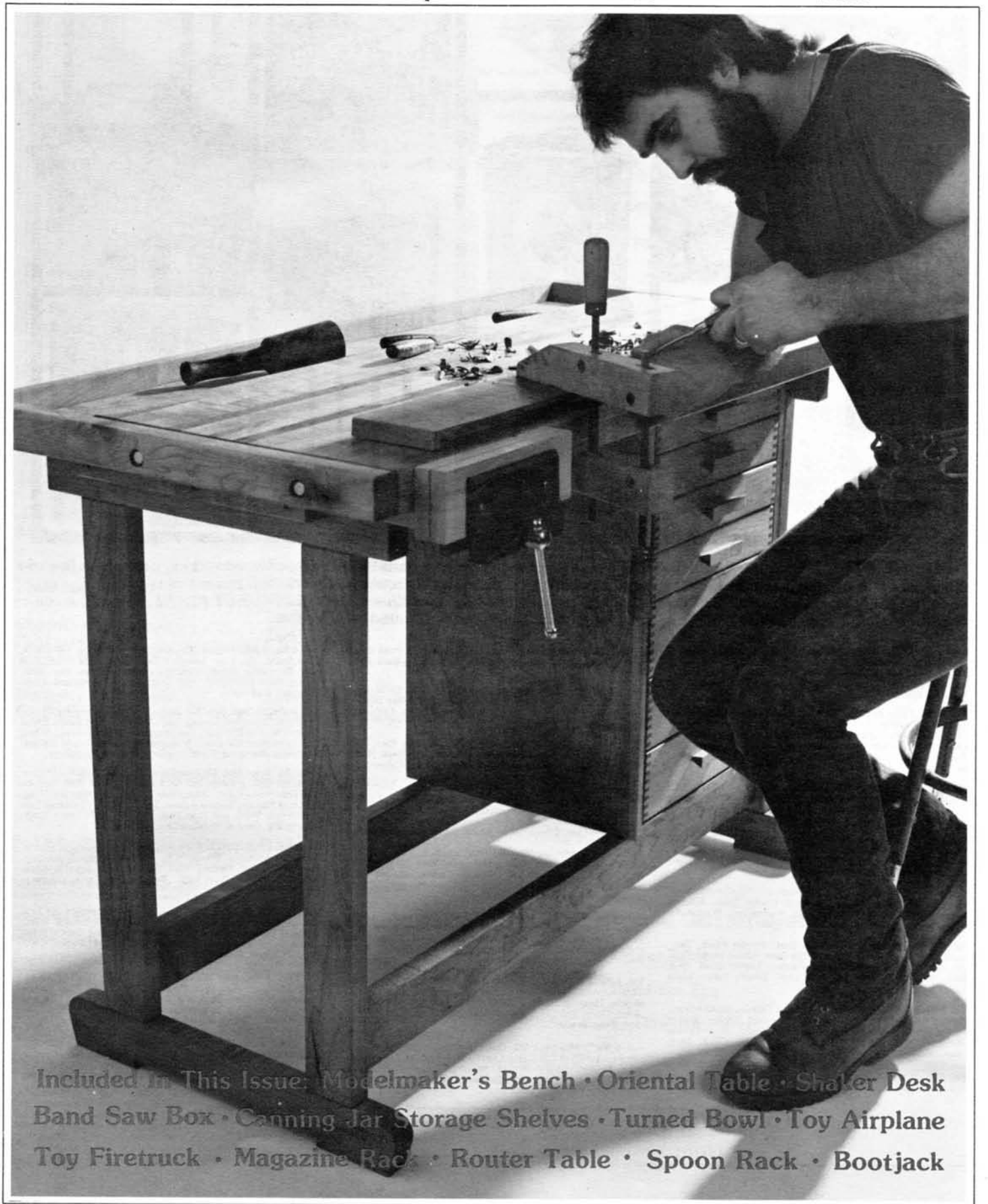
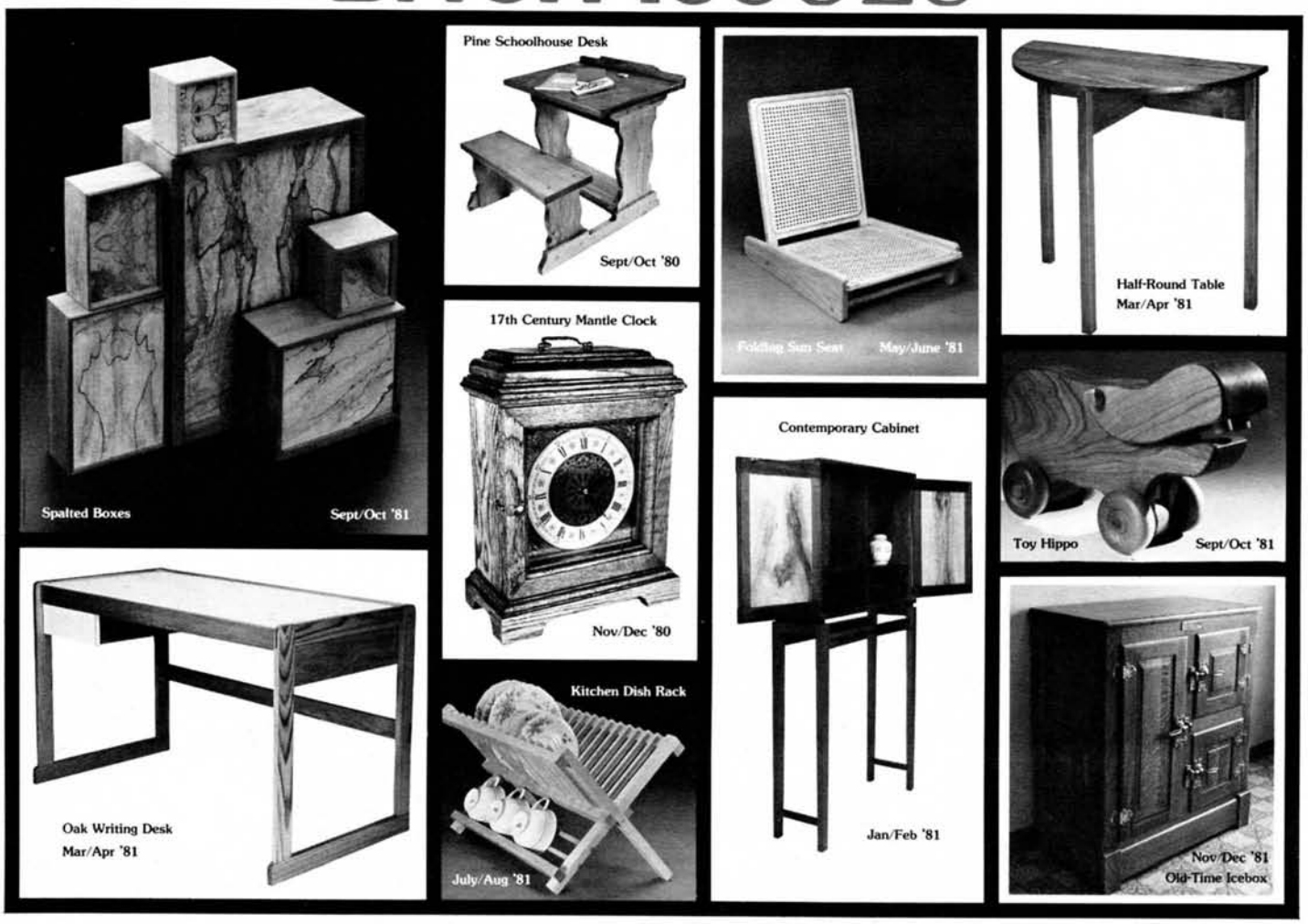
The Woodworker's Journal

Vol. 7, No. 5 September/October 1983 $2.50



Included In This Issue: Modelmaker's Bench · Oriental Table · Shaker Desk
Band Saw Box · Canning Jar Storage Shelves · Turned Bowl · Toy Airplane
Toy Firetruck · Magazine Rack · Router Table · Spoon Rack · Bootjack

BACK ISSUES



Each issue of *THE WOODWORKER'S JOURNAL* is filled with detailed plans for all types of woodworking projects, a few of which are shown above. There are also regular columns on restoring antiques and workshop income plus useful jigs and shop tips, but our main purpose has always been to provide our readers with a variety of *PROJECT PLANS*. Check the contents of available issues below and send your order today...supplies are limited.

Vol. 4 No. 1 Jan-Feb '80: Doughbox End Table, Contemporary Loveseat, Mahogany Chairside Table, Corner Cupboard Part I, Small Pine Corner Cabinet, Knife Rack Cutting Board, Apple-Shaped Mirror, Pine Tape Dispenser, Auxiliary Cut-Off Table for Tablesaw.

Vol. 4 No. 2 Mar-Apr '80: Firewood Rack & Carrier, Red Baron Triplane Toy, Pine Pie Safe with Pierced Tin Panels, Contemporary Glass Top Coffee Table and Matching End Table, 19th Cent. Pine Commode, Corner Cupboard Part II, Butcher Block Toy Box, Mahogany Corner Shelf, Jig for Wooden Trivets, Radial Arm Crosscut Table.

Vol. 4 No. 3 May-June '80: Miniature Campaign Chest, 19th Cent. Sawbuck Table, Decorative Frog, Violin Sconce, Shaker Cutlery Tray, Swinging Bracket & Planter, Club Chair & Ottoman, Oak Cottage Chair, Wooden Lock.

Vol. 4 No. 4 July-Aug '80: Magazine Rack, Gothic Oak Stool, Whale Cribbage Board, Doll Cradle, Nut & Bolt Toy, Basketweave Planters, Easy Wall Clock, Router Bit Box, Pine Cellarette, Lap Chessboard, Pine Wall Box.

Vol. 4 No. 5 Sept-Oct '80: Cabinetmaker's Workbench, Cobbler's Bench Coffee Table, 19th Cent. Cherry Table, Kitchen Utensils, Book Rack, Nuts & Bolts, Nutcracker, Walnut & Glass Bank, Schoolhouse Desk, Booster Seat.

Vol. 4 No. 6 Nov-Dec '80: 17th Cent. Mantle Clock, Toy Truck, Bud Vase, Grain Scoop, Letter Rack, Phone Memo Caddy, Toy Circus Wagons, Animal Puzzles, Library Stool, Quilt Rack, Ratchet Table/Lamp, 18th Cent. Trestle Table, Lathe Steady Rest.

Vol. 5 No. 1 Jan-Feb '81: 18th Cent. Wall Shelves, Hand Mirror, Cutting Boards, Tic-Tac-Toe Game, 18th Cent. Vanity, Shaker Pine Cupboard, Tenon Jig, Towel Ring, Matchbox, Corner Shelves, Contemporary Cabinet, Black Forest Clock, Shop Drawing Board.

Vol. 5 No. 2 Mar-Apr '81: Child's Rocker, Bandsaw Jig, Push-Pull Toy, Half-Round Table, Spoon Rack, Salt and Pepper Shakers, Calculator Stand, Anchor Thermometer, Plant Stand, Oak Writing Desk, 18th Cent. Chair Table, Shop-Built Handscrew.

Vol. 5 No. 3 May-June '81: 18th Cent. Sleigh Seat, Child's Step Stool, Kiddie Gym, Flying Duck, Dominoes, Trouser Hanger, Mug Rack, Folding Sun Seat, Ship's Wheel Table, Contemporary Buffet.

Vol. 5 No. 4 July-Aug '81: Longhorn Steer, Bike Rack, Miniature Chest, Doll House Bed, Curio Shelves, Belt Rack, Rocker Footrest, Early American Wall Shelf, Multipurpose Cabinet, Box Cutting Jig, Dish Rack.

Vol. 5 No. 5 Sept-Oct '81: 18th Cent. Rudder Table, Musical Jewelry Box, Colonial Candlestick, Deacon's Wall Shelf, Toy Hippo, Spalted Boxes, Woodbox, Sewing Cabinet with Tambour Doors, 18th Cent. Tavern Table, Router Jig for Stopped Dadoes.

Vol. 5 No. 6 Nov-Dec '81: Old-Time Ice Box, Victorian Sled, Tile Clock, Wine Glass Holder, Mahogany Wall Shelf, Inkwell, Bagel Slicer, Seal Push Toy, Wooden Combs, Antique Knife Tray, Memo Cube, Fireplace Bellows, Contemporary Shelving, Weather Station, Shop-Built Bar Clamp.

Vol. 6 No. 1 Jan-Feb '82: Contemporary Sofa Table, Artist's Easel, Candle Box, Laminated Box, Butcher Block Knife Rack, Frog Pull Toy, Infinity Mirror, Japanese Style Table Lamp, Empire Footstool, Desk Caddy, Stepped-Back Hutch, Buckboard Seat, Latticework Cutting Jig.

Vol. 6 No. 2 Mar-Apr '82: Early American Blanket Chest, 18th Cent. Corner Shelf, Pine Footstool, Cheese Cutting Board, Napkin Holder, Trivets, Coaster Set, Pierced Tin Cabinet, Hutch Clock, Oak File Cabinet, Mahogany Tripod Table, Wall Hung Plant Bracket.

Vol. 6 No. 3 May-June '82: Country Kitchen Cabinet, Rough-Sawn Cedar Clock, Swinging Cradle, Toy Helicopter, Casserole Dish Holder, Ship's Wheel Weather Station, Octagonal Planter, Tambour Desk, Band Saw Boxes, 19th Cent. Step-Chair, Sailing Ship Weather Vane.

Vol. 6 No. 4 July-August '82: Dovetailed Footstool, Toy Chest, Plant Stand, 18th Cent. Lawyer's Case, Frame and Panel Joint with Decorative Bevel, Collector's Plate Frame, Toy Jeep, Trestle Table and Bench, 19th Cent. Danish Washstand, Contemporary Wall Valet.

Vol. 6 No. 5 Sept-Oct '82: Early American Hanging Corner Cupboard, Breakfast Serving Tray, Veneered End Table, Chess Table, Chest of Drawers, Contemporary Writing Desk, Whale Toy, Laminated Shoehorn, Spaghetti Measure, Candle Holder, Horizontal Boring Jig, Cane Suppliers, Finishing Suppliers.

Vol. 6 No. 6 Nov-Dec '82: Lyre Clock, Geodesic Lighting Fixture, Sawhorse Dining Table, Oak Desk Clock, Shaker Wall Shelves, Old-Time Radio Case, Cider Press Lamp, Contemporary Hanging Light Fixture, Firewood Rack, Toy Tool Box, Christmas Tree Ornaments, Willie and Tuna Push Toy, Woodpile Trivet, Circle Cutting Jig, General Woodworking Suppliers.

Vol. 7 No. 1 Jan-Feb '83: Workshop Tote Box, Tinsel-Art Mirror, European Spinning Wheel, Key Holder, Dump Truck Toy, Bang-a-Peg Toy, Puzzle, Wall Cabinet with Reverse Glass Stencil, End Grain Table Lamp, Butler's Tray Table, Contemporary Clock, Pine Cabinet.

Vol. 7 No. 2 Mar-Apr '83: Porch Swing, Homemade Jig Saw, Cheval Mirror, Punched Tin Spice Cabinet, Television Stand, Nautical Table Lamp, Wooden Balance, Nesting Cube Tables, Steam Roller Toy, Back Massager, Mailbox, Wall Shelf, Chippendale Mirror, Clock Parts and Suppliers.

Vol. 7 No. 3 May-June '83: Oak Pedestal Table, Drafting Table, Early American Wall Unit, Folding Snack Table, Pine Corner Cupboard, Toy Car with Boat & Trailer, Letter Opener, Contemporary Serving Tray, Hanging Mirror with Shelf, Carved Eagle, Early American Portable Bookcase, Hardwood Suppliers.

Vol. 7 No. 4 July-August '83: Turned Lamp, Decoy Carving, Antique Sugar Chest, Record Album & Tape Cabinet, Chinese Tea Table, Old-World Weather Forecaster, Toy Tractor & Cart, Display Pedestal, Two Planter Projects, Collector's Plate Stand, Hardware Suppliers.

Please Note Vol. 4, No. 1 through Vol. 4, No. 4 are newsprint issues for $1.50 each. From Vol. 4, No. 5 on, they are magazines for $2.50 each, postpaid. CT residents only please add 7½% sales tax.

The Woodworker's Journal

VOLUME 7, NUMBER 5
SEPTEMBER/OCTOBER 1983

DEPARTMENTS

FEATURE

PROJECTS

Photos by John Kane/Silver Sun Studios

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Contributions
We welcome contributions in the form of manuscripts, drawings and photographs and will be glad to consider such for possible publication. Contributors should include a stamped, self-addressed envelope of suitable size with each submission. While we cannot assume responsibility for loss or damage, all materials will be treated with care while in our possession. Payment for the use of unsolicited material will be made upon acceptance. Address all contributions to: Editor, **The Woodworker's Journal**, P.O. Box 1629, New Milford, CT 06776.

Shoptalk

With this our biggest issue yet, we thought it a good time to introduce you to the fine people who've worked together to help The Woodworker's Journal grow from a sixteen page newspaper to the sixty-eight page magazine we all proudly bring you now.

Top row from the left: Glenn Firmender, Louise Ryan, Paul Levine
Middle: Pat Friberg, Judy Robinson, Maureen Murphy.
Bottom: Jackie Nowak, Jim Mc Quillan, Tom Begnal, Kim Gellatly.

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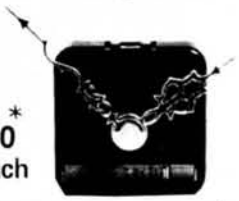

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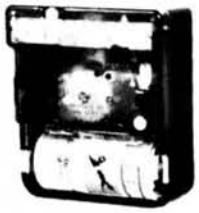

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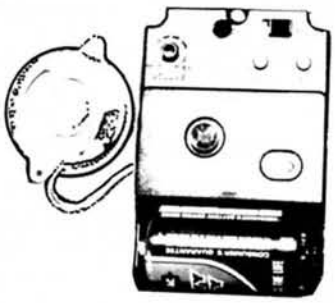

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Letters

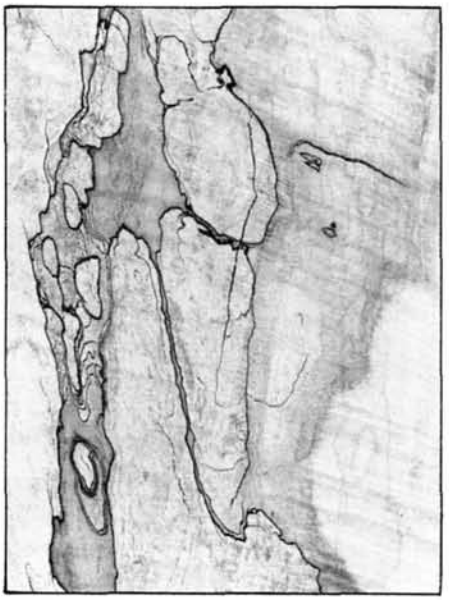
On several occasions I've come across the term "spalted wood". Unable to find the word spalted in my dictionary, I wonder if you could explain its meaning?
Malcolm J. Beaumont, Gainesville, Fl

When wood is exposed to an environment that's warm and moist, it is likely to be invaded by fungus. Given time, this fungus will attack the wood to the point where it will begin to rot. Ultimately, the wood will completely disintegrate. However, if the wood is dried out early enough in the process, the decay will be halted.

When certain types of fungus attack some woods, the decaying wood will show an extensive network of black or brown lines. These lines form an endless variety of intricate patterns, and woodworkers have come to learn that these patterns can be unusually beautiful. Wood that has these patterns is called spalted.

With spalted wood, the trick is to catch it at the right time. Usually, the right time is when the decay process is far enough along to produce the patterns, but before the wood begins to get soft.

Not all wood species produce spalted patterns. It's most likely to be found in maple, birch, and the fruitwoods such as apple and cherry.



Spalted Maple

When gluing inlaid edging (see Special Techniques column, page 26, July/August 1983 issue), rubber bands can provide a simple clamping method which works well. The ¼ in. wide, 2½-3 in. long bands are ideal for objects up to about 6 inches in cross-section or diameter. They are much less cumbersome than band clamps and apply pressure better than tape. Pressure can be increased by wrapping more rubber bands around the box. They are also excellent for gluing small segmented rings and other irregular objects.
Michael R. Herzog, Rochester, NY

I'm looking for a source for a toxic-free finish for salad bowls and cutting boards. Can you help?
Clarence Ruokangas, Vista, Calif.

Woodcraft Supply Corp., 41 Atlantic Ave., Woburn, MA 01888 carries a product called Salad Bowl Finish. It's approved by the U.S. Food and Drug Administration for use on items that

(continued on next page)

Letters (Cont'd)

come in contact with food. The current price is $7.65 per pint, $11.25 per quart, postpaid.

Can you tell me where I can get liners for kitchen canisters? I need the square shaped, one gallon and one-half gallon size.

Irie E. Bland, Huntsville, Ala.

Kitchen canisters can be purchased from the company Meisel Hardware Specialties, P.O. Box 258, Mound, MN 55364. Write to them for more details.

I have an old chest of drawers that has been painted, perhaps with as many as four or five coats. I've been using a heat lamp to strip the paint and it seems to work very well. However, now that I'm getting down to the bare wood, I can't tell if it was initially stained or if what I'm seeing is its natural color. Should I sand until I get a uniform color? Any suggestions would be welcomed.

Carmel Monti, Oak Brook Terrace, Ill

John Olson replies: Yes, within reason, the wood should be sanded. The surface should be smooth, but sanding should not be done to the point where it could damage such things as moldings and recessed panels. Cracks and crevasses should be carefully cleaned, with care being taken to avoid damaging the edges. Once you are satisfied with the general appearance of the piece, the final finish can be applied.

In your July/August 1983 issue, you included a shop tip (Page 50) that suggested a method of straightening drill bits. Here's another method--one that I prefer to use because it minimizes the guesswork.

With the drill press running, take a felt-tip pen and slowly move it towards the bit until it just touches it. With the machine shut off, the "high side" of the bit will be indicated by the pen mark. Using a plastic mallet, tap the bit on the spot marked by the pen. Erase the mark, then start the machine and check to see if the problem is corrected. If not, repeat the process. Since marking the bit eliminates the guesswork, it can usually be straightened in just two or three attempts.

Charles R. Blanchard, Becket, Mass.

Can you tell me where to get music box movements made by the Swiss company Thorens? It's the type that uses a small disc to play each song.

Leonard Meyer, Erie, Penn.

Craftsman's Corner, 4012 N.E. 14th Street, Des Moine, IA 50302 sells a thirty note Thorens music works and five starter discs. Price is $114.00 plus $3.50 shipping. Write to them for more details.

I'm looking for the hardware needed to fasten the folding legs to a card table. Can you help?

Ben Klug, Fargo, N. Dakota

The Woodworker's Store, 21801 Industrial Blvd., Rogers, MN 55374 sells card table leg braces, either right or left hand, made of brass plated steel. The overall length is 10 in. Price is $1.35 each.

Odds and Ends

I'm looking for a woodworking club in the New Orleans area. Do any of your readers know of such an organization?

Henry Heier
3443 Esplanade Ave. #110
New Orleans, LA 70119

(continued on page 9)

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#4/0	5"	2½"	12.45	8.50	45.90
#3/0	6"	3"	13.35	8.95	48.33
#2/0	7"	3½"	14.35	9.50	51.30
#0	8"	4½"	15.97	10.50	56.70
#1	10"	6"	18.25	11.95	65.50
#2	12"	8½"	20.94	14.25	76.95
#3	14"	10"	26.56	17.50	94.50
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#7260	60"	30.77	24.50
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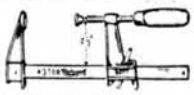
3801	V/Sp., B/Bearing, 35 Access.	94.95	60.95
572	Deluxe Moto-Shop Complete	129.95	84.95
580	4" Tilt-Arbor Motorized Table Saw	129.95	84.95
730	Disc-Belt Sander	119.95	78.95
290	Electric Engraver	20.95	14.95

Model	MOTO-FLEX® TOOLS	List	Sale
232	Moto-Flex Tool	$98.95	$63.95
332	Variable Speed Moto-Flex Tool	109.95	70.95

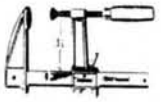
Model	MOTO-TOOLS®	List	Sale
250	Moto-Tool (Constant Speed)	$52.95	33.95
270	Moto-Tool (Constant Speed)	58.95	37.95
280	Constant Speed, Ball Bearing	70.95	45.95
370	Moto-Tool (Variable Speed)	71.95	45.95
380	Variable Speed, Ball Bearing	82.95	52.95



JORGENSEN STEEL BAR CLAMPS Style 37

2½" Throat
Bar Size ¼" x ¾"

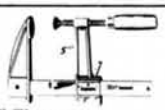
		List	Sale	Lots of 6
#3706	6"	$ 7.88	$ 5.50	$ 29.70
#3712	12"	8.73	5.95	32.13
#3718	18"	9.64	6.95	37.53
#3724	24"	10.54	7.35	39.69
#3730	30"	11.76	8.25	44.55
#3736	36"	12.85	8.95	48.33



JORGENSEN STEEL BAR CLAMPS Style 39

3½" Throat
Bar Size 5/16" x 1"

		List	Sale	Lots of 6
#3906	6"	$ 18.89	$ 12.95	$ 69.95
#3908	8"	19.45	13.50	72.95
#3912	12"	20.69	14.50	78.00
#3918	18"	22.55	15.85	85.50
#3924	24"	24.45	17.25	93.00
#3930	30"	26.16	18.35	99.00



JORGENSEN STEEL BAR CLAMPS Style 45

5" Throat
Bar Size 1 3/8" x 5/16"

		List	Sale	Lots of 6
#4506	6"	$ 22.49	$ 15.95	$ 86.15
#4508	8"	23.04	16.50	89.10
#4512	12"	23.85	17.50	94.50
#4518	18"	25.16	18.95	102.35
#4524	24"	26.61	20.95	113.15
#4530	30"	28.06	21.95	118.50
#4536	36"	29.54	22.95	123.95

JORGENSEN PONY PIPE CLAMPS

(pipe not included)

		List	Sale	Lots of 12
#50	for ¾" black pipe	$11.23	$ 7.95	$ 85.86
#52	for ½" black pipe	9.36	6.50	70.20
#74	Bar Clamp Pads Set of 4	4.03	2.50	27.00

JORGENSEN PONY SPRING CLAMPS Style 32

Model		List	Sale
#3201	HT-1" w/protected handles/tips 4"	$ 1.79	$ 1.15
#3202	HT-2" w/protected handles/tips 6"	2.78	1.75
#3203	HT-3" w/protected handles/tips 9"	5.09	3.25
#3204	HT-4" w/protected handles/tips 12"	8.14	5.40

JORGENSEN BAND WEB CLAMP

		List	Sale	Lots of 12
#1215	15'	$10.57	$ 6.50	$ 70.20

JORGENSEN HOLD DOWN CLAMPS

		List	Sale	Box of 6
#1623	3" Opening Gap	$9.98	$ 7.50	$ 39.95

JORGENSEN "PONY" KERF-KEEPER

		List	Sale	Lots of 6
#3432	7/8" Size	$ 5.43	$ 3.50	$ 18.95

Model	ARROW STAPLE GUNS	List	Sale
#T-50	Heavy Duty Staple Gun	$21.60	$14.95
#ET-50	Electro-Matic Staple Gun	31.50	21.50

MILWAUKEE ELECTRIC TOOLS

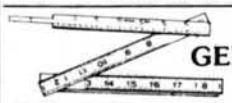
Model		List	Sale
0222-1	3/8" Hole Shooter H.D. 3.3A	$136	$ 95
0224-1	3/8" Magnum Hole Shooter	144	99
0244-1	1/2" 4.5A H/Shooter 0-600	155	109
0234-1	1/2" Magnum Hole Shooter	155	109
6507	TSC SawzAll w/case	179	120
6511	2 Sp Sawzall w/case	167	117
6365	7-1/4" Circular Saw 13A	149	99
6405	8-1/4" Circular Saw 13A	167	117
6245	3.8 Amp Single Spd Jig Saw	129	91
5900	3" x 24" Belt Sander	311	218
5910	4" x 24" Belt Sander	330	229
5620	1 H.P. 8 AMP Router	215	145
5660	1.50 H.P. 10 AMP Router	239	165
5680	2.00 H.P. 12 AMP Router	299	209
5397	T.S.C. 3/8" Hammer Drill Kit	203	145
5399	½" 6.2A HD Hammer Drill Kit	239	169
6750-1	HD Dry/W Shooter 0-4000rpm	136	95

MAKITA ELECTRIC TOOLS

Model		List	Sale
1900BW	3 1/4" Planer w/case	$143	$ 89
1100	3 1/4" Planer Kit	261	178
1805B	6 1/8" Planer Kit	416	285
9900B	3"x21" Dustless Belt Sander	191	127
9924DB	3"x24" Dustless Belt Sander	208	139
9401	4"x24" Dustless Belt Sander	273	179
B04510	Finish Sander, Square Base	79	49
B04520	Finish Sander, 5" Round Base	79	51
9045N	4½x9¼" Finish Sand., Dustless	160	110
3608B	1 H.P. Router	118	82
3601B	1 1/4 H.P. Router	196	130
3600B	2 H.P. Plunge Router	299	190
6510LVR	3/8" Rev. Var. Speed Drill	109	68
DP4700	1/2" V.S.R. Drill 4.8 AMP	142	95
2400B	10" Mitre Box	333	255
6010DWK	3/8" Cordless Drill w/case	142	84
4200N	4 3/8" Circular Saw	138	92
4300BV	Var. Speed Jig Saw	192	121

BOSCH POWER TOOLS

Model		List	Sale
90900	650° - 900°F H.D. Heat Gun	$ 89	$ 62
1578	Jig Saw Var/Sp Orbital Action	219	129
1577	Jig Saw Single/Speed 3000	199	119



GENERAL TOOLS

Model	6' Fiberglass Folding Rules	List	Sale
7200	with 6" exten., outside/read. in 16ths	$10.00	$8.00
7202	Outside readings graduated in 16ths	8.40	6.70
7204	with 6" exten., inside/outside readings Graduated on both sides	11.00	8.80

★ SUPER SPECIALS ★

Model		List	Sale
6377	Milwaukee 7¼" Worm Drive Saw	$220	$139
6378	Milwaukee 8¼" Worm Drive Saw	235	149
9005B	Makita 5" Grinder-10,000 rpm 9.4A	149	99
9607BL	Makita 7" Grinder-6,000 rpm 15A	229	149
9609B	Makita 9" Grinder-6,000 rpm 15A	236	154
7715	9" Dewalt Power Mitre Box	198	145
2401B	10" Makita Mitre Box w/blade	306	225
77	Skill 7¼" Worm Drive Saw	240	139
552	Skill 6½" 10A 2¼ H.P. Saw	148	109
553	Skill 7¼" 12A 2⅓ H.P. Saw	152	96
554	Skill 8¼" 13A 2½ H.P. Saw	165	119
6012HDW	Cordless 2-Sp. w/cl Drill *	164	107

** Special with purchase of above Leather Holster – $8 value* — ÷FREE÷

2 WAYS TO BUY: CHECK OR MONEY ORDER • VISA/MASTER CARD

HOME OF THE 1-DAY SHIPPER "Your Order Will Be The Nicest Thing In Our Mail"

SEVEN CORNERS ACE HDW. Inc.

216 West 7th St. • St. Paul, Minnesota 55102 • *Established 1933*

Call Toll-Free 1-800-328-0457 – In Minnesota Call (612) 224-4859

Letters (Cont'd)

I would like to restore a very old wooden trunk that was built in China before the turn of the century. My problem stems from the fact that the chest is made from camphor wood. I've searched local hardwood supply houses as well as many of the national mail-order sources, and no one stocks this wood. Do any of your readers know of a source for this wood?

William G. Martin
2633 New England Drive
Rochester, MI 48063

Woodworkers in the central Missouri area have recently formed an association to promote an awareness in woodworking among the public. Other objectives of the association are: (1) to provide a format for exchange of information among members and (2) to assist the members in gaining expertise in woodworking by providing educational and informational programs.

Membership in the organization is open to anyone with an interest in any facet of woodworking. Dues are $10 per year and includes a monthly newsletter with woodworking tips, suggestions and space for members to advertise for items needed or items for sale. Additional information can be obtained by writing to:

Midwest Woodworkers Association
c/o Gerald Jones, President
311 Cumberland Road
Columbia, MO 65201

I'm trying to locate an owner's manual and parts list for a Power Kraft jig saw, model number 25T6G2370A. It was made in Canada in 1952.

Richard L. Roulet
4142 North Elsie
Davenport, IA 52806

My wife and daughter bought me a used Sears Craftsman 18 in. jig saw (model number 10320720) for Father's Day. Naturally, no manual. Any information your readers can provide would be appreciated.

Tom Smith
2442 Collyer St.
Longmont, CO 80501

At a recent auction, I bought a 1947 table mounted Sears jig saw, model number 103.23150. I would greatly appreciate it if a fellow woodworker could provide me with a photocopy of the manual at my expense.

Doug Novack
1130 Stacy
Macomb, IL 61455

We've built our reputation on providing machines that are properly engineered throughout. In an age when much of the woodworking machinery on the market has become lightweight–even flimsy–we have adhered to the old tradition of solid craftsmanship by supplying only those machines built with high quality materials and heavy-duty castings.

If you are interested in woodworking then you simply won't find better machinery and equipment than that sold by J. Philip Humfrey Ltd. Machines that are built to give you high standards of performance...at prices that are remarkably reasonable.

In the two woodworking machines illustrated, J. Philip Humfrey Ltd. is again offering unsurpassed value. Feature for feature, these two machines deliver a combination of quality, capability and price that will be appreciated by the serious craftsman.

J. Philip Humfrey Ltd. are suppliers of the complete line of General, Concord, Kraemer and Excalibur woodworking machines, including: table saws, bandsaws, scroll saws, wood lathes, drill presses, jointers, planers, shapers and sanders, plus dust collectors.

During the past year alone, literally hundreds of woodworking machines have been shipped to workshops throughout the United States. Many customers have commented on how pleased they have been with the operation and quality of the machines they have purchased from our descriptive catalog.

"All our woodworking machines are heavy-duty–with good reason."

—PHIL HUMFREY

Special!

8" TABLE SAW PACKAGE

with BIESEMEYER T-Square Fence™

PRICES AS SHOWN
WHILE SUPPLIES LAST

Option #1: 8" Saw c/w 8" combination blade, T-Square Fence and Rails with 28" Rip capacity, Miter gauge, Motor Pulley, Belt & Steel Stand less guard, motor and switch...

$525

Option #2: Add $10.00 for 40" Rip capacity

Option #3: Add $180.00 for 1Hp motor or $220.00 for 1½Hp motor (incl. Manual Push Button Switch)

SHIPPED FREIGHT COLLECT.
NO OTHER CHARGES

Act now! and reserve your machine today...only 250 available. Call collect to place an order. Write for additional information.

