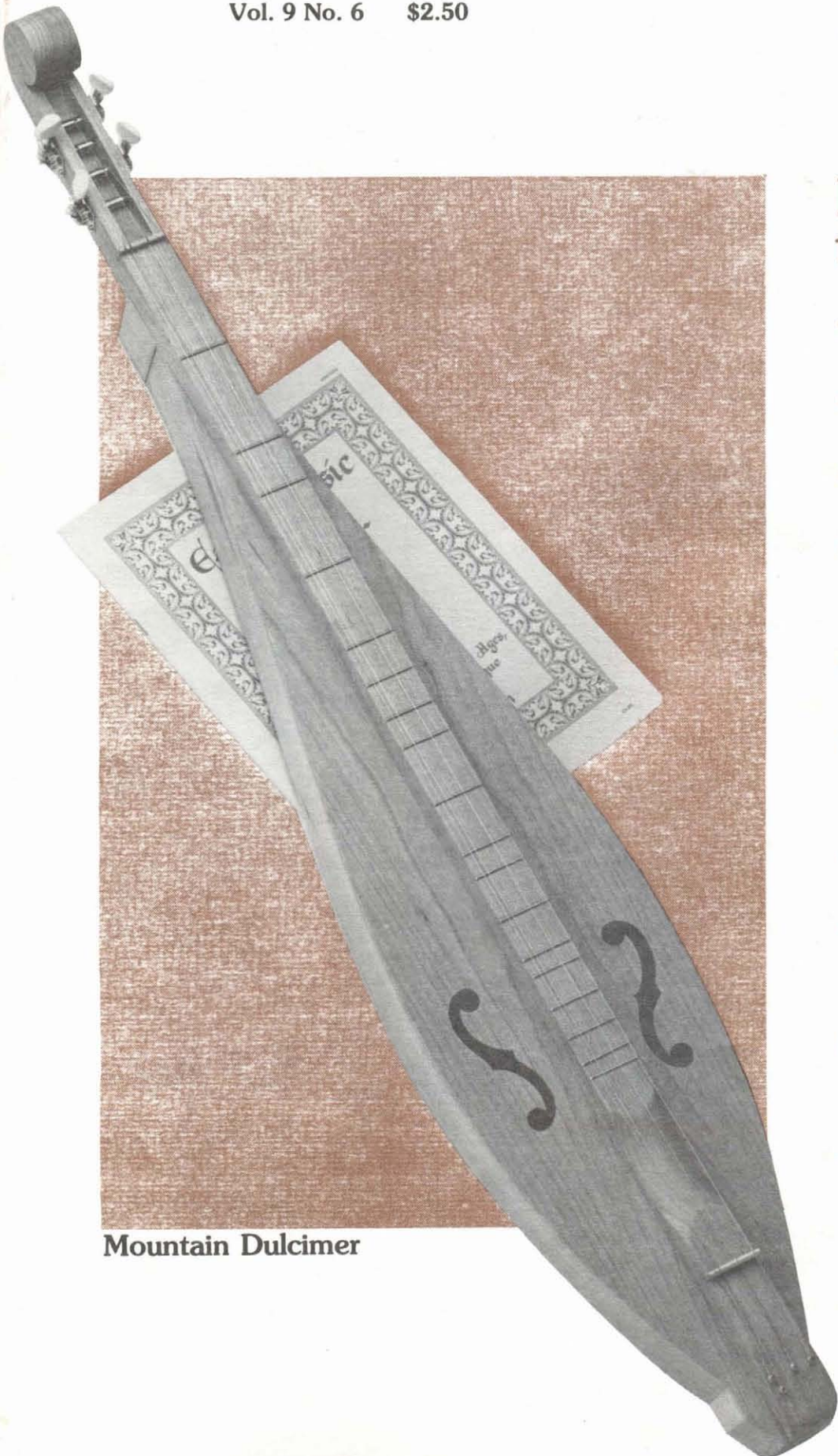


The Woodworker's Journal

Vol. 9 No. 6 \$2.50



Mountain Dulcimer

Included in this issue:

- Veneered Clock
- Moravian Chair
- Marking Gauge
- Landscape Cutting Boards
- 4 x 4 Off-Roader
- Shaker Washstand
- Duck Pull Toy
- Pine Desk Organizer
- Oak Dining Table
- Early American Tall Clock

November/December 1985

TREND-LINES BEATS ANY AD THIS ISSUE!

We honor all Freud specials

New! Freud tool sets

4 Pc.	Chisel Sets	19.95
6 Pc.	Chisel Sets	31.75
10 Pc.	Chisel Sets	52.95
8 Pc.	Lathe Set	53.95
6 Pc.	Carving Set	59.50
12 Pc.	Carving Set	111.50

Free
Wooden
Case!

MAKITA TOOLS

1100	3 3/4" Planer Kit	\$163.95
1805B	6 1/8" Planer Kit	264.95
1900BW	3 1/4" Planer w/cs	93.95
2030N	12 1/2" Plnr/Jntr	1475.00
2040	15 5/8" Planer	1185.00
2400BW	10" Miter Saw	

2401BW	10" Miter Saw w/blade	248.95
	w/electric brake	215.00
2708	Table Saw	218.95

3601B	Router	118.95
3608BK	Router w/cs	84.95
3612BR	3 HP Router	176.95
3700B	Laminate Trimmer	82.95
4200N	4 3/8" Circular Saw	92.95
4300DW	Cordless Jig Saw	124.50
4301BV	Vr. Sp. Orbital Jig Saw	

5007NB	8 1/4" Circular Saw	97.95
5008NB	8 1/4" Circular Saw	108.95
5012B	12" Chain Saw	119.95
5081DW	3 3/8" Cord. Saw	103.95
5201NA	10" Circular Saw	222.50
5402A	16" Circular Saw	314.75
6000R	Uni-Drill	104.95

6010DL	Cordless Drill w/charger	99.95
6010DWK	Cordless Drill w/charger	88.95
6010SDW	3/8" Rev. Cordless Drill	44.95

6012HDW	Cord. Drill Kit 2-Sp	108.95
6510LVR	3/8" Drill-Rev.	68.95
6710DW	Cord. Screwdriver	109.50
6800DBV	Drywall Screwdriver	88.95

9030	1 1/8"x21" Belt Sander	128.95
9035	Finishing Sander	47.95
9035N	Dual Action Sndr	59.95
9035DW	Cordless Sander	99.95

9045B	Finishing Sander	99.95
9045N	Dustless Sander	107.95
9207SPB	7" Sander Polisher	139.95
9401	4"x24" Belt Sander	162.95
9501BKT	4" Sander Grinder Kit	79.95

9900B	3"x21" Belt Sander	122.95
9924DB	3"x24" Belt Sander	130.75
994510	Finishing Sander	46.95
994530	6" Round Finish Sander	48.95

DA3000	3/8" Angle Drill	104.75
DA3000DW	Cordless Angle Drill	99.75
DA3000R	3/8 VSR Angle Drill	103.95
DK1001	Drill (6010D), Charger & Vacuum Cleaner	124.50

DP3720	3/8" Reversible Drill	59.95
DP4700	Drill Reversible	94.95
GV5000	Disc Sander	56.95
HP1030	Hammer Drill	109.95
JG1600	Jig Saw single Sp.	97.50

JR3000V	Recipro Saw	124.95
JV2000	Orbtl Var. Jig Saw	104.50
LS1400	14" Miter Saw	397.50

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JV2000	Orbtl Var. Jig Saw	104.50
LS1400	14" Miter Saw	397.50

RYOBI TOOLS

B7075	3X21 Belt Sander	\$115.95
B7200A	4X24 Belt Sander	164.95
BD1020R	3/8" Cordless Screw driver	94.95

E3800A	Drywall Screwdriver	78.95
JSE-60	Electronic Jigsaw	122.95
L-120U	3 5/8" Planer	88.95

L1323A	1/4" Planer	139.95
LS-35	Finishing Sander	59.95
L-580	6 1/8" Planer	249.95

R-150	1 HP Plunge Router	85.95
R-330	2 HP Router	137.95
R-500	3 HP Plunge Router	159.95

S500A	3x5 1/2 Finishing Sander	40.95
TR-30	Laminate Trimmer	99.95
TS-251U	10" Miter Saw w/ Freud LU85M10 Blade	229.95

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
6750-1	H.D. Drywall Screw driver	99.95
6753-1	Drywall Screwdriver	83.95

SO-110A	1/2 Sheet Sander	119.95
SB-75	3x21 Belt Sander	128.75
SB8T	2 Sp. w/dust bag	165.00

TR-6	Laminate Trimmer	88.95
TR-8	1 HP Plunge Router	126.95
TR-12	3 HP Plunge Router	167.50

W6V	Screwdriver	99.95
SO-110A	1/2 Sheet Sander	119.95
SB-75	3x21 Belt Sander	128.75

SB8T	2 Sp. w/dust bag	165.00
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TR-6	Laminate Trimmer	88.95
TR-8	1 HP Plunge Router	126.95
TR-12	3 HP Plunge Router	167.50

BLACK AND DECKER INDUSTRIAL TOOLS

1165	3/8" Angle Drill	\$119.50
1179	3/8" Var. Sp. Drill	74.95*
1180	3/8" VSR Holgun®	105.00

1575	3/8" VSR Scrudrill®	119.50
3051	7 1/4" Wormdriver	
3091	10" Miter Saw	148.95

3103	2 sp. Cut Sawkit	109.95
3105	Var. Sp. Cut Sawkit	119.95
3107	Var. Sp. Orbital Cut	129.25

3265	Laminate Trimmer	145.65
3310	1 1/2 HP Router	145.00
3370-10	3 1/4" Planer	129.95

4247	Palm Sander	49.95*
6750	4 1/2" Disc Sander/Grinder	69.95*
	Heat Gun	69.75

* \$5.00 Mail In Rebate		
** \$10.00 Mail In Rebate		

HITACHI TOOLS		
B600-A	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
C7SA	7 1/2" Circular Saw	68.95

C10FA	10" Miter Saw w/ vise ext.	268.75
C10FB	10" Miter Saw	194.50
C12Y	12" Table Saw	1245.00

D10VC	3/8" Rev. Drill	55.00
DRC-10	Cordless screwdriver	89.95
F1000A	Planer/Joiner	1275.00

C10FB	10" Miter Saw	194.50
C12Y	12" Table Saw	1245.00
D10VC	3/8" Rev. Drill	55.00

The Woodworker's Journal

NOVEMBER/DECEMBER 1985 VOLUME 9, NUMBER 6

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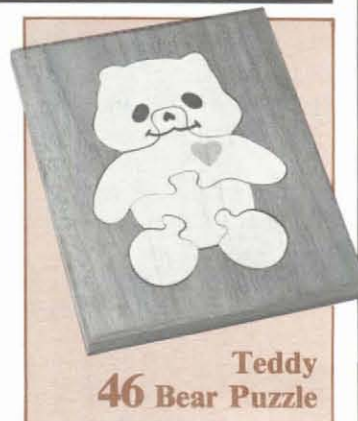
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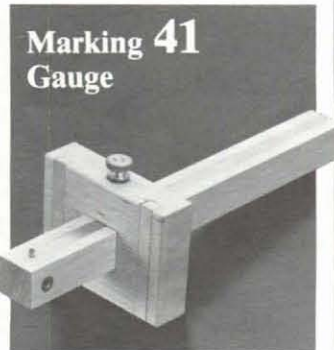
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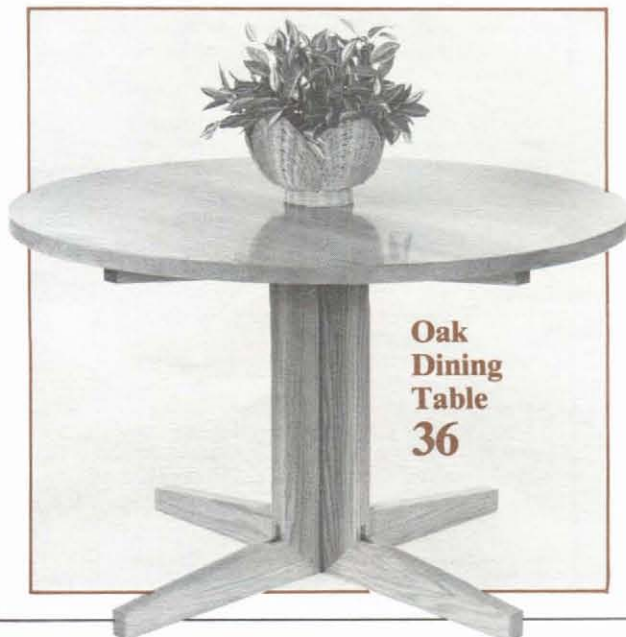


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Shoptalk

A Prestigious Award

Earlier this year, renowned California woodworker and author Sam Malloof received what is perhaps the highest recognition a living craftsman has ever received in this country. He was awarded the MacArthur Fellowship in recognition of his outstanding accomplishments in woodworking and design. Unlike honorary degrees and other such symbolic gestures, this award included a grant of \$300,000 to be paid out in installments of \$60,000 for five years, and the full amount is tax-free.

This award was made so that Mr. Malloof can continue to follow his own creative instincts without the constraints imposed by having to earn a living. In other words, he can do with the money as he sees fit. That's the stuff that daydreams are made of!

The MacArthur Foundation was established through the fortune of insurance magnate John D. MacArthur. Since 1981 there have been 166 honorees receiving tax-free awards ranging from \$128,000 to \$300,000. I think it's important to note that Mr. Malloof is the first craftsman to receive this honor and he now shares company with some of the nation's finest scientists, artists, writers and humanitarians. Speak-

ing for myself and all those who consider the working of wood a most worthwhile endeavor . . . congratulations to Sam Malloof.

'Tis the Season

This issue coincides with what I've always felt was the time of the year when woodworkers really start to get busy turning out projects for family and friends. The workshop seems especially inviting on these weekends when the weather is often inclement. To help keep you generating plenty of sawdust, we've assembled quite a lineup of projects for this and upcoming issues.

If I had to pick a favorite project from this issue, it would have to be the very imposing Early American Tall Clock. The simple elegance of this clock makes it not only a rewarding piece to build but also one that is well within the capabilities of most of our readers.

Since the clock is large and relatively unadorned, I suggest that particular care be given to emphasizing the beauty of the wood by very thorough sanding and the use of a transparent and low luster finish such as penetrating oil. This is a potential heirloom so I'd also suggest that before the final finish is applied, you proudly add your name, city or town and the completion date in waterproof black ink inside the case.

Jim McQuillan

Introducing The Hawk Precision Scroll Saw

Whether You Do Scroll Sawing As A Hobby, For Making Money, Or As A Craftsman, The Hawk Is The Tool For You!

We Designed Our New Precision Scroll Saws For Beginners and Built Them For Fine Woodworkers

- Make simple crafts like toys and puzzles to give as presents
- Paper towel holders, wall sconces, name cutouts and hundreds of others you can sell for profit
- Fancy scallops and precision scrollwork for clocks, heirlooms, intricate inlays and dovetails.

How creative do you have to be to scroll saw? If you can draw a line, you can follow it with a Hawk . . . and, like that, you're scroll sawing, with the kind of results you've always dreamed of. Trace any kind of pattern onto your wood and follow the lines. It's that simple.

Make Money or Just Scroll For The Fun Of It.

You'd be surprised how easy it is to make money with scroll woodworking. Hundreds of folks start doing it the minute they set The Hawk up in their workshops. Many use this to pay for their machines, supplement incomes and even start full-time businesses.

Experienced craftsmen find they can do intricate scrollwork for their fine woodworking projects in half the time it takes on a bandsaw or jigsaw.

If coupon is missing write your name and address on a postcard and mail to: RBI Industries, 201 First St., Pleasant Hill, MO 64080.



Hawk 20" Model

FREE Information Kit

FREE 30-DAY TRIAL! Get The Facts Today.

☐ YES! Put me on your mailing list to receive my Free Fact Kit.

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A Simple Solution To Successful Scroll Sawing For The Entire Family . . .

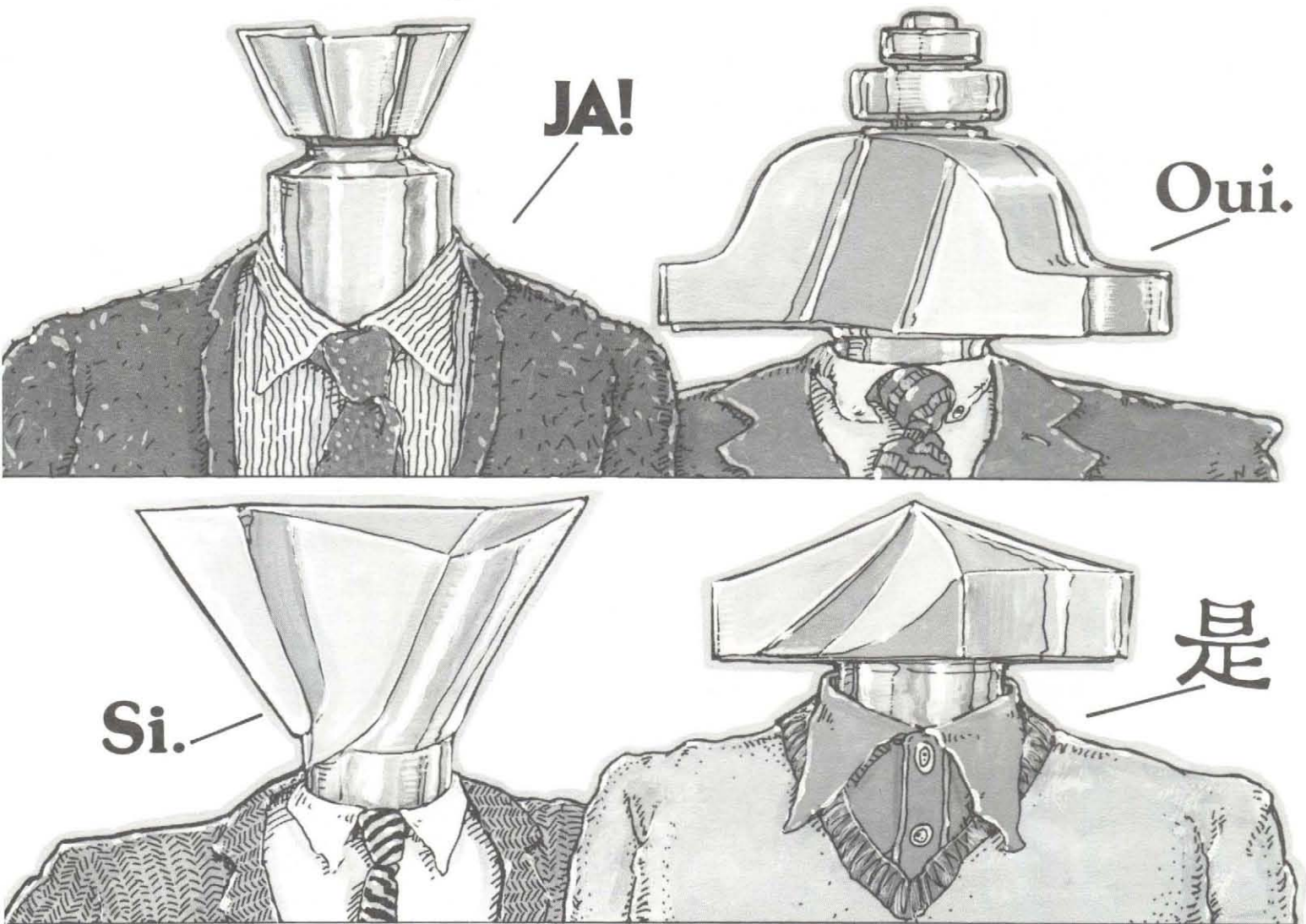
Scroll Sawing is not a "for-men-only" hobby. Far from it! Women get considerable enjoyment out of this kind of woodworking, and are quite good at it. The Hawk makes it all possible because of its simple design.

It's quality made-in-the-U.S.A. construction will give you years of service. And any of the four models - whether you choose the 26", 16", 14" or 12" model - will give you the precision, accuracy, and sand-free polished edges you get only after hours of hand sanding.

Four Important Reasons Why You'll Want To Send For Your Free Fact Kit Today!

1. **30-Day Guarantee of Satisfaction** - Use your Hawk for 30 days without risking a penny!
2. **One Year Warranty** - against defects in parts and craftsmanship.
3. **Free Membership in RBI Pattern Club** - Everything you'll need to get started including patterns, stencils **plus** our Scroll Saw Newsletter.
4. **Scroller's Hotline and Continuing Education** - When you want to talk about scrolling with another scroller, we're as near as your phone. **Plus**, we'll be coming to your area with our demonstrations and seminars on scroll sawing. You'll get invitations just by being on our mailing list.

When you order router bits, is something lost in the translation?



Maybe your supplier speaks very fluent "discount." But how conversant is he in "quality?" Sound more like "double talk?"

You know that cost counts when you buy router bits—and DML is the last to deny that fact. But a sharp buyer always looks for the best bit for his money. So wait a moment before you plunk down your dollar. Realistically, do you know your seller and his wares? Are his prices *always* the best? Is he always promoting some sort of lowball bargain? Don't you wonder... why?

DML, also, runs the occasional promotion. But we feel we should give you more than just dollar inducements. And we do.

DML offers you a router bit for every application. Bits of heat-

treated tool steel. Dressed to industrial standards, tipped with premium carbide, diamond honed, precision balanced. Over 370 in all. In a whole slew of sizes and configurations, to fit your portable and stationary equipment. Industrial quality router bits, matched to your exact cutting needs.

In sum, DML speaks your language. You get the right bit. At the right price. You see, we're a bit suspicious of a

manufacturer whose big story is a cheap price. Maybe you should be, too.

For more information or the distributor nearest you, contact DML, Inc., 1350 S. 15th Street, Louisville, KY 40210
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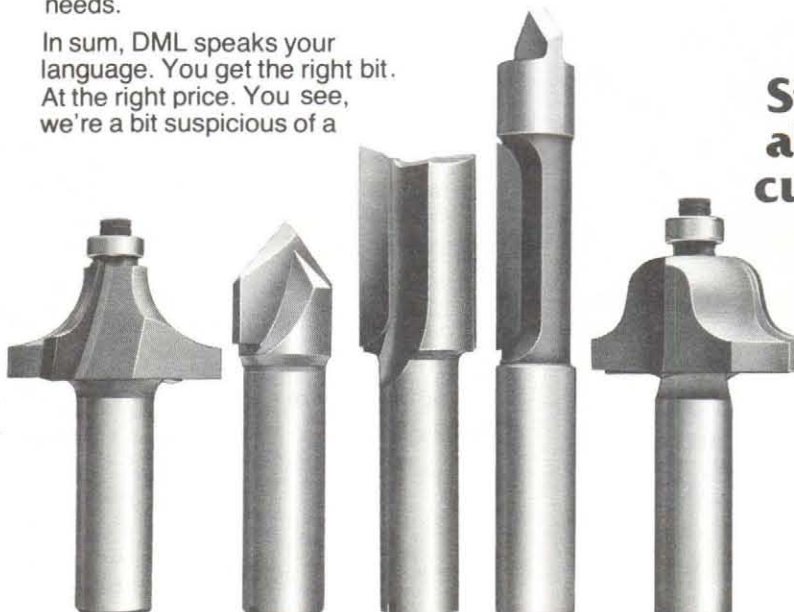
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about 1,002
cutting tools.**



DML
Cutting everything but corners

A SUBSIDIARY OF VERMONT AMERICAN CORPORATION

Letters

I make a beautiful walnut stain using one part boiled linseed oil, three parts paint thinner and a teaspoon (more or less) of concentrated burnt umber stain. However, I no longer have a source for the burnt umber stain. Can you help?

J.S. Farr, Jr.
Columbia, S.C.

The concentrated stain is probably a Japan color. Japan colors are highly concentrated pigments suspended in a varnish-like medium. They are made in a variety of colors, including burnt umber. It can be ordered in one-half pint or quart containers from Wood Finishing Supply Co., 1267 Mary Drive, Macedon, NY 14502.

Is there a tool available that will cut wooden toy wheels?

We know of a couple of sources. Wheelcutter, Box 443, St. Clair Shores, MI 48080 sells two cutters: one for \$39.95 and one for \$49.95. For more information, write to them and include a self-addressed stamped envelope. You can also order one for \$15.95 from Deaton, 5905 Gullstrand, San Diego, CA 92122. Send a stamp and they will mail you a brochure.

I'm refinishing an oak table and have discovered that the extension slides are worn and no longer efficient. Do you know of a source?

Karen Smith-Collins
Phoenix, NY

The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, MN 55374 carries several types of table slides. Send \$1.00 for a copy of their current catalog.

I make and sell unique handcrafted wooden items. Since I have access to a local cypress lumber mill that offers

very reasonable prices, I naturally have a tendency to work with this wood. As you know, cypress is a beautiful wood, but a cantankerous one to finish.

My business has now picked up to the point where I need to be able to cut down on my finishing time. Any information you can give me would be appreciated.

Gene Polley
Astor, Fla.

Editor's Note: John Olson, who writes our Restoring Antiques column, helped us with this one.

It might be a good idea to try a penetrating resin finish such as Watco or Deks Olje. I have a mailbox made of cypress that is about five years old and it was finished with Deks Olje. This finish hasn't prevented the wood from weathering to a dark gray color, but it has done a good job of preserving the wood. When the first coats were applied to the new wood, a nice lustrous finish resulted. Had it been protected from the weather, I'm sure it would have maintained its natural color. In



My **NEW** SCROLL SAW has a hinged arm to make repositioning your work easy –

cuts wood up to 2" thick with a 20" radius, and has a built-in air pump to blow away dust and chips so you can always see what you're doing!

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To separate the head from the blade, just loosen the blade tension knob and lift the hinged arm. Then position the workpiece over the blade and return the arm to the working mode. Blade changing is just as simple. The blade tension knob maintains constant, uniform tension. A quality machine at a very reasonable price.

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fact, the makers of Deks Olje recommend it for bright work on boats. They state that the natural color of the wood will be retained if the finish is renewed two or more times each year. My mailbox wasn't that lucky. Deks Olje can be ordered from The Wooden Boat Shop, 1007 Northeast Boat Street, Seattle, WA 98105.

I use the 1/2 in. capacity Jacobs chuck on my drill press to prepare dowels for gluing. Inserting the dowel in the chuck and applying even pressure with the chuck key results in three perfect indentations for excess glue to escape. If you want more grooves, simply rotate the dowel slightly and again apply pressure. I find this method superior to cut grooves because the indentations expand when the glue is applied, resulting in a tighter hold.

D. Larson
Renton, Wash.

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has deteriorated on our furniture. If you have any or know where we might be able to obtain some, please contact me.

Kirk H. Elder
Dayton, Ohio

Campaign style hardware is available from The Wise Company, 6503 St. Claude Ave., Arabi, LA 70032.

Odds and Ends

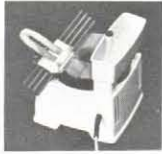
The Woodworking Association of North America (WANA) has two upcoming shows. "Woodworking World — The Carolina Show" will be held at the Charlotte Civic Center in Charlotte, North Carolina on November 15-17, while "Woodworking World — The San Francisco Bay Area Show" will be held at the Oakland Convention Center in Oakland, California on December 6-8. Admission is \$5.00.

The Illinois Woodworking Teachers' Association will meet Friday, November 1st, at Illinois State University in Normal, Illinois. The meeting will be held at 8:00 a.m. at the Circus Room of the University Union. Students as well as instructors are encouraged to attend. Contact Richard A. Davis, 1214 Porter Place, Lockport, IL 60441.

The Albuquerque Woodworkers' Association is holding a series of fall and winter workshops. For more information, including cost, write to them at Box 40407, Albuquerque, NM 87196.

The Green Country Woodworkers Club recently elected Oren Zehner as president for the coming year. The club meets on the 4th Thursday of each month, at 7 p.m., at the Tulsa County Vo-Tech School, 3420 S. Memorial Drive, Tulsa, OK 74145. Anyone interested in any kind of woodworking is invited to attend.

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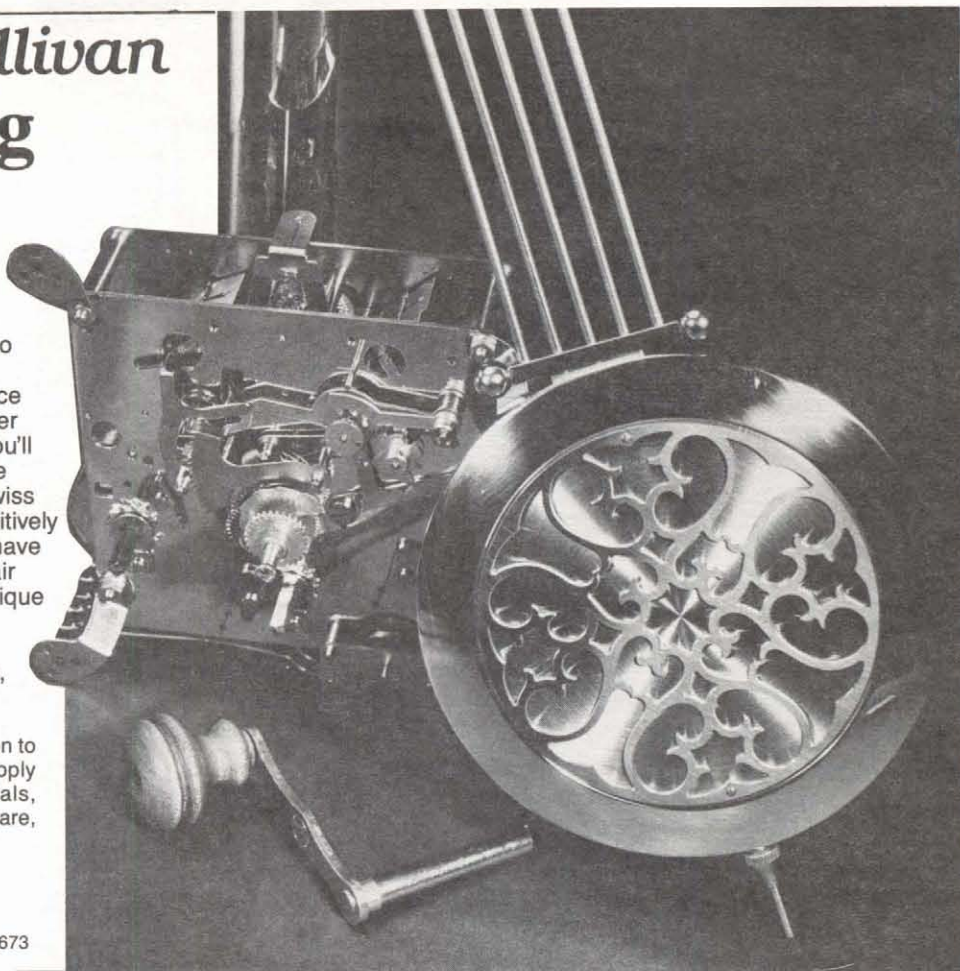
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Excalibur Precision Scroll Saws At-A-Glance

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Length of Cutting Stroke	14"	12"
Cutting Speed	6-1800*	1400 Single-Speed 800 speed 400 motor* 6-1800 variable-speed motor*
Worktable adjustment Right	20°	45°
Left	45°	45°
Worktable Width	14"	12"
Worktable Depth	24"	17 1/2"
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Overall Width	30"	12"
Overall Height	21"	14"
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*Rpm (strokes/minute)		

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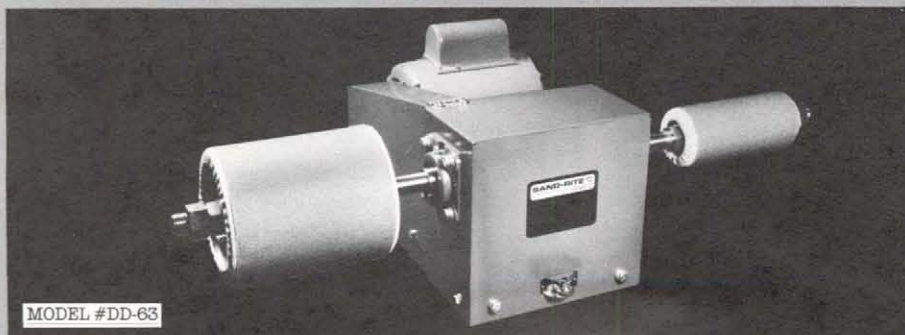
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How to Make Carcase Joints with Hand Tools

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- Making handsome raised panels with chisel and plane
- How to shape a perfect Dovetail Joint
- Chisel, saw and marking gauges are all the tools you need!

