The Woodworker's Journal

Vol. 11, No. 3 $3.00

Included in this issue:

- Vienna Regulator Clock
- Shop Drum Sander
- Kitchen Canister Set
- Serving Cart
- Country Vegetable Bin
- Medicine Cabinet
- Decorative Planter

Vienna Regulator Clock

May/June 1987

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The Woodworker's Journal

MAY/JUNE 1987 VOLUME 11, NUMBER 3

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Shoptalk

Time For A Change

After many years, we've discontinued the "Worshop Income" and "Restoring Antiques" articles in favor of the new series of in-depth articles covering shop tools, machinery and finishing techniques. "In The Shop," which launches in this issue, will deal with both hand tools and power equipment with respect to proper use, care, setup and problem solving.

Finishing is a "make or break" part of the woodworking process. We all know that careful joinery can be a sadly wasted effort if the final finishing does not achieve the effect we had in our mind's eye. The "Finishing" articles began in the last issue with an overview of the more widely used methods. In this and future issues, we will be looking at the many techniques employed, why they are used and how they are used. It's my hope that, along with the many project plans in each issue and the "Woodworking Basics" and "Special Techniques" articles, we will be covering those areas of greatest interest to our readers.

Art Appreciation

One year ago, I reported that an auction record had been set with the sale of an 18th-century pie-crust table for a bit more than $1 million. That record has since been eclipsed by the Sotheby's auction sale of an 18th-century Philadelphia Chippendale wing chair to the tune of $2.7 million!!!

According to an article in *The Litchfield County Times,* the chair, which features much intricate carving on legs and aprons, is attributed to Thomas Affleck who built it for General John Cadwalader around 1770.

It's nice to know that the efforts of our 18th-century woodworkers are being held in such high esteem. Hopefully, that appreciation will have some impact on the value of what is being produced by our contemporary woodworkers.

The Right Stuff

After years of coping with the problem of how to conceal plywood edges, we've taken a 180-degree turn (in this issue at least) and proclaim that plywood edges can be attractive . . . if you use the right stuff.

I was doubtful when Phil Bacon suggested we build the Contemporary Kitchen Cart of Baltic birch plywood, but after seeing some sample joints with exposed edges, I had to admit that they were indeed distinctive and attractive.

If you're a die-hard traditionalist and will not permit your fine-edged tools to contact anything other than solid cabinet woods, you could always build the cart of oak or maple. But *do* use the plywood for the wheels and they will remain forever round and sound.

Jim McQuillan

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W740	8¼" 13 amp circular saw	171	109
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JSE60	Jig Saw-electronic v/speed	198	123
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R330	2 H.P. Router	220	138
R500	3 H.P. Route	265	163
E3800	Drywall screwdriver 0-4000	126	79
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1107-1	½" drill 4.5A D-Hdle	222	145
3300-1	magnum rt angle drive kit	271	170
3102-1	Plmbrs rt angle drill kit	287	180
1676-1	HD Hole Hawg w/cs-2 sp	363	235
5395	⅜ sgle sp hammer drill kit	203	150
5397	⅜ var sp hammer drill kit	208	155
5371-1	HD mag. hammer drill ½"	313	207
5373	HD mag. ham. drill ⅜"	262	175
6511	2 speed Sawzall w/case	197	122
6226	port band saw 2 sp w/case	416	280
6234	TSC band saw port w/case	416	280
6405	8¼" circ. saw 13 amp	191	127
6460	10¼" 15 amp w/case	380	245
6165	12" Chop saw 15 amp 4200 R.P.M.	311	189
6255	v/sp Jig Saw 3.8 amp	217	140
6245	sgle sp Jig Saw 3.8 amp	191	125
6012	⅓ sheet HD Orb. sander	173	110
6014	½ sheet HD orb. sander	184	112
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5680	2 HP router 12 amp	342	220

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LU73M010	Cut-Off	10"	60	79.65	36
LU82M010	Cut-Off	10"	50	86.40	44
LU84M010	Combination	10"	40	70.99	36
LU84M011	Combination	10"	50	74.51	37
LU85M010	Super Cut-Off	10"	80	110.88	62
LM72M010	Ripping	10"	24	64.85	34
DS 306	6" Dado			139.00	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

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5600DW	6½" Circular Saw	284	125
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6010DWK	⅜" Cordless Drill Kit	174	88
6010SDW	⅜" Cordless Drill	94	45
8400DW	⅜" Hammer Drill	224	105
DA3000DW	⅜" Angle Drill	218	98
6010DL	⅜" Drill w/Flashlight	188	89
6012HDW	⅜" 2 spd Driver Drill w/Bat & Metal Case	208	98
DK1002	⅜" Drill w/Flursnt Lt	176	90
6710DW	Cordless Screwdvr Kit	176	84

LEIGH DOVETAIL JIGS

Model		List	Sale
TD514		149	125
TD514L		219	195
D1258-12		299	245
D1258-24		359	275

MAKITA BRAND NEW X-TRA SPECIAL

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5007NBA	7¼" Saw w/Elec. Brake	186	115
5008NBA	8¼" Saw w/Elec. Brake	212	130

MAKITA TOOLS

		List	Sale
B04510	Sander	92	43
9900B	3" x 21" belt sander	234	119
9924B	3" x 24" belt sander	222	130
9924DB	3" x 24" b/sand. w/bag	248	130
9035	½ sheet finish sander	96	48
9045B	½ sheet finish sander	186	90
9045N	¼ sht fin. sand. w/bag	190	105
4200N	4⅜ circ. saw 7.5 amp	182	93
5201NA	10¼ circ. saw 12 amp	438	215
4300BV	v/sp jig saw 3.5 amp	234	120
4301BV	orb v/sp jig saw 3.5 amp	248	125
JR3000WL	2 sp recip saw w/cse	198	120
JR3000V	vs recip saw w/case	208	120

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792210-7A	Carbide Bld for above	49	31
9820-2	Blade Sharpener	288	159
741074-9	60 (coarse) Grdg Whl	36	23
741070-7	1000 (med) Grdg Whl	34	22
741071-5	6000 (fine) Grdg Whl	45	30
1900BW	3¼" planer w/case	198	92
1100HD	3¼" planer w/case	328	160
3608BK	¾ hp router w/case	132	85
3601B	1⅜ hp router	218	115
3700B	½ hp trimmer 28,000 rpm	162	82
B04530	6" Round Sander	98	48
DA3000	⅜" angle drill	206	105
DP4700	½ v/sp w/rev 4.8 amp	178	92
HP1030W	⅜ v.s.r. hammer drill w/case	168	98
6300LR	½" angle drill w/rev	288	152
84198B-2W	½" s sp. hammer drill w/case	268	150
GV5000	Disc Sander	108	53
6800DB	2500 rpm 3.5 amp	146	79
6800DBV	0-2500 rpm 3.5 amp	156	89
6801DB	4000 rpm 3.5 amp	146	79
6801DBV	0-4000 rpm 3.5	156	89
2030n	12" planer/jointer	2580	1475
2040	15⅝" planer	2180	1195
1805B	6½" planer kit w/case	498	265
JV1600	var. speed jig saw	178	89
JV2000	var. speed orb. jig saw	198	100
5005BA	5½" circular saw 8 amp. with brake	192	98
9207SPC	7" var/speed electronic sander/polisher	250	130
9503BH	4½" sander-grinder kit	166	95
4014NV	var/speed blower	168	79

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35-593	8" x 48 TC&F	82.30
35-600	9" x 80 TC&F	97.70
35-619	10" x 60 TC&F	94.10
35-625	10" x 80 TC&F	123.05
35-646	12" x 60 TC&F	110.65
	Abrasive-Type Materials, Tile and Glued Compositions	
35-615	10" x 48 TC&F	94.65
35-601	9" x 60 TC&F	96.15
35-618	10" x 60 TC&F	90.70
	Plastic Laminates, Veneers, Compositions, Hard Fibers And Paper	
35-592	8" x 64 ATB	131.20
35-604	9" x 64 ATB	88.00
35-623	10" 80 ATB	116.40
	Veneers, Plastic Laminates And Compositions	
35-605	9" x 48 ATB	74.70
35-616	10" x 60 ATB	83.65
35-647	12" x 72 ATB	119.00
35-620	10" x 72 ATB	99.00
35-621	10" x 72 TC&F	110.50
35-626	10" x 60 ATB	83.65
	Compositions And Veneers	
35-622	10" x 80 ATB	111.20
35-655	12" x 96 ATB	133.75
	Rip Blades	
35-610	10" x 10 FT	54.75
35-611	10" x 18 FT	66.60
35-640	12" x 12 FT	76.80
35-641	12" x 24 FT	78.65
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35-617	10" x 50 ATB&R	78.25
35-614	10" x 48 ATB	87.60
35-591	8" x 24 ATB	59.85
35-603	9" x 24 ATB	59.20
35-612	10" x 24 ATB	68.10
35-602	9" x 34 ATB	68.05
35-613	10" x 40 ATB	72.00
	Soft And Hardwoods, And Particle Board	
35-643	12" x 48 TC&F	104.10
35-645	12" x 60 TC&F	110.65
35-656	12" x 60 ATB	107.70

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5920	belt sander 3x24 w/o bag	315	199
5925	belt sander 3x24 w/bag	315	215
5930	belt sander 4x24 w/o bag	326	209
5935	belt sander 4x24 w/bag	348	214

★X-TRA SPECIALS★
MAKITA TOOLS

		List	Sale
DP3720	⅜ drill Rev. 0-1800 rpm	99	47
6510LVR	⅜ drill Rev. 0-1500 rpm	144	67
6013BR	½" Drill rev. 6 amp	208	100
5402A	16" Circular Saw - 12 amp	542	315
3612BR	3 HP Plunge Router	338	175
9401	4x24 belt Sander w/bag	288	160

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5347	1-½" Rotary Hammer w/case 3150 BPM	595	375
5348	1-½" Rotary Hammer Kit 3150 BPM	711	530
5332	Demolition Hammer w/case 2000 BPM	1150	695

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#52	for ½" Black Pipe	9.36	6.10	67.50

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#4/0	5"	2½"	12.45	8.10	43.75
#3/0	6"	3"	13.36	8.50	45.95
#2/0	7"	3½"	14.36	8.95	48.35
#0	8"	4½"	15.97	9.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8½"	20.94	13.60	72.95
#3	14"	10"	26.56	16.75	91.35
#4	16"	12"	34.55	23.75	128.25

BRAND NEW BY JORGENSEN
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3536	36"	25.16	14.95
3548	48"	27.62	16.50
3560	60"	30.77	18.50
3572	72"	33.26	19.95

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3052	8¼" 13 amp - 4300 rpm	247	169
	SUPER SAWCATS		
3047-09	7¼" w/brake - 12.5 amp	226	149
3048-09	8¼" w/brake - 13 amp	240	155
	BUILDERS SAW CAT		
3030	7¼" 13 amp - 5800 rpm	155	100
3035	8¼" 13 amp - 5800 rpm	175	125
3034	7¼" 13 amp - 5800 rpm	162	115
3033	6½" 13 amp - 5800 rpm	162	115
	JIG SAWS		
3157-10	var/sp orb action d/hdl	174	115
3153-10	var/speed 4.5A 0-3100	158	105
3159-10	2/sp orb action barrel grip	178	120
	CUT SAW KITS		
3103	2 sp 6 amp-2400 strokes	163	100
3105	v/sp 6 amp-2300 strokes	170	110
3107	v/sp orb 6A 0-2300 strokes	183	119
4300	Drill Bit Sharpener	289	205
1321	½" drill 450 rpm 6 amp	175	115
4010	Palm Sander	80	48
4015	½ Sheet Finish Sander	160	105
	DRYWALL GUNS		
2034	v.s.r. 0-4000 rpm	121	79
2037	v.s.r. 0-4000 rpm	139	89

"Door Openers" from MAKITA

9501B	4" Grinder Kit	119	55
2708W	8¼" Table Saw	348	199
5007NB	7¼" Circ. Saw	158	94

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1582VS	Barrel Grip Jig Saw	126	119
1604	1¾ H.P. Router	199	118
1942	Heat Gun 650º-900º	99	69
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
	X-TRA SPECIAL BY BOSCH		
1920VSRK	Var/Sp Cordless 2 Spd.	169	79
		List	**Sale**
101-084	Shop Helpers	79	69

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Model 7648 Barrel Jig Saw
LIST 199 — SALE 129.95

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EZ 502	C/less Scrwdvr-190 rmp	98	52
EZ 505	C/less Drill/Driver	139	79
EZ 506	C/less Electronic Drl/Drvr	159	94
EZ 581	C/less Caulk Gun var/sp	179	106
SCR1E	Drywall Screwgun 0-2000	125	74
SCR11E	Drywall Screwgun 0-4000	125	74
BE8RL	⅜" var/sp drill 3.8 amp rev	86	51
BE10RL	⅜" var/sp drill 5 amp rev	125	74
SBE401RL	⅜" Ham Drill v/sp h.d.	88	52
SE2E13RL	½" Ham Drill 2 sp h.d.	169	101
TC25E	Tech Driver v/sp 5 amp	150	89
PC70	7¼" Circular Saw 12 amp	157	93
VS130	Orb Sndr 20,000 OPM ⅓ sh	75	48
VS260	Orb Sndr 25,000 OPM ½ sh	156	88
VSS260	Orb Sndr 25,000 OPM w/bag	189	118
Hbse75S	Belt Sander v/sp 3"x21"	199	118
BSPE60	Jig Saw Orb v/sp 4.6A w/case	214	127
RSK600	Recip Orb Saw 10 amp	229	136

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807	7¼" Skilsaw 13A-Super	153	100
808	8¼" Skilsaw 13A-Super	172	110
2016-02	⅜" Cordless Drill complete W/Charger, Case & 2 batteries	199	95

Letters

I am a latecomer to woodworking, having spent the better part of 45 years in large aircraft. I have an awful lot to learn, but there is one thing I must say — I've yet to find a woodworker who does not have time to share his experience or help in any way. I think it's great the way woodworkers share their ideas, techniques and plans. To me, this is praiseworthy of all of them and the world would be a better place if more people were like woodworkers.

Col. Marvin M. Dountz
Columbus, Ohio

I received your March/April 1987 issue just the other day and read about your incident with the table saw pulley (Shoptalk, page 4). Yesterday I went down to my shop and saw the pulley guard sitting on a shelf, not installed for the past 2½ years. Just for the heck of it, I spent the 15 minutes needed to install it. Ten minutes later, during a cut, I heard a clunk and the blade stopped moving. The pulley had come off and the pulley key had hit the inside of the saw. Fortunately there was no damage and no pain, thanks to that blade guard and your article.

Mike Napolitano, Port Chester, N.Y.

Recently, the motor on my 10 in. table saw kept getting hot, even with a minimum amount of sawing. I was about to purchase a new motor when I decided to first take a closer look at it. I took it apart and was shocked to see the windings and entire insides were coated with about ¼ in. of sawdust. I gave it a good cleaning out and now it runs like a charm.

James Smith, Cumberland, R.I.

Editor's Note:

Several readers have informed us that we did not call out the stock thickness for the Rhombohedron Puzzle project featured in our March/April '87 issue. The stock is ¾ in. thick.

The $^{15}/_{16}$ in. dimension shown on the puzzle base drawing (page 41) does not represent the thickness, rather it is the dimension across the edge of the ¾ in. stock after it is beveled at 30 degrees.

Your article "Making Bevel-Edged Drawer Bottoms" (March/April 1987, page 24) has an inconsistency. Fig. 3 shows the bevel facing toward the inside of the drawer, while Figs. 6A and 6B clearly show the bevel facing outside. Which is it?

Richard Wey, Waldwick, N.J.

Bevel-edged drawer bottoms should face outside as shown in Figs. 6A and 6B. Sorry for the confusion.

Where can I get my router bits sharpened?

Clyde Hammond, Moreland, Idaho

Most industrial woodworking equipment stores have good sharpening services. Generally, the work is done by an outside sharpening specialist. You leave the tool at the store and they send it along to the

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I recently built the Router Table project described in the November/December 1986 issue. I've always had problems with hand held routers, so your table has made life much easier. I have a suggestion, though. The bottom edge of the fence should be chamfered slightly. This would allow those chips that accumulate on the table surface a place to collect so that they don't prevent the workpiece from butting firmly against the fence.

Russ Mueller, Birmingham, Mich.

I enjoy your magazine tremendously. It is informative and packed with projects that can be made by amateurs like myself. I must say, however, that I was offended by your Workshop Income article in the March/April 1987 issue. I am a woodworker by hobby, but my profession is a pressman. Now I have never printed anything concerning woodworking, but if I did, I am certain the oak would not be green, and the padauk would be red just as it's supposed to be. Your article hit many good points, but let's remember the old saying — "you get what you pay for." Higher quality printing shops cost more, but if you bring in a good quality picture of your products, pressmen with no wood experience will be able to match your colors very nicely. Remember, at one time, the very best of both professions were called master craftsmen.

Thomas Krupka, Menasha, Wis.

I want to build a bunk bed for my grandson, but have been unable to find any plans. Please refer me to a source.

William D. Jordan, Tuscaloosa, Ala.

Bunk bed plans are available from Furniture Designs, 1827 Elmdale Ave., Glenview, IL 60025. Write for a copy of their current catalog.

I would like to obtain a copy of the Consumer Product Safety Commission's Regulations for toys and children's articles. Can you provide their address?

John W. Stahl, Westwood, N.J.

Write to the Consumer Product Safety Commission, Division of Regulatory Management, Washington, D.C. 20207 and ask for a copy of Code of Federal Regulation, Federal Hazardous Substance Act Regulations, Title 16, Part 1000 to end.

Can you tell me where to get music box kits?

Carl Meilyohan, Cincinnati, Ohio

Several styles of music box kits are available from the Mason and Sullivan Co., 586 Higgins Crowell Road, West Yarmouth, MA 02673.

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Readers' Information Exchange

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

I need the upper stationary guard (new or used) for a #646 Miller Falls portable circular saw.

Tom Schlesser
1901 Douglas, Sioux City, IA 51104

I'm looking for either an upper or lower blade guide assembly for a 16 in. Walker Turner band saw. I also need the rear blade guard cover plate, and a parts list. Will pay premium price.

Dawn Canfora
P.O. Box 224, Lindenhurst, NY 11757

I'm looking for a source for 10 in. circular saw blanks or blades that are seconds. No sawing will be done; I plan to make clocks out of them.

Pat M. May
3002 W. Griswold Rd., Phoenix, AZ 85051

I'm looking for a source for a pivot bearing retaining screw and pivot bearing retaining washer for a Craftsman 8 in. table saw, model no. 103.23832. The screw is part no. 37633, and the washer is part no. 37823.

John Rizzo
1063 Blair Ave., Scranton, PA 18508.

I have an old 1950's Sunbeam electric handsaw and need blades for it. There were some empty blade packs with model numbers for available blades, which are: WW6, WN8, WW10, WN14 for wood; HS14 and HS24 for metal. Any suggestions for locating these blades?

James P. Hadley
7415 Tower St., Falls Church, VA 22046

I'm looking for an idler wheel for a 12 in. Shop Master two-wheel band saw.

E. Carl Probst
25393 Kimberly Rd., Sturgis, MI 49091

I have a Shopcraft electric screwdriver purchased from McGraw-Edison Co. Can anyone tell me where I might purchase an end case for it?

Carl W. Smith
519 Rasho Rd., Traverse City, MI 49684

I need a source for a brass candle holder that swivels in front of a small (8 × 16 in.) mirror. Can anyone help?

W.H. Weatherford
1633 Marvelle Ave.
Rocky Mount, NC 27802

I need an owner's manual for a Craftsman jigsaw, model no. 110.27080. I also badly need the bow arm bracket that holds the top part of the blade.

John W. Jacobs
RR #1 Box 237, North Webster, IN 46555

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73-757	7-1/4	40	27.40	15.10
73-758	8	40	39.90	21.95
73-759	8-1/4	40	40.66	22.35
73-739	9	30	29.52	16.25
73-769	9	60	64.40	35.40
73-740	10	32	30.98	17.00
73-770	10	60	64.90	35.75

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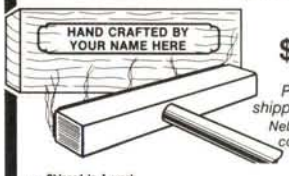

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Doug Hammer
Star Route Box 2633
Solon Springs, WI 54873

I'm looking for a source of parts for a Shopmate 4 in. belt sander, model no. 1860, Type 1, Serial no. HPA 41415.

Orville Sette
439 S. Main St., Juneau, WI 53039

I'm looking for plans to make an old fashioned double wide rocking chair.

Lawrence O. Walker
1737 Berwick Dr., Cambria, CA 93428

I'd like to find an owner's manual and parts list for a Montgomery Ward Powr-Kraft 8 in. band saw, model no. 33FD845A. I also need the blade backing roller for this saw.

J.P. Souther
Box 90304, Los Angeles, CA 90009

I have a Shop Master scroll saw and need an owner's manual and parts list, but can't find the model number on it. The splined shaft on the motor is damaged and I need that part particularly. I'd appreciate some help.

Orville Lanier
R #1 Box 39, Edgerton, MO 64444

I'm designing paneling and bookshelves for a den and want to incorporate a Murphy bed that folds into a wall pocket. The problem is finding the hardware for such a bed. Can anyone help me with this problem?

R. E. Daugherty
5530 Barrington Circle
Ooltewah, TN 37363

I have a 1947 Sears jigsaw, model no. 103.23150, and need both the top and bottom parts that hold the blade. Does anyone know where I might find them?

Richard Juhnke
Box 1325, Livingston, MT 59047

I'm looking to purchase used parts for an older Delta Unisaw (1950's, model no. 16-9519): 3HP, 3-phase motor (or single phase), a motor cover for the table saw base and a tenoning jig to fit the miter gauge.

Kerry Rubin
2611 Grand Ave., Baldwin, NY 11510

I've just gotten an old Craftsman cast iron jigsaw and am having trouble with bending and breaking blades. I need an owner's manual or information on the proper way of securing the blades. The only I.D. on the saw is SJ30 in the casting.

Nicholas Lenox
26 Cold Hill Drive, Granley, MA 01033

We are in need of an owner's manual and parts list for a Montgomery Ward radial arm saw, model no. 84-TMA-2278P, factory no. 2210137.

Roy Elie
Port Crescent State Park
1175 Port Austin Rd.
Port Austin, MI 48467

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537	1½ H.P. D-Hdle Speed	315	189
518	3 H.P. 5 Speed	490	323
520	3 H.P. 15 Amp	460	298

•••TRIMMERS•••

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310	3.8 Amp	190	124
312	3.8 Amp Offset Base	205	133
319	3.8 Amp Tilt Base	215	138

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696	H.D. Shaper Table	149	104

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352	3x21 w/Bag Belt	199	130
503	3x24 x-tra HD Belt w/Bag	510	338
504	3x24 x-tra HD Belt w/o Bag	495	328
360	3x24 w/Bag Belt	280	185
361	3x24 w/o Bag Belt	260	175
362	4x24 w/Bag Belt	295	198
363	4x24 w/o Bag Belt	280	185
304	Prof. 7" Disc Sander	169	114
303	Paint Remover	220	155

•••SAWS CIRCULAR•••

587	7¼" Speedtronic 14.5 Amp	199	125
315-1	7¼" Top Hdle 13 Amp	166	96
617	7¼" Push Hdls 13 Amp	166	96
346-1	6½" Top Hdle 12 Amp	161	100

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314	4½" Trimsaw 4.5 Amp	180	109
9314	4½" Trimsaw Comp/w cs	208	139

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7548	Top Hdle H.D. elec. V/SP	199	128
6748	Barrel Grip H.D. elec. V/SP	199	128
7648	H.D. top Hdle 4 Amp	163	110
548	X-tra H.D. V/Sp. 3.5 Amp	235	155
9548	X H.D. V/Sp. 3.5 Amp w/cs	255	169

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9627	2-Sp. 8 Amp Comp w/cs	193	124

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621	⅜" H.D. V/Sp. 0-1000 R.P.M.	130	84
7510	⅜" X-tra H.D. 5.2 Amp 1000 R.P.M.	160	109
7511	⅜" X-tra H.D. 5.2 Amp 0-1000 R.P.M.	164	102
7514	½" X-tra H.D. V/Sp. 0-750 R.P.M.	169	114

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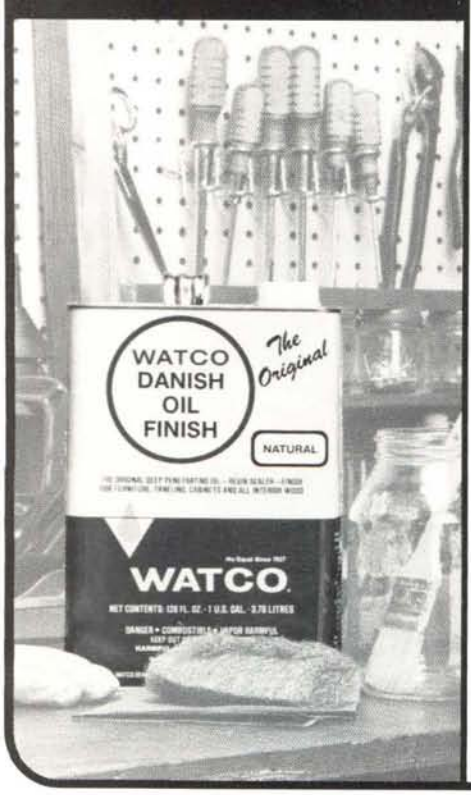

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Cabinetmakers' Supplies

As a service to our readers, we periodically list sources of supply for various woodworking products. In this issue we've included two listings: suppliers of cane and related products, and suppliers of wood finishing products.

Caning Supplies

Most of these companies also carry reed, splint, rush, rattan, and related materials.

The Brass Tree
308 North Main Street
St. Charles, MO 63301
Catalog $2.00

Cane & Basket Supply Company
1283 South Cochran Avenue
Los Angeles, CA 90019
Catalog $1.00

The Caning Shop
926 Gilman
Berkeley, CA 94710
Catalog $1.00

Connecticut Cane & Reed Co.
P.O. Box 762
Manchester, CT 06040
Brochure/Price List: 50¢

The H. H. Perkins Company
P.O. Box A.C., Amity Station
Woodbridge, CT 06525
Handbook/Price List: $1.00

Wood Finishing Supplies

Finishing Products & Supply Co.
4611 Macklind Avenue
St. Louis, MO 63109
Write for free information

Industrial Finishing Products
465 Logan Street
Brooklyn, NY 11208
Catalog $2.50

The Wise Company
P.O. Box 118
Arabi, LA 70032
Catalog $4.00

Events

New England:
The Brookfield Craft Center's upcoming workshops include: Furniture Design, May 16-17; Turning Wooden Boxes, May 29-30; Woodworking Using Solid Wood, June 13-14; Woodturning Workshop, June 20-21; Spray Finishing Workshop, July 11; Woodturning/Design, Color & Texture, Aug. 1; Furniture from the Lathe, Aug. 15-16. For preregistration or info, call the Center in Brookfield, CT: 203-775-4526.

Middle Atlantic:
The Sawmill Center for the Arts at Cook Forest State Park is sponsoring classes in: Relief Woodcarving, July 6-10; Woodcarving In The Round, July 13-17; Beginning Realistic Bird Carving, Aug. 3-7. For info, write to the Sawmill Center at P.O. Box 6, Cooksburg, PA 16217.

The Touchstone Center for Crafts in Uniontown, PA will be conducting workshops in: Birdcarving, July 3-4; Woodturning, July 13-18; Furniture Design & Construction, July 20 - Aug. 1; Wood Sculpture, Aug. 3-8. For info: 412-438-2811.

The New York Woodworking Show, May 1-3, Rockland County Community Center, Suffern, NY.

Upcoming seminars at The Olde Mill Cabinet Shoppe in York, PA include: INCA demonstration in Dover, DE, May 9; Freud Biscuit Jointer demo, May 9; Traditional Japanese Joinery with Toshio Odate, May 15-17; Slides and discussion with Franklin Gottshall, June 20; Finishing and Refinishing seminar with Behlen Bros. products, June 27. For info: 717-755-8884.

South Atlantic:
Country Workshops' 1987 summer schedule includes: Greenwood Chairmaking, July 27-31; Windsor Chairmaking, Aug. 9-14; White Oak Basketry, Aug. 24-28. For info, contact: Country Workshops, 90 Mill Creek Rd., Marshall, NC 28753. Ph. 704-656-2280.

East South Central:
"Spotlight '87: Southeast Crafts" is a juried exhibition open to residents of AL, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV. Slide entries due by July 14. For info: 615-436-5860.

East North Central:
Northern Illinois University, DeKalb, IL is sponsoring the following: Router seminar, May 11-12; Finishing seminar, May 13-14; Table Saw seminar, May 15-16; Hand Woodworking seminar, May 18-20. For info: 815-753-1454.

Equipment maintenance and repair workshop, June 8-13, Bowling Green State University, Bowling Green, OH. For info: 419-372-8181.

