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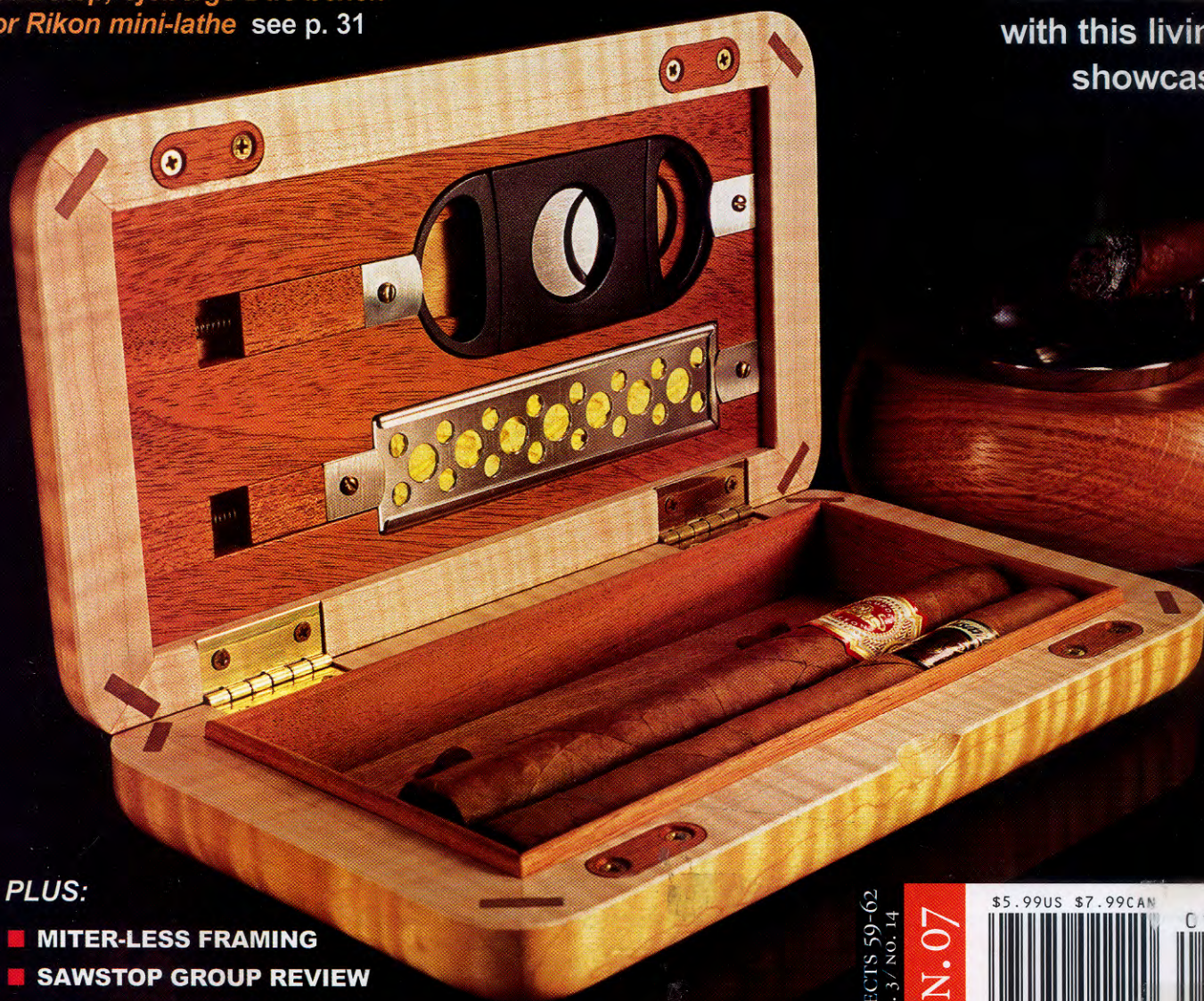
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2nd Annual Contest



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PROJECTS 59-62
VOL. 3 / NO. 14

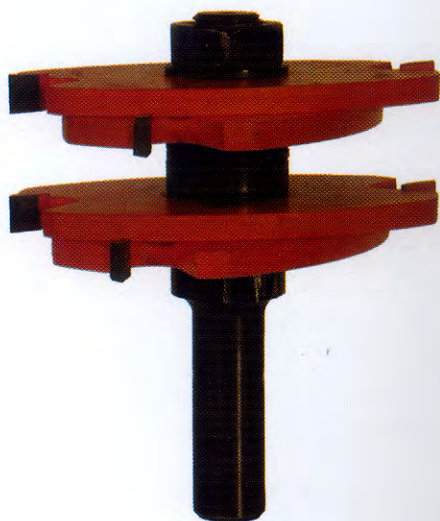
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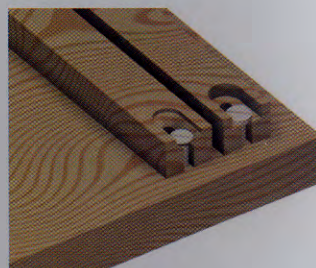
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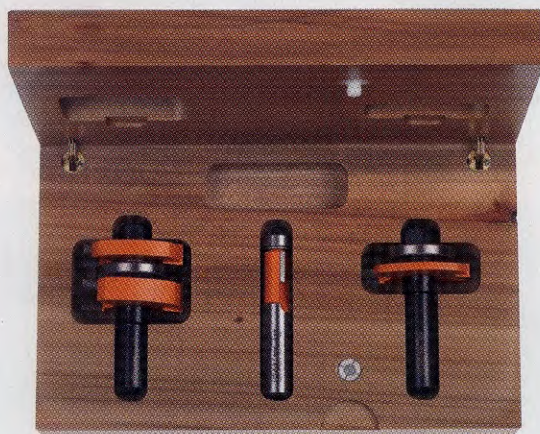
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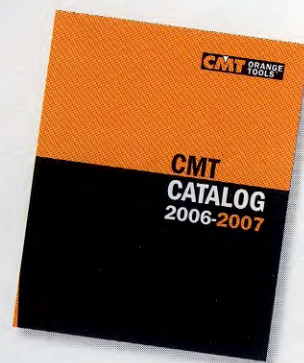


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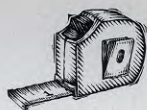


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A humidor that fits into your pocket.
Cover photo by
Wolf Moehrle

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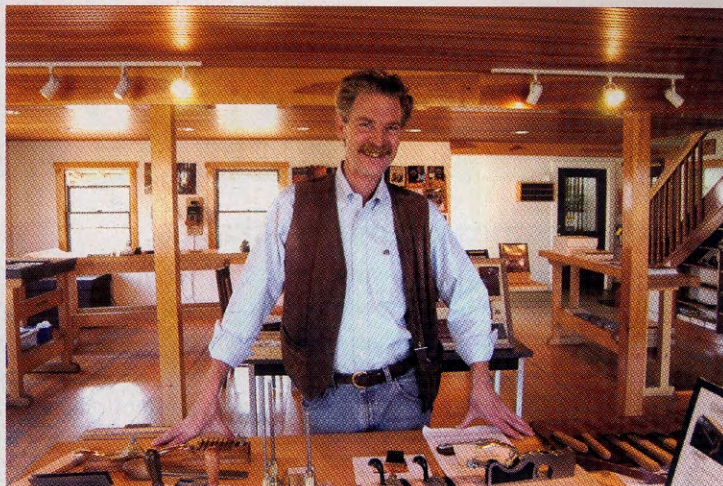
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CUTTING IN

Inspiration comes in small packages

At about this time last year, we were launching our first "Think Small, Win Big" contest. And we weren't quite sure what to expect. After all, it's natural for woodworkers to think big: bigger tools, more shop space, a challenging large project (such as this issue's 75-gallon aquarium). But as it turned out, more than 300 readers welcomed the opportunity to intentionally work on a small scale, sending in beautiful clocks that were 3" x 3" x 7" or smaller.

Thinking small has its advantages. You can finish a project faster, the materials cost less (smaller consequences for mistakes!), and there's no heavy lifting. I hope you had the opportunity to see some of the excellent, small-scale work our readers contributed to the first "Think Small, Win Big" contest. We were truly inspired by their creativity and ingenuity.

Now it's your turn to be inspired to design a small stamp holder for our second contest, which you can read about on page 31. I'm fired up about this one, first of all because there are three amazing prizes. But also because, when I asked some of our regular contributors to create stamp holders for the contest introduction, they really blew me away and bragged about how much fun it was. To help inspire you, we've included some of their designs as a project in this issue.

There are two other things about this issue that particularly inspired me. One is the Rochester Woodworkers Society (see Benchmarks, page 8) which is clearly one of the most active and successful groups in the country. They have proven that many hands are better than two, taking on challenging projects and learning from each other while making significant contributions to community causes.

The other inspiring piece of work is the group review of the SawStop table saw on page 56. While not particularly technical, it is characteristically candid, and I can only imagine how much fun it must have been to put one of the most-debated power tools of the 21st century through its paces. Even though this group seemed to reach a clear, positive consensus, a little debate among woodworking friends is always a welcome part of our favorite pastime.

It is in the spirit of these efforts that I'd like to ask you to write in about anything that's on your mind, woodworking-wise. If you've learned a valuable lesson in your shop, if you've been ripped off, if you had an epiphany, if you need to know more about something in particular ... write us! We'll do our best to answer your question, pass on your wisdom or air your grievance. As always, thanks for reading.