Compare price and features with any other 8" table saw on the market.

- Heavy duty construction throughout
- Main saw table is 22" x 24" wide, made of heavy cast iron, ground smooth.
- BIESEMEYER T-Square Fence™ system with 28" or 40" rip capacity gives accurate cuts every time
- Accurately milled, miter guide slots on each side of blade
- Saw mechanism consists of a strong arbor bracket and sawdust chute that tilts on accurately machined grey iron trunnions attached to the table
- Arbor is threaded ⅝" to accommodate a dado or molding cutter up to 13/16"
- Finished cast iron hand wheels raise, lower and tilt the saw blade
- A heavy gauge steel stand provides rigid support to the saw
- Comes with a Galt Micro-Cut, 8" x 35 tooth, combination style, carbide tipped, professional saw blade

New this last year!

THE EXCALIBUR 24" PRECISION SAW

The Excalibur 24" Scroll Saw is designed for cutting irregular shapes...PERFECTLY.
No other saw offers the features and capacity of an Excalibur... with a NO RISK opportunity to try one.

- Cuts are true with no tendency to wander and require virtually no sanding
- Cuts to 2¼" thick and to the center of a 48" panel
- Extra large 14" x 24" worktable can be tilted both ways
- Cut with all 5" blades– #0/8 to .25" wide
- Provides operator with absolute control and an infinite range of cutting speeds up to 1700 strokes per minute
- Utilizes a high quality constant torque motor and control
- Ball bearing construction throughout. Parallel arms will not distort under high tension cutting

The Excalibur Saw comes with heavy-duty steel stand, 150 assorted blades, instruction manual and 24 month warranty. Try one for two weeks and convince yourself that this saw is everything we say it is. If you're not convinced, simply return it for a full refund, including shipping charges.

$1285

Complete
NO OTHER CHARGES

SHIPPED FREIGHT COLLECT

J. Philip Humfrey Ltd.

3241 Kennedy Road, Unit 7,
Scarborough, Ontario, Canada, M1V 2J9
Tel: (416) 293-8624

Please rush to me your fully illustrated 1983 catalog. I enclose $3.00 (refundable against purchase).

Name _____

Address _____

City _____ State _____ Zip _____

Workshop Income

Some Thoughts on Low-Cost, No-Cost Advertising

If a business is to succeed, it must have customers. That's a plain and simple fact of business life. And to get customers, there must be some means of telling people about the business: its location, hours, products, and prices among other things. This applies to any business, new or old, large or small, part-time or full-time. In short, it pays to advertise.

Advertising can take a variety of forms, some of it quite expensive, some of it absolutely free. The type that's best for you will depend on your business --there's no single formula that works for everyone. For example, you'll need little advertising if you have a part-time business and are content to spend a few hours each week making a half-dozen wooden toys. However, if you're running a full-blown production shop, advertising will take on considerably more importance --and expense.

In this issue, we'll discuss no-cost, low-cost forms of advertising that may be of value to your business. Next issue, we'll cover some of the more expensive kinds.

Of all forms of advertising, "word of mouth" is one of the least expensive. It's free. However, it doesn't come without work on your part --it must be earned. Your customers must be completely satisfied with your product, from workmanship to price. If they are, they tell their friends and their friends, in turn, become new customers. Some craftspeople rely on word of mouth as their sole means of advertising.

Keep in mind that word of mouth has geographical limitations. If you want to attract potential customers in the next county, chances are this form of advertising won't reach them. Also, always remember that word of mouth can work against you if you generate unhappy customers. If a customer has a complaint with one of your products, do everything you can to correct the problem. The customer will be happy and, in the long run, you will be too.

Your local newspaper presents another opportunity for free advertising. Small newspapers often have to struggle to generate new ideas for articles. Stories about local craftspersons and the work they do is always of interest to readers. Drop a note to the editor and tell him about your business. If the newspaper is interested, they'll usually send a reporter to interview you. You talk about your business and the reporter takes notes and perhaps a few photographs. You don't have to write anything. The reporter goes back to the office and writes the article. Usually it's published within a week or two.

If you're one who has a flair for getting up in front of a group, you may want to consider giving a talk to a local club or civic organization. It's another way to get some advertising at no cost. Just as newspapers struggle to come up with articles, most program directors have a similar dilemma trying to find a speaker each week. Give him a call and let him know you're available. If invited, you might want to take along some of your products. Also, a demonstration is always interesting; perhaps one on how you hand-cut a dovetail or mortise and tenon. It goes without saying that the presentation must be professional and that you must be well prepared. Several dry runs at home will be helpful. For additional information, check your local library for books on public speaking.

(continued on page 14)

TURN YOUR RADIAL SAW AND YOUR ROUTER INTO A PRECISION PIN ROUTER!

$49.95

PLUS $6.00 POSTAGE AND HANDLING

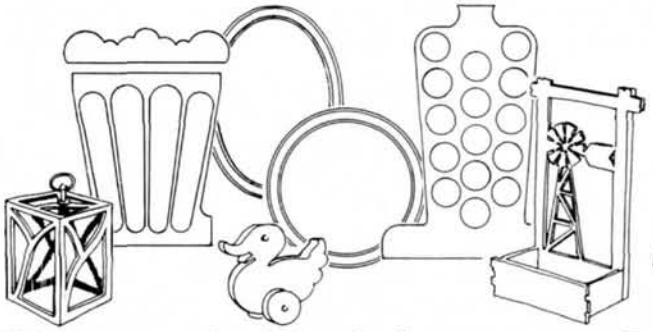
IT'S QUICK AND EASY AS CHANGING A SAW BLADE ... FROM RADIAL SAW TO PIN ROUTER IN A MINUTE!

Just lock the radial saw in the "out-rip" position, remove the blade and replace it with the router bracket. The saw's arbor locks the bracket in the perfect vertical position and wing bolts atop the bracket lock onto the saw arm to prevent pivotal movement. Unplug the saw's power supply. You don't need it. Only the raise/lower mechanism is used. Start the router and crank it down to drill a ¼" hole in the table top. Insert your pin, and that's it! Up to 24-inch throat capacity for larger jobs. Clear plastic safety shield permits full view of work at all times.

WELDED STEEL CONSTRUCTION. BUILT TO LAST!

Bracket fits any radial saw, and holds routers up to 4 ½ inches in diameter. No gears to wear, no moving parts. Extremely simple. Highly effective. You don't have to buy an extra table, an overhead arm and a very expensive rack-and-pinion gear. You have the equivalent in your radial saw! Watch the ads. You can buy a radial saw plus this unique bracket for LESS than you'd pay for a "router arm." Use standard router bits...buy them when and where the price is right. Make templates from inexpensive sink cutouts.

DOES ANYTHING ANY PIN ROUTER CAN DO!



Make one or one hundred copies from your pattern. Do freehand routing, decorative edges, laminate trimming. Build toys, coach lanterns, wine racks, picture frames—limitless gifts and novelty crafts. Perfect copies...and up to five times faster than with conventional methods.

CLIP & MAIL THIS HANDY ORDER FORM OR USE YOUR OWN STATIONARY-(PLEASE PRINT CLEARLY).

SEND CHECK OR MONEY ORDER TO:

JOE NORTH PIN ROUTER BRACKET

P.O. BOX 1348•SAN ANGELO, TEXAS 76902

NUMBER OF UNITS ORDERING _____

AMOUNT ENCLOSED $ _____

IN TEXAS ADD $2.50 SALES TAX PER UNIT.

NAME _____

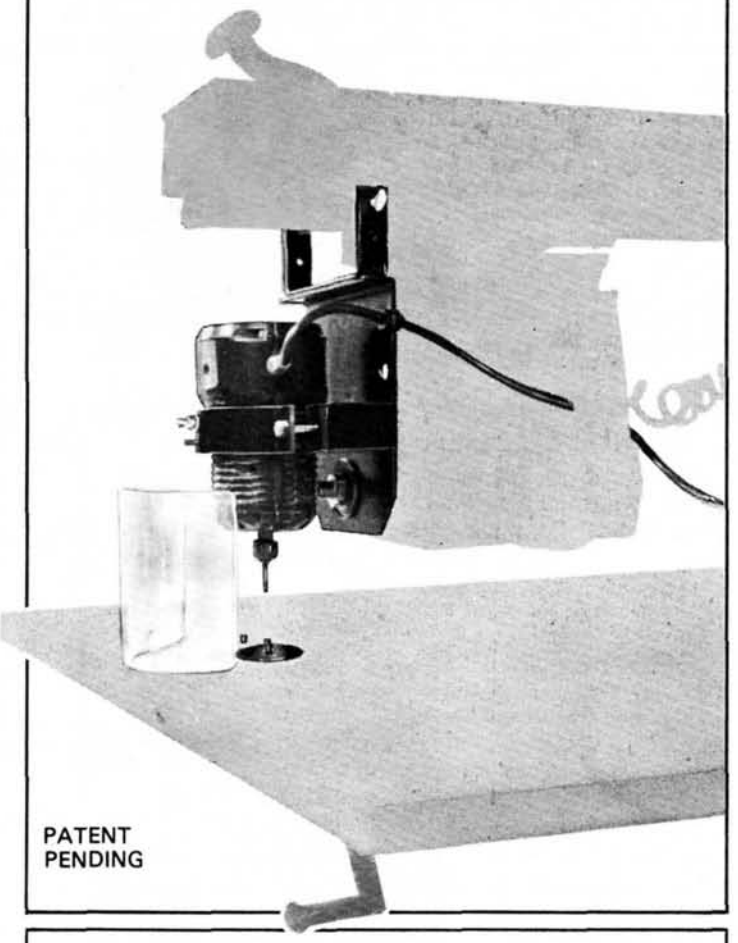
STREET _____

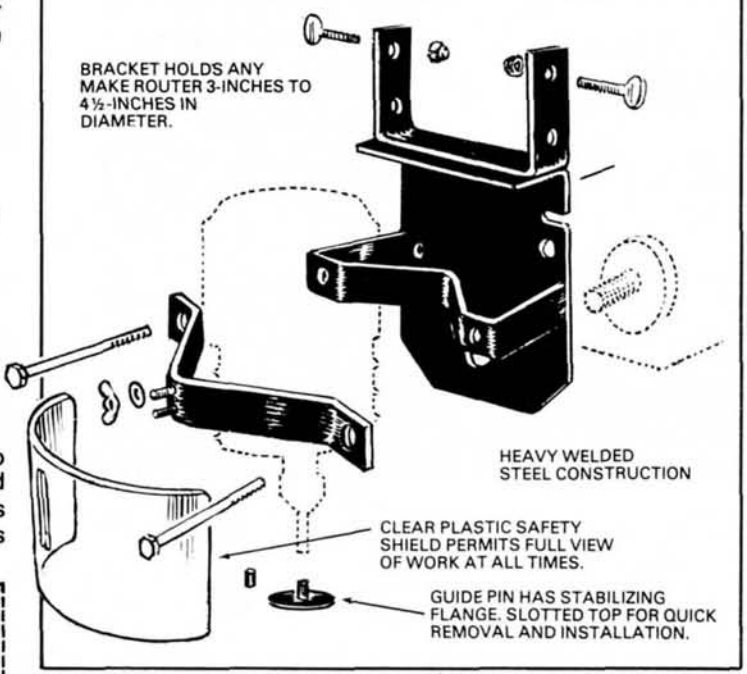
CITY _____

STATE _____ ZIP _____

ALLOW 4 TO 6 WEEKS FOR DELIVERY

JOE NORTH PIN ROUTER BRACKET





•30-DAY MONEY-BACK GUARANTEE! **•FULL INSTRUCTIONS** **•GREAT GIFT!**

THE $6.00 POSTAGE AND HANDLING CHARGE IS FOR EACH ORDER. IF MORE THAN ONE BRACKET IS ORDERED, THIS WILL COVER SHIPPING. THE $2.50 TEXAS SALES TAX APPLIES TO EACH UNIT THAT YOU ORDER, IF APPLICABLE.

JOE NORTH PIN ROUTER BRACKET

P.O. BOX 1348•SAN ANGELO, TEXAS 76902

Workshop Income (Cont'd)

The business card is one form of advertising that every business should have. It adds a professional touch without spending a great deal of money. For around $15 you can have 200 standard (2 in. high by 3½ in. wide) size cards printed. A logo can be added for a few dollars more.

Most importantly, a business card should clearly state the name of your company along with the complete address and telephone number. Keep it simple. After all, the point of the card is to tell people what your business does and where it is located.

Give your card to anyone who expresses an interest in your products. People have a tendency to hang on to a business card and it will serve as a reminder to them at some point in the future.

If a community bulletin board is available, it's worth your while to add your card. After all, the space is there to use at no charge and it just might yield a few sales. The same holds true for supermarkets or any other places that business cards are permitted.

The classified section of your local newspaper presents another opportunity for low-cost advertising. Most newspapers charge on a "per word" or "per line" basis. The larger the newspaper's circulation, the higher the charge. For example, a nearby daily paper with a circulation of around 70,000 readers charges 90¢ per line per day if you run the ad one to three days. Run the ad four to five days and the rate drops to 70¢. For fourteen days you only pay 60¢ per line per day.

A well written classified ad can say a great deal in just a few lines, but it will take some work on your part to get it to the point where it reads just right. Try writing it in several different ways. It may take a dozen rewrites, but don't be satisfied until you feel it reads clearly. Sometimes, the best approach is to write two or three ads, then do some experimenting with them. Run an ad for a few weeks and see how it does. Then run a different ad for the same length of time and compare the results. It's not uncommon to find that a slight change in the wording will have a substantial effect on how it does.

Of course, a classified ad will rarely result in a mass of customers knocking down your door. After all, many newspaper readers ignore the classified section entirely. And of those who read it, only a few will see your ad mixed in with the dozens of others. The point is that if a newspaper has a circulation of 70,000, only a small percentage of that number will see your ad --and even fewer will respond.

When the telephone company says "Let your fingers do the walking through the Yellow Pages", apparently a lot of people listen to them. Their research shows that four out of five adults use the Yellow Pages 34 times a year. It's because, they say, almost everyone receives a Yellow Pages directory or has access to one.

If you have a business telephone, your business is automatically listed in the Yellow Pages at no additional charge. The listing consists of the name and telephone number of the business. It will cost more if you want bold type or if you want to be listed under more than one heading. The rates will vary depending upon the number of people who are served by your directory.

The Yellow Pages also offer display advertising, although the costs jump considerably. A call to the telephone company will get you the rates for your area.

We know it takes advertising to get people to buy your products. With the cost of advertising continuing to grow, it makes good sense to consider some of the low-cost, no-cost ideas that have been discussed here. It may just pay off with increased sales.

WWJ

WE BEAT ANY AD IN THIS MAGAZINE

(If prepaid price is lower, we match the price and give you a gift certificate worth $5.00 when purchasing from our catalog. Few restrictions apply.)

SPECIAL SALE TO READERS OF THIS AD! **Freight prepaid in Continental U.S.A. orders of $35.00 or more.**

You Must Mention This Ad When Ordering. (This ad expires October 25, 1983) (under $35.00 add $2.00 freight)

sale·sale·sale

MasterCard VISA

TREND-LINES, INC.
170C Commercial St.
Box 189C Malden, MA 02148

800-322-6100 Mass 617-324-5500 Non-Order Calls
800-343-3248 Nationwide

Minimum Order $15.00

MAKITA TOOLS

1100	3¼" Planer Kit	$174.95
1805B	6-1/8" Planer Kit	281.95
1900BW	3¼" Planer	92.95
2030	12" Planer/Jointer	1399.50
2040	15-5/8" Planer	1295.00
2400B	10" Mitre Saw	278.50
2401BW	10" Mitre Saw with blade w/electric brake	215.00
3600B	Plunge Router	189.95
3600BR	Plunge Router	181.95
3601B	Router	135.70
3608B	Router	81.10
3700B	Laminate Trimmer	89.95
4200N	4-3/8" Circular Saw	91.95
4300BV	Jig Saw Var. Sp.	124.50
5007NB	7¼" Circular Saw	107.50
5012B	12" Chain Saw	114.95
5081DW	3-3/8" Cord. Saw	108.95
5201NA	10¼" Circular Saw	210.95
6000R	Uni-Drill	109.95
6010D	3/8" Cordless Drill	79.95
6010DW	3/8" Cordless Drill w/Charger	84.95
6010 DWK	Cordless Drill w/charger & case	89.95
6012HDW	Cord. Drill Kit 2-Sp.	109.75
6013BR	½" Reversible Drill	116.50
6300LR	½" Angle Drill	149.30
6510LVR	3/8" Drill-Rev. 0 to 1050 RPM	66.50
6710DW	Cord. Screwdriver	104.50
6800DBV	Drywall Screwdriver	95.75
9030	1-1/8"x21" Belt Sander	118.90
9045B	Finishing Sander	103.90
9045N	Finishing Sander-Dustless	107.50
9207SPB	7" Sander Polisher	136.95
9401	4"x24" Belt Sander	169.55
9501BKIT	4" Sander-Grinder Kit	76.55
9804	Blade Sharpener	585.20
9820-2	Blade Sharpener	159.10
9900B	3"x21" Belt Sander	127.00
9924DB	3"x24" Belt Sander-Dustless	138.90
B04510	Finishing Sander	45.95
B04520	Finishing Sander	50.95
DA3000	3/8" Angle Drill	113.70
DP3720	3/8" Reversible Drill (0-1800 RPM)	51.95
DP4700	Drill Reversible	94.95
JG1600	Jig Saw Single Sp.	78.50
JR300W	2 Sp Reciprosaw Kit	124.75
LP2501	Surfacer	2099.00
LS1400	14" Mitre Saw	429.50
Standard	**ZYLISS VISES**	$99.50
Quick Release		119.50

PONY CLAMP FIXTURES

	Each	Pkg. 6
No. 50 ¾" Pipe Clamp	$7.85	$ 7.10 ea
No. 52 ½" Pipe Clamp	6.40	5.80 ea
No. 56 ¼" Pipe Clamp	9.70	8.65 ea
No. 1215 Band Clamp (WEB)	15' 6.40	5.80 ea
No. 6220 20' HD	40.50	36.50 ea.
No. 7456 Bar Clamp Pads	2.50	2.25 ea

JORGENSEN BAR CLAMPS (Heavy Duty)

	Each	Pkg. 6
No. 7224 24"	$16.50	$14.95 ea
No. 7230 30"	17.25	15.65 ea
No. 7236 36"	17.85	16.15 ea
No. 7248 48"	19.75	17.90 ea
No. 7260 60"	21.55	19.55 ea
No. 7272 72"	23.40	21.20 ea
No. 7284 84" *	25.30	22.95 ea

(3 per pkg.) *No. 7284 only

JORGENSEN BAR CLAMPS (Med. Duty)

	Each	Pkg. 6
No. 3712 12"	$5.85	$5.30 ea
No. 3724 24"	7.20	6.50 ea
No. 3736 36"	8.80	7.95 ea

Catalog $1.00 — Free with any order.

WE SHIP QUICK!

Full Line **MAKITA** Distributor

HITACHI TOOLS

B-600A	14½" Band Saw	$1550.00
CJ65VA	Electronic Jig Saw	139.50
CR10V	Reciprocating Saw	135.75
C10FA	10" Miter Saw	297.50
C15FA	15" Miter Saw	449.00
DRC-10	Cordless Screwdriver	95.00
DR-10	3/8" Drill/Screwdriver	119.00
D6V	1/4" Var. Speed Rev. Drill	67.50
D10V	3/8" Var. Speed Rev. Drill	69.00
D13V	1/2" Var. Speed Rev. Drill	99.75
F-20A	3-1/4" Planer	99.75
JH-60A	Jig Saw	119.50
P50	6-5/8" Planer	295.00
P100F	12" Planer	1150.00
PSM-7	7-1/4" Circular Saw	117.75
PSM-8	8" Circular Saw	143.50
PSM-9	9-1/4" Circular Saw	199.95
SB-75	3x21 Belt Sander-2 Speed w/Dust Bag	135.75
SB-8TA	3x24 Belt Sander-2 Speed w/o Dust Bag	147.20
SB8T	3x24 Belt Sander w/Dust Bag	155.20
SB-110	4x24 Belt Sander-2 Speed w/Dust Bag	182.50
SO-110A	4½x9 Sander	98.50
SOD-110	4½x9 Sander w/Dust Bag	104.00
TR-6	Laminate Trimmer	93.00
TR-8	1 H.P. Plunge Router	123.90
TR-12	3 H.P. Plunge Router	194.75
W6V	Screwdriver	104.95

JORGENSEN HAND SCREWS

		Each	Pkg. 6
No. 3/0	3"	$8.85	$8.00 ea
No. 0	4½"	10.40	9.40 ea
No. 1	6"	11.80	10.65 ea
No. 2	8½"	14.10	12.70 ea

JORGENSEN BAR CLAMPS (5" reach)

	Ea.	Pkg. 6
No. 4512 12" Opening	16.25	14.65 ea
No. 4524 24" Opening	18.15	16.35 ea
No. 4536 36" Opening	20.20	18.25 ea

JORGENSEN CARRIAGE CLAMPS

No. 103 3" Opening	$4.70	$4.25 ea
No. 104 4" Opening	6.35	5.75 ea
No. 106 6" Opening	8.90	8.05 ea
No. 108 8" Opening	15.45	13.80 ea.

JORGENSEN CLAMPS

No. 3325 3 Way Edging	$5.15	$4.65 ea
No. 1623 3" Hold Down	6.85	6.17 ea
No. 3201 HT1 1" Spring	1.40	1.30 ea
No. 3202HT 2" Spring	2.15	1.95 ea

SUNGOLD X-WEIGHT SANDING BELTS

Sold in packs of 10 only. Outlasts regular belts 2 to 1.

Size	Grit	10	50
3"x21"	120	100 .83 ea	.75 ea
	80	.85 ea	.77 ea
	60	.90 ea	.82 ea
	50	.92 ea	.84 ea
	40	.95 ea	.86 ea
3"x24"	120	100 .89 ea	.81 ea
	80	.91 ea	.83 ea
	60	.95 ea	.86 ea
	50	1.09ea	.99 ea
	40	1.12ea	1.03 ea
4"x24"	120	100 1.50 ea	1.36 ea
	80	1.55 ea	1.40 ea
	60	1.59 ea	1.44 ea
	50	1.65 ea	1.49 ea
	40	1.70 ea	1.54 ea

SUN GOLD SANDING SHEETS

9x11 Aluminum Oxide C Weight

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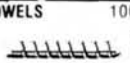

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Restoring Antiques

by John W. Olson

Correcting Flaws In The Finish

No matter how carefully you brush or spray the last coat of clear finish, there will always be at least a few minor defects that will show up upon close examination. And unless these defects are corrected, the final finish is going to be less than perfect. In this column I'll discuss several methods that can be used to correct these common problems.

There are a variety of ways in which a final finish can be spoiled after it is put on. A common source of trouble is one that can't be easily seen, yet it's in the air all around us. In varying degrees, air contains dust, and these free floating particles will slowly settle and stick to a wet finish. With a quick drying finish, like lacquer, the problem is minimized. But with a relatively slow drying finish, such as varnish, it's possible for a considerable amount of dust to come to rest on your finish.

Runs are another imperfection that will detract from an otherwise perfect finish. A run forms when too much finish is applied in one area, usually on a vertical surface. The best way to avoid them is to apply the finish using several light coats rather than one heavy one. It's also important to examine the finish several times as it dries. Any runs that start to form should be immediately brushed out. In spite of this precaution though, sooner or later you're likely to find a run in one of your projects.

Sometimes even nature works against you. You set aside a still wet project to dry and return the next day to find an unfortunate insect imbedded in your project.

Another thing. No matter how carefully you apply a finish, a few brush marks will usually remain - even if you use the highest quality finish, the best brush, and the finest technique.

Fortunately, all these defects are correctable. The first step is to remove the most obvious ones. This can best be done with wet and dry sandpaper. Wet and dry sandpaper is made of very finely ground silicon carbide applied to a waterproof paper backing. It is made in grades of 200 to 600 grit (and finer) and can be purchased in most paint stores and nearly all automotive supply houses. The best grades for furniture work are 400 to 600 grit, and perhaps as coarse as 250 grit if there are some thick sags or runs to remove. Before using any of these papers you must be absolutely sure that the finish is dry and hard. In spite of what the manufacturers may say on the can, it often takes several days for the finish to cure. It will be well worth your time to wait at least three days and as much as 4 or 5 days if the weather is cold and/or humid.

The technique isn't difficult - just tedious. Slow, careful sanding with water or mineral oil (as a lubricant) is the right approach. It is all too easy to get a little too impatient and end up removing the finish down to bare wood.

Begin with the large obvious defects using the 400 grit paper. Wet the surface first and dip your paper into the lubricant. I prefer water but many people use mineral spirits. It seems to me that it is easier to feel surface unevenness when using water. Selective pressure is the best approach. On very small lumps and runs it is possible to use only the tip of one finger. Be sure and sand only on the area that is

(continued on page 18)

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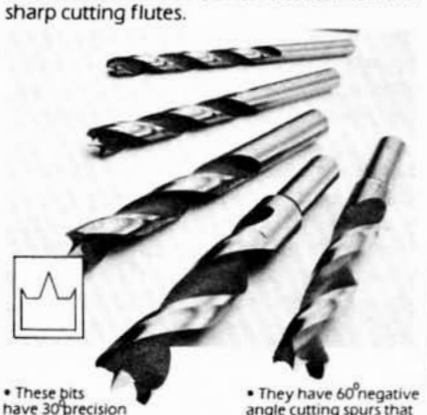

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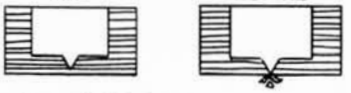

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Restoring Antiques,

(continued from page 16)

raised or you will cut through the surrounding finish in a flash. Try to sand evenly. With large defects there is a tendency to work on the middle part. Work carefully, wipe clean and inspect frequently. When the surface is wet it becomes difficult to tell the finish from the water, and with mineral spirits it's even more difficult. Patching isn't easy and often the only answer for a bare spot is to strip and refinish the whole surface.

Large areas of sags or dust particles can be leveled using a block of wood wrapped with the wet and dry sandpaper. Use plenty of lubricating fluid, wipe dry frequently and inspect carefully. Above all go slowly.

When all the obvious defects have been removed, or nearly removed, shift to 600 grit paper. Work the whole surface to obtain an even texture before beginning the next step. Inspect the surface carefully to make sure that all the scratches left by the previously used grits have been removed. As always, work parallel to the grain of the wood. The minute scratches left on the final surface will not be noticeable if they are running in the same direction as the grain of the wood.

When you are satisfied that the surface will smooth out and polish with rubbing compound, give it a good cleaning. Be sure to remove all traces of dust left by the silicon carbide papers. One speck of grit can result in an ugly set of scratches. In all of the above steps, save the edges and corners till last, and then be very careful. When sanding, corners can become bare wood before you know it.

The next step is to rub down the surface. Restorers who strive for authenticity use pumice and oil instead of silicon carbide papers and then polish with rottenstone and oil. This results in a highly polished surface. These techniques are not recommended for amateurs. They require much training and experience before a satisfactory surface can be obtained. Also, these finishing materials aren't readily available in quality grades. A lot of know-how and experience are required to separate the really good pumice and rottenstone products from the not-so-satisfactory ones.

Today's amateur has no need to bother with these old-fashioned materials. Nearly all paint and hardware stores, and all automotive supply houses stock automotive rubbing and polishing compounds which do a really good job with a minimum of work. Rubbing compound is used first to remove all traces of the minute scratches left by silicon carbide papers. This material can be applied by hand or, on large flat surfaces, with a slow speed polishing machine. By hand it is best to work parallel to the wood grain for the reasons outlined above. With the machine, keep the sheepskin bonnet wet and keep the machine moving so that the surface will not become overheated. If the finish goes too hot it will roll up into little balls under the bonnet, and then a stripping and refinishing operation becomes necessary. Read and follow the manufacturer's directions, and clean and inspect the surface frequently. When the whole surface has reached a dull, even sheen, and a low luster satin surface is desired, a coat of a good carnauba based wax will complete the job. If a highly polished surface is desired, a little more time and work will be required. A good rubdown with automotive type polishing compound will do the trick. As with the rubbing compound, it can be applied by hand or with a machine on flat surfaces. Be sure that all traces of rubbing compound have been washed from the sheepskin pad.

When you have a lot of work to do, keep two bonnets, one for rubbing compound and one for polishing compound. Again, when an even, shiny surface has been reached, complete with a coat of good wax. The wax will improve the general appearance of the surface by leaving an even, shiny appearance. WWJ

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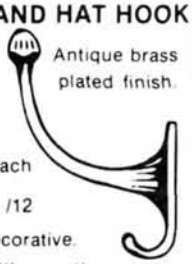

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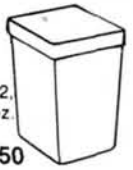

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The Beginning Woodworker

Dovetail Joints: Part Two

Through and Half-blind Multiple Dovetails

Previously, we discussed the laying out and cutting of a single dovetail joint and a few variations. If the beginning woodworker practices making these joints, using both pine and various hardwoods, he will have few problems in making good multiple dovetail joints.

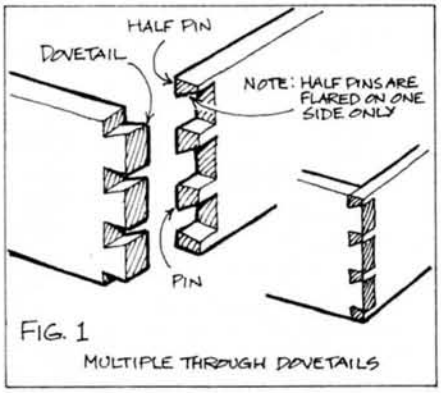


FIG. 1
MULTIPLE THROUGH DOVETAILS

Multiple dovetail joints are excellent in any situations where four boards must be joined at right angles to form a box. One of the most common applications is the joining of drawer fronts and backs to the sides. Multiple dovetails can be machine cut, but every woodworker should know how to make these joints with hand tools. Besides experiencing the pleasures of working wood by hand, the manual skills and confidence gained will be of considerable benefit even when using machinery.

In order to avoid confusion when referring to the parts of a multiple dovetail joint, we shall use the nomenclature shown in Fig. 1. When you plan to use dovetail joints, some thought must be given to the stresses that the joints will be subject to.

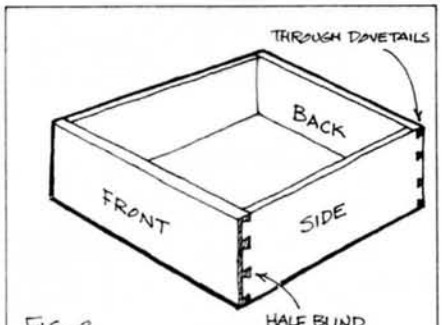


FIG. 2
TYPICAL DRAWER CONSTRUCTION

Fig. 2 shows a drawer assembled with half-blind dovetails at the front and through dovetails at the back. Obviously, the interlocking flaired pins and tails will prevent the drawer front from pulling loose even if the glue should fail, so it's up to you to determine how the joint will be stressed in use and plan your joints so that the wedging effect will be in the right direction.

The size and shape of the pins and tails must also be considered. If you examine the drawer joints on a good quality factory made chest, you'll most likely find that all of the joints are of the half-blind variety and the dovetails and pins are all equal in width. (Fig. 3A). This uniformity is characteristic of machine made dovetails. When cutting dovetails by hand, most craftsmen prefer to make the tails considerably wider than the pins as shown in Fig. 3B. The reason for this is simply that they look less confusing and more elegant. Also, if you're going to take the time to handcut dovetails, you might as well make them so they are not mistaken for machined joints.

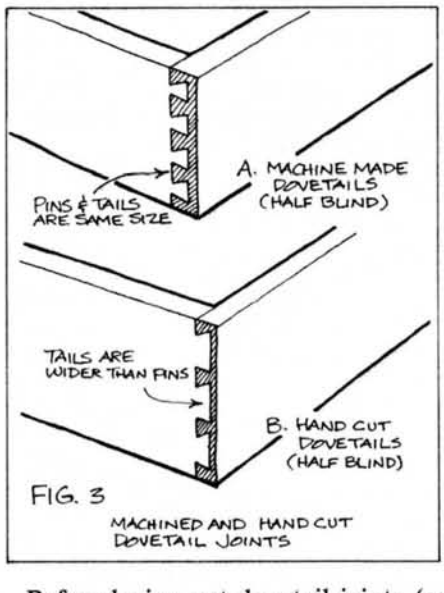


FIG. 3
MACHINED AND HAND CUT DOVETAIL JOINTS

Before laying out dovetail joints (or any other joints for that matter), the joining boards should be dressed flat and have their ends squared. You should also mark the face surfaces of all boards to be joined.

In the July/August issue we discussed the best angle or flare for a single dovetail. This applies also to multiple dovetails. The most practical choice is an angle of about 80 degrees which is equivalent to a taper of 1:6. Too much flare increases the risk of the corners of the tails and pins spliting off, while too little flare reduces the mechanical strength of the joint.

Fig. 4 shows how a 1:6 taper is laid out on a piece of scrap with a clean square edge. The vertical line (marked with a try square), is divided into six equal units which in this case is six inches. At the six inch mark, a horizontal line is drawn and a mark is

made one inch from the point where both lines intersect. A sliding bevel square is held against the edge of the board and the blade is set to intersect the points as shown. Locked

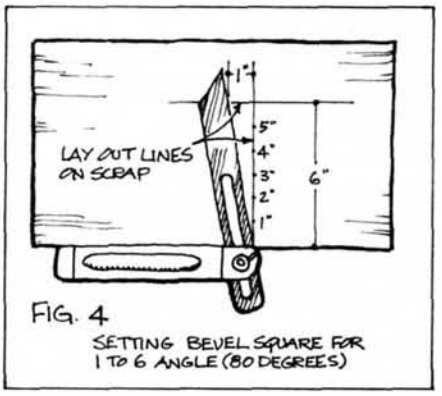


FIG. 4
SETTING BEVEL SQUARE FOR 1 TO 6 ANGLE (80 DEGREES)

at this setting, the blade is used to scribe the angles of the pins. To save yourself the bother of going through this procedure for every project, it's helpful to make a simple template as shown in Fig. 5.

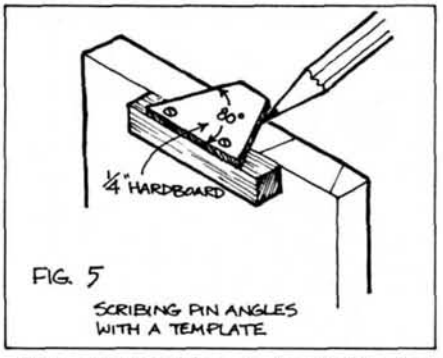


FIG. 5
SCRIBING PIN ANGLES WITH A TEMPLATE

The next problem is to decide how many dovetails (and corresponding pins) are to be cut for the joint. The decision will be based on how wide the mating boards are and your personal preference as to how the pins and tails are spaced.

