



Small, electric power carvers are quick and efficient for roughing out stock and cutting fine details. Bartholomew uses a reciprocating carver to rough out a cedar owl. She will change to a flexible-shaft rotary grinder, like the one hanging by her shoulder, to carve finer details.

Power Carvers

High-speed cutting with hand-tool precision

by Judi R. Bartholomew

I'm convinced that power carvers, such as rotary grinders and electric reciprocating machines, are the best tools for sculpting wood. It may take you a while to get used to the carvers, but once you do you'll find they excel at many carving tasks. Reciprocating devices are great for texturing or roughing out pieces quickly and accurately. I rely on rotary grinders for removing tool marks, surfacing and polishing. For ultra-fine detailing, I use high-speed microgrinders, which have smaller hand pieces than most rotary grinders. When guided skillfully, power carvers can rival the work of an accomplished craftsman sculpting wood by hand.

Of course, power carvers may not be suited for everybody. I know carvers who say they can rough out a piece with a mallet and

gouge faster than they can with a power tool. This is true if you can clamp the piece securely, and I often work that way myself. But if I anticipate hours of back-breaking labor on tough wood, I rough out with power. Once most of the waste is gone, power carvers are easier to control than hand tools when working gnarly grains. Since the power comes from the tool, not from a mallet, it is relatively easy to change your wrist angle or move your body to cut in from another side, although the tools can kick back dangerously if you try to cut against the grain. As with any power tool, you must wear adequate eye and ear protection, as well as a dust mask or respirator.

In this article, I'll discuss the major types of electric power carv-

ers listed in the chart on pp. 84-85: rotary grinders powered by an electric motor in the tool or by a flexible shaft connected to a separate motor; high-speed, microcarving rotary tools often used for jewelry work; and self-contained or shaft-connected tools with reciprocating chisel-like blades. But before discussing specific tools, I'll explain how the various types work.

Rotary tools—Rotary grinders, both the self-contained and flex-shaft models, are familiar tools in many craft fields. The hand pieces are machined to hold either a collet that can be tightened down on a cutter shaft or a three-jaw Jacobs chuck like those on power hand drills. Some of the simpler machines have built-in collets that only accept certain-diameter shafts. Others have interchangeable collets to handle everything from tiny dental burrs to 1/4-in.-dia. bits. Frequently, the devices are equipped with speed-control mechanisms that can be set from 0 RPM to 35,000 RPM or higher; others run at just one or two speeds, commonly between 10,000 RPM and 30,000 RPM. A few companies now sell adapters so that rotary grinders can run reciprocating blades as well.

The key to obtaining maximum performance with rotary cutters is to let the tool do the work. Don't bear down enough to stall the motor. I favor a two-hand grip: one hand holds the tool securely while the other guides it. Grasp the tool firmly, but don't strangle it, and don't risk overheating the motors by blocking the cooling vents with your fingers. With a flexible-shaft drive, the motor is either mounted to a bench or suspended from hooks or brackets. I prefer suspended motors because they can be hung out of the way, right over the work area. But the flex shafts can crimp if bent too far, and so hand-held grinders generally are easier to move

around since you only have to manipulate a thin electric cord going to the receptacle.

Reciprocating machines—I have been pleasantly surprised by how well the back-and-forth carving motion of these tools works. The tool's usual blade stroke length of 1mm minimizes the chance of splitting the wood during a cut. A sharp reciprocating blade can even smoothly scoop with the grain, a maneuver almost unheard of with hand-carving. Curly or fiddleback grains that switch direction without much notice are more easily carved with a gouge at a 90° angle to the grain. On most other woods, you will have more control and less vibration when you work at a 45° angle to the grain.

With the reciprocators, the blade vibrates only on contact with the wood. As you work with harder woods and increase the pressure on the tool, the SPM slows down as the carving head compensates for the load. When this happens, I switch to a smaller blade or take a lighter cut, to let the chisel resume a full stroke and work at optimum capacity. Reciprocators generally come with 5 to 10 blades, which are adequate for most work. I use large gouges for roughing out, V-shaped parting tools for outlining areas and defining details, and narrow U-shaped veiners in tight spots. Bent gouges or spoon gouges are ideal for smoothing background areas. I generally sharpen the blades like conventional hand-carving tools. For working in hardwoods, I prefer blades with a long primary bevel and a narrow secondary bevel. I avoid secondary bevels on blades for softer woods, because they can cause tearout.