Ken Brady
Publication Manager

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Publisher

Ken Kupsche

Publication Manager

Ken Brady

Associate Editor

Sharon Hambrick

Contributing Editors

John English, Sarah Brady,
Tim Rinehart, Udo Schmidt

Illustrators

Kevin Pierce
Shane Wiersma

Circulation Manager

Debbie West

Advertising Manager

Lori Mossor

Administrative Assistant

Linda Rowe

Circulation Specialist

Miranda Kidd

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Subscribe@WoodcraftMagazine.com

Contact Us

Woodcraft Magazine
1101 Rosemar Road

P.O. Box 7020

Parkersburg, WV 26102-7020

(304) 485-2647

Fax: (304) 420-9840

Editor@WoodcraftMagazine.com

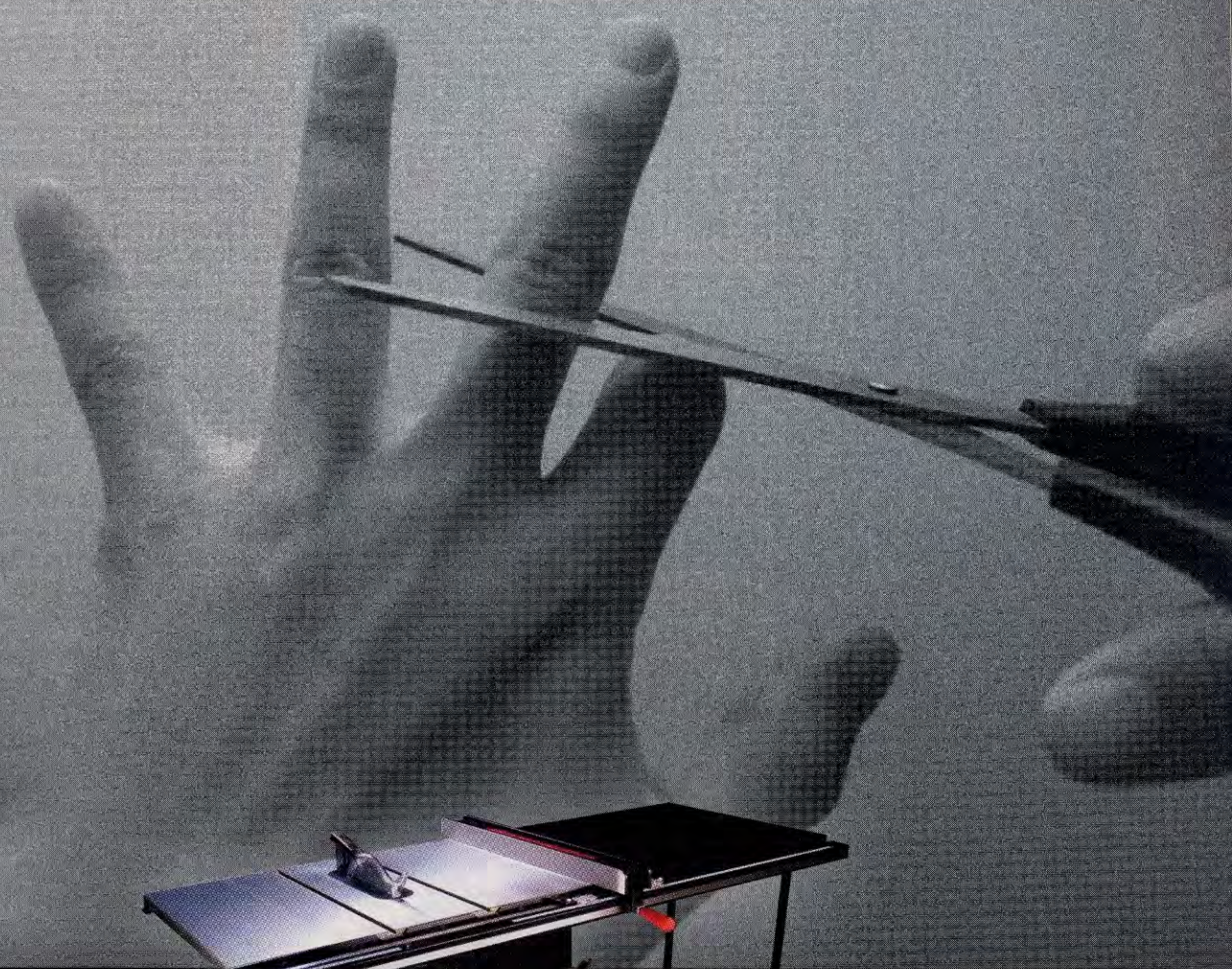
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BENCHMARKS

Woodworking for neighbors, Fresh Wood student contest, gifts with a trick twist **By Sharon Hambrick**



CHARITY CASE: Rochester Woodworkers Society members Steve Bryant, Rich Towsley, Mark Rakestraw, Connie Gates, Rick Diehl and Craig Carlson (not pictured) crafted this James Krenov-style cabinet of hard maple and walnut burl that sold for \$1,800 to benefit Habitat for Humanity. **IT'S THE BOMBÉ:** Rick Diehl, Dick Buck, Dave Schafer and Bruce Alles built the walnut bombé chest shown here that brought in \$1,400 at auction to benefit a local public television station; the mappa burl chest they built in 2006 (shown at lower right) brought an incredible \$10,500 for the Hillside Work-Scholarship Connection.



Common causes, uncommon results

WHEN A SMALL GROUP OF FRIENDS founded the Rochester Woodworkers Society in 1984, their thoughts were on woodworking, not community service. But two decades later, the RWS is a thriving club with 450 members and a rapidly developing reputation for helping their neighbors through woodworking.

The effort to use their hobby to serve the community started in 2004, as the society approached its 20th anniversary. Then-chairman Rick Diehl supported the idea of building group projects for charity.

Build groups were not new to the RWS; groups often exchanged their finished projects for meeting space. But after members were invited to meet at the Rochester Woodcraft store, the need did not exist. Diehl felt that reviving build groups to make charity projects would be a good way to bring members together again while publicizing the RWS and lending a



BENCHMARKS

hand in the community.

Many group projects are formed within the RWS's special interest groups (SIGs). In the fall of 2004, professional woodworker Bruce Alles organized members of the furniture SIG to build two bombé chests for charity.

Alles brought some veneering experience to the table, but said the whole group learned from each other as they completed the difficult bending and veneering tasks to build the first chest. Armed with their newfound skills, the team crafted a mappa burl chest that astonished the team by selling for \$10,500 when auctioned in April 2006 to benefit a program that provides support services for students. Matching funds boosted the total to \$30,125.

In January 2006, a furniture team headed by Diehl began a James Krenov-style cabinet on a stand. The piece raised \$1,800 for the Flower City Habitat for Humanity group.

Meanwhile, the chair/period furniture group headed by Ken Turner had begun building Shaker rocking chairs for donation to a local hospice house and other groups.

Turners contribute

The approximately 60 members of the turning SIG support the community by making wooden tops and cars for the Golisano Children's Hospital at Christmastime, turning pens for a hospice care center and the Freedom Pen Project, and donating pieces for a charity heart ball auction.

In an effort to attract younger turners, the group gives demonstrations at a local mall. "The advantage of woodturning is they can start, finish and give away a project in one day while other woodworking projects often take a week or more," Mike Hatchey said.

In 2007 the turners will embark on a new project for the Rochester

area – the Penwright Program featured in the October/November 2006 *Woodcraft Magazine*. Indiana woodworker Larry Beckwith developed the process and made the tools that allow Alzheimer's patients and other care home residents to turn quality pens without power tools. Mike and his wife and fellow turner, Debbie Hatchey, have been working since October to make the tools they will need to demonstrate the process at local care facilities.

Looking ahead

Chairman George Harvey said the RWS is putting together an education fund to provide \$1,000 for scholarships for members and high school students who want to take woodworking workshops and classes.

Harvey is working with a local woodshop teacher to set up a student competition that would offer a scholarship to the winner. Students' entries would then be auctioned to build a scholarship fund. Also, a mentoring program is matching members with students for one-on-one woodworking instruction.

Networking and education are big components of the RWS. "With our group, if anyone runs into a problem they are only a phone call away from a solution," Harvey said.

Other reasons for the success of the group include fun and companionship. "I guess if you boil it down to a common denominator, it would be the membership," Diehl said. "They are a great group."

RWS benefactors

Many individuals and companies have donated materials for various projects, thus saving RWS money that can be used for other activities. Harvey said Rochester Woodcraft store owner Sean Clayton has been especially helpful, letting the club use his shop and tools for meetings and workshops.

Memorial project

Longtime member and experienced carver and furniture maker Chuck Rinehart recalls "probably the most impressive group effort" – a 1997 project undertaken as a memorial for Dr. Bernard L. Friedman, one of the first members, who died suddenly in 1996.

Rinehart and five others from the period furniture SIG undertook the unusual and complex project shown here – a portable ark and table for Friedman's synagogue, Temple B'rith Kodesh.



RWS at a glance

Membership: 450 men/women of all ages and skill levels

Special Speakers: Six annual lecture/workshop sessions featuring top speakers

Workshops: Taught by members

Special Interest Groups (SIGs): Furniture, chair/period furniture, turning, carving, boat building

Resources: Library, newsletter, rochesterwoodworkers.org

Fresh Wood 2007 competition open to woodworking students

Woodworking students enrolled in accredited North American high or post secondary schools in 2005-06 or 2006-07 are eligible to enter the 2007 Fresh Wood Student Competition.

Sponsored by Association of Woodworking & Furnishings Suppliers (AWFS), Fresh Wood will be held in conjunction with the AWFS Fair July 18-21 in Las Vegas.



Rockingham College student Joshua Nickolds Williams won the Best of Show and People's Choice Awards in 2005 for his Newport block-front desk and a First Place Award for his Newport corner chair (shown here).

The contest recognizes the best in student furniture design and craftsmanship in seven categories: chairs, tables, case goods, reproduction, production/contract, class project and open. Judges are industry professionals from manufacturing, retail, education, design and the trade press. Prizes include: First Place and Best of Show, \$1,000; Second Place and People's Choice, \$500; Honorable Mention, \$250. The Best of Show winner's school receives \$2,500.

Schools must register for the competition before student entries are accepted. Deadline for student applications is May 11. Finalists' projects will be on display during the fair.

E-mail education@awfs.org for more information about the contest. Or visit awfs.org for information about Fresh Wood and the biennial fair, which will mark the 50th anniversary of the AWFS.



