

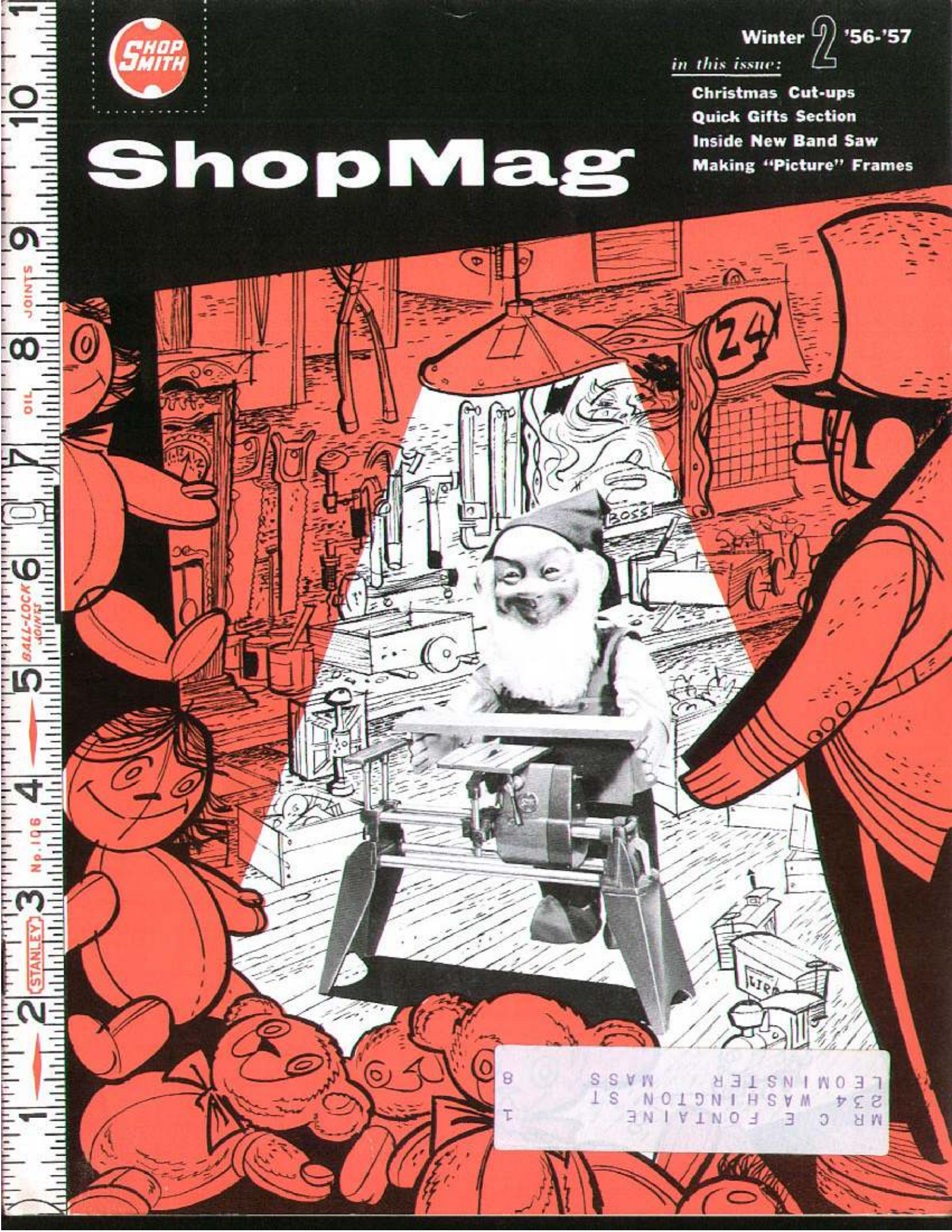


Winter 2 '56-'57

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Christmas Cut-ups  
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Making "Picture" Frames

# ShopMag



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# CHRISTMAS CUTOUTS

make your own ornaments  
for the tree and the mantelpiece  
by sawing wooden shapes  
into globes, stars and chains

Your own scrap box and your own imagination are the only limits in the creation of Christmas ornaments that are tasteful, unique, and personal.

Shown here are only a few of the basic shapes you can make on Shopsmith. This pre-sawed stock is then resawed to a standard thickness (at least one-eighth inch) with a corresponding standard slot for later mating and assembly.

The star is pre-sawed on the band saw, then sliced using the miter gauge, or cut off in a curve free-hand, producing curled stars.

The globes, made by mating two slotted circles at right angles, are resawed from round stock turned on the lathe and slotted on the table saw.

The "chain" components can also be produced on the table saw from a variety of basic shapes limited only by the necessity for mating slots.

Use common pins, bent with needle-nosed pliers, to hook chain units together, or provide hangers for stars and globes.

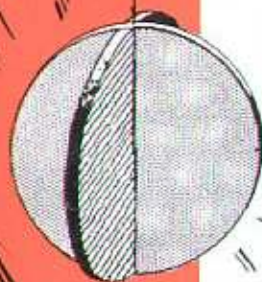
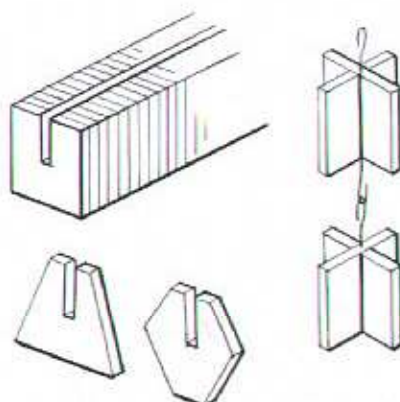
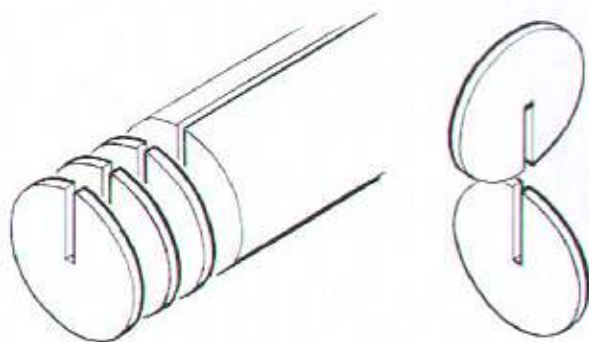
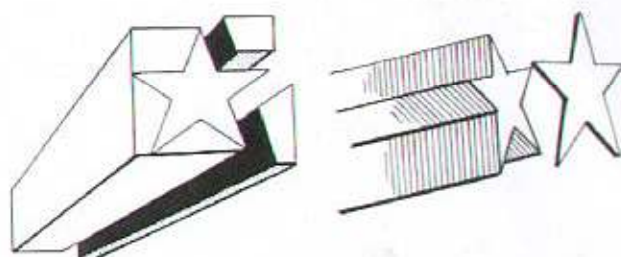
Finishing provides literally limitless possibilities in which the whole family can join. Unless you prefer a craftsman's tree with the raw wood showing, the first step is to dip the assembled decoration in clear resin sealer. Let the excess drain off into the container and hang up to dry.

After sealing, you can dip the units in glossy enamel. Two or three coats may be needed for a really smooth and shiny surface. Or you can hang the units so they can be rotated and spray them with lacquer or metallic finish.

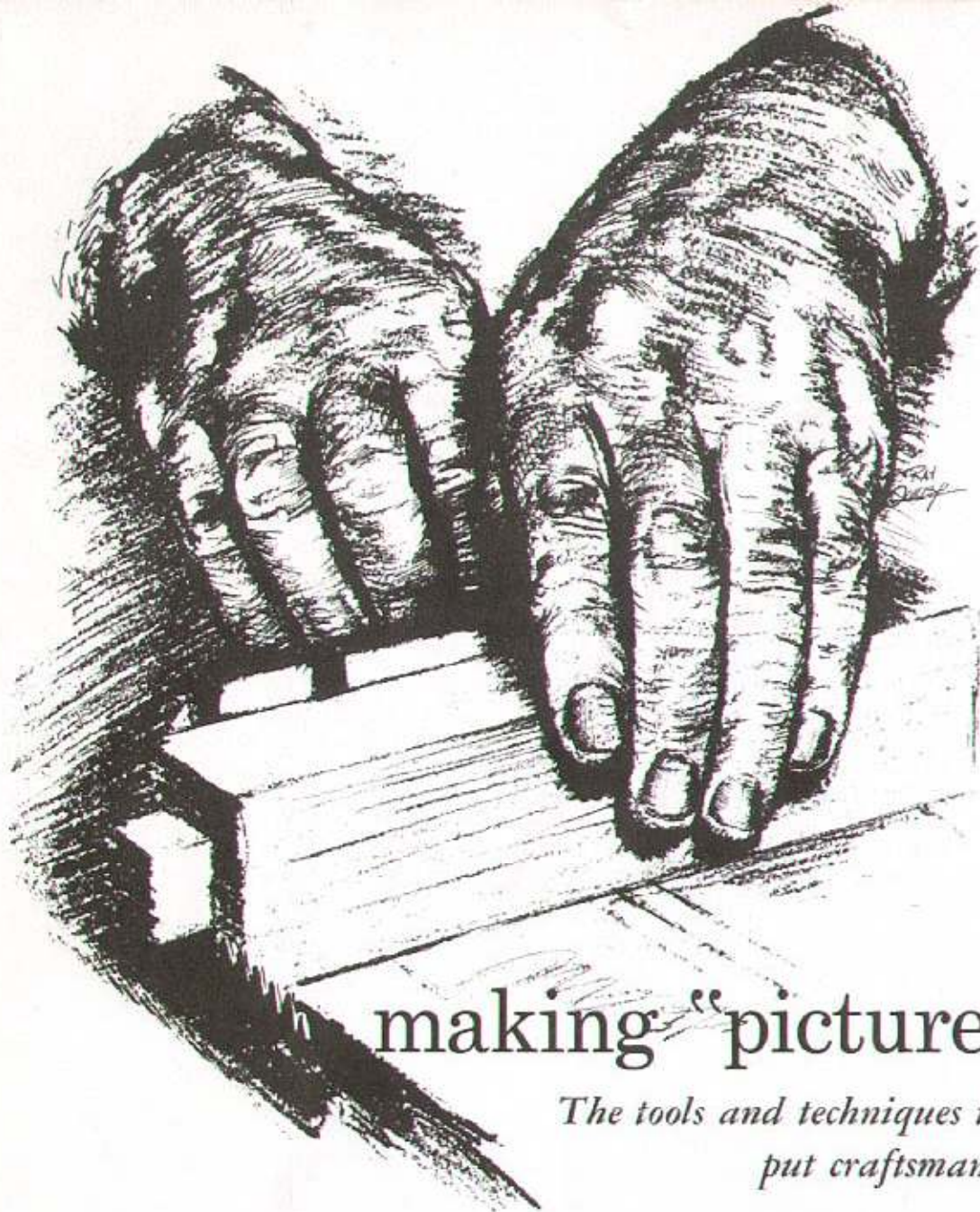
Colored sand, glitters (available in crafts stores) even cake sprinkles may be used to color and spark up the ornaments. Simply dip them in enamel for a ground coat and sprinkle by hand; catch the surplus on a paper and fling it on the tacky surface again.

You can use almost anything as surface coating, from coarse salt crystals to sawdust. On fresh enamel, the sawdust will soak up the color to provide a textured surface.

For an outdoor tree, use the simpler shapes as big as you can cut them. Dip them in melted fat from the kitchen scrap can, and just before it hardens dip them gently in a bag of wild bird seed. Enough will stick to give you feathered guests throughout the holidays.