Microcarving grinders—These high-speed rotary tools are designed for intricate, precise cutting and polishing, and you may have seen some in your dentist's office. The hand pieces on these devices are connected by a pliable, coiled electric cord, making them very maneuverable in tight places. But because the microcarving machines use finer bits with smaller-diameter shafts, it's critical that you heed the maximum RPM warning on individual bits.

Evaluating carving tools—As a professional carver, I rely on several types of machines in my work, as explained in the photo on the previous page and in the photo at left. In general, I've found that the machines with ball-bearing components stay cooler, run quieter and more smoothly, and are longer lived. Many companies market die grinders for metalworking or other trades, and I've listed a few of the manufacturers that offer flexible-shaft models in the chart or sources of supply box. Specifically, they are Dumore Corp., Enco Manufacturing Co. and Hatzco Industries. Similarly, several other companies are listed that make models which I was unable to review by publishing time. These include Cyclone, Micro-Mark and Mini Craft. Before buying any tool, I recommend you try several types of carvers to see what's best for you.

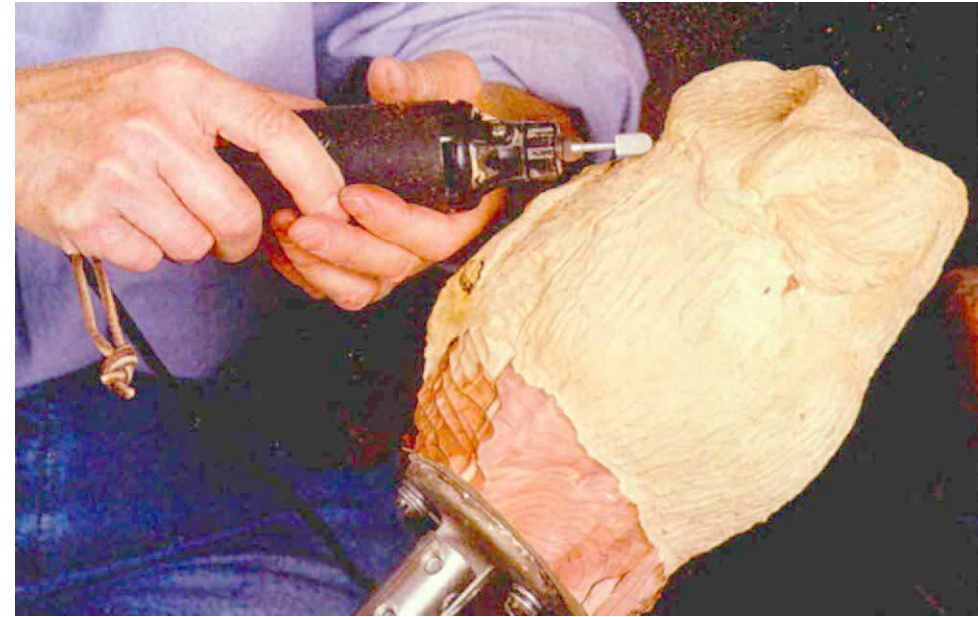
Chicago Wheel and Manufacturing Co.—The 18,000-RPM F-1000 model was one of the first power carvers I owned and it has continued to be reliable. While it is not particularly suited for delicate work, it does hog wood quickly and very accurately.

Dremel Moto-Tool—This company offers several constant-, two- and variable-speed grinders with a wide choice of bits and accessories. The model I like best is the single-speed #2750, which has ball bearings and a 28,000-RPM motor. This unit is a reliable, versatile worker. Dremel also manufactures a cordless model, as well as many of the rotary grinders sold by Sears.

I also liked Dremel's flexible-shaft unit (#732) that has a 1/5-HP, 20,000-RPM motor, a sensitive foot-operated speed control, and ro-



In creating this cherry "Monege" (French for carousel), the author laminated the animal collection at various depths, and then used hand tools, a reciprocating carver and a flexible-shaft grinder to texture the 1 1/2x22x22 background; detailing was done with 1/8-in. and 3/32-in. rotary cutters, while ultra-fine polishing was performed with a hand-held grinder and both diamond and ruby burrs. The plaque weighs about 25 lbs. and culminates in the 4-in. relief of the gilded gladiator horse shown in the foreground.



