

The Woodworker's Journal

Vol. 10, No. 2 \$2.50



Connecticut Shelf Clock

Included in this issue: Shaker Side Table • Federal Washstand
Pin-Hole Puzzle • Tumbling Monkey Toy • Shaker Oval Box
Microwave Cart • Wooden Mallets • Kicking Donkey Whirligig

March/April 1986

TREND-LINES BEATS ANY AD THIS ISSUE!

We honor all Freud specials

MAKITA TOOLS

1100	3 3/4" Planer Kit	\$163.95
1805B	6 1/8" Planer Kit	264.95
1900BW	3 1/4" Planer	
	w/case	93.95
2030N	12 1/2" Planer/Jntr	1395.00
2040	15 5/8" Planer	1185.00
2708W	Table Saw W/Carbide Blade	218.95
3601B	Router	118.95
3612BR	3 HP Router	176.95
4200N	4 3/8" Circular Saw	92.95
4300DW	Cordless Jig Saw	99.95
4301BV	Vr. Sp. Orbital Jig Saw	
	126.95	
5007NB	7 1/4" Circular Saw	299.95
5008NB	8 1/4" Circ. Saw	108.95
5081DW	3 1/8" Cordless	
	Saw	103.95
5402A	16" Circular Saw	299.95
6000R	Uni-Drill	99.95
6010DL	Cordless Drill w/charger	99.95
	light & case	99.95
6010DWK	Cordless Drill w/charger	88.95
	& case	
6010SDW	3/8" Rev. Cordless	
	Drill	44.95
6012HDW	Cordless Drill Kit	
	2 Sp	108.95
	3/8" Drill-Rev.	68.95
6510LVR	Cord. Screwdriver	109.50
6710DW	Drywall Screwdriver	88.95
6800DBV	Finishing Sander	99.95
9045B	Dustless Sander	107.95
9207SPB	7" Sander Polisher	139.95
9401	4"x24" Belt Sander	162.95
9900B	3"x21" Belt Sander	122.95
9924DB	3"x24" Belt Sander	130.75
98202	Blade Sharpener	169.95
B04510	Finishing Sander	46.95
DA3000DW	Cordless Angle Drill	99.95
DA3000R	3/8 VSR Angle Drill	103.75
DP3720	3/8" Reversible Drill	49.95
DP4700	Drill Reversible	94.95
GV5000	Disc Sander	56.95
JR3000V	Recipro Saw	124.95
JV2000	Orbtl. Var. Jig Saw	104.50
LS1000	10" Miter Saw	
	w/ise	229.95

AEG TOOLS

BSPE60	Orbtl. Top Handle	
	Jig Saw	127.95
EH82S	3 1/4" Planer	129.95
EZ501	Cordless Screwdrvr	39.95
EZ502	Cordless Driver	
	w/adj. Handle	51.95
EZ505	Cordless Drill/Driver	78.95
FSP60	Orbital Jig Saw	99.95
HBS75S	3" x 21" Belt	
	Sander	118.95
PC70	7 1/4" Circular Saw	93.95
RSK600	Orb. Recip. Saw	136.95
SBE401RL	3/8" Hammer Drill	52.95
SCRIE	Electronic Drywall	
	Driver	74.95
VS130	1/3 Sheet Orbtl.	
	Sander	48.95
VS260	1/2 Sheet Orbtl.	
	Sander	88.95
VSS260	1/2 Sheet Orbtl Sander	518
	w/Dustbag, Rubber	
	Sanding Plate	118.95

PONY CLAMP FIXTURES

No. 50	3/4" Pipe Clamp	7.30	6.55 ea
No. 52	1/2" Pipe Clamp	6.05	5.60 ea
No. 1215	(WEB) 15"	6.80	6.35 ea
No. 7456	Clamp Pads	2.95	2.50 ea

JORGENSEN BAR CLAMPS

No. 7224	24"	17.30	15.70 Ea
No. 7230	30"	18.10	16.45 Ea
No. 7236	36"	18.70	16.95 Ea
No. 7248	48"	20.75	18.70 Ea
No. 7260	60"	22.65	20.55 Ea
No. 7272	72"	24.55	22.25 Ea

JORGENSEN CLAMPS (Med Duty)

No. 3712	12"	5.90	5.35 Ea
No. 3724	24"	7.30	6.60 Ea
No. 3730	30"	8.20	7.40 Ea
No. 3736	36"	8.85	7.95 Ea

JORGENSEN HAND SCREWS

No. 3/0	3"	8.45	7.60 Ea
No. 0	4 1/2"	9.90	8.90 Ea
No. 1	6"	11.30	10.15 Ea
No. 2	8 1/2"	13.45	12.15 Ea

RYOBI TOOLS

AH115	12 1/2" Planer-Jntr	\$1275.00
AP125	12 1/2" Planer	995.00
AP10	10" Planer	399.95
B7075	3X21 Belt Sander	115.95
BS360NR	Hvy Dty Band Saw	1195.00
B550N	9 1/4" Band Saw	695.00
JSE-60	Electronic Jigsaw	122.95
L-580	6 1/8" Planer	249.95
R-330	2 HP Router	137.95
R-500	3 HP Plunge Router	159.95
RA2500	10" Radial Arm Saw	445.00
RA2500SP	Radial Arm and Kit	525.00
TS-251UB	10" Miter Saw w/ Freud LU85M10 Blade	229.00

MILWAUKEE TOOLS

0228-1	3/8" VSR Drill	\$ 93.95
0234-1	1/2" VSR Drill	113.95
0375-1	3/8" Rev. Angle Drill	117.95
1107-1	1/2" VSR D Handle	144.95
5660	1 1/2 HP Router	184.50
5680	2 HP Router	219.75
5935	4"x24" Sander	214.90
6014	1/2 Sheet Sander	124.95
6255	Vr. Sp. Jigsaw	139.95
6287	H.D. Jigsaw	224.50
6305	6 1/4" Cordless Saw	134.95
6367	7 1/4" Circ. Saw	129.95
6507	Sawzall w/case	139.95
6539-1	Cordless Screwdriver	61.95
6543-1	1/4" Screwdriver	155.50
6749-1	Magnum Screwdriver	139.95
8975	Heat Gun W/Scrapers	89.95

DELTA (ROCKWELL) POWER TOOLS

11-072	32" Radial Drill	\$ 399.95
22-651	13" Planer	1095.00
28-243	14" Band Saw	555.00
28-283	3/4 HP Bandsaw	674.95
31-730C	Belt and Disc Sander	1350.00
	Sawbuck w/ carbide blade	529.00
33-150	10" Radial Arm Saw	474.50
33-990	10" Contractors Saw	799.95
34-410	Unisaw	1199.00
34-761	6" Jointer	1250.00
37-220C	6" Jointer	495.00
37-255	8" Long-Bed Jointer	1495.00
37-315C	Electronic Scroll Saw	995.00
40-601	Wood Shaper	494.50
43-122	11" Lathe	425.00
46-140	12" Lathe	1399.00
46-541S	All Prices Include Genuine Delta Motors	

PORTER CABLE

7/8 HP Router	\$87.95
6" Disc Sander	149.95
Laminate Trimmer	79.95
4 1/2" Trim Saw	114.95
Abrasive Planer	99.95
Palm Finish Sander	55.95
3x21 Belt Sander w/bag	114.90
3x24 Belt Sander w/bag	179.75
4x24 Belt Sander w/bag	189.95
Finishing Sander	104.75
3 H.P. Electronic Router	324.80
7 1/4" Circular Saw	159.95
1 1/2 HP Router	129.95
1 1/2 HP Router/Shaper	210.50
Router/Shaper Table only	109.75
7 1/4" Circular Saw	119.50
Orb. Jig Saw w/ Barrel	133.95
Orb. Jig Saw w/ Barrel	133.95
Grip	133.95
2 Sp. Tiger Saw Kit	119.95

JORGENSEN BAR CLAMPS

No. 4512	12" Open	17.45	15.70 Ea
No. 4524	24" Open	20.85	18.85 Ea
No. 4530	30" Open	21.90	19.65 Ea
No. 4536	36" Open	22.90	20.60 Ea

JORGENSEN & PONY CLAMPS

No. 3325	3 Way Edging	5.75	5.10 Ea
No. 1623	3" Hold Down	7.50	6.30 Ea
No. 3202HT	2" Spring	2.15	1.90 Ea

TITEBOND WOOD GLUE

\$5.75 Qt.	\$12.95 Gal
------------	-------------



Free Wooden Case!

New! Freud Tool Sets

TFWC104	4 pc. Chisel Sets	19.95
TFWC106	6 pc. Chisel Sets	31.75
TFWC110	10 pc. Chisel Sets	52.95
TFTT108	8 Pc. Lathe Set	53.95
TFCS106	6 Pc. Carving Set	59.50
TFCS112	12 Pc. Carving Set	111.50

BLACK AND DECKER INDUSTRIAL TOOLS

1179	3/8" Var. Sp. Drill	69.95
1575	3/8" VSR Scrudrill®	99.95
1703	10" Miter Saw	199.95
3051	7 1/4" Wormdriver	
	Saw	139.95
3103	2 sp. Cut Sawkit	99.95
3105	Var. Sp. Cut Sawkit	109.95
3107	Var. Sp. Orbital Cut	129.25
3265	Laminate Trimmer	145.65
3310	1 1/2 HP Router	129.95
3370-10	3 1/4" Planer	99.95
4010	Palm Sander	49.95
4247	4 1/2" Disc Sander/Grinder	69.95
6750	Heat Gun	59.95
9425	Compound Miter Saw	119.95

HITACHI TOOLS

CB75F	14 1/2" Band Saw	\$1445.00
CJ65VA	Electronic Jigsaw	149.95
CR10V	Reciprocating Saw	118.50
C6DA	6 1/4" Circular Saw	128.75
C12Y	12" Table Saw	1245.00
DRC-10	Cordless screwdriver	89.95
F1000A	Planer/Jointer	1275.00
F20A	3 1/4" Planer	97.95
P50	6 5/8" Planer	269.95
P100F	12" Planer	965.00
SB-75	3x21 Belt Sander—2 Sp. w/dust bag	128.75
SB8T	3x24 Belt Sander	165.00
TR-6	Laminate Trimmer	88.95
TR-8	1 HP Plunge Router	126.95
TR-12	3 HP Plunge Router	167.50

SUNGOLD X-WEIGHT SANDING BELTS

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

Size	Grit	10 Belts	50 Belts
3"x21"	120	\$.98 ea	\$.84 ea
	80	1.00 ea	.86 ea
Assortment of	60	1.05 ea	.92 ea
10	\$12.95	50	1.07 ea
	40	1.10 ea	.96 ea
3"x24"	120	1.20 ea	.93 ea
	80	1.22 ea	.97 ea
Assortment of	60	1.26 ea	1.12 ea
10	\$13.95	50	1.31 ea
	40	1.34 ea	1.18 ea
4"x24"	120	1.68 ea	1.46 ea
Assortment of	80	1.73 ea	1.51 ea
10	\$18.95	50	1.78 ea
	40	1.85 ea	1.70 ea
	40	1.89 ea	1.76 ea

SUN GOLD SANDING SHEETS

9X11 Aluminum Oxide C Weight	
Grit	Pk of 100
150, 120, 100	\$21.95
150	23.70
120	28.90
100	32.05
80	38.30
9x11 Non-Loading Silicon Carbide	
Grit	Pack of 100
400, 360, 320, 280, 240, 220, 180, 150, 120	\$19.60

FREUD SAW BLADES 10"=5/8"

No.	Size	Teeth	Use	Price
LU72M10	10"	40	General	\$34.50
LU73M10	10"	60	Cut-off	38.00
LU73M12	12"	72	Cut-off	76.90
LU78M10	10"	80	Plastic	83.50
LU82M10	10"	60	Cut-off	44.95
LU82M12	12"	72	Cut-off	85.95
LU84M11	10"	50	Comb.	38.50
LU85M10	10"	80	Cut-Off	63.50
LM72M10	10"	24	Ripping	36.95
DS306	6"	Dado		94.75
DS308	8"	Dado		107.70

If a prepaid price for an identical product in our ad is lower, we match the price and give you a gift certificate worth \$5.00 when purchasing from our catalog. Few restrictions apply.

Minimum Order \$15.00

Freight prepaid in all U.S.A. on orders of \$35.00 or more.

Note: Under \$35.00 add \$2.50 per order. Extra charge to Alaska and Hawaii on stationary machines. Typographical errors are rare but do occur. Any error is subject to correction by Trend-Lines. This ad expires April 30, 1986. Watch for our next ad.

FREE CATALOG WITH ORDER OR BY WRITING TO POST OFFICE BOX. SPECIAL SALE TO READERS OF THIS AD You Must Mention This Ad When Ordering

800-343-3248 USA
617-884-8882 Non-Order Calls

TREND-LINES, INC.

375C Beacham St.
P.O. Box 6447C
Chelsea, Ma.
02150



or personal check

Open Mon. - Fri. 8 a.m. - 5 p.m., 9 - 5 Sat.

30 DAY MONEY BACK GUARANTEE

Examine any item in your home or shop. If it's not what you expected, return it in original condition for a full refund.

Watco Danish Oil Natural, Medium, Dark, Black, or Colors

\$5.70 Qt. \$17.65 Gal

POWER DRIVE W/FOUR BITS \$19.95 on TV

FREE! With Any Order For \$50.00 or More!

Free with any order:

- 1 year (3 - 4 issues) catalog subscription
- Subscription to Woodworking Trends
- Membership in TLC with special offers
- For special prices ask for code WJMA6

RYOBI 10" PLANER

Takes on the work of the big planers!
AP10 \$399.95

MAKITA BLADE SHARPENER

Handles long planer blades.
98202 \$169.95

RYOBI CORDLESS DRIVER/DRILL PACKAGE

1020RS \$89.95
R - 500 ROUTER WORKSHOP

Workshop Includes:

- Ryobi 3 H.P. router
- Freud 15 pc. carbide tipped router bit set w/case.
- Rolled edge/guide bushing kit
- The Router Handbook

TFRW500 **\$299.00**

RYOBI 10" MITER SAW

W/FREE FREUD LU85M10 CUT-OFF BLADE! Includes vise assembly, extensions and dust bag.
\$229.95 TS251U



The Woodworker's Journal

MARCH/APRIL 1986 VOLUME 10, NUMBER 2

CONTENTS

Editor and Publisher
James J. McQuillan

Managing Editor
Thomas G. Begnal

Editorial Staff
David F. Peters

Contributing Editors
Paul Levine
John W. Olson

Subscription Department
Lynne S. Walton, Manager
JoAnne Finkle
Maureen A. Murphy
Kathy Shook

Advertising and Promotion
Kimberly S. Gellatly, Manager

Art Department
Judy Robinson, Director
Dan Thornton, Associate Director

Designer/Craftsman
F. Phillip Bacon

Production Coordinator
Jane Pratt

Office
Patricia A. Friberg, Manager
Patricia Malumphy, Assistant

Photography
John Kane/Silver Sun Studios

The Woodworker's Journal (ISSN 0199-1892) is published bi-monthly in January, March, May, July, September and November by The Madrigal Publishing Co., Inc., P.O. Box 1629, New Milford, CT 06776. Telephone: (203) 355-2694.

Copyright 1986 by The Madrigal Publishing Co., Inc. No part of this publication may be reprinted without permission from the publisher.

Second class postage paid at New Milford, CT 06776 and additional offices.

Subscription Rates: In the United States and its possessions — One year (6 issues) \$12.00, Two years (12 issues) \$22.00. Canada — One year \$19.95 (CAD), Two years \$35.95 (CAD). Foreign countries — One year \$14.00 (USD), Two years \$26.00 (USD).

To Subscribe, Renew or Change Address: Write to The Woodworker's Journal, P.O. Box 1629, New Milford, CT 06776, including mailing label for renewals and changes. For gift subscriptions, include your own name and address as well as those of gift recipients.

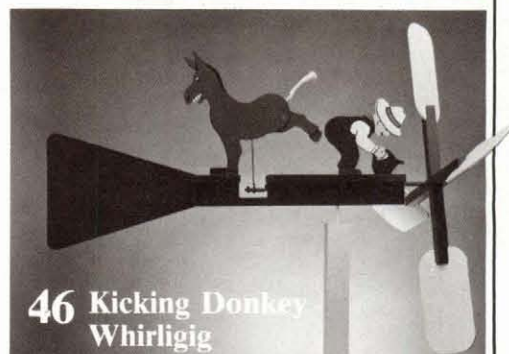
Postmaster: Send Change of Address to The Woodworker's Journal, P.O. Box 1629, New Milford, CT 06776.

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.

DEPARTMENTS

- 4 Shoptalk
- 7 Letters
- 12 Cabinetmaker's Supplies
Hardware Suppliers
- 13 Readers' Information Exchange
- 14 Workshop Income
A General Guide to Craft Fairs
- 16 Restoring Antiques
Why Wood Warps
- 18 The Beginning Woodworker
Cutting Tapers, Wedges and Other Irregular Shapes with the Table Saw
- 22 Special Techniques
Unsupported or Hand Steam Bending
- 26 Tool Review
3/8 in. Variable Speed Reversible Drills
- 31 Furniture Periods and Styles
Federal Period
- 42 Gift Shop
- 59 Shop Tips

Zebrawood Veneered End Table 34



46 Kicking Donkey Whirligig

PROJECTS

- 34 Zebrawood Veneered End Table
- 36 Shaker Oval Box
- 38 Microwave Cart
- 42 Pin-Hole Puzzle
- 43 Tumbling Monkey Toy
- 44 Early American Wall Box
- 46 Kicking Donkey Whirligig
- 48 Shaker Side Table
- 50 Wooden Mallets
- 52 Federal Period Washstand
- 55 Connecticut Shelf Clock

Microwave Cart 38



Shoptalk

A Slightly New Look

If you have a feeling that there's something different about this issue . . . you're right! We've upgraded our paper, from uncoated to coated stock, added a heavier cover, and gone to a "standard" (roughly 8 1/4 in. by 11 in.) size. The new size enables us to be printed on a faster, more efficient press. The coated paper permits sharper, cleaner photos and art, and the heavier cover stock will stand up better to use in the shop. Naturally, I hope that these changes serve to improve the magazine and that you like our new and not too different look at our old and no different price.

Another "first" for this issue is a tool review focusing on 3/8 in. variable speed reversible drills. I was a bit hesitant about committing to this type of feature, given its controversial nature and the amount of space required for an in-depth review. Therefore, I welcome your comments, opinions and criticism — either pro or con. Your letters will serve as a barometer in determining whether or not to include such reviews in future issues.

Beware

Something unusual and rather frightening happened recently in our shop. Phil Bacon, our Designer/Craftsman, had a very unpleasant reaction after using an aerosol can of

primer to undercoat the Kicking Donkey Whirligig shown in this issue. This was a small job, but Phil is a careful guy and decided to spray in a large storage basement at the bottom of a stairwell just below an open exterior door. He also set up a large floor fan to help move the fumes up and out, and he wore a respirator mask with a charcoal filter. The can label had the usual warning to use only with adequate ventilation.

In spite of these seemingly adequate precautions, and after only 5 minutes of spraying, several employees on the floor above started complaining of headaches and dizziness. Phil took off his mask and went quickly upstairs, but in less than a minute was overcome by severe headache, dizziness and nausea. He was, in fact, so sick that a fellow employee had to drive him home. This happened on a Friday afternoon and Phil said he "felt rotten" until Saturday night.

The incident was reported to the manufacturer, who immediately agreed to analyze sample cans from the suspect batch. As it turned out, the manufacturer's test showed nothing unusual with the product formula.

This experience served to reinforce in our minds the need for caution when using potentially hazardous products, especially aerosol spray cans of finishing materials containing so-called fast drying "hot solvents" such as xylol. I urge all our readers to take the label warning *very seriously* and, if at all possible, do your spraying outdoors. Also, remember that most of these products are not only bad news for your lungs, but are also highly flammable. Even if you don't smoke, a concentration of fumes in a basement workshop near a firing oil burner can be disastrous. *Take care!*

Jim McQuillan



Don't Miss These

WOODWORKING WORLD SHOWS

VANCOUVER SHOW

HYATT REGENCY VANCOUVER, VANCOUVER, BRITISH COLUMBIA

Friday, March 14 - 5 pm - 9 pm / Saturday, March 15 - 10 am - 6 pm / Sunday, March 16 - 10 am - 5 pm

NEW ENGLAND SHOW

SPRINGFIELD CIVIC CENTER, SPRINGFIELD, MASSACHUSETTS

Friday, April 11 - 5 pm - 9 pm / Saturday, April 12 - 10 am - 6 pm / Sunday, April 13 - 10 am - 5 pm

KANSAS CITY SHOW

KANSAS CITY MARKET CENTER AT EXECUTIVE PARK, KANSAS CITY, MISSOURI

Friday, May 2 - 5 pm - 9 pm / Saturday, May 3 - 10 am - 6 pm / Sunday, May 4, 10 am - 5 pm

EXHIBITS, DEMONSTRATIONS AND SALES of EVERYTHING FOR THE WOODWORKER
ADMISSION \$5

FREE SEMINARS WITH ADMISSION TO THE SHOW

Sponsored by:

WOODWORKING ASSOCIATION OF NORTH AMERICA

For more information and seminar schedule call or write: W.A.N.A. • P.O. Box 706 • Plymouth, NH 03264 • (603) 536-3876

WE DON'T CUT CORNERS.



Instead, we offer professionals and serious craftsmen saws built right and equipped with the right features. The result? Saws that cut corners and virtually anything else with more speed, power, accuracy and reliability than run-of-the-mill power tools designed for occasional use by weekend novices.

The professional features on our JSE-60 jigsaw will show you what we mean. This variable speed saw features an electronic

module that delivers constant speed with full torque on any job. An adjustable orbital action control to tailor the saw to the material being cut. And ball-bearing construction with hardened gears for super durability.

In short, it's made to make sawdust every day instead of gathering dust in between projects. Look for Ryobi saws and get the power tools made for more than weekends.

Made for more than weekends.



1158 Tower Lane
Bensenville, IL 60106

RYOBI TOOLS		List	Sale
S500A	3x5 1/2 Finish Sander	70	41
SU6200	Finishing Sand 1/2 Sheet	142	88
87075	3x21" dustless Belt Sander	179	116
87100	3x24" dustless Belt Sander	208	140
87200A	4x24" dustless Belt Sander	269	165
0100VR	3/8" VSR 0-1200 rpm drill	91	49
W740	7 1/4" 13 amp circular saw	158	99
J560	8 1/4" 13 amp circular saw	171	109
J560	Jig Saw-Single Speed	172	99
R150	Jig Saw-electronic v speed	198	123
R330	1 H.P. Plunge Router	138	86
R500	2 H.P. Router	220	138
E3800	3 H.P. Router	265	163
L120U	Drywall screwdriver 0-4000 126 79		
	3/8" Planer	142	89
BD1020R	3/8" 2-sp Cordless Drill		
	w/ free holster-Xtra special buy	148	95
TS251U	10" Miter Box	300	169
SG150C	4 1/2" H.D. Mini-Grinder	99	59

YOUR ATTENTION PLEASE!
All Above RYOBI TOOL Prices
Take Additional 10% OFF Sale Prices

MILWAUKEE TOOLS		List	Sale
0224-1	3/8 drill 4.5A magnum	159	109
0234-1	1/2 drill 4.5A magnum	159	112
0244-1	1/2 drill 4.5A magnum	159	115
0222-2	3/8 drill 3.3A 0-1000 rpm	146	99
0228-1	3/8 drill 3.3A 0-1000 rpm	129	92
0375-1	3/8 close quarter drill		
	— NEW — 3.5 amp	175	118
0210-1	3/8 cordless drill		
	— NEW — 2 speed	154	95
6539-1	cordless screwdriver		
	— NEW — 190 RPM	84	59
1007-1	1/2" drill 4.5A D-Hdle	199	145
1107-1	1/2" drill 4.5A D-Hdle	204	145
3300-1	magnum rt angle drive kit	249	170
3102-1	Plmbrs rt angle drill kit	263	180
1676-1	HD Hdw Hwag w/cse 2 sp	333	235
5395	3/8 sgle sp hammer drill	203	150
5397	3/8 var sp hammer drill	208	155
5371-1	HD mag. hammer drill 1/2"	287	207
5373	HD mag. ham. drill 3/8"	240	175
5511	2 speed Sawzall w/case	181	122
6226	port band saw 2 sp w/case	382	280
6234	TSC band saw port w/case	382	280
6365	7 1/4" circ. saw 13 amp	159	109
6405	8 1/4" circ. saw 13 amp	179	127
6460	10 1/4" 15 amp w/case	349	245
6377	7 1/4 HD worm saw 13 amp	235	155
6378	8 1/4 HD worm saw 13 amp	249	165
6165	12" Chop Saw 15 amp		
	4200 R.P.M.	267	189
6170	14" Chop Saw 15 amp		
	3600 R.P.M.	289	209
6255	v/sp Jig Saw 3.8 amp	199	140
6245	sgle sp Jig Saw 3.8 amp	175	125
6012	1/2 sheet HD orb. sander	159	110
6014	1/2 sheet HD orb. sander	169	112
5660	1 1/2 HP router 10 amp	256	175
5680	2 HP router 12 amp	314	220
8950	Wet/Dry 8 gal vac 6 amp	145	110

DRYWALL SHOOTERS		List	Sale
6753-1	3.5 amp 0-4000 rpm new	115	79
6747-1	4.5 amp 2500 rpm	144	100
6750-1	4.5 amp 0-4000 rpm	129	90

NEW FROM RYOBI
MODEL AP-10 — 10" Surface Planer
WEIGHS ONLY 58 LBS.
LIST \$59.00 — SALE \$39.00

MILWAUKEE Super Specials!
Model 6507 Trigger Speed Control Sawzall w/case & blades List 193. * Sale 125.
Go Cordless with MILWAUKEE
#6305 — 6 1/4" Cordless Circular Saw 12 volt — 1 Hour Charge
Cuts (80) 2x4's (Pin)
List Price 195.00 * SALE PRICE 135.00

FREUD SAW BLADES					
Univ. Bore — Professional Series					
CARBIDE TIPPED SAWBLADES					
Item No.	Description	Diam.	Teeth	List	Sale
PS203	Gen'l Purp.	7 1/2"	24	27.24	17.50
PS303	Fine cutting	7 1/4"	40	32.97	20.50
5/8" Bore — Industrial Grade					
CARBIDE TIPPED SAWBLADES					
Item No.	Description	Diam.	Teeth	List	Sale
LUT7M10	Gen'l Purp.	10"	40	68.58	34
LUT8M10	Gen'l Purp.	10"	40	69.30	35
LUT9M10	Cut-Off	10"	60	79.65	36
LUT10M10	Cut-Off	10"	60	86.40	44
LUT11M10	Combination	10"	40	70.99	36
LUT12M10	Combination	10"	50	74.71	37
LUT13M10	Super Cut-Off	10"	80	110.88	62
LM72M10	Ripping	10"	24	64.85	34
DS 306	6" Dado			139.00	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

FORSTNER BITS (ARCO)		West Germany	
Model	Size	List	Sale
2121	1/4"	6.40	4.00
2122	3/8"	7.00	4.50
2123	1/2"	7.80	5.00
2124	3/4"	10.35	6.50
2125	1"	10.95	7.00
2126	1 1/8"	11.40	7.25
2127	1 1/4"	12.25	7.75
2128	1 1/2"	12.75	8.00
2129	1 3/4"	13.85	8.75
2130	1 7/8"	16.45	10.50
2131	2"	18.15	11.00
2132	2 1/8"	21.25	14.50
2133	2 1/4"	23.95	16.50
2134	2 3/8"	25.50	17.50
2135	2 1/2"	26.25	18.25
2136	2 3/4"	30.50	20.50

16 Pieces (one of every size of above)
List Price 254.80 * SALE PRICE 150.00
4 Pieces (1/2" - 5/8" - 3/4" - 1")
List Price 38.95 * SALE PRICE 25.00

MAKITA TOOLS		List	Sale
804510	Sander	79	43
99008	3x21" belt sander	190	119
99248	3x24" belt sander	189	130
99240B	3x24" b/sander w/bag	214	130
9035	1/3 sheet finish sander	79	48
90458	1/2 sheet finish sander	156	90
9045N	1/4 sht fin. sand. w/bag	158	105
4200N	4 3/8 circ. saw 7.5 amp	152	93
5008NB	8 1/4 circ. saw 13 amp	178	105
5201NA	10 1/4 circ. saw 12 amp	348	215
43008VB	v/sp jig saw 3.5 amp	192	120
43018VB	orb v/sp jig saw 3.5 amp	208	125
JR3000WL	2 sp recip saw w/case	168	120
JR3000V	vs recip saw w/case	178	120
5010DWK	3/8 cordless drill w/case	152	89
60810W	3/8 cordless saw kit	165	100
19008W	3 1/4" planer w/case	154	92
1100HD	3 1/4" planer w/case	278	160
3608BK	3/4 hp router w/case	132	85
36018	1 3/8 hp router	168	115
3700B	1 1/2 hp trimmer		
	28,000 rpm	124	82
804530	6" Round Sander	84	48
67100W	Round Screwdriver	148	105
0A3000	3/8" angle drill	158	105
0A4700	1/2" v/sp w/rev 4.8 amp	154	92
HP1030W	3/8 v.s.r. hammer drill w/case	145	98
6300LR	1/2" angle drill w/rev	229	152
84198B-2W	1 1/2" s.p. hammer drill w/case	238	150
GV5000	Disc Sander	79	53
68000B	2500 rpm 3.5 amp	123	79
68000BV	0-2500 rpm 3.5 amp	133	89
68010B	4000 rpm 3.5 amp	123	79
68010BV	0-4000 rpm 3.5	133	89
2030n	12" planer/jointer	2160	1475
2040	15 1/8" planer	1780	1195
1805B	6 1/8" planer kit w/case	416	265

*** NEW from MAKITA! ***
LS1000 10" Miter Saw 348 198
9820-2 Blade Sharpener 235 159
66020W 3/8" 2-sp cordless drill kit 154 94
6010SDW 3/8" c/cless drill rev. 82 45
6010SDW 3/8" c/cless angle drill 172 98
JV1600 var. speed jig saw 145 89
JV2000 var. speed orb. jig saw 165 100
4300W cordless jgi saw 158 102
5005BA 5 1/2" circular saw 154 98
5600W 6 1/4" c/cless circ saw 224 139
9207SPC 7" var speed electronic sander/polisher 209 130
9303BH 4 1/2" sander-grinder kit 146 95
9035DW c/cless finishing sander 128 79
4014NV var speed blower 128 79

DELTA		List	Sale
34-612	9" contr. saw w/o motor	500	395
34-410	10" contr. saw w/o motor	871	650
34-710	super 10" motorized saw	579	450
15-091	15" floor model D/press	467	375
15-090	15" bench model D/press	467	375
37-207	Saw/Jointer Combination	1018	810
37-609	6" Motorized Jointer	413	335
37-290	4" Joiner w/o motor	346	275
22-651	RC-33 — 13" Planer	1943	1405
43-122	Wood Shaper w/stand and 1 H.P. Motor	689	495
46-140	11" lathe, gap bed model w/stand w/o motor	407	335
52-493	1 hp motor for #34-612	170	130
62-042	1 hp motor for #34-410	230	170
62-144	1/2 hp motor for #37-290	136	105
62-142	1/2 hp motor for #37-609		
	#28-243 and #46-140	121	85

1986 TOOL CATALOG AVAILABLE
Call Toll-Free 1-800-328-0457 — In Minnesota Call (612) 224-4859
4 WAYS TO BUY: CHECK — MONEY ORDER — VISA — MASTERCARD
SEVEN CORNERS ACE HDW. INC.
216 West 7th St. • St. Paul, MN 55102 • Est. 1933

SAW-ATHON
by PORTER-CABLE
#314 4 1/2" Trim Saw List 180 SALE 109
#346-1 6 1/2" Top Hdle List 161 SALE 100
#617 7 1/4" Push Hdle List 165 SALE 103
#587 7 1/4" Speedtronic List 199 SALE 125
#315-1 7 1/4" Top Hdle List 178 SALE 103
#368-1 8 1/4" Top Hdle List 178 SALE 110

DELTA
SUPER SPECIALS!
#33-150 SAWBUCK List 656 SALE 499
#28-560 BANDSAW 3 wheel List 449 SALE 349
#28-243 14" Band Saw with enclosed Stand and 3/4 hp Motor List \$897.00 Sale \$675.00
#28-243 14" Band Saw with Open Stand without Motor List \$594.00 Sale \$440.00
#22-651 13" Planer List \$1943.00 Sale \$1295.00

TOOLS ON SALE
AMERICA'S LOWEST PRICED TOOLS
* PLUS * FREE Freight On Every Item

SUPER CORDLESS SPECIALS		from BLACK & DECKER	
Model	Drill Kits	List	Sale
1930	3/8 rev/h speed	165	110
1950	3/8 High Torque	165	110
1930	Reversible Hammer	179	120
1970	3/8 rev/h torque screwdriver	179	120
1980	Rev/adj. clutch SCDrill	179	120

BRAND NEW! SUPER SPECIALS		from MILWAUKEE	
Model	Drill Kits	List	Sale
0214-1	3/8 c/less drive/drill	154	109
0875	H.D. heat Gun, 11.6A		
	Low 570°F - High 1000°F	69	49
5920	belt sander 3x24 w/o bag	289	199
5925	belt sander 3x24 w/bag	309	215
5930	belt sander 4x24 w/o bag	299	209
5935	belt sander 4x24 w/bag	319	214

BRAND NEW! BLACK & DECKER
#9425 8 1/4" Compound Miter Saw
Special Sale Price — \$115.00

MAKITA		(BUY OF THE YEAR)	
Model	Drill Kits	List	Sale
9401	4x24 Belt Sander w/bag		
	List 248.00 — SALE 139.00		
★ WHILE SUPPLY LASTS ★		★ ROUTER RIOT ★	
		by PORTER-CABLE	
Model	Drill Kits	List	Sale
100	7/7 H.P. 6.5 amp	141	98
630	1 H.P. 6.8 amp	150	100
690	1 1/2 H.P. 8 amp	194	130
691	1 1/2 H.P. D-Hdle 8 amp	218	145
536	1 1/2 H.P. Speedmatic Double Handle	300	190
537	1 1/2 H.P. Speedmatic Double Handle	315	215
520	3 H.P. Production	460	270
518	3 H.P. Micropressor 5-sp	490	345

TRIMMERS BY PORTER-CABLE		List	Sale
309	3.8 amp laminate trimmer	130	90
310	3.8 amp laminate trimmer	190	135
312	offset base laminate trim	205	140
319	tilt-base laminate trim	215	150

★ X-TRA SPECIALS ★		List	Sale
MAKITA TOOLS		List	Sale
6010DL	C/less Drill w/flashlight-charger & case	162	90
DP3720	3/8 drill Rev. 0-1800 rpm	90	47
6510LVR	3/8 drill Rev. 0-1500 rpm	116	67
6013BR	1/2" Drill rev. 6 amp	174	100
5402A	16" Circular Saw-12 amp	468	315
2414	14" Cut Off Saw-13 amp	282	189
3612BR	3 HP Plunge Router	286	175
9401	4x24 belt sander w/bag	248	160

PORTER-CABLE		List	Sale
695	H.D. Shaper Table	150	105
696	H.D. 1 1/2 hp Router-Shaper	278	190
399	Drywall Cut-Out Unit	100	70
736	V/Speed Speedtronic Band Saw	450	330
7564	1 1/2" X.H.D. Drill 8 amp	205	145

DELTA		List	Sale
34-010	Motorized Miter-Box	231	149

★ NEW LOW PRICES ★		★ PONY CLAMP FIXTURES ★	
Model	Length	List	Sale
850	for 3/4" Black Pipe	11.23	7.15 79.00
852	for 1/2" Black Pipe	9.36	6.10 67.50

#3/0	6"	3	13.36	8.50	45.95
#2/0	7"	3 1/2"	14.36	8.95	48.35
#0	8"	4 1/2"	15.97	9.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8 1/2"	20.94	13.60	72.95
#3	14"	10"	26.56	16.75	91.35
#4	16"	12"	34.55	23.75	128.25

Letters

While trying to finish sand what seemed to be miles of detailed crown molding during the refinishing of my home's woodwork, I came across an easy solution for such a tedious task. Steel wool was not the answer. It was too fine and a variety of millmarks, burrs and burns had to be removed. I found that by gluing a synthetic sponge to a sanding block with sanding disk cement and then wrapping crumpled (for added flexibility) 220 grit sandpaper around the sponge and block, sanding irregular surfaces becomes quite easy. In fact, the block works great for sanding any ornamental molding or for rubbing out lacquer between coats. The sandpaper can be replaced when it wears out.

Craig L. Graybar, West Allis, Wis.

Could you help me locate a source for knife handle rivets. I want them in two parts — male and female.

W.J. Colvin, Jr., Holly Hill, S.C.

Woodcraft Supply Corp., 41 Atlantic Avenue, Box 4000, Woburn, MA

01888 sells brass rivets that have a length of 11 mm., a body diameter of 4 mm. and a head diameter of 6 mm. Price for twelve rivets is \$5.15 postpaid. Order part no. 07615-BM.

Is there a book available that tells how to design and paint the many kinds of Pennsylvania Dutch hex signs?

Mark E. Moyer, Scottdale, Penn.

The book *The Pennsylvania Dutch and Their Furniture* by John G. Shea has several pages of hex designs along with a description on how to lay them out. There are also several pages covering how to apply the painted decorations they commonly used. In addition, over 50 measured drawings of Pennsylvania Dutch furniture are included.

The Early American Tall Clock project in the November/December 1985 issue (Vol. 9, No. 6, pages 52-55) looks like a great project and I am looking forward to building it soon. However, it seems a shame to build

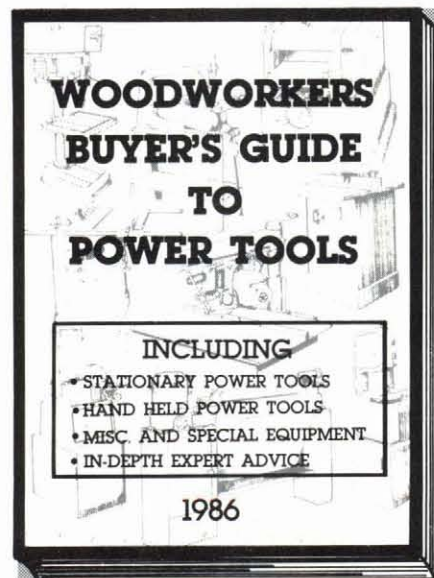
such a large and beautiful clock and then use a tiny quartz movement. The author does mention that a traditional weight-driven pendulum movement is available from the Mason and Sullivan Co. in West Yarmouth, Mass., but does not say what particular model no. should be ordered.

I would appreciate it if you could provide me with a Mason and Sullivan model no. for a traditional movement.

Bert Rosenbloom, Cherry Hill, N.J.

The Mason and Sullivan Co., 586 Higgins Crowell Road, West Yarmouth, MA 02673 offers three weight-driven movements that can be used. All have a 32 1/4 in. pendulum length (measured from the hand shaft centerline to the pendulum bob centerline) and a 9 in. pendulum swing. For the most part, the differences in price are related to the type and quality of the chimes and strike. Part no. 3268X is \$89.00 plus \$11.50 for weight fillings, part no. 3260X is \$119.00 plus

(continued on page 9)



Announcing The New 1986 Edition

At last, a single source for the woodworker, homeowner, and builder to become well informed about the selection of all types of stationary and hand held power equipment.

Our 1986 Buyer's Guide Contains:

- Thousands of photos, facts, charts, prices, and product descriptions of all types of woodworking equipment.
- Information on all stationary power tools such as table saws, planers, jointers, etc.
- Information on hand held power tools such as sanders, routers, jig saws, etc.
- Information on miscellaneous specialty equipment such as dust systems, spray equipment, moisture meters, etc.
- Expert, in-depth commentary and advice on each tool. This alone is worth more than the price of the book.
- Recommended to anyone who uses power tools, both amateur and professional, whether

you are building family heirlooms or doing home repairs.

- A special section on electrical motor, starters, phases, etc.

Now you have a chance to LOOK BEFORE YOU BUY. There are over 35 CATEGORIES of machines from the common to the unusual. This is the best source of information available anywhere.

A \$25.00 value. Order now at the low introductory price of only \$13.50 plus \$1.50 shipping. Send check or money order, Visa or MasterCard number with signature, card number and expiration date. Return in 10 days for a full refund if not satisfied.

AVAILABLE JANUARY 1986

JM Publications, Inc., Dept. JW-2 13 Walton Mall, Box 1408

Hendersonville, TN 37077-1408 • (615) 822-0857

Gentlemen: Please send me _____ copies of *The Woodworker's Buyers Guide To Power Tools* at \$13.50 each plus \$1.50 each for postage and handling. I understand that I may return it within 10 days for a full refund if not satisfied.