## making "picture" frames

*The tools and techniques that  
put craftsmanship in your hands*

There's more to frames than holding up pictures. The very same frames you are used to seeing on the wall can be many things. A frame around a plank makes a tray; add legs and you've got a coffee table. Molding on plywood makes shutters or cupboard doors. Frames plus glass, panels or screening make windows, doors or screens. In fact, a frame is as often the basic structure as it is a decorative finish.

Even the simplest frame calls for craftsmanship of the highest order. Its parts must fit *precisely* to have the strength and looks that make it a frame. There's no such thing as a "pretty good" frame; either it's perfect, or it's nothing but assembled kindling wood.

The craftsmanship involved in precision sawing and hairline joining is not easily won

with hand tools. But your Shopsmith has built-in craftsmanship at your disposal. It lies in the precise relationships between spindle and table, between table, miter gauge and fence. In the adjustments for accuracy provided. And in the jigs, fixtures and devices available that make accuracy automatic. With Shopsmith, craftsmanship becomes a matter of procedure rather than apprenticeship.

If you have checked out your Shopsmith for accuracy, and you follow directions, there is no reason why you can't make a perfectly fitted frame on the first try.

Start with a flat, 45° mitered picture frame, the most popular type in the frame-maker's catalog. The miter gauge is set at 45° and you make your pass. Easy? Not as easy as it looks. No matter how carefully you oper-

*Craftsman's Hands, Drawing by Ray Quigley*



But maybe you don't want splines that show. In that case, use dowels to reinforce each joint and you'll see nothing except the line of the joint.

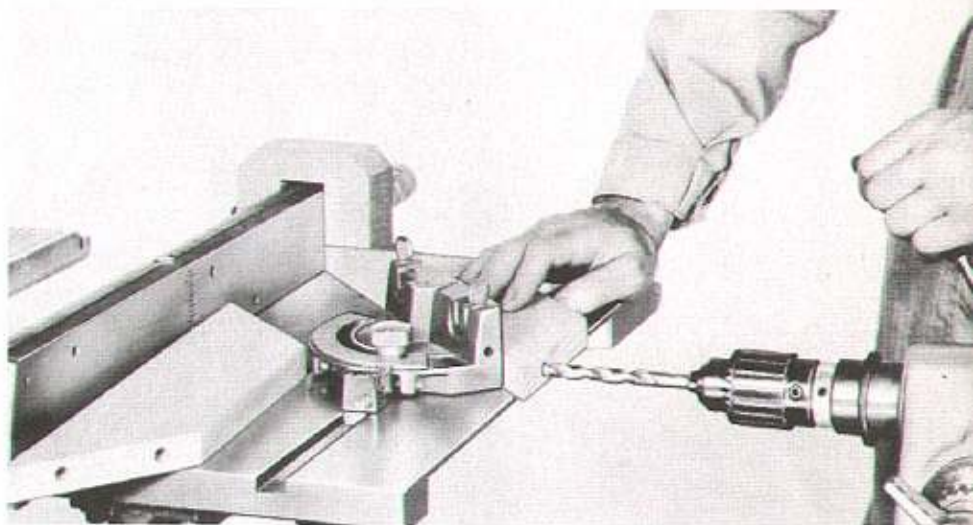
Drill holes for dowels with the horizontal drill. Shopsmith's built-in craftsmanship makes this precision operation a purely mechanical one. Use the miter gauge to position the work and a clamp to hold it firmly to the table. You can't go wrong in lining up opposing holes. Shopsmith's locking miter gauge is your ready-made jig for positioning any number of parts for exact drilling.

### MAKE RABBET CUTS FIRST

All picture frames require a rabbet cut at the inside edges to receive glass and back-up or canvas stretcher. Of course this cut is made before the frame is assembled, preferably before the stock is mitered. You can cut rabbets by making two passes with a standard saw blade. For faster cutting, use a dado or a molding head with a blank knife. Some craftsmen select a molding knife that will form the rabbet and shape the inside edge of the frame at the same time—like a cabinet doorlip cutter.

So much for flat frames. Maybe you have admired and wondered how to make the most attractive miter-joint frames with sides that are angled. The frame's sides slant away from the wall or mounting surface, producing a shadow-box effect. For such frames, a compound angle is required. This is a combination of a miter and a bevel cut.

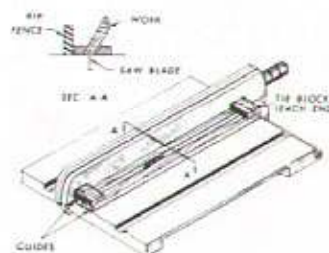
A miter cut requires a miter gauge setting. A bevel cut requires a table tilt. A com-



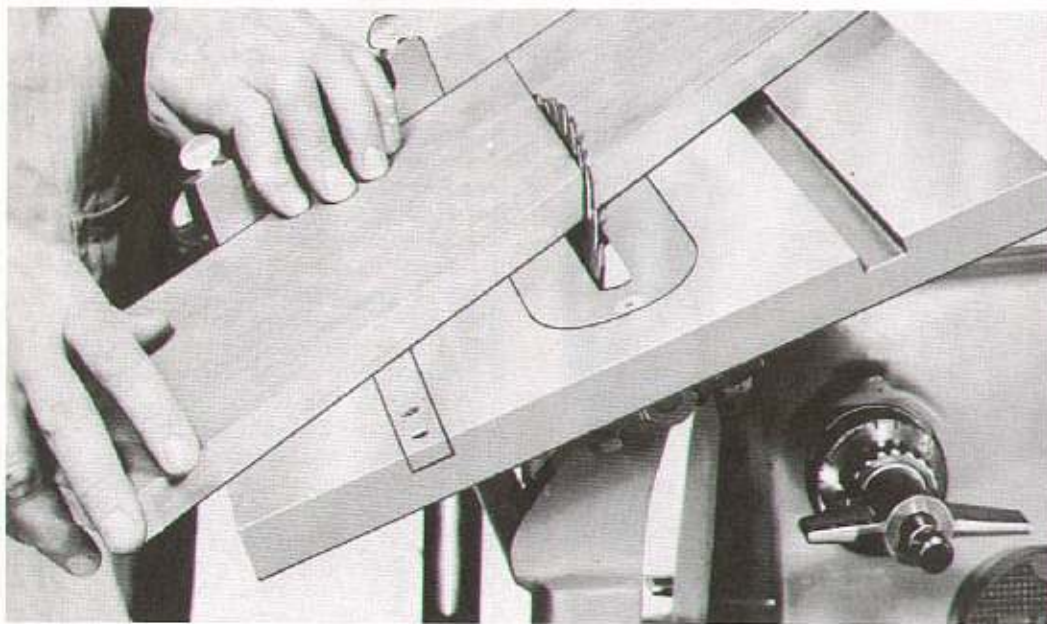
*If the frame is a small one you don't even have to clamp the stock to the table. Use the rip fence and a stop block as a fixture to hold the work as shown above*

ound angle cut requires both. The relationship of the two adjustments determines the angle at which the frame slants. Most popular is a 60° slant. Use a miter gauge setting of 49° and a table tilt of 21°.

By the time you've worked up to a compound-mitered shadow-box type of frame, complete with splined joints, you will find that if you can make a good frame, you can make about anything with your Shopsmith. Knowing your own capacity for craftsman-



*Below: making a compound-angle cut requires tilting the table and setting the miter gauge*





# ShopMag

TRADE MARK

A quarterly publication for today's home craftsman. Produced by Githens Editorial Associates, Westport, Conn. Perry Githens, Editorial Director.

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ate, or how accurately you set the machine, the saw blade always pulls the work, causing it to creep — usually just enough to spoil the perfect cut that craftsmanship demands.

To counteract creep, you can use the miter gauge extension, even face it with sandpaper. But nothing yet developed in several centuries of fine frame-making comes up to the new Magna miter gauge pistol grip for precision sawing available on Shopsmith. This mechanical hand holds the work tighter than a hundred expert fingers. Here is truly built-in craftsmanship which lets a sawdust duffer be as deft as an old-country backsaw artist. It is also the safest way yet invented to push wood through a saw. Blind men and brain surgeons can use it with one hand and complete confidence — and many do.

## PLANER BLADE BEST

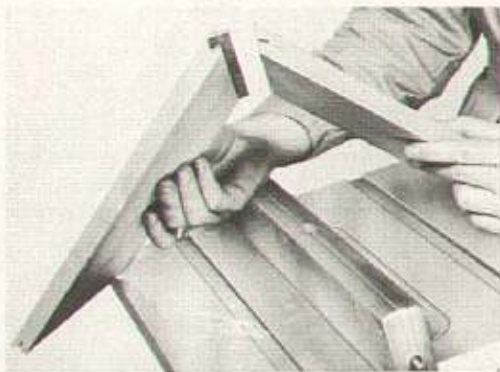
Not only must miters be perfect, but the sides of your frame must be matched perfectly if all four joints are to fit precisely. The craftsman's secret is to cut the four pieces to the length required and *then* miter each end of each piece. He *doesn't* cut the pieces consecutively from one length of board. Further, he uses the planer blade.

For some picture frames, and certainly for the kind of frame you run around a table to conceal its raw edge, you'll want to make a miter across the narrow edge of the stock. This cut is correctly called a cross bevel. Unlike miter cuts, which are made with a miter-gauge setting, cross bevels are made with the table tilted. For a square frame,



FOR BEVEL CUTTING, SET TABLE AT ANGLE REQUIRED AND MITER GAUGE AT 90°

*Below: miter gauge pistol grip holds work firmly for precision sawing without creep*



*How a spline strengthens a joint; remember the grain always runs across its width*

set the table for a bevel of 45°. The miter gauge is kept at 90°. In making this cut, craftsmen feed the work very slowly.

The simplest way to fasten a miter joint is with finishing nails. The nail heads are countersunk and the holes puttied over. Special holding fixtures are available to clamp mating pieces in correct position while the nails are hammered home.

Nails are all right for narrow frames, but those wider than an inch require reinforcement. One of the best techniques is to use splines. These are thin tabs of wood fitted into grooves cut in the mating edges of the pieces to be joined. Cut the grooves for splining a flat frame miter by clamping a slotted "spring stick" to the table to hold the segments snugly against the fence as you make your pass. You can accurately cut spline grooves in bevels with a jig made of two guides cut at the same angle as the beveled edge (see sketch far right).