The Parma Woodcarvers Guild will be sponsoring the Great Lakes Wood Carving Exhibit, June 13-14, Brooklyn Recreational Center, south of downtown Cleveland, OH. Info: 216-232-0975.

West North Central:
Woodworking World — The Kansas City Show, May 1-3, Kansas City Market Center in Executive Park, Kansas City, MO.

Pacific:
Woodworking, Machinery & Furniture Supply Fair, June 16-19, Anaheim Convention Center. Info: Diane Stone, 213-477-8521.

Everett Community College, Everett, WA has a number of four-quarter woodworking programs. For info: 206-259-1327.

We will be glad to list as many events of interest to woodworkers as space permits. Listings are free and may include shows, fairs, competitions, workshops and demonstrations. The issue closing date is the 1st of the 2nd month preceding the cover date (5/1 for July/August; 7/1 for September/October). Please address announcements to the Events Department.

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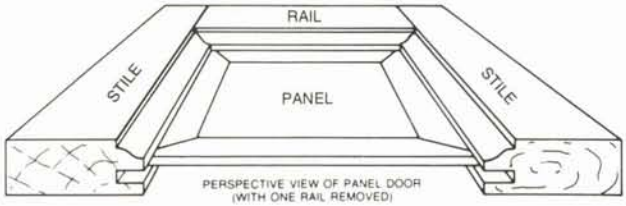

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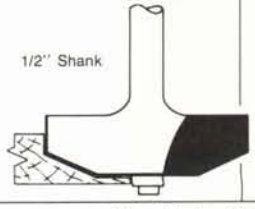
RAISED PANEL BIT
SUPPLIED WITH BALL BEARING
1/2" SHANK
3-1/4" Large Diameter



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(For making matching rails and stiles in raised panel doors, etc.)
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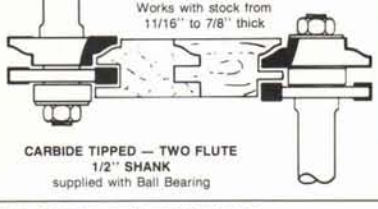

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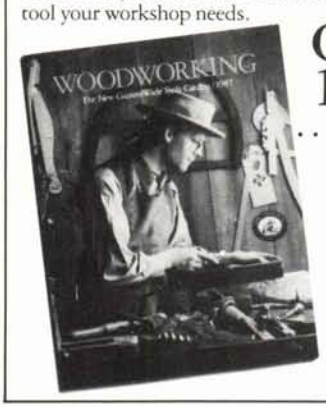
But offering quality tools isn't all that sets our catalog apart. There's quality advice. On current woodworking techniques. On choosing the right tool. On sharpening, clamping, finishing and more.

Just send us the coupon with $4.00 or call for your 1987 Garrett Wade Catalog — plus *free* handy supplements throughout the year. It could be just the kind of breakthrough tool your workshop needs.



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200-2557	2½"	$30.50
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200-2559	2¾"	$39.75
200-2561	2⅞"	$43.00
200-2562	3"	$45.00

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- 22 lbs — 9" Jaw opening
- Adjustable front dog
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- Pretapped holes for adding wood facings

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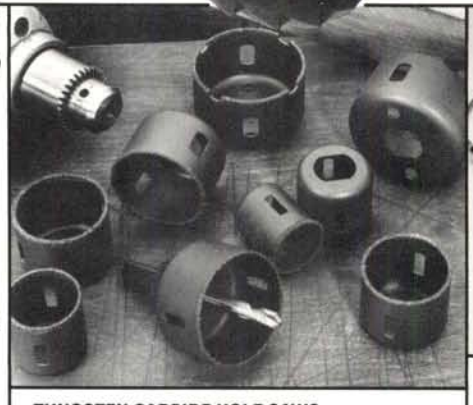

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Cut clean, round holes in ceramics, plastics, fiberglass, wood and sheet metal up to 18 gauge. 10-piece set includes mandrel with carbide tipped drill and saw sizes 1", 1⅛", 1¼", 1⅜", 1½", 1⅝", 1¾", 2", 2⅛".
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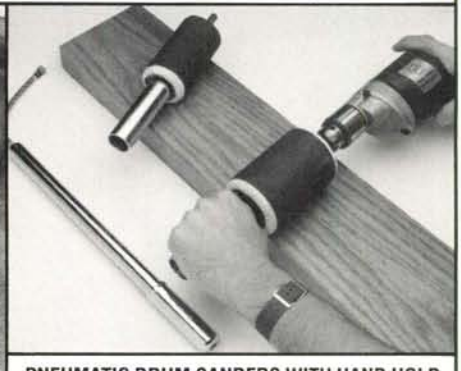

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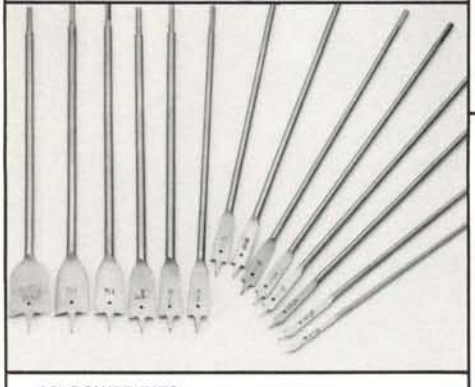
Order sleeves by 500-Number

*Minimum 3 sleeves 1 size, 1 grit

800-0700 Hand Pump



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An exceptional machine equal to others being advertised for $100.00 more.

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Finishing

Penetrating Oils and How to Use Them

New subscribers to *The Woodworker's Journal* and woodworkers just starting out are often surprised to find that our favorite finish, in most instances, is penetrating oil. While we do recommend lacquers, polyurethane, varnish, and other finishes for certain projects, our experience has shown that, all things considered, penetrating oils provide the most consistent and most easily applied finish, requiring the least fussing and no special equipment.

Penetrating oils are intended primarily for indoor use, and are marketed as Tung Oil, Danish Oil, Teak Oil, and various specially formulated blends such as Watco. Most of the better quality penetrating oil finishes include a percentage of tung or linseed oil, in combination with resins, petroleum distillate solvents, and driers. These blends are formulated to provide maximum durability, luster, and moisture resistance, while permitting easy application and fast dry time.

Penetrating oils work by penetrating below the surface of the wood, soaking into the wood fibers, and filling cell cavities. The finish hardens by reacting with oxygen (oxidation), which causes like molecules of the finish to bond together in a process called polymerization. This process effectively hardens the wood, with some penetrating oil blends claiming as much as a 25 percent increase in surface hardness.

While penetrating oils can be applied to most any wood, the best results are obtained with hardwoods. Softwoods, which are more porous and less dense, tend to absorb copious quantities of penetrating oil, particularly on end grain, and will require multiple coats to saturate the wood. Note that end grain, especially in pine, will darken substantially, presenting a problem of uneven, blotchy color around large knots and on board ends. All penetrating oils tend to darken the wood somewhat, usually lending a deeper, richer hue.

Wood Preparation

The surface to be finished should be either cleanly scraped, or sanded with up through at least 220 grit sandpaper. Wipe clean and vacuum or blow off any dust.

Filling

We do not use fillers, even on the most open-grained woods such as ash and oak. We believe that a thorough sanding, without any other form of alteration, best allows the true character and beauty of the wood to be displayed. However, some people prefer the smooth, gloss finish that is only attainable on open-grained woods if a filler is employed. To use a filler, first apply an initial coat of penetrating oil to the wood and let dry. Then wipe on a slurry mixture of paste filler thinned with penetrating oil. When dry

and after final sanding, a finish coat of penetrating oil is wiped on. Fillers can be premixed with stain if desired, and colored fillers toned to match specific wood types are also commercially available.

Staining

Stain may be applied before the penetrating oil, or you may purchase one of the many premixed penetrating oil stains. Be aware when staining, however, that the application of the penetrating oil over the stain will further darken the wood. *Note:* When using either stain or filler, it's best to experiment first on a small section of scrap. Using fillers and stains are subjects themselves, and will be covered thoroughly in future features.

Applying the Penetrating Oil

While most penetrating oil instructions direct you to first apply the oil (using a cloth or brush) and then wipe it off, we prefer to apply liberal coats, letting each coat dry before the next is applied, but *not* wiping off. After 2 - 3 coats (depending on grain and oil thickness), rub out with 0000 steel wool. Now apply one last coat of oil and wipe off with a soft cotton cloth as soon as the oil has started to "tack" up. If the oil becomes too sticky, simply let dry and steel wool as before. Remember, the more coats of oil you apply the deeper the luster and the better the preservative quality of the finish. Multiple coats will produce the "body" that characterizes the true hand-rubbed look.

After the Finish

When thoroughly dry, a surface finished with penetrating oil can be buffed out with a soft clean cloth. A light application of penetrating oil once a year is recommended to renew the finish. While many craftsmen prefer to top off their best pieces with a light coat of paste wax, consider the intended use of the piece first. Paste wax will provide a higher degree of luster, but it will also make the surface vulnerable to water stains and hand prints, and is therefore not recommended for table tops or heavy use items.

Storage of Penetrating Oils

The fact that penetrating oils harden by reacting with oxygen makes storing partially used containers a problem. Many a novice woodworker has learned the hard way that when the can is less than half full, the oxygen in the can may cause the product to solidify after several months on the shelf. Throwing away half a can, when the whole can costs $10, is like tossing out a $5 bill. While we've heard a number of ingenious solutions to this storage problem, our best recommendation is to transfer the contents to an appropriately sized container, or to a plastic squeeze bottle, where the sides can be compressed to expel the air.

Safety Note

The process of oxidation by which penetrating oils harden generates heat. Rags used to apply such finishes are liable to catch fire through spontaneous combustion, and should be disposed of or stored only in appropriately sealed metal containers. WWJ

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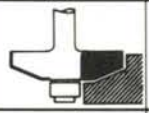	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
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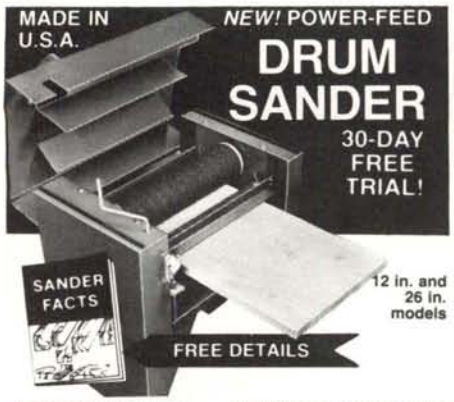

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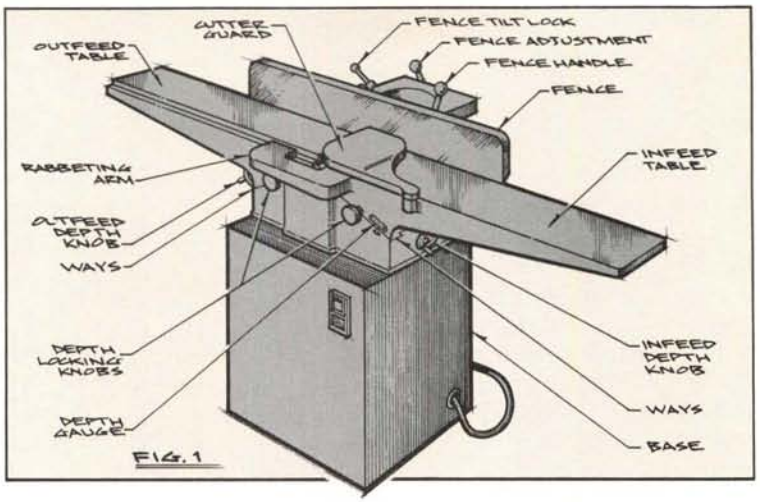


FIG. 1

The Jointer

The jointer is an especially useful stationary power tool for woodworkers who must often purchase rough cut stock that requires surfacing on all four sides. While the jointer performs many of the same tasks as the hand plane, it is a much faster, more efficient, accurate and versatile tool. For boards that have any kind of warp, the jointer provides the only practical method to flatten such material and obtain accurate rectangular stock.

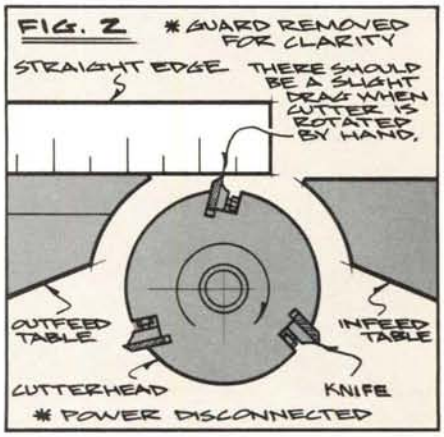
The jointer works by the stock being passed across a revolving cutter head typically containing three or four individual "knives". The smoothness of the cut depends on the number and sharpness of these knives, the speed of the cutterhead (usually 3500 to 4500 rpm), and the rate of feed.

The main parts of the jointer are shown in Fig. 1. Our illustration shows a unit with adjustable infeed and outfeed tables, which is the case with most jointers, but some models have a fixed outfeed table and an adjustment for raising or lowering the cutterhead.

Cutter Knives and Basic Setup

The Knives: If price is no object, buy carbide knives for your jointer. Carbide will enable you to work plywoods and resinous woods such as teak which would quickly dull High Speed Steel (HSS) cutters. When having knives reground, make certain they are done as a set. This is vital to maintain balance and avoid vibration in the cutterhead.

Installation: Before mounting the knives, first unplug the jointer. The knives are usually mounted with the outfeed table positioned somewhere between the mid-to-upper range of its adjustment. Install the knives one at a time, using an accurate straightedge as a guide (Fig. 2). Rest the straightedge on the outfeed table and set the knife so it just brushes and slightly drags the straightedge when the cutterhead is rotated (by hand) back and forth. Check several points across the knife with the straightedge and adjust as necessary to make certain that one end

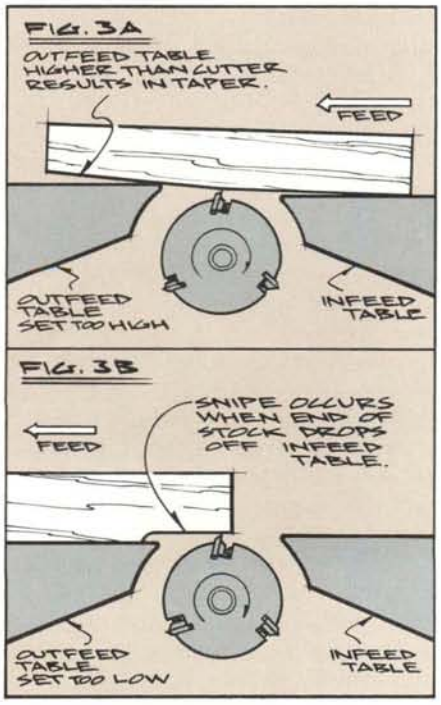


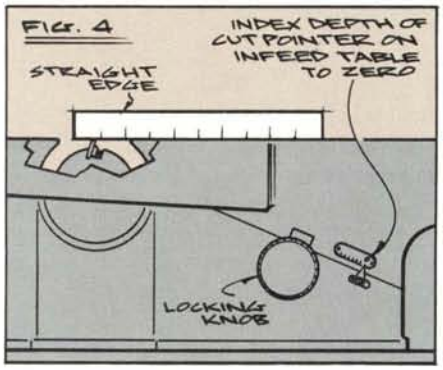
is not higher or lower. Now repeat this process with the remaining knives before final tightening all the bolts.

With the cutter guard in place, test the cutterhead by switching the machine on and off, gradually letting it come up to speed. Listen for any unusual vibration; if one develops, shut off the machine to check the position of the knives. Since a loose knife

thrown from the rotating cutterhead is extremely dangerous, careful installation of the knives is vital.

Setting Up the Outfeed and Infeed Tables: The outfeed table must be adjusted to eliminate tapering of the cut or sniping on the board end. Since wood compresses slightly when being jointed, the ideal outfeed table location is $\frac{1}{1000}$ -$\frac{2}{1000}$ of an inch under the cutter height. Fig. 3A illustrates how an outfeed table that is too high will result in an incorrect, tapered cut, and Fig. 3B shows how an outfeed table that is too low will result in the cutter sniping the board end. First, set the depth of cut pointer on the infeed table. As shown in Fig. 4, this is accomplished by using the straightedge to align the infeed table flush with the cutter knives, and then indexing the pointer to zero on the scale. A good hands-on method to obtain the ideal outfeed table setting is to first lower the outfeed table about $\frac{1}{32}$ in. from a flush position with the knives. Next, using the scale, set the infeed table for a $\frac{1}{16}$ in. depth of cut. Joint the edge on a scrap board, noting the snipe that will be created on the back edge of the board. Now, gradually raise the outfeed table in small increments, making a pass after each adjustment, until the snipe disappears, and lock the outfeed table in place at this point. The outfeed table should now be about $\frac{1}{1000}$ -$\frac{2}{1000}$ of an inch below the cutter height. *Note:* The difference in height between the two tables will determine the depth of cut. Never attempt any single cut greater than $\frac{1}{8}$ in. deep.





Basic Operation

The most common jointer operations are flattening and straightening the surfaces and the edges of boards. Begin by making certain that the fence is square to the outfeed table (check with a try square). To flatten a warped board that is *shorter* than the infeed table, orient the crown so it faces up and feed the end across the cutter. Once several inches of the board pass the cutterhead and move onto the outfeed table, apply pressure with the left hand (Fig. 5A) to keep the board seated flat. The left hand applies the pressure and holds the board tight to the fence, while the right hand (holding the push block) feeds. For surfacing and planing short boards with the jointer, this push block is handy and will enable you to keep your hands clear of the cutterhead area.

When surfacing and jointing stock that is longer than the infeed table, it is best to orient the stock crown *down,* and then make as many passes as are needed to flatten the crowned area (Fig. 5B). With the initial passes, take care to start the cuts with the front end of the board over the outfeed table. After the straight edge has been established, several passes, starting as usual on the infeed table, should result in a true flat edge.

After one side of the board has been flattened, it can be thickness planed using the jointer or a thickness planer. The thickness planer will *not* correct the warp in a board, though.

Edge jointing (the most common

(continued on next page)

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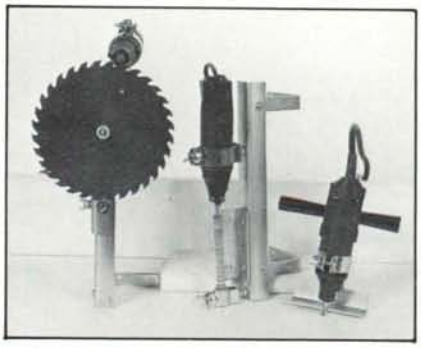

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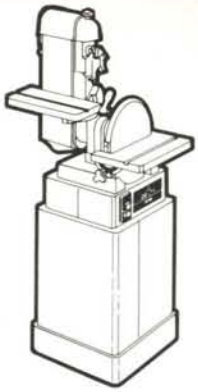

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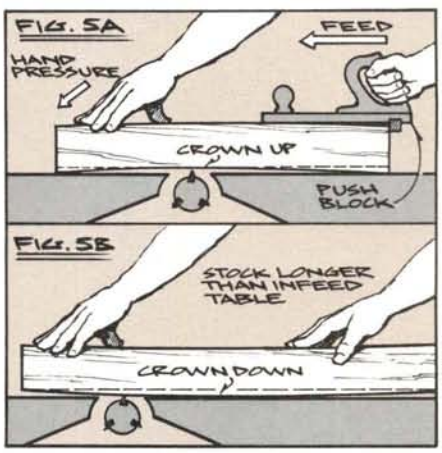
jointer operation) follows the same principles as facing and surfacing. After the board is flattened and thicknessed, it is edge-jointed. With edge jointing, maintain pressure on the outfeed table once several inches of the board have crossed the cutterhead. Surfacing and edging are necessary to produce accurate, workable material from rough milled board stock.

Parallel Jointing: While most jointer



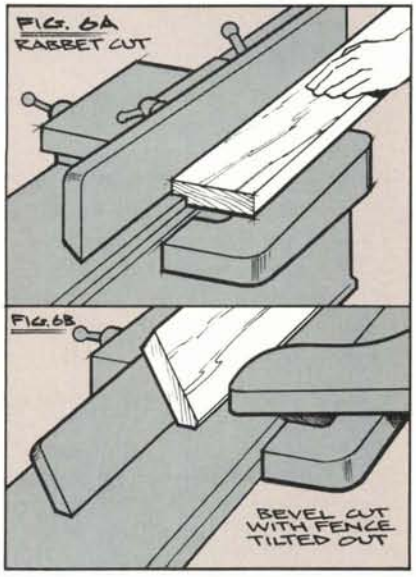
operations require that pressure be maintained on the outfeed table, with parallel jointing pressure is exerted on the *infeed* table only. An example of a parallel jointing situation would be a board that has been jointed straight on one edge, and then ripped to width. The rough sawn edge must now be cleaned up. In order to maintain a constant width on the board and keep the sides parallel, apply pressure only on the infeed table as you pass the board edge across the cutter. The end of the board may ride up, but the sides will remain parallel with an even amount of material removed the length of the stock. *Note:* Parallel jointing is necessary on long or narrow stock as there may be some release of tension in the wood, resulting in crowning *after* the piece is ripped on the table saw. Applying pressure to the outfeed table would remove the crown, producing a board that is no longer a constant width. Maintaining pressure on the infeed table will allow the cut to parallel the opposite edge, insuring a constant width.

Other jointer operations include rabbeting, end jointing, squaring up stock, beveling and chamfering, and tapering. For rabbeting, the guard must usually be removed as shown in

Fig. 6A. Bevels and chamfers are established by tilting the fence in or out as needed (Fig. 6B).

Safety

While the jointer is considered to be one of the safer stationary power tools, the potential for injury exists. Basic rules of thumb for safe operation are:



1. Hone or have knives resharpened frequently to maintain optimum cutting capability.
2. Check stock *before* milling for nails, screws, wire, staples, and other metal. Avoid stock with defects and never joint stock with loose knots.
3. Never try to surface stock less than 12 in. long on the jointer. The leading edge may catch on the cutters, possibly with your fingertips to follow. Use the hand plane instead.
4. Make certain that all adjustable parts of the jointer are locked tight, and employ the safety guard whenever possible.
5. Keep fingers well clear of the cutterhead, and always stand to the left of the machine.
6. Joint with the grain where possible; never try to plane the end grain of stock less than 10 in. wide.
7. Use a push block when surfacing or when jointing thin stock.
8. Never let your fingers hang over the ends of a board.
9. Give the machine your full and complete attention at all times.
10. Think before you cut! WWJ

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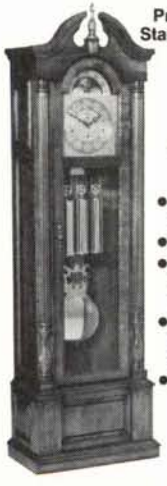

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Woodworking Basics

Veneer, Part I

People unfamiliar with wood and woodworking sometimes equate veneers with inferior or lower quality furniture. Perhaps this is due in part to the related misconception that an attractive veneer face hides or disguises poor quality materials and/or construction. While this may hold true in some small measure for the cheapest mass-produced discount store furniture, this is certainly not the case with quality furniture or handcrafted work.

Why veneer? There are several important reasons for using veneer. First, it is the only economically realistic way to conserve rare, unusual, or finely figured woods that are in limited supply. This is not to suggest that a piece made with a particular veneer is less desirable than the same piece constructed of solid stock. Simply put, without the availability of veneers the range and type of furniture made today would be severely limited. Where two hundred square feet of a fancy veneer might cost $100, two hundred square feet of board stock of the same material might well cost $1,000 or more. With such a great material expense, the cost to produce articles of furniture made with exotic woods in solid stock would probably be far in excess of their marketable value.

Second, veneers provide the only practical way to achieve certain special effects, such as bookmatches, sunbursts, marquetry, and the great variety of inlays, inserts, bandings and other artistic and decorative applications. Moreover, it would be well near impossible to use as solid stock the wild grain patterns and burls that characterize the most prized veneers.

Many of the same reasons for using veneers today held true for the ancient Egyptians, who made extensive use of veneer 3,500 years ago. Since precious and exotic woods were imported to ancient Egypt over great distances and at considerable peril, the Egyptian craftsmen had to make the most of these rare woods. The idea of thinly slicing the best woods and then gluing them over more common domestic woods has changed little over the years.

While the concept of veneering has changed little, the method of obtaining the veneers has changed immeasurably. Where the Egyptians used bronze saws to laboriously cut thick veneers (up to $\frac{1}{4}$ in.) from planks, and then hand smoothed the rough cut veneer face with stone grinders, modern automated veneer slicers cut paper-thin slices of veneer at up to 400 feet per minute.

Modern veneers come in thicknesses ranging from $\frac{1}{40}$ to $\frac{1}{28}$ of an inch, although the so-called flexible veneers which come with an applied bendable backing, are actually about $\frac{1}{64}$ in. thick. Our discussion here will concentrate on traditional veneering using $\frac{1}{40}$ in. to $\frac{1}{28}$ in. thick, unbacked hardwood veneers.

Veneer Cuts

Veneer is cut from the log in a number of different ways, with the type of cut typically depending on the species of wood, section of log, grain, and desired effect. With most modern veneer slicers, the log, or section thereof, is moved against a stationary cutter knife.

Flat Cut: For a flat cut, after the log is sawn in half the veneer is sliced parallel to the center line (Fig. 1A). This cut results in different types of grain (depending on the location of the cut), but usually a balanced figure, often exhibiting heartwood in the center, flanked by sapwood along the edges.

Quarter Cut: The quartered log is cut perpendicular to the growth rings, producing a quarter sawn or striped effect (Fig. 1B). In oak, the sliced medullary rays can be quite dramatic.

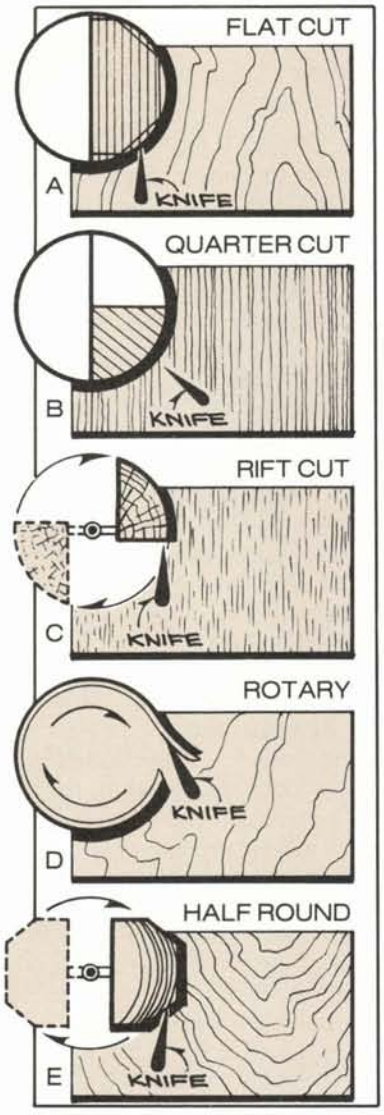
Rift Cut: Used mainly with woods that exhibit pronounced medullary rays, such as oak, this cut is made perpendicular to these rays and results in a specked grain effect (Fig. 1C).

Rotary Cut: By peeling the veneer off the log in a long continuous cut, exceptionally wide sheets of veneer with a wild, leafy, irregular figure are created (Fig. 1D).

Half Round: This arched cut across the annular growth rings produces a combination effect halfway between flat and rotary cut veneers (Fig. 1E).

The science of cutting veneers is

Fig. 1

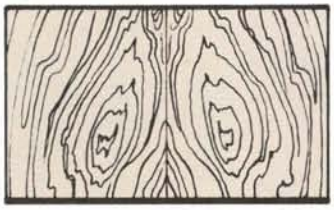


complex, and cuts made from different directions on the same wood will produce markedly different effects. Generally speaking, most of the fine hardwood and the highly figured burl and crotch veneers are flat, quarter, or half-round cut. Red and white oak is often rift cut to produce a particular effect, and most of the face veneers for the hardwood plywood industry are either flat cut and machine jointed, or rotary cut, producing an easily identified continuous grain figure. All told, about 95% of the veneers for the home craftsman are flat, quarter, rift, or half-round cut, with one exception being birdseye maple which is usually rotary cut. While veneers are typically sold by the square foot, occasionally large bundles or odd lots may be sold by the pound.

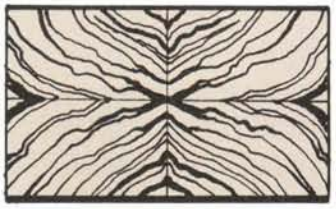
Unless specified otherwise, veneers are sold in "flitch" form, which is to say that the slices are in the exact same order in which they were cut from the trimmed log or flitch. A complete flitch is the entire log sliced into veneer. It is absolutely essential that the individual leaves of veneer are maintained in the exact order as they were sliced from the log in order to produce any type of book, butt, or slip match, and to insure that all the veneered surfaces in a given project have matching color and grain. Where veneers of the same species but from different flitches or trees must be combined, there is always the risk that the woods will not match in color and grain since there can be measurable differences from one tree to another.