Woodworker Andy Hoyt and Lori Mossor, advertising manager for *Woodcraft Magazine*, check out one of the two lathes Woodcraft Supply donated to Hoyt for a Sawmill Creek forum project.

"Creekers" trick buddies into taking up woodturning

IN TODAY'S WORLD, things are often not what they seem to be. Frank Chaffee of Arena, Wis., and Tyler Howell of Minneapolis, Minn., learned that lesson in mid-July when their Sawmill Creek woodworking forum buddies pulled a clever trick on them in an effort to get both men to learn woodturning.

Sawmill Creek owner Keith Outten said he encourages members to use the forum to promote projects that help others. In 2004 he launched the Freedom Pen Project that has so far provided nearly 60,000 turned

BENCHMARKS

wooden pens for military personnel.

Given this background, Andy Hoyt of Benton Falls, Maine, and fellow Creekers raised funds surreptitiously through private messaging last winter to provide a lathe to a fellow Creeker who was interested in turning but lacked funds to buy a lathe. When this project produced an excited new turner, Hoyt decided it was time to try again, but in a more complicated scenario. The targets were selected for different reasons this time: proximity to each other, lack of turning experience and their personalities, all necessary factors to pull off the Grand Deception – each was convinced he was part of a plot targeting the other man.

By mid-June Hoyt and his fellow conspirators had raised \$1,100 and obtained the promise of two lathes from Woodcraft Supply. He stopped at the Parkersburg, W.Va., Woodcraft Store June 22 to pick up the lathes and purchase some related tools, then delivered everything to a fellow Creeker in Knoxville, Tenn., on June 23. From there the “Pony Express” transported the goods from Creeker to Creeker through Tennessee to Alabama to Ohio to Michigan to Indiana to Illinois and finally to Wisconsin and Minnesota on July 17 for the surprise double deliveries.

Both men – self-labeled “flatheads” because they work with flat stock – had teased their fellow Creekers who are turners for months, which prompted the elaborate gift deception. Both men said in post-delivery interviews that their fellow Creekers’ efforts touched them – and they are now eager to learn woodturning.

Instigator Hoyt observed, “I am charged up and reinvigorated by the spirit of brotherhood demonstrated by the event.”

We want to receive information on news and events of interest to woodworkers. Send your news items and high-resolution photos, along with your contact info, to: Woodcraft Magazine, P.O. Box 7020, Parkersburg, WV 26102-7020

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STASH THOSE STOGIES IN A POCKET HUMIDOR

BY WOLF MOEHRLE

This prize-winning design can't fail to impress cigar lovers.



A few years ago, I built a large humidor on commission that accommodated about 150 cigars. Besides something of a cigar aficionado, my client is also a businessman who travels a lot. So he asked me to come up with a version of a pocket humidor that could hold four cigars as well as the cutter and a small humidifier unit – and it all had to be small enough to fit inside a jacket pocket.

Well, this was a challenge! But accepting the challenge paid off. Much to my surprise, the finished version of my pocket humidor won second prize for design in the 1999 Durham Wood Show woodworking competition.

This project is a great way to use up small pieces of figured wood that are too nice to throw out, but too small for most other projects. It's practical to build two humidors at a time.

While writing this article, I made four humidors: two of walnut and two of curly soft maple.

The veneers are padauk, curly aniegre and pomele bosse.

The humidifier units are factory-made of stainless steel, and the cigar cutters are available at better cigar shops. Both the cigar cutter and humidifier unit are held in place with sliding wooden retainers that allow for easy removal. The stainless steel tabs fixed to the retainers come with the humidifier units. The springs that operate these retainers are the ones found in ordinary click pens. If a

spring should ever get lost, it can be easily replaced.

Construction

Begin by milling up stock wide enough for two humidors, leaving plenty of material for saw cuts and cleanup. Cut the pieces slightly longer than finished size as well.

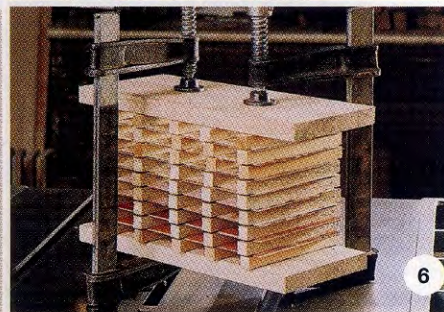
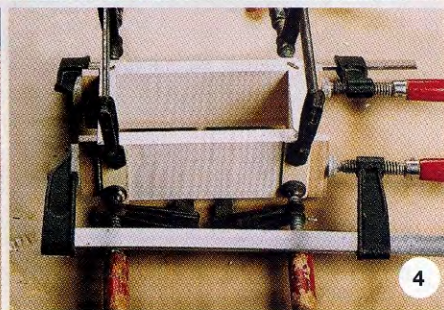
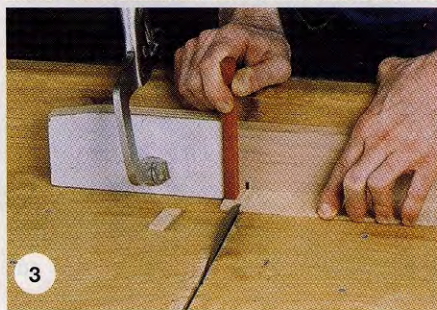
I make some test cuts to check the accuracy of the joint, and then check the angle of the miters by lining up the parts with a square. Using the type of miter jig shown in Fig. 1 allows me to make small adjustments to the tilt of the blade, ensuring a perfect joint. After cutting one end on all the parts, I clamp a stop to the jig and cut the other end, ensuring exact length of all parts (Fig. 1). I hold a block of scrap wood against the part as I feed it into the blade to reduce tearout.

For cutting the spline slots, I install a blade with a $\frac{1}{8}$ " kerf that I had ground to produce a square cut. I move the fence over to the left side of the blade and set the machine for a 45° cut. Once again I hold a scrap piece of wood against the back of the part to prevent tearing out (Fig. 2).

Machine material for the splines to half the width of the parts being glued up, because each joint will have two splines. Because we are actually making two humidors at once, we can use a different type of wood for the splines of each humidor. The splines are sliced off with the crosscut (grain across the width of the spline). To do this, I clamp a scrap piece of wood at the back of the jig to ensure a clean cut, and hold the splines with a stick to keep them – and my fingers – away from the blade (Fig. 3).

Dry-fit the joints. There should be almost no clearance around the splines, but they should go together without force. Fig. 4 shows the humidors in clamps.

The small sheets that make up the tops and bottoms of the humidors are made from glued-up veneer – each one consisting of three pieces of veneer for a finished thickness of just over $\frac{1}{16}$ ". The grain of the two outside sheets runs the long way, but the grain of the



core piece runs across the width, as in plywood. I usually cut the sheets about an inch oversized, which allows for final trimming and any shift that might occur in the press. For a press, I just used some high-grade plywood held together with clamps and cawls that are slightly rounded on one side (Fig. 5). With the rounded sides facing each other, I know that if the ends come together, then there's good pressure in the center. To make your own gluing cawls, just mill a piece of wood to uniform thickness, bend it with a clamp and use it for drawing a slightly curved line onto your stock. An excellent wood choice is elm.

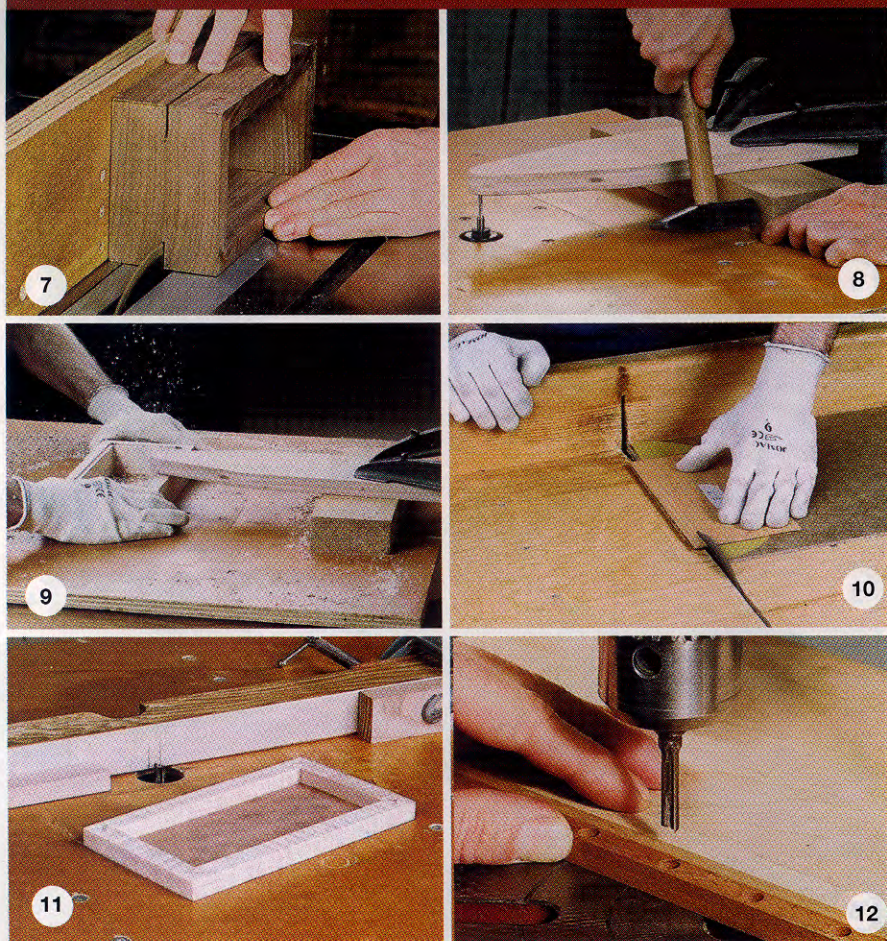
Before you start gluing up the plywood sheets, make sure you have everything you need ready. This has to be done as quickly as possible so the glue is still wet when it goes into the press. Ordinary wood glue thinned with a bit of water works fine. Spread it with a small roller over some card stock, and

use a fresh piece of card for each one. Place aluminium foil between the individual sheets to keep them from sticking together.