It's customary to include half pins at each end of the joint. They are called half pins as they are flared on one side only; not because they are half the width of full pins. Half pins give the joint a balanced appearance and are used when the joint is visible but in some applications such as the backs of drawers, they are often omitted.

It's a good idea to lay out the pins and tails on a piece of scrap first, to see how they look. In the case of drawers, the grooves for the drawer bottom have to be considered when planning the spacing of the tails and pins.

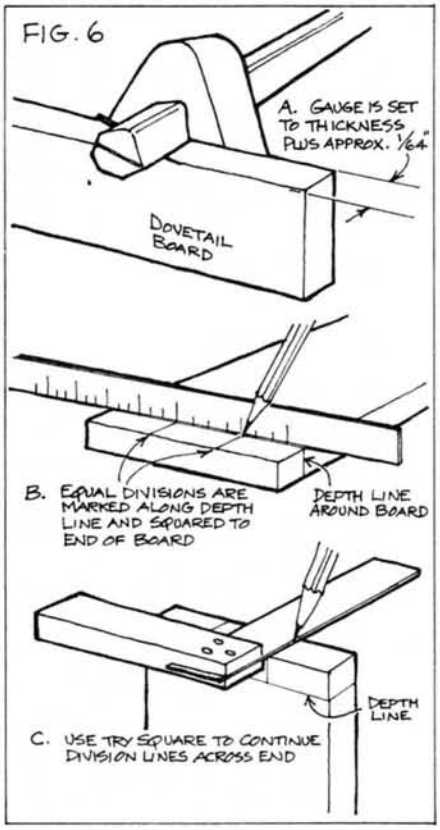
A rule of thumb is to make the pins, at their widest point, two-thirds the thickness of the stock and the dovetails twice the width of the pins. If you are reproducing an antique, you would probably want to duplicate the dovetail spacing of the original.

The first step in laying out the pins for a through joint is to scribe a line around the pin board at a distance

(continued on next page)

from the end equal to the thickness of the mating board plus about 1/64 inch, to insure that the pins and tails protrude slightly after assembly. After gluing up, the joint is then sanded flush.

A marking gauge is best for scribing this depth line. Incidentally, the steel marking pin on the gauge will incise a much cleaner line across grain if you file a flat on one side of the end and bring it to a point like the blade of a knife.



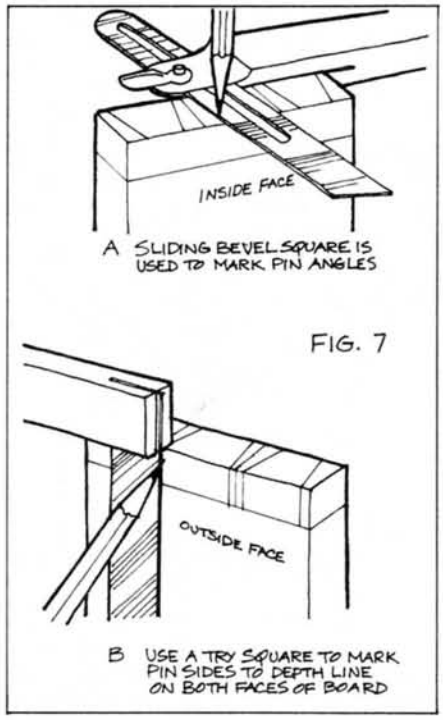
Set the marking gauge against the mating board (the one that gets the dovetails), and adjust the gauge to the thickness of the board plus the extra 1/64 inch (Fig. 6A). With the gauge locked at this setting, scribe a line completely around the pin board.

Your next task is to divide the width of the pin board into equal divisions depending on the number of full pins that will fit on the board. If, for example, there will be three full pins, divide the board into four equal parts.

The divisions are marked along the scribed depth line using a steel rule as shown in Fig. 6B. Use a try square to bring these lines to the end of the board and then continue them across the end grain (Fig. 6C).

These lines represent the center lines of each full pin. If the pins will be ½ in. wide at their widest point, measure over ¼ in. from each side of the center line to establish the location of the flared ends of the pins. Make sure that the outward flare of the pins is toward the *inside* face of the board.

The bevel square, which was previously set at the desired angle, is used to mark the angled sides of the full pins and half pins (Fig. 7A). It's best to use a scratch awl or sharp knife blade to score these cutting lines, but sometimes these incised lines are difficult to see. A hard No. 3 or 4 pencil can be used if care is taken to keep the point sharp so a thin line is scribed. After marking the pin angles on the end grain, the try square is used to bring the lines down both faces of the board to the depth line (Fig. 7B).



The next step is making the saw cuts that will establish the angled sides of the pins (and the waste that must be removed). It's easy to get confused as to which is pin and which is waste, so before you reach for the saw, mark all waste areas with an "X".

All sorts of saws are used for cutting dovetail joints but a thin blade backsaw as shown in the drawings offers good control and is preferred by most woodworkers.

Clamp the pin board vertically in the vise with the face (outside) toward you and lay the saw blade on the end grain on the *waste* side of, and grazing an angled line. Use your thumb knuckle as a guide for the blade.

Tip the front of the blade down and with a light stroke, start a slight groove on the far corner. Then tip the blade down toward you and continue cutting a shallow groove across the end grain.

Once you've scored the end grain at the proper angle, continue a vertical cut down the front almost to the depth line facing you. The saw is then tipped the other way to continue the cut down to the depth line on the opposite face. A few horizontal strokes completes the

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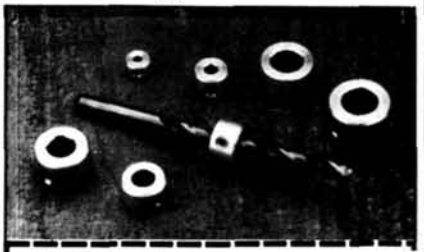

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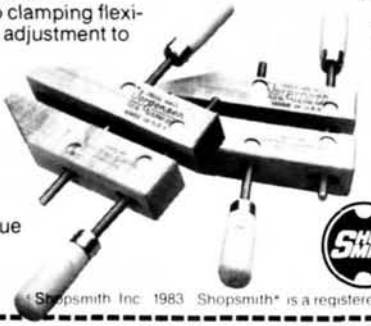

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cut. Take care not to go beyond the depth lines. Fig. 8 shows the sequence of these cuts.

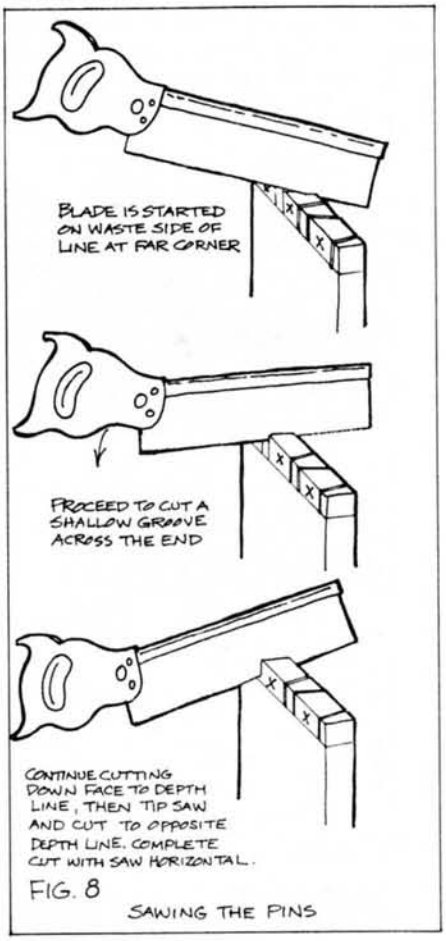
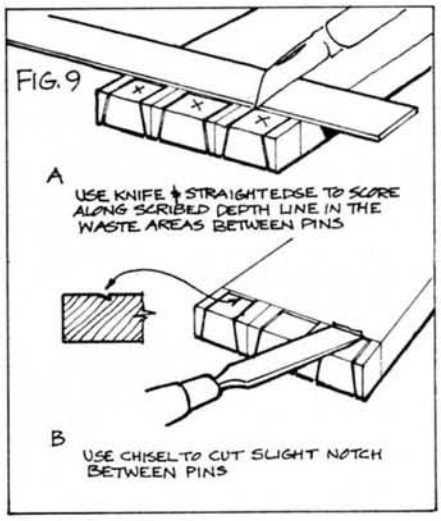


FIG. 8 SAWING THE PINS

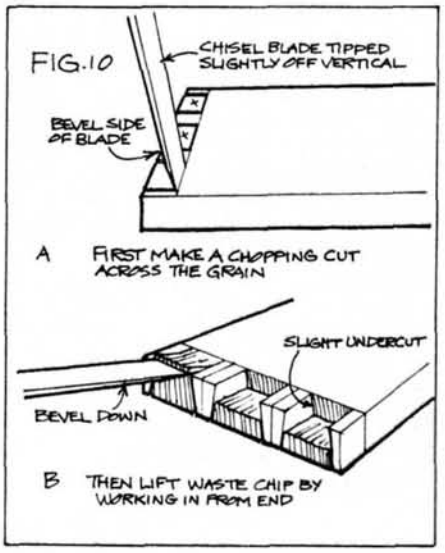
The waste between the cuts must now be removed with a chisel. To do this, clamp the board face up on a solid worksurface protected by a piece of scrap. Use a sharp knife to incise the depth line only across the waste areas. Don't cut across the pin bases as these cuts will show on the finished joint. Take care to cut exactly on the original marking gauge line, using a steel straightedge as a guide (Fig. 9A).



Next, use a chisel with the beveled side down to make a slight V-cut into the incised line. The resulting notch

provides a guide for the chisel and prevents grain splintering (Fig. 9B).

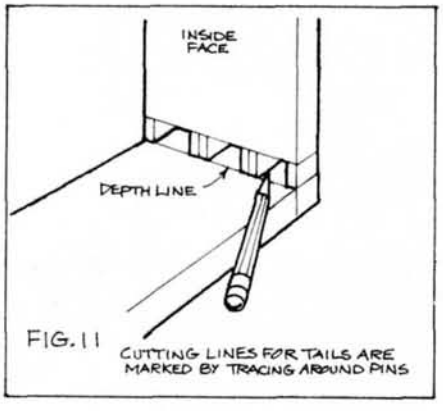
Remove the waste by laying the flat of the chisel blade against the back of the V-notch at the depth line and tilt the chisel handle slightly towards the end of the board. This will result in a slight undercut which will help insure that the joint pulls up tight (Fig. 10A).



A couple of smart mallet blows are made, then the chisel is placed flat side up against the end grain and about 1/16 in. down from the corner. A light tap will lift a chip out (Fig. 10B).

This process is repeated until you've removed half the thickness of the board at which time it's flipped over, clamped and the same process is repeated on the other face. There will still be a small amount of waste in the corners which is pared away with the chisel.

When all the waste has been removed, the sides of the pins should be perpendicular to the depth line. Check this with a try square and carefully pare them if necessary.



The mating dovetails are tackled next. Again, a depth line is scribed around the mating board at a point from the end equal to the thickness of the pin board plus about 1/64 in. The board is placed face down on the bench and the pin board is held in place on it so that the board edges are flush and

(continued on next page)

the inside face of the pin board is aligned with the depth line on the dovetail board.

Use a hard, sharp pencil or knife to scribe the shape of the pins on the inside of the dovetail board as shown in Fig. 11. The scribed lines are carried across the end grain and squared down the other face to the depth line.

To saw the tails, place the board in the vise with the scribed side facing you and tilted so that a set of angled cutting lines are vertical. The procedure for sawing the tails is the same as that described for sawing the pins. When one series of cuts at the same angle have been made, reposition the board and saw the rest.

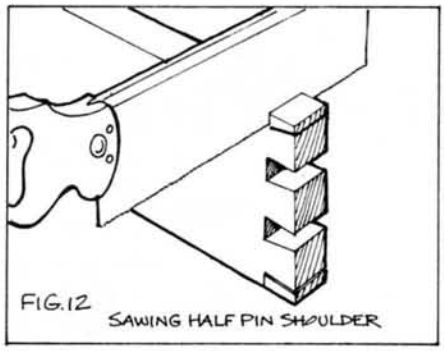


FIG. 12 SAWING HALF PIN SHOULDER

The waste between the dovetails is removed in the same way as was done on the pin board; however, do not undercut at each end where the half pins will fit. The waste that corresponds to the half pin is removed by sawing down from the board edges as shown in Fig. 12. Use a chisel to pare the resulting shoulder clean.

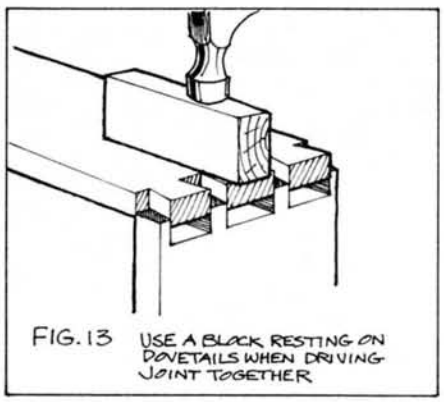


FIG. 13 USE A BLOCK RESTING ON DOVETAILS WHEN DRIVING JOINT TOGETHER

When trial fitting the joint, use a protective block and mallet to tap the joint partially closed as shown in Fig. 13. If there are fitting problems, you will see them right away. Forcing a too-tight joint together may cause splitting; besides you have to disassemble the joint again to apply glue. If you were using this joint to build a drawer, you would run grooves to hold the bottom before gluing the drawer together.

When you're satisfied that the joint fits, spread glue on the sides of the dovetails and drive the joint together.

(continued on page 28)

Roll Top Desk Plan

FULL–SIZE PLAN includes instructions for pedestal base & upper tambour roll top with bookshelf. Desk has 2 pull-out manuscript boards & 7 drawers, two with suspension files. Full size template for tambour is included. Size is 21" x 55" x 48" high. Price is $12.50.
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Half-blind dovetails are used when you do not want the end grain of the dovetails to show on one side of the joint (Fig. 14). Typically, this type of

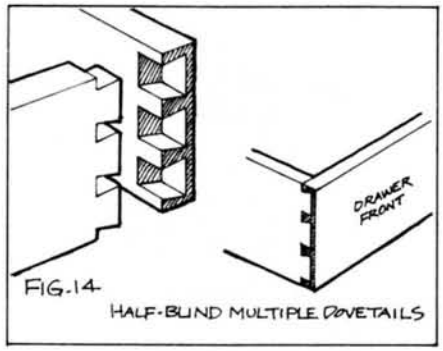


FIG. 14 HALF-BLIND MULTIPLE DOVETAILS

joint is used to join drawer fronts to the sides. Since drawer sides are usually thinner than the fronts, the pins are cut into the thicker front. The size and spacing of the pins and tails can be the same as for a through joint.

A depth line is first scribed on the pin board so the marking gauge is set for the exact thickness of the dovetail board (do not include 1/64 inch extra), and this thickness is scribed across the *inside* face near the end of the board.

The marking gauge is then reset to about 2/3 the thickness of the pin board. This measurement is scribed along the end grain of the pin board with the face of the gauge held against the *inside* face of the board. This line establishes the bottom of the dovetail socket. With the gauge at the same setting, scribe a depth line around the end of the dovetail board (Fig. 15).

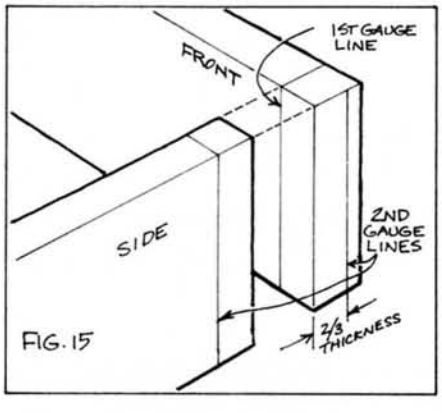


FIG. 15

It's advisable to lay out and cut the dovetails first as it is difficult to accurately transfer the shape of the pins to the tail board because of the blind sockets.

The dovetails are laid out and the angled sides are scribed with the bevel square on the outside face of the tail board. The techniques for sawing and removing the waste are similar to those described for the through joint.

After the tails have been completed, the pin board is clamped upright in the vise and the tail board is placed on it so the edges are aligned and the ends of the dovetails rest on the end grain exactly on the marking gauge line (Fig. 16).

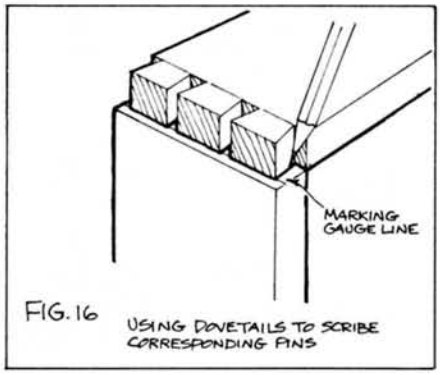


FIG. 16 USING DOVETAILS TO SCRIBE CORRESPONDING PINS

The shapes of the dovetails are transferred to the pin board by scribing around them with a sharp pencil or knife. These lines are then brought down the inside face of the pin board to the depth line.

The pins can only be partially sawed by starting the cut at the inside corner and sawing until both depth lines are reached (Fig. 17).

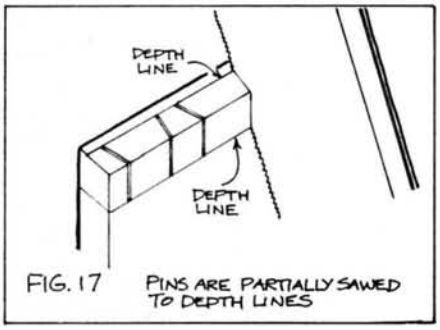
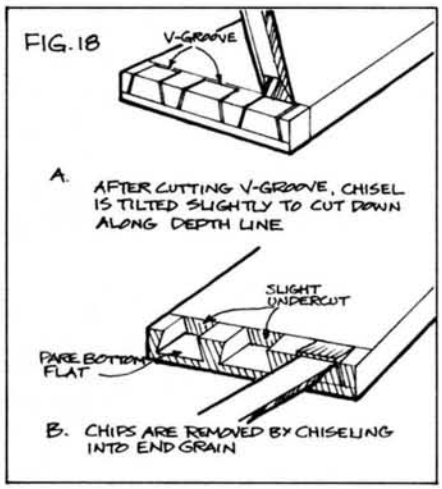


FIG. 17 PINS ARE PARTIALLY SAWED TO DEPTH LINES

Although the tail sockets do not go all the way through the pin board, the chiseling procedure is pretty much the same as for the through joint. Notches are cut along the depth line and the chisel is used slightly off vertical to chop down along the line. The chips are then lifted by working into the end grain (Fig. 18 A&B).

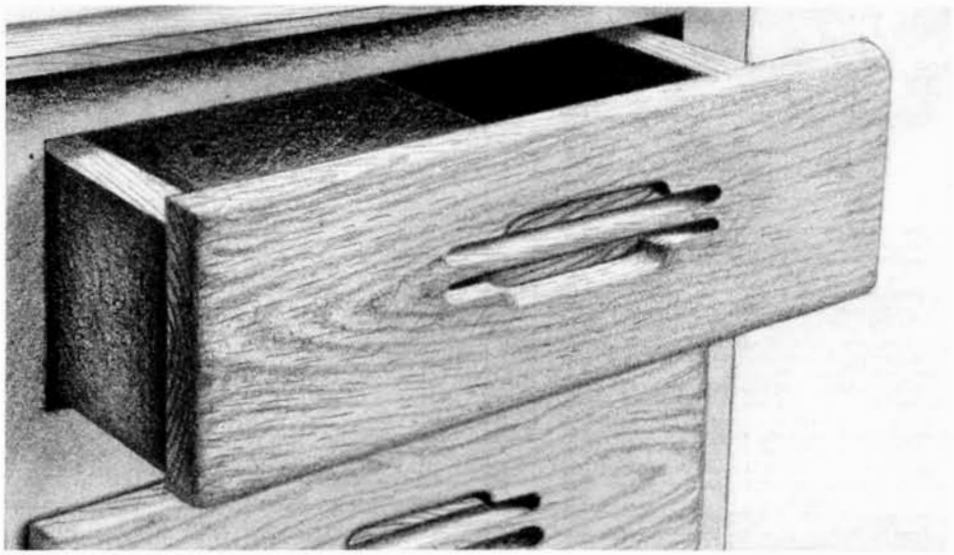


Because of the partial saw cuts, the inside corners will need to be cleaned

(continued on page 66)

Special Techniques

A ROUTED DRAWER PULL



Drawer pulls can be routed into facing boards which are then fastened to drawer fronts to add a distinctive sculptured look to your chests and cabinet systems. One such pull design is offered here, but this is only one of many possibilities. You can create your own pull designs so that your work will be a most unique personal statement.

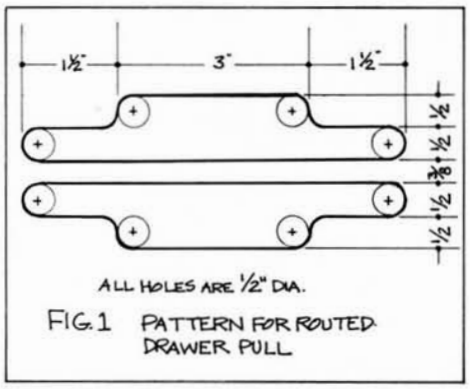


FIG. 1 PATTERN FOR ROUTED DRAWER PULL

To start, a full size pattern, as shown in Fig. 1, is laid out on a piece of ¾ inch plywood almost as long as the facing board. If the pattern is drawn centered on the plywood, it will be easier to place on the facing board. If the pattern is not centered, you can trim the plywood until centering is established.

Locate and mark centers for the eight ½ inch diameter holes, then center punch and drill them. A saber saw can be used to cut out the waste areas of the design, staying inside the lines. Use a file to smooth the saw cuts down to the lines.

Place the pattern board on the back side of a drawer face blank, centered in both directions, and fasten it temporarily with two No. 6 x 1¼ inch flat head wood screws. The screw heads should be countersunk so they will not interfere with the routing operation.

Using the pattern board as a guide, drill the eight holes completely through the drawer face as shown in Fig. 2. To minimize splintering on the face side of the workpiece, back it up with a piece of scrap and drill at a slow speed. If care is taken in drilling, the pattern board should last for many duplications.

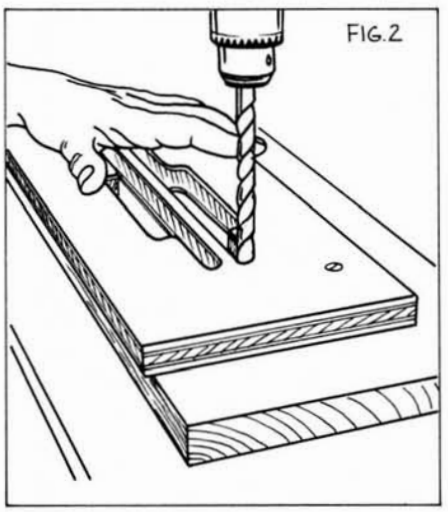


FIG. 2

(continued on next page)

Special Techniques (cont'd)

After drilling, use a sharp pencil to trace the outline of the pattern onto the blank. The pattern board is then removed from the face board and a saber saw is again used to remove most of the waste from the traced design. Keep the cuts close to and inside the lines (Fig. 3).

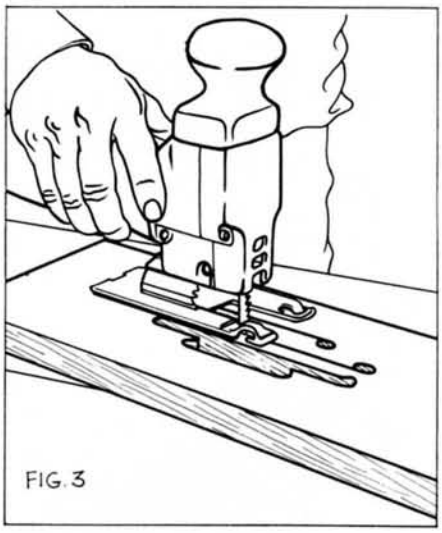


FIG. 3

Next, reattach the pattern board to the drawer face and clamp the two down to the bench with the pattern board on the bottom. Place a few thin pieces of scrap underneath the pattern board so that the router chips can fall out of the way.

Use a 1 inch long trimmer bit with a guide bearing to clean up the edges of the design. Since most of the waste was removed with the saber saw, this should be a smooth cut (Fig. 4).

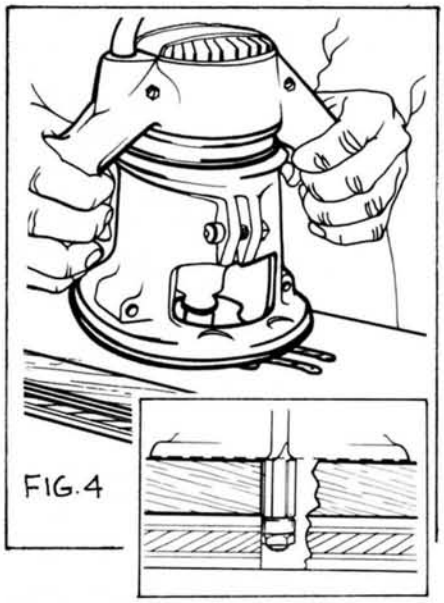


FIG. 4

Remove the pattern board again and use a ¼ inch radius cutter (bearing guided) to round over all the outside edges of the routed pull. If the drawer facing will overlap the drawer opening, you may want to round over the four outside edges with a ⅜ inch

rounding over bit.

The last cuts are made on the back side of the facing board with the router and a straight cutter (no bearing). Set the cutter for a 3/16 inch deep cut and rout away part of the thickness of the back of the center

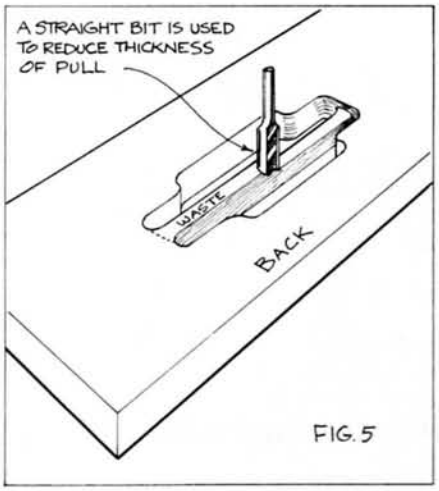


FIG. 5

pull (Fig. 5). Then reset the cutter for a ⅜ inch deep cut and rout again until the center pull has been reduced in thickness (from front to back) of about ⅜ inch. Two cuts are necessary to get a clean splinter-free cut. All faces and edges of the routed board are then sanded.

If the routed facing board is to fit flush within the drawer opening, hold it in position and centered in the opening. Ideally, there should be a slight clearance all around. Open the drawer from inside the cabinet and use a handscrew to clamp the facing to the drawer front.

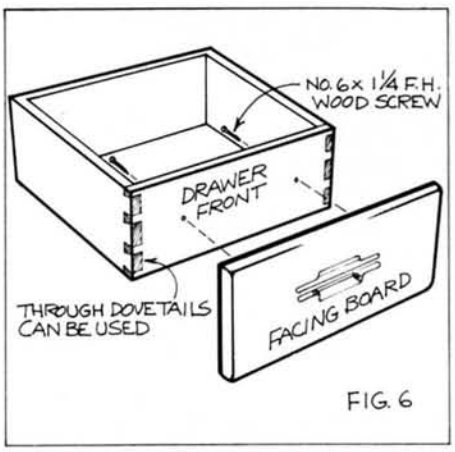


FIG. 6

Drill and countersink the drawer front from the inside and attach it to the facing board with two No. 6 x 1¼ inch flat head screws (Fig. 6). Mounting the facing in this way permits a slight adjustment in any direction to center the facing in the opening. It also permits dismounting for repair, refinishing or replacement.

Paul Levine

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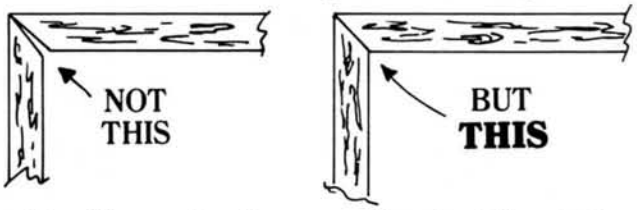

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Working Wood Co-operatively

by Mark Brady

In modern day America, land of record interest rates, rising tool costs, ever-increasing energy expenses, and exorbitant overhead and start-up costs, how can a creative, evolving craftsperson establish an independent studio or workshop? To single-handedly sustain a fully equipped, independent operation is probably beyond comprehension for most of us. Not to be put off by such obstacles however, three Northern California woodworkers faced this problem in 1975. They crafted a simple and satisfactory solution which is in operation today as the Southbay Woodworker's Co-operative.

Like many good ideas, this one began of necessity. Don, Dennis and Brad knew each other as fellow woodworkers, each with a variety of power tools housed in separate make-shift woodshops, a.k.a. garages. The three men felt a basic liking for one another and so one day they began discussing the possibility of garaging their different tools all under one roof. Out of that discussion it was learned that each of them wanted to turn his own workshop into an office or family room. Since the noise and the dust of a fully equipped wood shop might possibly be an aesthetic deterrent to the single person's office or family room, the three acquaintances began looking into the possibility of renting a neighbor's garage. In the midst of that search they stumbled onto a 1,700 square foot building available in an industrial park for $435 per month. No lease was required and the rent seemed reasonable enough, so they took the space on a monthly basis and began to set up shop. Soon the first counters, shelves and work tables were installed and some tools moved in. Then word wandered out into the community. Immediately the original three were joined by Bruce and Marshall. By the end of the first month the shop was completely set and ready to go with two table saws, a jointer, a radial-arm saw, a large compressor with a complete air system, a 36 in. belt sander, a planer, a shaper, several dozen pipe and C-clamps, and all the varieties of glue and sandpaper a sawdust jockey could ever utilize.

Good ideas do seem to have a life of their own. Indeed, word of the Co-operative continued to spread and in the second month the starting five were joined by Walter and Jonathan, two more large work tables, a stereo, a bandsaw, a variety of router jigs, a drill press, a floor model jigsaw, a lathe, and a wide assortment of hand power tools. This certainly seemed proof that the time was right for this idea to be born.

And so it was. News of the assembly continued to spread and wood suppliers and tool and hardware vendors soon came calling, offering discounts for bulk purchases and special deals for many of their more expensive items. Also around this group of initial members came other woodworkers, professionals and novices alike, all with tips and tools of their own. By the end of the year it was necessary to agree that no new members could be offered space until a current member moved on.

When I found the Co-operative in the Fall of 1980, it held 11 members and had been operating successfully for more than five years. Don, Dennis, and Brad, all three of the founding members, were each making preparations to move on, thus space was immediately available for me. I took it, but not without reservations. What if I didn't like the other members? What about some of the machinery that I knew absolutely nothing about? Also, I didn't want

(continued on page 35)

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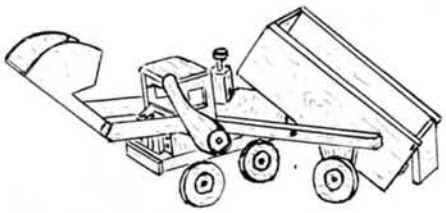

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Working Wood Co-operatively,

(continued from page 33)

other people ruining my $90 double-ground, carbide-tipped blades. And what would happen if my tools or materials were stolen? How did 11 people work together? Who decided who worked where? My list of apprehensions went on and on. Acknowledging these as genuine concerns, I signed on anyway and told myself I would leave after two months if I didn't like the way things turned out.

Well, more than two *years* later, things have indeed "turned out", although not always as smoothly and not always the way I might have wished them to. However, the view from the inside is considerbly different than the one from the outside looking in. First of all, as a Co-op member each person shares equal responsibility for the shop. We all agree to operate within established, written guidelines when we become a member. When a member doesn't abide by the guidelines it is usually with good reason and it frequently points to some need for change. And in the two years that I have been a Co-op member a number of changes have been made. Dues were increased, guidelines clarified and storage space reapportioned. Also, whatever problems have arisen, we have been able to co-operatively resolve. For example, several times my tools have been broken and either the responsible individual or the Co-op entity has seen to the repair. As for 11 people effectively utilizing the work space, only rarely is it a problem. The most members I've ever had to work with in the shop at any one time (except for pre-planned clean-up days) has been five, and that number only rarely. Once in a while, depending on how I might be feeling on a particular day, even two people in the shop feels like too big a crowd. On those occasions I simply come back at a less busy time.

By and large, the mood and spirit in the shop is a light one and truly co-operative. In part I suspect this is so because the Southbay Woodworker's Co-operative has a fairly loose structure. Briefly it's set up like this: There are a maximum of 11 equal members who pay a security deposit of $70 and the first month's rent of equal amount. Each member completes a registration form with his home address, phone number and person(s) to be contacted in an emergency. Additionally, a $5 key deposit is tendered, and then each person is given a key and the guidelines to read. This completed, he or she becomes eligible to use the shop at any hour, day or night. Here's how the $770 dues ($70 x 11 members) are generally spent each month: rent- $655, liability insurance- $40, phone- $15, gas and electricity- $35 average, sandpaper, glue, repairs and miscellaneous purchases- $25. All major power tools in the shop (e.g. table saws, planer, drill press, etc.) are individually owned and available for any member's general use with the Co-op being financially responsible for maintenance and repairs. Special, individually owned tools, such as routers, electric or manual hand planes, diamond blades, etc. are kept under personal lock and key in the shop, but are usually available for other's use with the tool owner's permission and/or supervision. Some items have been bought and are owned by the Co-op as an entity, such as a vacuum-powered dust collection system, a large (60 gallon) air compressor, and a number of air-powered tools (nailers, staplers, and orbital and dual-action sanders). These are all available for general use by the membership.

A treasurer and an assistant treasurer volunteer to sign the lease, sign checks, make needed shop purchases, deposit dues and generally be responsible for the month-to-month operations. Members pay their dues in the following manner: In January every year, each member gives the acting treasurer 12 personal checks for $70, dated the 20th of each one of the months to come. As the 20th of, say, May comes along, the acting treasurer simply deposits the 11 checks previously dated May 20th into the Co-op's account.

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Working Wood Co-operatively,

(continued from page 35)

This account then has cash on hand to pay all bills due on June 1st. With this method people don't have to constantly remember to pay their dues on the 20th and the money is always available to pay creditors. Should a member leave the Co-op in mid-year, the unused, pre-dated checks are returned along with their security deposit. When the key is returned, so is that deposit. Departing members are also encouraged to find suitable replacements for themselves.

One important agreement I made with myself when I joined the Co-op (since it would not be my full-time occupation) was that I would unfailingly put in sufficient time each month to construct and sell enough pieces to cover at least the cost of membership. The shop had a free scrap barrel from which I could produce a myriad of small items: lap desks, cutting boards, signs, trivets, stools, boxes and anything else I could dream up. These all turned out to be projects I never got to. The first month after I became a member a local librarian heard about me through friends and ordered $3000 worth of simple plywood bookcases for the library storeroom! So much for minimally covering the cost of membership.