Left: Rotary grinders are fast, but they produce hefty doses of sawdust. The author's two-hand grip makes it easy to control the tool as it cuts: The rear hand holds the tool securely and the front hand guides the cutter as it moves across the cedar blank.



Right: Reciprocating carvers offer an option for those who prefer the look of tool marks and want to avoid dust. The tools, which cut only when pressed against the wood, as shown, cut smoothly when used across the grain or at a 45° angle to the grain.

tary hand piece that can handle 1/4-in. and 1/8-in. collets. With the hand piece furnished, I could do rough and intermediate work. The motor ran smoothly and coolly, and the cable-end reinforcements on this model were the best of the machines I tried.

Foredom Electric—Foredom's #CC-30 is a good 1/10-HP, variable-speed machine equipped with the company's standard #30 hand piece and a 36-in. flexible shaft. Even at 15,000 RPM, it is smooth running and comfortable to handle. The hand piece has a key-tightened Jacobs chuck, which will handle cutters with a 1/8-in.-dia. shaft. A microchuck can be purchased to hold hair-thin bits, sizes 60 to 80. For fine detailing I recommend its #8 hand piece with collet. The company also offers a 1/8-HP motor, as well as models with different shaft lengths and hand pieces.

Gesswein & Co.—The Power Carver by Gesswein includes a tabletop controller unit with transformed d.c. power source; a hand piece with cradle; and 1/8-in., 3/32-in. and 1/16-in. collets. The grinding speeds range from 5,000 RPM to 55,000 RPM, and the motor has a reverse switch. Unlike the other models in which the collets slid into the hand pieces easily, I found that changing the Gesswein collets was difficult at times since the hand piece had to be taken apart whenever the collets had to be changed. I tried this model at its maximum speed of 55,000 RPM and found that the hand piece began to scream and heat up. However, Gesswein offers an optional hand piece for hardwoods, which turns at a more reasonable 30,000 maximum RPM.

Grizzly Imports Inc.—The Grizzly #G-1806 is an 18,000-RPM flexible-shaft grinder with an easy-to-operate foot speed control. The unit comes with a stiff, 36-in.-long flexible shaft, detachable hand piece and hanger bracket. Its 1/4-HP motor makes it a good choice for roughing work.

NSK America Corp.—The variable-speed Electer GX has a sealed d.c. motor that turns up to 40,000 RPM. It comes with 1/8-in., 3/32-in. and 1/16-in. collets, a tapered hand piece with a holder and wrench, and fuses to prevent overloading. The burrs change easily with the flip of the chuck control lever located on the side of the hand piece. You need only insert the burr, finger-tighten the collet, flip

the lever and it's ready to go. This carver did a good job of removing wood when detailing, and it remained cool and quiet throughout.

Pfingst & Co.—The Pfingst #CHP-440 has a 1/8-HP motor, foot-operated speed control, and hand piece that accepts 1/8-in., 1/8-in. and 3/32-in. collets. I found I had to remove the hand pieces carefully, because the pressed-metal wrapping on the shaft ends could pull out easily. The grinder proved gutsy enough, without bogging down or vibrating loose, even with coarse-cutting bits. Pfingst also manufactures the Carve-Ease model from P.C. English.

Rakuda—The company rates its #RA-200 as a professional model reciprocator. It features an ample 72-in. flexible shaft, which gives
(continued on p. 85)

Sources of supply

The following companies distribute at least one of the following: reciprocating or rotary machines, flexible shafts, hand pieces, collets, cutters or blades, power-carving kits or accessories.

Barap Specialties, (616) 352-9863.
CLT Co., (501) 524-8525.
Carefree Woodcarving Supply, (602) 488-0318.
Craft Supplies USA, (801) 373-0917.
Craftsman-Wood Service Co., (800) 543-9367.
Dumore Corp., (414) 633-8221.
Dupli-Carver Enterprises, Inc., (317) 271-1542.
Frank Mittermeier, Inc., (212) 828-3843.
Frog Tool Co., Ltd., (312) 648-1270.
Garrett-Wade, (800) 221-2942.
Harbor Freight Tools, (800) 444-3353.
Highland Hardware, (800) 241-6748.
Kimball Woodcarver Co., (912) 598-8903.
Leichtung Workshops, (800) 321-6840.
Marlin Industries, Inc., (704) 743-5551.
Sculpture House, Inc., (212) 679-7474.
Silvo Hardware Co., (800) 331-1261.
Trendlines, (617) 884-8951.
Veracka's Carousel Barn, (708) 966-1266.
Warren Tool Co., Inc., (914) 876-7817.
Wood Carvers Shop, (203) 634-4454.
Woodworker's Supply, (800) 645-9292.
The Woodworkers' Store, (612) 428-2899.