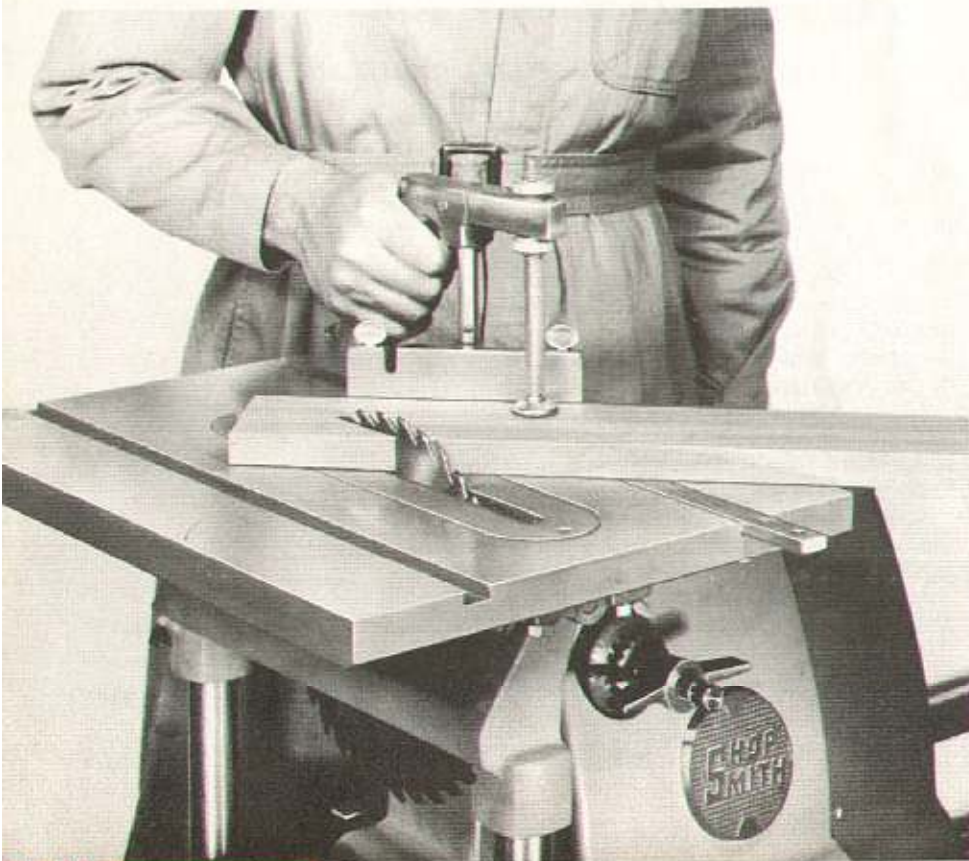
## DRUM SANDING SPLINES

The important thing to remember in cutting splines is the grain of the spline must never be parallel to the line of the joint. The secret of getting perfectly fitting splines is to sand them to exact thickness. So set up your Shopsmith in horizontal position with drum sander mounted on spindle. Lock the table at the point that provides the right distance between drum and table surface. Feed work through from behind against the direction of rotation of the drum.

To remove "a little bit more" stock, the craftsman doesn't change the table setting. He merely puts a sheet of paper between the work and the table.

Some framemakers like splines, even accent them by making them of contrasting wood.

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







## ShopMag How-to...

*This is the department where ShopMag was born, here are the tested tricks and know-how hints, the new ways that make shopwork easier and more fun.*

### Shelf for Saw Table

The Shopsmith saw table, as a precision instrument itself, deserves its own private parking space where it is protected from jolts when not in use. In ShopMag's own workshop, we store the saw table on the wall. This has the added advantage of making Shopsmith instantly available for any multi-purpose use.

The open box-shelf shown here is easily constructed of any scrap stock. It is 4" wide, 19" long, 6" high overall. Mark the (1½") holes for the table-riser tubes by laying the

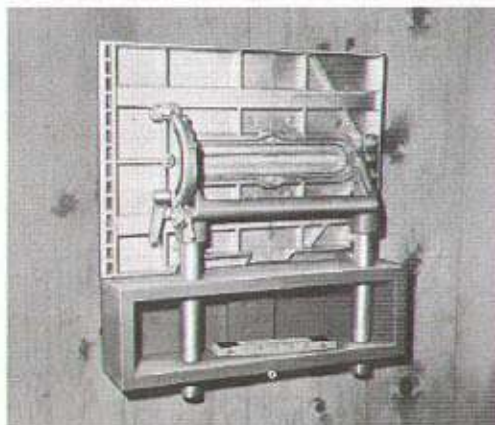


table flat on the bench and lining up the shelf piece with the table. Center a mounting block between the twin shelves and nail in place.

Tilt the saw table to the drill-press position before you remove it from Shopsmith. Then simply slide it along the wall, line up an edge with the shelf, and tubes will slip into holes without fumbling.

### Sander Sharpens Shovels

The disc sander makes a good grinding wheel for coarse work on garden tools. You can use it free-hand to sharpen the edge of a spade or a hoe. Just be careful to hold the tool firmly, and press lightly against the "down" side of the disc.



*When using the sprayer, the easy way to keep the hose out of harm's way is to clamp it under the "pony tail" which locks the ways in the horizontal position.*

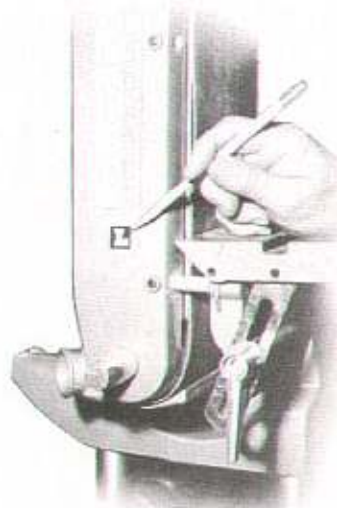
### Speed Letters

Dear ShopMag:

In using the various accessories on Shopsmith, I find it hard to remember the maximum speeds for each. So I cut letters from an old calendar, corresponding to those on the Speed-Dial, and cemented them on the tools where they couldn't be missed.

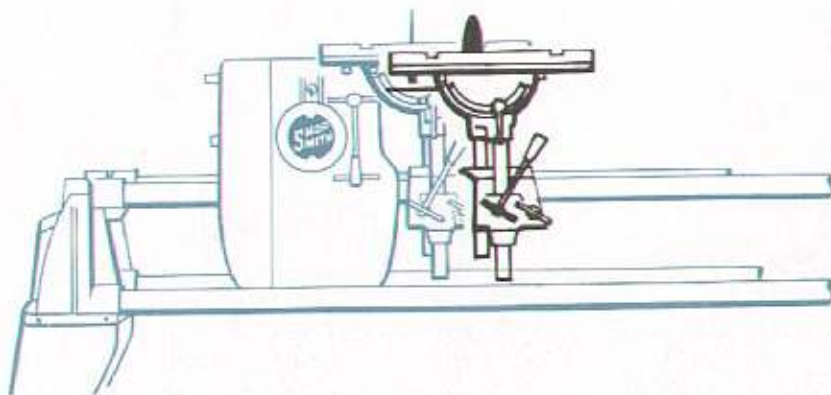
David X. Manners,  
Norwalk, Conn.

*Professional craftsman-writer Manners has a good idea ShopMag is happy to pass along. Maximum speeds are: belt sander, L; band saw, D; jigsaw, J; compressor, C. Consult manuals for special circumstances.*



### Increased Cut Depth

When, on some rare occasion, you wish you had a greater depth of cut than seems possible on Shopsmith, it can be done. By extending the quill, on which the saw is mounted, as far as possible you can then drop the saw table a half-inch lower, in effect giving the 9" blade the capacity of a 10" saw.





ship, you can begin to experiment. Maybe, for your first frames, you went out and bought molding; now you can custom-make your own to your personal specifications. With the molding head locked to the spindle, and with an assortment of knives at your disposal, you can turn out literally thousands of standard moldings and shapes of your own.

Add a wood facing to your rip fence (see sketch) and you can use it for molding-head operations. With-the-grain cuts (the kind you'll have to make in producing moldings) are made with the work riding against the fence. The secret of successful molding cuts is not to cut too deep or too fast. Make deep cuts in stages, lowering the table after each pass, until the full depth is reached.

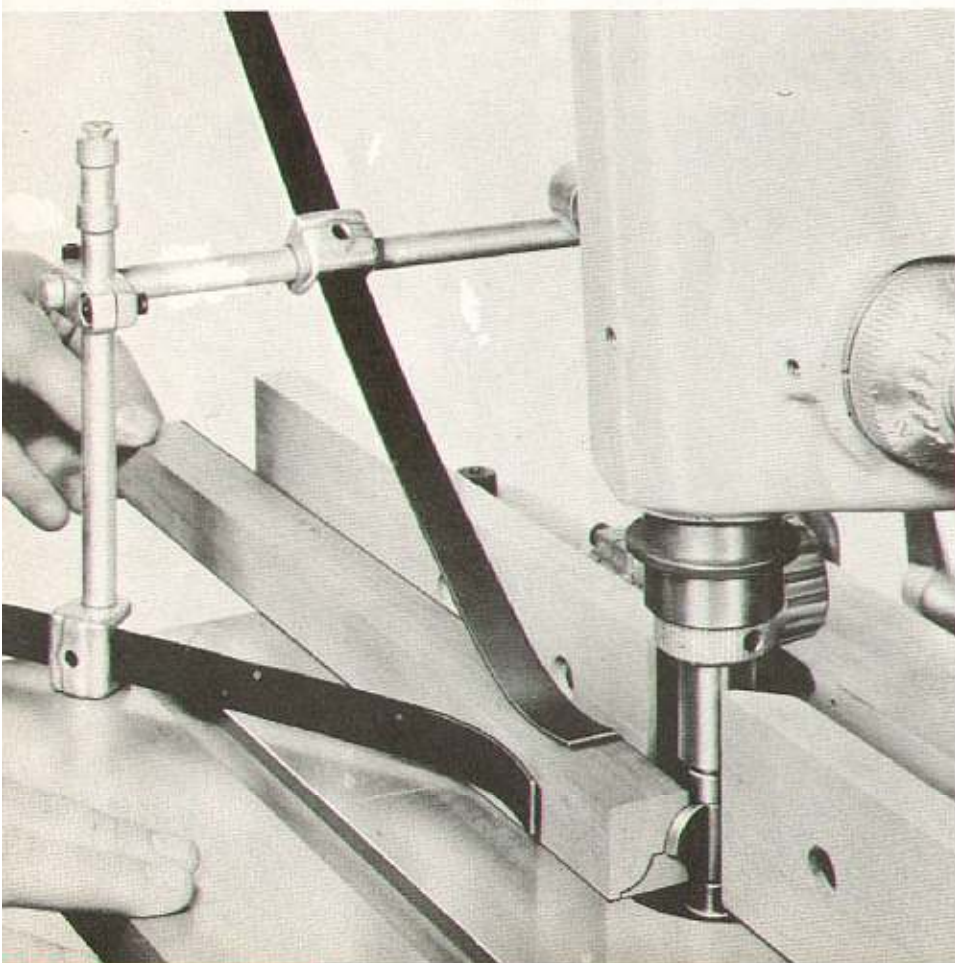
Often, of course, a knife will be used for a partial rather than a full profile cut. It may mold just one part of the edge, several passes

with different blades being required to complete the desired cut. The molding head may be used, too, for making decorative cuts on the surface of flat stock. A little experimentation will show the possibilities are unlimited.

The addition of a shaper head and fence turns your Shopsmith drill press into a real molding mill. One three-lip shaper cutter can produce a dozen or more shapes, depending on its position, height, depth of cut.

From the simplest flat picture frame to the finest cabinet door, your Shopsmith can be an expert fellow craftsman at your side. One commercial framer not only uses Shopsmith to rip, mold and miter old wood into new frames — he also uses the quill to squeeze in the brads that hold the back-up cardboard. Quicker and slicker than a hammer, he says: just give the table a slight tilt to the left and use the fence to take the thrust. **END**

## KNOW YOUR ACCESSORIES: The Shaper



On a picture frame, a coffee table, or a drawer front, the difference between an adequate job and a professional look is often the treatment of the edges.