When gluing veneer, the glue-to-wood ratio is high, so very little air can actually get into the press to dry the glue. So after the sheets set up for a few hours, take them out and place them in another press to air-dry thoroughly (Fig. 6). Not much pressure is needed here – just enough to prevent the sheets from twisting out of shape. You'll want to cut the small spacer strips to uniform thickness to ensure even pressure; $\frac{1}{2}$ " particleboard works well.

Now cut the bodies of the humidors into separate units on the table saw (Fig. 7). Clean up each saw cut with a tall fence on the router table and a straight cutter.

To make the rabbet cut that will receive the plywood top and bottom, set up a tracer pin assembly positioned



directly over the cutter. The assembly is made of plywood, and the pin is a screw cut off with a hacksaw. I carefully position the pin over a small cutter, and when it is exactly dead center, I tighten the clamps and replace the small cutter with the $\frac{1}{2}$ " cutter for making the rabbet cuts (**Fig. 8**).

Set the cutter depth so the plywood sheets will end up just slightly below the surface. With this setup I have just enough room to tilt the humidor body upright, pass it under the tracer pin assembly, lay it down and machine out the rabbet joints (**Fig. 9**). Turn it over and repeat the process.

For cutting the plywood tops and bottoms to size, first stick a piece of hardboard onto the crosscut jig with double-sided tape and make a fresh cut. This cut will be the line to which you can trim the edges of the tops and bottoms. To prevent the parts from slipping, cut an adhesive sandpaper disc in

half and stick it to the hardboard surface near the cutting edge. Mark the parts with a pencil and cut them to the marks, but leave them just a little oversized for now (**Fig. 10**). While cutting, remember to keep the blade set as low as possible and hold the part by pressing straight down. Do not tempt fate by applying pressure in the direction of the blade!

Match up the sheets with the humidor frames. By hand, round the corners off and sand the edges until each piece fits exactly into its rabbeted opening.

Cut some $\frac{3}{4}$ " plywood pieces that are just a bit smaller than the parts being glued, then glue and clamp. It is not necessary to apply great pressure.

When the glue has dried, sand both sides flush, and then separate the lid from the base at the table saw. Clean up the saw cut on the router as before, but this time bring the part to its final dimension.

Magnet retainers

Fig. 11 shows the setup to cut cavities for the magnet retainers. The distance from the cutter to the stops must be carefully calculated and should be exactly the same on both sides of the table. The moveable stick must also be machined to precise specifications which will allow the humidor to move exactly 1". Use a $\frac{5}{16}$ " straight cutter at a depth of $\frac{5}{16}$ ". Make the first cut and move the stick to the other side, repeating the process. After all the cavities are cut, move the fence slightly away from the cutter, repeat the process with all the cavities, and then move it toward the cutter and repeat again. The result should be a cavity that is exactly $\frac{3}{8}$ " wide. I do it this way because the initial cut is aggressive and can sometimes tear, or pull slightly to one side. This method takes a little longer, but helps avoid accidents.

Mill enough $\frac{3}{8}$ " x $\frac{3}{8}$ " stock for the magnet retainers, and some scrap stock to the same size for setups and test parts. Mark the stock for the magnet retainers, along with the positions of the magnet holes.

Set up a fence on the drill press and drill the holes for the magnets to a depth of $\frac{5}{16}$ ". Then, without changing the setup, use a $\frac{1}{4}$ " straight router cutter in the drill press to enter each hole again (**Fig. 12**). This will produce a hole with a nice flat bottom, and the material remaining at the bottom of the hole should be $\frac{1}{16}$ " thick. This means the magnets will be about $\frac{1}{8}$ " from each other, allowing for plenty of mutual attraction.

Check the depth of the hole by putting in a magnet. Then mill off the excess material above the magnet so you end up with a part that is $\frac{5}{16}$ " high. (This may sound obvious, but make sure you take the magnet out before feeding it into the planer.)

You can now cut a small piece from the scrap stock to check the fit in one of the cavities.

Separate the individual retainers on the crosscut jig by cutting first to the pencil mark, and then against the stop

(Fig. 13). The parts should be left just slightly longer than the cavities because they will be brought to finished size in the next step.

For rounding off the outsides of the retainers, I made a small jig to hold them against the router cutter. Fig. 14 shows the underside. The wooden clamp on the side of the jig has just enough spring in it to allow me to effectively hold the part, but also lets go so I can turn it around. I stuck some small pieces of sandpaper on the inside wall and on the wooden clamp to prevent the part from slipping forward while being machined. The screw acts as a stop, and is perfect for the micro-fine adjustment that will bring the part to its final length (Fig. 15). The rounded corner on the jig is what the bearing on the cutter will follow and therefore will determine the radius on the part. Each corner of the retainer is individually rounded off, so each one gets four cuts (Fig. 16). I have clamped a board across the router table with a 1/2" hole so I can work very close to the cutter.

Now return to the drill press and, using a fence and a stop, cut the screw holes. Without changing the setup, countersink the holes for the screw heads. Fig. 17 shows a magnet and two finished retainers.

Drill the pilot holes for the retainer screws (Fig. 18), and screw them into place. Don't forget to orient the magnets so they will be pulling toward each other.

The installed retainers should be just slightly proud of the body, so when you sand the inside face of the lid and base, the retainers will be perfectly flush with the entire surface.

Making the lid insert

The material for the insert should be machined to 5/16" thick and, for now, left slightly wider than the opening in the lid. I like to leave them long enough to make two inserts from one piece.

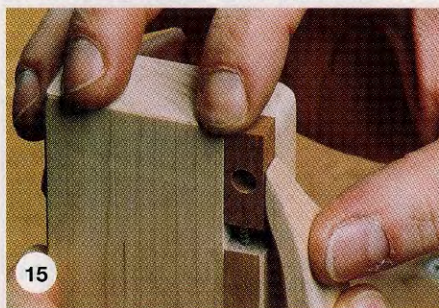
I made a jig for cutting the cavity for the cigar cutter by tracing around the cutter onto a piece of melamine, and then cutting out the hole. Hold



13



14



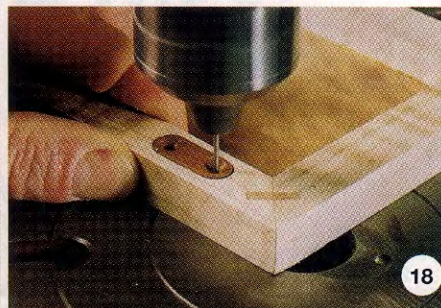
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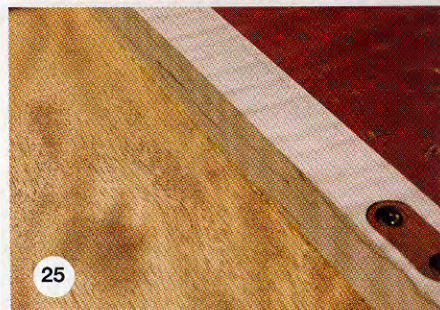
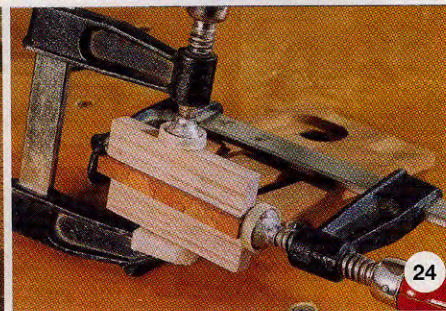
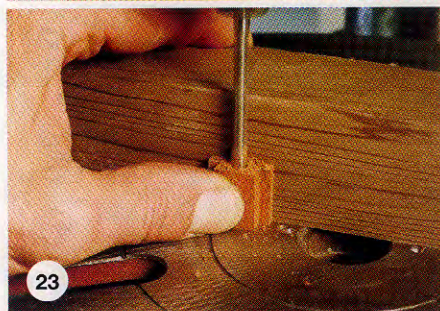
the jig in place with double-sided tape (Fig. 19), then cut out the cavity with a plunge router. Make some test cuts in scrap wood and enlarge the jig as needed with a small drum sander on the drill press. You should end up with a cavity that fits the cigar cutter perfectly. Mark the position of the cutter onto the stock, clamp it to the table and cut the cavity.

With a 3/4" Forstner bit, cut the holes that will later form the groove under the cigar cutter (Fig. 20).

Cut the inserts to length but slightly oversize.

Using the router table with a 1/2" straight cutter, cut the slots for the sliding retainers and the rabbets on the undersides of the slots. All of these cuts require separate setups (Fig. 21).

Fig. 22 shows the inserts and machined parts that will make up both the sliding retainers and the pieces that will close the now-open ends of the slots. The pieces machined to close the ends of the slots look the same as the sliding retainers but must be machined for an exact fit. The sliding retainers, on the other hand, should be cut slightly undersize to ensure they



will move freely without binding.

Cut the pieces forming the ends of the slots to length, and drill holes for the springs (**Fig. 23**) before gluing the pieces into place (**Fig. 24**).

Put some masking tape on the insert, mark the opening for the humidifier and cut it out with a scroll saw. Clean up the hole and bring it to finished size with a fine rasp. The material between the two holes under the cigar cutter can also be removed at this time.

Sand the lid inserts to finished size, label them and test-fit into each unit.

Inside the humidor is a glue bead

that will get in the way of the insert (**Fig. 25**). The easiest way to deal with this is to cut a 45° chamfer all around the underside of the insert. This will not be seen, and provides clearance for the glue bead (**Fig. 26**).

Installing the hinges

Fig. 27 shows the setup used for cutting the hinge mortises. The first cut is made with the part against the fence (this cuts the inside edge of the mortise). Then the spacer stick is placed against the fence and the second cut is made (cutting the outside edge of

the mortise). The spacer stick must be machined to a dimension that will produce the best mortise for the hinges being used, and it will be necessary to cut some test mortises in scrap wood.