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	How to Work With Hand Planes – (Both tapes above)	☐ VHS 602-0010 ☐ Beta 602-0030	\$69.95	
	How to Make Carcase Joints with Hand Tools	☐ VHS 602-0004 ☐ Beta 602-0024	\$39.95	
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Rugged Construction

The factory uses the Mehanite process under license in making all castings. Then, a combination of natural and artificial aging gives assurance that raw castings for every saw are perfect. Engineered ribbing and precision machining yield a superior product in both appearance and performance.

Table

The General 10" saw has a heavy all-cast table. After the casting is aged, its entire surface is precision-ground to close tolerances. This accuracy is apparent when the mitre gauge is inserted and it glides effortlessly forward or back, with no side-play in the deep T-slot grooves. Finally, the large size of the table is noted. It is both impressive and functional... as it provides a full eleven inches in front of the blade where it counts the most.

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A reinforced heavy-gauge steel cabinet-style base has a hinged vented clean-out door for convenient shop clean-ups. A motor cover may be added to completely enclose the base for use together with a dust-collection system.

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Mitre Gauge

The T-roller design mitre gauge is adjustable and pre-settable to 90° and 45° right and left. Its cast body is pre-drilled for insertion of optional stop rods which permit accurate repetitive cuts.

Guard

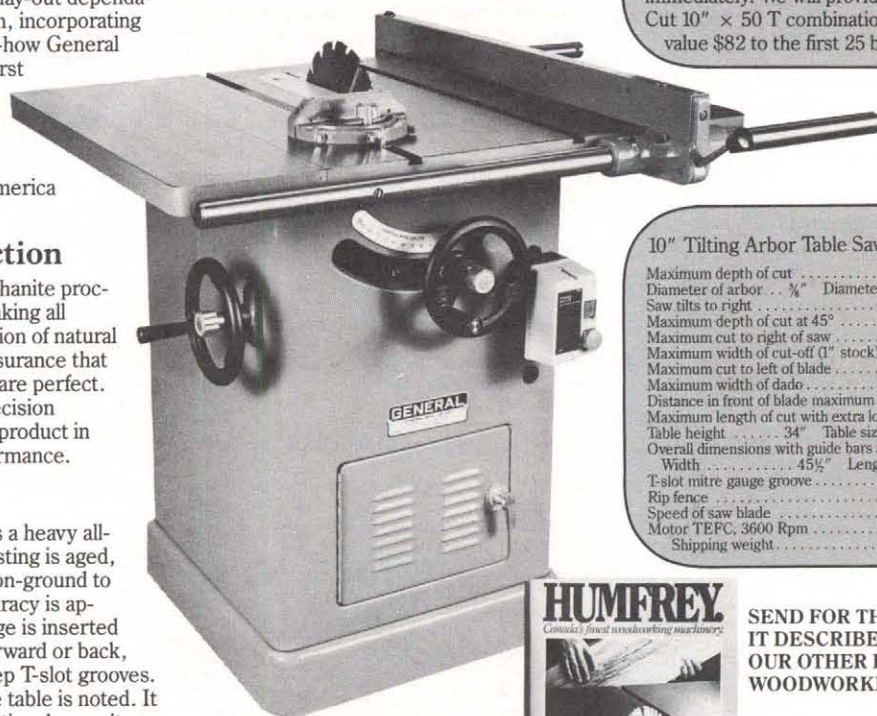
The General 10" Table Saw completely encloses all moving parts within the cabinet stand for maximum safety. The exposed portion of the blade may be covered by a swing-away splitter/guard complete with anti-kickback fingers (standard with every machine). An overarm guard can be provided if required.

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I would be grateful for any help in locating an operations manual for a Sears Craftsman radial arm saw model no. 113-29441.

I'll be glad to pay for cost of copying and mailing.

Mike Broda
932 Lobster Lane
Key Largo, FL 33037

I would like information as to whether there is a duplicator available (or adaptable) for an AMT no. 2731 wood lathe.

Raymond Dec
5428 S. NewCastle
Chicago, IL 60638

I am seeking any data — parts list and manual — for an old Sears jigsaw model no. 103-0407. I will reimburse cost for copying and postage.

Nicholas Leondiris
Box 562
Warsaw, NC 28398-0562

Can anyone give me a source for an Ogee router bit for 3/4 in. table edges with a 1/4 in. shank and its own pilot?

Bob Clayton
R.D. 2, Box 230
Meshoppen, PA 18630

I'm in need of an owner's manual and parts list for a Sears-Roebuck 3 x 21 belt sander, model no. 315.11751.

Robert T. Cragg
400 Broadmeadow Rd.
Rantoul, IL 61866

I am restoring a model 61 J.A. Fay & Egan 16 in. jointer and would like to obtain a copy of the owner's manual, parts list, and/or catalogs advertising said model. Any information would help.

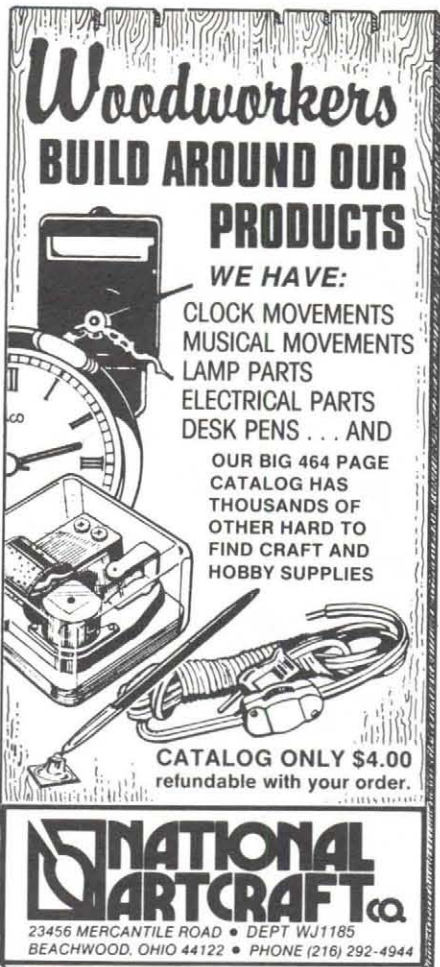
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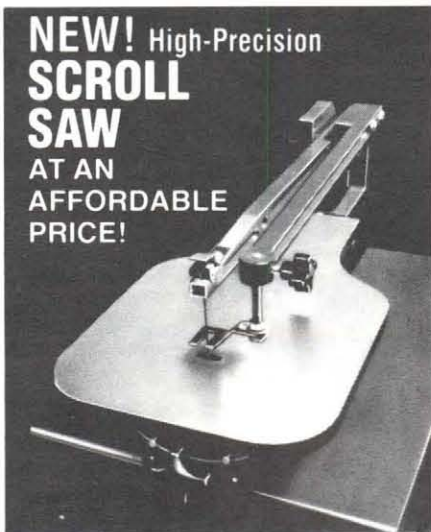
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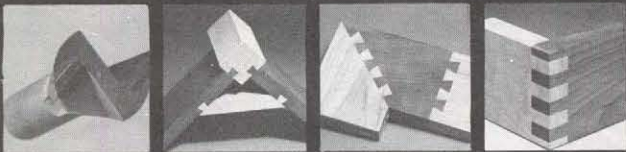
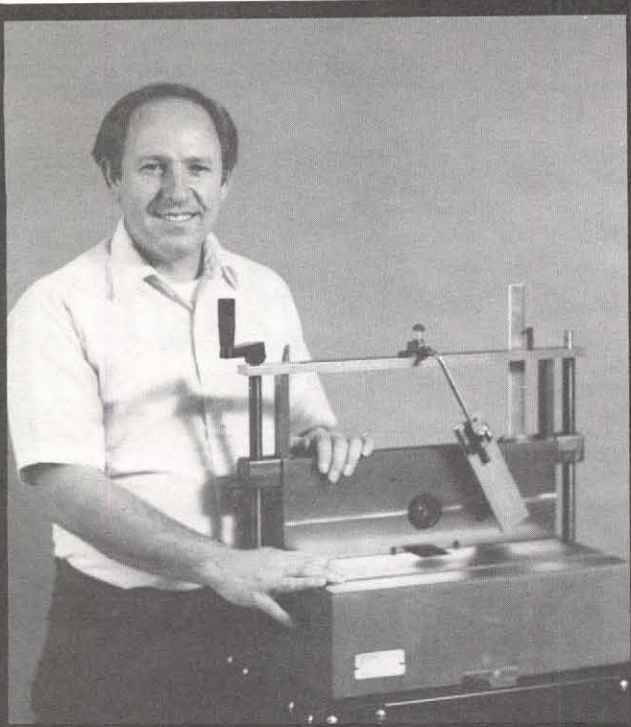
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Workshop Income Secrets of Success

We often receive letters from subscribers who are thinking about starting a woodworking business. Over the years, here in the Workshop Income feature, we have tried to provide these readers with useful and specific information.

There are so many aspects and angles to consider, and so many points to remember, that it would be impossible to thoroughly review them all in one column. Instead from all the previous articles we will attempt to distill the key elements. We will identify and examine the most important factors, the "secrets" if you will, of a successful woodworking business.

First — Know yourself: your skill level, ability, and potential. Tailor the business so that you will be able to meet your own expectations. Be realistic. Remember, the hardest and loneliest path is that of the artist. The dropout and failure rate is incredible. To succeed as an artist you can't be merely good, you must be great. Recognize the fact that unless you are an artist/woodworker/craftsman with a well established clientele, you cannot afford to specialize in custom-made, one-of-a-kind pieces.

*No matter how competent and skilled
you are, you will labor in
obscurity if you do not sell or
market your work.*

Second — No matter how competent and skilled you are, you will labor in obscurity if you do not sell or market your work. Some woodworkers choose to be their own retailers. Others choose the fair or craft show route. Still others strictly wholesale production items. Whatever you do, know this: you will have to sell, you will have to advertise, you will have to plan, keep records, and do inventory and bookkeeping. You will need to learn about taxes, write-offs, depreciation, deductions, profit and loss and a host of other things that have absolutely nothing to do with woodworking.

You will have to figure costs, including labor, materials, overhead, and other fixed and hidden costs. And, you will have to price your work accordingly, having factored all these things in.

If you are still considering starting a business, don't forget that you will have to purchase tools, possibly need to hire help (then you become an employer, with all the accompanying headaches and paperwork) and, of course, you must have insurance.

As you can see, we have done our very best to discourage you. The fact is, 80% of new businesses fail within five years. But, you say you are still interested! And what about those "secrets of success" we promised earlier?

Okay, here is our advice. *Timing, Opportunity, Product, Service.* These four words are keys to success in business. *Timing* — Every successful business has at least a little luck, and timing is vital to luck. If you are producing a Christmas item, it must be ready for market in July, perhaps even earlier if you are to reach wholesale buyers. Timing your production schedule, planning for shipping, knowing when to increase and decrease inventory — all these things are important. Even the best product, if it is presented at the wrong time, can fail.

Opportunity — Tailoring your product to meet a specific need, to respond to local or regional culture, economic reality, and available markets is another key to success. For example: expensive furniture will not sell in economically depressed areas. Instead you must seek out, identify, and seize sales opportunities. Perhaps a local museum store has had requests for reproductions of colonial style tables and chairs. Here then is a ready-made market. Or perhaps an area retailer will be willing to sell your cutting boards and kitchen utensils crafted in native hardwoods. Whatever the case, you must both recognize and create opportunities.

Success = The right person, with the right product, at the right time, in the right place.

Product — Your product is the key piece in the success picture. Opportunity will be wasted and timing is meaningless if the product is not right. What constitutes the right product? As a rule, a product must be practical, serving a purpose and filling a need. Tables, chairs, beds, desks, cabinets, shelves — these things will always be popular because they are necessary. Items that are specialized, such as a computer desk, a TV/VCR cabinet, or a microwave cart will also sell well when the things they are designed to house are in demand.

Many woodworkers have done well because they have developed a new, interesting or different idea. Whether it is a small box, a trivet, or a cutting board, remember a unique and distinctive look or shape may be just the thing that makes your work attractive.

Service — You must believe in your product. You must be a salesman, like it or not, to at least some degree. You must meet delivery deadlines, cater to egos, smile when you feel lousy, and perhaps repeat the same tired sales pitch with the same enthusiasm no matter how stale it sounds. Whether you are at a neighborhood craft fair selling whirligigs one by one, or in a wholesale expo selling hundreds of production items, make no mistake — both require dedication, work, and perseverance.

So, what does all this mean? In a word, there are many directions that you might take, many paths to the goal, many ways to succeed. Whatever your choice though, remember that timing, opportunity, product, and service are all interrelated, dependent one upon the other.

Reduced to the simplest equation, this is the essence:
SUCCESS = The right person, with the right product, at the right time, in the right place. Good luck! WwJ

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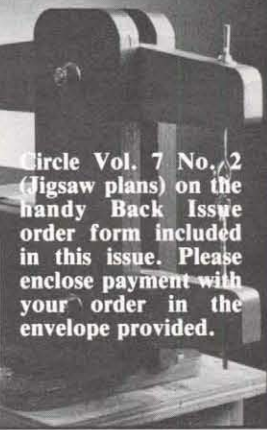
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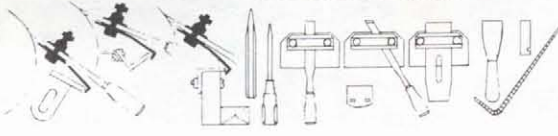
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Restoring Antiques

Weaving a Rush Seat, Part I

by John W. Olson

To make chairs lighter and more comfortable, old-time chairmakers often used woven seats. They had a variety of natural materials to choose from. Cane, splint, leather, worsted tape, and rush were among those most commonly used, each with its own distinctive features.

Woven rush made a seat that was attractive and durable and, for the early American chairmaker, it was a thrifty substitute for cane. The Egyptians used it as a seating material as early as 4000 B.C. Some 150 years ago, Lambert Hitchcock was making rush-seated chairs by the thousands in his factory in Riverton, Connecticut. The Shakers also used it extensively.

Rush is made from the female leaf of the cattail (sometimes called cooper's flag), the plant commonly found in fresh water shallows and swamps. Although natural rush is still commercially available, it has been almost entirely supplanted in recent years by a man-made substitute called fiber rush.

Fiber rush is made of a tough grade of paper that is twisted to form a strand. Fiber rush looks like natural rush, yet it has the advantages of being less expensive and easier to handle. It makes a strong and long lasting seat — in fact, it will outwear natural rush. Of course, any quality antique rush-seated chair should be restored with natural rush. However, for most chairs, fiber rush is the logical choice.

Fiber rush is generally sold by the pound. An average chair (16 in. wide x 14 in. deep) usually requires about two pounds, so a number of suppliers offer two pound coils. It's usually available in five diameters ($\frac{3}{32}$ in., $\frac{1}{8}$ in., $\frac{3}{16}$ in., $\frac{1}{4}$ in., and $\frac{5}{16}$ in.) and three colors — golden brown, kraft brown, and multi-colored (brown, green, yellow). Of the three colors, kraft brown is the least durable. These colors will darken in time, a point to be taken into consideration when trying to match the color of an old seat.

Fiber rush can be ordered from the Connecticut Cane and Reed Co., P.O. Box 1276, Manchester, CT 06040 or The Caning Shop, 926 Gilman Street at Eight Ave., Berkeley, CA 94710. Both companies offer catalogs for \$1.00.

Chair seats with rush will have either a rectangular or trapezoidal shape. A seat that has square corners will be rectangular, while a seat that has the front rail wider than the back rail will be trapezoidal. The weaving process for a trapezoidal seat is a bit more involved, so in this issue we'll limit our discussion to the rectangular seat. Next issue we'll cover the trapezoidal shape.

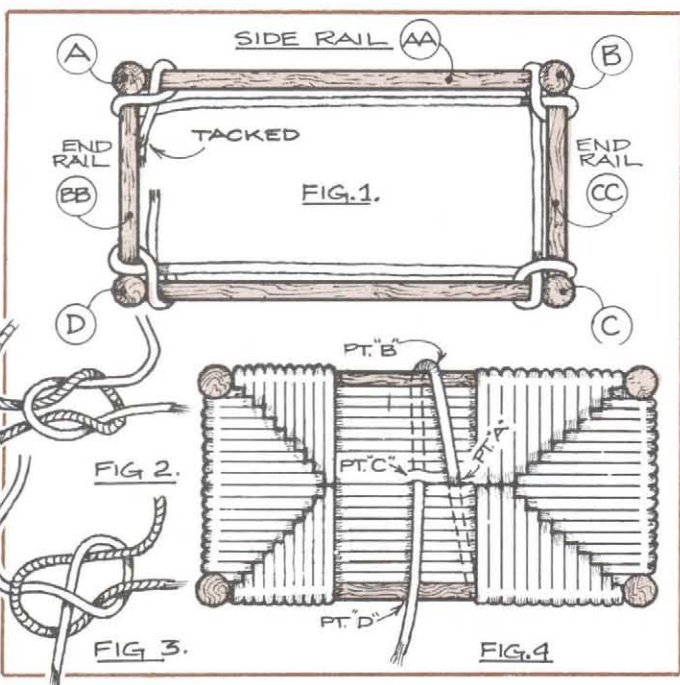
A cracked rail or loose joint is not likely to stand up to the tension created by the woven rush, so make all repairs before starting to weave. Check the rails for sharp edges. If you find any, round them over with sandpaper because they can lead to wear and shorten the life of the rush.

With all repairs complete, give the entire chair a thorough washing with a mild soap and water solution. Dry the surface quickly to avoid soaking the wood.

Before starting, cut the rush to a length that is easily handled (about 25 feet), then roll it into a ball. When ready to weave, briefly dunk the rush in a pail of water, allowing it to get wet but not soaked. The water makes the strands pliable so it's easier to weave. After the seat is woven, the rush will shrink as it dries, making a tight seat. When dunking the rush

though, don't allow it to get too wet. If it does it becomes soft and unworkable, and it may even start to deteriorate.

Fig. 1 shows how to begin weaving a square cornered seat. It will help to tack the end of the rush to the inside of one of the end rails next to the leg. As shown, starting at the leg labeled A, carry the end of the rush over the side rail (AA), back under the same rail, then over itself to tie a half hitch. Now bring it over, then under the adjacent end rail (BB). Pull the end of the fiber rush across to the opposite end rail (CC) at the corner labeled B. Repeat the half hitch at this corner, then go on to corners C and D before returning to corner A. This finishes one complete weave. Continue this process until about two-thirds of the rail surface is covered. When the end of the cord is reached, a new piece is tied using a square knot (Fig. 2) or sheet bend knot (Fig. 3). Be sure to locate the knots on the underside of the seat.



As you proceed you will see that pockets are forming at each corner between the upper and lower wraps of the cord. To create a flat, comfortable seat, and to protect the fiber rush cord against wear on the inside corners of the rails, the pockets are stuffed with heavy brown paper. Supermarket grocery bags work just fine. The stuffing should be snug but not so tight as to deform the seat.

Some chairmakers use triangular shaped pieces of cardboard for stuffing. The cardboard is inserted as the weaving proceeds. However, cardboard doesn't give as much protection as brown paper and it doesn't tighten the seat as well.

When the end rails have been filled, the middle can now be filled in. As shown in Fig. 4, this filling weave is a bit different. The end is threaded through the center opening (at point A), then brought over the back side rail (point B), back through the center (point C), and around the front side rail (point D). Continue this weave until the space is filled, then tack the rush to the underside of the nearest rail. Cut the rush about 4 in. from the tack and tuck the loose end into a nearby strand.

Keep in mind that, in a short article like this, it's impossible to detail each and every step that's required to weave a rush chair. At best this is a general overview of the subject. If I've managed to perk your interest though, you may want to do some further reading. The booklet *Rush Seats for Chairs* by Ruth B. Comstock is a good one and it's available from both mail-order sources listed earlier.

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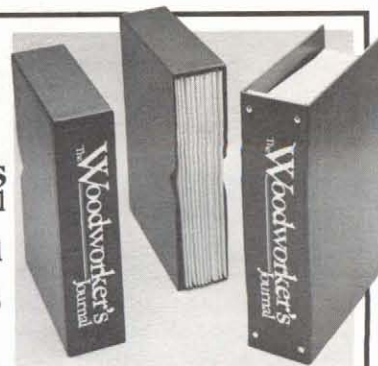
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B7100	3x24" dustless Belt Sand	208	140
B7200A	4x24" dustless Belt Sand	269	165
D100VR	3/8" VSR 0-1200 rpm drill	91	49
W640	7 1/4" 13 amp circular saw	158	99
W740	8 1/4" 13 amp circular saw	171	109
JS60	Jig Saw-Single Speed	172	99
JS60J	Jig Saw-electronic vspeed	198	123
R150	1 H.P. Plunge Router	138	86
R330	2 H.P. Router	220	138
R500	3 H.P. Router	265	163
E3800	Drywall screwdriver 0-4000	126	79
L120U	3 5/8" Planer	142	89
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0234-1	1/2 drill 4.5A magnum	159	115
0244-1	1/2 drill 4.5A magnum	159	115
0222-1	3/8 drill 3.3A 0-1000 rpm	146	99
0228-1	3/8 drill 3.3A 0-1000 rpm	129	95
0375-1	3/8 close quarter drill	175	118
0210-1	3/8 cordless drill	154	114
6539-1	cordless screwdriver	84	64
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	plmbs rt angle drill kit	263	180
1676-1	HD Hole Hawg 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
6511	2 speed Sawzall w/case	181	123
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	267	189
6170	14" Chop Saw 15 amp	289	209
6255	v/spl sgle sp 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	115
5935	4" by 24" belt sander	319	215
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

BENCH GRINDERS

Model	Description	List Price	Sale Price
4901	1/2 HP 2.6 amp 24"	159	110
4921	1/2 HP 4 amp 26"	179	130
4981	1/2 HP 4 amp 41"	279	195
5041	1/2 HP 8.2 amp 58"	379	270

DRYWALL SHOOTERS

Model	Description	List Price	Sale Price
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

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PS303	fine cutting	7 1/4"	40	32.97	20.50

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LUB1M010	Gen'l Purp.	10"	40	69.30	35
LUT3M010	Cut Off	10"	80	79.65	36
LUB2M010	Cut Off	10"	80	86.40	44
LUB4M010	Combination	10"	40	70.99	36
LUB4M011	Combination	10"	50	74.51	37
LUB5M010	Super Cut Off	10"	80	110.88	62
LMT2M010	Flipping	10"	24	64.35	34
DS 306	6" Dado			139.90	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

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2123	1/2"	7.80	5.00
2124	5/8"	10.35	6.50
2125	3/4"	10.95	7.00
2126	7/8"	11.40	7.25
2127	1"	12.25	7.75
2128	1 1/8"	12.75	8.00
2129	1 1/4"	13.85	8.75
2130	1 3/8"	16.45	10.50
2131	1 1/2"	18.15	11.00
2132	1 5/8"	21.25	14.50
2133	1 3/4"	23.95	16.50
2134	1 7/8"	25.50	17.50
2135	2"	26.25	18.25
2136	2 1/8"	30.50	20.50

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Model	Description	List Price	Sale Price
804510	Sander	79	43
9900B	3"x 21" belt sander	198	119
9924B	8"x 24" belt sander	188	135
9924NB	3"x 24" b/sander w/bag	214	130
9035	1/2 sheet finish sander	79	48
9045B	1/2 sheet finish sander	156	90
9045N	1/2 " w/bag	156	105
4200N	4-3/8 circ. saw 7.5 amp	152	95
5008NB	8 1/4 circ. saw 13 amp	178	105
5201NA	10 1/4 circ. saw 12 amp	348	215
4300NB	v/spl jig saw 3.5 amp	192	120
4301BV	orb v/spl jig saw 3.5 amp	208	125
2401BW	10" mitre saw (for vice)	369	249
JR3000WL	2 sp recip saw w/cse	168	120
JR3000V	vs recip saw w/case	178	120
6010DWK	3/8 cordless drill w/case	152	99
6010DW	3/8 cordless saw kit	165	109
1900BW	3 1/4" planer w/case	154	92
1100HD	3 1/4" planer w/case	178	160
3608BK	1/4 hp router w/case	132	85
3601H	1-3/8 hp router	188	115
3700B	1/2 hp trimmer	124	82
804530	6" Round Sander	84	55
6710DW	Cordless Screwdriver	148	105
DA3000	3/8" angle drill	158	105
DP4700	1/2 v/spl w/cse 4.8 amp	154	92
HP1030W	3/8 v.s.r. hammer drill	145	98
6300LR	1/2" angle drill w/cse	229	152
84198B-2W	1/2" 2 sp. hammer drill w/case	238	150
GV5000	Disc Sander	79	53
8800DB	2500 rpm 3.5 amp	123	79
8800DBV	0-2500 rpm 3.5 amp	133	89
8801DB	4000 rpm 3.5 amp	123	79
8801DBV	0-4000 rpm 3.5 amp	133	89
2030N	12" planer/jointer	1980	1350
2040	15-5/8" planer	1780	1195
1805B	6-18" planer kit w/case	418	285
LS1400	14" Mitre Box	578	410

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6602DWK	3/8" 2-sp c/less drill kit	154	94
8010SDW	3/8" cordless drill rev.	82	45
DA3000W	3/8" c/less angle drill	172	105
JV1800	var. speed jig saw	146	89
JV2000	var. speed orb. jig saw	165	100
4300DW	cordless jig saw	158	102
5005BA	5 1/2" circular saw		
	8 amp. with brake	154	98
5600DW	6 1/4" c/less circ/saw	224	139
9207SPC	7" var/speed electronic sander/polisher	209	130
9303BH	4 1/2" sander-grinder kit	146	95
9035DW	c/less finishing sander	128	79
4014NV	var/speed blower	128	79

DELTA

Model	Description	List Price	Sale Price
34-621	9" contr. saw w/o motor	500	395
34-410	10" contr. saw w/o motor	871	650
34-710	10" motorized saw	578	450
15-091	15" floor model Dipress	467	375
15-090	15" bench model	467	375
37-207	Saw/Jointer Combination	1018	810
37-609	6" Motorized Jointer	413	335
37-290	4" Ribbed Joiner w/o motor	346	275
22-651	RC-33 - 13" Planer	1943	1450
43-122	Wood Shaper w/stand and 1 HP Motor	869	495
46-140	11" lathe, gap bed model w/stand w/o motor	407	335
52-493	1 hp motor for #34-621	170	130
62-042	1 1/2 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 #28-243 and #46-140	121	85

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List 180		SALE 109	
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List 181		SALE 100	
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List 186		SALE 103	
#587	7 1/4" Speedtronic		
List 199		SALE 125	
#315-1	7 1/4" Top Hdl		
List 186		SALE 103	
#368-1	8 1/4" Top Hdl		
List 178		SALE 110	

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Model	Description	List Price	Sale Price
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List 656		SALE 499	
#28-560	BANDSAW 3 wheel		
List 448		SALE 348	
#28-283	14" Band Saw with enclosed Stand and 3/4 hp Motor		
List		897.00	
Sale		667.50	
#28-243	14" Band Saw with Open Stand without Motor		
List		654.00	
Sale		444.00	
#22-651	13" Planer		
List		1943.00	
Sale		1295.00	

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1950	3/8" High Torque	165	110
5930	Reversible Hammer	179	120
1970	3/8 rev/hi torque screwdriver	179	120
1980	Rev/adj. clutch Scruddrill	179	120

BRAND NEW! SUPER SPECIALS from MILWAUKEE

Model	Description	List Price	Sale Price
0214-1	3/8" c/less driver/drill	154	109
8975	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	225

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630	1 H.P. 6.8 amp	145	95
690	1 1/2 H.P. 8 amp	189	125
691	1 1/2 H.P. D-Hdle 8 amp	213	135
536	1 1/2 H.P. Speedmatic Double Handle	295	185
537	1 1/2 H.P. Speedmatic Double Handle	310	210
520	3 H.P. Production	435	275
518	3 H.P. Micropressor 5-sp	475	310

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309	3.8 amp laminate trimmer	120	78
310	3.8 amp laminate trimmer	180	120
312	offset base laminate trim	195	130
319	tilt-base laminate trim	205	135

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Model	Description	List Price	Sale Price
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. 0-1050 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	169
3612BR	3 HP Plunge Router	286	175
9401	4x24 belt Sander w/bag	248	160

PORTER-CABLE

Model	Description	List Price	Sale Price
696	H.D. Shaper Table	150	105
695	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	1/2" X.H.D. Drill 8 amp	205	145

BOSCH TOOLS

Model	Description	List Price	Sale Price
1581VS	Top Handle Jig Saw	225	128
1582VS	Barrel Grip Jig Saw	128	118
1604	1 1/2 H.P. Router	199	110
1942	Heat Gun 650° - 900°	99	85
1272	3x24" Belt Sander	259	159
1272D	3x24" Belt Sander w/bag	274	169
1273	4x24" Belt Sander	274	169
1273D	4x24" belt sander w/bag	289	179

DELTA

Model	Description	List Price	Sale Price
34-010	Motorized Mitre Box	231	149

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The Beginning Woodworker

Table Saw Ripping Problems and Their Solutions

Of the two main table saw operations, namely ripping and cross-cutting, most woodworkers will probably agree that ripping cuts have more potential problems and hazards. Let's examine some of the common difficulties that arise when using the table saw in the ripping mode and some of the methods that woodworkers have developed to overcome them.