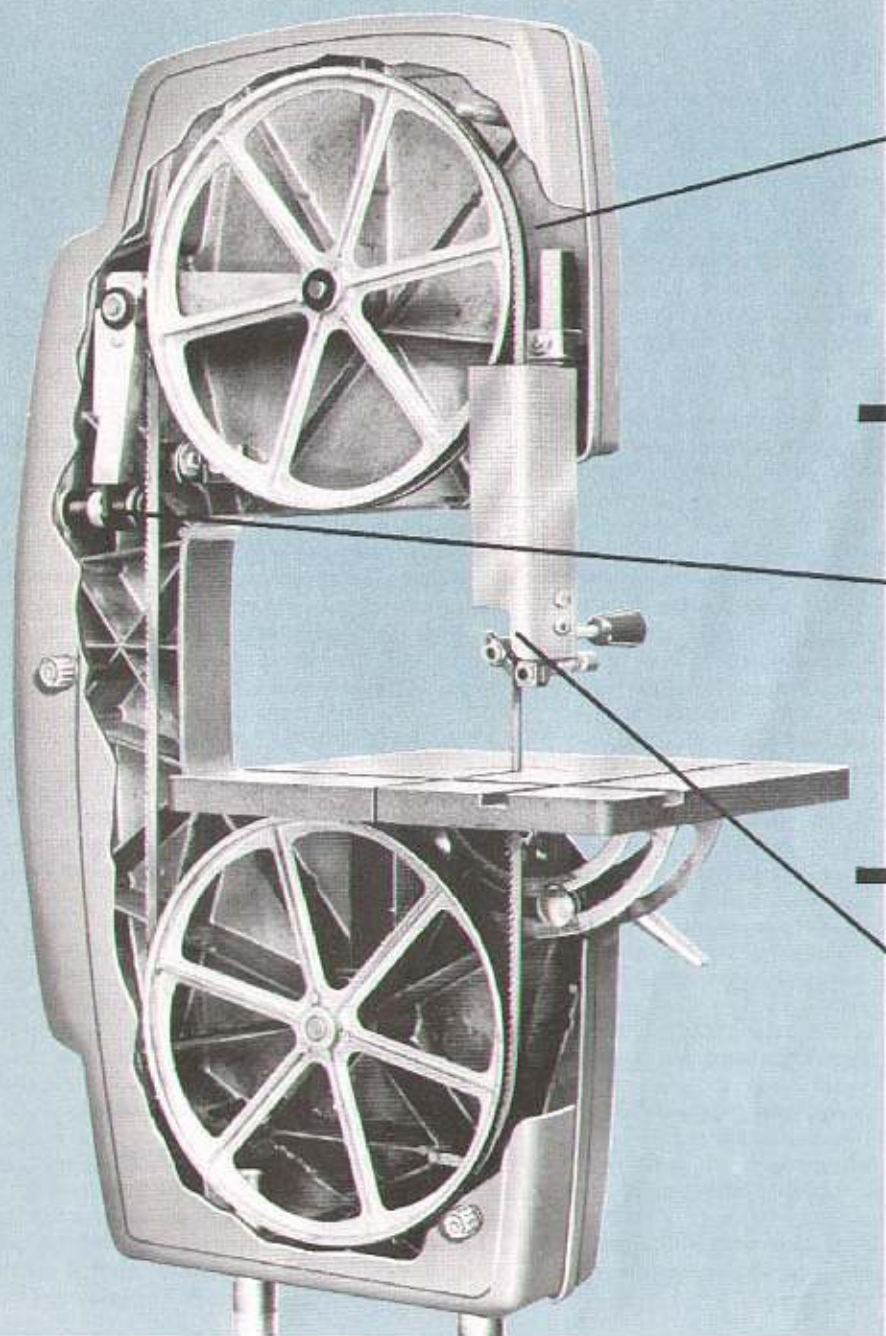
The shaper is the tool of tools when it comes to giving your work the truly professional touch. It consists essentially of a three-lip cutter or knife, held on an adapter like an arbor, which mounts directly on the Shopsmith spindle. It also has its own table insert and fence.

In the close-up at the left, the shaper is being used to make the first of two passes to produce bead-and-cove molding. The Universal Hold Down keeps the work tight against the fence and makes the job safe.

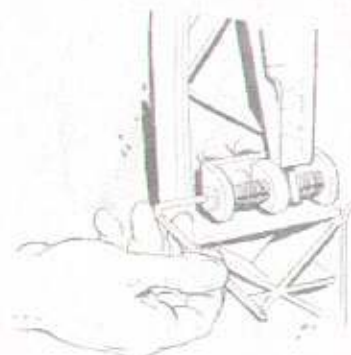
Shaper cutters are available to produce a wide variety of moldings and such edge treatments as cabinet-door lip or drop-leaf table edge. You can also do rabbeting, jointing, panel raising, or tongue-and-groove work with the shaper.

Of all the edging tools and procedures, the shaper offers the broadest opportunities for individual craftsmanship. Even a single pattern of shaper knife can create many profiles, depending on the height in relation to the work, and the portion of the cutter being used. The Magna shaper on your Shopsmith is also a great time saver and allows you to undertake the more advanced woodworking projects.

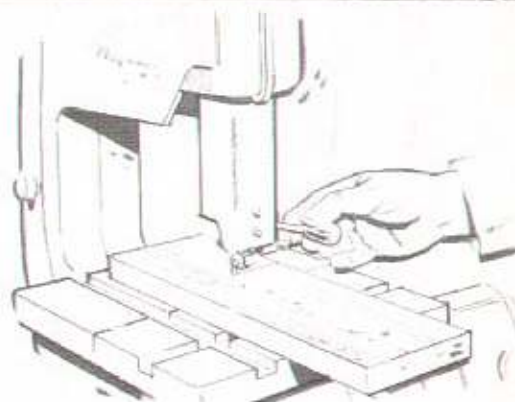




*automatic tracking*



*pre-set tension*



*one hand guard*

## INSIDE THE NEW BAND SAW

Anyone who has ever pushed wood through a smooth-running band saw knows the wonderful pleasure and utility of this versatile power tool.

When the band saw is "running right" you can carve a cylinder from a six-by-six block, slice off circles like bread, then stack up the slices and pad-saw them to a pattern all at once. And only with the band saw can you cut the loaf of wood the long way to resaw thin boards out of thick ones.

Since its sawmill beginnings, the band saw

has always been a favorite of woodworkers. But ever since one Wm. Newberry forged together the ends of a long blade, bent it around a couple of wagon wheels and got a British patent in 1808, the problem has always been to get a band saw running right.

Tuning up the old-fashioned band saw calls for a series of adjustments to *track* and *tension* the blade, with each adjustment affecting the other settings.

Tension has to be just right: too much may bind the drive wheel; too little causes blade

*new engineering  
makes it safe  
and easy to use*



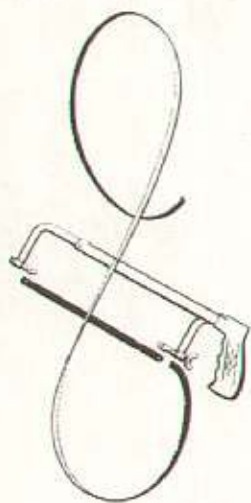


## How-to...



### Bevel Rip Trick

This is a way to bevel rip planks and plywood that are too wide to use the fence on the saw table. First, set saw table to correct tilt and blade projection. Place fence on lowered extension table. Position work by moving headstock and table to right, raising extension table until guiding edge of workpiece rides both fence and table. Use quill for hairline accuracy and test settings with practice cut.



### Free Blades

A broken band saw blade need not be a total loss. Magna blades are hardened only along the toothed edge; this means you can cut them into short lengths, and drill them for use in a hacksaw frame. A woodworking hacksaw is a handy thing to have around.

### Tool Duster

For the complete shop clean-up, there's nothing like the air compressor with the dusting nozzle, especially to clean out the jointer and the band saw. The next best, says one Shopsmith

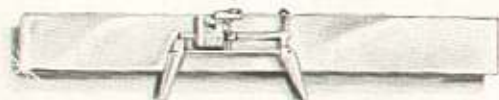
expert, is not the usual brush many people use, but the plain old feather duster now seldom used for house cleaning. Really gets the chips and sawdust off without knocking anything out of adjustment.

### Shapes Unlimited

Many craftsmen know the molding head as a talented tool. Using even a few of the many shapes of knives available, you can create hundreds of standard shapes and variations. However, few craftsmen know that this great variety can be expanded even more simply by tilting the saw table slightly.

### Anti-Rust Paper

Save that "VPI" paper used to wrap steel parts in shipment. Sometimes called "vapor paper," it is impregnated with a rust inhibitor. ShopMag recommends it highly for covering the steel tables of the band saw, jointer, and jig saw. Just cut to fit, slit for saw blade. Our band saw table is as shiny as the day it came out of the carton.



## The 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."

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Editors, ShopMag  
1 Homewood Place  
Menlo Park, Calif.



human thing is to make this adjustment without stopping the saw, exposing both hands in the danger zone.

On the Magna band saw, one hand on the control knob well out of the hazard zone raises, lowers and locks the guides. You can change the position of the upper guides with complete safety while the blade is running.

Most band saws have a miter gauge slot in the table for use in crosscutting. The new Magna band saw has a *second* such slot at right angles. This lets you lock the miter gauge with its face parallel to the blade for ripping and resawing, and to support fences of various heights and lengths. There's no need for the lash-up temporary fences that had to be clamped on the table.

Magna engineers added other practical touches. Borrowing from industrial band saws, they bevelled one end of the blade guide blocks. Reversed in the guides, the angled blocks twist the blade as it runs in the cutting area. This allows long stock up to 4" wide to be crosscut without throat limitation.

The engineers seemed to think of everything: there's even a little nib on the round table insert to keep it from walking into the blade under vibration.

### WHAT, NO KNOBS?

When the new Magna band saw was previewed in ShopMag's own workshop by several well-known craftsman-writers, they were puzzled at first by the sleek, clean exterior. Where, they wondered, were all the old, familiar knobs? The only knobs are those that keep the cover tight.

They could hardly believe their eyes when blades were changed with safety-razor ease, tensioned with the twist of an Allen wrench, and tracked with the flip of a finger.

The experts were quick converts. Here at last, they agreed, was a band saw *engineered for use* by home craftsmen of every degree of experience. The raw beginner can handle

this new kind of band saw safely and effectively. The old hand can have his choice of blades — and not have to use skill as a substitute for proper size.

Freed from the complexities of its old adjustments, the modern band saw has new opportunities for smooth and speedy work. And the jobs it can handle are as varied as the curves it can cut.

### BLADES CAN FIT JOB

With a one-eighth inch blade, you can cut some pretty small capers in wood, plastics, or metals. With the big blade, a full half-inch in width, you have a junior sawmill with triple the depth of cut of a jigsaw. It can make a plank out of a 6" log, or cut it into stove wood like a hot knife in butter. Workshop scraps seem to melt into kindling wood ready for stacking.

But easily the most satisfying of all band saw operations to watch is to see a cabriole leg come out of a square timber.

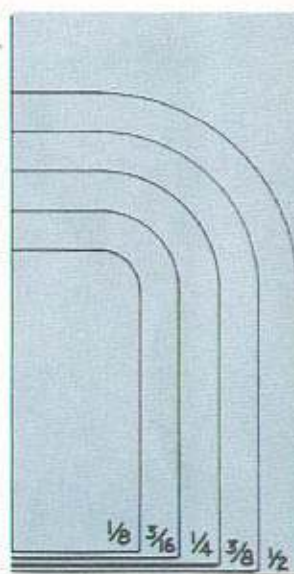
You've seen the cabriole often in Queen Anne and Chippendale furniture. The leg sweeps out and down, then goes into a reverse curve tapering to the foot.

In the pictures below, ShopMag shows the steps in the process of cutting compound curves which turns a block of wood into a thing of beauty — and turns even a weekend woodworker into a proud craftsman.

To demonstrate the ease of using the new Magna band saw, the cabriole leg for a stool shown in the photos was actually cut by a plain home handyman who had never used a band saw before.

Of course, he had an expert behind him, and a Magna band saw in front of him.

