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PROJECTS
INSIDE!

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November 1998 #105

Popular Woodworking

The Skill-Building Project Magazine for Practical Woodworkers

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1/2" SHANK

| MODEL | CUTTER DIA. A | CUT. LENGTH B | REG. PRICE | SALE PRICE |
|-------|---------------|---------------|--------------------|----------------|
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| C1010 | 3/8" | 3/4" | \$5.95 | \$4.95 |
| C1011 | 1/2" | 1-3/16" | \$7.95 | \$6.95 |
| C1013 | 5/8" | 1-1/8" | \$9.95 | \$8.95 |
| C1015 | 3/4" | 1-1/8" | \$11.95 | \$10.95 |
| C1017 | 1" | 1-1/8" | \$11.95 | \$10.95 |



Reversible Stile & Rail - Roman Ogee with Guide Bearing



| MODEL | SHANK | CUTTER DIA. | CUTTER LENGTH | REG. PRICE | SALE |
|-------|-------|-------------|---------------|--------------------|----------------|
| C1392 | 1/2" | 1-5/8" | 13/16" | \$49.95 | \$47.95 |



Reversible Stile & Rail - Ogee with Guide Bearing



| MODEL | SHANK | CUTTER DIA. | CUTTER LENGTH | REG. PRICE | SALE |
|-------|-------|-------------|---------------|--------------------|----------------|
| C1652 | 1/2" | 1-5/8" | 13/16" | \$49.95 | \$47.95 |



Reversible Stile & Rail - Beveled with Guide Bearing



| MODEL | SHANK | CUTTER DIA. | CUTTER LENGTH | REG. PRICE | SALE |
|-------|-------|-------------|---------------|--------------------|----------------|
| C1653 | 1/2" | 1-5/8" | 13/16" | \$49.95 | \$47.95 |



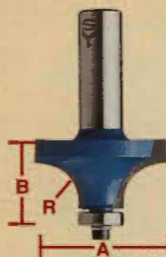
Reversible Stile & Rail - Classical with Guide Bearing



| MODEL | SHANK | CUTTER DIA. | CUTTER LENGTH | REG. PRICE | SALE |
|-------|-------|-------------|---------------|--------------------|----------------|
| C1654 | 1/2" | 1-5/8" | 13/16" | \$49.95 | \$47.95 |



Anti-kickback Roundover Bits with Guide Bearing



Roundover bits are used to make quarter rounds of various radii. Also used to soften edges, especially if making anything a child would use. Everyone needs a drawer full of these. So many uses we can't list them all.



1/4" SHANK

| MODEL | CUTTER DIA. A | CUT. LENGTH B | RADIUS r | REG. PRICE | SALE PRICE |
|-------|---------------|---------------|----------|--------------------|----------------|
| C1713 | 5/8" | 3/8" | 1/16" | \$9.95 | \$8.95 |
| C1714 | 7/8" | 3/8" | 1/8" | \$9.95 | \$8.95 |
| C1715 | 7/8" | 3/8" | 3/16" | \$9.95 | \$8.95 |
| C1716 | 1" | 1/2" | 1/4" | \$10.95 | \$9.95 |
| C1717 | 1-1/8" | 1/2" | 5/16" | \$11.95 | \$10.95 |
| C1718 | 1-1/4" | 5/8" | 3/8" | \$13.95 | \$12.95 |
| C1719 | 1-1/2" | 5/8" | 1/2" | \$14.95 | \$13.95 |

1/2" SHANK

| MODEL | CUTTER DIA. A | CUT. LENGTH B | RADIUS r | REG. PRICE | SALE PRICE |
|-------|---------------|---------------|----------|--------------------|----------------|
| C1720 | 3/4" | 3/8" | 1/8" | \$9.95 | \$8.95 |
| C1721 | 7/8" | 3/8" | 3/16" | \$9.95 | \$8.95 |
| C1722 | 1" | 1/2" | 1/4" | \$10.95 | \$9.95 |
| C1723 | 1-1/8" | 1/2" | 5/16" | \$11.95 | \$10.95 |
| C1724 | 1-1/4" | 5/8" | 3/8" | \$13.95 | \$12.95 |
| C1725 | 1-1/2" | 3/4" | 1/2" | \$14.95 | \$13.95 |

NEW!

4-pc. Anti-kickback Roundover Set

Set includes: 1/8"r, 1/4"r, 3/8"r, 1/2"r bits, bead cutting conversion bearing and wooden box.



| | | |
|-------|------------|----------------|
| C1780 | 1/4" SHANK | \$39.95 |
| C1781 | 1/2" SHANK | \$39.95 |

NEW!

20-pc. Anti-kickback Set

1/4" set includes: Flush Trim, Roman Ogee, 1/4", 3/8", 1/2", 3/4" Straight, 45° Chamfer, 1/4"r, 3/8"r, 1/2"r Roundover, 1/4", 1/2" Rabbeting, 3/8", 1/2" Dovetail, 1/4", 3/8"r Cove, 3/8" Core Box, 3/8" Key-Hole, Panel Bit, 1/2" V-Groove and wooden box. 1/2" set includes: Flush Trim, Roman Ogee, 1/4", 3/8", 1/2", 3/4" Straight, 45° Chamfer, 1/4"r, 3/8"r, 1/2"r Roundover, 1/4", 1/2" Rabbeting, 1/2", 3/4" Dovetail, 1/4"r, 3/8"r Cove, 3/8", 1/2" Core Box, Panel Bit, 3/4" V-Groove and wooden box.



| | | |
|-------|------------|-----------------|
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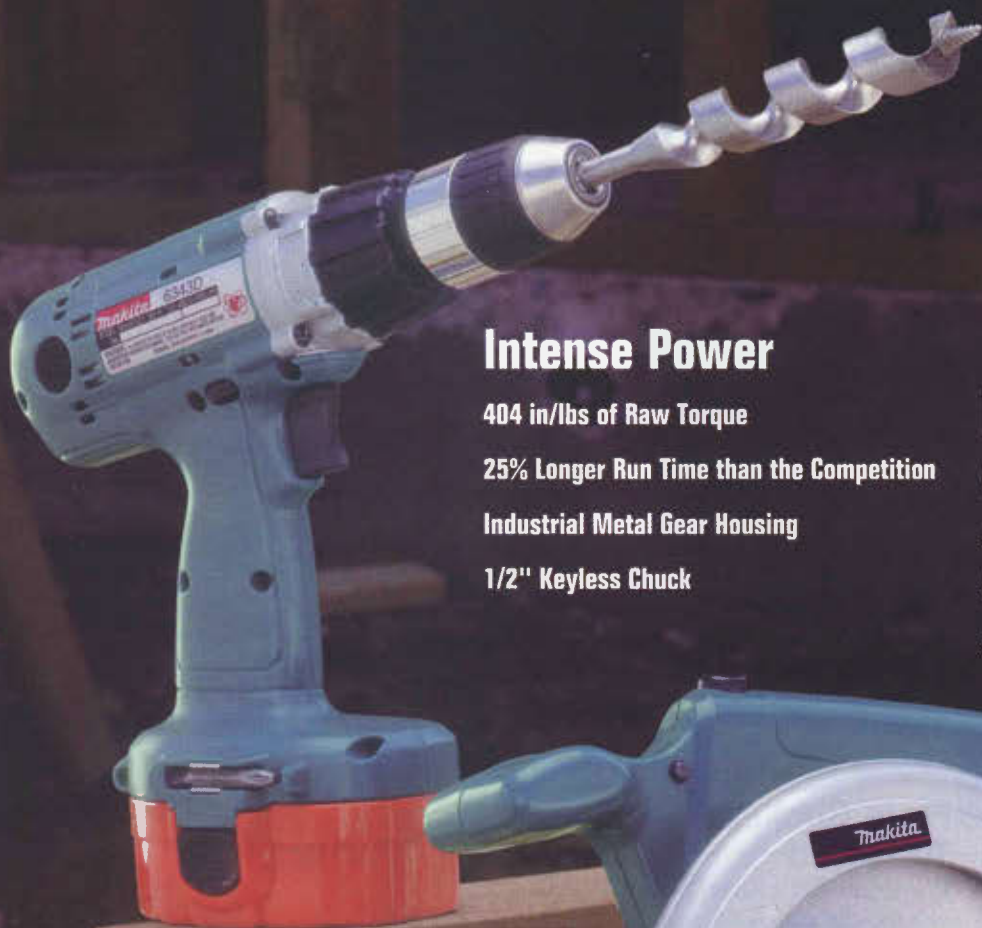
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Features

Peasant Chair 26

Don't be scared of building a chair. Using an ancient chair design, we show you the basics of this fine art that will put you on your way to constructing a Windsor chair.

Barrister Bookcases 32

This modernized version of the classic stackable storage units are versatile and attractive enough to clear the clutter from any room in your house.

Arts and Crafts Magazine Stand 54

This towering shelf holds more than magazines, it's the perfect place for books and pottery.

Cheval Mirror 58

Build this for a great reflection of yourself and your woodworking skills – not to mention an easy way to try out veneering.

From Bucket To Board 64

If your project's finish looks more like the surface of the moon than glass, you need to read this article. Learn how to purchase the right brush and use it on your next project.

Christmas Ornaments 68

In less than an afternoon's time you can show off your Christmas spirit and woodworking pride with these whimsical ornaments from the *Pop Wood* staff.



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Project File

This special section, exclusive to Popular Woodworking, features building basics for six projects.

Stocking Hangers 37

Forget the ugly hooks. These two stocking hangers seem to defy gravity and hold almost 20 pounds of booty. The secret? Torque and friction.

Bat House 38

Bats eat their body weight in bugs every night. Build them this nice home and they will move into your back yard this fall.

Sliding Santa Chimney 40

Watch Santa scoot down the chimney with this easy-to-build novelty that will delight the old and young.

3D Star Puzzle 49

It's easy to make, but not to solve. Stump your friends with this deceptively easy-looking 3D puzzle.

Tabletop Hutch 50

Learn to make new furniture look 100 years old while you build this versatile tabletop hutch.



Are we on target?

We want to know what type of projects you want to see in future issues of *Popular Woodworking*. If you like a particular project, simply circle that project's identification number on the postage-paid card located in the Resource Directory at the back of this magazine. We'll use this information to help plan future issues.

—Steve Shanesy, editor and publisher

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Safety Note

Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand. Think ahead. **Safety First!**

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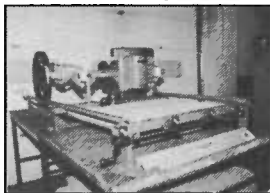
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November 1998, Vol. 18, No. 5
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Popular Woodworking (ISSN 0884-8823, USPS 752-250) is published six times a year in January, March, May, July, September and November by F&W Publications, Inc. Editorial and advertising offices are located at 1507 Dana Ave., Cincinnati, OH 45207; tel.: (513) 531-2222. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (6 issues) is \$19.97; outside of U.S.A. add \$7/year.

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Produced and printed in the U.S.A.

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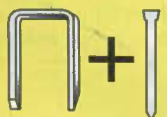
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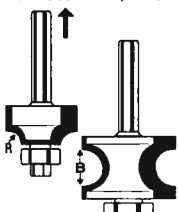
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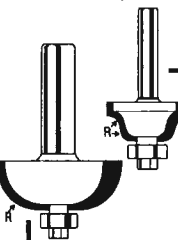
Roundover Bits with Bearing

| 1/4" Shank | Radius | |
|------------|--------|------|
| WL-1040 | 1/16" | *9. |
| WL-1041 | 1/8" | *9. |
| WL-1042 | 3/16" | *9. |
| WL-1043 | 1/4" | *9. |
| WL-1044 | 5/16" | *10. |
| WL-1045 | 3/8" | *11. |
| WL-1046 | 1/2" | *13. |
| 1/2" Shank | | |
| WL-1049 | 1/8" | *9. |
| WL-1042-5 | 3/16" | *9. |
| WL-1050 | 1/4" | *9. |
| WL-1044-5 | 5/16" | *10. |
| WL-1051 | 3/8" | *12. |
| WL-1052 | 1/2" | *13. |
| WL-1053 | 5/8" | *16. |
| WL-1054 | 3/4" | *18. |
| WL-1055 | 7/8" | *25. |
| WL-1056 | 1" | *27. |
| WL-1057 | 1-1/8" | *30. |
| WL-1058 | 1-1/4" | *30. |



Bullnose Bits with Bearing

| 1/4" Shank • Bead | | |
|-------------------|--------|------|
| Opening | | |
| WL-1100 | 1/4" | *12. |
| WL-1101 | 3/8" | *14. |
| WL-1102 | 1/2" | *16. |
| WL-1103 | 5/8" | *18. |
| WL-1104 | 3/4" | *19. |
| 1/2" Shank | | |
| WL-1110 | 1/4" | *12. |
| WL-1111 | 3/8" | *14. |
| WL-1112 | 1/2" | *16. |
| WL-1113 | 5/8" | *18. |
| WL-1114 | 3/4" | *19. |
| WL-1115 | 1" | *22. |
| WL-1116 | 1-1/8" | *25. |
| WL-1117 | 1-1/4" | *28. |
| WL-1118 | 1-1/2" | *32. |



Cove Bits

1/4" Shank • Radius

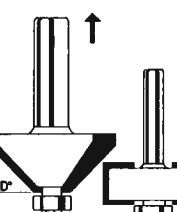
| | | |
|---------|-------|-------|
| WL-1159 | 1/8" | \$10. |
| WL-1160 | 3/16" | \$10. |
| WL-1161 | 1/4" | \$11. |
| WL-1162 | 3/8" | \$13. |
| WL-1163 | 1/2" | \$14. |

Cove Bits (continued)

| | | |
|---------|------|------|
| WL-1169 | 1/8" | \$10 |
| WL-1170 | 1/4" | \$11 |
| WL-1171 | 3/8" | \$13 |
| WL-1172 | 1/2" | \$14 |
| WL-1173 | 5/8" | \$18 |
| WL-1174 | 3/4" | \$20 |

Chamfer Bits

| 1/4" Shank • Degree | | |
|-----------------------------|---------|-----|
| WL-1180 | 15° | *10 |
| WL-1181 | 25° | *11 |
| WL-1182 | 45° | *12 |
| WL-1183 | 45° | *14 |
| (for up to 3/4" material) | | |
| 1/2" Shank | | |
| WL-1184 | 45° | *10 |
| WL-1185 | 11-1/2° | *12 |
| WL-1186 | 15° | *12 |
| WL-1187 | 22-1/2° | *12 |
| WL-1188 | 30° | *14 |
| WL-1189 | 45° | *15 |
| WL-1190 | 45° | *22 |
| (for up to 1-1/4" material) | | |



Rabbeting Bits

| | | |
|------------|-------|-----|
| WL-1220 | 1/2" | *11 |
| WL-1220-2 | 1/16" | *10 |
| WL-1220-3 | 1/8" | *10 |
| WL-1220-4 | 1/4" | *10 |
| WL-1220-5 | 3/8" | *10 |
| 1/2" Shank | | |
| WL-1225 | 1/2" | *11 |
| WL-1225-2 | 1/16" | *10 |
| WL-1225-3 | 1/8" | *10 |
| WL-1225-4 | 1/4" | *10 |
| WL-1225-5 | 3/8" | *10 |
| WL-1225-6 | 3/4" | *12 |

Roman Ogee Bits

| | | |
|---------------------|-------|------|
| 1/4" Shank • Radius | | |
| WL-1230 | 5/32" | \$13 |
| WL-1231 | 1/4" | \$15 |
| 1/2" Shank | | |
| WL-1235 | 5/32" | \$13 |
| WL-1236 | 1/4" | \$15 |

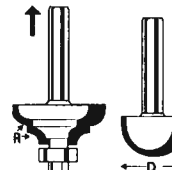
Double Roman Ogee

| | | |
|---------------------|-------|------|
| 1/4" Shank • Radius | | |
| WL-1240 | 5/32" | \$18 |
| WL-1241 | 1/4" | \$20 |
| 1/2" Shank | | |
| WL-1245 | 5/32" | \$18 |
| WL-1246 | 1/4" | \$20 |

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ROUTER TABLE

Classical Ogee Bits

| | | |
|---------------------|-------|-----|
| 1/4" Shank • Radius | | |
| WL-1250 | 5/32" | \$1 |
| WL-1251 | 1/4" | \$2 |
| 1/2" Shank | | |
| WL-1252 | 5/32" | \$1 |
| WL-1253 | 1/4" | \$2 |

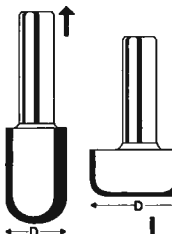


Core Box Bits

| | | |
|-----------|------|-----|
| WL-1370 | 1/8" | \$1 |
| WL-1371 | 1/4" | \$ |
| WL-1371-1 | 3/8" | \$ |
| WL-1372 | 1/2" | \$1 |
| WL-1373 | 3/4" | \$1 |

Roundnose/Core Box

| 1/2" Shank • Diameter | | |
|-----------------------|------|-----|
| WL-1375 | 1/4" | *8 |
| WL-1375-1 | 3/8" | *11 |
| WL-1376 | 1/2" | *11 |
| WL-1377 | 3/4" | *11 |
| WL-1378 | 1" | *11 |

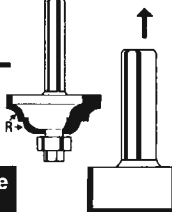


Bowl & Tray Cutter

| | | |
|-----------------------|--------|-----|
| 1/4" Shank • Diameter | | |
| WL-1380 | 7/16" | \$1 |
| WL-1381 | 3/4" | \$1 |
| 1/2" Shank | | |
| WL-1385 | 3/4" | \$1 |
| WL-1386 | 1-1/4" | \$1 |

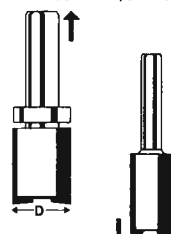
Dado & Planer Bit

| 1/4" Shank • Diameter | | |
|-----------------------|--------|-----|
| WL-1390 | 3/4" | \$1 |
| 1/2" Shank | | |
| WL-1391 | 3/4" | \$1 |
| WL-1392 | 1" | \$1 |
| WL-1393 | 1-1/4" | \$1 |
| WL-1394 | 1-1/2" | \$1 |
| WL-1394-1 | 2" | \$2 |



Pattern Cutting Bit

| | | |
|-----------------------|--------|-----|
| 1/4" Shank • Diameter | | |
| WL-1400 | 1/2" | \$1 |
| WL-1401 | 5/8" | \$1 |
| WL-1402 | 3/4" | \$1 |
| 1/2" Shank | | |
| WL-1405 | 3/4" | \$1 |
| WL-1406 | 1-1/8" | \$1 |



Straight Bits

| Straight Bits | | |
|-----------------------|-------|-----|
| 1/4" Shank • Diameter | | |
| WL-1001 | 1/8" | \$1 |
| WL-1002 | 3/16" | \$ |
| WL-1002-5.5 | 5.5mm | \$ |

| | | |
|-------------------------------|--------|------|
| WL-1003 | 1/4" | *5. |
| WL-1004 | 5/16" | *5. |
| WL-1005 | 3/8" | *5. |
| WL-1006 | 15/32" | *5. |
| (for undersized 1/2" plywood) | | |
| WL-1007 | 1/2" | *6. |
| WL-1008 | 9/16" | *6. |
| WL-1009 | 5/8" | *7. |
| WL-1010 | 23/32" | *8. |
| (for undersized 3/4" plywood) | | |
| WL-1011 | 3/4" | *9. |
| WL-1012 | 1" | *10. |

| | |
|-------------------------------|----------|
| 1/2" Shank | |
| WL-1020 | 15/64" * |
| (for undersized 1/4" plywood) | |
| WL-1021 | 1/4" * |
| WL-1019 | 5/16" * |
| WL-1022 | 3/8" * |
| WL-1023 | 7/16" * |
| WL-1024 | 15/32" * |
| (for undersized 1/2" plywood) | |
| WL-1025 | 1/2" * |
| WL-1027 | 5/8" * |
| WL-1028 | 23/32" * |
| (for undersized 3/4" plywood) | |
| WL-1029 | 3/4" * |

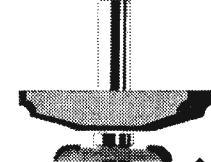


Corner Lock Mitres

| | |
|-----------------------------|------------|
| For up to 5/8" material | |
| WL-1420-2 | 1/4" shank |
| For 1/2" to 3/4" material | |
| WL-1420-1 | 1/2" shank |
| For material 3/4" to 1-1/4" | |
| WL-1420 | 1/2" shank |

For the Shaper

| | | |
|------------|---------|------|
| Lock Mitre | WL-1581 | *40. |
|------------|---------|------|



Horizontal Panel Raiser with Undercutter • 1/2" Shank

| | | |
|---------|-----------------------------------|------|
| WL-1346 | Ogee | *49. |
| WL-1347 | Traditional | *49. |
| WL-1348 | Convex (Cove) | *49. |
| WL-1359 | 12° Facecut with Quarter Round | *49. |
| WL-1363 | Wave | *49. |

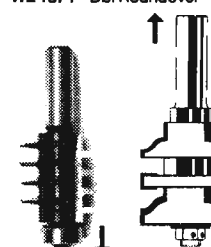


2-piece Rail & Stile Cutter Sets

| 1/2" Shank | Set | |
|------------|--------------|------|
| WL-1360 | Ogee Profile | *59. |
| WL-1361 | Roundover | *59. |
| WL-1362 | Cove & Bead | *59. |

1-piece Rail & Stile Cutter Sets

| Just raise the cutter to make the matching cut. No changing or reversing. | | |
|---|---------------|------|
| 1/2" Shank | | |
| WL-1365 | Ogee Profile | *49. |
| WL-1366 | Roundover | *49. |
| WL-1367 | Cove & Bead | *49. |
| WL-1368 | Wedge | *49. |
| WL-1374 | Dbl Roundover | *49. |



Finger Joiner Router Bit

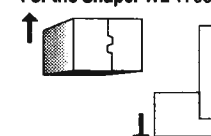
| | |
|---------|------|
| WL-1429 | *39. |
|---------|------|

For the Shaper WL-1580 *89.

Reversible Glue Joint

| | | |
|---------|-------------|------|
| WL-1430 | 1-3/4" Diam | *35. |
|---------|-------------|------|

For the Shaper WL-1706 *35.



Drawer Corner Lock

| | | |
|---|-------------------|------|
| Makes drawer side separation virtually impossible | | |
| 1/2" Shank | | |
| WL-1435 | For 1/2" material | *30. |

SHAPER CUTTERS

3/4" BORE

Corner Round

| | | |
|---------|--------|------|
| WL-1509 | 1/8" | *22. |
| WL-1510 | 1/4" | *24. |
| WL-1511 | 3/8" | *26. |
| WL-1512 | 1/2" | *26. |
| WL-1513 | 3/4" | *30. |
| WL-1514 | 1" | *32. |
| WL-1515 | 1-1/4" | *38. |

Bead

| | | |
|---------|------|------|
| WL-1520 | 1/4" | *24. |
| WL-1521 | 3/8" | *26. |
| WL-1522 | 1/2" | *26. |
| WL-1523 | 3/4" | *28. |
| WL-1524 | 1" | *30. |

Flute

| | | |
|---------|------|------|
| WL-1530 | 1/4" | *24. |
| WL-1531 | 3/8" | *26. |
| WL-1532 | 1/2" | *26. |
| WL-1533 | 3/4" | *28. |
| WL-1534 | 1" | *30. |

Rabbeting/Straight

| | | |
|---------|--------|------|
| WL-1540 | 1/4" | *24. |
| WL-1541 | 3/8" | *26. |
| WL-1542 | 1/2" | *26. |
| WL-1543 | 3/4" | *28. |
| WL-1544 | 1" | *30. |
| WL-1545 | 1-1/2" | *32. |
| WL-1546 | 2" | *48. |



SHAPER CUTTERS 3/4" BORE

1-piece Rail & Stile

Just raise the cutter to make the matching cut. No changing or reversing.

| | | |
|---------|---------------|------|
| WL-1500 | Roman Ogee | *89. |
| WL-1501 | Roundover | *89. |
| WL-1502 | Cove & Bead | *89. |
| WL-1503 | Dbl Roundover | *89. |

| | |
|---------|--|
| WL-1600 | |
| WL-1601 | |
| WL-1602 | |
| WL-1603 | |
| WL-1604 | |
| WL-1605 | |

Panel Raisers (Shaper Cutter)

| 3/4" Bore | | |
|-----------|-----------------------------------|------|
| WL-1600 | Ogee | *59. |
| WL-1601 | 15° Facecut | *59. |
| WL-1602 | 18° Traditional | *59. |
| WL-1603 | Convex (Cove) | *59. |
| WL-1604 | 12° Facecut with Quarter Round | *59. |
| WL-1605 | Wave | *59. |

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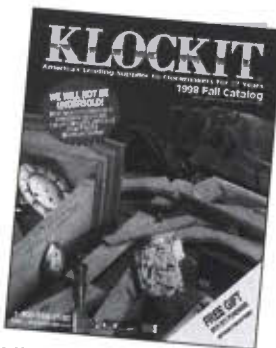
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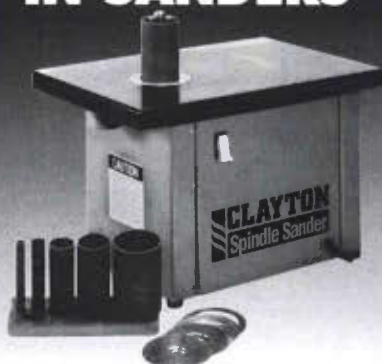
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OUT ON A LIMB

The Only RULE to Observe



BECAUSE of the way we work in our project shop here at *Popular Woodworking*, we share a lot of tools. Now it would be normal to expect in any shop that all the power tools are shared, but here we share hand tools just the same. The problem is that hand tools are much more personal than ones that are electrified. It's just easier to develop an attachment to them for some reason.

Well, the other day I got really peeved when I discovered my nearly new tape measure had a kink in its blade, something I can assure you occurred at the hands of another. I was ticked off because I had gone to some trouble in selecting this tape. It was the right length: 12 feet. It had $\frac{1}{32}$ " lines dividing the first 12 inches. The case was bright orange, which helps me find it because I'm forever putting it down and forgetting where. It was lightweight, and the blade was wide enough to extend a good distance without bending. All the rule lines were thin and finely marked.

And now it was less than a month old and it was ruined. Though I didn't go looking for a perpetrator among the magazine staff, I did express my frustration.

"Do you know that I own two other tapes that I keep at home," I said. "One's at least 10 years old, the other's probably 15. They both saw daily duty in commercial shop operations and are both nearly perfect after all these years." OK, the cases are a little worn, but both hooks are accurate and neither tape is kinked.

The point of this story is this: You can tell a lot about a woodworker, I believe, by the tape measure he or she carries. It's the most-used hand tool. I can tell you that when a cabinetmaker showed up looking for work at a shop I was running, I'd ask to see two things: his hands (just how accident-prone is this person), and his tape measure. If he was carrying anything longer than 16 feet, I'd ask if he was a carpenter or a woodworker. If the tape didn't have $\frac{1}{32}$ " divisions, I'd ask how he measured these fractions. If the hook was abused, or the blade kinked, I suspected he wasn't particularly interested in accuracy. (And I wondered how my tools would get treated in this guy's hands.) If the tape looked pretty good and he said he was a stickler for accuracy, yet he stood there yanking out the blade then letting it slam back into the case, I concluded the guy might be less than truthful.

And if after the hand inspection the applicant produced a folding rule, I'd simply hand it back and explain that my business was slow and suggest he call on my competitors.

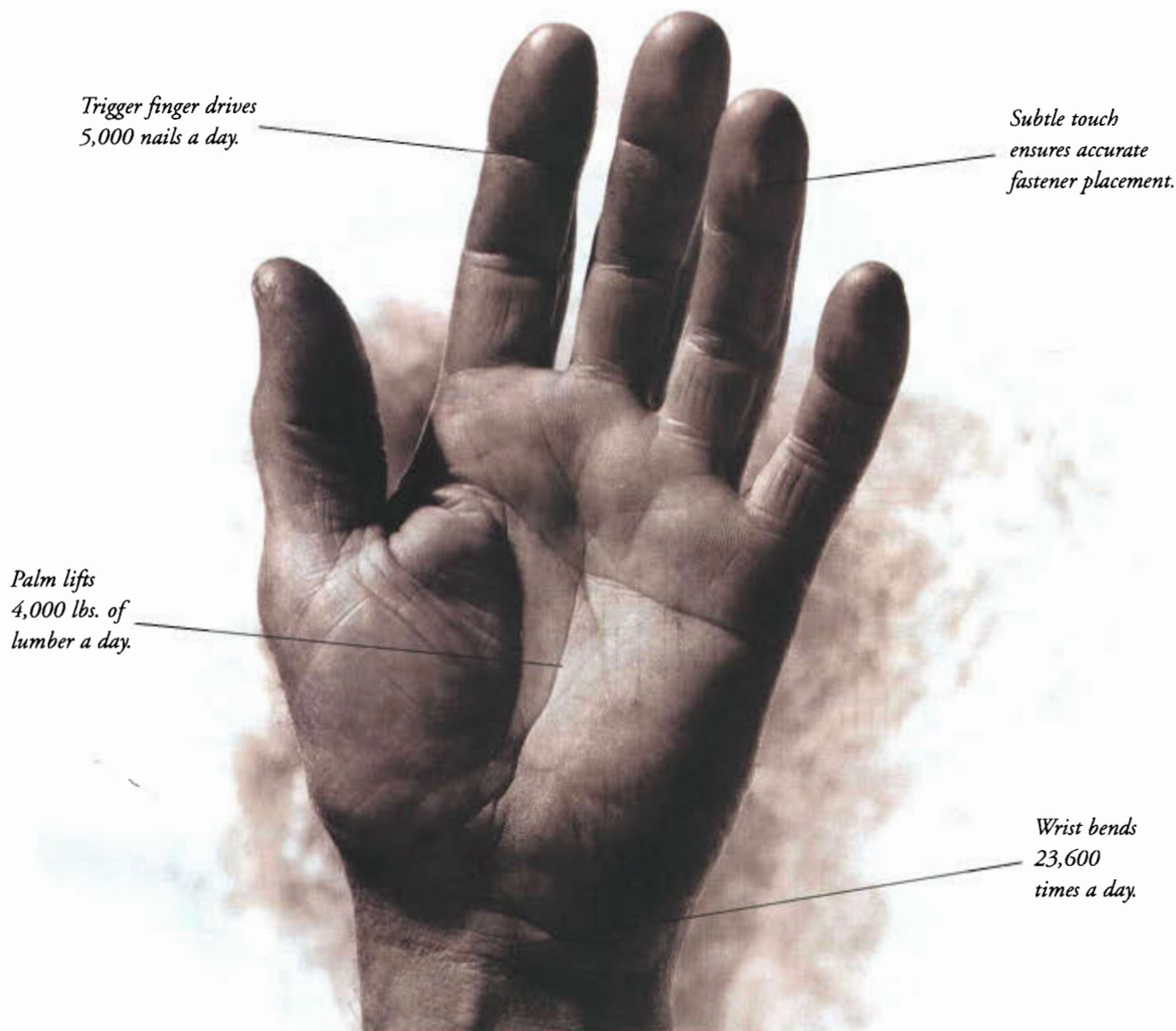
For shop work, there's only one rule. It's 12 feet long, has $\frac{1}{32}$ " divisions on the first 12 inches, it's lightweight, and the blade extends a good distance without bending. All the rule lines are thin and finely marked. And if you are a folding rule type guy, let's just agree to disagree. Sorry. **PW**

Steve Shanesy

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By the way, we recently launched our website (www.popwood.com). It has some great features: You can search an online index of all our back issues, you can report problems with your subscription, purchase back issues and plans, and more. If you have suggestions about other things you'd like to see there, drop me a line at SteveS@FWPubs.com.