Kickback

First and foremost is our concern for making all cuts as safely as possible. All woodworkers, and especially those who have just started to use a table saw, fear kickback. This occurs whenever a workpiece becomes trapped or binds between the rotating blade and the fence. The workpiece may then be hurled back towards the operator at great speed; certainly fast enough to cause serious injury. It is also possible that the operator's hand may be pulled into the blade as the kickback happens. But kickbacks will not occur if safety devices are used and you take a few moments to think through each cut before turning on the saw.

Safety Devices

In addition to the blade guard, all table saws should be equipped with a splitter and anti-kickback pawls. These devices are usually part of the blade guard assembly (Fig. 1). The splitter is

located directly behind and must be in line with the blade. Its purpose is to keep the kerf open as the cut proceeds to prevent friction and binding of the wood against the blade. The anti-kickback pawls are a second line of defense which will normally ride the top of the board, but will dig into it and hold it if it starts to kick back. To perform properly, especially with hardwoods, the teeth of the pawls should be kept sharp.

Many woodworkers have a cavalier

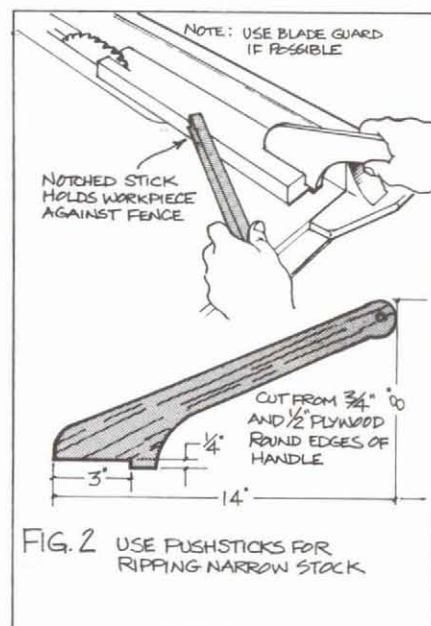
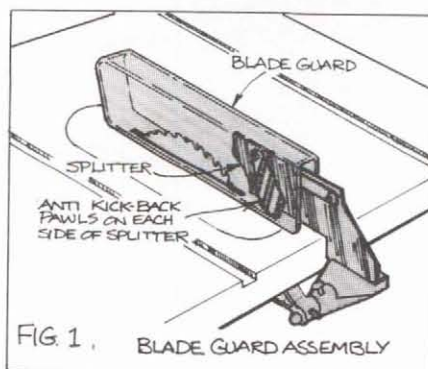


FIG. 2 USE PUSHSTICKS FOR RIPPING NARROW STOCK



attitude toward the blade guard assembly and rarely use it. At times it may seem inconvenient, and there are operations that require that the guard be removed, but please remember that the odds of avoiding injury are far more in your favor if you use these safety devices.

Safety goggles or a face shield are a must for all operations. When cutting, the blade will kick up a stream of sawdust or splinters, especially from

plywood. Apart from the possibility of serious eye injury, ducking and squinting your way through a long ripping cut can also be dangerous to your hands.

Another safety device is the push stick — an absolute must for many ripping cuts. If there will be less than a hand's width or 6 inches between the fence and blade, use a push stick rather than your hand. A good push stick should grip the workpiece while keeping your hand high above the blade as shown in Fig. 2. Keep it hanging right on the saw stand where it will always be handy.

Inspecting the Stock

Ripping warped or irregular lumber can be hazardous. Most of the stock you purchase will probably be dry, flat and square, but take the time to inspect the boards before ripping. Avoid ripping cupped or twisted boards or else you may have binding and kickback. All stock should be planed flat and true before trimming to finish dimensions. Choose the best edge to ride against the fence and leave enough extra width to allow for planing to finish width. Later on, we will describe a couple of methods used to true up boards with wavy edges.

Grouping the Cuts

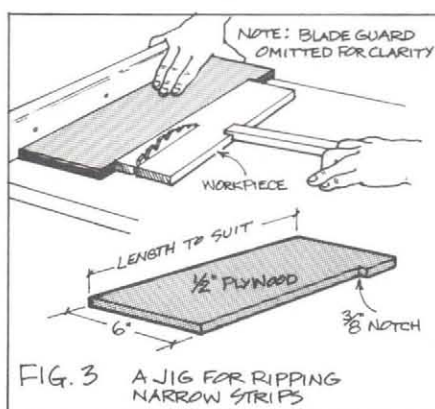
Check your bill of materials and group as many parts as possible by width. If you need six boards ripped to a width of 8 inches, do them all before changing the fence setting. It's just plain common sense to avoid unnecessary fence adjustments and this approach guarantees that all six boards will be exactly the same width. If the boards are all long but the project requires only short lengths, use a hand-saw to crosscut them to more manageable lengths.

Ripping Narrow Strips

This is one of those situations where both safety and accuracy are concerns. Let's assume that you need to rip a number of very narrow and perfectly uniform strips from a board. If the board is held against the fence and ripped so the strips are cut off on the other side of the blade, it will be necessary to reset the fence for every strip. Obviously, this is a hassle and will result in strips that are not exactly uniform. But reversing the setup and cutting so the strips are cut off between the fence and blade presents a safety problem. A narrow space between the blade and fence prevents the use of the blade guard and a push stick, and the

strips may bind and kick back or get caught in the slot of the table insert.

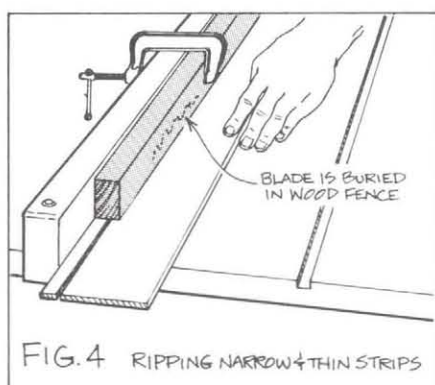
Fig. 3 shows a jig which rides along



the fence and is wide enough to be pushed safely by hand. The fence is set at a distance which equals the width of the jig at its narrow end plus the desired width of the strips. A push stick holds the stock against the jig as the cut is made. Since the blade guard can be used, this jig provides both safety and accuracy.

Ripping Thin Stock

Thin stock of say 1/4 inch or less will tend to ride up the blade and vibrate with a disconcerting ratchety sound. Sometimes this violent slatting will cause the workpiece to split. To overcome this, use a board clamped to the fence and set just high enough for the workpiece to slide under (Fig. 4). If the



strips to be cut are narrower than the thickness of this wood fence, the blade is elevated to cut into the bottom of the fence. Thus the fixture will serve as a hold-down and a blade guard. If the strips are wide, there may be enough space between the fixture and the blade to permit the use of the blade guard and a thin push stick.

Table Inserts

Another problem with ripping small stuff is the possibility of the cut off pieces being driven down the slot

(continued on next page)

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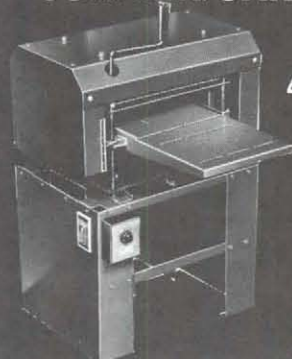
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alongside the blade. Steel table inserts usually have a wide slot so that the blade can be inclined. As the end of a cut is reached the strip may tip down into the slot. This hazard can be avoided by making a special insert with a slot just wide enough for the blade.

Use the steel insert as a template and trace around it on a piece of thin wood. Rip the sides and shape the curved ends with a saber saw and sandpaper. This insert should fit snugly into the table recess, flush with the table top. If you can't get a piece of plywood of exactly the right thickness, use small screws as adjustable feet or plane down a piece of solid stock (Fig. 5).

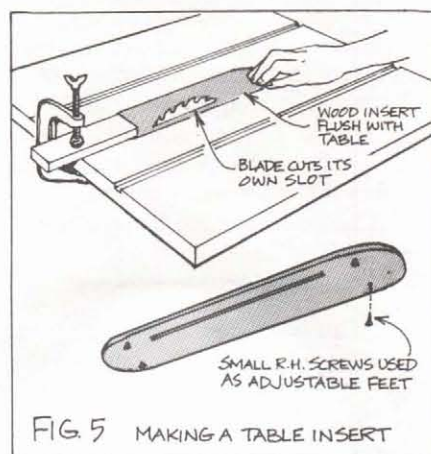


FIG. 5 MAKING A TABLE INSERT

Clamp the insert as shown and hold down the front, turn on the saw and elevate the blade to its full height so it cuts its own slot. The blade should be vertical (tilt set at 0 degrees). Later, you will want to make additional inserts for other blades and dado cutters. (Editor's Note: See the shop tip on page 54 for getting double duty from your table inserts).

Ripping Long Stock

Any board that is too awkward or heavy to hold flat on the table at the start or finish of a cut is too long to cut safely without some extra support. Fig. 6 shows a method of gaining up to 2

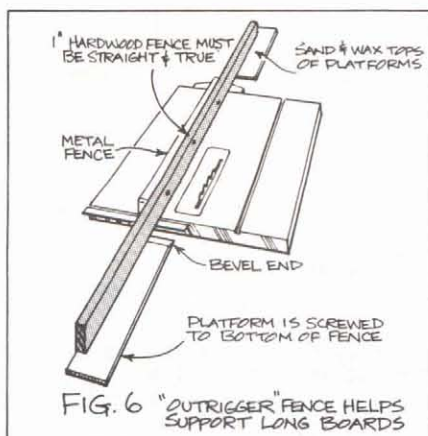


FIG. 6 "OUTRIGGER" FENCE HELPS SUPPORT LONG BOARDS

feet of extra support at the back end of the table. The platform can be butted and flush with the back edge of the table, or set back a bit to clear a rear fence rail. This same idea can be used to make an extension at the front of the table to aid in starting the cut.

If these extensions are not adequate for a very long or heavy board, you will need outboard support in the form of a "dead man". Woodworkers are notoriously ingenious in adapting ironing boards, drill press tables and the like to serve as temporary supports. In a pinch, the sawhorse setup in Fig. 7A will do the job. If you do a lot of long ripping, a support with an adjustable height roller is needed (Fig. 7B). Plans

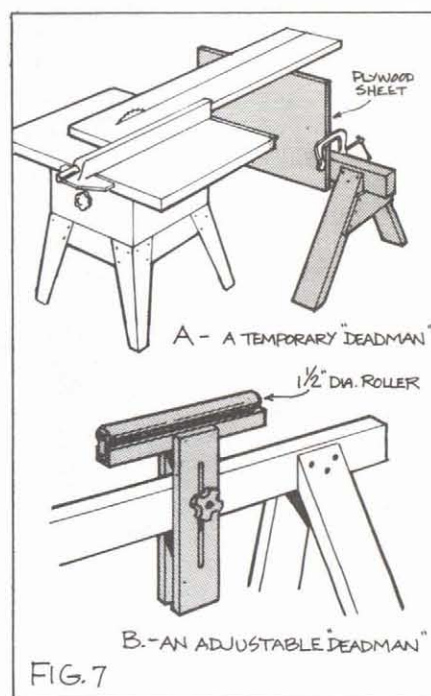


FIG. 7

for this shop aid can be found in our November/December 1983 issue.

Ripping Large Pieces of Plywood

You may have to rip down the middle of a wide piece of plywood and find that your fence cannot be set far enough from the blade. In this case, clamp or nail a straight guide strip

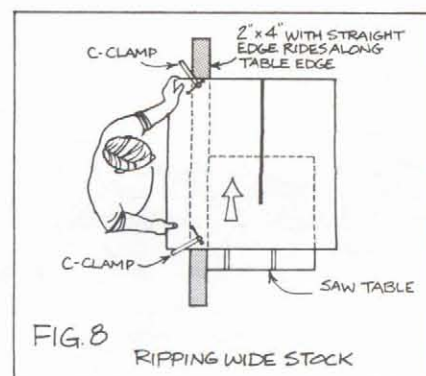


FIG. 8

RIPPING WIDE STOCK

along the bottom of the stock so it bears against the table when the cutting line is aligned with the blade (Fig. 8). Stand along the side when making the cut and keep the guide strip firmly against the table edge. If your table extension has bolt heads that interfere with this operation, add a hardwood strip with counterbored holes to recess the bolt heads.

Ripping Irregular Boards

If the edges of a board are wavy or out of parallel, the fence alone cannot be used as a guide. The easiest way to straighten one edge is to tack-nail a plywood guide strip overhanging one edge as shown in Fig. 9. This strip rides

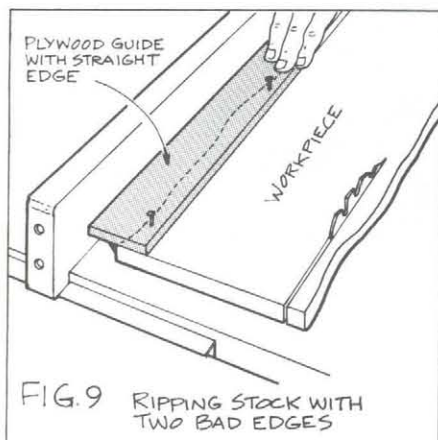


FIG. 9 RIPPING STOCK WITH TWO BAD EDGES

along the fence to true one edge of the board. It is then removed and the board is flopped over so that the trued edge rides against the fence. Sufficient waste is removed from the opposite edge to straighten it and remove the nail holes. If there won't be enough waste to permit nailing, the jig shown in Fig. 10 can be used. Note that the

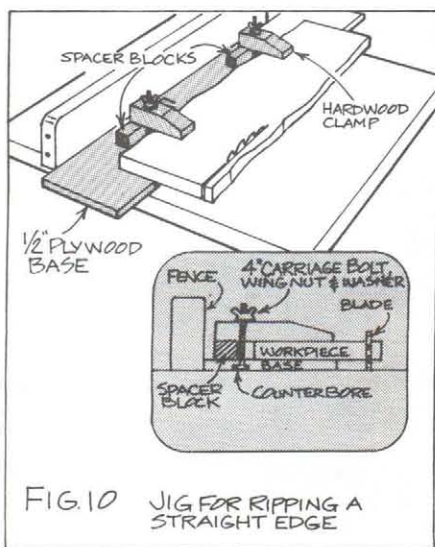


FIG. 10 JIG FOR RIPPING A STRAIGHT EDGE

spacer blocks under the clamps should be of the same thickness as the workpiece.

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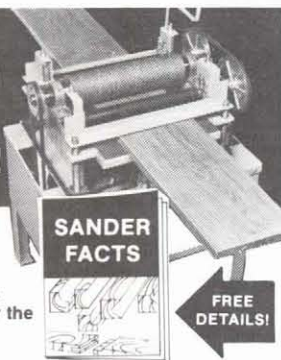
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How many times have we woodworkers admired a flawlessly executed 4-piece book match? In examining the symmetry and beauty of a professionally done 4-piece book match we cannot help but wonder how exactly is so lovely a pattern created?

The science of veneering or, more specifically, book matching is an area of woodworking so unique and specialized, it is a separate art. In fact, there is a world of difference between a simple 2-piece book match, and a 32-piece sunburst book match on a round tabletop. The techniques, tools, and veneering processes are nearly identical. However, the "science" of complex book matching involves a logical system whose purpose is to establish two key elements: pattern jump and balanced light refraction. With complex book matches, a formula is used to insure that both pattern jump and balanced light refraction are consistent.

There are literally hundreds of veneering possibilities—from diamond, reverse diamond, and herringbone butt matches, which are best used with straight grained veneers, to the various sunburst book matches that feature burl or figured veneers. In order to understand the theory behind creating book matched veneer patterns, it is best to look closely at one specific pattern. The 4-piece book match is perhaps the most versatile, and certainly one of the most

attractive of all book matches. It can be used for tabletops, trays, panels, or virtually anywhere a distinctive, dramatic visual effect is needed. We designed a wall-hung clock around a striking 4-piece book match, a project that is featured on page 42.

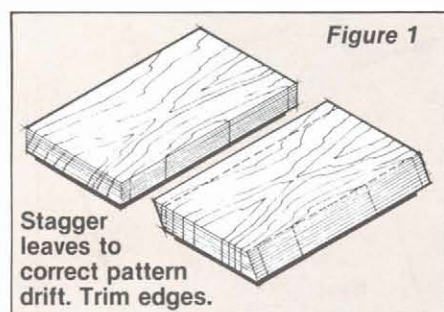
To create a 4-piece book match you must have four consecutive matching leaves of veneer. Veneers are typically sold in consecutive order, however, by indicating to the retailer that you intend to use the veneer in a 4-piece book match, you can usually insure that the leaves you receive are consecutive.

The most dramatic 4-piece book matches are achieved with burl veneers that show great contrast. We used olive-ash burl, however a number of other highly figured veneers will also do well. Redwood, carpathian elm, poplar, and walnut burl can also result in fine multiple piece book matches.

Because burl veneers are typically wavy, rippled, or curled, the first task is to flatten your veneer. Be careful to maintain the order of the leaves. We used a plant mister to spray a three-to-one part mixture of water and glycerine on the veneer. Although the leaves must be misted individually, they can be clamped up or weighted together. Do not soak the veneer, just lightly mist it on one side. Place brown Kraft paper over and under the veneer to absorb excess moisture. Then leave the veneer

overnight, clamped up or weighted between several layers of particleboard.

Note: Although it is best to flatten each leaf individually, and leave it pressed for two or three days, in practice we have used veneers almost immediately after lightly misting to lend some flexibility. Such shortcuts may work with small sections, however with larger areas the veneer must be thoroughly dry before it is applied. If it is not dry it will almost certainly shrink, opening up unsightly cracks later on. More information about veneering basics, including preparation, repairs, taping, gluing, and pressing can be found in The Beginning Woodworker feature in our January/February 1981 issue.

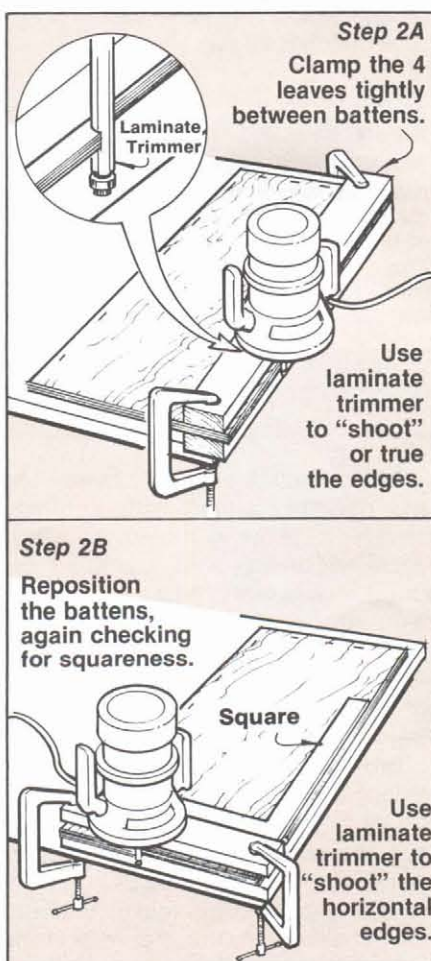
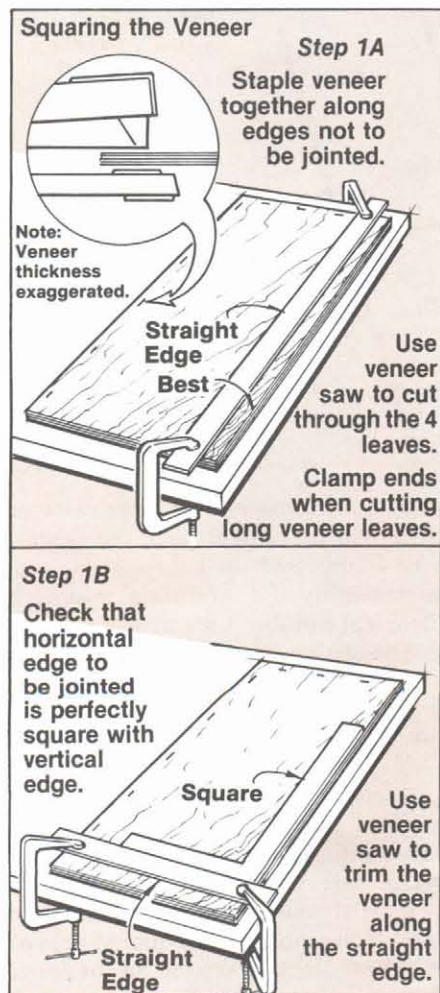


There are several "keys" to an accurate 4-piece book match. First, the four veneer leaves must be aligned as closely as

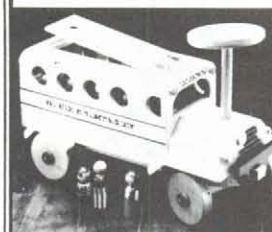
possible. Examine the veneer stack. In most veneers there is some "pattern drift". If this pattern drift is not compensated for or corrected, the 4-piece book match will show misalignment. With highly figured burls, identify a distinct point that is clear on all four leaves, make a pinhole through each of the leaves at that exact spot, and then align the pinholes. Another method is to align the pattern vertically from top to bottom by staggering the leaves, as shown in Fig. 1. Trim the veneers evenly along the staggered edges.

The second key to a good 4-piece match is to locate the most intense burl at the center of the bookmatch. In order to search over large leaves of veneer to discover the best book match, use a pair of hinged mirrors as explained in the Shop Tip on page 58.

After you have found the best area for the book match, turn the veneer stack so this "best" area is at the lower right hand corner. You are now ready to true-up the veneer. As shown in the veneer squaring illustration, the leaves must be anchored tightly together for this operation. Check the alignment of the four leaves, then staple them together along the edges that will later be trimmed. Using the veneer saw and the router with a laminate trimmer bit, square the veneer following the procedure illustrated in steps 1 and 2. With



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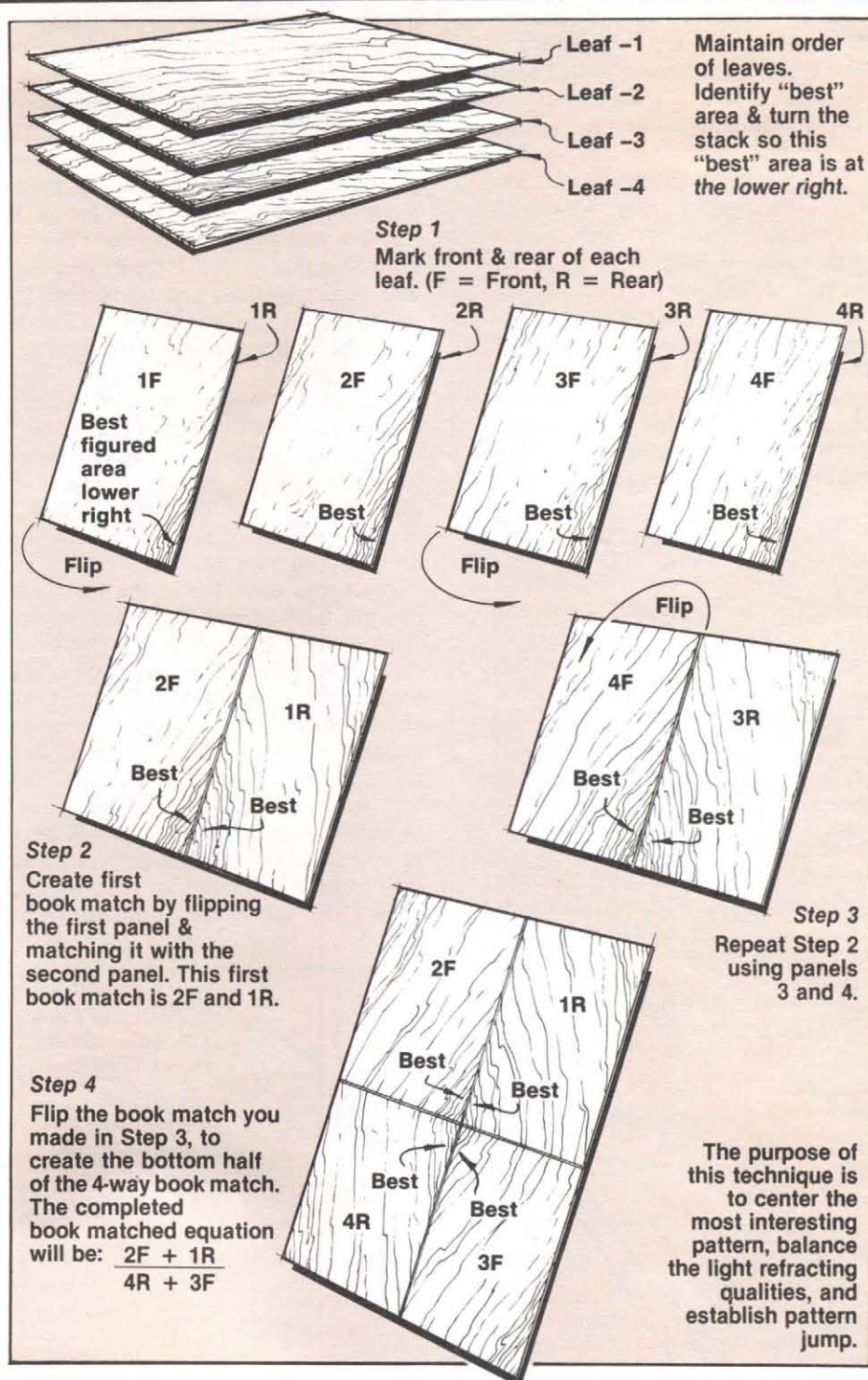
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relatively straight grained veneers the edges may be jointed with a plane. However a plane will tear out burl veneer, which has wild grain, so the method shown works best.

You are now ready to create the 4-piece book match. After labeling the four leaves in sequence, designating face and reverse sides, follow the step-by-step book matching illustration to see how the 4-piece book match is developed. The important point in the formula $\frac{2F + 1R}{4R + 3F}$ is that we have established the two elements noted earlier, pattern jump and balanced light refraction. The pattern jump means that any slight variance in the figure will be divided among the four separate book

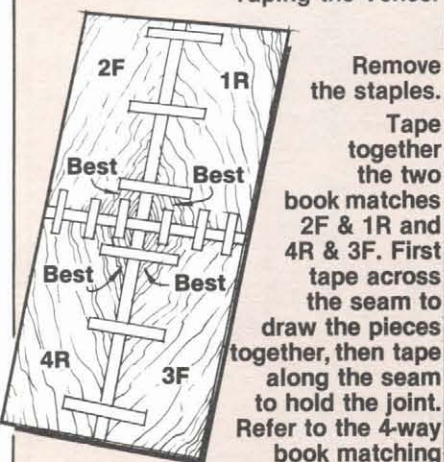
matches, as opposed to a large variance that might be evident were the veneers to be simply laid up 1 through 4, with the possibility of a substantial mismatch where leaf number 1 meets leaf number 4. The balanced light refraction is achieved by balancing the opposite corners of the 4-piece book match with face and reverse veneers. In the formula $\frac{2F + 1R}{4R + 3F}$, 2F and 3F, which are diagonally opposed, are both F or face side veneers, while 4R and 1R, also diagonally opposed, are both R or reverse side veneers, thus establishing the desired balanced light refraction.

Note: If the most highly figured area of the veneer stack is located on the lower left side, then the 4-piece book match

formula will read $\frac{1R + 2F}{3F + 4R}$. An easy way to understand the system is to think of the four leaves of veneer as though they were the pages of a book. If the best figuring is on the bottom right, the top and third leaves or pages open to the right. If the best figuring is on the bottom left, the top and third leaves open to the left. Remember, in both cases the bottom book match must then be flipped along its horizontal axis.

To join the four leaves follow the taping procedure explained in the taping illustration. The taped side of the veneer will be the finished side; the glue is applied to the opposite side.

Taping the Veneer



Remove the staples.

Tape together the two book matches 2F & 1R and 4R & 3F. First tape across the seam to draw the pieces together, then tape along the seam to hold the joint. Refer to the 4-way book matching

illustrations to see how the 4-way book match is created. Now join 2F & 1R and 4R & 3F along the horizontal seam, using the same taping system.

There are a number of suitable adhesives for veneering, from urea formaldehyde to contact cement. We have had good success using white or yellow glue, which spreads easily and permits some work time. However, for tabletops, trays, and other surfaces that may be exposed to moisture, use a waterproof plastic resin glue such as Weldwood or Cascamite. Remember, when veneering you must also veneer the opposite side of your substrate to equalize tensions. Cover the veneered surfaces with wax paper and clamp securely between several layers of particleboard, using blocks to help distribute clamp pressure.

The 4-piece book match may seem complex at first glance. To best learn how the system works, cut a small stack of four leaves, label them as we have indicated, and work the pattern through several times. Seeing how the book match develops illustrates the theories of pattern jump and balanced light refraction, concepts that may otherwise be difficult to understand.

An excellent source for information about veneering is *The Complete Manual of Wood Veneering* by W.A. Lincoln.

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The first Pennsylvania Dutch immigrants came to America at the invitation of William Penn in 1683, and by the Revolutionary War they had carved out a substantial niche for themselves in the New World. The golden years of Pennsylvania Dutch furniture making spanned a full century, from 1780 to 1880. Today we might associate the Pennsylvania Dutch with the quaint Amish folk, tied to patterns of the past, but in the first decades of these United States they were at the very center of the furniture design renaissance that the young country was enjoying.

First, to dispel a common myth, the Pennsylvania Dutch immigrants were not actually Dutch, that is, from the Netherlands. They came chiefly from the Rhineland in southern Germany, and from Switzerland, though others came from Sweden, Denmark, Silesia, France, Moravia, and Saxony. Most left their native lands because of economic hardship and/or religious persecution. They were drawn to William Penn's Holy Experiment, as we will perhaps remember from our history lessons, by the promise of religious freedom, and by the rich farmlands to the north and west of Philadelphia, in the land called Pennsylvania.