Electric Power-Carving Systems						
Manufacturer or U.S. Distributor	Model	Description	Cutting Action	Motor, Recommended Speed (Range or Maximum)	Collet or Chuck Dia.	
Chicago Wheel & Mfg. Co.— (312) 226-8155, (219) 879-8390	Handee F-1000	Flexible shaft with hand piece and motor	Rotary	¾ HP; 18,000 RPM	½ in., ¼ in.	
Cyclone/Chesterfield Craft Shop—(609) 298-2015	150	Flexible shaft with hand piece and motor	Rotary	½ HP; 0-20,000 RPM	½ in., ¼ in., ¼ in.	
Dremel Moto-Tool Inc.— (800) 437-3635, (414) 554-1390	2750	Hand-held grinder	Rotary	1.15 amps; 28,000 RPM	½ in. to ⅜ in.	
	2850	Hand-held grinder	Rotary	1.15 amps; 15,000/28,000 RPM	½ in. to ⅜ in.	
	3950	Hand-held grinder	Rotary	1.15 amps; 5,000-30,000 RPM	½ in. to ⅜ in.	
	Heavy-Duty 732	Flexible shaft with hand piece and motor	Rotary	½ HP; 0-20,000 RPM	½ in. to ¼ in.	
	Free-Wheeler 850	Hand-held cordless grinder	Rotary	6v battery; 15,000/20,000 RPM	½ in. to ⅜ in.	
Enco Mfg. Co.—(800) 621-4145, (312) 745-1500	801-1780	Flexible shaft with hand piece and motor	Rotary	0.115 HP; 10,000 RPM	⅝ in.	
	801-1785	Flexible shaft with hand piece and motor	Rotary	¼ HP; 16,000 RPM	¼ in.	
The Foredom Electric Co.— (203) 792-8622	CC-30	Flexible shaft with hand piece and motor	Rotary	¼ HP; 0-15,000 RPM	0 to ⅝ in.	
	R-25	Flexible shaft with hand piece and motor	Rotary	⅓ HP; 0-20,000 RPM	⅜ in.	
	S-30	Flexible shaft with hand piece and motor	Rotary	⅜ HP; 0-18,000 RPM	0 to ⅝ in.	
	H-44B	Flexible shaft with hand piece and motor	Rotary	⅓ HP; 0-20,000 RPM	¼ in.	
Gesswein & Co.— (203) 366-5400, (800) 544-2043	Power Carver	Hand-held microgrinder with transformer	Rotary	28.5 watts d.c.; 5,000-55,000 RPM	⅜ in., ⅝ in., ⅝ in.	
	PH-IX	Hand-held microgrinder with transformer	Rotary	26 watts d.c.; 0-35,000 RPM	⅜ in.	
Grizzly Imports Inc.— (800) 523-4777, (800) 541-5537	G-1806	Flexible shaft with hand piece and motor	Rotary	¼ HP; 0-18,000 RPM	⅝ in.	
Hatzco Industries— (708) 485-3600	Leigh LG-6	Flexible shaft with hand piece and motor	Rotary	¼ HP; 17,500 RPM	¼ in.	
Micro-Mark—(800) 225-1066, (201) 464-6764	15230/15232	Hand-held microgrinder with transformer	Rotary	1.2 amps; 5,600-21,000 RPM	⅝ in., ⅜ in.	
Mini Craft/National Fulfillment Systems—(800) 288-5331, (301) 785-7200	MB-1010	Hand-held drill grinder	Rotary	100 watts d.c.; 1,000-17,000 RPM	Keyless	
	MB-120	Hand-held drill grinder	Rotary	40 watts d.c.; 1,000-30,000 RPM	Keyless	
NSK America Corp.— (708) 228-1175	Electer-GX	Hand-held microgrinder with transformer	Rotary	150 watts d.c.; 0-40,000 RPM	⅜ in., ⅝ in., ⅝ in.	
P.C. English Enterprises Inc.— (800) 221-9474, (703) 582-2200	Carve-Ease 091001	Flexible shaft with hand piece and motor	Rotary	½ HP; 0-14,000 RPM	¼ in.	
Pflingst & Co.— (908) 561-6400	CHP-440	Flexible shaft with hand piece and motor	Rotary	½ HP; 2,000-14,000 RPM	¼ in.	
	CH	Flexible shaft with hand piece and motor	Rotary	⅓ HP; 2,000-14,000 RPM	¼ in.	
Rakuda/The Japan Woodworker— (415) 521-1810, (800) 537-7820	RA-200	Flexible shaft with hand piece and motor	Reciprocating	3.2 amps; 6,600 SPM	¼ in.	
	Hex Shaft Assembly	Flexible shaft with hand piece †	Reciprocating	NA; 1,000-3,450 RPM	¼ in.	
Sears/Craftsman— (800) 366-3000, (312) 875-2500	25147	Flexible shaft with hand piece and motor	Rotary	0.95 amps; 7,500-25,000 RPM	½ in. to ⅜ in.	
	61003	Hand-held grinder	Rotary	1.15 amps; 5,000-30,000 RPM	½ in. to ⅜ in.	
	61001	Hand-held grinder	Rotary	1.15 amps; 30,000 RPM	½ in. to ⅜ in.	
Sugino Corp./Auto Mach— (708) 397-9401	Hi Holiday Woodcarver	Flexible shaft with hand piece and motor	Rotary hammer	55 watts; 6,000 RPM	¼ in.	
	HCT-30	Hand-held carver	Reciprocating	80 watts; 10,000 SPM	¼ in.	
	WCT-100	Flexible shaft with hand piece †	Reciprocating	NA; 2,800-6,000 RPM	¼ in.	
Sum-Flex/Woodcraft Supply Corp.— (800) 225-1153, (800) 535-4482	09N31	Flexible shaft with hand piece †	Rotary or reciprocating	NA; 1,800-3,600 RPM	½ in., ⅜ in., ¼ in.	
Sun Flag +	Easy Carve 750	Flexible shaft with hand piece †	Reciprocating	NA; 1,000-7,000 RPM	¼ in.	
Wood Carvers Supply— (800) 284-6229, (804) 583-8928	Master Carver	Flexible shaft with hand piece and motor	Rotary or reciprocating	¼ HP; 0-18,000 RPM	⅝ in., ⅜ in., ¼ in.	
	Optima 11	Hand-held microgrinder with transformer	Rotary	70 watts; 2,000-24,000 RPM	⅝ in., ⅜ in.	