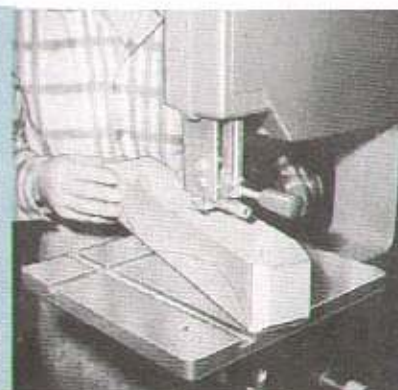
Anyhow, the next time you see a cabriole leg on a stool, a table, or a chest you can look right through the varnish and say to yourself, "I know how to make one of those things." And you can do it yourself, too, given the know-how and the right tool.



*A set of aluminum templates is handy to determine the minimum turning radius for each width of blade. Patterns above are actual size for each blade size.*



*Now make the second cut with the first face against the table. Again, replace the pieces you have cut out.*



*The workpiece now looks like a 3-dimensional puzzle. Make the final cuts, being sure to saw along every pencil line.*



*And there you are: the cabriole leg emerges from the block, ready for final smoothing and sanding and finishing.*



*Here is the finished product, all legs made from the same cardboard pattern shown in the first picture of this series.*





Circular cuts with the table tilted produce cone-shaped blocks, reducing lathe work.



Duplicate pieces can be produced by pre-shaping a large piece and then resawing, like these stars.

wobble and uneven cuts. So you must twiddle a couple of knobs to raise, lower and lock the upper wheel. Then comes tracking: keeping the blade running at the high center of the crowned wheels.

This adds another mechanism (and more knobs) to steer the blade by tilting this same upper wheel. All this metal hung on the upper arm of the band saw, plus the stress of tensioning, demands such extra strength and weight that even a home workshop model can run 150 lbs.

Changing blades on the old-fashioned band saw has been such a chore (and hazard) that one power tool how-to book bluntly advises: "use the widest blade the curves of your work will accept . . . as it is not practical to change blades for each job."

Yet the full usefulness of the band saw depends on the proper blade for the job. It takes a narrow blade to cut tight curves, a wide one to handle thick stock — especially in resawing. There are blades designed especially for woodworking, and all-purpose blades which will also handle non-ferrous metals.

When Magna set out to design a band saw good enough for Shopsmith, it became quite a project. Ultimately, it called for more fresh engineering thinking, perhaps, than had been applied to the band saw in all the years since 1808 plus some completely new principles of design, construction and operation.

The Magna 11" band saw is brand new, inside and out:

- ... light weight (40 lbs.) easy to lift from shelf to Shopsmith.
- ... completely enclosed front and back.
- ... automatic blade tracking.
- ... preset blade tensioning.
- ... one-hand control of blade guides and guard above workpiece.
- ... cross-slots in table to permit use of miter gauge as fence for resawing as well as crosscutting.

- ... blade guides adjustable for "offset" crosscutting without limitation of throat.
- ... quick change of blades.

Such radical improvements in the construction and operation of the band saw did not come easy.

Reducing overall weight involved more than a shift from the brute strength of cast iron to pressure-cast aluminum for the frame, and high-impact polystyrene for the cover. For the Magna engineering staff, it meant also a completely fresh approach to Newberry's old problem of controlling a saw blade on wheels.

In the new Magna system, the upper wheel bearing is moved from the center of the upper frame to the strong vertical column. The wheel itself is mounted on an arm, pivoted on the column and spring-loaded. In a neat simplification, the flat steel spring itself becomes the indicator for the tension gauge you set for width of blade you want.

## FACTORY-SET WHEEL TILT

Old-style wheels were crowned because the flying ribbon of steel tends to climb uphill. In the Magna band saw system, the rubber tired wheels have a flat face. Both wheels are canted slightly in a permanent, factory-set adjustment.

You simply set the tension dial according to the width of the blade, and it climbs into position automatically. There is no need to track a blade under power, with the cover off, one of the hazards of the old system.

The Magna system eliminates the weight and nuisance of the whole tracking-tilting mechanism.

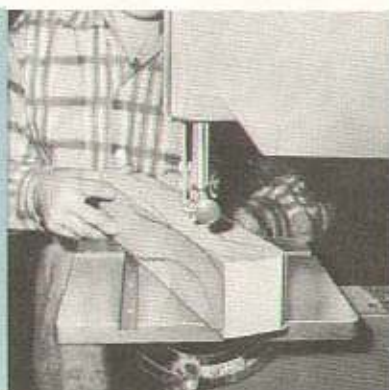
In any band saw, the upper blade guides must be movable up and down to accommodate work varying from a fraction of an inch to several inches in thickness. The blade guard rides up and down with these guides. It takes two hands to adjust and lock the guides. The



Cut the pattern with a long tenon piece. Mark the stock to identify the inside corner to avoid confusion later.



Mount band saw on Shopsmith using Power-Mount and flexible coupling, or on stand as single-purpose tool.



Make the first cut carefully, feeding the work slowly and smoothly. Keep blade guides about half-inch above work.



Save the waste stock: it must be replaced on the cut to provide bearing surface. Two-faced Scotch tape works well.





## POPULAR MECHANICS

Look for the dual-purpose child's chair in the forthcoming JANUARY '57 issue. Used as a chair, the back locks firmly in place. It converts to a desk, with a drawer under the seat, in one easy motion.

In the same issue, there's an article on making *staved* ornamental boxes. The unusual "coopering" techniques shown have applications in other projects.

## FAWCETT BOOKS

*Children's Furniture You Can Build* is a new Fawcett Book (No. 322) now on the stands. Bill Baker uses Shopsmith in the construction of many of his well-known step-by-step projects. Seventeen different big and little projects are detailed with some interesting layouts and procedures.



## MECHANIX ILLUSTRATED

If you work with plywood, and who doesn't, you cannot afford to be without a copy of *Mechanix Illustrated*, DECEMBER '56. It has a 10-page Special Service Section titled "All About Plywood" that is a reference book in itself. Covered, in text, illustrations and tables, are types and grades of plywood; how to tell the various qualities of veneers; how to specify exterior and interior grades; kinds of glue and how to use them; techniques for working with plywood; the newest surface textures available; what screws and nails to use; construction and erection techniques.

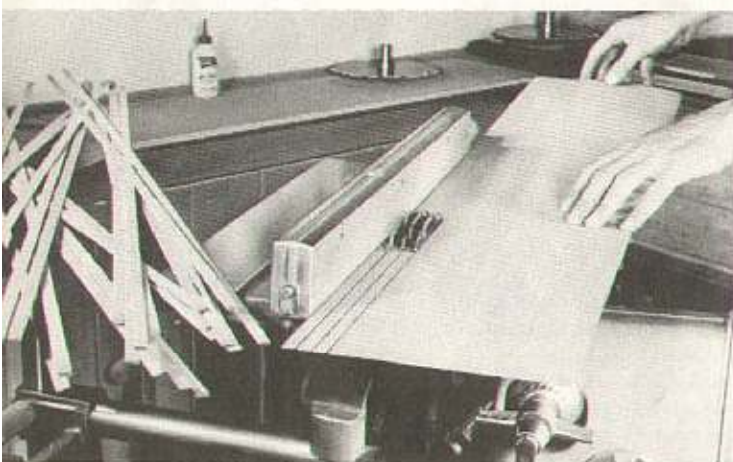
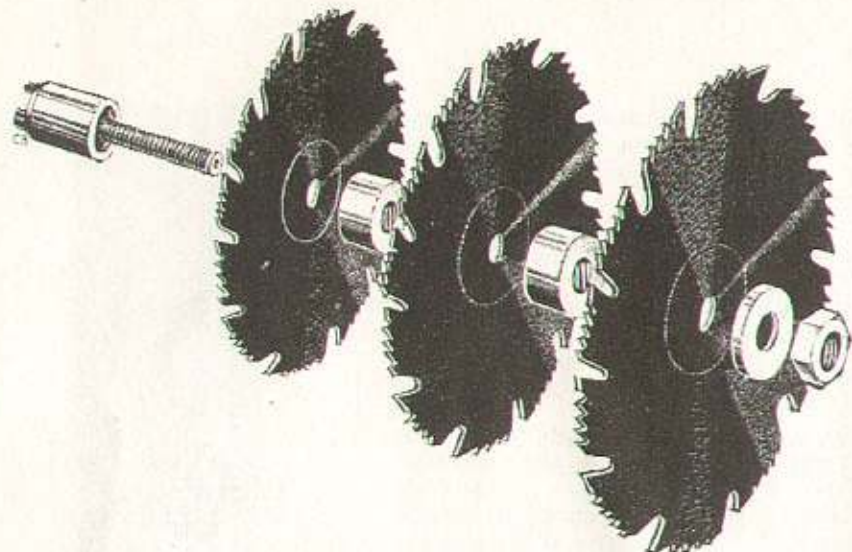
There's a special table on *finishing* arranged according to type and effect desired, materials needed, and tested procedures.

This Special Service Section is something you will want to keep and use. In ShopMag's own workshop it is kept on file cards.

SHOPMAG acknowledges with appreciation the cooperation of the editors of magazines and books who have supplied advance proofs for previews.







# ShopMag NEWSSTAND

*Reviews and previews of magazine  
articles and books of significance  
to the homeowner craftsman*

## POPULAR SCIENCE

"Three Blades Are Better Than One," says Popular Science — and they show how on Shopsmith in a four-page article in the December issue.

"Two or more circular-saw blades, turning on a single shaft, speed production on thousands of industrial duplicating jobs. Yet few home craftsmen have ever tried this time-saving, multiple-cutting set-up."

This article is made to order for Shopsmith owners because the nine illustrations show the set-ups on Shopsmith.

These set-ups are not limited to the mass production of strips. Blades of varying diameters cut drawer parts and grooves for rabbets simultaneously. Spiral glue grooves, tenons and decorative kerfing are possible. *Popular Science*, DECEMBER issue.

## HOME CRAFTSMAN

The sectional sofa gets the feature treatment in the Silver Anniversary issue. The units shown have simple, functional lines that fit both modern and traditional decorating schemes. Construction has been simplified; plans and procedures are clear. *Home Craftsman*, DECEMBER issue.

## NEWSSTAND MISCELLANY

If you ever plan to do anything about those built-ins be sure to latch onto a copy of *Better Homes & Gardens* for November '56. It covers just about all applications in a special 16-page section with dozens of idea-provoking illustrations.

A triple-duty, space-saver table becomes a dining table when it's open. Closed, it's a china and glassware cabinet and a wall planter. *Family Handyman*, 15th Edition, out now.

Adjustable bookshelves on metal brackets may solve a special problem. For pictures, check your public library for *House & Garden*, May '56.



*Whatever you make or build, the pencil is your first tool. This is the department that helps you learn to use it. This lesson: "How To Draw A Curve."*

Anybody can draw a curve with his eyes shut — if it doesn't have to fit anything. But if your curve has to be that "sweetest distance between two points" like the leg of a chair or the base of a lamp, the kind of curve you seek — its length, width and wiggles — cannot be a happy accident. You have to work for it.

Whether you want to work your own curves into wood, or pick a pattern off the printed page, you will sooner or later run into the tedious but vital business of "proportional squares." This is simply a grid system which helps you to visualize from little pictures to big plans, or vice versa.

If you're good (and you won't know until you try) you can swing in a full-scale curve free-hand once you see it against a grid. Or you may have to use the dot-and-plot system by marking off intersection points and then connecting them with a drawn line.