Although the Amish folk still exist much as they did two or more centuries ago, the great numbers of original Pennsylvania Dutch immigrants have long ago been assimilated and scattered throughout the United States. At the time of the Revolutionary War however, they represented a major

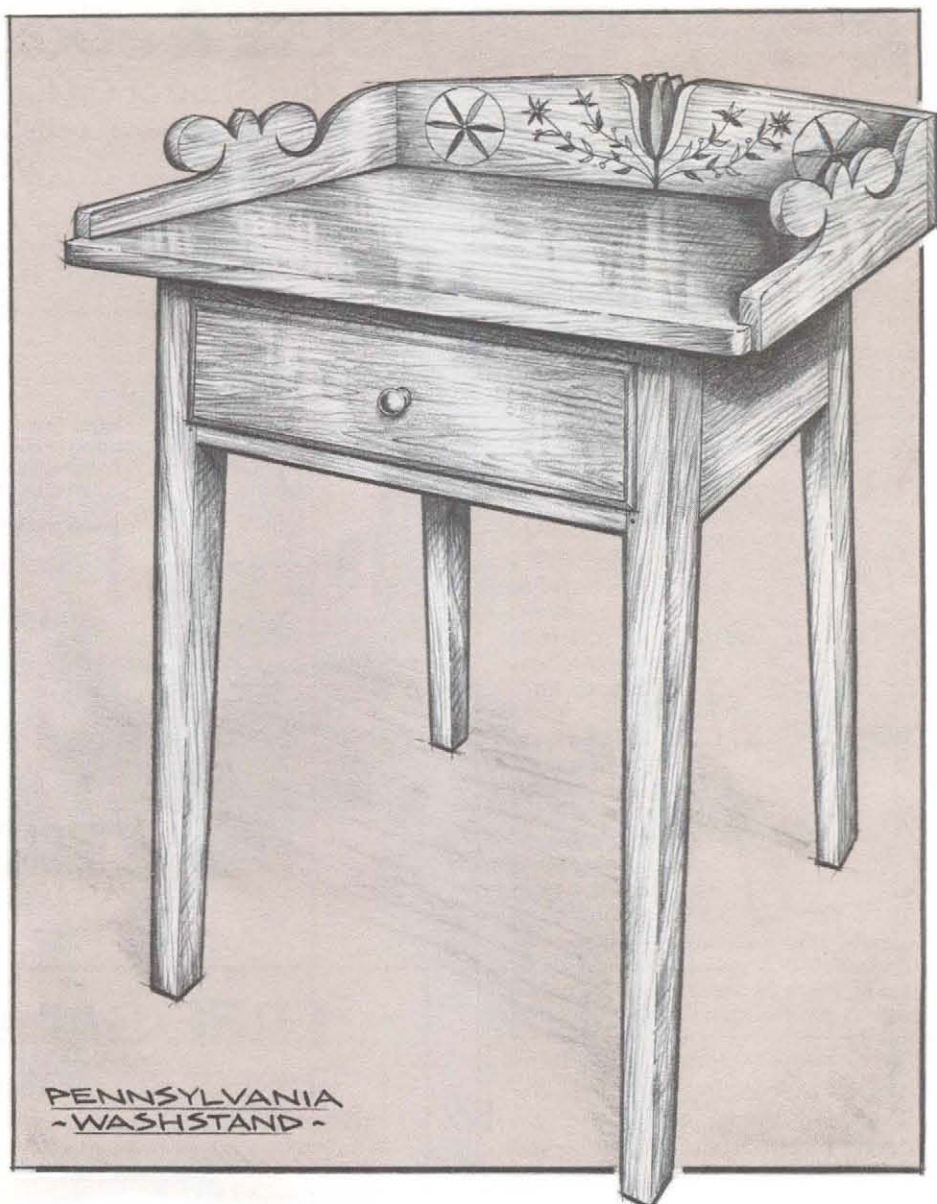
force in the colonies, and their influence on furniture making was significant. The original settlers had prospered and many who had been skilled turners and joiners in their native lands continued to actively practice their craft. Indeed, Pennsylvania had the highest concentration of craftsmen in the colonies with many of these being of "Dutch" extraction.

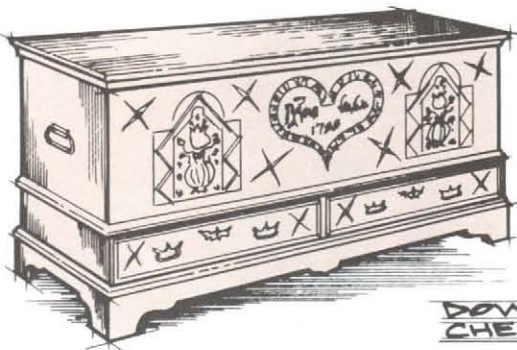
The Pennsylvania Dutch style is a blending of various influences. Some work is distinctively European in origin, while other pieces are indistinguishable from other Colonial or Early American work. The typical Pennsylvania Dutch cabinetmaker was perhaps a farmer, dairyman, and carpenter as well — in other words, a jack-of-all-trades. He admired the fine mahogany furniture that was produced in Philadelphia, and borrowed many elements of design from it, however a clear utilitarian purpose for his work was equally important. He preferred to

craft his furniture from the native woods that were so abundant in the great forests of Pennsylvania, chiefly walnut, cherry, and maple. He appreciated the special beauty in these woods, often selecting crotch walnut, birdseye, and striped, or curly maple for his best pieces.

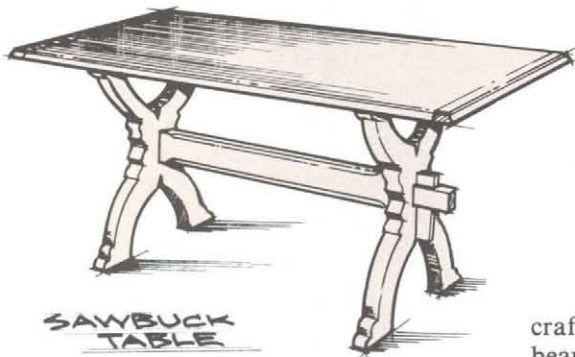
There was a great variety of furniture produced by the Pennsylvania Dutch, owing in part to the fact that they came from so many different regions in Europe, each with its own customs, culture, and traditional designs. Many of the elements that we consider to be of Pennsylvania Dutch origin, such as the heart, tulip, and geometric patterns, were actually motifs that these early settlers brought with them from their homelands.

What then is the Pennsylvania Dutch style? No doubt its most striking features are the decorative devices, the superimposed ornamentation, painting, carving, incising, stenciling, etc.





DOWER CHEST



SAWBUCK TABLE



**PAINTED
ROCKER**

However, it should be noted that the purpose of all this ornamentation was to beautify what the Pennsylvania Dutch considered plain and functional, but not necessarily aesthetically pleasing work. Articles that were painted and decorated were usually the everyday furniture, much of which was crafted in poplar or pine, woods that were more easily worked than the hardwoods. The colorful painting of chests, chairs, tables, cabinets, and many of the other common articles of furniture in the average household was probably done to enliven and decorate their homes through the use of bright and bold colors.

A great variety of decorative motifs was employed. Among the more common are the geometric hex patterns and pointed stars we often associate with the Pennsylvania Dutch barns. Images from nature were also popular, including the rose, tulip, pomegranate, and the "tree of life". Many animals and especially birds appear in Pennsylvania Dutch designs, among them the peacock, parrot, horse, unicorn, dove, rooster, robin and eagle. Biblical scenes and religious motifs were also frequently depicted, with the angel being a particular favorite.

The representational and decorative painting of the Pennsylvania Dutch is the element of design that we most associate with the style, but their best work was rarely if ever painted. Their

craftsmen appreciated the inherent beauty in the graining of the figured maples, select walnut, and wild cherry, and these choice woods were reserved for their very best furniture. Many of these best pieces were years in the making, and the precise joinery, careful design, and special attention to selection of stock are what we recognize today as being hallmarks of the finest Pennsylvania Dutch work. Although they did not usually paint them, these "best" pieces were often highlighted by intricate inlay work. Most of this fine remaining craftsmanship is now in museums or private collections.

Pennsylvania Dutch work is highly individualistic. Rarely do we find more than a few choice pieces by a single craftsman. Most often the craftsman made his own furniture, and perhaps some for friends, neighbors, and relatives, such as a dower chest for a daughter. If there were a "recipe" for the Pennsylvania Dutch style, we might say that the designs commonly borrowed elements from the sophisticated Philadelphia furniture styles, and were tempered with some old fashioned common sense, and flavored with traditional decorative elements.

Because the Pennsylvania Dutch made all their own furniture, which resulted in a broad variety of styles and designs, it is difficult to characterize typical work. However, there are pieces that they excelled at making, and for which they are particularly noted.

DOWER CHESTS: Dower chests were given to a girl on or about her 10th birthday. Both her name and the date

of presentation were usually painted on or incised into the chest. Beautifully painted or stenciled, these chests were the repository of all the girl's worldly possessions, which she then took with her in the chest on her wedding day. Because they were handed down through the generations, many of these dower chests survive today, often with their original paint still intact.

SAWBUCK TABLES: The sawbuck table design is thought to have been brought to America by early Pennsylvania Dutch settlers from Bavaria. The sturdy rails and key tenoned construction were a simple practical design that became a favorite. Massive yet elegant, many of these tables still remain an apt testament to their enduring strength.

SHRANK or LARGE CUPBOARD: These huge enclosed wardrobe cupboards were made by the man of the house, who usually inscribed his name and the date on the cupboard doors or face. The best examples have delicately inlaid designs, and were built of cherry or walnut. The shrank was something of a status symbol, a work of pride, and for this reason typically displayed the craftsman's best efforts.

The Pennsylvania Dutch also excelled at making fine dining room cupboards where china, crystal, and metalware were displayed in a glazed upper section, with drawers and paneled doors for storage below. These cupboards were the forerunner of today's dining room cabinet, which serves much the same purpose.

CHAIRS and ROCKERS: The Moravian chair was a popular European design that came to America much in its original form. With their distinctive splayed legs and solid plank seat and back, these chairs continued to be popular well into the 19th century, and are valued collector's items today. A Moravian chair appears in project form on page 32.

Rocking chairs, with seat back and arms carefully sculpted to provide maximum comfort, were also a favorite of the Pennsylvania Dutch. Both chairs and rockers were often painted or decorated with stenciling.

As we have seen, the Pennsylvania Dutch contributed a great deal to American furniture design. Many country, Colonial, and Early American designs and many of the decorative motifs that are popular today had their beginnings, or were first brought to this country, by the Pennsylvania Dutch.

Back Issues

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Mirror, Japanese Style Table Lamp, Empire Footstool, Desk Caddy, Stepped-Back Hutch, Buckboard Seat, Latticework Cutting Jig, *Articles:* Working with Plywood; Insurance for the Workshop; Some Thoughts on Glues and Gluing.

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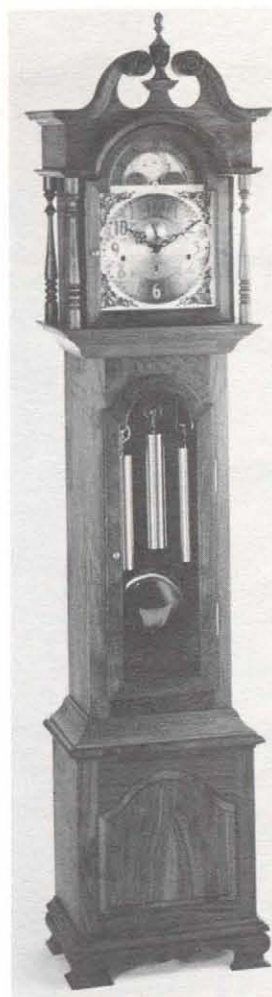
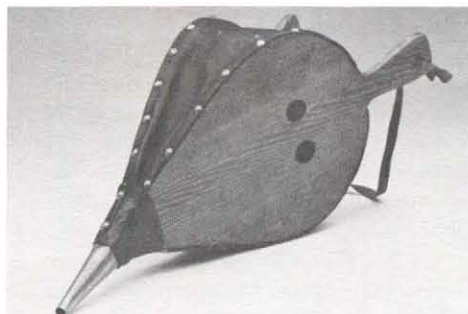
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Vol. 7 No. 2 Mar-Apr '83: Porch Swing, Home-made Jig Saw, Cheval Mirror, Punched Tin Spice Cabinet, Television Stand, Nautical Table Lamp, Wooden Balance, Nesting Cube Tables, Steam Roller Toy, Back Massager, Mailbox, Wall Shelf,

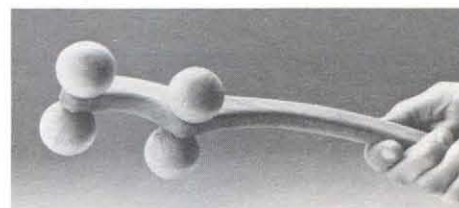
Fireplace Bellows Nov/Dec '81



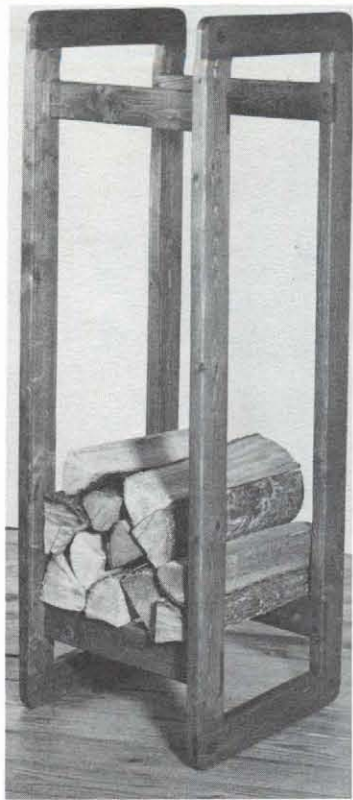
Grandfather Clock Sept/Oct '84



Christmas Tree Ornaments Nov/Dec '82



Back Massager Mar/Apr '83



Firewood Rack Nov/Dec '82

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.

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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.

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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.

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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.

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Colonial Doll House
Nov/Dec '84



Salt Shaker and Pepper Mill
Sept/Oct '84

Moravian Chair

We must confess, when we started building this chair in the shop we all agreed that it looked as though it would be terribly uncomfortable to sit in. However, much to our surprise, the finished product is not only a handsome looking piece, but it is quite comfortable. The slightly angled back feels just right against the spine, and it encourages the sitter to "sit straight".

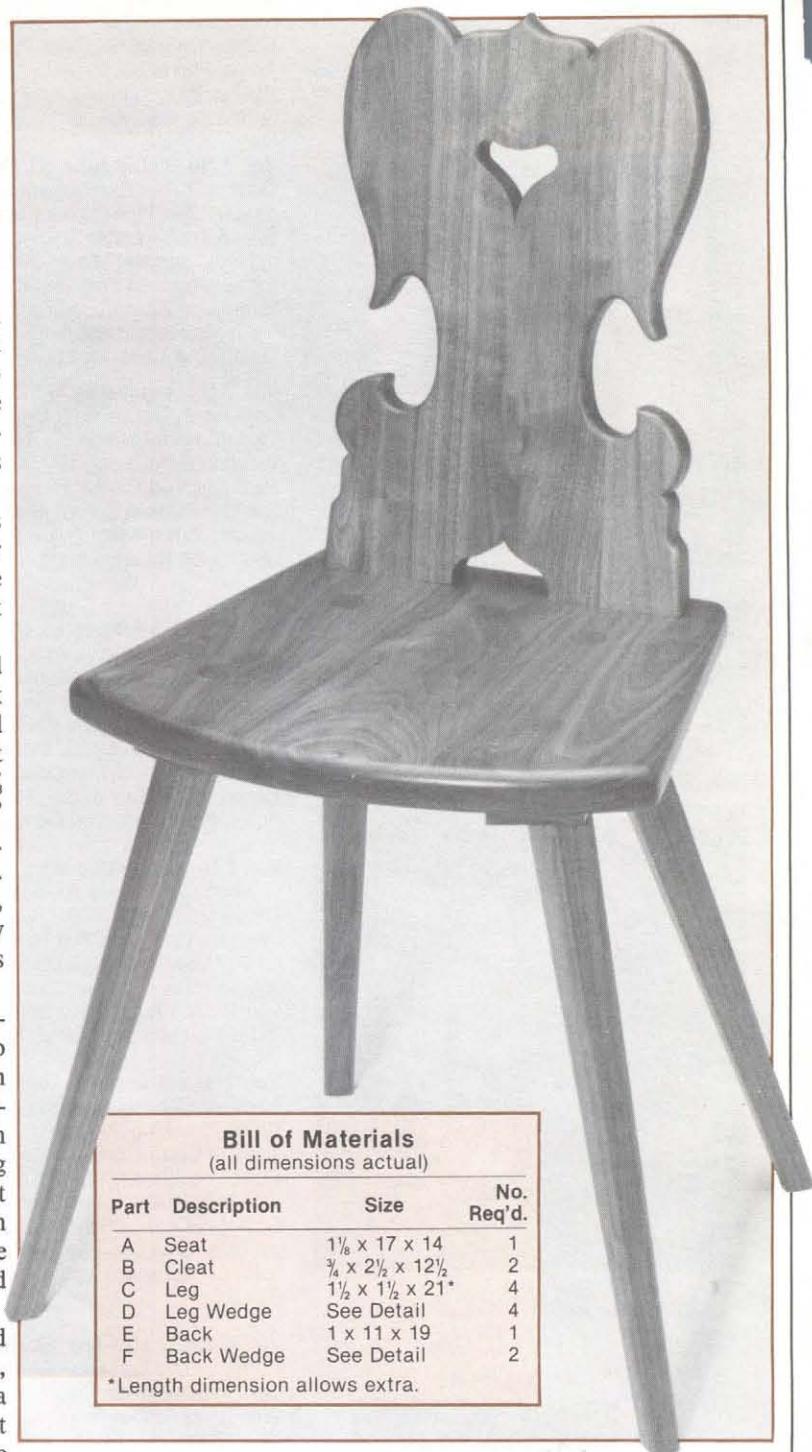
As with most Pennsylvania Dutch designs, the chair is sturdy. The splayed legs lend it a wide stance, and the key or wedge tenoned back provides a strong support. We made our chair from walnut, a Pennsylvania Dutch favorite, but it would also look good in maple or cherry.

Begin by gluing up 1 in. thick stock for the back (E), and 1 1/8 in. thick stock for the seat (A). Referring to the seat back grid pattern, transfer the shape to your back stock and band saw the perimeter. Use the saber saw to cut out the heart center, first drilling a starter hole for the saw blade. The 3/8 in. square mortises in the tenons to accept the back "key" wedges are made by first drilling through with a 3/8 in. diameter drill bit, and then squaring the hole with a chisel. As you will note, these mortises are cut straight through, and need not be angled since the back wedge will bear only on the bottom of the mortise. Chamfer the tenon ends as shown.

Next, referring to the seat grid pattern, transfer the profile to the 1 1/8 in. thick stock and cut out the seat. Cut the two cleats (B) from 3/4 in. thick stock and glue and clamp them in place on the seat underside, also as shown in the grid pattern. Now make a boring jig as illustrated in steps 1 through 3. Again referring to the seat grid pattern, locate the leg tenon centerpoints and establish the 45 degree jig alignment lines. Keeping the jig on the 45 degree line, eyeball through the jig's guide hole, centering the bottom end of the guide hole over the tenon center point. Clamp the jig securely and bore the 1 in. diameter tenon holes as shown in step 4.

You may now cut the two mortises through the seat and cleats to accept the back tenons. As shown in the side view, these tenons must be angled at 100 degrees. If you have a drill press, by tilting the table 10 degrees with the seat clamped to the table, you can drill through and establish the mortise angle. In any event there will be considerable hand work with the chisel in cutting these mortises. Check the seat back tenons against the mortises as you work to insure a proper fit. These tenons must fit snugly, and cannot be sloppy or loose. Bevel the seat back shoulder for an even fit where it meets the seat.

To make the legs, first cut the leg tapers using the table saw tapering jig. The 45 degree chamfers along the four edges can be cut by hand with the plane. We cut our leg tenons on the lathe. The square tenon shoulders are not a problem since they are fairly well out of sight. If you use the lathe, naturally you will need sufficient length in the leg stock to allow for mounting in the lathe. Make the tenons extra long, so they may be flushed up later after assembly. We made our tenons 3 1/2 in. long, allowing 1/2 in. for cut off of the end mounted in the lathe. Cut the saw kerf in the tenons as shown to accept the wedges. Note: If you do not have a lathe you might consider making the leg tenons



Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Seat	1 1/8 x 17 x 14	1
B	Cleat	3/4 x 2 1/2 x 12 1/2	2
C	Leg	1 1/2 x 1 1/2 x 21*	4
D	Leg Wedge	See Detail	4
E	Back	1 x 11 x 19	1
F	Back Wedge	See Detail	2

*Length dimension allows extra.

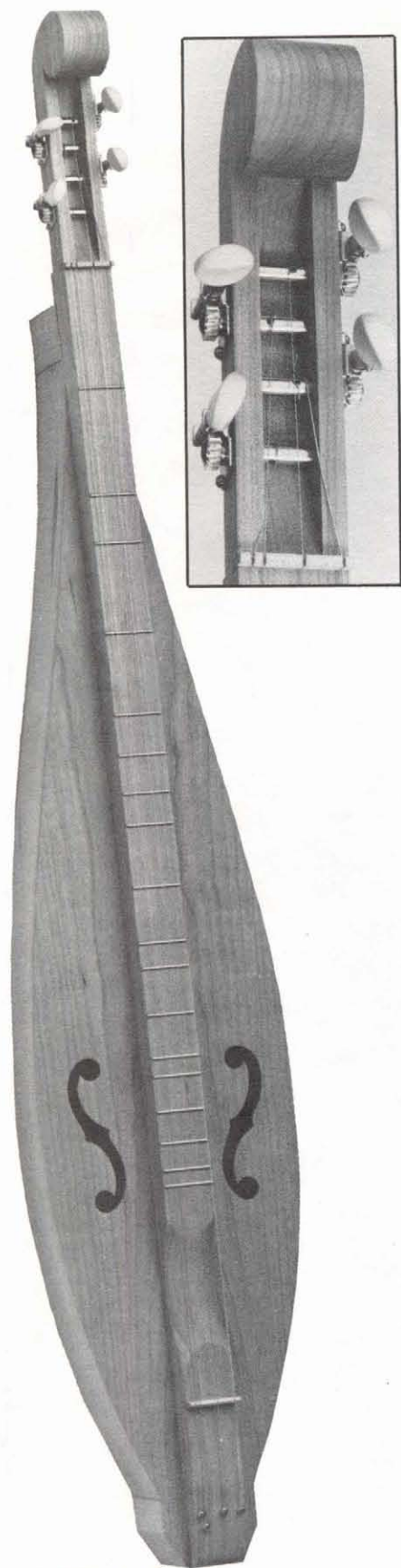
square and cutting their mortises with a chisel, although this will entail considerable hand work and can be quite fussy.

Before assembly, apply the various round-overs as shown on the seat and back. We used the router with bearing guided round-over bits. Also, carefully sand all pieces.

The legs are mounted and wedged, and then trimmed flush with the seat top. Remember to align the wedges perpendicular to the grain direction of the seat. To mount the back, first cut two key wedges, as shown in the back wedge detail. These wedges are tapped into place, but not socked up hard. Since their function is to anchor the back, they may be adjusted as necessary if after years of use the back should come a little loose.

After assembly is complete, set the chair on a flat surface such as the saw table, mark the leg ends, and trim them so they will sit flush. We finished our chair naturally, with several applications of tung oil. Rub in paste wax to lend the finish a low luster shine.

Wwj



Dulcimer

The dulcimer has long been a popular traditional folk instrument in America. The design we offer here is courtesy of Folkcraft Instruments in Winsted, Connecticut. It is relatively easy to build, with no special jigs or instrument making tools required.

Our dulcimer is made of cherry, however walnut or maple could also be used. You will need $\frac{1}{8}$ in. thick stock for the bottom (A), sides (B), and the bookmatched top (C). If you do not have, or cannot resaw $\frac{1}{8}$ in. thick material, these parts are available from Folkcraft. All the hardware needed for the dulcimer (the tuning gears, fret wire, strings, pins, screws, etc.) is sold as a kit. The hardware kit (order part no. 3020) is \$11.00 postpaid, while the hardware plus the $\frac{1}{8}$ in. parts (order part no. 3021) is \$29.00 postpaid. Write to Folkcraft Instruments, Box 807, Winsted, CT 06098.

Cut parts A, B, and C to the dimensions shown in the Bill of Materials. Bookmatching the top pieces lends a nice detail. Next, cut the fret board (D). This is the most difficult and fussy part of making the dulcimer. After cutting a $\frac{1}{4}$ in. thick board $1\frac{1}{2}$ in. wide by $36\frac{1}{2}$ in. long, make the tuning gear and sound hollows. We made our hollows by using the dado-head and setting up a series of stops. However, since lowering the fret board onto the dado-head can be somewhat tricky, you may wish instead to use the router to cut these hollows (the ends of the hollows need not be sloped). The hollows can also be chiseled out by hand. Next, locate and drill the four tuning gear holes. As shown in the head detail, two holes are drilled from the right side, and two from the left. Note that in each case the holes extend $\frac{1}{8}$ in. into the opposite wall of the tuning gear hollow. Shape out a recess $5\frac{1}{4}$ in. from the fret board end to serve as a strumming area.

Referring to the dulcimer side view, now cut the slots to accept the nut (H) and saddle (I). In order to establish the various fret wire locations simply measure over, starting from the nut slot. As shown, these fret wire slots are all about $\frac{1}{16}$ in. deep. To cut the fret wire slots, file the set off one side of a fine coping saw blade. The resulting kerf should be just about right to accept the stem of the mushroom shaped fret wire.

Glue the head scroll block (G) in place at the head of the fret board and shape to achieve a scrolled look (see side view head scroll). If you prefer, the head may be carved or shaped to personalize your dulcimer. Birds heads and faces are among some of the more traditional carved motifs. The fret board end is tapered, as shown in the fret board end detail.

Make the end block (E) and head block (F) as shown in their respective details. The angled kerfs are cut with the table saw. These kerfs establish the teardrop shape of the dulcimer, so make certain that the blade set angle is accurate when you make the cuts.

To assemble the dulcimer, first glue the sides into the end and head blocks. Glue the bottom on, and trim the excess. Temporarily position the two top pieces $\frac{1}{8}$ in. apart to determine the tone hole locations. Using the illustrated full-size tone hole profile, trace the tone holes on the bookmatched halves of the top, and cut them out. The tone hole ends, which are $\frac{1}{2}$ in. diameter, can be simply drilled out.

Position the top pieces $\frac{1}{8}$ in. apart and glue them to the fret board. You may wish to use brads, fastened up through the top and into the fret board edges, in place of clamps. Then glue the top and fret board assembly to the sides to complete the dulcimer. Trim back the excess from the top to meet the sides and sand all edges smooth. Finish with Watco penetrating oil.

Section the fret wire up to make the individual frets. Allow a little extra length with the frets so they may be filed back flush with the fret board after they are mounted. Add the nut and saddle in their respective slots (neither is glued). Note that kerfs must be cut in the nut to accept the strings (see nut detail). These kerfs are angled toward the head of the dulcimer, and the kerf depth should stop just short — the thickness of a dime — of the fret board surface. The saddle is shaped to a V at the top, but is not notched for the individual strings. Again referring to the fret board end detail, locate and drill the $\frac{1}{16}$ in. diameter holes into which the brass pin string anchors will fit. The holes for these pins must be angled, and the pins, which are epoxied in place, should extend far enough to allow for the string collars to mount securely.

Insert the tuning gears (right hand on right side, left hand on left side) and fasten with screws as shown. Add the strings, referring to the head detail top view for the proper string-to-gear orientation. The strings are tightened by turning the gear knobs clockwise.

Although we can help you to build a dulcimer, we leave the playing to the pros. Books on tuning and playing the dulcimer are available at most music stores, or may be ordered from Folkcraft.

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Bottom	$\frac{1}{8}$ x $7\frac{1}{2}$ x 33"	1
B	Sides	$\frac{1}{8}$ x $1\frac{1}{2}$ x 29	2
C	Top	$\frac{1}{8}$ x 4 x 33"	2
D	Fret Board	$\frac{3}{4}$ x $1\frac{1}{4}$ x $36\frac{1}{2}$	1
E	End Block	$1\frac{1}{2}$ x $2\frac{1}{2}$ x $1\frac{1}{4}$	1
F	Head Block	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$	1
G	Head Scroll	$1\frac{3}{8}$ x $1\frac{1}{4}$ x $1\frac{1}{8}$	1
H	Nut	$\frac{1}{8}$ x $\frac{1}{2}$ x $1\frac{1}{4}$	1
I	Saddle	$\frac{1}{8}$ x $\frac{1}{16}$ x $1\frac{1}{4}$	1

*Lengths and widths include extra.

Many large projects are somewhat complicated and require considerable skill to build. Happily, this dining table does not fall into such a category. Both its design and construction are surprisingly simple and straightforward. Our table was crafted in oak and walnut, however other woods can be used, so long as they are contrasting.

As you will note in the Bill of Materials, the eight arm pieces (A) are all identical. Use a tapering jig to cut these tapers on a table saw. As shown the tapers begin $4\frac{1}{2}$ in. from the mitered ends. Make the four leg sections (B), and cut the 45 degree arm and leg miters as indicated. Next, referring to the spline cutting detail, use the dado head to cut the spline grooves that will accept the walnut corner splines (C). Remember to set the dado head for a whisker more than a required $1\frac{1}{4}$ in. deep cut, so the splines will not bottom in their grooves and prevent the miters from being drawn up tight.

Now glue up and clamp the four U-shaped arm and leg assemblies. Referring to the clamping detail, attach temporary clamp blocks to achieve the proper clamp pressure along the mitered joints. These clamp blocks may be tacked or screwed in place. In either case, any blemishes left by the tacks or screws when the blocks are removed will not present a problem since these surfaces are concealed. Note that the corner splines are trimmed flush after the clamp up is complete.

Next, cut the 2 in. square walnut core piece (D), and the $\frac{1}{4}$ x $\frac{1}{4}$ x $28\frac{1}{2}$ in. long splines (E). Also, joint and edge glue sufficient stock to make the $1\frac{1}{4}$ in. thick top (F). The top should be rounded out with a saber saw since it is too large and awkward to be fed accurately through the band saw.