NA=Not applicable

+ = U.S. distributors for Sun Flag are Carefree Woodcarving Supply, The Japan Woodworker and Woodcraft Supply (phone numbers in sources of supply or above).

List Price*	Comments
\$435	3/16-in. dia. flexible shaft; wrench, reducer collets, lubricant included
\$185	Ball-bearing hand piece, speed control available; high-torque micromodel with 35,000 RPM available
\$56	Includes 20 assorted bits; optional 36-in. flexible shaft
\$98	Includes 30 assorted bits, thrust bearing, 6-ft.-long power cord; two speeds only
\$123	Includes 40 assorted bits, thrust bearing, carrying case
\$195	39-in. flexible shaft; foot-operated speed control
\$101	Requires three hours to recharge; two speeds only
\$304	Includes 1/8-in. collet; adaptable to d.c.
\$542	Includes 1/8-in. and 1/4-in. collets; adaptable to d.c.
\$300	36-in. flexible shaft; speed control
\$380	37-in. flexible shaft; speed control; other hand pieces available
\$240	39-in. flexible shaft; hanging bracket; foot-operated speed control
\$280	42-in. flexible shaft; foot-operated speed control; tabletop dial available
\$665	Reversible motor; overload switch; 6-ft. cord
\$485	Reversing switch; overload switch; optional 3/32-in. reducing collet
\$120	36-in. flexible shaft; foot-operated speed control
\$395	Optional reducer collets, speed control; similar models with different HP and RPM available
\$95	5.4 ozs; optional electric cables
\$57	Optional modeling kits
\$34	Optional modeling kits
\$785	Reversible motor; overload switch; optional hand pieces, foot-operated speed control
\$148	Speed control
\$169	Optional speed control
\$164	Optional foot-operated speed control, hand pieces
\$540	76-in. flexible shaft; six blades; carrying case
\$275	76-in. flexible shaft; five blades
\$92	4.5 lbs.; maximum-speed switch
\$45	1.7 lbs.; finger pad speed control; pantograph kit available
\$27	1.7 lbs.; tabletop speed control; carrying case available
\$378	60-in. flexible shaft; five blades; one collet size
\$288	2 lbs.; five blades; optional rotary head; one collet size
\$155	60-in. flexible shaft; operated by electric drill; one blade size
\$89	40-in. flexible shaft; five blades; two interchangeable heads
\$89	59-in. flexible shaft, five blades, wrench included; heavy-duty model available
\$300	38 1/2-in. flexible shaft; five blades; two hand pieces; foot-operated speed control; optional bench dial
\$250	Includes 1/2-in.-dia. hand piece, reversing switch