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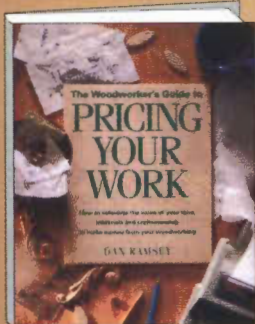
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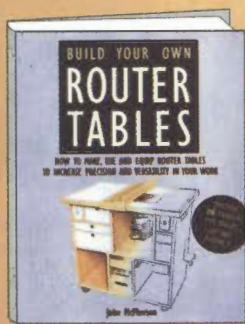
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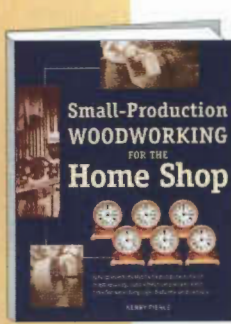
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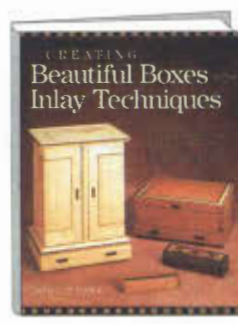
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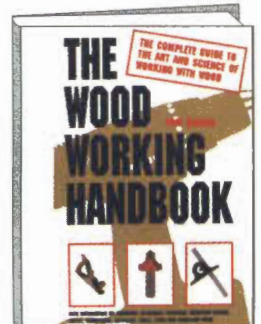
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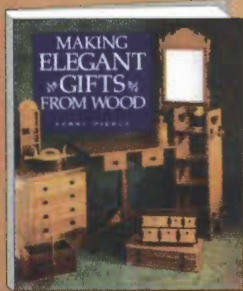
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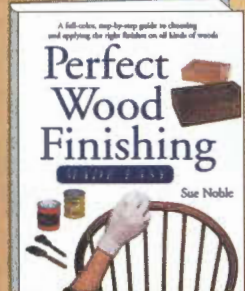
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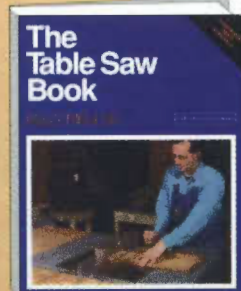
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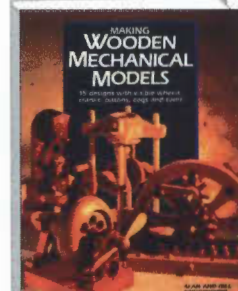
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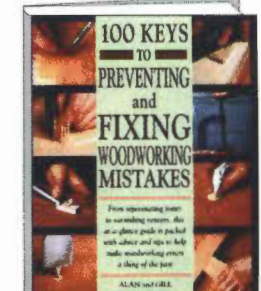
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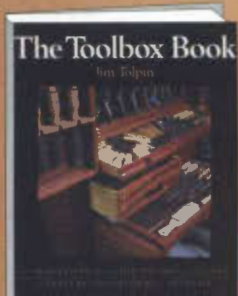
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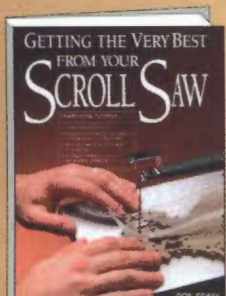
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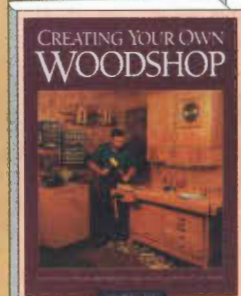
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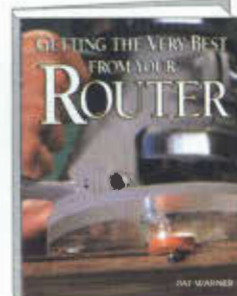
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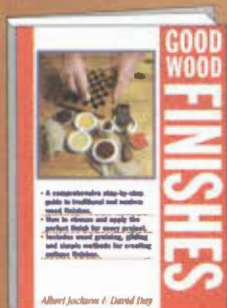
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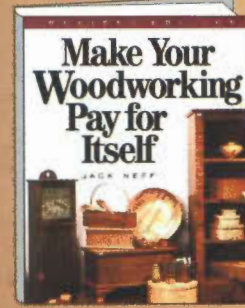
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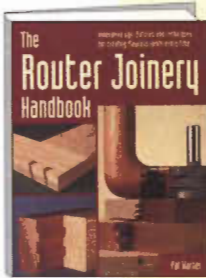
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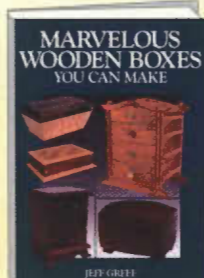
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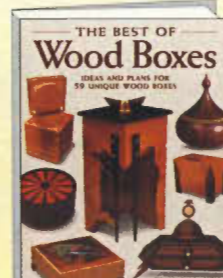
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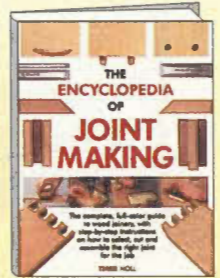
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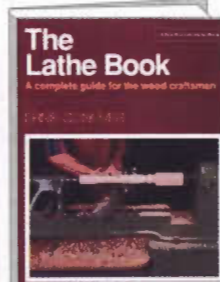
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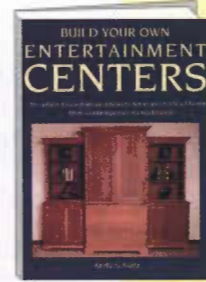
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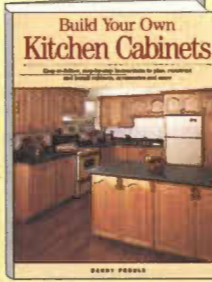
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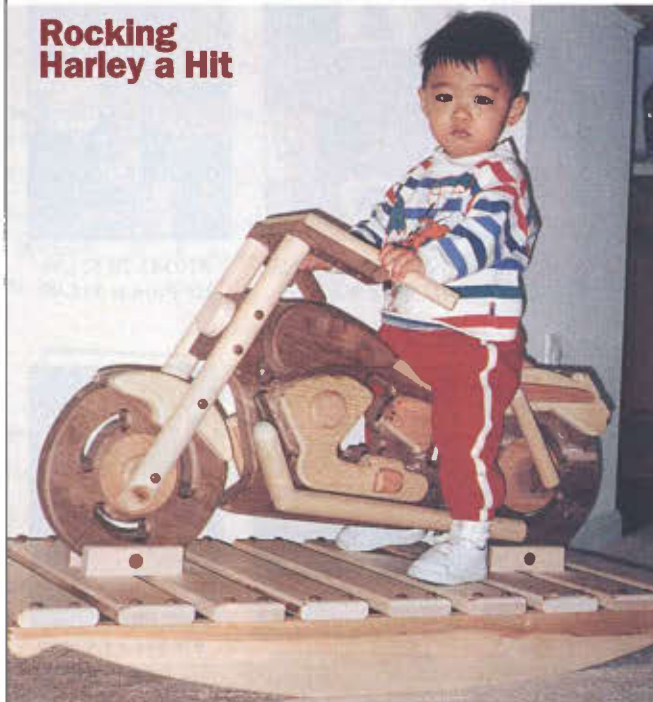
INFEED/OUTFEED

From the PW Mailbag . . .

We welcome your comments about *PW* or anything related to woodworking. We'd also like to see color pictures of what you're building. Send your input to: Infeed/Outfeed, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. Our e-mail address is: popwood@fwpubs.com. Letters may be edited for publication.

— Steve Shanesy, editor, *PW*

Rocking Harley a Hit



My first experience in woodworking began about three years ago when a colleague of mine told me about a local woodworkers' club that was opening about five miles from my house. Having always had a fascination for working with tools, I was hooked on woodworking from the start of enrolling in the "Fundamentals of Woodworking" class. Over the past three years I've taken great pleasure in learning to work wood to make furniture for my wife and our new home. But the real joy in woodworking for me is making toys.

I've made gumball machines and Christmas nutcrackers for family and friends, as well as participated in our club's Christmas toy-making drive for local underprivileged children. So, when I saw the "Rocking Harley" that you featured in your November 1997 issue (#99), I knew I had to make it as a gift for my son's first birthday. Not only was the rocking motorcycle a big hit with my son, but it was a hit with all the other children and adults who attended the party.

Here's one of my favorite pictures of my son, riding the motorcycle you helped me build for him. Thank you so much for the interesting articles and great project ideas.

George Louie
Kingstowne, Virginia
Continued on page 12

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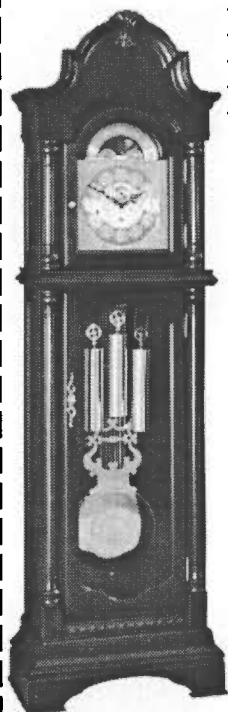
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12 Popular Woodworking

INFEED/OUTFEED

Continued from page 10

"Made in America" is the Only Way

I have to agree with the views expressed by John Gascoyne and Ira Falk in your July issue (#103) about the use of foreign tools. My first table saw was a low-end (price-wise) belt-driven 8" unit that was built in Taiwan. It lacked sufficient power to do what I wanted to do and was a total pain to change blades on.

Yes, we might pay a few dollars more for an American-made tool, but the quality, power and useful life will be the reward. If you want tools that are "made" by a company that is interested only in its bottom line, then by all means go out and buy foreign and watch some fellow American's job disappear.

Al Pilger

Baltimore, Maryland

Editor's Note: Any company that's not interested in its bottom line won't be around long enough to order a replacement part from, so I'd be careful about that, too. Foreign- or American-made, "buyer beware" is still the rule to follow. It's always important to evaluate price vs. quality, then weigh your conclusion against your expectations. Mr. Pilger says the low-price table saw he bought didn't have enough power. Hey, my Taiwan-made benchtop saw I use for "Little Shop That Could" projects has limitations, to be sure. But it gets the job done, and for the \$169 it cost, it exceeds my expectations. There are good companies (many of them in the United States) that are doing a fine job with their imports. Others are not. It's up to the buyer to do the homework (reading woodworking magazines is one way) before opening the checkbook. —Steve Shanesy, editor

Thanks for the Glue and Finishing Tips

Two of the articles in the July 1998 issue (#103) are unusually well done. They are the articles about polyurethane glue and how to choose the best finish.

Entry-level woodworkers should be able to understand them easily. They are concise but have more appropriate information than most articles.

It took me several years to understand the concepts presented in the finishing article, mainly because most articles focus on only one finish. Books generally don't emphasize that shellac is the preferred finish unless the nature of the work requires a different finish. For example, a bar top needs something other than shellac. I hope you continue to publish articles of similar character.

Harold A. Hubbard

Berkeley, California

Two Thumbs Up for Finishing Article

Your article on finishing in the current issue is just great. I sure hope your readers take the time to read and absorb it. I brag to everyone about your work in *Popular Woodworking*. Together, maybe we can make a difference.

Bob Flexner

Norman, Oklahoma



Finished Product

Enclosed is a photo of a table I built from your March 1998 issue (#101).

Frank Liberti

Locust Grove, Virginia

Continued on page 14



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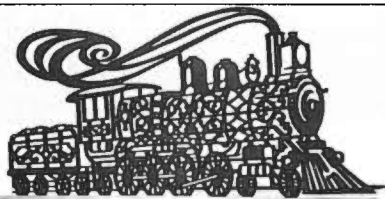
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GREETINGS

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14 Popular Woodworking

INFEEED/OUTFEED

Continued from page 12

Building Furniture for Eisenhower

The article on the last page of your July magazine (#103), "Duck Tales: How woodcarving got me through the Navy," was much enjoyed.

In 1952-53 I was in North Korea with a signal company. I made myself a pipe rack and finished it off with boot polish. Our section leader, a sergeant, wanted me to make him one. He became a real pest. I did not want to make another one.

Then one day we were told that Dwight D. Eisenhower was going to inspect our area. Wow! Now, until that time, the switchboard operators, wire chiefs, teletype operators etc. took their breaks and doze time sitting on the floor of, or under, the switchboard van. The powers-that-be decided that for the big "visit," we had to have a "break" room. A tent was set up, and I was selected with two pals to build adirondack chairs, a table and two bookcases. I think my fellow pipe smoker got me into this detail.

It all came out very well. We had Red Cross books and magazines. Boy were we happy. But then, the big day came and went. Ike did not appear. Our furniture went to an officers club. The books and magazines vanished, and the tent left in time. Back to breaks on the floor. When I left Korea, I left my pipe rack to my pipe-smoking sergeant. It was Colonial in style. He loved it.

John G. Schurer
Mt. Laurel, New Jersey

Magazine Should Stick to Woodworking

Like any professional military man I usually shrug off the long, boring anti-military stories that drunks at parties tend to tell about their own short-term service experiences. But I was surprised to find such a tale in your July 1998 issue. It was called "Duck Tales" and had nothing to do with woodworking, the ostensible focus of your magazine. The sum total of the story was that an ornithologist sailor crammed a bunch of disease-killed ducks into a food refrigerator and was discovered by a surprised inspecting party.

On this flimsy framework, author Andrew Schultz hung a number of misstatements and insulting generalizations, apparently to vent his spleen about his service experience. He refers to the "underclass" of the military, by which he obviously means enlisted personnel. In 31 years as an enlisted man and officer in the military, I never heard anyone use the term "underclass" or met anyone who would have considered it appropriate. Schultz states that this "underclass" was filled with "perfectly patriotic Americans who were dubious about Vietnam," which conveniently disregards those who had no such doubts.

Mr. Schultz labels the inspectors as "two spit-and-polish sorts," "Napoleons" whom he gratuitously labels Tweedledum and Tweedledee. He indicates that he and his friend were in their own quarters when the inspectors "burst" (walked, perhaps?) through the door. He claims that such rooms were to be kept spotless and the inhabitants "always ready for inspection," which any military person will tell you is not true. Among the misstatements: that the events happened in 1969 "before the lottery system determined your likelihood of service in the military."

And finally, Schultz says that the inspectors were so nonplused at seeing the ducks that "John and I were never inspected again." If you believe that, I have a bridge...

As I said, I usually shrug off these self-serving "recollections" by discontented former servicemen, but it annoys me to find them in a woodworking magazine for which I have paid good money. Did your editors simply publish Schultz's non-woodworking story because *Popular Woodworking* is printing one of his books, or do they share his contempt for the military? Would you care to respond – in print? PW

Richard W. Smith
Annapolis, Maryland

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Jointing with Accuracy

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IF YOU STUDY the owner's manual of your jointer, as you should, you'll find a statement that says something like, "This machine has been checked at the factory for accurate results, but..."

That "but" is something to heed because a lot can happen between the statement and setting up the tool in your shop. What causes your tool to become misaligned during shipment isn't important; being sure the machine will work with you, is.

Checking

The horizontal plane of the outfeed table must be tangential to the cutting circle of the knives (**Diagram 1**). Check for accuracy by placing a straightedge on the table so it extends over the cutterhead. Rotate the cutterhead by hand (tool unplugged) and determine if each knife just barely touches the straightedge. Because the knives must also be parallel to the tables, make the check at each end of the knives. Jointer designs differ, so refer to the owner's manual for instructions concerning adjustments that might be necessary. We'll talk more about this phase of jointer maintenance when we address knife sharpening. Anyway, you'll know as soon as you start working whether the relationship is correct. Work should pass smoothly over the cutterhead and firmly onto the rear table. This will not

R.J. DeCristoforo is the author of more than 30 woodworking books and a member of this magazine's editorial advisory board. His latest book, "The Master Jig Book," will be published in spring 1999 by Popular Woodworking Books.



Edge jointing is a primary jointer function. Position yourself and your hands so you can make the pass smoothly from start to finish. Several light cuts are usually better than a single heavy one.

happen if the knives are too high or too low (**Diagram 1**).

The Fence

The angle between the fence and the tables must be 90 degrees when the fence

is locked at its "0" setting. Check the angle with a square or a draftsman's template and, if necessary, make a correction by adjusting the setting's auto-stop. Repeat the procedure with the fence tilted to 45 degrees. There might also

Diagram 1
Alignment

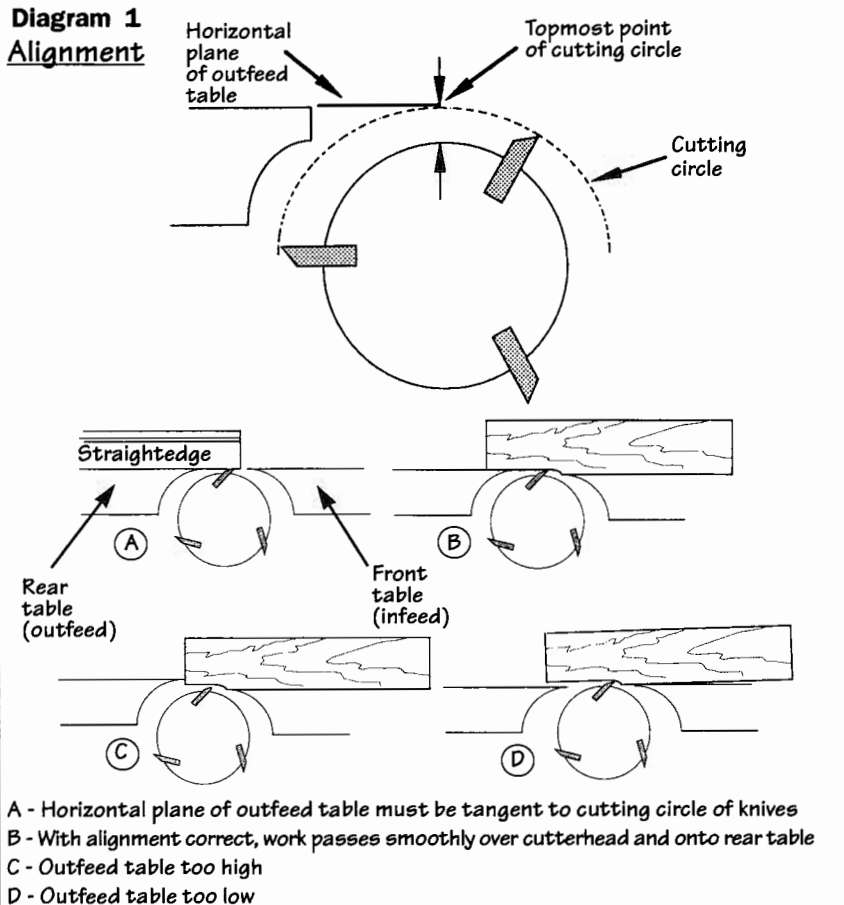
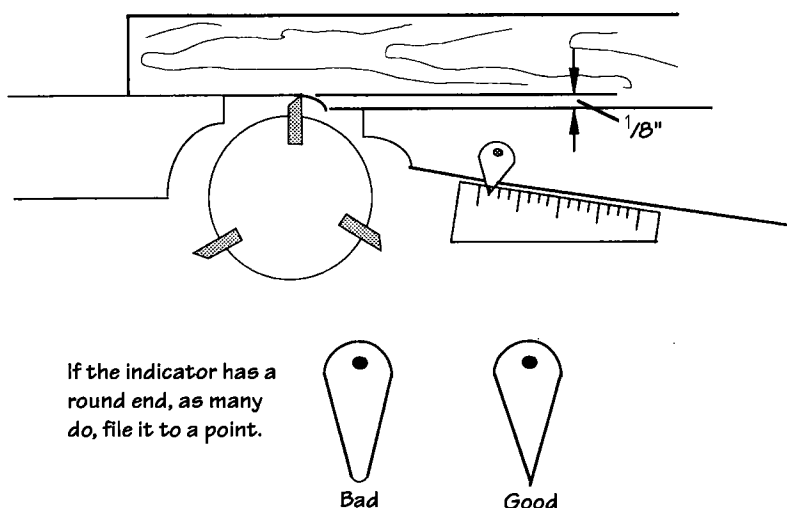


Diagram 2 Setting a Depth Gauge



eration done on the jointer. Use both hands to hold the work firmly down on the infeed table and snug against the fence. As the cut progresses, move your left hand to keep the work down on the outfeed table while your right hand merely moves the work forward.

Some operators object to passing either hand over the cutterhead, but this can result in some awkward positions, especially on long pieces of work. Actually, there is little danger involved in ignoring the advice so long as you stay alert, are sure the guard is working properly, and don't attempt to joint pieces that are too narrow for safe hand positions.

Use a depth-of-cut setting that gets the job done; the less, the better, even if you must make repeat passes to achieve the edge you want. Several light passes are usually better than a single heavy one.

Jointing End Grain

If you joint the end of a board in one pass, it's inevitable that a portion of the

Continued on page 18

be stops at 22½ degrees and/or 30 degrees. Their accuracy can be determined later when you're at work and those angles are called for.

In all cases, final judgment of accuracy is determined by checking actual cuts with a protractor or a square.

its edge and make a partial test cut. When you are sure the cut is correct, adjust the pointer on the depth-of-cut scale to exactly 1/8". If the pointer has a round end, and they usually do, file it to a point (**Diagram 2**). Reestablish this setting anytime the knives are replaced.

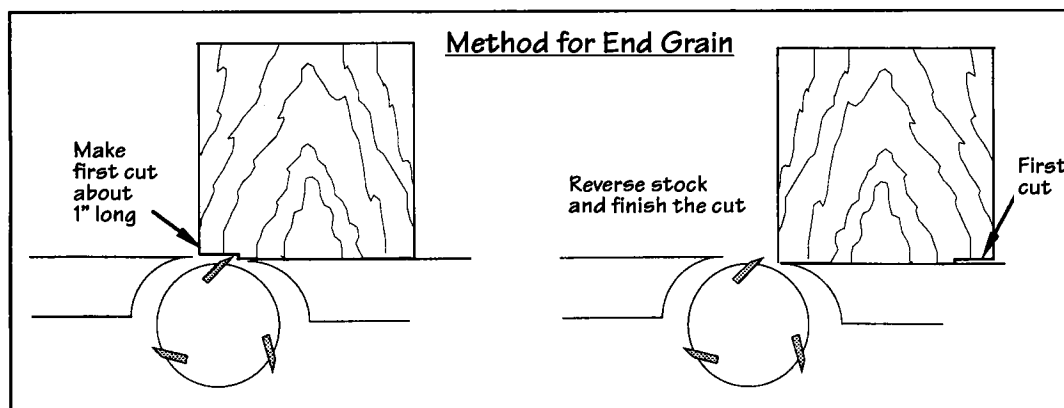
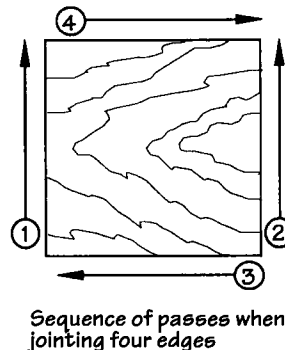
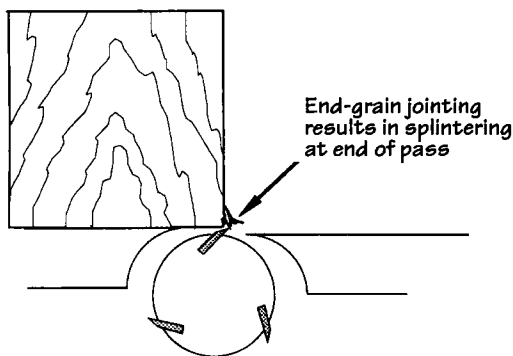
Depth of Cut

Carefully mark a piece of stock 1/8" from

At Work

Edge-jointing is the most common op-

Diagram 3 Jointing Four Edges of a Board



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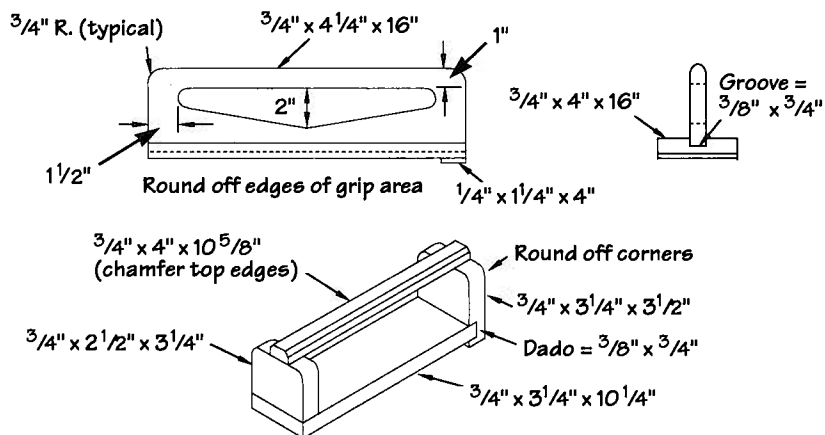


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Diagram 4 Pusher Hold-Downs



Successful surface planing requires that the work be kept flat on the tables throughout the pass. Combination pusher hold-downs help accomplish this while they keep your hands well away from the cutting area. Here, more so than in edge jointing, light cuts are good practice.

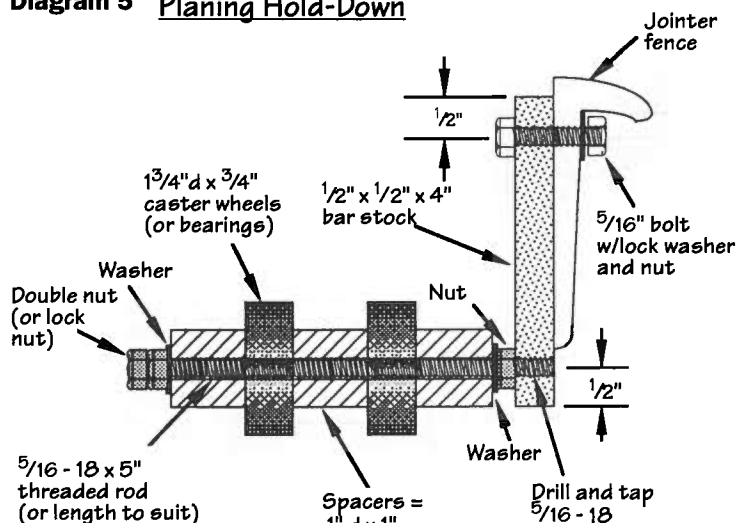


Another way to keep work flat on the tables when doing surfacing. Position the strip of wood so it bears down just enough to maintain the work in proper position. The strip does not interfere with using a pusher.

wood will split off at the end of the pass. Avoid the problem by using a two-pass technique. That is, advance the work over the cutterhead only an inch or so, and then reverse the stock and make a sec-

ond, complete pass (**Diagram 3**). When jointing four edges, follow the sequence of passes that are suggested in the drawing. The idea is that your with-the-grain cuts will remove the imperfections caused

Diagram 5 Planing Hold-Down



by your cross-grain cuts.

If you are working with plywood – and you can if you keep your depth-of-cut to a minimum – judge the grain direction of the surface veneer as if you were working with solid stock.

It's good practice to occasionally move the position of the fence so as not to overuse one area of the knives. Be aware that this exposes the knives behind the fence, which is why I recommend getting a second guard. Most jointers will permit mounting a guard behind the fence so the knives will be covered fore and aft.

Surfacing

Surfacing is usually done to smooth a rough surface or, if you don't have a planer, reduce the stock's thickness. The chore requires more consideration than simple edge jointing or face jointing. For one thing, a lot more material is removed so keep depth-of-cut to a minimum. It's critical to maintain uniform contact with the tables throughout the pass to avoid tapered cuts, gouges, and generally imperfect results. Signs that you are not "on track" are work chatter or an obvious decrease in cutterhead RPM. When these symptoms occur, you are probably cutting too deep or too fast.

Successful surfacing requires a tool that combines a pusher with a hold-down. Such an accessory, which you can make,

Continued on page 20



My custom-designed roller-type hold-down. I use it to keep the work down on the outfeed table when surface planing long stock. Bearings can be used in place of the wheels, which I salvaged from casters.

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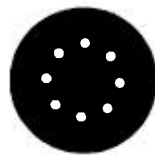
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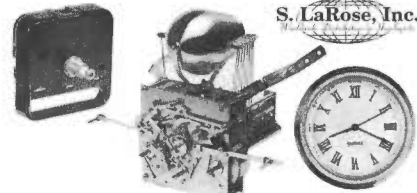
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Diagram 6 Distortions

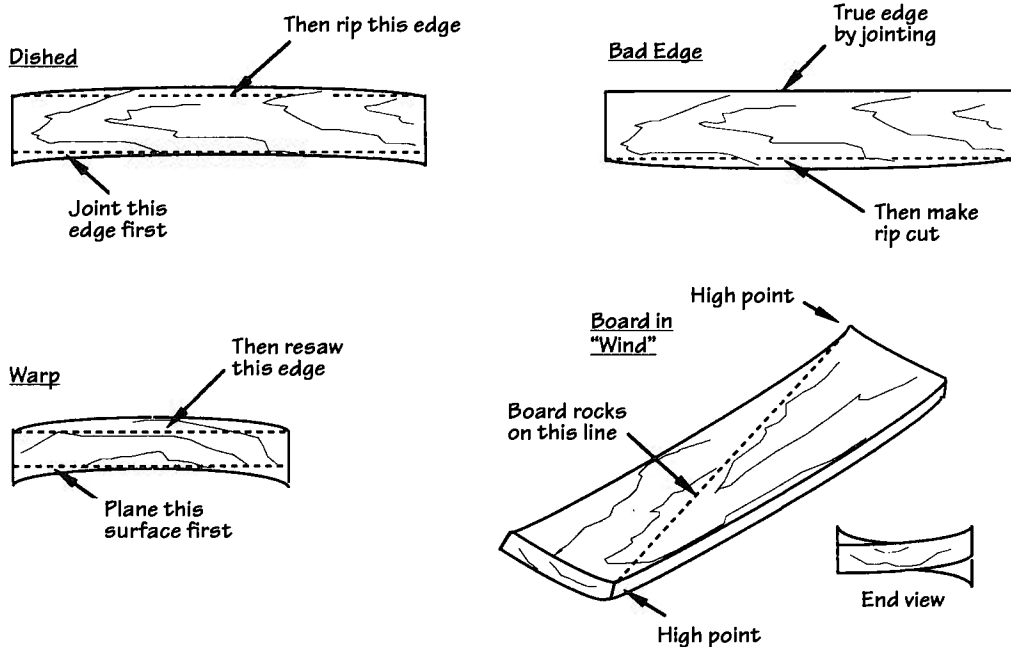
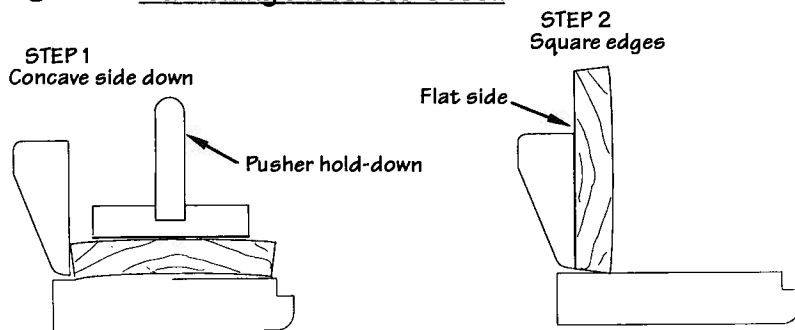


Diagram 7 Flattening Distorted Stock



Flattening Tip

When face jointing a board to flatten it, push from the infeed side and use only slight pressure to hold the board down. Let only the fence of the rotating cutterhead draw the board to the outfeed table. Never artificially "straighten" the board by pressing down, as it will only spring back to its warped shape when released.

does more than help do a good job. It provides an extra degree of safety because it automatically keeps your hands away from the cutterhead.

It's good practice to have a couple of pusher hold-downs available, the major difference between them is in length and grip design (**Diagram 4**). The longer type allows the use of both hands to keep the work in good contact with the jointer tables. Each of them has a 1/4"-thick "cleat" at the pusher end so the tool can't be used on thin material; a good precaution since it isn't wise to surface very thin stock.

In some cases, for example, long work, the pusher hold-downs are not ideal. I have two solutions you might

consider. With one, I place the work on the infeed table and clamp a strip of wood to the fence so it bears down on the workpiece just enough to keep it in contact with the tables.

My second idea is a roller-type hold-down that's secured with a bolt that passes through a custom-drilled hole in the fence over the area of the outfeed table. The unit, made as shown in **Diagram 5**, can be pivoted toward the front or rear of the table. In use, I advance the work just far enough so the hold-down can be locked to bear down on the workpiece enough to keep it flat on the outfeed table.

Distorted Stock

The jointer is most commonly used to

make right a piece of stock that isn't flat or straight (**Diagram 6**), but the machine is not always a cure-all. Sometimes you must resort to combining jointer work with cuts on a band saw or table saw. A "dished" or "cupped" board, one that is not wider than the cutterhead knives, can be flattened by following the steps in **Diagram 7**. Make the first pass, or passes, with the concave side down on the table. When flat the next step is to square an edge by jointing it with the flat face against the fence. The convex surface should be flattened using a planer to ensure you make it parallel to the jointed face. A board with an edge that's dished along its length can be made us-

Continued on page 22

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* Professional Builders Brand Use Study, 1996, 1997.

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CRIS CUTS

Continued from page 20

able by first flattening the concave edge with jointer cuts. This provides a straight edge so the piece can be ripped to width by running the straight edge against the saw's fence. The sawn edge can then be smoothed on the jointer.

Boards "in wind" (twisted along their length) is usually the hardest problem to correct. If the twist is slight, the board might be dressed by flattening one surface on the jointer and then planing the opposite surface. If the twist is extreme, it's better to use the board for shorter pieces that can be flattened.

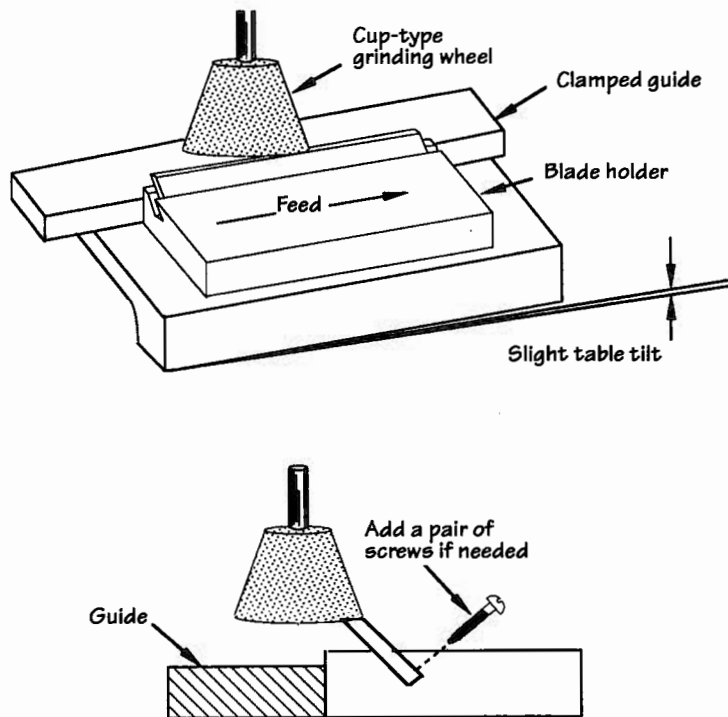
In any case, when salvaging distorted stock, you must accept a reduction in the thickness or width of the piece.