To get acquainted with veneers you may want to purchase one of the beginner veneering kits or veneer assortment packages offered by veneer supply companies (see listing on page 23). The beginner kits typically include glue, a veneer saw, and a veneer roller in addition to a variety of veneers. While becoming familiar with the hundreds of different species of veneer and learning all the specialized aspects of veneering is a formidable task, the

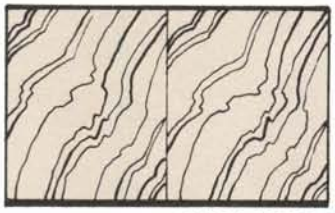
Fig. 2



BOOK MATCH



4-WAY BUTT MATCH



SLIP MATCH

(continued on next page)

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technique of veneering is quite simple, and the kits provide the beginner with an ideal opportunity to practice and experiment. Fig. 2 shows three popular veneer face arrangements.

Principles of Veneering

Because veneer is paper thin (one sheet of veneer is equal to about eight pages of *The Woodworker's Journal*), and has no significant strength by itself, it requires a strong and stable base. This base, the material to which the veneer will be glued, is commonly called the ground or substrate. The best grounds are the most stable materials, such as plywood and flake or particleboard. From the time of the ancient Egyptians up through the introduction of plywoods in the 1870's, veneers were glued directly to a base of edge joined common hardwoods, but modern manufactured plywoods and composites make far superior substrates.

With large surfaces, particularly those without extensive rigid frame work or support, veneer should be applied to both surfaces in order to balance tensions on the substrate. Often a less expensive veneer, such as birch, is used on the reverse or bottom side of the substrate, if that bottom side will not be visible or visually important to the appearance of the piece. The top or visible, finished veneered side is called the face.

Preparation of the Veneer

Before the veneer can be used, the veneer sheets must be flattened (if necessary), and splits must be repaired.

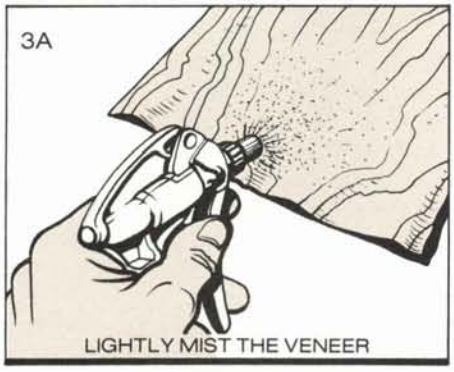
Flattening: Not all veneers require flattening. If the veneer is reasonably flat it can usually be used as is. Veneers that typically require flattening are the highly figured hardwoods and exotics, crotches, burls, and wild or wavy grains.

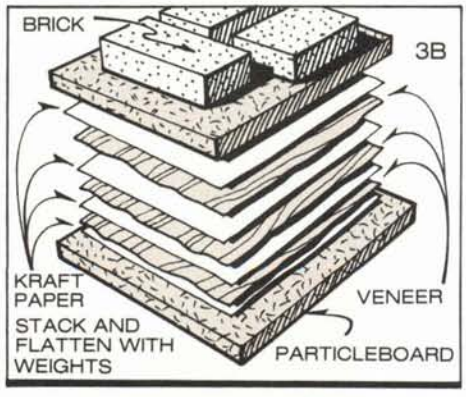
While veneers can usually be flattened overnight in a pinch, it is best to allow several days for optimum results. To flatten the individual sheets of veneer, take one sheet or leaf at a time and lightly sprinkle water on one side of the veneer only. Plant misters or pump-type window cleanser sprayers produce an excellent even spray pattern (Fig. 3A), but you can also use a stiff brush or your fingers to sprinkle on the water. The leaves should be

moistened slightly, *but not soaked*. Be sure to keep the sheets of veneer in consecutive order as you stack them, and between each piece of veneer place one or two layers of heavy brown kraft paper. Never substitute newspaper or some other printed paper for the plain kraft paper, since ink will transfer onto the veneer and ruin it.

The stack of veneer and kraft paper is sandwiched between several pieces of hardboard or plywood, and weighted with bricks or books for 24 hours (Fig. 3B). Then replace the brown kraft paper with fresh sheets and allow to dry for an additional 24 hours. Replace the kraft paper again if it is still absorbing moisture, and repeat the 24-hour drying cycle. *Note:* The veneer should remain in this drying press right up until the time you are ready to use it.

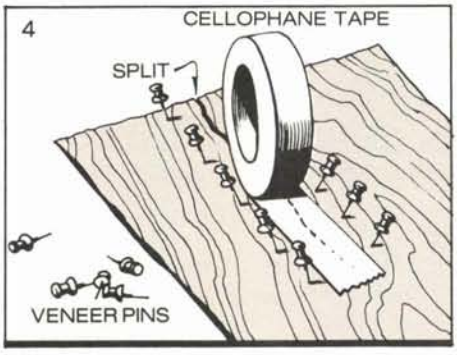
FLATTENING THE VENEER





Repairing Splits: Clean splits are common in veneer and are certainly not a reason for discarding or rejecting the affected material. To repair splits, first pull the split together to a tight butt joint, and anchor temporarily with pins inserted through the veneer into a section of particleboard or plywood. Then apply clear cellophane tape over the split to fix it in the correct position (Fig. 4). While 1½ in. wide moistened gum tape was traditionally used to repair splits, the clear cellophane tape is easy to remove, and permits inspection and readjustment to properly close up the split. When taping or repairing veneer, note that the cellophane tape or gummed paper must be on the face side — the side of the veneer that will face out. The opposite, back, or down side of the veneer is the side to which the adhesive will be applied. The tape is not removed until after the veneer has been applied and the adhesive has thoroughly dried.

REPAIRING SPLITS



In this first part of our two-part Woodworking Basics article on veneering, we have covered the subject up through the preparation of the veneer. Next issue, we'll detail how to cut, joint, and apply the veneer using the two most popular methods, with white or yellow glue and with contact cement. WWJ

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Artistry In Veneers, *450 Oak Tree Ave., South Plainfield, NJ 07080.*

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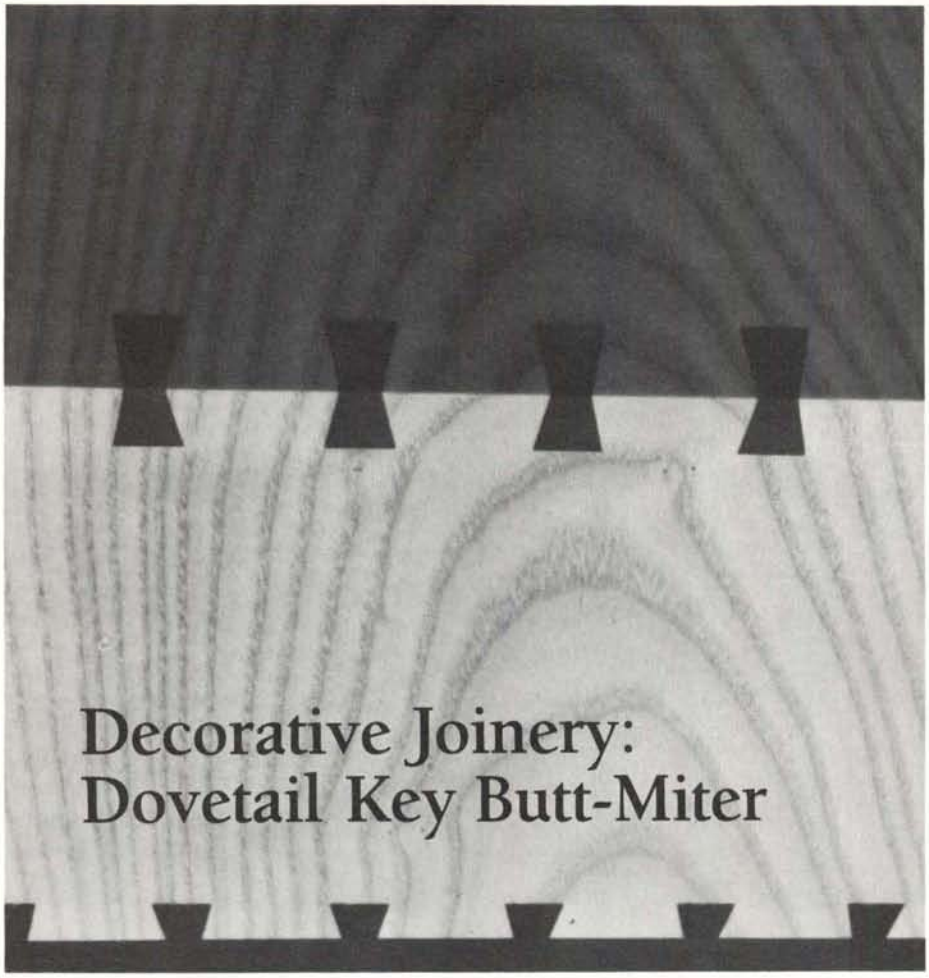


Decorative Joinery: Dovetail Key Butt-Miter

There is no doubt that woodworking as a craft offers great opportunity for creative and artistic expression. One of the most interesting aspects of woodworking, and coincidentally an area where the fine line between art and craft is blurred, is the broad field of decorative joinery.

The challenge in developing a practical decorative joint is the need to balance form with function. The Japanese and Chinese were masters at this, and indeed volumes have been written on the many different types of attractive and purposeful joinery that the Orientals perfected. Locking scarf joints, and variations of the mortise and tenon utilizing keys, wedges, and dovetails were but a few of these many types of joints. The fact that such joints typically relied on a mechanical or locking connection for their primary strength was proof of the inadequacies of early adhesives.

While some of the more complex decorative joints required so much hand labor to produce that they are hardly worth the effort today, other more common woodworking joints can usually be enhanced by the creative use of colorful and contrasting woods. In frame construction, for example, a simple through tenon can be improved by the use of attractive contrasting wedges or pins. In carcase or box construction, butt-miter joints can be reinforced and beautified by the use of keys, strip inlays, or dowels inserted across the joint.

The dovetail key is an excellent way to combine mechanical strength with simple construction, and thereby improve a common butt-miter joint. While this joint could be executed by hand, a much quicker, and more accurate method is to use the router table and dovetail bit, as shown in our instructions. For a project such as the Kitchen Canister set on page 28, which requires a total of 72 dovetailed keys, this machine method insures consistent, well-fitted joinery with a minimum of fuss.

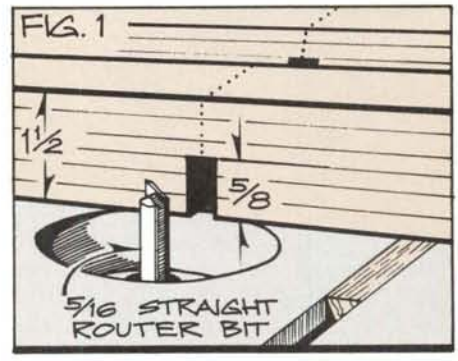
Routing the Keyway

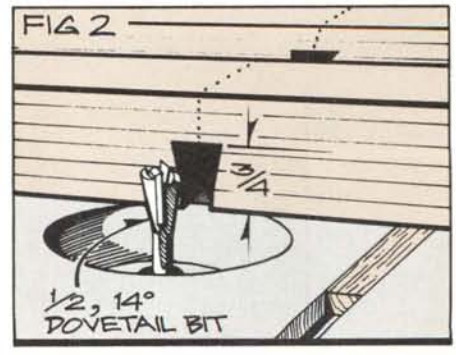
Since any fine decorative joint must be precise in every respect, take special care with the cutting of the box miters. Once the boxes have been cut and glued up, construct the router table jig that is used to rout the dovetail keyways across the box corners. Note that while the dimensions and sizes shown in our illustrations are for the canister set project, the same general technique can be employed to reinforce any type of mitered box construction.

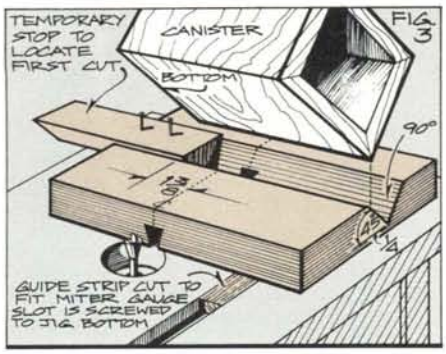
Our router table fixture utilizes the miter gauge slot. If your router table does not have a miter gauge slot, you will need to gauge the jig off the fence. The 90-degree V in the jig board to accept the boxes is cut on the table saw.

The best way to cut the dovetail slot in the fixture is to pass a straight bit through (Fig. 1), then follow with the dovetail bit (Fig. 2). We used a ½ in. wide dovetail bit, set to cut ¾ in. deep. Given the ¼ in. measurement from the router table surface to the point of the V-cut in the jig, this will result in a maximum ½ in. deep dovetail keyway across the box corners.

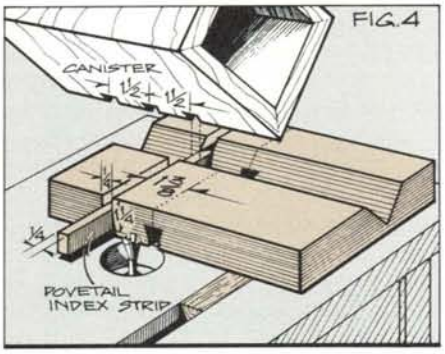
Now cut the first dovetailed keyway







in the box. As shown in Fig. 3 a temporary stopblock is tacked in place, and the bottom of the box is butted to it for this first cut. Rotate the box to cut the first keyway in the remaining three corners. *Note:* With the canister project, where the dovetail keys are all spaced 1½ in. on center, the 1⅜ in.



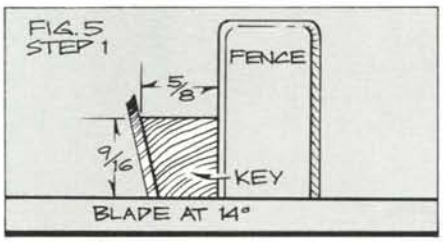
distance from the keyway center to the edge of the indexing strip (see Fig. 4) is coincidentally equal to the 1⅜ in. distance that the first key is centered from the box bottom. When making these canisters, you will therefore be able to eliminate the temporary stopblock, and simply use the dovetail index shown in Fig. 4 as the stop for the first keyway cut. However, in other projects where this coincidental dimensional relationship does not apply, the stopblock will be needed to locate the first keyway.

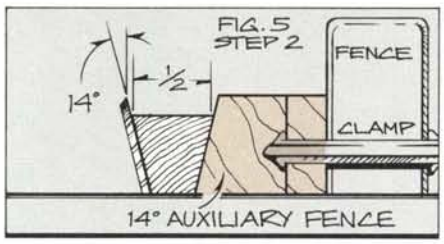
Now remove the fixture from the router table, turn it over and use a straight bit in the router table or the table saw dado head to cut the slot that will accept the dovetail index strip. Note that the thickness of this index strip must precisely equal the dimension between the points of the keyway in the box corner. With our ½ in. wide 14-degree dovetail bit, this distance worked out to a nice even ¼ in., but this dimension will vary depending on the size dovetail bit and the depth of the keyway. In any case, dimension your index strip accordingly, and then locate the index strip slot for the dovetail key spacing that you prefer.

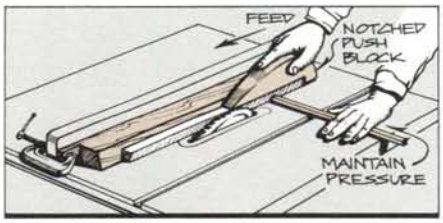
As illustrated in Fig. 4, the successive dovetail keyways are cut in much the same manner as box joints by repositioning the box over the index strip for each new cut.

Making the Dovetail Key

The dovetail key stock is ripped on the table saw as shown in the two-step Fig. 5 illustration. After ripping one side (Step 1), you will need to make an angled auxiliary fence to accommodate the stock for the cut on the opposite side (Step 2). Note the use of a stick and notched push block to keep your hands well clear of the blade. Of course, the dimensions and angles shown reflect our 14-degree dovetail bit, and a different dovetail bit will require key stock to match.

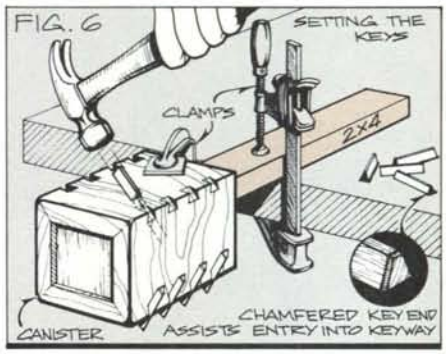






Inserting the Dovetail Keys

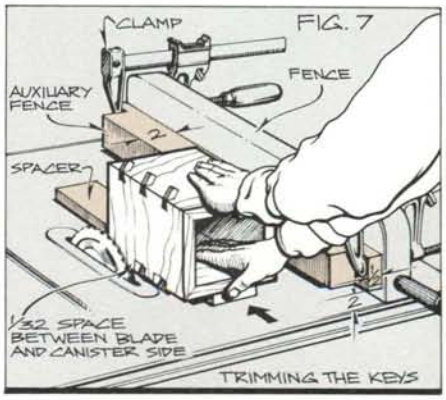
After the key stock has been crosscut into the individual keys, chamfer one end of each key as shown, apply glue, and gently tap the key into place. A board clamped to the workbench (see Fig. 6) makes it easy to temporarily clamp the canister to secure it while your work. Rotate and reclamp the canister as needed for each corner.



Note: The key stock is cut slightly thicker than required (9/16 in. instead of ½ in.) to allow for final sanding to bring the keys down flush with the canister corners. When inserting the keys, take care to apply glue to only one key at a time, since pre-gluing several keys may result in the wood swelling and making for a difficult assembly.

Trimming the Dovetail Keys

Although the keys can be trimmed by hand with a dovetail saw, a simple table saw setup (Fig. 7) is recommended where you have many keys to trim, as is the case with the canister set. Just be sure to use a sharp multitooth blade. The auxiliary fence and spacer are needed to compensate for the protrusion of the keys. Once they have been trimmed close, the keys are final sanded to bring them in flush with the box sides.



The dovetail key is an attractive detail that can be used to highlight any butt-mitered box or carcase construction. We recommend a high quality carbide dovetail router bit for clean, consistent, accurate cuts with no burn or chip out. Remember, neatness of the joinery and care in assembly contribute significantly to the overall appearance of the finished pieces. WWJ

Display Pedestal

This attractive display pedestal combines a handsome central turned post with a unique hexagonal shape. As you might note from the top view of the drawing, this hexagonal theme is reflected in the shape of the post, cleat, and top. While we built the model shown in mahogany, some other hardwood or pine could also be used.

Start with the post (A). After cutting a rectangular 3¼ in. by 3¾ in. by 23¼ in. long blank, lay out a hexagon on the end of the stock. Incline the table saw blade 30 degrees, adjust the fence so the cut will fall on the waste side of the lines demarking the hexagon, and make the four cuts establishing the hexagonal post. Now move to the router table, and use a ⅜ in. diameter straight bit and the setup shown to rout the 3 in. long by ⅝ in. deep spline grooves in the bottom end of the post. Note that if you intend to leave a little extra length for mounting the post in the lathe, the 3 in. spline grooves would have to be slightly longer; the extra length will be trimmed later.

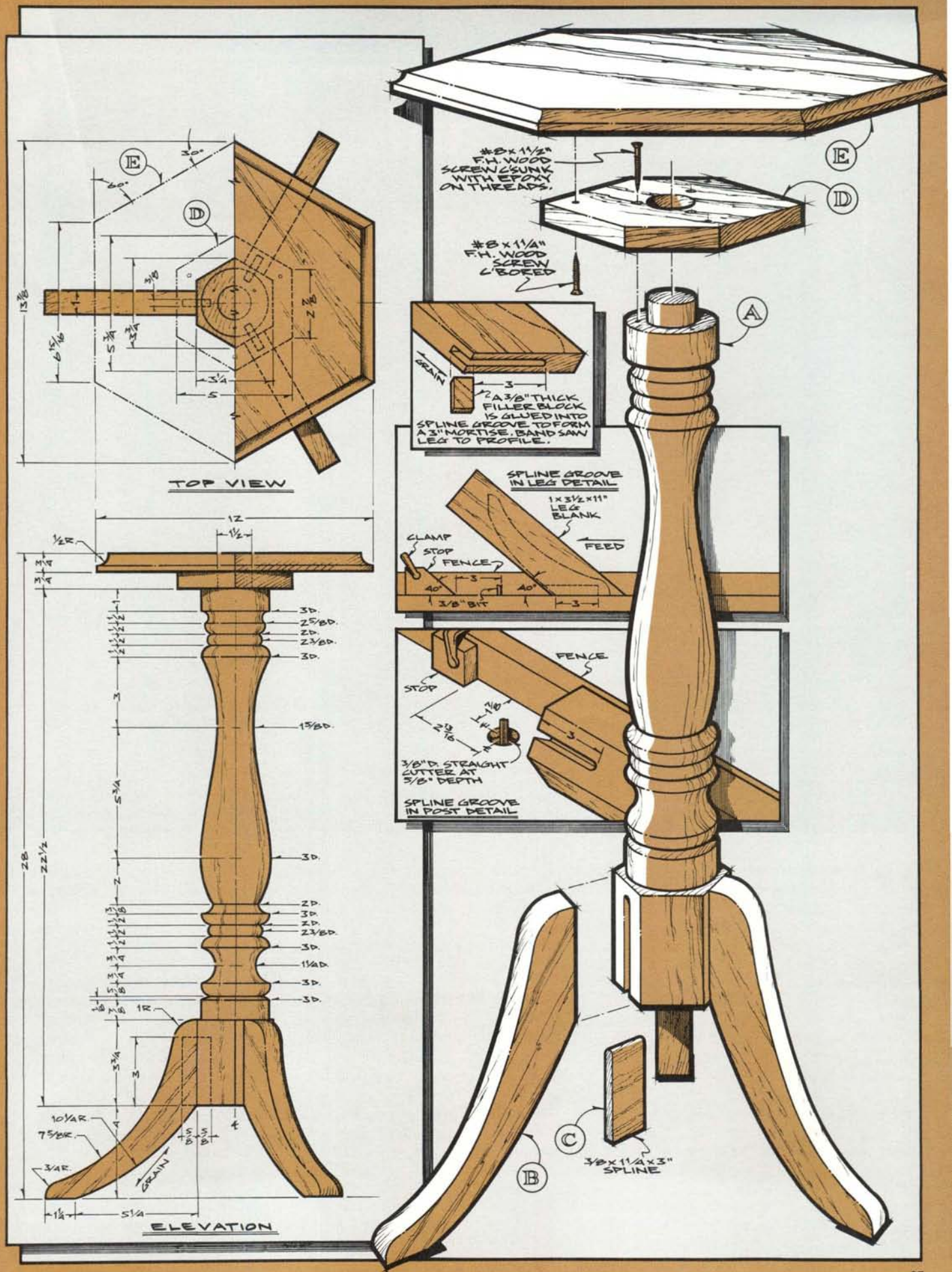
Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Post	3¼ × 3¾ × 23¼	1
B	Leg	1 × 3½ × 11*	3
C	Spline	⅜ × 1¼ × 3	3
D	Cleat	see top view	1
E	Top	see top view	1

*Size of leg blank before shaping.

Now transfer the post to the lathe, refer to the various diameters and lengths shown in the elevation, and turn as illustrated. Note the 1½ in. diameter by ¾ in. long tenon turned on the top end of the post. Next make the three legs (B). Start with 1 in. by 3½ in. by 11 in. long stock, then use the table saw to miter one end at 40 degrees. Now cut a 40-degree stop, locate this stop 3 in. from the edge of the ⅜ in. diameter straight bit set for a ⅝ in. deep cut, and cut the spline grooves in the three leg blanks (see detail). After these spline grooves are cut, a ⅜ in. thick filler block is glued into the open end of the spline groove as shown to create a 3 in. long mortise. Lay out and then band saw the leg profile.

The best way to lay out the hexagonal cleat (D) and top (E) is to draw two circles, 5¾ in. diameter for the cleat, and 13⅞ in. diameter for the top, and use a compass to establish the points of the hexagons. The *table saw* and miter gauge are used to cut the hexagon sides. Drill and countersink the cleat for screws as shown, and use a ½ in. radius cove cutter to establish the cove detail on the top. Use a band clamp to apply mild pressure as you mount the legs to the post with the splines as shown. Then screw the cleat to the top end of the post, and mount the top to the cleat. Keep the grain in the same direction for both parts. After final sanding, we applied several coats of penetrating oil, followed by paste wax which was lightly buffed to a soft gloss. WWJ


TOP VIEW
ELEVATION
#8 x 1½" F.H. WOOD SCREW C'SUNK WITH EPOXY ON THREADS.
#8 x 1¼" F.H. WOOD SCREW C'BORED
A 3/8" THICK FILLER BLOCK IS GLUED INTO SPLINE GROOVE TO FORM A 3" MORTISE. BAND SAW LEG TO PROFILE.
SPLINE GROOVE IN LEG DETAIL
1 x 3½ x 11" LEG BLANK
FEED
CLAMP
STOP
FENCE
3/8" BIT
SPLINE GROOVE IN POST DETAIL
3/8" D. STRAIGHT CUTTER AT 5/8" DEPTH
3/8 x 1¼ x 3" SPLINE
GRAIN

Kitchen Canister Set

Frankly, we're proud of these ash and padauk canisters. They're a simple design, easy to make, functional, and beautiful. The appealing use of contrasting woods to highlight the distinctive dovetail keyed joinery, and to accent the top, works especially well. These details, in combination with balanced form and carefully thought out construction point up the fact that good designs need not be elaborate or complex.

While the design of the canisters is not complex, several subtle details are incorporated to lend them that special look. The four sides for each canister are cut from a single board, so the grain appears to "flow" around three of the corners. Also, the gentle radius of the top is a theme that carries through to the pull and the canister bottom edge. While you may want to experiment with different combinations of wood, we found that the contrast of ash and padauk is especially striking.

The construction of the canister set makes this an ideal production item. All solid stock parts can be cut from ¾ in. thick stock. Since jigs are used for the machining of the dovetail keyed joinery and the top/knob detail, it is a simple matter to machine enough stock for two or more sets. The canisters are dimensioned to fit commercially available plastic liners sized from 1½ pint to 1 gallon (see bill of materials for source).

The first step in building the set is to cut the sides (A) for each canister. Rip and joint stock to the indicated widths for the four different sizes, and then use the dado head to cut the ¼ in. by ¼ in. grooves to accept the bottoms (B). Now set the table saw blade at 45 degrees and miter the four sides for each canister. We recommend you cut sides for a test box from scrap stock first to insure that your 45-degree blade angle setting is precise. After cutting the ¼ in. thick plywood bottoms to size, glue and assemble the boxes, making certain they are perfectly square.

While waiting for the boxes to dry, you can make the tops (D) and knobs (E). Start by cutting the stock for the four tops to the final indicated dimensions (see bill of materials). Now construct a router jig as shown in the router jig detail. As shown in the jig top view, a 3 in. square hole is centered in the

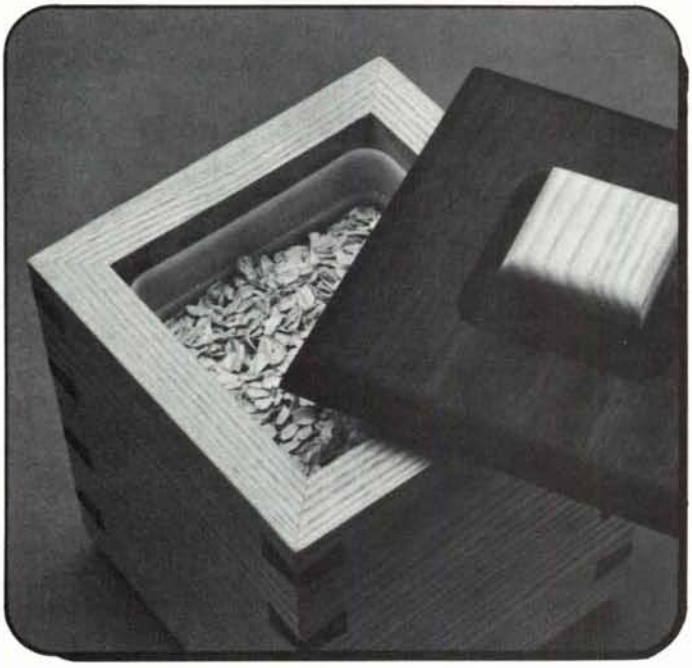
Bill of Materials
(all dimensions actual)

Part	Description	Tea	Coffee	Sugar	Flour	Number Required
A	Side	¾ × 5⅛ × 5½	¾ × 6½ × 5½	¾ × 8 × 6½	¾ × 9½ × 7¾	four of each
B	Bottom	¼ × 4½ × 4½	¼ × 4½ × 4½	¼ × 5½ × 5½	¼ × 6¾ × 6¾	one of each
C	Dovetail Key	½ × ½ × 1*	½ × ½ × 1*	½ × ½ × 1*	½ × ½ × 1*	72 total
D	Top	¾ × 5½ × 5½	¾ × 5½ × 5½	¾ × 6½ × 6½	¾ × 7¾ × 7¾	one of each
E	Knob	¾ × 1¾ × 1¾**	¾ × 1¾ × 1¾**	¾ × 1¾ × 1¾**	¾ × 1¾ × 1¾**	4
F	Liner	1½ pint	1 quart	½ gallon	1 gallon	set***

*Final dimension. Actual dovetail key stock made longer and thicker (see Special Techniques article on page 24).