And that's how it's been for more than two years now. One job has consistently led to another. In this time I've learned a tremendous amount about woodworking. I've also expanded my interest and ability in the craft. In addition I've learned a lot about myself and about other people, but mostly I've learned firsthand a lot about co-operation, probably best pointed up by the Co-op experience of Jackie.

Jackie joined the group about four months after me. She had some woodworking experience, but was primarily a talented artist and designer. For about six consecutive months she spent most of her free time doing small pieces, asking questions and learning all she could. At the end of that time she decided that she was going into the business of making and selling children's wooden toys. Realizing that this full-time enterprise would be making new and excessive demands on space and machine time in the shop (since it's not really designed or intended to support any single person working there 8 hours a day, five or six days a week), Jackie asked for ideas and for the group's support in this undertaking at a business and clean-up meeting. By meeting's end, a plan was worked out. New storage space was built and an acceptable work schedule for her was agreed upon. Also, a further agreement to re-evaluate the situation in four months was made. However, in three months time, demand for Jackie's toys was so great that she not only attracted a partner with venture capital and new design ideas, but she had to hire other employees and buy several additional jig saws and sanders. Needless to say, Jackie soon found a place of her own necessary to successfully set up and operate her new full-time business, Warm Wood Gifts.

WWJ

Mark Brady is a licensed California general building contractor. Readers wishing to know more about the forms, finances and guidelines of the Southbay Woodworker's Co-operative are invited to send $1 c/o the author at P.O. Box 1094, Menlo Park, CA 94025.

Cabinetmakers' Supplies

Furniture Kits

As a service to our readers, *The Woodworker's Journal* periodically lists sources of supply for various woodworking products. In this issue we've included a listing of some of the mail-order companies that sell furniture kits. In most cases these kits come pre-cut, pre-sanded, ready to assemble, and require only a minimum of tools. In addition to assembly instructions, some also supply the necessary hardware, sandpaper, and glue.

The Bartley Collection, Ltd.
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Concord, MA 01742
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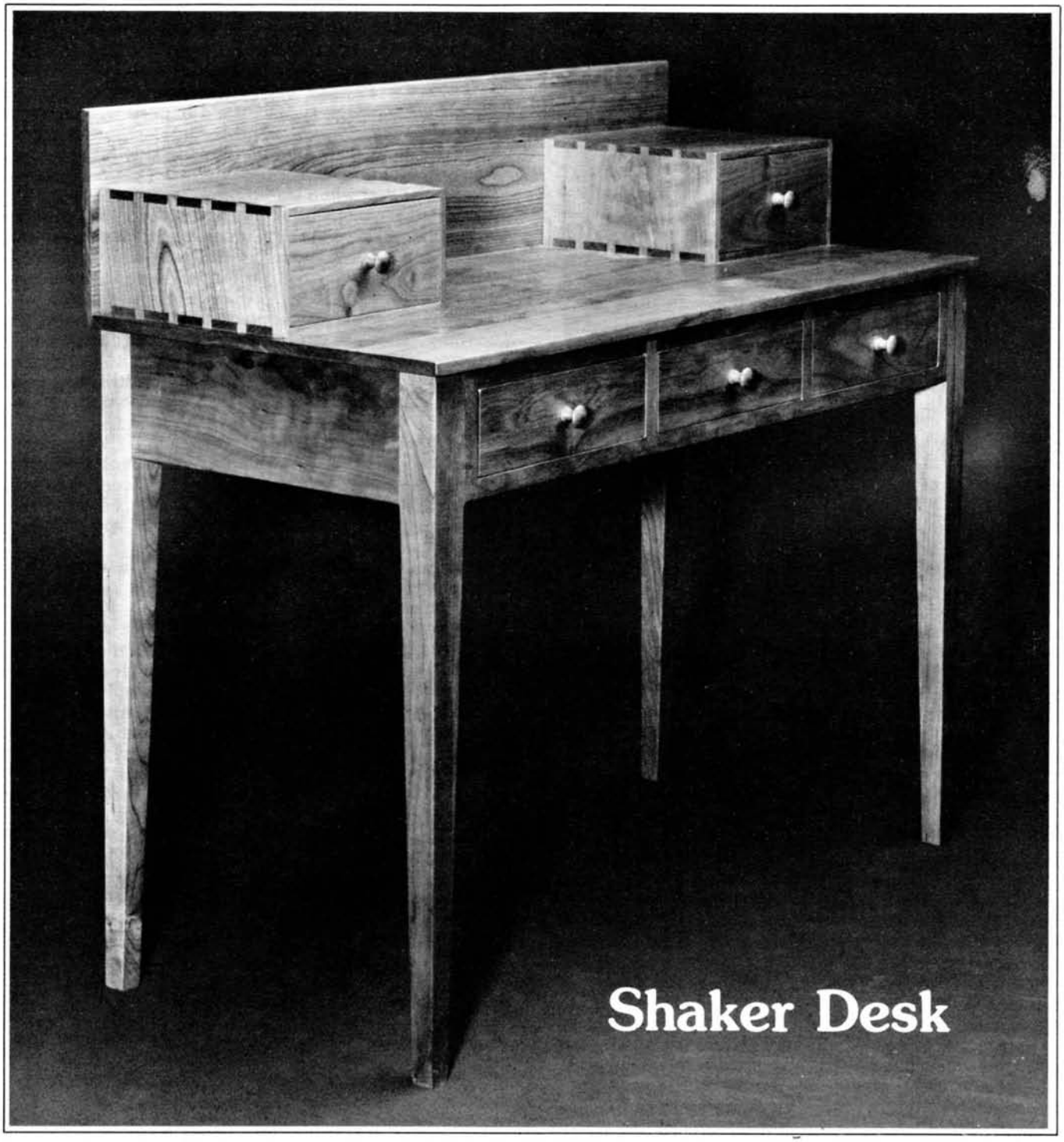

We discovered this lovely example of a Shaker writing desk at a local cabinetmaker's shop. While not an exact reproduction, the overall design is very nearly the same as the Shaker original.

Cherry was used for this piece, a wood commonly chosen by the Shakers. The drawer sides, back, and bottom are made of pine, although maple could also be used here.

The four legs (A) can be made first. From 2 in. stock (which actually measures 1¾ in.), rip each leg to a width of 1¾ in. Although the overall length of the legs is 27⅛ in., it's best to initially cut them slightly oversized, then trim them to final length later on.

Lay out and mark the location of the apron mortises on each leg. To cut each mortise, use a drill press equipped with a ⅜ in. diameter bit and drill a series of holes. This will remove most of the material and what remains can be cleaned up with a sharp chisel. Be sure to cut the mortise about 1/16 in. deeper than the tenon length. This extra depth will allow room for any excess glue that may be in the joint when it is later assembled. If the joint does not have room for excess glue, it becomes just about impossible to make it close.

At this time, also cut the small mortises for the drawer frame (parts D and E) tenons. These can best be cut with a chisel.

Referring to the drawing, note that each leg is tapered down to 1 in. on two sides. The taper starts at a point just below the apron (B), 5¼ in. from the top of the leg. If you have a tapering jig for your table or radial-arm saw, this is a good time to use it, although a good sharp hand plane will also do the job in little time.

The two side aprons (B) and the back apron (C) can be made next. Cut to the length and width shown in the bill of materials, making sure to include the tenon length. Although the tenons can be cut by hand using a back saw, we generally prefer to use a table saw equipped with a dado head cutter. Set the dado head to a height (about 3/16 in.) that will provide a snug fitting tenon when both cheeks are cut, then use the miter gauge to pass the stock over the cut-

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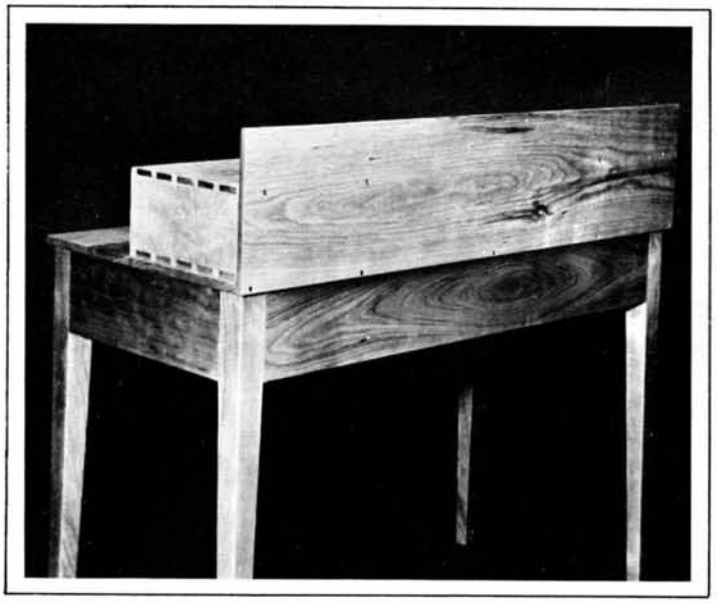


ter. It's best to make some test cuts on scrap stock before starting.

Cut the inner and outer dividers (parts F and G) to overall length from ¾ in. square stock. Use a sharp hard pencil to lay out the dovetail profile, then use a dovetail or fine-toothed back saw to cut out. For best results, cut just on the outside of the line, then use a sharp chisel to pare the material exactly to the line.

Next, make the upper and lower drawer frame (parts D and E). Cut to overall length from ¾ in. square stock, then lay out the location of the dovetail pins. To insure accuracy, use the divider dovetails as templates. And to avoid confusion later on, label each divider dovetail and its corresponding pin on the drawer frames. Once marked, use a dovetail saw and chisel to remove the pin material. Cut just inside the line and use the chisel to pare to an exact fit.

Before assembly, give the legs, aprons, drawer frame members and dividers a thorough sanding. Be sure to remove any unsightly planer marks that tend to give a washboard effect to the stock.

Assemble each side apron (B) to a pair of legs as shown. Apply glue to the apron tenon, then assemble the leg and clamp with a bar or pipe clamp. Use scrap stock as clamp pads to prevent marring the legs. Check for squareness before setting aside to dry.

The inner and outer dividers (F and G) can now be glued to the upper and lower drawer frames (D and E). Use glue and clamp lightly. When dry, this frame unit and the back apron (C) can then be joined to the two previously glued subassemblies consisting of the side apron and legs. Again, use bar or pipe clamps and check for squareness before setting aside to dry.

Now the side apron and back apron cleats can be cut to length from ¾ in. square stock. Properly cut, they should fit snugly inside the legs. To permit the cleats to be screwed and glued to the aprons, drill and countersink each one for ¾ in. x #8 flat headed wood screws.

The lower cleats serve as a means for the bottom (L) to be attached. They can now be secured in place, keeping in mind that they are located ¾ in. from the bottom edge of the apron (see drawing).

The upper cleats provide a means for attaching the top (M) and need to be predrilled and countersunk before assembly. To permit expansion and contraction of the top, these holes should be slotted in parts H.

The bottom (L) can now be cut to size from ¾ in. thick birch plywood. Note that it will have to be notched at the corners in order to fit around the legs. With the desk base unit upside down, drop the bottom in place, then drill and countersink holes for 1¼ in. x #8 flat head wood screws.

Next, cut the inner and outer drawer guides (parts J and K) to length so they fit snugly between the dividers and the back apron cleat. Secure to the bottom (L) with round headed wood screws and washers. It's best to make the drawer guide holes slightly slotted so they can be adjusted later on when the drawers are added.

Part M, the top, is made from ½ in. thick stock. If you can't get ½ in. stock, most millwork shops will plane down ¾ in. material. Or, if you have a band saw, you can resaw narrow stock to ½ in. thickness.

Cut the top boards a bit on the long side (about 40 in.) before edge joining. Since the edges have a tendency to slip over each other when clamp pressure is applied, it's a good idea to add two or three ¼ in. diameter dowel pins to each edge joint. Apply glue to all mating surfaces (the dowel pins don't need any) then clamp firmly with bar or pipe clamps. Following this, the back (O) can be made in the same manner.

The battens (part N) serve to stiffen the top and prevent warping. They are cut to fit just inside of parts I and L, but are attached only to the top. Four slotted holes (to allow expansion and contraction of the top) are drilled in each batten to take 1¼ in. x #8 round head wood screws and washers.

The dovetailed drawer box (parts P and Q) are made from ⅜ in. thick stock as shown. For a thorough description of cutting dovetails, see The Beginning Woodworker column on page 20 of this issue. Once cut, the box is assembled as shown. Again, use glue and clamp firmly. Check for squareness before setting aside to dry.

Both the top (M) and the back (O) can now be thoroughly sanded. Work through 220 grit to insure a smooth surface.

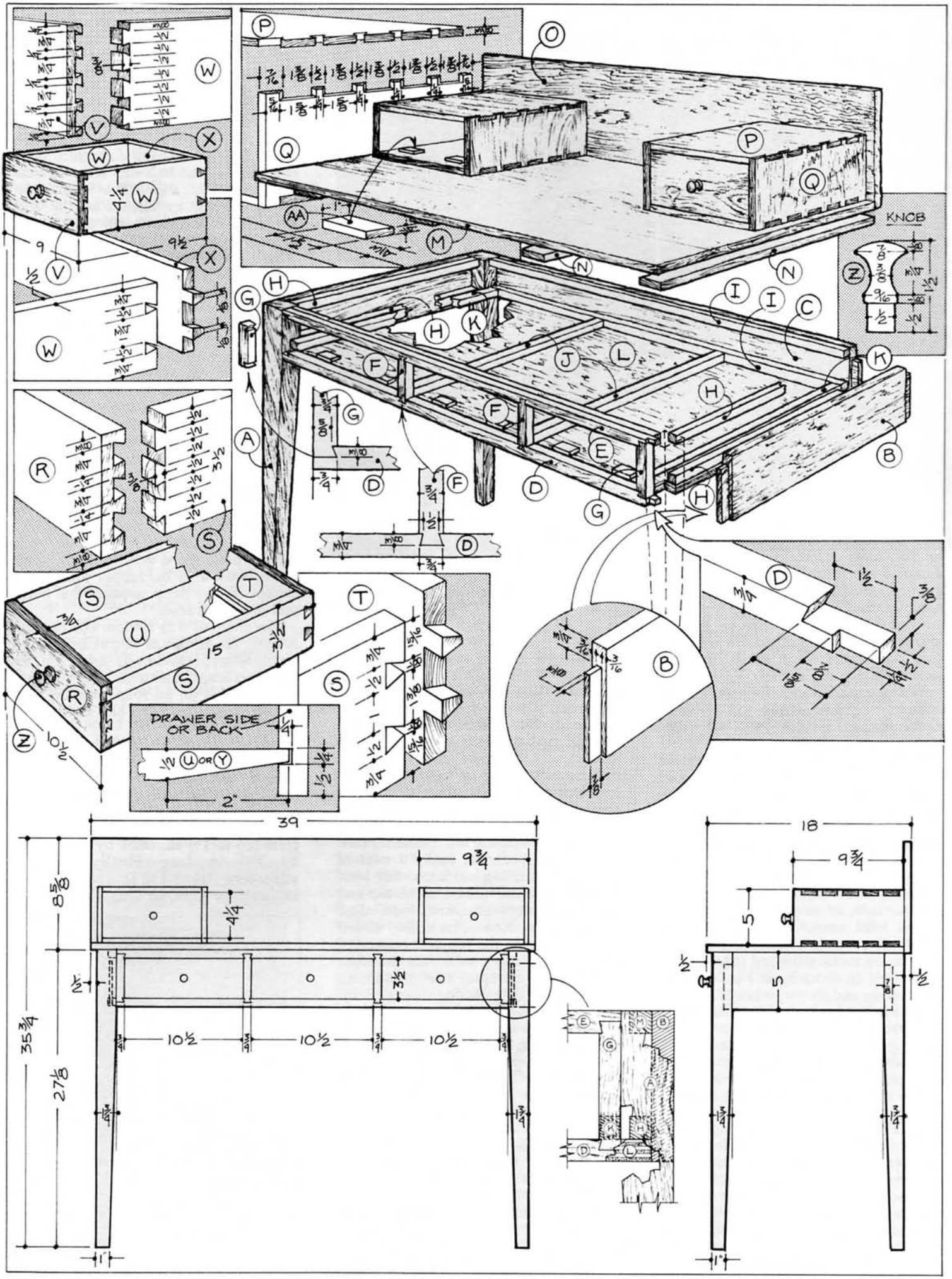
The base can now be attached to the top. Place the top upside down on a blanket or other protective surface, then locate the base in its proper position. With the bottom (L) removed, mark the location of the holes in cleats. Remove the base and drill pilot holes for 1¼ in. x #8 flat head wood screws. Attach the base, then add the bottom (L).

The drawer boxes (parts P and Q) are not glued to the top. Instead, angled screws are driven through the bottom of the box and into the top. Two are driven at the front of the box and two at the back. The back (O) is also screwed in place.

After the three base drawers are made, the entire project can be final sanded. Lightly round all corners. Check drawers for a good sliding fit and adjust as necessary. Three coats of Watco Danish Oil complete the project. WWJ

Bill of Materials
(All Dimensions Actual)

Part	Description	Size	No. Req'd
A	Leg	1¾ x 1¾ x 27⅛	4
B	Side apron	¾ x 5 x 15¼ (incl. tenon)	2
C	Back apron	¾ x 5 x 36¼ (incl. tenon)	1
D	Lower drawer frame	¾ x ¾ x 36¼ (incl. tenon)	1
E	Upper drawer frame	¾ x ¾ x 36¼ (incl. tenon)	1
F	Inner divider	¾ x ¾ x 4¼ (incl. dove)	2
G	Outer divider	¾ x ¾ x 4¼ (incl. dove)	2
H	Side apron cleat	¾ x ¾ x 13½	4
I	Back apron cleat	¾ x ¾ x 34½	2
J	Inner drawer guide	¾ x ¾ x 14¾	2
K	Outer drawer guide	¾ x ¾ x 14¾	2
L	Bottom	¾ x 15½ x 36½	1
M	Top	½ x 17½ x 39	1
N	Batten	½ x 2 x 14	4
O	Back	½ x 8⅝ x 39	1
P	Box top and bottom	⅜ x 9¾ x 9¾	4
Q	Box side	⅜ x 9¾ x 5	4
R	Base drawer front	¾ x 3½ x 10½	3
S	Base drawer side	½ x 3½ x 14⅝	3
T	Base drawer back	½ x 3½ x 10½	3
U	Base drawer bottom	½ x 10 x 14⅜	1
V	Box drawer front	¾ x 4¼ x 9	2
W	Box drawer side	½ x 4¼ x 9⅛	4
X	Box drawer back	½ x 4¼ x 9	2
Y	Box drawer bottom	½ x 8½ x 8¾	2
Z	Drawer knob	See detail	5
AA	Drawer stop	¼ x 1 x 1½	10


KNOB
DRAWER SIDE OR BACK
39
18
9¾
8⅝
4¼
35¾
27⅛
10½
5

Modelmaker's Bench

by James E. Doerflinger

Many woodworkers have a limited amount of space in the workshop so there just isn't room for a full-sized workbench. Here's a bench that offers a good-sized work surface, yet doesn't take up a great deal of room. The drawer carcase provides plenty of extra storage space while adding structural rigidity. Not only is the bench ideal for my modelmaking hobby, it is also suitable for just about any of my woodworking requirements.

It's important that the bench be tough and durable, so maple should be used for all solid stock. Where plywood is required, use maple or birch.

Begin by making the top (A). Cut ten pieces 1¾ in. thick by 2¼ in. wide by 50 in. long and three pieces 1-1/16 in. thick by 2¼ in. wide by 50 in. long. Remember to joint each edge before ripping. Now joint one side on each of the thirteen pieces. Then use a thickness planer to reduce the 1¾ in. stock to 1½ in. and the 1-1/16 thick stock to ⅞ in.

It is important to cut and glue the stock for the top in the same day. If you let them sit overnight, they may begin to twist. Although all 13 pieces for the top can be glued-up in one gluing, we found it better to do it in two steps. The advantage of gluing-up in two steps is that it enables you to joint and thickness plane your top in two sections. Then they are glued together so that only one joint needs to be hand flattened. No matter which one you choose, the glue-up process is the same.

Begin by setting up two saw horses and getting at least nine bar clamps and six C-clamps. Four ¾ in. by 2 in. by 20 in. waxed clamp blocks will also be needed. With the aid of a small roller or glue spreader, apply a coat of glue to all mating surfaces. Set your first clamp in the middle of the top and apply minimum pressure, then align all the ends. Now attach the waxed clamp blocks to the top and bottom of the ends and apply moderate pressure with the C-clamps. The remaining clamps are then added every 6 in. Work from the center to the outside and alternate clamps top and bottom. Clamp for at least four hours. Once dry, the clamps can be removed. The top is then jointed and thickness planed to 1⅞ in. Next, joint one edge and rip to 17 in., then cross-cut to 47⅝ in.

The end cleats (B) are cut to 1¾ by 1⅞ by 24 in. then jointed on one side and thickness planed to 1⅜ in. Choose a good side, then lay out and mark the location of the two holes as shown in the drawing. Do this to both pieces, then bore a 7/16 in. diameter hole through the stock at each point. Now clamp the end cleats in place, taking care to keep the front edges flush as well as the top and bottom. Also, remember the off-center holes should be closer to the underside of the top. Now, using the end cleat holes as a guide, bore a 7/16 in. hole 2⅛ in. into the end of the top. Remove the end cleats and increase the 7/16 in. diameter holes to ½ in. diameter, then counterbore the holes to 1 in. in diameter by ⅜ in. deep. The ½ in. hole will allow for expansion of the top while the counterbore will enable you to use a socket to tighten the bolts.

Now, with the underside of the top up, mark a point in the center of the 7/16 in. hole by 1¾ in. from the ends (see bolt detail). With a 1 in. bit, bore a hole 1½ in. deep on the four points. Before attaching the cleats, a ¾ in. by 1 in. rabbet must be cut on the inside face of the two end cleats. Once the rabbets have been cut, the end cleats are then bolted in place with ⅜ in. x 3 in. long bolts, nuts and washers.

Now cut the tool tray back (C) and fit into place. Dry clamp first, then lay out and mark the points on each end, each one ½ in. from the end of the joint and ½ in. in from the edges. Bore a 7/64 in. hole 2 in. deep and countersink, then screw part C to B with No. 8 x 2 in. flat head wood screw. Equip your router with a ⅜ in. rabbet and cut a rabbet ¾ in. deep around the perimeter of the frame.

Now the tool tray bottom (D) can be added. To minimize shrinkage problems, ¾ in. plywood was used. Cut to the exact length and width and scribe a ⅜ in. radius on all four corners. Cut the radius on the band saw then fit in place.

For the time being, set the top aside and begin construction of the base. Start by cutting the leg (E) to 1¾ in. thick by 3⅛ in. wide by 30⅞ in. long. Next, cut the feet (F) to 1¾ in. thick by 3 in. wide by 22 in. long, and the leg cleat (G) to 1¾ in. thick by 3 in. wide by 20½ in. long. Finally, cut the stretchers (H) to 1¾ in. thick by 3½ in. wide by 43⅝ in. long. When cut-

Bill of Materials
(All Dimensions Actual

Part	Description	Size	No. Req'd
A	Top	1⅞ x 17 x 47⅝	1
B	End Cleat	1⅞ x 1⅞ x 24	2
C	Tool Tray Back	¾ x 1⅞ x 49⅝	1
D	Tool Tray Bottom	¾ x 7 x 48⅜	1
E	Leg	1½ x 2⅞ x 30⅞*	4
F	Foot	1½ x 2¾ x 22	2
G	Leg Cleat	1½ x 2¾ x 20½	2
H	Stretcher	1½ x 3¼ x 43⅝*	2
I	Top Cleat	1⅜ x 1⅜ x 13¾	2
J	Vise	Sears part No. 5190	1
K	Vise Cleat	¾ x 2 x 9⅛	1
L	Outside Vise Face	¾ x 3 x 9⅛	1
M	Inside Vise Face	¾ x 3 x 9⅛	1
N	Carcase Side	¾ x 15¾ x 25½	2
O	Carcase Frame	¾ x 1¾ x 14⅞	4
P	Carcase Frame	¾ x 1¾ x 15¾	4
Q	Carcase Back	½ x 14⅞ x 25½	1
R	Edging	¾ x ½ x 25½	2
S	Small Drawer Side	½ x 2-9/16 x 14⅞	8
T	Small Drawer Face & Back	½ x 2-9/16 x 14¾	8
U	Large Drawer Side	½ x 4¼ x 14⅞	6
V	Large Drawer Face & Back	½ x 4¼ x 14¾	6
W	Drawer Bottom	¼ x 14⅜ x 14⅛	7
X	Drawer Guide	5/16 x 1 x 15¾	14
Y	Drawer Handle	¾ x ¾ x 4	7

*including tenons

ting each of these parts, be sure to joint one edge before ripping. Now joint one side on each of the pieces, then thickness plane to 1½ in. After thickness planing the stock, rejoint one edge and rip to final width.

Now, lay out the mortise on the jointed edge of parts F and G. On part F the mortise is located 2⅞ in. from each end. On part G the mortise is located 2⅛ in. in from each end.

After all the mortises have been cut, parts F can be shaped. Begin by laying out a 2 in. radius on the topside of both members. Lay out the radius such that the very outer edge of the circle touches the edges of the stock. Now plot a point ⅝ in. in from the edge of the bottom side of the stock. With your bevel edge, connect and mark the bottom point and the point in which the radius touches the end of the stock. Do this to all four corners. With bevel still set, lay out and mark a ½ in. line at a point 4⅜ in. from the end of the stock, then scribe a line connecting the two ½ in. lines. Make all cuts on the band saw and shape with the router and hardboard template guide or by hand.

Once parts F and G are completed, part E can be fabricated. To cut the tenons, set up a dado blade on the table or radial-arm saw. Set the dado head to a depth of 7/16 in. and as wide as possible. Before starting, it's best to make a sample cut with scrap stock. A stop block to establish the length of the cut and to insure consistency.

To complete the base, the stretchers (H) must be added. Begin by cutting a ½ in. wide by 2¼ in. long by 1⅛ in. deep mortise in parts E. The tenons on part H can now be cut to fit the mortise using the same process as previously explained. The top cleats (I) are now cut to 1¾ in. thick by 1½ in. wide by 13¾ in. long. Joint one face and thickness plane to 1⅜, then joint one edge and rip to 1⅜. On the face side of both pieces drill and countersink three 3/16 in. diameter holes. On the bottom edge drill three more 3/16 in. diameter holes. To add a nice detail, we applied a ¼ in. chamfer on parts A, B and C and a 3/16 inch chamfer on parts E, F, G, H and I. Beginning with part A, the chamfer is used on all 90 degree corners and is done with a bearing guided chamfer bit in the router. The router is hand-held. On parts B, the chamfer is used on all corners except the back rabbeted area. Before part C is chamfered, the top must be disassembled. Once apart, both the inside and outside edge of the top can be chamfered as well as the bottom outside edge. On parts E, F and I, all 90 degree edges are chamfered; on parts G all but the top edges are chamfered.

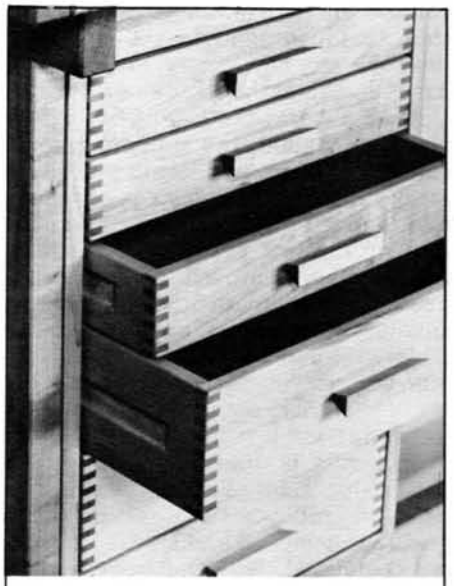
Drawer guides (Part X) are screwed to inside of carcase.

Once the detailing is completed, all parts can be sanded to 220 grit. The bench is now ready for assembly. Begin with the top. Reassemble and glue part D into place, using clamps to secure the plywood until dry. Next, glue the two side assemblies, making sure to assemble a right and left side with the stretcher support mortises on the bottom inside of each side assembly. Clean off excess glue with a chisel and damp rag.

Once dry, glue and clamp part H into place, again cleaning off excess glue while wet. Now position the top on the base with the front edge overhanging the upper base support by 2 in. Position the top cleat in place and fasten it to both the top and upper base support with No. 10 x 2 in. flat head wood screws.

The vise can now be attached. Begin by cutting parts K, L and M to exact size. Now attach Part K to the bottom side of the top, flush with the front edge and 3 in. in from the end of the top. Next cut a mortise in Part M, 6⅞ in. long by 2⅝ in. wide by ½ in. deep. Center the vise on the vise cleat and mark the countersunk hole. Then predrill and fasten the vise to the bench with No. 10 x 2 in. flat head wood screws. Install the inside vise face and attach with four No. 8 x 1¼ in. flat head wood screws. Locate the screws 1 in. in from the ends. The outside vise face can now be positioned and attached with No. 8 x ⅝ flat head wood screws.

The drawer carcase is made last in order to insure a good fit. The carcase measures 25½ in. tall by 16¼ in. deep by 14⅞ in. wide. The drawers are finger jointed and side-hung on traditional wooden glides. Begin by cutting the carcase side (N) to ¾ by 15¾ by 25½ in. then edge band the front edge of the plywood with ½ in. solid maple. Two spline mitered frames were then made (Parts O and P). The miters were cut on the table saw; the ¼ in. grooves were cut on the router table with a ¼ in. carbide bit ⅜ in. deep. The splines were made of ¼ in. plywood cut to ¾ in. wide by 3 in. long. The miter's splines and grooves were all glued, then press fitted together. A C-clamp was used for more even pressure.



Drawer sides are grooved to slide on wooden drawer guides.

Check both frames for squareness. It is very important that the frames remain perfectly square. Allow frames to dry and trim away the excess spline from the inside of the frame.

The carcase is now ready to be assembled. Sand thoroughly before gluing the frames in place. Both frames should remain flush with the top and bottom edges as well as the front edges. Allow to dry and then cut the back (Q) to size.

The drawer carcase consists of seven drawers; three are 4½ in. high and four are 2-9/16 in. high. Begin by cutting the narrow drawer sides to ¾ in. thick by 2¾ in. wide by 15 in. long. Next, cut drawer faces and backs to ¾ in. thick by 2¾ in. wide by 14⅞ in. long. Cut the wider drawer sides to ¾ in. thick by 4½ in. wide by 15 in. long; then cut the faces and back to ¾ in. thick by 4½ in. wide by 14⅞ in. long. Once all members have been cut, joint one surface then thickness plane to ½ in. Finger joints are cut on all the drawer parts. For a detailed explanation on cutting these joints, refer to the Beginning Woodworker column in our September/October 1982 issue.

After all the finger joints have been cut, a ¼ in. by ¼ in. groove is cut on the inside of the two sides and face. The groove begins ¼ in. from the bottom edge. On the face member, the groove begins and ends ¼ in. from the end. On the side, the groove begins ¼ in. in from the end and travels through the back end. Each back panel is then reduced ½ in. —remember to cut from the bottom edge of the drawer. The ½ in. material that is removed will allow you to slide the drawer bottom into place. Sand all drawer parts, then glue and clamp; check each drawer for squareness.

After all drawers have dried, sand all sides. Use a belt sander—first to

(continued on next page)

remove the 1/16 in. finger protrusions, then to finish sand to 150 grit. The drawers are now ready to be cut to exact height on the table saw.

After all drawers have been cut to size and sanded, the support grooves can be cut. Begin by locating the center of the sides, then lay out and mark a ½ in. line to both sides of center, beginning the line 1⅝ in. in from front and transfer thru back. Once this has been done to both the larger and smaller drawer, set up your router table with a ¾ or 1 in. diameter carbide cutter. Now set the bit to cut 1⅛ in. of material, then set the fence so the cutter will just touch the line. If a ¾ in. cutter is used, two settings are required to achieve a 1 in. width. Repeat the process till a ¼ in. deep groove is achieved and all the drawers are completed. Now the front portion of the groove must be squared off. This is done with a chisel and mallet.

The drawer glides are now cut to size and fitted to the groove. Begin by jointing and thickness planing a piece of 5/4 in. thick by 6 in. wide by 15¾ in. long to 1 in. Joint one edge then band saw a strip ⅜ in. thick; repeat the process until you have at least 17 pieces. Now thickness plane the strips to 5/16 in. and insert into drawer grooves.

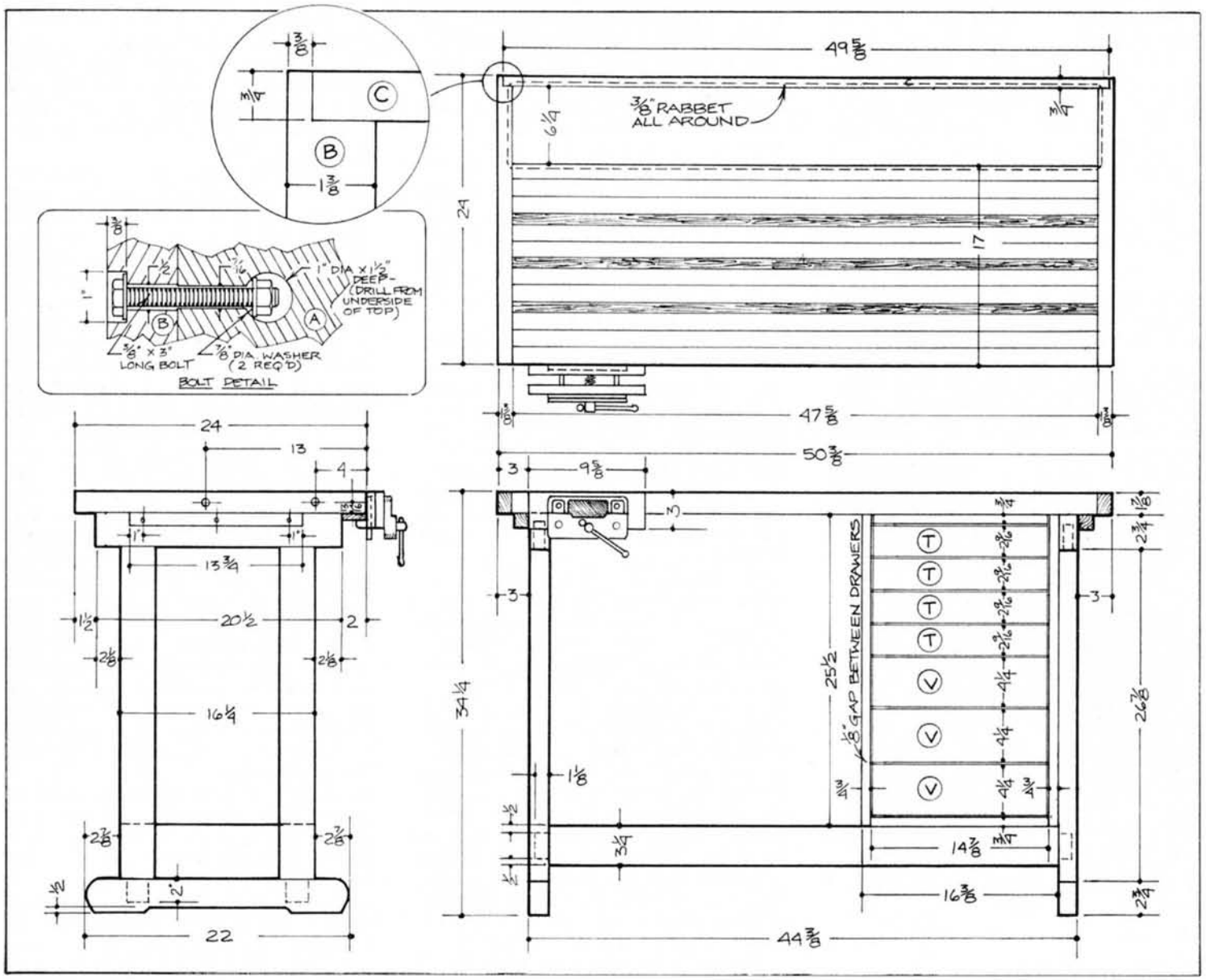
In order to hang the drawer, a pair of ⅛ in. thick by 1 in. wide spacers are needed. one for each side. These are used to establish the ⅛ in. distance between each drawer. Place the spacers on the bottom frame, then set the bottom drawer on them. The front of the drawer should be flush with the front edge of the carcase. Insert a pair of drawer guides (X) into the drawer grooves. Remember to butt the guide up to the squared-off end. The back of the guides are now screwed to the carcase with two No. 6 x ¾ in. flat head wood screws countersunk flush. Now, push the drawer forward about 4 in. and set another pair of screws. Continue the process until the guide has been completely attached. Repeat the process for all the drawers using the same ⅛ in. spacer.