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

ACCOUNT NO. _____ EXP. DATE _____

SIGNATURE _____

NAME (PLEASE PRINT) _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

* SANDPAPER *

BELTS: GRITS ASSORTED
UNLESS OTHERWISE
SPECIFIED

1 x 30	\$.69 ea
1 x 42	.69 ea
1 x 44	.69 ea
2½ x 16	.73 ea
3 x 18	.74 ea
3 x 21	.77 ea
3 x 23¼	.80 ea
3 x 24	.80 ea
3 x 27	.83 ea
4 x 21¾	.91 ea
4 x 24	.94 ea
4 x 36	1.14 ea
6 x 48	2.98 ea

OTHER SIZES ON
REQUEST

SHEETS: (9 x 11) PRICE
ON REQUEST FOR GRITS NOT SHOWN

CABINET PAPER

	50/pk	100/pk
40-D	\$16/pk	\$30/pk
50-D	15/pk	27/pk
60-D	14/pk	25/pk
80-D	13/pk	23/pk
100-C	12/pk	21/pk
120-C	12/pk	21/pk
150-C	12/pk	21/pk

WET/DRY PAPER

	100/pk
220-A	\$23/pk
320-A	23/pk
400-A	23/pk
600-A	23/pk
800-A	23/pk

NO LOAD PAPER

180-A	\$10/pk	\$18/pk
220-A	10/pk	18/pk
280-A	10/pk	18/pk
320-A	10/pk	18/pk
400-A	10/pk	18/pk

*** OTHER ITEMS ***

*** WIDE BELTS**

*** ROLLS**

*** FLAP WHEELS**

*** FIBER DISCS**

*** ABRASIVE CORD**

PRESSURE SENSITIVE ADHESIVE DISCS!

PACKAGED PER 10, GRITS ASSORTED UNLESS
OTHERWISE SPECIFIED (MATERIAL-A/O-RESIN)

3"	\$.35 ea
5	.77 ea
6	1.06 ea
8	1.99 ea
9	2.46 ea
10	3.05 ea
12	4.45 ea
15	7.07 ea
16	8.09 ea

OTHER SIZES ON
REQUEST

*** PREMIUM WOOD GLUE**

*** GRINDING WHEELS**

*** BELT CLEANING STICKS ***

\$6.50 ea

ECON-ABRASIVES

P.O. BOX 865021

PLANO, TX 75086

TELEPHONE (214) 422-2147

*** TEXAS RESIDENTS ADD 6% SALES TAX**

*** SHIPPING CHARGES ADD \$4.25**

*** MINIMUM ORDER \$25.00**

*** NO COD'S SEND CHECK OR MONEY ORDER**

NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

*** NO GIMMICKS JUST BETTER PRICES ***

*** ALL BELT MATERIAL WILL BE INDUSTRIAL QUALITY A/O ***

*** NO BUMP SPLICES ***

\$22.00 for weight fillings, and part no. 3262X is \$139.00 plus \$27.50 for weight fillings. Shipping costs are additional. For more information, write to them for a copy of their current catalog.

As mentioned in the article, these movements need a support system, which means you may have to modify the top of the waist section of the clock. It's best to have the movement on hand before starting the project.

Can you tell me if you have a past issue that includes plans for a toy marble race?

Sonja Tapps, Van Metter, Iowa

We had plans for a marble race in our May/June 1985 issue. A copy is available from our Back Issue Department for \$3.00.

For some time now I have been looking for a pantograph, the tool that enables you to enlarge or reduce patterns. Can you help?

Mrs. Floyd A. Stoner
Bailey's Harbor, Wis.

You can get a pantograph from Woodworker's Supply of New Mexico, 5604 Alameda, N.E., Albuquerque, NM 87113. Current price is \$19.95 plus postage.

I am trying to locate the address of a carving magazine called "Chip Chats". Can you provide any information?

Harrison Herron
Hickory Withe, Tenn.

"Chip Chats" is the bimonthly publication of the National Wood Carvers Association, an organization of some 25,000 members all sharing a common interest in the craft of carving wood. It's \$5.00 to join the Association and the cost includes a one year subscription to the magazine. For more information write to the National Wood Carvers Association, P.O. Box 43218, Cincinnati, OH 45243.

Would you please send me the address of a company that sells rubber webbing for furniture seating?

Adam Rogalsky
Kent, Ohio

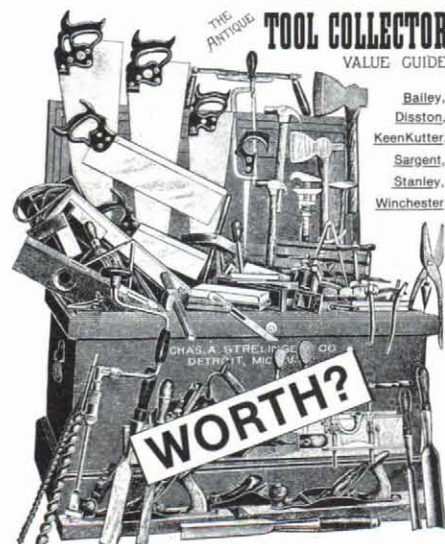
You can get rubber webbing from The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, MN 55374.

In your Readers' Information Exchange column, I've noticed that you often get requests for information about heavy-duty (commercial-type) stationary tools such as shapers, belt sanders, table saws, etc. Your readers may want to keep in mind that this type of equipment is commonly found in high school wood shops and small cabinet shops. They may find some help by making a phone call to one of these local sources.

Alvin Sherwood
Round Lake, Ill.

I'm having difficulty keeping a finish on my kitchen table. The turned legs and trim are oak, but the table top appears to be a closer-grained wood, perhaps beech. I've tried Danish Oil, tung oil, and Deft, and all have worn off very quickly. Can you suggest anything?

(continued on page 11)



What Are Your Old Tools Really Worth?

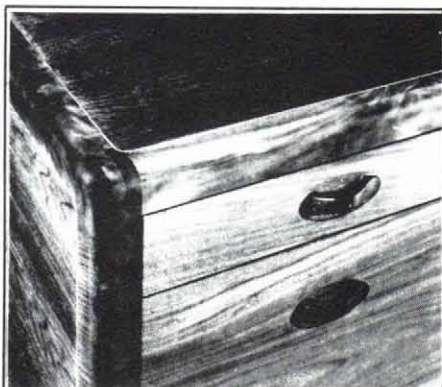
Old woodworking tools are one of today's hottest new areas of collecting. Long neglected by all but a few sophisticated insiders, this field is growing rapidly. Several Stanley-Bailey carpenter planes are already selling in the \$500-\$900 range, and an early plow plane sold for over \$6,000 at a recent tool auction. Ronald Barlow has spent the last 3 years working full-time on this guide—amassing photographs, and recording dealer and auction prices from all over the world.

Antique Tool Collector's Value Guide

Just a few of the over 5,000 items described and priced: adzes, anvils, axes, trade catalogs, braces, bitstocks, chisels, cobbler's tools, cooper's items, compasses, dividers, hammers, hatchets, knives, lathes, levels, planes, pliers, plumb bobs, routers, rules, saws, scorps, screwdrivers, shears, spoke shaves, surveying instruments, tinsmith's tools, trammel points, wrenches, and wheelwright's items. Over 2,000 illustrations. 1st Ed. • 230 pgs. • 9X12 paperback • Library of Congress #84-50055.

NOW IS THE TIME to identify and price all of your old tools. Just one find could pay for this new book, many times over! Rush check or money order. \$12.95 plus \$1.05 postage.

WINDMILL PUBLISHING COMPANY
2147 Windmill View Rd., Dept. NJ—El Cajon, Calif. 92020



Hand Crafted Desk by Oregon Fine Joinery.

TUNG OIL with URETHANE for greater durability



Deft, Inc., Irvine, CA 92714. Alliance, OH 44601.

DO-IT-YOURSELF KITS

BUILD YOUR OWN GRANDFATHER CLOCK



Prices Starting Under **\$280**
(including movement and dial)

- Do-it-yourself case kit, parts pre-cut
- Finished clocks
- Solid 3/4" hardwoods: black walnut, cherry, oak
- Heirloom quality
- Factory direct prices
- Solid brass West German chiming movements
- Money back guarantee
- Prompt shipment
- No woodworking experience necessary

WRITE FOR FREE COLOR CATALOG



**EMPEROR®
CLOCK COMPANY**

WORLD'S LARGEST MANUFACTURER
OF GRANDFATHER CLOCKS

Dept. 1840, Emperor Industrial Park
Fairhope, Alabama 36532 • Phone 1-205-928-2316

I am interested in ☐ Do-It-Yourself Kits
☐ Finished Clocks

Name _____
Street _____
City _____
State _____ Zip _____
(please print)

EXCALIBUR: WHEN YOU'RE READY FOR THE BEST.

CALL TOLL FREE 1-800-387-9789

The top-of-the-line Excalibur 24" precision scroll saw.
In your shop it can really cut it!

Large Capacity

Excalibur 24 is a large-capacity precision saw offering a blade-to-frame throat measuring 24". So it cuts to the centre of a 48" panel with ease. The extra-large worktable is supported by a sturdy trunnion and tilts 45° left and 20° right. The table measures 14" x 24", providing ample support for large bulky panels and other hard-to-manage materials.

Versatile

The Excalibur 24 is the ultimate machine for fine detail cutting. It is ideal for inlay work, cabinet and furniture making, model and toy building – in short, just about every activity requiring intricate precision cuts. Excalibur 24's are hard at work right now making nameplates, jewelry, intricate puzzles and designs in wood up to 2 1/4" thick, plastics, metals, etc. Using the correct blades, Excalibur 24's cut glass, shell, ivory and other extremely hard materials.

EXCALIBUR 24



Cutting Mechanism: Precise Control

The blade, together with the parallel arms and tensioning control, forms an articulated parallelogram. Arm movement is produced by a durable totally-enclosed 1/4 Hp variable-speed motor providing an infinite range of cutting speeds up to 1800 strokes per minute. For complete and precise control, the highly-tensioned blade is pulled (not pushed), on both the up and down stroke.

EXCALIBUR 24

Precision
Scroll Saw c/w 1/4 Hp
Var. Speed Motor & HD Stand.
SHIPPED UPS PREPAID

\$ 1350.

No other charges

24
MONTH
WARRANTY

Satisfaction

With Excalibur you get a 30-day trial period. You must be satisfied your Excalibur is everything we say it is, or your purchase price will be refunded.

The budget-minded Excalibur II cuts the cost of precision scroll sawing handily!

Smooth Operation

The Excalibur II is amazingly smooth in operation. So smooth in fact, that you might want to try to stand a coin on edge on the saw table when the saw is running! This smooth operation has another bonus – no special stand is required – Excalibur II works equally well on the tail-gate of a truck, on a workbench or any table, etc. It cuts 1 3/4" thick stock, throat depth is 19".

Double-Parallel Link

Where Excalibur II differs from any other scroll saw is in the blade holding/driving mechanism. This double-parallel link system eliminates blade flexing when in operation so there is less tendency for blade breakage. Also this allows the operator more cutting strokes per minute when using very fine blades.

Excalibur Precision Scroll Saws At-A-Glance

	Excalibur 24	Excalibur II
Throat	24"	19"
Cutting Depth Maximum	2 1/4"	1 3/4"
Length of Cutting Stroke	1/2"	1/2"
Cutting Speed	6-1800*	1400 Single-Speed motor* 800 speed 400 motor* 6-1800 variable-speed motor*
Worktable adjustment Right	20°	45°
Left	45°	12°
Worktable Width	14"	12"
Worktable Depth	24"	17 1/2"
Overall Length	33"	37"
Overall Width	20"	12"
Overall Height	21"	14"
Weight	110 lbs	45 lbs
*Rpm (strokes/minute)		

Operation Is A Cinch

In operation, the Excalibur II excels. The table is 12" x 17 1/2" and tilts 45° both left and right on two wide-stance trunnions. The work hold-down foot tilts right along with the table. The Excalibur II blade tension can be safely adjusted while the saw is running to save time, and optimize cutting performance.

EXCALIBUR II

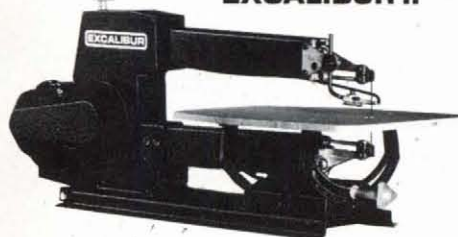
less motor & switch,
Shipped UPS Prepaid

\$495.

No other
charges

12
MONTH
WARRANTY

EXCALIBUR II



HUMFREY
Canada's finest woodworking machinery.



SEND FOR THIS CATALOG.
IT DESCRIBES
OUR OTHER FINE
WOODWORKING MACHINES

J. Philip Humfrey International

3241 Kennedy Road, Unit 7
Department WJ 3/4
Scarborough, Ontario M1V 2J9

☐ I enclose \$1.00 (refundable against first purchase). Please rush my copy of your catalog.

Name _____

Address _____

City _____ State _____

Zip _____

J. Philip Humfrey International

3241 Kennedy Road, Unit 7
Scarborough, Ontario, Canada M1V 2J9



HUMFREY'S ORDER PHONES
U.S.A. Toll Free 1-800-387-9789
Canada Call Collect (416) 293-8624

Editor's note: We've asked John Olson, who writes our Restoring Antiques column, to field this one for us:

Without knowing the specific finishing method or how the table is used, it's difficult to offer an explanation as to why those finishes have not been holding up. Before refinishing though, all traces of the old finish must be removed. This means a thorough stripping job followed by a light sanding to get down to bare wood.

The type of finish to use depends on the desired result. One of the best finishes for surfaces that receive hard use is a penetrating resin finish. These finishes are marketed under a number of labels — a couple of good ones are Watco and Deks Olje. If the directions are closely followed, a good job should result. These finishes enter the pores of the wood and polymerize — that is, they turn to solids and measurably increase the hardness of the wood.

Polyurethane is also a durable finish. Three, or better yet four, coats of a good polyurethane will make a hard, long-wearing finish. As always,

carefully follow the manufacturer's instructions.

Odds and Ends

In Ripley, West Virginia, the Cedar Lake Crafts Center has scheduled a couple of one week workshops during the month of March. The first one, titled Designing for Wood Production, is scheduled for March 3-7. Windsor Stoolmaking will be the subject of the workshop on March 24-28. For information write to the Center (zip code 25271) or call (304) 372-6263.

The Woodworking Show, 1516 South Pontius Ave., Los Angeles, CA 90025 (213-477-8521) has three upcoming shows: March 14, 15, 16 in Portland, Oregon at the Multnomah County Exposition Center, South Hall, 2060 North Marine Drive; April 4, 5, 6 in Atlanta, Georgia at the Atlantic Civic Center, South Exhibit Hall, 395 Piedmont Ave., N.E.; and May 2, 3, 4 in Arlington, Texas at the Arlington Convention Center, Room E1, 1200 Stadium Drive East.

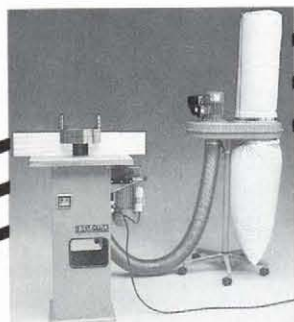
The Woodworking Association of North America (W.A.N.A.) also has three shows on tap: March 14, 15, 16 in Vancouver, British Columbia at the Hyatt Regency Vancouver; April 11, 12, 13 in Springfield, Massachusetts at the Springfield Civic Center; and May 2, 3, 4 in Kansas City, Missouri at the Kansas City Market Center at Executive Park. For more information write to W.A.N.A., P.O. Box 706, Plymouth, NH 03264 (603-536-3876).

The Hill Skills Arts and Crafts Festival will be held April 17 through 20, 1986 in the Greenville (S.C.) Memorial Auditorium, 10 a.m. to 9 p.m. A new feature of this semi-annual show will be the addition of antiques and furniture showrooms, completely decorated and furnished.

The Minnesota Wood Carvers Association, 10309 Thomas Ave. South, Bloomington, MN 55431, will hold their annual show on March 15 and 16 at the Northtown Mall, University Ave. N.E. and Highway 10, Minneapolis, Minn. WwJ

ELEKTRA BECKUM

THE PERFECT COMBINATION



TF100 SPINDLE SHAPER 'and' SPA1000 DUST EXTRACTOR

- 6" Cutter block, maximum
- 4" Height adjustment, max.
- 3/4", 1" or 1 1/4" spindle shafts available
- 3 speeds: (4800-7200-9000)
- 3.0 HP fixed motor or 2.4 HP Unimex
- A clean work environment
- 765 cfm suction capacity
- 4" x 98" heavy duty hose
- Use any standard trash bag
- 3/4 HP motor 110/1/60

\$985.00

\$450.00

Suggested list price
FOB Somerdale, NJ

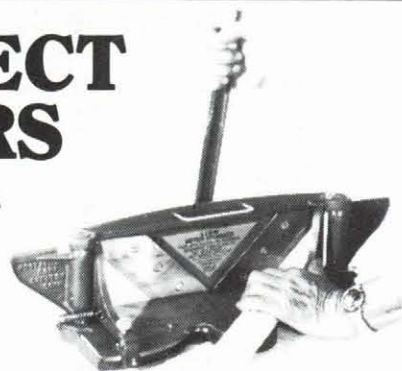


Send \$1.00 for full color catalog to:
ELEKTRA BECKUM USA DEPT TFS
PO BOX 24, SOMERDALE, NJ 08083
Call for your local dealer: 1-800-223-8600
See these machines demonstrated at:
Portland, Mar. 14-16; Atlanta, April 4-6;
Springfield, Ma. Apr 11-13; K.C. May 2-4.

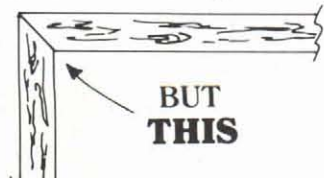
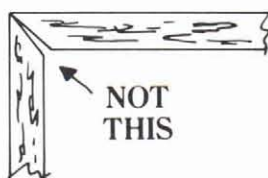
PERFECT MITERS

Glass-smooth cuts

ANY WOOD:
soft or hard
ANY ANGLE:
45° to 90°



Miters can tell your story:



You'll wonder how you lived without it!

WRITE OR CALL:

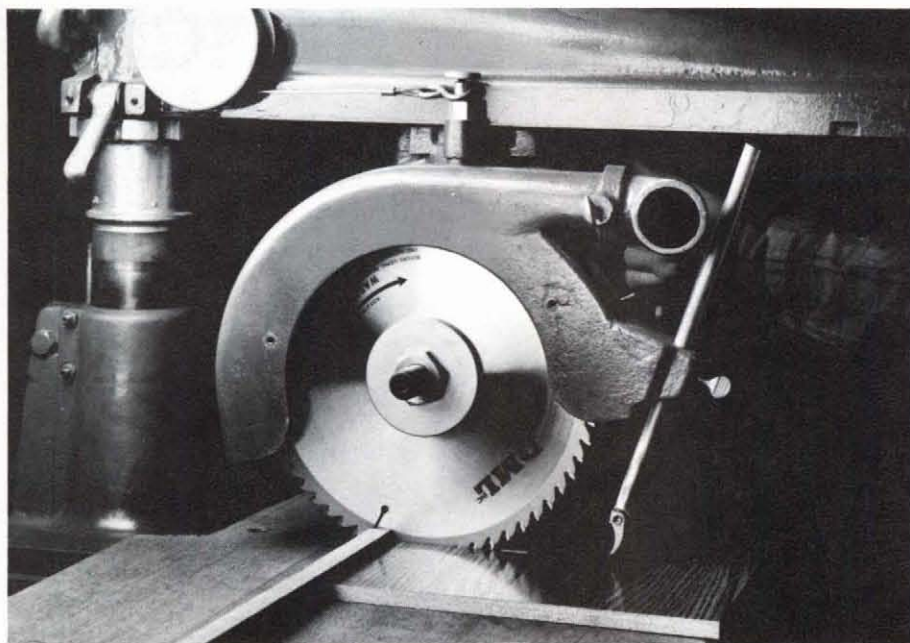
POOTATUCK CORPORATION

Box 24, Dept. WJ863 • Windsor, VT 05089 • (802) 674-5984

Name _____

Address _____

City/State/Zip _____



DML's Radi-All® & Miter-All™ cut the push and pull of overfeed.

Everyone has experienced the problem with ordinary radial arm saw and power miter box blades. They begin to feed faster than they can cut. So you fight the machinery. Your finish gets ragged. Maybe your motor bogs down, and you risk damage to your saw.

Radi-All is a breakthrough in carbide tipped radial arm saw technology. Its specially engineered hook angle reduces overfeed; its unique tooth grind makes for a



Miter-All, with its meticulously calculated hook configuration, is another revolutionary development in saw blade design. Tipped with C-4 grade carbide, specifically engineered to enter the material at exactly the right angle, Miter-All reduces tear-out. You get a clean finished cut in any species of wood. Maximum efficiency from your equipment. And longer blade life.

Radi-All, for trim, cutoff, general purpose and hand feed mitering operations on radial arm saws. And Miter-All, for cutting picture frames, molding, and all trim material. Both available from your DML distributor. To take the fight out of cutting wood.



DML

Cutting everything but corners

A SUBSIDIARY OF VERMONT AMERICAN CORPORATION

For details about DML's complete line of cutting tools, fill out and mail to:

DML, Inc.
1350 S. 15th Street
Louisville, KY 40210

Dept. WJ

NAME

COMPANY NAME

ADDRESS

CITY

STATE

ZIP

New large 3/4" long by .160 thick premium C-4 carbide on all DML blades

smooth cut through any kind of wood. So you get a comfortable feed flow and a fine finished cut every time. You need fewer regrinds. And you don't fight the equipment.

Cabinetmaker's Supplies

Hardware Suppliers

As a service to our readers, *The Woodworker's Journal* periodically lists sources of supply for various wood-working products. In this issue we are listing companies that specialize in mail order sales of hardware. This is by no means a complete listing, and we hope to include additional companies in future issues.

Allen Specialty Hardware

P.O. Box 10833, Dept. 5
Pittsburgh, PA 15236
Catalog \$1.00
Modern cabinet hardware

Anglo-American Brass Co.

Box 9487, Dept. WJ
4146 Mitzi Drive
San Jose, CA 95157
Catalog Free
Solid brass reproduction and some modern hardware

Carolina Craftsmen

975 S. Avocado St., Dept. WJ
Anaheim, CA 92805
Catalog \$2.00
Solid brass antique furniture reproduction hardware

Horton Brasses

Nooks Hill Rd., P.O. Box 120WJ
Cromwell, CT 06416
Catalog \$2.00
Reproduction furniture hardware from the 1700's to 1900's.

Imported European Hardware

3820 Schiff Dr.
Las Vegas, NV 89103
Catalog \$1.00
Styles of Louis XV and XVI, Regency, Rustic, and Modern

Lee Valley Tools Ltd.

2680 Queensview Drive
Antique Hardware Division
Ottawa, Ontario, Canada K2B 8H6
Catalog \$2.00
Original hardware from 1860 to present.

Paxton Hardware Ltd.

7818 Bradshaw Road, WJ5
Upper Falls, MD 21156
Catalog \$3.50
Reproduction hardware (Chippendale, Victorian, Federal, Queen Anne), Miscellaneous hardware

Period Furniture Hardware Co.

123 Charles Street
Box 314 Charles St. Station
Boston, MA 02114
Catalog, 142 pages \$3.50
Reproduction & Decorative hardware

Renovator's Supply

Renovator's Old Mill, Dept. 4053
Millers Falls, MA 01349
Catalog \$2.00
Reproduction hardware & Supplies

The Wise Co.

P.O. Box 118WW
6503 St. Claude
Arabi, LA 70032
Catalog, 2 Vol. Set, \$4.00
Antique Reproduction hardware

18th Century Hardware Co., Inc.

131 E. Third St., Dept. WJ
Derry, PA 15627
Catalog \$3.00
Hardware for antique and reproduction furniture in brass, iron and porcelain.

Readers' Information Exchange

Looking for an owner's manual for an old band saw? Need a bearing for a hand-me-down table saw? Can't find a source of supply for an odd piece of hardware? Maybe our readers can help. Send along your request and we'll try to list it here — and hopefully one of our readers will have an answer for you. Due to space limitations, we will be unable to list all requests, but we will include as many as we can.

My band saw takes a $\frac{5}{8}$ in. wide by 70 in. long sanding belt. However, I am unable to find a place that sells them. Can you help?

Frank X. Fischer, Jr.
Box 415, Ocean Beach, NY 11770

I have a quick-action woodworking vise with a 4 in. by 7 in. face made by Ridge Tool Co. of Elyria, Ohio (part no. W-7). The brass insert with the threads has gone bad, and I've now learned that the company is no longer in business. Do you know where I might find a replacement for this part?

Roy E. McKee
Rt. 2 33751 TR 392
Frazeyburg, OH 43822

I am in need of an owner's manual and parts list for an old Saw Smith 10 in. radial arm saw (model no. 500003) made by Magna American Corp. of Cincinnati, Ohio.

Adrianus Verbree
116 Ohio Street
Rochester, NY 14609

I am interested in obtaining a motor housing for a Craftsman 10 in. radial arm saw (model no. 113.23111). The housing is broken, although the motor is good, but I will take both the motor and housing if necessary.

Roger Geary
1130 Juniper Ridge Drive
Waterbury, CT 06708

I would be grateful for any help in locating an owner's manual and parts list for a Craftsman jigsaw, model no. 113.20500. I'll be glad to pay any reasonable fee plus cost of copying and mailing.

Donald Z. O'Bier
Box 584, Lottsburg, VA 22511

HI-PERFORMANCE WOODTURNING LATHE

4-speeds lets you turn all types of wood

- Turn a 15½" bowl
- 39½" between centers
- 1¼ hp motor
- 4-speeds—600, 1100, 1800, 3000 rpm
- Copying attachment available



emco★USA

Dept. WJ36D • 2080 Fairwood Ave.
P.O. Box 07795 • Columbus, OH 43207

Call Toll-Free
1-800-521-8289
(In Ohio 614/445-8382)



Our catalog doesn't just sell you things. It teaches you things.

The Garrett Wade Catalog is a new, 212-page collection of woodworking hand tools, machinery, finishing supplies and accessories that are simply the finest available. Anywhere.

And besides offering quality tools from around the world, we also give you a lot of quality advice. On woodworking techniques. On picking the proper tool for a particular job. On finishing, sharpening, clamping and more.

The catalog is filled with superb photography, honest specifications and reliable descriptions. It's neatly divided into seventeen sections, including a section on our Swiss INJECTA INCA power tools. And throughout the year, our catalog owners will receive several handy supplements—free of charge.

Just send in the coupon below with \$3.00, and we'll send out your copy of the 1985 Garrett Wade Catalog. It just may prove to be the most useful tool you own.

Garrett Wade Co., Dept. 109
161 Avenue of the Americas
New York, NY 10013

Gentlemen:
Send your complete 212-page catalog of woodworking tools, machinery, and accessories. Enclosed is \$3.

☐ I would like *only* the following sections of the catalog, for 50¢ each:

☐ INJECTA INCA ☐ Carving ☐ Finishing

Enclosed is \$ _____

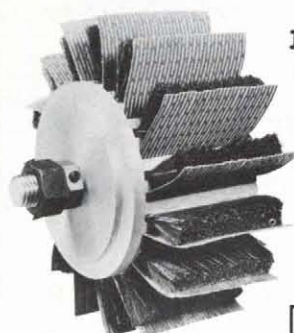
Name _____

Address _____

City _____

State _____ Zip _____





NEW, SELF-FEEDING Model #B-12 Brush Head

replaces hand sanding
on all types of shaped
surfaces including
mouldings, furniture,
and carvings.

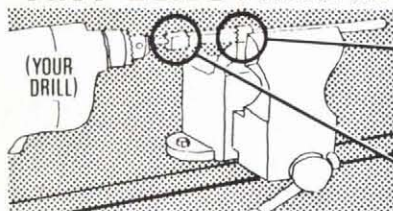
Write for brochure and price list.

Sand-Rite

MFG. COMPANY

1611 NORTH SHEFFIELD AVENUE • CHICAGO, ILL. 60614 • 312/642-7287

MAKE YOUR OWN DOWELS! ANY LENGTH...ANY WOOD



DUDS DOWEL CUTTERS

15913 Amherst Rd.
Birmingham, MI 48009

Write for more information.

Buy My 5
Steel Dowel
Cutters—
3/16 • 1/4 • 3/8 • 1/2
and special 3 pc.
aluminum chuck.
\$20.00 PPD.
Money Back Guarantee
Other Sizes Available

big HOSS



SAWHORSE BRACKETS

Wide, Flat Working Surface
Permanent, Easy Assembly
Legs Fold For Storage
Heavy Duty Construction
Galvanized Steel

Send Me

- ☐ 1 Set For \$9.45
☐ 2 Sets For \$16.95

Name _____

Street _____

City _____

State/Zip _____

Enclose your check for _____
and mail to:

WNC MFG. CO.
P.O. Box 2048
Hendersonville, NC 28793

JUST PLUG IT IN!
MAKES MONEY
FIRST DAY!
\$50 per hour



"DUST-FREE"
DUST COLLECTING
SYSTEM KEEPS
SHOP CLEAN



MODEL **K3**

The K-3 is our most popular Model. All components are heavy duty and of commercial quality, with a wide working range, deluxe clamping, engraves woodstock of any length and any thickness. Engraves panels even larger than the machine. Signmakers, engravers and commercial woodworkers buy this Model.
The K-3 is our latest Model, most versatile, and with recent improvements. We recommend it.

Call or write for a free brochure.

KIMBALL WOODCARVER CO.

2602 WHITAKER ST. • SAVANNAH, GEORGIA 31401
PHONE: (912) 232-6561

Workshop Income

A General Guide to Craft Fairs

Most woodworkers are shrewd enough to realize that their craft will not be a means to great wealth. Still, there are opportunities for part-time woodworkers to sell their creations, and one of the best is at craft fairs. Contrary to what is often assumed, the great majority of craft fairs are not especially difficult to get into.

A craft fair is primarily an opportunity to sell directly to the public, although some fairs do have wholesale periods. Additionally, prizes or awards may be involved.

Very broadly, craft fairs may be local or regional, a single event or perhaps part of a larger celebration or festival. Craft fairs are sponsored by small towns, cities, counties, states, arts councils, organizations, associations, churches, charitable non-profit groups, malls, shopping centers, and for-profit craft fair corporations. Craft fairs differ from shows in that the craftsman is actively marketing his work, not merely offering for sale a piece that is on display in a show setting.

There is a wide spectrum of craft fairs, with the type of fair usually determined by the sponsoring organization. For the purpose of this article we shall divide them into three levels.

Level I — A level I fair is small and local, perhaps sponsored by a church or some other area organization. It may be a one-time-only or an annual event. There is usually no formal prejudging of slides of work, although the sponsor typically asks that your product is in fact a craft, and not a kit from Taiwan, for instance. Entry, booth, or space fees range from \$5 to \$25. Average per day sales, depending on attendance, may range from \$25 to \$100. Most items for sale should be priced under \$10, and the fair will last one or two days.

Level II — Level II fairs comprise the great majority of all craft fairs. They may run from one day to several weeks, but most will last 2 or 3 days. Level II fairs generally have some form of prejudging and are often termed "juried".

Jurying entails the submission of a number of color slides of pieces representative of those you will be offering for sale at the fair. The sponsor or a committee of his choosing then either accepts or rejects the craftsperson's application based on these slides.

In Level II fairs, the purpose of the "jurying" process is usually twofold. First, it helps the sponsor to maintain a level of quality, while insuring that no kits, imports, or manufactured items are offered for sale, and it eliminates shoddy or substandard craftsmanship. Second, it enables the sponsor to effectively control the make-up and balance of the craft fair. For instance, if the sponsor already has a toymaker, he may select a turner rather than another toymaker, thereby eliminating a situation where the woodworking part of the fair might seem weighted in one direction or another. The jurying process is as important to the craftsperson as it is to the sponsor. It insures both a standard of excellence and the integrity of the fair, while eliminating unnecessary competition within an individual craft.

Because of these considerations, being turned down in the jurying process is not necessarily an indication that your

The Woodworker's Journal

work is unacceptable. It may simply be the result of the sponsor seeking to maintain the balance. By the same token, if you are turned down you should reapply the next year. Many sponsors choose to rotate craftsmen in and out every few years, to lend each fair a slightly different, fresh look. The rationale behind this policy is the fact that most craft fairs have a fixed or repeat clientele, which is to say that the same visitors will return each year. Rotating the craftspeople means that the fair-goers are not likely to be presented with the same products each year, a situation which could prove to be rather dull and uninteresting. If your products are sensibly designed and well made, the jurying process should not present a problem.

The entry fee for level II fairs will range from a low of about \$25 up to several hundred dollars. Additionally, sponsors may request a "sponsor commission percentage", which is usually between 10 and 30 percent of the craftspeople's retail sales at the fair.

Most craftspeople recommend concentrating on sales of inexpensive items, under \$10, at level II fairs, although a few more costly articles can also be marketed successfully. Average sales at a level II fair can be anywhere from \$100 a day for small fairs to \$1000 a day or more at large fairs, if you have the right product.

Level III — Level III fairs are more competitive events, where the creative or artistic element in crafts is emphasized, as opposed to the purely functional or utilitarian. While there are thousands of level I and II fairs across the U.S., there are no more than 100 level III fairs. In the average level III fair, several hundred woodworkers may be competing for 10 or fewer woodworking exhibit spaces. Acceptance may depend on such things as national recognition as a craftsman, gallery exhibitions, shows, and whether your work is on the leading edge artistically. Level III fairs are for full-time craftspeople who depend on their craft for their livelihood. The fairs are typically partitioned into "wholesale" or "buyers" days, and retail days when the fair is open to the general public. Most wholesaling is at 50 percent of retail cost, and this portion of the fair is limited to buyers, distributors or direct retailers. Many craftsmen in level III fairs will make the bulk of their sales during the wholesale part of the event. Average sales for level III fairs are usually between \$3000 and \$15,000 per exhibitor.

The broad variety of craft fairs affords the woodworker an ideal opportunity to develop his craft. One might start out on a limited basis, making and selling small and simple items in a local (level I) fair. With the experience gained there you may move on to a level II fair, where you will be selling a greater number of articles, and making enough money (hopefully) to support a part time woodworking business. Then, if you are exceptionally talented and creative and all goes well, you may wish to move on to the competitive third level, where you work full-time at your craft.

Many woodworkers do quite well in level II fairs, participating in several fairs a year and supplementing their income or, at the very least, paying for new tools and equipment. Selling at level II fairs can become a full time woodworking business if you are able to produce enough and participate in enough fairs each year.

In any event, all craft fairs, no matter what their size, offer an excellent opportunity to communicate with other craftspeople and woodworkers, sharing ideas and experience. *W&J*

March/April 1986

Distinguish Your Fine Workmanship
With Your Own, Personal

BRANDING IRON

For Hard and Soft Wood

Available with your:

- ★ Initials ★ Name—w/wo Address
- ★ Logo ★ Choice of Wording

Changeable date available
for most units

- Fast heating
- Easy to use
- Choice of sizes
- Most orders shipped
in 1 week



GUARANTEED

Call or write for free brochure
NOVA TOOL CO.

4533 Colfax Circle, Dept. WJ
P.O. Box 29341, Lincoln, NE 68529
(402) 464-0511

New:
Digital Moisture Meter,
ask for introductory special

E12: Max Measuring Depth 2"

Wood Moisture Meters

Why waste time and money on wood that is not dry?

Lignomat has the moisture meter of your choice: From pocket-size Mini-Ligno (only \$110) to moisture meters with analog or digital display, and accessories to monitor air and kiln drying.

Call 800 225-2105 for information and free brochure.

P.O. Box 30145 fw
Portland, OR 97230
503 257-8957
Tel: 800-227-2105

Lignomat USA Ltd

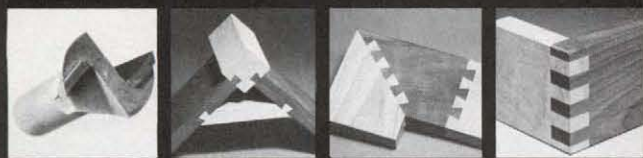
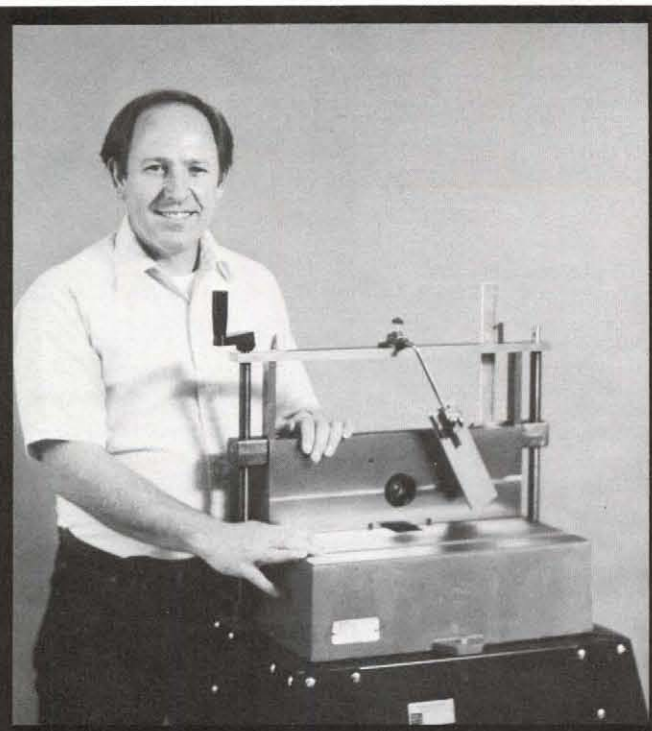
AMERICAN TRADITION
WOODWORKING
PRIDE • CRAFTSMANSHIP

Comfortable 100% cotton White, Beige, Lt. Blue w/4 color screened Logo.
S, M, L, XL, \$10.95.

Baseball Cap — w/Logo adj. size
White front with: White, Dk. Green, Blue, Maroon \$7.95

☐ CHECK ☐ VISA ☐ MASTERCARD		ITEM	SIZE	COLOR	QTY.	PRICE EACH	SUB TOTAL
ACCT # _____		T-SHIRT				10.95	
SIGN: _____ EXP. DATE: _____		CAP				7.95	
NAME _____		SHIPPING HANDLING					
ADDRESS _____ CITY _____		VISA		T-SHIRT		1.50	
STATE _____ ZIP _____		MasterCard		CAP		1.75	
OR PHONE (318) 255-6149		TOTAL					

WOODWORKING DESIGNS • P.O. BOX 825 • RUSTON, LA 71273-0825



... The Joint-Matic 4200 is a new system in joinery that offers operating convenience, efficiency and accuracy that can not be compared to anything on the market. The Joint-Matic will help you produce woodworking pieces of elegance, precision and beauty more quickly and expertly than you ever thought possible. Now, in minutes make ... Mortise, Tenon, Sliding and Through Dovetail, Box Finger Joint and much much more. Exclusive features of the Joint-Matic are so advanced in design and simplicity that set up time has been all but eliminated.

Features:

- Built for ruggedness and rigidity the table and slide unit have extra deep ribbing allowing a more accurate and chatter free cut.
- The base is heavy ribbed 1/2 inch thick casting, hardcoat anodized aluminum to a 52 Rockwell.
- The adjustment screws are rolled thread with a thread pitch of 3/4-16.
- Accuracy can be achieved to as close as .001th of an inch.
- Comes equipped with a 1-3/4 H.P. router.

For Your Brochure Please Send \$2.00 to:

Strong TOOL DESIGN

20425 Beatrice
Dept. W. J.
Livonia, MI. 48152

Joint-Matic Machine Is Protected By U.S. Patent 4,163,465

Restoring Antiques

Why Wood Warps

John W. Olson

It's not uncommon for an old piece of furniture to have one or more warped boards, and dealing with this problem can be a bane for many antique restorers. Yet, there are ways to effectively remedy this condition, so I'll use this issue and next (May/June 1986) to talk about some cures. First though, to approach this problem intelligently, some basic knowledge of wood and its structure is necessary.

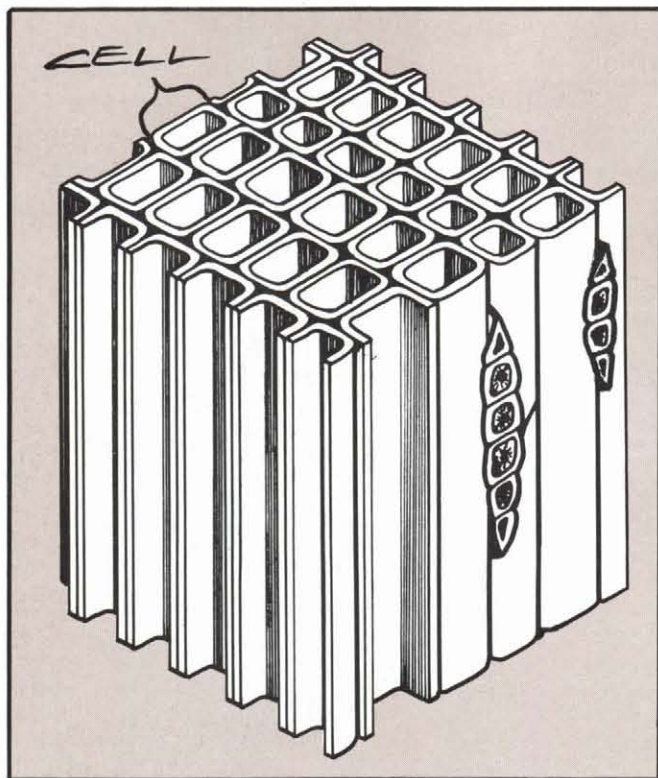
A tree — including its main trunk, limbs, twigs, and even leaves — is made up of hollow cells. Most of these cells are elongated, especially the larger ones, and they are oriented with their long axis parallel to the length of the member in which they occur. They are arranged in concentric layers around the central cortex, often called the pith. The roots are the only woody members that do not have a pith at the center, but their cells are arranged in the same manner. The layers and cell types have botanical names used in scientific discussions, however, for our purposes, it will suffice if we understand the general structure of the woody portions of the tree and have a rudimentary knowledge of general cell function.