**Final dimension. Before machining knob stock measures ¾ × 4 × 4

***Canister liners available from: Meisel Hardware Specialties, P.O. Box 258, Mound, MN 55364. For a set of four, order part no. 159. Current price is $8.79 plus $3.50 shipping and handling.



jig, and four ¾ in. by 2 in. by 6 in. stops are positioned as needed to accommodate your router base. As illustrated in the cross-sectional view, these stops must be positioned so they will guide the router, equipped with a ¾ in. diameter core box bit, in routing a ⅜ in. deep cove 1¾ in. square.

The stops to guide the router are fixed permanently in place with glue and screws since this 1¾ in. square ⅜ in. deep radius cove is common to all four canister tops and to the knobs.

On the bottom side of the jig you will need to mount four adjustable clamp blocks as shown. These clamp blocks are adjusted as needed to secure the workpiece. While you may simply reposition the clamp blocks and screw them in place for the four separate workpiece sizes (three top sizes plus the knob stock), by slotting these clamp blocks (see illustration) the jig can be utilized for other projects where you might want to employ this unique knob detail.

While you may use your small ¼ in. collet router for these operations, we recommend a more powerful ½ in. collet plunge router. If you have a router with a round base you will need to mount an auxiliary ¼ in. thick, square plywood base in order to guide the router accurately as you tip it down to start each cut. Make cross-grain cuts first, resetting the depth twice to achieve the full ⅜ in. depth. Routers with a square or rectangular base will not need an auxiliary base. While we were able to achieve the full ⅜ in. depth in a single pass using a ½ in. shank bit in a 3-hp machine, a smoother cut will result if you accomplish the cut in two passes.

After routing the ⅜ in. radius groove in the tops and in the oversize knob stock (see knob detail), use the dado head to rabbet the tops as shown (¼ in. by ¾ in.) to fit the boxes. As illustrated, these rabbets are cut with the tops on edge. Note the use of an auxiliary wood fence, since the dado head would otherwise nick the metal fence. Use a backup block to prevent chip out, and make the end-grain cuts first. With the rabbets complete, use the ½ in. radius round-over bit on the router table to radius the top perimeter. Since there will be no contact surface for the ball bearing pilot, gauge off the router table fence. Make the end-grain cuts first.

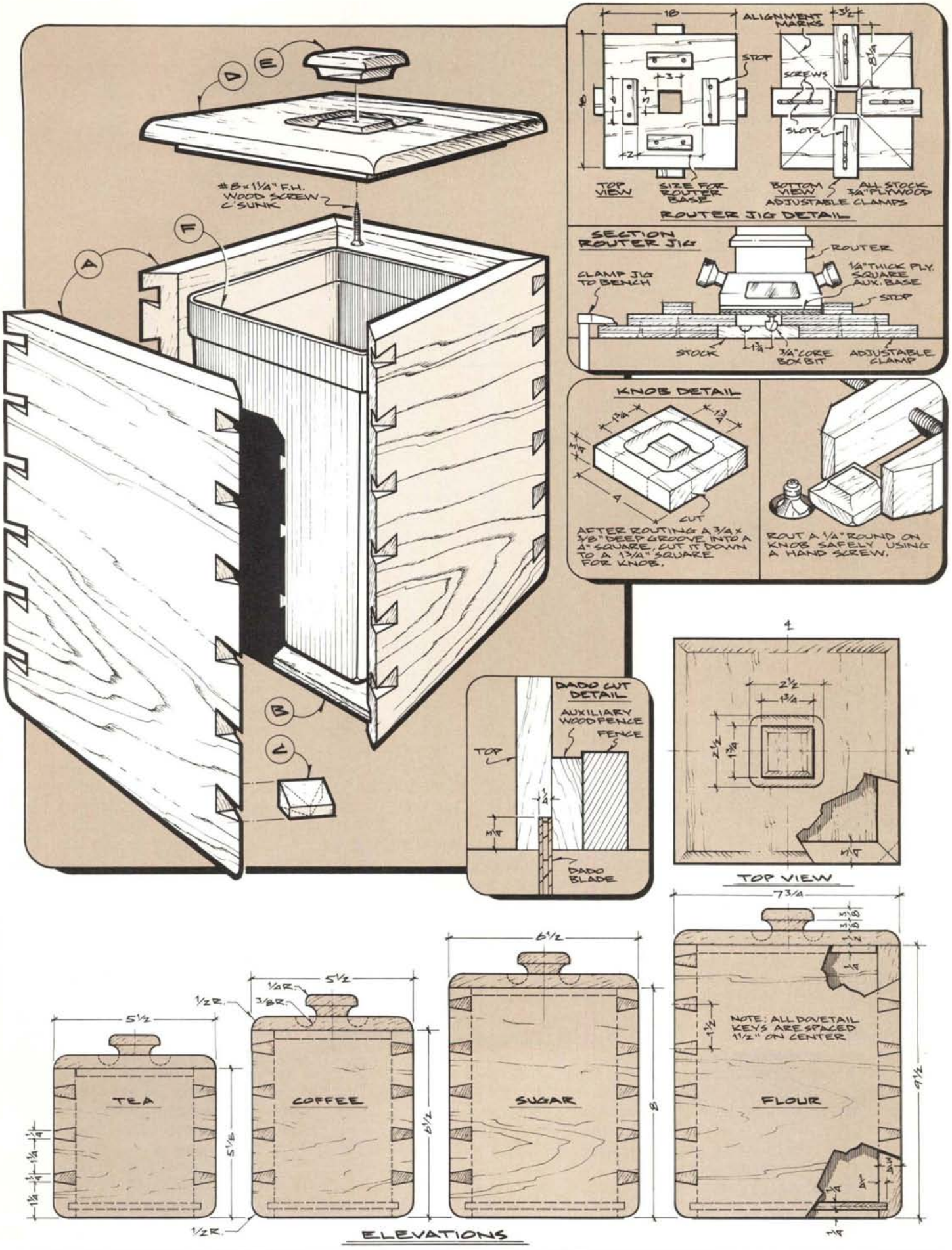
To finish the knobs, cut down the oversize knob blocks as shown to their 1¾ in. square final size, using the miter gauge and completing the end-grain cuts first. Then apply the ¼ in. radius round-over to the knob, using the hand screw as indicated to keep your fingers well away from the bit. A ball bearing guided round-over bit is needed, since a piloted bit will burn into the narrow surface the bearing must ride against. Once again, make the end-grain cuts first.

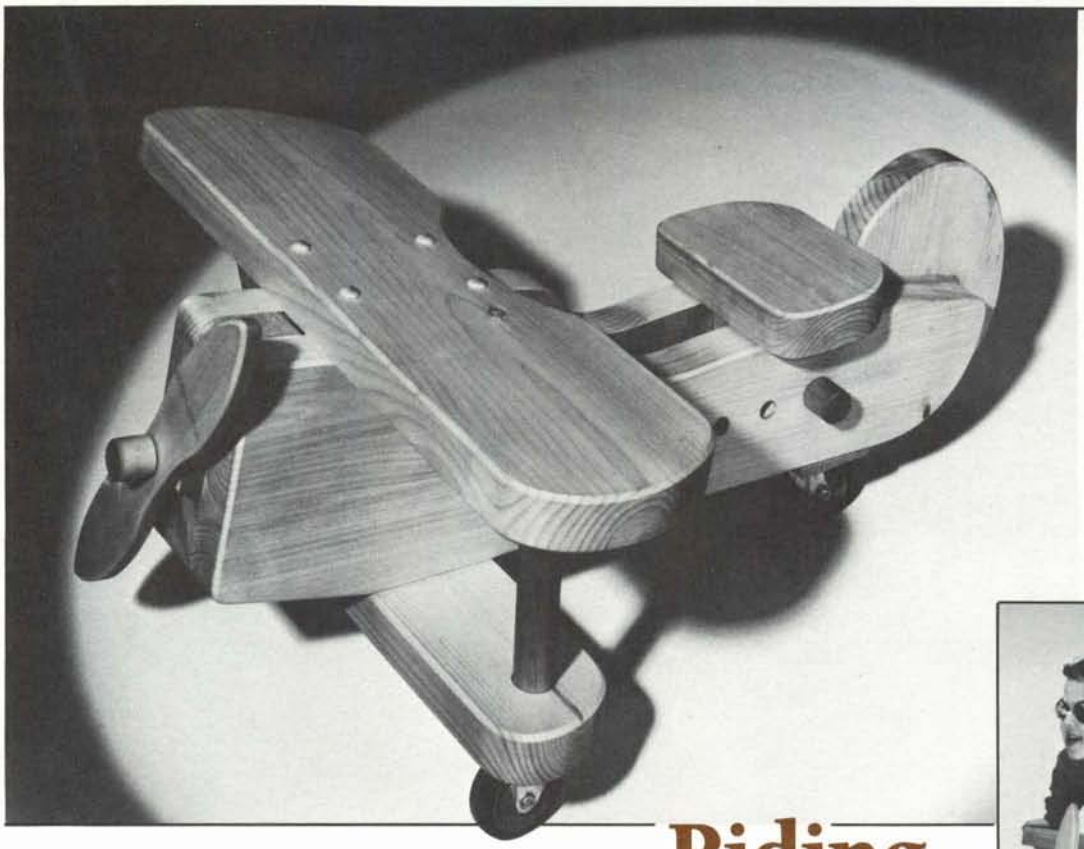
Mount the knob by first drilling through the indexed center of each top, and then locating and marking the knob bottom with the screw tip prior to drilling. A dab of glue in addition to the screw will prevent the knobs from turning. Note that the knob grain is aligned parallel to the canister top grain.

The dovetail keyed joinery of the canisters is detailed in the Special Techniques article on pages 24-25. As shown, the keys are all 1½ in. on center. When machining the keyways, work from the bottom edge of each canister, cut the first keyway in the four corners of each canister, then proceed to the next keyway. The keys are cut, inserted and trimmed as shown in the Special Techniques feature.

After using the ½ in. radius round-over bit to round the bottom perimeter of the canisters, final sand and finish with a good quality penetrating oil. WWJ

(continued on next page)


#8 × 1¼" F.H. WOOD SCREW C'SUNK
A
B
C
D
E
F
ROUTER JIG DETAIL
ALIGNMENT MARKS
STOP
SCREWS
SLOTS
TOP VIEW
SIZE FOR ROUTER BASE
BOTTOM VIEW
ALL STOCK ¾" PLYWOOD
ADJUSTABLE CLAMPS
SECTION ROUTER JIG
ROUTER
CLAMP JIG TO BENCH
¼" THICK PLY. SQUARE AUX. BASE
STOP
STOCK
¾" CORE BOX BIT
ADJUSTABLE CLAMP
KNOB DETAIL
CUT
AFTER ROUTING A ¾ × ⅛" DEEP GROOVE INTO A 4" SQUARE, CUT IT DOWN TO A 1¾" SQUARE FOR KNOB.
ROUT A ¼" ROUND ON KNOB SAFELY USING A HAND SCREW.
DADO CUT DETAIL
AUXILIARY WOOD FENCE
FENCE
TOP
DADO BLADE
TOP VIEW
TEA
COFFEE
SUGAR
FLOUR
NOTE: ALL DOVETAIL KEYS ARE SPACED 1½" ON CENTER
ELEVATIONS



Courtesy of The Wooden Toy, Canton, CT

Riding Biplane

Young aviators are sure to enjoy "flying" around the house in this sturdy scaled-down version of a World War I biplane. The seat can be adjusted to any one of three positions to accommodate kids of various sizes. It's made entirely from 2 x 8 and 2 x 10 pine, which is readily available at lumberyards and home building centers. We've included a cutting diagram that shows how to obtain the stock with a minimum of waste. Keep in mind, though, that a 2 x 8 will actually measure 1½ x 7¼, while a 2 x 10 measures 1½ x 9¼.

The two fuselage halves (A) can be made first. Cut the 2 x 10 stock to 30 in. lengths, then transfer the grid pattern to one of the halves. Use a band or saber saw to cut out the profile, staying slightly on the waste side of the stock. Once cut out, sand the edges smooth. Use care when laying out the angled bottom edge as this establishes the angle of the lower wing (C) relative to the upper wing (B). The angles of the two drill block guides, which are used later on to drill the strut (H) holes, were calculated based on the lower wing angled as shown. Next, using the cut-out fuselage half as a template, transfer the profile to the other half, then once again cut out and sand.

The front (D) is made by simply cross-cutting the 2 x 10 stock to 2¾. It will be trimmed later on after assembly.

To make the tail (E), cross-cut the 2 x 8 stock to a 10 in. length before transferring the grid pattern shown in the tail detail drawing. Cut out and sand smooth.

The fuselage halves can now be assembled to the front and tail. First dry assemble the three parts using clamps to hold everything together. The front edge of the front should be flush with the front edge of the fuselage halves. The top and bottom edges of the front can extend just beyond the top and bottom of the fuselages. Now orient the tail as shown in the side view, then use a pencil to scribe the fuselage profile on the tail. Once marked, the clamps can be removed and the parts disassembled.

Apply a thin coat of white or yellow glue to the mating surfaces of the three parts (use the pencil line on the tail as a guide for the glue area), then firmly clamp each joint. Set aside to dry thoroughly.

When dry, remove the clamps and hand plane the top and bottom edges of the front (D) so that it is flush with the fuselage. Also, lay out and mark the location of the three ¾ in. diameter holes that are bored through the sides of the fuselage to accept the seat pin (I). The holes should be square, so use care when drilling. If you have one, a drill press will come in handy here. Before drilling, it's a good idea to temporarily insert a piece of scrap stock between the fuselage halves to serve as a backup block. This block will prevent tear-out at the point the drill bit breaks through the first fuselage half. Note that the holes are bored completely through both halves, so you'll also need a backup block where the drill exits the second fuselage.

To make the upper wing (B) and the lower wing (C), cut stock (see cutting diagram) to the dimensions shown in

(continued on next page)

the bill of materials.

Next, lay out and mark the center points of the strut holes (see hole layout detail) and label the reference lines "AA" and "BB" as shown. Note that the holes will be drilled on the bottom side of the upper wing and on the top side of the lower wing.

To drill the strut holes, you'll need two drill guide blocks — one angled at 16 degrees and a second angled at 21 degrees (see drawing). To make the 16-degree block, cut stock to 1¾ in. thick by 2¼ in. wide by 5 in. long. Starting at a point 1 in. from one end, scribe the 16-degree angle as shown, then band saw just outside the marked line. Use the disk sander or hand plane to smooth the cut to the line. The clamp notch can also be cut on the band saw.

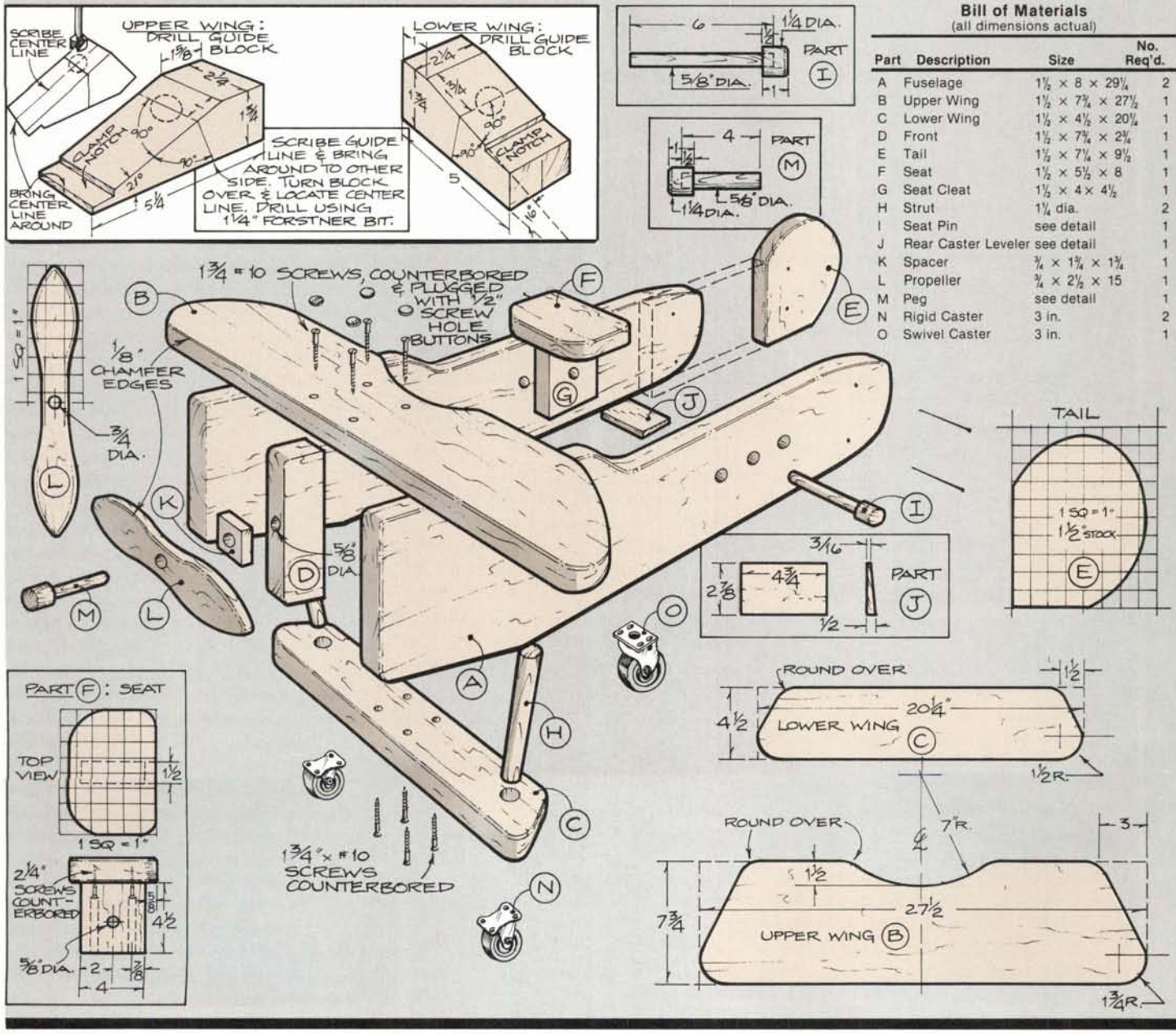
At a point 1¾ in. from the top face of the block, scribe a guide line across the block's angled face. Carry this line around the remaining three faces as shown. On the bottom, scribe a center line, then carry this line around to the front and back edges.

Now flip the block so that the bottom faces up, then use a 1¼ in. diameter Forstner bit to bore a hole completely through. The intersection of the two marked lines will serve as the center point for the drill. The 21-degree drill block is made in the same manner; just make the dimensional changes shown in the drawing.

To drill the holes, locate the clamp blocks as shown in the drawing detail. The center line of the block must line up with "AA" while the wrap-around guideline must line up with "BB". Make sure the front of the block is facing in the direction shown. Clamp the block firmly in place at two points, then use an electric hand drill with a 1¼ in. diameter Forstner bit to bore a ¾ in. deep hole. Once the holes are bored, lay out the various wing curves, then cut them out and sand smooth. A disk sander will come in handy here for smoothing the outside curves.

The lower wing can now be joined to the fuselage with glue and four 1¾ in. long by no. 10 flathead wood screws. The underside of the wing is counterbored to a depth of ¾ in. to accept the screws.

To establish the strut (H) length, temporarily clamp the upper wing in place, then use a string to measure the distance — bottom to bottom — between the holes. The two struts can be



Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Fuselage	1½ × 8 × 29¼	2
B	Upper Wing	1½ × 7¾ × 27½	1
C	Lower Wing	1½ × 4½ × 20¼	1
D	Front	1½ × 7¾ × 2¾	1
E	Tail	1½ × 7¼ × 9½	1
F	Seat	1½ × 5½ × 8	1
G	Seat Cleat	1½ × 4× 4½	1
H	Strut	1¼ dia.	2
I	Seat Pin	see detail	1
J	Rear Caster Leveler	see detail	1
K	Spacer	¾ × 1¾ × 1¾	1
L	Propeller	¾ × 2½ × 15	1
M	Peg	see detail	1
N	Rigid Caster	3 in.	2
O	Swivel Caster	3 in.	1

cut from 1¼ in. diameter dowel stock or closet pole.

With the struts now cut to length, the upper wing can be assembled as shown. The top of the wing is counterbored to a depth of ¾ in. to accept four 1¾ in. long by no. 10 flathead wood screws. Apply glue to the ends of the struts and to their mating holes. Also add glue to the mating surfaces of the wing and fuselage, then add the screws. Four screw hole buttons will serve to cover the counterbored holes.

The seat (F) and seat cleat (G) are made next. Round the seat corners as shown in the grid pattern, then screw the seat cleat in place (see detail). Counterbore two holes to a depth of 3½ in. and use 1¾ in. long by no. 10 flathead wood screws. Once assembled, place the seat and seat cleat assembly in position on the biplane, then use one of the already bored fuselage holes as a guide to bore a matching hole through the seat cleat. The seat pin (I) serves to lock the adjustable seat in place. It can be lathe-turned to the dimensions shown or made from ⅝ and 1¼ in. diameter dowel stock.

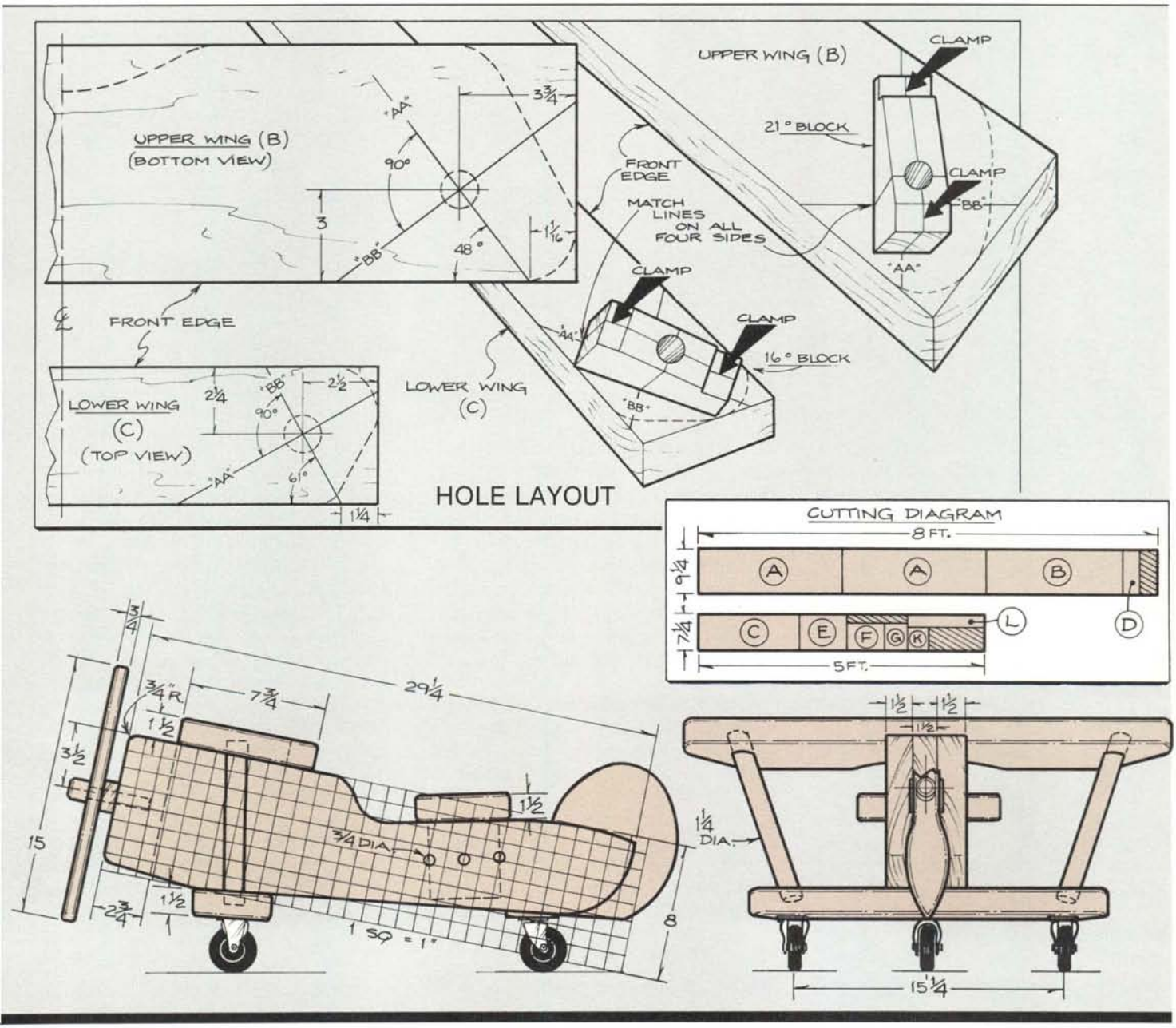
The spacer (K) can now be cut to size and glued to the front of parts A and D. Four finishing nails will help secure it in place. A ⅝ in. diameter by 2¾ in. deep hole can now be bored to accept the peg (M). Like the seat pin, the peg can be lathe-turned or made from two pieces of dowel stock.

Make the propeller (L) from ¾ in. thick stock. Use the grid pattern to establish the curved shape before cutting out and sanding. A ¾ in diameter hole at the center will allow it to spin easily on the peg. Assemble the propeller to the peg, then glue the peg in the peg hole.

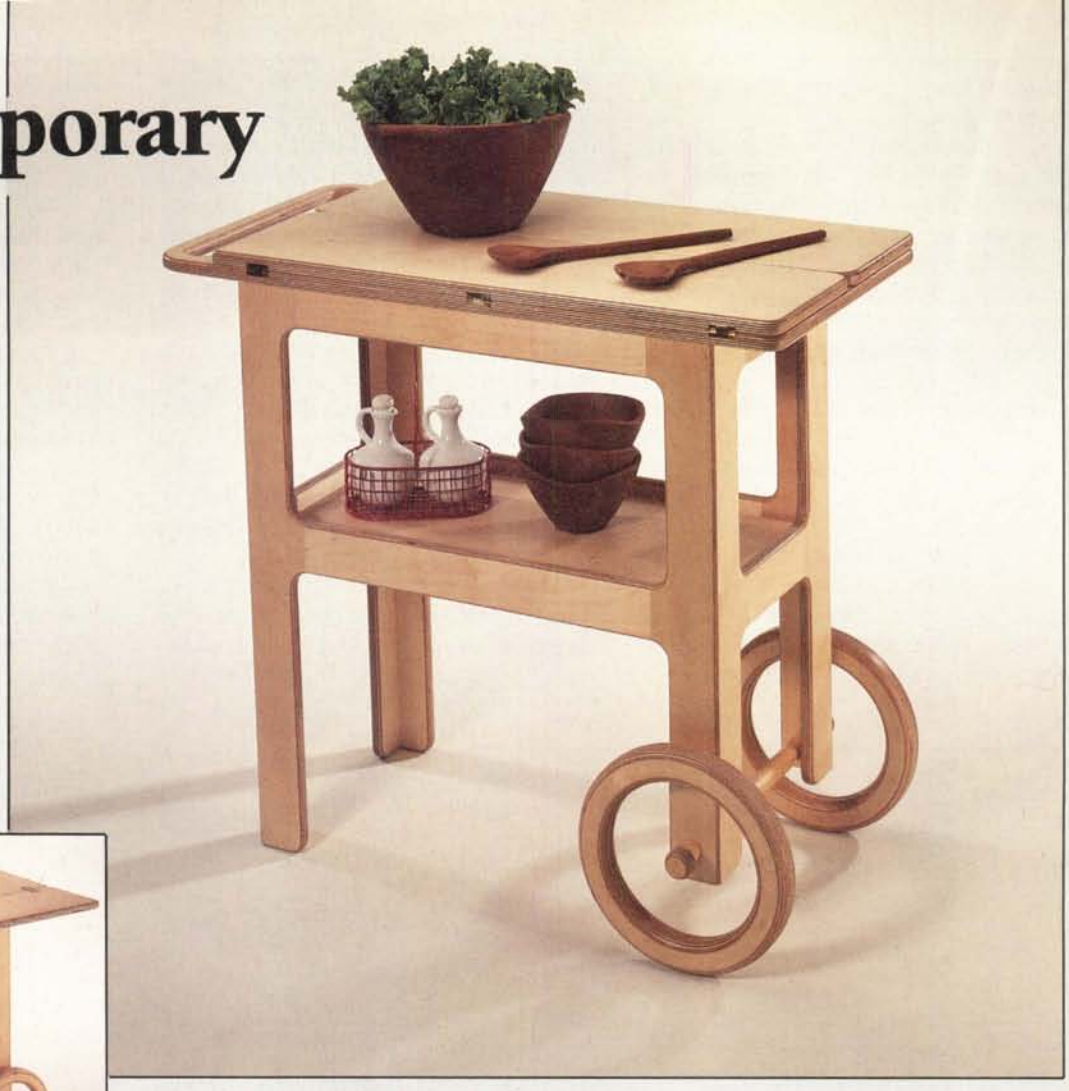
The rear caster leveler (J) is now cut and hand planed to the dimensions shown on the drawing. It's joined to the underside of the fuselage with glue and finishing nails.