Honing Knives

Frequent, careful honing of the knives will help them keep for a long time. The procedure is to cover part of a fine carborundum stone with paper and place it on the infeed table so it projects over the

Continued on page 24

Diagram 8 Grinding Knives on a Drill Press



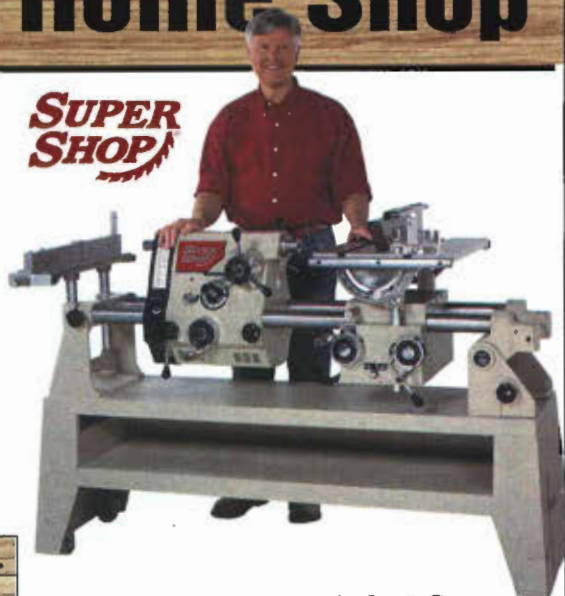
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| #1302 | 1/2" Shank Router | *3-1/2" | \$79.95 |
| #1303 | 1/2" & 3/4" Shaper | 4-5/8" | \$99.95 |

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*Raised Panel Router Bit

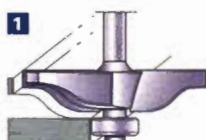


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#1330 1/2" Dia. of Circle.....\$16.00
#1331 3/4" Dia. of Circle.....\$21.00



4 LOCK MITRE BIT
#1433
2" Dia., Stock thickness: 1/2"-3/4".....\$37.50



5 RABBETING KIT
4 depth of cuts: 3/8", 7/16", 5/16", 1/4".
Set: 1/4" shank rabbeting bit, 4 bearings (3/8", 1/2", 5/8", 3/4") & hex key.
#1425 1-1/4" Large Diameter.....\$25.00



6 BRASS PILOTED
Rout into tight spaces and sharp corners. These bits have Brass Pilots, measuring only 5/32" in dia., instead of usual 1/2" bearing.
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#1429 1/4" R Round Over.....\$17.00
#1430 3/8" R Round Over.....\$19.00

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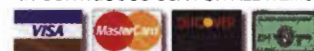
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Continued from page 22

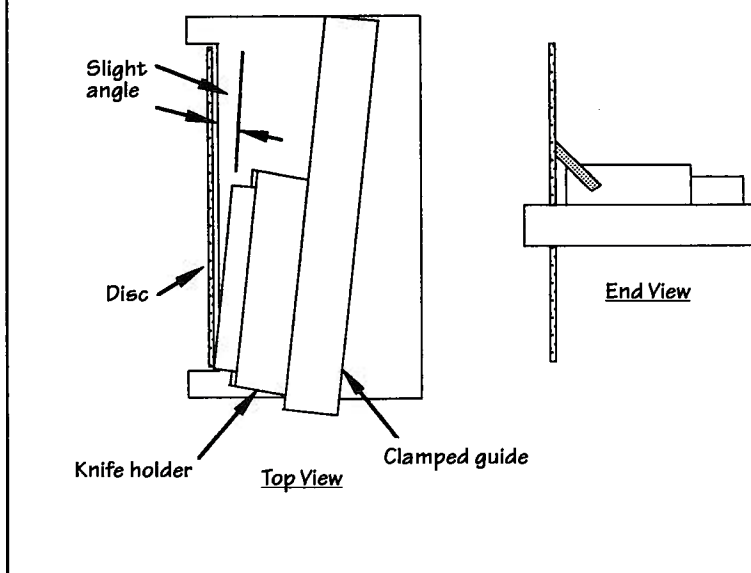
cutterhead. Raise the table and rotate the cutter head BY HAND until the stone rests flat on the bevel of the knife. Stroke the knife lengthwise four or five times. Repeat the chore on each of the knives.

Grinding Knives

When knives have been nicked or are beyond sharpening by honing, the cutting bevel must be reground. The work can be accomplished fairly easily on a drill press or disc sander (**Diagrams 8 and 9**). In each case you need a holder that has a groove that will hold the knife firmly and at the correct angle. When necessary, a strip of paper or screws can be used to secure the knife. Always be sure each knife is bedded in the groove.

Work with a fine-grit cup-type grinding wheel on the drill press. Position the guide strip so only the edge of the grinding wheel is used. Lock the quill so the grinder makes very light contact with the knife. Note that the drill press table is tilted at a slight angle, which provides further insurance that only the edge of the cup will contact the knife.

Diagram 9 Grinding Knives on a Disc Sander



The blade/holder arrangement is moved from left to right and lifted from the table at the end of the pass. If necessary, repeat the procedure after lowering the quill a fraction. Make the first pass on each knife before making any change. Always wear safety goggles.

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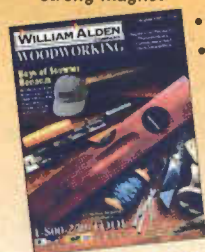
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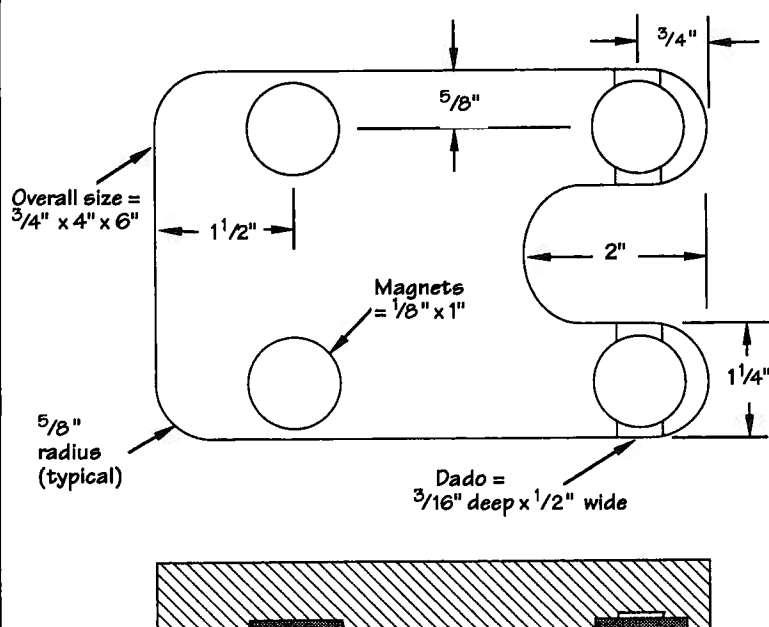
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Diagram 10 Magnetic Knife Resetting Jig



My magnetic knife-resetting jig stays flat on the outfeed table while holding the knife at the correct height. Note the straight-edge. It's there so I can set the knives lengthwise to conform with the rabbeting ledge.

Sources for Rare Earth Magnets

- Lee Valley 800-871-8158
- Woodcraft 800-225-1153

The procedure for doing the job on a disc sander is much the same. The guide strip is clamped so there is a slight angle between the forward edge of the disc and the knife. Make the setup so there is light contact between the disc and the knife. The pass is from right to left and is repeated, if necessary, after repositioning the guide strip.

After grinding, be sure to remove the burr from the edge by drawing the flat side of the knife over an oil stone.

Resetting the Knives

While methods of securing knives in the cutterhead differ, all have one thing in common – the height of the knives must relate correctly to the plane of the table. This can be accomplished by using a

straightedge as a guide, but it can be awkward. That's why I made and use the magnetic holder shown in the photo.

The holder is hardwood with flat-bottom holes that were formed with a Forstner bit. The holes contain flush-set, 1/8"-thick x 1" diameter button magnets that keep the jig on the table while holding the knives at the correct height.

Shape the jig along the lines shown in **Diagram 10**. Then form the holes 1/8" deep and shape the dado along the center of the forward holes. Use a drop of epoxy to secure the magnets. I obtained the magnets in a hobby shop. If this doesn't work for you, a source of supply is, Magnet Sales & Mfg. Co., 11248 Playa Court, Culver City, CA 90230 (800-421-6692). **PW**

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Peasant Chair

A wooden peasant chair with a Celtic knot backrest and a sword leaning against it. The chair is made of light-colored wood and has a simple, sturdy design. The backrest features a large, intricate Celtic knot pattern. A sword with a dark blade and a metal hilt is leaning against the chair. The chair is set on a stone path with ivy in the background.

Here's an easy way to cut your teeth on chair building without taking a bite out of your schedule.

Like many woodworkers, I am a closet chair -o-phobe. I'm fascinated by the old styles but have always been intimidated by the joinery and compound angles.

The peasant chair shown here is a German chair with obvious Celtic influences. (Considering the Celts originated in Europe, this isn't too much of a stretch.) It has ancestral links to the Windsor style and dates from the early 18th century. Style aside, it's remarkably easy to build, and that's why I chose it.

Construction didn't involve much complex joinery. But I've done a lot of the hard work for you. I used the computer software that I use for our magazine's illustrations to draw the chair in three dimensions. So, before I even cut the first board, I felt comfortable with the dimensions of the chair. Still, I made a particleboard seat and tried my legs and back on it for size — I had to see it for myself before I cut up a bunch of nice oak.

*By Jim Stuard, associate editor,
Popular Woodworking*

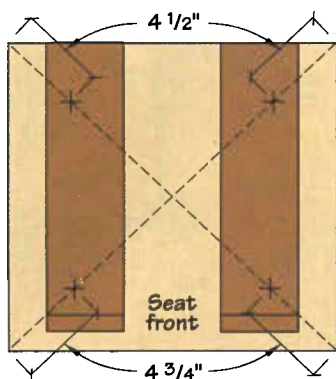
Schedule of Materials: Peasant Chair

| No. | Item | Dimensions T W L | Material |
|-----|---------|-----------------------|----------|
| 1 | Seat | 1" x 16" x 17" | Oak |
| 4 | Legs | 1 1/2" x 1 1/2" x 18" | Oak |
| 2 | Battens | 1" x 4" x 15" | Oak |
| 1 | Back | 3/4" x 13" x 18" | Oak |

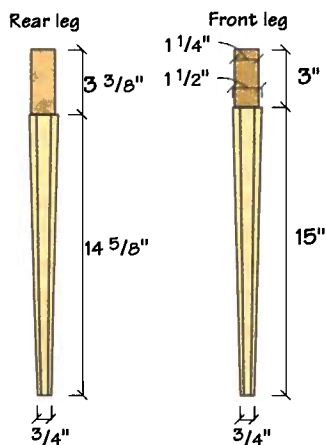


Are we on target?

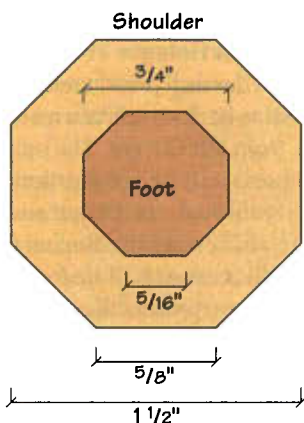
To see more projects like this in future issues, circle "P9" on the postage-paid card in the Resource Directory.



Plan of hole drilling layout

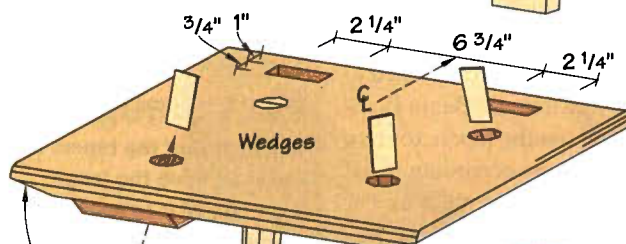
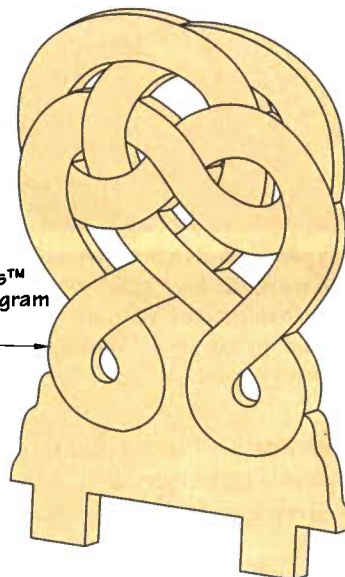


Elevation of legs



Full-size diagram of leg taper layout

See PullOut Plans™ for a full-size diagram of the back.



Front legs are drilled at 12° to seat corner.

Hand saw kerf cut into 1 1/4\"/>

Back legs are drilled at 15° to seat corner.

PEASANT CHAIR



1 PLANE • Clamp the leg in a vise and plane the tapered surfaces flat, then mark the legs again for the octagonal tapers according to the diagram. With the legs again clamped in the vise, plane to the second taper to finish shaping the legs as shown above.



2 DRILL THE SEAT • Clamp the seat upside-down with the diagonal layout line oriented roughly perpendicular to an imaginary line running from the drill bit to the drill press post. If you are using a press that angles front to back, orient the layout line *with* the imaginary line.

STEP 1 “Roughing” the Parts • Peasant chairs were crude affairs, usually made by farmers in the winter, after their harvest. They used crude tools and methods, and the results reflected this.

Start by cutting out the parts according to the Schedule of Materials. While the seat, back and battens can be of figured wood, the legs need to be straight-grained for strength. Begin shaping the legs by laying out the tapers for two front legs and two back legs according to the diagram. The shorter measurement on the back legs will make the seat sit at a comfortable angle.

Now comes the fun part — getting a round tenon on a square leg. Each leg will have about 3" of a 1 1/4" round tenon at the top. I tried forming this tenon with a drawknife and chisels on one leg to see if it could be done. It is painstaking work that is done better in much less time on the lathe. After turning the leg tenons, cut the first tapers on the legs using a band saw. This leaves you with a tapered, four-sided leg with a round tenon. Next, clamp the legs in a vise and shape the legs with a bench plane. You could make all of these taper cuts on a jointer or a table saw, but it sure feels good to kick up some shavings in a nice quiet shop and get a feel for how our woodworking ancestors did things.

Next up is making the two battens. After cutting the pieces to size, cut a 30-degree angle on one end of each batten. The angled end will face forward and serves to lighten the look of the seat assembly. For now, lay the battens cross grain to the seat bottom, two inches in from the ends, and temporarily clamp them in place. With the battens in place, lay out the leg hole and back mortise locations according to the seat detail in the diagrams. Draw a diagonal line from each corner across

the middle, then measure in from the outside corners approximately 4 3/4" for the front legs and 4 1/2" for the back and mark the leg locations.

Mark the batten locations on the seat, then remove them and drill oversized pilot holes for six #12 x 1 1/2" flathead screws in each batten, avoiding the areas where legs will be. The oversized pilot holes will allow for wood movement. Attach the battens (with the batten ends flush to the back), applying a little glue to the center of each batten only. This allows the seat to move from the center out.

Now the seat edges can be profiled. Rout a 1/2" quarter-round profile on the sides and front of the seat. Cut an angle according to the diagram on the underside of the seat sides on the table saw. Using a block plane and rasp, blend all of these profiled edges together.

Don't pitch that wedge!

When cutting the tapers on the legs, keep the falloff. You can use it to wedge the tenons in the seats when you assemble the chair.

STEP 2 The Right Angle on Holes • To drill the holes for the front legs, set your drill press' table to a 12-degree angle. Our drill tilts front to back — unlike a machinist's style drill press, which tilts from left to right. The only difference on a machinist's drill press will be how the seat is oriented. Drill a hole completely through the batten and seat into a backer board with a 1 1/4" Forstner bit. Repeat for the other front leg, then set the drill press to a 15-degree angle for the back legs and repeat the above process. Keep in mind that accuracy isn't absolutely necessary, but it helps. The legs can be adjusted at the feet to get the seat level after assembly.

STEP 3 Drilling Mortises • Finish the seat by drilling out the 3/4" x 2 1/2" mortises for the back tenons according to the diagram. They are set at 7-degree angles, 1" in from the



3 SQUARE THE MORTISES • Use a chisel to clean up and square out the through-mortises for the back tenons.

Leave some for later

Cutting the tenons to leave a predetermined amount is easy using a small piece of cardboard to hold the saw blade up from the chair seat. Cut a 1½" hole in the cardboard and place it over the tenon. Lay the saw flat to the cardboard and simply cut through. What's left of the tenon will be the height of the cardboard thickness.

back edge of the seat. Cut the mortises completely through the seat and battens. After drilling, use a chisel to clean up the mortises and square them up.

STEP 4 Scrolling the Back • The back is a simple affair that has a scrollsawn pattern with low relief carving. Begin by attaching the pattern supplied in the PullOut™ Plans to the back using rubber cement. Scroll saw the waste areas from the back and band saw the outside edge of the pattern. Clean up the rough edges of the cuts with a rasp and sandpaper.

Next, cut the tenons on the bottom of the back and fit them into the through mortises in the seat. When fit, cut a 7-degree angle on the bottom edge of the back that contacts the seat using a small trim saw or jigsaw. It doesn't have to be perfect, just enough to make the back-to-seat joint less noticeable.

STEP 5 Carve the Knot • The Celtic knot is simply a low-relief carving that can be done with a chisel (see photo). After carving, the last task is to assemble the seat, legs and back. Take the legs and place them into the seat. Trim the tenons to 1/8" above the seat, then remove the legs and move over to your bench vise. Using a European-style back saw, cut a kerf into the end of each tenon at about a 30-degree angle off the grain orientation at the top of the leg to help prevent splitting. Apply glue to the tenons and re-insert them into the seat so the kerf is at an angle to the grain of the seat. Drive a wedge (made from the scraps left from the leg tapers) with



PEASANT CHAIR

4 BACK PATTERN • Drill small holes into the waste areas of the back for your scroll saw's blade.



5 CARVE • Start by cutting straight down at the lines of the knot under-cut. Then, with the chisel slightly angled off of the back, cut the waste out of the way. Finish the cut by smoothing the edge of the overlapping curve. With a little practice the back will be ready in no time.

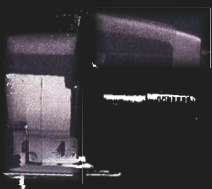
some glue into the kerf. Tap it in good and snug but not enough to split the seat. Clean up the excess glue on the tenon and cut the wedge flush with the tenon end.

Using 80-grit paper in a random orbit sander, sand down the tenon ends until there is a small bump with the edges of the tenon flush with the seat. This gives an authentic look. The seats on the antique chairs were not glued, they just rested in their mortises. This might have been done in order to store the chair more easily.

After finish sanding, apply a generous coat of glaze and let it dry. Apply three coats of paste wax, then take a break on your new chair and be glad you're not a peasant. Because with their tools, this chair would have taken a lot longer to build. **PW**



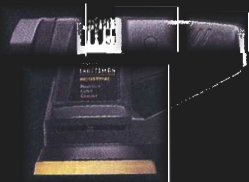
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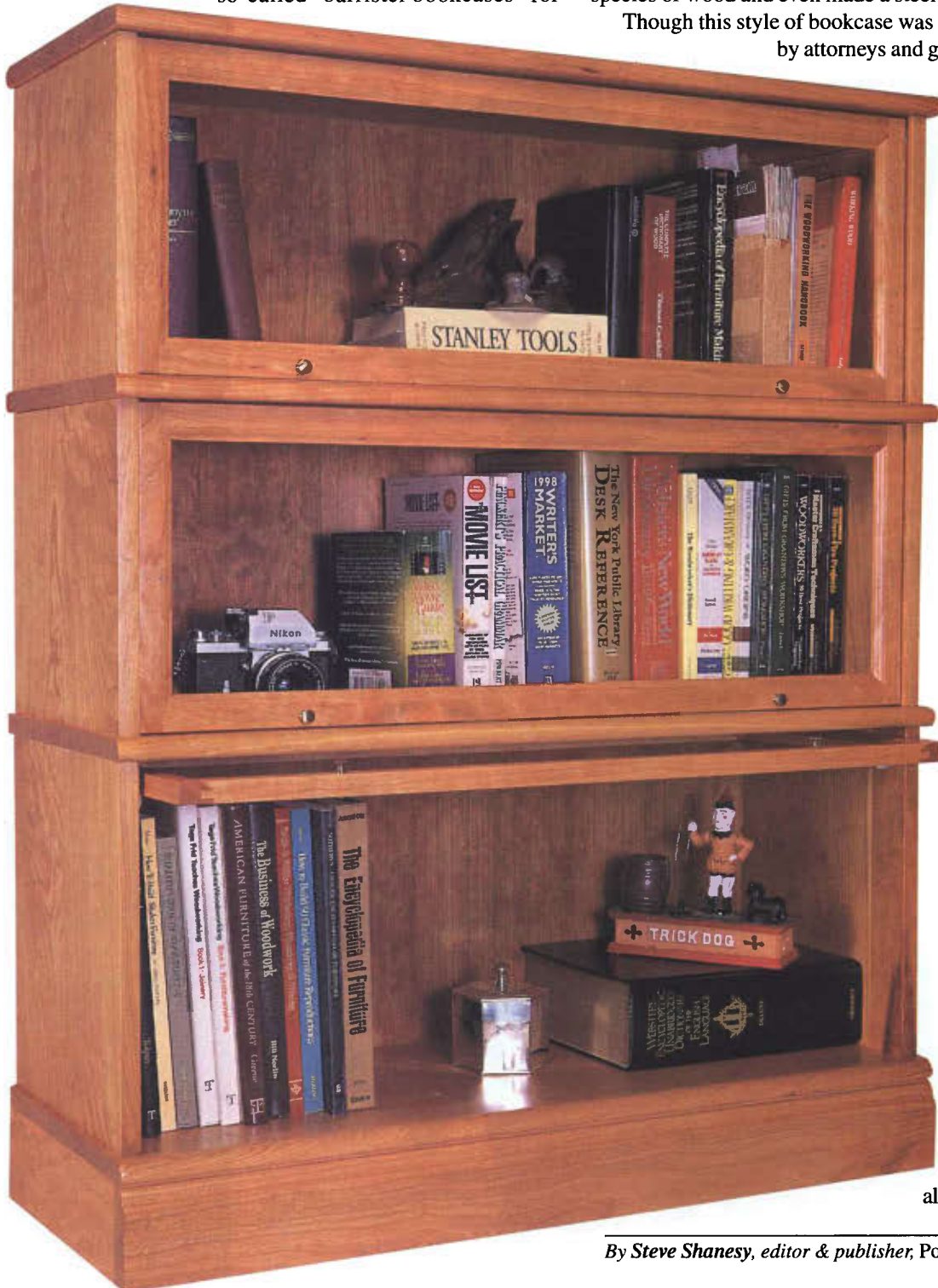
lawyers and bureaucrats across the nation. Many were made of oak, but the company also made them from other species of wood and even made a steel version.

Though this style of bookcase was first used exclusively by attorneys and government-types, the

stackable units are now extremely popular (and pricey) in antique stores. And no wonder. You can use them to store just about anything anywhere. While most people use them for books or their favorite collectibles, I know one person who uses them in her bathroom for toiletries.

I designed these bookcases so you can make any number of units that can be stacked on top of one another and side-by-side as well. And there's a complete economy of material use because the top of one also serves as bottom of the case above it. In constructing the three cases shown, I used two different heights for the boxes. The shorter one accommodates books that are 9" tall or less; the larger case accepts books up to 13" tall.

Other than the extra time and the expense of more material, it makes a lot of sense to make several boxes because the set-



By Steve Shanesy, editor & publisher, Popular Woodworking

ups to build the boxes are perfect for the “short production run” approach to building. That means setting up the machine — in this case a router in a table and a drill press — then running the parts. Because it can take longer to accurately set up the machine than run a part or two, running a few more parts makes real sense. Remember that accuracy is the key to the project because each unit has to be able to mate with all the other units.

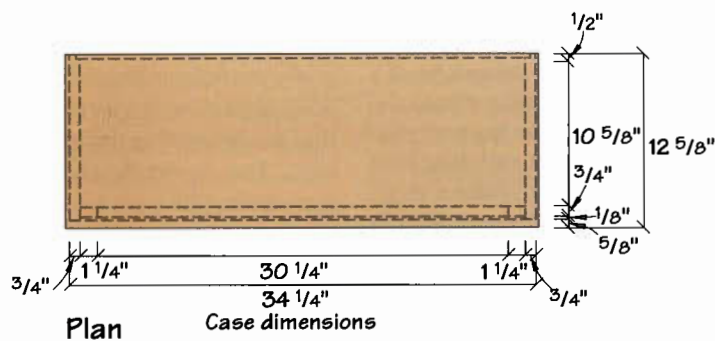
After you’ve determined the quantity and size of the cases you want to build, prepare enough wood to glue into the panels you need. Glue up your panels, then sand the joints flush, making sure to keep all the panels the same thickness. Cut the panels to the finished sizes indicated in the Schedule of Materials.

Schedule of Materials: Barrister Bookcase (tall unit)

| No. | Item | Dimensions T W L | Material |
|-----|---------------|----------------------------|----------|
| 1 | Top or bottom | 3/4" x 12 5/8" x 34 1/4" | Cherry |
| 2 | Sides | 3/4" x 12" x 13 1/4"* | Cherry |
| 1 | Back | 1/2" x 33 1/4" x 13 3/4"* | Cherry |
| 2 | Door rails | 3/4" x 1 1/4" x 30 3/8" | Cherry |
| 2 | Door stiles | 3/4" x 1 1/4" x 13 1/16"* | Cherry |
| 1 | Base front | 1" x 3 1/2" x 34 3/16" | Cherry |
| 2 | Base sides | 3/4" x 3 1/2" x 11 7/8" | Cherry |
| 1 | Base back | 3/4" x 3" x 32 11/16" | Plywood |
| 1 | Glass | 1/8" x 12 1/4"* x 30 5/16" | |
| | Glass stops | 3/8" x 7/16" x 8 ft. | Cherry |

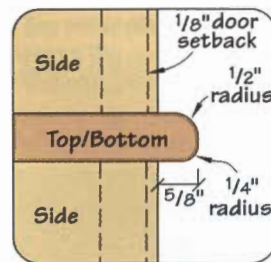
*Subtract 2" for shorter unit.

Diagrams

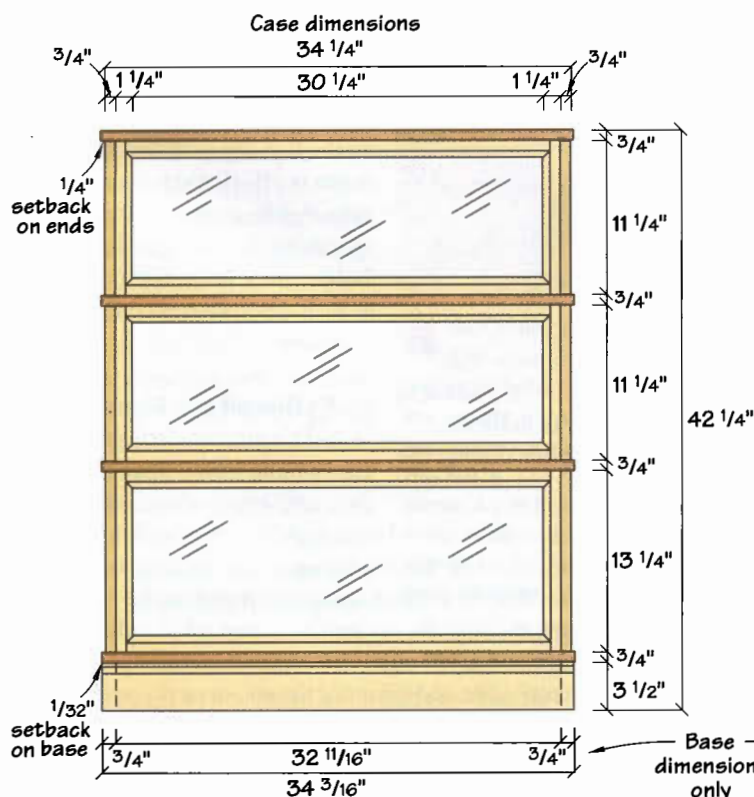


Are we on target?

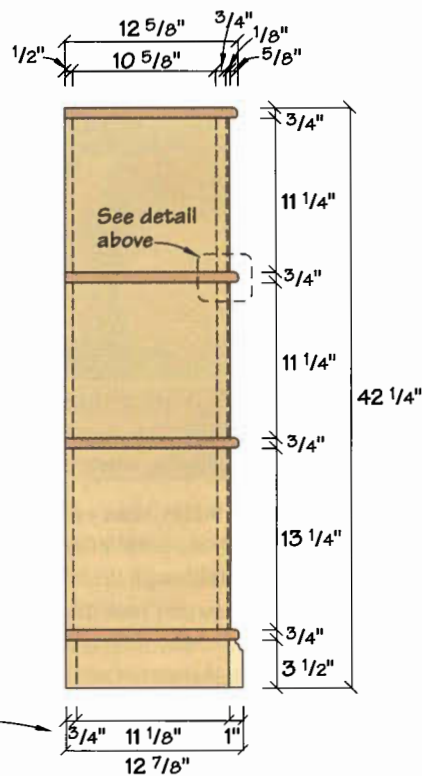
To see more projects like this in future issues, circle "P2" on the postage-paid card in the Resource Directory.



Detail of shelf edge radius



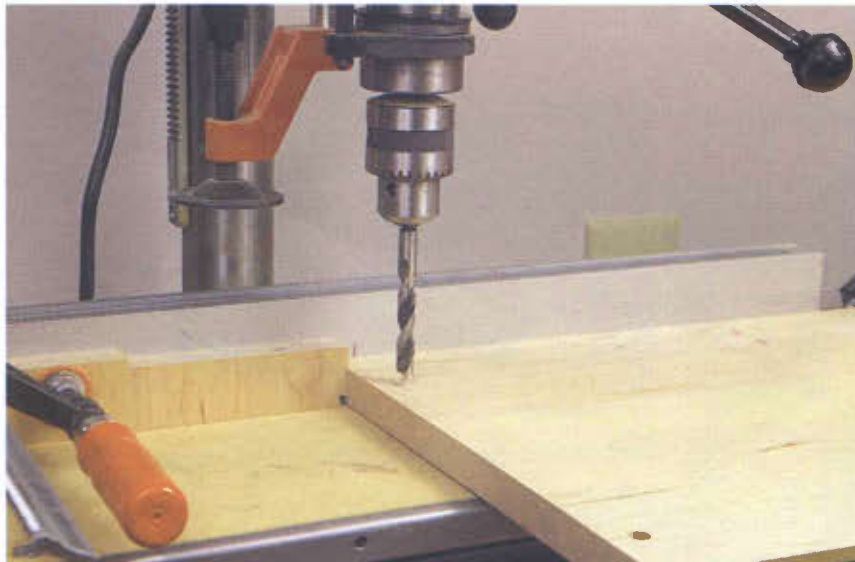
Elevation



Profile



1 DOOR SLIDE • With a $\frac{1}{2}$ " straight bit set in a router and mounted in a router table, set the height of the cutter to make a $\frac{3}{8}$ "-deep cut. Now set up a fence on the router table so that the cut starts $\frac{5}{8}$ " from the edge (see PullOut Plans). Next set a stop on the fence so that the cut you make stops $\frac{3}{8}$ " from the front edge of the sides. (Remember that you will have to change the stop when switching from right to left sides.) Because the peg used is $\frac{1}{2}$ " thick, you'll need to create a very slight amount of clearance, say $\frac{1}{32}$ ", so that the peg moves easily through the dado. Do this by adjusting the fence away from the cutter. Then rerun the parts.



2 THESE HOLES HOLD IT TOGETHER • If you want your cases to mate correctly, accuracy is key. Use stop blocks on your drill press when drilling the bottom and use a doweling jig when drilling holes on the sides.

STEP 1 Mill the Cases • The joinery for the cases is straightforward. The plywood back is captured in a rabbet made on the sides and bottom (although the bottom rabbet is stopped $\frac{1}{2}$ " from both ends so you can't see it from the outside). Then the bottom is biscuited to the sides. The cases stack on one another using dowels in the tops of each case and holes on the bottom. Begin construction by chucking a straight bit in a router mounted to a table and make the $\frac{1}{2}$ " x $\frac{1}{2}$ " rabbets in the sides and bottoms.

Now it's time to do some additional routing to make the groove in the sides for the sliding doors and some hole drilling.

While you can purchase special slides for barrister bookcases, my homemade method is cheaper, works just as well and is almost as easy as installing slides. Each of these steps requires real accuracy, and you must pay attention to which parts are for the right and left sides, fronts and backs, tops and bottoms. The best way to keep this straight is to organize your parts by type, then stack them so they are oriented the way you want them. Marking them with a pencil adds another measure of insurance.

Begin by routing the stopped dados in the case sides that make up part of the sliding door mechanism (the other part of the mechanism is simply a peg inserted into the edge of the door).

STEP 2 Make Perfect Holes • Now drill the holes in the case bottoms. These holes are used to receive the indexing pins that are inserted in the top edges of the sides. This interlocking quality keeps the cases from sliding while stacked atop one another and holds the sides in position. Remember that the holes are drilled in the bottom piece and line up with each case's sides. Set up the drill press with a $\frac{3}{8}$ " diameter bit, using the fence and a stop block, and drill the holes as indicated in the PullOut™ Plans to a depth of $\frac{3}{8}$ ". Bear in mind that the holes are a different distance from the front and back edge so the fence set-up must change accordingly.

Now drill the corresponding holes in the top edges of the sides, again to a depth of $\frac{3}{8}$ ". These holes are for the dowel pins. Again, accuracy is key. I used a self-centering doweling jig for drilling these holes. Mark the drilling locations carefully. Refer to the PullOut Plans for drilling locations.

STEP 3 Biscuit the Sides • Next cut the biscuit slots for joining the sides to the bottom. I used three biscuits in each side, a #20 size in the middle and back, and

a #10 in the front. I used the #10 so the slot didn't interfere with the hole drilled in the bottom. The last thing to do before final assembly is to run a roundover detail on the front edge of the bottom. To make my profile, I used a $\frac{1}{2}$ " radius bit on the top edge and a $\frac{1}{4}$ " radius bit on the bottom edge. Again, use the router table and fence for the cut, even if you have router bits with guide bearings on them. You can rely on the bearing for the first cut. But on the second cut the bearing would ride on the previously cut radius, which sweeps away from the edge.

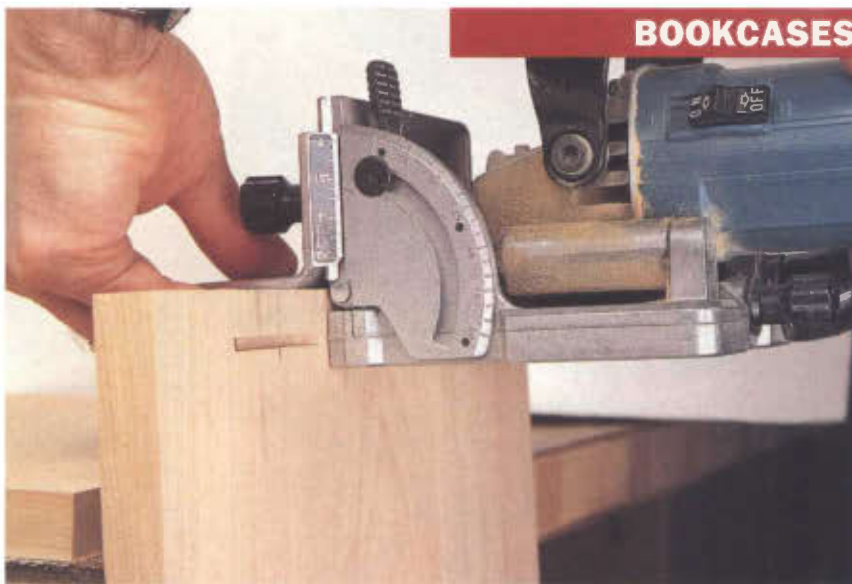
Assemble and glue the sides to the bottoms. I set the case backs in place to help keep the assembly square during the

glue-up. Here's how I glued these up: Put glue on the mating parts and set them in place. Then set the back in and clamp across the back and sides. Next, while making sure the back edge of the side is flush to the back edge of the bottom, clamp the side and bottom from top to bottom. With all the clamps in place, check for square and adjust as needed. Do not attach the backs until after finishing.