Test cuts will also help you determine the depth of cut. Cut two pieces, hold them together and slide a folded hinge into the space (**Fig. 28**). It should just go in with little very little pressure and no play. (It's better to have it too loose than too tight, because you can always put some tape under the hinge leaf to raise it slightly.) When all is right, cut the mortises.

Use the hinges themselves to mark the positions of the screws and set up the drill press to drill pilot holes. Use a fence to ensure they will be uniform (**Fig. 29**). If the drill bit wanders, move it up into the chuck so that only a short length is exposed.

When the humidor is assembled, the lid should open just a little past the 45° point and then stop. This is because the lid is heavier than the base, and if the humidor is set down on a flat surface with the lid open, the weight of the lid would cause it to fall over backward. The best way (that I know of) to determine the angle is to make a dummy part (**Fig. 30**).

The setup used for cutting the chamfer at the back of the humidor is shown in **Fig. 31**, with the blade tilted to a 45° angle. The two halves of the dummy part are cut first, starting with a lighter setting than will likely be needed. When the hinge is installed we can then see exactly what the lid angle will be on the finished project. You may have to repeat this process a few times, taking progressively deeper cuts until you have the desired angle. When the setup is perfect, cut the humidor parts.

Lining the base

After machining the material that will make up the lining for inside the base, I use my other miter-cutting jig to cut the parts to fit inside. It's a good idea to put masking tape on the part being cut to minimize tearout (**Fig. 32**).

Before we can install the lining,

PROJECT NUMBER 59



HARDWARE

cigar cutter, available at cigar shops

$\frac{5}{16}" \times 4" \times 1"$ stainless steel humidifier unit (1),
\$20.49 wolfmoehrle.com

$\frac{1}{4}" \times \frac{1}{4}"$ rare earth magnets (4),
#99K36.01 \$3 leevalley.com

30mm x 26mm brass-plated hinges (1 pair),
#00D30.21 \$1.60 leevalley.com

$\frac{3}{16}" \times 1"$ springs from click pens (2)

#3 x $\frac{1}{4}"$ round-head screws for steel tabs (4)

#3 x $\frac{3}{8}"$ flat-head brass screws for hinges (8)

#4 x $\frac{1}{2}"$ flat-head brass screws for retainers (8)

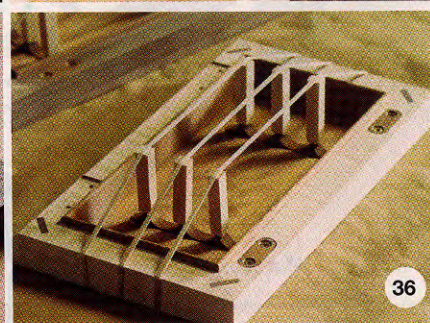
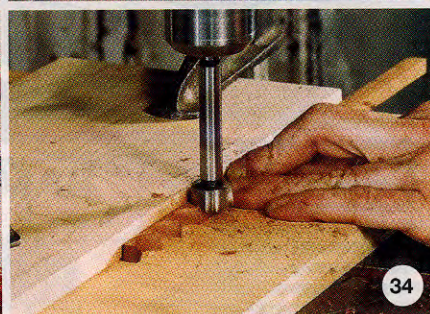
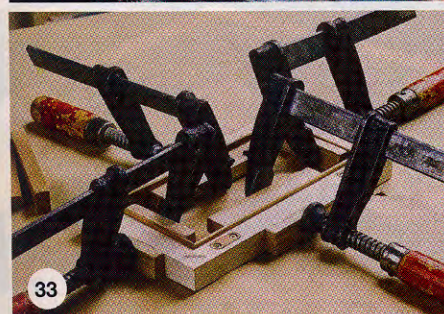
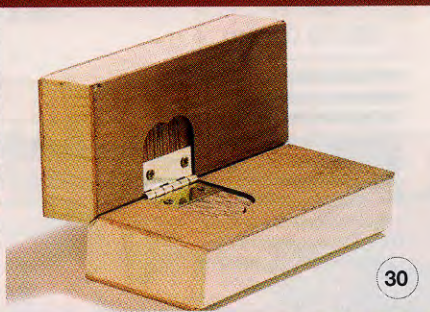
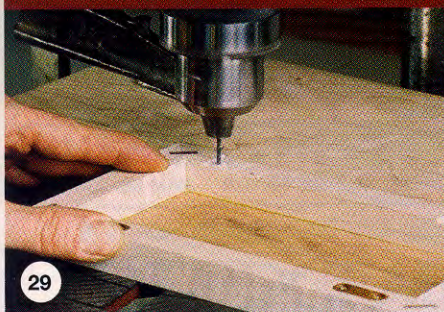
CUT LIST

Frame for lid, long side (2)	$\frac{9}{16}"$	$\times$	$\frac{5}{8}"$	$\times$	$8\frac{1}{8}"$
Frame for lid, short side (2)	$\frac{9}{16}"$	$\times$	$\frac{5}{8}"$	$\times$	$4\frac{9}{16}"$
Frame for base, long side (2)	$\frac{23}{32}"$	$\times$	$\frac{5}{8}"$	$\times$	$8\frac{1}{8}"$
Frame for base, short side (2)	$\frac{23}{32}"$	$\times$	$\frac{5}{8}"$	$\times$	$4\frac{9}{16}"$
Spine for corners* (4)	$\frac{1}{8}"$	$\times$	$\frac{1}{2}"$	$\times$	$1\frac{5}{8}"$
Top and bottom** (2)	$\frac{3}{32}"$	$\times$	$3\frac{11}{16}"$	$\times$	$7\frac{1}{4}"$
Lid insert (1)	$\frac{5}{16}"$	$\times$	$3\frac{5}{16}"$	$\times$	$6\frac{7}{8}"$
Retainer for cigar cutter*** (1)	$\frac{5}{16}"$	$\times$	$\frac{23}{32}"$	$\times$	$1\frac{11}{16}"$
Retainer for humidifier*** (1)	$\frac{5}{16}"$	$\times$	$\frac{23}{32}"$	$\times$	$1\frac{1}{4}"$
Liner for base, long side (2)	$\frac{1}{8}"$	$\times$	$\frac{3}{4}"$	$\times$	$6\frac{7}{8}"$
Liner for base, short side (2)	$\frac{1}{8}"$	$\times$	$\frac{3}{4}"$	$\times$	$3\frac{5}{16}"$
Cigar cradles (2)	$\frac{1}{4}"$	$\times$	$2\frac{3}{8}"$		

*before separation of lid & base

**after gluing of three sheets

***thickness just under $\frac{5}{16}"$



we have to deal with the glue bead just like we did with the lid insert – and the process here is the same. The top edges of the parts will also have to be rounded off with sandpaper prior to installation. Then the parts are glued and clamped into place (**Fig. 33**).

The cigar cradles

These cradles prevent the cigars from moving around and potentially becoming damaged.

Start by machining strips of material about $\frac{1}{2}$ " wide and $\frac{1}{4}$ " thick. Using a

$\frac{3}{4}$ " Forstner bit and a fence on the drill press, hold the part firmly against the fence and cut out a half-circle, leaving about $\frac{1}{16}$ " of material at the bottom. Then by putting a pencil mark on the drill-press board, line up the half-circle you just made, and cut another one $\frac{3}{4}$ " from the first (**Fig. 34**). Repeat until you have enough material for the cradles.

A word of caution: My fingers are very close to the cutter, but I feel relatively safe because I am on the side of the cutter that is rotating away from the

fence. Don't ever put your fingers on the left side of the cutter with this type of setup. If you do not feel safe doing this, hold the part with a piece of scrap wood or cut out the cradles with a scroll saw.

Clean up the parts with a small drum sander in the drill press and some hand sanding.

Glue them into place with a simple jig that is used to both position and center the cradles (**Fig. 35**).

The bottom parts of the cradles are very thin, and if moisture is introduced (in the form of glue) it can sometimes cause the wood to react. So to avoid movement, I use small sticks and rubber bands to hold the cradles down until they are dry (**Fig. 36**).

Final steps

It's time to glue the lid insert into place, but first, mark the position of the screws for the steel tabs and drill the pilot holes. I cut some plywood pieces that are slightly smaller than the insert that are then held in place with some clamps.

Mark the position of the thumb push with masking tape, then sand it out with a small drum sander (**Fig. 37**).

Install the hinges and check the lid for fit. The two halves should come all the way together with only the force of the magnets, but will likely require a little sanding of the lining around the base.

With the humidor assembled, I scribe $1\frac{1}{4}$ "-radius corners, then remove them with a sanding disc.

Round off the remaining corners on top and bottom using a $\frac{5}{8}$ " roundover bit at the router table. Sand them with an air-powered or electric orbital sander. The rounded corners I sand by hand, because the machine removes too much material and tends to leave flat spots. The project is now ready for finishing.

Finishing

I decided to use a plain nitrocellulose lacquer as a sealer and top coat because it is easy to use and buffs to a high, mirror shine. First I sprayed them with three coats, let them dry and sanded with 320-grit paper. Then

I gave them three more coats and this time let them dry for a full week.

Working with lacquer can be a little tricky because it dries to the touch very quickly, but actually takes about three months to totally cure. And it is important not to put on too many coats because a too-thick finish can eventually develop cracks.

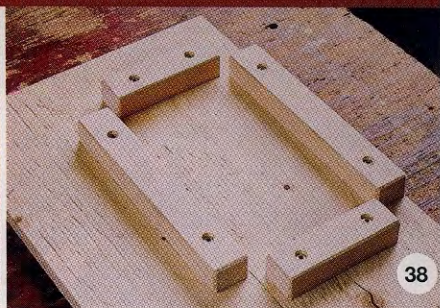
After a week, I sanded the humidors with 1500-grit automotive emery paper, using kerosene to lubricate and to prevent the paper from plugging up.