Shown on page 17 is a section of wood magnified about 150 times. This sketch is not intended to depict any particular species of tree, but rather to show how the cells are arranged within the woody structure. When the tree is alive these cells are filled in greater or lesser amounts with aqueous fluids that are the life blood of the tree. Some cells serve as conduits for transporting nutrients from the leaves to other parts of the tree where they are needed. Others serve as storage cells for nutrients and still others have various functions as parts of the structure of the tree. As the tree grows and matures, the function of many individual cells may change with time. The live wood of the tree may contain as much as 65 to 75 percent by weight of aqueous fluids.

Immediately after the tree is felled the cells begin to lose fluid and dry out. The drying process continues as the tree is cut into logs, hauled to the mill and cut into boards. The boards are further dried in kilns or are stacked and stickered for air drying in a covered, well-ventilated place. The latter process is favored by many makers of fine furniture. Their specifications may require that the time period for drying extend for a year, two years or even longer. Specifications for moisture content vary, but usually require something less than ten percent moisture by weight. At this point the wood is dry enough to be easily worked and to be reasonably stable in most environments where humidity and temperature do not vary greatly.

A change of environment with an accompanying marked change in humidity is the major cause of most warps. Unfortunately, the worst possible environment for most classic antiques is the modern residence. Our newer houses and apartments are built so tight that any exchange of air between the inside and outside is almost impossible. The effect of this en-

environment on antique furniture is especially severe during the winter heating and the summer air-conditioning seasons. Both tend to dry the inside air to a degree that is rarely, if ever, reached in older houses. (Except in the desert southwest where the exceptionally dry air is a problem to all wooden construction). These older houses were constructed, intentionally or unintentionally, in such a manner that a continual exchange of air takes place between the inside and outside. Some builders say these old houses can breathe. The result is a more or less stable environment which does not affect the moisture content of the members in a piece of furniture. A lovely old antique that is transported from a really old house into a modern residence is likely to develop all sorts of cups, hollows, warps and even splits and cracks.

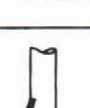


A change in the humidity and, to a lesser degree, in ambient temperature can set up stresses in a piece of furniture as it attempts to adapt to the new conditions. Damage is a likely result. This is especially true when the unexposed portions of the structure are left unfinished. Under these conditions the unfinished side of a board can absorb more moisture than the finished side. (All finishes are porous and permeable to some degree). The dried hollow cells begin to fill and try to regain their original shape and size. The effect of one cell is very minute, but the combined efforts of thousands of cells expanding at the same time can set up tremendous forces that may cause all sorts of damage to a beautiful piece of furniture. Cracks, splits, warps and other defects show up for no apparent reason. The same kind of damage can be caused by introducing a piece of furniture into a markedly drier environment. The unfinished side of the board begins to lose moisture faster than the finished side.

Although changes in moisture content can create enough force to warp a board, that same force can be used to correct the problem. Next issue I'll explain how to do it. WwJ

March/April 1986

CARBIDE TIPPED ROUTER BITS PROFESSIONAL PRODUCTION QUALITY SPECIAL OFFER — SAVE 50% - 75% BELOW COST

BEST CUT BEST PRICE	ITEM NO.	DESCRIPTION	RADIUS	LARGE DIAM.	CUTTING LENGTH	PRICE
		COVE				
	#01	1/4" R	1/4"	1"	1/2"	\$13.00
	#02	3/8" R	3/8"	1 1/4"	9/16"	14.00
	#03	1/2" R	1/2"	1 1/2"	5/8"	15.00
		ROUND OVER				
	#04	1/4" R	1/4"	1"	1/2"	15.00
	#05	3/8" R	3/8"	1 1/4"	5/8"	16.00
	#06	1/2" R	1/2"	1 1/2"	3/4"	19.00
		ROMAN OGEE				
	#07	5/32" R	5/32"	1 1/4"	15/32"	18.00
	#08	1/4" R	1/4"	1 1/2"	3/4"	20.00
	#11	3/8" RABBETING	Deep 3/8"	1 1/4"	1/2"	14.00
	#09	1/8" (KERF) SLOT CUTTER		1 1/4"	1/8"	14.00
	#10	1/4" (KERF) SLOT CUTTER		1 1/4"	1/4"	14.00
	#12	45° CHAMFER	45° Angle	1 1/2"	5/8"	15.00
	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
		DOVETAIL BITS				
	#16	3/8" DOVETAIL 9°		3/8"	3/8"	7.50
	#17	1/2" DOVETAIL 14°		1/2"	1/2"	8.50
	#18	3/4" DOVETAIL 14°		3/4"	7/8"	10.50
		CORE BOX (ROUND NOSE)				
	#19	3/8" CORE BOX 3/16"		3/8"	3/8"	11.00
	#20	1/2" CORE BOX 1/4"		1/2"	11/32"	14.00
	#21	3/4" CORE BOX 3/8"		3/4"	5/8"	18.00
		GROOVE FORMING OGEE				
	#22	1/2" GROOVING OGEE		1/2"	3/8"	16.50
	#23	3/4" GROOVING OGEE		3/4"	7/16"	21.00
	#13	1/2" FLUSH TRIM		1/2"	1"	8.50
	#14	3/8" KEY HOLE	CUTS 3/8" KEY HOLE FOR FLUSH MOUNTING PICTURE FRAMES, ETC.			8.50

WHEN ORDERING ANY 3 OR MORE, DEDUCT \$1.00 EACH
ALL PRICES POSTAGE PAID

- Professional Production Quality
- 1/2" Ball Bearing Pilot
- 1/4" Diameter Shanks x 1 1/4" Long
- One Piece Construction
- Two Flute Thick High Quality Tungsten Carbide Tips

To order by Master Charge or Visa Toll Free
7 Day — 24 Hour Order Service Call
1-800-523-2445 Ext. 56 (In PA 1-800-346-7511 Ext. 56)
or send check to: MLCS, P.O. Box 53, Rydal, PA 19046



TEST YOUR IMAGINATION

Create Any Hollow Cylindrical Shape up to 12" dia. Cut flat wood into straight or angle rings, stack rings, glue, sand, & finish. All on your Ring Master.

ORDER YOUR **FREE BROCHURE TODAY**

1-800-894-9815
In Florida 305/859-2664

We accept
Master Card, Visa, C.O.D. and
phone orders

P.O. Box 8527A, Orlando, FL 32856

RING MASTER

Planer Molder Saw

3 Power TOOLS in 1



Now you can use this ONE power-feed shop to turn rough lumber into moldings, trim, flooring, furniture — ALL popular patterns, RIP-PLANE-MOLD . . . separately or all at once with a single motor. Low Cost . . . You can own this power tool for only \$50 down.

30-Day FREE Trial! SEND FOR EXCITING FACTS
NO OBLIGATION—NO SALESMAN WILL CALL
RUSH COUPON TODAY!

FOLEY-BELSAW CO.
90789 FIELD BLDG.
KANSAS CITY, MO. 64111



Foley-Belsaw Co.
90789 Field Bldg.
Kansas City, Mo. 64111

☐ **YES** Please send me complete facts about
PLANER—MOLDER—SAW and
details about 30-day trial offer.

Name _____

Address _____

City _____

State _____ Zip _____

The Beginning Woodworker

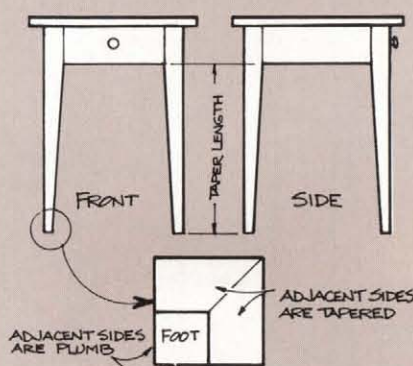
Cutting Tapers, Wedges and Other Shapes with the Table Saw

Cutting Tapers

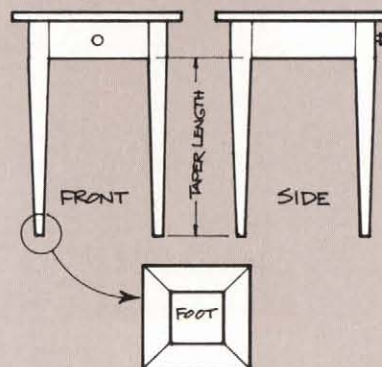
Most of the cutting done with the table saw results in pieces with parallel edges and ends, but it's sometimes necessary to make parts that have tapered sides, or are otherwise irregular in shape. A typical example would be the tapered legs of a table or night stand.

Table legs may be cut with a taper on two adjacent surfaces — usually the in-

Fig. 1

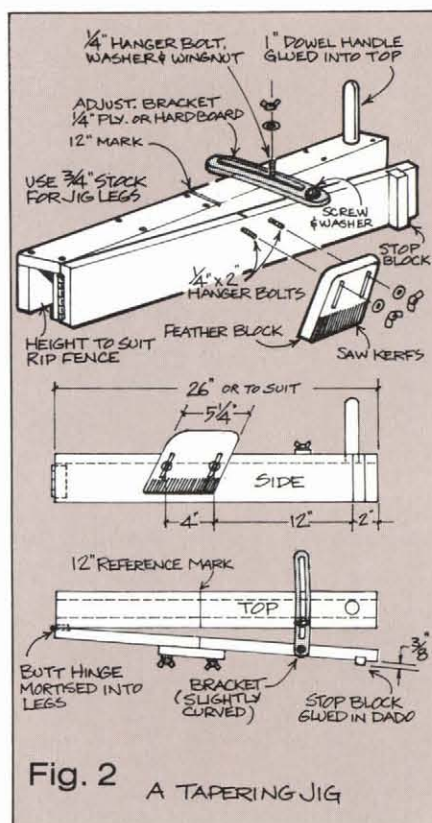


A TAPER ON TWO ADJACENT SIDES MAKES LEGS APPEAR SPAYED



B TAPER ON ALL SIDES MAKES LEGS APPEAR LONGER & LIGHTER

side and back, leaving the outside and front surfaces plumb (Fig. 1A). This type of leg is typical of many Shaker designs and displays a taper when viewed from the front, back and sides.



When a light and long-legged effect is desired, table legs are generally tapered on all four sides as shown in Fig. 1B.

Taper cuts made with the table saw are not difficult, but they do require a jig which will maintain contact with the ripping fence while holding the workpiece and feeding it into the blade at the proper angle. Manufactured jigs can be purchased, but they are somewhat expensive and a perfectly satisfactory jig can be made easily as shown in Fig. 2.

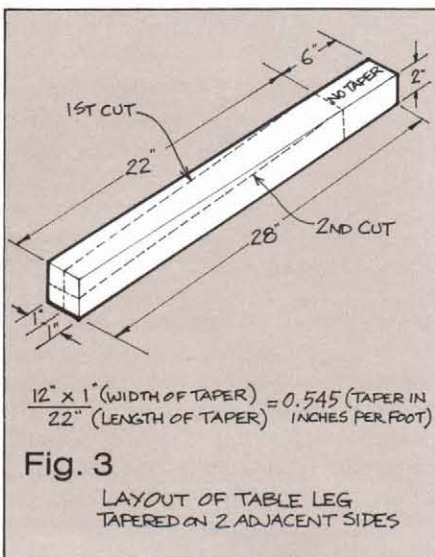
Unlike most taper jigs that bear against the fence, this jig is designed to straddle it for added stability. A handle that keeps the hand far above the blade and an adjustable hold-down are additional safety features that are worth adding. The movable leg and the two parts that ride each side of the ripping fence should be wide enough so a taper on a leg of large section can be cut without the danger of the blade cutting

into the slotted adjustment bracket. As with all shop jigs that will be subject to years of use, you should use straight and seasoned hardwood and give the completed jig a few coats of a sealer such as shellac.

After the jig is assembled, measure exactly 12 in. from the hinge end and scribe a mark, or better still, cut a thin kerf with a dovetail saw across the top of the jig. Tapers are usually calculated in inches per foot, so this mark provides a reference point from which the legs of the jig are spread to get the correct cutting angle.

The formula for determining the taper inches per foot is 12 multiplied by the width of the taper. The product is then divided by the length of the taper. Fig. 3 shows a layout for a table leg which is to be tapered on two adjacent surfaces. Note that the upper 6 in. of this particular leg will remain square so that aprons can be fitted to it. The leg is 2 in. square at the top, and the adjacent sides will be tapered so that the foot will be 1 in. wide.

The total width of the taper in this case is 1 in. (from 2 in. down to 1 in.), and the taper extends for 22 in. Applying the formula and punching in the



numbers on our trusty pocket calculator, we get $\frac{12 \times 1}{22} = .545$ which, for all practical purposes, can be rounded off to $\frac{1}{2}$ in.

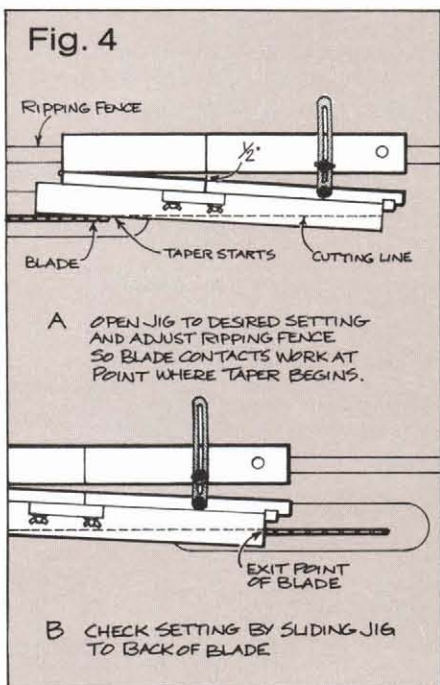
The jig is then set so there is $\frac{1}{2}$ in. between the legs at the 12 in. mark. The leg stock is placed with the end to be tapered butting against the stop block. With the jig in place on the ripping fence, the fence is adjusted so that the blade will make contact with the leg at the point where the taper is to start which, in this case, is 6 in. below the

top of the leg (Fig. 4A).

Before turning on the saw, you can double-check the jig setting by moving the jig to the back side of the blade and bringing the end of the workpiece into contact with the blade to see clearly the point where the blade will exit at the completion of the cut (Fig. 4B).

Adjust the feather block hold-down to bear lightly against the workpiece. Turn on the saw and begin feeding the workpiece into the blade using a notched stick to apply pressure against the outboard side of the workpiece to hold it firmly against the jig. After the taper cut has been made, the leg is rotated 90 degrees and, without changing the setting, the jig is used to cut the taper on an adjacent side. The process is repeated for the remaining legs.

When opposite sides of a workpiece must be tapered, the jig is set for the



amount of taper per foot of one side and the cut is made on all the workpieces. The jig is then opened up to double the original setting and the workpieces are rotated 180 degrees for the second cut.

To taper legs equally on all four sides, set the jig to taper one side and make that cut, then without changing the setting, cut a taper on either adjacent side. Repeat this with the remaining legs, then open the jig to double the setting, readjust the fence and taper the remaining sides of all legs. The basic rule to remember is: use one setting for tapering adjacent surfaces and double that setting for tapering opposite sur-

(continued on next page)

Mighty Mite Mini-easydriver

The handiest screwdriver you'll ever own!

ORDER YOURS TODAY!



MD-10 w/screwstarter \$10.95
2 for \$20.00

Add \$2 postage & handling each order
M.C., Visa — Call 800-451-4266

CREATIVE PRODUCTS INC.

Box 517-WJ36, N. Bennington, VT 05257

MADE IN U.S.A. NEW! POWER-FEED

DRUM SANDER

30-DAY FREE TRIAL!

12 in. and 26 in. models

FREE DETAILS

A Finish Sander ... A Thickness Sander
You can use this high-tolerance machine for light dimensioning as well as the finest finish work. Because stock is power-fed at a uniform rate, you'll achieve results impossible to duplicate with hand methods or hand-held sanders. Dimensions remain exact ... no more low spots, waves or cross grain marks!

Improves Results!

Use the Woodmaster to dimension and finish-sand cabinet pieces, resawn stock, paneling, grandfather clocks, toys, tabletops, knees, burls, crotches, and much, much more! You'll soon find it's one of the most valuable tools in your shop!

30-Day FREE Trial!

Send for Complete Facts! See how you can use the Woodmaster Drum Sander in your own shop for 30 days completely without risk! Easy terms.

Call Toll-Free Today 1 (800) 251-4888

Woodmaster Tools, Dept. DR19, 2908 Oak
Kansas City, MO 64108

☐ YES! Please rush my FREE Information Kit and details on your 30-Day Free Trial Guarantee.

Name _____

Address _____

City _____

State _____ Zip _____

STRAPPING & CLAMPING

WITH
MITY-TITE



**APPLIES
UNIFORM
TENSION.**

Large or odd shaped pieces are held securely. Reusable strap and buckle system attach quickly. Fingertip control of tensioning tool applies uniform pressure to work being clamped while gluing or fastening. **MITY-TITE** kit comes complete with 150 ft. of strap, steel and plastic buckles, a tensioning tool and complete instructions.

At your hardware store or send \$19.95 to:

mitytite
SYSTEMS

4229-1st N.W. Dept. 10
Seattle, Washington 98107
Literature **FREE** on request.

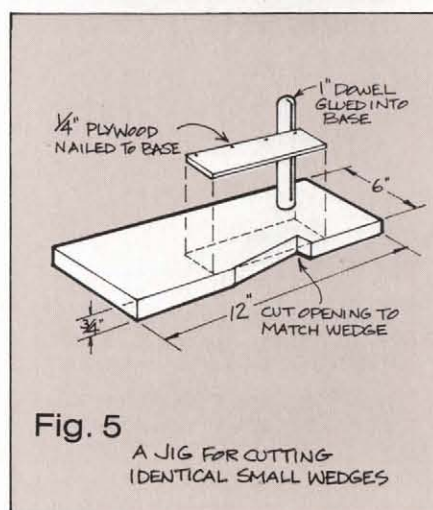
faces.

Most furniture plans give the dimensions of a part at the points where the taper begins and ends, and this information plus the length of the taper is all you need to determine the taper per foot. Occasionally, a plan may show the taper of a part in degrees, in which case you can measure up $7\frac{1}{8}$ in. from the hinge end of the jig and make another mark across both legs. For every degree of taper required, spread the legs $\frac{1}{8}$ in. at this second reference point.

The tapering jig can also be used with a dado cutter to run grooves on a bias on a workpiece that has parallel edges. By measuring the angle between the groove and the workpiece edge on a drawing, the jig can then be set using the $7\frac{1}{8}$ in. reference point.

Cutting Wedges

The tapering jig can be used for cutting large wedges, but it's sometimes necessary to cut small wedges for locking parts such as table trestles and stretchers together. When a number of small wedges of the same size are needed,



ed, the jig shown in Fig. 5 will do the job quickly and with safety.

To make the jig, a notch the same size as the wedge is cut from a piece of plywood. This base should be wide enough to keep the pushing hand a safe distance from the blade. A dowel handle also helps in this respect. A small piece of thin plywood tacked over the top of the wedge opening will keep the cut wedges from flying out as the cut is completed.

In use, the ripping fence is set so the blade just grazes the outside of the jig. The stock is inserted into the notch with the grain direction as shown, and the jig is moved along the fence while

the stock is held firmly against the jig until the cut is completed (Fig. 6). Cut as many wedges as needed by turning the stock over on the opposite face for each cut.

Cutting Irregular Shapes

Shapes such as trapeziums (four-sided with all sides out of parallel), rhombi (diamond shapes) and polygons can be a problem to cut with the table saw, especially if they are small. Usually one or two cuts can be made utilizing either the fence or miter



gauge, but then the workpiece probably cannot be held securely for the remaining cuts. If only a few irregular parts are needed, it's best to lay out the shape on the stock and cut it slightly oversize with a handsaw. Then you can plane and sand the edges right to the line.

If you make a lot of puzzles, toys or other items that require strange shapes, it will be worthwhile to construct a jig such as shown in Fig. 7. This will be a big help in cutting many different shapes with safety and accuracy. It consists of a $\frac{1}{2}$ in. plywood base with a hardwood strip to fit in the table slot. Cut the base wide enough to extend from the left edge of the table to slightly beyond the cutting line of the blade. After the guide strip is glued and screwed in place, make a pass through the blade to trim the edge of the base exactly flush with and square to the blade.

Quick release toggle clamps are screwed to the base in position where they will be able to hold the stock for most, if not all of the cuts without repositioning. These clamps are extremely useful for many jig applica-

**Woodworkers
BUILD AROUND OUR
PRODUCTS**

WE HAVE:
CLOCK MOVEMENTS
MUSICAL MOVEMENTS
LAMP PARTS
ELECTRICAL PARTS
DESK PENS... AND

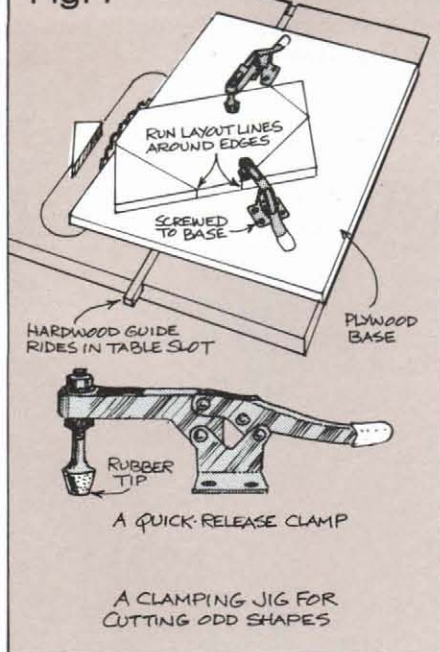
OUR BIG 464 PAGE
CATALOG HAS
THOUSANDS OF
OTHER HARD TO
FIND CRAFT AND
HOBBY SUPPLIES

CATALOG ONLY \$4.00
refundable with your order.

**NATIONAL
ARTCRAFT Co.**

23456 MERCANTILE ROAD • DEPT. WJ386
BEACHWOOD, OHIO 44122 • PHONE (216) 292-4944

Fig. 7



tions and well worth the cost of about \$25.00 for a pair. Get the kind that exert vertical pressure with a holding force of 300 or more pounds. Not all mail order suppliers carry them but one firm that does is Woodworker's Supply of New Mexico, 5604 Alameda NE, Albuquerque, NM 87113.

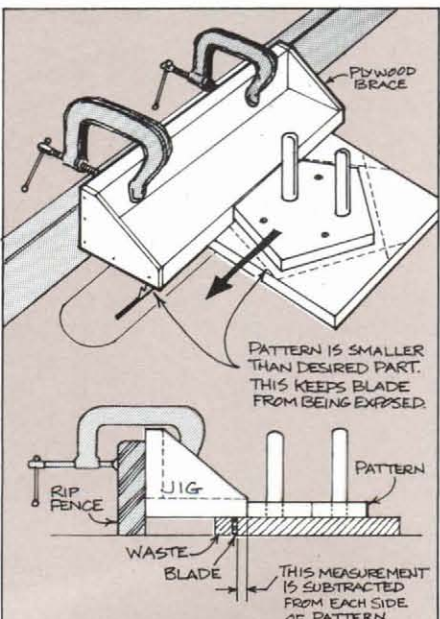


Fig. 8

DUPLICATING AN IRREGULAR SHAPE WITH A PATTERN AND JIG.

To use the clamp jig, you must lay out the shape on the stock with lines dark enough to be seen easily. It's a big help if you extend the lines around the edges of the stock as shown. Align a

cutting line exactly flush with the edge of the jig and engage the clamps. After the cut is made, loosen the clamps and rotate the workpiece for the remaining cuts.

If you need to make many identical parts and screw holes in them are not objectionable, a pattern cutting jig can be used (Fig. 8). This jig consists of an L-shaped auxiliary fence which is clamped to the ripping fence at a height above the table equal to the thickness of the workpiece. The edge of this jig serves as a guide for a pattern which is screwed to the workpiece. In use, the workpiece slides under the guide and is cut to the same shape as the pattern.

If the pattern is cut to the same size as the desired part, the guide must be set exactly flush with the outer teeth of the blade. Since the blade guard cannot be used, a safer approach is to cut the pattern $\frac{1}{2}$ in. smaller all around and set the blade back $\frac{1}{2}$ in. in from the guide edge.

The jig should extend out far enough from the fence to allow plenty of room for waste pieces so they will not get jammed between the fence and blade. Still, it's best to remove these often. The stock should be fed slowly, with firm contact being maintained between the pattern and the guide. That's why two sturdy dowel handles are fastened to the pattern. If the pattern is skewed slightly during the cut, a kickback will occur. For this reason, the jig should not be used with small patterns or those which have a short side that will not provide a good bearing surface against the guide.

While the table saw is indeed one of the most versatile shop machines, it does have its limits. It's possible to cut discs with a pivot jig, and gentle convex and concave curves can be cut using shaped fences, but why bother if a band saw or even a saber saw is available.

For safety's sake, always use the blade guard if possible when cutting any parts that do not have parallel sides and ends. Use jigs with push handles located well above and to the side of the blade, and always secure the workpiece so that it will feed into the blade without twisting.

We hope this feature has provided an introduction to tapering, and some of the many related and specialized operations that are possible with the table saw. As a first tapering project, you may wish to try the veneered end table (page 34), which features tapered legs.

WwJ

MORE

PLEASURE PROFIT PRIDE

FROM
WOODWORKING!



The world famous *Constantine Catalog* offers over 2,000 items to help you BUILD, RESTORE, REPAIR, REFINISH anything made of wood!

Every item is top quality, reasonably priced and backed by CONSTANTINE'S MONEY BACK GUARANTEE! Choose from 150 kinds of veneer, 118 carving tools and chisels, 32 upholstery tools and essentials, 39 clamps, pages of brass furniture and cabinet hardware, 72 lamp parts, 96 how-to books, 73 wood picture kits, 33 styles of pre-finished picture molding, 200 sizes and kinds of cabinet lumber, professional wood finishes, hundreds of plans for furniture, cabinets, shelves, toys...over 2,000 ITEMS IN ALL!

116 page catalog—Only \$1.00

\$2.00 refunded on 1st order.

CONSTANTINE Est. 1812
2044R Eastchester Road, Bronx, NY 10461

LIKE OWNING YOUR OWN LUMBER- YARD!



NEW SOLID STATE
ELECTRONIC CONTROLS!

Just a twist of the dial
gives you from 70 to over
1,000 cuts-per-inch!

Made in U.S.A.

Makes you money...saves you money!

New 4-in-1 power-feed shop planes, molds, joints, sands! Quickly converts low-cost rough lumber into high-value finished stock! Turns out perfect picture frame, quarter-round, casing, tongue & groove...all popular patterns...any custom design. Planes or joints without change-over. Converts in just minutes to a powerfeed drum sanding machine! This one low-cost powerfeed shop opens up a truly astonishing range of products you can make and sell. Find out how you can try this versatile tool in your own shop on our 30-day Free Trial! Easy terms.

PHONE TOLL-FREE 1-800-251-4888

SEND FOR FREE FACTS TODAY

Woodmaster Tools, Inc.
Dept. PS26, 2908 Oak
Kansas City, MO 64108

☐ YES! Please rush my FREE Information Kit and details on your 30-Day Free Trial Guarantee.

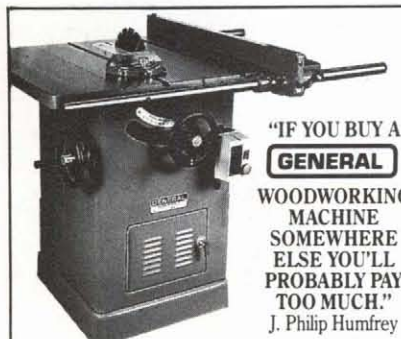
Name

Address

City/State

Zip





Every General machine receives and is shipped with Humfrey's all-points inspection report.

CALL TOLL FREE **1-800-387-9789**

#350 10" Table Saw **\$1345.** US FREIGHT & COLLECT
3 HP motor, Magnetic switch

#1180-1 6" Jointer **\$765.** US FREIGHT & COLLECT
1 HP motor, Manual switch

#160-2 Variable Speed Lathe **\$1095.** US FREIGHT & COLLECT
1 HP motor, Manual switch

#490-1 15" Bandsaw c/w Base **\$845.** US FREIGHT & COLLECT
1 HP motor, Manual switch

SIMILAR SAVINGS ON OTHER GENERAL MACHINES

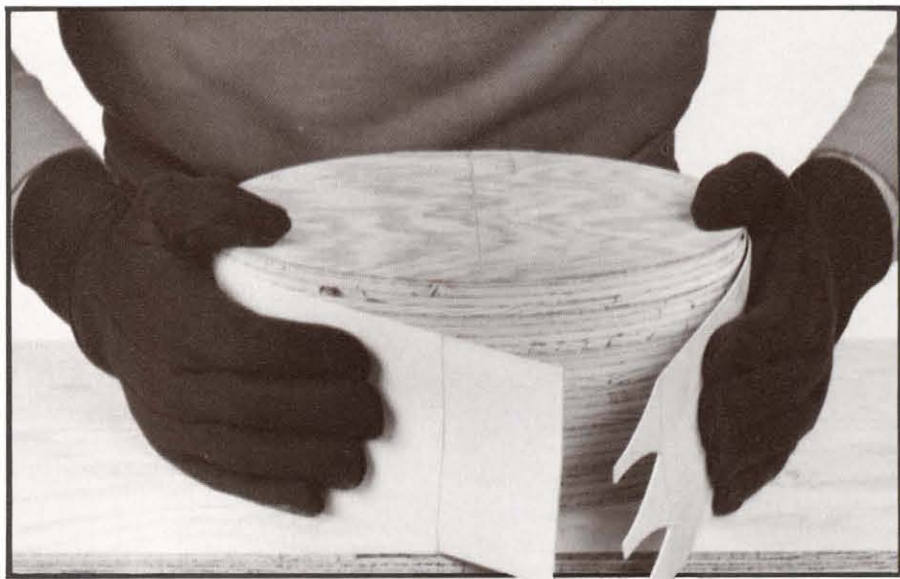
J. Philip Humfrey
International

We sell more General year after year - the reason is value - we satisfy our customers!

VISA CATALOG \$2.00 (Refundable from order) MasterCard

Special Techniques

Unsupported or Hand Steam Bending



In its natural state, wood is an extraordinarily versatile material. We plane it, saw it, shape it, join it, sand it, and finish it. Still, there are occasions where bent forms are convenient or necessary, requiring in turn that the wood be made flexible so these forms can be achieved. The great advantage in bent wood where the wood grain parallels the curve is strength, a quality that could not be equalled in a band-sawn curve where the inevitable short grain problems would be introduced.

The great advantage of steam bending (as opposed to cold bending) is two-fold. First, the steam heat plasticizes the wood; and second, after it has cooled and dried, the bent member will retain the desired shape (springback taken into account).

Why Steam?

From a technical standpoint, there is no real advantage in steaming a piece as opposed to submerging the same piece in boiling water. In either case the main purpose is to heat the wood.

If there is an advantage to steam, it is convenience. Since most pieces to be bent are fairly long, boiling would require a huge stove or heat source, and a pan several feet long depending on the piece length. Steam, on the other hand, can be generated quite easily, and the

steam box itself can either be built to size from plywood, or crafted from lengths of stove pipe, as we shall see later.

Although over the years various chemical treatments have been tried, none have been found to be as effective as steam or boiling water.

Types of Steam Bending

Steam bending can be divided into two separate classes: unsupported or hand bending, and supported bending which requires the use of various tension straps and end blocks to counteract the tensile stresses that develop on the convex side of the bent piece. Supported bending is mandated when attempting severe bends with thick stock.

In this, the first part of a two-part Special Techniques feature on steam bending, we shall examine unsupported or hand steam bending.

Unsupported steam bending is a simple yet exacting technique. Things like the type of wood, grain direction, moisture content, thickness of stock, severity of bend, and work time are all critical elements to be considered for each project.

To complement this special technique we have a classic Shaker box project (page 36). Shaker boxes are an ideal first project because the thinness

MECHANICAL CLOCK MOVEMENTS

For use in your
Grandfather
Clock Case

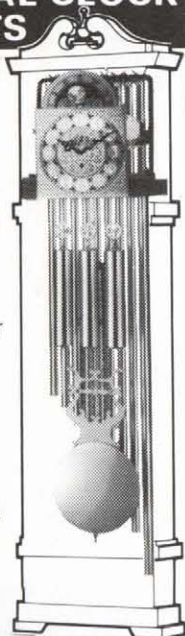
Prices Starting Under **\$125**

Klockit offers precision Grandfather Clock movements by Urgos, Kieninger and Hermle featuring...

- Tubular Chimes
- Cable-Wound Drive
- Triple Chimes
- New Filigree Dials

In Stock and Ready to Ship!

Write For
Free Color
Catalog



KLOCKIT
DEPT. WJ36 • P.O. BOX 542
LAKE GENEVA, WI 53147
1-800-KLOCKIT (Toll Free)



NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Table 1*

Type of Wood	Percentage of Unbroken Pieces in Steam Bending
Ash	67
Basswood	2
Beech	75
Birch	72
Chestnut	56
Hackberry	94
Hickory	76
Maple (hard)	57
Maple (soft)	59
Oak (red)	86
Oak (white)	91
Walnut (black)	78
Willow	73
Yellow Poplar	58

*U.S. Forest Products Laboratory, *Wood Handbook: Wood as an Engineering Material*, 1974.

Table 2**

Type of Wood	Maximum Curvature (radius) possible with 1 in. thick air-dried steamed material (shown in inches)	
	Unsupported	Supported
Ash (American)	13	4.5
Beech	13	1.5
Birch	17	3
Cherry	17	2
Chestnut	18	6
Ebony	15	10
Elm	13.5	1.7
Hickory	15	1.8
Mahogany	36	33
Oak (red)	11.5	1
Oak (white)	13	.5
Teak	35	18

**W.C. Stevens and N. Turner, *Wood Bending Handbook*, Forest Products Research Laboratory, Buckinghamshire, England, 1970.

to the final required dimension.

Refer to Tables 1 and 2 for an understanding of how the various species compare in their ability to be bent successfully. Table 1 lists the relative percentage of unbroken pieces, while Table 2 compares the bendability of various species, indicating both the supported and unsupported figures. Fig. 1 illustrates the relationship of the radius to the curvature, which is the basis of the Table 2 chart. As Table 2 and Fig. 1 show, support blocks and straps will, for most species, dramatically increase bendability.

By referring to the tables we can see that some species are indeed much better for bending than others. Other than species, the next two considerations when selecting stock are grain direction and moisture content. Grain direction is critical since any irregular cross grain or defects can result in failure. As a rule of thumb, the grain should not slope more than 1 in 15; the straighter the grain the better. Avoid using wood with knots, burls, surface checks, shakes, or pith.

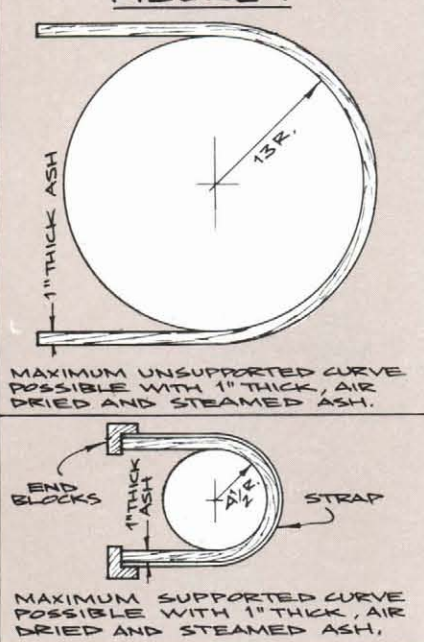
The optimum moisture content for bending is about 30 percent, which is roughly the fiber saturation point of most woods. As noted earlier, green wood is best, with air-dried stock preferable to kiln dried. In any case, air-dried material with a moisture content of between 12 and 25 percent is within the broad range of acceptability.

Most experts recommend flatsawn stock, as opposed to quartersawn, with the heartwood side of the board facing inside the bend.

The Steam Box

Almost any enclosed space can be used as a steam box. As illustrated in Fig. 2, we utilized a couple of sections (continued on next page)

FIGURE 1



of the stock being bent will enable you to accomplish the bends easily and with minimum breakage.

Generally, unsupported steam bending can be divided into four steps:

Stock Selection

Although all species of wood have some flexibility, only hardwoods are recommended for steam bending. The most preferred woods are oak (red or white), elm, ash, hickory, and beech. Walnut, maple, and cherry can also be bent, though not as easily. For projects where the stock is thin (such as our Shaker boxes), or where the bend is very gradual, most any hardwood will do. The best stock for projects that require thicker material is fresh cut green ash, oak, or beech saplings, about 2 inches in diameter. The saplings are drawknifed square or round as needed

HEAVY CONSTRUCTION EQUIPMENT

Front End Loader
Crawler Crane
Motor Grader
Scraper
Backhoe
(as illustrated)



Full Size
Plans — \$10.00 each

Average Size:
14"-18" long, 6"-8" high
Send check or money order
plus \$1.00 postage to:

A & G DESIGNS
P.O. BOX 7,
WEST PADUCAH, KY 42086

introducing...



Some of its unique features:

- forces frames into perfect square
- holds frames in square for jointing
- handles frames from 2 1/2" x 2 1/2" to 12 feet around
- creates even jointing
- quickest way to clamp mitres
- adjustable clamping pressure
- sturdy cast aluminum and steel construction

CALL TOLL FREE 1-800-428-2222
(In PA 1-800-222-2292)

VISA or MasterCard accepted
or send check to:

INDUSTRIAL ABRASIVES CO.
P.O. Box 8611, Reading, PA 19603

NEW! HIGH-PRECISION

SCROLL SAW OUTPERFORMS THEM ALL!

30-DAY
FREE
TRIAL!

Use this high-precision saw to make hundreds of profitable, unusual items...toys, name-bars, filigree work, clocks, holders...the list is nearly endless! Because the Model 1600 cuts so smoothly, sanding is virtually unnecessary!

BUILT FOR THE PROS!

The new Woodmaster Model 1600 gives you a big 16-in. throat capacity, 2-in. cutting depth, a generous, oversize worktable, ball-bearing drive...and much more!

30-DAY FREE TRIAL!

Send for Complete Facts! See how you can use the Model 1600 in your own shop for one full month without risk! Easy terms. MAIL COUPON TODAY!

Call Toll-Free 1(800) 251-4888

SEND FOR FREE
FACTS TODAY!

SCROLL
SAW
FACTS

Woodmaster Tools, Inc.
Dept. CD11, 2908 Oak
Kansas City, MO 64108

☐ YES! Please rush my FREE Information Kit and details on your 30-Day Free Trial Guarantee!

Name _____
Address _____
City _____
State _____ Zip _____

Full Size Plans



Our Rocking Horse has a padded saddle & flowing mane. He's 36 x 25 and easily made from our full-size plan. Plan-245..... \$7.00



Toddlers love riding Charlie Horse. He is 11 x 22 x 26 high & easily built of pine. Plan-335 \$4.50



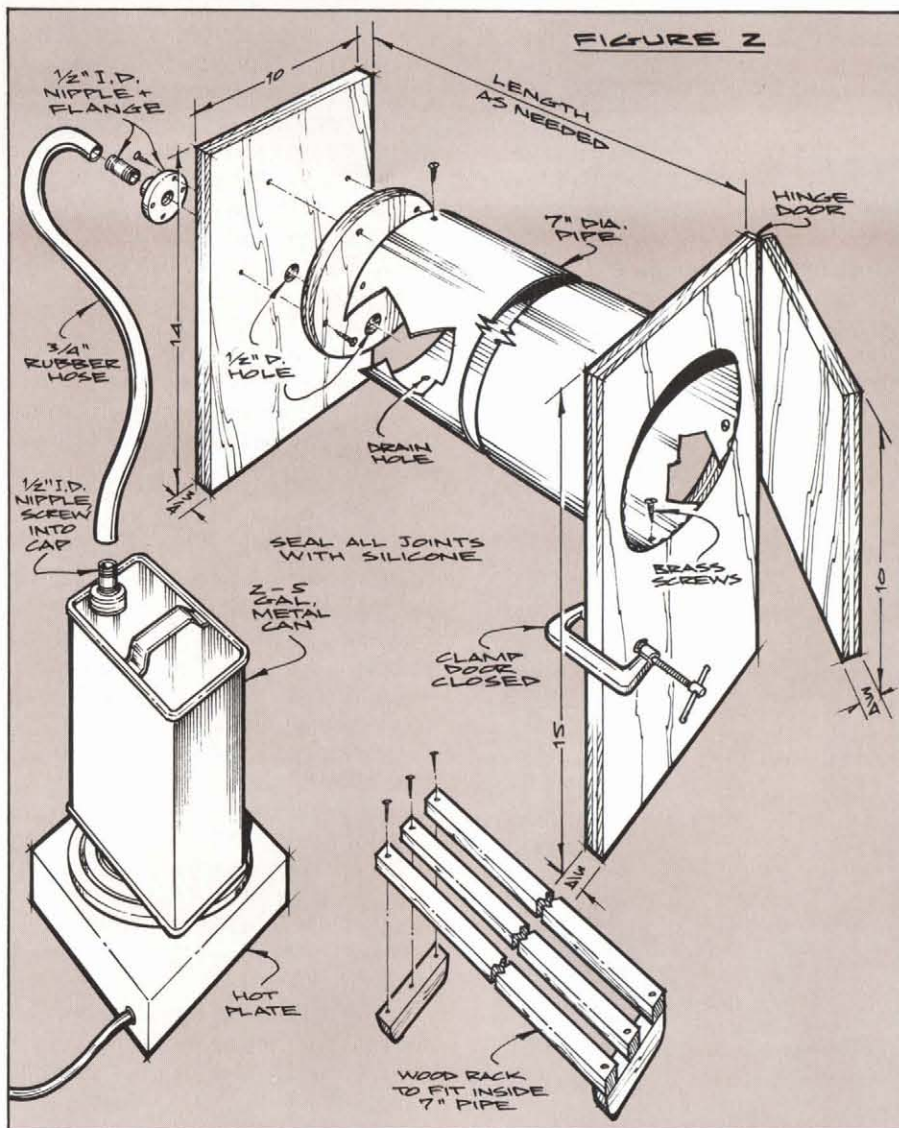
Jib Crane swivels on ball bearings and has two working hand controls. Height 24" Plan-319..... \$4.00



Our great collection of five toy vehicles is easily built with hand & power tools. Trailer is 18" long & 7" tall. Plan-18004..... \$8.50

Add postage 50¢ per plan. NY Res. add tax. Catalog \$1.00—Free with plans. Phone (516) 462-6228. We accept Visa & MasterCard orders if over \$15.00

ARMOR, Dept. H, Box 445, E. Northport, NY 11731



of stove pipe with plywood ends. A small steam box for steaming a single length of board at a time can be fashioned from aluminum gutter downspout. Simply cut the gutter to accommodate the length of board. A good shop-built steam box can be made from $\frac{3}{4}$ inch plywood (marine exterior grade is best). Use waterproof glue and brass screws in the box assembly, and paint the box both inside and out with a waterproof paint. Whatever you use for the box construction, remember that the box should slope slightly, and must have a drain hole at the low end for the condensation to escape. Also, inside the box you will need a simple slatted rack to support the material as it is steamed. One end of the box must, of course, have a door which should be hinged for easy access. The steam box can be supported on saw horses and shimmed under one end to achieve the required slope.