The two rigid casters (N) and the swivel caster (O) can now be secured with roundhead wood screws. If not available locally, they can be ordered from C and H Distributors, Inc., 400 South 5th Street, Milwaukee, WI 53204. For part N, order part no. 71-191/1D ($7.50 each); for part O, order part no. 71-188/7A ($6.00 each).

Final sand all parts, then final finish with two coats of a good quality penetrating oil. WWJ



Contemporary Serving Cart



This attractive contemporary style serving cart is constructed from Baltic birch plywood, a high grade plywood product whose multiple cross bands produce a unique and distinctive edge detail. Baltic birch is sold in 5 ft. by 5 ft. sheets, and all the plywood parts for our cart are obtained from a single sheet (see bill of materials for source).

We recommend that you use only *carbide* cutters when machining Baltic birch, since the glue lines of the plywood tend to burn into high speed *steel (HSS)* cutters.

To start, lay out all the plywood parts (A - I) as shown in the cutting diagram, allowing sufficient space between each part for saw kerfs. Then rip and crosscut to obtain these parts.

Now make the side and end sub-assemblies (C, D, E, F). First determine the side of the leg blanks that will face out, and identify with an X. Cut all mortises in leg blanks and stretchers using a ⅜ in. diameter straight cutter, then rip the 45-degree miters, and cut the spline grooves on all legs.

Construct the leg jig as shown, then trace each leg, band saw the profile, and flush trim with a router and flush trimming bit. Note that the same jig is used for both the long and short legs by simply relocating the end block (see leg step-by-step).

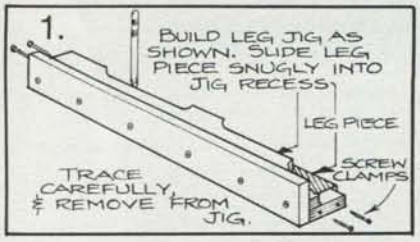
Glue and assemble the four leg and stretcher sub-assemblies. Clamp the two side sub-assemblies back to back and bore the ¾ in. diameter axle holes; also bore the two end sub-assemblies for the ½ in. diameter shelf support pins (O). Now apply a ¼ in. radius round-over to all inside edges (except top) and finish sand.

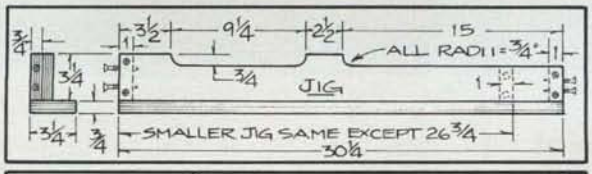
Turn the axle (K) as shown from 1 in. diameter birch dowel. Cut maple splines (L) for the legs, and glue and clamp the four sub-assemblies (make certain adequate clamps and clamp blocks are available). Note that the axle must be in place as part of this assembly. When dry, apply the ¼ in. radius to all outside edges (except top).

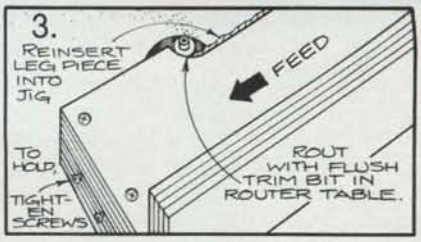
Cut the inside diameter of the four wheel blanks (H) with a fly cutter, sand smooth, rout the ⅛ in. by ½ in. rabbets as shown (use a bearing guided wing cutter) and apply the ½ in. inside radius. Cut out the 8 in. diameter plexiglass rims (J) and drill the ½ in. diameter axle holes. Back up the plexiglass with a block, with the clamps positioned close to the hole location, or the plexiglass will shatter where the drill bit exits. Now assemble the wheel halves around the plexiglass, glue and clamp. When dry, band saw then disk sand the outside diameter, and apply the ½ in. outside radius as shown.

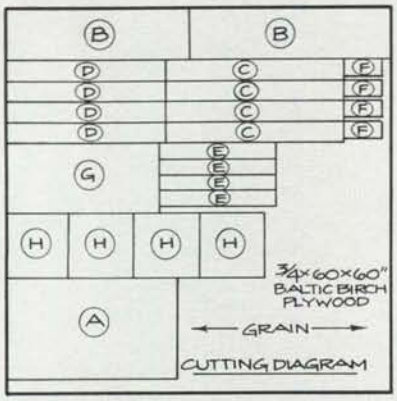
Now assemble the top (A) and leaves (B) using bar clamps and clamp blocks

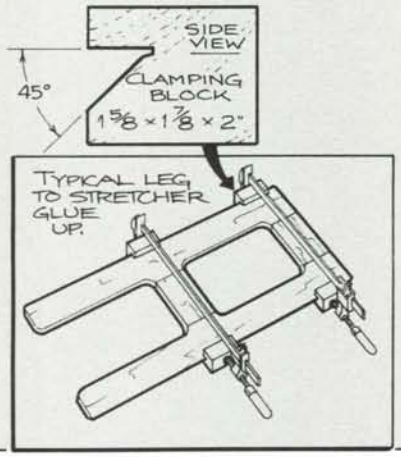
(continued on page 36)









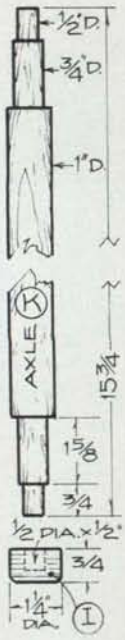


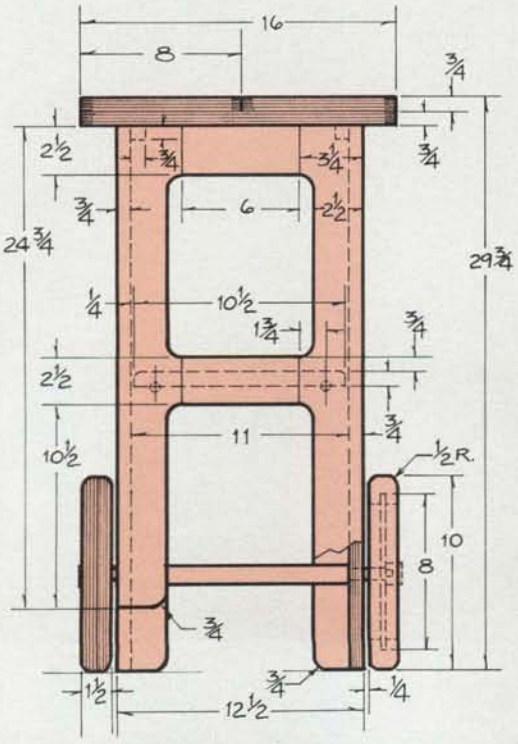
Bill of Materials
(all dimensions actual)

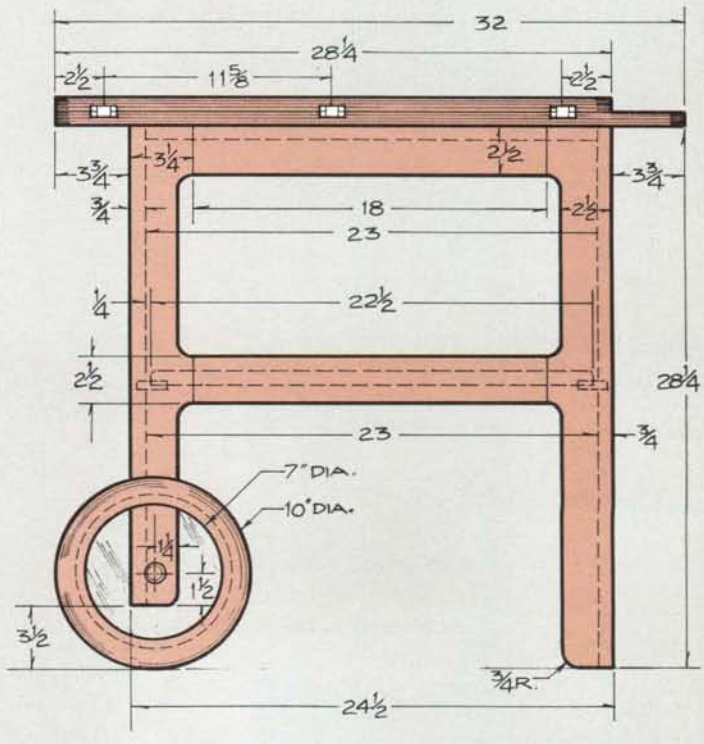
Part	Description	Size	No. Req'd.
A	Top*	¾ × 16 × 32	1
B	Leaf*	¾ × 8 × 28¼	2
C	Long Leg*	¾ × 3¼ × 28¼	4
D	Short Leg*	¾ × 3¼ × 24¾	4
E	Side Stretcher*	¾ × 2½ × 18	4
F	End Stretcher*	¾ × 2½ × 6	4
G	Shelf*	¾ × 10½ × 22½	1
H	Wheel Blank*	¾ × 10 × 10	4
I	Hub*	¾ × 1¼ in. dia.	2
J	Rim	¼ × 8 in. dia. plexiglass	2
K	Axle	1 in. dia. × 15¾ long	1
L	Spline Stock (legs)	⅛ × ¾	9 ft.
M	Spline Stock (stretchers)	⅜ × 2	2 ft.
N	Cleat	¾ × ¾ × 23	2
O	Dowel	½ dia. × 1¼	4
P	Hinge (extruded brass)	1³⁄₁₆ × 2¾**	6

*Parts made from Baltic birch. Baltic birch may be ordered by your local lumberyard from: Allied International, 490 Rutherford Ave., Boston, MA 02129.

**Available from: The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374. Order part no. D2420. Cost is $13.95 per pair (3 pair required).







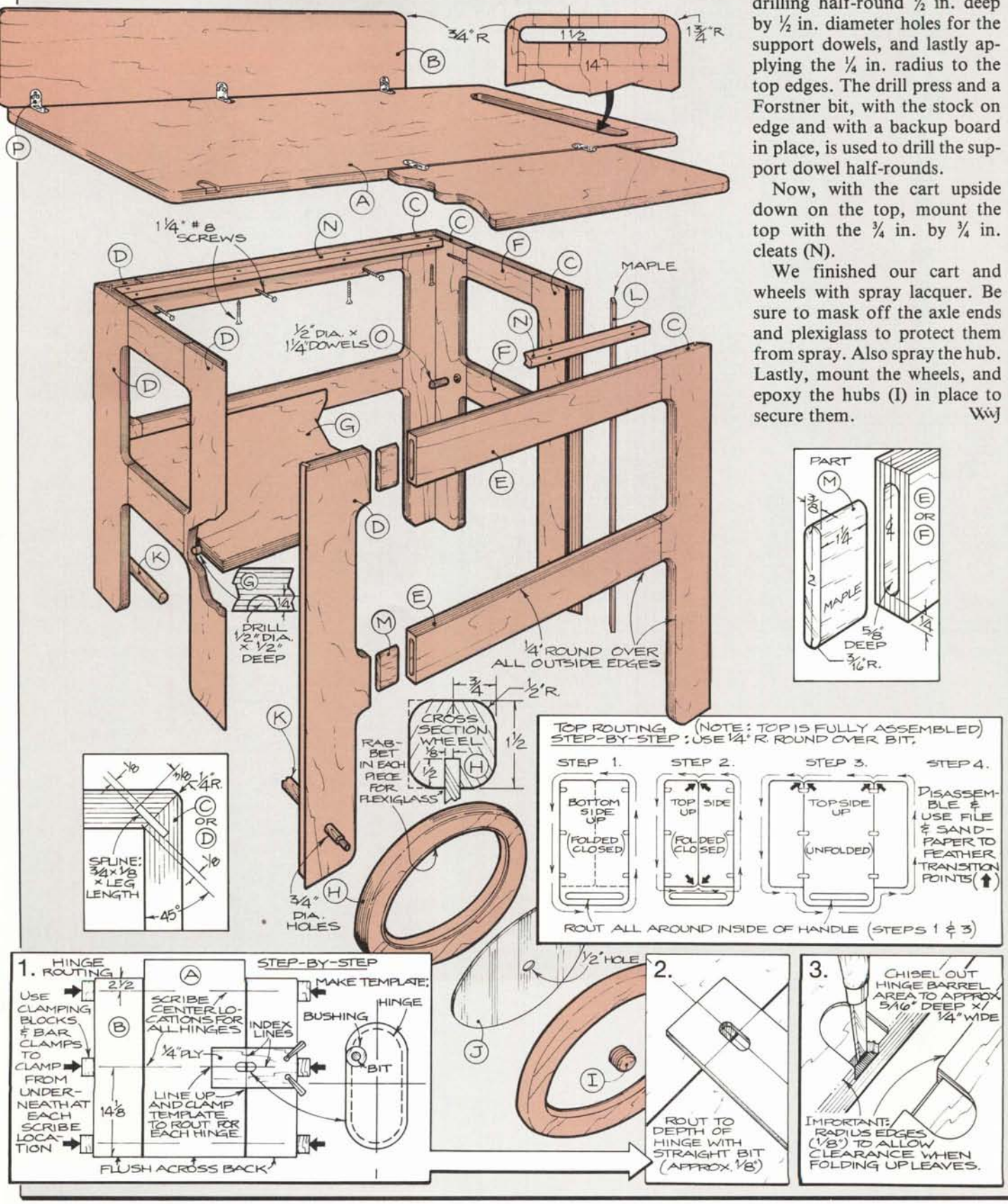
as shown in step 1 of the hinge routing step-by-step illustration. Mark the hinge (P) locations. and use a template as shown in conjunction with the router equipped with a bushing and straight bit to rout the ⅛ in. deep hinge mortises. The template must be sized with respect to your choice of bushing and bit diameters. After routing, disassemble and chisel a relief as indicated for the hinge barrel.

Round the corners and cut out the handle. Assemble with the hinges and follow the top routing step-by-step to round the edges of the top and leaves.

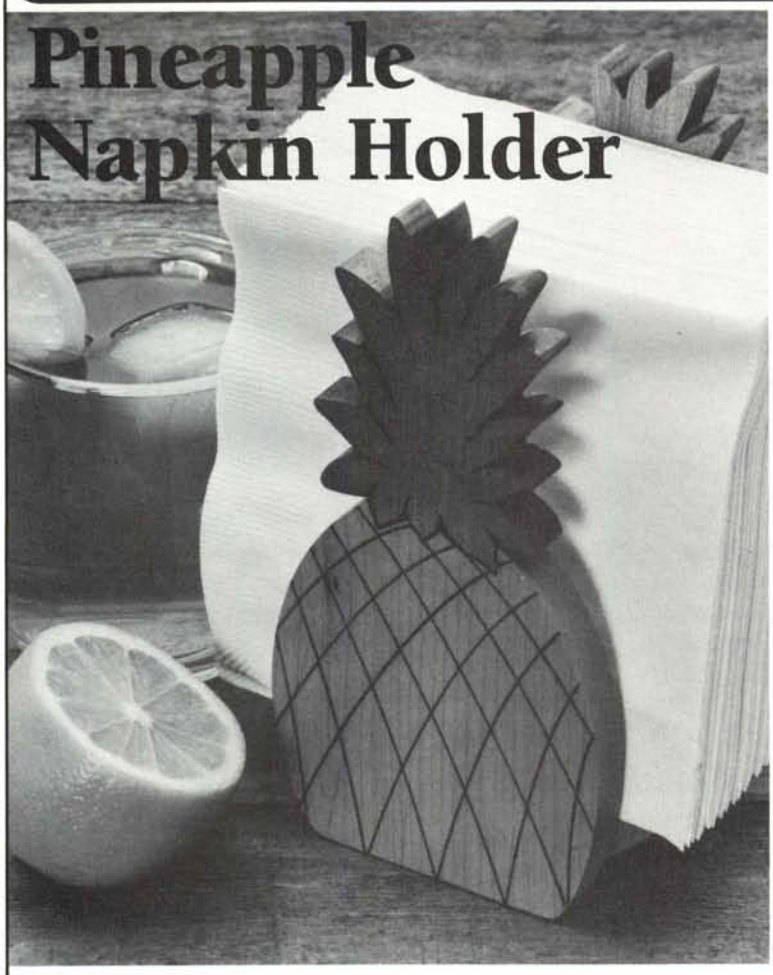
Next make the shelf (G), first drilling half-round ½ in. deep by ½ in. diameter holes for the support dowels, and lastly applying the ¼ in. radius to the top edges. The drill press and a Forstner bit, with the stock on edge and with a backup board in place, is used to drill the support dowel half-rounds.

Now, with the cart upside down on the top, mount the top with the ¾ in. by ¾ in. cleats (N).

We finished our cart and wheels with spray lacquer. Be sure to mask off the axle ends and plexiglass to protect them from spray. Also spray the hub. Lastly, mount the wheels, and epoxy the hubs (I) in place to secure them. WWJ



Pineapple Napkin Holder

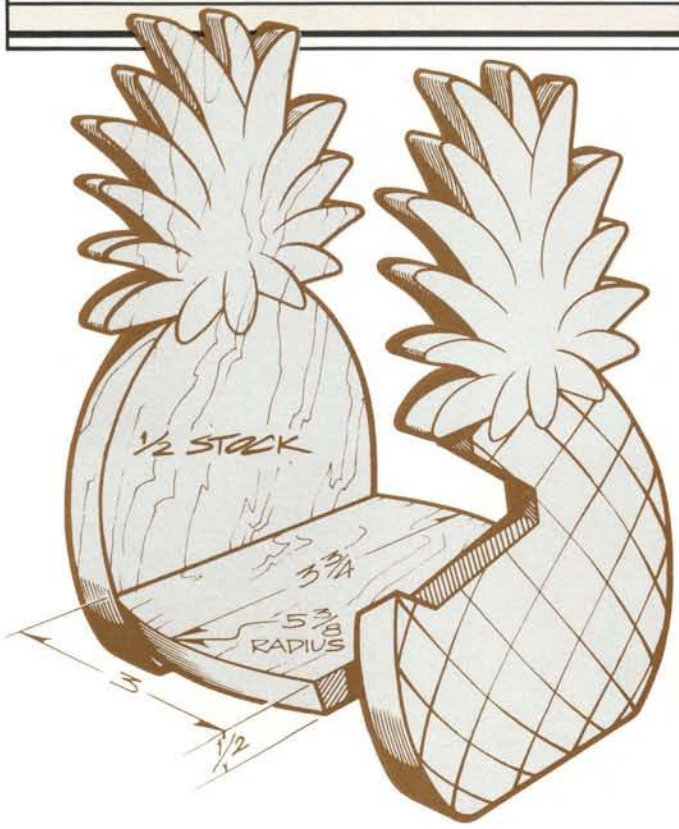


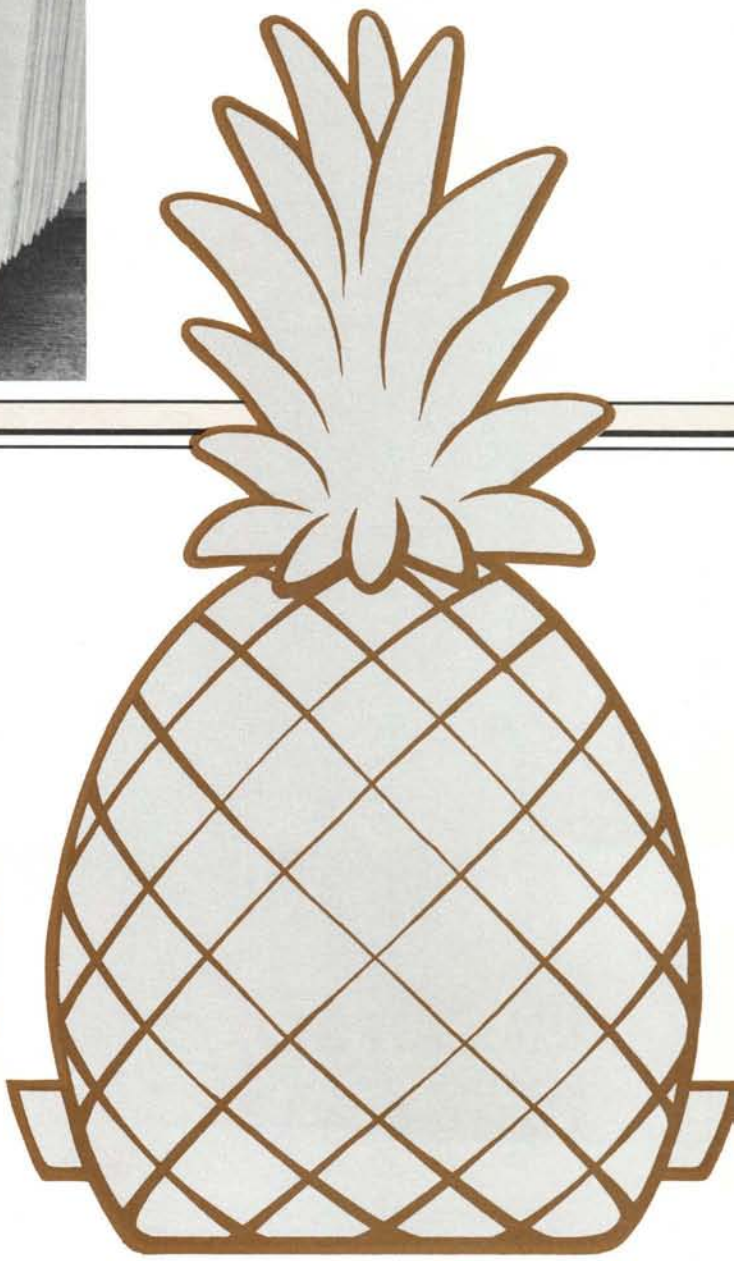
Many woodworkers don't always have time for large or involved projects. This easy-to-build country style napkin holder should take less than one evening in the workshop. All you need are a saw (a fretsaw, jigsaw, saber saw or band saw will all do) and one clamp with at least a 4 in. capacity.

Although we used ½ in. maple for our napkin holder, either pine or hardwood ¾ in. thick stock could be used as well. Refer to the full-size pattern for the pineapple profile, cut the two ends and the bottom and assemble as shown.

You may either paint the napkin holder green and yellow, as we have, or improvise with your own color scheme. A black felt tip pen is used to draw the diamond pattern on the pineapple and to outline the leaves. For a three-dimensional look, use a V-gouge or X-Acto knife to incise the diamond pattern before painting. WWJ

Actual Size Pattern





Here's a weekend project that, when filled with flowers, will help brighten your yard or garden this spring. Also, we found that it can be put to use indoors as a planter or as a magazine or firewood rack.

Since we intend to use our planter out-of-doors, we chose redwood because it has good resistance to moisture and decay. Cedar is another good choice since it has similar characteristics. If your planter is to go out-of-doors, be sure to use plastic resin glue which, unlike white or yellow glue, has good water resistance. Plastic resin glue comes in the form of a brown powder that is mixed with water just before use. It's available at most hardware stores.

The front (A) is made first. Cut ¾ in. thick stock to a width of 10½ and a length of 11¾ in. Referring to the grid pattern, lay out and mark the profile of the tulip design as shown. Bore a ⅜ in. hole at the tulip center, then use a saber saw to cut out the shape. Use a file and sandpaper to smooth the cut edge. Also, at this time, lay out and mark the profile along the top edge of the front. Cut out with a band or saber saw and sand smooth.

Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Front	¾ × 10½ × 11¾	1
B	Side	¾ × 10 × 20	2
C	Bottom	¾ × 10½ × 19¼	1
D	Leg	¾ × 11 × 10⅛	1
E	Handle	¾ × 2 × 40	2
F	Wheel	8¼ dia. × ¾ thick	1

The two sides (B) can be made from two pieces of ¾ in. thick stock measuring 10 in. wide by 20 in. long. Lay out the profile shown in the side view, then cut out and sand.

After cutting the bottom (C) to size, the upper box (consisting of parts A, B and C) can be assembled. Final sand all parts before joining them together with plastic resin glue and galvanized (or stainless steel) finishing nails. Set aside to dry thoroughly.

To make the wheel (F), cut ¾ in. thick stock to 10 in. square, then use a compass to scribe the 8¼ in. diameter circle. Also mark the centerpoint of the five 2 in. diameter circles as shown in the drawing. Use a hole saw or circle cutter to cut out the five circles, then use the band or saber saw to cut the 8¼ in. diameter. Stay just outside the marked line with the band or saber saw blade. Once cut, use a disk sander to smooth the edge exactly to the line.

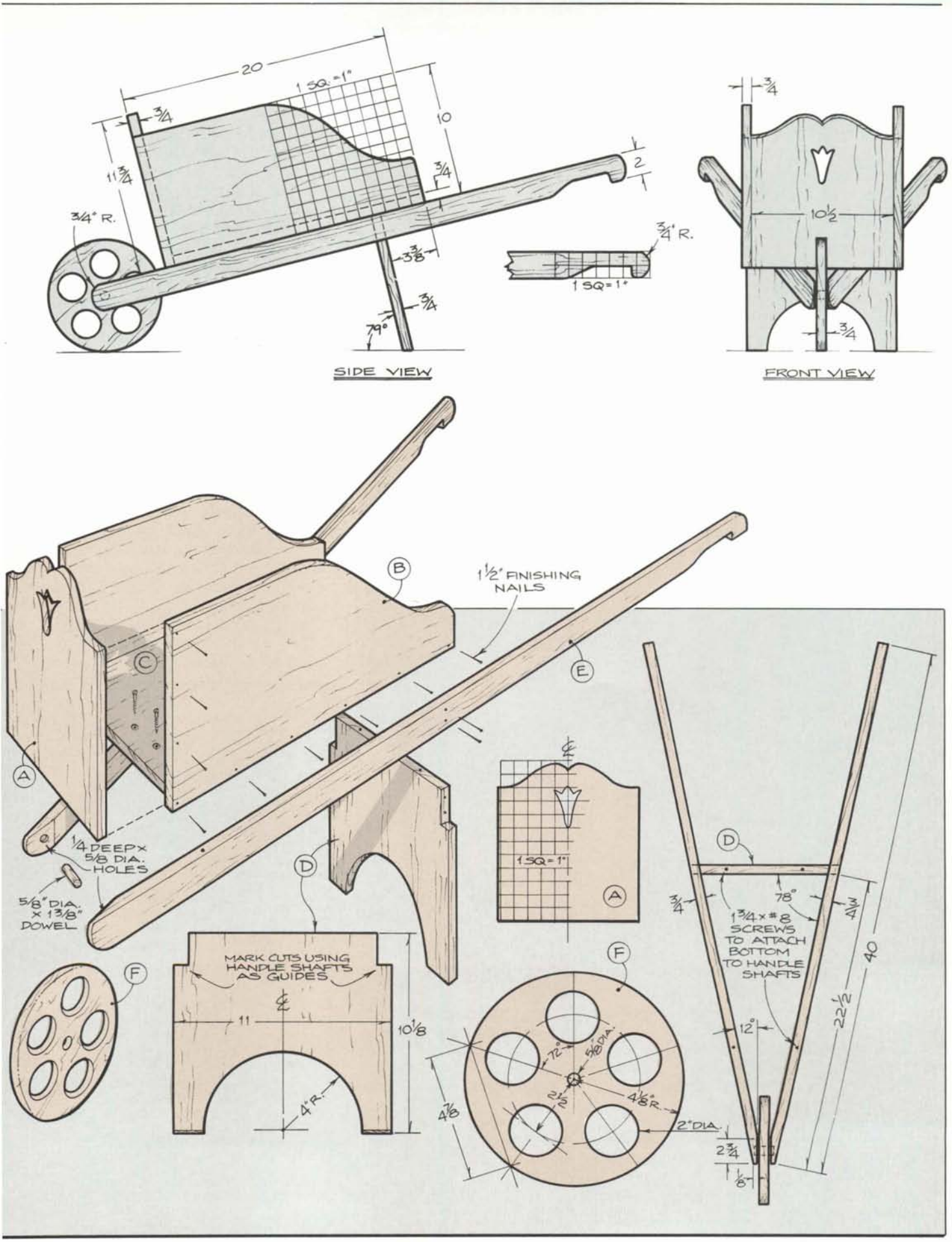
Next, make the leg (D) as shown, notching the upper corners to accept the handles (E). The 12-degree bevel on the front of the handle can be cut with a hand plane.