Next I made the base of the bookcases. Rout the ogee profile on the top edge of the front piece only before biscuiting and gluing the base together. The sides simply butt to the back side of the front piece, and the plywood back piece butts into the sides. The back piece is narrower than the sides and front so leave some space at the floor for any base moulding on your floors. Attach the back piece flush to the top of the base assembly. I also elected not to attach the base permanently to one of the cases. Instead, I screwed indexing blocks to the case bottom that allow the lower case to nest into the base. This allows you to level the base when you install it and then simply stack the cases on top.

STEP 4 Frame and Panel Doors • The frames for the glass doors were the last chore to tackle before moving on to sanding and finishing. Because I wanted the relatively small doors to have a delicate appearance, I made my stiles and rails just 1 1/4" wide. For a strong corner joint and a pretty detail on the inside edge of the frame, I used a matched stile-and-rail router bit set normally used for frame-and-panel doors. The nice ogee detail I used echoed the detail on the base and complemented the rounded front edge of the case bottoms.

Again, make sure you cut your stiles and rails to the exact length needed using a stop block. This will help ensure you make a frame that's square. Because the router bits are intended to be used with fixed panels, and the glass needs to be removable, it's necessary to cut away part of the edge detail on the back, changing it from a groove to a rabbet. Using a table saw, it's a simple procedure for the rails because you can run the part all the way through. For the stiles, however, you need to make a stopped cut because the piece you leave at the ends is part of the "mortise" joint made by the matching router profiles. Mark the stiles from the ends where you want to stop the cut (it can vary slightly depending on the cutters you use), then mark the table saw's fence at the point where the blade projects above the table when it is set to



3 BISCUITS ARE A GOOD CHOICE • After cutting the slots for the biscuits, assemble the cases. I used polyurethane glue. While not necessary, it does provide a stronger joint because of its ability to provide some glue strength to the end grain/cross grain joint where the sides join the bottom.



4 ROUTING THE DOORS • First run the ogee detail on the inside edges of both the stiles and rails. Set the height of the cutter so that it leaves just a slight bead on the face of the parts, say 1/32". After running the parts, switch to the "coping" cutter and cut the matching opposite detail on the ends of the rails only. Make sure you use a back-up block, also called a coping block, to stabilize the narrow part while running it across the router bit.



the correct height for the cut you're making. While holding the part firmly to the fence, slowly lower it onto the blade with the motor running, then cut the part to the matching lines on both the part and the saw fence.

Now you can glue up the stile and rail assembly, making sure you check for square and adjust as needed. When dry, chisel out the corner of the back of the stile where the waste piece remained from the stop cut you just made.

BOOKCASES



5 A LITTLE JIG MAKES IT EASY • A simple block made to index off the top edge of the side along with a dowel center marks the drilling center for the dowel pivot guide. Use the dowel center's point to insert a $\frac{1}{2}$ " brad point drill point and make the hole. Inset: the dowel, door and slide/groove.



STEP 5 Critical Dowel Location • Check the fit of the doors. You should have a $\frac{1}{16}$ " gap on the sides and bottom and a $\frac{1}{8}$ " gap left for the top (this allows the door to pivot up without touching the piece above it). If the fit is good, drill a $\frac{1}{2}$ " hole in the door's edge that's $\frac{1}{2}$ " deep. Locate the hole in the center of the edge so that the hole centers $\frac{13}{16}$ " down from the top edge. Use your combination square as a marking gauge and a doweling jig for accurate drilling. Drill these holes on both edges of each door. Insert a $\frac{7}{8}$ " length of dowel or other $\frac{1}{2}$ " rod into the door edge (I used a nylon rod). Place the doors in the side grooves of the case (this is easily done with the top open). Bring the doors forward and gently lower them down into position.

STEP 6 Glass Installation and Finishing • The last bit of fussing with the doors is setting the pin below the groove where the doors slide in their grooves. Carefully positioning the pin provides not only the spot where the doors rest when open, but also coaxes them into the proper location at the top when closed. Lastly, cut and fit the $\frac{3}{8}$ " x $\frac{7}{16}$ " strips that will hold the glass in place on the back side of the frames.

Next sand your parts with 120 and 150 grit paper using a random orbit sander. Also make sure no glue was left be-



6 INSTALLING THE GLASS • To install the glass, use wood stops with mitered corners cut to fit in the rabbets. An easy way to hold the stops in place is using $\frac{1}{8}$ " fender washers and screws. Simply screw them into the frame with part of the washer lapping over the stop. I clipped the ones on the door sides so they didn't hit the dowel on which the door rests when slid back into the cabinet.

hind that would splotch a nice finish. For the final finish, I tried something I'd never done before. I added a slight amount of oil-base stain to boiled linseed oil. Linseed oil on cherry brings out the grain of the wood more than a film finish like varnish, shellac or lacquer does. The wee bit of color added (I used about a thimbleful of stain to 10 ounces of oil) gave the new cherry a bit of "maturity," which new cherry always lacks. I tend to think that new cherry without any color added looks anemic. But too much color causes cherry to blotch if applied full strength.

If you choose to use an oil-only finish, apply a couple more coats of boiled linseed oil, making sure you thoroughly wipe off all excess oil after applying. For my bookcases, I allowed the oil to dry overnight then sprayed the pieces with clear lacquer. Brushing on varnish, shellac or polyurethane will work as well. Finally, put your doors back into the cases and screw the backs into the sides and bottom.

When it comes time to set up your barrister bookcases, their modular construction and variety of arrangements should prove a real asset. That is, unless you can't agree with your "significant other" about how they should be arranged. In that case, you might just need a barrister to settle the bookcase dispute. **PW**

Scrap-Pile STOCKING HANGERS

With holiday shopping looming ever closer, we're reminded of one of the best perks of being a woodworker: why buy gifts when you can make them? Well, these stocking hangers make great gifts (and they don't cost an arm and a leg—you can build them from scrap). And if you follow these designs, you can always hang your stocking "by the chimney with care" whether you have a fireplace or not.

The principles that make these stocking hangers work are friction and torque. Friction will keep them from sliding off the mantel, shelf or window sill, and torque allows you to use less weight to hold more stocking. If you keep your hanger at least as large as the overall 3" x 5³/₄" x 9" dimensions and use stock with at least the density of white pine, you can build the hanger in just about any configuration you want. The fireplace hanger pictured here is made from Baltic birch plywood and oak scraps and supports a 20-pound weight.

Keep in mind that the hanger should be placed as far back on the mantel as



possible. This will allow the weight of the stocking positioned to use the most friction and torque. Of course, if your stocking stuffers include gifts heavier than traditional apples, oranges and deodorant (thanks Mom, er, Santa), you can always use that spare piece of bubinga or supplement the weight of the hanger with lead shot.

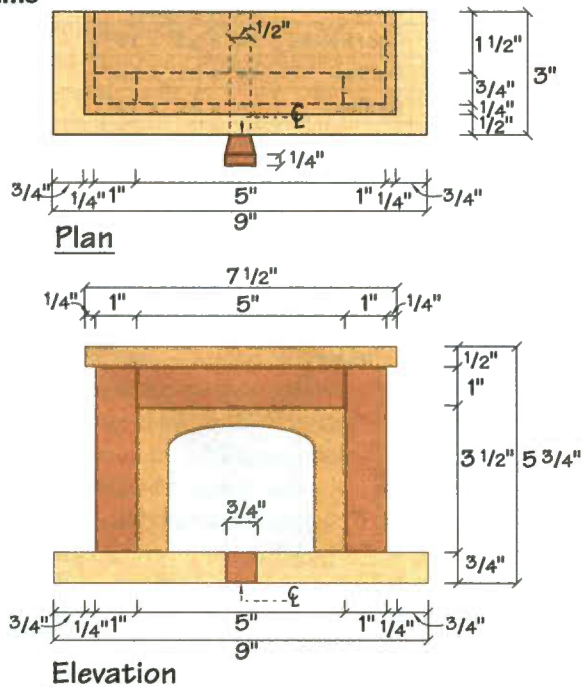
Keep these building points in mind: Don't make the base wider than the

mantel, shelf or window sill the hanger will sit on when in use. This will move the pivot point, or fulcrum, and will throw off the necessary balance.

Make the hook so that the string upon which the stocking hangs will be drawn toward the base. Note the angle in the drawing; this should be a key design element regardless of your own design. **PW**

—Bruce Stoker, associate editor, *Popular Woodworking Books*

Diagrams



Schedule of Materials: Chimney Hanger

| No. | Item | Dimensions T W L |
|-----|-----------|------------------------|
| 1 | Fireplace | 1 1/2" x 4 1/2" x 7" |
| 2 | Side | 3/4" x 1" x 4 1/2" |
| 1 | Top | 3/4" x 1" x 5" |
| 1 | Mantel | 1/2" x 2 1/2" x 7 1/2" |
| 1 | Base | 3/4" x 3" x 9" |
| 1 | Hanger | 3/4" x 3/4" x 3 3/4" |



To see more projects like this in future issues, circle "P10" on the postage-paid card in the Resource Directory.

DELUXE BAT HOUSE



This house is designed with the bat in mind. It provides ample space, warmth and comfort.

STEP ONE: Start by cutting all the pieces to size according to the Schedule of Materials. When cutting the baffles, orient the grain horizontally to provide a better gripping surface for the bats' claws. Our baffles are oriented wrong because our bat expert suggested the change after

construction.

Next, cut the mating edges of the roof at a 30-degree angle, then use the roof pieces to lay out the roof peak on the front and back pieces. Make the angled cuts, then drill ventilation holes in the front and sides as shown on the drawing.

STEP TWO: Add small horizontal grooves to the baffles and back by using a veining bit in a router, or a utility knife. The grooves should run the width of the baffles, 1" apart and cover the entire height of each piece and the landing pad, which is the portion of the back that juts down

from the house. The grooves are footholds, so sand off splinters to protect the bats.

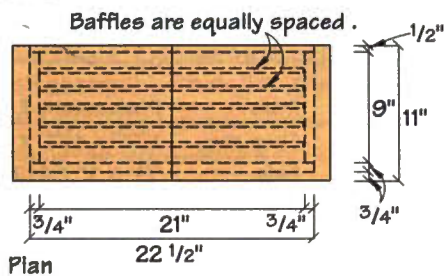
STEP THREE: Fasten the back to the sides and attach the attic floor between the sides as shown using galvanized screws. There should be a 1" space between the attic floor and the back to allow bats into the attic. Don't use glue, as our bat expert says it could be harmful to residents. The house should be as airtight as possible, however, to keep the bats warm. Next, use spacing blocks to hold one of the 10" baffles 1 1/4" from the back and flush to the attic floor. Attach through the sides with galvanized nails. Repeat this step, alternating the baffle sizes.

STEP FOUR: With the baffles in place, attach the front to the sides, then attach the roof pieces.

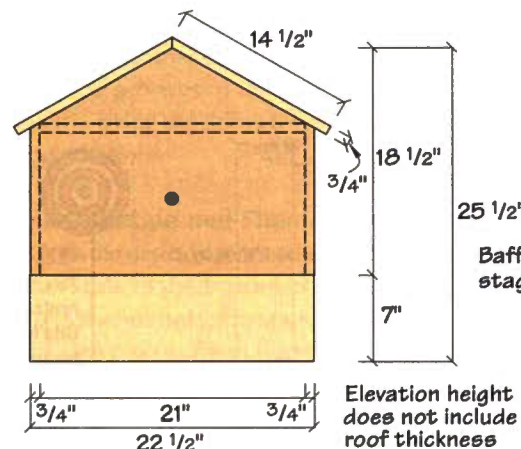
STEP FIVE: There is no need to sand anything other than the grooves in the baffles. Stain the outside of the house only using a water-based stain. Attach roofing paper to the roof using exterior-grade staples. Also attach pieces of roofing paper to the front and back peaks and to the two sides, extending 5" down from the top edge. This creates areas of different temperatures for bats. **PW**

—Michelle Taute, PW staff

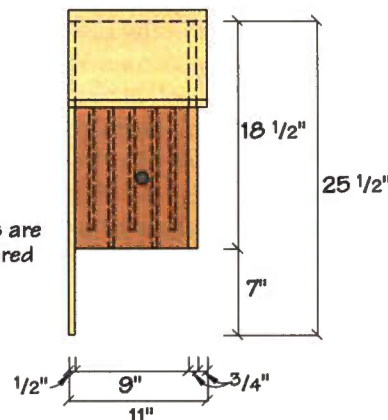
Diagrams



Plan



Elevation



Profile

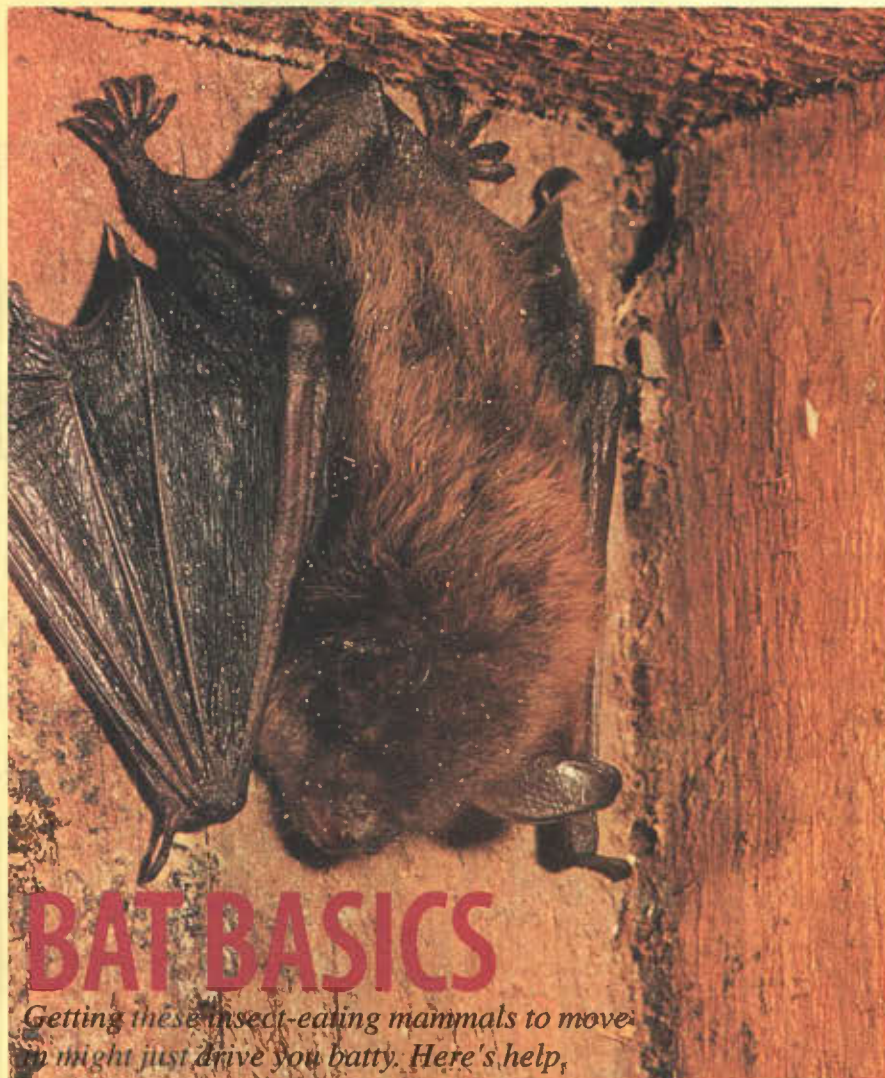
Schedule of Materials: Bat House

| No. | Item | Dimensions T W L | Material |
|-----|-------------|--------------------------|----------|
| 1 | Front | 3/4" x 22 1/2" x 18 1/2" | Cedar* |
| 1 | Back | 1/2" x 22 1/2" x 25 1/2" | CDX Ply |
| 2 | Sides | 3/4" x 9" x 12" | Cedar* |
| 2 | Roof halves | 3/4" x 11" x 14 1/2" | Cedar* |
| 3 | Baffles | 1/4" x 21" x 10" | CDX Ply |
| 2 | Baffles | 1/4" x 21" x 11" | CDX Ply |
| 1 | Attic floor | 3/4" x 21" x 8" | Cedar* |

* Cedar should be rough cut.



To see more projects like this in future issues, circle "P13" on the postage-paid card in the Resource Directory.



BAT BASICS

Getting these insect-eating mammals to move in might just drive you batty. Here's help.

The good news is the average bat will eat its body weight in insects every night. The not-so-good news is that bats are picky about where they live. So if you build our bat house, mount it in a nice place and if no one moves in, it's probably not your fault.

Bats are creatures of habit. According to Dr. Jacqueline Belwood, research biologist for the Ohio Biological Survey, scientist-in-residence at Cincinnati Nature Center and leading bat expert in the United States, many of these creatures travel between the same two places for their entire 10- to 15-year life span. They live all over the United States in the summer and hibernate or migrate south in the winter. Common homes include buildings and hollow trees. Belwood says bats will not usually leave an established home to move into a man-made bat house. But even though bats are not guaranteed to move into a bat house, Belwood says, "Go for it!"

There are several ways she suggests to improve the odds of having bats move

into the house you build for them. First, the bigger the house, the better. Bats will be hesitant to move into a small house if there is a larger home nearby. However, many small bat houses are used as resting places for a few hours during the night while bats are hunting.

An acceptable home must also help the creatures stay warm. A bat house needs at least seven hours of direct sunlight a day. Houses should also be placed 12 to 15 feet in the air and have unobstructed entrances. They are best hung from the side of a building or mounted on a pole.

Belwood says the best time for getting bats to move into a man-made environment is after they are forced out of an attic or a barn. Then the creatures are likely to move into the closest quarters available. Place your man-made bat house near the current home well before forcing the bats out, preferably the spring of the year before kicking them out.

The two best times of the year to force bats out is in the early spring or

Wacky Bat Facts

- Female bats usually give birth to one live young each year, which they nurse with their own milk.
- Vampire bats don't feed on people. This species is found in Central and South America and drinks only two tablespoons of blood each night from farm animals.
- Bats can see, but navigate at night using echolocation, a system similar to radar.
- In most of the United States, the Little Brown Bat and Big Brown Bat are the most common species. The Mexican Free-tailed Bat is more common in the South.

late fall because they have babies during the summer. Watch at dusk to find where they exit the building. Then place a small sleeve made from a square piece of plastic or bird netting (with a 1/4" to 1/2" diameter) over each opening to allow the bats to crawl out the bottom. The top and two sides of the sleeve should be affixed to the building with tape or Velcro and the bottom simply hangs free. When bats return they will not be able to find the opening because they are not able to climb up smooth surfaces like the siding of a house. When they stop exiting the house seal the entrance and exit points.

To find out if bats have moved into your bat house, observe it at dusk to see if any exit. Bat droppings are another sign that the house is being used. They are dark colored and consist entirely of ground-up insects.

Once bats have moved in, Belwood says it is best to disturb them as little as possible. Bats should never be touched, and handling their house or shining a flashlight on it can cause them to leave.

While bats will not attack humans or fly into people's hair, they will bite in self-defense. It is best not to approach bats and to keep pets and children from doing the same. Rabies does occur in a very small number of bats, as it does in cats, raccoons and other animals.

In general, people are more of a threat to bats than they are to us. Many species are endangered and most have declining populations. This decline is caused by human predation and pesticides. **PW**

—Michelle Taute, PW staff

Santa's CHIMNEY TOY

This type of "controlled fall" toy has been around for a very long time, but I couldn't think of a more natural application than Santa coming down the chimney. The toy itself is remarkably simple to build — the ornamentation you choose to add may take three times as long as construction.

STEP ONE: Cut the pine pieces to rough size. Next, cut the chimney bottom at a five-degree angle to allow the piece to tip back a little. Then cut away the sides as shown on the diagram using a table saw or band saw.

STEP TWO: Mark and drill the $\frac{3}{16}$ "-diameter holes to a depth of $\frac{1}{2}$ " in the locations shown on the diagram. A drill press provides the best results for this step.

STEP THREE: Position the chimney on the base as shown, and mark the base for two screw holes. Drill clearance holes through the base at five-degree angles, then attach the chimney to the base.

STEP FOUR: Cut the 13 pegs to size and place them temporarily in the holes on the chimney face.

STEP FIVE: Cut the Santa figure to size and shape using the full-size pattern below. Then sand the piece to remove any rough edges.

STEP SIX: Send your Santa on a test run to make sure he works well. If he seems to hang up a lot on his trips you may need to sand a little more on the feet or hand areas to correct it.

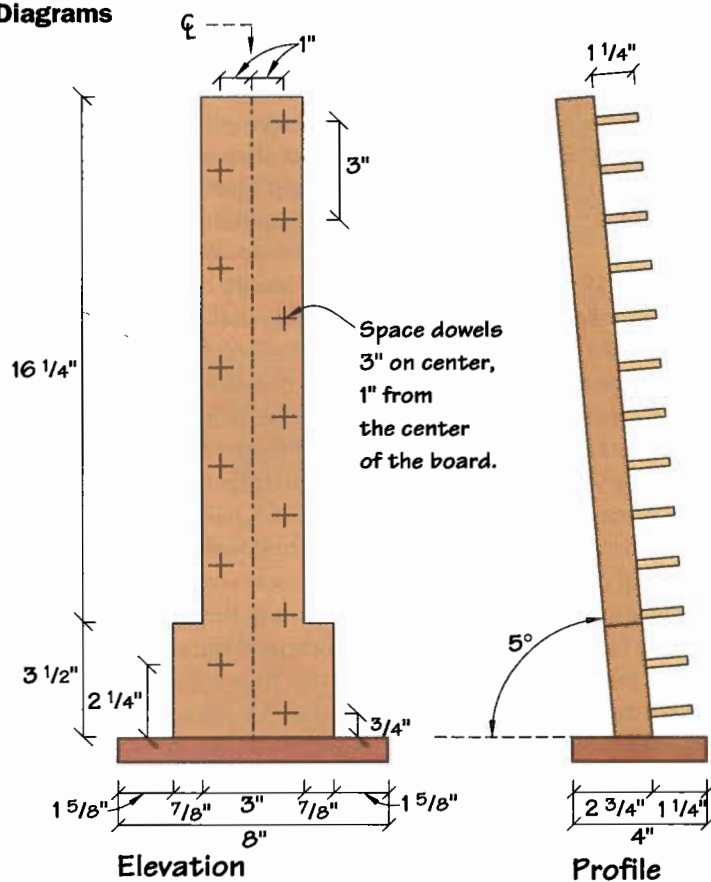
STEP SEVEN: The painting is self-explanatory. I used a roller ball pen to mark the bricks on the chimney, the rest is simple craft paints. Add a dab of glue to the pegs, then HO HO HO! **PW**

— David Thiel, PW staff



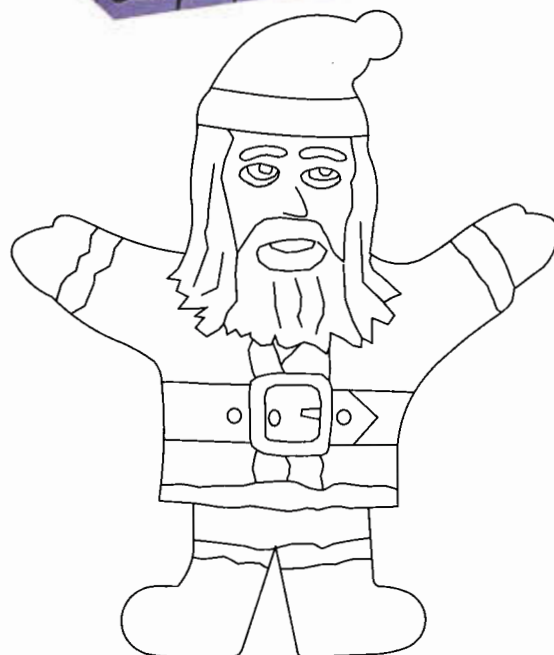
To see more projects like this in future issues, circle "P6" on the postage-paid card in the Resource Directory.

Diagrams



Schedule of Materials: Santa's Chimney

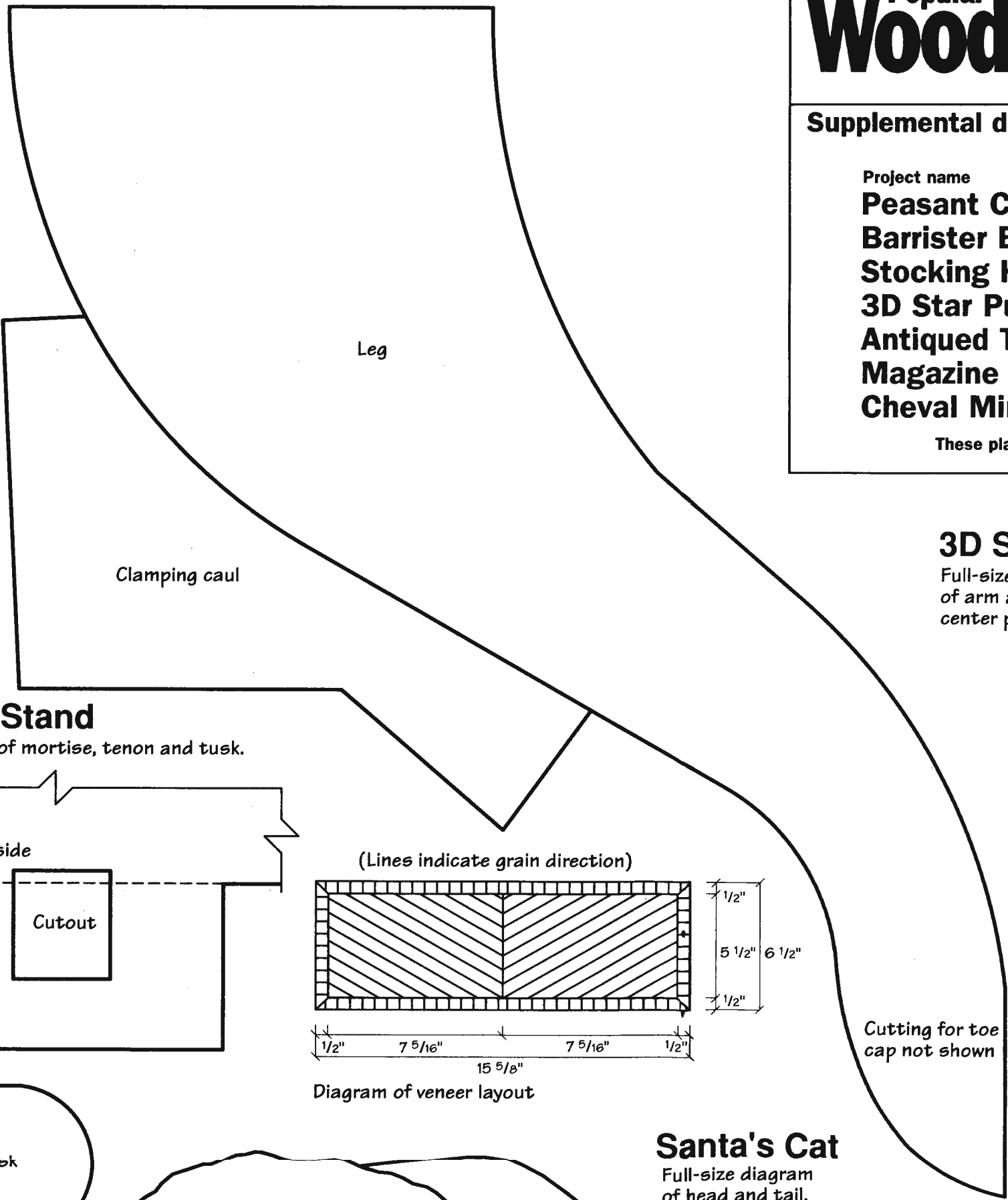
| No. | Item | Dimensions T W L | Material |
|-----|---------|---------------------------|----------|
| 1 | Chimney | 1 1/8" x 4 3/4" x 19 3/4" | Pine |
| 1 | Base | 3/4" x 4" x 8" | Pine |
| 1 | Santa | 3/8" x 2 3/4" x 3 1/2" | Plywood |
| 13 | Pegs | 3/16" x 1 3/4" | Maple |



Full-size outline of Santa

Cheval Mirror

Full-size diagram of leg, clamping caul and veneer layout.



Popular Woodworking

Carefully open staples to remove plans, then bend staples closed again.

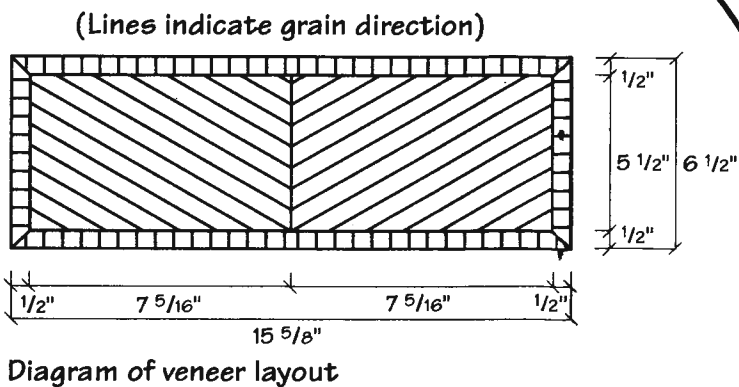
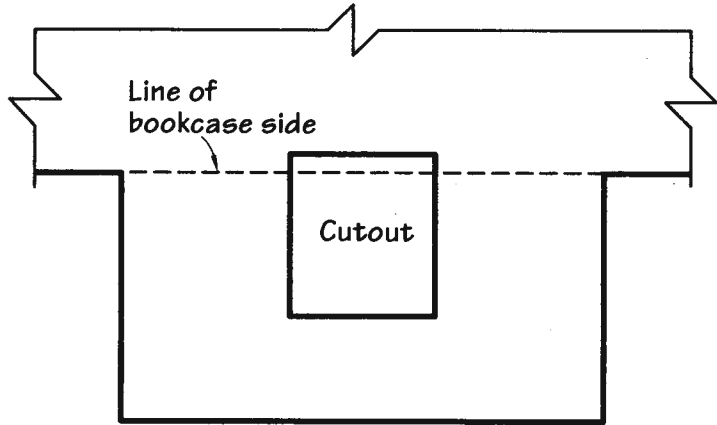
Supplemental drawings for projects in this issue

| Project name | From page |
|-------------------------|-----------|
| Peasant Chair | 26 |
| Barrister Bookcase | 32 |
| Stocking Hanger | 37 |
| 3D Star Puzzle | 49 |
| Antiqued Tabletop Hutch | 50 |
| Magazine Stand | 54 |
| Cheval Mirror | 58 |

These plans incorporate pages 41 to 48 of this magazine

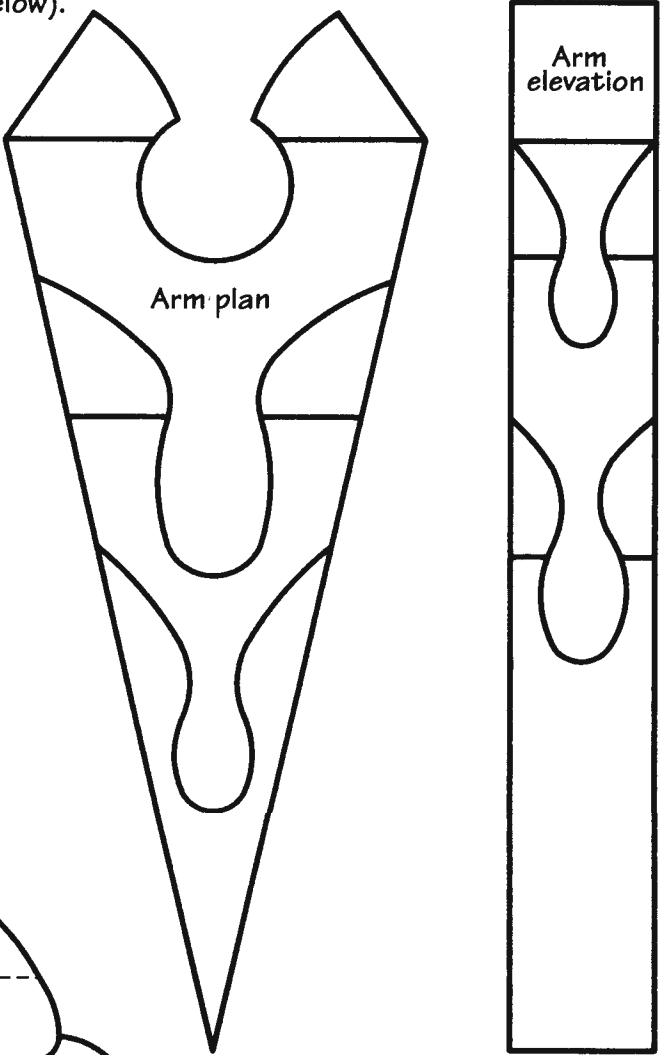
Magazine Stand

Full-size diagram of mortise, tenon and tusk.



3D Star Puzzle

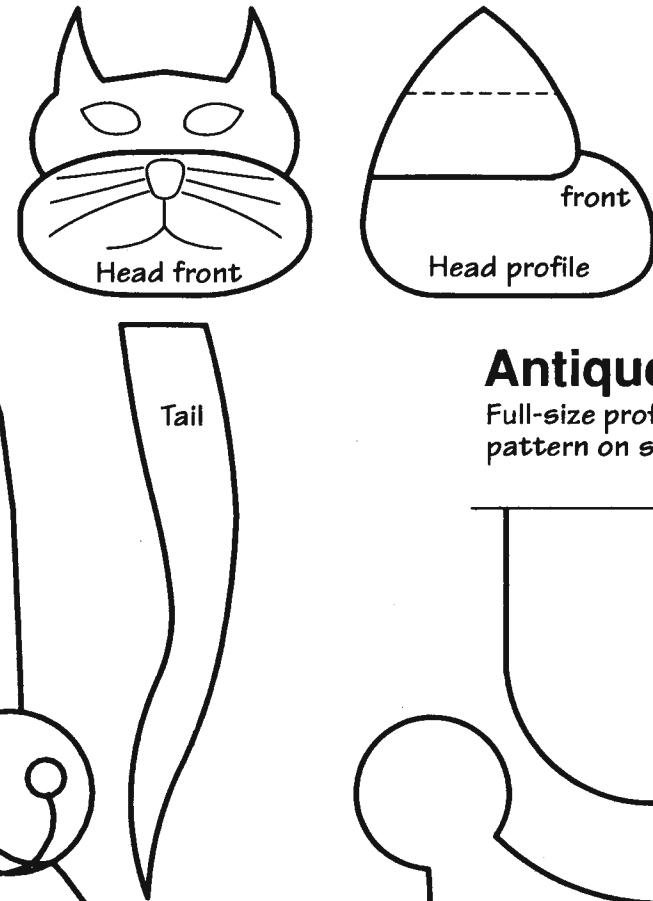
Full-size plan and elevation of arm and plan of center piece (below).