There are many ways to generate steam. We used a hot plate, although a wallpaper steamer, camp stove, or an open charcoal or wood fire outdoors can also be used. If you utilize a stove or open fire you will need a 2-5 gallon can in which to boil water, and a hose to conduct the steam to the steam box. Make the distance between the can and steam box as short as possible in order to minimize condensation within the hose. Avoid any dips in the hose, where condensation may accumulate. You may wish to mount pipe nipples on both the steam box and can, over which the hose can be clamped securely (see Fig. 2).

Steaming the Wood

Contrary to popular opinion, steaming does not significantly increase the percentage of moisture in the wood. Very dry wood will pick up a certain amount of moisture, but mainly on the surface. Although air dried wood is

preferred to kiln dried mainly because air-dried wood will have a higher moisture content, we suspect that in addition to removing moisture, the kiln drying process results in the wood becoming brittle and prone to failure when bent, perhaps from prolonged exposure to heat. For this same reason we caution against *prolonged* exposure to heat in the steaming process. As a general guide, allow one hour in the steam box for each inch of kiln or air-dried material thickness, and ½ hour in the box for each inch of green wood thickness.

The principal effect of the steam is to heat the wood, requiring that the steam be as hot as possible. Since wood is most pliable when heated to near the boiling point, or 212 degrees Fahrenheit, the steam inside the box should be between 200 and 212 degrees. A small thermometer can be inserted through the vent hole in the steam box to monitor temperature. Naturally, you will need a pair of heavy gloves to protect your hands when handling the steamed material.

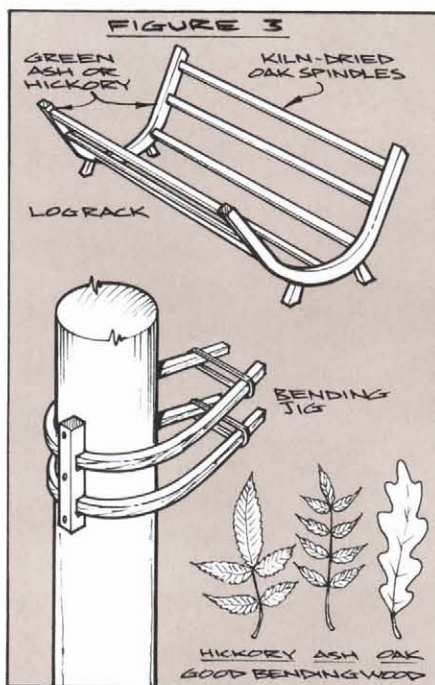
The importance of an efficient steam box will depend on the project. The ½ in. thick stock we used for the Shaker boxes will bend fairly easily in its cold state, and needs only moderate steaming. Thicker material, on the other hand, requires steaming up to or very near the boiling point in order to properly plasticize it.

Bending and Fastening

Unsupported bending is somewhat less predictable than supported bending. In some instances the wood should be overbent slightly to allow for springback. Since so many factors (severity of bend, type of wood, moisture content) will impact on springback, it is best to experiment with several test pieces to determine the bend that will best compensate for springback. Generally, unsupported bending requires that the ends be fixed in the final application, thereby eliminating any inconsistencies that may exist between the steam-bent pieces. In our Shaker box, the top and bottom serve this function.

Time is a critical element when steam bending. It is essential that you work as quickly as possible. Have everything ready so that when you remove the material from the steam box it can be immediately bent around the form. Remember, you have only a few moments in which to work.

With even the simplest bends, one or more helpers is necessary. The Shaker boxes required one person to bend the sides around the form, and another person to apply the band clamp and draw it tight. When bending heavier stock you will need one person on each end, and a third to anchor the bend in place. Fig. 3 illustrates an unsupported bend using a tree as a form. As shown, the pieces being bent are used to fashion a firewood rack. Note the dadoed block which centers the pieces and the rope which holds them in position until they have set. The bend has been increased somewhat to allow for springback. Allow the pieces to cool



and dry at least 24 hours before removing them from the bending jig.

Most unsupported steam bending is done around a form. The form can be arranged so the ends can be clamped in place. If you are bending outdoors around a tree, tie the ends as we have done. Smaller bentwood projects can be anchored with a strap clamp, as was the case with the Shaker boxes.

Steam bending can be used to create a variety of articles. Bentwood furniture, basket handles, plant hangers, and coat racks are but a few of the usual items that come to mind. Boxes and baskets can be made from thin-walled steam-bent stock. Either the Shaker boxes or the firewood rack is an ideal first project for steam bending.

Next Issue — Supported Steam Bending: Expanded Creative Possibilities.

WwJ

THE WOODWORKING SHOW

machinery
tools — supplies



PASADENA, CA

Feb. 28 — Mar. 2, 1986

The Pasadena Center
300 East Green St.

PORTLAND, OR

Mar. 14–15–16, 1986

Multnomah County
Exposition Center
2060 N. Marine Dr.

ATLANTA, GA

April 4–5–6, 1986

Atlanta Civic Center
395 Piedmont Ave., N.E.

3 SPECIAL SHOWS!

- FREE WORKSHOPS
- 100 EXHIBITS
- DOOR PRIZES

Call 1-800-826-8257 for further information.

With this ad \$1.00 OFF
general admission
price of \$5.00

Cascade Precision Tool Co. Box 848, Mercer Island, WA 98040

FEATURING CARBIDE TIPPED ROUTER BITS AND SHAPER CUTTERS
KNOWN WORLDWIDE FOR MORE THAN 20 YEARS AS A SYMBOL OF QUALITY



FREE ½" DOVETAIL WHEN YOU ORDER THIS SET OF CARBIDE TIPPED ROUTER BITS INCLUDING ¼" RABBIT ½" OGE, ½" COVE, ½" ROUNDOVER, ½" AND ½" STRAIGHT BITS WITH EXTRA BEARING FOR BEADING

¼" SHANK SET \$64.95 PPD. ½" SHANK SET \$69.95 PPD.



CARBIDE TIPPED 3 CUTTER-3 STEP ROUTER BIT SET WITH ½" SHANK AND ¾" O.D. PANEL RAISER \$179.95

3 WING PANEL RAISERS IN 5 PROFILES - \$69.95 ea.



5" FACE CUT 15" FACE CUT CONCAVE 12" FACE & QTR RD CONVEX 4 1/4" O.D. WITH 1/4" BORE OR 5 1/4" O.D. WITH 1/4" BORE & 1" BUSHING

HEAVY DUTY SHAPER CUTTERS, ¾" BORE WITH ½" BUSHING from \$29.95

6-PIECE CABINET SETS ¾" BORE WITH ½" BUSHING from \$149

RUB COLLARS W/BUSHINGS, \$22.95

ORDER BY PHONE WITH VISA/MC OR SEND M.O. CHECK, VISA/MC NUMBER, EXP. DATE, PHONE NUMBER CATALOG \$1 — FEATURING OVER 200 CARBIDE TIPPED ROUTER BITS AND SHAPER CUTTERS

SATISFACTION GUARANTEED

ORDER TOLL FREE

1-(800) 235-0272

IN WASHINGTON CALL 1-206-236-0272

CHARGE YOUR ORDER

10 AM-7 PM

Monday through Saturday



Comparative Tool Review:

3/8 in. Variable Speed Reversible Drills



Over the years many readers have asked us to include a comparative tool review column in *The Woodworker's Journal*. Frankly, although we realize that many magazines feature product reviews, from an editorial standpoint we had serious reservations about the real value of such articles to you, our readers. After all, the "bottom line" should be: What tools are

best for woodworkers? We wondered if there would really be significant differences in features and/or performance among the various tools we reviewed.

In an effort to be as objective as possible in our tests, we did not solicit any advertising from the manufacturers whose products we reviewed, and all tools were returned after

testing. Although we have no true scientific laboratory for testing tools, we did use the tools in our shop, subjecting them to stress in a manner we felt would be of interest to woodworkers.

Why 3/8 in. Variable Speed Reversible Drills?

We chose 3/8 in. variable speed reversible (VSR) drills for our first tool review feature for three reasons. First, no one else (to our knowledge) has looked into them from a woodworker's point of view. Second, it was our feeling that, generally speaking, drills are very similar, which is to say they will all drill a hole. If we could find enough differences among the various drills to result in an interesting and informative article, then that would be an indication to us that other comparative tool reviews (jigsaws, routers, sanders, etc.) could also be of some real value to our readers.

The reason we selected 3/8 in. VSR drills for review (instead of 1/4 in. or 1/2 in. drills) was because the 3/8 in. VSR is an ideal all-around drill for woodworkers. The 3/8 in. capacity chuck is large enough to accept drill shanks that could not fit in 1/4 in. chucks unless they were turned down, and the 3/8 in. VSR drill motors are powerful enough for most any type of drilling woodworkers require. Also, 3/8 in. VSR drills are lighter, easier to control, and can get into tighter spaces than the larger and heavier 1/2 in. drills. We feel that the variable speed and reversing features are useful to woodworkers, and add an important versatility to the drills. The variable speed enables one to select the proper speed for a specific drill bit: usually slower speeds for large bits, and higher speeds for the smaller bits. The speed control is also important for starting holes and sinking screws. The reversing feature enables the user to back out screws, and can also be helpful in removing a bit that has become jammed.

What to Look For in 3/8 in. VSR Drills

Our initial thought was that there would be clear differences between the drills, and that we could therefore make a recommendation based on the number of amps, types of bearings, and housings, for example. After talking to engineers and manufacturers,

The Woodworker's Journal

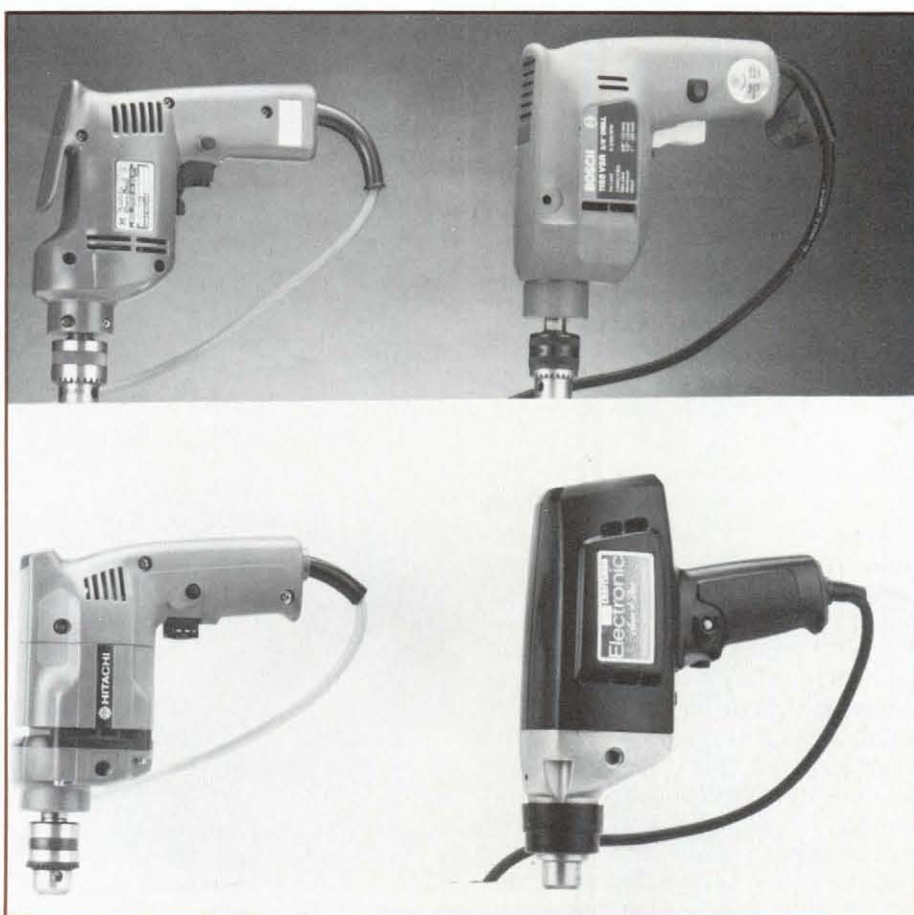
\$50 Retail (on sale) Drills
Left to right, top row: Makita DP 3720, Bosch 1158 VSR. Bottom row: Hitachi D10 VC, Sears 1030.

and after testing the drills ourselves, several things became apparent.

First, amps do not necessarily translate into actual power to the drill bit. Factors such as motor speed, gear size, ratio and reduction, and even machining can all impact on real torque and power at the bit. As we discovered, a 3.3 amp drill can be more powerful than a 4 amp drill in terms of actual ability to drill a hole.

Second, although ball bearings are generally better than needle bearings,

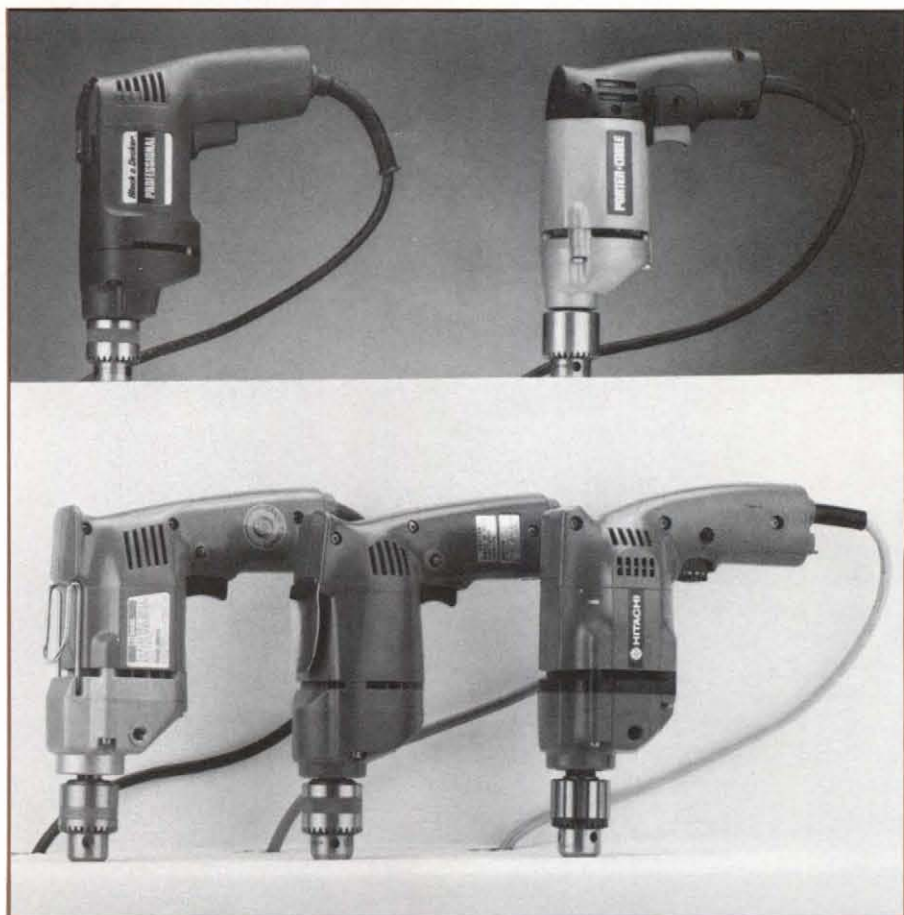
(continued on next page)



Manufacturer — Model Number	Manufac. Sug. Retail \$	Amps	Weight*	Speed	Cord Length	Housing	Auxiliary Handle	Special Features
Bosch — 1158 VSR	\$ 85.00	2.8	3.7	0-2100	80 in.	Plastic	Multi-Adjustable	
Hitachi — D10 VC	\$ 90.00	3.2	3.25	0-1800	99 in.	Plastic	Left Side	Var. Speed Stop
Makita — DP 3720	\$ 90.00	2.7	3.6	0-1800	109 in.	Plastic	No	Belt Clip, Var. Speed Stop
Sears — 1030	\$ 99.99	3.0	4.75	0-1200	78 in.	Alloy/Plastic	Both Sides	Var. Speed Stop
Black & Decker — 1179 VSR	\$116.00	4.5	3.5	0-1200	96 in.	Plastic	No	
Hitachi — D10 V	\$118.00	3.3	3.7	0-1100	99 in.	Plastic	Left Side	Belt Clip, Var. Speed Stop
Makita — 6510 LVR	\$116.00	3.0	3.75	0-1050	109 in.	Plastic	No	Belt Clip
Porter Cable — 621 HD	\$120.00	4.0	3.75	0-1000	84 in.	Alloy/Plastic	No	
Ryobi — D1010	\$118.00	3.3	3.8	0-1300	105 in.	Alloy/Plastic	Left Side	Belt Clip
Bosch — 1157 VSR	\$159.00	3.3	4.1	0-1400 0-2400	80 in.	Plastic	Multi-Adjustable	Var. Speed Stop, 2 Speed Gearing
Black & Decker — 1180 VSR	\$148.00	4.5	3.63	0-1200	96 in.	Alloy/Plastic	No	
Milwaukee — 0228-1	\$129.00	3.3	4.00	0-1000	96 in.	Alloy/Plastic	No	
Milwaukee — 0224-1	\$159.00	4.5	4.6	0-1200	90 in.	Alloy/Plastic	Both Sides	Detachable Cord, Brush Access Panel
Porter Cable — 7511 EHD	\$150.00	5.2	4.2	0-1000	118 in.	Alloy/Plastic	Left Side	
Skill — 6628	\$139.00	4.5	4.4	0-1300	96 in.	Alloy/Plastic	Multi-Adjustable	Dual Reverse Switch

*All these weights include the cords.

\$75 Retail (on sale) Drills
 Left to right, top row: Black & Decker 1179 VSR, Porter Cable 621 HD. Bottom row: Ryobi D1010, Makita 6510 LVR, Hitachi D10V.



and needle bearings are better than bushings, other factors such as bearing size, composition, and thrust may mean that a tapered roller bearing could in some instances be preferable to a ball bearing. Because we are not engineers, and do not have a laboratory to conduct careful scientific examination and, given the many factors that could impact on any determination of which drill had the best bearings, housing, or construction, we have decided to pass on these questions. Suffice it to say that all of the drills in our test featured impact resistant plastics (where plastic was used in the housing) and seemed to be well-constructed. Additionally, most of the drills in our test group featured ball bearings, which are, in any case, preferable to bushings.

Tool Buymanship

Common sense is your best guide here. Remember you usually get what you pay for. A \$150 drill will be built better, have higher quality parts, and should last longer than a \$50 drill. All else being equal, your choice will probably boil down to a comparison of features, comfort, and feel.

The Test

In order to "wring out" these drills, we chucked them with a 2 in. Forstner bit, and attempted to drill through 2 in. thick poplar. Although most of the drills were equal to the task, some bogged down, and a few emitted various burning odors. In using the drills we noted such aspects as power, noise, comfort, and accessibility of controls, and commented on them where appropriate.

Although we realize that our tests

were somewhat severe, the feeling was that a short term "torture test" like this would be a good indication of a drill's ability to withstand years of hard use and abuse in a workshop setting.

The tests were conducted by Tom, our managing editor, Dave, on the editorial staff, and Phil, our designer/craftsman. In the final analysis, we asked our testers to make a choice for their favorite drill in each of three price categories. The three categories, \$50, \$75, and above \$75 represent the approximate sale prices these drills can be purchased at, and *not* their manufacturers' suggested retail prices, which are listed in the specifications chart. As a rule, tools can be purchased on sale for anywhere from 35 to 55 percent off the manufacturer's suggested retail price. The actual discount may also be affected by special dealer incentives and/or manufacturer's rebates.

The \$50 Category

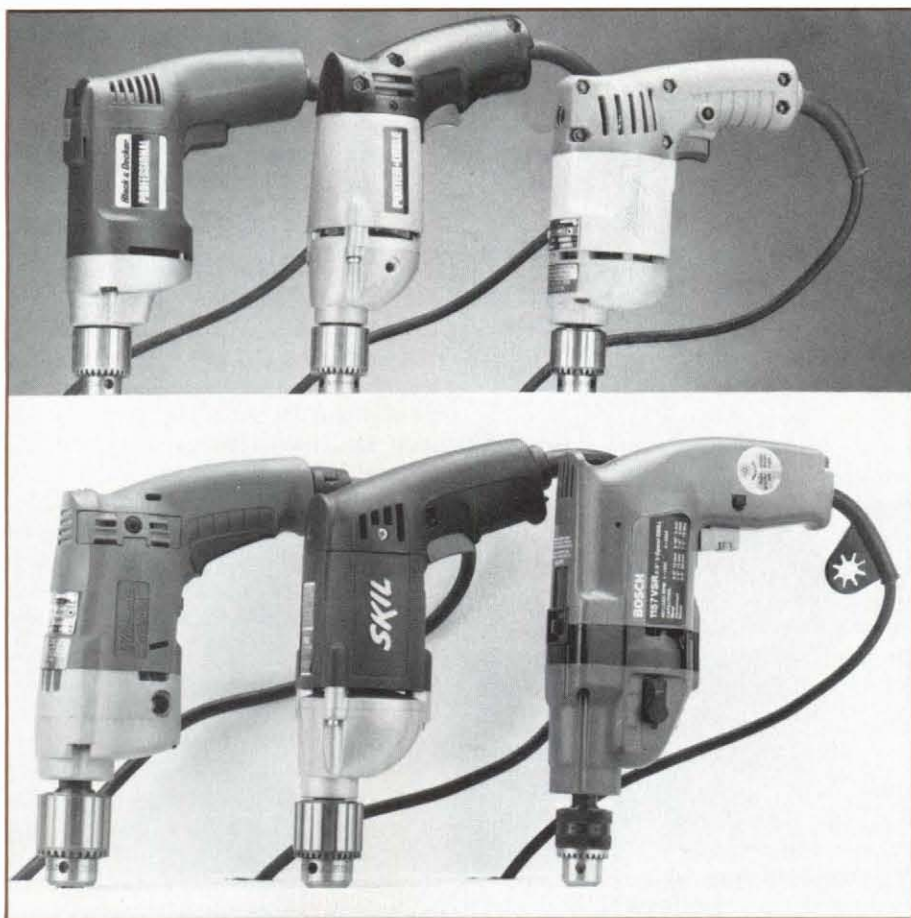
BOSCH 1158 VSR — This tool met with high praise on all accounts. Tom, Phil, and Dave all noted that it was

lightweight, comfortable, and had adequate power. It did not hesitate in the Forstner bit test, something of a surprise given the relatively high (2100) top speed. Phil added that the drill was "exceptionally quiet and smooth running."

HITACHI D10 VC — A good drill, very close in all respects to the Bosch 1158. The 8 ft. 3 in. cord was one of the longest on any of our test drills.

SEARS 1030 — This drill is one of Sears' new "Electronic" line of tools. Although Sears touts the drill as featuring an "analog feedback control" so that speed remains constant from 0-1200 rpm, our testers were unable to recognize any real benefit from this when using the drill. In actual function the drill seemed no different from conventional electric drills, leading us to seriously question the wisdom of Sears' lending this tool the high-tech sounding "electronic" moniker. The drill was well balanced and accepted an auxiliary handle on both sides, but relative to the other drills in this category it proved to be somewhat underpowered in the

The Woodworker's Journal



\$100 Retail (on sale) Drills

Left to right, top row: Black & Decker 1180 VSR, Porter Cable 7511 EHD, Milwaukee 0228-1. Bottom row: Milwaukee 0224-1, Skil 6628, Bosch 1157 VSR.

given its "torqueness", an auxiliary handle would have been a good option, and that the recessed trigger lock was difficult to work.

PORTER CABLE 621 HD — Very close to the Black & Decker 1179 in almost all respects. The only complaints concerned the reversing switch, which Tom said "looks a little flimsy", and which Phil noted might be "accidentally bumped".

RYOBI D-1010 — Although slightly less powerful than the Porter Cable and Black & Decker in this category, the Ryobi was considered an excellent value. Both Phil and Dave noted its light weight, and the 105 in. long cord, and Tom liked the solid feel of the switches and controls.

HITACHI D10V — This drill has adequate power and was comfortable to use. However, Dave noted that the trigger locking button accidentally engaged on occasion. Like the Ryobi, this drill accepts an auxiliary handle (left side only).

MAKITA 6510 LVR — Although this drill had good power, like the other Makita it heated quickly and emitted the same unusual plastic odor. In all fairness to Makita, however, we admit that we are not certain what this odor was, if it is normal with all new Makita drills when they are overloaded, or if it is in fact an indication of problems down the road. Phil complained that "the trigger pinched", and Tom called the drill "loud".

The Over \$75 Category

MILWAUKEE 0228-1 — Although by rights this drill probably should have been included in the middle price category, its \$129 list price placed it in (continued on next page)

Forstner bit test. The drill had no chuck key, which brings us to the most controversial aspect of the tool. There is no chuck key because none is required. Instead of the traditional chuck, Sears has developed an "automatic" chuck. In order to open the chuck, one grasps a plastic collar around the chuck and pulls down with the drill held on in the reverse mode. To tighten the chuck, repeat this procedure, only with the reversing switch in the forward setting. Although the system performed well in our tests, when we disassembled the drill to see how this "automatic" chuck worked, there were some reservations about its design. Specifically, we wondered whether the teeth on the engaging hub would wear round after years of use, reducing the ability of the chuck to be automatically tightened. Given the fact that there is no back-up system to manually tighten the chuck, this might present a problem.

Sears has no doubt subjected this tool to long-term tests, however our testers were still apprehensive. Tom said he was "reluctant to buy this drill right now". Dave was concerned about

the chuck's longevity. Phil, though noting the chuck's novel idea, felt the drill was "big, awkward, and under-powered for its size". Note: Sears does sell this same drill with a conventional keyed chuck, and without the "analog feedback control". We feel that this conventional drill (model 1041) is a better buy, especially given the \$79.99 list price.

MAKITA DP 3720 — A comfortable, good-looking drill with one of the longer cords (109 in.) of any in our test. Although it came with a belt clip, Tom noted that this is not a feature woodworkers are likely to need. The drill performed adequately with smaller bits, but heated quickly, stalled, and emitted a pungent odor of burning plastic in the tough Forstner bit test.

The \$75 Category

BLACK & DECKER 1179 VSR — This drill was a pleasant surprise. All three testers remarked on the drill's excellent power. Dave noted the comfortable grip, and the fact that none of the controls got in the way. Phil called it "the most powerful in the group". The only criticisms of the drill were that,

our "over \$75 cost" range. This was a quiet, comfortable drill with excellent power. The only negative comment was that, given the drill's power, an auxiliary handle would have been a desirable option. Like the Milwaukee 0224-1 drill, this model had extra heavy-duty bearings and construction, making it the type of tool that will withstand years of daily use.

MILWAUKEE 0224-1 — As powerful as any of our test drills, this model featured an oversize chuck, huge sealed bearing, and an auxiliary handle that could be mounted on both sides, making it ideal for those who are left-handed. Other special features of interest are an easy access door for quick brush change, and a unique detachable cord. Milwaukee touts its tools as being designed for contractors, and, based on our tests and observations, and from the standpoint of longevity, there is little doubt that as Phil put it "these drills will probably outlast all others".

BLACK & DECKER 1180 VSR — This drill was another top choice with our testers. Phil said you "can't bog this drill down". The only complaints concerned the locking switch, which Tom found difficult to operate, and the lack of an auxiliary handle, which Dave noted "could present a problem if a bit should catch".

PORTER CABLE 7511 EHD — A fine drill on all accounts. Tom said this drill was "as powerful as any", Phil noted how "smooth the drill felt", and Dave liked the drill's "clean, no-nonsense design and quality feel". With an auxiliary handle on the left side only, this drill was not designed for leftys, but everyone applauded the 9 ft. 10 in. cord, which was the longest of any in our test.

BOSCH 1157-VSR — This drill was a favorite despite relatively low (3.3) amps when compared to the other large drills in our test. Two features figured prominently in this drill's high ranking. First, it had a multi-adjustable auxiliary handle which could be locked in any position, making it an ideal tool for left-handed woodworkers. Second, the drill had a two-speed gear box. In the low gear setting, the drill had power near that of the most powerful drills in the test, while the high speed setting gave the drill great versatility.

SKIL 6628 — Although not quite as powerful in the Forstner bit test as the

large Black & Decker, Porter Cable, and Milwaukee, the Skil performed well and was exceptionally quiet. This drill had a unique reversing switch that could be accessed from either the left or right side of the pistol grip and, like the Bosch 1157, it had a multi-adjustable auxiliary handle.

Conclusion:

Not all manufacturers or models were included in our tests, and we

The Tester's Choice

Tom:

\$50 — Bosch 1158 VSR, Hitachi D10VC

\$75 — Ryobi D1010

Over \$75 — Bosch 1157 VSR

Phil:

\$50 — Bosch 1158 VSR

\$75 — Black & Decker 1179 VSR

Over \$75 — Porter Cable 7511 EHD

Dave:

\$50 — Bosch 1158 VSR

\$75 — Ryobi D1010

Over \$75 — Milwaukee 0224-1

apologize for those that have been excluded. AEG, a European manufacturer, is highly regarded by our designer/craftsman Phil Bacon, and several other woodworkers we queried. We were advised that AEG's tools are comparable to Bosch, which fared well in our tests, and we will try to include AEG in future tool comparisons.

As for Sears, we recognize that we may have seemed somewhat hard on Craftsman in this test, and that many of our readers have equipped their shops with and swear by Craftsman tools. In fairness to Sears, the drill we reviewed was from the light-duty homeowner series, made for Sears by Singer. In Sears' industrial line, their best $\frac{3}{8}$ in. VSR drill (model 27101) is made for Sears by Black & Decker, and is identical in every respect (except color) to the Black & Decker model 1180 in our test, the difference being in name only. It can therefore be inferred that this Sears drill would perform exactly as the Black & Decker, which proved to be an excellent tool.

We might add that Sears is widely recognized as having one of the best guarantees in the business. Considering this fact, and the ease with which repairs and returns can be accomplished, it is not surprising that Sears is so highly regarded.

Like Sears, several of the other manufacturers in our test have both a homeowner and a professional line of

tools. There is usually a world of difference between the two tool lines, and it is our belief that over the long term the "professional" or "contractor's" models offer the better value.

In the words of Tom, "All the drills tested will drill a hole for you". Although some of the smaller drills did not fare well in the Forstner bit test, it is our opinion that all the drills should be adequate for most home workshop requirements.

The differences between the various brands and models are often subtle. As the evaluations show that certain drills may be clearly better than others, choosing the best drill for you is likely to be a subjective, personal decision, depending on things like what type of woodworking you do, how much money you are willing to spend, what features you want, whether you are left or right-handed, and how the drill feels. Our first recommendation, therefore, is that whenever possible you try the drills yourself.

As we noted at the start, the bottom line in this evaluation has to be: Which drills are best? So here, then, is our recommendation: if price is a major consideration, then the Bosch 1158 VSR is your best bet, with the Hitachi D10VC a very close second.

In the middle price range, the Porter Cable 621 HD, the Black & Decker 1179 VSR, and the Ryobi D1010 all represent an excellent value. The Ryobi is a "best buy", only because it comes with an auxiliary handle.

In the over \$75 range, we had a "horse race". Frankly, all of the drills in this category were excellent tools. A choice here will probably boil down to personal factors. The Bosch 1157 VSR had the most features, the Milwaukee drills are probably best in a commercial shop environment, and the Porter Cable, Skil, and Black & Decker models lie somewhere in between.

We hope that this first tool feature has highlighted the fact that there is a wide variety of drills available, and that there are significant differences between models and manufacturers. As for selecting "the best of the best", that decision will depend on your individual needs, likes and, of course, on the all important criteria of price. Remember, if you are patient, most tools can be purchased on sale at close to 50 percent off their retail list, either locally or from mail-order discounters.

WJ

Furniture Periods and Styles

Federal Period 1782-1815

The Federal Period is dated from the conclusion of the Revolutionary War (1782) up through about 1815. Just as the Colonial Period's name reflected the fact that we were colonies, the name Federal referred to the fact that the new nation was a federation of states.

The Federal Period in America roughly corresponded with the neo-classical revival period in Europe. In a broad sense, it can be said to overlap the end of the Chippendale Period (in America), and includes the Sheraton and Hepplewhite styles. In fact, the English designers Robert Adam, Thomas Sheraton, and George Hepplewhite, and the great American cabinetmaker/designer Duncan Phyffe were the major influences in the Neo-classical/Federal Periods.

The Neo-classical or Federal style, as it was known in America, was a sharp contrast to the heavy, elaborate, ornate rococo style, which had dominated furniture design for several centuries. Interest in the classical really began with the discovery and excavation of Herculaneum near Rome in 1738, and at Pompeii a decade later. These archaeological finds provided the inspiration for a whole new style based on the forms and motifs of classical Rome. The English architect and designer Robert Adam was the first to utilize classical elements in his designs. Later, American furniture forms were tremendously influenced by Hepplewhite's book, *The Cabinet-Maker's and Upholsterer's Guide*, (published posthumously in 1788), and Sheraton's book, *The Cabinet-Maker's and Upholsterer's Drawing Book*, published in 1791.

The Neo-classical style took America by storm. With the Revolu-

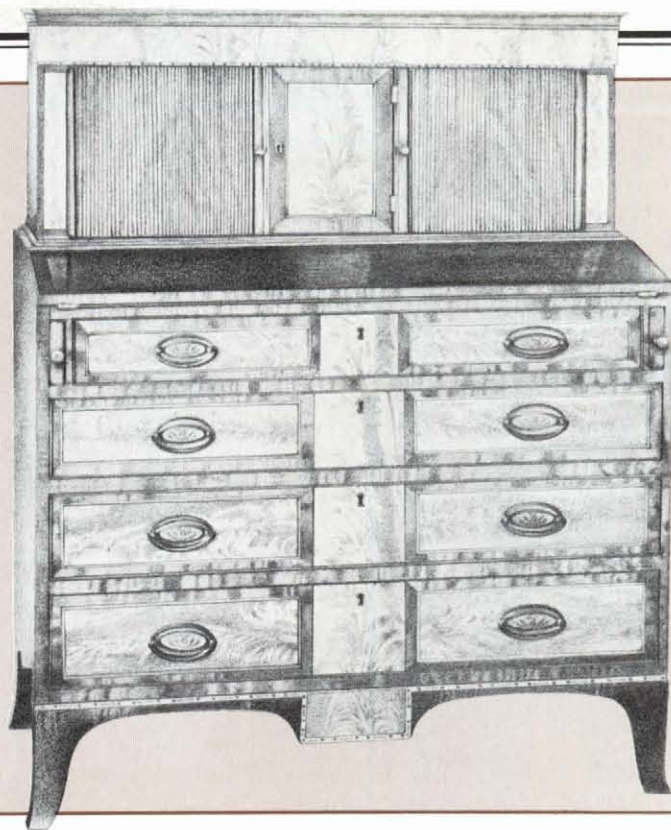
tion over, trade with England resumed, and American cabinetmakers quickly picked up on the new "classical" designs. As in the Queen Anne and Chippendale periods, however, American designs were somewhat more restrained and less ostentatious than their English counterparts.

CHARACTERISTIC FEATURES

Federal period chair designs typically featured either shield or heart-shaped backs (following Hepplewhite),



or rectangular backs (following Sheraton). Table and chair legs were usually slim and tapering, either reeded or fluted, and possibly ornamented with low relief carving and/or inlay. The spade or block foot was popular, with some high quality pieces featuring applied brass lion's paw terminals.



Drawing by Michael Gellatly

Classical motifs, particularly discs, ovals, pendants, spandrel fans, feathers, floral swags, the cornucopia, and the classic urn were common decorative elements. The most popular motifs were the husk, bellflower, eagle, sheaf of wheat, basket of fruit, drapery, and vines. Mahogany was the favored wood, though many fine pieces were also executed in domestic hardwoods.

Several new furniture forms appeared. As homes grew larger, and dining rooms became more common, dining room extension tables were developed for the first time. In the bedroom, the dressing table, with fewer drawers than a chest and with a mirror attached above, became popular. This was the forerunner of our present-day dresser.

As the Federal Period matured, it came to include elements from classical Greek and Egyptian styles. Many designers flavored their work with gothic interpretations of the classic forms. Following the French Revolution there was considerable French migration to America, and French influence was also integrated into the Federal style.

On the whole, Federal Period furnishings are characterized by delicacy in both design and ornamentation. Heavy, ponderous forms were out; graceful designs, inlay, veneer, and fine carvings were in.

W&J

Vol. 4 No. 5 Sept-Oct '80: Cabinetmaker's Workbench, Cobbler's Bench Coffee Table, 19th Century Cherry Table, Kitchen Utensils, Book Rack, Nuts & Bolts, Nutcracker, Walnut & Glass Bank, Schoolhouse Desk, Booster Seat, *Articles:* All About Wood Chisels; Being Your Own Salesman; Restoring a 19th Century Carved Table.

Vol. 4 No. 6 Nov-Dec '80: 17th Century 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 Century Trestle Table, Lathe Steady Rest, *Articles:* Lap Joints; Pricing Your Work; Correcting a Warped Top.

Vol. 5 No. 1 Jan-Feb '81: 18th Century Wall Shelves, Hand Mirror, Cutting Boards, Tic-Tac-Toe Game, 18th Century Vanity, Shaker Pine Cupboard, Tenon Jig, Towel Ring, Matchbox, Corner Shelves, Contemporary Cabinet, Black Forest Clock, Shop Drawing Board, *Articles:* Veneering Basics; Selling Quality; Repairing Loose Joints.

Vol. 5 No. 2 Mar-Apr '81: Child's Rocker, Band Saw Jig, Push-Pull Toy, Half-Round Table, Spoon Rack, Salt and Pepper Shakers, Calculator Stand, Anchor Thermometer, Plant Stand, Oak Writing Desk, 18th Century Chair Table, Shop-Built Handscrew, *Articles:* The Minimal Workshop; Submitting Plans to Magazines; A Finishing Tip for Matching Colors.

Vol. 5 No. 3 May-June '81: 18th Century Sleigh Seat, Child's Step Stool, Kiddie Gym, Flying Duck, Dominoes, Trouser Hanger, Mug Rack, Folding Sun Seat, Ship's Wheel Table, Contemporary Buffet, *Articles:* Enlarging and Transferring Patterns; Selling at Fairs; Filling Wood Pores.

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, *Articles:* The Plain Rabbet-Miter Joint; Photographing Your Work; Restoring a Walnut Coffee Table.

Vol. 5 No. 5 Sept-Oct '81: 18th Century Rudder Table, Musical Jewelry Box, Colonial Candlestick, Deacon's Wall Shelf, Toy Hippo, Spalted Boxes, 18th Century Tavern Table, Router Jig for Stopped Dadoes, *Articles:* The Locked Miter Joint; Finding Used Equipment; Restoring Hitchcock Chairs.

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, *Articles:* Frame and Panel Construction; Casework; Replacing Old Cane.

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, Lattice-work Cutting Jig, *Articles:* Working with



Oak Swing
July/Aug '84

Back Issues



Folding
Deck
Chair

May/June
'84

Plywood; Insurance for the Workshop; Some Thoughts on Glues and Gluing.

Vol. 6 No. 2 Mar-Apr '82: Early American Blanket Chest, 18th Century 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, *Articles:* Methods of Producing Thin Stock; Some Thoughts on Selling; A Pseudo-Colonial Spanish Chair: Part I.

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 Century Step-Chair, Sailing Ship Weather Vane, *Articles:* Bench Hooks and Shooting Boards; Bookkeeping: Part I; Pseudo-Colonial Spanish Chair: Part II.