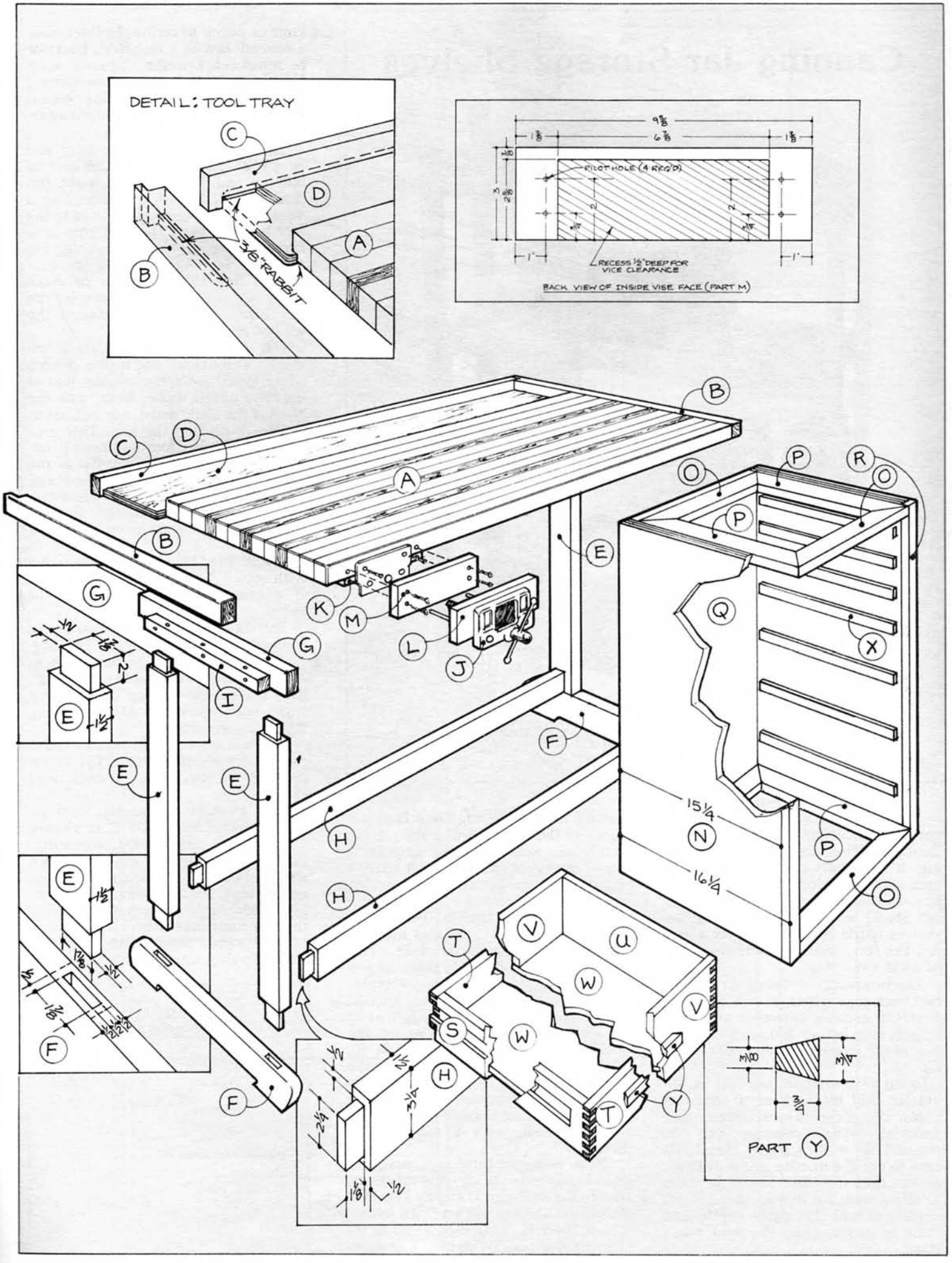
After all the drawers have been hung, some adjusting may be neeeded to produce a good sliding drawer. Once the drawers have all been adjusted properly, wax each one with bee's wax, then attach the back with glue and clamps.

To construct the handles, cut the ¾ in. by ¾ in. by 16 in. long blanks. Set the blade on the table saw to 14 degrees and rip a bevel on the two sides of the blank. Now cross cut to a length of 4 in. using the same bevel. To locate the handle, mark the center of the drawer both in length and width, then do the same for the handle. The handles are now glued and clamped in place. Before attaching, though, drive a pair of brads into the handle, chip off. When clamped, the brads will keep the handle from sliding on the drawer front.

The drawer carcase can now be installed. Begin by pulling out all the drawers, then position the carcase in place. The front edge of the carcase should be flush with the front leg. Attach the carcase to the lower stretcher supports through the lower frame with No. 10 x 1¼ in. flat head wood screws.

For a final finish, use a good penetrating oil. Avoid using lacquer or polyurethane as they make for difficult refinishing and tend to chip off. WWJ




DETAIL: TOOL TRAY
C
D
A
B
3/8" RABBIT
9 3/8
1 3/8
6 3/8
1 3/8
PILOT HOLE (4 REQ'D)
RECESS 1/2" DEEP FOR VICE CLEARANCE
BACK VIEW OF INSIDE VISE FACE (PART M)
B
C
D
A
O
P
R
O
P
E
G
K
M
L
J
Q
X
G
I
F
E
E
H
H
15 1/4
N
16 1/4
P
O
T
V
U
W
V
S
W
T
Y
F
H
PART Y

Canning Jar Storage Shelves

by Warren W. Bender, Jr.

If you're one who enjoys putting garden products up in jars, as we do, I think you'll find this project to your liking. It's a solidly constructed storage rack with room for plenty of canning jars. The one shown is made from solid oak stock, with oak plywood for the shelves (parts F). However, for a project like this, just about any wood can be used, even pine.

The two front legs (parts A) and the two back legs (parts B) can be made first. Cut each leg to overall width and length, then lay out and mark the location of the mortises for the rails (parts C).

To cut each mortise, use a ¼ in. diameter drill bit to bore a series of holes. This removes most of the waste material. What remains can be cleaned out with a sharp chisel. Be sure to cut the mortise about 1/16 in. deeper than the tenon length in order to allow room for excess glue. If you neglect to add this extra depth, and there is excess glue, the joint won't close.

A well made mortise should be square to both the edge and face surfaces of the leg. A drill press, if you have one, will make this step fairly easy. However, if done with care, a hand brace or portable electric drill will do as good a job.

The stretchers (parts D) and back (part E) are joined to the legs with single half-lap through dovetails. This joint is not as difficult to make as you might think, and it adds considerably to both the strength and visual interest of the piece. Cut parts D and E to overall length and width, then lay out the location of the ⅜ in. deep by ¾ in. wide dado that's cut to accept the shelves (parts F). This cut is best made with a dado head cutter, although you can get the same result by making repeated passes with a regular saw blade.

Next, using the same procedure, cut a ⅜ in. deep by ¾ in. wide rabbet on the end of each part D and E. This step forms the half-lap portion of the joint.

Now, referring to Details A and B, lay out the dovetails as shown. For maximum accuracy, it's best to use a sharp knife or pencil to scribe the lines. Use a dovetail saw or a fine tooth backsaw to remove the waste. *Editor's note: For a detailed discussion on cutting dovetails, see The Beginning Woodworker column in the July/August 1983 issue.*

The dovetail pins on the front and back legs (parts A and B) can best be laid out and scribed by using the finished dovetails as a template. Use a square to carry the scribed lines to the face of the board. The next step is to make the two saw cuts establishing the angled sides. Again, use a dovetail saw or fine tooth backsaw to make these cuts. For an accurate cut, lay the saw blade on the waste side of the scribed line, just grazing it.

The waste between the cuts is removed with a chisel and mallet. With a sharp knife, score the original line at the base of the waste. Next, with the bevel of the blade down, use a chisel to make a V-cut into the line. This prevents the grain from splintering behind the line. Now, lay the flat of the chisel against the back of the V-cut and proceed to chop away the waste material. When halfway through, flip the stock over and start from the other side.

A well fitted joint should go together with only light tapping from a mallet. If necessary, trim further with the chisel.

The shelves (parts F) can now be cut to overall length and width. The edging (parts G) is glued to both ends as shown. Use pipe clamps to secure until dry. It's best to cut the edging a bit wider than necessary. After clamping it can be planed flush.

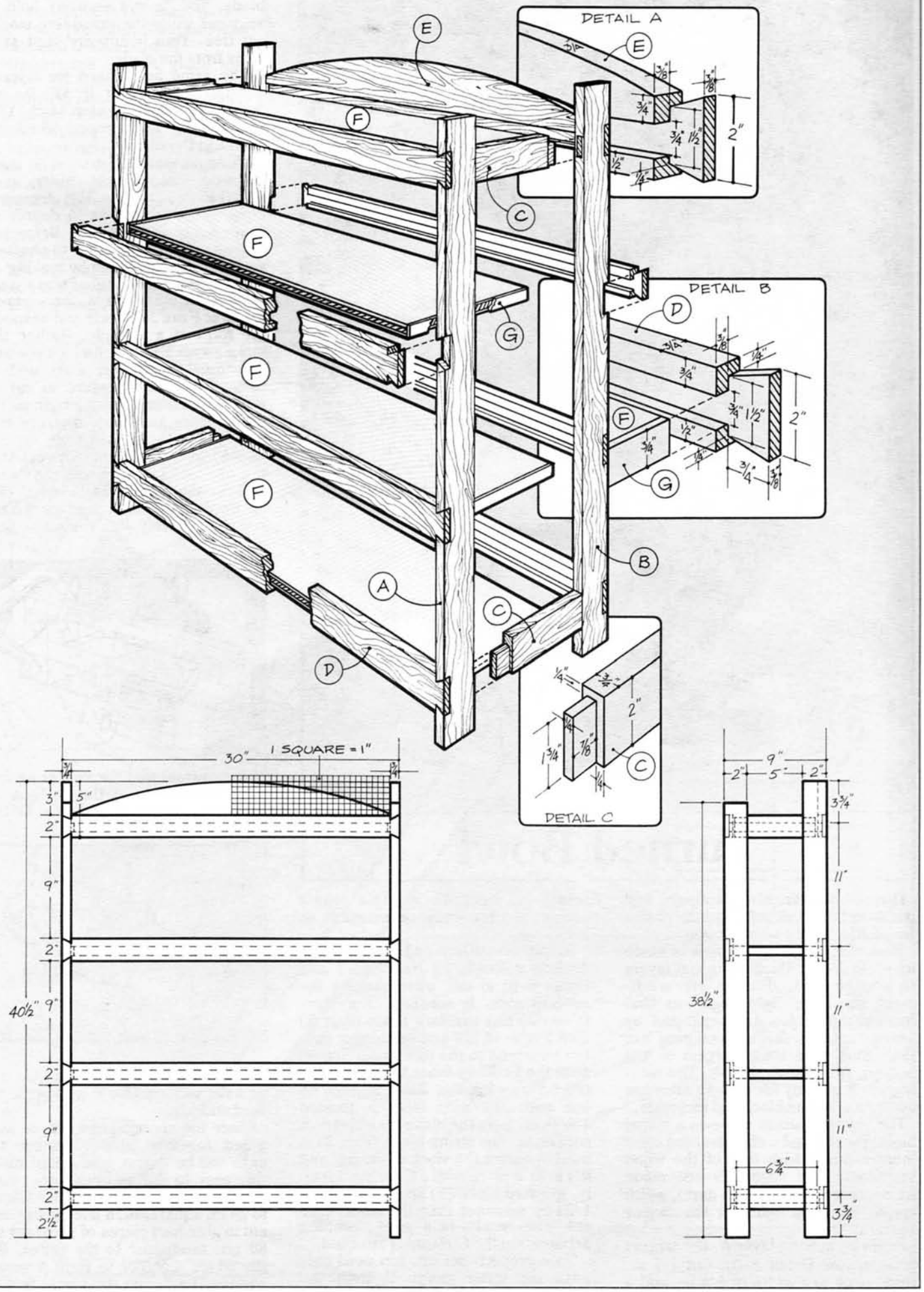
The rails (parts C) can now be cut to overall length and width. The tenon can best be cut using the dado head cutter.

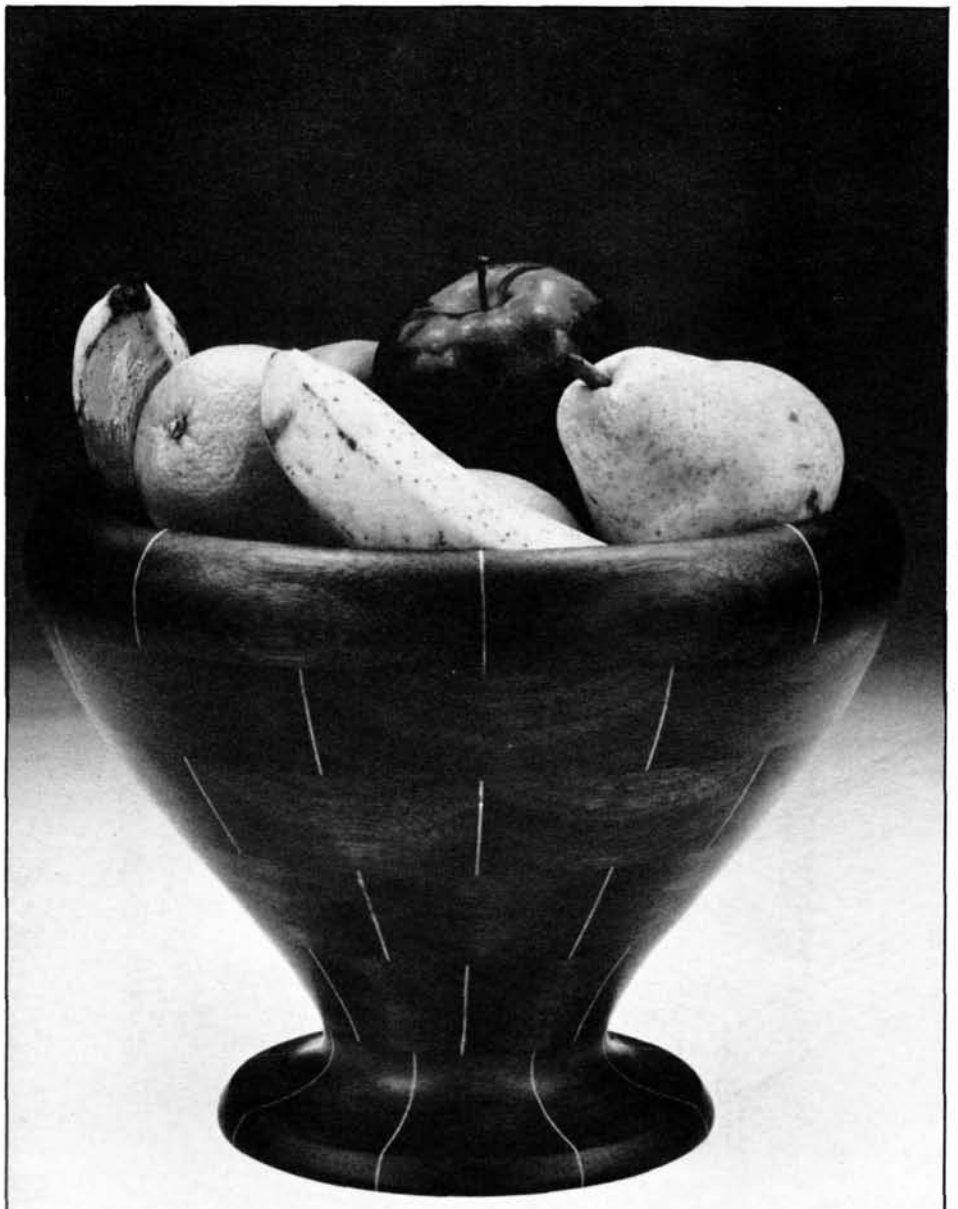
Sand all parts thoroughly, then assemble parts A, B, and C as shown. Use glue and pipe clamps. When dry, assemble part E and the three back stretchers (parts D), again with glue and clamps. Finally, complete assembly by adding the shelves (parts F) and the four front stretchers.

Final sand, then finish with two coats of polyurethane varnish. WWJ

Bill of Materials
(All Dimensions Actual)

Part	Description	Size	No. Req'd
A	Front Leg	¾ x 2 x 38½	2
B	Back Leg	¾ x 2 x 40¾	2
C	Rail	¾ x 2 x 6¾	4
D	Stretchers	¾ x 2 x 30	7
E	Back	¾ x 5 x 30	1
F	Shelf	¾ x 8¼ x 28	4
G	Edging	¼ x ¾ x 8¼	8


DETAIL A
DETAIL B
DETAIL C
E
F
C
G
D
A
B
30"
1 SQUARE = 1"
40½"
38½"
9"
2"
11"
6¾"
3¾"



Turned Bowl

Turned bowls are always popular and we expect that this one, with its graceful profile, will be no exception.

Basically, the turning block is made up of six 1¼ in. thick octagonal layers (A through F, Fig. 3), each layer a different size. The eight segments that form each octagon are separated by veneer spacers. All six octagons are then glued in a stack, largest on the bottom, smallest on the top. The turning block is ready for turning after the addition of a glue block and faceplate.

The veneer spacers serve as a visual highlight and, to be effective, the color must contrast with that of the wood segments. Our segments are made from walnut (which is dark), with maple (which is light) for the veneer spacers.

Begin by making layer A, the largest octagon (see Detail A-A). Cut 1¼ in. thick stock to a width of 1⅞ in. and a length of about 40 in. This length allows for a few extra segments to be cut.

To improve safety and accuracy, we devised a simple jig (see Fig. 1 and Detail B-B) to use when making the mitered cuts. It consists of a short (about 20 in.) auxiliary fence (Part X) with a strip of 220 grit sandpaper rubber cemented to the front face. Screwed to the auxiliary fence is a stop block (Part Y), mitered at 22½ degrees on one end. The stop block is located 4-9/16 in. from the blade for all layer A segments. The clamp block (Part Z) is used to secure the stock to the jig, and it's held in place with a C-clamp. Ideally, the stop block (Y) should be about 1/32 in. narrower than the stock to be cut. This results in a good clamping action when the C-clamp is attached.

Once properly set up, you need only push the miter gauge through the blade. The jig will securely hold the segment while the remaining stock is cut free. Your hands are kept safely away from the blade.

The same jig is used for layers B through F, however it will be necessary to relocate the stop block (Y) for each layer. The proper location is shown in Detail B-B.

It's important to note that to cut an accurate octagon, the miter gauge must be set at exactly 22½ degrees. A deviation of as little as ½ degree can cause a gap in the joints. Before cutting any walnut, it's best to check the accuracy of your gauge by making one or two test octagons out of scrap stock.

Unlike the other layers, the segments for layer F are 3 in. wide and shaped in the form of a triangle. Rather than make another jig, we feel it's easier to individually measure, mark and cut each piece. Just be sure to cut the stock with enough extra length so that your fingers are a safe distance from the blade on the last cut.

Once cut, the segments for each layer can be glued together with the veneer spacers sandwiched in between (Fig. 2). Apply glue to all mating surfaces and clamp firmly with the web clamp.

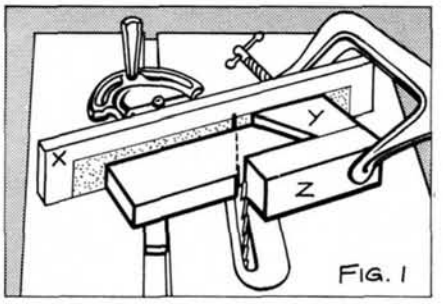


FIG. 1

It's important that the veneer be flush with the outside of the octagon and overhang the inside as shown. To keep

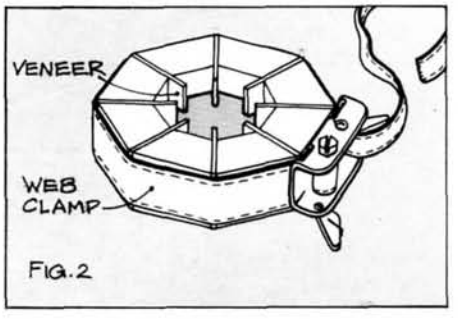


FIG. 2

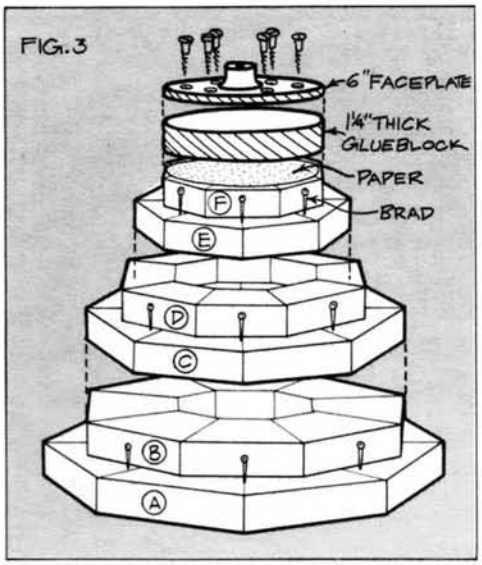
the octagon flat, it's best to glue it up on a flat surface. Use wax paper to prevent sticking.

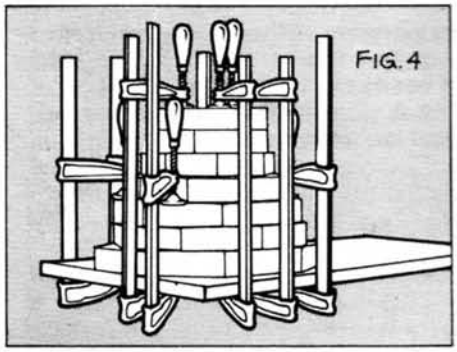
Since the six octagons will be stack glued together, it's important that each one be flat. A glue board makes this easy to do. To make one, cut a piece of ½ or¾ in. thick particleboard to 24 in. square, then use rubber cement to glue four pieces of standard size 80 grit sandpaper to the board. Butt the edges together to form a smooth surface. To flatten the stock, first re-

move any excess glue with a sharp chisel, then simply lay the octagon on the board and move it back and forth, applying light pressure. The surface will be flattened in short order.

The octagons can now be glued together (Fig. 3). Their proper orientation is shown in Detail A-A. We found it easiest to glue two layers at a time, temporarily tacking several brads in place to keep the octagons from sliding over each other. Once dry, the three resulting sub-assemblies are glued and clamped in the same manner (Fig. 4).

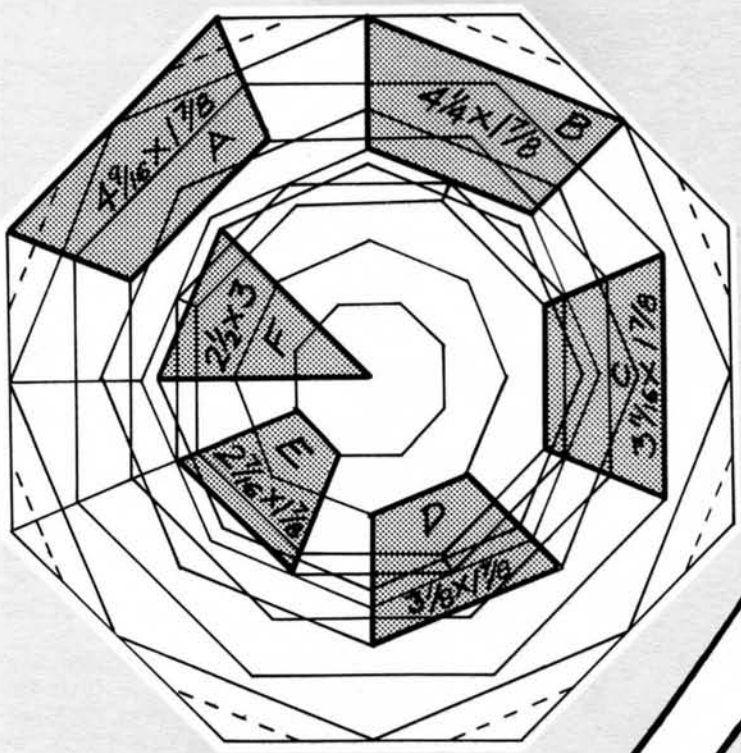
Note that a 1¼ in. thick glue block is glued to layer F, with a piece of paper (brown grocery bag type works well) sandwiched in between. The paper will make it easy to remove the glue block later on.





The 6 in. faceplate can now be added. Take care to locate it exactly at the center of the turning block, otherwise the mass will be unbalanced and you'll be faced with considerable shaking

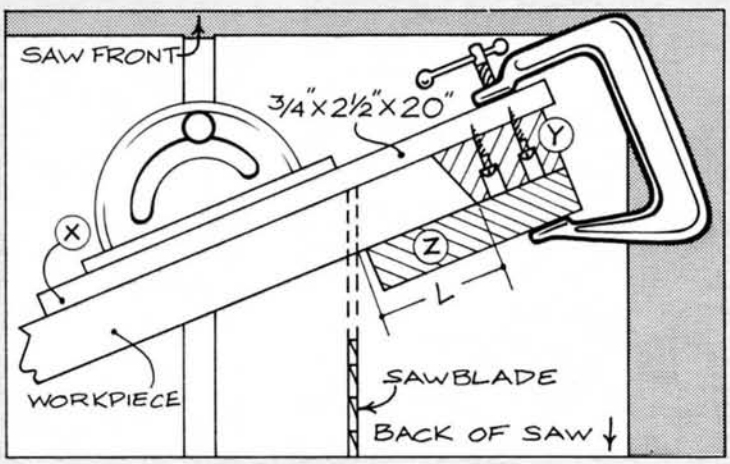
(continued on next page)



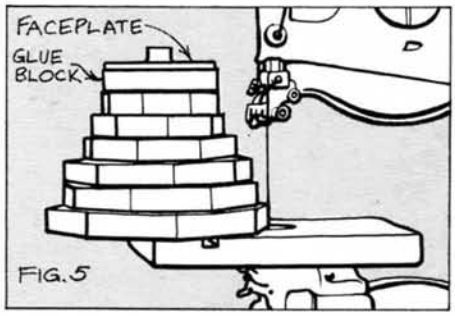
DETAIL AA

DETAIL BB

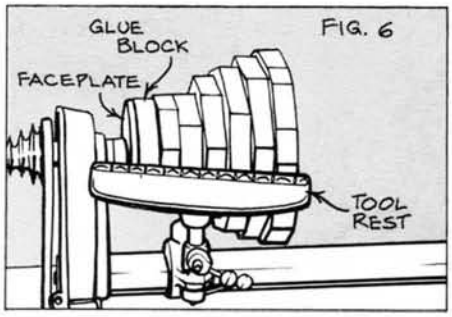
SEGMENT	"L"
A	4 9/16
B	4 1/4
C	3 11/16
D	3 1/8
E	2 7/16



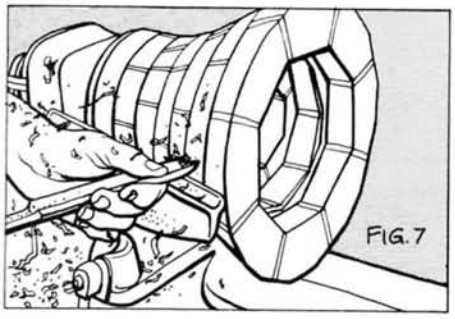
and vibration as the stock turns. To cut down on some of the mass, we used the band saw to trim the corners off of layer A (Fig. 5). The cut line we followed is shown in detail A-A.

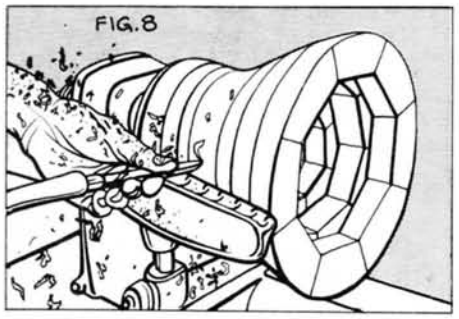


Secure the turning block to the lathe (Fig. 6). The tool rest is fixed roughly parallel to the angle of the block and about ⅛ in. below the horizontal centerline. Set the lathe at its slowest speed (ours was about 600 R.P.M.'s.

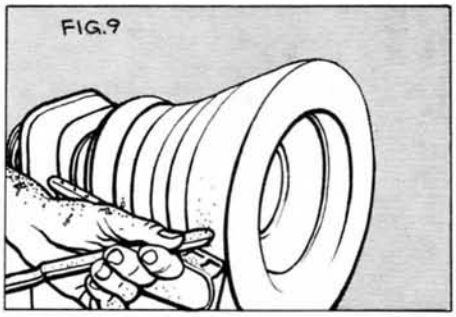


The profile of the bowl is shown on page 49. Use a ¾ in. gouge to reduce the outside of the turning block to rough form (Fig. 7). Once roughed out, switch to a ½ in. gouge to further reduce and smooth the shape (Fig. 8).

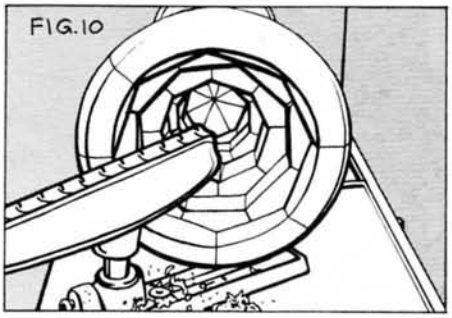




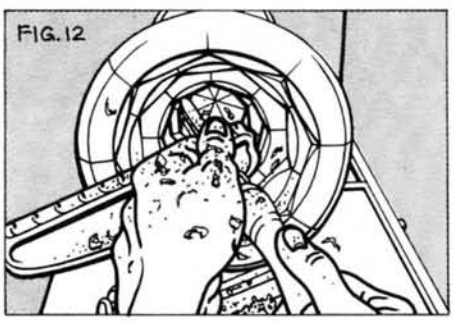
The lathe speed is now increased to about 1,000 R.P.M.'s and a ½ in. round nose is used to shape the outside of the bowl to its final profile (Fig. 9). However, don't shape the profile of the base at this time.



To turn the inside of the bowl, the tool rest must be relocated and the lathe-speed changed to about 600 R.P.M.'s (Fig. 10). As before, it should be roughly parallel to the angle of the turning block and about ⅛ in. below the horizontal centerline.



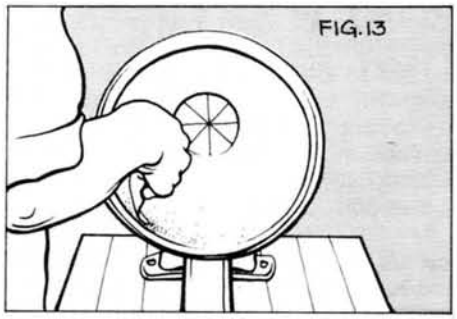
Use a ½ in. gouge to begin removing material from the inside of the bowl (Fig. 11). At a point about one-half way into the bowl, we found that the gouge began to grab, so we switched to a ½ in. round nose (Fig. 12). This



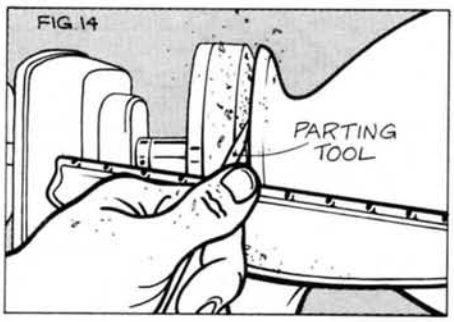
tool was used to turn the entire inside surface to its final profile.

Reposition the tool rest to the outside of the bowl. It should be as close as possible to the base of the bowl. A ½ in. round nose is used to finish shaping the base.

Finish sand all inside and outside surfaces (Fig. 13). Start with 80 grit, then finish with 100, 120 and 150.