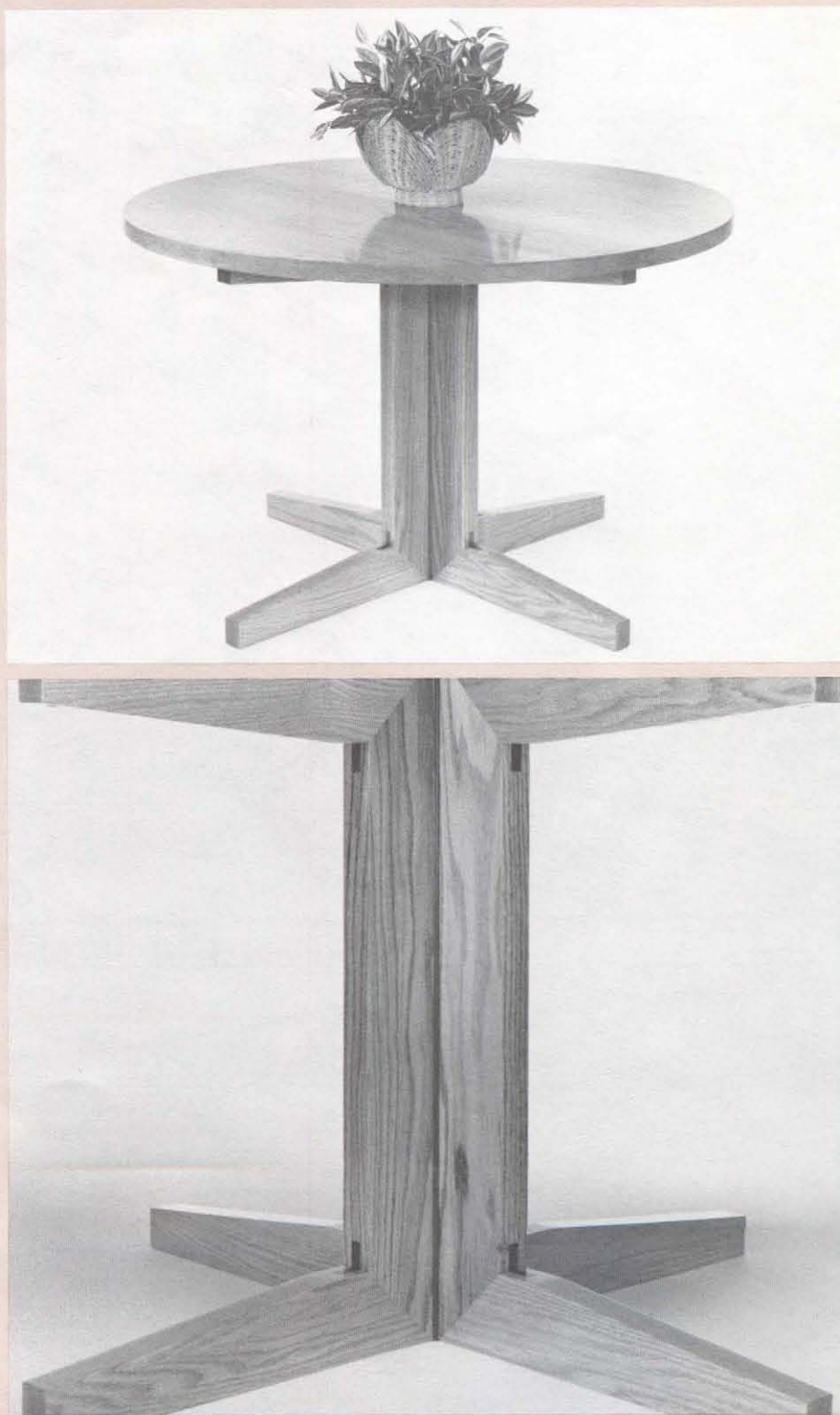
To make the spline grooves in the core piece and legs, set the dado head to a $\frac{1}{4}$ in. width and raise the blade for a $\frac{1}{2}$ in. deep cut. Because the splines are $\frac{1}{4}$ in. wide, the resulting $\frac{1}{2}$ in. deep spline grooves will allow $\frac{1}{8}$ in. on either edge so the splines will not bottom in their grooves. Using the rip fence as a guide, cut these spline grooves. Take care when guiding the leg assemblies through the blade to hold them securely and avoid any tip or sway.

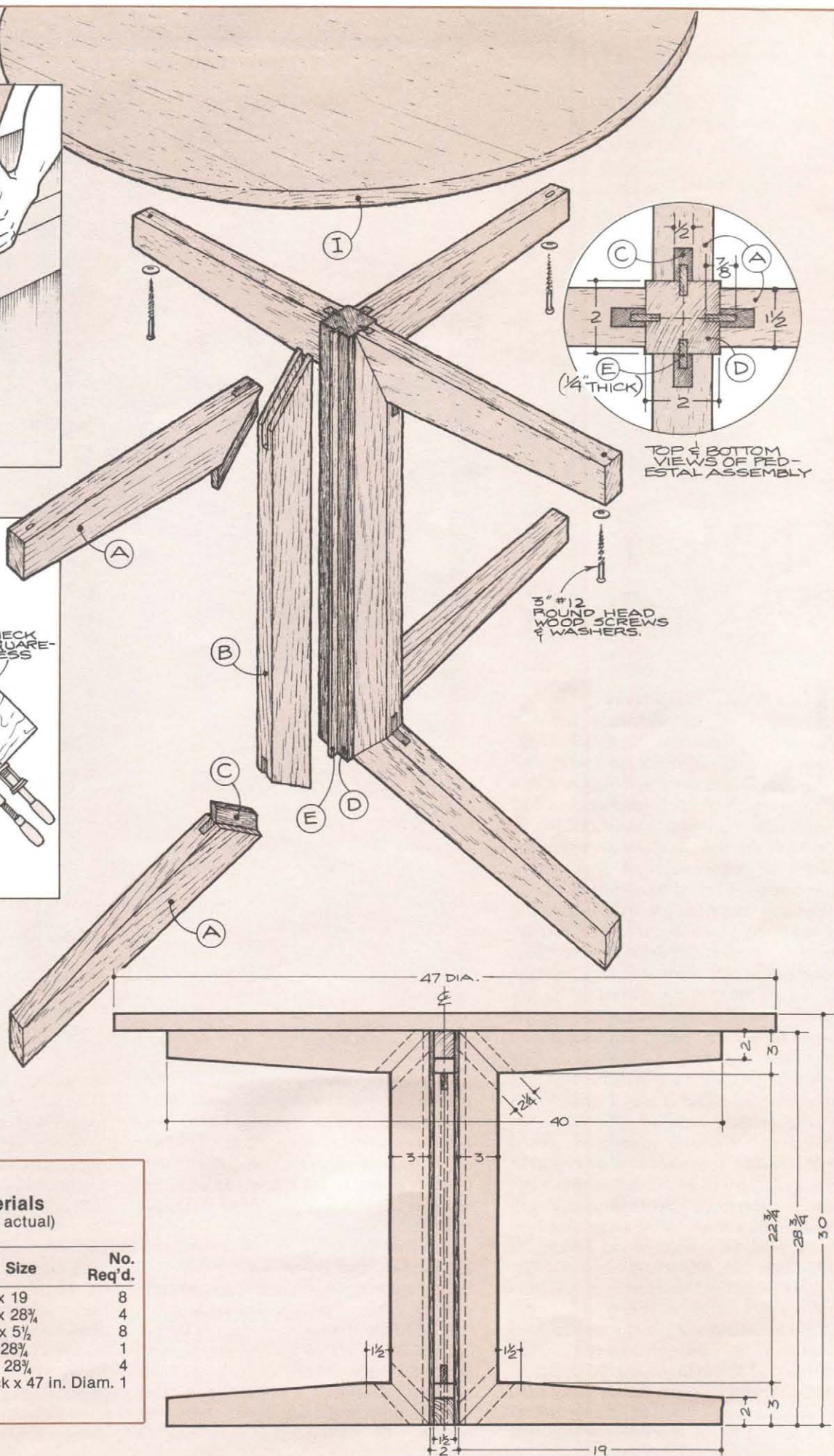
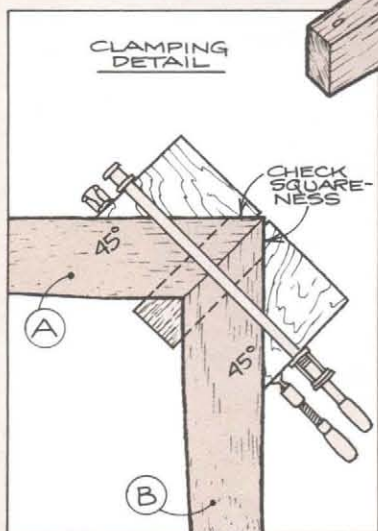
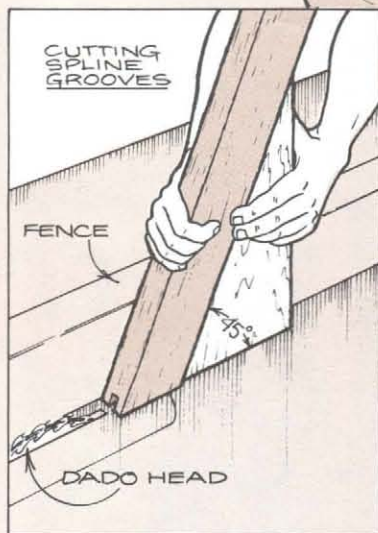
The four leg assemblies are now splined to the core. Use sufficient glue and work quickly. Clamp blocks should be employed to avoid marring the wood. Make certain that the four leg assemblies are bottomed on a flat and true surface, so the table top will rest flat when it is mounted.

Contemporary Dining Table

As illustrated, the table top must be positioned so the wood grain direction is in line with two of the arms. The top is then fixed to both of these arms while the arms on either side are slotted to accommodate wood movement across the grain, which could be substantial given the diameter of the top.

Sand the table carefully, softening all edges and apply two coats of Deft Danish Oil Finish to all exposed surfaces. Add levelers to the four feet to prevent any tendency the table might have to rock on uneven floors. W&J





Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Arm	1 1/2 x 3 x 19	8
B	Leg	1 1/2 x 3 x 28 3/4	4
C	Corner Spline	1/2 x 2 1/4 x 5 1/2	8
D	Core	2 x 2 x 28 3/4	1
E	Long Spline	1/4 x 7/8 x 28 3/4	4
F	Top	1/4 Thick x 47 in. Diam. 1	

Shaker Washstand

This Shaker washstand is in the collection of Hancock Shaker Village in Hancock, Massachusetts. Like some other museum pieces, we have found that the construction is not always designed with respect to wood movement. However, this is not to imply that Shaker craftsmen were not aware of or concerned with wood movement. Very simply, wood movement was less of a problem before the advent of insulation and central heating, and early cabinetmakers did not need to allow for it in their designs to the extent that we do today. In any case, the washstand has survived intact for well over 100 years, and seems none the worse for wear.

To begin, we should note that the Shakers made liberal use of small brads in the construction of this piece. In situations where a glue joint could either fail or cause a panel or board to crack, the use of brads does allow some wood movement. Authentic cut nail style brads are available from The Tremont Nail Co., Elm St. at Route 28, P.O. Box 111, Wareham, MA 02571.

Like much other Shaker work, this piece was crafted in cherry. First, cut parts A through T to the dimensions shown in the Bill of Materials. The various wide surfaces (parts D, E, F, G, L, P, and T) must be made by edge gluing narrower stock to achieve the required widths. A thickness planer will



probably be needed for this project because of the many different part thicknesses. Use a tapering jig on the table saw to cut the leg (A) tapers. The rounded ends on parts B and N and the corners on part P can be made with the band saw, which is also used to shape the shelf (O).

Mortise the cleats (B) to accept the leg tenons, and notch out the top (E) and the shelf (O) for the 1 in. square supports (N), as shown. The dado head is used to cut the $\frac{3}{4}$ x $\frac{1}{4}$ in. dados in the top and bottom to accept the divider (F). Note that these dados are cut straight through, even though the divider does not extend out their full length. The dado head is also used to

cut the $\frac{1}{4}$ x $\frac{1}{8}$ in. deep grooves in parts F and G that will accept the drawer supports (I and H).

As shown in the door top view, the right side door stile (J) is rabbeted to accommodate the end (G), and the left side door stile (K) is rabbeted to accept the divider and the door panel. The two door cleats are shortened to provide clearance when the door is opened. Depending on the intended use of the washstand, you may choose to eliminate the bowl cutout in the top, and/or the glass holder holes in the shelf.

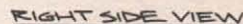
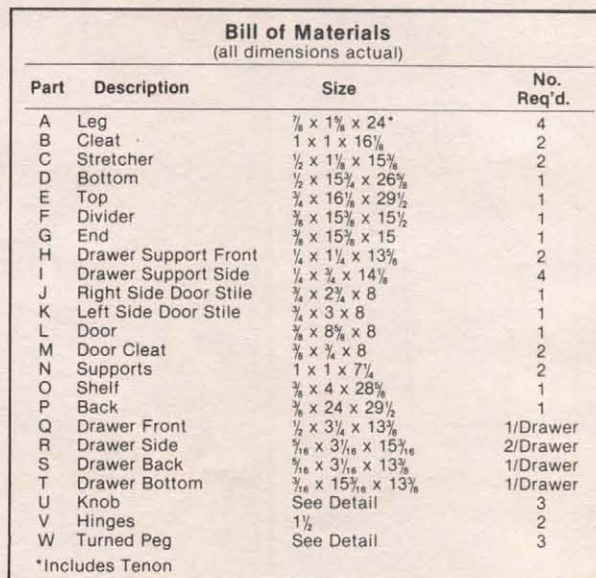
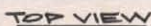
Make the two drawers as shown; both drawers are identical. Refer to the drawer side view for the dovetail layout

To assemble the washstand, mount the legs to the cleats, locking the tenons with dowel pins. As shown, the top and back are mounted with screws through slotted holes. Use brads and/or glue as

The knobs (U) and pegs (W) are mounted where indicated. These knobs and pegs may be made as shown, or authentic Shaker style knobs may be purchased from Shaker Workshops, P.O. Box 1028, Concord, MA 01742.

by rubbing in a good quality penetrating oil.

In our modern world there is little need for an old-fashioned washstand as it was originally intended to be used. However, we have found that the stand makes an ideal houseplant work center. It is handy for repotting, and storing fertilizers, a watering can, and small tools. If you use the washstand for this purpose, you might consider applying polyurethane finish instead of the penetrating oil to protect the wood and prevent water staining. WJW



39

We checked many of the leading fine tool catalogs, and found that marking gauges similar to this one are generally priced in the \$20 to \$30 range. Our gauge is crafted of hard maple and features $\frac{1}{4}$ in. square solid brass inlays. It is a handsome tool, and one that will stand up to a lifetime of hard use.

All the wood used in the gauge is $\frac{3}{4}$ in. square material. Make the 8 in. long arm section, and glue up the four pieces that comprise the collar around a waxed $\frac{3}{4}$ in. square block, as shown. The $\frac{1}{4}$ in. square grooves in the arm and collar that accept the brass inlays are cut on the router table with a $\frac{1}{4}$ in. straight bit (see illustration). Round the arm inlay end to match the routed groove end. The brass inlays are then epoxied into their respective grooves.

Drill $\frac{1}{4}$ in. diameter holes in the arm and collar to accept the 8-32 threaded inserts, and drill a $\frac{3}{32}$ in. diameter hole through the arm as shown to accept the scribe. The scribe can be made from an old $\frac{3}{32}$ in. drill bit. Insert the arm threaded insert to within a hair of the $\frac{3}{32}$ in. scribe. Since the scribe hole is drilled through the center of the $\frac{3}{4}$ in. arm, the threaded insert will protrude slightly. File it down flush. An 8-32 stainless steel set screw holds the scribe in place.

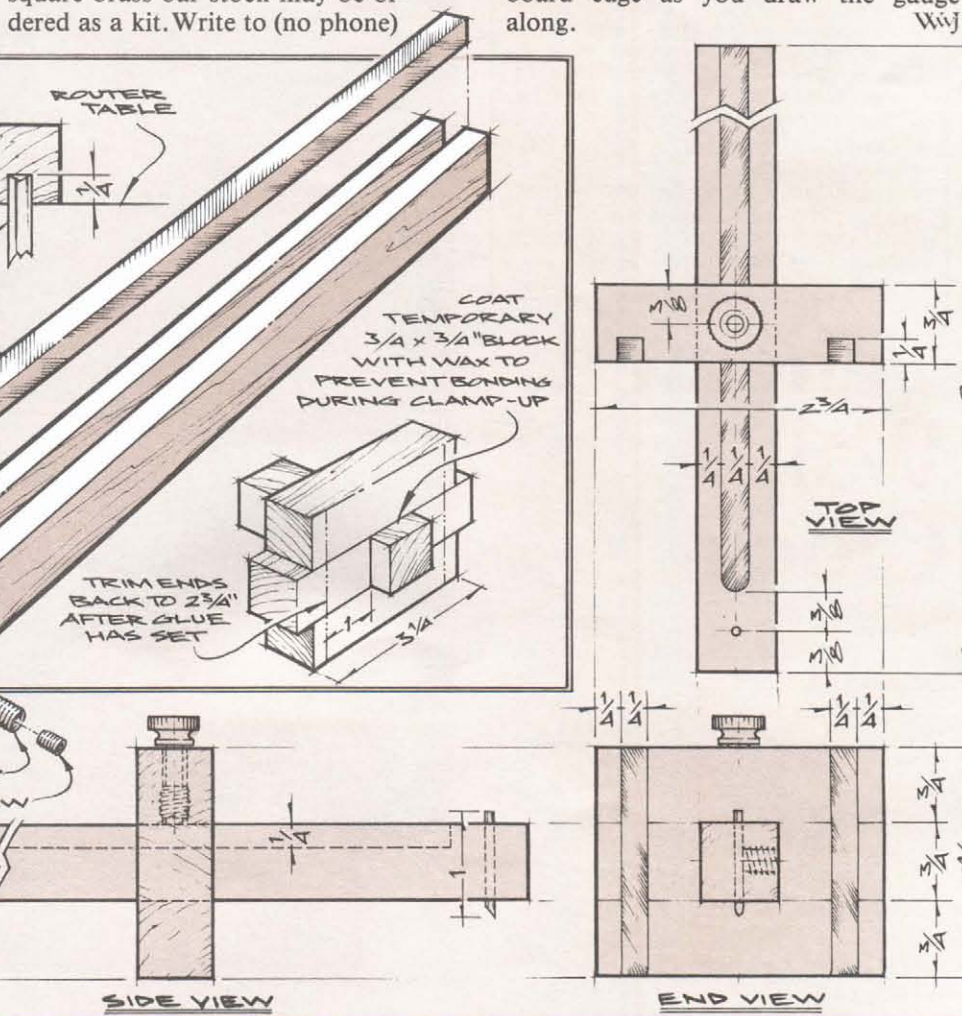
The locking collar pin is made by epoxying an 8-32 knurled nut onto a $1\frac{1}{4}$ in. long section of 8-32 brass screw which has had the head hacksawed off.

The 8-32 brass knurled nut, the 8-32 threaded inserts, the 8-32 stainless steel set screw, and a 12 in. length of $\frac{1}{4}$ in. square brass bar stock may be ordered as a kit. Write to (no phone)

Elwick Supply Co., 230 Woods Lane, Somerdale, NJ 08083 and specify kit #100. Cost of the kit is \$5.00 postpaid.

When using the marking gauge, note the bevel direction on the scribe. The alignment with the bevel facing in helps force the collar up tight against the board edge as you draw the gauge along.

Marking Gauge



This veneered wall clock looks like a showpiece, yet it's a surprisingly easy project to build. The 4-piece book matched veneer face lends it a dynamic and interesting appearance. Since no two veneers will have the same look, every clock will be unique.

The heart and soul of the clock is the book matched face. Refer to the Special Techniques feature on page 24 for instructions on how to select and create an attractive 4-piece book match. We used olive-ash burl veneer for our clock.

The book matched face (D) is laid up over a 1/4 in. thick plywood base (C). A backing veneer (E) must be applied to the back side of the plywood in order to equalize tensions. After gluing and clamping, set the veneered plywood aside to dry while you work on the frame.

We made our frame from walnut, however you might use a different wood for the frame, depending on the veneer you select. At any rate, the

frame and face should compliment each other. Cut the four frame pieces (A), leaving a little extra length so the ends may be mitered. With the dado-head cut the 1/4 in. deep groove into which the face will fit. Make this groove slightly wider than 1/4 in. to allow for the thickness that the veneers will add to the plywood. Miter the frame ends and use the spline cutting jig shown in Fig. 1 to cut the spline grooves in the four frame corners.

The 1/4 in. diameter hour marks are made from ebony. We turned a short cross-grain piece of ebony on the lathe (see turning detail), and then sliced off four round inlay sections. Use a Forstner bit to drill the face to accept these hour inlays. The inlays should be

thick enough so they protrude slightly, and then be sanded flush. Align each inlay with the grain running toward the face center, and drill through the center to accept the movement arbor. The face must be final sanded before assembly.

Assemble the frame around the face, trimming the splines flush after glue-up (see Fig. 2). Sand the frame and finish with tung oil.

A source for various veneers (including olive-ash burl), veneer tape, glue, and other supplies is Artistry In Veneers, Inc., 450 Oak Tree Ave., South Plainfield, NJ 07080. When ordering, specify that you will be using the veneer to make a 4-piece book match.

W&J

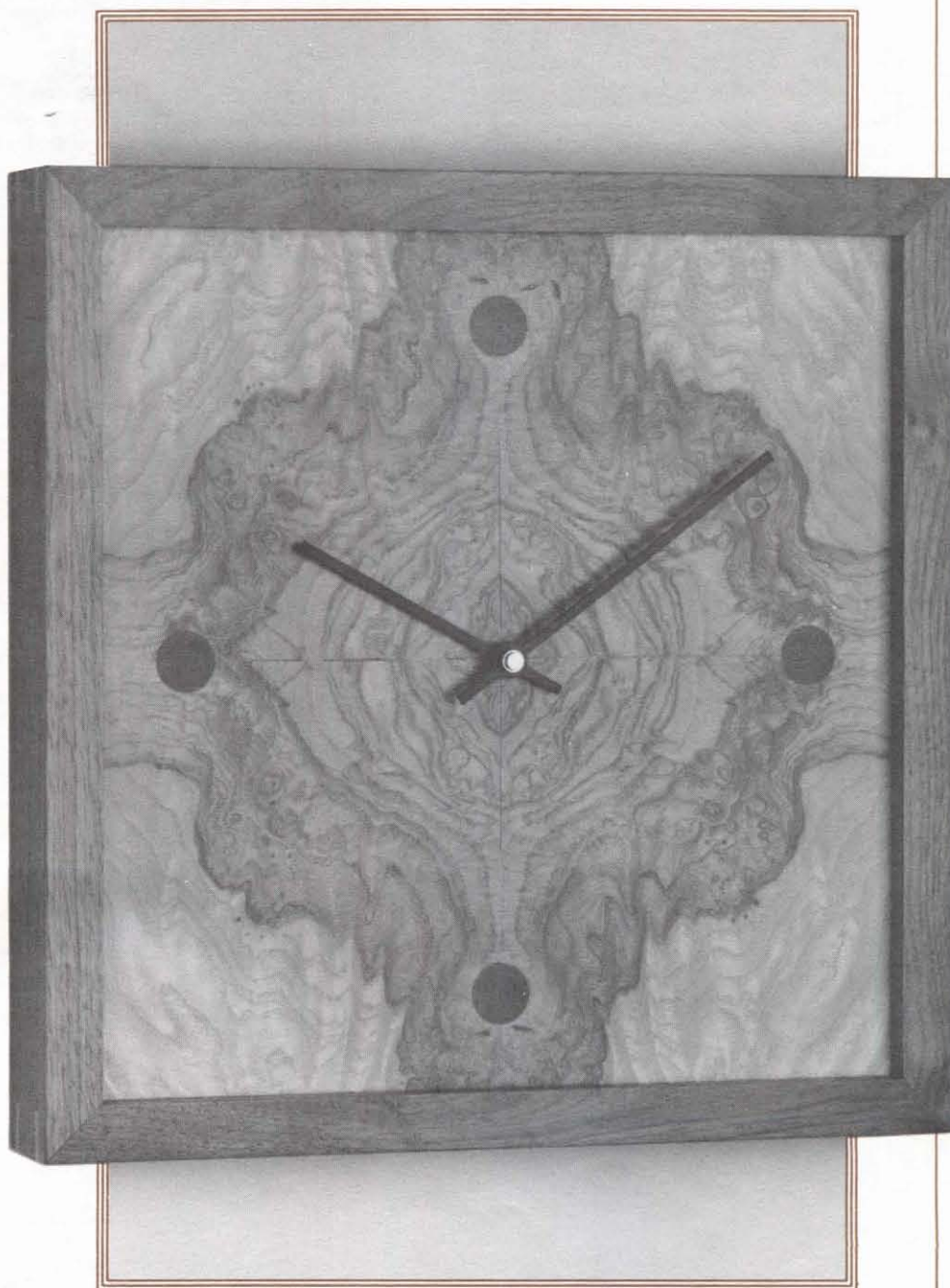
Bill of Materials (all dimensions actual)

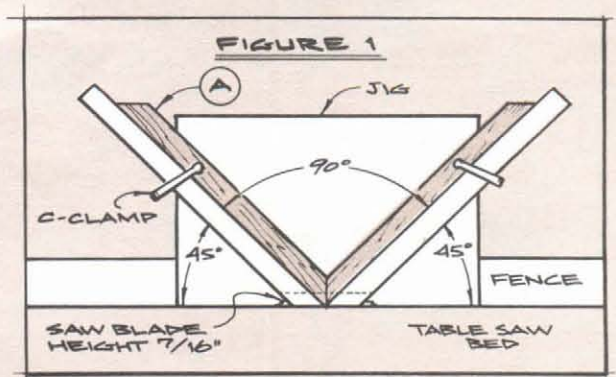
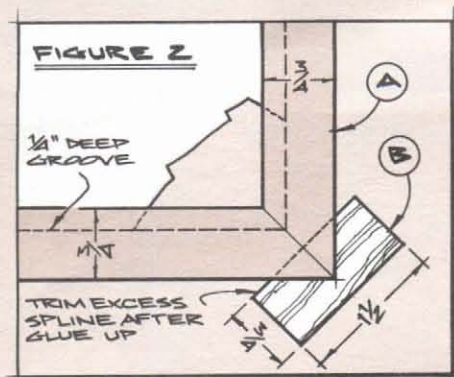
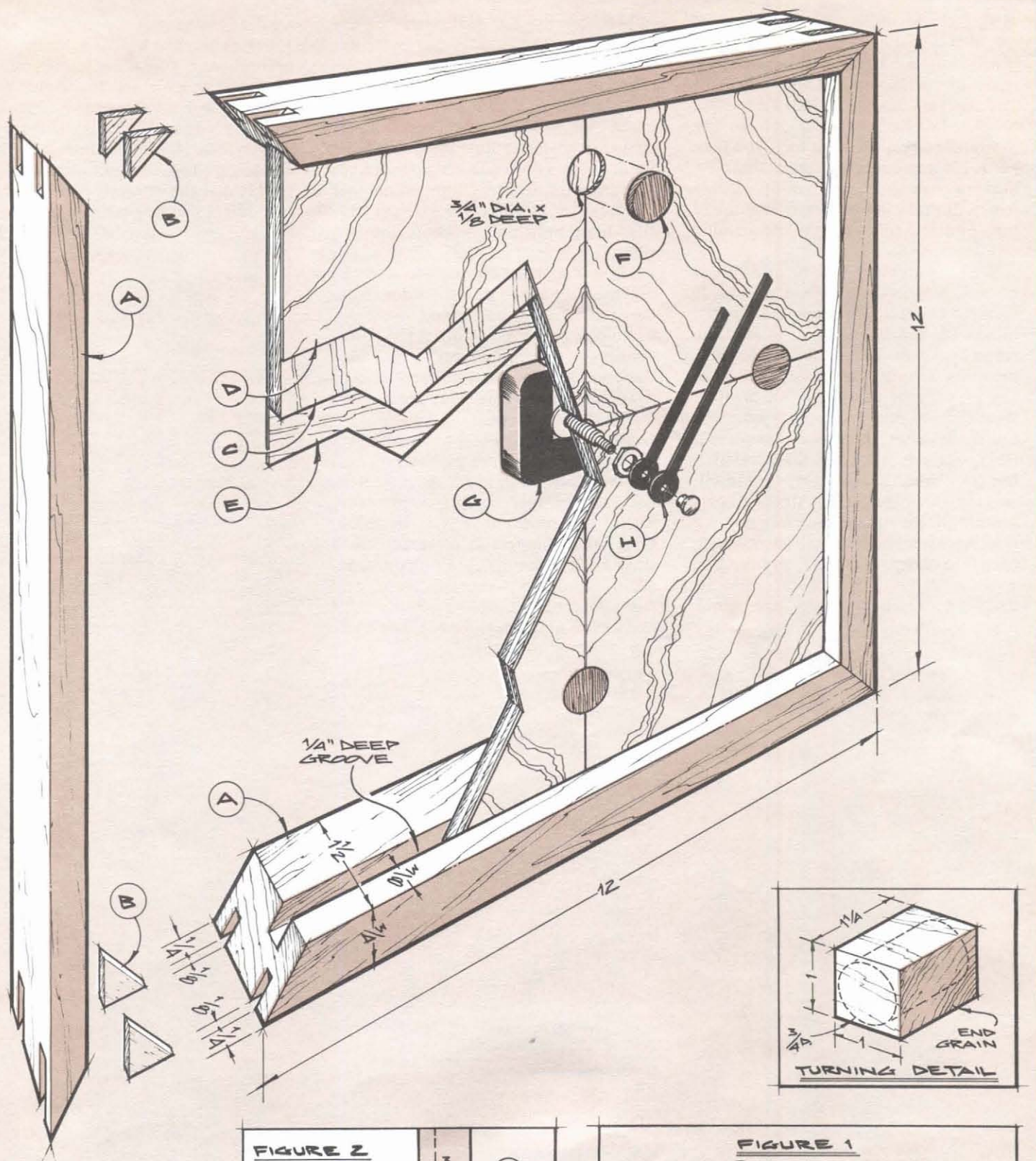
Part	Description	Size	No. Req'd.
A	Frame	3/4 x 1 1/2 x 12	4
B	Spline	1/8 x 3/4 x 1 1/2*	8
C	Plywood	3/4 x 11 x 11	1
D	Face Veneer	As shown	1
E	Back Veneer	As shown	1
F	Hour Inlay	1/8 thick 3/4 dia.	4
G	Quartz Movement**		1
H	Hands**		1 pr.

*Before trimming

**Available from: Klockit, P.O. Box 629, Highway H North, Lake Geneva, WI 53147. Order part no. 10022 for quartz movement, part no. 66943 for hands.

Veneered Wall Clock





With the increasing popularity of 4-wheel drive off-road vehicles, it was only a matter of time before we came out with our "wood" version. The scale of this toy is fairly accurate, so the finished product looks very much like a real 4 x 4. In fact, you may be a bit reluctant to hand this fine looking toy over to junior. Don't worry though, it's built tough and will take punishment, just like the genuine article.

We built our 4 x 4 using cherry and walnut, but most any wood will do. It is best to select a dark wood for the blocks (A and B), as this will lend the wheel wells and grill an authentic look. Begin by cutting parts A and B. Part A can initially be cut about 8½ in. long since the notches to accept the bumpers are made after the toy is assembled. Next, cut out stock for the hood (C), top (D), sides (E), bumpers (F and G), and the axle blocks (H). All these parts are simply cut square since any shaping is done after assembly. The notch in part B to accept the hood, and the axle grooves in parts H are cut with the dado head. Chamfer the axle block edges as shown.

Temporarily hot glue together the two ½ in. thick side pieces. After transferring the illustrated grid pattern, cut both pieces out at the same time, using either a saber or jig saw. To make the window cutouts you must first drill a starter hole into which the jig or saber saw blade is then inserted. As noted earlier, the bumper notches are cut after assembly. Once their profiles have been cut, separate the two sides.

Glue the two blocks (A and B) together, and then add the sides. Note that the sides are positioned so the upper block protrudes ½ in. at the front, giving the appearance of a grill. Glue the hood and top in place, and sand to shape as shown. The sides are beveled at the top with a plane.