Vol. 6 No. 4 July-Aug '82: Dovetailed Footstool, Toy Chest, Plant Stand, 18th Century Lawyer's Case, Frame and Panel Joint with Decorative Bevel, Collector's Plate Frame, Toy Jeep, Trestle Table and Bench, 19th Century Danish Washstand, Contemporary Wall Valet, *Articles:* Cabinet Scrapers and How to Use Them; Bookkeeping: Part II; Finishing Tips.

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, *Articles:* Pinned and Wedged Mortise and Tenon Joints; The Craft Market; More Finishing Tips.

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 Router Jig, *Articles:* All About Box Joints; Don't Sell for Less than Cost; Finishing Tips.

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, *Articles:* Miter and Spine Joints; The Added Costs of Being in Business; Selecting Clear Finishes.

Vol. 7 No. 2 Mar-Apr '83: Porch Swing, Home-made 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, *Articles:* Flat Miter Joints with the Table Saw and Router; Woodworking for Fun vs. Woodworking for Work; Applying a Clear Finish.

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, *Articles:* Handtools and Table Saw Methods; Record Keeping: The Key to Profitable Costing; A Cure for Loose Legs.

Vol. 7 No. 4 July-Aug '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, *Articles:* Dovetail Joints: Part I; Keep Track of Costs or You'll Be Overtaxed; Some Spraying Techniques; Inlaid Edging.

Vol. 7 No. 5 Sept-Oct '83: Shaker Writing Desk, Modelmaker's Bench, Canning Jar Storage Shelves, Turned Bowl, Oriental Table, Router Table, Band Saw Box, Toy

Pumper Firetruck, Toy Airplane, Spoon Rack, Magazine Rack, Bootjack, Furniture Kit Suppliers, *Articles*: Dovetail Joints: Part II; Some Thoughts on Low-Cost, No-Cost Advertising; Correcting Flaws in the Finish; Routed Drawer Pulls; Working Wood Co-operatively.

Vol. 7 No. 6 Nov-Dec '83: Lighted Wall Planter, Roller Stand, Early American Wall Secretary, Dressing Screen, Wine Rack, Shaker Chest of Drawers, Waterbed, Toy Train, Mitten Box, Hooded Doll Cradle, Coal Scuttle, Elephant Push Toy, *Articles*: Basic Drawer Construction and Installation; Display Advertising; Some Repair Hints; Making a Raised Arch Panel.

Vol. 8 No. 1 Jan-Feb '84: Shaker End Table, Medicine Cabinet, Cassette Tape Rack, Captain's Clock, Stacking Storage Unit, Veneer Bracelets, Toy Car Carrier, Infant Bead Toy, French Bread Cutter, 19th Century Kitchen Clock, Early American Trestle Table & Benches, Table Saw Cut-Off Table, Coaster Set, General Woodworking Suppliers, *Articles*: Doweling Details; Sources of Information; Restoring Hopeless Cases; Mirror Image Panels.

Vol. 8 No. 2 Mar-Apr '84: Shaker Wall Clock, Compact Dry Bar, High Chair, Kitchen Canister Set, Colonial Water Bench, Stacking Desk Trays, Wooden Brooches, Toy Bulldozer, Rocking Horse, Contemporary Table, Wall Hung Telephone Cabinet, Pipe Smoker's Organizer, Clock Parts Suppliers, *Articles*: Edge-Joining Boards; More Sources of Information; More Hope for the Hopeless Cases; Making Cabriole Legs.

Vol. 8 No. 3 May-June '84: Country Vegetable Bin, Folding Deck Chair, Shaker Pedestal Table, Wall Hung Display Cabinets, Wooden Coat Hanger, Toy Car and Trailer, Paper Towel Holder, Carved Hand-Mirror, Writing Desk, Carved Walking Stick, Laminated Clock, Oak and Glass End Table, *Articles*: How to Lay Out and Make Circular Cuts; Mail Order Selling; Stripping Old Finishes; Carving the Ball-and-Claw Foot.

Vol. 8 No. 4 July-Aug '84: Wag-on-Wall Clock, Oak Swing, Candy Dispenser, Coffee and End Tables, Tugboat and Barge, Lazy Susan, Early American Mirror, Colonial Pipe Box, Sewing Machine Cabinet, Cam Clamp, Hamper, *Articles*: What Sells Best?; Homemade Removers; Buying a Basic Set of Hand Tools; Kerf Bending; Suppliers of Caning & Wood Finishing Products.

Vol. 8 No. 5 Sept-Oct '84: Contemporary Stereo Cabinet, Shaker Woodbox, Bongo Box, Nesting Tables, Shop Trammel, Jack-knife Letter Opener, Salt Shaker and Pepper Mill, Toy River Ferry and Car, Toy Top, Cookbook Holder, Hall Table, Grandfather Clock: Part I, *Articles*: Starting a Business: Part I; Applying Filler; Building a Basic Workbench; Making Specialty Moldings with the Table Saw and Scratch Bader.

Vol. 8 No. 6 Nov-Dec '84: Stickley Chair, Tool Cabinet, Shaker Sewing Stand, Lighted Display Pedestal, Teardrop Clock, Pierced Tin Cabinet, Toy Hook and Ladder Fire Truck, Busy Bee Toy, Colonial Doll House, Kitchen

Organizer, Wine Server, Grandfather Clock, Part II, *Articles*: Starting a Business Part II; Applying the Final Finish; The Fundamentals of Wood; Inlays and Inserts; Gustav Stickley and American Mission Furniture.

Vol. 9 No. 1 Jan-Feb '85: Early American Step Table, Oak Barrister's Bookcase, Parquet Table, Shaker Trestle Table, Bandsawn Wooden Scoops, Toy Biplane, Book Ends, Contemporary Candle Holders, Necktie and Belt Holder, Keyed Miter Jig, Modular Coffee Table and Bar, Magazine and Book Rack,

Contemporary Chest of Drawers, *Articles*: Toys and Children's Articles: An Outline of The Consumer Product Safety Commission Standards; Shellac; Truing and Squaring Lumber; The Fingerjoint Spline; Suppliers of Furniture Kits; The Shakers; Special Section: Back Issue Index.

Vol. 9 No. 2 Mar-Apr '85: Queen Anne Lowboy, Television/VCR Stand, Early American Pine Corner Cupboard, Toy Tool Set, Windspinner, Woodchopper Whirligig, Chinese Puzzle, Cut-off Jig, Blanket Chest, Shaker Harvest Table, Blacksmith's Tool Tray, *Articles*: A Guide to Photographing Your Work; Applying Shellac and Lacquer; Sharpening Plane Blades and Chisels; Installing Machine Woven Cane; American Queen Anne, 1715-1755; General Woodworking Suppliers.

Vol. 9 No. 3 May-June '85: Jacobean Joint Stool, Wall Cabinet with Recessed Finger Pulls, Shaker Desk, Kitchen Cart, Contemporary Wall Clock, Colonial Wall Sconce, Card Box, Towel Bar with Glass Shelf, Marble Race Toy, Cradle, Vanity Mirror, Miter Clamping Jig, *Articles*: Product Liability, Part I; Restoring an Antique Mirror Frame; Coping with Wood "Movement"; Making Recessed Finger Pulls; The Jacobean Period.

Vol. 9 No. 4 July-Aug '85: Gate-leg Table, Computer Desk, Shaving Horse, Stamp Dispenser, Crumb Collecting Breadboard, Toy Trucks, Early American Wall Shelf, Pivot-top Game/Coffee Table, Settle Bench, Shaker Single-Drawer Cupboard, Fold-up Workbench, *Articles*: Product Liability, Part II; Caning and Wood Finishing Supplies; Spray Finishing; Table Saw Basics; Making the Rule Joint; The William and Mary Period.

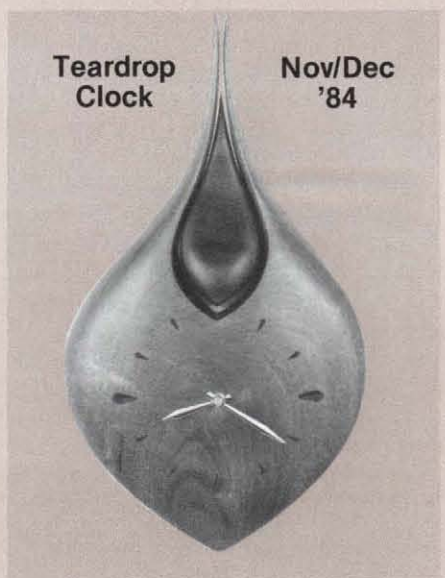
Vol. 9 No. 5 Sept-Oct '85: Colonial Schoolmaster's Desk, Contemporary Sideboard, Mahogany End Table, Victorian Hall Tree, Cutlery Wall Cabinet, Swing-out Plant Hanger, Prancing Horse Silhouette, Block Puzzle, Iron Caddy, Toy Ironing Board, Early American Water Bench, Wooden Smooth Plane, Shaker Sewing Box, *Articles*: A Craft Fair Visit; How to Use Stick Shellac; A Guide to Circular Saw Blades; Making Bent Laminations; Country Colonial Furniture.

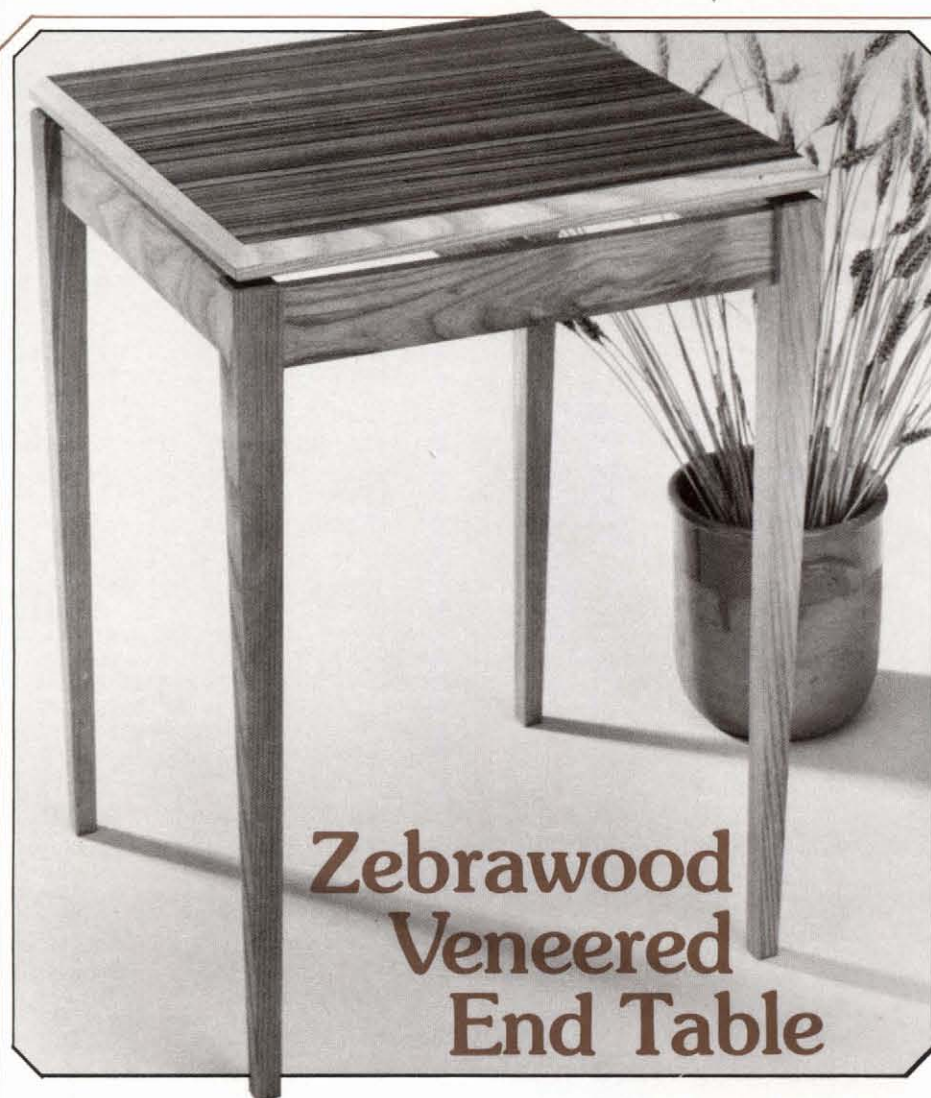
Vol. 9 No. 6 Nov-Dec '85: Moravian Chair, Dulcimer, Oak Dining Table, Shaker Washstand, Marking Gauge, Veneered Wall Clock, 4 x 4 Off-Roader, Teddy Bear Puzzle, Duck Pull-toy, Landscape Cutting Boards, Early American Tall Clock, Pine Desk Organizer, *Articles*: Secrets of Success; Weaving a Fiber Rush Seat, Part I; Table Saw Ripping Problems and Their Solutions; 4-Piece Book Match Veneering; Pennsylvania Dutch Furniture.

Vol. 10 No. 1 Jan-Feb '86: Freestanding Shelf System, Chippendale Bachelor's Chest, Oriental Serving Tray, Country Bench, Antique Knife Tray, Tape Dispenser, Valentine Box, Toy Tow Truck & Car, Shaker Drop-leaf Table, Shop-made Bow Saw, Child's Settle Bench, Plate Shelves, *Articles*: On Getting Paid for Your Work; Weaving a Fiber Rush Seat, Part II; Table Saw Crosscutting: Techniques & Tips; Router-Lathe Fluting: A Shop-made Approach; Chippendale Furniture.



Back Issues
are \$3.00 each
ppd. To order use
the form included
in this issue.





Zebrawood Veneered End Table

Light and delicate seem to be the words that best describe this lovely piece. Part of its appeal probably stems from the fact that the top appears to “float” just above the base.

Birch plywood is used as the core material for the top, with zebrawood veneer on the upper surface and ash veneer below. Solid ash stock is used for the edging and for all other parts of the table.

The four legs (parts A) can be made first. Note that the legs are tapered only on the two outside surfaces (the two inside surfaces are plumb) and that the taper runs the entire length of the leg. If you have one, a tapering jig will come in handy here. If you don't, a good description on how to make and use one can be found in *The Beginning Woodworker* column on page 18 of this issue.

Should you prefer not to make a tapering jig, there is another way to make the legs. With a long straightedge and a sharp pencil, scribe the taper on the two outside faces of the leg blank,

then use a hand plane to remove the waste stock.

Next, lay out and mark the location of the $\frac{1}{4}$ in. wide by $1\frac{3}{4}$ in. long by $\frac{3}{4}$ in. deep apron mortises on the two untapered surfaces of each leg. Chop each one out with a sharp chisel or, if you prefer, use the drill press and bore a series of $\frac{1}{4}$ in. diameter by $\frac{3}{4}$ in. deep holes to remove most of the material. The remaining waste stock can then be cleaned out with a chisel.

The four aprons (parts B) can now be cut to overall length and width from $\frac{1}{2}$ in. thick stock. The tenons on each end are best cut using the table saw equipped with a dado head cutter, although repeated passes with a regular saw blade will also work. Carefully lay out and mark each tenon, then raise the dado head cutter or saw blade to a height of $\frac{1}{8}$ in. Next, using the miter gauge, pass the stock over the cutter to establish the $\frac{3}{4}$ in. tenon length. A second pass with the dado head will clean up the remaining material; several more passes will be needed if a regular

saw blade is used.

Now flip the stock over and repeat the procedure on the opposite side. Once both sides are cut, repeat the process on the top and bottom edges to complete the $\frac{1}{8}$ in. shoulder all around the tenon. Keep in mind that the tenon thickness is regulated by the height of the cutter or saw blade. It's always a good idea to make some trial cuts in scrap stock to get the tenon thickness just right. Finally, to complete work on the tenon, use the table saw to bevel the end of the tenon to 45 degrees.

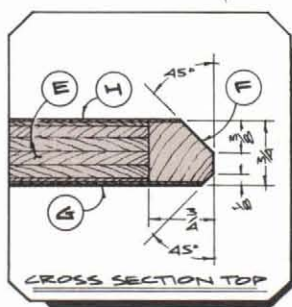
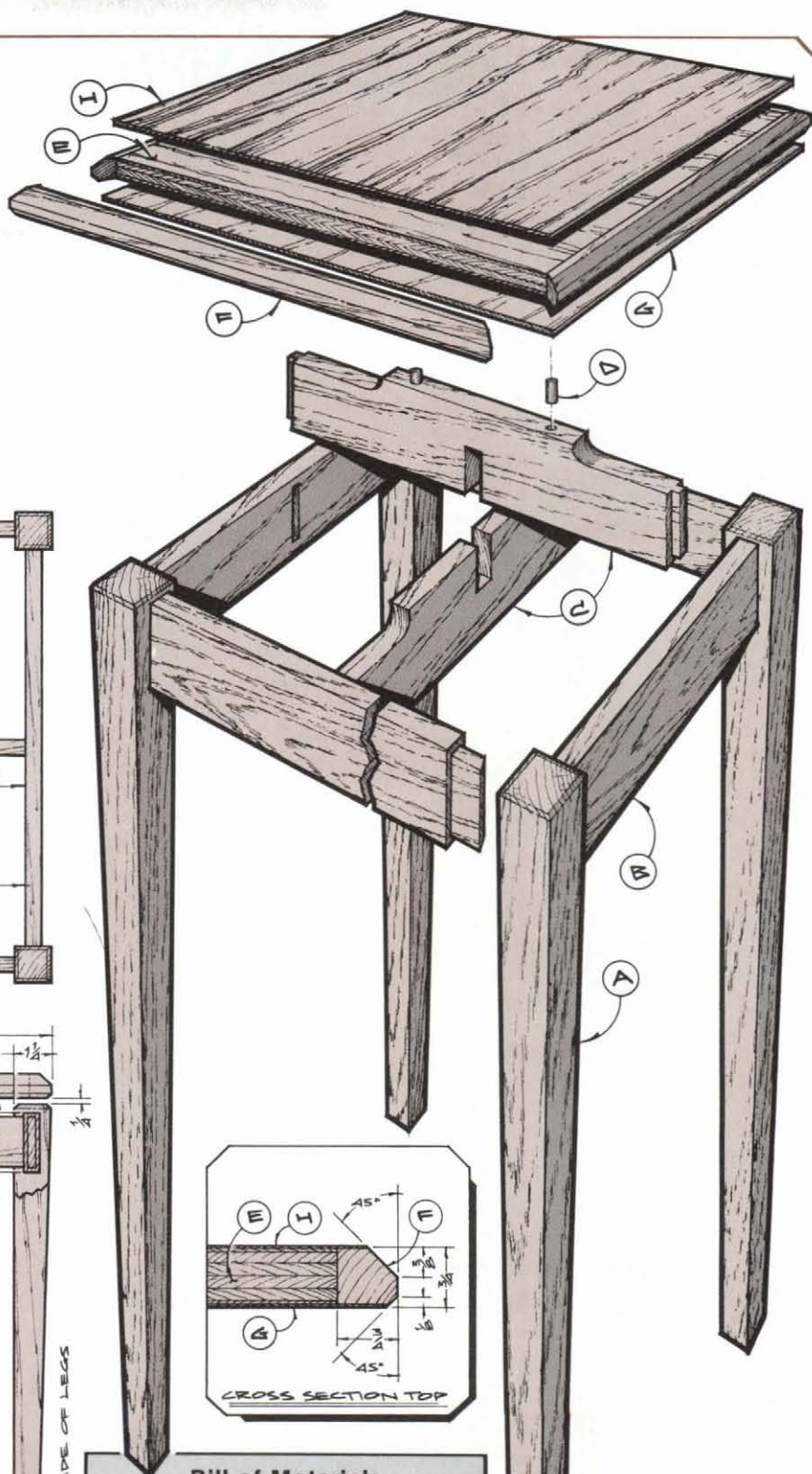
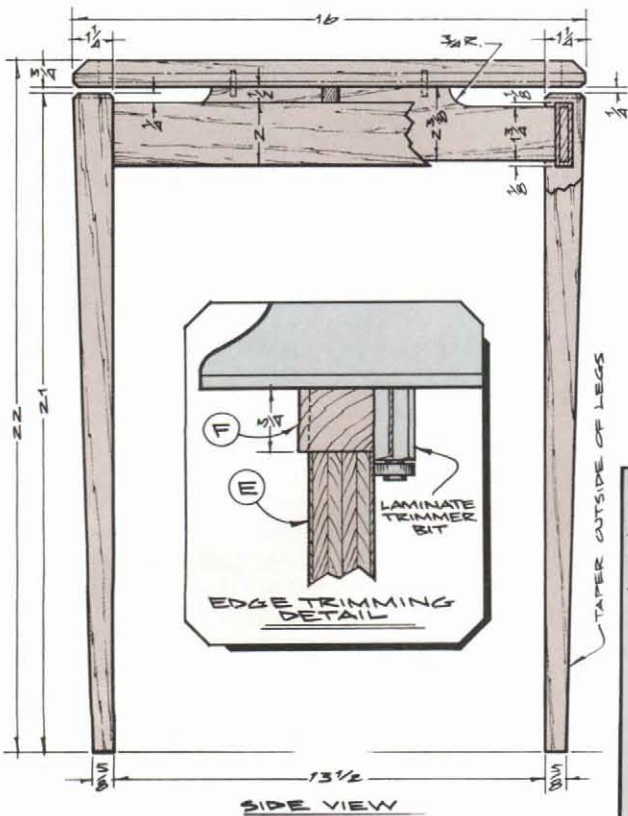
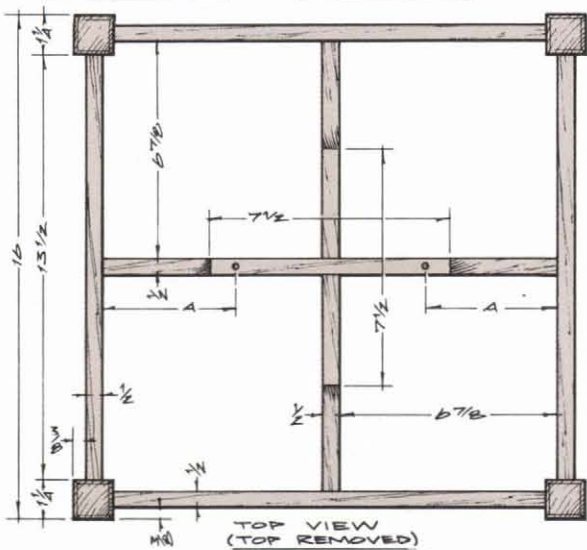
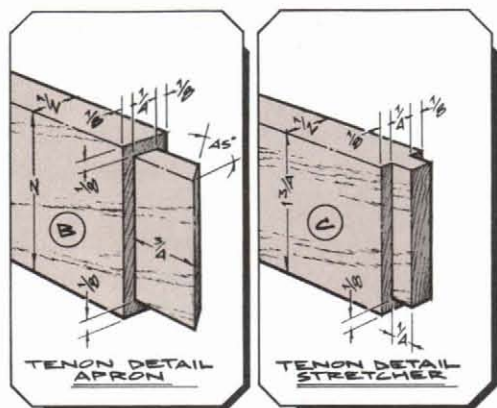
The mortise at the midpoint of each apron can be cut next. Carefully lay out the location, then chop out with a sharp chisel.

The two stretchers (parts C) are made in much the same way the aprons are made. After the tenons are cut, lay out and mark the curved cutout along the top edge, then cut it out with a band or saber saw. To cut the half lap notches, set the table saw blade to a depth of $1\frac{1}{16}$ in., then use the miter gauge to pass the stock, on edge, through the blade. Several passes are needed to complete the cut.

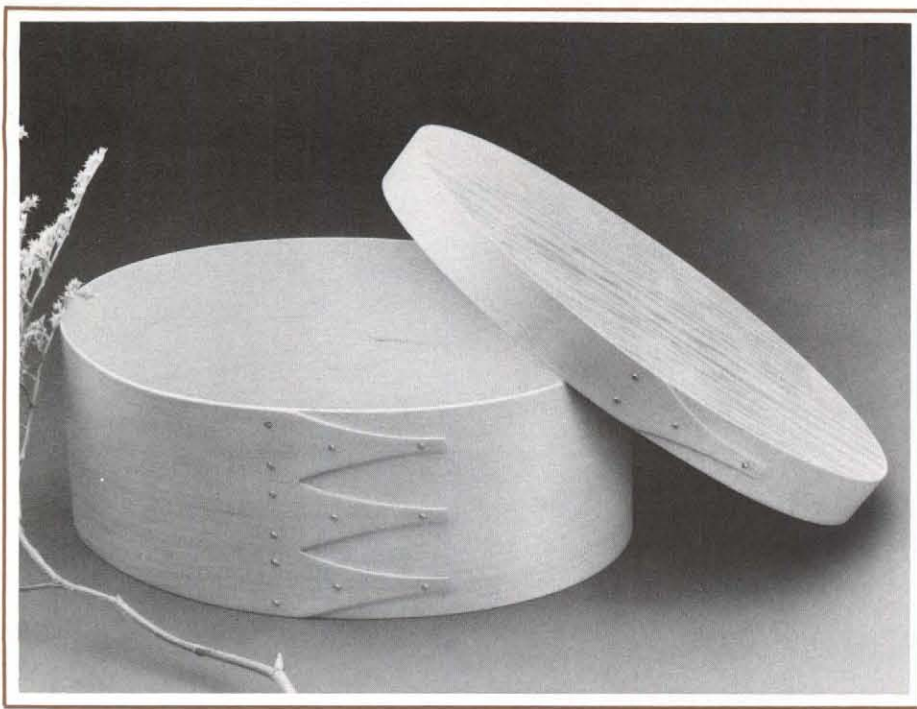
The top (consisting of parts E, F, G, and H) is made next. Cut $\frac{3}{4}$ in. thick birch plywood to $14\frac{1}{2}$ in. square. Rip the ash edging (F) stock to 1 in. thick and $\frac{3}{4}$ in. wide and cut it to length. Miter the ends to 45 degrees, then glue and clamp in place as shown in the exploded view. The 1 in. thickness will allow the edging to overhang about $\frac{1}{8}$ in. on both the top and bottom. Once dry, remove the clamps and use a router equipped with a laminate trimmer bit to trim the edge flush with the plywood (see edge trimming detail). Once trimmed, apply the veneer on the top and bottom surfaces, then cut the 45-degree chamfers (see cross section top detail) on the table saw or with a chamfering bit on the router.

Final sand all parts, then assemble the legs, aprons, and stretchers. Glue is used on the leg-to-apron joints, but the stretcher-to-apron joints and the lap joints do not require glue. These latter joints are end grain joints, and glue is of no real value. Use bar or pipe clamps to secure the glued joints. The top is joined with two dowel pins (D). Before joining apply a coat of glue along the top edge of both stretchers.

Ours is finished with two coats of Deft clear wood finish. We purchased their aerosol can and sprayed on both coats, resulting in a smooth, low gloss finish that is quite durable. WJ



Bill of Materials (all dimensions actual)			
Part	Description	Size	No. Req'd.
A	Leg	1 1/4 x 1 1/4 x 21	4
B	Apron	1/2 x 2 x 15	4
C	Stretcher	1/2 x 2 3/8 x 14 3/4	2
D	Pin	1/4 dia. x 3/4 long	2
E	Top	3/4 x 14 1/2 x 14 1/2	1
F	Edging	3/4 x 3/4 x 16	4
G	Bottom Veneer	as req'd.	1
H	Top Veneer	as req'd.	1



Shaker Oval Box

This lovely box is fashioned after the oval boxes made famous by the Shakers. Like the originals it is both light and strong, with a lid that fits snugly on the top. First made in the late 1700's, production continued until the 1950's when the last male Shaker, Brother Delmar Wilson, stopped crafting them. The boxes were often sold in sets of 5, 7, 9 or 12 that nested one inside the other. The sides and lid were generally $\frac{1}{16}$ in. maple with a pine top and bottom. After steam bending the sides and lid, copper tacks were used to join them to the top and bottom. Our box closely follows the design of a Shaker original.

Begin by making the mold (Fig. 2) that's needed for steam bending the side (A) and the rim (B). Cut six pieces of $\frac{3}{4}$ in. thick plywood to 8 in. wide by 12 in. long and face-glue the parts together. Clamp firmly and allow to dry thoroughly. When dry, transfer the full-size mold pattern (see page 37) to the plywood block, then cut it out with the band saw. As you cut, stay just outside the marked line. Use sandpaper wrapped around a flat sanding block to smooth the surface exactly to the cut line. For the base, cut a piece of $\frac{3}{4}$ in. thick plywood to about 10 in. wide and 34 in. long. Secure the mold to the base with glue and a couple of wood screws. For a reference point that will come in handy later on, mark the midpoint of the mold (point "A" on the mold pat-

tern) with a pencil line.

The $\frac{1}{16}$ in. thick maple is available from Constantine, 2050 Eastchester Road, Bronx, NY 10461. It's their part no. 16MP and sold as $\frac{1}{16}$ in. thick veneer. The length is 36 in. and the widths are random. When ordering, specify that you need a width of at least $5\frac{1}{2}$ in. It's sold by the square foot.

To make the side, rip the $\frac{1}{16}$ in. thick stock to a $3\frac{3}{4}$ in. width, then cut it to a length of $30\frac{3}{4}$ in. For the rim, rip the stock to 1 in. before cutting it to the same length as the side. Transfer the profile of the fingers, or lappers as the Shakers called them (shown in Fig. 3), then cut them to shape on the band saw. Use a half-round file to apply the slight bevel to each finger as shown. Now, with 220 grit sandpaper, sand the top and bottom edges of each piece to remove the table saw marks and also the edges between each finger to remove the band saw marks.

As shown (see top view — part A or B), the end opposite the fingers is sanded to a taper. It begins at a point $2\frac{3}{8}$ in. from the end and tapers to a feather edge (about $\frac{1}{64}$ in.). Later, when the side is attached to the bottom and the rim is attached to the top, the taper will provide a smooth transition in the area where the ends overlap.

At this point you can use a pencil to mark the location of the holes for the pins, but don't drill them yet. Also mark the centerline ($15\frac{3}{8}$ in. from each

end) of the side and rim to provide a reference point when the piece is bent around the mold later on.

The side and rim are now ready for steaming. For details on how to steam thin unsupported stock, including how to make a steam box, see the Special Techniques article on page 22 of this issue.

The side is steamed first. Because the stock is only $\frac{1}{16}$ in. thick, we found that the side tends to cup when in the steam box. To minimize this we added a couple of $\frac{1}{4}$ in. square cleats to each end, with rubber bands holding them together (see Fig. 4). About one-half hour in the steam box is all that is needed. Overheating tends to weaken wood, so don't leave it in too long.

As the side is steaming, make preparations for bending. Have the mold near the steam box. The stock starts to cool immediately after it comes out, so the bending must be done quickly. The stock is held to the form with a web clamp, so have it ready and adjusted to approximately the right size. Also, since the stock will be very hot, a pair of heavy gloves to protect your hands is important.



You'll need an extra pair of hands here too, someone to tighten the clamp while you make the bend — it's almost impossible to do it alone. And finally, have a piece of $\frac{1}{16}$ in. stock (about 4×6) ready to place between the fingers and the web clamp to help to distribute clamp pressure in that area.

Remove the side from the steam box and line up the marked centerline with point "A" on the mold. Bend the stock around the mold (see photo page 22), then hold it in place while your helper adds the $\frac{1}{16}$ in. bearing stock and the web clamp. Tighten it firmly and set aside to cool overnight. Ideally, it should not take much more than 30

seconds from the time the steam box is opened until the web clamp is tightened.

After cooling overnight, remove the side from the mold. Apply a thin coat of glue to the tapered surface (see top view — part A or B), then place the piece back on the mold and re-clamp. We used two web clamps, one above the other, to provide clamp pressure along the entire width of the joint. The $\frac{1}{16}$ in. bearing stock is also included. Before clamping, to prevent the side from sticking to the mold should any glue squeeze-out occur, we added a coat of paste wax to the mold in the area of the glue joint.

When dry, slide the side off the mold, then drill $\frac{1}{16}$ in. diameter holes at the pin locations previously marked. The Shakers used copper pins (they called them tacks) but we were unsuccessful in our search for a source for them. Several companies still make copper tacks, but all those we examined were too big. We had to settle for $\frac{1}{2}$ in. long brass escutcheon pins from our local hardware store.

Working one at a time, press a pin through a pilot hole, then clip it off as short as possible on the inside. Now, with a short length of pipe clamped in a vise to serve as an anvil, use a hammer to peen (mushroom) the clipped end. Before adding the pin on the end of each finger, try to lift the finger just enough to get a spot of glue under it.

The lid is steamed, bent, glued, and tacked in exactly the same way as the side — with one important exception. Before bending the lid, the side is put on the mold. In effect then, the lid is bent around the side, giving it a slightly larger diameter.

For the bottom (C) and top (D) you'll need two pieces of $\frac{1}{4}$ in. thick pine measuring about 8 in. wide by 12 in. wide. Quartersawn stock is best (it doesn't move as much with

changes in humidity and it's less likely to cup) but not mandatory. To make the top, place the side on the mold (to establish its exact shape) then flip it over onto the pine and trace the outside profile of the side. Where the overlap occurs, try to blend the curve together. Now use the band saw to cut just outside the marked line, then sand the edge exactly to the line. It's important that there be a good snug fit here, so only sand a little at a time. Keep checking the fit as you sand.

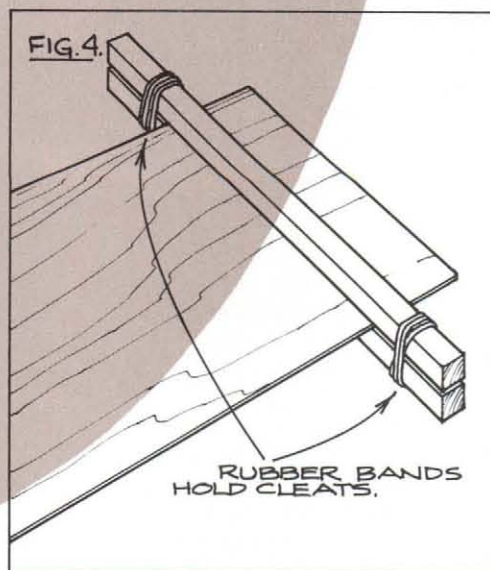
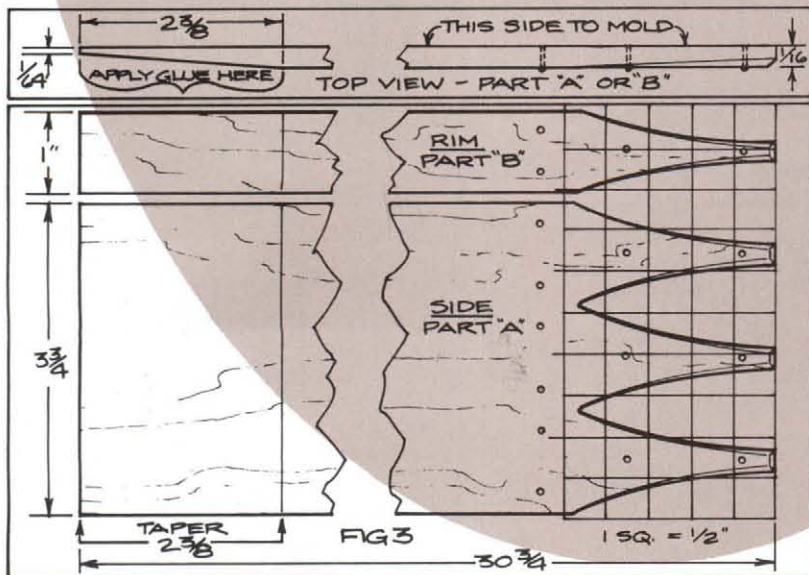
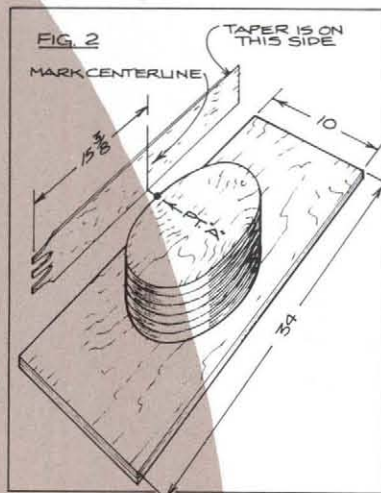
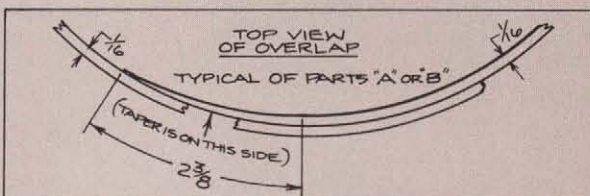
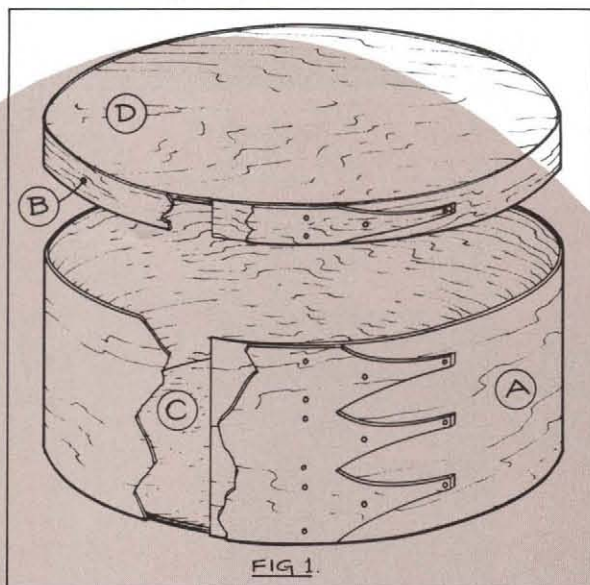
Dry assemble the top to the rim, then push the rim down until you have a $\frac{1}{4}$ in. lip all around. Add a coat of glue to the lip, then push the top back until it is flush with the top edge of the rim. Wipe away any excess glue that gets squeezed out.

To get the profile for the bottom, simply trace the mold profile. Cut out and assemble to the side as above.

The Shakers generally finished their boxes with shellac or clear varnish, although many were painted. Red, blue, green and yellow were their favorite colors.

W&J

Full-size mold pattern shown in brown



Microwave Cart



This microwave cart is intended to be a companion piece to the Kitchen Cart project that appeared in the May/June 1985 issue of *The Woodworker's Journal*. Both are crafted in white oak and feature similar design and construction. Like the Kitchen Cart, this project can be built with a minimum of power tools, requiring only a table saw and drill.

There is no questioning the tremendous recent popularity of microwave ovens, yet in most conventional kitchens counter space is at a premium. Since placing a microwave oven on the counter means a sacrifice of valuable space, and given the fact that the counter is not exactly an ideal location, microwave carts have become nearly as popular as the ovens themselves.

In developing the design of our cart, we looked at a variety of other carts and tried to incorporate the best features. We placed the oven up high, over a convenient butcher block work surface, yet not so high that it will be above eye level or beyond the easy reach of a five foot tall person. There are storage shelves below and casters for easily moving the cart about. The cart is designed for stability so it will not tip over, and the microwave shelf is large enough to accommodate a full-size oven.