Cutting for toe cap not shown

Santa's Cat

Full-size diagram of head and tail.



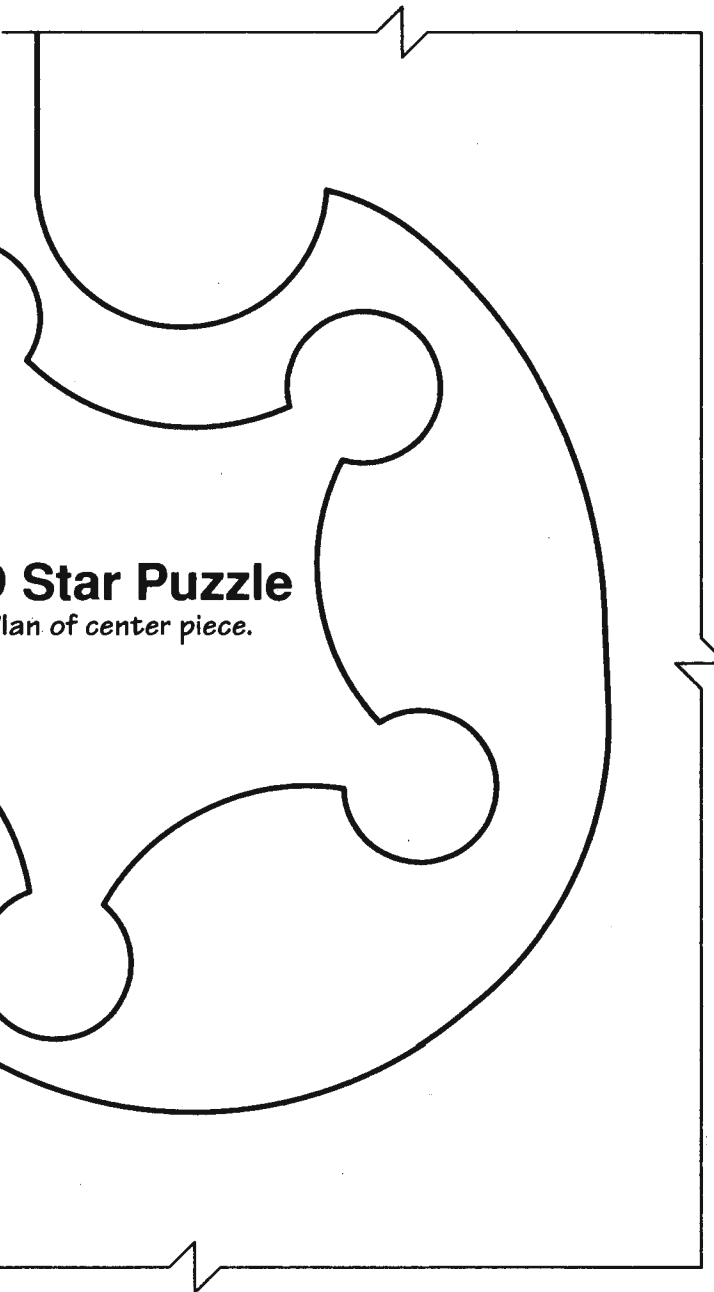
Stocking Hangers

Full-size diagram of Santa's head.



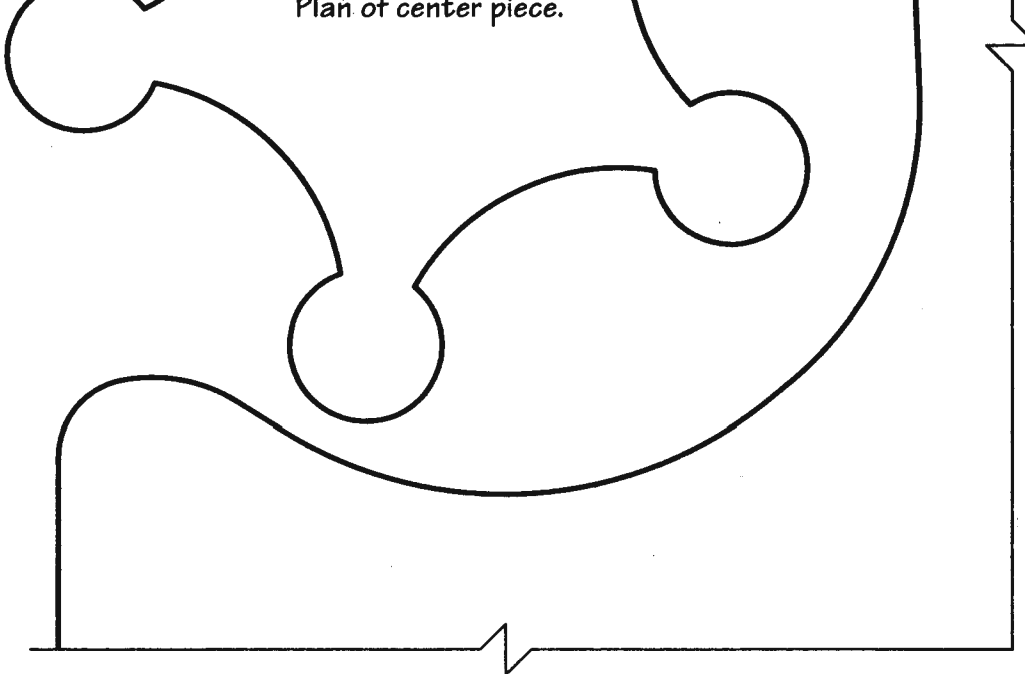
Antiqued Tabletop Hutch

Full-size profile of pattern on side.



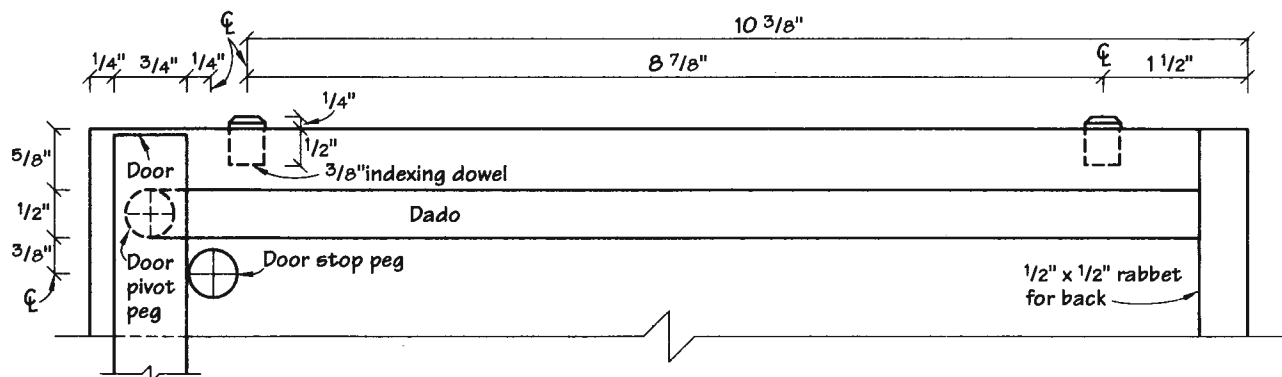
3D Star Puzzle

Plan of center piece.



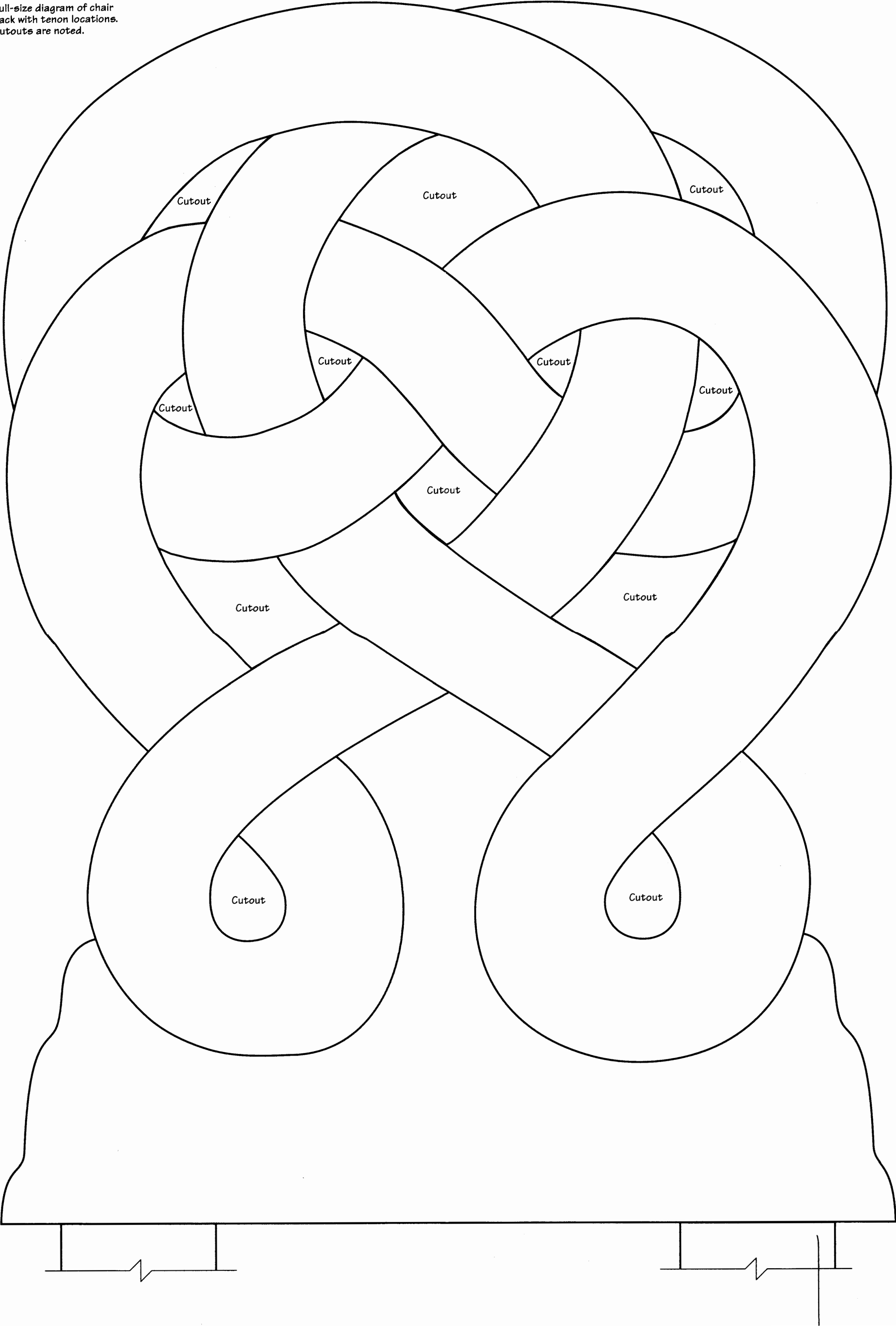
Barrister Bookcase

Diagram of indexing pin, door peg, door-stop peg and dado layout.



Peasant Chair

Full-size diagram of chair back with tenon locations. Cutouts are noted.



This star puzzle makes a great gift or coffee table novelty. It looks deceptively easy because all the parts appear to be interchangeable. But because they are hand made, they are not. To complicate things further, cuts are made on the side of each arm as well as on the faces.

A hardwood must be used for the puzzle because some of the parts are cut quite small. I like to use oak or walnut.

STEP ONE: First make posterboard templates of one arm and the center piece using the PullOut™ Plans as a guide. Transfer the patterns onto the wood and cut out each of the five arms and then the star center. I use a $\frac{1}{8}$ " blade in my band saw. A scroll saw could also be used. Sand all the sharp edges round. Arrange the five arms together, sanding where necessary for fit.

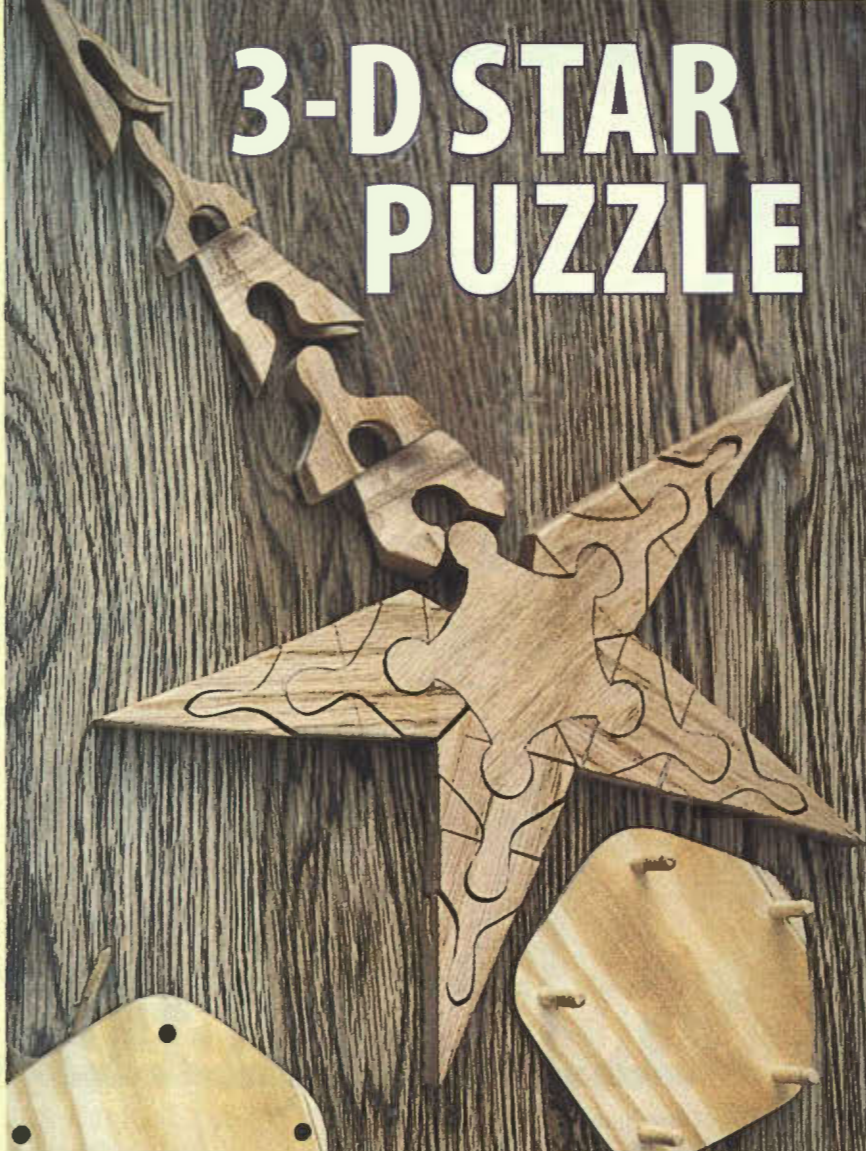
STEP TWO: Place the star center over the arms until everything looks even, then trace around the center piece with a pencil. Cut the marked piece from each arm and fit to the center. Call this puzzle cut #1.

STEP THREE: Cut the sides of the puzzle pieces as shown in the diagram below. Don't cut the "neck" of the piece too thin or it will break easily. Alternate the cuts by making cut #2 from the side of the arm, then cut #3 from the face, and so on, as shown in the diagram. I clamped each arm in a wooden hand clamp to keep it straight during the side cuts. Assemble each arm starting with the last piece cut, working in reverse order.

STEP FOUR: Sand each arm and attach it to the corresponding position on the star center. Be careful not to mix the pieces (or forget which arm goes where). Take each arm apart and coat the pieces with a clear finish.

If you try to pick up the completed puzzle it will fall apart, so build a holder from two pieces of $\frac{1}{4}$ " plywood and five

3-D STAR PUZZLE

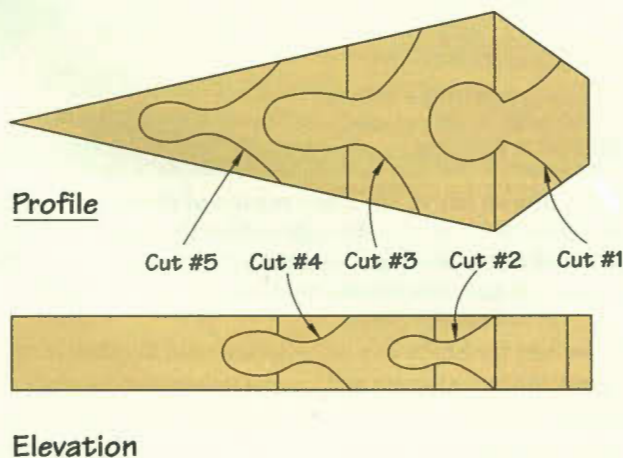


dowels Use two-sided carpet tape to hold the two pieces of plywood together while you cut, sand and drill the holder.

STEP FIVE: Glue the $\frac{1}{4}$ " dowels in the bottom piece of the holder and slide the top piece over the dowels to hold the star together. If the top piece sticks, sand the dowels until they fit snugly, then apply clear finish to the holder. **PW**

—W.L. Wardle

Diagrams



Schedule of Materials: Star Puzzle

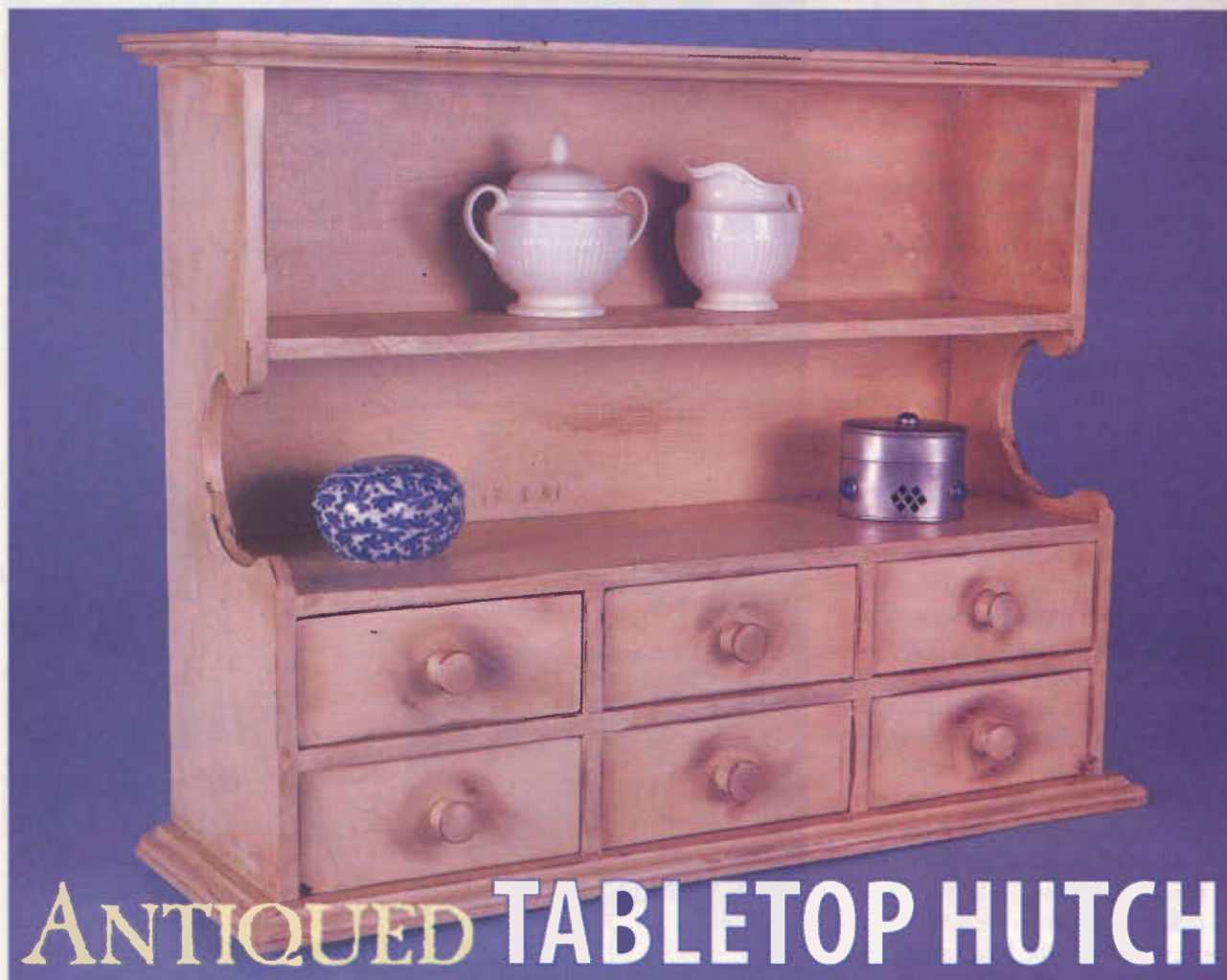
| No. | Item | Dimensions T W L | Material |
|-----|--------|---|---------------|
| 1 | Star | $\frac{3}{4}$ " x 12" x 12" | Oak or Walnut |
| 2 | Holder | $\frac{1}{4}$ " x 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " | Plywood |
| 5 | Dowels | $\frac{1}{4}$ " x 1 $\frac{1}{2}$ " | |

Diagram is in half scale.
Enlarge 200% for full scale.



Are we on target?

To see more projects like this in future issues, circle "P11" on the postage-paid card in the Resource Directory.



ANTIQUED TABLETOP HUTCH

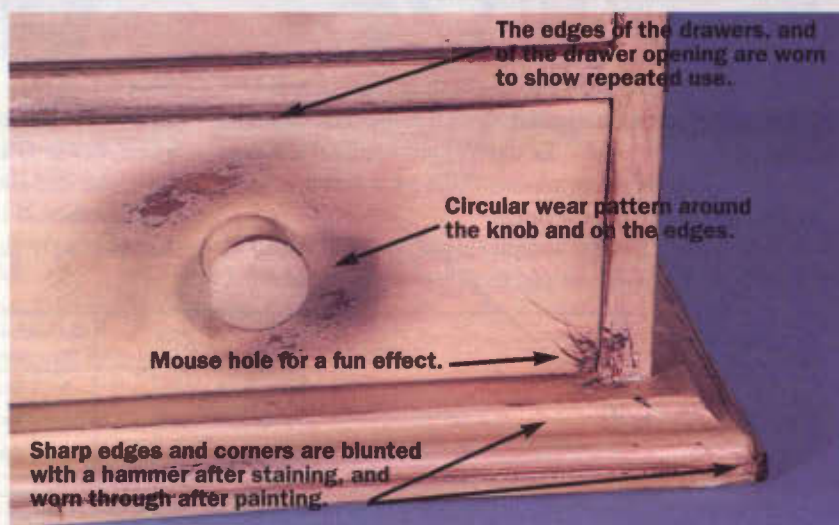
This clever little hutch will prove useful in more than one room of your house, but our reason for offering it to you is as a training piece on creating a simple but stunning antique finish.

STEP ONE: The wood used for this project should have a reasonably tight grain and be fairly inexpensive. In our part of the country, poplar fit the bill. Start by cutting the pieces to the sizes given in the Schedule of Materials.

STEP TWO: Using the template provided in the PullOut™ Plans, mark and cut the shape on the sides, then sand the edges to smooth the profile.

STEP THREE: Next, cut a $\frac{1}{4}$ " x $\frac{1}{4}$ " through-rabbit on the back inside edge of each side, and stopped rabbets of the same dimension on the top and bottom. Stop the rabbets $1\frac{1}{4}$ " from each end.

STEP FOUR: Now rout the edge treatment of your choice on the front and side edges of the top and bottom pieces. I used a simple ogee bit.



DISTRESSING • Shown above are a few results of simple antiquing. The stained level of the finish shows through behind the paint, and the paint is worn in areas that would likely see use through the years. The antiquing was done with a grey 3M pad. The mouse hole was done with needle nose pliers.

STEP FIVE: Before the hutch can be assembled, notch the two dividers and the center shelf with bridle joints (also called egg-crate joints) to form the six-drawer openings. Lay out and mark the

location for the shelves on the sides and nail the shelves in place. Next nail the top and bottom to the sides, slide the divider section into place and nail through the shelf and bottom to hold it in place.

Diagrams

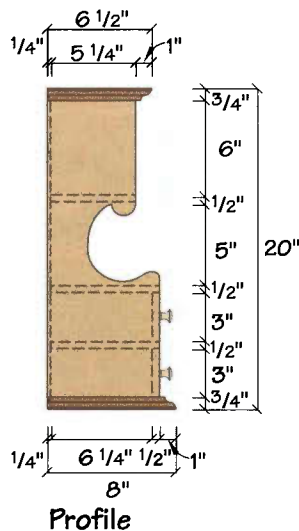
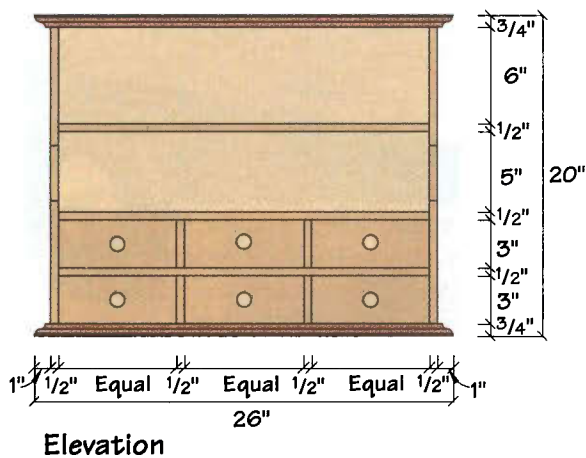
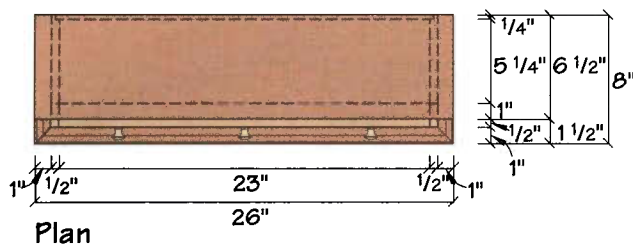


Are we on target?

To see more projects like this in future issues, circle "P12" on the postage-paid card in the Resource Directory.

Schedule of Materials: Tabletop Hutch

| No. | Item | Dimensions T W L | Material |
|-----|---------------|--------------------------|----------|
| 1 | Top | 3/4" x 6 1/2" x 26" | Poplar |
| 1 | Bottom | 3/4" x 8" x 26" | Poplar |
| 2 | Sides | 1/2" x 7" x 18 1/2" | Poplar |
| 2 | Bott. shelves | 1/2" x 6 3/4" x 23" | Poplar |
| 1 | Top shelf | 1/2" x 5 1/4" x 23" | Poplar |
| 2 | Dividers | 1/2" x 6 1/2" x 6 3/4" | Poplar |
| 6 | Drwr fronts | 1/2" x 3" x 7 3/16" | Poplar |
| 12 | Drwr sides | 1/2" x 2 15/16" x 6 1/4" | Poplar |
| 6 | Drwr backs | 1/2" x 2 1/2" x 6 11/16" | Poplar |
| 6 | Drwr bottoms | 1/4" x 6 1/4" x 6 11/16" | Poplar |
| 1 | Back | 1/4" x 18 3/4" x 23 1/2" | Poplar |
| 6 | Knobs | 1" diameter | Poplar |



STEP SIX: Double-check the drawer sizes against the Schedule of Materials, then cut the drawer pieces to size. I used rabbeted joinery to provide a little extra strength to the drawers. Cut a 1/4" x 1/2" wide rabbet on both inside ends of the fronts, and another 1/4" x 1/2" wide rabbet on the back ends of each side. Next cut a 1/4" x 1/4" groove on the inside bottom edge of each drawer side and front, starting the groove 1/4" up from the bottom edge. Assemble with nails holding the drawer backs flush to the top of the drawer sides to allow the drawer bottoms to slip into the side grooves under the drawer back. Leave the drawer bottoms loose at this time.

Cut the hutch back to size and attach the knobs to the center of each drawer. Now you're ready to put an antique finish on the piece.

STEP SEVEN: The finish is a five-step process. The first is to stain the entire piece as it would have been done originally. While this stain will be covered with paint, you should approach it with

almost the same care as if it were your final finish. If your final paint color is light, the underlying stain should be dark to provide strong contrast. I used a brown mahogany gel stain on the piece and stained everything, including the inside of the drawers.

STEP EIGHT: Have a little fun. Use a ring of keys, hammer or screwdriver and beat on the piece a little. The idea is to provide the appearance of decades worth of wear, *not abuse*. It's tempting to go overboard. Think about how the damage you are inflicting could have happened — corners on the moulding would be dented, edges would be blunted and the drawers would have seen a fair amount of use. This is only the middle of the antiquing process, so don't go too far.

STEP NINE: The next step is to apply a coat of paint to the piece. This would be a point in the hutch's life when it had fallen out of favor and had been relegated to the pantry or cellar. Because of this the paint job wouldn't be too neat

or perfect, but rather an effort to cover the damage to the original stain.

STEP TEN: With the paint dry, get the keys back out and add some more "time" to the piece. As a next antiquing step, take some steel wool or an abrasive pad and wear through the paint at points of high contact. This would be around the knobs, where the drawers slide against the top and bottom surfaces of the cabinet, the edges of the shelves and on the edges of the sides.

STEP ELEVEN: With the paint finish distressed, add a coat of brown glaze to the piece, immediately wiping most of it off after applying. The remaining glaze will leave a discolored look to the paint, and highlight the new dings and scrapes.

STEP TWELVE: As a final step, add a coat of flat or satin clear finish to protect the paint and glaze.

Your completed antique hutch can be placed on a counter or table top, or can be hung on a wall. Enjoy it, and happy antiquing! **PW**

—David Thiel, PW staff

Earlier this century, **The Delta** magazine, Vol. 16, Issue 2, 1946-1947, published a magazine filled with woodworking plans. These magazines are more than nostalgia — the plans are dam good! In the interest of history, we're happy to offer this project from yesteryear.

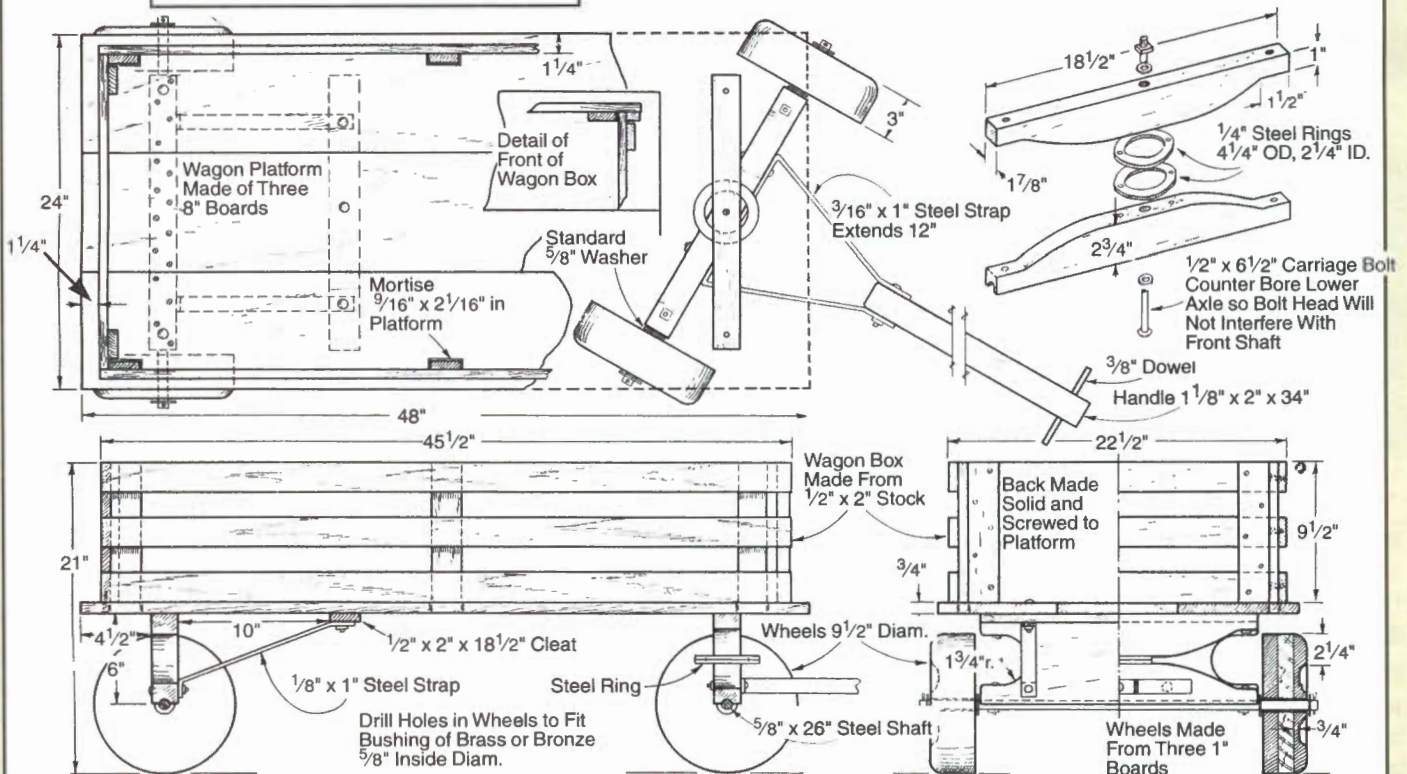
PROJECTS FROM THE PAST COASTER WAGON

This wagon will work equally well as a child's toy or a household decoration. The one pictured is made from maple. If you are feeling ambitious, the wheels can be made from three 1" boards glued together and turned on a lathe. Otherwise, rubber tires from the local hardware store should work just fine. **PW**



Are we on target?

To see more projects like this in future issues, circle "P1" on the postage-paid card in the Resource Directory.



One thing's for sure. You don't mess with success. The massive cast iron table and trunnion and power and precision are right where they've been since the day we built the first one of these critters. And we're still building them right here in the good ole US of A.



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ARTS & CRAFTS MAGAZINE STAND

*A turn-of-the-
century classic
that fits in
almost any
floor plan.*



During the Arts & Crafts heyday at the turn of the 20th century there were an extraordinary number of designs for bookcase and magazine stands offered to the public as completed pieces and construction plans. Most included simple designs and straightforward construction. A variation of the design shown here appears in the Dover Publications reprint of the 1906 Roycroft Furniture Catalog from the Roycroft Shops in East Aurora, N.Y.