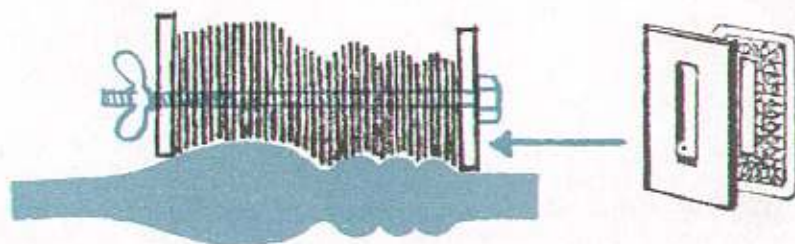
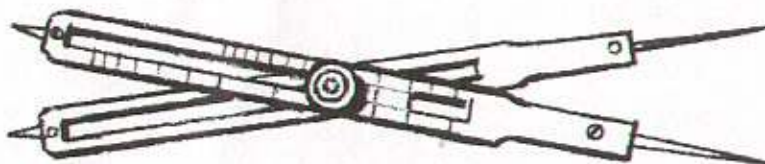
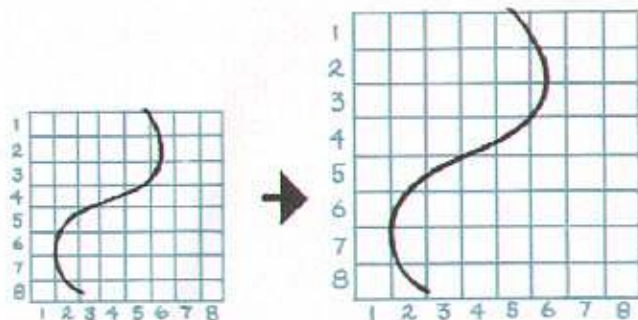
You will need accurate dividers, and while you are about it you might as well spend a few bucks more for proportional dividers. This wonderful device works like any dividers for picking off a dimension without measuring, but in addition a scale on the shafts allows you to set a proportion so that what you pick off a scale drawing with one end of the dividers is mechanically translated to full scale at the other end.

Remember that you don't have to be an artist to get what you want. Use wire solder, which holds its shape however you bend it, to find just the right shape for that lamp base even before you try to draw it with a pencil. The eye and the hand are older tools of expression than the pencil.

Wire solder is also a fine way to take off an existing curve, like a molding against which you wish to fit a built-in.

A template is also a good way to take off a curve — say you want to replace a broken chair rung with a new turning. But an easier way is with an adjustable template you can make yourself. Simply gather up all the 51-card decks of playing cards around the house. Slot them on the drill press with a router bit and a pattern; or make multiple drill holes and smooth with a file while the cards are clamped tight. Add plywood pads at each end of your king-size deck, and a long bolt with a wing nut. To use, loosen the nut enough to let the cards slip into the profile of the curve you want to reproduce, then tighten and lift off.

By such mechanical aids, you can acquire an educated pencil and start sketching. In getting ideas from the mind to the wood, it is not the ability to draw that counts, but the ability to think by sketching.







## ShopTalk of people and projects

*ShopTalk, the world-wide work bench for ShopMag readers, is the place to point with pride, exchange information, and learn about new ideas and developments. ShopMag will award The "SILVER SHOPSMITH" and \$10 for published letters. Watch this department for timely hints and behind-the-scenes news from Magna.*

### Old Timers in Mind

Dear ShopMag:

Have had a IOER for five years, and many hours of pleasure, also profit, from this machine. Its ruggedness keeps me amazed. When my basement was flooded, my Shopsmith was completely submerged. I disassembled, cleaned, regreased all parts . . . and was greatly impressed with the workmanship of the hidden parts. In your new magazine kindly keep us old-timers, the owners of the IOER, in mind.

Bernard A. Ristig  
La Grange, Ill.

*ShopMag, and Magna, will always keep IOER users in mind. Every new accessory will work on every Shopsmith, as will practically every technique described in ShopMag. In illustrations, naturally, ShopMag uses the latest models with which its own workshop is equipped.*

### Cleveland Club Makes Toys

For the fifth consecutive year, the Shopsmith Club of Cleveland, Ohio, this fall began its annual mass-production of toys for underprivileged children. The club was founded in 1951 under the auspices of Gary Gray, of Gary Gray Machinery & Tool Co., to provide woodworking instruction and fellowship among owners of Shopsmith. It has more than 400 members, of whom about 100 are active in the Christmas program.

Present officers are: Russ Bauer, president; Lawrence Beckworth, vice president; Paul Hillson, treasurer; Dick Goodrue, secretary. Founders include Carl and Bill Winkle, Walter Van Uum, Gary Gray, and John Van Uum—an expert although totally blind.

*Gary Gray looks over some of the toys made by the Cleveland Shopsmith Club.*



Local merchants and industries cooperate: lumber yards donate stock, Glidden contributes paint, the Cleveland Press lends its newspaper trucks for distribution of the toys and carries frequent news stories of the club.

This year, as usual, each member received plans and instructions for the toys he will build. There are no "Shopsmith widows" because many wives help in the sanding and painting. As an example of the club's output, Gary Gray alone turned out 15 tables and 20 child's benches last year.

New projects this year include wheelbarrows, doll cribs, hobby horses—and an endless variety of pull toys, many made of scrap wood saved for the purpose. The total nobody bothers to count, but it's quite a bag even for Santa to lift.

### Any \$ Projects?

ShopMag is gathering material for an article about people who use Shopsmith to make money, as well as have fun. Whether you make salad bowls or antique reproductions, we'd like to hear from you.

Tell us, particularly, what projects you have found most profitable in terms of time and material costs; what sales outlets you have found best; what cost markup you use in pricing. ShopMag will pay a minimum of \$10 for usable material, and award the Silver Shopsmith to contributors.

### Calling Model Railroaders

Dear ShopMag:

How about an article on the Shopsmith in model railroading? Some think you have to have small power tools for this work, but I can chuck brass rod in the lathe, turn stacks and domes that are really small, and still have Shopsmith for the big woodwork in track layouts.

Cal Sacks  
Weston, Conn.

*Send along your ideas and pictures, model railroaders, and we'll see what can be done. Enclose stamped envelope for return, please.*

### Why No Holes . . .

Many readers have asked why we do not punch holes for binding ShopMag. The reason is simple: some like holes; some don't. Besides, there are modern ringless binders available. But if you want to punch your own copies you have a dandy machine for the purpose: the Shopsmith drill press.





### Bobbing Duck Clothes Rack

Here's a new way to make children want to hang up their clothes. When a youngster remembers to hang up his coat, pants or six-gun holster, a duck rewards him by bobbing up from the waves with a gold star in his bill. When the coat is removed, the duck dives down, ready to reward again. The clothes rack can be long or short with as many ducks and pegs as you desire. Constructed of plywood as shown on the tear-out plans, the entire rack can be made on SHOPSMTIH using the saw, vertical drill and jigsaw (or band-saw). Duck and waves are scaled on tear-out plans for easy transfer to wood.



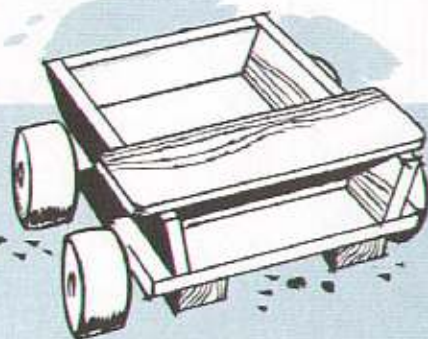
### A Versatile Indoor Playhouse

Come Christmas morning . . . surprise the "junior mother" in your family with this playhouse for use indoors during wintertime or outdoors in the summer. Simple to build, the indoor version has only two sides and can be used in the corner of any room. The table and bench detach and the two sides hinge compactly together for storage. Using exterior plywood for construction, you can bolt on two more sides, a two-piece roof of asphalted composition board and have an outdoor playhouse when the weather permits. Complete instructions are on tear-out plans and call for SHOPSMTIH to be used for all sawing, sanding and drilling operations. Scalloped edges can be cut on jigsaw or bandsaw.



### Cigarette Box

A short time spent with your SHOPSMTIH in the lathe position will turn out this interesting gift for almost anyone on your Christmas list (you'll probably want to keep one for yourself, too). The uniqueness of a perfect grain-match in lid and box adds beauty and appeal to the box. A special, but simple, lathe technique is used to cut the body and cover from the same workpiece. The box body is used as a chuck to turn the cover, insuring a tight fit to keep cigarettes fresh. Tear-out plans call for any good lathe wood such as walnut, maple, birch, Honduras mahogany.



### Toy Wagon

Pull toys are always a hit with the younger set and this cute toy wagon can be built in a minimum of time from scrap lumber or wood salvaged from fruit boxes or crates. Complete instructions are shown on tear-out plans and unique use of SHOPSMTIH as sander for pivot sanding of wheels makes this job easy and fun.





# gifts you can make for the whole family



Each year Christmas brings a surge of gift-searching shoppers elbow to elbow looking for the perfect gift for every member of the family. Part of the fun of Christmas is trying to find the items on that "Dear Santa" list, but there are always moments when you wish the "elves" you hear so much about at this time of the year would take over the job of supplying all the gifts on your Christmas list.

We are not sure Santa can release any of his co-workers at this time to give you assistance, but we do know it's easy and fun to make useful and inexpensive Christmas gifts, toys and decorations with your SHOPSMITH. With the tear-out plans found on following pages, your SHOPSMITH and the necessary wood and materials, you can truly play the role of Santa Claus in your workshop and have the special thrill of giving something you made yourself.



## Pop-Out Spice Rack

Kitchen spices will always be at her fingertips on this unique pop-out rack. The spice cans slip back in place easily, too. The dimensions shown on the tear-out plans will fit standard spice cans. If she uses other size containers or spices in jars, simply change the dimensions to fit. Use a hardwood, such as maple or birch, and give it a natural finish to add an ornamental as well as useful touch to the kitchen.



To prove that SHOPSMITHS are used at the North Pole, ShopMag sent a field correspondent north to get these on-the-spot photos of elves at work. (Note to nonbelievers: The elves are toys which were made in Germany and the SHOPSMITH is a true-to-scale miniature.)



## Outdoor Christmas Card Decoration

Have the most original outdoor Christmas display in your neighborhood by making a large plywood replica of your own Christmas card.

Simply scale your card with grid lines and transfer the art work of your card to larger proportional grid areas on a piece of exterior plywood. The enlarged drawing can be done either on paper or directly on the plywood. Elements within your Christmas card can be cut out with a bandsaw or jigsaw and mounted to the display for a three-dimensional effect.

Paint both sides and all edges with an exterior paint primer. You can thin primer to allow penciled design to show through or apply design after primer coat. Apply a second coat of primer paint mixed with the finish color. The final coat may be exterior house paint tinted to a desired color or an exterior trim paint.

Well-placed outdoor flood or spotlights will add drama and color. Position your new and attractive Christmas decoration in your front yard, on your porch or roof.



## Palette Chopping Block

Those scraps of dry hardwood around your shop can be used for a handy "palette" chopping block—a welcome gift for any kitchen. Different woods and different thicknesses will make it all the more attractive.

First, joint your scraps smooth and square. Using a stop block or miter gauge on the horizontal drill press, drill them all for three  $\frac{1}{2}$ -inch or larger dowels as shown. Assemble with a good waterproof glue and the three dowels, squeezing the pieces tight together with furniture clamps, or use your SHOP-SMITH as a glue press by locking the quill feed.