The notches to accept the bumpers can now be cut, either by hand or with the table saw dado head. As indicated, the back bumper notch is ⅜ in. wide, while the front notch is ¼ in. wide. Glue both bumpers in place and flush their lower edges to continue the angled undercarriage profile, front and rear. Add the axle blocks and mount the wheels and axles. Since there is not

a lot of clearance on either side of the wheel wells, axle block position is important, and you must watch out for slippage along the axle block glue lines.

Sand the 4 x 4 thoroughly, breaking all sharp edges. We finished the piece with Watco Natural Danish oil, which darkened the wood slightly and highlighted the attractive cherry grain. If toddlers will be playing with this toy however, it is better left unfinished.

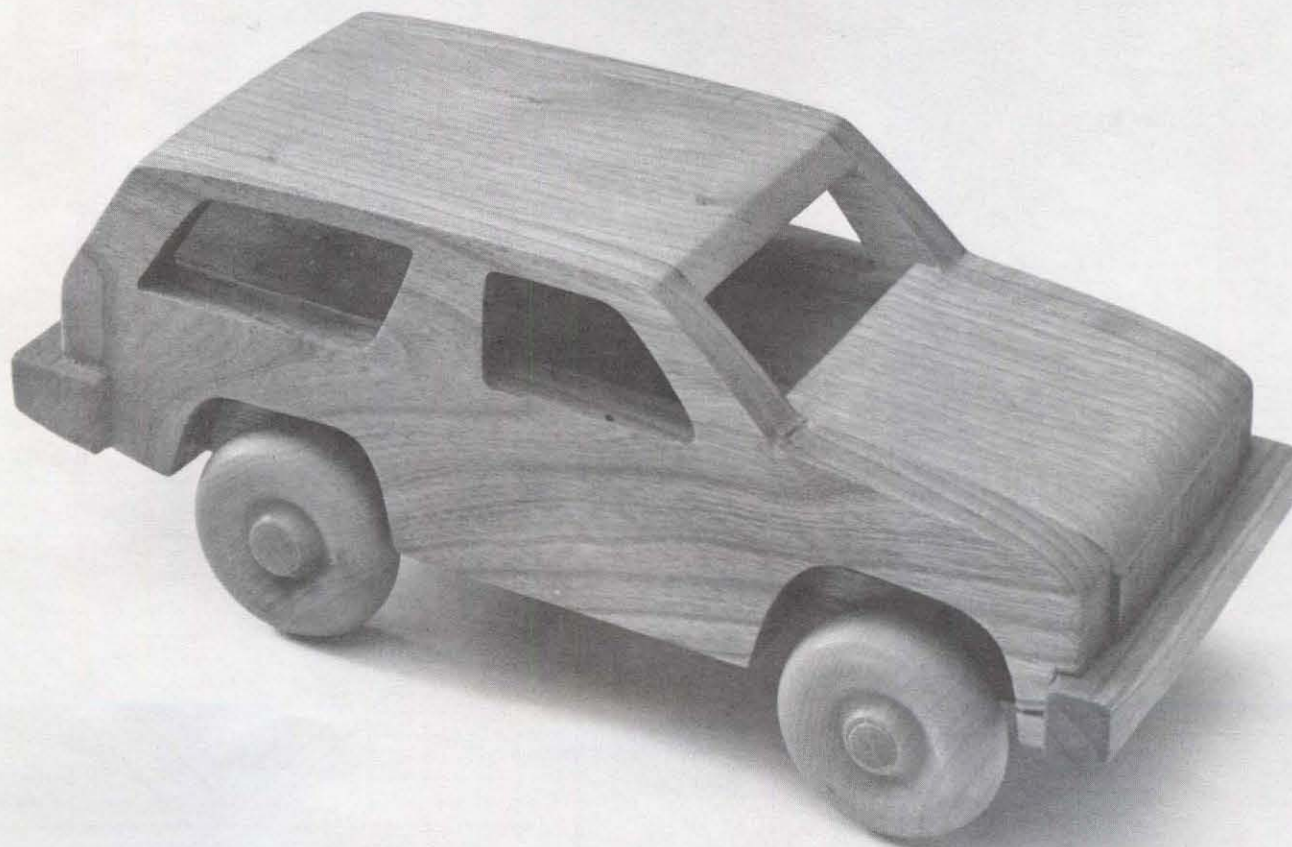
Wwj

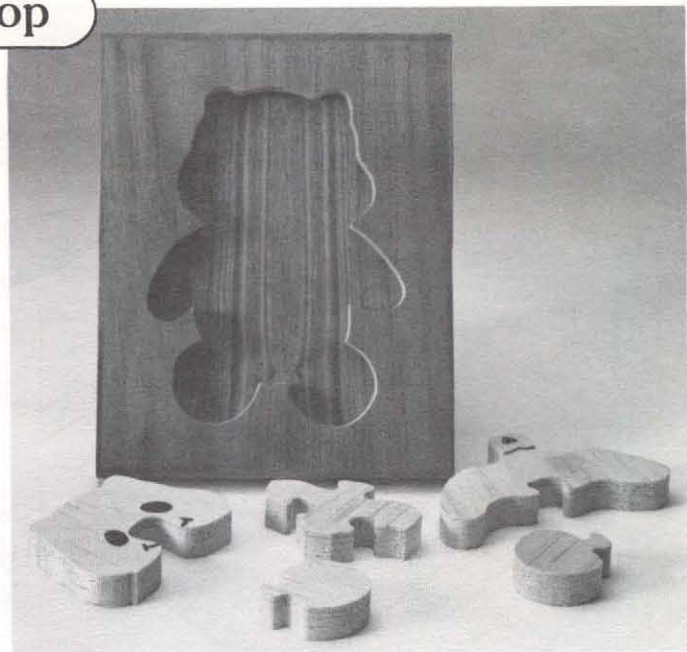
Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Lower Block	¾ x 2⅝ x 8	1
B	Upper Block	¾ x 2⅝ x 8⅝	1
C	Hood	½ x 2⅝ x 2½	1
D	Top	¼ x 2⅝ x 5	1
E	Sides	½ x 2⅝ x 8½	2
F	Front Bumper	½ x ⅞ x 3¼	1
G	Rear Bumper	⅝ x ¾ x 3¼	1
H	Axle Block	½ x ¾ x 2⅝	2
I	Axle	⅝ diam. x 3¼ dowel	2
J	Wheel*	1¼ diam. x ⅞ in. thick	4

*Available from The Woodworker's Store, 21801 Industrial Blvd., Rogers, MN 55374. Order Part No. B1463, set of 4 wheels is \$1.08.

4 x 4 Off Roadster





Teddy Bear Puzzle

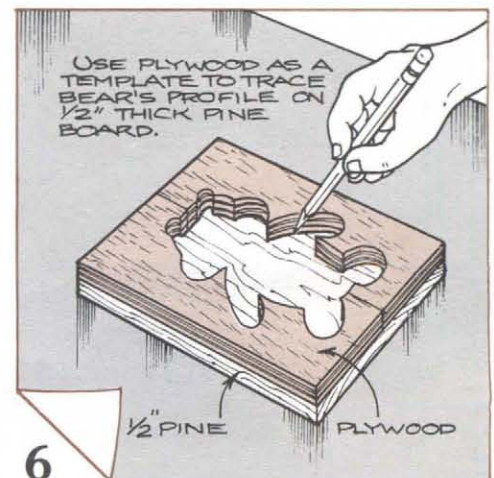
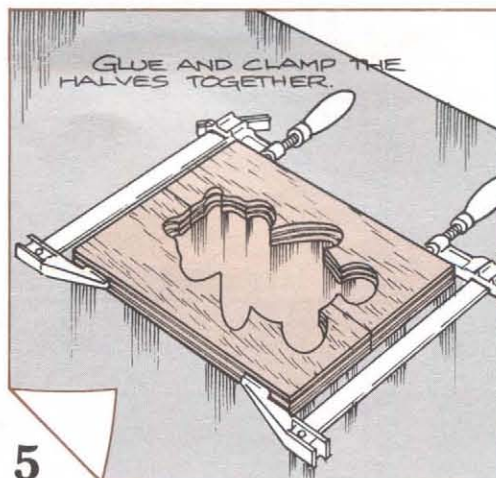
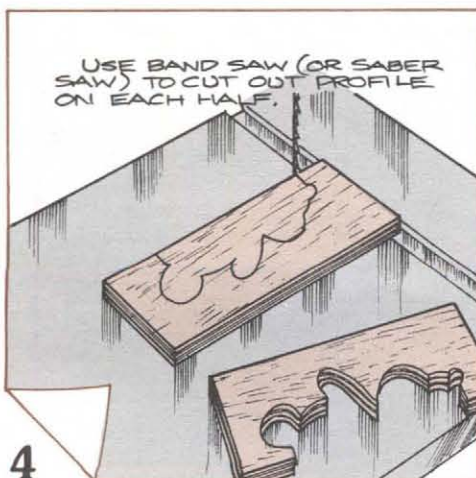
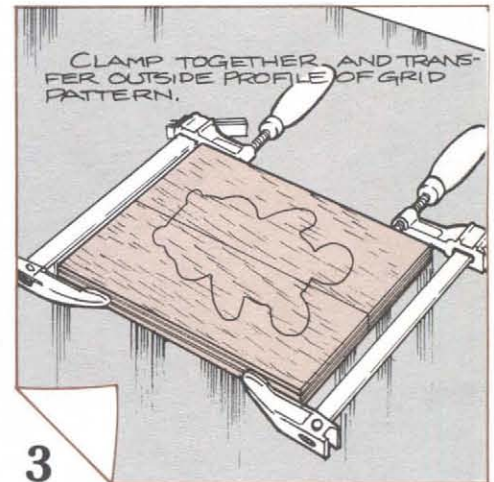
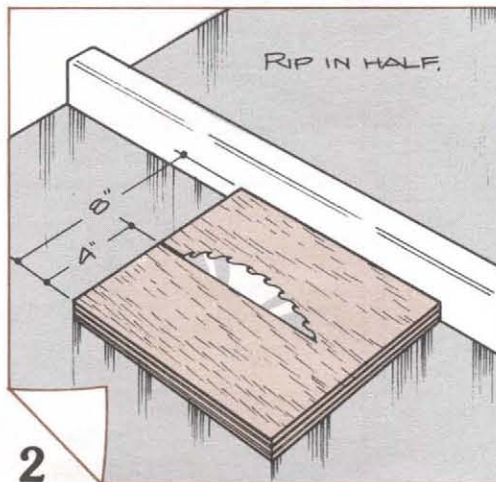
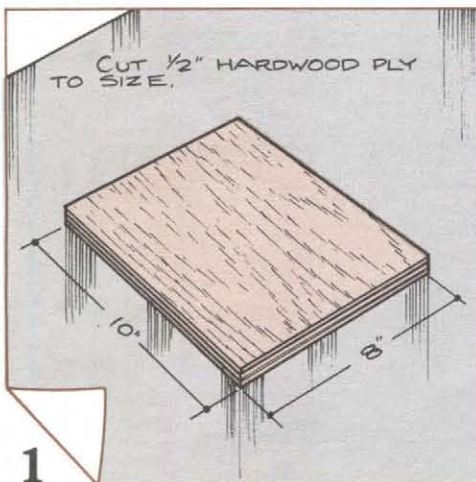
Designed by Patrick Marineau

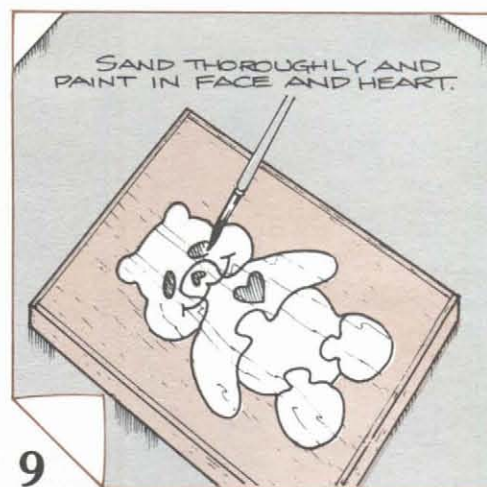
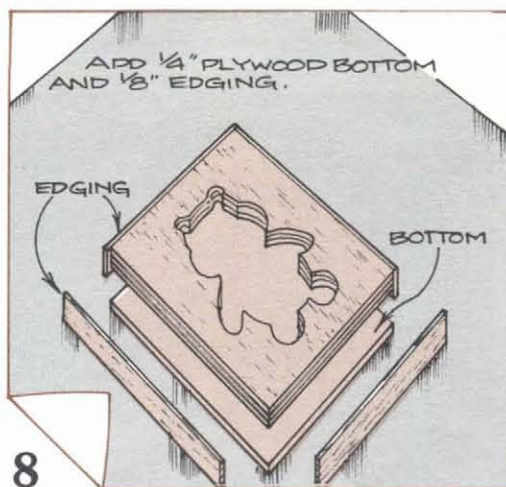
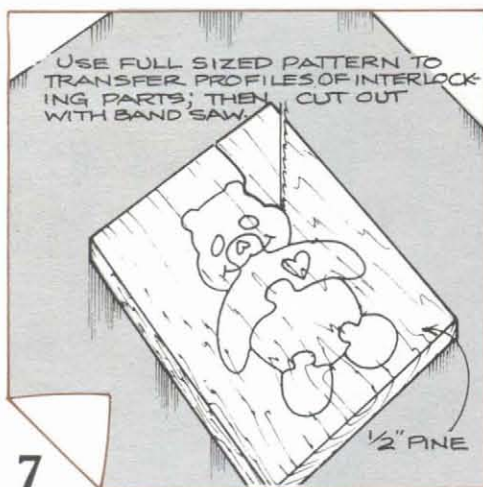
Children 1 to 3 years old will find this puzzle lots of fun. We used $\frac{1}{2}$ in. walnut plywood for the top, $\frac{1}{4}$ in. walnut plywood for the bottom, and solid walnut stock for the edging. The bear was cut out from $\frac{1}{2}$ in. clear pine. Steps 1 through 9 detail the construction.

Step 1: Cut the $\frac{1}{2}$ in. plywood top to 8 in. wide by 10 in. long. To keep splintering to a minimum, the side that will be exposed should face up as you make the table saw cut.

Step 2: Rip the top lengthwise down the center.

Step 3: Temporarily clamp the stock together while making sure the ends are flush. Once clamped, transfer the outside profile of the full-size pattern to the stock. Take care to center the profile.





Step 4: Use the band saw with a $\frac{1}{8}$ in. or $\frac{1}{4}$ in. wide blade to cut out the profile on each half.

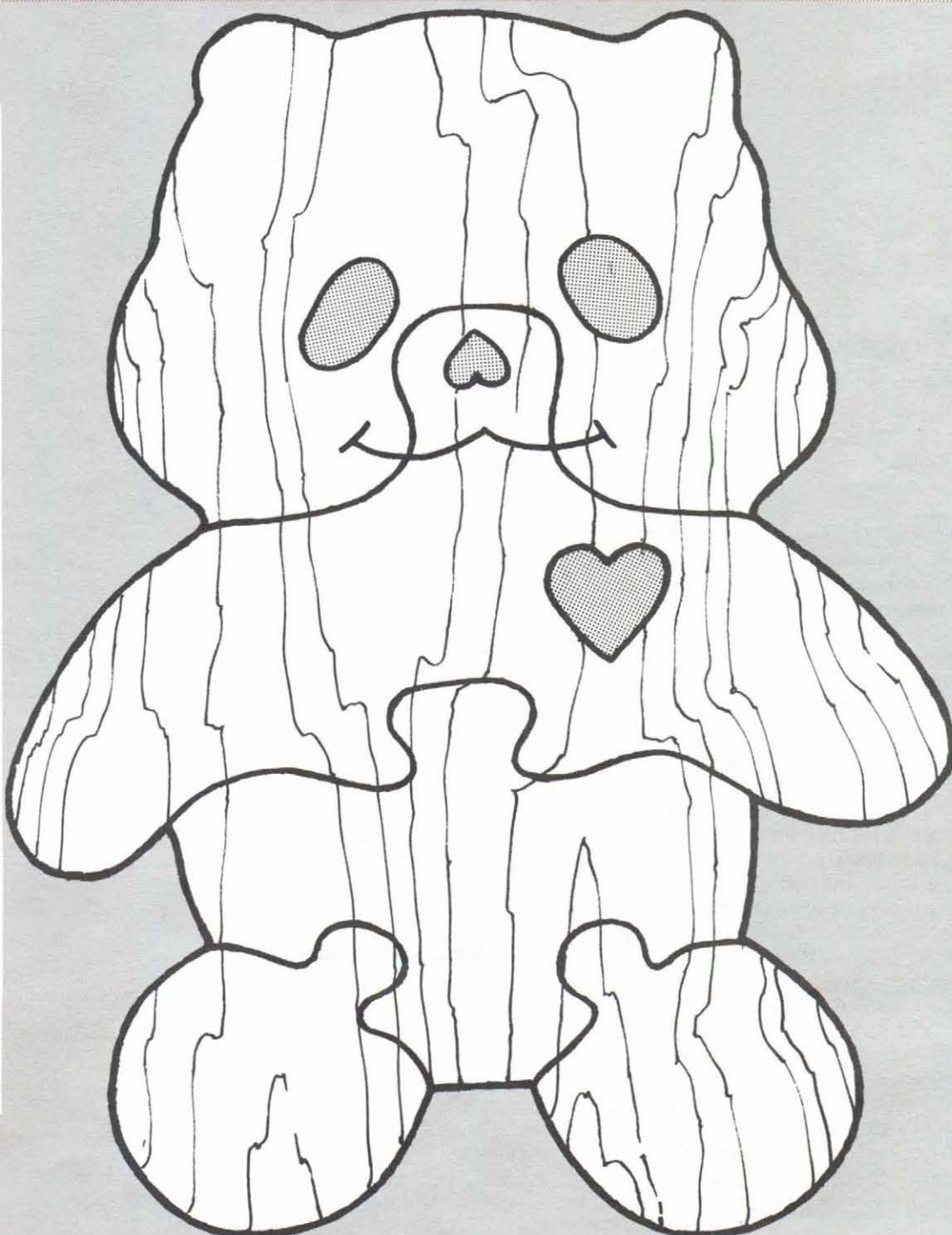
Step 5: Apply a thin coat of glue to the mating surfaces, then clamp together. Make sure the edges are flush.

Step 6: Use the plywood top as a template to trace the outside profile of the bear on a piece of $\frac{1}{2}$ in. clear pine.

Step 7: The full-sized pattern is used to add the various curves of each interlocking piece. Use the band saw to cut to shape.

Step 8: Cut the $\frac{1}{4}$ in. plywood bottom slightly oversized, then glue and clamp it to the underside of the top. When dry, use the table saw to trim the $\frac{1}{4}$ in. plywood so that it is flush with the edges of the top. Rip the $\frac{1}{4}$ in. thick edging a little wider than necessary (about 1 in.) so that after gluing and clamping it can be sanded flush with the surface.

Step 9: Sand all parts thoroughly. Use a non-toxic, waterproof paint (we used enamel) for the eyes, nose, mouth, and heart. Since young children often chew on toys like this, it's best to avoid any kind of a final finish. WwJ



Duck Pull Toy

Pull toys have long been favorites with the small fry. This simple-to-build duck rolls along easily on four large wheels, with an up and down wing motion generated by offset pegs mounted on the rear wheels.

Our duck is made from cherry but most any wood can be used. Maple or birch are good choices because they are hard. Pine can also be used, although as a softwood it will not be as durable.

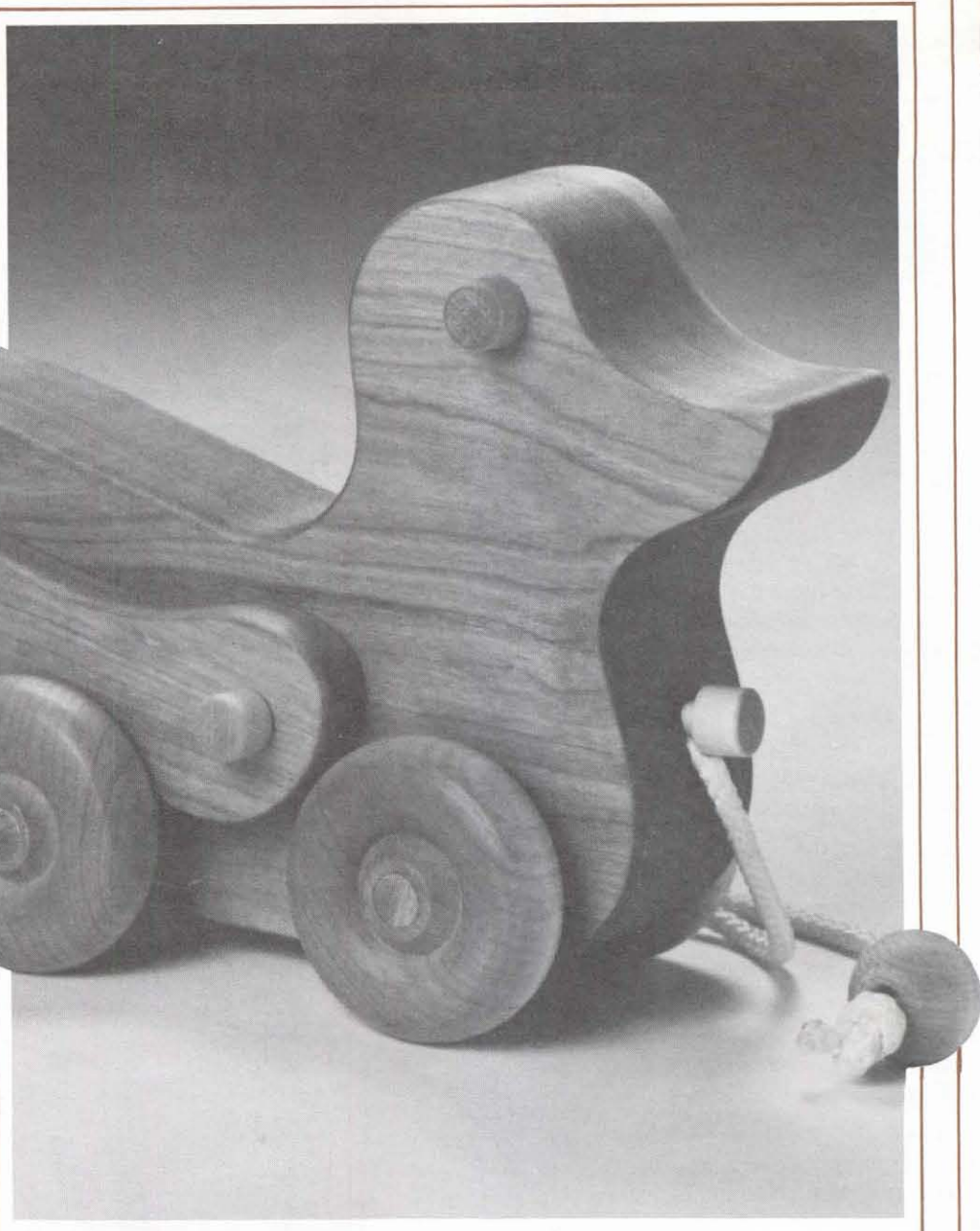
To make the body (H) and wings (I), lay out a grid pattern, as shown, on a 1½ in. thick board. Carefully transfer the duck and wing profiles, and then use the band saw, saber saw, or jig saw to cut them out. The band saw is also used to resaw the two ½ in. thick wings from the wing cutout. Final sand the duck body and wings before assembly.

The remaining parts of the duck — the pegs (A and B), the ball (C), the wheels (D), the rope (E), and the axles (F and G) — may either be made as shown or purchased from Cherry Tree Toys, who provided us with the duck plans. Their catalog, listing various other plans and hardwood toy parts, is available for \$1. Write to Cherry Tree

Toys, P.O. Box 369, Belmont, OH 43718.

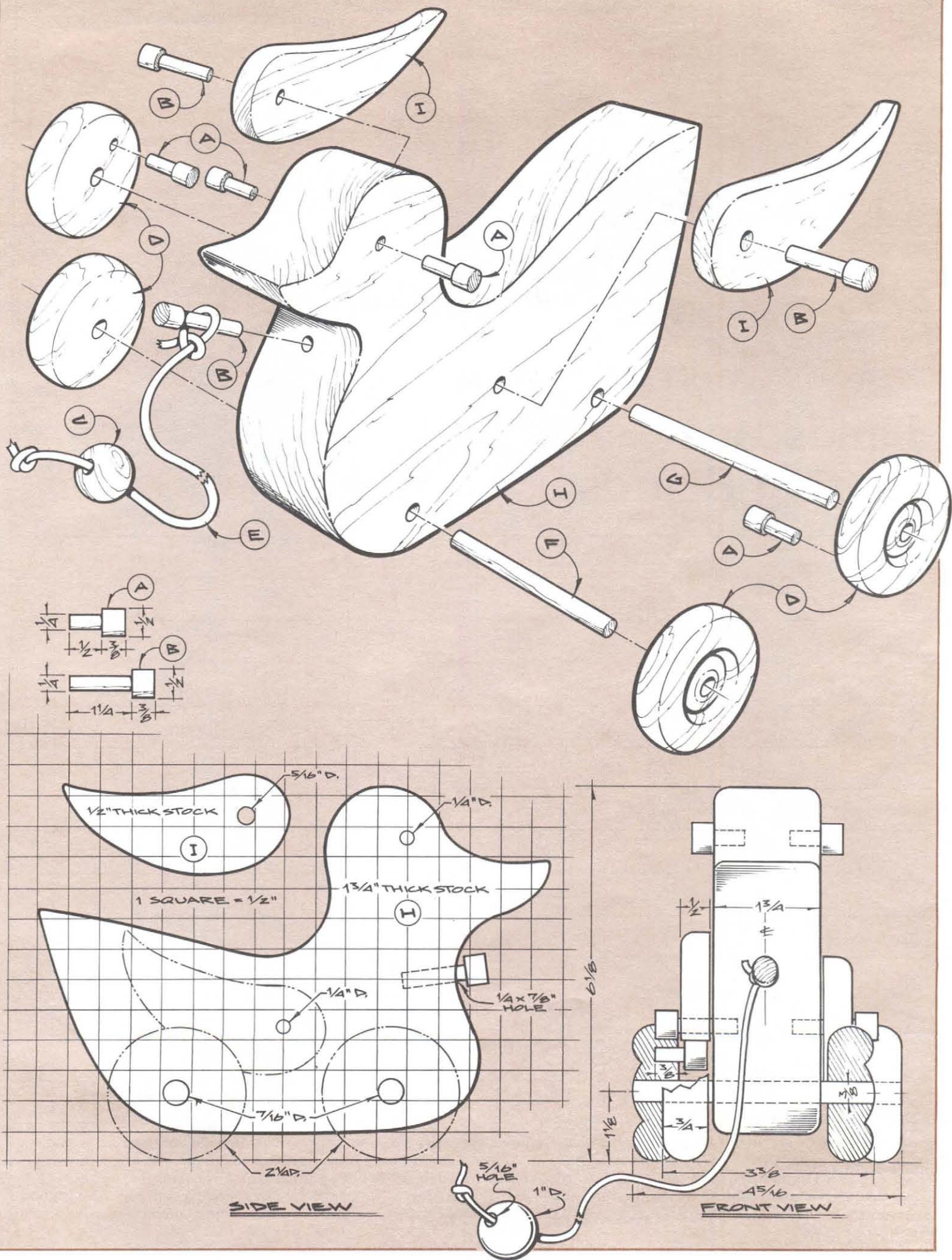
To assemble the duck, first drill the various holes as indicated to accept the pegs and axles. Glue the eye pegs in place and mount the wings. Note that the ¾ in. deep peg holes on the inside of each rear wheel are located about midway between the axle and outer diameter. Now mount the wheels on their respective axles and glue the rope pull peg in place.

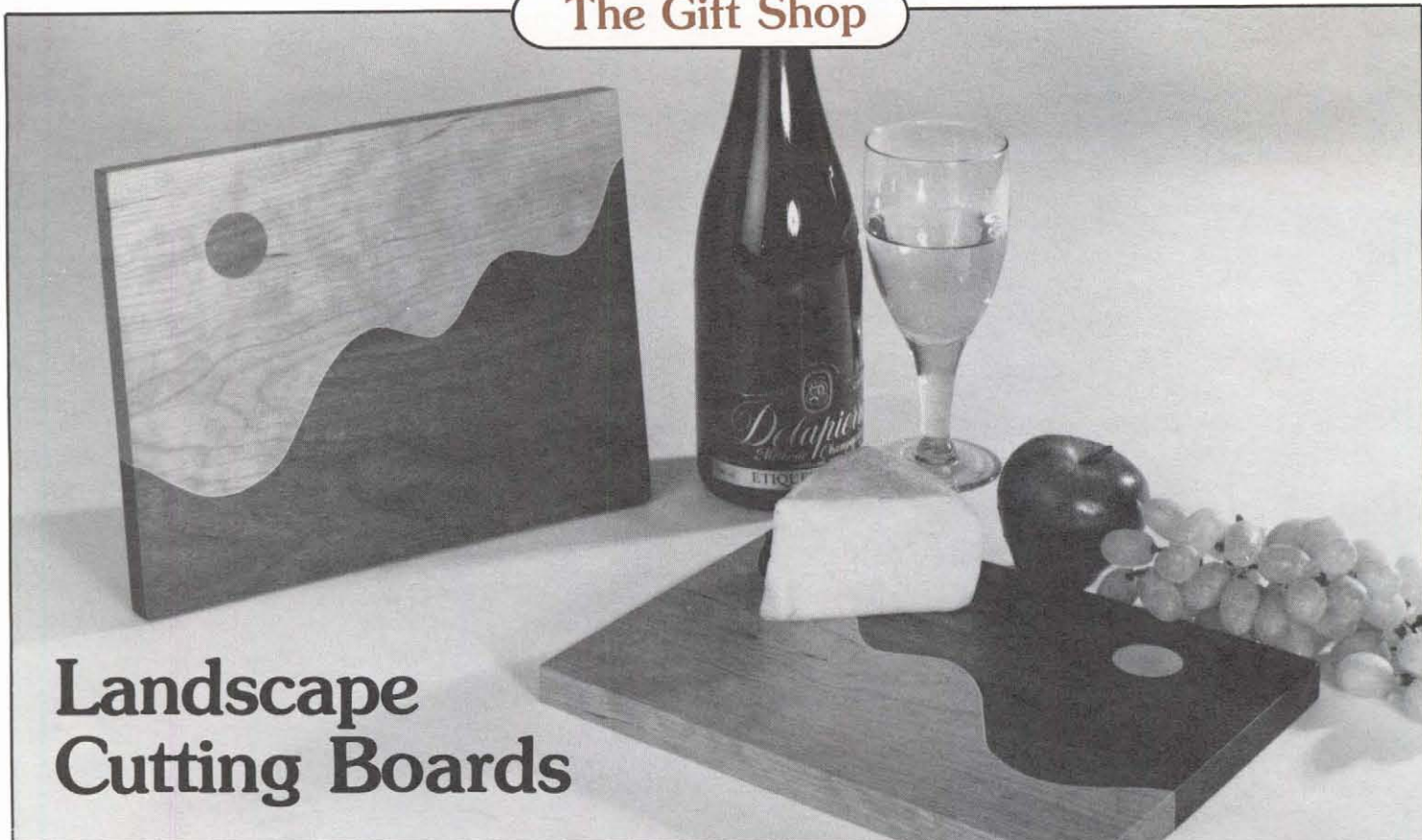
As with most of our toys for very young people, we prefer to leave the wood natural, as opposed to applying a potentially toxic finish. If you prefer a finish on the wood though, Behlen's Salad Bowl finish, a non-toxic alternative, is available from Wood Finishing Supply Co., 1267 Mary Drive, Macedon, NY 14502. 