As with the kitchen cart, we suggest

Bill of Materials

(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Leg	$\frac{3}{4}$ x $3\frac{1}{2}$ x $49\frac{1}{4}$	4
B	End Retainer	$\frac{3}{4}$ x $2\frac{1}{2}$ x 18	2
C	Back Retainer	$\frac{3}{4}$ x $2\frac{1}{2}$ x $29\frac{1}{4}$	1
D	Top Shelf	$\frac{3}{4}$ x $17\frac{3}{8}$ x $28\frac{1}{2}$	1
E	Top Shelf Edging	$\frac{1}{4}$ x $\frac{3}{4}$ x $28\frac{1}{2}$	1
F	Shelf Support	$\frac{3}{4}$ x $1\frac{1}{2}$ x $28\frac{1}{2}$	6
G	Butcher Block Shelf	$1\frac{1}{2}$ x $27\frac{3}{4}$ x 24*	1
H	Lower Shelf	$\frac{3}{4}$ x $15\frac{1}{2}$ x 28	1
I	Lower Shelf Side Edging	$\frac{1}{4}$ x $\frac{3}{4}$ x $15\frac{1}{2}$	2
J	Lower Shelf Front Edging	$\frac{1}{4}$ x $\frac{3}{4}$ x $28\frac{1}{2}$	1
K	Base Apron End	$\frac{3}{4}$ x $3\frac{1}{2}$ x $23\frac{1}{2}$	2
L	Base Apron Front & Back	$\frac{3}{4}$ x $3\frac{1}{2}$ x $29\frac{1}{4}$	2
M	Stretcher	$\frac{3}{4}$ x $3\frac{1}{2}$ x $29\frac{1}{4}$	2
N	Cleat	$\frac{3}{4}$ x $2\frac{1}{2}$ x $27\frac{3}{4}$	2
O	Rib	$\frac{3}{4}$ x 1 x $22\frac{1}{2}$	18
P	Caster**	2 $\frac{1}{2}$ in. height	4

*Final Dimensions

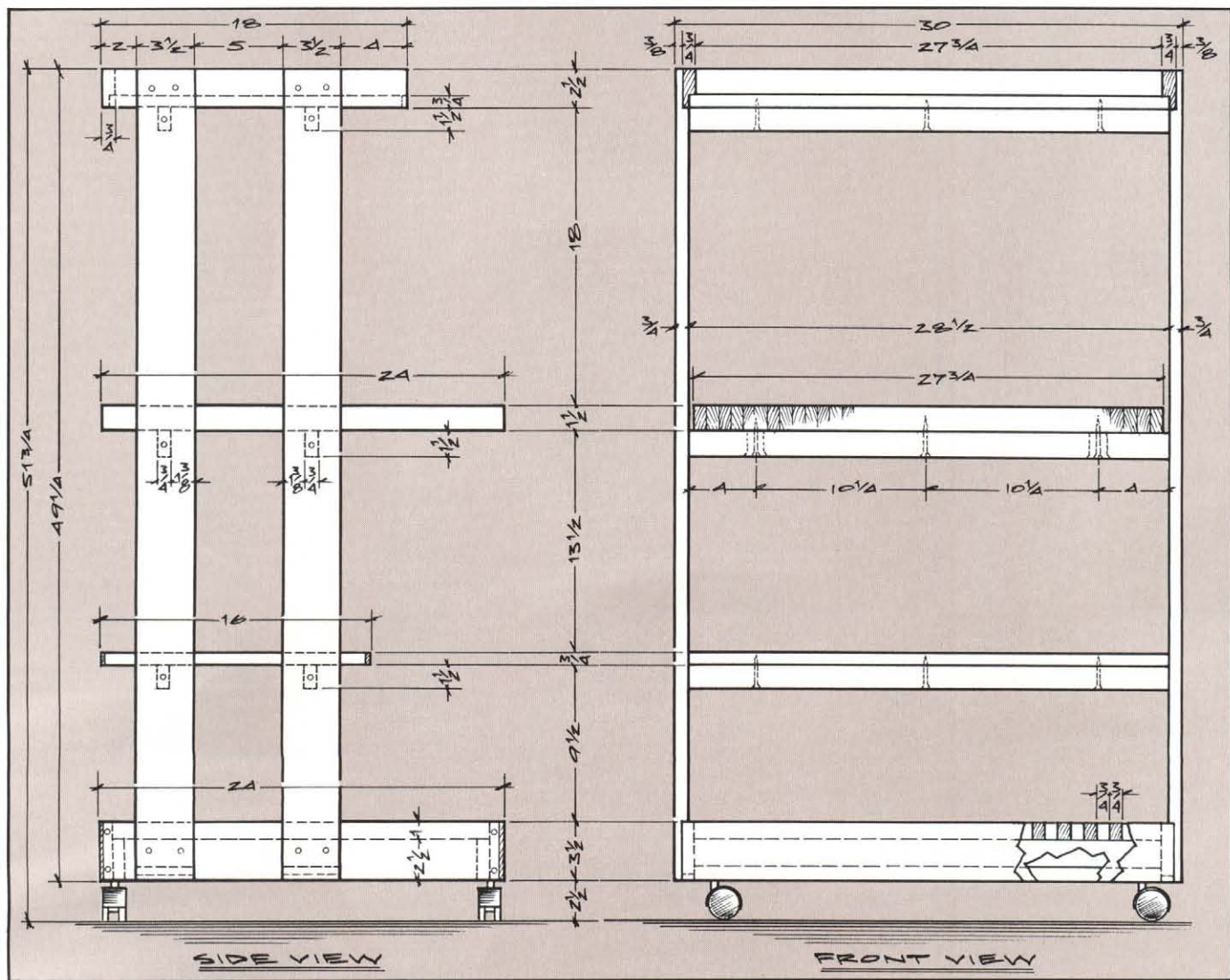
**Available from: The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374. Order part no. C1141, set of four is \$10.95.

While the butcher block is clamped up and drying, you can go to work on the rest of the cart. First, cut to length and width all the remaining hardwood

Now make the base section. Notch parts K to accept the rabbeted ends of parts M, and assemble parts K, L, and M using glue and screws as shown. Glue the two cleats (N) to the inside of parts L, and add the 18 ribs (O), which are spaced $\frac{3}{4}$ in. apart. Also, drill the four holes to accept the casters (P), sizing the holes as necessary to accommodate the caster shank sockets. As you will note in the bottom view detail, these holes are located $2\frac{1}{2}$ in. from the ends, and exactly on the seam between parts L and N.

Fine sand the cart. Soften all sharp corners and edges, and finish the cart (except the butcher block) with several applications of a good quality penetrating oil such as Watco. As noted in the section on butcher block construction, a natural, non-toxic salad bowl finish should be used on this surface. WWJ

(continued on next page)



Making the Butcher Block

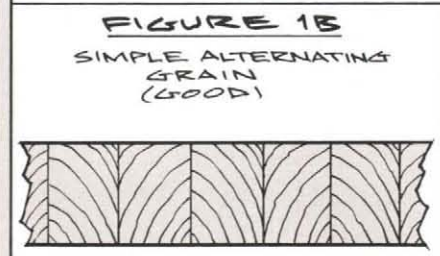
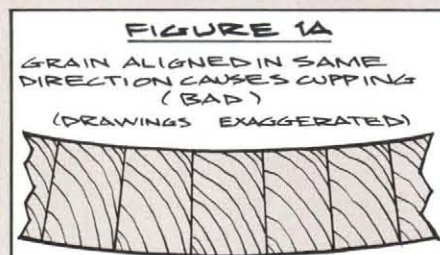
Butcher block is an attractive surface, and can come in handy for a variety of projects. Although well-made butcher block is exceptionally strong, stable, and durable, there are several problems that may be encountered in making it. The basic procedure of ripping sufficient boards to achieve the desired width, gluing and

vertically so that the exposed end grain serves as the cutting surface, butcher block today is usually comprised of boards laid up horizontally. If you use plainsawn boards on edge, as most of us will do, avoid facing all the boards with grain running in the same direction, as this may result in the butcher block cupping (Fig. 1A). There are three basic acceptable methods for laying up butcher block.

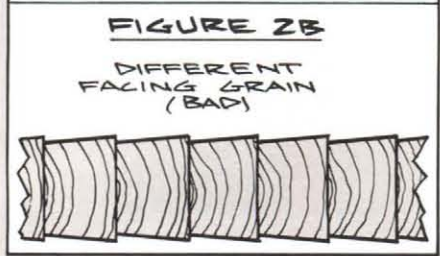
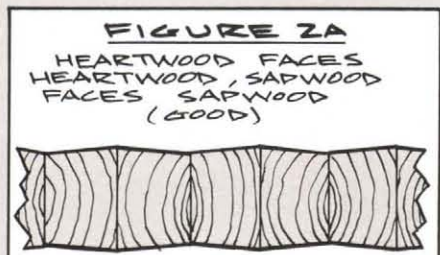
First, the boards can be arranged with a simple alternating grain pattern (Fig. 1B). Second, you may arrange the boards with facing grain (heartwood to heartwood, sapwood to sapwood), as shown in Fig. 2A. This method effectively eliminates the problem of small steps from uneven shrinkage, which is often encountered when boards are laid up with different facing grain (Fig. 2B). The third method of creating butcher block is to utilize quartersawn boards and alternate the grain, as

ends may be squared later.

Gluing and clamping the butcher block also requires care. Because it will be exposed to moisture, you should use a waterproof glue. Plastic resin glue has good moisture resistance and is easy to work with. Apply a thin coat to each mating surface, making certain the coverage is complete. Clamps should be closely spaced to provide even pressure. As the clamps are drawn up you should see slight glue squeeze-out along the length of each joint.

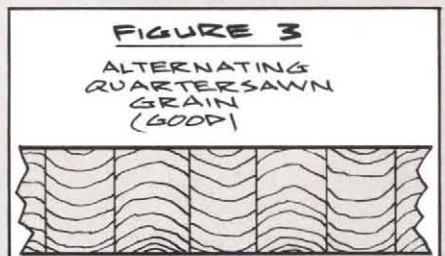


clamping them together, squaring the ends, and then planing, sanding, and finishing is simple and straightforward. But how the boards are prepared and arranged, along with the gluing and clamping process itself, requires



careful planning and accuracy. As anyone who has attempted it knows, making butcher block can be a rather special technique.

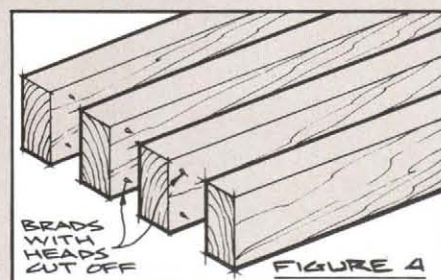
The first point to consider is grain direction. Although true butcher block has short lengths of board arranged



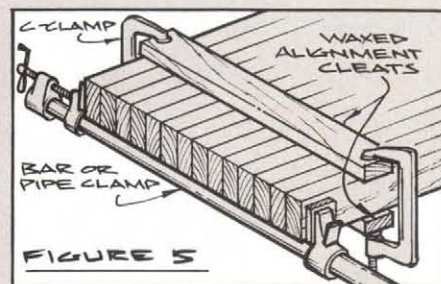
shown in Fig. 3. The method you select will probably depend on the type of boards (quartersawn, flatsawn, etc.) available to you.

Whichever technique you use, the three important elements to remember are: stock selection, flat glue surfaces, and adequate clamp pressure. The material should have straight, even grain with no knots, burls, or other defects.

The easiest way to make butcher block is to take $\frac{3}{4}$ in. thick mill planed boards, and then rip them into widths equal to the butcher block's intended thickness. Because the flat, factory surface on the board now becomes the edge that will be glued, you need not joint the stock. If, however, you use roughsawn lumber, it will be necessary to joint all surfaces to be edge-glued. A power jointer will speed the work, though the material can also be jointed by hand, as our ancestors did. In any case, when cutting the stock, allow extra board length so the butcher block



One clamping trick is to insert small headless brads in each board, as illustrated in Fig. 4. The brads prevent slippage along the glue lines when clamp pressure is applied. An alternative is to use several waxed cleats clamped on either side of the butcher block to keep the pieces aligned (Fig. 5).



If you have a hand-held power planer, the task of surfacing will be a breeze. However, the butcher block can also be glued up in sections that a thickness planer can accommodate, and then final assembled after these sections have been fed through the planer. For the rest of us, a sharp plane, belt and pad sanders, and a healthy measure of elbow grease will get the job done.

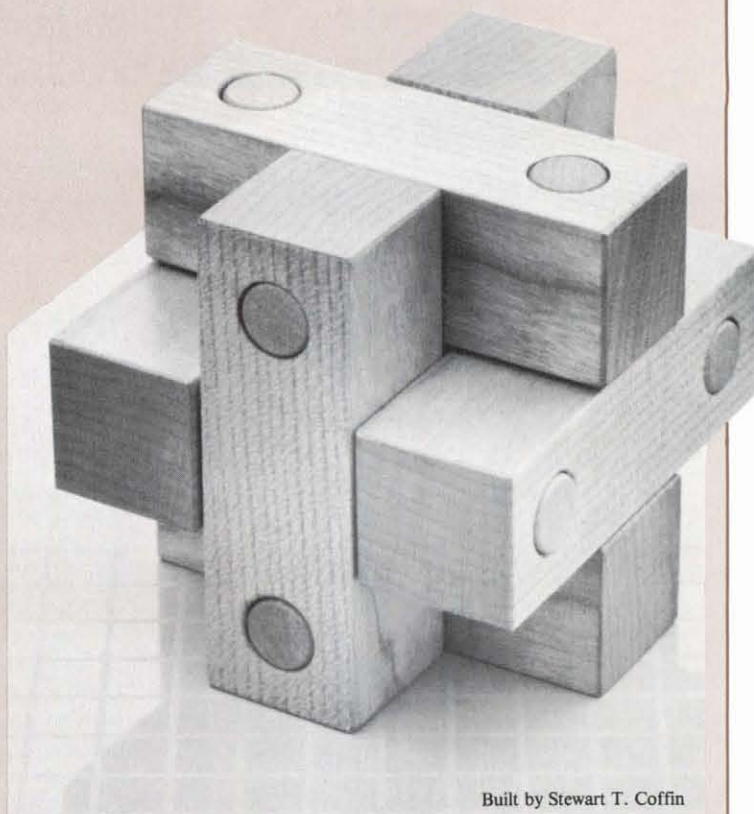
Use only non-toxic finish on the butcher block. Salad Bowl Finish, sold by Woodcraft Supply Corp., 41 Atlantic Ave., P.O. Box 4000, Woburn MA 01888, is one of several brands available.

Pin-Hole Puzzle

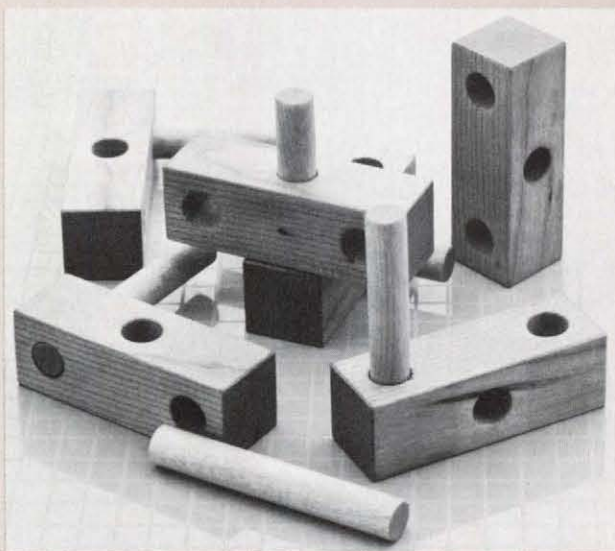
Judging from the reader response, puzzle projects have been surprisingly popular. This pin-hole puzzle makes an ideal desk paperweight or coffee table toy, and best of all, the puzzle solution (see page 58) is rated “moderately easy”.

The puzzle can be made of any wood or combination of woods. We used cherry throughout, but a dark wood such as ebony for the drilled blocks, contrasting with a lighter dowel wood such as birch, might be especially attractive.

The pin-hole puzzle consists of seven puzzle pieces, as illustrated below. The seven pieces are made from two component parts: $\frac{7}{16}$ in. diameter by 3 in. long dowels, and 1 x 1 x 3 in. blocks, with three $\frac{1}{32}$ in. holes drilled through them as shown. All told, you will need six dowel parts and six drilled block parts. One of the dowels serves as the “locking dowel” puzzle piece, and one of the drilled blocks serves as the “bar” puzzle piece. Two of the dowels are combined with two of the drilled blocks to make the two “cross” puzzle pieces, and the three remaining dowels are combined with the three remaining drilled blocks to make the three “elbow” puzzle pieces.

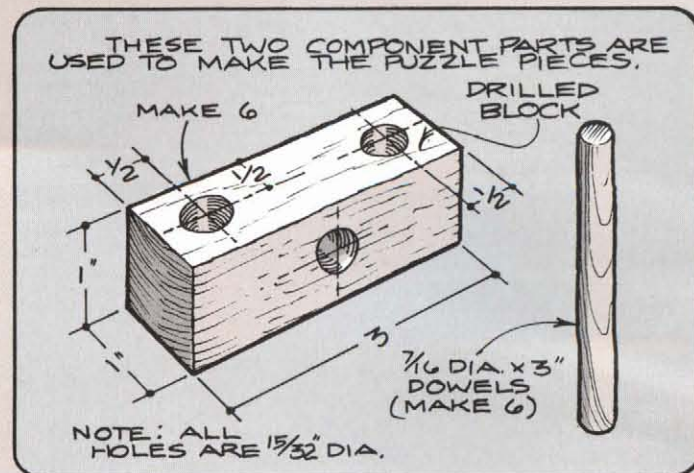
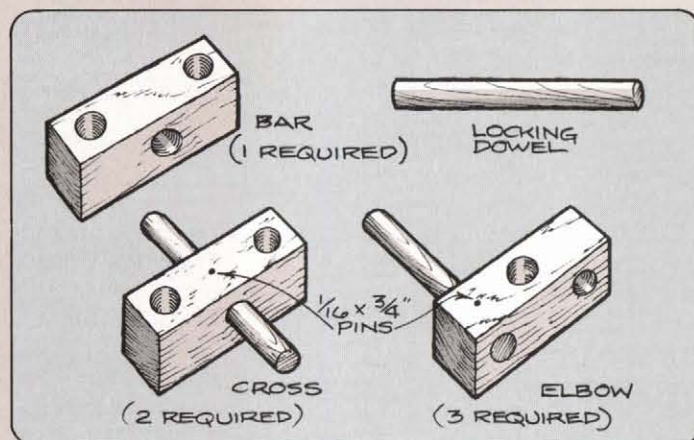


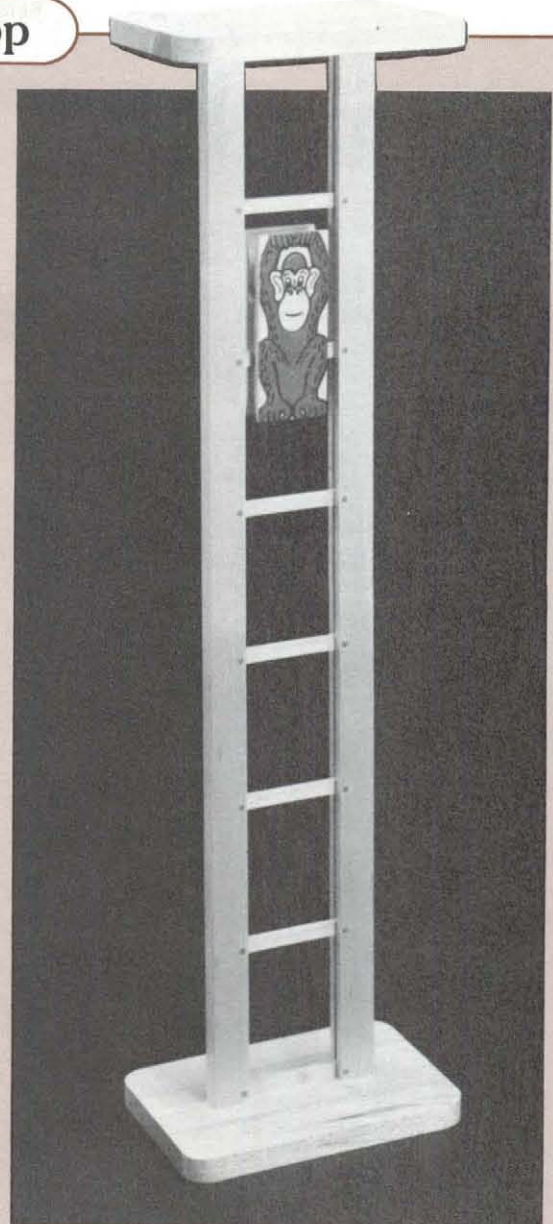
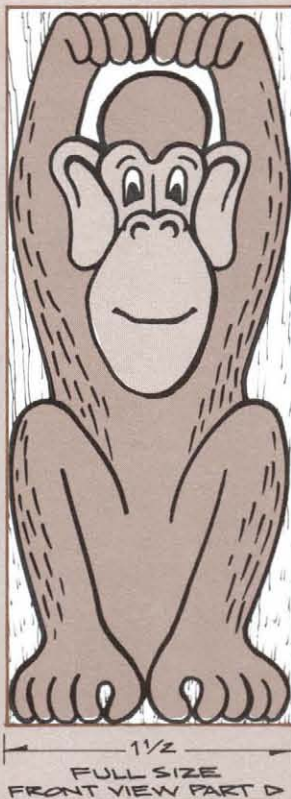
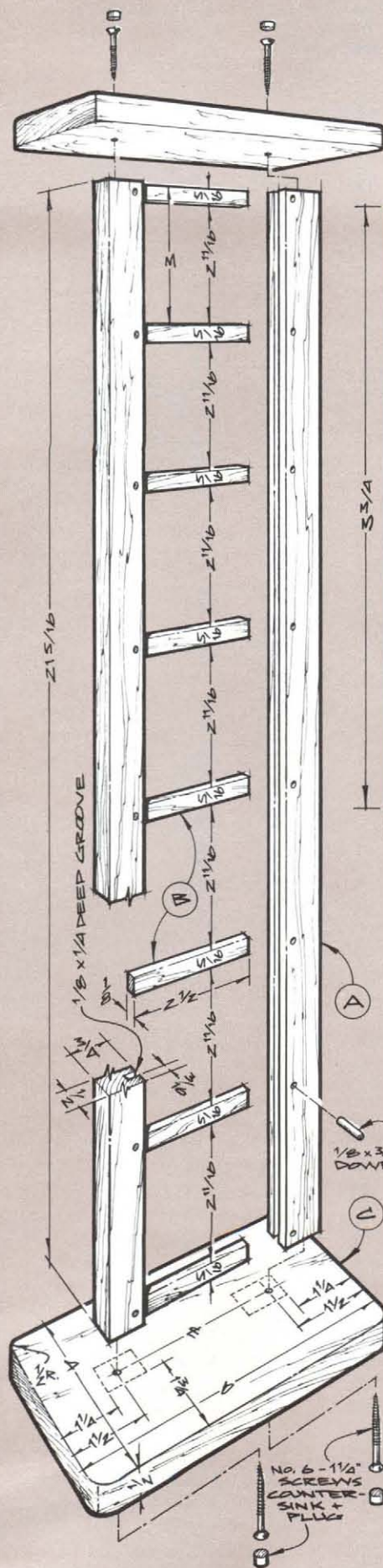
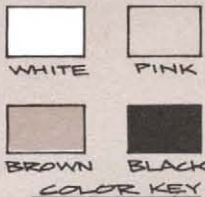
Built by Stewart T. Coffin



Make the six identical drilled blocks, and the six dowel pins. Chamfer the edges of the blocks and the ends of the dowels, and final sand before assembly. In assembling the two crosses and three elbows we did *not* use glue, locking each of the dowel pins in place with a single headless brad instead. This made for an exceptionally neat job. If you do decide to use glue, carefully clean off any glue squeeze-out. We finished the puzzle pieces with tung oil.

Editor's Note: More puzzles can be found in Mr. Coffin's book, Puzzle Craft. Write to: Stewart T. Coffin, 79 Old Sudbury Rd., Lincoln, MA 01773. Price is \$12.00 postpaid.





Tumbling Monkey Toy

This "executive toy" is sure to amuse young and old alike.

Begin by making the ladder section parts (A, B, and C), as shown. Cut the stock for part D, and drill the two $\frac{3}{8}$ in. diameter holes as indicated. Then use the tenoning jig on the table saw to first cut the $\frac{5}{32}$ in. wide slots, and next establish the 16 degree sides of the V-shaped slot approach. Transfer the monkey profile to both sides and color it, following the key.

When making and assembling this toy, all measurements must be followed exactly if the monkey is to tumble as intended. The ladder is assembled with the monkey in place, since he cannot be removed. The $\frac{1}{8} \times \frac{3}{8}$ in. dowel pins help to locate and anchor the rails. Flip the ladder end-over-end and watch the monkey go!

Wwj

Early American Wall Box

Since most early American homes were small, space was hard to come by, which perhaps explains why wall boxes were so popular during the period. They could be found in all shapes and sizes, sometimes with one or two drawers, but often without. Once a convenient location was found, the box was hung on a peg or cut nail and used to store candles, spices, salt and other small items.

Ours is a reproduction of a pine wall box made during the 18th century. The maker probably sized it to accept candles, but we were delighted to find that it's just the right size for 20th-century letter-sized envelopes.

Like the original, ours is made from pine. A piece like this usually looks best if clear pine is used, although a few small knots are acceptable. The sides and back are made from $\frac{3}{4}$ in. thick stock while the fronts and bottoms are $\frac{5}{8}$ in. thick.

Most lumberyards don't carry $\frac{3}{8}$ in. material, so you'll need to start with thicker stock and reduce it. Some lumberyards have thickness planers and they are willing to plane stock to any thickness for a nominal charge. If your lumberyard doesn't do this, check some local millwork shops as they often offer this service.

A band saw, if you have one, can also be used to get thinner stock. Select a piece of $\frac{3}{4}$ in. thick stock that measures 4 in. wide by about 48 in. long, then use a marking gauge to

scribe the $\frac{3}{8}$ in. thickness. With this as a guideline, the band saw is used to cut the stock just slightly on the outside of the guideline. Now use a hand plane to smooth the band saw marks, then rip the stock to width on the table saw.

Of course, there's still another way to reduce the thickness of a board. A sharp hand plane and a little hard work will produce a thinner board in short order.

The two sides (A) can be made first. Rip $\frac{3}{4}$ in. thick stock to a width of $3\frac{5}{8}$ in. and a length of 11 in. Lay out and mark the location of the curved profiles and also the $7\frac{1}{2}$ -degree angled front. Now, using a band saw with a narrow ($\frac{1}{4}$ in.) blade, cut out both the curves and the angled front.

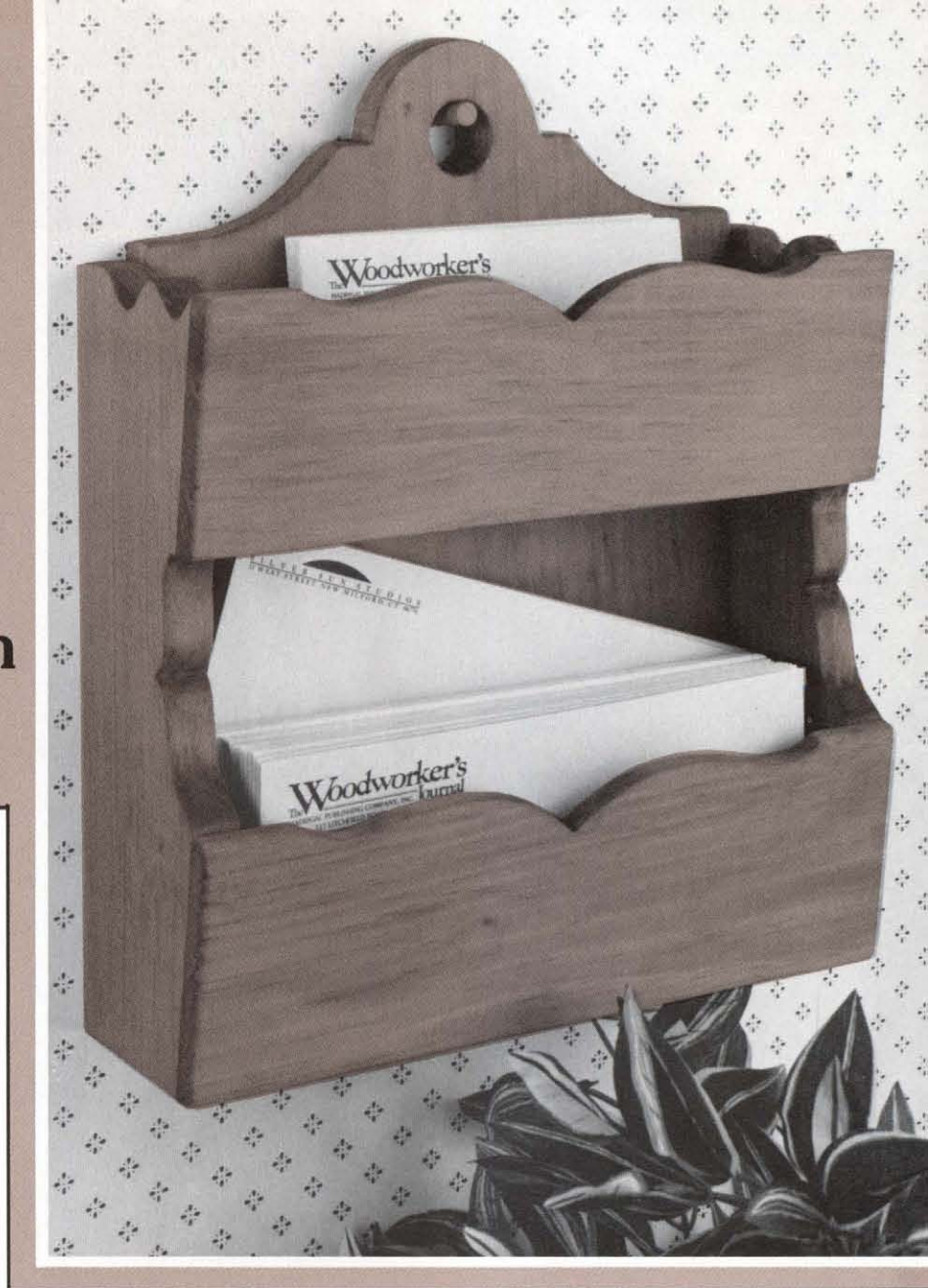
The back (D) can be made from edge-glued stock or from a piece of 1 x

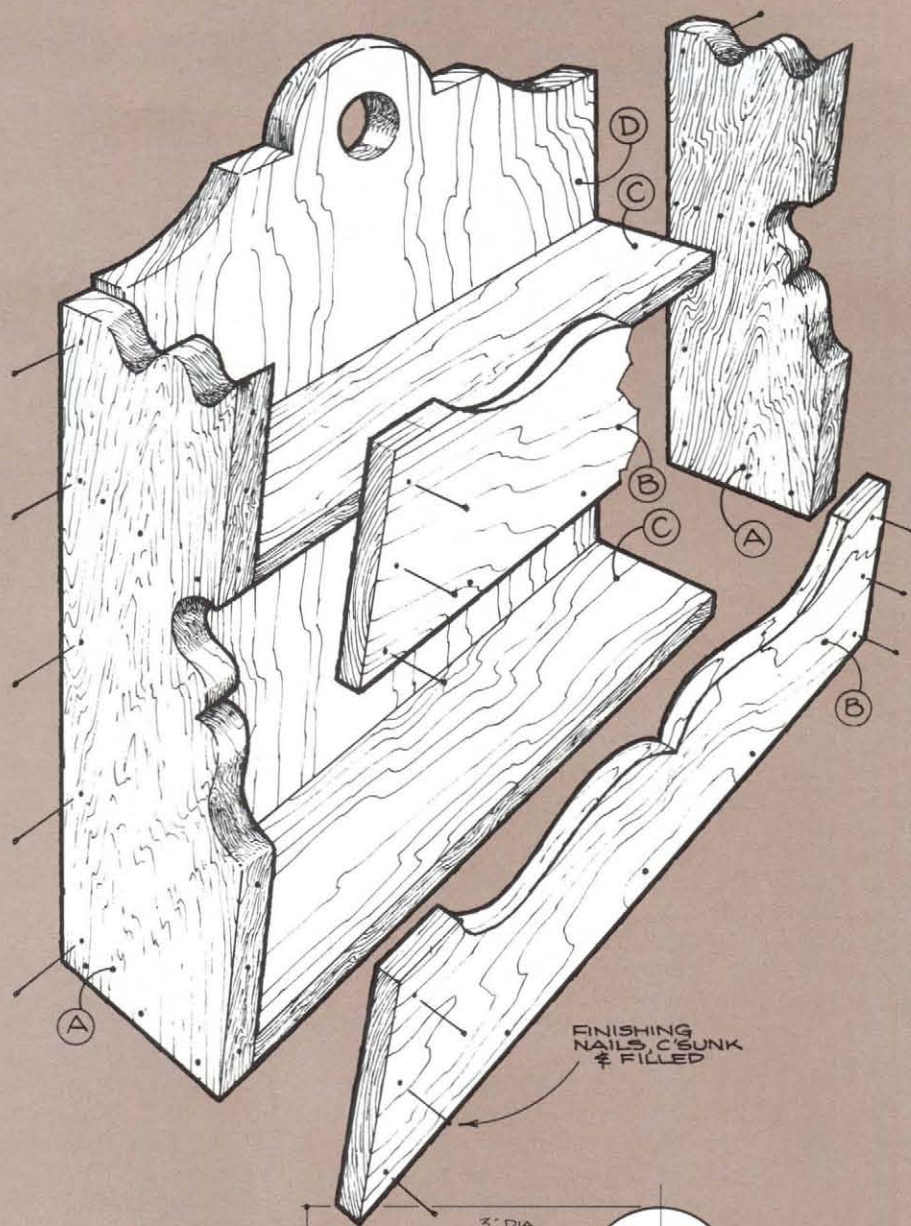
12 stock (which measures $11\frac{1}{4}$ in. wide) ripped to $10\frac{1}{4}$ in. Bore the 1 in. diameter hanger hole, then lay out and mark the curved profile at the top. Cut out with the band saw, staying slightly on the waste side of the line, then sand smooth.

Cut the two fronts (B) to size, and rip the front edge of the two bottom boards (C) to $7\frac{1}{2}$ degrees. Assemble as shown using both glue and countersunk finishing nails. Use wood putty to fill the countersunk holes.

The original box was assembled with cut nails to reinforce the glue joints. If you want to add this authentic look, cut nails can be ordered from the Tremont Nail Co., P.O. Box 111, Wareham, MA 02571. We suggest using their fine cut headless brads (part number N-13). The $1\frac{1}{2}$ in. length is

The Woodworker's Journal





est, but you'll need to cut them to a 1
1. length to join the fronts to the sides.
o minimize chances of splitting, bore
ilot holes before driving any of the
rads.

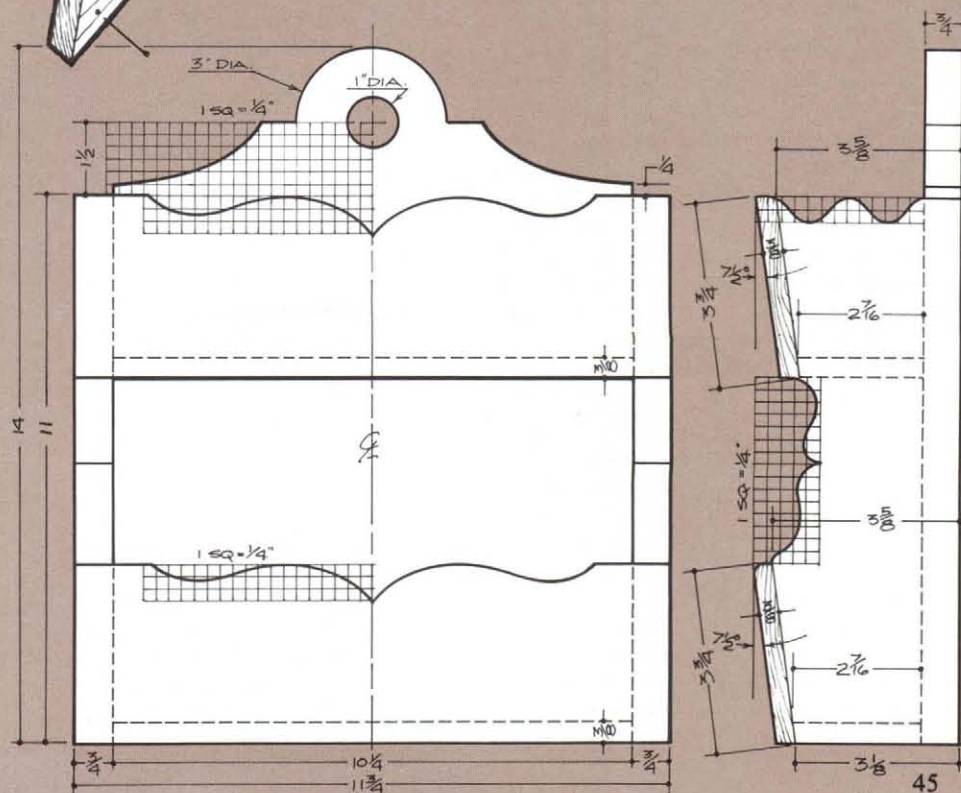
Final sand all parts. Give all corners
nd edges a good rounding-over to
mulate years of wear. We finished
urs with two coats of Minwax's Early
merican Wood Finish followed by
vo coats of tung oil. A coat of paste
ax completes the project. Wwj

Bill of Materials

(all dimensions actual)

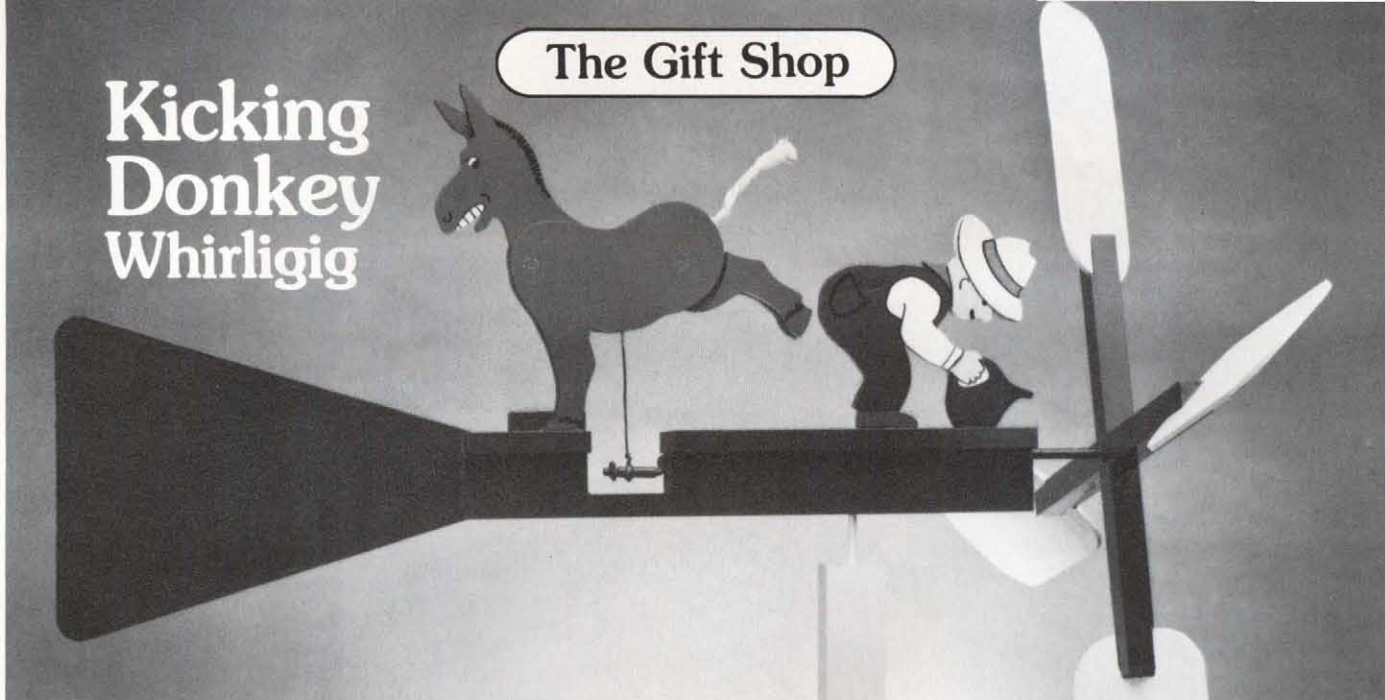
Part	Description	Size	No. Req'd.
A	Side	$\frac{3}{4} \times 3\frac{5}{8} \times 11$	2
B	Front	$\frac{3}{8} \times 3\frac{3}{4} \times 11\frac{3}{4}$	2
C	Bottom	$\frac{3}{8} \times 27\frac{1}{8} \times 10\frac{1}{4}$	2
D	Back	$\frac{3}{4} \times 10\frac{1}{4} \times 14$	1

March/April 1986



Kicking Donkey Whirligig

The Gift Shop



The kicking donkey is a classic whirligig design. Its operation is similar to the woodchopper whirligig that appeared in our March/April '85 issue. We have improved the propeller design, however, in response to a number of readers who wrote in to advise us that the woodchopper required a "small hurricane" to go into motion. The new propeller will catch more air, and should require a lower windspeed

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Spine	$\frac{3}{4} \times 1\frac{1}{2} \times 14$	1
B	Front Base	$\frac{1}{2} \times 1\frac{1}{2} \times 9$	1
C	Rear Base	$\frac{1}{2} \times 1\frac{1}{2} \times 3$	1
D	Block	$\frac{5}{16} \times \frac{1}{2} \times 1\frac{3}{4}$	1
E	Donkey Body	see grid	2
F	Donkey Head	see grid	1
G	Donkey Thigh	see grid	1
H	Donkey Leg	see grid	2
I	Farmer	see grid	1
J	Blade Arm	$\frac{3}{4} \times \frac{3}{4} \times 11$	2
K	Blade	$\frac{1}{8} \times 3\frac{1}{2} \times 7$	4
L	Drive Shaft	$\frac{3}{16}$ diam. brass rod	1
M	Drive Shaft Sleeve	$\frac{1}{4}$ in. diam. $\times$ 10 $\frac{7}{8}$ copper tubing	1
N	Tube Sleeve	$\frac{1}{4}$ in. diam. $\times$ $\frac{7}{8}$ copper tubing	1
O	Pivot Bushing	$\frac{1}{4}$ in. diam $\times$ 1 in. copper tubing	1
P	Rudder	cut from 8 $\frac{1}{2} \times 10$ aluminum sheet	1
Q	Tail	4 in. long rope	1

to turn. The kicking donkey features a dual movement: the head is bucking while the back legs and hooves are applying an unexpected jolt to the farmer's posterior.

Begin by making the spine (A). The $\frac{1}{4} \times \frac{1}{4}$ in. groove to accept the drive shaft sleeve is cut on the table saw. Next, notch the spine as shown to accept the offset section of the drive shaft rod, and use a hacksaw to kerf the spine end into which the rudder will fit. Also, drill the $\frac{1}{4} \times 1$ in. deep hole in the bottom to accept the pivot bushing. Make the two base sections (B and C), the donkey mounting block (D), and the blade arms (J). Half lap the blade arms as shown, and cut the $\frac{1}{8}$ in. wide by 1 in. deep slots in the arm ends to accept the propeller blades.

Transfer the illustrated grid pattern to $\frac{1}{4}$ in. thick stock, then lay out and cut the various donkey parts (E, F, G, H) and the man's profile (I). The four propeller blades are cut out of $\frac{1}{8}$ in. thick material. Since all wood parts for this project will be painted, the type of wood you select is not critical.