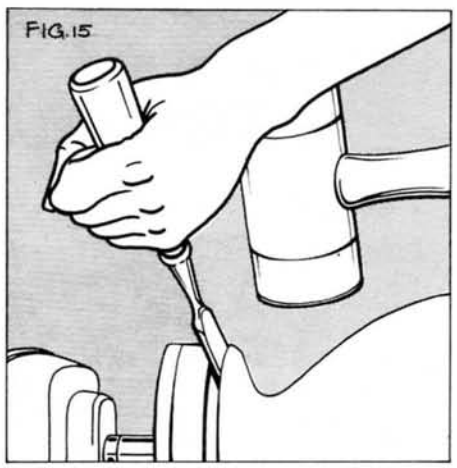
Use a parting tool to partially cut into the base at the paper line. The parting cut should stop at a point that leaves the stock measuring about 1½ in. in diameter (Fig. 19). At this point, it's a

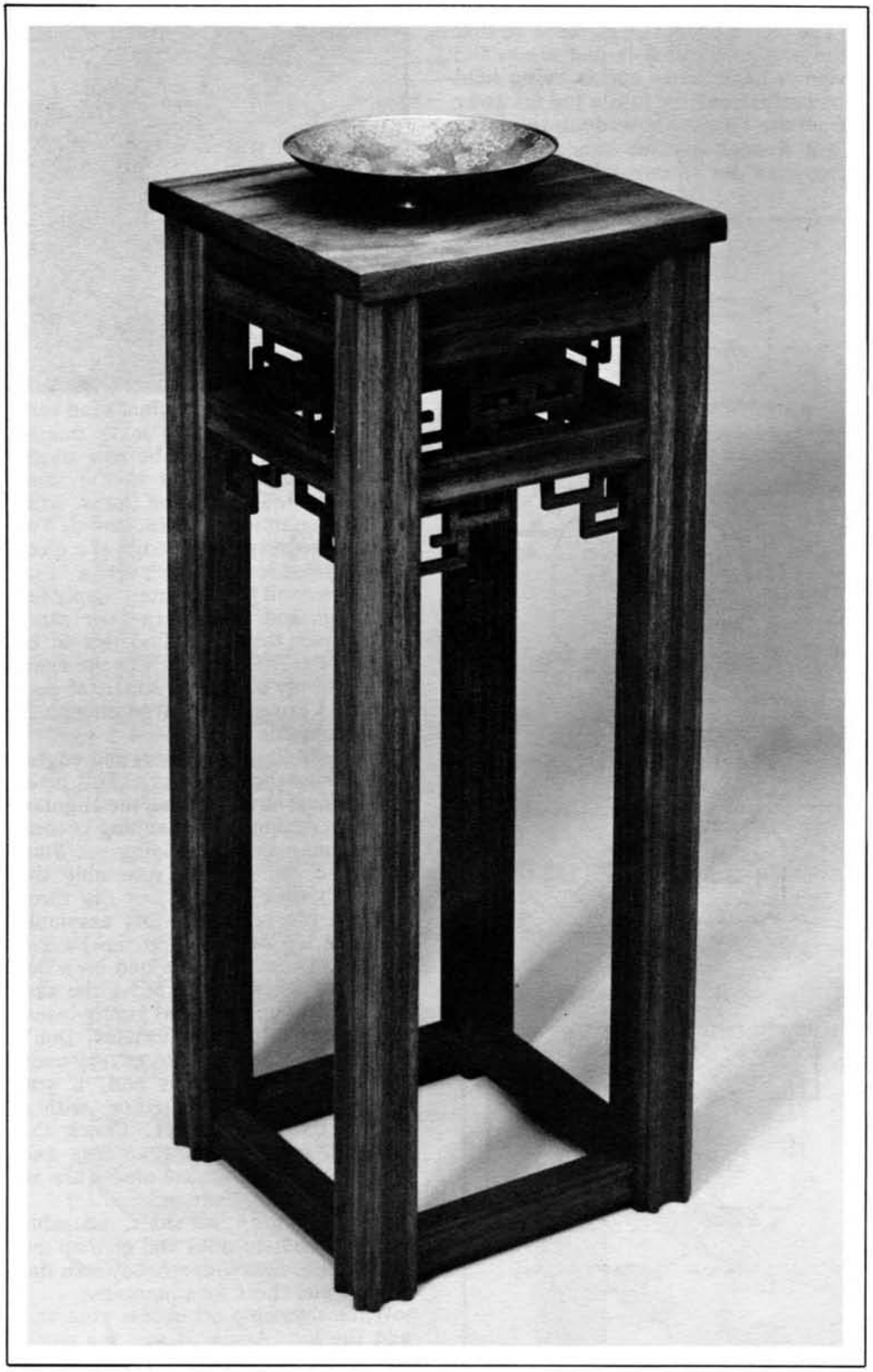


good idea to slightly undercut the base of the bowl. The undercut will help the bowl to sit flat on slightly uneven surfaces.

The bowl can now be removed from the lathe. A sharp chisel blow at the paper joint will knock it free (Fig. 15). Sand the bottom to smooth out the undercut.

If the bowl is to be used for food items, it's best to use a non-toxic finish. Woodcraft Supply Corp., 41 Atlantic Ave., Woburn, MA 01888 sells one that's approved by the U.S. Food and Drug Administration. It's called Salad Bowl Finish. Several coats will provide an attractive look.





Oriental Table

by Gary F. Walden

This Oriental table has similarities in design to the Huang-Hua-Li variety of Chinese end stands and dates back to the Ming Dynasty of the 16th and 17th centuries. The concave surfaces bring a play of light and dark, and the scroll brackets enrich the design. Rosewood is the traditional wood, although we used mahogany to make this one. Cherry or any other close-grained hardwood that will finish dark will also give excellent results.

There's a variety of ways that this project can be made. If you have a shaper, you'll no doubt want to use that versatile machine. However, since many woodworkers do not own shapers, this article will describe how to make the table using a molding-head cutter in conjunction with a table saw. The molding head keeps costs to a minimum. Sears Roebuck sells a 7 in. diameter molding-head for around $15. The cutter costs around $5 a set and you'll need three sets to make this table.

Cut all four legs to 2 in. square. It's best to cut them a little longer than 29 in.; they can be trimmed to exact length later. To cut the corners, we used a Sears molding head and a ¼ in. quarter round cutter (Sears No. 9-2351), although a router equipped with a bearing-guided ¼ in. quarter round bit can also be used. Before starting you'll need a plywood inset for the table saw. The metal one that comes with the saw cannot be used with the molding head and must be removed. Trace the outline of your present insert onto a piece of scrap plywood of the appropriate thickness: ¼ in. thick for a Sears 10 in. saw, ½ in. thick for a 10 in. Rockwell unisaw. Cut the pattern and fit it to the saw. Mount the three cutters to the molding head and mount it on your saw. Lower the cutters below the table, then add the new plywood insert and rotate the cutter by hand to make sure it is below the plywood. (This should be done with the power off and the cord disconnected).

While holding down the insert with a stick, start the saw and raise the cutter very slowly. Continue raising the cutter until it is slightly above the desired height, then lower it slightly to back it off the plywood. Make a test cut and adjust if necessary. A new insert should be made for each cutter to minimize chipping out.

Often when using the molding head, part or most of the cutter must be buried in the fence. This necessitates an auxiliary wood fence. Straight, square stock should be chosen, as long and high as the metal fence and ½ in. thick. Clamp it to the saw fence and screw it in place with two No. 12 x 2 in. flat head wood screws. The wooden fence should then be moved into approximate position with the cutter lowered below the table. The spinning cutter should then be slowly raised with the fence locked in place. Again, the cutter should take a slightly heavy cut before being backed off. For the first cut with the quarter-round cutter, set it for flush round; cut the two back corners of the rails (B) and the inside corner of each leg (A).

Maintaining the fence in the same position, raise the cutter ¼ in. to make the double cuts on the other three sides of the legs. Before cutting, it's best to test on a piece of scrap to see if the cut is correct. Run the piece through on one corner and then reverse the piece end-for-end and cut the same corner. Adjust if necessary and cut the remaining three sides of the legs.

Drop the cutter back to make the partial cuts on the front edges of the rails (B).

The mortises are cut in the sides of the legs (A) before the cove cuts are

(continued on next page)

Bill of Materials (All Dimensions Actual)			
Part	Description	Size	No. Req'd
A	Leg	2 x 2 x 29	4
B	Rail	1¼ x 1¼ x 8½	8
C	Skirt	¾ x 2½ x 8½	4
D	Cleat	¾ x 1 x 7½	4
E	Center Scroll	¼ x 3 x 3¾	4
F	Corner Scroll	¼ x 2⅛ x 3½	8
G	Top	¾ x 12 x 12	1

made on the outer faces. Lay out the mortises with a sharp pencil and square or a marking gauge. Mortise with a hollow chisel in the drill press or use a regular bit and clean out with a chisel.

To make the ½ in. radius cove cuts, mount the fluting cutters in the molding head (Sears No. 9-3206 1 in. flute). Cut the flutes on the legs (A), the rails (B), and the skirts (C), changing the fence and cutter height as needed.

The remaining cuts in the skirts (C) can be made with molding cutter (Sears No. 9-2302) or a dado blade.

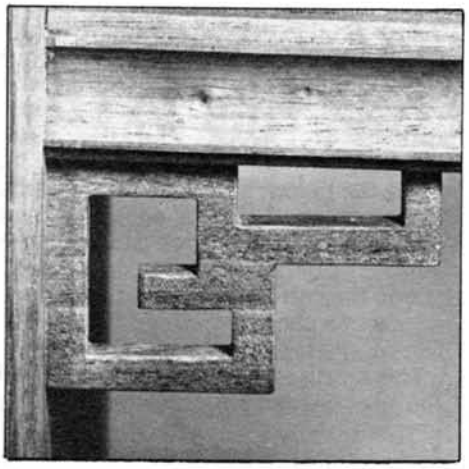
Once all the molding cuts have been made, cut the rails, legs, and skirts to exact length. Referring to the drawing, use the dado blade on the table saw to cut tenons on each end.

Cut top (G) to size from a wide board or glued-up stock. Also, you can use a ¾ in. mahogany plywood and edge it with mahogany. If solid wood is chosen, slot the screw holes in the cleats (D) to compensate for expansion. Plywood need only be glued and screwed in place.

The scrolled pieces (E and F) are made from ¼ in. thick stock. This can be resawn on the table saw.

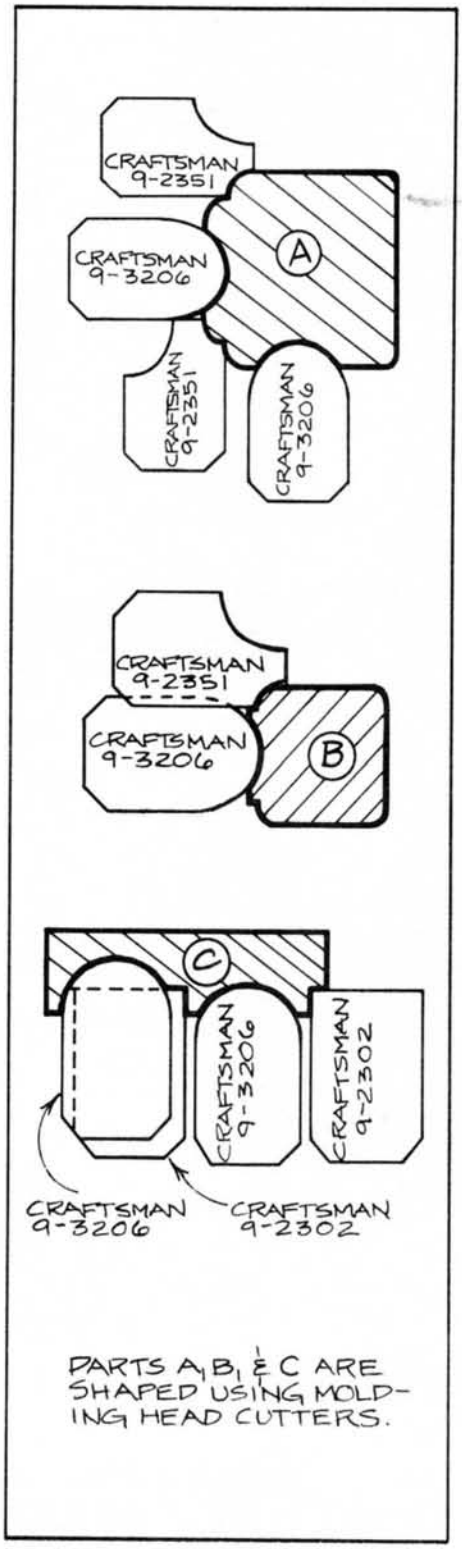
Make a copy of the pattern and rubber cement it to your stock. A scroll saw, power fret saw, fret saw or coping saw may be used to make these cuts. Drill a ⅛ in. hole in each of the cutouts for saw blade entry. Using a fine (No. 5 or 7) blade, enter the blade through the hole and mount to the saw.

After all cutouts have been made, cut the outside pattern. Clamp the pieces



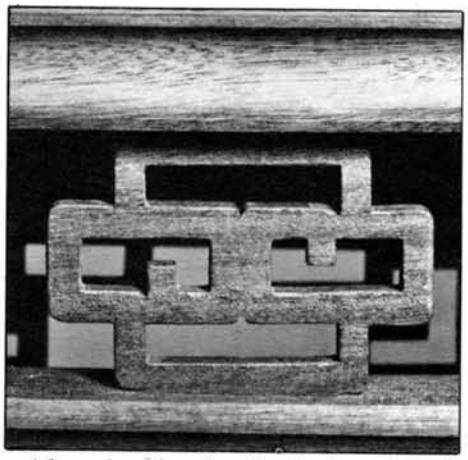
and sandpaper.

The pieces should be clamped so that the part to be filed is just above the vise or hand screw and is being held securely. Don't try to file too far away from the vise or these delicate pieces in a wooden vise or handscrew and and even out all cuts with small files



may break. Round over all edges to soften their appearance.

After you have made all the scrolled pieces, dry fit each side of the table, making any adjustments necessary. Don't force the scrolled pieces into their housings. They are more likely to break than go in.



After checking for fit, final sand each piece. (Don't forget to mark mating pieces so that you will be able to get them all back together in the same orientation). To sand the flutes, wrap sandpaper around a ⅞ in. dowel. You can also round over the edge of a piece of scrap that is ¾ in. thick with a ⅜ in. round-over bit in the router. Apply felt over this and then wrap your sandpaper over the felt. I find this to be easier because I can cut it to the exact length of my quartered sheets of paper, and I can make it large enough to be comfortable to hold.

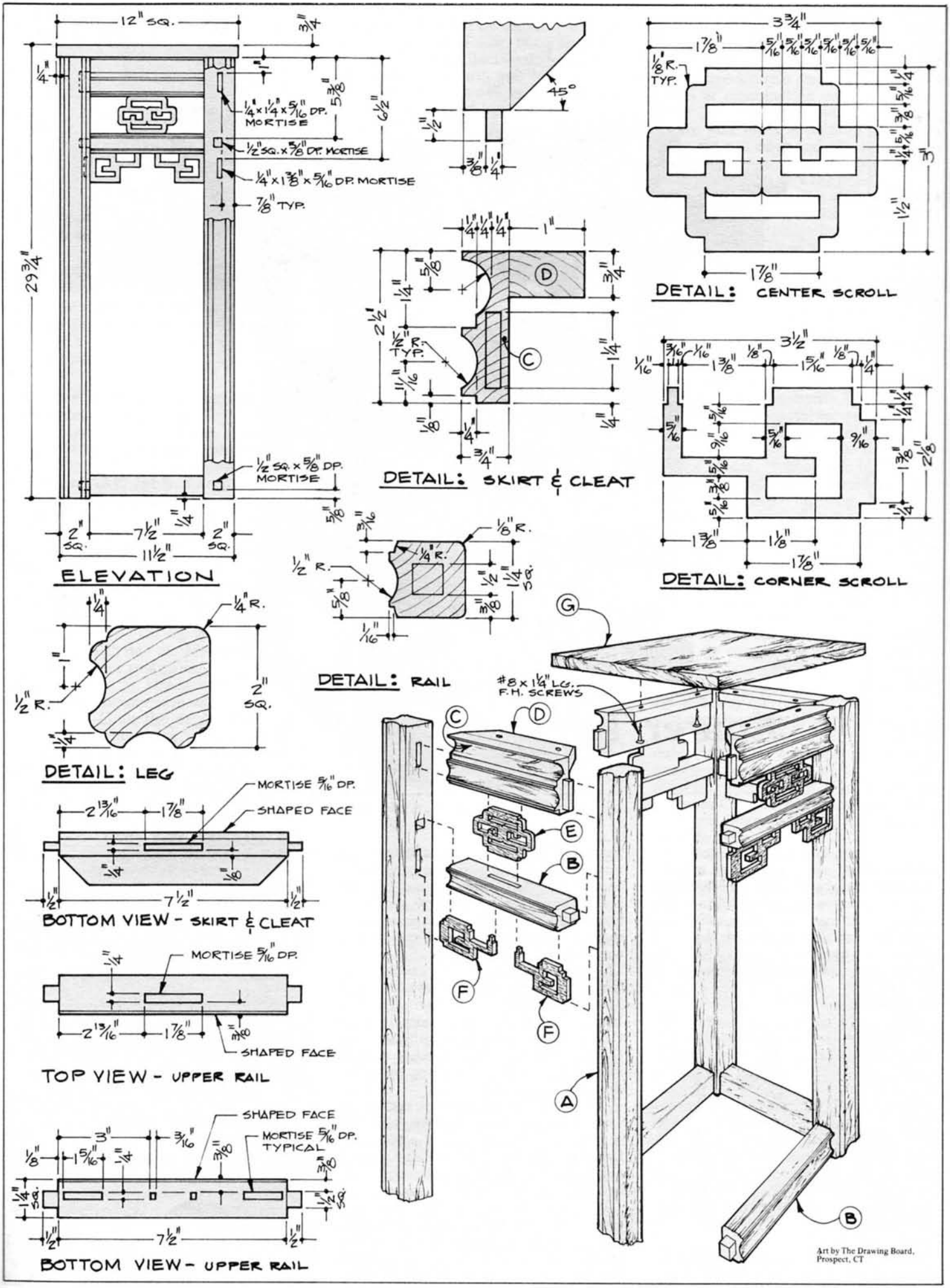
When sanding the corners and edges, don't round them too much. This piece gains visual strength from the angularity of its design. Once sanding is complete, you may begin gluing up. Start with one entire side. Assemble the skirt (C) with rail (B) and the three scrolled pieces. Insert this assembly into one leg (A) and add the bottom rail (B). These can be glued on a flat surface without strain. Move the second leg into position and gently insert the tenons into their mortises. Don't force them. The scroll pieces may need some jockeying around and, if you drive the assembly together with a clamp, they may break. Check the whole assembly for squareness and clamp together once the pieces are all the way home and square.

After gluing up two sides, assemble the intermediate sides and glue up the entire piece (less the top). Lay on a flat surface and check for squareness.

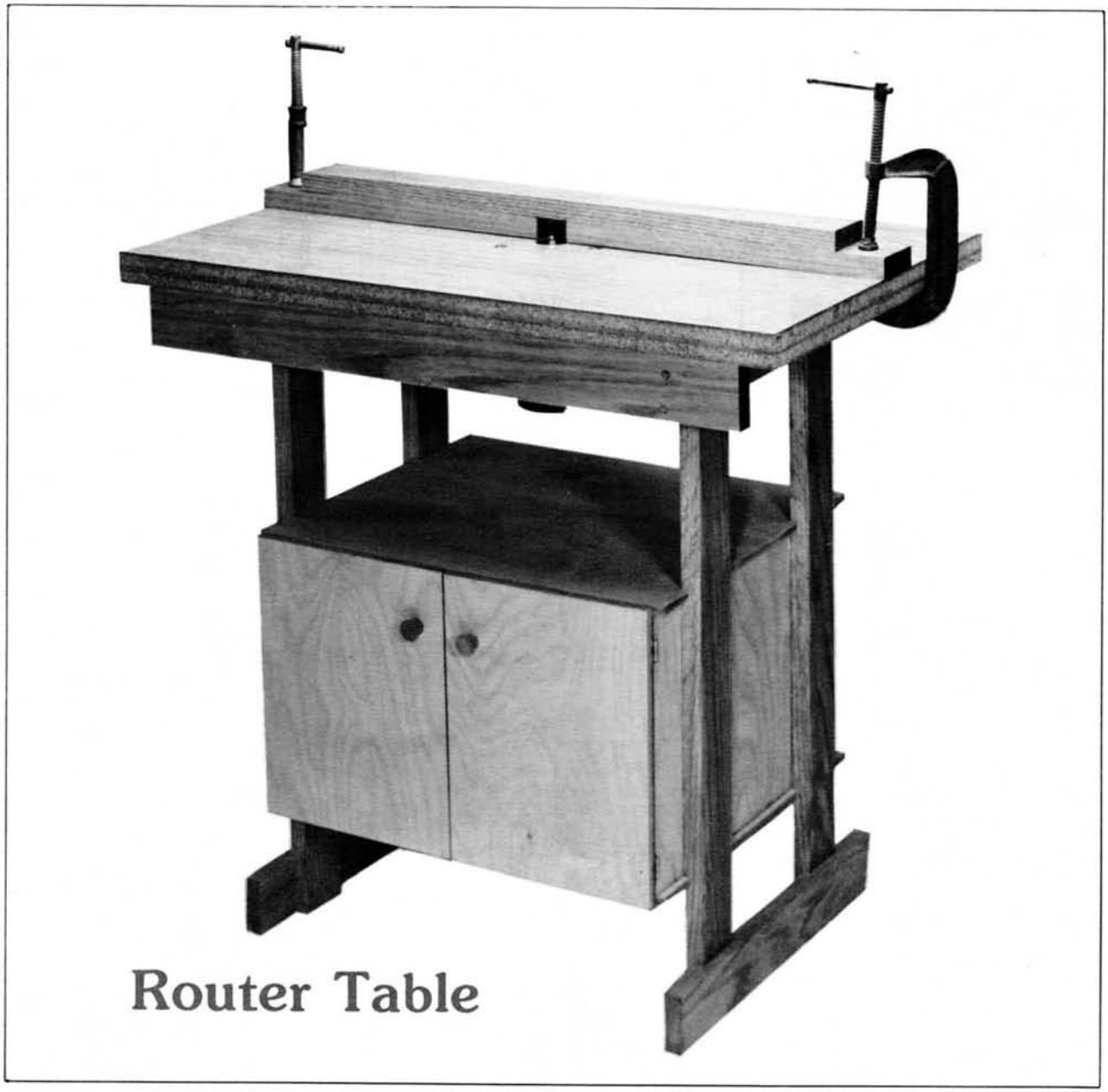
When dry, chip off excess glue and add the top. Again, if you are using solid stock, screw down one edge of the board and then screw down the other edge *in slotted holes.*

To get a nice finish, apply Watco Oil liberally over the entire piece. Wait ten minutes and dry off excess with a rag. (Oil soaked rags are a fire hazard, so dispose of them carefully). Wait one day and repeat. Wait until thoroughly dry (3-4 days) and then wax using Butcher's wax or your favorite brand. However, don't use spray-on waxes because they contain water and will raise the grain. I prefer butcher's wax because it contains pine oil which gives it a nice smell. Wait overnight and buff to a high shine.

WWJ



Art by The Drawing Board, Prospect, CT



Router Table

The shaper is a versatile workshop machine that can be used to make a wide variety of special cuts. Moldings, dadoes, grooves, and dovetails are just a few of the many operations that can be completed with minimum time and effort. However, a shaper is a pretty expensive piece of equipment so, in spite of its versatility, few woodworkers are able to afford one.

We think a sturdy router table, like this one, is a worthwhile alternative. In effect, it enables you to convert your router into a shaper —at a fraction of the cost.

We particularly like the design because it's large and heavy. Equipped with a ¾ horsepower Sears router, we find it more than adequate for most requirements. Of course, if you regularly work with heavy stock, you'll want to use a larger horsepower router. A pair of C-clamps are used to secure the fence to the table.

The top (Part A) is made up of two pieces of particleboard laminated together. We used a caul clamping system with locating pins one inch in on each of the far corners. If caul clamps are not available, screws and glue may be used. Keep in mind that the screws must be countersunk and out of the way of the router location.

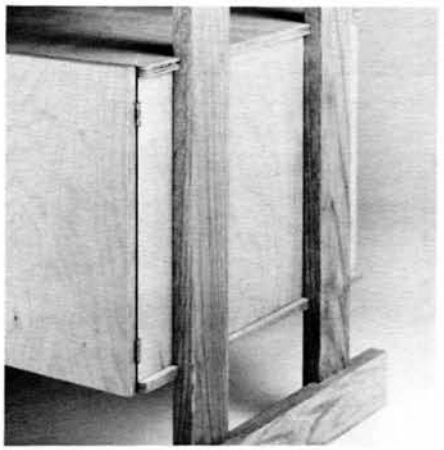
Next, parts B and C are cut to size. On parts B, lay out and mark a line 3½ in. from the ends, then with No. 10 x 1¾ flat head screws, attach parts C to B. Position the inside of part C to the marked line. Countersink part B enough to accept a ⅜ in. long by ⅜ in. diameter wood plug.

This frame can now be attached to the underside of the top. Use No. 10 x 2½ in. flat head wood screws and screw from the top side. Locate the screws about 6 in. apart. Countersink the heads flush with the top.

The plastic laminate (Part D) is applied next. The purpose of the laminate is to provide a smooth surface for the material to ride on, so a textured laminate is not recommended. Stay

Bill of Materials
(All Dimensions Actual)

Part	Description	Size	No. Req'd
A	Top	1½ x 22¾ x 36	1
B	Front and Back Stretchers	1 x 3 x 31	2
C	End Stretchers	1 x 3 x 20	2
D	Plastic Laminate	1/16 x 22¾ x 36	1
E	Side Risers	1 x 3 x 33	4
F	Side Stretchers	1 x 3 x 20¼	2
G	Carcase Bottom and Top	½ x 19¼ x 23	2
H	Carcase Center Divider	½ x 19 x 13¾	1
I	Carcase Sides	½ x 19 x 13¼	2
J	Carcase Back	¼ x 22 x 13¼	1
K	Carcase Doors	½ x 10⅞ x 14¼	2
L	Door Hinges	½ x 1	4
M	Door Knob	See Detail	long 2
N	Fence	1 x 3 x 31	1
O	Fence	1 x 3 x 36	1
P	Levelers	Paxton No. 6131	4



The carcase top and bottom (Parts G) fit into dadoes cut into the side risers (Parts E).

away from water base cements as they tend to delaminate in time.

Begin by cutting laminate at least 1 in. oversize. Then apply a liberal coat of cement to both the laminate and the top. When dry, apply a second coat. Once the second coat is dry, apply the laminate to the particleboard. Then, with a block of wood and your hammer, tap hard around the whole surface to insure a good bond. Now, with a laminate trimmer bit and your router, trim off the excess laminate.

Locate the center of the top and mark it on both sides. On the bottom side, drive in a finish nail on the mark, leaving about ½ in. protruding. With your router and a ¼ in. straight cutter, rout a 6⅜ in. diameter circle using the nail as a fence. Limit the depth of cut to 3/16 in. for each pass, and continue the process till you reach a depth of 1 in. Now remove the nail and lay out the rectangle shown in the drawing detail. To rout the rectangle you must set up a fence system. We choose to use a ¼ in. template guide. This enabled us to fix the fence just 1/16 in. away from the guide lines. For the fence we used ¼ in. plywood and tacked it in place on two sides at a time. A complete 360 degree fence system can be made, but it's time consuming and not necessary. Once set up, cut to a depth of ⅝ in. Now remove all fences and switch cutters to a ½ to ¾ plunge cutter, then begin to reduce the circle to 1 in. and the rectangle to ⅝ in.

Now remove the bit and the black plastic guide plate from the router, then position the router in the center of the 1 in. cut-out. Mark the holes that were used to support the glide plate and with a ⅛ in. drill bit, drill through the top. Flip the top over and counterbore a ⅝ in. hole ¼ in. deep. Next, increase the ⅛ in. diameter hole to ⅜ in. and press fit a ⅝ in. diameter washer into the ⅝ in. hole.

Construction of the base is next. Begin by cutting parts E and F to exact length and width. On parts F, lay out and cut ½ in. deep by 3 in. wide dadoes as shown. We recommend using a dado head on either the table saw or radial-arm saw. Now on parts E, lay out and cut the two dadoes to accept the carcase top and bottom (G). The first will start 6½ in. in from the ends by ½ in. wide by ½ in. deep; the second will start 20½ in. in from the same ends by ½ in. wide by ½ in. deep.

Sand all parts to a finished 220 grit and dry assemble. Lightly wax around all the joints to be glued. This will make clean up of excess glue much easier. Next, glue and clamp the side assemblies (Parts E and F).

Once the assemblies are dry, the storage cabinet can be constructed. Begin by cutting parts G, H and I to length and width. On parts G, locate the center of one side and cut a ½ in. deep by ½ in. wide dado the full width of the piece. Also, on parts G, cut a 45 degree angle on the four front corners, ¼ in. long. Now attach the side assemblies to the upper framework (Parts A, B and C) with No. 10 x 1¾ flat head wood screws. Countersink the heads flush.

Once parts E and F are secured to the

Underside of top (A) is recessed to accept router.

top, parts G and H can be attached. Begin by gluing the top and bottom (Parts G) to the side assemblies. Once dry, the center divider (Part H) can be glued in place. For clamping, we used deep throat clamps, although an alternative might be screws or caul clamps. Remember, when gluing parts H, the front edges must remain flush. Parts I are added last. We chose to screw them in place with No. 8 x 1¼ flat head wood screws, countersunk flush. Again, remember to keep the front edges flush. Now cut the back panel (Part I) to size; glue and screw in place. Use No. 6 x ⅝ flat head wood screws countersunk flush.

The doors (Part K) are now cut to size. Before attaching to the cabinet, the hinges and handles must be applied. Begin by attaching ½ in. by 1 in. brass or steel barrel hinges to the doors. We simply attached them to the inside face of the door and the side edge of the carcase.

Now the handles (M) can be attached. We chose to use a pre-fabricated handle found at the local hardware store. Keep in mind that applied handles are not always the answer. Experiment with some sample doors using cut out areas or combination cut-out and applied handles. To attach the handle, locate and mark a point 3 in. down from the top edge and 1½ in. in from the inside edge of both doors. Drill a ¼ in. hole and apply the handle.

The doors can now be attached to the carcase. Begin by setting the doors into place and lightly clamping them to avoid shifting. Now mark the location of the hinges on the edge of the carcase with a pencil; then remove the clamps. Transfer your lines to the front edge of the carcase and locate the hinges for proper position and mark the holes. Pre-drill the holes marked and attach the doors.

The fence system (Parts N and O) is next in line to be built. We chose to simplify the system to avoid complication and maximize versatility. To assemble the fence, we used two pieces of oak, 1 in. thick by 3½ in. wide. The first was cut to 36 in. long, the second to 33 in. long. We then clamped the two pieces together as shown in the fence detail. Once the fence is dry, joint one edge and rip to 3 in. Now locate and mark the center of the 36 in. side and then locate and mark a line 13/16 in. to both sides of the center line. Use the dado blade to cut a ½ in. dado just inside the guide lines. By cutting the dado completely through, you reduce the amount of chip build-up. To cut the second relief, set a ¼ in. straight cutter and template guide in your router and adjust to a 1 in. depth. Cut the second relief in only 1 in. The template guides will help you on the sides only; the width must be cut free hand. The second relief provides you with more flexibility in height when the fence is positioned over the bit.

The floor levelers (Part P) will be helpful on uneven floors. They can be ordered from Paxton Hardware, Upper Falls, MD 21156.

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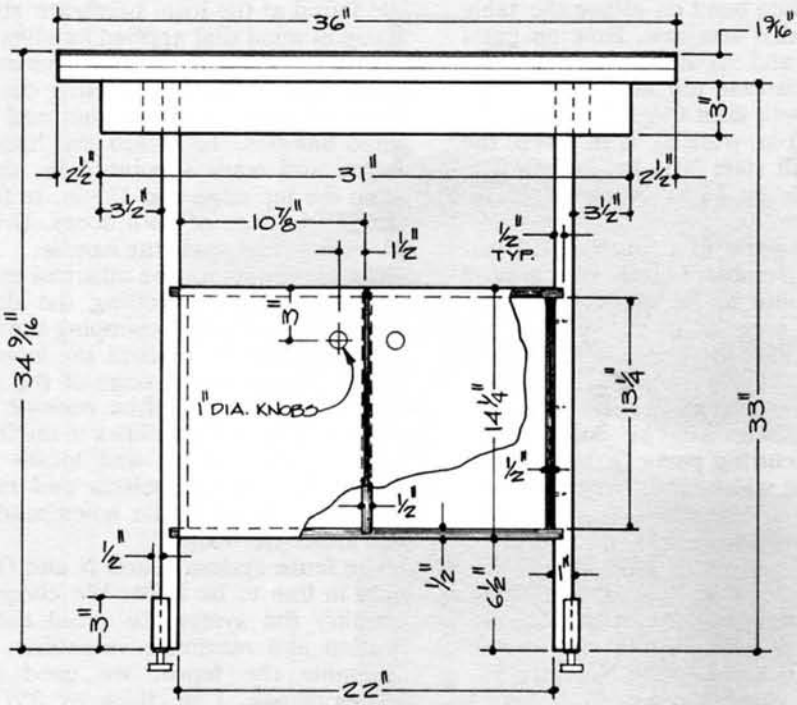
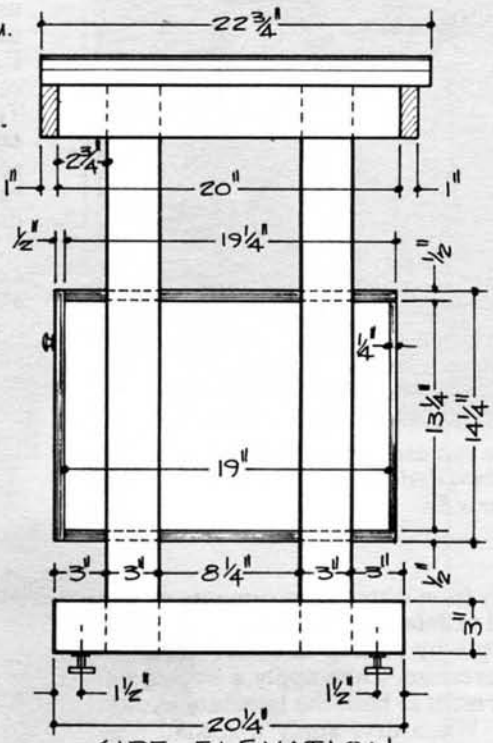
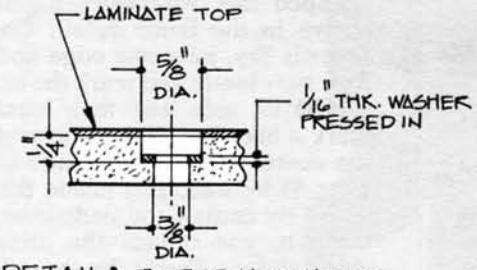
Double cabinets provide extra room for shop tools and supplies.