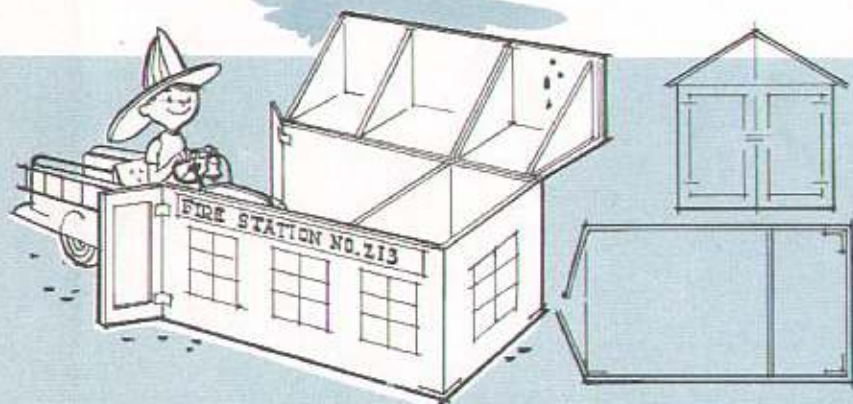
When dry, roughly sketch the block to a palette shape and cut out on your bandsaw or jigsaw. Round and smooth the edges on the disc or drum sander. Drill the thumb hole completely through the block for hanging on the wall. Four small rubber bumpers are placed on the bottom of the block so it will not slide. Best finish is the simplest . . . just rub on several coats of cooking oil.



## Drive-In Toy Storage

There's nothing like this fire station (or make it a store, freight car or jet plane hangar) to intrigue the youngsters into putting their toys away. Wheeled toys can be driven in, like real, and the "backroom" holds a multitude of miscellaneous items.

Simply build the toy chest of  $\frac{1}{2}$ -inch plywood with plain butt joints and make it whatever size is needed to store the bigger toys. If you wish, build it high enough to drive in a car without raising the larger section of the lid. Include a plywood bottom and use glue, as well as nails or screws. Brace the 1-in. by 3-in. studs at the doors with two three-inch angle iron braces screwed to studs and the bottom. For simplicity, use strap hinges on doors and top. Give the chest a good undercoat of a color contrasting to the finish. When dry, mark out the windows and signs with cellophane tape. Brush on the finish coat and, before it dries, pull off the tape.





Some of the best how-to reading is in manuals and booklets published by manufacturers of products and materials, and by their trade and service associations. The literature listed here has been reviewed by the editors of SHOPMAG and is recommended by them. For your convenience SHOPMAG has arranged to handle your requests for some of these booklets directly. Indicate your selection on the coupon below.



**PLANS FOR PLYWOOD:** Here are three new plan-and-idea booklets that belong in your "things to make" file. These new booklets—"Ideas for Your Home from NBC-TV HOME"—are free. They contain completely detailed, illustrated plans and step-by-step instructions for over 20 worthwhile home improvements you can make with easy-to-use panels of fir plywood. One set of plans is for built-ins and storage units; another for furniture and home decorations; the third has plans for fences, garden storage and other ideas for outdoor living. All specially designed for home craftsmen by topflight architects and designers. Check the coupon for this free set.

## 2



**NEW STANLEY TOOL:** Both the file type "SURFORM" (shown here) and the plane type, use the same razor-sharp cutting strip to work all kinds of materials. "SURFORM" forms the surface of wood, rubber, leather, plastics, copper, aluminum—even mild steel. And it works fast—12 times faster than a rasp on wood. 450 teeth really cut and 450 holes take the cuttings away from the work. No skill is needed . . . you can't go wrong. Easy control of depth of cut is assured . . . there is nothing to adjust. At your hardware store now—Stanley "SURFORM"—File type \$2.69, Plane type \$3.69. Check the coupon for complete information, free.

## 3

No. 149 Multi-Spur Bit



No. 140 Spiral Plug Cutter

**GREENLEE TOOL SPECIALTIES:** The multi-spur bit and spiral plug cutter (shown here) are tools that can be "lifesavers" in your workshop. The Greenlee multi-spur bit will bore veneered stock without tearing, bore at an angle, bore overlapping or close-center holes without splitting the stock, or cut an arc of a circle on the edge of piece—in either hard or soft wood. When cross-grain plugs or end-grain dowels up to 2 in. long are required in a hurry use the spiral plug cutter. Both tools can be used with your Shopsmith drill chuck. Free catalog information will be furnished by the Greenlee Tool Company. Check number three on the coupon provided below.

## 4



How step-by-step ideas to help you  
**LIVE BETTER Electrically**

**"LIVE BETTER . . . ELECTRICALLY":** This color-illustrated 70-page booklet titled "New Step-By-Step Ideas to Help You Live Better . . . Electrically" is now available. Presenting detailed suggestions for better living electrically in every room of the house, and outdoors as well, this booklet has more than 100 full-color illustrations showing the variety of ways in which a home can be made more attractive, efficient and convenient with electrical products and equipment. Of special interest is the special workshop section, the building and remodeling suggestions, and planning information on electrical wiring. See your local electric utility company for a copy.

Mail your request to:

SHOPMAG, No. 1 Homewood Place, Menlo Park, Calif.

Send me items checked below for my "information file."

- 1 ☐ PLANS FOR PLYWOOD
- 2 ☐ NEW STANLEY TOOL
- 3 ☐ GREENLEE TOOL SPECIALTIES

Name \_\_\_\_\_

Street and Number \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

(You can enclose this order coupon with your SHOPMAG subscription)



A

big

gift

list

that can

be clipped

out and placed

in obvious spots

around the house for

all the family to see is

one way of making sure that

some of those needed SHOPSMITH

accessories you've always wanted are

found under your tree on CHRISTMAS day



MAGNA POWER TOOL CORPORATION  
America's Finest Power Tools

## gift list

Checked off are some of the items I would like to have for my SHOPSMITH:

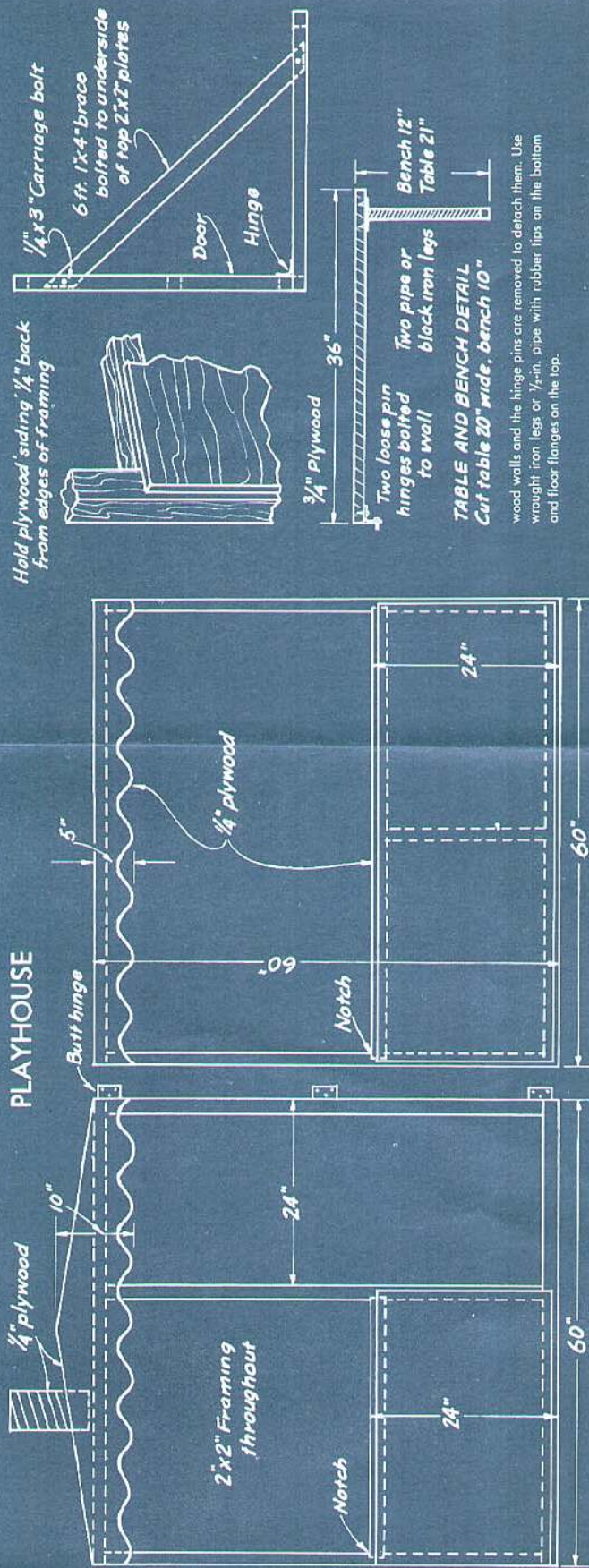
- |                          |  |         |
|--------------------------|--|---------|
| <input type="checkbox"/> | Magna Bandsaw (Model 630).....                                 | \$79.95 |
| <input type="checkbox"/> | Magna Belt Sander (Model 640).....                             | 49.95*  |
| <input type="checkbox"/> | Magna Jigsaw (Model 610).....                                  | 49.95*  |
| <input type="checkbox"/> | Magna Jointer (Model 620).....                                 | 49.95*  |
| <input type="checkbox"/> | Magna Sprayer .....  | 49.95   |
| <input type="checkbox"/> | Flexible Shaft .....   | 16.95   |
| <input type="checkbox"/> | Magna Dado .....   | 15.95   |
| <input type="checkbox"/> | 6" Dado Blade .....  | 15.95   |
| <input type="checkbox"/> | Carbide Lathe Chisels (set of 4).....                          | 14.95   |
| <input type="checkbox"/> | Reractable Casters .....                                       | 12.95   |
| <input type="checkbox"/> | Shaper Fence .....   | 12.95   |
| <input type="checkbox"/> | Lathe Chisels (Set of 5).....                                  | 9.95    |
| <input type="checkbox"/> | Miter Gauge Safety Grip .....                                  | 8.95    |
| <input type="checkbox"/> | Key Switch and Outlet Box.....                                 | 7.95    |
| <input type="checkbox"/> | Auger Bits (Set of 5).....                                     | 7.45    |
| <input type="checkbox"/> | Shopsmith Cover .....  | 6.95    |
| <input type="checkbox"/> | 9" Saw Blade—Hollow Ground.....                                | 6.95    |
| <input type="checkbox"/> | Rubber Bonded Abrasive Wheel .....                             | 5.95    |
| <input type="checkbox"/> | Jigsaw Machine Files.....                                      | 5.95    |
| <input type="checkbox"/> | 12" Sanding Disc .....   | 5.95    |
| <input type="checkbox"/> | Magna Molder .....   | 5.95    |
| <input type="checkbox"/> | Book—"Power Tool Woodworking<br>For Everyone" .....            | 4.95    |
| <input type="checkbox"/> | Power Mount Coupling Kit .....                                 | 4.95    |
| <input type="checkbox"/> | Front Table Extension .....                                    | 4.95    |
| <input type="checkbox"/> | Mortising Attachment .....                                     | 4.45    |
| <input type="checkbox"/> | Mortising Chisel—Size ( ).....                                 | 3.95    |
| <input type="checkbox"/> | Lathe Tailstock Live Center.....                               | 3.65    |
| <input type="checkbox"/> | Carb. Lathe Chisel (Rd Ns.)<br>(Sq. Ns.) Size (1/4) (1/8)..... | 3.95    |
| <input type="checkbox"/> | Drum Sander .....  | 3.45    |
| <input type="checkbox"/> | 9" Saw Blade—(All Purpose)<br>(Rip) (Crosscut) (8-Tooth).....  | 3.45    |
| <input type="checkbox"/> | 6" Lathe Face Plate .....                                      | 2.95    |
| <input type="checkbox"/> | Safety Goggles .....   | 2.95    |
| <input type="checkbox"/> | Mortising Bit—Size ( ).....                                    | 2.75    |
| <input type="checkbox"/> | Mortising Hold Down .....                                      | 2.75    |
| <input type="checkbox"/> | 1 1/2" Saw Arbor .....   | 2.45    |
| <input type="checkbox"/> | Table Insert—Shaper .....                                      | 2.45    |
| <input type="checkbox"/> | 1/2" Arbor .....   | 2.45    |
| <input type="checkbox"/> | 3/8" Arbor .....   | 2.45    |
| <input type="checkbox"/> | 12" Sandpaper (Pkg. of 6)—Assorted .....                       | 2.45    |
| <input type="checkbox"/> | 3 3/4" Lathe Face Plate .....                                  | 2.25    |
| <input type="checkbox"/> | Router Bit—Size ( ).....                                       | 1.95    |
| <input type="checkbox"/> | 1/2" Router Chuck .....  | 1.95    |
| <input type="checkbox"/> | 6" Wire Brush (Fine) (Coarse).....                             | 1.95    |
| <input type="checkbox"/> | Lambswool Polishing Pad (Bonnet).....                          | 1.75    |
| <input type="checkbox"/> | Shaper Collars—(Set of 4) .....                                | 1.65    |
| <input type="checkbox"/> | Miter Gauge Stop Rod .....                                     | 1.65    |
| <input type="checkbox"/> | Miter Gauge Extension .....                                    | 1.45    |
| <input type="checkbox"/> | Table Insert—(Dado) (No Slot) .....                            | 1.45    |
| <input type="checkbox"/> | Liquid Adhesive .....  | 1.45    |
| <input type="checkbox"/> | Drum Sander Sleeves (Pkg. of 6)—Assorted .....                 | 1.45    |
| <input type="checkbox"/> | 1/2" Shaper Adapter .....                                      | 1.45    |
| <input type="checkbox"/> | Lathe Screw Center .....                                       | 1.45    |
| <input type="checkbox"/> | Lathe Tailstock Chuck Arbor.....                               | 1.45    |
| <input type="checkbox"/> | 6" Buffing Wheel .....   | .95     |
| <input type="checkbox"/> | .....  |         |
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This gift suggestion list can be used for Christmas, Father's Day, Your Birthday, etc.