Now assemble the whirligig. Epoxy the blade arms together, and glue the four blades into their slots. Use either epoxy or plastic resin glue throughout the whirligig construction to insure that it will not be affected by weather. Next, drill the screw holes in the donkey (see grid for hole locations), mortise for the screw heads and nuts so they will fit flush and assemble the donkey parts. Use washers on either side of parts G and F to reduce friction and serve as spacers.

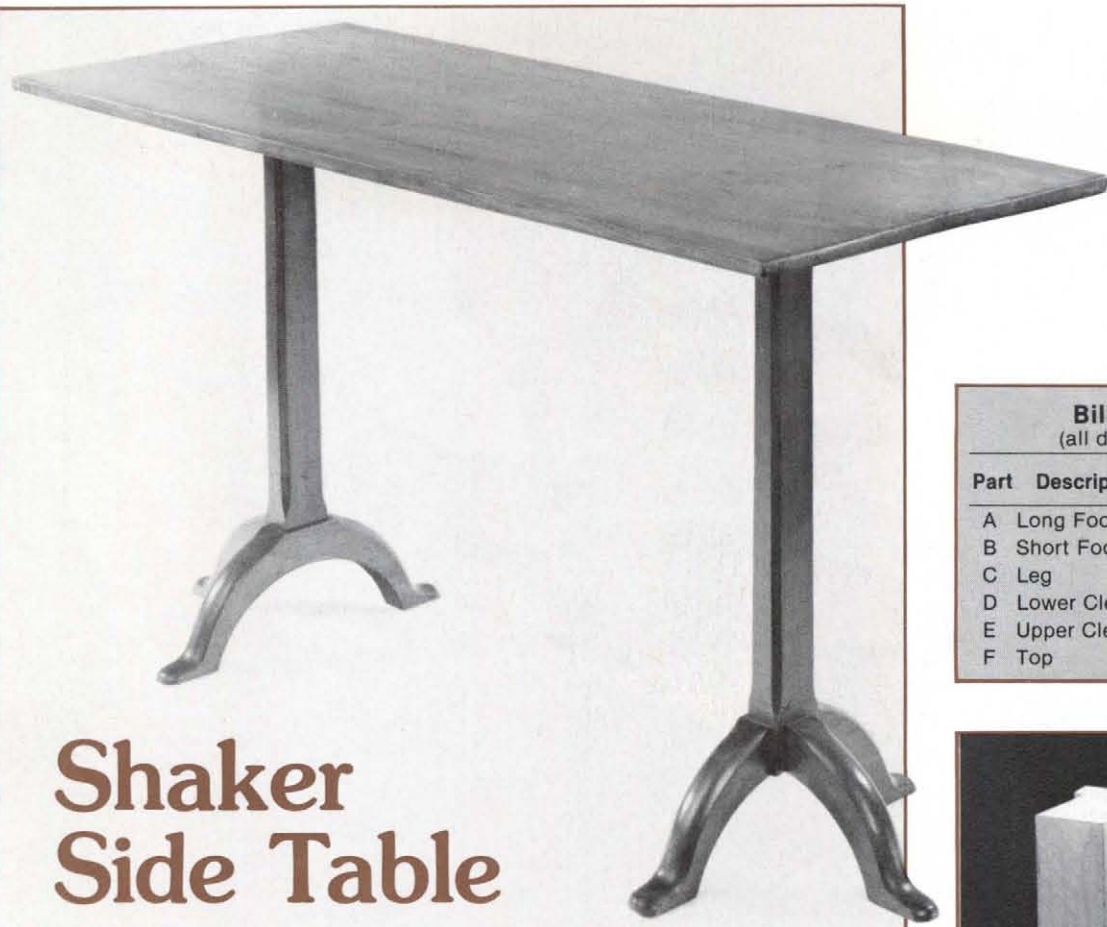
To make the drive mechanism, first

offset the drive shaft (L) end with two 90 degree bends. Drill a hole as shown to accept a small cotter pin, and cut the lengths of $\frac{1}{4}$ in. copper tubing needed for parts M, N, and O. Mount the tube sleeve (N), add a washer, and insert the cotter pin to hold the washer and sleeve in place. Slide the long sleeve (M) over the drive shaft, epoxy the sleeve into the $\frac{1}{4} \times \frac{1}{4}$ in. spine groove, and add the front and rear bases. Mount the man to the front base with $\frac{1}{8}$ in. dowel pins and glue, then glue the donkey to the mounting block, and the mounting block to the rear base.

Insert the screw eyes in parts F and G, add the short link wire, and then the longer connecting wire, which is fastened around the tube sleeve. It may be necessary to adjust the connecting and/or link wire length to fine tune the donkey motion. Drill through the propeller center, and epoxy the propeller onto the drive shaft end, using a washer to reduce friction between the center and drive shaft sleeve.

Cut out the sheet metal rudder, folding the top edge over to stiffen it. Epoxy the rudder and pivot bushing in place, add the rope tail (Q) on the donkey, and then paint the whirligig, following the color scheme suggested on the grid pattern.

W&J



Shaker Side Table

This tripod side table, from the collection at Hancock Shaker Village, is an unusual and exceptionally fine piece. The table features a uniquely designed tripod which is mounted to the tapered legs with a special locking dovetail joint. Although at first glance this joint appears complicated, it is actually fairly easy to make. The rest of the table requires no special tools or skills.

In the original table, the legs and feet are maple while the top is pine. The Shakers used a single wide pine board for the top. Unless you have access to very wide stock, you will need to glue up material to achieve the necessary width. Although the Shakers preferred cherry, maple, or pine, this table would also look good in walnut or oak.

The logical place to start is the top (F). Cut, joint, glue, and clamp the stock required for the total 21 1/4 in. width, and set the top aside to dry. Cut the 1 5/8 in. thick by 6 3/8 in. wide stock for the feet (A and B) next. Lay out a one in. grid pattern as shown, and transfer the profile of the feet. As a shortcut here, make one of part B, and then use it as a template to mark the profiles of the remaining feet. After bandsawing the feet shape, round their upper edges. Then rough out the

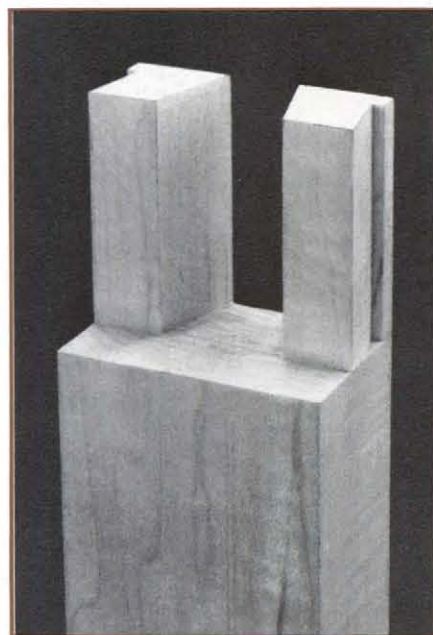
tapered legs (C). First, cut these tapers with the band saw, and then plane them smooth.

Now fashion the special dovetail joint that locks the feet and legs together. Refer to the illustration (leg detail, bottom view) for these joint dimensions. The 3/4 in. deep dovetail mortise in parts A is made by using a backsaw to establish the sides and cleaning out the waste with a large chisel. Next, cut the dovetail pin on parts B. The tricky part is making the locking tails and mortise on the lower end of each leg. A good way to approach this is to first cut a full dovetail pin on part C that will fit snugly into the dovetail mortise in part A. Then use the dovetail pin on part B to scribe for the dovetail slot in the center of the part C dovetail pin. The detail photo of the leg should help you visualize the part C locking dovetail pin. Cut the tenon on the top end of each leg, and apply a 1/4 in. wide 45 degree chamfer to the leg edges as illustrated.

Now make the lower and upper cleats (D and E). Taper the ends and chamfer the edges of the lower cleats as shown, and mortise them to accept the 3/4 x 5/8 x 2 in. long tenons on the leg ends. Glue and assemble the tripod feet to the legs, and glue the lower cleats in

Bill of Materials (all dimensions actual)

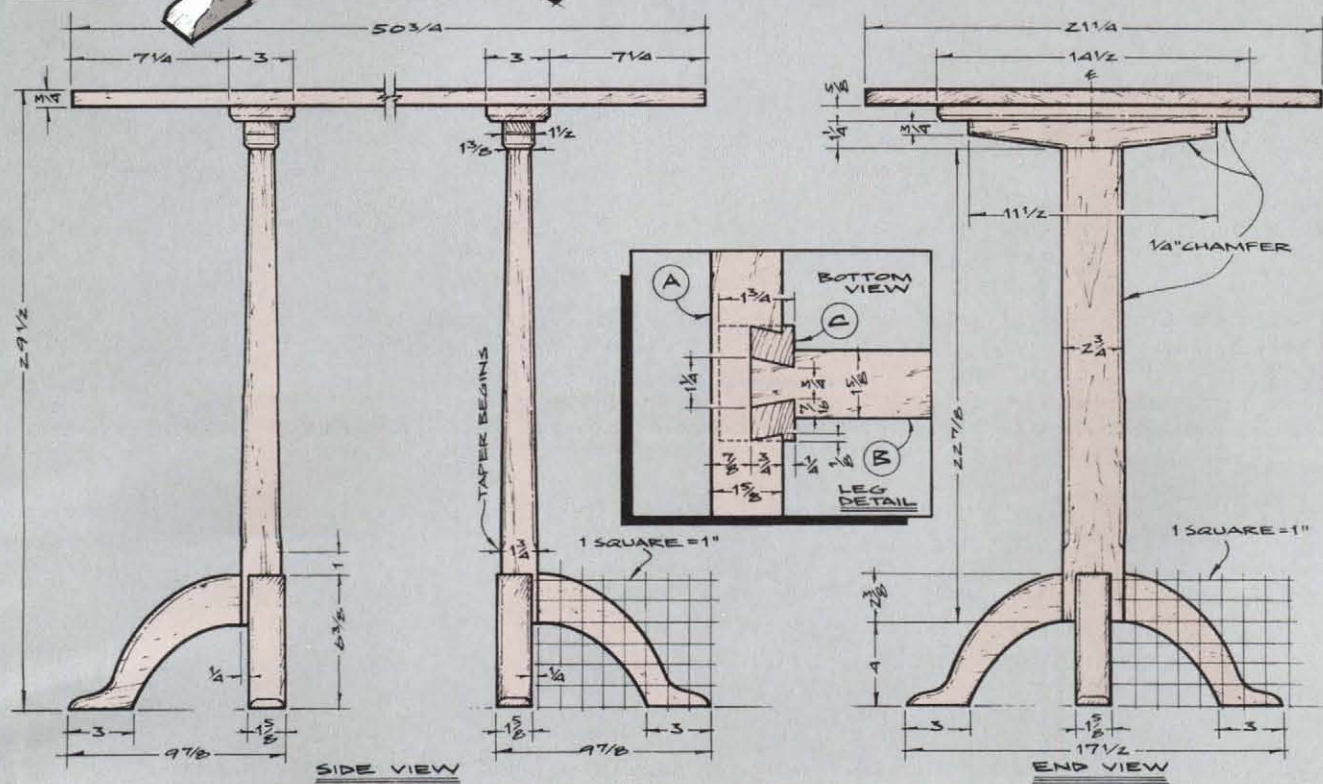
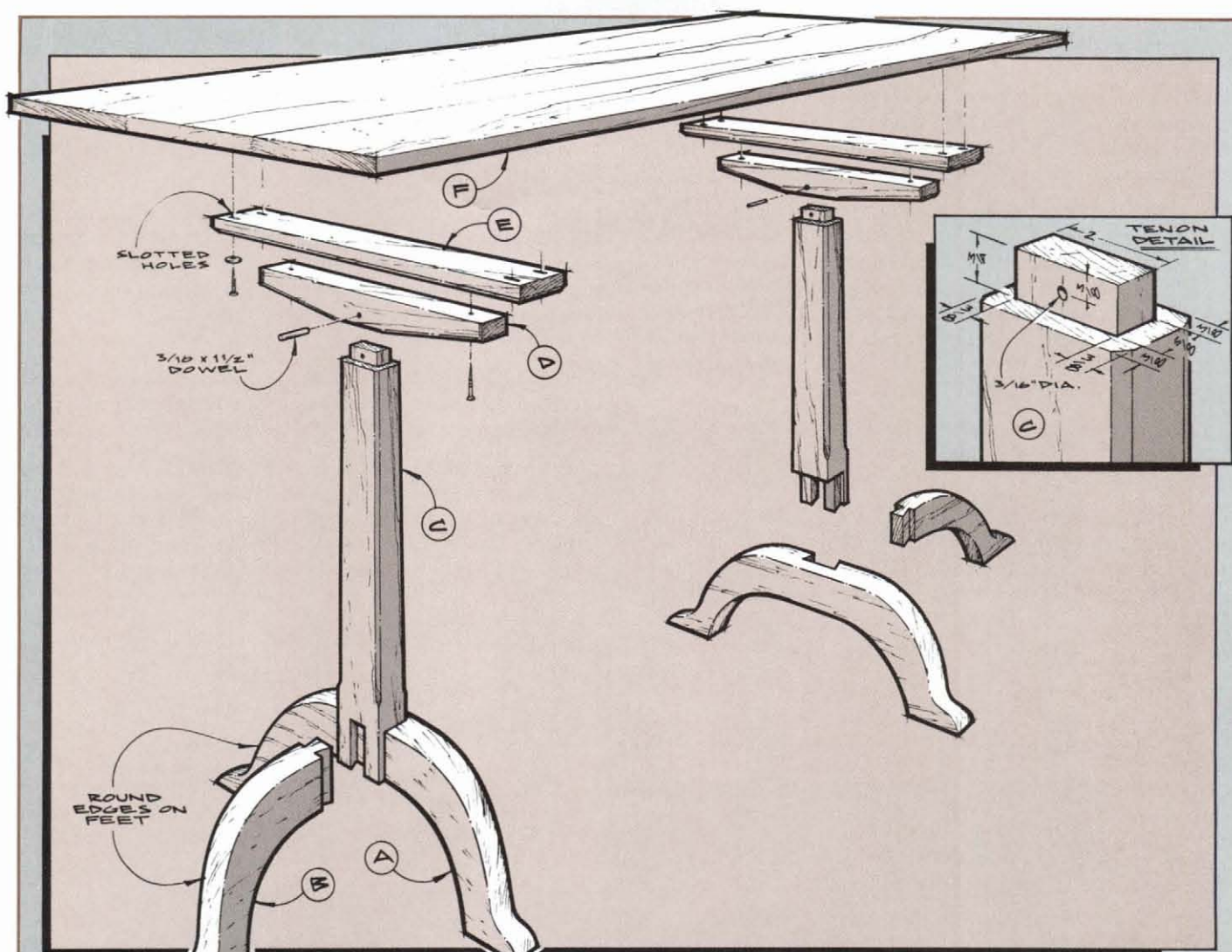
Part	Description	Size	No. Req'd.
A	Long Foot	1 5/8 x 6 3/8 x 17 1/2	2
B	Short Foot	1 5/8 x 6 3/8 x 9	2
C	Leg	1 3/4 x 2 3/4 x 23 5/8	1
D	Lower Cleat	1 1/2 x 1 1/4 x 11 1/2	2
E	Upper Cleat	5/8 x 3 x 14 1/2	2
F	Top	3/4 x 21 1/4 x 50 3/4	1



Leg section of the locking dovetail joint.

place, locking them with 3/16 in. diameter dowel pins. Drill four slotted holes through each upper cleat as indicated, and fasten the upper cleats to the top using round head screws and washers. The lower cleat/leg/foot assemblies are then screwed but not glued to the upper cleats and top. Counterbore and countersink these four screws.

The table will look best finished with a penetrating oil such as Watco. If you intend the table for daily use, however, use polyurethane on the top, coating both sides for stability.



A traditional joiner's mallet is surprisingly easy to make using our method of laminating stock around the handle. It's handy to have both a large and a small mallet, so we've provided dimensions for both sizes. You'll want to use maple for this project because a hard and durable wood is most important. Steps 1 through 8 detail the construction.

Step 1: To make the handle, cut $\frac{7}{8}$ in. thick stock to a width of $1\frac{1}{2}$ in. and a length of 12 in. Note that the handle tapers from $1\frac{1}{2}$ in. at the top to $1\frac{1}{4}$ in. at the bottom. Using a ruler, lay out and mark this taper, then cut out with a band saw. Be sure to stay slightly on the waste side of the stock. Once cut, use a hand plane and make several light passes to remove the band saw marks. Mark the location of the $\frac{1}{4}$ in. chamfers, then use a file to cut them as shown.

Step 2: Cut stock for the head. Dimensions for both the large and small mallets are given in the chart. Label the middle piece part "X".

Step 3: Center the handle on part "X" as shown. The centerline of the handle should be at 90 degrees to the top edge of part "X", and the top end of the handle must extend $\frac{1}{2}$ in. Once the handle is properly located, use a pencil to

scribe the taper on each side of the handle.

Step 4: Using the band saw, cut out the middle of part "X". Stay slightly on the waste side of this line.

Step 5: A disk sander is used to remove band saw marks from part "X".

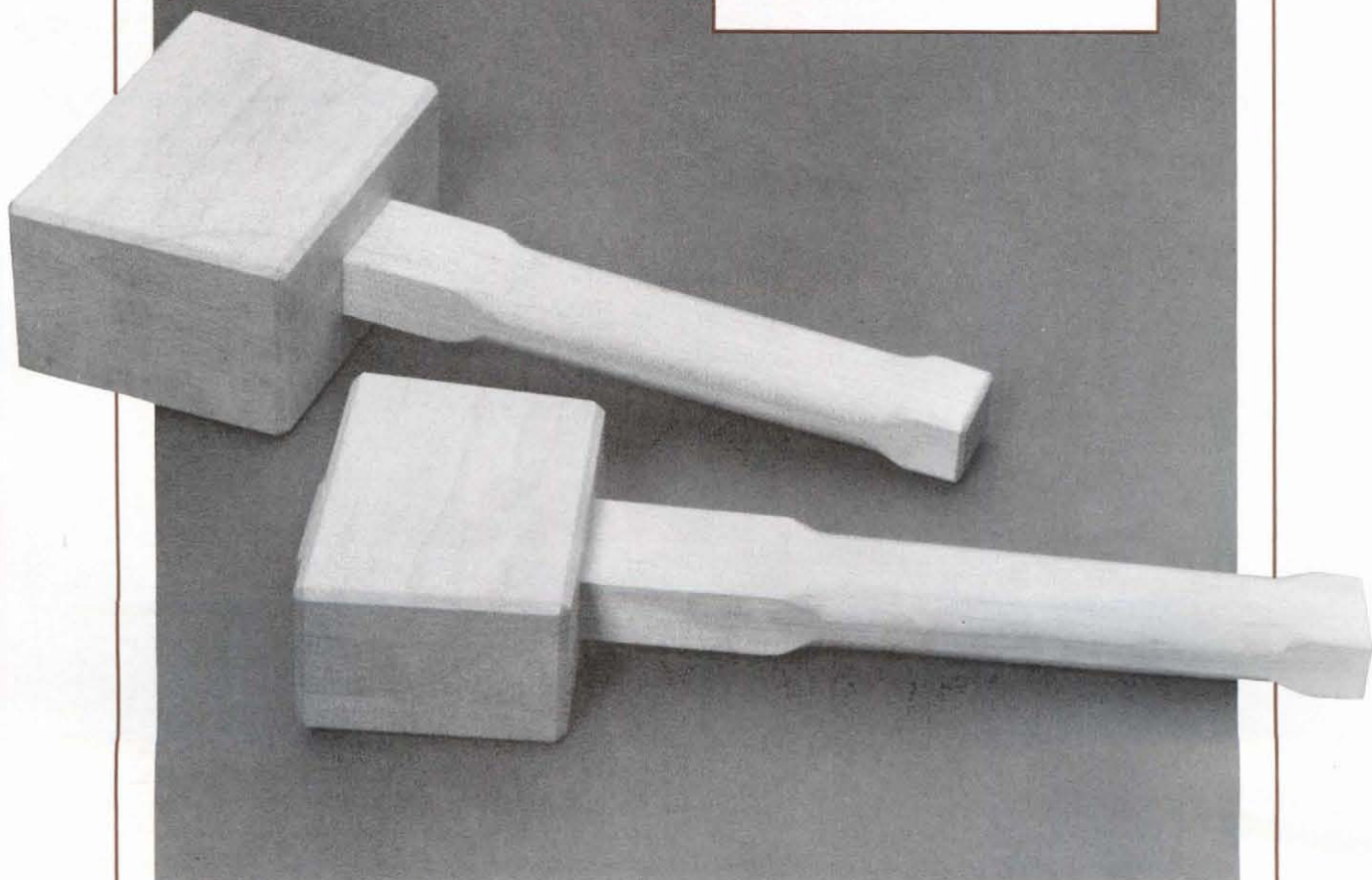
Step 6: Apply a coat of paste wax to the head end of the handle. Add glue to the mating surfaces of the four head parts, then assemble the parts around the handle. Use clamp blocks to protect the stock and to keep the edges flush. Wax the surface of any glue block that will come in contact with any glue squeeze-out.

Step 7: Using the chart, lay out and scribe the taper lines for the head. Cut out with the band saw, then sand smooth on the disk sander.

Step 8: Acetone (available at most hardware stores) is used to remove the wax on the handle, then a coat of penetrating oil is applied. Install the handle in the head, lightly tapping it in place, then bevel the edges of the head with a file. A coat of oil applied to the head completes the mallet.

Wwj

Wooden Mallets



Federal Period Washstand

This handsome washstand is part of the collection of the Washington Historical Museum in Washington, Connecticut. It is built of mahogany and features finely turned legs, and a small drawer with lion's head brass pulls. The museum original is very delicate, yet strongly constructed, and when we picked it up we were surprised by its extraordinarily light weight.

A good place to start this project is with the turned legs (A). Your turning stock should be about 2 in. longer than the 31½ in. leg length to allow for mounting in the lathe. Refer to the turning detail for the turning layout.

Next, cut all the remaining wood parts, B through R. In the museum original, part G is a domestic hardwood while the apron facings (F) are mahogany. This unusual construction probably reflected the high cost of mahogany back in the early 1800's when it had to be shipped to America over great distances at considerable risk and expense. If you use mahogany throughout, simply increase the thickness of parts G by ⅜ in., and dispense with part F.

Tenon the various apron and stretcher ends, referring to the appropriate tenon details, and mortise the legs correspondingly. As shown in Fig. 1 the aprons, facings, and stretchers are all inset ⅛ in. Refer to the grid patterns for the profiles of parts B and L, and band saw them to shape. Cut the dovetails in parts L and M (see dovetail detail), tenon the shelf ends (see shelf tenon detail), and mortise parts L accordingly.

The washstand top features bowl and glass cutouts (see top view for size and location). However, if you intend some alternate use for this piece, these cutouts need not be included.

Next, make the dovetailed drawer. The drawer side view shows the layout of these dovetails. Use a ⅛ in. diameter veining bit (available from Sears) in the router to cut the ⅛ in. grooves in the drawer front.

In the museum original, the washstand is simply glued together, with no



Bill of Materials

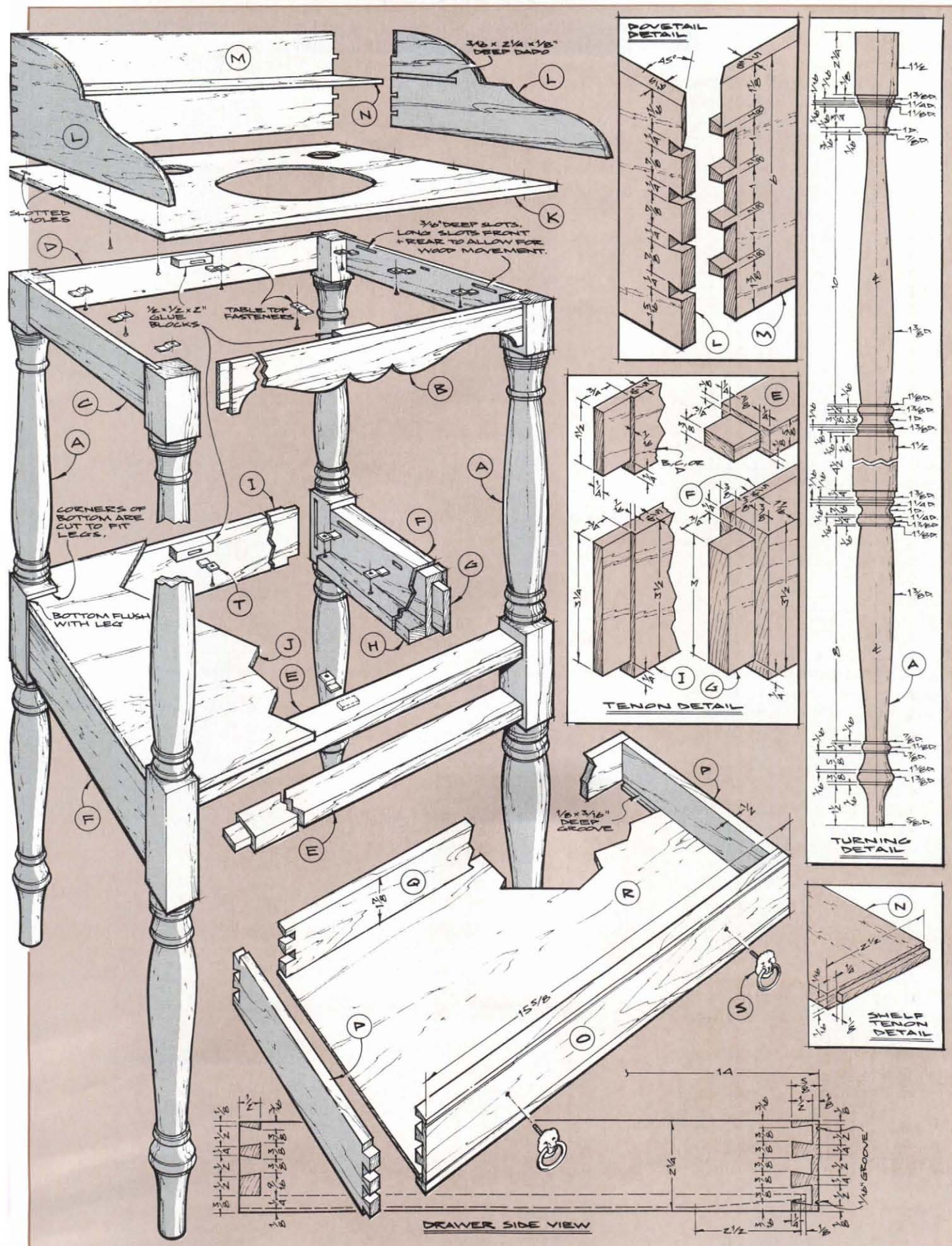
(all dimensions actual)

Part	Description	Size	No. Req'd.	Part	Description	Size	No. Req'd.
A	Leg	1½ x 1½ x 31½	4	I	Lower Back		
B	Upper Front Apron	⅝ x 1¾ x 17⅞*	1	J	Bottom	⅝ x 14¾ x 18⅝	1
C	Upper Side Apron	⅝ x 1¾ x 13¼*	2	K	Top	⅝ x 15¼ x 19	1
D	Upper Back Apron	⅝ x 1¾ x 17⅞*	1	L	End	⅝ x 6 x 14¼	2
E	Stretcher	⅝ x 1¾ x 17⅞*	2	M	Back	⅝ x 6 x 18⅝	1
F	Lower Side Apron Facing	⅝ x 3½ x 11¼	2	N	Shelf	⅝ x 2½ x 18¼*	1
G	Lower Side Apron	1⅞ x 3½ x 13¼*	2	O	Drawer Front	⅝ x 2¼ x 15⅝	1
H	Drawer Runner	⅝ x ½ x 11¼	2	P	Drawer Side	½ x 2¼ x 13⅞	2
				Q	Drawer Back	½ x 1¾ x 15⅝	1
				R	Drawer Bottom	¼ x 13⅞ x 15	1
				S	Drawer Pulls**	1¼ x 2⅝ brass	2
				T	Tabletop Fasteners***	¾, ⅝ in. offset	16

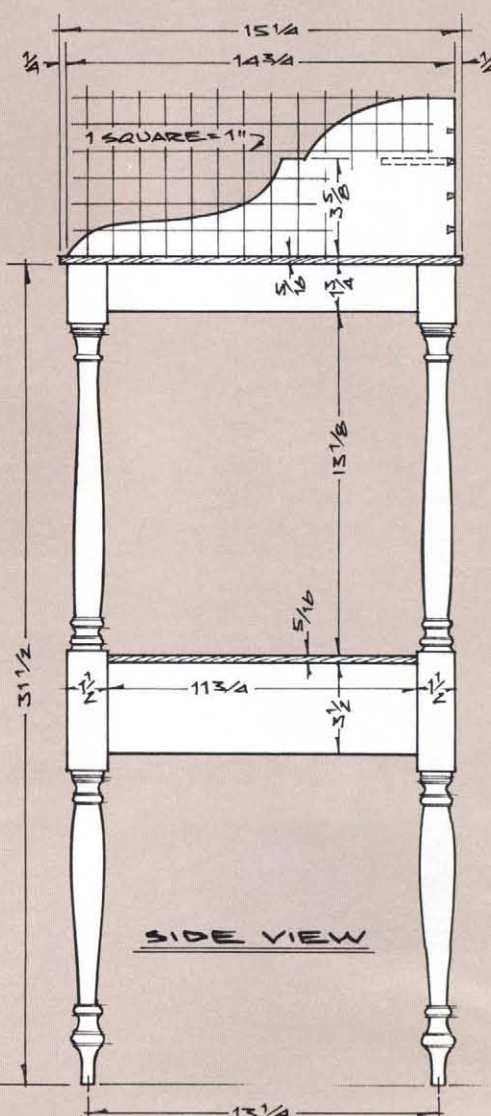
*Length includes tenon.

**Available from: Paxton Hardware, Ltd., 7818 Bradshaw Rd., Upper Falls, MD 21156

***Available from: Constantine, 2050 Eastchester Rd., Bronx, NY 10461. Order part no. 96N4.



Fine sand the washstand and hand
rub in three coats of tung oil, buffing
with 0000 steel wool between coats. Wax





Connecticut Shelf Clock

Clocks of this style originated in Connecticut during the early 19th century, although the basic design evolved from the English bracket clock. Eli Terry, a well-known Connecticut clockmaker, was primarily responsible for their popularity. They were made by the thousands and became a significant factor in the industrial growth of the state.

We used an eight-day spring driven brass bell movement, but if you are on a tight budget, a battery operated quartz movement can be substituted. A source for the movement, glass, and hardware is given at the end of the article. Ours is made from walnut, but cherry or mahogany can also be used. The dial board (F) and back (T) are $\frac{1}{4}$ in. walnut plywood. A 12 in. by 24 in. piece (large enough to make both parts) is available from Craftsman Wood Service, 1735 West Cortland Ct., Addison, IL 60101. Order part no. W0102.

The two sides (A) and the top (B) can be made first. Cut $\frac{3}{4}$ in. thick stock to a width of $4\frac{7}{8}$ in. and a length of at least 40 in., then crosscut it into two pieces 15 in. long (for the sides) and one piece $9\frac{1}{2}$ in. long (for the top). Both length dimensions allow a little extra.

Using the table saw equipped with a dado head, now cut the $\frac{1}{4}$ in. deep by $\frac{7}{8}$ in. wide rabbet along the front edge of the sides and top as shown. And, while the dado head is in the saw, you can also cut the $\frac{3}{8}$ in. thick by $3\frac{1}{2}$ in. wide by $\frac{1}{4}$ in. long tenon on the bottom end of each side. Later, after the case is assembled, the tenon width will be reduced to $3\frac{1}{4}$ in. (see exploded view) when the rabbet for the back is cut.

Next, replace the dado head with a regular saw blade set to 45 degrees and cut the miter on the top end of each side. After the miter is cut, the overall length of the side (tenon included) should be $14\frac{3}{4}$ in.

The $\frac{3}{4}$ in. long spline groove is best cut using the arrangement shown in the spline detail. The top and one side are clamped back to back along with a router support piece. This support piece provides extra bearing surface for the router. A bearing-guided wing cutter that cuts a $\frac{3}{16}$ in. wide by $\frac{1}{2}$ in. deep groove is used in the router. Notice, however, that the bearing is assembled so that it is located between the router and the cutter. This permits the cutter shaft to be fully chucked in the router.

To complete work on the sides and top, the router with a $\frac{1}{4}$ in. diameter straight bit is used to cut the $\frac{1}{4}$ in. by $\frac{1}{4}$ in. groove for the dial board (F). On the sides, note that the groove is stopped at the bottom edge of the dial board. Since the router bit leaves rounded corners, use a chisel to square the end of the groove.

The bottom (D) is made from $\frac{3}{4}$ in. thick stock cut to $5\frac{3}{8}$ in. wide by $10\frac{1}{4}$ in. long. With the router and a $\frac{3}{8}$ in. radius bearing-guided cove bit, cut the cove on both sides and the front as shown. A router and $\frac{3}{8}$ in. straight bit is used to cut the $\frac{3}{8}$ in. wide by $3\frac{1}{2}$ in. long by $\frac{1}{4}$ in. deep mortises. Use the chisel to square the front edge of each mortise.

The two feet (E) can now be made. Use the router table with a $\frac{1}{4}$ in. bearing-guided cove cutter to cut the cove on the sides and front of each piece.

(continued on next page)

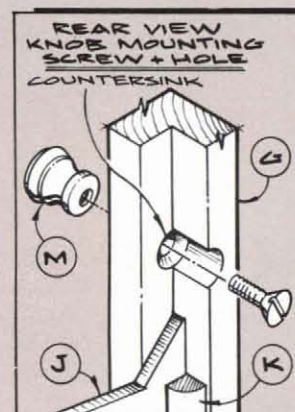
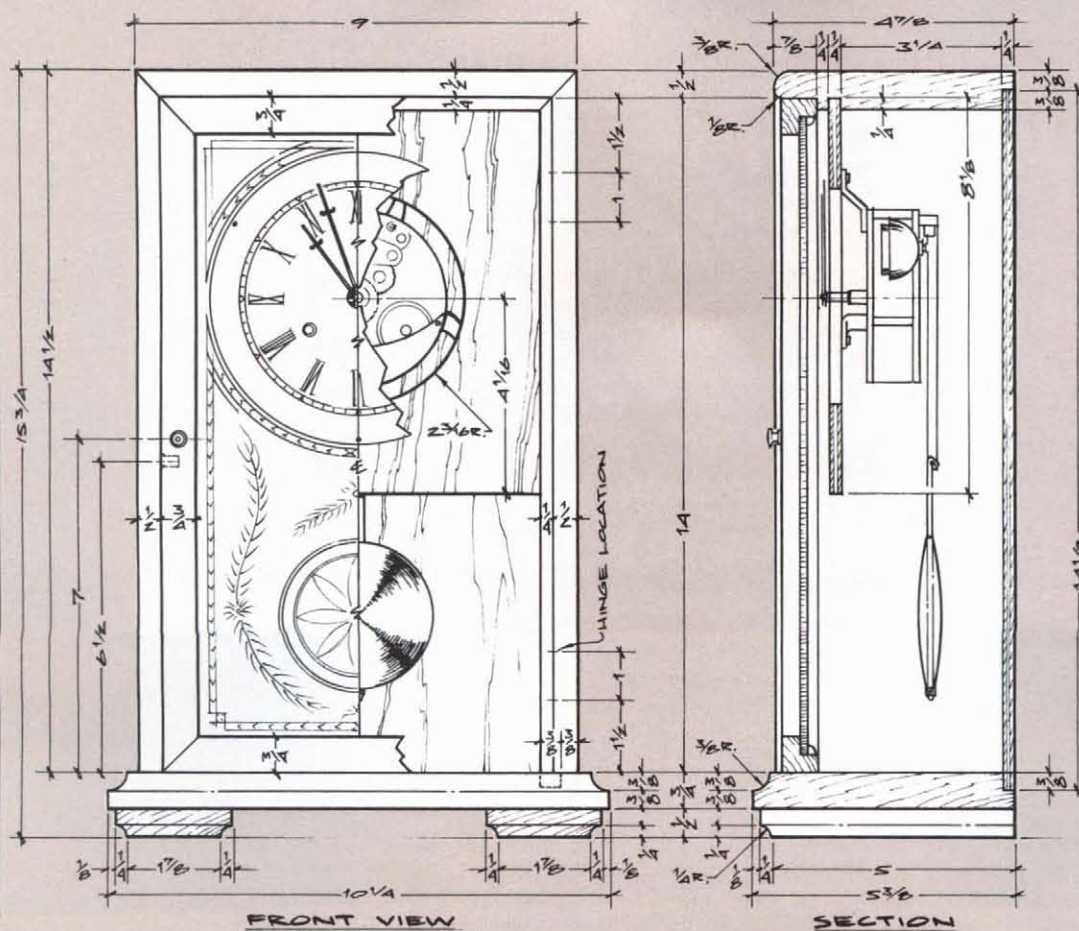
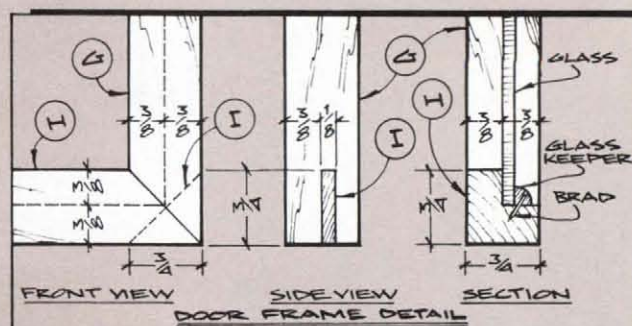
Bill of Materials (all dimensions actual)

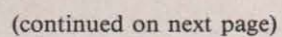
Part	Description	Size	No. Req'd.
A	Side	$\frac{3}{4} \times 4\frac{7}{8} \times 14\frac{3}{4}$ *	2
B	Top	$\frac{3}{4} \times 4\frac{7}{8} \times 9$	1
C	Case Spline	$\frac{3}{16} \times 1 \times 3\frac{1}{4}$	2
D	Bottom	$\frac{3}{4} \times 5\frac{3}{8} \times 10\frac{1}{4}$	1
E	Foot	$\frac{1}{2} \times 2\frac{3}{8} \times 5\frac{1}{4}$	2
F	Dial Board	$\frac{1}{4} \times 8 \times 8\frac{1}{8}$	1
G	Door Stile	$\frac{3}{4} \times \frac{3}{4} \times 14$	2
H	Door Rail	$\frac{3}{4} \times \frac{3}{4} \times 8$	2
I	Door Spline	$\frac{1}{8} \times \frac{3}{4} \times 1\frac{1}{4}$ **	4
J	Glass	$\frac{1}{8} \times 7\frac{7}{16} \times 13\frac{3}{16}$	1
K	Keeper Strip	$\frac{1}{4}$	4
L	Hinge	1 in.	2
M	Knob	$\frac{1}{2}$ in. diam.	1
N	Bullet Catch	$\frac{9}{32}$ diam.	1
O	Dial Face	6 in. diam.	1
P	Bell Movement		1
Q	Alternate Quartz Movement***		1
R	Hands		2
S	Pendulum		1
T	Back	$\frac{1}{4} \times 8\frac{1}{4} \times 14\frac{1}{2}$	1

*Length includes tenon.

**Length and width dimensions before trimming.

***Can be substituted for bell movement (P).





Part F, the dial board, is made from $\frac{1}{4}$ in. thick walnut plywood cut to 8 in. wide by $8\frac{1}{8}$ in. long. If you plan to use the bell movement (P), locate the center of the board, then cut out a $4\frac{3}{8}$ in. diameter ($2\frac{3}{8}$ in. radius) hole using an adjustable circle cutter on the drill press. If you don't have a circle cutter, use a compass to scribe the $4\frac{3}{8}$ in. diameter, then cut out the hole with a saber saw. However, should you intend to use the quartz movement (Q), you need only locate the center of the board and bore a $\frac{3}{8}$ in. diameter hole at that point.

The clock case (consisting of parts A, B, C, D, E, and F) can now be assembled. The splines (C) are made from $\frac{3}{16}$ in. thick solid stock, with the grain direction running as shown (parallel to the top and sides) in order to get maximum strength. Make the splines a little wider than necessary (about $3\frac{1}{2}$ in.) so they can be trimmed flush with the back after assembly. The front end is rounded to match the radius made by the wing cutter.

Sand all parts, then dry assemble them to make sure everything fits to your satisfaction. If all looks okay, add glue to all mating parts and clamp firmly. The dial board must be part of this assembly, but only a few spots of glue are needed to fix it in place. Use scrap blocks to protect the wood from the clamps. It's important that the case be square, so if any adjustments are necessary, make them at this time. Set aside to dry overnight.

Once dry, use a router with a $\frac{3}{8}$ in. bearing-guided rabbeting bit to cut a $\frac{1}{4}$ in. by $\frac{3}{8}$ in. rabbet around the entire back edge. The back (T) can now be cut to fit in this rabbet. Also, at this time, the two feet can be glued and screwed to the underside of the bottom.

You'll need about 48 in. of $\frac{3}{4}$ in. square stock to make the door frame (parts G and H). Cut each part to length with 45-degree miters on each as shown.

The door spline (I) is best cut using the keyed miter jig. To make the jig, cut a piece of particleboard (or plywood) to a width of 10 in. and a length of 12 in. Next, cut two pieces of $\frac{3}{4}$ in. square stock to a length of about 9 in. and miter one end of each piece to 45 degrees. Glue and screw the mitered parts to the particleboard at a 45-degree angle as shown.