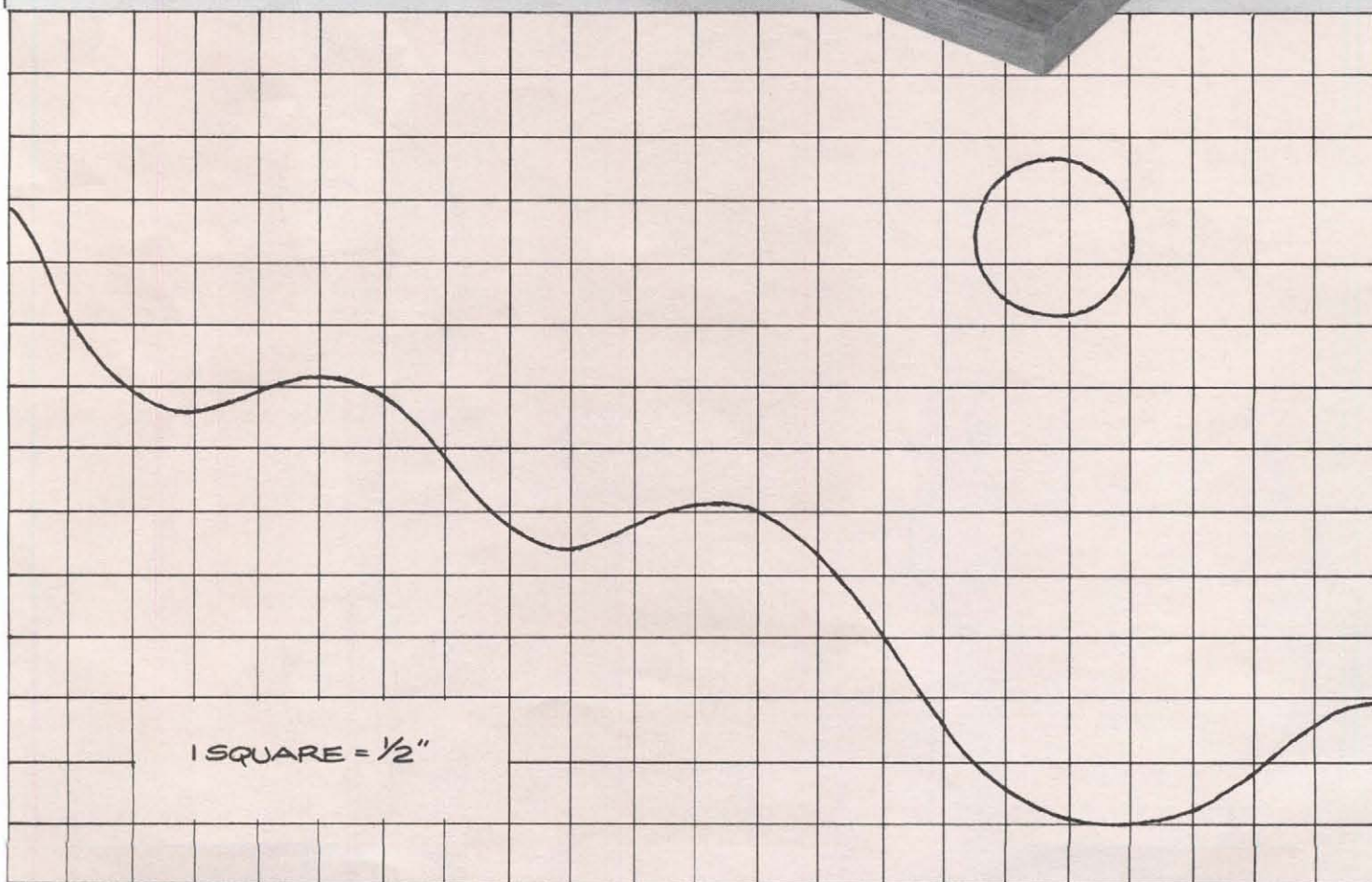
Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Short Peg	As shown	4
B	Long Peg	As shown	3
C	Ball	1 in. diameter	1
D	Wheel	2¼ in. diameter x ¾ in. thick	4
E	Pull Rope	7/32 in. diameter x 24 in. long	1
F	Front Axle	¾ in. diameter x 3½ in. long	1
G	Rear Axle	¾ in. diameter x 4½ in. long	1
H	Body	1¾ x 5¼ x 8¼	1
I	Wing	½ x 1½ x 3½	2





Landscape Cutting Boards



Cutting boards are an always popular gift item, and over the years we've seen them made in what seems to be an endless variety of shapes and styles. Of the many that we've seen though, these landscape designs remain one of our favorites. They require a minimum of time and effort, yet the result is a design that's both unusual and attractive.

We used cherry and walnut for ours, but just about any combination of wood species can be used as long as there is good color contrast. The maple veneer strip serves to fill the space made by the band saw cut while at the same time creating a nice detail.

Steps 1 through 9 explain the construction techniques. This procedure keeps waste to a minimum and results in two cutting boards.

Step 1: For best appearance, select $\frac{3}{4}$ in. thick straight-grained stock that's free from knots or other defects. Cut two boards, one from cherry and one from walnut, each measuring $8\frac{1}{2}$ in. wide by 11 in. long.

Step 2: Use double-faced (carpet) tape to temporarily join the two boards together. When joining, make sure the edges are flush. Now transfer the grid pattern to the top board.

Step 3: Band saw the joined boards. For best results use a fine-toothed blade (12 or more teeth per inch) that's $\frac{1}{8}$ - $\frac{1}{4}$ in. wide.

Step 4: Cut 1 in. wide maple veneer to a length of about 18 in. Match each cherry section to a mating walnut half, then apply glue to both sides of the veneer and to the mating surfaces of the walnut and cherry.

Step 5: Clamp the two sections firmly. An end clamp will keep the end edges aligned. Make sure the veneer extends above the surface on both sides so that it can be sanded flush after the clamps are removed.

Step 6: Sand the veneer flush with the surface on both sides and the ends. Lay out and mark the location of the "moon"

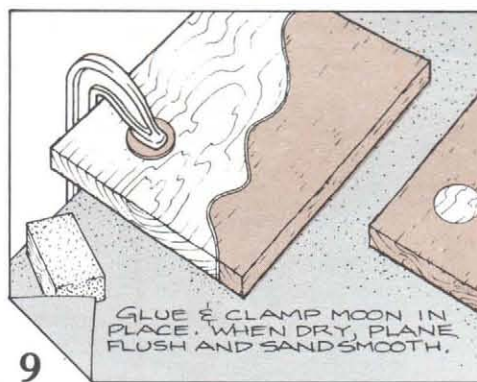
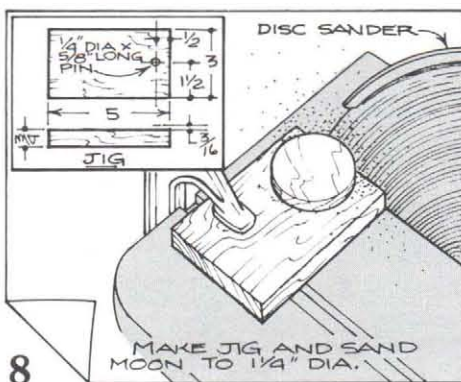
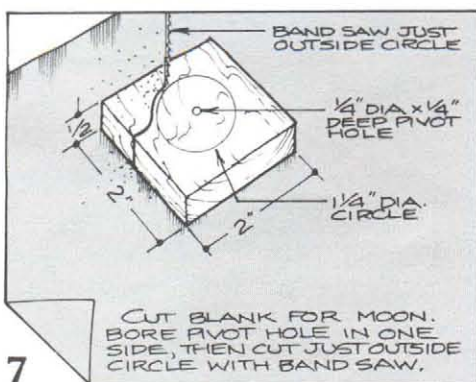
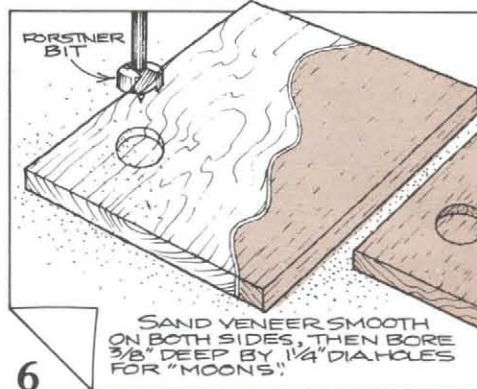
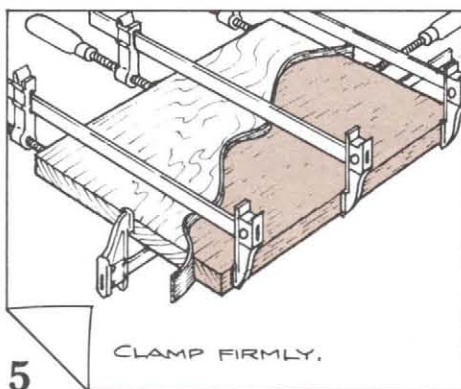
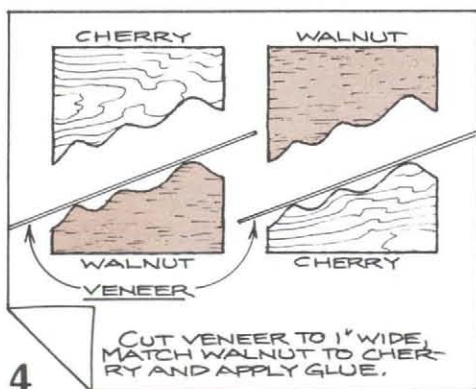
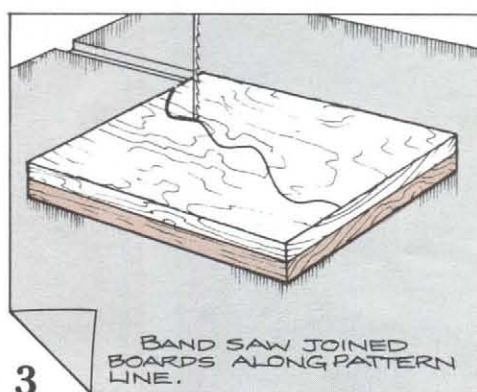
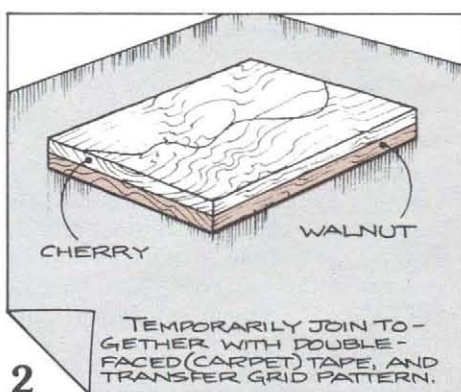
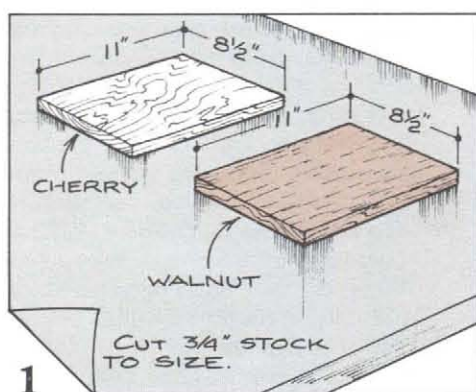
on each side, then bore a $1\frac{1}{4}$ in. diameter by $\frac{3}{8}$ in. deep hole. A Forstner bit, which bores a flat bottomed hole, is ideal here, but any bit can be used as long as the spur point is short. A long spur point will come through the other side.

Step 7: Cut a $\frac{1}{2}$ in. thick by 2 in. square blank for the moon. Use a compass to scribe a $1\frac{1}{4}$ in. diameter circle, then bore a $\frac{1}{4}$ in. diameter by $\frac{1}{4}$ in. deep pivot hole on one side only. The band saw is now used to cut just outside the scribed circle.

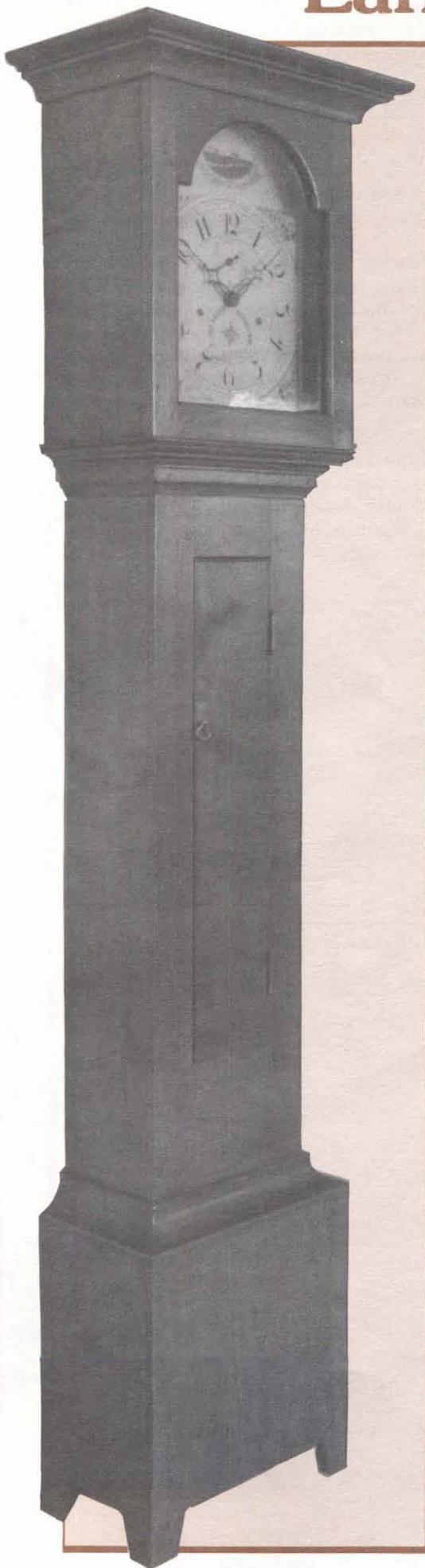
Step 8: To sand the moon to a perfect circle, a jig is made for the disc sander. The jig simply consists of a piece of $\frac{1}{4}$ in. thick scrap stock cut to about 3 in. wide by 5 in. long. At a point $\frac{1}{2}$ in. from one end, a $\frac{1}{4}$ in. diameter by $\frac{3}{8}$ in. long pin is glued into a $\frac{1}{8}$ in. deep hole. The pin protrudes $\frac{3}{16}$ in.

To use the jig, start the disc sander then assemble the moon to the jig pin. While holding the moon firmly on the jig, slide the jig toward the disk sander until it sands to the $1\frac{1}{4}$ in. diameter circle. At this point clamp the jig to the disk sander table, then rotate the moon 360 degrees. A perfect circle will result.

Step 9: Glue and clamp each moon in place. When dry, plane smooth and final sand. Our boards were finished with Behlen's Salad Bowl Finish, available from Woodcraft Supply, 41 Atlantic Ave., Woburn, MA 01888. Avoid using any finish that is potentially toxic. W&J



Early American Tall Clock



This handsome clock, made almost entirely from clear pine, was built about 1809 by Samuel Hoadley and is part of the collection of Early American furniture at the Washington Historical Museum in Washington, Connecticut.

Because Early American homes did not have the modern central heating systems, cabinetmakers did not need to allow for wood movement in their work to the extent that we must. In those parts of the clock where such movement may present a potential problem, we have specified plywood.

The hood is not anchored to the clock. It simply slides off, supported by the upper molding, to expose the movement.

The base front (A) is made first. Since 15½ in. wide boards are hard to find, you'll probably need to edge-join two narrower boards in order to get enough width. Visually, this front piece stands out, so try to select stock that has a pleasing grain. When edge-gluing the stock, allow extra material for the length and width. After the clamps are removed, it can be trimmed to final size.

Following this same procedure, the base sides (B) can be glued up and trimmed. Next, the dado-head or the router is used to cut the ½ in. wide by ¼ in. deep dados in parts A and B as shown. If the router is used, make the ¼ in. deep cut in two passes, with each cut removing ⅛ in. of material. Making the cut in two passes produces a smooth surface with a minimum of strain on the router.

The ¼ in. deep by ¾ in. wide rabbet can now be cut along both side edges of part A. Also a ½ in. rabbet is cut along the back edges of parts B. Use the dado-head cutter or router to make the cuts. Lay out and mark the location of the cutout on the bottom of parts A and B, then use a band or saber saw to remove the stock.

After the base bottom (C) is cut from ½ in. thick plywood stock, parts A, B, and C can be assembled. Make sure the bottom is cut square as it will serve to square-up the assembly when the three parts are joined. Apply glue to the rabbet in part A and the front edge of part B. Lightly clamp the two parts across the front (for side-to-side pressure) then slide part C in place. Parts A and B must be free to move with changes in humidity, so do not apply glue to part C. Now clamp along the sides (for front-to-back pressure), then check that all parts are square.

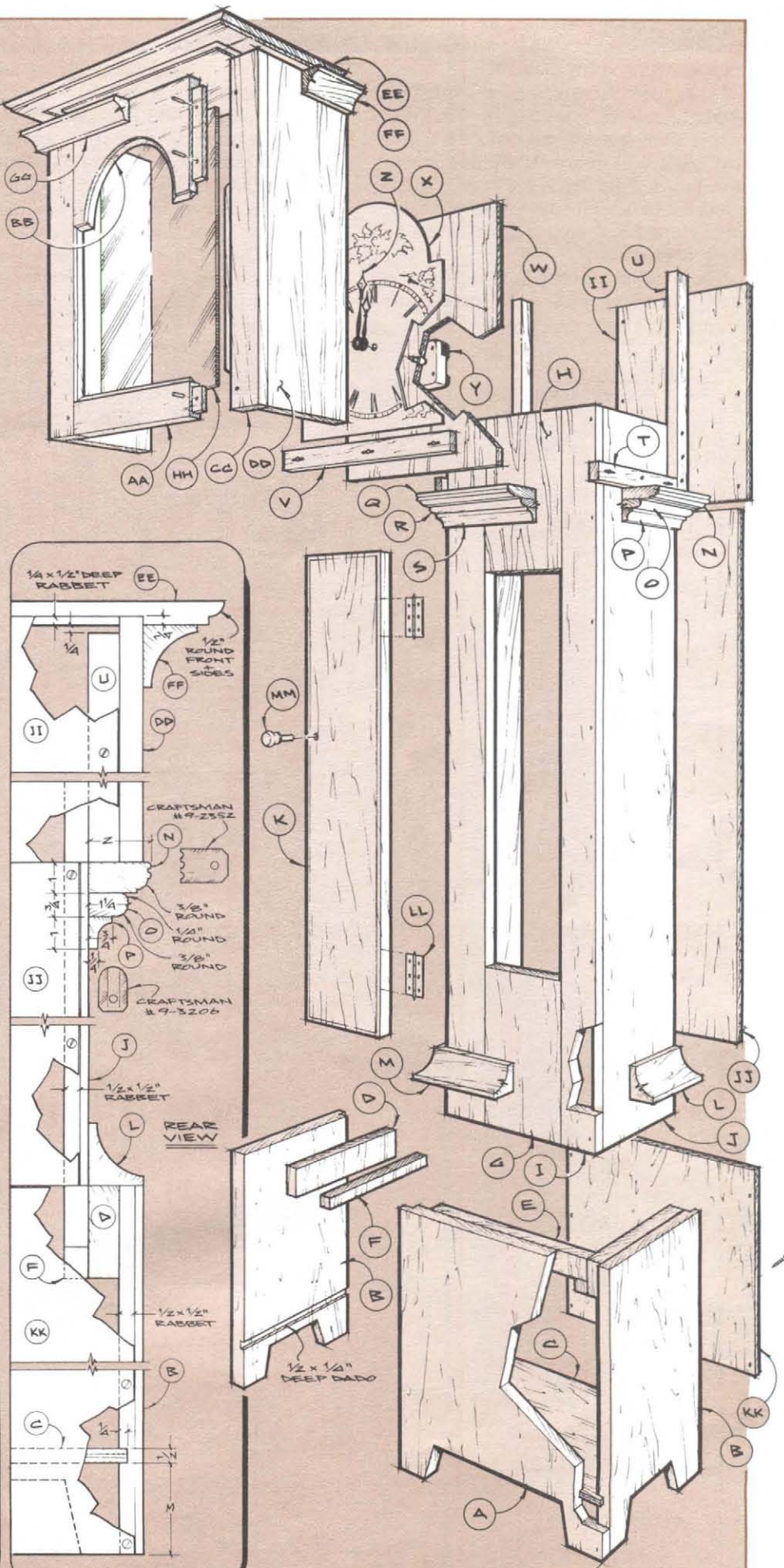
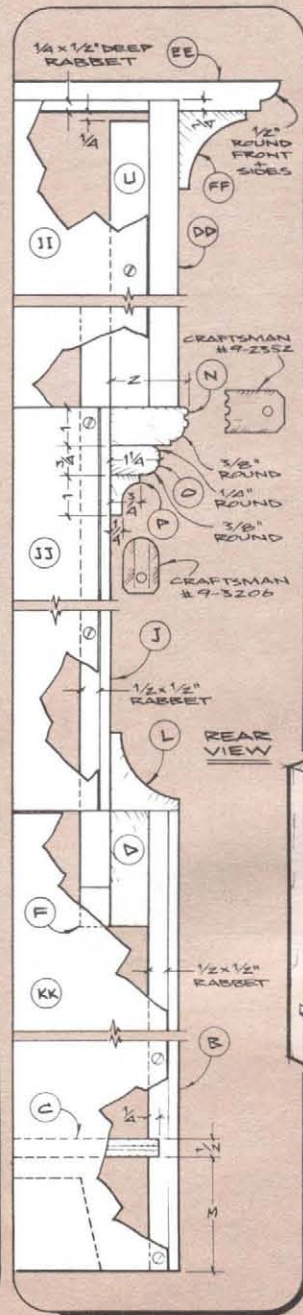
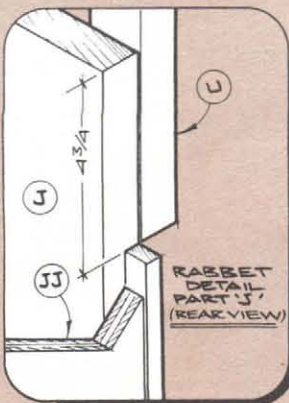
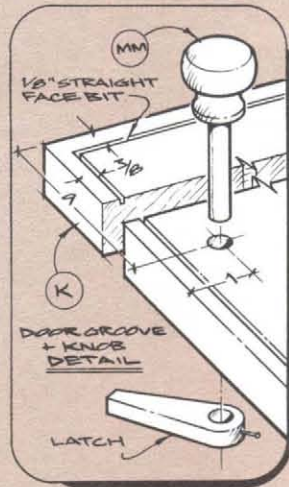
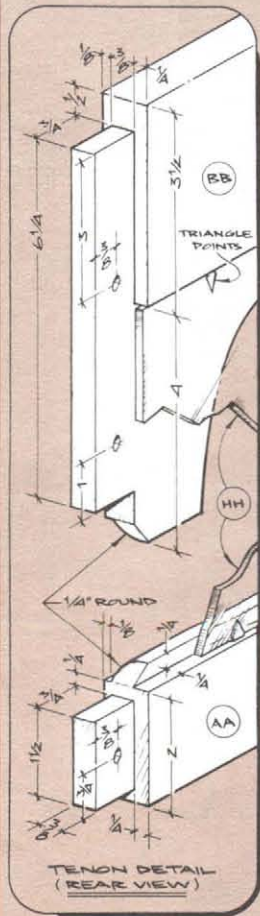
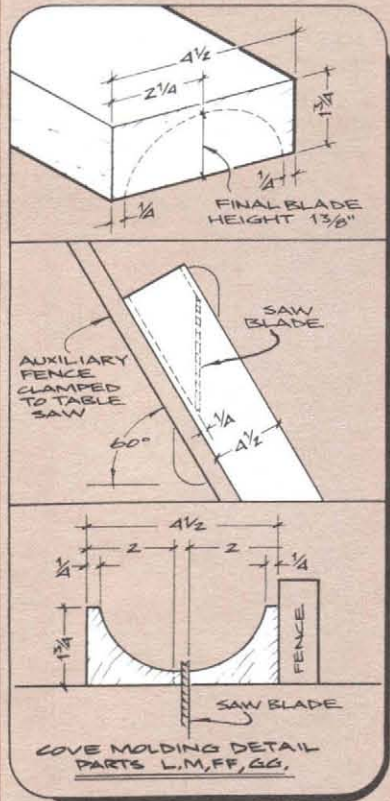
The original clock was assembled with cut nails to reinforce the glue joints. With modern glues, a long-grain to long-grain joint, as we have here, does not need nails to provide strength. However, cut nails do add an authentic look, so you may want to use them. They can be ordered from the Tremont Nail Co., P.O. Box 111, Wareham, MA 02571. Specify fine finish (N-19), 3d, 1¼ in. long. To minimize chances of splitting, bore pilot holes before driving the nails.

Next, the base spacers (D), base cleat (E), and supports (F) are made. Note that the grain direction runs vertically on all these parts. Running the grain this way results in a strong long-grain joint between parts B and D and parts A and E. Also, with the grain running parallel on these mating parts, any wood movement problems are eliminated.

To make parts D, E, and F you'll need a board that measures 1 in. thick by 13 in. wide by 20 in. long. Edge-glue stock as needed to get the 13 in. width. The 20 in. length allows extra stock for safe crosscutting on the table saw. Glue and clamp parts F to parts D. When dry, parts D and F can be glued to parts B. Also part E can be joined to part A.

The waist bottom rail (G), the waist top rail (H), and the two waist stiles (I) can now be made. Cut all parts to thickness and width, but allow about an inch on all length dimensions. Parts G and H are simply edge-glued to parts I. Before clamping, make sure the distance between parts G and H (the door open-

Bill of Materials (all dimensions actual)							
Part	Description	Size	No. Req'd.	Part	Description	Size	No. Req'd.
A	Base Front	¾ x 15½ x 17	1	U	Back Hood Spacer	1 x 1½ x 20¼	2
B	Base Side	¾ x 8¼ x 17	2	V	Dial Board Cleat	½ x 1½ x 12	1
C	Base Bottom	½ x 8¼ x 14½	1	W	Dial Board	½ x 12 x 18½	1
D	Base Spacer	1 x 8 x 3	2	X	Dial Face	M. & S. p/n 7420S	1
E	Base Cleat	1 x 12 x 2	1	Y	Movement	M. & S. p/n 3634X	1
F	Support	¾ x 8 x 1	2	Z	Hands	M. & S. p/n 4842X	1/pair
G	Waist Bottom Rail	¾ x 6 x 11	1	AA	Hood Bottom Rail	¾ x 2½ x 13*	1
H	Waist Top Rail	¾ x 6 x 11	1	BB	Hood Top Rail	¾ x 7½ x 13*	1
I	Waist Stile	¾ x 3 x 50½	2	CC	Hood Stile	¾ x 2½ x 20½	2
J	Waist Side	¾ x 7 x 50½	2	DD	Hood Side	¾ x 8½ x 20½	2
K	Waist Door	¾ x 6 x 28½	1	EE	Hood Top	¾ x 11½ x 20½	1
L	Waist Side Molding	See cove molding detail	2	FF	Hood Side Molding	See cove molding detail	2
M	Waist Front Molding	See cove molding detail	1	GG	Hood Front Molding	See cove molding detail	1
N	Side Bead Molding	See top waist molding detail	2	HH	Hood Glass	¾ x 11½ x 15¼	1
O	Side Nose Molding	See top waist molding detail	2	II	Hood Back	¾ x 14 x 20½	1
P	Side Trim Molding	See top waist molding detail	2	JJ	Waist Back	½ x 11½ x 43¾	1
Q	Front Bead Molding	See top waist molding detail	1	KK	Base Back	¾ x 15 x 17	1
R	Front Nose Molding	See top waist molding detail	1	LL	Waist Door Hinge	2½ in.	2
S	Front Trim Molding	See top waist molding detail	1	MM	Waist Door Knob	1¼ diameter	1
T	Lower Hood Spacer	1 x 1½ x 6½	2	*Includes tenon(s)			



(continued on next page)

ing) measures $28\frac{1}{2}$ in. Once dry, trim each end of the assembly so that parts G and H each measure 11 in. long.

Next, use the dado-head cutter or router to cut the $\frac{1}{4}$ in. deep by $\frac{1}{4}$ in. wide rabbet along the side edges of parts I. The two waist sides (parts J) are now cut to size and a $\frac{1}{2}$ in. by $\frac{1}{2}$ in. rabbet is cut along the back edge (see rear view detail). Once the rabbets are cut, parts J can be glued to parts I.