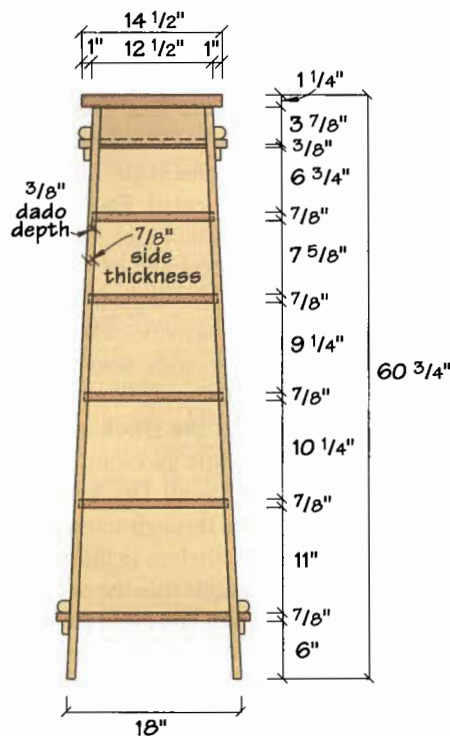
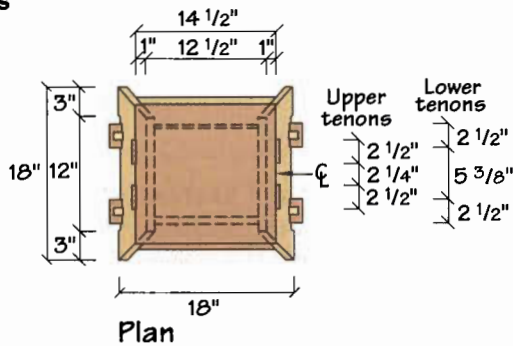
STEP 1 Slabs • In keeping with the Arts & Crafts style of stout furniture, the sides and shelves of this piece are called out as $\frac{7}{8}$ "-thick material. You may find the design more economically feasible by changing that to $\frac{3}{4}$ " material. Start by milling and matching the grain patterns on the two side

By David Thiel, senior editor, Popular Woodworking

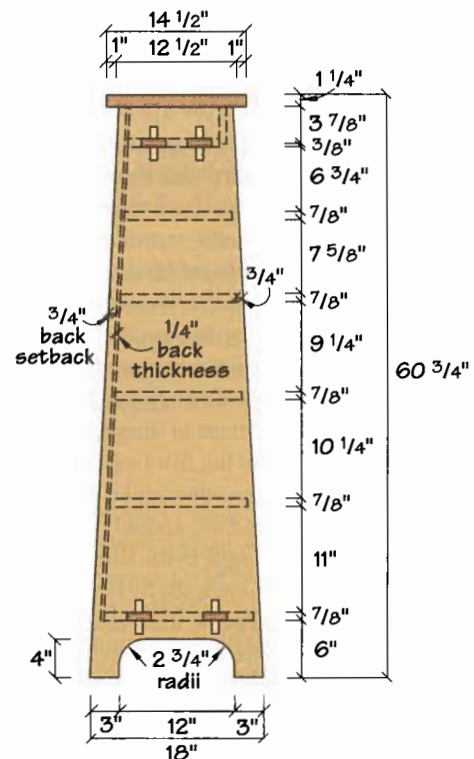
Schedule of Materials: Magazine Stand

| No. | Item | Dimensions T W L | Material |
|-----|--------------|--|-----------|
| 1 | Top | $1\frac{1}{4}" \times 14\frac{1}{2}" \times 14\frac{1}{2}"$ | White Oak |
| 2 | Sides | $\frac{7}{8}" \times 18" \times 59\frac{1}{2}"$ | White Oak |
| 1 | Bottom shelf | $\frac{7}{8}" \times 15\frac{9}{16}" \times 20"$ | White Oak |
| 1 | Shelf | $\frac{7}{8}" \times 14\frac{5}{16}" \times 15\frac{7}{16}"$ | White Oak |
| 1 | Shelf | $\frac{7}{8}" \times 13\frac{3}{16}" \times 14\frac{3}{8}"$ | White Oak |
| 1 | Shelf | $\frac{7}{8}" \times 12\frac{1}{8}" \times 13\frac{7}{16}"$ | White Oak |
| 1 | Shelf | $\frac{7}{8}" \times 11\frac{1}{4}" \times 12\frac{11}{16}"$ | White Oak |
| 1 | Top shelf | $\frac{7}{8}" \times 9\frac{1}{2}" \times 15\frac{5}{16}"$ | White Oak |
| 8 | Wedges | $\frac{3}{4}" \times 1\frac{1}{4}" \times 3\frac{1}{2}"$ | White Oak |
| 1 | Back | $\frac{1}{4}" \times 16" \times 53\frac{1}{2}"$ | Oak Ply |
| 1 | Drwr front | $\frac{3}{4}" \times 3\frac{7}{8}" \times 10\frac{9}{16}"$ | White Oak |
| 2 | Drwr sides | $\frac{3}{4}" \times 3" \times 8"$ | Birch Ply |
| 2 | Drwr ends | $\frac{3}{4}" \times 3" \times 9\frac{1}{4}"$ | Birch Ply |
| 1 | Drwr bottom | $\frac{1}{4}" \times 7\frac{1}{2}" \times 9\frac{1}{4}"$ | Birch Ply |

Diagrams



Elevation



Profile



Are we on target?

To see more projects like this in future issues, circle "P8" on the postage-paid card in the Resource Directory.

MAGAZINE STAND



1 MILL THE SIDES • A 1/4"-thick strip of wood is taped in place on the side slab to give a 3-degree angle to the shelf dados and the through mortises. Using a 1/2" straight router bit required moving the set-up once for each dado to achieve the 7/8" width necessary.

pieces. If possible, try and use only two boards per side for the width. If this isn't possible, the trapezoidal design will allow you to use two 7"-wide boards for the center of each side, adding a 2" strip on the front and back edges of the lower half, keeping the exposed glue lines to a minimum.

With the sides glued, squared up and sanded flat, mark the location of the shelves as shown on the diagram. The top and bottom shelves will have angled through-mortises cut into the sides, while the other four shelves are captured between the sides in 3/8"-deep stopped dados. To mark the start and stop locations of the dados, draw the shape of the sides on the side blanks, then measure in 3/4" from the front and back edges.

Cut the dados with a plunge router and a router guide. Even though the sides of the stand are angled 3 degrees, the dados can be cut at a 90-degree angle to the side leaving only a slight gap on the underside of each shelf. If you prefer to eliminate the gap, a wood strip can be used to tilt the router at a 3-degree angle. If you opt for the angled dados, run a test piece or you may inadvertently transfer your gap to the top of the shelf.

The through-mortises can also be cut using a router with the base tilted to a 3-degree angle or marked and hand cut. In either case, cut from the outside surface to keep any tearout



2 TAPERS EVERYWHERE • The sides are tapered only after all the necessary milling in the sides is completed. I used a jigsaw to cut the sides to size, then smoothed up the edges with a bench plane.

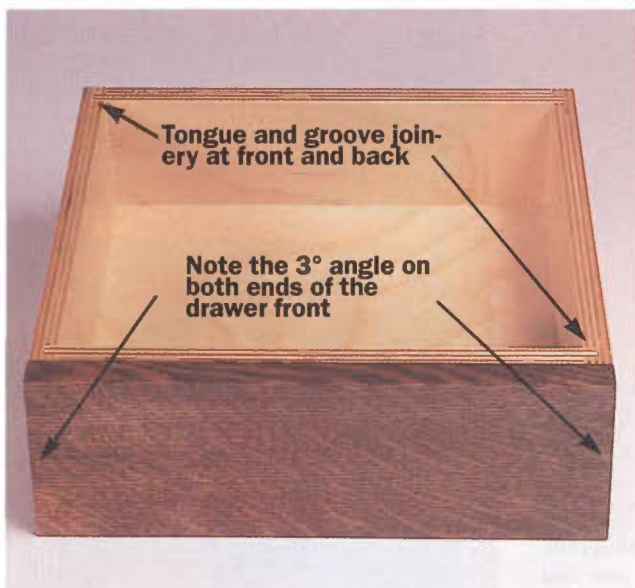
to the inside of the case. Use a scrap backing board to reduce the tearout even further.

STEP 2 Trapezoids and Shelves • With the dados and through-mortises complete, crosscut the top and bottom edges of the sides at a 3-degree angle, then use a band saw or a jigsaw and a plane to shape the sides. Next, mark and cut the elongated half-oval at the base of each side to form the legs. Lastly, mark the back edge of each side for a 1/4" wide x 3/8" groove for the back. The groove should be set in 1/2" from the back edge and start 6" up on the sides, running through at the top.

Next cut the shelves to size. The four center shelves can be cut to the sizes given in the Schedule of Materials, with all four edges cut on a 3-degree angle. The top and bottom shelves are a little more complicated. Each must have the through-tenons cut to size and shape (see PullOut™ Plans for a pattern of the tenon), and the end of the shelf should be pared with a chisel on a 3-degree angle to match the inside surface of the sides. Don't cut the mortises for the wedges at this time. See the wedge diagram on the next page.

STEP 3 Dry-Assemble the Back and Drawer • This next step can be a little awkward, so if you have a friend handy, give him or her a call. Dry-assemble the stand by laying one side flat so the through-mortises hang over the edge of the table. Place the shelves in their respective dados and insert the through-tenons into the mortises. Then place the other side over the tenons and insert the shelves. To hold everything in place, use soft-jawed clamps across the width of the stand placed underneath the through-tenons. This should pull the tenons and the shelves into place. Check the fit and adjust as necessary.

With the stand still dry-assembled, measure for the trapezoidal back, allowing as tight a fit in the back grooves as pos-



3 DRAWER • The drawer is made of $\frac{1}{2}$ " Baltic birch plywood, and it uses tongue-and-groove construction. A more complex joint could have been used, but the drawer is unlikely to see any heavy use and could be left out altogether.

sible. The bottom of the back will overlay the back edge of the bottom shelf and be tacked in place to the shelf. The top of the back should be flush to the top of the sides.

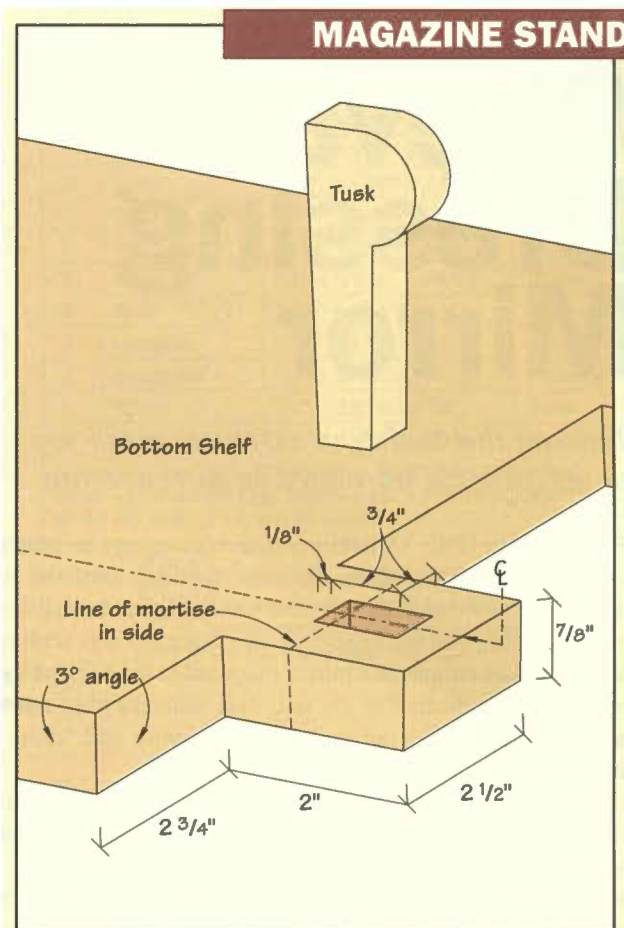
With the stand still dry-assembled, mark the location of the sides on the top and bottom surfaces of the shelf tenons extending through the sides. Then disassemble the stand and drill out or hand cut through-mortises through each tenon to accept the wedges. Note that the inside edge of the mortise should be $\frac{1}{8}$ " or so inside your marks to allow the wedges to draw the stand up tight. The diagram at right shows how the joint works, and the PullOut™ Plans offer a pattern for the wedge itself. Cut the wedges a little oversized, reassemble the stand and fit the wedges in place. Make sure you mark the wedges so you'll be able to reassemble the piece easily.

If you hadn't noticed, this stand includes a little drawer just below the top. While not of a size to store a great many things, it's a good place for hiding an extra set of keys. The drawer itself is of simple box construction using tongue-and-groove joinery with a bottom captured in a groove. The angled sides of the stand serve as indexing runners to keep the drawer centered left-to-right. The drawer face is cut to match the shape of the sides and overlaps the top shelf, which serves as a drawer stop. Screw the face to the drawer box from the inside.

Topping Things Off

The top is a simple slab of wood that is attached to the sides by dowels. I carefully drilled dowel locations in the tops of the assembled sides, I then used dowel centers placed in the holes to locate the mating locations on the underside of the top piece.

With the top fit, disassemble the stand again and sand all the pieces through 220 grit. As a finish for the piece I first applied a coat of brown mahogany gel stain. When the stain was



Wedges

The wedged through-mortises are the joints that hold the whole stand together. The diagram above gives the details of how they should look when completed. The mortises are chopped through the tenons with a chisel, but to make things a little more complicated, they should be hand cut on a 3-degree angle to follow the angle of the sides. The tusks are cut on the band saw to the dimensions shown in the PullOut Plans, but should be left a little oversized until they can be test fit.

In the old days different manufacturers used different styles of wedges. It's one of the ways collectors can quickly identify a piece. Some made the wedges with a round top. Others used half an octagon. A few even carved the wedges, which gives the piece a more medieval look. PW

dry, I applied a coat of clear lacquer, sanded and then applied a coat of warm, brown glaze. After the glaze had dried overnight, I added two more coats of lacquer.

Assemble the stand as you did during the dry fit, tapping the wedges in place to hold the stand tightly together. If you plan on ever disassembling the piece, use a couple of screws to attach the back to the lower shelf and to the two center shelves for support. Then slip the top into place over the dowels. If you won't be disassembling the piece, use brads to attach the back and add some glue to the dowels to secure the top. PW

FULL-LENGTH

Cheval Dressing Mirror

Building this bedroom essential gives you an inexpensive introduction to veneering.

IF THERE'S ONE THING my dear wife enjoys as much as shopping for clothes, it's trying on different "outfits" until she finds one that suits the occasion and her frame of mind. I figured a full-length dressing mirror ought to win me big points. My dilemma was settling on a design that was not so simple as a mirror mounted to the back of the closet door, yet not so complicated as the tall, oval-shaped tilting mirrors that have their own stand. Why not strike a compromise and "dress up" a rectangular-shaped cheval mirror?

I decided on a design that borrowed from the Federal Style (1785-1810) that included a bit of veneering, a reeding detail on the mirror frame and stand uprights, plus brass toe caps to set off the bottom of the legs. The reeding detail became a piece of cake to make after purchasing a moulding cutterhead that uses insert tooling to form the profile. The handy tool sets up on a table saw just like mounting a saw blade. Best of all, it's relatively inexpensive from Delta International Machinery (The Moulding Cutterhead No. 34-562 is \$68; the Three-Bead Knives No. 35-190 are \$18.15 plus shipping and handling — call 800-223-7278). Craftsman makes a similar tool. Many different inserts are available to form different shapes.

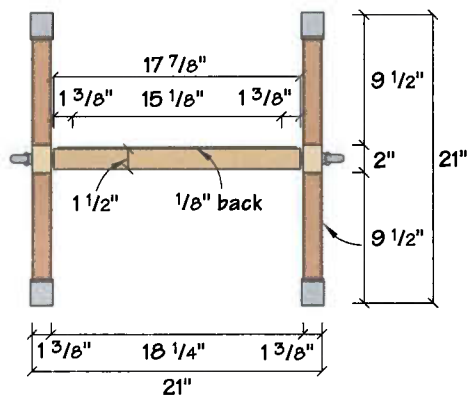
Before starting, it's best to have your piece of mirror in hand. I bought mine from a home center store for less than \$25. It was intended to be mounted on the back of a door and was just the right width at 16". However, it was too long so I cut it to length. The width and length of the mirror, needless to say, determine the size of the frame and the stand.

STEP 1 Make the Veneer Panel • The design calls for a veneer panel in a chevron pattern with crossbanding for the top of the mirror frame. Believe me when I say this is really simple to do. This is a manageable exercise in veneer work and pays big dividends in the look of the finished piece.

Use ribbon stripe mahogany veneer. Its grain pattern not only produces the chevron design for the central field of the panel, but it also makes a distinctive pattern for the $\frac{5}{8}$ "-wide crossbanding around the outside edge of the panel. After cutting out the central field's veneer using a razor knife by following the pattern in the PullOut™ Plans, butt the mating edges together and tape *across* the joint using ordinary masking tape. Use about three short pieces. Make sure the joint is tight but not buckling. Next put a piece of tape down the length of the joint. This veneer face should be about 1" larger overall than the finished dimension of the panel. Don't worry

By Steve Shanesy, editor and publisher, Popular Woodworking





Plan

Schedule of Materials: Cheval Mirror

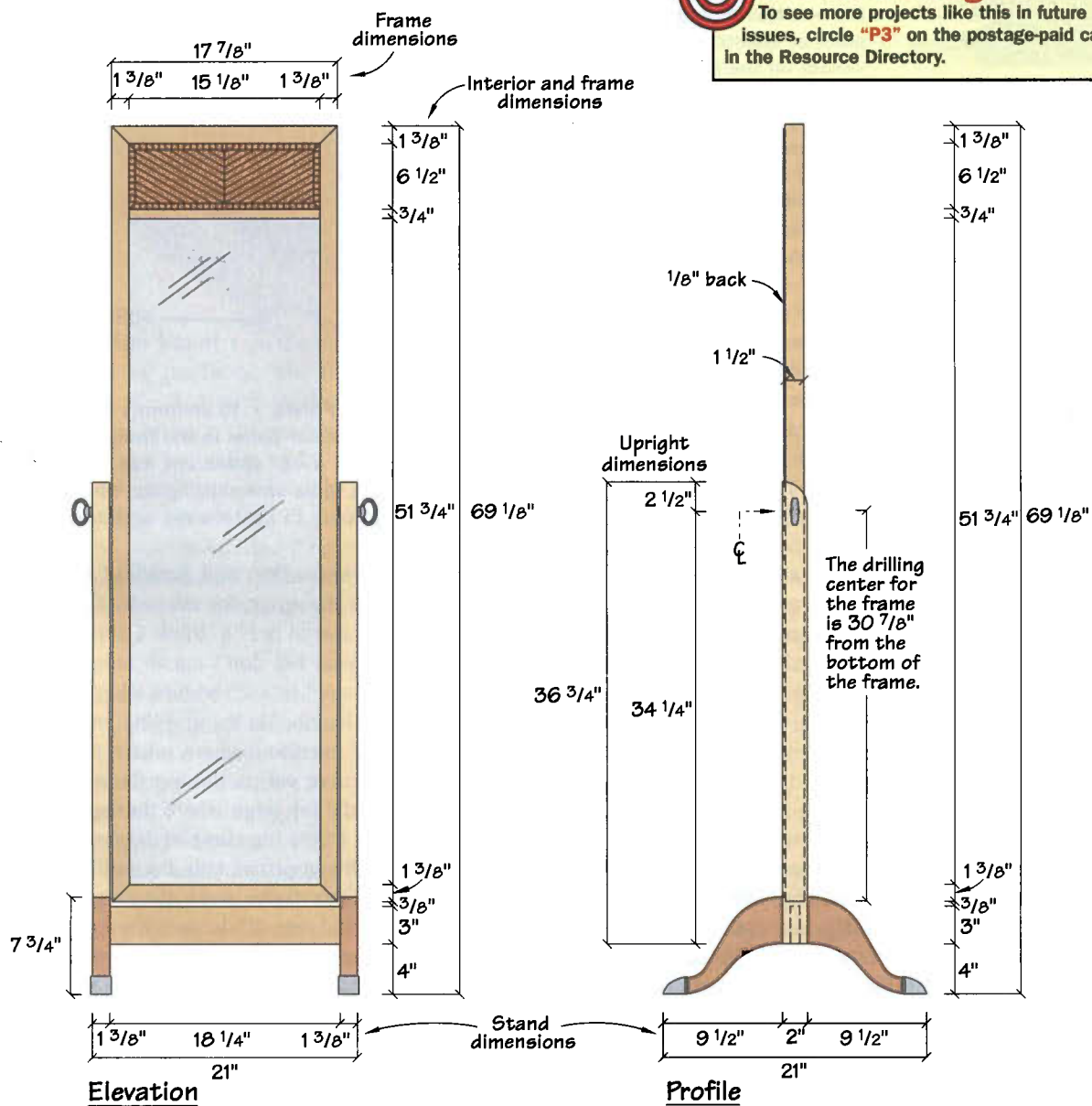
| No. | Item | Dimensions T W L | Material |
|-----|---------------|---------------------------|----------|
| 2 | Stiles | 1 3/8" x 1 1/2" x 61 3/4" | Cherry |
| 2 | Rails | 1 3/8" x 1 1/2" x 17 7/8" | Cherry |
| 1 | Internal rail | 3/4" x 1 1/2" x 15 1/8" | Cherry |
| 1 | Top panel | 3/4" x 6 1/2" x 15 1/8" | Cherry |
| 1 | Back | 1/4" x 17 3/8" x 61 1/4" | Cherry |
| 4 | Feet | 1 3/8" x 6" x 13" | Cherry |
| 2 | Uprights | 1 3/8" x 2" x 36 3/4" | Cherry |
| 1 | Stretcher | 3/4" x 3" x 18 1/4" | Plywood |
| 1 | Mirror | 1/8" x 16" x 52 3/8" | Glass |
| 1 | Mirror back | 1/4" x 17 3/8" x 16 1/4" | Hrdbrd |

Hardware: Van Dyke's Restorers 800-558-1234 • Toe caps: part# AD-S5726, \$5.35 each • Mirror hinges: part# AD-S58-1234, \$4.95 a pair



Are we on target?

To see more projects like this in future issues, circle "P3" on the postage-paid card in the Resource Directory.



CHEVAL MIRROR



1 LEARN CROSSBANDING •

After gluing the veneer face on the slightly oversized core, or substrate, rout off the veneer on the edges where the

crossbanding will be glued. Use a straight bit and an edge guide with your router. Apply the crossbanding piece by piece using contact cement as an adhesive (Inset). Crosscut the veneer with a razor knife so that it's slightly wider than the $\frac{5}{8}$ " finished width on the completed panel. Pre-cut the mitered corners following a pencil line marked using a combination square.

about the crossbanding yet. Now cut one more piece of veneer that's the same overall dimension as the first one. It will go on the back of the panel to balance it, or keep it from warping. Now cut out a piece of medium density fiberboard (MDF) or particleboard to use for the core of the panel.

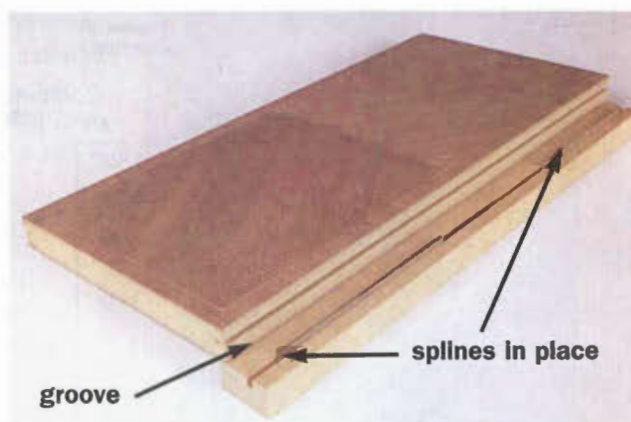
You can now glue up the panel. Use a moderate amount of regular wood glue and apply it to one side of the panel, then place the piece of veneer for the back on it, next glue the other side of the panel and place the front piece on it. Before clamping the assembly to a flat surface, cover both sides of the panel with wax paper to prevent any glue from sticking to the surface you're clamping to. Place another piece of particleboard or plywood over the top and now tightly clamp the entire assembly. Allow it to dry for at least two hours. When dry, trim the panel to final size, making sure the veneer seam on the front is centered on the panel.

Now set up a router and trim away the veneer on the front to the $\frac{5}{8}$ " width that will be replaced with the crossbanding. Cut the crossbanding material in strips across the grain about $\frac{3}{4}$ " wide. To apply, use contact cement. Follow the directions carefully. You can miter the corners by cutting the veneer with a razor knife. Simply fit the pieces in place around the edges. It shouldn't take more than 30 minutes to apply the edge banding around the panel. When done, trim the overhang using the edge of a file, or a router with a flush trimming bit with a pilot bearing. Give the face of the panel a good sanding after removing the masking tape. Once the panel is glued in place, sanding will be difficult.



2 EASY REEDING •

A moulding cutterhead, which mounts on the table saw arbor, makes milling the flutes a snap. The insert tooling cuts all three details at once. Mirror frame parts are run all the way through while uprights are start/stop cuts.



3 PREPARE THE PANEL •

To uniformly establish the setback for the veneer panel in the frame and the $\frac{3}{4}$ " cherry internal rail, a $\frac{1}{8}$ " spline cut was made. The cut was made on the table saw shifting the fence between panel and frame cuts to achieve the setback.

STEP 2 Stock Preparation and Reeding • Now you can rough out the stock for the rest of the frame and stand parts. All material is $1\frac{3}{8}$ " thick. Cut the mirror frame pieces to $1\frac{1}{2}$ " wide but don't cut to length yet. Cut the uprights for the stand to a 2" width and go ahead and cut them to finished length. On the uprights, mark the top and bottom, then lay out the location where the legs will be joined, and the curve cut on the top. Now make a pencil line 2" up from the top edge where the legs will join and $1\frac{1}{2}$ " down from where the curve at the top will be. These marks indicate the stop/start cuts for milling the reeding detail. For the mirror frame parts, the corners are mitered so the reeding detail runs all the way through.

Set up the tool for milling the reeds (it cuts all three at once) on the table saw. You'll want to use a table saw insert that you've previously used for dadoing because it will have a wide slot already cut in it. Raise the saw arbor until it projects about $\frac{1}{8}$ " to $\frac{3}{16}$ " above the table. Set the saw fence so that the profile is centered exactly in the $1\frac{3}{8}$ " thickness of the parts. After running a test piece, run the frame parts all the way through and the uprights



4 STOPPED RABBIT • The mirror sits in a deep rabbet milled on the back edges of the frame parts before assembly. A stopped cut is required for the top part of the frame sides where the veneer panel begins and the mirror ends. Cut the rabbet on the table saw and chisel the last part of the cut to square it up.



5 CAULS AID YOUR CLAMPS • Clamping cauls are just the ticket for ease of gluing up the leg/upright joint. The shape of the cauls are provided in the PullOut Plans. The joint is made with two biscuit joints for each leg-to-upright connection.

following the stop/start marks you laid out in the last step. They should correspond to the points on the saw where the reeding tool projects above the saw table.

STEP 3 Position the Panel • Now cut the miters for the frame. You'll also need to cut a 1/8" groove in the inside edge of the top piece to receive a spline that helps position the veneer panel in place. I set my panel back from the front edge of the frame about 1/8". At this time, also groove the long edges of the panel and the 3/4" piece of cherry that is glued the bottom edge of the panel.

STEP 4 Deep Back Rabbet • Lastly, before you can glue up the frame assembly, you must cut a deep rabbet in the back of the frame parts to receive the mirror. Cut the rabbet 1 1/8" deep by 1/2" wide. Note the stopped rabbet cut on the rabbet for the frame sides at the top where the transition occurs between the frame and veneer panel. Now glue up the entire assembly. I first positioned and clamped the veneer panel, its bottom rail and top frame part, then proceeded to glue and clamp the two sides and bottom frame part.

STEP 5 Make the Stand • Use the leg pattern in the PullOut™ Plans to make a pattern on 1/4" plywood. Transfer the pattern to the cherry parts, then cut the edge that will form the joint with the upright. This cut must be

WOOD WORDS (wood 'wurds) n.

Cheval mirror: A long, rectangular tilting mirror on a frame, from the French: *chevalet*, support, horse

Chevron: A "V"-shaped pattern, esp. a kind of fret used in architecture, from old French meaning rafter, from the meeting of rafters at an angle.

Balance: As in veneering, to equalize the stress on both surfaces of a panel to prevent warping by applying veneer to opposite sides.

Core or substrate: The material the veneer is glued to.

Face: One or more pieces of veneer pieced together to make up a single sheet.

Toe cap: A reinforced covering of leather or metal applied to a shoe or boot, or in furniture, the base of a leg.

straight and square, so use a chop saw or your table saw with a slot miter gauge to make this cut. Next band saw the curved lines. Then smooth the band saw cuts with an oscillating spindle sander. The last bit of preparation before assembly is making relief cuts where the toe caps fit on the feet. Use the actual toe caps to determine where to make your cuts. For mine, I removed about 1/8" material from the two sides and top of each foot using the band saw.

Don't forget to cut the curves on the tops of the uprights following the diagram. And since it's easier now, go ahead and drill the holes in the uprights where the decorative bolts run through and clamp the mirror to the desired tilt. Use a drill press if you have one. You can also drill the holes for the threaded insert in the mirror frame sides now as well. Verify their location relative to the uprights first, however.

Now assemble the feet to the uprights. Biscuit joints are easy and plenty strong for this application. Use two biscuits for each joint. Before gluing, make sure you have clamping cauls cut to the shape provided in the PullOut Plans ready. They make this glue-up assembly a walk in the park. Glue and clamp as shown.

STEP 6 One Last Joint • The last bit of joinery and assembly is the stretcher that connects the two upright leg assemblies. Here again, I used two biscuits for each joint. Cut the biscuit slots on the ends of the stretcher by indexing

CHEVAL MIRROR



6 A SECOND HELPING OF BISCUITS • Double biscuits are also used to join the uprights to the stretcher. The set-up for the plunge cut in the upright uses a block clamped along the joint line formed by the upright and leg, and a spacer to accommodate the difference in thickness between the $1\frac{3}{8}$ " stretcher and 2"-wide upright. Move the set-up to the other leg/upright joint line to index for the second biscuit cut.

both the part and the biscuit joiner off the surface of your bench. To make the slots correspond exactly on the uprights, use a block clamped in place and a spacer as shown in the photo. When done, simply clamp across the assembly, making sure the joints pull up tight, that the stretcher is square to the uprights and that the bottom edge of the stretcher is flush with the bottom edge of the upright it's joined to. All this will ensure the stand and mirror will sit flat on the floor and the mirror frame will fit correctly between the two uprights.

STEP 7 Install the Mirror • To get ready to install the mirror I made five retainers to hold the mirror in place. They were made of $\frac{1}{4}$ " hardboard measuring 5" wide by the width of the opening between the rabbets. A piece of $\frac{3}{4}$ " x $\frac{3}{4}$ " x 5" poplar is glued to each end. To cover all this on the back, I cut a piece of $\frac{1}{8}$ " hardboard that screws to the back and sets in from the edges about $\frac{3}{8}$ " all around.

Sanding and Finishing

As part of preparation for sanding and finishing, check carefully over all the areas that will be exposed. Look for dents, dings and scratches as well unwanted glue squeeze-out. Take care of all these problems now before sanding and finishing so you don't have more work later.

I used a random orbit sander and started with 100 grit paper, progressing to 120 and finally, 150 grit. When sanding the reeded surface, be careful not to remove too much material or the rounded tops of the reeds will look flat. Unless you have a real problem (like burn marks) down in the reeding detail, don't worry about sanding the profiles.

Before clear-coating the project, I added a thimbleful of Olympic Red Oak stain to 8 oz. of boiled linseed oil. This made a diluted stain that added color without risking any



7 WEIGHTS AND MIRRORS • To support the mirror in the rabbets, glue $\frac{3}{4}$ " square wood block to the ends of $\frac{1}{4}$ " hardboard cut to the width of the opening. Screw through the blocks into the frame to secure the retainers. The extra piece of wood in the bottom section counterweights the mirror to make sure it always pivots to the bottom.

blotching on the cherry. It's no problem to rag the color onto the veneer panel, too. When done, let it all dry overnight.

The next day you can apply one or two coats of clear finish, such as varnish, spray lacquer or polyurethane. I also painted the hardboard back black to give it an acceptable appearance.

Because the mirror and frame are heavy, I placed shims on the top of the stretcher to align the holes when inserting the decorative bolts through the uprights and into the frame. I also discovered that the frame and mirror were a bit top-heavy. Although the bolts were strong enough to hold the mirror in place, I didn't want to risk an accident so I removed the back and counterweighted the bottom of the mirror with a piece of particleboard as shown.

Upon presentation to my wife, I was right about scoring those big points, and oddly enough, I even find myself checking out my "outfit" from time to time with this latest addition to the bedroom. It's a benefit I'd really never considered! **PW**

Why Do Some Woodcrafters Make Big Money While Others Struggle?

Hello, we're Rick and Amy Gundaker, the "Woodchuckers". We've been self employed as woodcrafters for the past thirteen years.

When we first started crafting, we really struggled just to cover our cost. We'll never forget those first craft shows. We were amazed at how some crafters were always busy selling and restocking their crafts, while many other crafters, like us, hardly sold anything. It wasn't until we learned how those successful crafters produced and marketed their crafts that we started to make some *Real Money*.

It didn't take us long to develop some quick and easy methods of our own for cutting, painting and selling our woodcrafts. In less than a year from the day we started, we were making enough money from our woodcrafting business to pay all of our personal bills, including our home mortgage. What a great feeling that was!

You, too, can make the extra money you need while enjoying your hobby. Using your basic woodworking skills, you can create great gifts and turn your woodshop into a part-time or full-time money maker. We know it can be done because we did it, and we've helped many other woodworkers make money, too!

The following are excerpts from letters we've received from woodcrafters we've helped.

"The crafts I make sell for \$1.00 to \$75.00. I am averaging from \$400 to \$600 a week, and I'm booked six months ahead. Thanks to your help."

J.R. of Muncy, PA

"My wife is a school teacher. I made her one of your cute designs to set on her desk. Other teachers saw it and she sold eleven of them before the day was over. Keep up the good work."

C.M. of Baltimore, MD

If these woodworkers can do it, you can, too!

When we sat down to develop an easy step-by-step decorative woodcrafting program, we had so many proven marketing methods, painting and woodcrafting tips and shortcuts to share with you, we ended up with two fact-filled programs. One, called "*Woodchucker's Workshop*", is an 82-minute video, and the other is our fact-filled guide, "*Woodcrafting for Profit*."

As an example, in our woodcrafting video we make some of our fastest selling woodcrafts using our money making methods. We'll show you step by step how to lay out, cut, sand, paint and finish each project.