To make polishing easier, I made a quick jig that allows me to use both hands on the drill while I buff (Fig. 38). This is clamped to the table and draped with a soft, clean rag (Fig. 39). I buffed them with an automotive polishing compound that does not contain wax. It's not a good idea to use wax on lacquer until it is completely cured.

The very last step is to break the corners all around the opening. Because the humidors were closed during the finishing, they probably were sealed shut by the lacquer. Just go around the opening with a small



37



38

blade like an X-acto knife before trying to pry the humidor open. Then, with some fine sandpaper put a small chamfer all around the edges of the lid and base. This chamfer, and the inside of the humidor, will remain unfinished.



39

Wolf Moehrle

Wolf Moehrle is an award-winning craftsman and custom furniture designer from Neustadt, Ontario. He has taught cabinet making at the same high school where he took woodshop. He is also a musician, and sometimes performs on weekends.



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Finishing is just the beginning.



A SUCCESSFUL MIX OF WATER & WOOD

BY BOB & JACQUIE GOAD

Secrets from the professionals help you craft 75 gallons of fine furniture for your fish.

Before you bypass this article thinking it is too complicated, let me assure you it is no more difficult than building any other piece of furniture. My wife and I build aquariums in many shapes and sizes. The 75-gallon corner unit in this article, similar to the one pictured here, is one of the easiest to build and one of the most practical to own.

First, we'll build the frame and waterproof the tank. You'll be amazed at how well the waterproofing process works, and how beautiful the result can be. Then we'll craft a lid, install the glass, finish the entire unit and add the plumbing for your beautiful piece of living art. The pump, associated aquarium apparatus, the fish and their care will be up to you.

Cutting the frame

The aquarium will have a substantial, durable frame that will require some muscle to cut and assemble. Handling 4' x 8' sheets of 1"-thick plywood requires an assistant or a good set of roller stands (**Fig. 1**).

Cut both sheets of plywood to 65". Measure 23" from the long side of one piece, or set your fence to 23" and rip the back left side. Mark or reset your fence to 24" and rip the remainder of that sheet for the back right side. It's important to save all the offcuts for later use.

To cut the front panel, lay the board with its best side down. Mark lines 9" and 18" from one side; from the other side, mark in 22". Rip the line you drew at 18". Now set the saw to 45° and, with the best side down, rip the 18" piece at the 9" line.

Leaving the saw angled, cut the remaining 30" at 22", making sure the best side is down. You may need to set up a fence to keep the angled board straight. Turn the 22" board around and rip the other side, keeping the best side down, so that both sides are cut at 45°. The best side should be the wider one.

Dadoes and windows

To ensure you will have the window and





door openings and the dadoes in the correct places, dry-fit the pieces. Place the two back pieces, best sides facing in, at right angles. The 23" panel (**piece A**) should be touching the inside of the end of the 24" panel (**piece B**) which makes the sides equal. If you do not have sawhorses, just stand them on the floor. Secure four or five screws from the flat side of the 24" piece into the end of the 23" piece (**Fig. 2**).

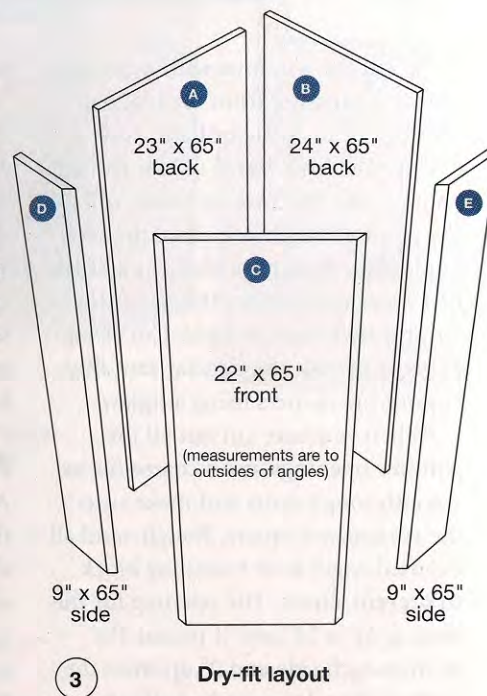
Stand the back up and dry-fit the five main pieces. Place the sides (**pieces D & E**) against the back, with the 90° angles together and the slant fronts facing out. The widest part of the board should be toward the inside (**Fig. 3**). Place four or five screws into each of the sides to hold them in place.

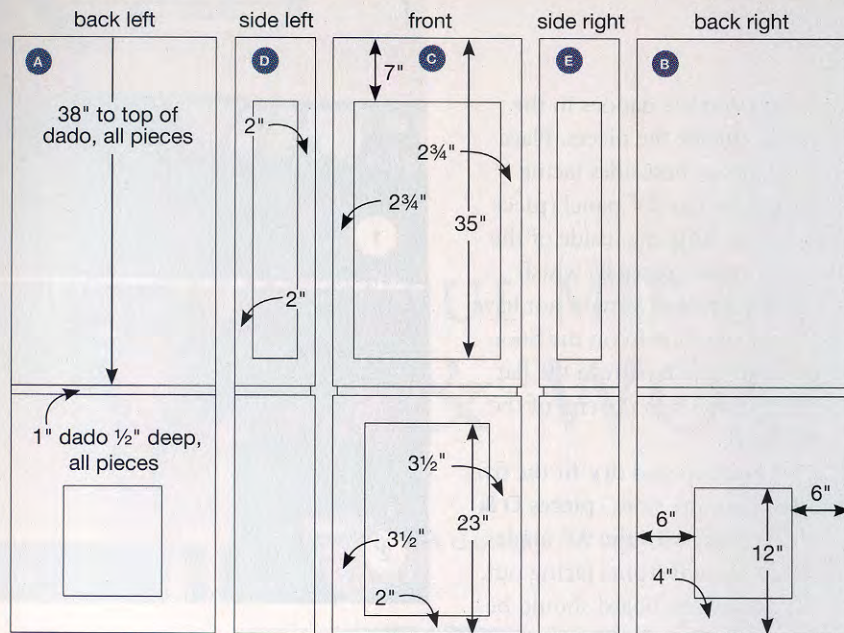
Now place the front (**piece C**) against the sides, with the widest part facing the inside of the aquarium. Place an X on the top of each piece, then make rough drawings of where the openings will go, on the outside of the front and two sides (**Fig. 4**). There will be no openings on the two back pieces just yet. Also write "dado here" on the insides of the two back pieces. Take the pieces apart, removing the temporary screws.

The dadoes go between 38" and 39" from the top, on all five panels, on the inside (**Fig. 5**). Measure and draw lines at these two measurements to avoid confusion at the table saw. Plow the dadoes 1/2" deep with a dado set.

Rough-sand the dado edge and use a 1" scrap piece to check for fit.

On the inside of the front (**piece C**), measure 7" down from the top and using a right angle, draw a line straight across; do the same at 35" from the top. On each of these lines measure and mark 2 3/4" in from each side, then draw lines intersecting the first two lines, forming the rectangle for the window. Check for square on each angle. Repeat this process for both sides (**pieces D & E**), but measure for your vertical lines 2" rather than 2 3/4" from the edges.





5

Major vertical components-viewed from the inside

To cut the windows with a circular saw, first measure from the blade to the edge of the plate or base. Add $2\frac{3}{4}$ " for the front panel (2" for the side panels), and this measurement will be the point at which you place the saw guide (**Fig. 6**). Set the blade to a depth of 1"; this will prevent the saw from cutting sawhorses or table. Cut as far as you can with the circular saw, then cut out the corners using a jigsaw.

When you have cut out all the window openings, use a coarse file to smooth rough spots and make sure the corners are square. Rough-sand all exposed edges with a sanding block to prevent splinters. The opening for the door is 21" x 14" and is placed $3\frac{1}{2}$ " in from each side and 2" up from the bottom. The door can be built and

attached to suit your preference.

Using the remnant from one of the ends of the two pieces of 4' x 8', cut a 23" square. Measure and mark $9\frac{3}{4}$ " out in both directions from one corner. Connect the marks with a straightedge and cut off that corner. Dry-fit the floor, sanding where necessary. This (**piece F**) is not the bottom of the entire unit (which will be cut later), but the floor of the tank.

Assembling the tank

As your aquarium takes shape, take the time to make sure all joints and dados are lined up as closely as possible to save sanding time later. Be careful when gluing and wipe glue off as soon as possible to save sanding places where sanding will remove too

much material or may interfere with the bonding of the waterproofing and woods.

Assembling on sawhorses or a table will be less stressful physically than assembling from the floor. Gather the following to have at hand before beginning: drill with screw bit and countersink bit; screws; claw hammer; rubber mallet; medium clamps (4"-12"); glue (in a bottle with a tip is best); and a bucket of water with an old rag.

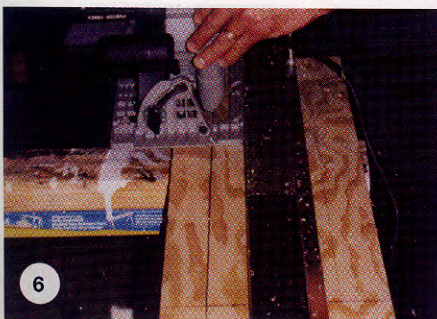
On the outside of each piece, eyeball the middle line of the dado and mark it; this will guide you in placing the screws. Lay the two back pieces on the platform, dado side facing up, with the 23" piece (**A**) on the bottom. Lay a glue line along one whole inside edge of the 24" piece (**B**). Pull that piece (unglued side) toward you, and stand it up when it reaches the edge of the other piece so the glue line is facing the edge of the bottom piece. Fasten the two together, being very careful to ensure that the two back pieces line up exactly. Countersink holes every $1\frac{1}{2}$ " to make the installation of the screws easier and to prevent breakage.

Next, place a glue line in the dado groove for the tank floor (**piece F**) and put this piece in, tapping it if necessary with the rubber mallet (**Fig. 7**). Place screws carefully; if you miss and can see the tip, remove the screw and try again. Countersink every $1\frac{1}{2}$ " and place the screws.