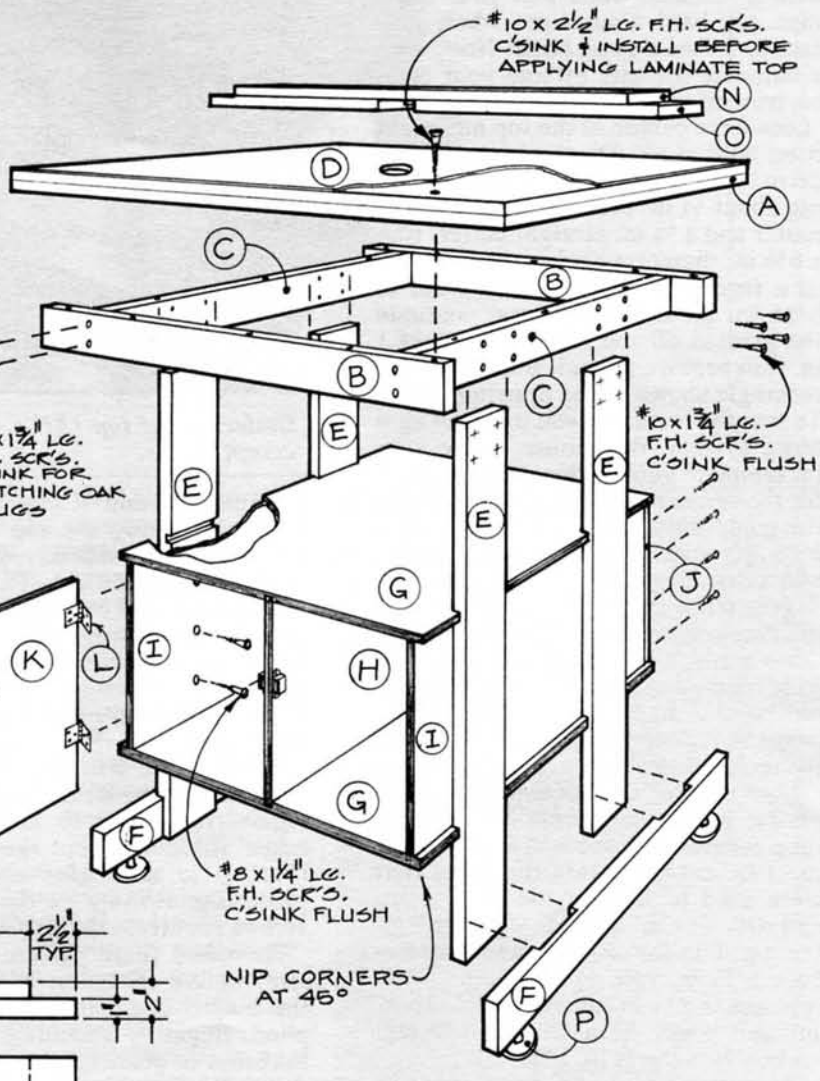
FRONT ELEVATION

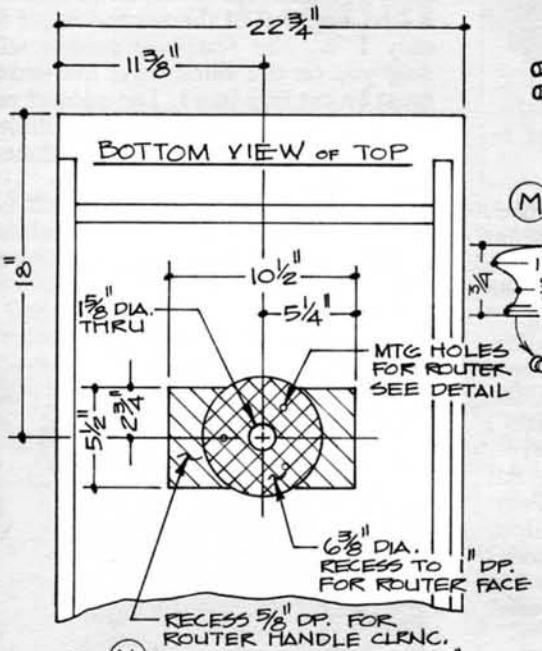


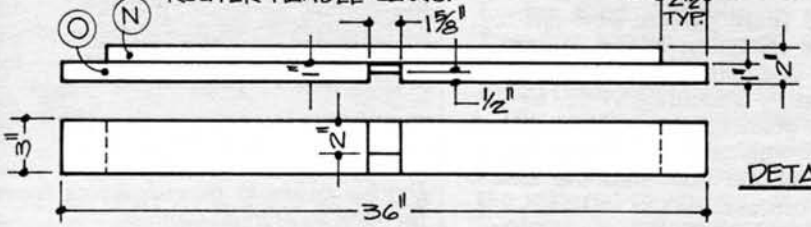
SIDE ELEVATION



DETAIL: ROUTER MTG. HOLES



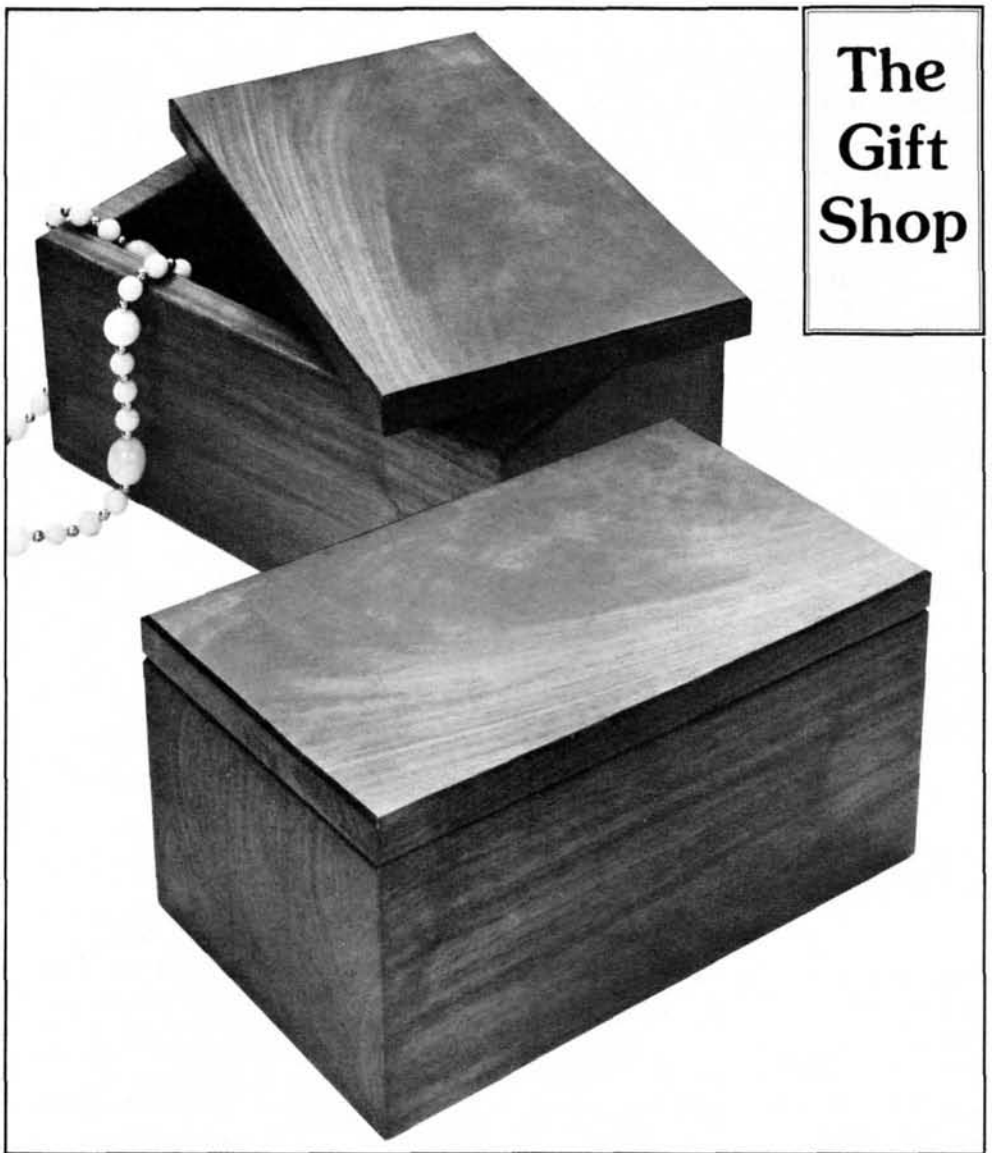




DETAIL: FENCE

Art by The Drawing Board, Prospect, CT

The Gift Shop



Band Saw Box

There doesn't seem to be an end to the various ways that small wooden boxes can be designed and constructed. Often called "fancy" boxes, they've become a popular item at gift shops and craft fairs. We particularly like this one because it's straight forward design makes it surprisingly easy to build.

Our box measures 7¾ in. long by 4 in. high by 4¾ in. deep, however there is no hard and fast rule that dictates the"best" size. The size that is best will depend on its intended use and, of course, the personal taste of the woodworker.

There's no limit to the way these boxes can be used. A medium-size box, like ours, is ideal for jewelry, while a smaller one might hold sewing needles, business cards, pocket change, or even toothpicks. Sometimes a box serves as a decorative piece and holds nothing.

One nice feature of this design is that the "core" cut from the box blank (see step 4) can be used to make a second box, and the core from that box will make even another box. Thus, several boxes, all in descending size, can be made from the initial box blank. Little scrap stock results.

Since these are generally considered "fancy" boxes, they look best if made with one of the so-called "elegant" or "exotic" woods. We used a walnut body and a crotch walnut lid. A few of the many other possibilities include cherry, mahogany, teak, bubinga, and rosewood.

Begin by cutting stock for the blank. Three pieces are required to make our box, each measuring 8¼ in. long by 3½ in. wide by 1¼ in. thick. The 8¼ in. dimension allows extra length that will later be trimmed. Once cut, glue the three pieces together (edges up) using your bench top as a flat surface (Fig. 1). Clamp lightly across the edges with a scrap block to prevent shifting, then use additional clamps to apply pressure on the face. Remember to wax both the scrap blocks and your bench top to avoid sticking. Allow to dry for at least one hour before removing all clamps. Following this, use the table saw to trim each end while cutting to a final length of 7¾ in.

Before going any further, it's a good idea to flatten any uneveness along the edges of the blank. A hand plane will work well here—just keep in mind that the plane must remain parallel to the edges.

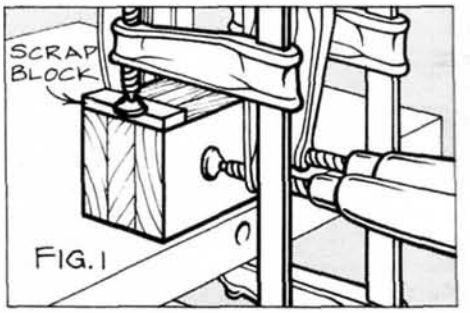


FIG. 1

Lay out and mark a ½ in. guide line around the perimeter of the box. This establishes the thickness of the sides and base. Now use a drill press to bore a ½ in. diameter hole in the lower corners of the blank (Fig. 2). The outside diameter of the hole should just touch

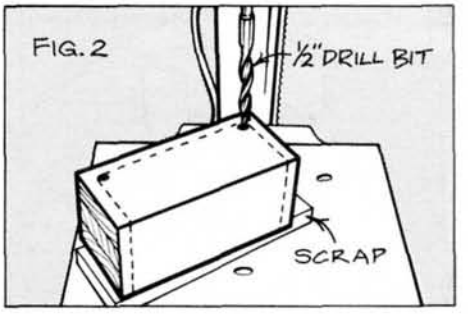


FIG. 2

the guide lines. Use a scrap block under the blank to avoid tear out.

Two steps are required to remove the core. The first step is done on the table saw (Fig. 3).

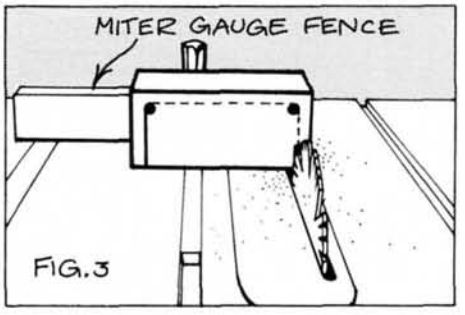


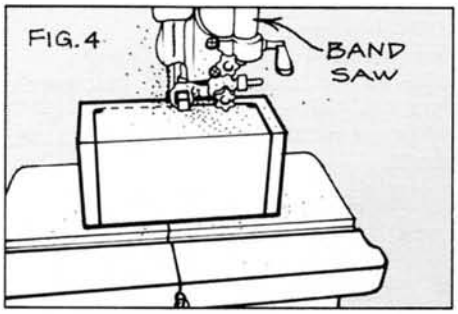
FIG. 3

When cutting heavy stock like this, we've found that the table saw blade often tends to wobble resulting in an uneven cut. To minimize the problem, it's best to make two cuts, the first one 1/16 to ⅛ in. on the waste side of the line, the second one right on the line. The blade is set to a height of 2⅝ in. for all cuts.

The band saw is used to make the remaining cut (Fig. 4). To save time, we made a free hand cut along the guide line. However, if you plan to make a number of boxes, it would be helpful to set up an auxiliary rip fence.

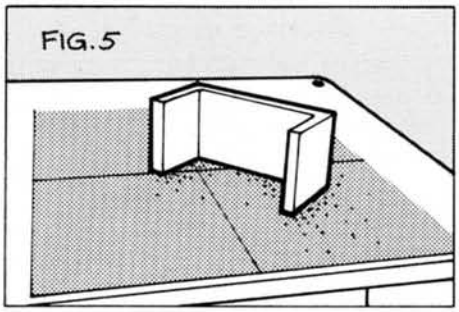
Due to the nature of the table saw and band saw, some tear out may occur. If this happens, it will be necessary to sand both sides. A sanding board,

(continued on next page)

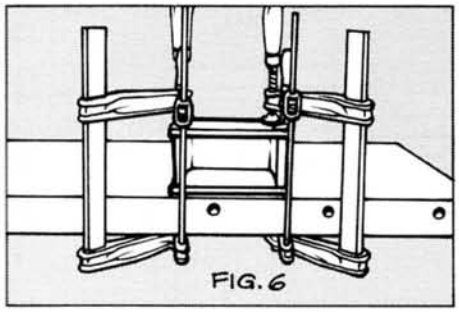


which is easy to make, can be put to use here. Cut a piece of ⅜-¾ in. particleboard to 24 in. square, then use rubber cement to glue four pieces of standard size 100 grit sandpaper to the board. Butt the edges together to form a smooth surface (Fig. 5).

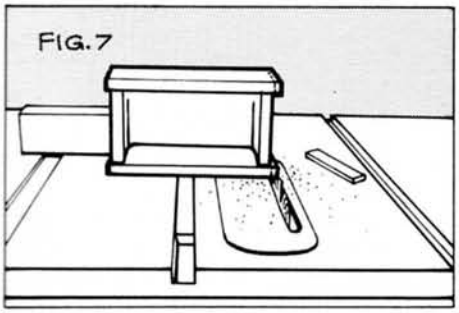
The two ½ in. thick sides can now be cut to length and width. It's best to cut them a little on the long side to allow for later trimming. If you don't have ½ in. thick stock, it can be resawed on



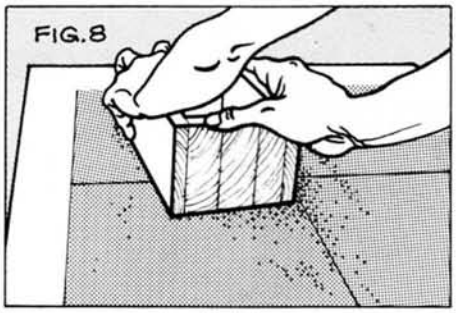
the table saw from thicker material. After resawing, use a block plane to remove the saw marks and flatten the stock. Once completed, the sides are glued and clamped in place (Fig. 6). Be sure to keep the top and bottom edge aligned with the sides.



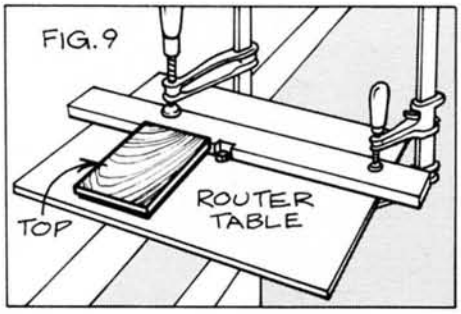
When dry, the extra length allowed for the sides can be trimmed on the table saw (Fig. 7). It's best not to trim flush; instead leave a 1/32 to 1/16 in. lip to be cleaned up on the sanding board. The router equipped with a



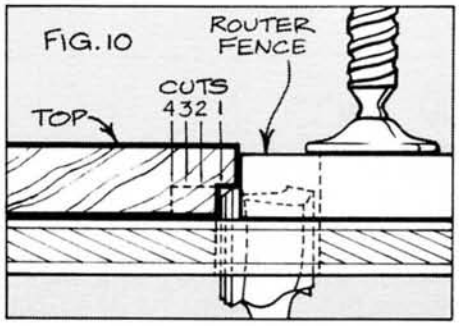
laminate trimmer bit can also be used. The trimmer bit will automatically leave a 1/32 in. lip. The sanding board is now used to clean up the top, bottom and ends of the box (Fig. 8).



The lid can now be cut to size. Ours measured 7¾ in. long by 4¾ in. wide by 1-1/16 in. thick. Using a router table and a ¾ in. straight bit, cut a ½ in. deep rabbet at a point 9/16 in. from the edge of all four sides (Figs. 9

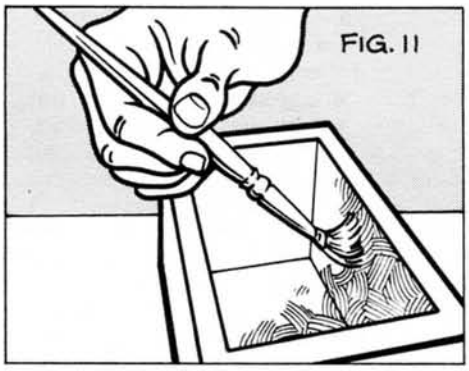


and 10). As shown in Fig. 10, the cut is done in four steps. The height of the bit never changes, only the depth of



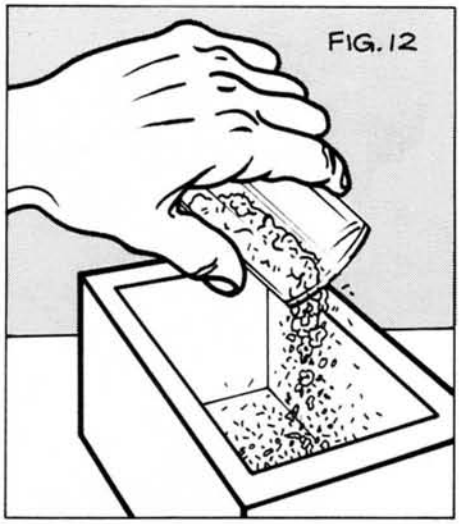
the cut which is regulated by the location of the fence.

Next, the box is "flocked" to give the interior a velvet like surface. Flocking is a powder-like material that is sold in a variety of colors at most craft shops.



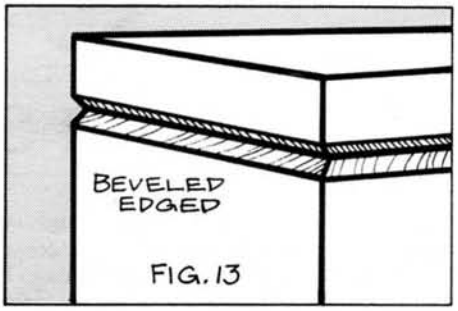
It's easy to do and results in an attractive look.

Select an oil-based paint that roughly matches the color of the flocking. Then apply the paint to the interior of the box (Fig. 11). Allow to dry. Apply a second coat of paint, then sprinkle a small amount of the flocking into the box (Fig. 12). Cover the box with an oversized piece of wood and shake thoroughly to spread the flocking



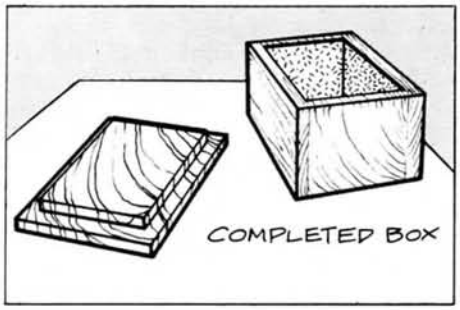
evenly over the paint. Allow to dry and remove any excess flocking.

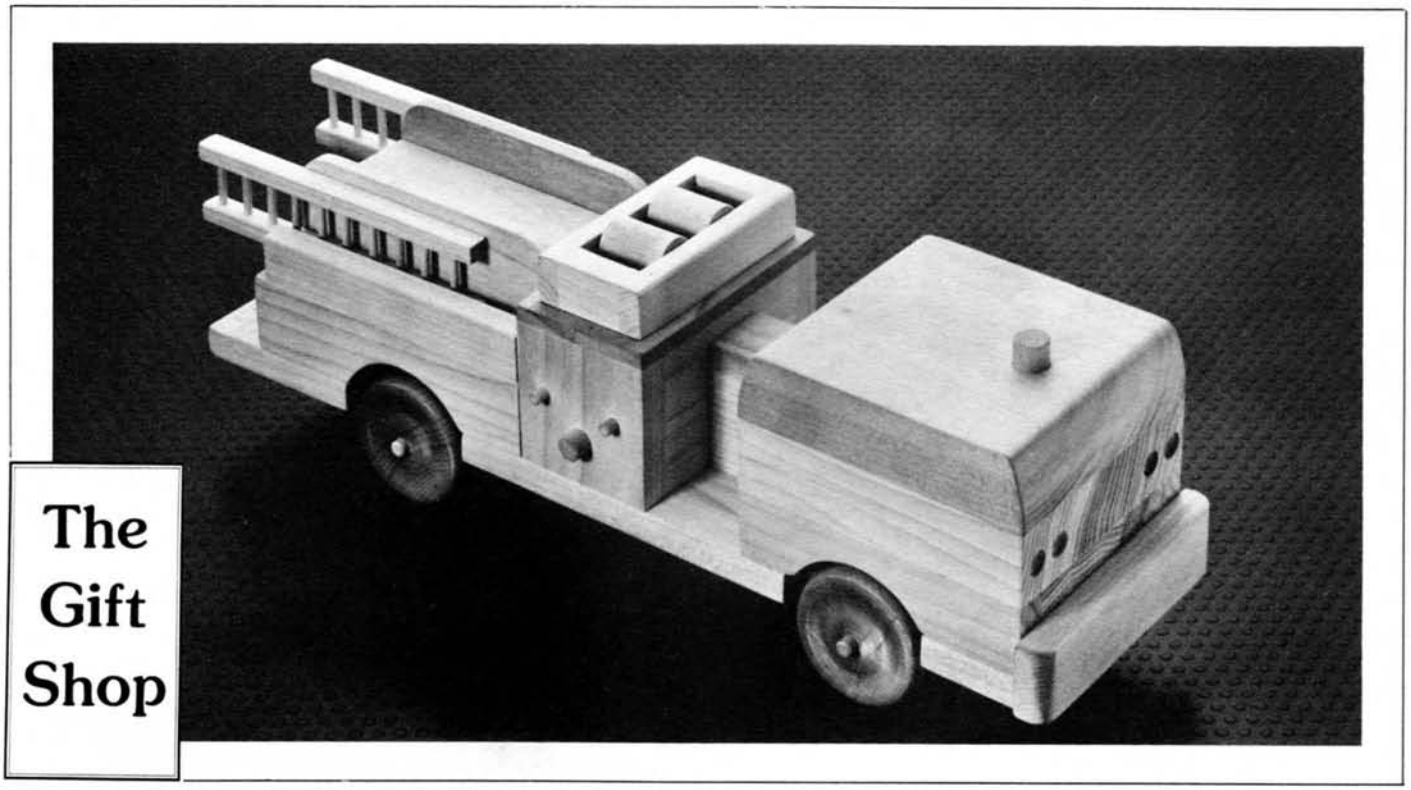
A chamfered edge can now be applied to both the top and base. We used a router and a bearing guided chamfer bit, although a hand plane or hand sanding will also give good results (Fig. 13). The chamfer not only pro-



vides a nice detail, it makes it easier to remove the lid.

Final sand the box on the sanding board to at least 220 grit. The sanding board will keep the edges crisp. Apply a coat of penetrating oil to the box and wet sand with 400 grit paper. Wipe off the excess and allow to dry. Apply additional coats until the finish has been built up to your satisfaction. A coat of paste wax completes the project. WWJ





The Gift Shop

Toy Pumper Firetruck

by C.J. Maginley

Young firefighters will enjoy playing with this toy. It's a sturdy replica of a "pumper" firetruck, complete with a pair of ladders for second story rescues.

Just about any type of wood can be used, although I chose poplar because it's reasonably priced yet hard enough to stand up to pretty rough service. If you're looking for maximum durability though, maple is the best choice of the commonly available woods.

The frame (part A) is made first. Cut to overall length and width from ½ in. thick stock, then lay out and mark the location of the front and back wheel cutouts. These cutouts are best made using a dado head cutter in conjunction with a table saw.

Hold the stock against the miter gauge (edge down), then pass the stock through the dado head cutter. A ¾ in. wide cutter will require three or four passes to form the 2¼ in. wide cutouts.

The cab parts (B, D, and E) are made next. Cut to length and width from five-quarter stock, keeping in mind the grain direction as shown. Note that part D has four "headlight" holes while part E has a single hole for the warning light (W).

Parts C, the front fenders, are also made from five-quarter stock. Rip to a width of ½ in., then scribe the radius as shown. Cut out with a band or saber saw.

The pump panel parts (G, H and I) can now be cut to size. The ¼ in. thick stock for part I can best be obtained by resawing ¾ in. thick material. Holes for the hose connectors (parts X and Y) are drilled as shown.

The reel rack assembly consists of parts J, K, L and M. The hose reel (part L) is made from ¾ in. dia. dowel stock cut to a 1 in. length. A 5/16 in. dia. hole is drilled through the center of each one.

Next, parts Q, R, and S are cut to length and width as shown. Together, these parts form the tank assembly. Note that part S is located at each end of the assembly.

The remainder of the parts are cut to the sizes specified in the bill of materials. The wheels (parts DD) can be made as shown or ordered via mail-order from The Toymaker's Supply Company, 2907 Lake Forest Road, Tahoe City, CA 95730. Their part number 11 has a 7/16 in. thickness with a 2 in. dia. and ¼ in. axle hole.

Before assembly, give all parts a thorough sanding, however, don't round any edges or corners yet. Since toys should be well smoothed, it's best to use 220 grit for the final sanding.

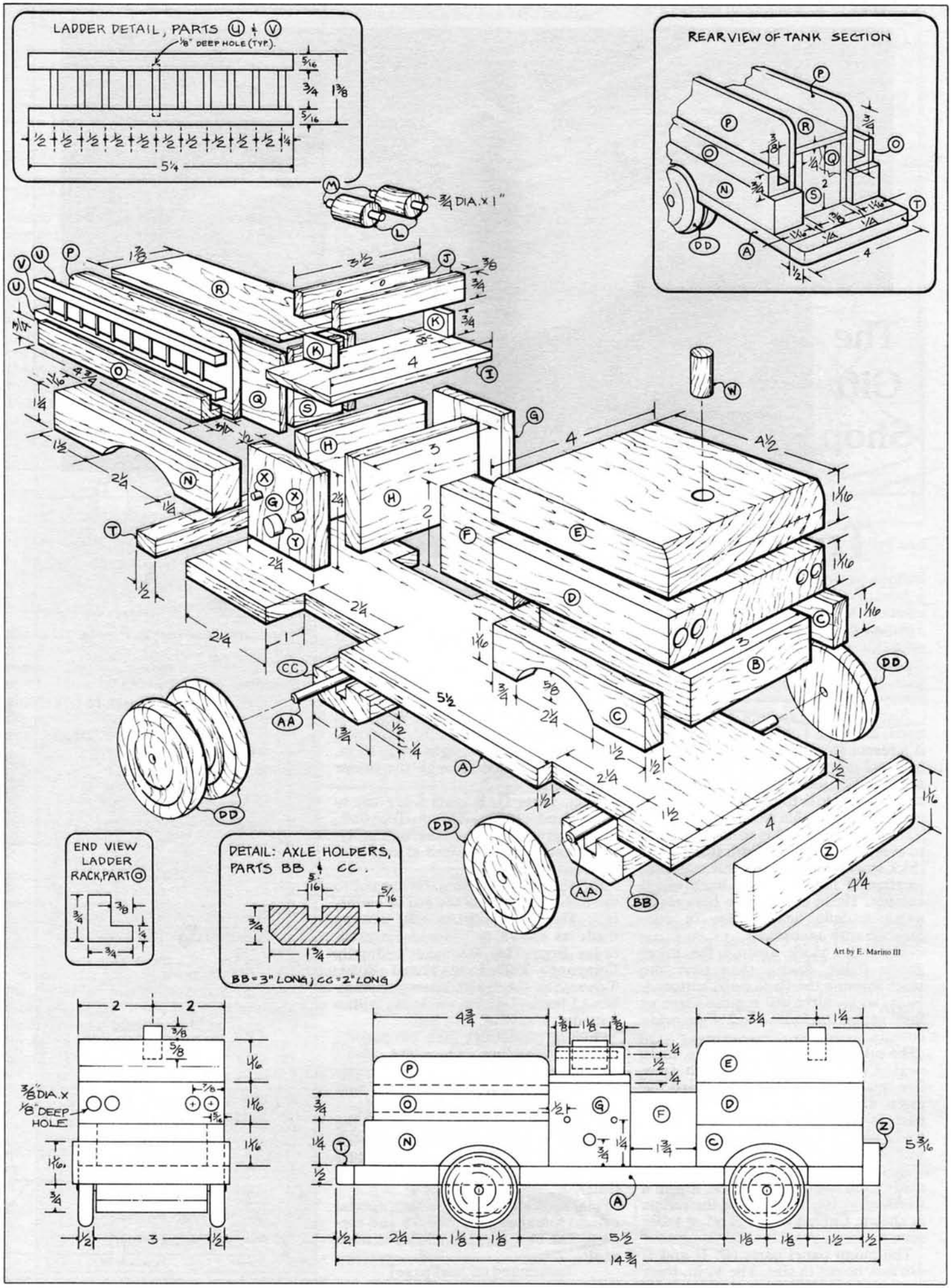
Assemble all parts as shown on the drawing. Use glue and clamp securely. When building toys, it's best to use a non-toxic glue such as Elmer's Glue-All.

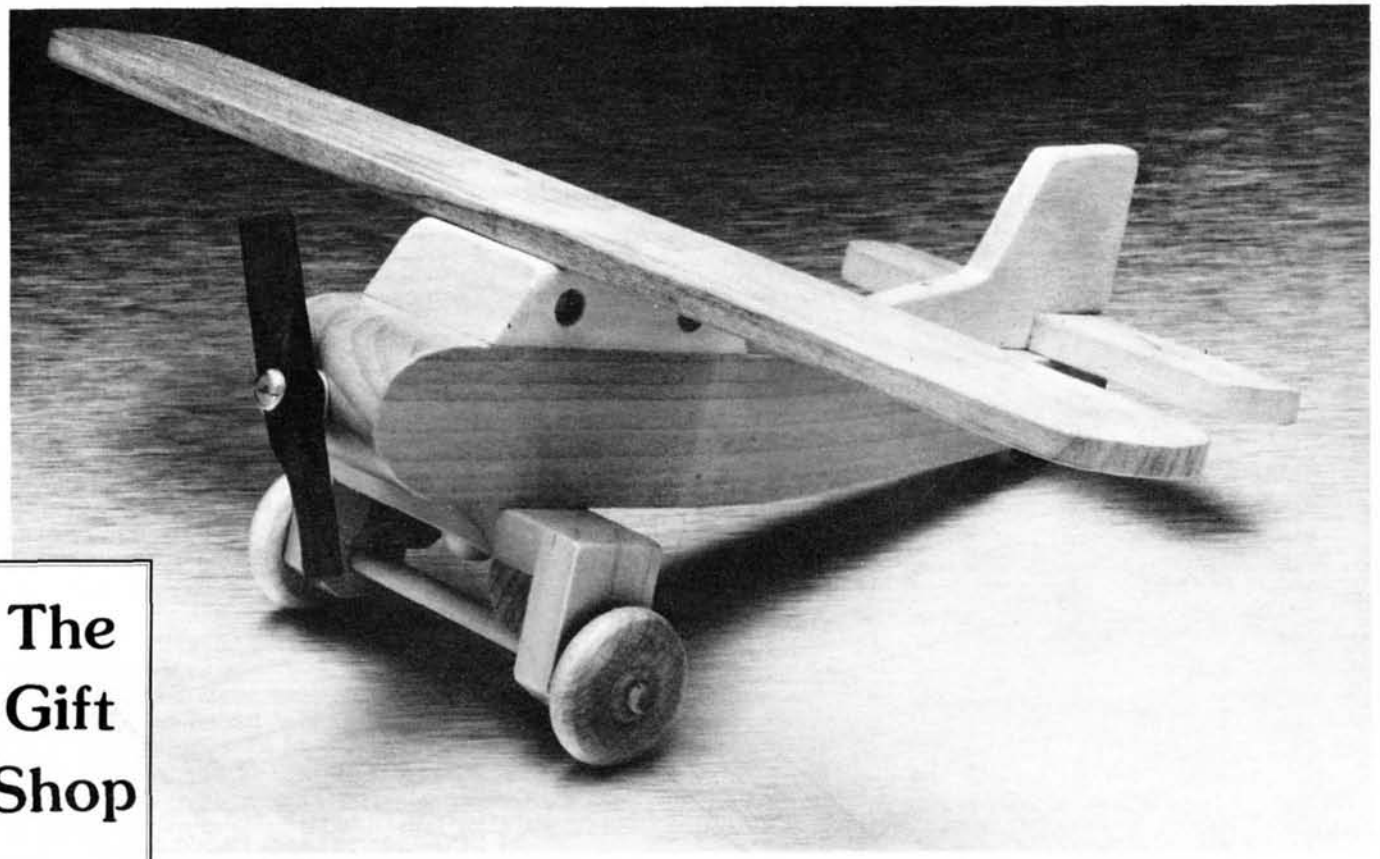
Final sand all surfaces, taking special care to round all sharp edges and corners. The best non-toxic finish is none at all.