\*These prices will increase effective January 1, 1957.  
All prices subject to change without notice.

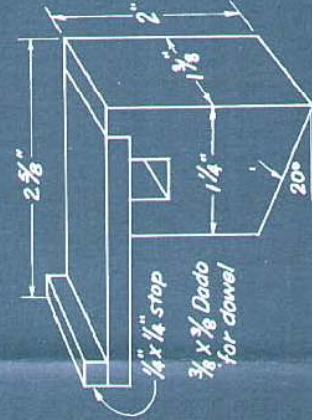
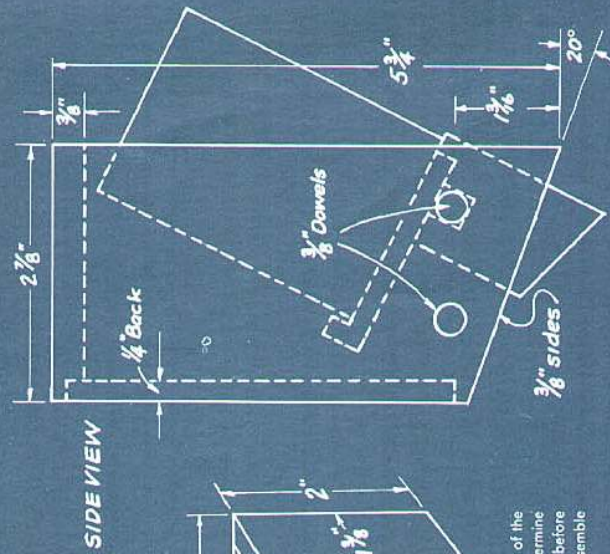


## PLAYHOUSE



All framing for the indoor playhouse is 2x2 softwood, glued and nailed together. All plywood parts will come from one 4x8 panel of 1/4-in. plywood. Use small finishing nails and glue to attach the plywood walls and roof. Place the hinges close to the top and

bottom as shown, so they will help strengthen the framing joints. Screw the plywood chimney to the back side of the plywood gable. One 1x4 brace across the top locks the two walls in position. The hinges of the bench and table are bolted to the ply-



Rip and dado a long piece of hardwood to the shape of the finger blocks, then cut the piece into individual blocks. Determine that a 3/8-in. dowel will turn freely in the 3/8-in. groove before cutting out the pieces. Use quick-drying white glue and assemble the shelves without nails.

## SPICE BOX

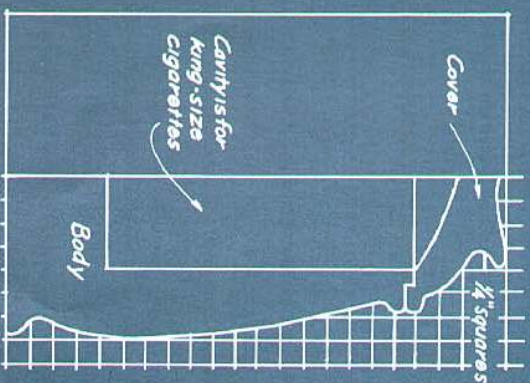
Build the outer box of the pop-out spice rack of 3/4-in. hardwood, and the finger blocks, also. Maple or Birch with a natural finish is excellent for this purpose. The individual shelves for the cans may be of hardwood or plywood. The width of the rack will be determined by the number of shelves needed.

Rabbet the back into the sides and top. Miter the sides to the top. Drill two 3/16-in. holes through each side for the two dowels. Assemble the box with glue using small nails on the back side.

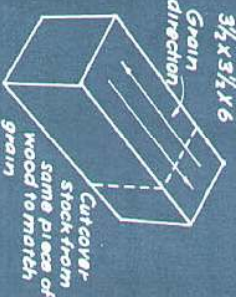
Here are plans for several of the gift projects described in the preceding pages. These projects are designed to become useful and good-looking gifts for each member of the family. You may be ambitious enough to make them all, or you may just want to select that "special" hand-made gift for a particular person. Whichever your choice, you can be sure your Shopsmith efforts will be well rewarded on Christmas Day.



## CIGARETTE BOX



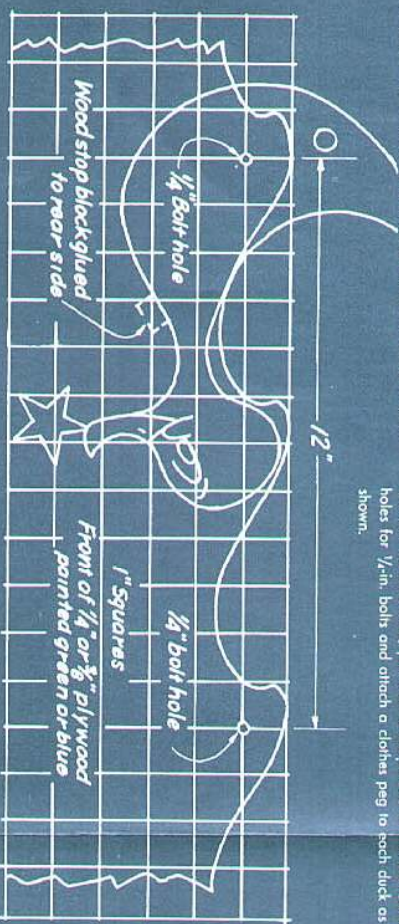
First cut the cover piece from the piece of stock and then mount the box body blank on a 3-in. face plate with three No. 6 flat wood screws, 1 in. long. Turn the box portion complete, inside and out, and when forming the cavity be sure to situate the foot rest very close to the cutting area so that maximum support is provided of the cutting end of the tool. Use a round nose tool in a scraping action. Mount the cover stock on a 3-in. face plate using three No. 4 flat head wood screws, 3/4-in. long. Turn the underside of the cover and be sure that it is a TIGHT fit on the lip of the body. Check this frequently while turning and remove the wood slowly. When the underside is formed remove the box body on the face plate and force the cover in place. Now shape the outside of the cover and your project is complete except for some stock removal on the lip of the body so that the cover will slip on easily.



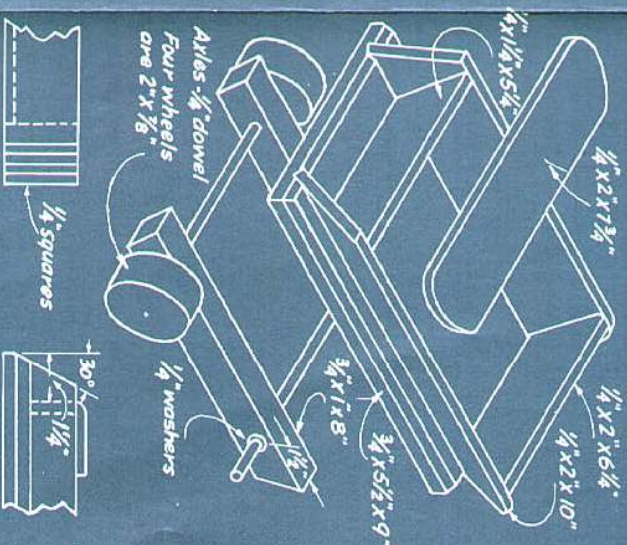
## CLOTHES DUCKS

This clothes rack, with its "built-in" reward, can be short or long, with as many ducks and pegs as you desire. First, draw one-inch squares on two sheets of paper and then draw in the duck and

the wave design to scale. Trace both scaled drawings on pieces of plywood and cut them out on your jig saw or bandsaw. Don't cut into the duck's bill, just around the outside of the star. Drill holes for 1/4-in. bolts and attach a clothes peg to each duck as shown.

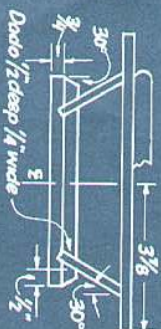


## PULL WAGON



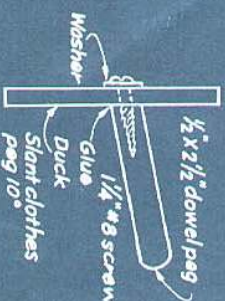
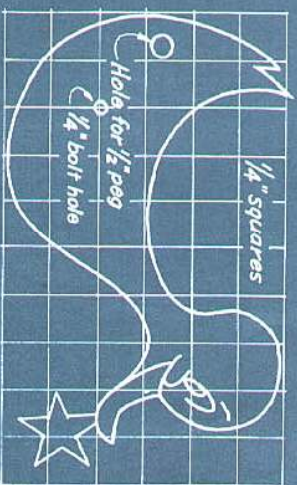
The component parts of this sturdy little wagon can be quickly and easily cut from scrap lumber or from wood salvaged from crates, yet the finished product will be a handsome durable toy.

Coat the meeting edges with glue before nailing parts together. The turned parts should be made of hardwood, Birch or Maple for example. The axle holes in the wheels should be a tight fit for a 1/4-in. dowel. Put a drop of glue in the hole before pressing the wheel in place. Be sure that the holes in the axle supports are a loose fit for 1/4-in. dowel. You can use upholstery nails to simulate hubs over the ends of the axles. For a good finish sand all parts before assembly, then when the project is assembled, set nail heads below the surface, fill holes with wood putty, and sand again. A wash coat of white shellac (50-50 alcohol and shellac) will provide an excellent base for bright-colored paint.



Paint the duck yellow, the waves green or blue and draw in the eye and mouth with black. Use gold or aluminum paint on the star or paste on a piece of gold wrapping paper. Each completed duck pivots on the waves on 1/4-in. bolt, with a washer on both sides of the duck and the nut loose enough for the duck to swing freely. With

ducks attached, position and glue a 3/4-in. thick stop block on the back of the waves for each duck, as shown, to prevent it from diving too far. The clothes peg will stop it in the "up" position. Last, hang the completed rack on the wall with screws and small 3/4-in. thick spacer blocks between waves and wall.



Duck of 1/4 plywood

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