* = Dealer selling prices are typically 5% to 25% lower.

† = Motor or drive source not included.

good maneuverability. Another good feature is that the hand piece doesn't twist the flexible shaft because it swivels on the shaft via a system of roller bearings. Roughing out or moderately texturing wood was relatively easy with the spanners included, but when detailing it took a little while to get used to the drag caused by the longer flexible shaft. Blade changing was easy, and the leather sleeve on the hand piece made the grip comfortable.

Sugino Corp./Auto Mach—The company's reciprocating carver (#HCT-30) comes with a single spanner and five blades. It handles very well when carving moderate to light work, and the tool's top-rated speed of 10,000 SPM produces a smooth cut in a variety of woods. When sharpening these blades, I found I got best results with just a primary bevel and no secondary bevel. Vibration loosened the threaded collar holding the carving head, and the company sent me an O-ring, which kept the collar tight, but made the blade wobble. Wrapping plumber's tape on the threads eventually solved the problem, though.

Sugino's other model I tried, #WCT-100, features a 5-in.-long carving head with a comfortable hand piece. The two spanners provided let me securely snug down the five blades that are included. The flexible shaft is designed to be attached to a drill or bench-mounted motor, running at 3,400 RPM to 3,500 RPM, but even when attached to my 3,100-RPM drill press, it easily whittled away at a piece of hand-held cherry. Don't use excessive pressure, though; the blades bend fairly easily.

Sum-Flex/Woodcraft Supply Corp.—The #09N31 model includes a reciprocating 90° elbow-shaped hand piece, a rotary grinder head with four collet sizes, and a 40-in. flexible shaft that can be connected to a motor running between 1,800 RPM and 3,600 RPM. I tried carving walnut at about 2,700 RPM, and got a smooth cut, although the carver did heat up after I had used it a short while. The blades provided are good, but I had difficulty removing them without pliers on the collet collar.

Sun Flag—The Easy Carve 750 attaches to any motor not exceeding 7,000 RPM. Because the arbor is a little less than 1/4 in., you'll need a Jacobs chuck on the motor to hold it. The reciprocating hand piece and shaft snap on easily, and the six blades supplied are easy to change. While detailing, this machine cut quietly and smoothly without overheating. Two 4-in.-long springs nicely reinforced the ends of the flexible shaft, and the optional collar allows direct connection to most flexible-shaft motors.

Wood Carvers Supply—The Master Carver model includes both reciprocating and rotary hand pieces; five cutters; 1/4-in., 1/8-in. and 3/32-in. collets; a 1/4-HP, 0 to 18,000-RPM hanging motor; and foot-operated speed control. The machine runs smoothly enough for fine carving and neither the motor nor hand pieces overheated. The reciprocating carver operates from 3,000 SPM to 12,000 SPM, and produced a better cut at the high speed. The tightening tools are simple to use and colored orange, making them easy to spot.

Wood Carvers Supply's Optima II microgrinder offers variable speed, up to 24,000 RPM, with a tabletop control supplying power to the hand piece. It comes with 1/8-in. and 3/32-in. collets, and a wrench to tighten them. There are no vents in the hand piece to "inhale" dust; venting is provided on the convertor, which sits on your bench. This simple machine is quiet, stays cool and handles detail work and roughing out comfortably. □

Judi Bartholomew is a professional woodcarver in Milwaukee, Wisc. Photos by Dick Burrows except where noted.