To use the jig, clamp one stile and one rail in the jig with the mitered ends butted tightly together. Set the table saw blade to make a $\frac{1}{2}$ in. deep cut, and locate the rip fence so that the spline slot is located $\frac{3}{8}$ in. from the front (see side view, door frame detail). After all four corners have been cut, the four door frame parts can be assembled with glue and clamped firmly. Cut the splines oversize so they can be trimmed flush after the clamps are removed.

Once dry, lay out the location of the knob (M) and bore a $\frac{3}{8}$ in. hole to a depth of $\frac{3}{8}$ in., then countersink the hole bottom to accept the screw head.

Next, the router with a $\frac{3}{8}$ in. bearing-guided router bit is used to cut the $\frac{3}{8}$ in. rabbet all around the back. The rounded corners are chiseled square.

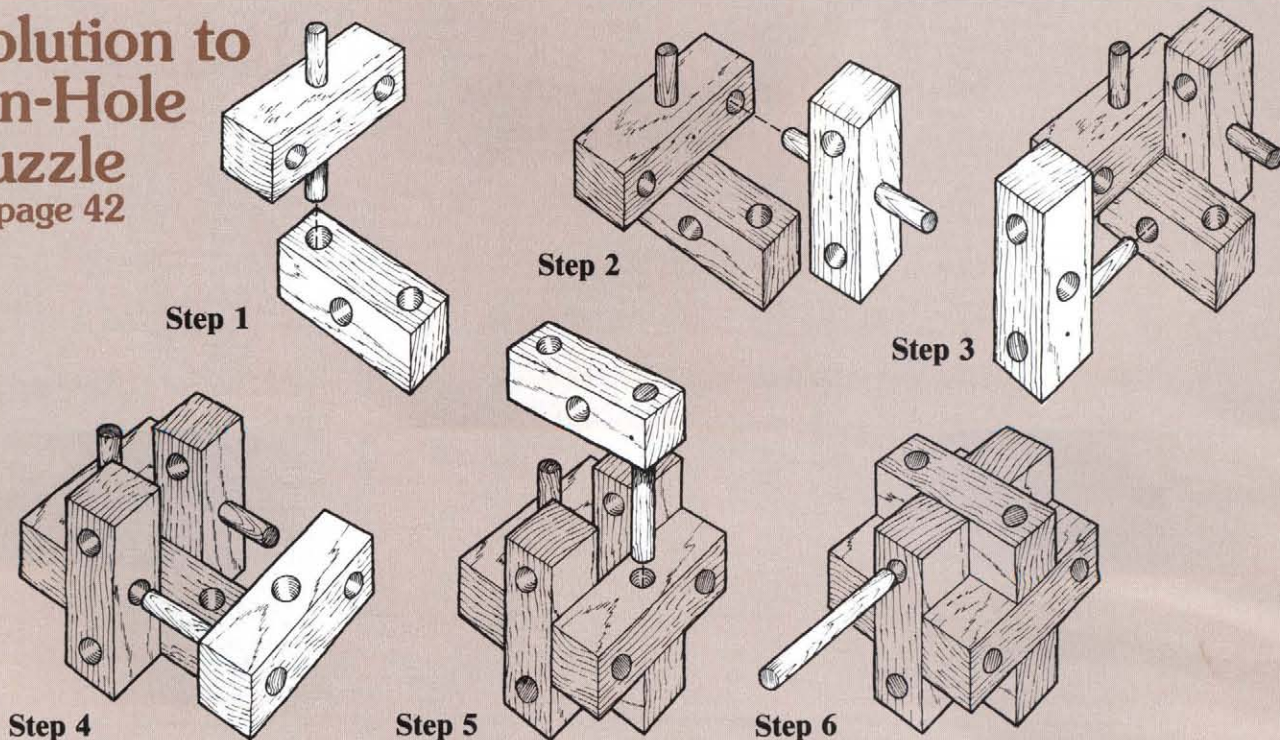
The frosted glass (J), dial face (O), brass movement (P), and all hardware (K, L, M, and N) are available from the Mason and Sullivan Co., 586 Higgins Crowell Road, West Yarmouth, MA 02673. For the frosted glass order part no. 2782G (\$15.95), for the dial face order part no. 7460S (\$9.25), for the brass movement order part no. 3398X (\$69.00) and for a hardware package that includes the hinges, knob, bullet catch, and keeper strip, order part no. H6660X (\$6.95). The prices do not include shipping costs. The pendulum (S) is included with the movement. The hands (R) are free (order part no. 4964X).

If you choose to use the quartz movement (Q), order part no. 3643X (\$10.95). It comes with an adjustable pendulum which means you'll have to cut it to establish the $6\frac{1}{2}$ in. pendulum length (measured from the hand shaft centerline to the centerline of the pendulum bob). The hands (part no. 4864X) are 60° per pair.

Final sand all parts before finishing with several coats of a good penetrating oil. Mount the back (T) with several small brass screws. Install the knob, then assemble the glass to the door with small brads driven through the keeper strip. Add the bullet catch and mount the door. A coat of paste wax completes the project. Wwj

Solution to Pin-Hole Puzzle

on page 42

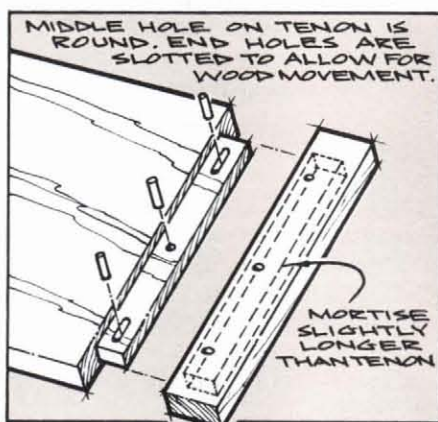


Shop Tips

One way to get thin stock is to resaw thicker boards with the band saw. However, resawn stock often has a tendency to cup, mostly due to the difference in moisture content from outside to inside the board. To minimize this problem, clamp the stock flat immediately after resawing, and keep it clamped for a couple of days. This allows the stock to dry while remaining relatively flat, even after the clamps are removed.

Breadboard ends help keep stock flat while adding a finished look to the ends. Early American furniture makers often incorporated them, especially on table tops. In those early days before central heating, when household relative humidity remained fairly constant, breadboard ends were simply glued in place because very little wood movement occurred. Today, however, extremes in household humidity from season to season mean that the top must be free to move, otherwise the wood is likely to crack. Breadboard ends can still be used, but

the modern version must accommodate that inevitable movement. Here's how to do it. Cut the mortise and tenon as shown, and dry clamp the

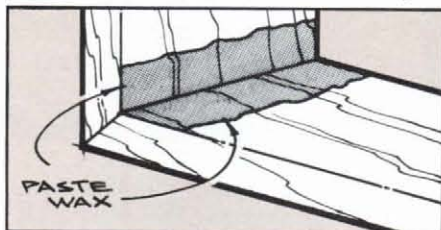


parts. Bore a middle and two end holes, then separate the parts. Use a file to elongate the two end holes, then reassemble. Apply glue to the dowel pins and tap in place.

Most homes don't have radiators these days, but enough remain so that radiator brushes are still sold in hardware stores. Woodworkers will find that the radiator brush, with its long and narrow shape, will come in handy for cleaning out the underside of the

table saw, jointer, band saw and other hard to get at places around the shop.

Glue squeeze-out, especially in tight corners, is often difficult to remove. To simplify the job, first dry clamp the parts, then apply a coat of paste wax in the areas where squeeze-out is likely to



occur. After gluing and clamping, any glue that squeezes out won't stick to the wax. Once dry, the glue can be easily cleaned off with a chisel. A cloth wetted with acetone (available at hardware stores) can be used to remove the wax.

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.

THE WOODWORKER'S MARKETPLACE

EDLCO
Appalachian Hardwood Specialists
Also Softwoods, Squares, Turnings
Kiln Dried Delivered Prices
New Catalogue \$2.00
Stay In The Woods With Us
EDUCATIONAL LUMBER CO., INC.
Box 5373 JO Asheville, N.C. 28813

REUGE SWISS
MUSICAL MOVEMENTS
—Retail and Wholesale prices quoted—
Send a \$1.00 for
Tune Lists and
Specification Data
WOODSMITHS
128 West Henry Road
Enola, PA. 17025

101 GIFT & NOVELTY PATTERNS
This wonderful packet contains 101 FULL SIZE PATTERNS of Gifts, Novelties, Lawn Figures, Bird Houses, Shelves, Action Windmills, Alphabets, and many more things. Just trace and saw out. Plus "Make Money Jig Sawing" Only \$7.00 Prepaid 1st Class for this big packet!
MASTERCRAFT PLANS WEST, Dept. 35W
P.O. Box 625, Redmond, WA 98073

HORTON BRASSES
Nooks Hill Road P. O. Box 120 WJ
Cromwell, CT 06416 (203) 635-4400
HORTON BRASSES are authentic
copies of 17th, 18th, 19th & early
20th century pulls.

Mfrs. of Cabinet & Furniture
Hardware for Homes & Antiques.
Send \$2.00 for a Catalogue.

Imported European Hardware

3820 Schiff Drive
Las Vegas, Nevada 89103
871-0722
SEND \$1.00 FOR CATALOG
MasterCard VISA

SCROLL SAW OWNERS - Lettering Layout Guides!
• Use our specially designed guides to layout letters & numbers to be cut from wood or other materials.
• Made from a durable plastic material.
• Several styles & sizes.
Send \$3.00 (Refundable with first order) for descriptive brochure & prices to:
SEYCO SALES 1238 Bardfield
Box 472749
Garland, Texas 75047

BUILD IT YOURSELF

TOYS • PUZZLES • PLAQUES • PLANTERS
FURNITURE • LAWN ITEMS • BIRD HOUSES
ROCKING & RIDING HORSES • PLAY SETS



SAME SIZE PATTERNS • WHEELS • HOW-TO BOOKS

ILLUSTRATED CATALOG \$100

Design Group, Box 514-F, Miller Place, N.Y. 11764

30 BIRDHOUSES



Attractive new bird houses and feeders. Expertly designed to attract Wrens, Martins, Robins, etc. Easily made. Full size patterns and directions. Only \$7.00. Prepaid 1st Class.

MASTERCRAFT PLANS WEST, DEPT. 316W
P.O. Box 625, Redmond, WA 98073



RECANE YOUR HEIRLOOM CHAIRS

Full line of caning & basketry materials & supplies —
Weaving Cane Woven Cane

Flat, Oval & Round Reeds
Fibre & Genuine Rush Danish Seat Cord
Raffia, Rattan, Seagrass Hoops & Handles

20-page illustrated catalog with complete information, prices, order form: \$1

CANE & BASKET SUPPLY CO.

1281-WJ Cochran, Los Angeles, CA 90019



WOOD PARTS

TOY, FURNITURE, CRAFT & GAME

Wheels • Spindles • Balls • Knobs • Shaker pegs • And more!

Since 1927! Send \$1.00 for Catalog.

BROWN WOOD PRODUCTS CO.
P.O. Box 8246WJ, Northfield, IL 60093 • (312) 446-5200

Furniture Refinishing

Earn \$500 - \$1000 in a single day!

Part-time, full-time opportunity. **FREE** catalog stripping, repairing, refinishing, mirror resilvering, veneering supplies & systems. Complete training provided.

Send \$1 for postage & handling to:
MINUTEMAN, INC., Dept. 06
115 N. Monroe St., Waterloo, WI 53594



SAVE \$100'S

ON STORAGE ARMOIRE!
FULL-SIZE PLANS

& easy directions for 3 widths: 36", 42", 48".
Shelves & 6 drawers, or adjust shelves only for TV-VCR. Yours for only \$11. Money-back guarantee.
Send for **FREE** illustrated furniture catalog.
FLEXIPLANS DEPT. DX
48 Lowell St., Westwood, NJ 07675

TABLE STROKE SANDER

6 Models \$595.00 — \$695.00 **BALL**
Deluxe \$750.00 — \$1200.00 **BEARING**

Sand 38" x 6' & 8'
Sidestroke & String Sanders
Available, Kits \$45 to \$570.

(Less Motor) F.O.B. * McCall House, Box 1950-C
Lenoir, N.C. 28645 704-758-1991

OVER 34 YEARS MANUFACTURING LATHE-TOP WOOD TURNING DUPLICATORS



Ours is the only ORIGINAL
Duplicator of its kind. Be a
professional in minutes.
New wide base model.

LITERATURE \$1.00
Refundable with first order

TURN-O-CARVE TOOL CO. P.O. Box 8315-WJ Tampa, FL 33674

Wood Classics



Parts / Plans / Kits

Wood Classic
P.O. Box 389 / Everson, Washington 98247

Send
\$1.00 for
Catalog

MAKE TOYS & WOOD PROJECTS



7 CAR TRAIN
\$6—Plan only.
\$27.50—Plan & turned parts
(92 parts in all!).
Visa & M/C
100's of plans, kits, colored & unfinished hardwood parts for toys, crafts & furniture; plus tools, wood, finishes & supplies. Bulk prices available. Color catalog subscription \$1. (614)484-4363
Cherry Tree Toys, Box 369-31, Belmont, OH 43718

22 1/2° OCTAGON GAUGE



TO SET MITER TO SAW BLADE FOR 22 1/2° CUT. HARDENED ALUMINUM GAUGE HAS OCTAGON FORMULAS AND 14" RULER SCREENED ON. ALSO SCREW CHECKER AND INFORMATION.

\$7.95 Plus \$2.00 Handling and Shipping
California residents add 6% sales tax. Send check or money order to:

LYON ELECTRIC COMPANY, INC.
P.O. BOX 81303 SAN DIEGO, CA 92138

Queen Anne Lowboy Full-Size Professional Plan



You can build this classic piece of furniture. Plan gives construction details of cabriole legs, dove-tailed drawers and chip carving of middle drawer. Overall size: 35 1/2" wide, 20 1/2" deep and 30 1/2" high.

Order Plan #194 .. \$11.75

CATALOG 180 diff., full-size prof. furniture plans — \$2.00 (catalog free with order)

FURNITURE DESIGNS, Dept. JE-36
1425 Sherman Ave., Evanston, Ill. 60201

NATIVE AMERICAN HARDWOODS

WALNUT, BUTTERNUT, CHERRY
CURLY & BIRD'S-EYE MAPLE
Most Other Domestic Woods

- EXTRA WIDE/EXTRA THICK STOCK
- TURNING SQUARES/BLOCKS
- QUARTERSAWN/BOOKMATCHED LUMBER
- SPALTED LUMBER/BLOCKS
- THIN STOCK
- FLOORING/PANELING

NO MINIMUM
WHOLESALE & RETAIL

Comprehensive Listing—\$1 (Refundable) (716)942-6631
NATIVE AMERICAN HARDWOODS LTD.
R1, W. VALLEY, N.Y. 14171



Discover a new world of satisfaction and creativity with your bandsaw making small, unique bandsaw boxes for fun and profit. This unpublicized, little-known technique is guaranteed to delight you as you easily turn common inexpensive lumber and scraps into valuable utility boxes for home and office. High demand in gift shops, stationery stores and craft fairs. Fully illustrated instruction booklet of 15 original and profitable designs. Satisfaction absolutely guaranteed. Send \$10.00 to: BOX-ART, Dept. J, Box 8069, Woodridge, IL 60517.

SHAKER FURNITURE

An exciting collection of Shaker dining chairs, tables, beds and other furniture available in Kits or completely finished. All exemplify the simplicity and versatile beauty of Shaker design. Pegs, peg-board, Shaker baskets, oval boxes, dolls and miniature furniture.



Large selection of replacement chair tapes.

New 48 page color catalog and 12 tape samples \$1.00

SHAKER WORKSHOPS
Box 1028-WJ6, Concord, MA 01742

...learn how the pros



..HOT TOOL!

17.95 Plus \$2.00 Postage
MA Resident add 5%
Dealer inquiries welcomed
send today for brochures

HOT TOOLS Inc.
P.O. Box 615-J • Marblehead, MA 01945 • 617 639-1000

The Woodworker's Marketplace

BANDSAW OWNERS!

A NEW TOOL is now available so you can make or repair any length Band Saw Blade in minutes!

This professional quality tool was developed for use in our own shop and has proven itself with hundreds of high quality, true running splices.

Our splicer enables any craftsmen to purchase economical 100 foot rolls of bandsaw blade stock and make up any length blade QUICKLY and EASILY. The resulting silver brazed joint normally outlasts the service life of the blade.

Three models are currently available:

- 1C-001 1/4" to 3/4" Blades.....\$45.00 ppd.
1C-002 3/8" to 1" Blades.....\$45.00 ppd.
1C-003 1 1/8" to 1 1/2" Blades.....\$150.00 ppd.

The tool comes complete with detailed instructions and supplies for approximately 100 splices. We also carry additional supplies as well as OLSON bandsaw stock at reasonable prices.

Send L.S.A.S.E. for FREE information to:

NEW MILFORD SPECIALTIES CO.

Dept. WJ, 24A South Main St.

New Milford, CT 06776 • (203) 426-4276

SHAKER PEGS or MUG PEGS

\$17.95 per 100, prepaid.

Wide selection of other wood products.

Catalog \$2.00 or free with order.

Benny's Woodworks

P.O. Box 656, Dept. WJD1

Antioch, TN 37013

(615) 331-8384

Shaker Peg

Mug Peg



The Toymaker Supply Co.

Largest selection of wood toy patterns/parts/books
Catalog Free

Lake Forest Rd., Dept. J3
Tahoe City, CA 95730-5459

Pattern R3

\$3.98 ppd.

PRECISION PLANNER / JOINTER HSS KNIFE SHARPENING USING CBN ABRASIVES

AFFORDABLE RATES PER LINEAL INCH

THICKNESS: 40" approx

1/8" THICK — \$35 PER INCH
5/32" THICK — \$45 PER INCH
3/16" THICK — \$55 PER INCH

Return Shipping & Handling \$2.50 Per Order. Tape in sets and send to:

LEADING EDGE TOOL SERVICE

Route 2, Box 108AA, Dept. 1, Palmyra, Missouri 63461

SPECIAL WOODEN PARTS ASSORTMENT PACKAGES

34 PARTS ASSORTMENT \$5.00

Includes:

- 4 — 1" Wheels
- 4 — 1 1/2" Wheels
- 4 — 2" Wheels
- 4 — 2 1/2" Wheels
- 8 — 1/4" Axle Pegs
- 8 — 1/2" Axle Pegs
- 1 — Large Smoke Stack
- 1 — Medium Smoke Stack

75 PARTS ASSORTMENT \$10.00

Includes the 34 part assortment plus:

- 4 — 1/4" Wheels
- 4 — 1 1/4" Wheels
- 4 — 2" Wheels
- 4 — 2 1/2" Wheels
- 1 — Milk Can
- 1 — Gentleman
- 1 — Lady
- 1 — Child
- 4 — 1/4" Axle Pegs
- 4 — 1/2" Axle Pegs
- 1 — 1/4" Multi-grooved Dowel
- 1 — Small Smoke Stack
- 1 — Medium Smoke Stack

WOODEN TOY PATTERNS WHEELS & PARTS CATALOG \$1.00 — Refundable on your first order.

WOODCRAFT

P.O. BOX 40344, DEPT. W10
GRAND JUNCTION, CO 81504

WOODCRAFT

FREE Tool Catalog

Quality Products For Woodworkers

Send today for your FREE copy of our new colorful catalog. It's fully illustrated with the finest quality tools, supplies, books, components, hardware, and much more. Satisfaction Guaranteed.

Write today for your FREE catalog.

WOODCRAFT SUPPLY CORP.
Dept. WJ36
41 Atlantic Avenue, Box 4000
Woburn, Massachusetts 01888

CUSTOM BRANDING IRONS

DRILL PRESS or HANDHELD
250 to 800 watts

SEND \$1.00 FOR BROCHURE

ENGRAVING ARTS (707) 984-8203
P.O. Box 787
Laytonville, CA 95454

WOODWORKERS FULL SIZE PATTERNS

Simple to make — Fun — Profitable

- 75 pattern packet plus "Shop Secrets"
- Over 50 "Folk Art" patterns
- 6 "Wind-Action" whirligigs packet
- 40 craft plaques plus projects
- 8 child pleasing aircraft packet
- 6 decorative magazine racks

Send \$6.00 per blueprint packet or choose any 3 FOR ONLY \$12.00.

ACCENTS, Dept. MJ36
P.O. Box 262
Danvers, MA 01923

Brochure of 400 designs \$2.00 (Free with order)

WOODWORKERS

Save on Wood - Tools - Supplies!

OVER 4000 ITEMS

Send for New 1986 148 Page Money Saving CATALOG

Finest Dimensioned HARDWOODS and Quality VENEERS

42 Varieties 1/64" to 4" Thickness

Fast service on choice kiln dried Wood and Veneers, Moldings, Trim, Hand and Power Tools, Lamp Parts, Upholstery Supplies, Clock Movements and Kits, Hard-to-Find Hardware, Finishing Materials, Books... over 4000 items in stock! Craftsman — Woodworker's best friend.

\$3.00 Discount Coupon

Good on Your First Order FREE with Catalog!

CRAFTSMAN WOOD SERVICE
Dept. E-46 1735 W. Cortland Ct., Addison, IL 60101

Please enclose \$1.00 to help pay postage and handling

DUBUQUE CLAMP WORKS.

527 Garfield
Dubuque, Iowa 52001

8" Kit ~ 6.95 / 10" Kit ~ 7.95
12" Kit ~ 8.95 / 14" Kit ~ 9.95

Kits Include:

- 2-Heavy Steel ferrules with spiro pins...
- 2-7/16 ACME, double lead, threaded rods...
- 4-5/8 Pivot nuts...

Complete layout with instructions.

Also available — 2 Wood handles. — \$1.00

Send Check or Money Order
Visa or MasterCard accepted.
WE PAY FREIGHT!

MIRO MOOSE
Quality Made in USA
Dubuque, Iowa

THIN HARDWOOD SIX PACKS

CLEAR — KILN DRIED — SURFACED 4 SIDES
IN OUR KILNS — OUR 4 SIDED PLANNER

Each pack contains 6 square feet of one thickness — one species — pieces are 2 to 4 feet long and 3 1/2 to 7 inches wide.

PRICES FOR 6 SQUARE FEET

Thick.	Walnut	Cherry	Red Oak	White Oak	Poplar	Shipping Handling
1/4"	\$18.55	\$17.35	\$17.35	\$19.85	\$15.55	\$3.82
3/8"	\$21.95	\$19.40	\$18.40	\$21.70	\$16.65	\$4.93
1/2"	\$25.30	\$22.70	\$21.70	\$23.15	\$18.40	\$5.95
3/4"	\$28.80	\$26.10	\$24.12	\$24.84	\$20.52	\$9.84

To Order: Circle dollar amount above — add shipping and handling — check or money order only please.

Mail to: **BERGERS HARDWOODS**
Route 4, Box 195, Bedford, Virginia 24523

Virginia residents please add 4% sales tax.

— If not satisfied, price refunded on return of wood —

Name _____
#/Street _____
City/Town _____
State _____ Zip _____
Amount Enclosed _____ CK _____ MO _____
Other exact sizes available — please ask

Sleeveless DRUM SANDER

NO PRE-MADE SLEEVES TO BUY

ECONOMICAL — Simply cut sandpaper from standard size sheets
UNIQUE — Twist of key tightens sandpaper to drum.
SPONGE RUBBER backing insures long wear of sandpaper

1" x 3" long \$13.50
2" x 3" long \$15.50
2 1/2" x 3" long \$16.00
3" x 3" long \$17.50

1" and 2 1/2" Above \$27.00
Above 4 Drums \$55.00

1/4" x 3" long \$14.50
1/2" x 4 1/2" long \$21.00
3" x 4 1/2" long \$22.50
2 1/2" x 6" long \$25.50
3" x 6" long \$27.50

Add \$2.50 Per Order For Shipping

AVAILABLE WITH:
1/2" Bore with 1/2" or 1/4" shaft
1/2-20 RH Thread except 1/4" x 3"
3/8" Bore except 3/4" x 3" and 2" x 3"

USE ON:
Drill Press
Small Motor
Lathe, Combo-Tools,
Radial Saw, 1/4" Drill

MONEY BACK GUARANTEE

Send Check or Money Order to:
SINGLEY SPECIALTY CO. INC.
P.O. Box 5087, GREENSBORO, N.C. 27403
CALL: (719) 852-8881

CLASSIFIED

The Classified Rate is \$1.00 per word, payable with order. Minimum ad length is 15 words, and the deadline date is the 25th of the 3rd month preceding the issue (4/25 for the July/August 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.

Brochure of unique wood toy & craft plans \$1.00 refundable. Lap desk, doll beds, spaceships. E-Z Built Toys & Crafts, 116 S. 3rd Avenue, Ilion, NY 13357.

Plans for 100+ tools for your shop. Catalog \$1.00 refundable. Wood-Met, 3314 Shoff, Peoria, IL 61604.

Twelve all new action toy plans! Carousel, trucks, vans, sports cars, hammering benches, train. \$5.00 complete. Don's Designs, 3600W San Sebastian, Tucson, AZ 85715.

Waterbed and bedroom furniture catalog of plans, \$2.75. Over 50 beautiful selections! Kraemer Furniture Designs, P.O. Box 33, 1350 Main St., Plain, WI 53577.

Post Office box doors; combination or keyed — No. 1 \$5.00; No. 2 \$7.50; No. 3 \$10.00. Cherry or walnut banks \$36.00; add \$1.00 each shipping. Woodcrafts, P.O. Box 1415, Fletcher, NC 28732.

Woodworkers: Make \$100.00 every Saturday with your shop scraps! Complete instructions \$3.50. Cedartree, Box 744C, Oregon City, OR 97045.

Planer blades, sharpened shaper cutters and moulder knives — custom ground. 1-800-346-3026 ext. 958. WDR Sales Co., 9604 Belmont KC, MO 64134.

Create an heirloom with full size wooden toy patterns, parts, and accessory kits. Over 100 classic to contemporary designs. Catalog \$1.50. Toy Designs, Box 441-W, Newton, IA 50208.

Start moneymaking woodcraft business making "easy-quick" toys, gifts, novelties. Free details. Williams, 3600J San Sebastian, Tucson, AZ 85715.

Rosewood, ziricote for craft projects. All sizes. List \$1.00 (refundable). Tropical Hardwoods, Rt. 2 Box 69-A, Eureka Springs, AR 72632.

Thanks for all your orders and nice letters thanking me. Dud Brown (Dud's Dowel Cutters).

Musical instrument kits — dulcimers, hammered dulcimers, banjos, mandolins and more. Color Brochure 56° stamp. Folkcraft Instruments, Box 807-K, Winsted, CT 06098, (203) 379-9857.

12" sanding drums. Build your own 12" drum sander. Kit includes three assorted pre-cut belts. Write Universal Clamp Corp., 6905 Cedros Ave., Van Nuys, CA 91405.

Over 50 "folk art" patterns! Create profitable "country cut" woodworking designs. Hundreds of unique projects! Only \$6.00. Accents (CJ-36), Box 262, Danvers, MA 01923.

Thin hardwoods, 1/32" to 1/4" thick, cherry, walnut, butternut, oak, etc. Large SASE. Shaker Miniatures, Dept. WJ, 2913 Huntington Rd., Cleveland, OH 44120.

Rosewood cut-offs — 7/8" thick, 1 1/2" to 2 1/2" wide up to 8" long. Make fine jewelry — knife handles — handgun stocks — trivets — coasters — etc. 10 lb. assortment \$10.00 delivered east of the Rockies. Send check or money order. Grampa Ben, 2021 S. 19th Avenue, Broadview, IL 60153. (312) 343-2020.

77 innovative plans. Barns, all sizes, types, styles. Workshops, garages, storages. Catalog \$4.00 (refundable). Ashlandbarns, 990WJ Butlercreek, Ashland, OR 97520.

Plan booklets — \$4.00 ea.! 1) 10 quartz clocks, 2) 25 wood toys, 3) 25 kitchen accessories, 4) 20 gift items, 5) 15 sewing accessories. All specially designed for mass production! Any 3 — \$15.00. All 5 — \$15.00. Order includes catalog of 200 woodworking plans! Products, 389 Ward Road, Burlington, Ontario, Canada L7R 3H8.

Whirligig plans, patterns! Create six of our favorite "wind action" woodworking designs. Only \$6.00. Accents (WJ-36), Box 262, Danvers, MA 01923.

American made, 5 hp single phase, 1750 motors. \$199.00 FOB. Daily Mfg., Box 7-W, Rockwell, NC 28138, (704) 782-0700.

Woodentoy patterns, hardwood wheels, parts. Catalog \$1.00 refundable. Woodentoy, Box 40344-W102, Grand Junction, CO 81504.

Rustic picture frames, detailed plans, also included where to order beautiful low cost posters and prints. \$5.00 to: Dale Adams, Rt. 3 Box 375, Massena, NY 13662.

Combination lock post office box doors. \$8.00 each ppd. Banks \$40.00 ppd. Clayton, 1500 Huntcliff Way, Clinton, MS 39056.

Free wooden toy plan — A \$4.00 value, no gimmick, just our way to introduce you to our products. Send \$1.00 to cover postage: Toyecraft, Dept. WJ03, 601 East Main, Waynesboro, PA 17268.

Miniatures hardware, electrical, wallpaper, wood moldings, spindles, shingles, furniture parts, dollhouse and furniture kits, etc., 1" to 1' scale. Catalog \$2.00 (credited first order). LeMunyan's, Dept. WJ, Rt. 1, Troutman, NC 28166-9728.

Earn easy money making wood tulips. For patterns and instructions, send \$3.00 and SASE: Kogelmann, P.O. Box 515, New Baltimore, MI 48047-0515.

Reps wanted for Japanese thin kerf carbide blades. No investment. Small refundable deposit. Boone Wholesale, 5330 S.W. Lower Drive, Lake Oswego, OR 97034.

Dulcimer builders supplies — precision milled and fine sanded dulcimer and hammered dulcimer woods. Cherry, Walnut, Paduk, Rosewood, Birdseye and Curly Maple. Sitka Spruce, W.R. Cedar; related hardware, strings, and accessories. 56° stamp for brochure. Folkcraft Instruments, Box 807W, Winsted, CT 06098, (203) 379-9857.

Patterns hundreds new toys games household doll children furniture backyard projects more. Catalog \$1.00. Arto, Box 128, Upperjay, NY 12987.

Outdoor wood cut-out patterns/instructions — "farmerboy scarecrow"; "woodland birds"; "parading skunks"; "calico hen & chicks"; "little dutchies"; "balancing parrot" . . . \$3.00 each, four for \$10.00. Catalog 50° refundable. Fourth Dimension W2, 85 Helmar Drive, Spencerport, NY 14559.

C L A S S I F I E D

Attention scroll-sawers! All new 1986 catalog — Bigger and better. Everything for the scroll-sawer; number and lettering templates, patterns, blades, saws, accessories. Good prices. Many new items. Catalog \$3.00 refundable. The Nostalgia Factory, 315 Beech, Liberal, KS 67901.

Index of *The Woodworker's Journal* 1977 through 1985. Send \$5.00 to: Essman, WJ 12798 Rt. 62, Orient, OH 43146.

Ebony. Black ebony turning squares. 2 x 2 x 12, \$15.00 ppd. Highest quality, quantity discounts. List of other exotics, SASE. SJC, 650 St. John, Pasadena, CA 91105, (818) 441-1067.

Wood Whirligigs. Full-size patterns, instructions. Wind-driven 15"-22" bee, chipmunk, dog, coyote, roadrunner, cat, songbird, duck. \$3.00 each; any four \$10.00; all eight \$20.00. W. Skov, 3380 So. 4th Ave. #54, Yuma, AZ 85365.

Wooden power tool plans. Create a treasured "display model" chain saw. \$6.95. Brochure included. Step-Up, Box 3401-WWJ, Kansas City, KS 66103-0401.

Lumber kiln kits, plans. Custom kiln drying. Finest gently kiln dried hardwood lumber featuring walnut to 15" wide. Information, send long stamped envelope to Donald's Enterprises, 68 Schuyler St., Belmont, NY 14813.

Build beautiful Queen Anne style furniture with cabriole legs from Overeem Woodcraft, Picture Butte, Alberta, Canada T0K 1V0.

Anniversary Special: Gallery spindles \$6.95 per 50, oak shaker pegs \$2.25 per 10, cherry or walnut shaker pegs \$3.50 per 10, birch shaker pegs or mug pegs \$9.50 per 50, smokestacks \$5.00 per 25, little people \$3.00 per 25, wood drums or barrels \$5.50 per 25, beanpot candle cups \$5.75 per 25, maple toy wheels (per 100) $\frac{7}{8}$ " \$3.25, 1" \$3.50, $1\frac{1}{4}$ " \$3.95, $1\frac{1}{2}$ " \$6.00, $1\frac{3}{4}$ " \$9.95, 2" \$12.00, $2\frac{1}{4}$ " \$15.00, $2\frac{1}{2}$ " \$20.00. Tack rags 10 for \$4.95, dust masks 5 for \$1.25, safety glasses \$1.50 ea., Elmers yellow glue \$3.00 per 16 oz., 120 grit A/O sandpaper \$2.00 per 10, maple screw hole buttons $\frac{3}{8}$ " or $\frac{1}{2}$ " \$8.00 per 500. Catalog \$1.00, free with order. Add \$3.25 for orders to \$35.00 and 10% on orders over \$35.00. Mastercard & Visa \$25.00 min. K & K Woodcrafters, RD #4 Box 270A, Scotia, NY 12302. (518) 374-1981. Prices good until April 30th.

Swing: Comfortable, old-time platform family lawn swing. Detailed illustrated plan with material list. Send \$5.00 to: Edward G. Mason, 8322 S. Howell Avenue, Oak Creek, WI 53154.

Woodworkers — Enjoyable home business (Turn \$4.00 into \$39.95) — Free details! Pine Shop, 897-3 Mammoth, Manchester, NH 03104.

Wood supplies: Shaker pegs, candle cups, dowels, toy parts, bulk prices available. Free catalog. Rainbow Woods, 47 Glenmar, Newnan, GA 30263.

Chair caning supplies — cane webbing, rush, splint, ash, rawhide, cord. Catalog \$1.00 (refundable). Caning Shop (WJ), 926 Gilman, Berkeley, CA 94710.

35 full-size toy patterns! Ten cars, six trucks, two airplanes, nine hot-rods, six piece train, two earthmovers! Only \$5.00! Franks, 1202-J32 Second, Booneville, MS 38829.

PEG-1000 wholesale — 10 pounds polyethylene glycol green wood stabilizer. \$19.00 plus \$3.20 shipping. General Finishes, Box 14363J, West Allis, WI 53214. (414) 774-1050.

Wooden backhoes . . . giant yard sets . . . pushcycles . . . flying cylinders . . . games . . . original plans. Catalog — Wonder Works, Waverly Road, Dalton, PA 18414.

Power Feeder three wheels 4 speeds. Universal mount can resawing \$495.00. Shaper 2.5 HP $\frac{3}{4}$ " spindle \$595.00. Spliner \$299.95. 1-800-346-3026 ext. 958. WDR Sales Co., 9604 Belmont, KC, MO 64134.

Letter layout guides! Excellent for scroll sawers, carvers, etc. Several styles, sizes. Made from durable plastic material. Also Excalibur scroll saws! Brochure \$3.00 (refundable). Seyco, 1238 Bardfield, Box 472749-WJ, Garland, TX 75047.

Woodcrafters: Our hottest selling craft show items. Five full scale size toy plans and instructions. \$3.50. Grandpa's Workshop, 307 S. Magnolia Ave., Dunn, NC 28334.

Woodworkers! 8 Full-sized patterns for cars and trucks from scrapwood. \$3.00. Tubecity Graphics, Box 322, Milton, MA 02186.

Easy to build, unique wooden toys . . . Plans, supplies catalog, \$1.00, refundable . . . Phillips, Box 51820, Mount Pleasant, NC 28124-0518.

Woodcrafts. Veteran craftsman has experienced \$1000 craft shows. Will send plans for 6 best-selling wood items for \$5.00. Bennett Wood Products, Route 8, Box 680-S, Pensacola, FL 32506.

The Hardwood Connection, 420 Oak St., Dekalb, IL 60115. A complete wood-working store, staffed by woodworkers. Native and imported hardwoods, plywood, power tools, books and supplies. Call for our free brochure on our workshop (815) 758-6009.

Free illustration with details for building a complete play area with tree house. SASE: Kidstuff, Box 154W. Kipton, OH 44049.

Bandsaw owners: Produce over \$100.00 per day making bandsaw puzzle boxes. Plans \$5.95 includes 4 styles. Bennett Wood Products, Route 8 Box 680-S, Pensacola, FL 32506.

PEG-1000 and the woodworker. All you need to know in an informative 25 page how-to booklet. Send \$2.00 to Brandy Station Woodcrafts, 11 Pinewood Circle, Corning, NY 14830.

Wood moulding knives made for Belsaw type planer molders. Custom knife grinding specialist. Wanager Custom Knives, 536 East B, Kingman, KS 67068. (316) 532-5391.

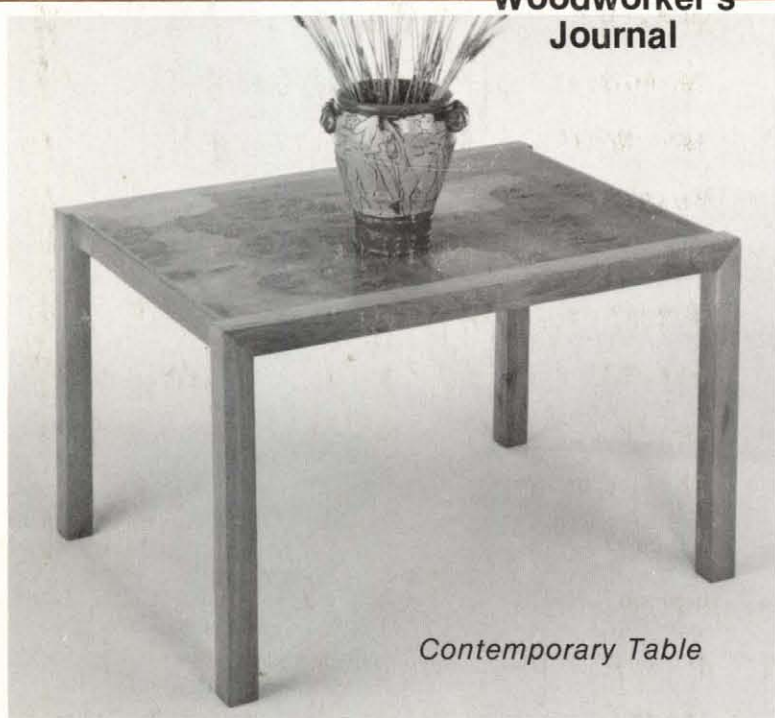
Make wooden toys — projects — 100's plans, kits, hardwood parts (toys, crafts, furniture), tools, wood, supplies. Color catalog \$1.00. (614) 484-4363. Cherry Tree Toys, Belmont, OH 43718-0369.

A new book from The Woodworker's Journal contributing editor Roger Schroeder and Paul McCarthy. "Wood-carving Illustrated Book 2" gives you complete, fully illustrated, how-to information on 8 useful projects. American eagle, wall clock, ship model, & 5 more, 256 pages. Only \$12.95 plus \$2.00 postage. Book 1 also available with 10 projects for \$11.95 plus \$2.00 postage. Alternate selection of Popular Science & Self-sufficiency Book Clubs. Send checks or credit card # and expiration date (Visa, Mastercard, American Express) to: Stackpole Books, Dept. WWJ, P.O. Box 1831, Harrisburg, PA 17105.

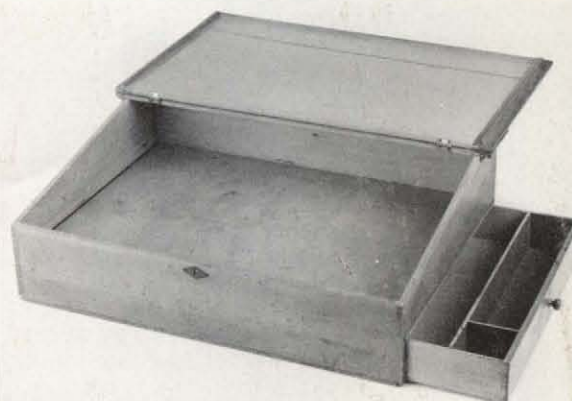
Next Issue . . .

Here are a couple of the projects we've lined up for the May/June 1986 issue of

The Woodworker's Journal



Contemporary Table



Shaker Lap Desk



Keep your journals readily accessible . . .

One Binder or box style Case is all you need to accommodate 12 issues. Both Binders and Cases are handsomely made with rich maroon leatherette covers and gold leaf embossed lettering.

The Woodworker's Journal Binders hold 12 issues, open flat for easy reading and reference and are economically priced at only \$8.50 each; 3 for \$24.75, postpaid.

The rugged, compact box Cases, which hold 12 or more issues, are only \$6.95 each; 3 for \$20.00, postpaid.



Please send your order with payment **DIRECTLY** to:

Jesse Jones Industries
P.O. Box 5120, Dept. WWJ
Philadelphia, PA 19141

I enclose my check or money order for \$ _____

Send me: _____ Cases @ \$6.95 _____ Binders @ \$8.50

Name: _____

Street Address: _____

City: _____

State: _____ Zip _____

Orders outside U.S.A. please add \$2.50 each for postage and handling. Please allow 4-6 weeks for delivery.

Note: Satisfaction guaranteed or your money refunded.