Final sand the leg, handle, and wheel before assembly. To assemble, first join the wheel to the handles by gluing the ⅝ in. diameter by 1⅜ in. long dowel into the ⅝ in. diameter by ¼ in. deep hole bored in each handle end. Now use glue and 1½ in. long galvanized finishing nails to join the handles to the leg.

The front (A), sides (B), and bottom (C) are now assembled to the handles and leg. A pair of 1¾ in. long by no. 8 flathead stainless steel wood screws are driven into the handle while two more are driven into the top edge of the leg (see top view of wheel, handle and leg). No glue is needed here.

If used outdoors, a couple of coats of spar varnish will provide a durable final finish. Indoors, two coats of a good penetrating oil will suffice. WWJ

Decorative Planter


20
1 SQ. = 1"
3/4
10
11 3/4
3/4
2
3/4" R.
3 3/8
3/4
79°
3/4" R.
1 SQ = 1"
SIDE VIEW
3/4
10 1/2
3/4
FRONT VIEW
B
1 1/2" FINISHING NAILS
E
C
A
1/4 DEEP x 5/8 DIA. HOLES
5/8" DIA. x 1 3/8" DOWEL
D
1 SQ = 1"
A
D
3/4
78°
4 1/4
1 3/4 x #8 SCREWS TO ATTACH BOTTOM TO HANDLE SHAFTS
40
22 1/2
12°
F
MARK CUTS USING HANDLE SHAFTS AS GUIDES
11
10 1/8
4" R.
F
72°
5/8 DIA.
2 1/2
4 1/8" R.
4 7/8
2" DIA.
2 3/4
1/8

Country Vegetable Bin

This handsome vegetable bin is one of the best "easy pine" projects we've seen in a while. The bottom bin is for onions, and the top bin is for potatoes. A heart cutout on either side provides ventilation for the potatoes, and the tulip carving incised on the front lends the piece an authentic country flavor.

The entire piece (except the plywood back) is constructed of ¾ in. thick common pine, which is available at lumber and building supply centers. If you don't want to edge-glue stock to achieve the widths required (see bill of materials), you can purchase pre-edge-glued solid pine material instead.

Start by cutting the sides (A) to overall length and width. Use the dado head to establish the ¾ in. by ¼ in. deep groove for the bottom (B), and the ½ in. by ½ in. rabbet along the inside back edge to accept the back. The ¾ in. by ¼ in. stopped groove for the shelf (C) can be cut with the router using a straight bit. Bevel the top end of the sides as shown at 10 degrees to provide the top slant, and use a saber saw to cut the 1 in. radius profile at the bottom edge (see side view), and to make the heart cutout (drill a starter hole for the saber saw blade).

Now cut the bottom (B), shelf (C), door stop (D), front (E), lower door (F), and base apron (G) to overall length and width. Note that a ⅜ in. radius is applied to both edges of the door and to the bottom edge of the front. A ½ in. radius is applied to the top edge of the base apron, and the top edge of the front is beveled at 10 degrees to match the bevel on the sides. The tulip may be incised on the front either now or after assembly. To carve the tulip, first refer to the grid pattern and transfer a ½ in. grid and a pencil sketch of the tulip to the front. Our carving was made entirely with an X-Acto brand knife (we used their blade no. 19), but a sharp-pointed pen knife could be used as well. Cuts should be made with the grain to avoid tearing or chipping. Several light cuts pared to the line are usually more effective than attempting to complete the deeper cuts with one pass, especially if you are not familiar with this type of carving. The photo detail shows which areas to incise.

Assemble the bin as shown, using glue and finishing nails. Cut and fit the plywood back (J); add the top (H) and top door (I). All finishing nails should be set and filled. The upper edge of the top door is beveled at 10 degrees; the lower edge is radiused as shown. Mount the top door, drill for the pivot dowels, mount the lower door, and install a magnetic catch (available at hardware stores) to keep it closed.

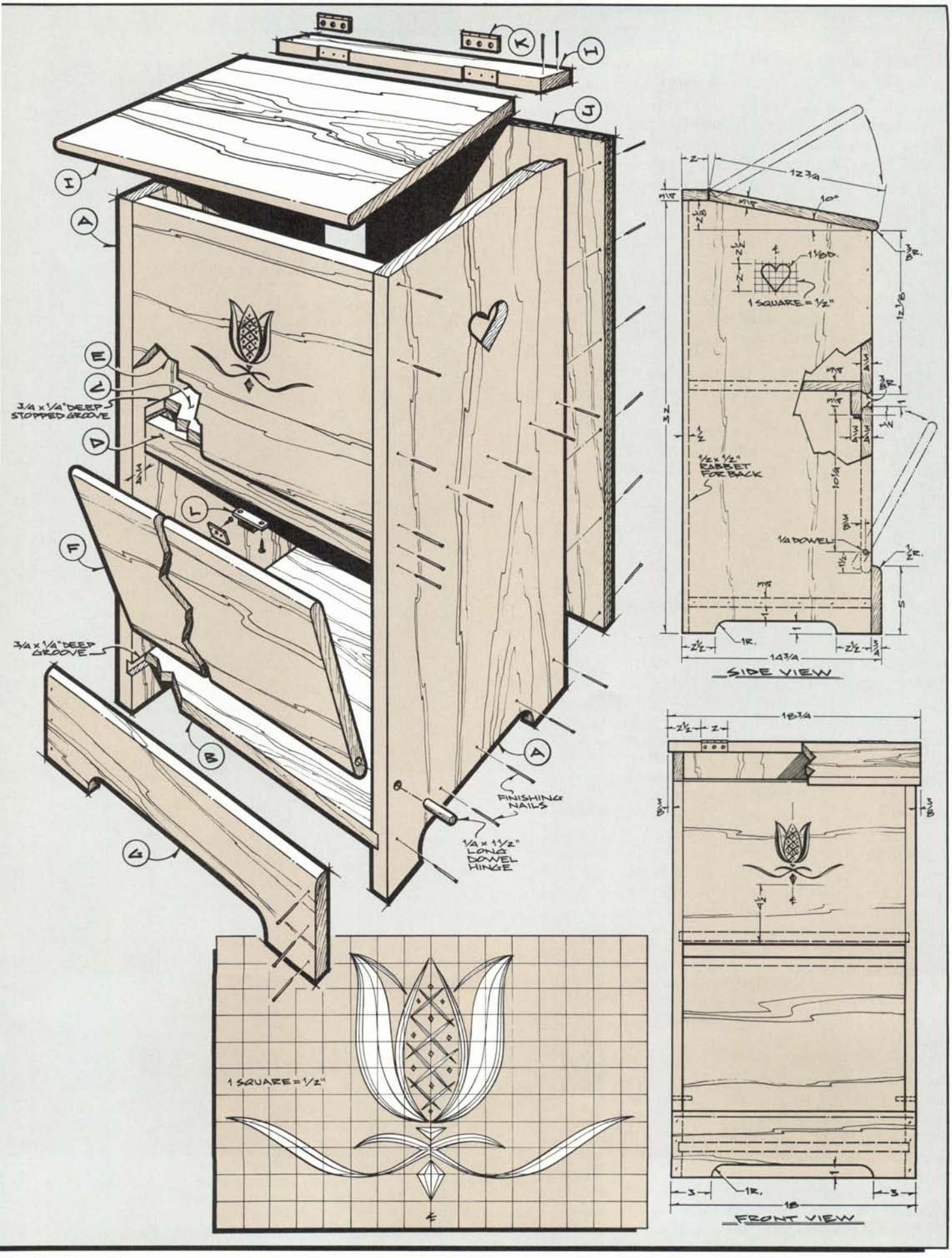
After sanding, we finished our bin with a cherry stain followed by two coats of penetrating oil. WWJ

Bill of Materials
(all dimensions actual)

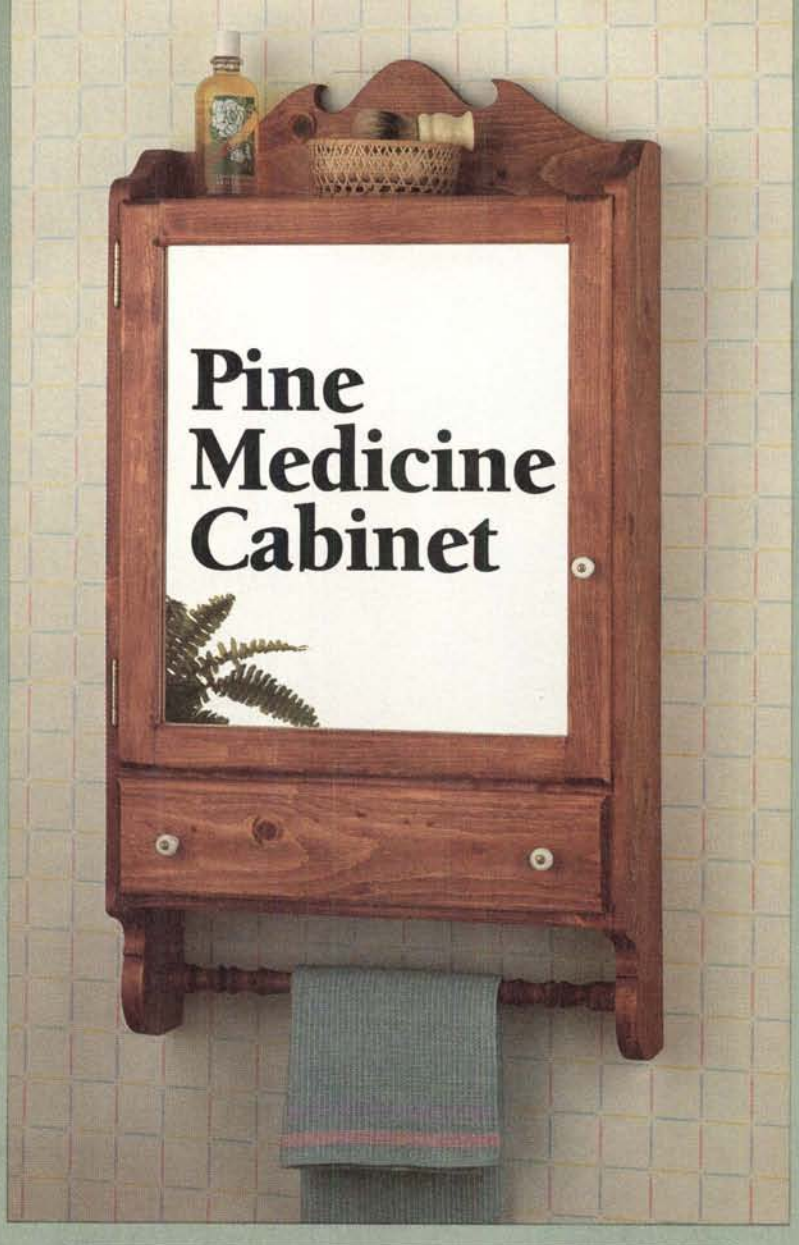
Part	Description	Size	No. Req'd.
A	Side	¾ × 14 × 32	2
B	Bottom	¾ × 13½ × 17	1
C	Shelf	¾ × 12¾ × 17	1
D	Door Stop	¾ × 1¾ × 16½	1
E	Front	¾ × 12⅛ × 16½*	1
F	Lower Door	¾ × 12¼ × 16½	1
G	Base Apron	¾ × 5 × 18	1
H	Top	¾ × 2 × 18¾	1
I	Top Door	¾ × 12¾ × 18¾	1
J	Back	½ × 17½ × 32	1
K	Hinge	1½ × 2	1 pair
L	Magnetic Catch	as shown	1

*Allow slight extra width for beveled top edge.

Note: Our bin is sized roughly to counter height. Overall height, width and depth could be scaled down.


K
H
J
I
A
E
C
3/4 x 1/4" DEEP STOPPED GROOVE
D
L
F
3/4 x 1/4" DEEP GROOVE
B
A
FINISHING NAILS
1/4 x 1 1/2" LONG DOWEL HINGE
G
1 SQUARE = 1/2"
12 3/4
10°
1 1/8 D.
1 SQUARE = 1/2"
12 1/8
32
1/2 x 1/2" RABBET FOR BACK
10 1/4
1/4 DOWEL
5
1R.
2 1/2
14 3/4
SIDE VIEW
18 3/4
2 1/2
2
1R.
3
3
18
FRONT VIEW

Pine Medicine Cabinet



A pine medicine cabinet is just the right detail to complement the home featuring a country decor. This project is relatively easy to build. If you don't have a lathe, dowel stock could be substituted for the turned towel bar (G).

Start by getting out stock for the cabinet carcase. Refer to the grid patterns for the curved profiles of the sides (A) and top (E). These profiles are cut with the band saw or with the saber saw after the dadoes for the upper/lower shelves (B) and bottom (D) have been cut. Use the router equipped with a 3/8 in. rabbeting bit to rabbet the sides as shown to accept the top and the back (F). Bore the 1/4 in. diameter shelf pin holes and the 1/4 in. deep by 7/8 in. diameter holes for the towel bar (see side elevation for the hole location), and glue and assemble the carcase. The back should help to square up the carcase if it is mounted now. Important: The towel bar (see turning detail) must be made and in place for the assembly, since it cannot be added later.

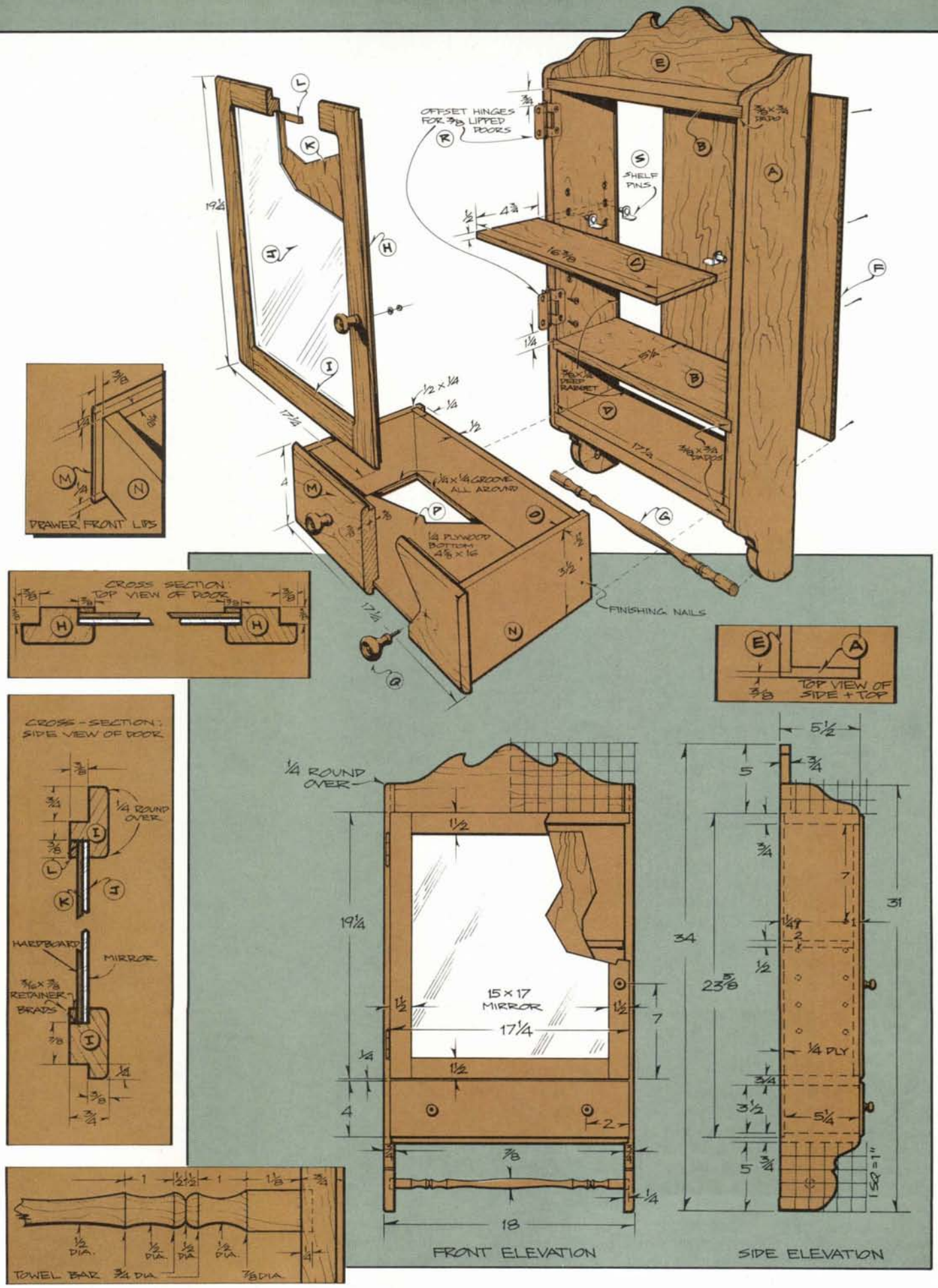
To make the door, first construct a simple half-lapped frame consisting of the stiles (H) and rails (I). Next, use the router equipped with a bearing-guided 3/8 in. rabbeting bit, and cut a 3/8 in. by 3/8 in. rabbet around the inside of the door frame to accept the mirror (J), mirror backing (K) and retainer (L). Use a chisel to square the corners. Again using the router, but this time equipped with a 1/4 in. radius round-over bit, round over both the inside and the outside perimeters of the door frame front. Then use the table saw dado head to cut the 3/8 in. deep lips as indicated around the door perimeter. Note that while this lip will be 3/8 in. wide on the door sides, it is 3/4 in. wide at the top of the door, and 1/4 in. wide on the bottom. Mount the mirror and the backing (a section of 3/16 in. paneling or hardboard), and tack the retainer molding in place to secure them. This system permits future replacement of the mirror, if necessary. Cut the adjustable shelf (C) to size, and hang the door with standard 3/8 in. recessed cabinet hinges (R). The hinges, shelf pins (S), and the porcelain knobs (Q) should be available at your local hardware store.

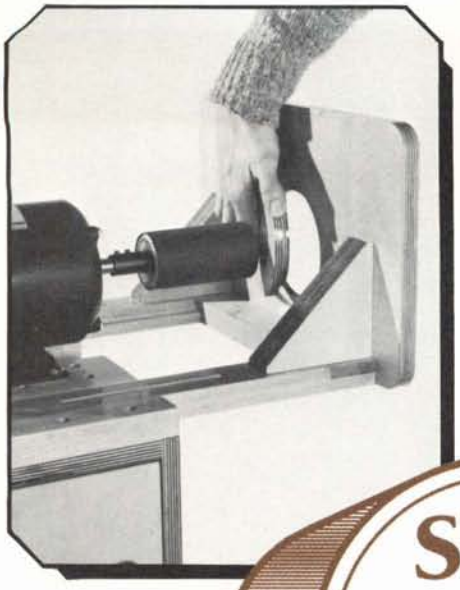
The drawer (parts M, N, O, P) is made as shown. Round the perimeter of the drawer front with the 1/4 in. radius round-over bit, and use the table saw dado head to cut the various rabbets and grooves in the drawer front, sides and back. Assemble the drawer with glue and finishing nails as shown.

After final sanding, we wiped on a light stain (take care not to darken the wood too much) and finished the cabinet with two generous coats of Watco Danish Oil. WWJ

Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Side	3/4 × 5 1/2 × 31	2
B	Upper/Lower Shelf	3/4 × 5 1/4 × 17 1/4	2
C	Adjustable Shelf	1/2 × 4 3/4 × 16 3/8	1
D	Bottom	3/4 × 5 1/2 × 17 1/4	1
E	Top	3/4 × 5 × 17 1/4	1
F	Back	1/4 × 17 1/4 × 23 5/8	1
G	Towel Bar	7/8 in. dia. × 17 in. long	1
H	Door Stile	3/4 × 1 1/2 × 19 1/4	2
I	Door Rail	3/4 × 1 1/2 × 17 1/4	2
J	Mirror	15 × 17	1
K	Mirror Backing	15 × 17	1
L	Retainer	3/16 × 3/8 stock	65 in.
M	Drawer Front	3/4 × 4 × 17 1/4	1
N	Drawer Side	1/2 × 3 1/2 × 5 1/4	2
O	Drawer Back	1/2 × 3 1/2 × 16	1
P	Drawer Bottom	1/4 × 4 5/8 × 16	1
Q	Knob	3/4 in. dia. porcelain	3
R	Hinge	Offset cabinet type for 3/8 recessed doors (brass finish)	1 pair
S	Shelf Pins	For 1/4 in. dia. hole	4


OFFSET HINGES FOR 3/8 LIPPED DOORS
SHELF PINS
3/8 x 3/4 BRADS
3/8 x 3/4 BRADS
1/2 x 1/4
1/4 x 1/4 GROOVE ALL AROUND
1/4 PLYWOOD BOTTOM 4 3/8 x 16
FINISHING NAILS
DRAWER FRONT LIPS
CROSS SECTION: TOP VIEW OF DOOR
TOP VIEW OF SIDE + TOP
CROSS-SECTION: SIDE VIEW OF DOOR
1/4 ROUND OVER
HARDBOARD
MIRROR
3/16 x 3/8 RETAINER
BRADS
1/4 ROUND OVER
15 x 17 MIRROR
FRONT ELEVATION
1/4 PLY
SIDE ELEVATION
TOWEL BAR 3/4 DIA
7/8 DIA



Shop Drum Sander

An inflatable drum sander is the kind of tool that woodworkers often wish they had, and once they get, wonder how they ever did without.

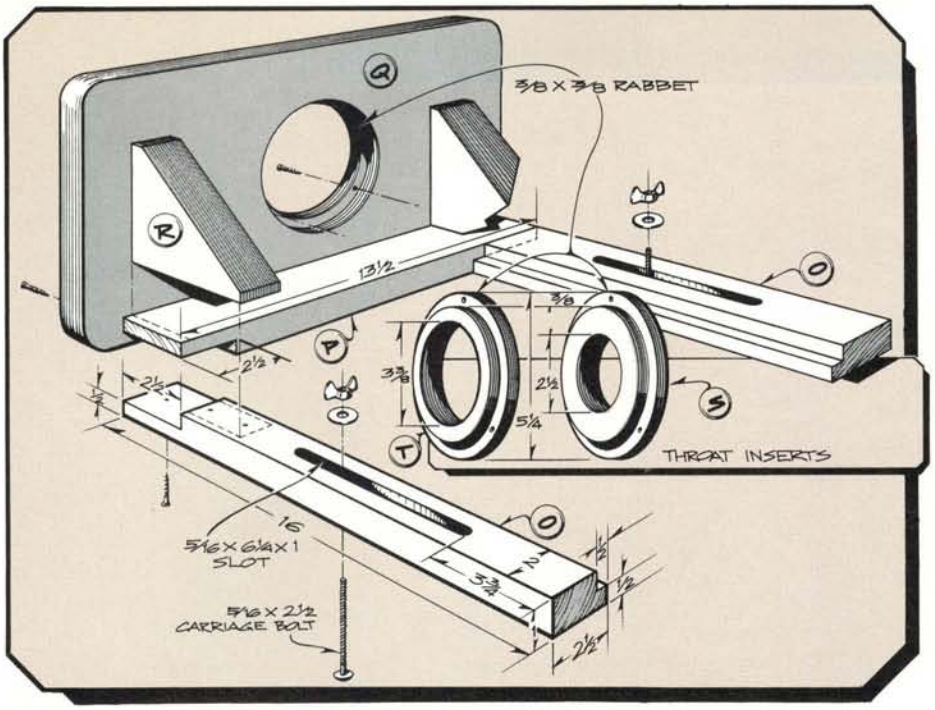
Since we wanted a durable machine, we decided to use only top quality parts and materials. These included the choice of Baltic birch plywood and the Delta motor, which comes pre-wired as shown. With three sizes of inflatable drums, the total cost for our unit was about $300. Of course, you could knock over $100 of this cost off if you have an old but functional ½ hp electric motor.

The greatest single advantage of inflatable drum sanders is their versatility. Depending on air pressure, the individual drums can adapt to a variety of jobs and are especially useful for sanding curved or contoured surfaces. The abrasive sleeves are available in 60, 100, and 150 grits, and range in price from $7.00 for a pack of five for the 2 in. by 4 in. size to $10.70 for a five pack of the 4 in. by 5½ in. size.

All the plywood parts can be cut from a single 5 ft. by 5 ft. sheet of Baltic birch plywood as shown in the cutting diagram. Baltic birch is sold in 5 ft. by 5 ft. sheets and can be ordered by your local lumber yard from Allied International, 490 Rutherford Ave., Boston, MA 02129. Because of its multiple crossbanded laminations, Baltic birch is particularly strong and stable and has an attractive edge detail. Of course, you may substitute an ordinary ¾ in. thick cabinet grade birch plywood for the Baltic birch, if you prefer.

Begin by cutting all the plywood parts to size. Forstner bits are used to bore the 1 in. diameter finger hole in the door (H), the 1⅛ in. diameter cord hole in the back, the 1½ in. diameter hole in the top, and the ½ in. diameter switch hole and 1½ in. diameter switch recess in the side. Notch the back edge of the top shelf (L) for the cord, and bore the various screw holes in the top and bottom (F). Refer to the top view for the layout of the base (D), and miter the ends of A, B, and C as shown to reflect these angles. Bore through A, B, and C and mount them to D.

The cleat parts I and J are pre-mounted with countersunk screws to the sides, and parts K are screwed in place to the top and bottom before the sides, top and bottom are final assembled with screws inserted through parts F and into the side and end cleats as shown. Lastly, add the back. The assembled case is now screwed to the base.



Next, cut stock for the end and center ways (M and N), for the runners (O) and for the cross member (P). Rabbet parts N and O, half-lap parts O and P, and slot parts O as indicated. At this time, also make the fence (Q), gussets (R) and throat inserts (S, T). All these parts are cut from the scrap remaining from your 5 ft. by 5 ft. sheet of birch plywood. Simply laminate two pieces of the ¾ in. ply to achieve the 1½ in. gusset thickness. The throat inserts' 5¼ in. outside diameters are cut out on the band saw, then disk sanded smooth, while the inner diameters of the fence and throat insets are established with a fly cutter. The router and a ⅜ in. rabbeting bit are now used to cut the ⅜ in. by ⅜ in. rabbets as shown. These rabbets enable the inserts to be fit into the fence to accommodate different size drums. No insert is used with the largest 4 in. by 5½ in. drum, while the part S insert accommodates the 2 in. by 4 in. drum, and the part T insert accommodates the 2¾ in. by 5½ in. drum. Note that the inserts are mounted with three screws countersunk through the front of the fence.

It is absolutely essential that the ways and runners be mounted properly if the adjustable fence is to operate as intended. We started by drawing lines across the top (F) with a T-square to locate the ways. The ways are then drilled, countersunk, and screwed (but not glued) in place. The fact that they are not glued is important since this permits some fine-tuning of their location later if necessary. Now insert the runners, and temporarily screw the half-lapped cross member in place. Check that the runners slide easily back and forth, and then glue and screw the cross member to the runners. The fence and gussets are now added to complete the fence assembly. Carriage bolts (5/16 in. by 2½ in.) and wing nuts are used to lock the fence assembly in the desired position. The motor is now fastened securely as indicated with 5/16 in. by 2½ in. carriage bolts inserted through the center ways and top. Thread the switch wire behind the top shelf, mount it (on/off plate and retainer nut are included with motor kit) on the side as shown, and run the plug wire through the back.

The various inflatable sanding drums are mounted to the motor with a ⅝ in. - 11 threaded arbor (V), sized to fit a ½ in. diameter motor shaft. Of course, if you choose to purchase only one size sanding drum (we would recommend the large size), there is no need to cut the additional throat inserts. The sanding drums can be inflated either with a bicycle pump or with a compressor if you have one in your shop.

The front door can now be mortised for the hinges (X). Round over the finger pull hole in the door with a ¼ in. radius router bit (bearing guided), and add the magnetic catch (Z) as shown. The use of three cushion glides (Y) makes the sander easy to level on uneven floors, although a four-point stance (the cushion glide set comes with four) is preferred if you have a level floor. The hinges and magnetic catch should be available at your local hardware store.