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- How much you should charge for your crafts
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- Which paints work the best, and which ones not to use
- How to choose paint brushes that will make your painting much easier
- How to avoid the mistakes that we made... and save hundreds of dollars
- and much, much more . . .

There's plenty of room for everyone in woodcrafting. We won't be competing with you and you won't be competing with us. That's why we would enjoy showing you how you can start your own profitable craft business using your basic woodworking skills. You can go as far as you want... *profits are virtually unlimited!*

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From BUCKET to BOARD

Choose the right brush for the job, then lay out the material with the greatest of ease.

BECAUSE the vast majority of home woodworkers use a brush to apply their finish, learning how to select a good brush and to handle it are crucial steps in the finishing process.

Are there differences in brush quality other than how often a bristle falls out? Are China bristles from China? Do you need a different brush for applying shellac versus varnish?

How do you avoid tell-tale brush marks? Is there a way to keep bubbles off the surface? Should you brush in both directions or only one?

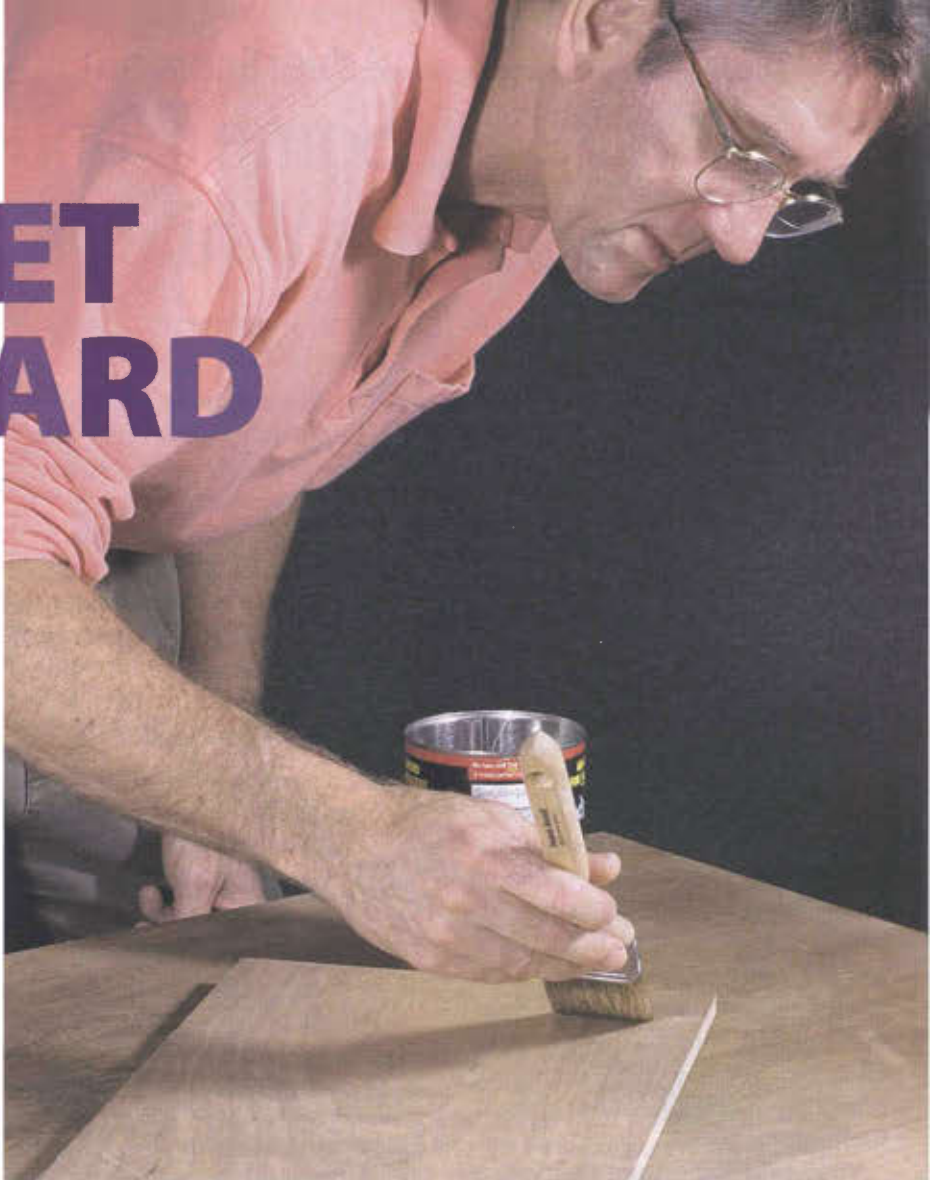
Brush and Bristle Basics

As you might imagine, not all paint brushes are created equal, but all bristle brushes have the same components. These include the handle, the ferrule and the bristles. Generally speaking, the bristles are the most important part of the brush because, after all, it's where the shellac meets the sideboard. For most brushes, the bristles are held together with an epoxy adhesive. The glued bristles are then attached to the brush handle by way of the ferrule.

Most of you probably know already that bristles are either natural, meaning they're made from animal hair, or synthetic. Natural bristles should only be used for non-water-based finishes such as oil-based varnish, including polyurethane, shellac or brushing lacquer. Synthetic bristles can be used for both water-based finishes or solvent-based finish materials, although it's generally accepted that natural bristles are better for solvent-based materials.

Don't be tempted to use a natural bristle brush with a water-based finish. The animal hair will absorb the water, and the bristles will permanently lose their shape. It's a condition called splaying.

By *Steve Shanesy*, editor and publisher, Popular Woodworking.



Although natural bristles are made from many different types of animal hair, the most common ones for general furniture and paint finishing are called "China" bristles, a trade name for hogs' hair. The "China" designation doesn't necessarily refer to its country of origin. These bristles are almost always black or off-white. The features of these bristles that make them work well are the way they hold and release the finish material evenly, and they provide the appropriate stiff-



Three types of brushes: a black China bristle brush (left), a white China (center), and a synthetic bristle brush (right).

ness for brushing with the tips of the bristles.

Synthetic bristles (which are usually made of nylon, polyester or a blend of both) don't absorb water and therefore are the right choice for water-based finish. They hold and release water-based paints and finish material best. Different combinations of nylon and polyester bristles give synthetic brushes differing degrees of stiffness. With all bristles, natural or synthetic, the stiffness of the bristles affects the performance of the brush relative to how thick or thin the finish material is and how quickly it dries. Thicker, slow-drying finishes such as an oil-based varnish is best applied with a stiffer brush. Thin, fast-drying shellac flows on better with more

flexible bristles.

What you might not realize about bristles is that they are available with various types of tips, each suited for a particular type of work. The tip of each bristle may be tapered, tipped or flagged.

Tapered bristles look like the end of a sharpened pencil. Tipped bristles look like the eraser end of a pencil. Flagged bristles are basically hairs with split ends. By splitting the ends, the finish material is released from the brush from these fine strands, resulting in fewer brush strokes. However, these finer strands can work against you when using either thin solvent-based or water-based finishes because they tend to produce unwanted bubbles in the finish. For these materials, a tapered or tipped bristle end is best suited for the task.

Lastly, bristles may be either blunt cut across all the ends or chiseled. When you look at a chiseled brush from the side, the center bristles are longer than the ones on the front and back. For applying finishes, always choose a chisel-shaped end over a blunt-cut end to reduce brush marks.

Buying a Brush

In the world of paint brushes, you generally get what you pay for. Better brushes use better materials and cost more to produce. As such, they are more expensive, but they also produce better results. When properly cared for, a good brush should last for years. I see an expensive brush, meaning a \$12 to \$15 brush, as an investment that I'll take more care to clean and preserve than a cheap brush that is tempting to throw away after a few uses.

For most woodworking finishing jobs, a 2" brush is ideal. It's wide enough to get the job done on wider surfaces, while not too wide for smaller spaces or on narrow pieces like table legs.

Some people may tell you they can determine the quality of China bristles by their color, with white being best. This is an unreliable gauge because bristles are dyed one color or another when a shortage of a particular color occurs. Besides, if this were true we'd all be finishing with those very inexpensive throw-away brushes with the white bristles and wood handles.

WOOD'WORDS (wood'wurds) n.

Ferrule: The metal band that encircles the handle and the top of the bristles on your brush.

Four Steps to an Even Coat of Finish



A Start about 2" away from an end and $\frac{3}{4}$ " away from an edge and make three or four strokes.



B Now come back farther and brush through the wet finish, even closer to the edge.



C Finally, come all the way back to the edge with your brush. Using this process prevents your fully loaded brush from leaving too much finish near the edges and causing runs along the edges.



D After you've applied your finish, blend brush overlaps by "tipping off." Hold the brush at 90 degrees to the surface and — using just the tips of the bristles — lightly drag the brush across the wet finish in a single, continuous stroke.

Getting Ready to Finish

If you've been following this series, you know all about the preparation that's gone into your project before you apply the finish. So let's assume your project is ready. No matter what finish material you're applying, make sure it's fully stirred to mix the heavier materials that have sunk to the bottom. Now pour the material you'll need for the time being into a separate container, such as a coffee can or paper bucket.

If you are using a brand new brush, remove it from its protective cover and save the cover (more on this later). Remove any loose bristle particles by gently running your hand over the tips.

Before dipping the brush in the finish material, presoak the brush in the appropriate solvent for the material you'll be using; water, mineral spirits or alcohol, etc. Dip the brush all the way up to the ferrule and let it soak for two or three minutes. This procedure makes clean-up easier because the solvent that now coats the bristles inside the heel of the brush will help prevent finish material from drying there. And this is the most difficult part of the brush to clean. Plus, in preventing the finish material from drying, it will give the length of the bristles the full benefit of their flexibility because they won't be coated with stiff, thick, even crusty finish material. The flexibility has a direct effect on brush marks.

This profile of the brush shows the chiseled end. For applying finishes, always choose a chisel-shaped end over a blunt-cut end to help reduce the chance of leaving brush marks.



To clean your brush, dip it in solvent and remove as much finish material as you can. After removing as much solvent as you can, spin the handle rapidly in your hands as shown above. Do this in a deep sink or garbage can to avoid splatters. Once clean, store the brush in its original cover or a homemade wrapper.



Brushing the Finish

Load the brush with finish by dipping it in the container so that no more than one-third to one-half of the bristle length is submerged. Don't drag the entire length of the bristles against the side of the container to remove excess material. To prevent drips, you can either tap the ferrule against the side of the container to "shake" off excess material, or drag just the tips against the top edge of the container. Remember, removing too much material defeats the purpose of loading the brush in the first place. Furthermore, a dry brush can lead to excess brushing on the wood surface, which can produce bubbles and/or brush marks.

Guidelines for holding the brush say it should actually

be held with your fingers on the ferrule and the handle nested in the crotch between your thumb and index finger. The concept to remember is to think of the bristles as extensions of your hand and fingers. It will lead to better control of the brush. The brush should be held at any angle between 45 degrees and 90 degrees that feels comfortable in your hand.

When applying the loaded brush to the wood, (assuming you are working on a wide, level surface) start about 2" away from an end and $\frac{3}{4}$ " away from an edge. Make the first strokes, then come back to the end and along the edge to brush through the wet finish already applied. The

purpose is to prevent the loaded brush from leaving too much finish near the edges and causing runs along the edges. Use this technique over and over, every time you reload your brush, picking up your brushing where you stopped.

When applying the finish, resist the temptation to over-brush the material. Brush back over the just-wetted surface only enough to leave a consistently thick coating of finish. Brush with the grain and brush in one direction only. You can turn the brush to release finish from the opposite side of your first strokes.

If you are brushing on vertical surfaces, or on turnings or carvings, reduce the amount of finish on the brush to avoid runs or sags.

It's quite possible that after applying a few rows of finish to the width of the brush, the wet surface may still need some brushing to better blend brush overlaps. Do this by "tipping off." This procedure also removes air bubbles. To "tip off," hold the brush at 90 degrees to the surface and, using just the tips of the bristles, lightly drag the brush across the wet finish in a single, continuous stroke. The objective is to produce a wet film surface without visible signs of brushing, bubbles or variations in the amount of wet finish. Bear in mind that you probably won't produce a perfect, flawless wet film. There are ways to fix this that

I'll cover in the next installment. The objective is to get as close as possible to an even, wet film before the finish stiffens in the drying process.

Clean Your Brush

Get into the good housekeeping habit of thoroughly cleaning your brush as soon as you are done. Start by brushing any excess material onto a piece of scrap wood or cardboard. Follow by immersing the bristles in the appropriate solvent for the finish you have used. Because soaking isn't enough, massage the bristles all the way up to the ferrule. It might be necessary to discard the first batch of solvent for a final bath in fresh solvent.

When you are satisfied the bristles are clean, remove the excess solvent. First squeeze out the bristles, then rapidly spin the brush as shown in the photo. Finally, return the brush to its original cover or neatly wrap it in craft paper. Store the brush so that the bristles remain straight in their wrapper.

After putting down the first coat of finish you'll begin to see the big pay back in all your hard work. Your careful construction, wood preparation, sanding and properly applied finish will bring out the rich beauty and color of the wood. You are well on your way to the completion of a project that's built *and* finished right. **PW**



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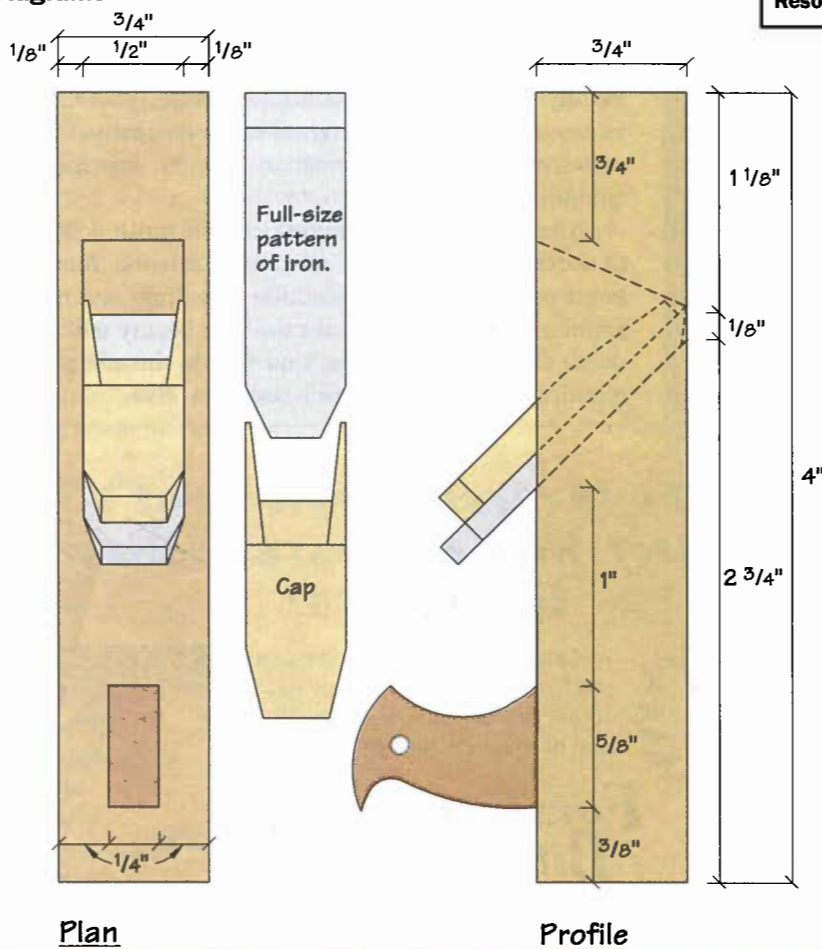
To see more projects like this in future issues, circle "P5" on the postage-paid card in the Resource Directory.

OLD PLANE ORNAMENT



An OLD PLANE Ornament

Diagrams



TWO-FACED SNOWMAN



SANTA'S CAT



Nothing identifies a woodworker more than a wood plane, so why not mark your tree by hanging one (or a dozen) wooden planes on it.

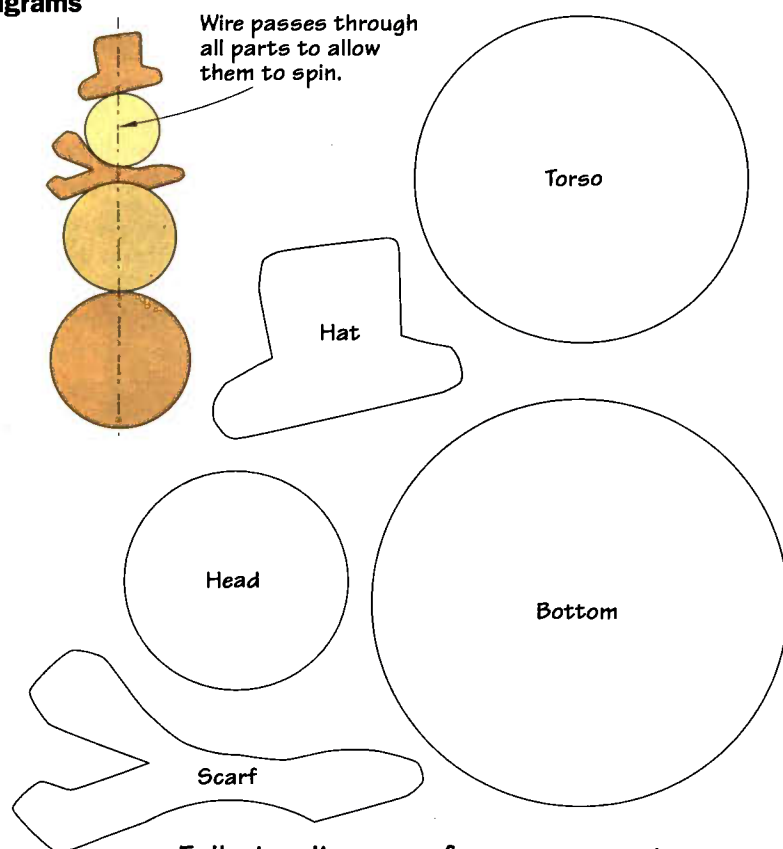
The plane shown here is a jack plane made from four scraps. The body of the plane is mahogany, as is the cap and the handle. The "iron" is made of white oak, but if you have a piece of metal to use, it's even more authentic.

Cut the pieces to the sizes shown on the pattern, then cut the cap, iron and handle to shape using a scroll saw. The body of the plane is chiseled out as shown on the plan and profile views of the diagram to fit the cap and iron. Next, glue all of the pieces in place. When you've got the plane assembled, spray on a couple coats of clear finish, then add your hook and hang. It's an easy thing to personalize these planes with a special greeting and give them to friends and family as a special holiday gift from your own workshop.

David Thiel, Popular Woodworking staff

Two-Faced SNOWMAN

Diagrams



Full-size diagram of snowman parts

This ornament literally puts a new spin on the traditional Christmas snowman. All the pieces are painted on both sides and can be spun to display a different hat, scarf or face!

The pieces are all cut from pieces of 1/4" plywood scrap. Different thicknesses can be used but keep in mind that the ornament needs to be fairly light to be easily supported by a tree branch. Trace the pieces onto the wood using the drawing or make your own modifications.

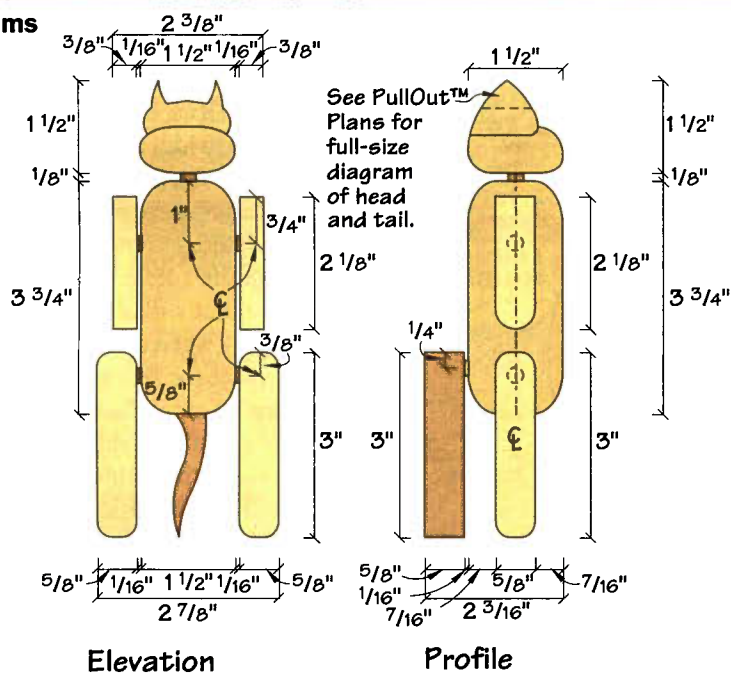
Cut out the pieces using a scroll saw. Then drill a small hole through the length of each piece. Take it slow. It's easy to drill out the side of one of the pieces. Next paint all of the pieces with the design of your choice. Just remember to vary each side so the pieces can be mixed and matched when spun.

Now it's time to assemble the piece. You need a piece of wire that is small enough to fit through the holes you drilled and six or seven inches long. Put the snowman pieces on the wire one at a time. Then bend the wire over at the top and bottom to keep the pieces from coming off. You can use the wire as a hanger or add a piece of ribbon.

Michelle Taute, Popular Woodworking staff

Here Comes SANTA'S CAT

Diagrams



Elevation

Profile

Schedule of Materials: Santa's Cat

| No. | Item | Dimensions T W L | Material |
|-----|------|--------------------------|----------|
| 1 | Body | 1 1/2" x 1 1/2" x 3 3/4" | Walnut |
| 2 | Legs | 5/8" x 5/8" x 3" | Walnut |
| 2 | Arms | 3/8" x 5/8" x 2 3/8" | Walnut |
| 1 | Head | 1 1/2" x 1 1/2" x 1 1/2" | Walnut |
| 1 | Tail | 5/8" x 5/8" x 3" | Walnut |

Not every ornament on our family's tree has a Christmas theme. In fact, we have a lot of ornaments that have more to do with our pets than with the holidays. However, I'm sure that once my wife gets ahold of this cat it will have a red ribbon around its neck, a Santa Claus hat and a felt bag of presents.

Begin by cutting a piece of 1 1/2" x 5" x 7" piece of walnut to size. Now cut kerfs in the walnut block for the maple strips, or "stripes." Here's how: Set the height of your table saw's blade to 5/8". Now make a cut through the width of the block. Turn the block over and make the same cut on the other side. Move your stop or fence 1/4" and make the two cuts again. Repeat this procedure through about two-thirds the length of the block. Now glue 1/8" strips of maple into the kerfs. When the glue is dry, cut and shape the cat's parts on your band saw and disk sander. Carve the head from walnut scrap with a shop knife.

To assemble the cat, glue 1/4" dowels into the arms, legs and head. Then stick the dowels into 1/4" holes in the body. Don't use glue here — this makes your cat poseable.

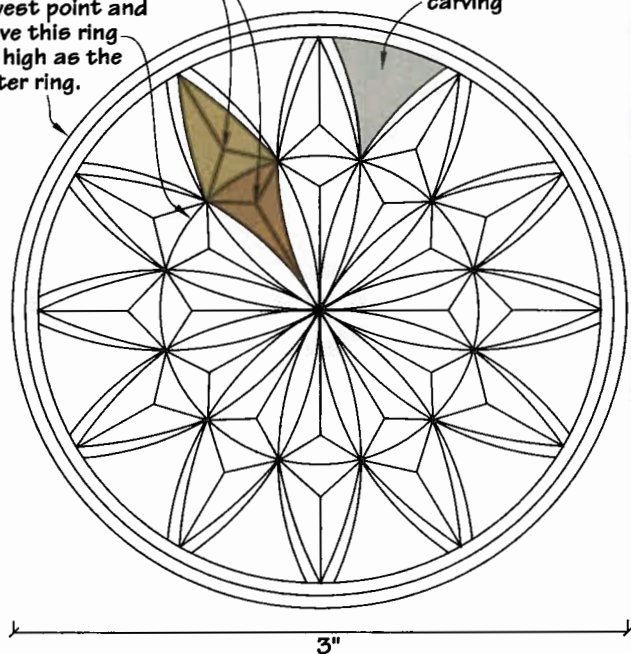
Christopher Schwarz, Popular Woodworking staff

Chip-Carved SNOWFLAKE

Diagram

Carve a three-sided facet down to this lowest point and leave this ring as high as the outer ring.

Cut this area out all the way around the carving



Full-size diagram of snowflake ornament



Christmas in the Midwest involves removing lots of the stuff symbolized by this ornament from your driveway. It's more fun making snowflakes than shoveling them.

Start by cutting a $\frac{1}{4}$ " x 3" x 3" piece of basswood. Paste the full-size pattern down

to the wood and cut out the circle. Drill clearance holes into the areas where you need to cut through the ornament. Scroll saw the triangular-shaped holes first.

Chip carve the remaining areas of the ornament. The easiest way to start carving is to remove a little version of what the finished depression will look like. This

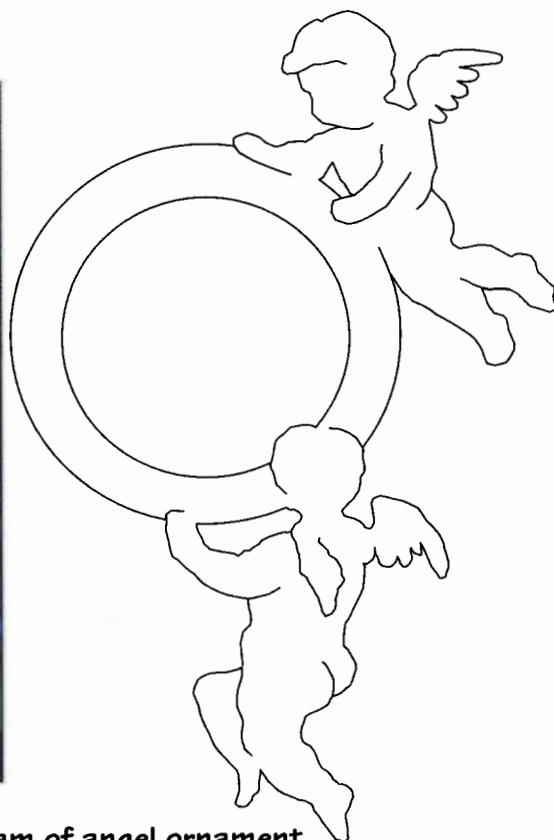
will give you an idea of how the wood grain will react to the knife. The outer depressions are a little deeper than the inner ones. This gives a sense of depth. Take your time and try to carve each depression evenly.

Finish the ornament by applying color and spraying a clear finish. Using gold paint, stipple (use the end of the brush pushed into the work) the edges of the ornament to highlight the carving. Pierce one of the cutouts and attach a wire for hanging.

Jim Stuard, Popular Woodworking staff

Angel-face ORNAMENT

Diagram



Full-sized diagram of angel ornament.

If you are a traditionalist at the holidays, this Victorian-era ornament is perfect for you. First browse through your photo album to find a photo that will fit the opening. Then head for the scroll saw.

For material, use $\frac{1}{8}$ " Baltic birch plywood. It provides strength where the cuts come close together. Before cutting, consider stacking three or four pieces so you cut multiple ornaments. If you stack them, glue the pieces together with a spray adhesive that will allow you to separate them easily when done. Then glue the design in place (or first make photocopies if you plan on more than one cutting).

Use a $\frac{1}{16}$ " drill bit to pierce the pattern to make the inside cuts. Cut the outside first, then the inside. When done, separate and lightly sand, especially the edges.

To finish, first paint on a coat of dark red craft paint. When dry, lightly sand. Follow up with a light coat of gold paint. Apply this coat with a "dry" brush, a brush not fully loaded. Let some of the red show through.

Mount the photo using two pieces of round card stock, one in the shape of a doughnut to surround the photo, the other to cover the back. Glue both down. **PW**

Steve Shanesy, Popular Woodworking staff

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|-----------------------|-------|-------|-------|-------|
| 14"x40TX1" | \$215 | \$149 | \$134 | \$119 |
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| 12"x40TX1" | \$183 | \$129 | \$116 | \$103 |
| 12"x30TX1" | \$162 | \$119 | \$107 | \$95 |
| 10"x40TX1/8" or 3/32" | \$156 | \$119 | \$107 | \$95 |
| 30T 1/8" or 3/32" | \$135 | \$99 | \$89 | \$79 |
| 9"x40T | \$146 | \$109 | \$98 | \$87 |
| 30T | \$125 | \$99 | \$89 | \$79 |
| *8-1/4"x40TX 3/32" | \$136 | \$99 | \$89 | \$79 |
| 8"x40T 3/32" | \$136 | \$99 | \$89 | \$79 |
| 30T | \$115 | \$89 | \$80 | \$71 |
| 7-1/4"x30T 3/32" | \$112 | \$69 | \$62 | \$55 |
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WOODWORKER I— CROSSCUT — 7 1/4" - 14"

For TABLE AND RADIAL SAW — 10% to 20%
NON-SPLINTERING PLYS

| | LIST | SALE |
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| 14"x60TX1" | \$224 | \$159 |
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| 10"x60TX5/8" 3/32"K | \$162 | \$129 |
| 8-1/4"x60T | \$150 | \$109 |
| 8"x60T | \$150 | \$109 |
| 7-1/4"x60T | \$150 | \$109 |

OTHER SIZES AVAILABLE — 7 1/4" - 14"

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New specs, 5° Neg. Pts. & flat, runs out less than .002 for perfect, tight, smooth, splinter-free miter joints.

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| Delta 9"x80TX5/8" | \$204 | \$119 |
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| DeWalt, Makita, B&D, Hitachi 12"x80TX1" | \$229 | \$139 |
| Ryobi-Makita 14"x100TX1" | \$266 | \$179 |
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For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

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Faster feed rates & absolute splinter control. Stops splintering on OAK/BIRCH PLY VENEERS & MELAMINE

| SIZES AVAILABLE | LIST | SALE | SIZES AVAILABLE | LIST | SALE |
|----------------------------|-------|-------|----------------------------|-------|-------|
| 7-1/4" x 60T x 3/32" K | \$149 | \$129 | 300mm x 100T x 1/8" x 30mm | --- | \$197 |
| 8" x 80T x 1/8" & 3/32" K | \$202 | \$169 | 12" x 100T x 1-1/8" K | \$253 | \$215 |
| 220mm x 80T x 1/8" x 30mm | --- | \$167 | 14" x 80T x 1" | \$232 | \$197 |
| 9" x 80T x 1/8" & 3/32" K | \$207 | \$179 | 14" x 100T x 1" | \$266 | \$226 |
| 10" x 80T x 1/8" & 3/32" K | \$207 | \$159 | 16" x 80T x 1" | \$262 | \$223 |
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(Bore up to 1-1/4" Add \$25 — Plus \$5.50 S&H)

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See American Woodworker April 1998, pp. 64-69.

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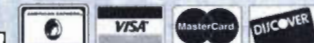
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20 PC. SET

- 20 sizes from 1/4" to 3/4" by 16ths, 7/8", 15/16", 1" to 2" by 8ths

ITEM 31130-1SPA

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16 PC. SET

- 16 sizes from 1/4" to 2-1/8" by 8ths

ITEM 32404-3SPA

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PROFILE SANDER KIT

New design includes attachments for any sanding job! Even projects that could only be done by hand are accomplished with this unit. Sand corners, curves, angles, and an entire roll top desk. Flutes, decorative picture frames, grooves, score lines, shutter slats - they're no challenge for this revolutionary device.

1.8 amps @ 120V; 6000 SPM; Includes dust pick-up pad (for hook & loop paper), dust wand, regular and offset sanding profile mounting attachments, six each of convex and concave radius profiles, five degree angle profiles, and an assortment of sandpaper all packed in a blow mold case. Factory reconditioned, factory perfect

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Adjustable belt sands inside and outside curves. Cast aluminum sanding disc features a cast aluminum table that locks in any angle from 0° to 45°. Table can be repositioned for use with belt or disc. Includes: 7-1/2" x 5" cast aluminum table, miter gauge, and adjustable backstop; 4000 FPM belt speed; 1725 RPM disc speed; 1/3 HP, 1725 RPM, 115V, single phase

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- Increase the life of your sanding belts and discs up to 500%
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HEAVY DUTY 4" DISC GRINDER

- Compact and powerful • 11" long
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- 115V, 5.18 amps, 10,000 RPM
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- Spindle lock

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4" INDUSTRIAL GRINDING WHEELS

- 24 grit, 7/8" arbor hole, 3/16" thick

| TYPE | ITEM | PACK OF 10 |
|-------------|------------|---------------|
| FOR METAL | 35551-0SPA | \$7.99 |
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6" INDUSTRIAL RABBETING JOINTER

- Infeed table size: 22-1/2"
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ITEM 30289-4SPA

\$199.99

REPLACEMENT BLADE SET

ITEM 33271-2SPA

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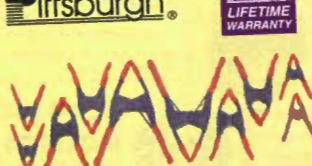
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Aggressive 12 amp, 5500 RPM gear-driven motor for tough cutting jobs. Equipped with a carbide tipped 6-1/2" diameter blade. Crosscuts, miters, bevels, cuts compounds - makes just about any cut (except rip). Horizontal D-handle design for positive, full grip control. Two rigid stainless steel rods minimize deflection and maximize accuracy. Motor: 12 amps, 120V; Blade diameter: 6-1/2"; Arbor: 5/8"; Speed 5500 RPM; Capacity: Cut-off at 90°, 12"; Cut-off at 45° miter: 9-1/2"; Depth of cut at 90°: 1-3/4"; Depth of cut at 45° bevel: 1-5/8"; Positive miter stops: 0°, 22-1/2°, 31.62°, & 45°; Weight: 42 lbs.

ITEM 52880-4SPA

\$299.99 **\$249.99**

Pittsburgh



10 PC. SPRING CLAMP SET

Ideal for gluing, assembling, welding, and 1001 other uses in home or shop. Made of nickel-plated, heavy gauge steel, with heavy duty tempered springs and comfortable vinyl coated handles.