(continued on next page)

Bill of Materials
(All Dimensions Actual)

Part	Description	No. Req'd	Size
A	Frame	½ x 4 x 13¾	1
B	Lower Cab	1-1/16 x 3 x 4½	1
C	Front Fender	½ x 1-1/16 x 4½	2
D	Center Cab	1-1/16 x 4 x 4½	1
E	Upper Cab	1-1/16 x 4 x 4½	1
F	Divider	1-1/16 x 2 x 1¾	1
G	Pump Panel End	½ x 2¼ x 2¼	2
H	Pump Panel Sides	½ x 2¼ x 3	2
I	Pump Panel Top	¼ x 2¼ x 4	1
J	Reel Rack Sides	⅜ x ¾ x 3½	2
K	Reel Rack End	½ x ¾ x 1⅜	2
L	Hose Reel	¾ Dia. x 1	2
M	Hose Reel Axles	3/16 Dia. x 1⅜	2
N	Rear Fender	1-1/16 x 1¼ x 5	2
O	Ladder Rack	¾ x ¾ x 4¾	2
P	Support	¼ x 1¾ x 4¾	2
Q	Tank Side	¼ x 2 x 4¾	2
R	Tank Top	¼ x 1⅞ x 4¾	1
S	Tank End	½ x 2 x 1⅜	2
T	Rear Bumper	½ x ½ x 4	1
U	Ladder Side	5/16 x ⅜ x 5¼	4
V	Ladder Rung	⅛ Dia. x 1	20
W	Warning Light	½ Dia. x 1	1
X	Hose Connector	3/16 Dia. x ¾	4
Y	Hose Connector	⅜ Dia. x ¾	2
Z	Front Bumper	½ x 1-1/16 x 4¼	1
AA	Axle	¼ Dia. x 4¼	2
BB	Front Axle Holder	See Detail	1
CC	Rear Axle Holder	See Detail	1
DD	Wheels	2 Dia. x ½ thick	6


LADDER DETAIL, PARTS U & V
1/8" DEEP HOLE (TYP.)
5/16
3/4
1 3/8
5/16
1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/4
5 1/4
REAR VIEW OF TANK SECTION
3/4 DIA. x 1"
END VIEW LADDER RACK, PART O
DETAIL: AXLE HOLDERS, PARTS BB & CC.
BB = 3" LONG; CC = 2" LONG
3/8 DIA. x 1/8" DEEP HOLE
Art by E. Marino III



The Gift Shop

Toy Airplane

by C.J. Maginley

Of all civilian aircraft, the Piper Cub is probably the most widely known. Over the years, its simple, safe flying qualities have made it popular with a great many weekend pilots.

This toy is a scaled-down version of that famous plane, with general proportions that are roughly the same. I suspect kids will have as much fun buzzing around with this toy as grown-ups do with the real thing.

Readers will be pleased to learn that it can be made with a minimum of materials—and it requires only a few hours in the workshop. As with most of my toys, I used poplar because it's not exceptionally expensive, yet it stands up to wear reasonably well. Of course, pine can be used, but it will be more susceptible to dents and scratches. If you are looking for maximum durability, use maple or birch stock for all parts.

The fuselage (part A) can be made first. Cut five-quarter stock (which actually measures 1-1/16 in. thick) to a width of 1¼ in. and a length of 7 in. Transfer the profile of the fuselage from the drawing to the stock, then cut out with a band or saber saw.

Next, the cabin (part B) is made. To get the ½ in. thick stock that's needed, it's best to resaw thicker stock on the table or band saw. Once cut to a width of 1¼ in., the bevel on each end is formed using a dovetail or back saw. Two shallow holes are then added as shown.

The wing (part C) is made from 3/16 in. stock, so again it will be necessary to resaw thicker stock on the table or band saw. After resawing, the wing can be cut to overall length and width. The wing ends are then generously rounded as shown.

On a piece of ¼ in. thick stock, lay out the shape of the stabilizer (part D) as detailed in the drawing. Cut to shape with a jig saw or, if done by hand, with a dovetail or backsaw. The rudder (part E) is made in the same manner.

The landing gear assembly (parts H, I, J, K, L and N) can now be cut to the sizes shown. With the wheels (part K) and the peg (part N), readers have the option of ordering them from The Toymaker's Supply Company, 2907 Lake Forest Road, Tahoe City, CA 95730.

After cutting and shaping the propeller (part M), all parts can be given a complete sanding. Sand through 220 grit to insure a smooth surface.

Use a non-toxic glue (such as Elmer's Glue-All) for all assembly. Begin by joining the cabin (B) to the fuselage (A). Clamp securely and allow to dry.

The stabilizer (D) and rudder (E) can now be added, again using clamps. When dry, bore holes for pins P and Q, then add the pins and sand flush.

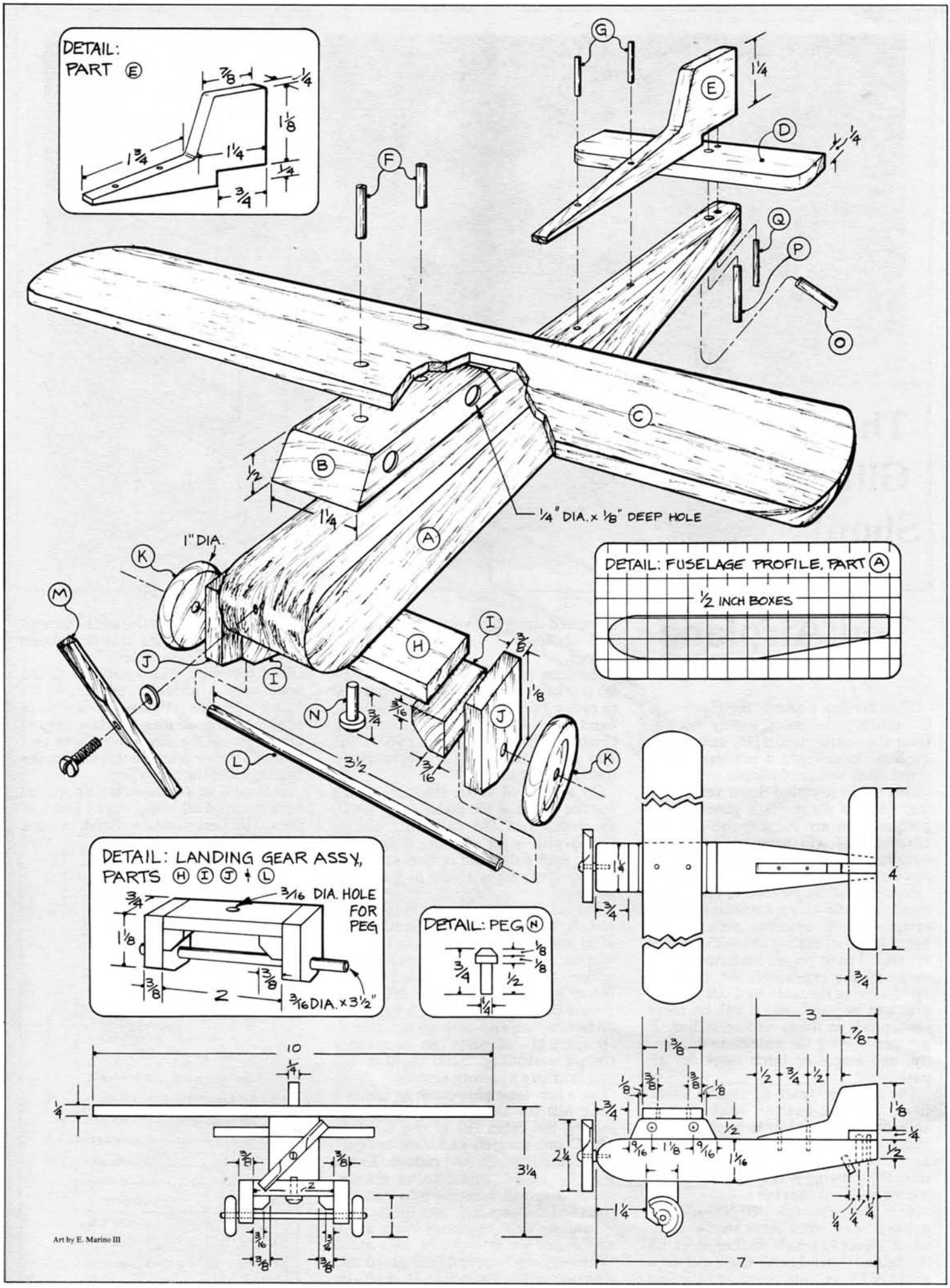
Landing gear assembly parts H, I, and J are glued together as shown. When dry, this assembly is glued and clamped to the underside of the fuselage. The turned peg (N) adds strength to the joint. Following this the wheels (K) and axle (L) are added.

The propeller (M) is secured to the nose with a sheet metal screw. To make sure that the screw stays in place, it's a good idea to add a drop of epoxy glue to the screw hole. Note that a small washer is installed between the fuselage and the propeller.

Final sand all surfaces, taking special care to round all sharp edges and corners. The best non-toxic finish is none at all. WWJ

Bill of Materials
(All dimensions actual)

Part	Description	Size	No. Req'd
A	Fuselage	1-1/16 x 1¼ x 7	1
B	Cabin	½ x 1¼ x 2¼	1
C	Wing	3/16 x 1⅜ x 10	1
D	Stabilizer	¼ x ¾ x 4	1
E	Rudder	¼ x 1⅜ x 3	1
F	Wing pin	⅛ dia. x ⅜	2
G	Stabilizer pin	1/16 dia. x ⅜	2
H	Landing gear base	5/16 x ¾ x 2	1
I	Landing gear support	⅜ x ¾ x ¾	2
J	Landing gear end	⅜ x ¾ x 1⅛	2
K	Wheel	5/16 thick x 1 dia.	2
L	Axle	3/16 dia. x 3½	1
M	Propeller	¼ x ¼ x 2¼	1
N	Peg	See detail	1
O	Tail rest	3/16 dia. x ⅜	1
P	Pin	3/16 dia. x ¾	1
Q	Pin	1/16 dia. x ¾	1


DETAIL:
PART (E)
7/8
1/4
1 1/8
1 3/4
1 1/4
1/4
3/4
G
E
1 1/4
D
1/4
F
Q
P
O
C
B
1/2
1 1/4
A
1/4" DIA. x 1/8" DEEP HOLE
1" DIA.
K
M
J
I
H
I
3/8
1 1/8
N
3/4
3/16
J
L
3 1/2
3/16
K
DETAIL: FUSELAGE PROFILE, PART (A)
1/2 INCH BOXES
DETAIL: LANDING GEAR ASSY,
PARTS (H) (I) (J) & (L)
3/16 DIA. HOLE
FOR
PEG
3/4
1 1/8
3/8
3/8
2
3/16 DIA. x 3 1/2"
DETAIL: PEG (N)
1/8
1/8
3/4
1/2
1/4
1/4
4
3/4
3/4
10
1/4
1/4
3/8
3/8
2
3 1/4
3/16
3/8
3/16
3/8
3
1 3/8
7/8
1/8
3/8
3/8
1/8
1/2
3/4
1/2
3/4
1 1/8
1/4
1/2
2 1/4
9/16
1 1/8
9/16
1 1/16
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1/4
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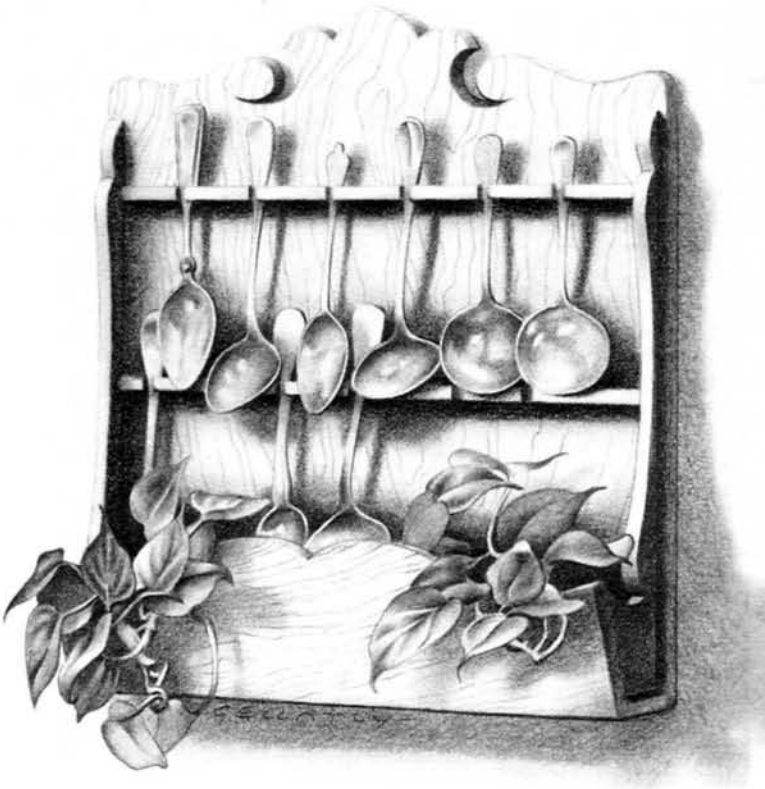
7
Art by E. Marino III

Spoon Rack



This rack will provide a lovely setting for your favorite spoon collection. Ours, with its Early American styling, is made from pine, although cherry would also be a good choice.

If you don't have ½ in. thick stock, most millwork shops will plane down ¾ in. material. Also, you can re-saw narrow stock on the table saw, then edge-glue it to get enough width for the front (A) and the back (B). Or you can get it the way our forefathers did by going to work on thicker stock with a well sharpened hand plane.

The front (A) can be made first. Cut to a width of about 4¾ and a length of about 18½ in. These dimensions will be trimmed later on. Transfer the profile of the top edge to the stock, then cut out with a band or saber saw.

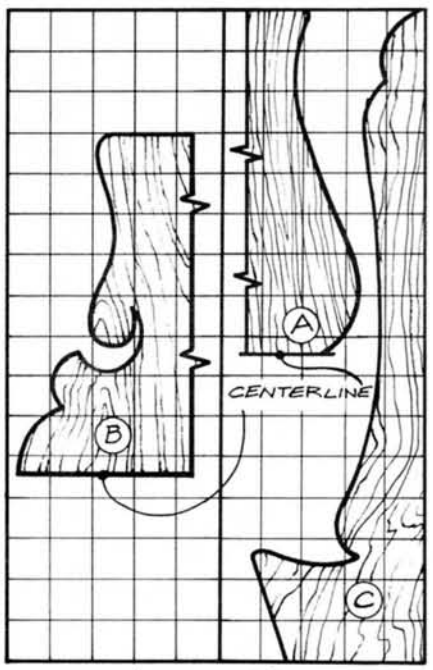
The back (B) measures 18 in. wide, so it will be necessary to edge-glue two or more narrower boards. Apply glue to all mating edges, then clamp firmly with bar or pipe clamps. To keep the edges from sliding out of alignment, it's helpful to clamp two pairs of cleats (made from scrap stock) across the width of the board. To prevent sticking, use wax paper between the cleats and the stock. Once dry, remove the clamps, then transfer the curved profile of the top. Cut out with a band or saber saw.

Once the sides (C) have been made, the spoon holders (Parts E and F) can be cut to length and width. Mark the location of each spoon, then bore a ½ in. diameter hole as shown. The hole should be centered along the 1 in. width. The notches can then be cut out with a dovetail or back saw. Readers should keep in mind though, that some spoon designs may require slightly different cutouts.

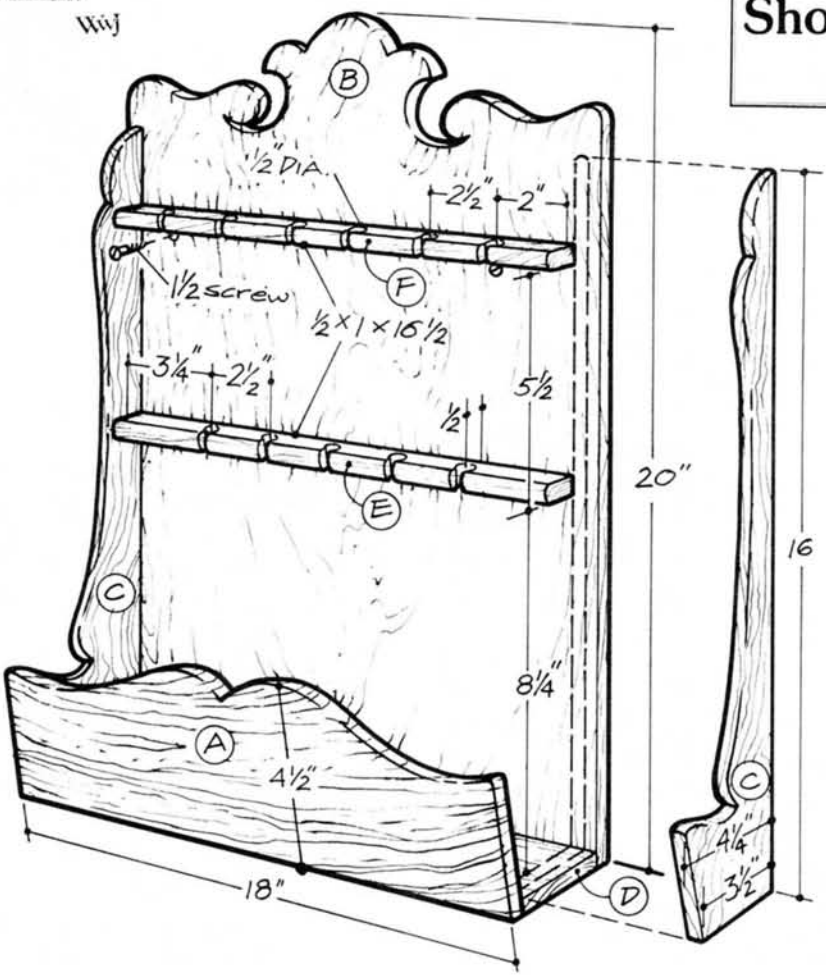
Give all parts a thorough sanding, taking particular care to smooth the curved edges. Assemble as shown. Use glue and finishing nails, countersunk and filled. Final sand before staining to suit. Several coats of a good penetrating oil, such as Deftco, will provide an attractive final finish.

Wij

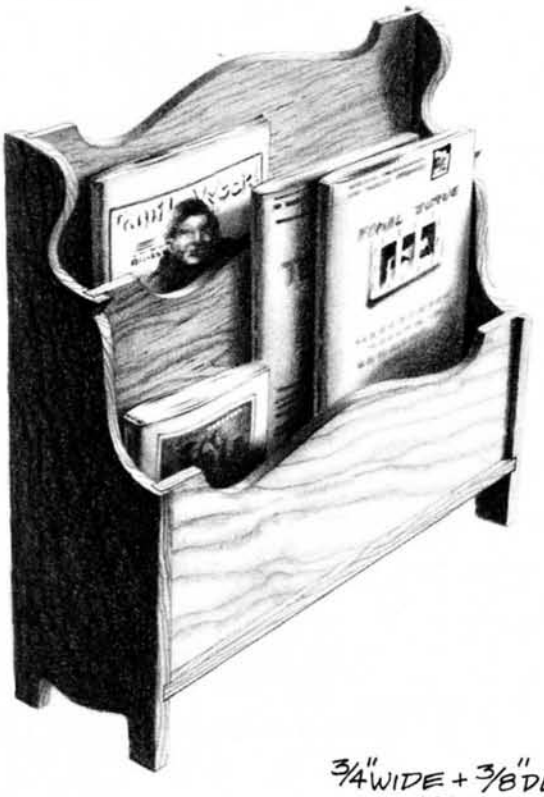
The Gift Shop



1 SQ. = 1 in.
ALL STOCK
½" THICK



Magazine Rack



A weekend in the workshop is all that's needed to complete this project. With its Early American styling, pine is a good choice, particularly since it's relatively inexpensive. We used ¾ in. thick stock throughout.

Begin by cutting the two sides (D) to overall length and width from ¾ in. thick stock. If necessary, edge-joint stock to get the 6 in. width.

Referring to the drawing, lay out and mark the location of ¾ in. wide by ⅜ in. deep dado for the bottom (E). To cut the dado, use the table saw equipped with a dado-head cutter or use a regular saw blade and make repeated passes.

Since the dado for the dividers (Parts A, B and C) must be stopped at the bottom dado, it's best to use a router for this operation. Equip the router with a straight bit. If you have a ¾ in. diameter bit, the cut can be made in one pass. Smaller bits will take several passes and the edge-guide will need to be relocated after each pass. To cut the dadoes, clamp the edge guide to the stock, then hold the router against the guide as you make the cut. A piece of scrap stock that has a straight edge will make a good edge guide. Be sure to stop the cut at the point it meets the bottom dado.

Next, transfer the profile from the drawing to the sides, then cut out with a band or saber saw. This completes preliminary work on the sides.

The dividers (Parts A, B and C) can now be cut to overall length and width as shown. Transfer the grid pattern to the stock and cut out with a band or saber saw.

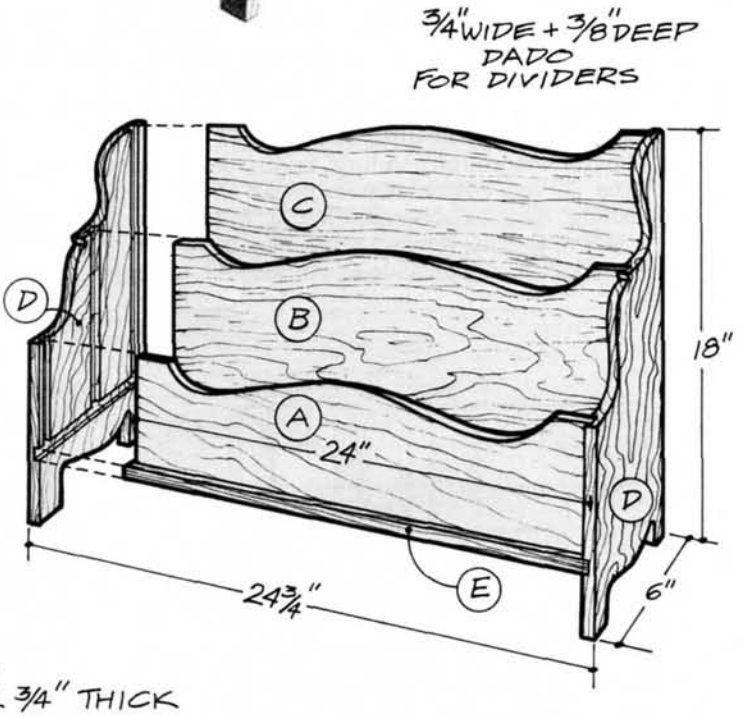
After cutting the bottom to size (¾ x 6 x 24 in.), all parts can be given a complete sanding. Give special attention to the curved edges, as these should be well smoothed with no rough areas.

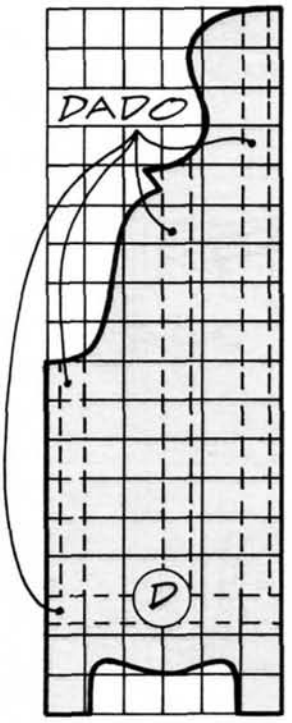
Assemble as shown. Use glue and wood screws to join the sides (D) to the dividers (A, B and C) and the bottom (E). Countersink the wood screws, then plug with wood plugs.

Final sand all parts. Give the corners and edges a good rounding to simulate years of wear, and sand the wood plugs flush with the surface.

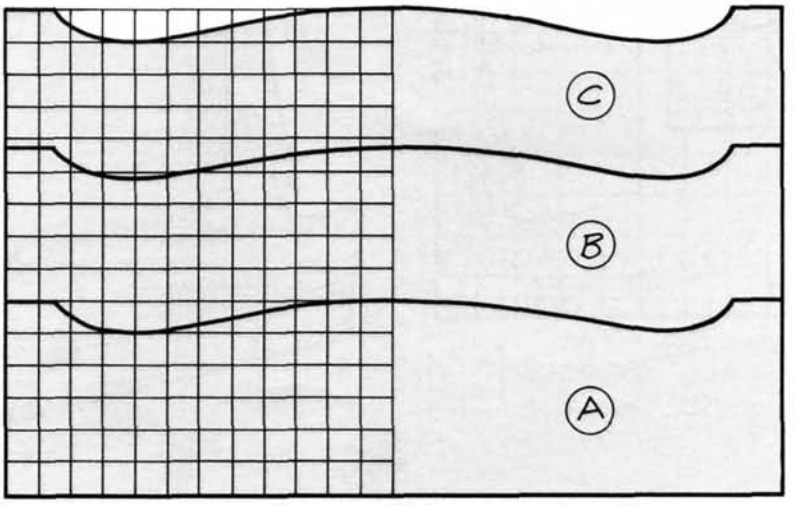
Apply stain to suit (we used Minwax's Early American), then apply two coats of polyurethane varnish as a final clear finish.

WWJ





1 SQ. = 1 in.
ALL STOCK ¾" THICK

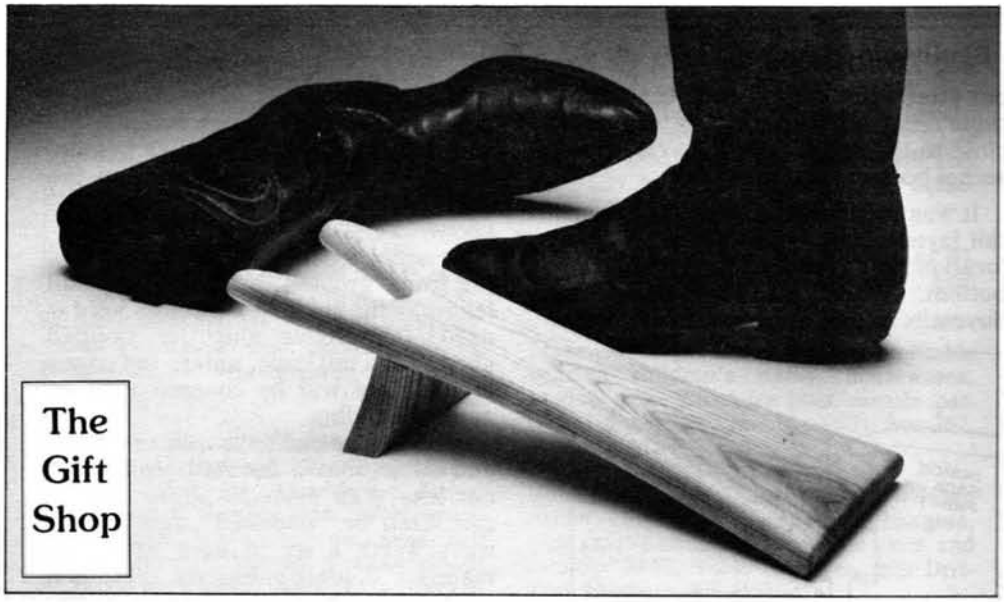


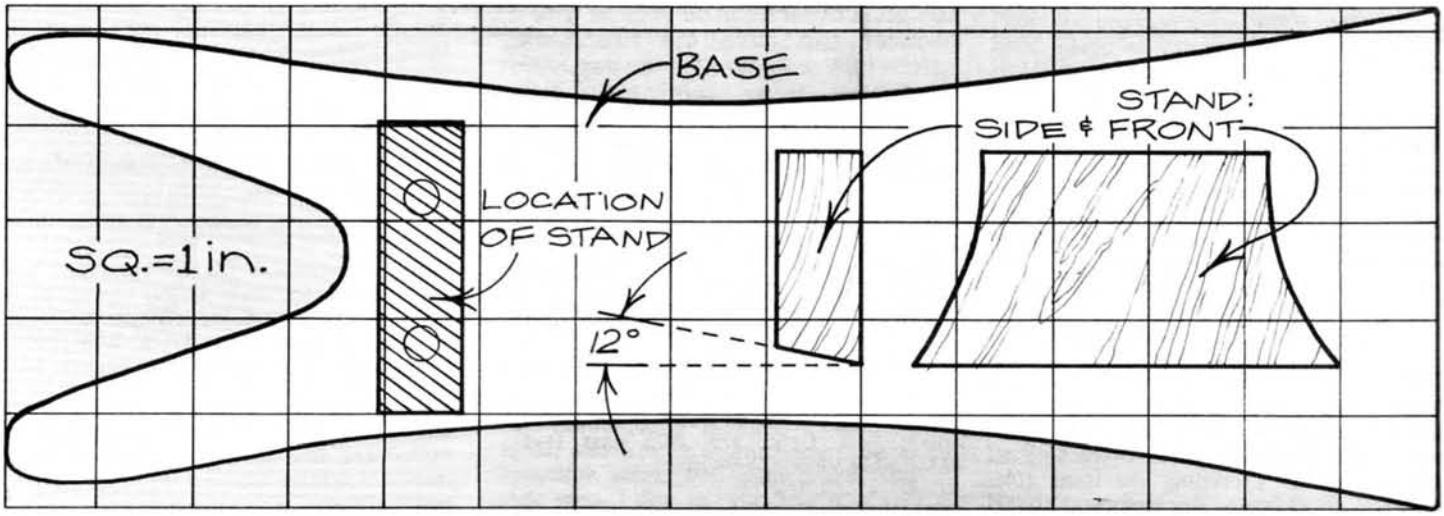
The Gift Shop

Bootjack

Boots seem to be as popular as ever today, in spite of the fact that getting one off almost always results in an annoying struggle. We suspect that, in one form or another, this simple tool has been around nearly as long as the boot itself. Our version, made of ash, can be built in just a few hours in the workshop—time well spent if you own a pair of troublesome boots.

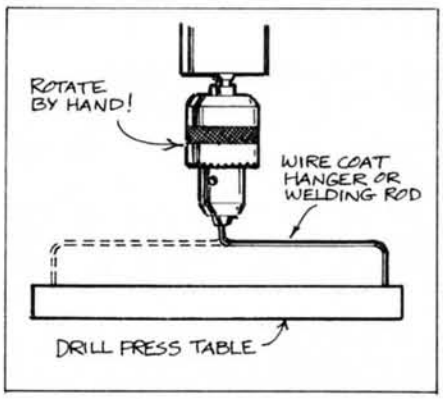
To make the base you'll need a piece of ¾ in. thick stock measuring 5 in. wide by 15 in. long. Transfer the grid pattern, then cut out with a band or saber saw. The stand is made as shown, then glued to the base using a pair of ⅜ in. by ¾ in. long dowel pins. Sand thoroughly, rounding all edges, then apply two coats of polyurethane varnish to complete the project. WWJ





Shop Tips

A tilt-top table is a nice feature to have on a drill press, however it's often difficult to get the table perfectly level once it's been tilted. Here's a technique that makes the procedure quick and easy. Bend a coat hanger to



the shape shown and secure it in the chuck. As the chuck is rotated by hand, the end of the coat hanger will show the high and low spots of the table.

Terry Plata, Pontiac, Ill.

When edge-gluing, strips of scrap material are often clamped across the stock to keep the edges from sliding out of alignment. To keep the scrap strips from sticking to the stock, apply a coat of paste wax to each one.

A sanding board will come in handy when it's important to sand a surface perfectly flat. To make one, cut a piece of ½ in. birch plywood to 24 in. square. Using rubber cement, glue four pieces of standard size sandpaper to the board. Butt the edges together (See Figs. 5 and 8 on page 58). You may want to make several boards, one for each of the commonly used grits. To use, clamp it in place, then move the stock back and forth on the board. When the sandpaper wears, the rubber cement makes it easy to peel off and replace.

Rubber bands often come in handy for clamping odd-shaped parts (See "Letters", page 6). For large jobs, an old automobile inner tube can be cut up to get ones that are extra long and strong.

Here's a finishing method for table tops that's easy to do and results in an exceptionally smooth surface. Using an orbital sander, sand the top thoroughly, starting with 80 grit sandpaper, then go to 120, followed by 180. If the stock does not have any deep scratches, you can start with 100 grit, then go to 150 followed by 180. Don't skip any steps though, otherwise you'll end up with scratches.

Flood the surface with a good penetrating oil finish (such as Watco Danish Oil), then sand the surface with 320 grit wet or dry sandpaper. As you sand, the oil traps the sanding dust and forces it into the wood pores. After sanding, wipe dry and let stand overnight. The resulting finish will be satin smooth.

Paul Levine, Sherman, Conn.

The Woodworker's Journal *pays $25 for reader submitted shop tips that are published. Send your ideas (including sketch if necessary) to:* The Woodworker's Journal, *P.O. Box 1629, New Milford, CT 06776, Attention: Shop Tip Editor. We redraw all sketches so they need only be clear and complete.*

out after each chip is removed. Continue removing waste in this way until close to the depth line, then clean the socket bottom right to the line.

It was mentioned earlier that dovetail layouts may be influenced by the location of grooves for a drawer bottom. When planning half-blind dovetails to join a drawer front to the sides, the groove cut in the front must be located so that it does not run into and damage the half pin. The best location for the groove is between the half pin and the full pin above it as shown in Fig. 19.

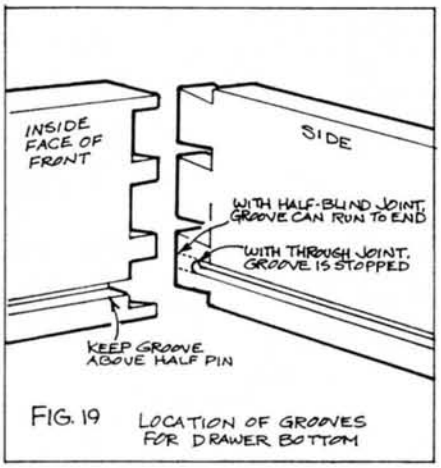


FIG. 19 LOCATION OF GROOVES FOR DRAWER BOTTOM

Provided a half-blind joint is used at the front, grooves can be run the full length of the sides. If a through joint is used, the groove must be stopped short of the tail ends, unless the edges of the front will be covered with an applied molding.

We all have bad days now and then, and sometimes a dovetail joint turns out less than perfect. Slight defects can often be "doctored" and it's always worth a try to save time and material. If, after gluing up, there is a slight gap between a tail and pin, the end grain of each can be peened with a hammer and often the fibers will spread just enough to fill the gap. Aim the hammer blows right on the gap.

If the gap is too large to close by hammering, it can be filled with a triangular piece of matching veneer or a thin slice of wood cut with the end grain matching the pin.

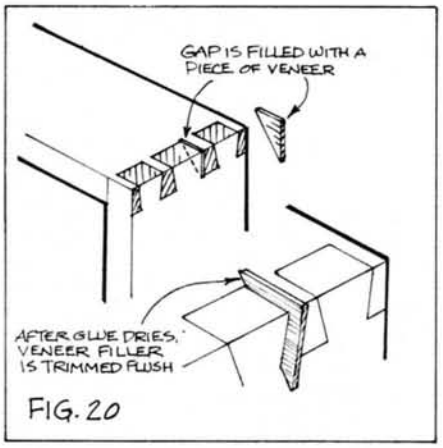


FIG. 20

If the gap is less than the thickness of the veneer, hammer the veneer flat to compress it. Glue is forced into the gap (don't put glue on the veneer or it will quickly swell) and the veneer is inserted (Fig. 20). After the glue dries, the excess veneer is trimmed off and the joint sanded.

WWJ

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The Classified Rate is 75¢ per word, payable with order. Minimum ad length is 15 words, and the deadline date is the 10th of the 2nd month preceding the issue (for example, 7/10 for the September/October issue). Send copy (count each word and initial) and check to **The Woodworker's Journal,** Classified Dept., P.O. Box 1629, New Milford, CT 06776.

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Shop Notes