We finished our sander with a marine spar varnish, which is hard and durable, although polyurethane could be used as well. WWJ

(continued on next page)

Bill of Materials
(all dimensions actual)

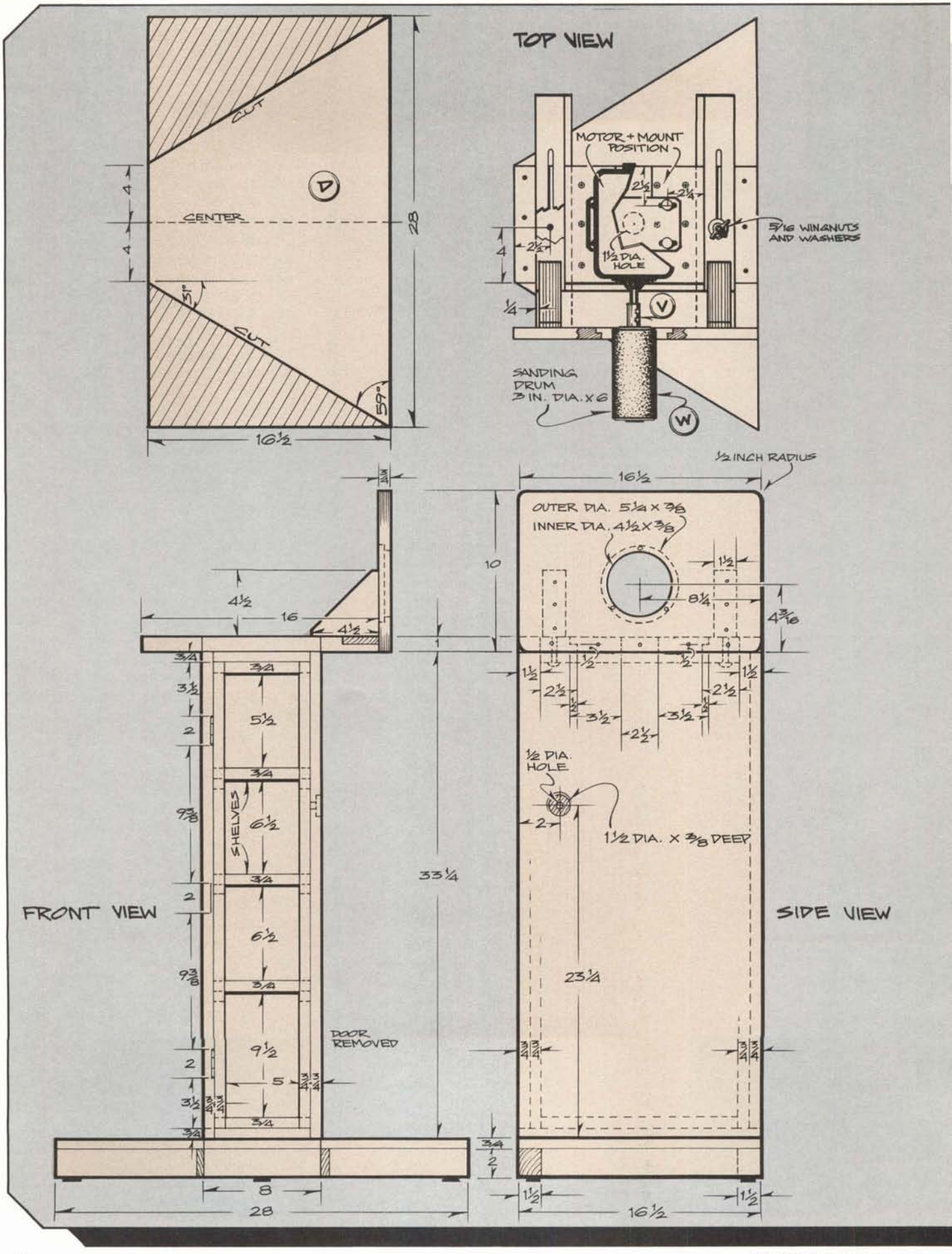
Part	Description	Size	No. Req'd.
A	Base Side	1½ × 2 × 18⅜	2
B	Base Front	1½ × 2 × 9¾	1
C	Base Back	1½ × 2 × 24½	1
D	Base	¾ × 16½ × 28	1
E	Side	¾ × 16½ × 33¼	2
F	Top/Bottom	¾ × 6½ × 16½	2
G	Back	¾ × 6½ × 31¾	1
H	Door	¾ × 6½ × 31¾	1
I	Post Cleat	¾ × ¾ × 31¾	4
J	Side Cleat	¾ × ¾ × 13½	10
K	End Cleat	¾ × ¾ × 5	4
L	Shelf	¾ × 6½ × 15	3
M	End Way	1 × 1½ × 8	2
N	Center Way	1 × 3½ × 8	2
O	Runner	1 × 2½ × 16	2
P	Cross Member	1 × 2½ × 13½	1
Q	Fence	¾ × 10 × 16½	1
R	Gusset	1½ × 4½ × 4½	2
S	Throat Insert	for 2 × 4 drum	1
T	Throat Insert	for 2¾ × 5½ drum	1
U	Motor	½ hp*	1
V	Arbor (⅝-11 thread)	for ½ dia. motor shaft**	1
W1	Drum Sander (sm.)	2 × 4 × ⅝-11 internal thread**	1
W2	Drum Sander (med.)	2¾ × 5½ × ⅝-11 internal thread**	1
W3	Drum Sander (lg.)	4 × 5½ × ⅝ -11 internal thread**	1
X	Hinges	1½ × 2 brass finish	3
Y	Cushion Glide	1¼ dia.***	3
Z	Magnetic Catch	1 in. as shown	1

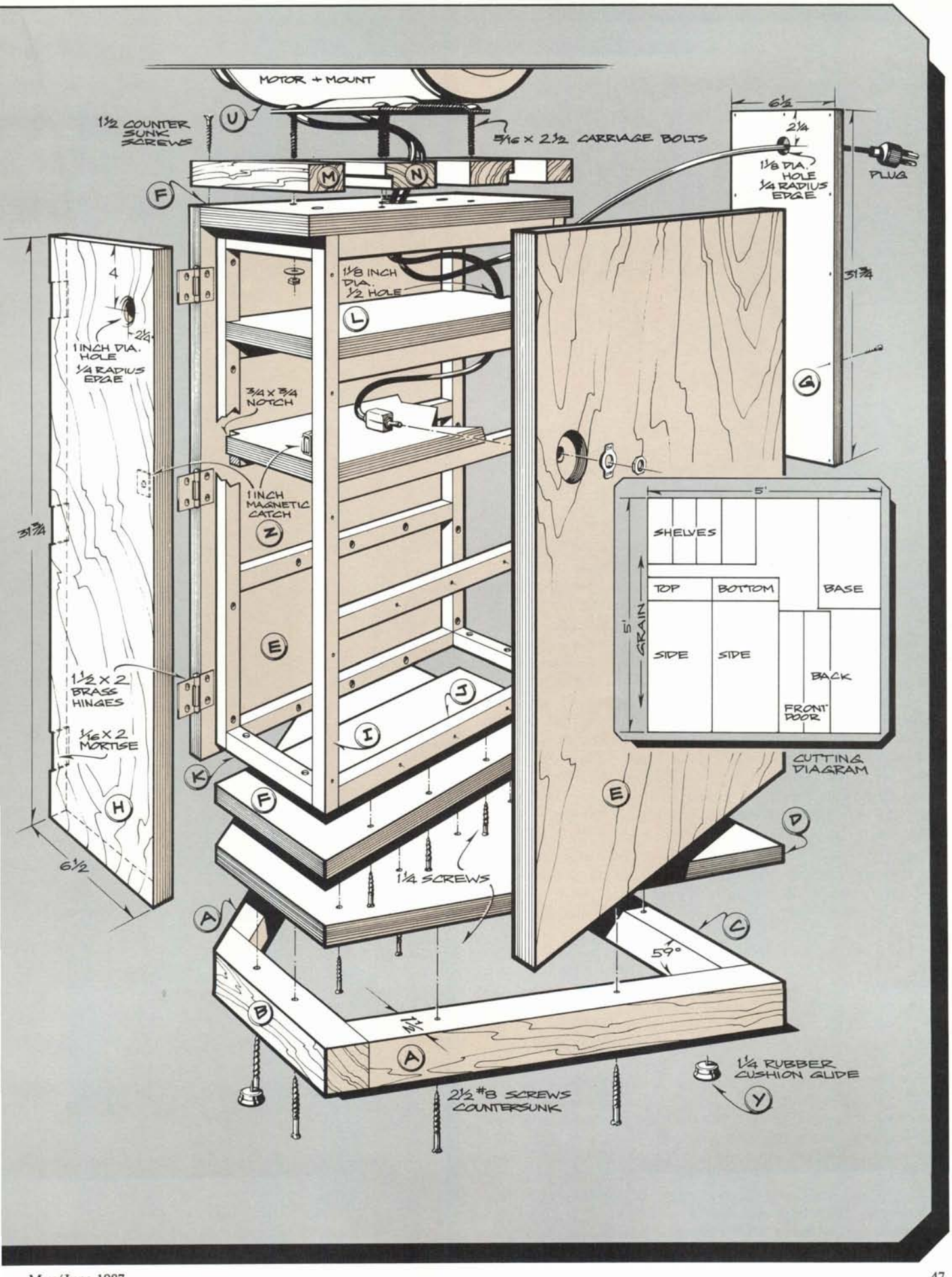
*We used Delta no. 62-142, which is complete with switch and cord as shown. Cost is $125. For nearest dealer, write to Delta International Machinery Co., 246 Alpha Drive, Pittsburgh, PA 15238.

**Arbor and drum sanders available from the Fine Tool Shops, Inc., P.O. Box 7091, Portsmouth, NH 03801.

Arbor — part no. 400-0400	$ 3.00
Sm. Drum Sander — part no. 500-1933	$24.95
Med. Drum Sander — part no. 500-1934	$29.95
Lg. Drum Sander — part no. 500-1935	$34.95

***Available from: The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374. Order part no. C1704, cost is $2.30.


TOP VIEW
CUT
CENTER
28
16½
51°
59°
D
MOTOR + MOUNT POSITION
2½
2¼
5/16 WINGNUTS AND WASHERS
1½ DIA. HOLE
¼
V
SANDING DRUM 3 IN. DIA. X 6
W
½ INCH RADIUS
OUTER DIA. 5½ X ⅜
INNER DIA. 4½ X ⅜
10
8¼
4⅜
½ DIA. HOLE
1½ DIA. X ⅜ DEEP
23¼
33¼
FRONT VIEW
SIDE VIEW
SHELVES
DOOR REMOVED
4½
16
5½
6½
9⅜
9½
5
3½
8


MOTOR + MOUNT
1½ COUNTER SUNK SCREWS
U
5/16 × 2½ CARRIAGE BOLTS
M
N
F
6½
2¼
1⅛ DIA. HOLE ¼ RADIUS EDGE
PLUG
31¾
G
4
2¼
1 INCH DIA. HOLE ¼ RADIUS EDGE
31¾
1⅛ INCH DIA. ½ HOLE
L
¾ × ¾ NOTCH
1 INCH MAGNETIC CATCH
Z
E
1½ × 2 BRASS HINGES
1/16 × 2 MORTISE
H
6½
K
I
J
5'
SHELVES
TOP
BOTTOM
BASE
5' GRAIN
SIDE
SIDE
BACK
FRONT DOOR
CUTTING DIAGRAM
F
E
D
1¼ SCREWS
A
C
59°
B
1½
A
2½ #8 SCREWS COUNTERSUNK
1¼ RUBBER CUSHION GLIDE
Y

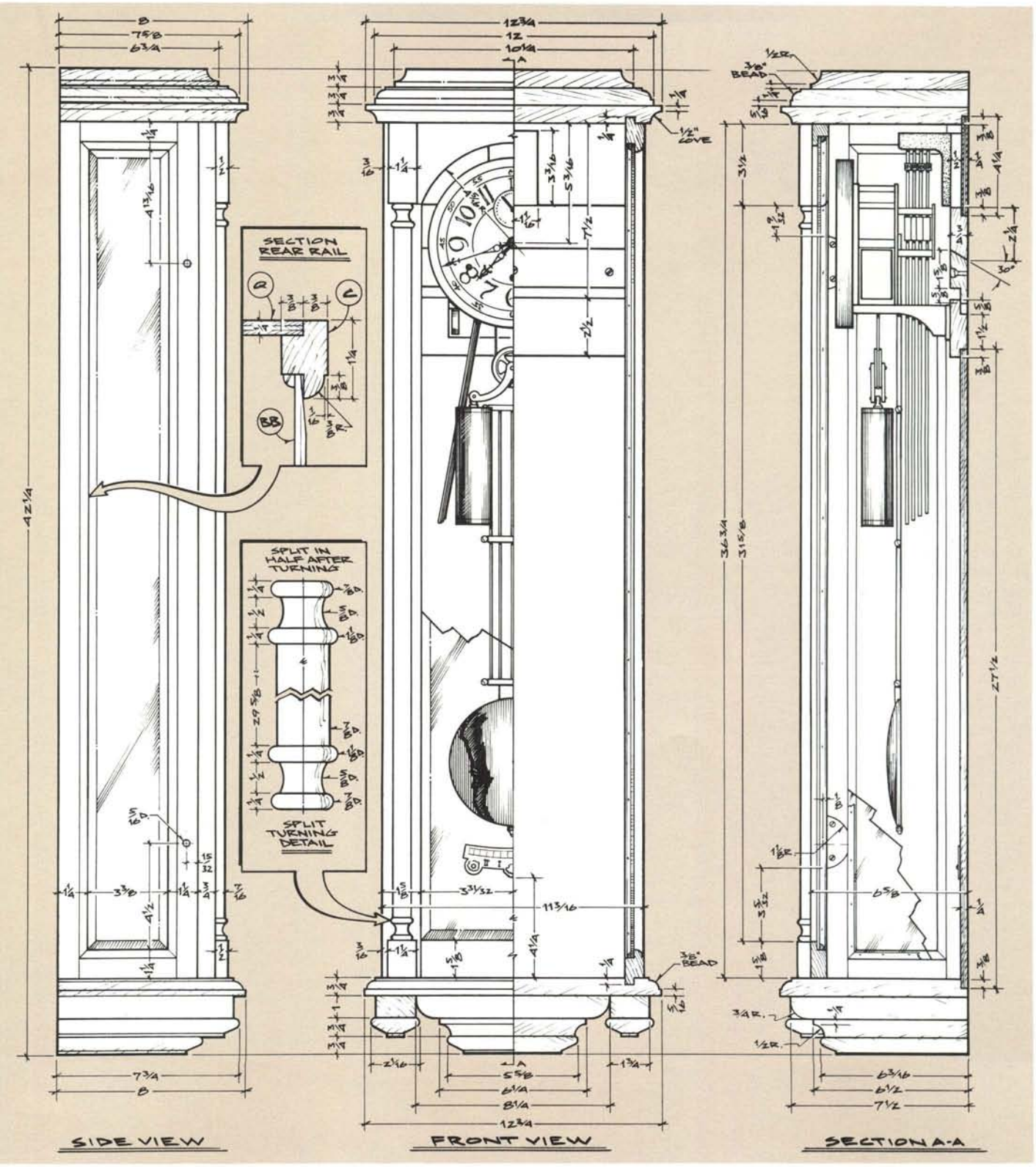
Vienna Regulator Clock

The Vienna regulator clock was and still is considered to be one of the finest classic European clock designs. The style was developed and perfected in Austria and Germany during the 19th century, and has changed little over the years. This particular model is representative of a traditional Vienna regulator from the 1850's.

With thick beveled glass on the front and both sides, the Vienna regulator case is intended to fully expose the handsome solid brass movement, weight shells, and pendulum that characterized this design. While the model pictured was crafted in cherry, walnut would be an excellent alternate choice. We have arranged with the Mason and Sullivan Company to provide a single kit including all the hardware, glass, and movement parts that you will need to build the clock exactly as shown (see bill of materials). Although the specified hardware, glass, and movement represent an expense of about $400, this cost should be balanced by the fact that the identical finished clock retails for about $1,200.

The construction of the clock case involves basic woodworking skills, however because of the need for precision, this is a project that is best undertaken by those with a moderate to advanced level of experience. It is strongly recommended that the hardware, glass, and movement (see bill of materials) be purchased *before* beginning the assembly to insure proper fit of all the parts.

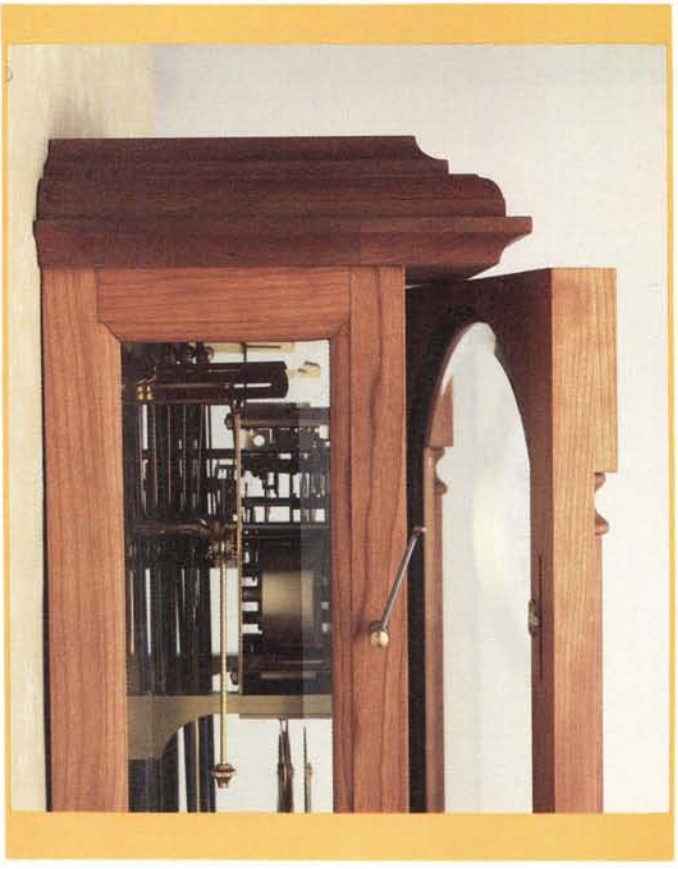
The best method to build the case is to construct the individual assemblies of the side frames first. The stiles (A, B, C) and rails (D) are of a mitered molded type. First, use a ⅜ in. radius ball bearing guided router bit to apply the ⅜ in. radius detail, then cut the ⅜ in. by ⅜ in. rabbet for the glass. Tenon the ends of D and mortise A, B, and C to fit. Note that although the tongue cut on parts D which fits into the corresponding groove cut in parts F and E is stepped on the ends, this in no way affects the strength of the construction. Parts A and B are identical except in the hardware application, where A is mortised for the hinges, and B is mortised for the latches. After mitering the bead as shown (note that the stile bead must be mitered *and* cut back to accept the rails), glue and assemble the side frames. Now cut the parts for the base (E), top (F), upper top (G), crown (H), pediment base (I), lower pediment (J), pediment molding (K), base blocks (L) and base molding (M). A ½ in. bearing guided cove cutter is used to profile parts H, F, and J, while a ⅜ in.

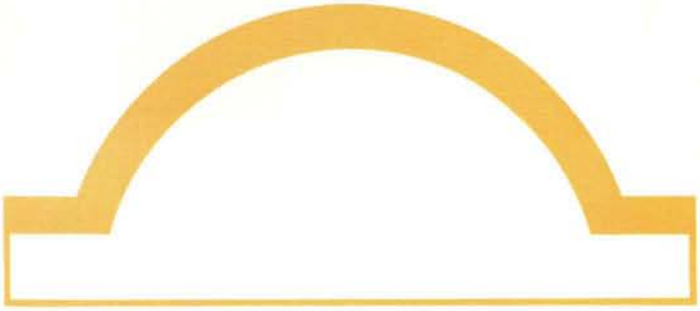


beading bit molds the edges of parts E and G. A ¾ in. radius round-over is applied to part I, and the simple four-step process shown in the molding detail is used to establish the pediment moldings on parts K and M. Don't forget to rout the ⅜ in. by ¼ in. grooves in the base and top as shown to accept the tongue on parts D.

Now assemble the case. Begin by mounting the base and top to the side frame assemblies. Bore, countersink and screw parts E and F to reinforce the tongue-and-groove glue joint. Screw part G to part H as shown, and then mount to part F. No glue is needed here, but all parts should be final sanded before assembly. The lower moldings and pediments are screwed in place, one over the other, as shown. *Drill* and countersink for all the screws, keep all edges flush at the back as indicated, and plug the screw holes in parts K and M.

(continued on next page)





Next, using the router equipped with a ⅜ in. rabbeting bit, rabbet the case back to accept the various back and hanger parts. Square the rabbet corners with a chisel. Now cut and fit the lower and upper back (Q and R), the case back rail (N), case hanger (O), and wall hanger (P). Note that the case hanger and wall hanger are both beveled at 30 degrees. When complete, the case is lowered onto part P, which is mounted securely to the wall with toggle bolts or other screw type fasteners. The case back rail and case hanger are both glued and screwed in place, but the upper and lower back are secured only with screws. All these parts are best final mounted *after* the side glass has been fixed in place to provide clear access through the back for a drill.

The door, consisting of parts T, U, V, and W, is made as shown in the door tenon detail. Note that tenons on the ends of the upper and lower door rails fit into corresponding mortises in the stiles. The ⅜ in. rabbeting bit is used to cut the ⅜ in. by ½ in. deep rabbet to accept the glass in the door rails and stiles. You will need several passes to achieve the ½ in. depth. Make certain that you understand the door construction, and the fact that stiles T and U must be notched (see exploded view) to receive the top rail, before laying out and cutting the door parts. Assemble the door frame, and cut the upper and lower stile blocks (X, Z). The stile turning (Y) is a simple split turning, if you have access to a lathe. If not, the split turnings can be ordered from the Mason and Sullivan Company (see bill of materials for address, order part no. 2247). Be sure to specify either cherry or walnut. The cost is $6.95 per piece (two required). The stile blocks and split turnings are located and glued in place. *Note:* The ⅛ in. by ⅜ in.

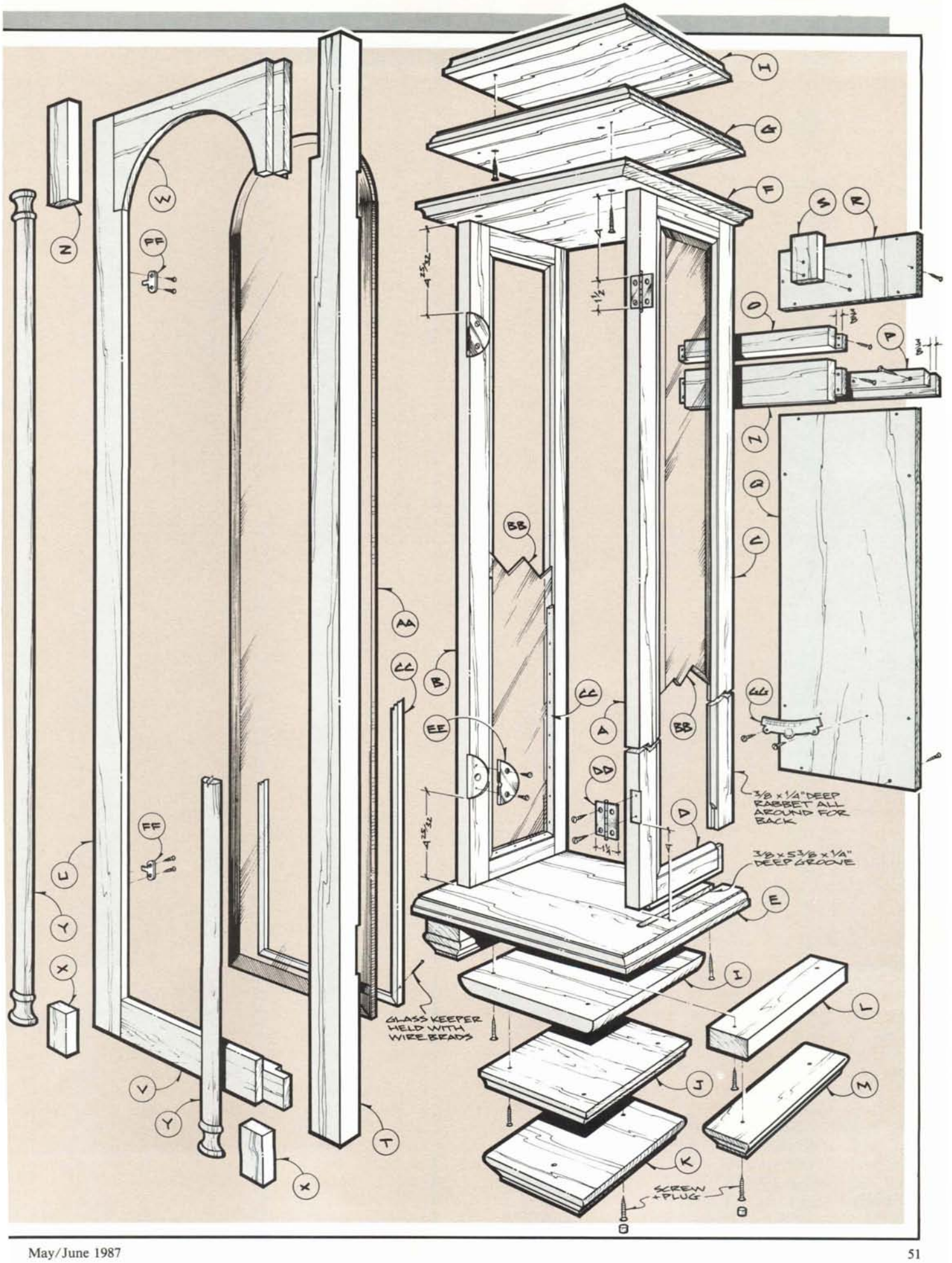
(continued on page 52)

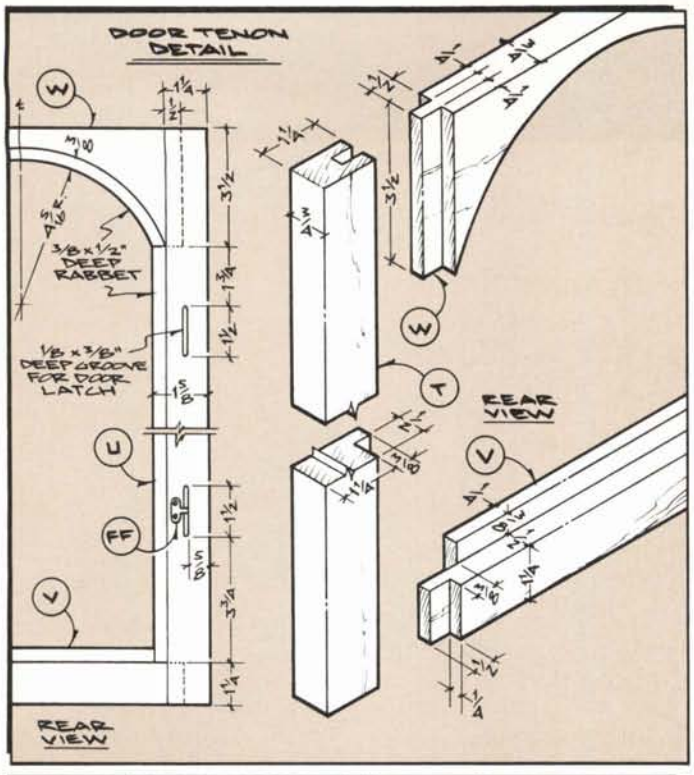
Bill of Materials
(all dimensions actual)

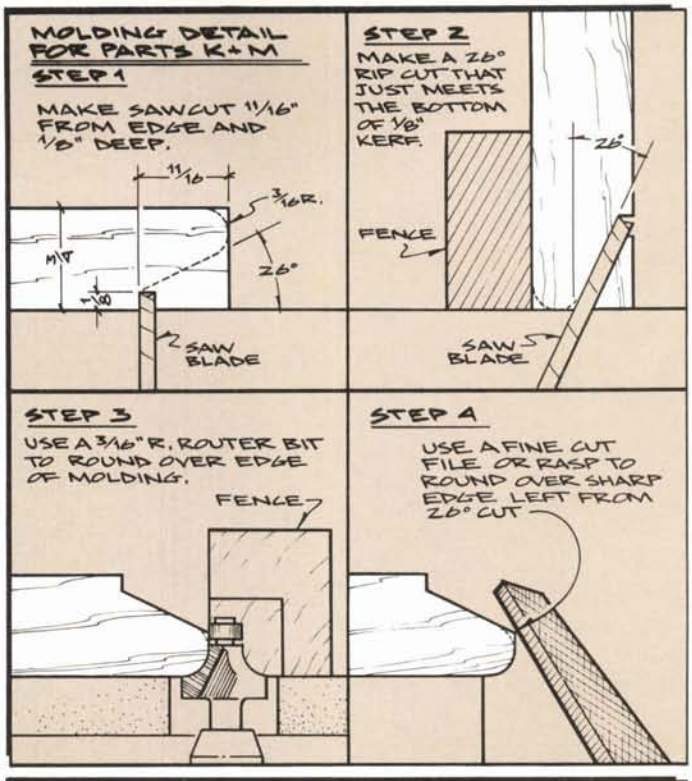
Part	Description	Size	No. Req'd.
A	Right Side Front Stile	¾ × 1¼ × 36¾	1
B	Left Side Front Stile	¾ × 1¼ × 36¾	1
C	Rear Stile	¾ × 1¼ × 36¾	2
D	Side Rail	¾ × 1½ × 4⅞*	4
E	Base	¾ × 8 × 12¾	1
F	Top	¾ × 8 × 12¾	1
G	Upper Top	¾ × 7⅝ × 12	1
H	Crown	¾ × 6¾ × 10¼	1
I	Pediment Base	1 × 7½ × 8¼	1
J	Lower Pediment	¾ × 6½ × 6¼	1
K	Pediment Molding	¾ × 6 3/16 × 5⅝	1
L	Base Blocks	1 × 1¾ × 7½	2
M	Base Molding	¾ × 2 1/16 × 7¾	2
N	Case Back Rail	¾ × 2½ × 10 7/16	1
O	Case Hanger	¾ × 2¼ × 10 7/16	1
P	Wall Hanger	¾ × 2¼ × 10 7/16	1
Q	Lower Back	¼ × 10 7/16 × 27½	1
R	Upper Back	¼ × 10 7/16 × 4¼	1
S	Chime Spacer	½ × 2⅛ × 3 3/16	1
T	Door Stile Right	¾ × 1⅝ × 36¾	1
U	Door Stile Left	¾ × 1⅝ × 36¾	1
V	Lower Door Rail	¾ × 1⅝ × 9 11/16*	1
W	Upper Door Rail	¾ × 3½ × 9 11/16*	1
X	Lower Stile Block	½ × 1¼ × 1⅝	2
Y	Stile Turning	see detail	split
Z	Upper Stile Block	½ × 1¼ × 3½	2
AA	Door Glass (beveled)	8⅝ × 34 1/16**	1
BB	Side Glass (beveled)	4 1/16 × 35**	2
CC	Keeper Strip	¼ × ¼**	20 ft.
DD	Hinge	1¼ × 1½**	2
EE	Latch	as shown**	2
FF	Catch	as shown**	2
GG	Regulator Plaque	1½ × 3⅝ brass**	1
HH	Chimes	Westminster**	1
II	Movement	solid brass, cable drive**	1
JJ	Hands	as shown**	3
KK	Pendulum	5½ in. diameter brass**	1
LL	Lead Weight	as shown**	2

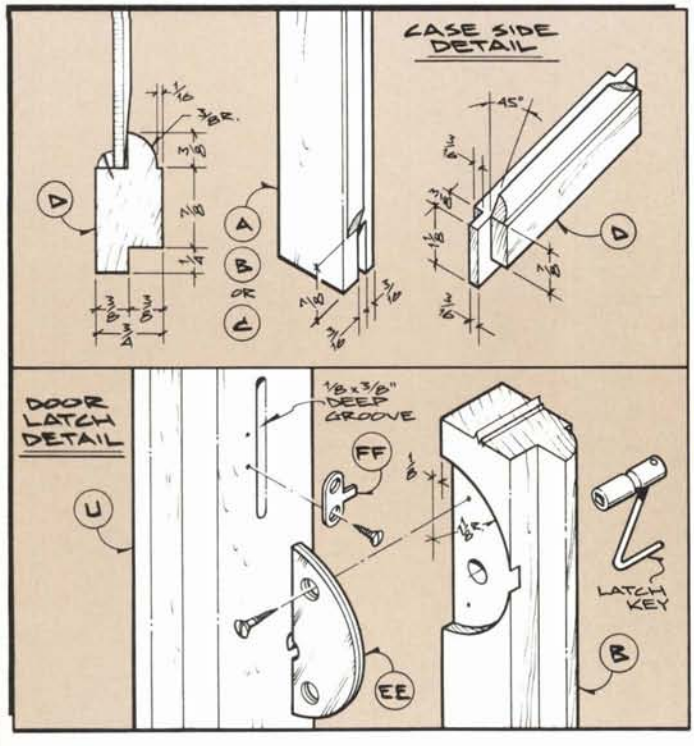
*Includes tenons.