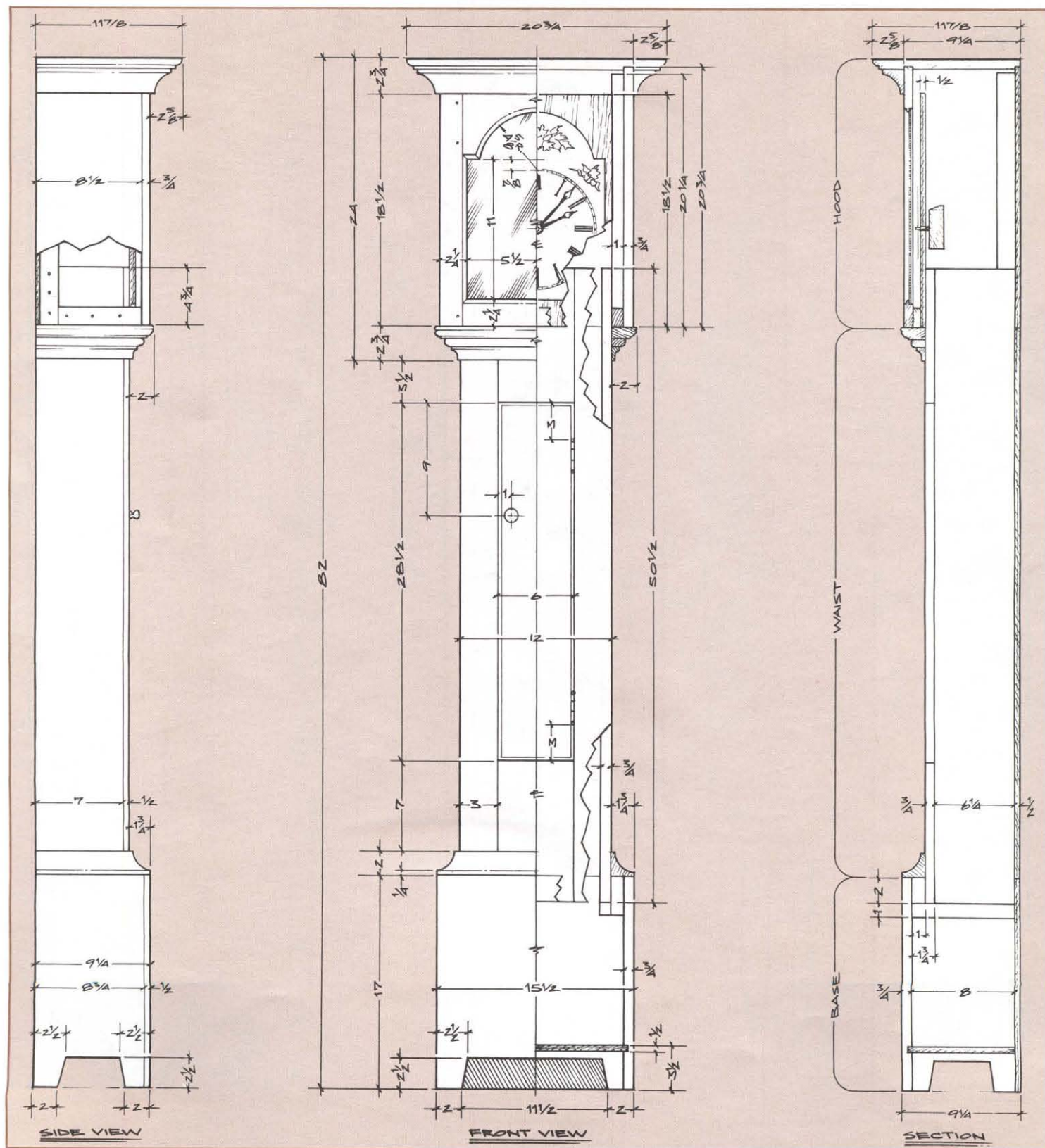
The waist section can now be joined to the base. Apply glue to the mating sur-

faces of parts D, E, G, I and J, then fit the waist into the base. For clamping pressure, drive three screws through each part J and into parts D. Also screw through parts G and I and into E.

The waist side and front moldings (parts L and M) and the hood side and front moldings (parts FF and GG) are made as shown in the cove molding detail. Cut $1\frac{1}{4}$ in. thick stock to a width of $4\frac{1}{2}$ in. Clamp an auxiliary fence (at 60 degrees) to the saw table. With the saw blade set to a height of $1\frac{1}{8}$ in. note that

the fence is located $\frac{1}{4}$ in. from the blade. Lower the saw blade to a height of $\frac{1}{8}$ in., then pass the stock through the blade. Flip the stock, end for end, and make the same cut. Raising the blade in $\frac{1}{8}$ in. increments, continue this process until the final blade height of $1\frac{1}{8}$ in. is reached. To be sure your set up is accurate, it's a good idea to make a practice run on a short piece of scrap pine. Once the cove is cut rip the piece to 2 in. wide.

Now cut the 45 degree miters on the front ends of parts L and each end of



parts M. Note that the back ends of parts L are cut square. Use small brads (or cut nails) to secure them to the case. Parts G, I, and J must be free to move with changes in humidity, so do not glue the molding in place.

Next, cut the lower hood spacer (T) and the back hood spacer (U) to size. Before adding part U you'll need a sharp chisel to cut away the rabbet for a distance of $\frac{3}{4}$ in. (see rabbet detail, part J). Glue and screw part U as shown. To allow part J to move with changes in humidity, part T is attached without glue. Three counterbored wood screws will do the job nicely. Note that the two end holes are slotted.

The side and front bead molding (N and Q), the side and front nose molding (O and R) and the side and front trim molding (P and S) can now be cut. A table saw molding-head is used to cut the profile on parts N and Q and also parts P and S. The two cutters needed (parts 9-2352 and 9-3206) are available from Sears-Roebuck. The profile on parts O and R can be cut on the router table.

Apply molding N and Q first. As with the moldings made earlier, make sure the front ends are mitered at exactly 45 degrees. Don't use glue. Instead, use small cut nails or finishing nails to "toenail" the molding to the case. Parts O and R and also P and S can be added in the same manner.

Next, the hood top rail (BB) is made. Cut $\frac{3}{4}$ in. thick stock to a width of $7\frac{1}{2}$ in. and a length of 13 in. Make sure all corners are square. Equip the table saw with a dado-head cutter set to make a $\frac{1}{4}$ in. deep cut then, using the miter gauge, cut the $\frac{3}{8}$ in. thick by $\frac{3}{4}$ in. long tenons on each end. However, don't cut the shoulder at the ends of each tenon yet.

As shown in the rear view detail, a good portion of part BB is cut away in order to accept the glass. The dado-head can also be used to remove this material.

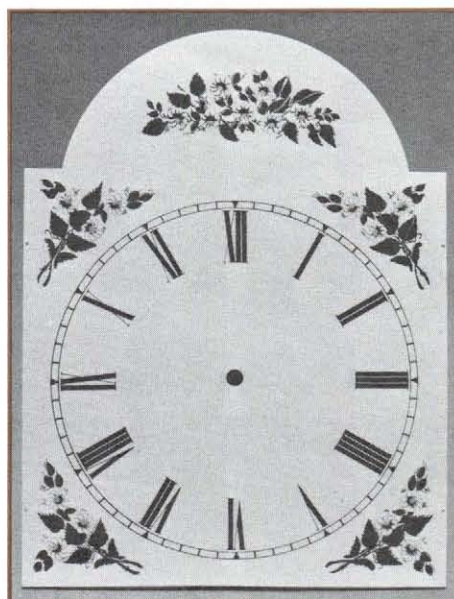
With a compass, scribe the $\frac{4}{8}$ in. radius of the arch (see front view), then use a band or saber saw to cut out. Stay slightly on the waste side of the line. Once cut, use sandpaper to smooth the edge exactly to the line. A router with a $\frac{1}{4}$ in. ball-bearing round-over bit can now be used to apply the $\frac{1}{4}$ in. round as shown. Following this, use a back saw to cut the shoulders at each end of the tenons.

The hood bottom rail (part AA) and the hood stiles (parts CC) are made next. Cut to length and width before using the router table to cut the $\frac{1}{4}$ in. by $\frac{1}{4}$ in. rabbet along the back edge. A $\frac{1}{4}$ in. round-over bit can then be used to cut the $\frac{1}{4}$ in. round as shown. The tenons on the ends of parts AA can now be cut using the dado-head.

Before cutting the mortises in parts CC, you'll need to chisel away the $\frac{1}{4}$ in. round for a distance of $7\frac{1}{4}$ in. at the top

and 2 in. at the bottom. Now lay out the location of the mortises and chop them out with a sharp chisel. Cut the mortise slightly deeper than the tenon to allow for any excess glue. The joint won't close until you miter (at 45 degrees) the $\frac{1}{4}$ in. rounds at the point they meet. Cut these miters with care to insure a good fit.

Parts AA, BB, and CC can now be assembled. Apply glue to the mating mortises and tenons and clamp firmly. Once dry, bore holes for the $\frac{1}{4}$ in. diameter



Enameled dial face (part X) has Early American look.

locking pins. Cut the pins a bit on the long side before gluing in place. When dry, trim flush with a sharp chisel.

The two hood sides (parts DD) can now be made. Cut to length and width before using the router to cut the $\frac{1}{2}$ in. by $\frac{1}{2}$ in. rabbet along the inside of the back edges. Once the rabbets are cut, parts DD can be glued and clamped to parts CC.

Next, the hood top (part EE) is cut to size from $\frac{3}{4}$ in. thick stock. As shown, a $\frac{1}{4}$ in. deep by $\frac{3}{4}$ in. wide groove is cut in the underside to accept the hood case. Make the cuts with a router, then use a chisel to square the corners in front.

With the groove cut, once again use the router (with a $\frac{1}{2}$ in. ball-bearing round-over bit) to cut a $\frac{1}{2}$ in. round on both the front and sides. The top is joined to the hood with glue and wood screws (or cut nails) driven from above.

Now that the top is added, the hood side and front moldings (parts FF and GG) can be applied. Follow the same procedure used to add the waist moldings (L and M).

The dial board (part W) is cut to size from $\frac{1}{2}$ in. thick birch plywood. It is secured to the case with three screws driven through part V and into parts H and I. Slot the end holes in parts V and W and, of course, don't use glue. Note that,

when installed, the bottom edges of parts V and W will rest on part Q.

We could not find a commercially made dial face that matched the hand painted one found on the original clock. However, we did find one that is appropriate (part X). It's sold by the Mason and Sullivan Co., 586 Higgins Crowell Road, West Yarmouth, MA 02673. Order part number 7420S. Current price is \$27.00 plus postage and handling. A copy of their catalog is \$1.00.

The dial face is secured to the dial board with four small screws. As shown in the front view, the bottom edge of part X is located $2\frac{1}{4}$ in. from the bottom edge of part W.

Once the dial face is attached to the dial board, use the center hole as a guide to bore a $\frac{3}{8}$ in. diameter hole through part W. The movement (part Y) is also available from Mason and Sullivan. Order part number 3723X. The current price is \$7.50, not including postage. The hands are free with each movement; order part number 4842X.

If you prefer a traditional weight driven pendulum movement, Mason and Sullivan has several that can be used on this clock. Prices run in the \$120.00 to \$175.00 range. Keep in mind though, that these movements require a support system — and that means you may have to slightly modify the top of the waist section. If you plan to use a weight driven movement, it's best to have it on hand before starting the project.

The waist door can now be cut to fit the door opening. As shown, a $\frac{1}{8}$ in. diameter router bit is used to cut a $\frac{1}{8}$ in. by $\frac{1}{8}$ in. decorative groove all around.

The $1\frac{1}{4}$ in. diameter turned knob (part MM) can be made as shown or purchased from Horton Brasses, Nooks Hill Road, Cromwell, CT 06416. Order part number WCT-2.

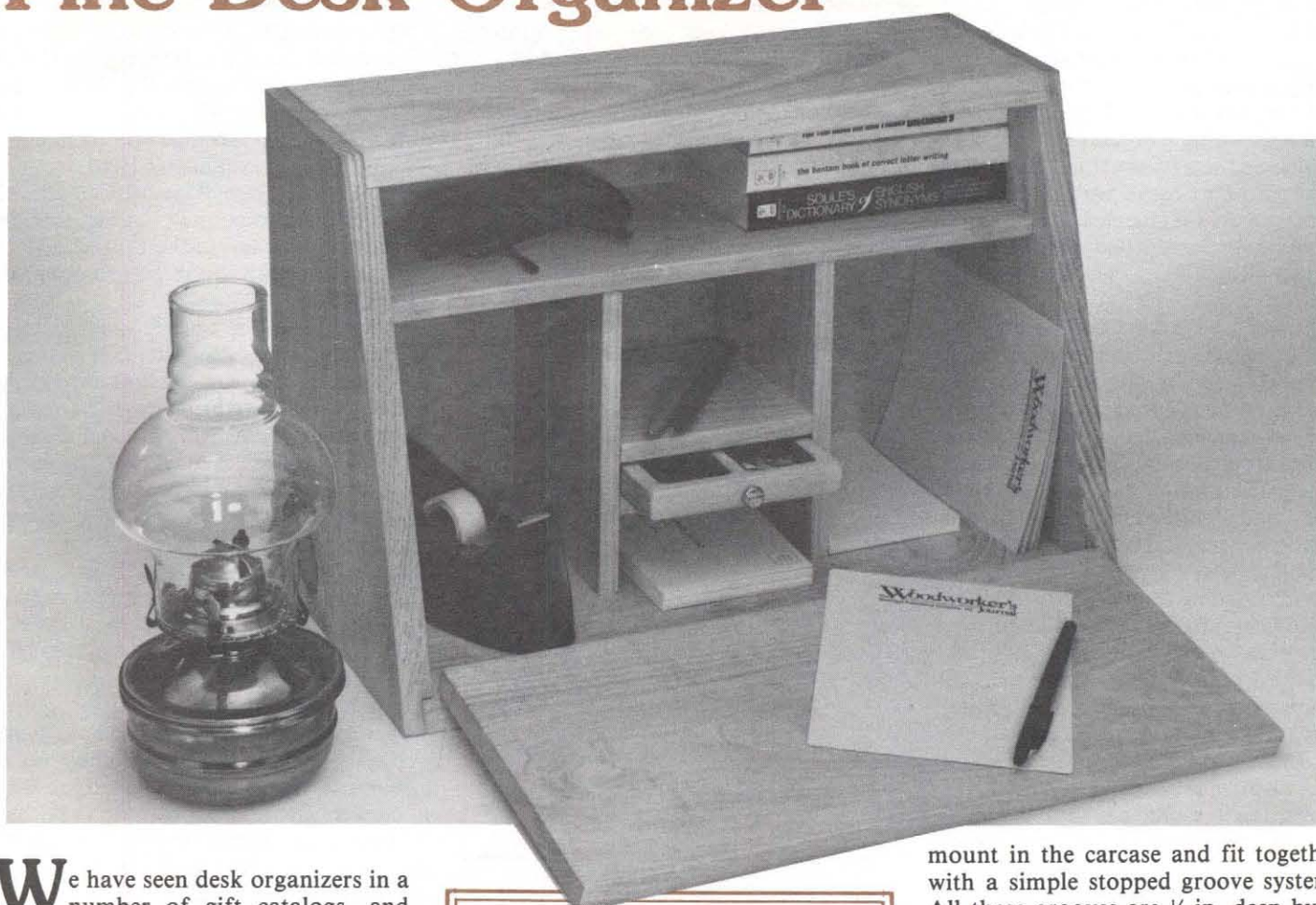
Next the hood back (part II), waist back (part JJ) and base back (part KK) are cut to size from $\frac{1}{2}$ in. thick plywood. All are secured with wood screws. Before part KK can be installed, you'll need to cut away a portion of the rabbet in the lower end of part J, much as the rabbet was cut away in the top end of part J.

A glass shop will cut the $\frac{1}{2}$ in. thick hood glass to size. It's held in place with several triangle points.

There is no "best" final finish for this project. It can be stained or left natural. For a clear finish, we suggest a good penetrating oil. Apply three coats, then add a coat of paste wax and rub it down with a soft cloth.

As mentioned earlier, the hood simply slides in place from the front. It's supported by the bead, nose, and trim moldings (parts, N, O, P, Q, R, and S). If you prefer to anchor the hood in place, two or three screws driven through parts U and into parts DD will do the job. ~~W&W~~

Pine Desk Organizer



We have seen desk organizers in a number of gift catalogs, and they seem to be quite popular. The organizer is easily moved about, and it holds notepaper, envelopes, and has a handy little drawer for paper clips and stamps.

Our organizer, which is crafted in pine, is designed so that the major parts can be cut from commonly available 1 x 6 and 1 x 10 pine boards, which typically measure $\frac{3}{4}$ in. thick by 5 $\frac{1}{2}$ and 9 $\frac{1}{4}$ in. wide respectively.

The top (A) and the drawer (H) are made from 1 x 6 stock, while the bottom (B), sides (C), and front (D) are made from 1 x 10 stock. The top shelf (E), partitions (F), and center shelves (G) are also made from 1 x 6 material, however you must resaw to obtain the $\frac{1}{2}$ in. thickness these pieces require. The back (I) is a section of $\frac{1}{4}$ in. thick plywood.

After cutting all parts to length and width use the table saw to establish the 67 degree angles on the front edge of the top and bottom, and on the upper and lower edges of the front. Next, rabbet the sides to accept the top and bottom. The tapering jig is used to taper the sides.

The various shelves and partitions

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Top	$\frac{3}{4}$ x 5 $\frac{1}{2}$ x 17	1
B	Bottom	$\frac{3}{4}$ x 9 $\frac{1}{4}$ x 17	1
C	Sides	$\frac{3}{4}$ x 9 $\frac{1}{4}$ x 12	2
D	Front	$\frac{3}{4}$ x 8 $\frac{1}{4}$ x 16 $\frac{1}{2}$	1
E	Top Shelf	$\frac{1}{2}$ x 5 $\frac{1}{4}$ x 17	1
F	Vertical Partition	$\frac{1}{2}$ x 5 $\frac{1}{4}$ x 7 $\frac{1}{4}$	2
G	Center Shelf	$\frac{1}{2}$ x 5 $\frac{1}{4}$ x 5 $\frac{1}{2}$	2
H	Drawer	$\frac{3}{4}$ x 5 $\frac{1}{4}$ x 5	1
I	Back	$\frac{1}{4}$ x 11 $\frac{1}{4}$ x 17 $\frac{1}{4}$	1
J	Hinges	2 in. butt hinges	1 pr.
K	Knob	$\frac{1}{2}$ in. diameter	1

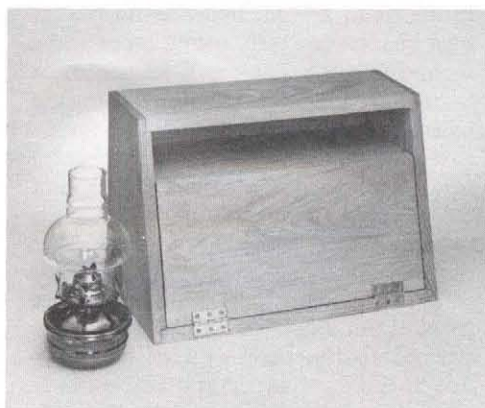
mount in the carcase and fit together with a simple stopped groove system. All these grooves are $\frac{1}{4}$ in. deep by $\frac{1}{2}$ in. wide, and can be easily cut with a router and a $\frac{1}{2}$ in. rabbeting bit. The grooves in the bottom and sides are cut before the carcase is routed to accept the back, and will therefore be 5 in. long. The grooves in the top shelf and partitions measure from the back, and will be 4 $\frac{1}{4}$ in. long. Square the groove ends with a chisel.

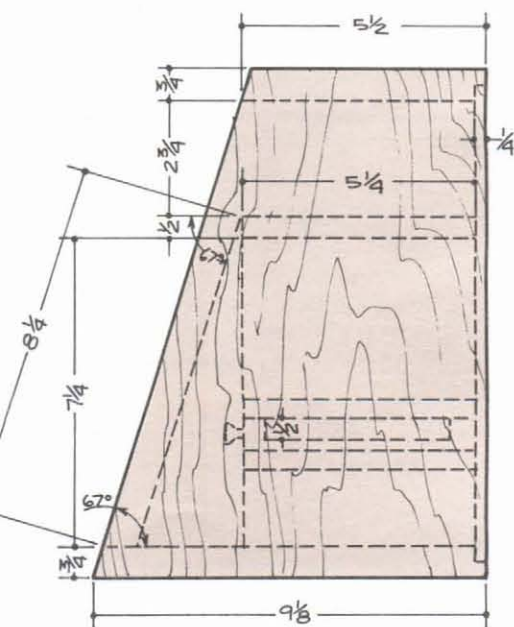
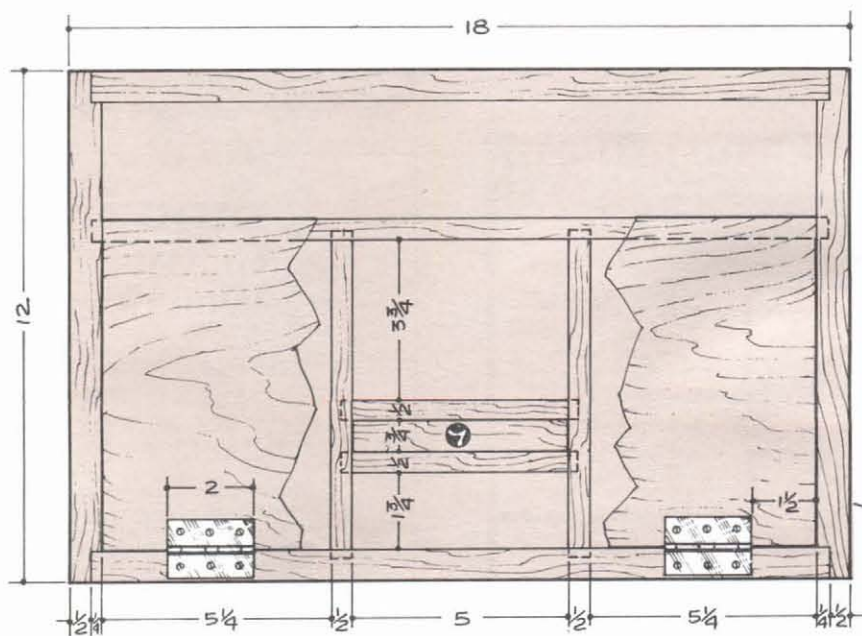
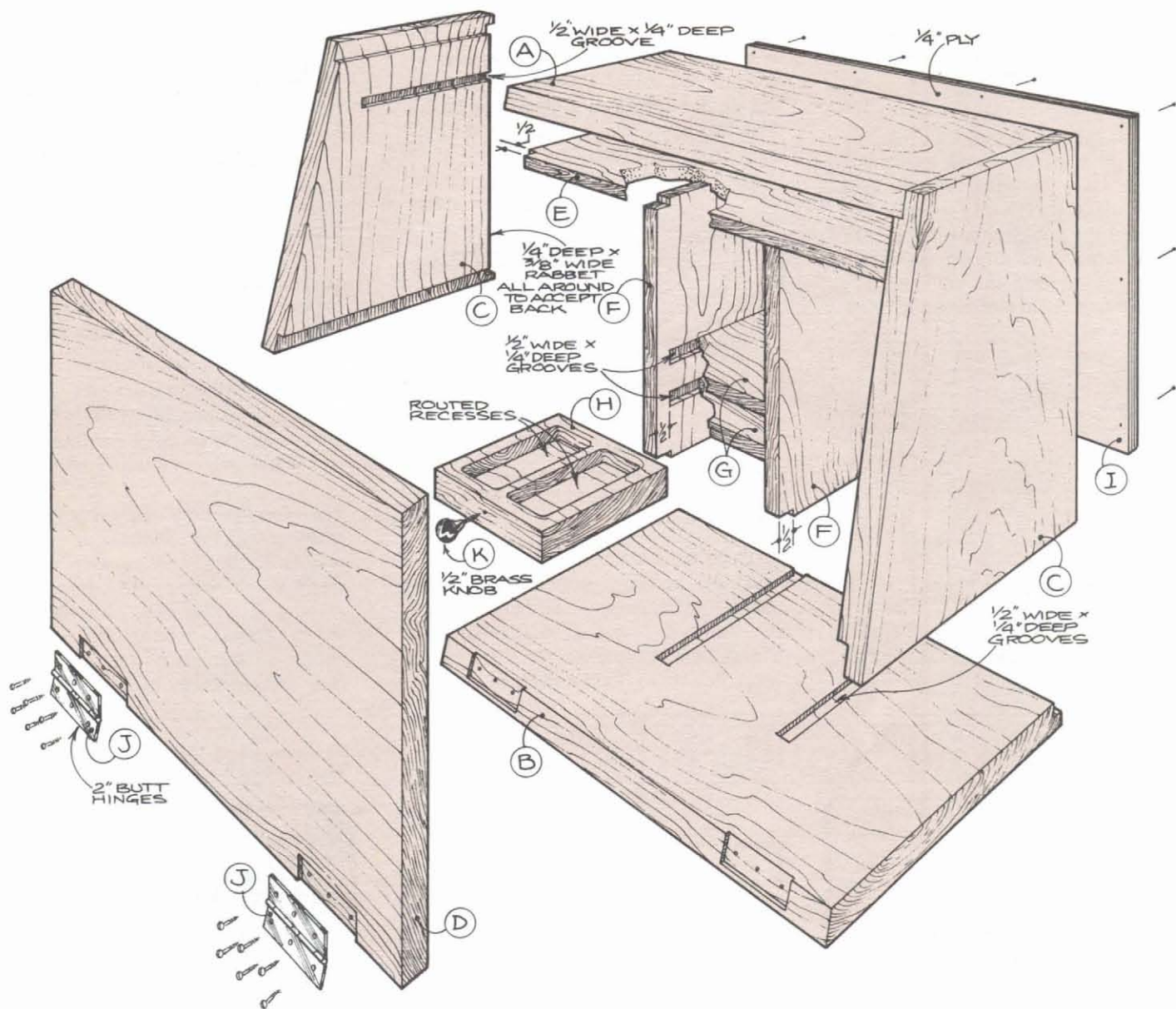
The small drawer is simply a $\frac{3}{4}$ in. thick section of board with two routed compartments. Note the grain direction of the drawer, since it is important if you are to avoid problems with wood movement as the relative humidity changes.

Glue up, assemble and clamp the desk carcase. If you prefer, the four corners may be reinforced with dowels or finishing nails. Rout around the inside edge of the carcase perimeter to accept the plywood back, squaring the corners with a chisel. Now slide the shelves and partitions into place and add the back, securing it with brads.

Mortise the bottom and front to accept the butt hinges, and mount the $\frac{1}{2}$ in. diameter knob on the drawer. Sand the piece, stain if desired, and finish with penetrating oil.

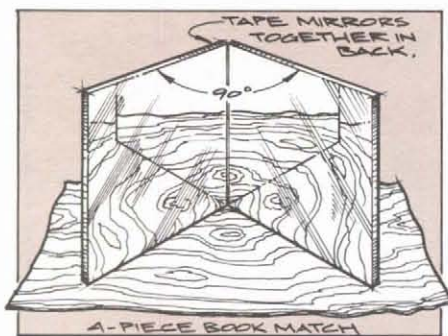
W&J





Shop Tips

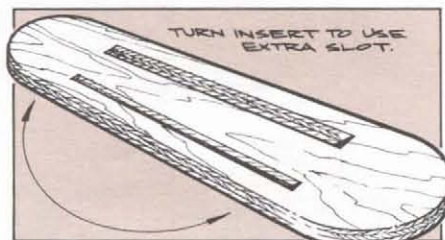
A pair of mirrors hinged with masking tape and held at 90 degrees will enable you to study a sheet of veneer for the best 4-piece bookmatch. The mirrors show you exactly what the bookmatch will look like and by moving them around the veneer you'll be able to find the pattern that's most interesting. Different angles preview



other bookmatches; 45 degrees = 8 pieces, 22½ degrees = 16 pieces, and 11¼ degrees = 32 pieces.

An old plastic detergent squeeze bottle that's been emptied and cleaned will come in handy when you need to blow away sawdust and chips. A few quick squeezes will do the job. You'll save your breath while keeping both eyes a safe distance away from the action.

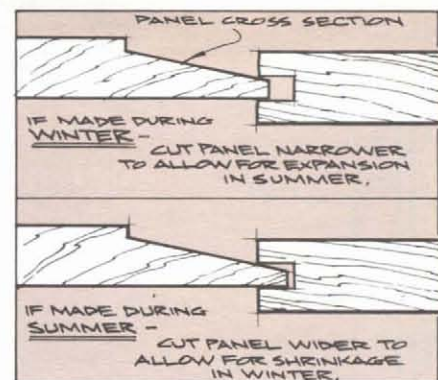
William J. Younie
Paramus, New Jersey



For some table saw operations a plywood inset is needed. You'll get double-duty from your plywood one if both sides are used.

Three parts water to one part glycerine (available at drugstores) makes a good solution to spray on veneer before flattening. Although water alone is often used, the addition of glycerine makes the veneer more flexible so it's less likely to crack.

Before starting on any type of frame and panel construction, it's a good idea to



think about what time of year it is. In summer, cut your panel so it fits well into the groove. In winter, cut it narrower. During spring and fall, it should fit halfway in.

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.

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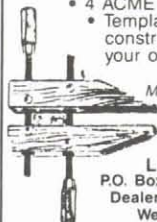
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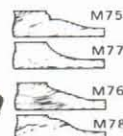
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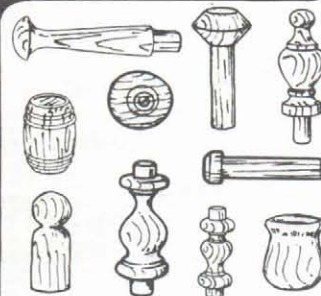
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Wooden wheels and unique toy plans. Catalog \$1.00. Howee Toys, Route 7 Box 633WJ, Joplin, MO 64801.

Nailless sawtooth hangers 100 for \$7.50, 500 for \$26.50. Free brochure. D. Wilhelm, Box 904, Jackson, AL 36545.

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Wide selection of woodworking supplies. Black & Decker, Makita, Hitachi tools. Catalog \$2.00 (refundable). Benny's Woodworks, P.O. Box 656, Dept. WJ, Antioch, TN 37013.

Catalog Full-Size Furniture Plans — \$2.00. Refunded with first order. Traditional, Early American, over 180! Furniture Designs, 1425 Sherman, Dept. CJ-115 Evanston, IL 60201.

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

Thin Hardwoods, 1/2" to 3/4" thick, cherry, walnut, butternut, oak, etc. Large SASE. Shaker Miniatures, Dept. WJ, 2913 Huntington Rd., Cleveland, OH 44120.

Woodworkers — Turn \$4.00 material into \$39.95 — Free brochure! Pine Shop, 897-3 Mammoth, Manchester, NH 03104.

Burlwood slabs — Redwood, Buckeye, Myrtlewood, Maple, Olive, Juniper. Turning wood. Myrtlewood plaques. Clock movements, chimes, pendulums. Pouring resin, pens, buckles. Weather instruments. Free brochure. Redwood BurlEsque, Dept. WJ1185 1454 Orchard Home Drive, Medford, OR 97501.

Plans and kits: Oak & antique glass pool game and bar lamps, St. Francis shrines, book backs, record browsers. Brochures and pictures \$2.00 refundable. Rusticraft, 3712 Lakeridge Drive West, Sumner, WA 98390.

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

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Next Issue . . .



Shaker Drop-leaf Table

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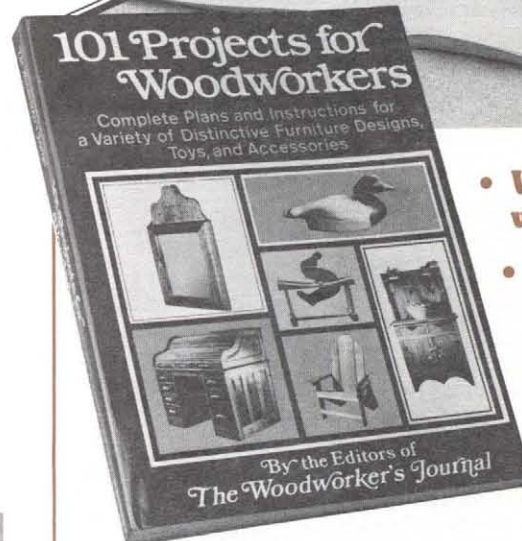


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