- Contains four 1" capacity clamps, four 2" capacity clamps, and two 3" capacity clamps

ITEM 37451-4SPA

\$9.99 **\$5.99**

TUNGSTEN CARBIDE TIPPED ROUTER BIT SETS

Both include individually organized storage cases. 15 most popular sizes. • 1/4" shanks

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- Includes: 1-1/4" rabbeting, 1-3/8" cove, 1-1/16" roman ogee, 1-1/4" rounding over, 1/2" flush trimming, 1-3/16" 45° chamfer, 1/2" dovetail, 3/4" straight, 1/2" straight, 3/8" V-groove, 1/4" combination panel, 1/4" straight, 1/2" mortising, 1/4" cove, 1/8" straight
- Includes pilot bearing

ITEM 31164-5SPA

\$36.99 **\$29.99**

4 PC. ROUNDING OVER BITS

- Sizes: 1/8", 1/4", 3/8", & 1/2"
- Set includes 4 rounding over bits w/pilot bearing tips • 2 flutes each
- 1-5/32" long shanks

ITEM 33078-5SPA

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- Powerful 15 amp motor
- 10 positive miter stops 15°, 22.5°, 30°, 45° left and right, 0°, and 60° right
- Dust collection
- Includes electric brake

ITEM 35249-4SPA

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Move up to higher voltage and more torque with this new 18 volt cordless saw. Cut up to 85 ft. of plywood on a single charge. Kit includes: 1 hour quick charger, 18 volt battery, saw and hex key. 3000 RPM, 1.3 amps, 10mm arbor, 50° bevel capacity, maximum depth of cut @ 90°: 1-1/2"; @ 45°: 1-1/4"; weights 7-1/2 lbs., blade and rip fence sold separately

ITEM 37412-6SPA

\$109.99 **\$59.99**

5-3/8" TUNGSTEN CARBIDE TIP BLADE

Teeth: 24, C2 carbide steel, 10mm arbor, max. RPM: 7000

ITEM 37413-0SPA

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16" SCROLL SAW

- Precision milled 14-1/2" x 8" table tilts 0° to 45° • 1/8 HP, 110V, .83 amps
- Uses pin end blades, 5-1/2" long
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ITEM 36392-4SPA

\$49.99

5 PC. 5-1/2" SAW BLADES

- Pin end type

ITEM 35024-0SPA

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CHICAGO Electric Power Tools



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- Includes rabbeting guide plate/fence, sharpening holder, blade setting jig, replacement brushes, & replacement belt
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ITEM 32222-3SPA

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CENTRAL MACHINERY

12" DIRECT DRIVE, BENCH TOP DISC SANDER

Get sharp, accurate finishes without burning or marring. Direct drive disc won't slip. Table tilts to 45°. Includes 60 grit, 12" sanding pad.

- 1 HP, 120V, 14.0 amps • Base: 13" x 10"
- No load speed: 1793 RPM
- Wheel diameter: 12"
- Shipping wt.: 92 lbs.

~~\$129~~ **\$89⁹⁹**

ITEM 37297-3SPA

12" SANDING DISCS

| GRIT | ITEM | PK. OF 2 |
|------|------------|--|
| 60 | 37958-1SPA | \$6 \$6⁹⁹ |
| 120 | 37959-1SPA | \$6 \$6⁹⁹ |

CHICAGO Electric Power Tools

VARIABLE SPEED RECIPROCATING SAW

110V, 60 Hz, single phase; 600 Watts; 3.6 amps; Gear driven, variable speed; 1-1/4" stroke; 300 SPM to 2400 SPM; Tool weight: 7-1/4 lbs.; Overall length: 17"; All ball bearing

~~\$69~~ **\$39⁹⁹**

ITEM 36595-6SPA

RECIPROCATING SAW BLADES

Contains a grab bag selection of saw blades for your reciprocating saw. Contents vary for each package.

~~\$3~~ **\$1⁹⁹**

ITEM 36340-4SPA

Pittsburgh

LIFETIME WARRANTY

2 PC. 3/4" HEAVY DUTY PIPE CLAMP

Constructed from heat-treated cast iron, these durable clamps keep your work rock steady. Just screw the handle side onto a 3/4" threaded pipe and slide the spring loaded end on. You're ready to go! Pipe not included.

- Handle screw operating range: 2-1/8"
- 1-1/2" throat depth
- Weight: 2-7/16 lbs.

ITEM 31255-1SPA

1/2" PIPE CLAMP

- 1-1/2" throat depth
- Weight: 1-4/5 lbs.

ITEM 37056-2SPA

CENTRAL MACHINERY

NO MORE LOST CHUCK KEYS!

5 SPEED BENCH DRILL PRESS WITH KEYLESS CHUCK

- 8-1/4" maximum distance spindle to table
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- 620 to 3100 RPM • 1/2" chuck
- 22-1/2" high, 47 lbs.

ITEM 34231-6SPA

DRILL PRESS WITH KEYED CHUCK

ITEM 05901-0SPA

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Easier layout for professional mortise and tenon joints in furniture, cabinets, and restoration projects. Fence with hold down clamp keep workpieces from lifting off the table. Large capacity - up to 5" maximum height. Includes fence, workpiece clamp, and 1/4", 3/8", and 1/2" mortising chisels and bits.

- 10-7/8" x 7-3/4" base
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- 3580 RPM spindle speed • 5" throat
- 5" maximum workpiece height
- Accepts .745" chisel shanks
- 1/2 HP, 110V, 2.3 amps

~~\$149~~ **\$149⁹⁹**

ITEM 35570-5SPA

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7-1/4" ADJUSTABLE DADO BLADES

Carbide steel tips last up to 50 times longer and can be resharpened. High speed steel blades are denser and stronger for greater impact resistance. Does not have to be removed from saw to adjust cutting width. 4500 max. RPM; 1" arbor with 5/8" adapter

| TEETH | ITEM | PRICE |
|-------------------------------------|------------|--|
| CARBIDE DADO BLADES | | |
| 24 | 36911-3SPA | \$12 \$12⁹⁹ |
| 40 | 36912-3SPA | \$14 \$14⁹⁹ |
| HIGH SPEED STEEL DADO BLADES | | |
| 24 | 36913-2SPA | \$8 \$8⁹⁹ |
| 40 | 36914-4SPA | \$9 \$9⁹⁹ |

THREE VIAL LASER TORPEDO LEVEL

No more fiddling around with line levels. Red laser projects level marks over 100 feet away - with pinpoint accuracy! Perfect for masonry, fencing, landscaping and cabinet work. Constructed from brass anodized aircraft aluminum. Three unbreakable vials for horizontal, vertical and 45° V-groove for pipes. Threaded mount for tripods.

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~~\$74~~ **\$59⁹⁹**

ITEM 37760-5SPA

CHICAGO Electric Power Tools

3/8", 14.4 VOLT CORDLESS DRILL KIT WITH KEYLESS CHUCK

High voltage, heavy duty battery gives long run times between charges. T-Handle design makes this drill easy to use.

- Variable speed, reversible; 0 to 600 RPM
- 6 torque settings
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, magnetic extension bit, charger, battery, Jacobs® keyless chuck, and carrying case

ITEM 34793-2SPA

14.4 VOLT BATTERY

ITEM 34794-0SPA

CENTRAL PNEUMATIC CONTRACTOR SERIES

18 AND 19 GAUGE AIR FINISH NAILER

The excellent balance and 2-1/2 lb. weight make this brad tacker easy-to-use in tight spots. Loading up to 105-18 gauge brads to get more done with less down time. Uses 5/8" to 1-3/16" brads.

- Air consumption: 3.5 CFM at 75 PSI
- Uses 18 and 19 gauge brads
- 1/4" NPT inlet

~~\$39~~ **\$29⁹⁹**

ITEM 36618-5SPA

18 GAUGE BRADS

| LENGTH | ITEM | PACK OF 5 |
|---------|------------|--|
| 1" | 33206-1SPA | \$5 \$5⁹⁹ |
| 1-3/16" | 33207-2SPA | \$6 \$6⁹⁹ |

LIMITED QUANTITIES

DELTA 12-1/2" PORTABLE PLANER

Get smooth, even cutting and superior snipe control adjustment with this 2-knife cutter head. Quick change, high speed steel double-edged/reversible knife system requires no radius gauge for setting. Easy-to-read SAE/metric scale. Includes carrying handles & infeed/outfeed tables.

- Motor: 15 amp, 120V, 60 Hz, single phase
- Capacities: 12-1/2" width, 6" thick, 1/8" maximum depth of cut
- Feed rate: 26.2 FPM
- Cutter head speed: 8000 RPM
- Table size w/extensions: 12-1/2" x 23-5/8"
- Improved dust exhaust system
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~~\$349~~ **\$299⁹⁹**

ITEM 51706-2SPA

CENTRAL MACHINERY

6" x 12" MINI WOOD LATHE

Create projects from miniature to full-size. Heavy duty, cast iron construction for minimum vibration and high strength. Light weight and compact size allow bench top mounting or taking it on the job. Dual speed range for absolute cutting control.

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- Swing over bed: 6" • MT1 spindle
- 25" L x 4-3/4" W x 9-1/2" D
- Speed range - Low: 275 to 3050; High: 400 to 4450

~~\$139~~ **\$139⁹⁹**

ITEM 34837-7SPA

CENTRAL MACHINERY

10", 2 HP BENCH TABLE SAW

Die cast aluminum table 25-3/4" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting.

- Max. depth of cut at 90°: 3-1/8"; at 45°: 2-1/2"
- Blade sold separately, below
- Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM • Shipping weight: 36 lbs.
- Miter gauge adjusts 0° - 60° left and right
- Blade capacity: 10" with 5/8" arbor

ITEM 35715-2SPA

10" CARBIDE TIP SAW BLADE

- 5/8" arbor • 40 tooth

~~\$99~~ **\$99⁹⁹**

ITEM 00529-4SPA

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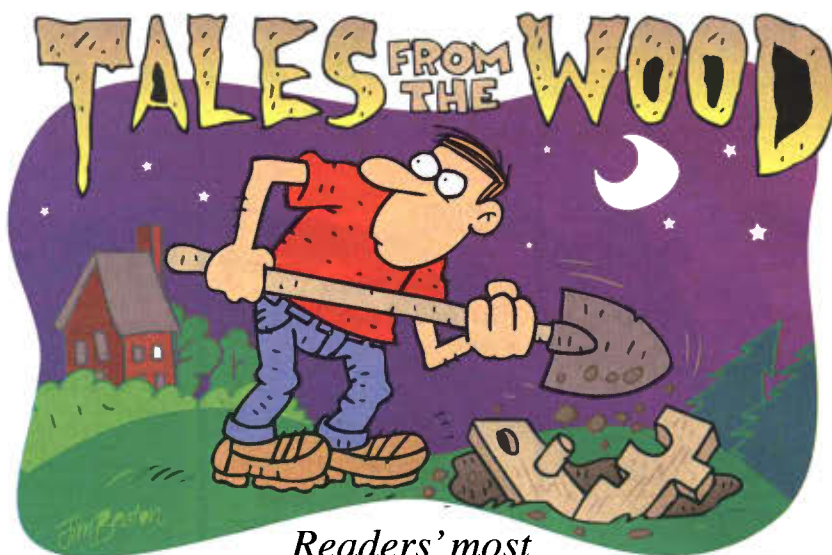
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WOOD TALES

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*Readers' most
amazing stories from their workshops.*

WINNER! Roll-Top With a View

A few years back, my wife decided that she wanted a fancy desk to house her new computer system. We shopped around and after trips to many stores she finally found a desk that she fell in love with. It was a huge roll-top desk that took two of us to move and position in the den of our house. However, when she attempted to set up her computer system, she found that everything wouldn't fit as she envisioned. She called me into the den and showed me what she wanted.

I looked over the project in a very professional manner and told her confidently that the adjustments would be easy to make. I carefully traced out my cuts, made them and sanded and refinished the wood to make the adjustments as invisible as I could. I set the computer system in and called my wife back to view the work. She admired it and then attempted to close the roll top. "I still can't close the lid over the system, I want to be able to do that."

I looked over the problem and thought, "This is simple," and made another few cuts on the rear panel. Then I pushed the monitor back and closed the roll top. As the top came down, I realized that I had made a serious mistake. I had cut a hole in the rear of the desk top right through the roll top! Well, we keep the roll top up now, and I'm a much better woodworker, but I've learned a very valuable lesson about cutting wood. Don't always just measure twice and cut once, but THINK TWICE before you measure twice!

*Larry R. Kuderick
Palm Harbor, Florida*

Train Your Dog to Fetch – With a Router!

First off, let me describe my dog, Rocky. He is a 120-pound labrador-chow mix that prefers tug-of-war to fetching. When attempting to teach him to catch a Frisbee, he'd just lie down to watch me retrieve it.

I do my woodworking in a small shed that gets incredibly hot in Delaware's summer, so I keep the doors open. One particularly warm day last year I was building some small shelves using my router. When running one of the boards across the table, the bit found a hidden nail and the wood took off. As I watched it fly out the door, my dog ran by, jumped up, caught it in his mouth and brought it right back to me!

Since then, he still refuses to fetch, but he has a new-found affinity for the taste of wood (untreated of course) to chew on.

*Steven E. Fritz
Woodside, Delaware*

Flying Bowl Turns Heads

I am now 34 years old, but when I was a junior in high school, I was very involved in wood shop. I had a 3" x 6" piece of round stock I had taken from an old oak tree. I fastened it to a wood lathe and proceeded to turn a bowl out of it.

Well, everything seemed to be going just fine when all of the sudden my bowl flew off the lathe. It went about 7 feet into the air, headed straight through a big picture glass window and out into the school yard. Well, I looked over my left shoulder to see if my shop instructor had noticed. "Wow!" Clear to the left. So, I turned the other way, and there he was. He had been watching me the whole time. Well, I just stood there and waited to see if I was about to get a free trip to the principal's office. He just shook his head, walked off and never said a word.

I think about this many times, and it was very fortunate that no one was injured. From that time until this day, I always make sure my work is secured very well. **PW**

*Ken Colson
Griffin, Georgia*



Share Your Story & Win!

Turn your favorite tale from the woodshop into a \$150 gift certificate from Lee Valley Tools in *Popular Woodworking's* "Tales from the Wood" contest. We're looking for your funniest, most embarrassing or incredible story. And if we can learn something from your yarn — even better.

Each issue, our editors choose the best tale and print it here. Runners-up receive a Veritas Sliding Square (shown at right) from Lee Valley Tools, the catalog company that features an impressive array of quality woodworking tools, supplies and accessories. One final rule: Please, no stories about people getting hurt. That's not funny.

To make things easier, you can e-mail your tale and daytime phone number to us at popwood@fwpubs.com or mail it to: Tales from the Wood • *Popular Woodworking* • 1507 Dana Ave. • Cincinnati, Ohio 45207

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November 1998 **75**

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#31

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**David Bowen,
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never come back!"**

**Dave Melvin,
from Bloomingdale,
Illinois**

***"But Dad, you
always told us to
play fair and
square."***

**Lyn Spriggs,
from Grinnell, Iowa**

illustrated
by Bob
Rech

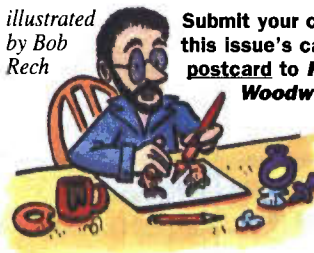
Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*.

**Cartoon Caption
#33, 1507 Dana
Ave., Cincinnati,
OH 45207 by
October 24, 1998.**

Winners will be chosen by the editorial staff.

The winner will receive Makita's new 3" x 18" variable-speed belt sander (Model 9911). One side of the sander is flat so you can sand flush to walls. The top is flat so you can turn it upsidedown to use as a benchtop sander.

The runners-up each win a one-year subscription to *Popular Woodworking*.



**WIN
Me!**

Circle #118 on Resource Directory Coupon

NEW PRODUCTS

Popular Woodworking endeavors to provide readers with accurate, useful information on the newest woodworking tools and products by testing most of them in the Popular Woodworking shop. We consider cost, design and benefit, and add our comments about tested items to help you make future purchasing decisions.

Bench Random Orbit Sander from Delta

Contact: Delta International, 800-438-2486 (www.deltawoodworking.com/delta)

Retail Price: \$199

Available at most home center and woodworking stores.

Model 31-750 Features:

- Offers the fast, swirl-free finish of a 1/2 hp random orbit sander in a benchtop model
- Large 16" x 22" table and 3" x 22" fence for supporting large workpieces
- Efficient built-in, fan-drawn dust collection with attached collection bag

- Interchangeable pads for use with 9" hook-and-loop or PSA sanding discs

PW Tool Report:

Never clamp your random orbit sander into your bench vise again. This clever benchtop tool is the perfect solution for sanding small parts.

For more information, circle #160 on the Resource Directory Coupon.

New Tilt-Base Jigsaw From Porter Cable

Contact: Porter Cable 901-668-8600 (www.porter-cable.com)

Retail Price: \$179 Available in catalogs and stores.

Model 9543 Features:

- Quick and simple blade change by squeezing the clamp, inserting the blade and releasing the clamp
- Base tilts from 0 - 45 degrees, left or right, without tools
- 6-amp motor offers variable speed ranges from 500 to 3,100 strokes per minute
- Blade guide system minimizes blade deflection during straight and angled cuts
- Four-position orbit selector adjusts aggressiveness of cut

PW Tool Report:

Porter Cable fans can have a tilting-base jigsaw to call their own, and the unique blade guide system adds a degree of blade support never before seen in a jigsaw.

For more information, circle #161 on the Resource Directory Coupon.

Powermatic Offers Left-Tilt Contractor's Saw

Contact: Powermatic, 800-248-0144 (www.powermatic.com)

Retail Price: \$780

Model 64A Features:

- 1 1/2 hp single-phase 115/230v motor
- 40-tooth, 10" carbide-tip blade
- Toothed V-belt drive system reduces vibration
- Bottom-mount dust collector shroud
- Solid cast-iron extension wings offer a 39 3/4" x 27" table size
- Powermatic's 30" Accu-Fence® system

Circle #162 on the Resource Directory Coupon.

Continued on page 78



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Circle #104 on Resource Directory Coupon

NEW PRODUCTS

Continued from page 77

Bosch's New Jigsaws Offer Simplest Blade Change Ever

Contact: S-B Power Tools, 773-286
7330 (www.boschtools.com)

Retail Price: \$179

Available early 1999.

Features:

- Available as a barrel-grip or top-handle model. Both offer a blade ejection system that's as simple as it gets
- Base tilts 0 - 45 degrees left or right
- 6.3-amp motor offers variable speed ranges from 500 to 3,000 strokes per minute (no load) with constant speed even under load due to Electronic Feedback Circuitry
- Three orbital settings for fast cutting, and a non-orbital setting for cleaner cuts
- Exhaust deflector can be set for on, partial, or off as desired
- Optional vacuum adapter tube for easy dust collection

PW Tool Report:

Takes blade changing to a new level in simplicity. Electronic feedback keeps the tool cutting smoothly through any wood. Bosch deserves its position at the top of the jigsaw market.

For more information, circle #163 on the Resource Directory Coupon.



Makita Enters Scroll Saw Market With 16"

Contact: Makita USA,

800-4-MAKITA

Retail Price: \$179 Available
now in catalogs and stores.

Model SJ401 Features:

- Heavy-duty cast-iron table (14³/₈" x 9³/₈") and base for firm cutting with little vibration
- Table tilts from 0 - 45 degrees left, and 0 - 15 degrees right
- Parallel-arm motion for more accurate cut with 16" throat capacity
- Uses both plain-end blades with supplied wrench or pin-end blades with tool-less change
- Variable speed control (400 to 1,600 strokes per minute) and blade tensioning control located at front of tool

PW Tool Report:

Good price for a tool with lots of useful features. An entry-level scroller won't outgrow this saw anytime soon.

For more information, circle #164 on the Resource Directory Coupon.



Lightweight Craftsman Air Tools

Contact: Craftsman Tools, 800-377-7414

(www.sears.com/craftsman)

Retail Price: \$79.99

Features:

- Model 18402 18-gauge brad nailer accepts 5/8" to 1¹/₄" brad lengths
- Model 18401 1/4" crown stapler fires 1/2" to 1" staples
- Both are constructed of a high-performance polymer housing with textured rubber grip and weigh only 1¹/₂ lbs
- Both offer a 100-staple magazine and have an operating pressure range of 60 to 100 psi and deliver 2.6SCFM @ 90psi

PW Tool Report:

Extraordinarily lightweight, these air tools perform well without tiring your arms — a great bargain for home woodworkers.

For more information, circle #165 on the Resource Directory Coupon.



Emerson Introduces Ridgid® Woodworking Tools

Contact: Emerson Tools Co.,
800-474-3443 or
www.ridgid.com

Emerson Tool Company, (manufacturer of Craftsman woodworking machines for many years) has introduced a new and redesigned line of woodworking machinery marketed under the Ridgid brand name. The tool line, most of which is manufactured or assembled in Emerson's North American facilities, will be offered initially in all Home Depot stores.

The Ridgid Machinery Line Includes:

- **TWO 1½ hp CONTRACTOR STYLE TABLE SAWS** - The TS2412 (\$499) features steel extension wings and a rip capacity of 12" to the left of the blade and 24" to the right. The TS2424 (\$679) features a dual-voltage motor with a thermal overload switch, perforated cast-iron extension wings, a built-in mobile base and a micro-adjustable rip fence with a rip capacity of 24" to either side of the blade.
- **A 10" COMPOUND MITER SAW** (\$230) featuring a 15-amp motor, an electronic brake and a 104-tooth steel blade.
- **16" VARIABLE SPEED PARALLEL-ARM SCROLL SAW** (\$189) 500 - 1,700 strokes per minute and tool-less blade change.
- **An OSCILLATING EDGE BELT-SPINDLE SANDER** (\$239).
- **A 6½" 3-KNIFE JOINTER** (\$400) with a 46"-long table bed.
- **15" FLOOR MODEL DRILL PRESS** (\$300) with a 7½" throat.
- **14" OPEN BASE BAND SAW** (\$500).
- **A 36" LATHE** (\$300) with a 6" clearance from center to bed.

For more information, circle #166 on the Resource Directory Coupon.

Hitachi's New 14.4- Volt Cordless Drill/Driver

Contact: Hitachi Koki, USA,
800-546-1666

Availability: \$225 at most woodworking stores

Features:

- The **DS14DV** drill/driver features a keyless, single sleeve, ½" 22-position chuck that offers a positive locking mechanism, which secures the drill bit or apex in place with a click
- Generating 305 inch-pounds of torque from its rare earth magnet motor, the variable speed unit operates at 0-350 rpm in low speed and 0-1,200 rpm in high speed
- The DS14DV is a mid-handle tool that weighs 4.62 lbs and includes two 2.0-amp hour batteries, a one-hour charger and a carrying case



GOT A QUESTION ABOUT A TOOL?

If you have questions about tools, including what tool would be best for your needs, you can reach our tool expert, David Thiel, at (513) 531-2690 ext. 255. PW

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| 1X30 | \$.81 ea | 3X24 | \$.93 ea |
| 1X42 | .81 ea | 3X27 | .96 ea |
| 1X44 | .81 ea | 4X21 3/4 | 1.06 ea |
| 2 1/2X16 | .85 ea | 4X24 | 1.10 ea |
| 3X18 | .86 ea | 4X36 | 1.35 ea |
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| 8" | 3.50 |

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Abrasives

ECON-ABRASIVES. Econ-Abrasives makes custom abrasive belts up to 52" wide in any size and grit. Sandpaper is our specialty; we can help you answer any questions you may have on product applications. Call now for your free catalog; it contains hundreds of abrasives and woodworking accessories, including: safety equipment, velcro®-backed discs, wood clamps, wood glue, drawer slides, hinges and much, much more! **Circle #125.**

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BAKER PRODUCTS feature a wide variety of woodworking machinery from our world famous band resaws to scragg mills, conveying systems plus a variety of wooden pallet component machinery. Call or write today for your free literature and video package. Baker Products, P.O. Box 128, Ellington, MO 63638; (573) 663-7711. **Circle #102.**

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Catalogs

CONSTANTINE'S CATALOG for woodworkers. The oldest-established, most comprehensive woodworker's catalog in the USA. 104 pages, more than 5,000 items, including lumber, veneers, adhesives, tools, finishes, hardware, books, plans and more, all covered by a 60-day money-back guarantee. Free when you call (800) 223-8087 and mention Dept. 38610 or **Circle #104.**

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ADAMS WOOD PRODUCTS is a manufacturer of solid wood furniture components. They make a variety of table bases, Queen Anne table legs, claw & ball table legs, turned legs, plus a variety of ready-to-assemble and finish dining chairs & occasional tables. These items are carried in stock in a variety of woods. There is no minimum order size as they can be purchased one at a time. **Circle #100.**

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WOOD TYPES

Mahogany

(*Swietenia macrophylla*)

Other Common Names: Honduras mahogany, Belize mahogany, Bigleaf mahogany, Mara, Acajou, Caoba.

Growing Regions: Mahogany is found in Central and Latin America. The trees grow mainly in dry forests but can also be found in moist forests.

Characteristics of Tree: These trees can have heights in excess of 150 feet and trunk diameters of more than 72 inches.

Characteristics of Wood: In general, mahogany has a good strength-to-weight ratio despite variable strength among pieces of the wood. This variation is caused by differences in density. Mahogany's texture is uniform, ranging from fine or medium to coarse. It has no odor and is very durable. Heartwood is resistant to fungi and attack by termites. Mahogany also works well with planing and mortising operations —

Unfinished

Finished

except figured material, which chips and tears. The wood also does well with hand tools and sanding.

Finishing Characteristics: Mahogany takes stain, varnish and polish well.

Workability: Glues, nails and screws well.

Common Uses: Cabinetmaking, bedroom suites, boat building, chairs, chests, desks, office furniture, rustic furniture, veneer, mouldings.

Availability: Common.

Special Features: Mahogany is highly lustrous and its grain ranges from straight to wavy, striped or curly. Grain irregularities often make the wood more attractive. These irregularities cause figures such as fiddle-back, blister, strip, mottle or roe. Mahogany is also an excellent choice for boat building because of its resistance to moisture.

Midwest Price: $\frac{3}{4}$ " surfaced \$5.26 a board foot. **PW**

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TRICKS OF THE TRADE



Each issue of *Popular Woodworking* offers tips and tricks for the woodworker that we've accumulated from readers, contributors and from our own workshop and woodworking experiences. We want to encourage the free exchange of these time-saving and safety ideas for all woodworkers. If you have a good trick, we'd love to hear about it. Send your trick, whether it's one your father taught you or one you came up with on your own, to *Popular Woodworking*, Tricks of the Trade, 1507 Dana Ave., Cincinnati, OH 45207.

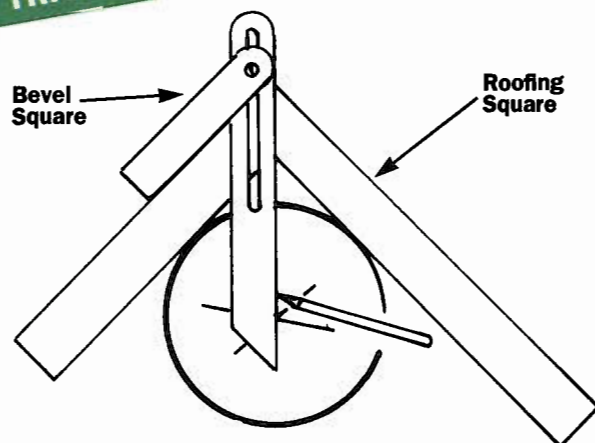
Find Your Center ...

Many people don't own a center square because they don't need to use it every day. If you need to find the center of a circular object, you can improvise a center square using other tools. Set a bevel square to 45 degrees and position it across the corner of a roofing square so its blade bisects the angle. If you arrange this against the round object and pencil along the blade in two or more positions, the lines will cross at the center.

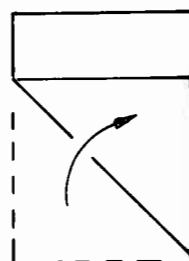
If you are unsure what to use to set the bevel to 45 degrees, use this magazine. Fold a corner of this page back on itself and the fold will be at 45 degrees to the edges.

*Percy W. Blandford
Warwickshire, England*

CENTERING TRICK



By folding the bottom of a page of paper against itself, you create a 45-degree angle.



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Build this replica of President Kennedy's cigar humidor. Detailed plans give you all the direction you need. (#98003)



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To HAVE and HAVE NOT

Is there a mystical force guiding our tool purchases?



ISHARE A SHOP WITH SEVERAL OTHER PEOPLE. We are an odd collection of woodworkers and boat builders all housed under the large shed roof of a turn-of-the-century livery stable. Each of us works independently, but we share ideas, tools and lunch together in a friendly atmosphere.

The other day I went around to the other guys asking to borrow a marking scribe. This is a tool that I have never bothered to buy, always making due with a sharp pencil or ground-down nail when I wanted a very precise line. But the project I was doing required a lot of precise lines, and I was sick of fudging around with a makeshift tool.

Willie told me that no, he didn't have one, but he listened to my tale about never having gotten this basic tool, which we all use in one way or another. This struck a chord with him, by way of opposites, and he called me over to his bench to look at something.

"I bought it in 1983 and have never used it."

The tool was a large Japanese slick, or wide chisel. Nearly two inches wide and two feet long, it's the kind of thing you use for very large work, like timber frame construction. As I always do when looking at good Japanese chisels, I marveled at the quality of its construction and attention to detail. The process of laminating hard steel onto soft is no easy task but yields a tool that stays sharp longer than others and is tough. Carefully ground recesses on the lap side make for easier sharpening, and the overall balance of the tool makes it a pleasure to hold in the hand and use. But the original lacquer was still on the bevel.

Willie had never used it, and it was this fact that brought it to his mind when I asked about the scribe. There I was asking about a tool that we all use but I had never gotten, and he had a tool that many of us rarely use but he had gotten a long time ago.

Most of us have some tools like this. My father has

given me several beautiful Lie-Nielsen bronze hand planes over the last several years, which perform really well. But I have to confess that they mostly just sit on the shelf, and when I need a smoothing plane I reach for an old Acorn I found at a yard sale. Fact is that it works well too because I tuned it well, and it's my standard for that work. I've seen other chisels on Willie's bench, which he obviously uses in preference to that large Japanese slick.

"I just pulled it out of storage," he said.

All that time, sitting there not being used. All that money spent on a tool, money that could have gone to bench chisels that would be used daily, or router bits, or sandpaper. But there it sat in storage, the lacquer preventing rust. Then a thought struck.

"Will, this reminds me of what I read once from an owner of a BMW sedan, who was asked why it is that he has a car that he can't use to its full potential. The car is made to go at very high speeds and perform well at those speeds, but of course on the highway you can't use the car at anywhere near those limits. The owner said that he got satisfaction just knowing that his car was capable of doing those extraordinary things, even though he didn't use them.

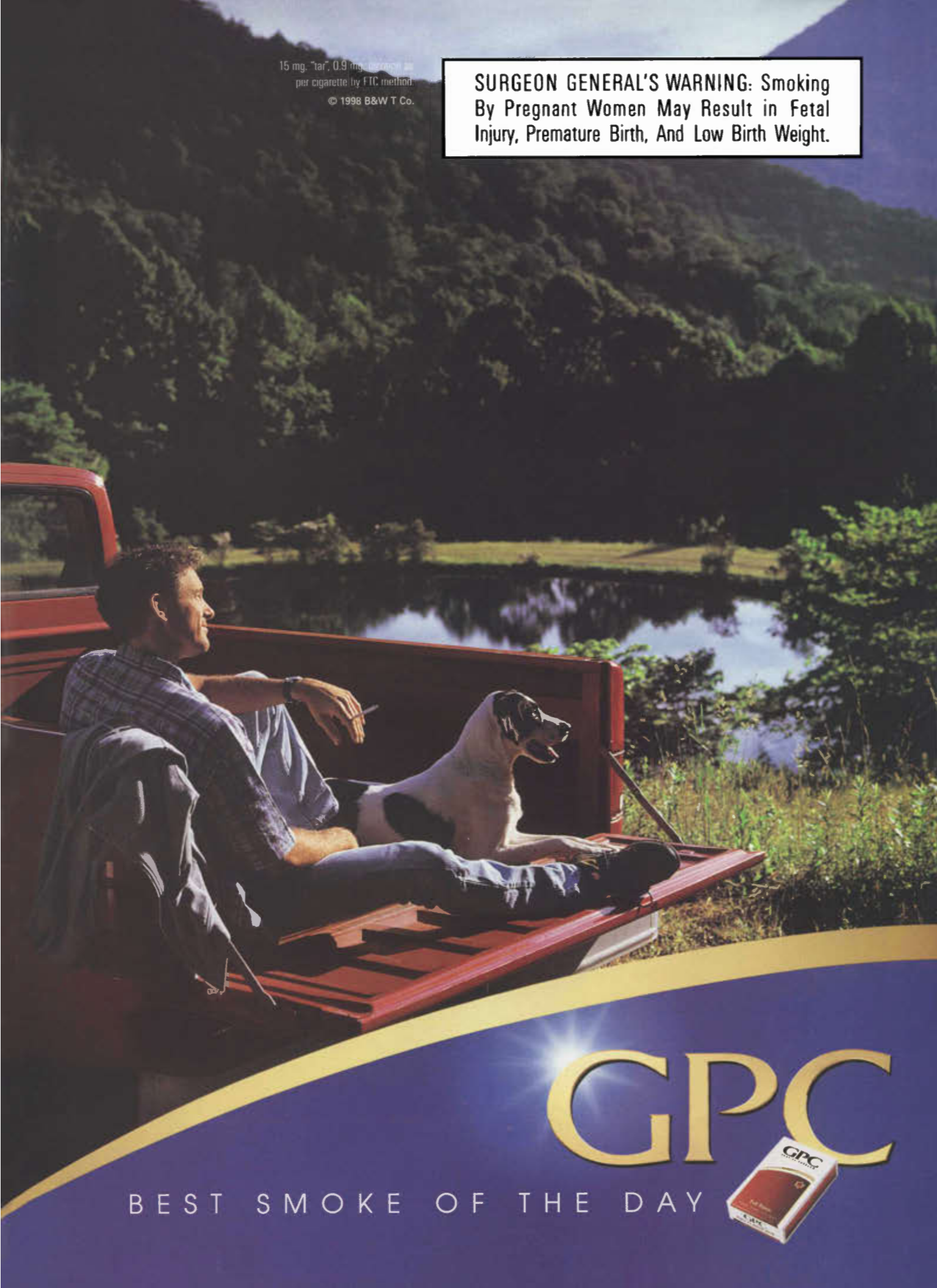
"So tell me, did you derive satisfaction knowing that you had the extraordinary capabilities of that fine Japanese slick, waiting for your use when the right task arose?"

His response was immediate and certain, "No, no, I'd just forgotten that I had it." **PW**

Jeff Greef works wood and writes about it in Santa Cruz, Calif. He misplaces his tools but eventually runs across them (after he needs them) in his shop. Greef is also the author of three woodworking books, "Make Your Own Jigs and Woodshop Furniture," "Display Cabinets You Can Customize" and "Marvelous Wooden Boxes You Can Make," all published by Betterway Books.

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