After securing the floor, glue and place one side on, matching 90° angles and making sure the window is at the top. Be careful not to use screws so long that they might pierce window or door openings.

Screw side (**D**) to the tank floor before screwing the side to the back. A clamp helps hold it straight (**Fig. 8**). Place a bead of glue where the second side (**E**) will attach and place the second side, tapping it in to get a good fit. Again, attach the floor screws before rotating the unit and placing the side screws.

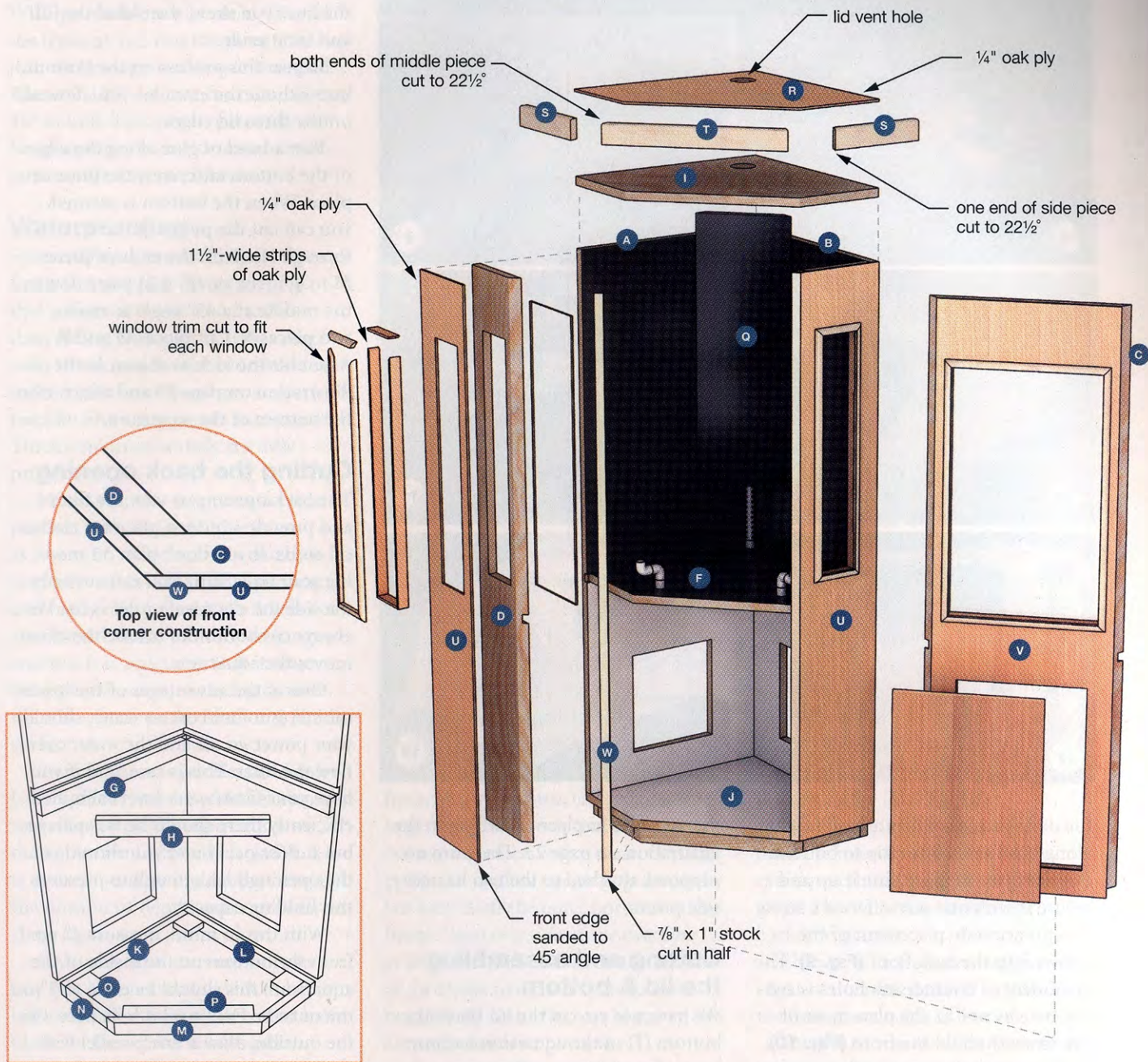
Lay down the front side (**C**) with



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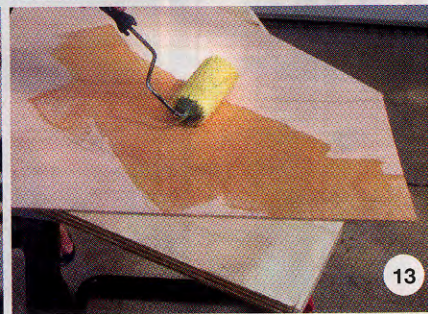
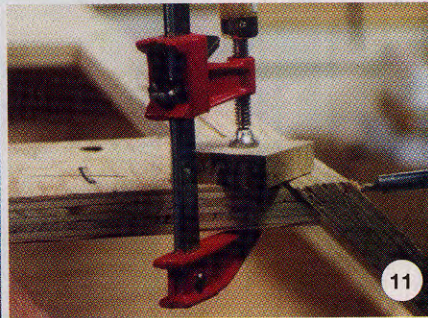
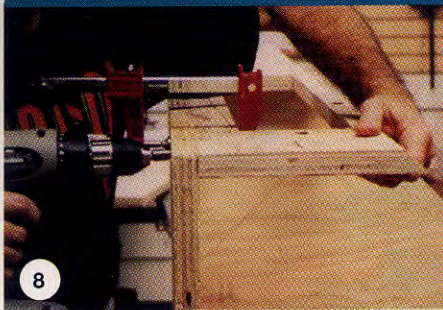


Locations for tank supports (G and H) and kick panel pieces (K through Q)

Tank floor (J) and front (C) removed for clarity

CUT LIST

A. Back left panel	1" x 23" x 65"	M. Front kick (trim ends to 45°)	1" x 2" x 22"
B. Back right panel	1" x 24" x 65"	N. Side kick (2)	1" x 2" x 9"
C. Front panel	1" x 22" x 65"	O. Kick support block (3)	1" x 3" x 3"
D, E. Side panel (2)	1" x 9" x 65"	P. Front kick support	1" x 2" x 18"
F. Tank floor	1" x 23" x 23"	Q. Overflow panel	1" x 11" x 32"
G. Back tank floor support (2)	1" x 2" x 22"	R. Lid covering	1/4" x 24" x 31 1/2"
H. Front tank floor support	1" x 2" x 18"	S. Side lid trim (2), trim to fit	1" x 2" x 10"
I. Tank lid (cut to fit)	1" x 24" x 31"	T. Front lid trim, trim to fit	1" x 2" x 23"
J. Aquarium floor (cut to fit)	1" x 24" x 31"	U. Side panel covering (2)	1/4" x 10 3/8" x 64"
K. Back left kick	1" x 2" x 21"	V. Front panel covering	1/4" x 18 3/4" x 64"
L. Back right kick	1" x 2" x 22"	W. Front trim (2), trim to fit	3/8" x 1" x 65"



the dado facing up. Lay a bead of glue along both sides from top to bottom. Put the front in place, line it up and secure it with one screw. Draw a screw line for accurate placement of the screws into the tank floor (Fig. 9). The alignment of countersink holes is critical here as well as the placement of the screws to hold the front (Fig. 10).

To prevent the front of the aquarium from sliding out of alignment as you place the screws, clamp the two pieces together (Fig. 11).

Supporting the tank floor

You'll need to find all those offcuts from earlier and grab a tape measure. Turn the aquarium upside-down, or if you can manage, leave it on the table. From the scraps, cut pieces G and piece H to support the tank floor. Place a bead of glue along each joint between the floor of the tank and the underside, even with the dado. Glue

the supports in place according to the illustration on page 23. There are no supports attached to the two narrow side pieces.

Cutting and assembling the lid & bottom

We have not yet cut the lid (I) or the bottom (J) of the aquarium because I have found it more efficient to assemble the frame and custom-fit these pieces. Cut the drop from one of the 4' x 8' sheets in half to make two 24" x 31" pieces.

Turn the aquarium right-side-up and, using one of the 24" x 31" pieces, line up the 90° angle on the back where the two side pieces meet. If it does not match perfectly, remove the piece and square the corner. Scribe around the front and two sides (Fig. 12), but place a 1/4" plywood spacer against each surface to allow for an extra 1/4" to grasp when opening the lid. Cut on

the lines you drew, then label the lid and set it aside.

Repeat this process on the bottom, but without the extra 1/4" you allowed on the three lid edges.

Run a bead of glue along the edges of the bottom and screw the floor in place. When the bottom is secured, you can cut the pieces of the kick (K through N). Trim the ends of piece M to 45°; cut an 18" x 2" piece down the middle at a 45° angle to make two pieces N. Cut pieces O and P. Assemble the kick as shown in the illustration on page 23 and attach it to the bottom of the aquarium.

Cutting the back opening

The back opening(s) vent the filter and provide a hidden place for electrical cords. If you don't plan on moving your aquarium, you can cut only the side the electrical outlet is on. We always cut both sides in case the client moves the aquarium.

One of the advantages of the lower cabinet is to hold excess water, should your power go off and the water overflow the filter. This is rare, and if you have your filter/water level calibrated efficiently there should be no spillage; but it does occur and you should cut the opening high enough to preserve this holding capacity.

With this in mind, measure 4" up from the bottom on the inside of the aquarium; this should be close to 7" on the outside. Drill a pilot hole here. On the outside, draw a line parallel with the bottom at the height of the hole. The remaining dimensions are not written in stone; about 6" in from each end and 12" above the bottom line should do. You can use a jigsaw to cut the opening, as it will be hidden when you install the aquarium.

Cutting the overflow

On the inside of the upper tank portion, you will need to measure from the bottom of the tank to 1" above the window opening. (This should be approximately 32".) Cut a piece from the remaining scrap to that length.