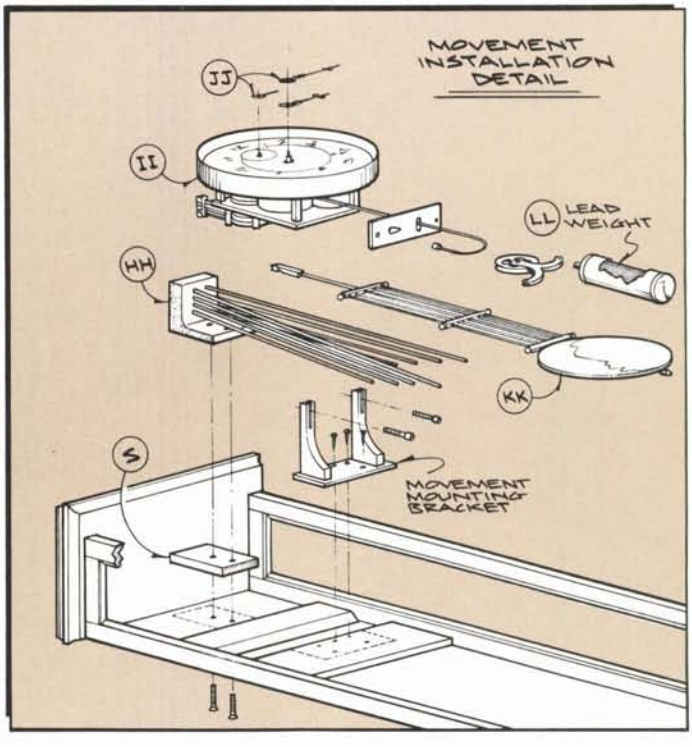
**Parts AA - LL are all available as a kit from Mason & Sullivan, 586 Higgins Crowell Road, Dept 3997, West Yarmouth, MA 02673. Order part no. CO572X, current price is $399.00.


H
G
F
S
R
O
P
N
Q
C
W
FF
BB
AA
CC
B
EE
A
DD
D
E
I
L
J
M
K
U
Y
X
V
T
3/8 x 1/4" DEEP RABBET ALL AROUND FOR BACK
3/8 x 5 3/8 x 1/4" DEEP GROOVE
GLASS KEEPER HELD WITH WIRE BEADS
SCREW + PLUG









groove in part U to accept the door latch (see door latch detail) and the hinge mortises in part T are best cut before the stile blocks and split turnings are mounted.

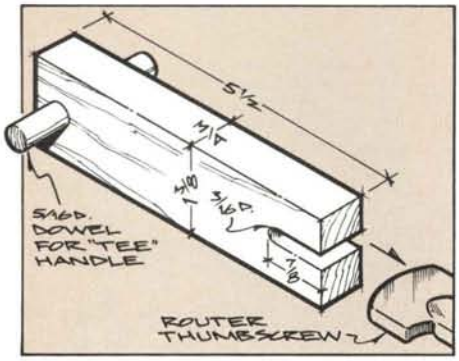
The door and side panel glass (AA and BB) are secured with a plastic keeper strip (CC) that is included in the clock kit. You will need to pre-drill for the wire brads (also included) to avoid bending them or breaking the glass.

The clock movement (II) is mounted to the case back rail, and the chime assembly is mounted to the chime spacer (S), which has been screwed in place to the case back as shown. Further instructions on mounting and adjusting the movement are included in the kit.

Note: Final sanding of the clock case and door, and application of the finish should be accomplished before the glass is inserted and the movement mounted. Our clock was finished with several coats of a linseed oil/varnish mixture. Take care not to get finish on the area of the rabbets where the case back rail and case hanger will be glued in place. These parts, in addition to the upper and lower back and chime block, should be finished *after* they have been mounted. Touch-up finishing will probably be needed after the glass, door, and movement have been mounted. WWJ

Shop Tips

Some router thumbscrews are notoriously difficult to tighten, and while pliers will help, they tend to chew things up. A simple wooden wrench,



made as shown, will save both your fingers and the thumbscrew.

James Ganotes, Los Angeles, Calif.

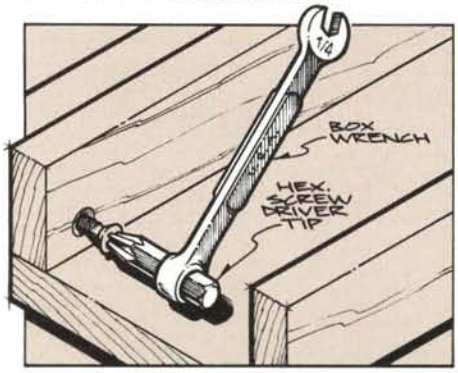
Palm sanders work great, but the sandpaper tends to tear easily. I've found that by covering the back of the sandpaper with contact paper (sold at most hardware stores) it will last 3 - 4 times longer.

Roger Willmann, Belleville, Ill.

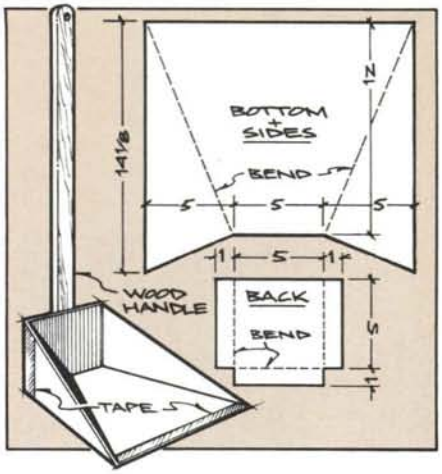
Screws or bolts don't get lost when I stick them to a large (4 in. diameter) magnet kept handy on my workbench. The magnet was salvaged from an old stereo speaker.

D. Harrison, Trenton, N.J.

A box wrench and a removable screwdriver tip will make it easier to drive screws in tight places.



Kitchen dustpans aren't big enough for most workshop sweeping chores. I make a jumbo version from two pieces



of cardboard, cutting and folding as shown, then taping the joints and front edge with duct tape. The wood handle is optional. Sheet metal can be substituted for cardboard, with pop rivets used to secure the joints.

Gary W. Gaither, Abilene, Tex.

WWJ

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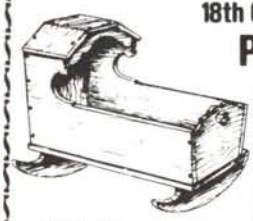

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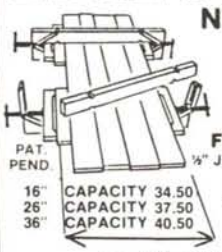

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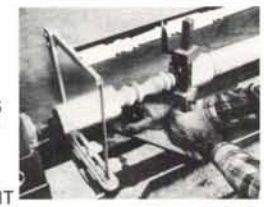

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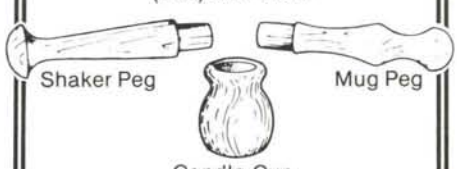

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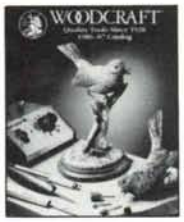

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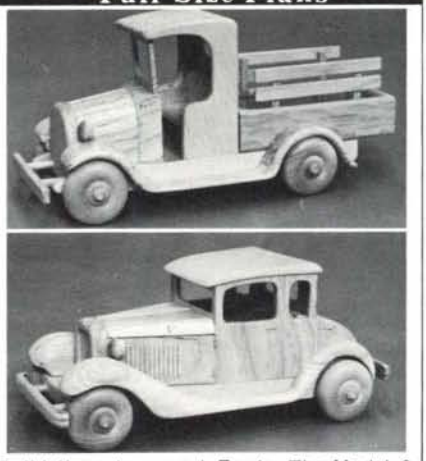

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Crumb Collecting Breadboard J/A '85

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

Vol. 6 No. 1 Jan-Feb '82
Contemporary Sofa Table, Artist's Easel, Candle Box, Laminated Box, Butcher Block Knife Rack, Frog Pull Toy, Infinity Mirror, Japanese Style Table Lamp, Empire Footstool, Desk Caddy, Stepped-Back Hutch, Buckboard Seat, Latticework Cutting Jig, *Articles:* Working with Plywood; Insurance for the Workshop; Some Thoughts on Glues and Gluing.

Vol. 6 No. 2 Mar-Apr '82
Early American Blanket Chest, 18th Century Corner Shelf, Pine Footstool, Cheese Cutting Board, Napkin Holder, Trivets, Coaster Set, Pierced Tin Cabinet, Hutch Clock, Oak File Cabinet, Mahogany Tripod Table, Wall Hung Plant Bracket, *Articles:* Methods of Producing Thin Stock; Some Thoughts on Selling; A Pseudo-Colonial Spanish Chair: Part I.

Vol. 6 No. 3 May-June '82
Country Kitchen Cabinet, Rough-Sawn Cedar Clock, Swinging Cradle, Toy Helicopter, Casserole Dish Holder, Ship's Wheel Weather Station, Octagonal Planter, Tambour Desk, Band Saw Boxes, 19th Century Step-Chair, Sailing Ship Weather Vane, *Articles:* Bench Hooks and Shooting Boards; Bookkeeping: Part I; Pseudo-Colonial Spanish Chair: Part II.

Vol. 6 No. 4 July-Aug '82

Not Available

Vol. 6 No. 5 Sept-Oct '82
Early American Hanging Corner Cupboard, Breakfast Serving Tray, Veneered End Table, Chess Table, Chest of Drawers, Contemporary Writing Desk, Whale Toy, Laminated Shoehorn, Spaghetti Measure, Candle Holder, Horizontal Boring Jig, Cane Suppliers, Finishing Suppliers, *Articles:* Pinned and Wedged Mortise and Tenon Joints; The Craft Market; More Finishing Tips.

Vol. 6 No. 6 Nov-Dec '82

Not Available

Vol. 7 No. 1 Jan-Feb '83
Workshop Tote Box, Tinsel-Art Mirror, European Spinning Wheel, Key Holder, Dump Truck Toy, Bang-a-Peg Toy, Puzzle, Wall Cabinet with Reverse Glass Stencil, End Grain Table Lamp, Butler's Tray Table, Contemporary Clock, Pine Cabinet, *Articles:* Miter and Spline Joints; The Added Costs of Being in Business; Selecting Clear Finishes.

Vol. 7 No. 2 Mar-Apr '83
Porch Swing, Homemade Jig Saw, Cheval Mirror, Punched Tin Spice Cabinet, Television Stand, Nautical Table Lamp, Wooden Balance, Nesting Cube Tables, Steam Roller Toy, Back Massager, Mailbox, Wall Shelf, Chippendale Mirror, Clock Parts and Suppliers, *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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Oak Pedestal Table, Drafting Table, Early American Wall Unit, Folding Snack Table, Pine Corner Cupboard, Toy Car with Boat & Trailer, Letter Opener, Contemporary Serving Tray, Hanging Mirror with Shelf, Carved Eagle, Early American Portable Bookcase, Hardwood Suppliers, *Articles:* Handtools and Table Saw Methods; Record Keeping: The Key to Profitable Costing; A Cure for Loose Legs.

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Turned Lamp, Decoy Carving, Antique Sugar Chest, Record Album & Tape Cabinet, Chinese Tea Table, Old-World Weather Forecaster, Toy Tractor & Cart, Display Pedestal, Two Planter Projects, Collector's Plate Stand, Hardware Suppliers, *Articles:* Dovetail Joints: Part I; Keep Track of Costs or You'll Be Overtaxed; Some Spraying Techniques; Inlaid Edging.

Vol. 7 No. 5 Sept-Oct '83
Shaker Writing Desk, Modelmaker's Bench, Canning Jar Storage Shelves, Turned Bowl, Oriental Table, Router Table, Band Saw Box, Toy Pumper Firetruck, Toy Airplane, Spoon Rack, Magazine Rack, Bootjack, Furniture Kit Suppliers, *Articles:* Dovetail Joints: Part II; Some Thoughts on Low-Cost, No-Cost Advertising; Correcting Flaws in the Finish; Routed Drawer Pulls; Working Wood Co-operatively.

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Lighted Wall Planter, Roller Stand, Early American Wall Secretary, Dressing Screen, Wine Rack, Shaker Chest of Drawers, Waterbed, Toy Train, Mitten Box, Hooded Doll Cradle, Coal Scuttle, Elephant Push Toy, *Articles:* Basic Drawer Construction and Installation; Display Advertising; Some Repair Hints; Making a Raised Arch Panel.

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

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Shaker Wall Clock, Compact Dry Bar, High Chair, Kitchen Canister Set, Colonial Water Bench, Stacking Desk Trays, Wooden Brooches, Toy Bulldozer, Rocking Horse, Contemporary Table, Wall Hung Telephone Cabinet, Pipe Smoker's Organizer, Clock Parts Suppliers, *Articles:* Edge-Joining Boards; More Sources of Information; More Hope for the Hopeless Cases; Making Cabriole Legs.

Vol. 8 No. 3 May-June '84
Country Vegetable Bin, Folding Deck Chair, Shaker Pedestal Table, Wall Hung Display Cabinets, Wooden Coat Hanger, Toy Car and

Trailer, Paper Towel Holder, Carved Hand-Mirror, Writing Desk, Carved Walking Stick, Laminated Clock, Oak and Glass End Table, *Articles:* How to Lay Out and Make Circular Cuts; Mail Order Selling; Stripping Old Finishes; Carving the Ball-and-Claw Foot.

Vol. 8 No. 4 July-Aug '84

Wag-on-Wall Clock, Oak Swing, Candy Dispenser, Coffee and End Tables, Tugboat and Barge, Lazy Susan, Early American Mirror, Colonial Pipe Box, Sewing Machine Cabinet, Cam Clamp, Hamper, *Articles:* What Sells Best?; Homemade Removers; Buying a Basic Set of Hand Tools; Kerf Bending; Suppliers of Caning & Wood Finishing Products.

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Contemporary Stereo Cabinet, Shaker Woodbox, Bongo Box, Nesting Tables, Shop Trammel, Jackknife Letter Opener, Salt Shaker and Pepper Mill, Toy River Ferry and Car, Toy Top, Cookbook Holder, Hall Table, Grandfather Clock: Part I, *Articles:* Starting a Business: Part I; Applying Filler; Building a Basic Workbench; Making Specialty Moldings with the Table Saw and Scratch Beader.

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.

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Queen Anne Lowboy, Television/VCR Stand, Early American Pine Corner Cupboard, Toy Tool Set, Windspinner, Woodchopper Whirligig, Chinese Puzzle, Cut-off Jig, Blanket Chest, Shaker Harvest Table, Blacksmith's Tool Tray, *Articles:* A Guide to Photographing Your Work; Applying Shellac and Lacquer; Sharpening Plane Blades and Chisels; Installing Machine Woven Cane; American Queen Anne, 1715-1755; General Woodworking Suppliers.

Vol. 9 No. 3 May-June '85

Jacobean Joint Stool, Wall Cabinet with Recessed Finger Pulls, Shaker Desk, Kitchen Cart, Contemporary Wall Clock, Colonial Wall Sconce, Card Box, Towel Bar with Glass Shelf, Marble Race Toy, Cradle, Vanity Mirror, Miter Clamping Jig, *Articles:* Product Liability, Part I; Restoring an Antique Mirror Frame; Coping with Wood "Movement"; Making Recessed Finger Pulls; The Jacobean Period.

Vol. 9 No. 4 July-Aug '85

Gate-leg Table, Computer Desk, Shaving Horse, Stamp Dispenser, Crumb Collecting Breadboard, Toy Trucks, Early American Wall Shelf, Pivot-top Game/Coffee Table, Settle Bench, Shaker Single-Drawer Cupboard, Fold-up Workbench, *Articles:* Product Liability, Part II; Caning and Wood Finishing Supplies; Spray Finishing; Table Saw Basics; Making the Rule Joint; The William and Mary Period.

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Colonial Schoolmaster's Desk, Contemporary Sideboard, Mahogany End Table, Victorian Hall Tree, Cutlery Wall Cabinet, Swing-out Plant Hanger, Prancing Horse Silhouette, Block Puzzle, Iron Caddy, Toy Ironing Board, Early American Water Bench, Wooden Smooth Plane, Shaker Sewing Box, *Articles:* A Craft Fair Visit; How to Use Stick Shellac; A Guide to Circular Saw Blades; Making Bent Laminations; Country Colonial Furniture.

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Moravian Chair, Dulcimer, Oak Dining Table, Shaker Washstand, Marking Gauge, Veneered Wall Clock, 4 x 4 Off-Roader, Teddy Bear Puzzle, Duck Pull-toy, Landscape Cutting Boards, Early American Tall Clock, Pine Desk Organizer, *Articles:* Secrets of Success; Weaving a Fiber Rush Seat, Part I; Table Saw Ripping Problems and Their Solutions; 4-Piece Book Match Veneering; Pennsylvania Dutch Furniture.

Unsupported or Hand Steam Bending; ⅜ in. Variable Speed Reversible Drills; Federal Period; Hardware Suppliers.

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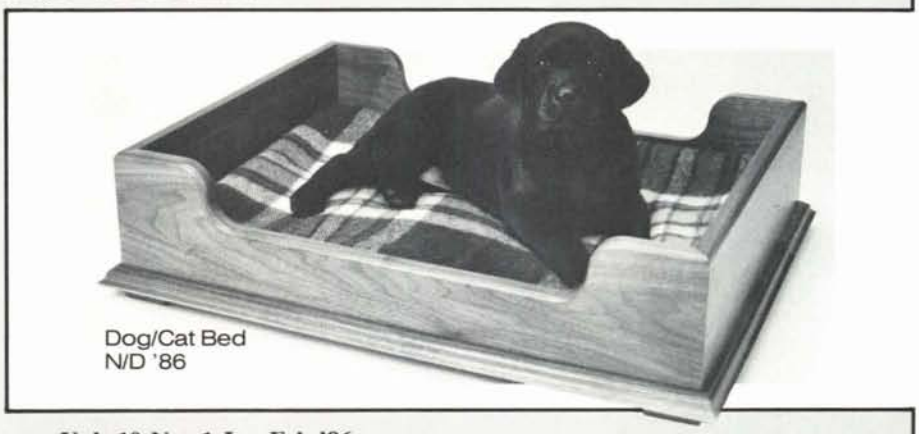
Victorian Whatnot Shelf, Contemporary Lamp, Early American Bench, Steam-bent Clock, Pine Hutch/Cupboard, Canada Goose Basket, Toy Crane, Condiment Holder, Shop Workstation, Parsons Table, Shaker Lap Desk, *Articles:* An Interview with Toymaker Clare Maginley; How to Flatten a Warped Board; A Guide for Choosing Your First Router; Supported Steam Bending; Victorian Period.

Vol. 10 No. 4 July-Aug '86

Shaker Slat-Back Side Chair, Wall-Hung Display Cabinet, Latticework Planter, Country Bucket Bench, Adirondack Chair, Coffee Mill, Clamdigger's Basket, Box of Shapes Toy, Disk Clock, Tenon Jig, Dictionary Stand, *Articles:* Selecting the Right Project for Production; More About



Dog/Cat Bed
N/D '86

Vol. 10 No. 1 Jan-Feb '86

Freestanding Shelf System, Chippendale Bachelor's Chest, Oriental Serving Tray, Country Bench, Antique Knife Tray, Tape Dispenser, Valentine Box, Toy Tow Truck & Car, Shaker Drop-leaf Table, Shop-made Bow Saw, Child's Settle Bench, Plate Shelves, *Articles:* On Getting Paid for Your Work; Weaving a Fiber Rush Seat, Part II; Table Saw Crosscutting: Techniques & Tips; Router-Lathe Fluting: A Shop-made Approach; Chippendale Furniture; Special Section: Back Issue Index.

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Zebrawood Veneered End Table, Shaker Oval Box, Microwave Cart, Pin-Hole Puzzle, Tumbling Monkey Toy, Early American Wall Box, Kicking Donkey Whirligig, Shaker Side Table, Wooden Mallets, Federal Period Washstand, Connecticut Shelf Clock, *Articles:* A General Guide to Craft Fairs; Why Wood Warps; Cutting Tapers, Wedges and Other Irregular Shapes with the Table Saw;

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Warped Boards; All About Router Bits; The Sliding Dovetail Joint; Furniture Kits Suppliers.

Vol. 10 No. 5 Sept-Oct '86

Desk with Tambour Top, Vanity Case, Stool, Coffee Table, Blanket Chest, Mortar and Pestle, Whale Folk Art Silhouette, Toy Wagon, Cranberry Rake, Router Bit Box, Shaker Drop-leaf Table, *Articles:* Are Your Prices Competitive?; Restoring a Rosewood Chair; Basic Router Operations; Making Tambour Doors; General Woodworking Suppliers.

Vol. 10 No. 6 Nov-Dec '86

Early American Hamper, Cube Table, Rabbit Pull Toy, Old-Time Sled Wall Shelf, Cassette Tape Holder, Dog/Cat Bed, Vanity Mirror, Early American Washstand, Router Table, Victorian Sleigh, *Articles:* Wholesale and Discount Sources of Supply; Sandpaper Abrasives; Using the Router Table; The Mitered Bead Frame and Panel; Clock Parts Suppliers.

Vol. 11 No. 1 Jan-Feb '87

Shaker Blanket Chest, Glass-Top Dining Table, Dovetailed Stool, Jewelry Box, Door Harp, Toy Firetruck, Canada Goose Mobile, Balancing Sawyer Folk Toy, Early American Style End Table, Jointer Push Board, *Articles:* Direct Mail Promotions — Defining the Market for Your Work; Old Wood; The Mortise and Tenon, Part I; Combination Hand/Router Dovetailing; Special Section: Back Issue Index.

Vol. 11 No. 2 Mar-Apr '87

Shaker Sewing Desk, Garden Bench and Table, Mirrored Wall Shelf, Rhombohedron Puzzle, Wood Sawyer Whirligig, Folk Art Door Stop, Kangaroo Pull Toy, Colonial Pine Wall Shelf, Contemporary Hall Table, *Articles:* How to Create a Direct Mail Promotion; Types of Finish — An Overview; The Mortise and Tenon, Part II; Making Bevel-Edged Drawer Bottoms.

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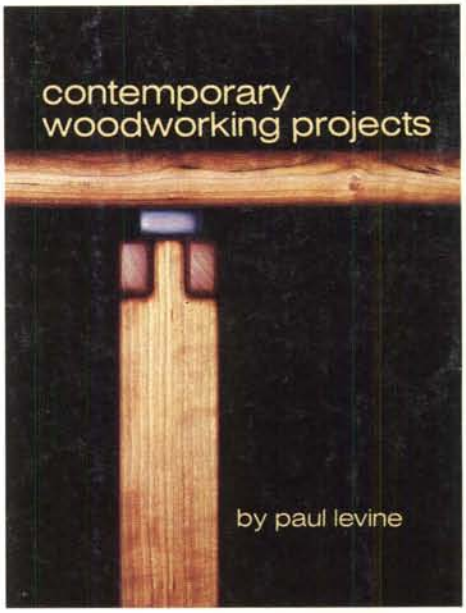

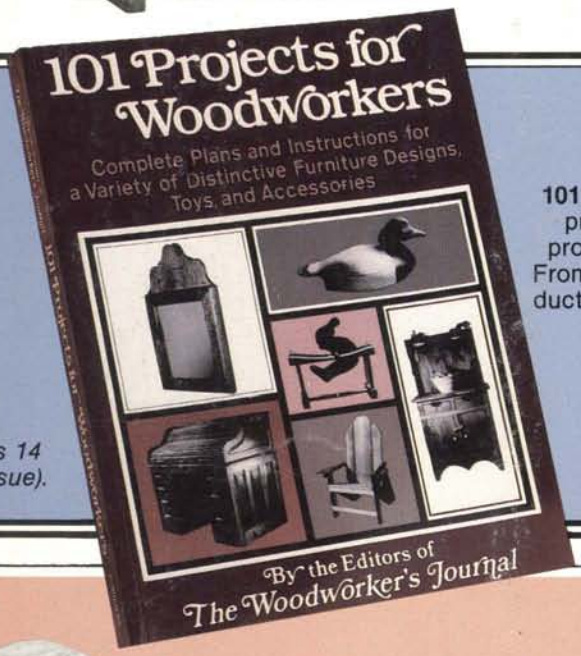

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Pine Bookcase

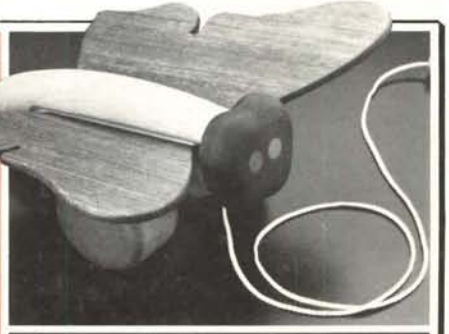
Next issue . . .

Here are a few of the projects we've lined up for the July/August 1987 issue of

The Woodworker's Journal

. . . and more

Butterfly Pull Toy



Vanity Mirror with Drawer