With your table saw blade at 45° and the fence at 11", run the piece you just cut through so the side is angled. Rotate it 180° and cut the other side at 45° as well. This panel (**piece Q**) will fit up against the back corner of the tank to form the overflow.

Waterproofing

System Three General Purpose Epoxy Resin is a two-part epoxy coating that infuses into the wood rather than sitting on top of it. It was originally developed for the boat-building industry, but woodworkers are continually finding new uses for System Three's environmentally friendly products.

Mixed at a two-to-one ratio, this product will cure at temperatures as low as 35° F. When fully cured, it is unaffected by water, oil, kerosene, and many other chemicals. It will not stain wood and is immune to fungus and rot. It is unique in that it may be applied to damp wood, provided the adhesive is worked well into the surface.

System Three is odorless and colorless. Pigment may be added as desired; we recommend the top portion of the aquarium be tinted black. Black is desired because it gives the viewer the illusion of depth and is unlikely to show algae.

If you are adventurous, you can buy one gallon and divide it in half; tint one half white and the other half black. It does come in half-gallon sizes, which might make tinting easier. Follow System Three's instructions for tinting.

Take care to protect clothing, hands and surfaces when applying the epoxy. Purchase cheap brushes or rollers, because you will have to discard them when finished. The applicator of choice can be placed in a plastic bag and stored in a freezer for use on successive days.

There is no need to sand or prepare the inside surface of the aquarium prior to applying the first coat. Paint the top portion of the aquarium and



the overflow black, and the lower portion and lid white. The white lid will reflect the light and the bottom compartment should be white so the filter and electrical items are visible.

Using a disposable brush or roller, apply a liberal coat of black to the inside of the upper portion of the frame you've constructed, making sure to get into the corners and joints, but not leaving excess epoxy there. Getting epoxy on window openings is desirable, but keep it off the outer portions of the frame. Paint one side of the overflow at this time. Somewhere on the outside of the frame mark this coat. You will be applying six to 10 coats of epoxy, so keeping track is important.

You can apply more than one coat per day if you begin early and it is warmer than 72° outside. If the epoxy feels solid and dry, sand lightly and apply the next coat. You need a minimum of seven coats if you plan to ever move the aquarium. Make sure to paint both sides of the overflow.

Lid construction

Drill a 2" vent hole in the back corner of the lid (**I**). Cut a piece of 1/4" oak plywood (**R**) to the size of the lid, plus 1/2" on the three front edges.

Apply contact cement to the lid

and the back side of the oak ply lid covering (**Fig. 13**). When it has dried, carefully lay the pieces together and press with a roller.

Make a pilot hole in the oak using the vent opening as a guide, and rout the oak to match the lid vent hole (**Fig. 14**). Cut the edge of the oak flush with the lid (**Fig. 15**).

With a sanding block, carefully sand from the interior of the oak lid to the exterior at the edges, following the grain. This will smooth the edge grain back into place.

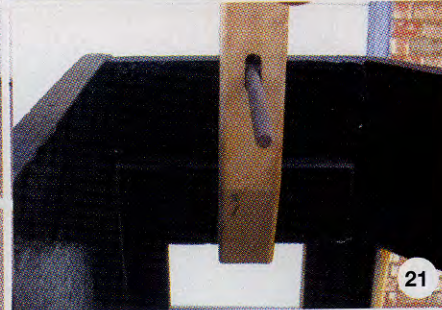
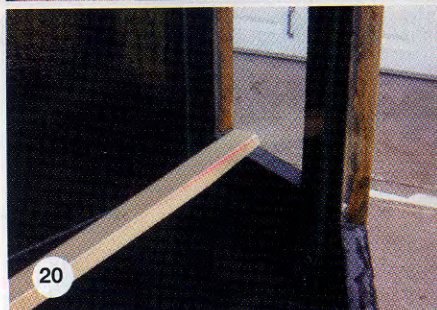
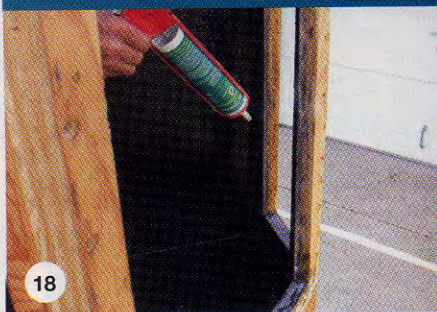
Using a 1/4" roundover bit, round the edges of the trim that will be affixed to the three front edges of the lid.

Cut the trim to size. Cut one end of the two short pieces (**S**) and both ends of the front piece (**T**) at 22 1/2° (**Fig. 16**). Affix the trim with 1 1/4" brads.

Mix some of the white waterproofing and coat the underside of the lid, making sure to get into the crack between the trim and the lid itself and in the vent hole, but not onto the outside of the lid or trim (**Fig. 17**). This is a good time to waterproof the bottom compartment of the cabinet as well.

Installing the glass

Move the aquarium to a location where it will remain undisturbed for



24 hours. Check that the edges of your glass have been deburred; if not, do so with a block sander. Also have all your equipment and the hose ready to fill the aquarium. You have approximately 30-45 minutes to insert all the glass pieces and fill the aquarium to achieve optimal results. You will need: block clamps; homemade wood block wedges, rounded at the ends, 1" x 2" x [the measurement of the opening to the back wall]; three tubes of Dow Corning 732 silicone caulk; silicone gun.

Using a coarse file, remove all the waterproofing "nibs," those drips or drops which have formed on the opening for the glass. Apply a liberal coating of caulk all around one side opening (Fig. 18). Make sure to vary the pattern and spread the caulk out 1"-2" beyond the opening. You cannot use too much, but too little will cause problems creating a watertight seal.

Lay a bead of silicone along the three front sides before placing the windows. Carefully place the bottom of the first panel of glass on the bottom of the tank. Make sure it is square with the window and press it against the silicone (Fig. 19). Wedge the glass in with your wood blocks (Fig. 20) until the silicone squeezes out the cracks between the glass and the wood 1/4". You might want to place a piece of cloth between the wood and glass. Press gently but firmly in place. Place a clamp over the top of the aquarium to squeeze the silicone flat (Fig. 21).

The silicone should be evenly distributed under the glass. Also squeeze a bead around the edge of the glass, then use your finger to smooth it out evenly. Repeat this process with the second side and then the front piece.

After all three pieces of glass are installed, fill the aquarium so the water level just reaches the top of the glass.

Hopefully you have placed enough caulk so that you won't have leaks. But if a pin leak does sprout, place the wooden wedge back into the tank and compress the silicone gently until the leak stops. The pressure of the water should help by morning.

Exterior finishing

Carefully empty the aquarium and give the plywood a good general sanding, avoiding contact with the glass.

Gently remove the silicone which hardened around the glass, but avoid scratching the glass (Fig. 22). Cut from the bottom and from the top, then remove excess silicone until you have a smooth surface.

Lay a piece of oak (U) over one side and mark a pilot hole for the router (Fig. 23). Remove the piece and drill a hole where you marked. I like to label each piece.

After coating the aquarium and underside of the oak plywood with contact cement and allowing it to dry, place 12" x 1/4" dowel rods at about 6" intervals along the side.

Place the oak plywood onto the dowel rods. At one end, line up the oak with the side with a little overhang. Remove the dowel and stick the oak to the aquarium (Fig. 24).

Go to the opposite end and repeat the center-and-stick-down procedure. Gently remove each dowel rod with a smooth motion. Do not jerk the dowel rods out, or you could move the oak out of alignment.

Using a roller, securely affix the oak to the aquarium. Repeat this process with the second side.

Adjust your router so the bearing does not touch the glass, using an uncovered window as a guide. Trim the outside edge of the oak.

Starting at your pilot hole, carefully rout the oak out of the window openings (Fig. 25).

The oak on the front edges of the sides should be hand-planed and sanded to a 45° angle. Be careful to avoid removing too much material.

There will be space left for trim on

each side of the front piece of oak plywood (**Fig. 26**).

I like to scribe a line down both sides of the front so I know where the oak goes (**Fig. 27**). Drill a pilot hole in the section of oak where the glass will show, and one where the cabinet is open below the tank. Next, apply contact cement to the underside of **piece V** and to the outside of the front of the aquarium. Allow to dry, then place dowels as you did for the two sides. Lay the oak on the dowels and match it up with the lines you drew. Starting at the top, secure the oak to the aquarium and remove successive dowels.

Rout out the window and cabinet openings. Square the rounded corners with a utility knife.

Cut a long piece of $\frac{7}{8}$ " x 1" stock in half on the table saw for trim, and glue one on each side of the front oak ply (**V**). I do not like to fill nail holes, so I take the time to tape the trim to the aquarium after gluing (**Fig. 28**). Allow the glue to dry for 24 hours.

Carefully plane the trim down until only about $\frac{1}{16}$ " remains proud of the sides and front (see illustration p.23). If you scratch the oak, you might not be able to repair it. Switch to a scraper to reduce the size of the trim so it is flush with the oak (**Fig. 29**).

Cut lengthwise $1\frac{1}{2}$ " strips from the oak after you measure and mark each vertical side of the three windows. You will have six strips. You may need to label them because you want them to fit as closely as possible.

Make a 45° notch on the end of each piece (**Fig. 30**). Next, glue and tack the strips into place. Then measure for the six horizontal strips; cut, glue and tack into place.

Gently trim the excess oak so it lies flush with the face (**Fig. 31**).

I carefully measure and cut each side of the exterior window trim separately. **Fig. 32** shows an exploded view of the trim ready to attach with glue and nails.

In **Fig. 33**, the aquarium is fully trimmed and ready to stain and seal.



Plumbing

Gather all your plumbing supplies and become familiar with what they are. It wouldn't hurt to dry-fit the pieces beforehand.

One of the 1" male adapters will be attached to a 1" x 15" piece of straight PVC using PVC glue. Drill four holes every $\frac{1}{2}$ " along the resulting piece, including the glue end of the threaded piece (**Fig. 34**).

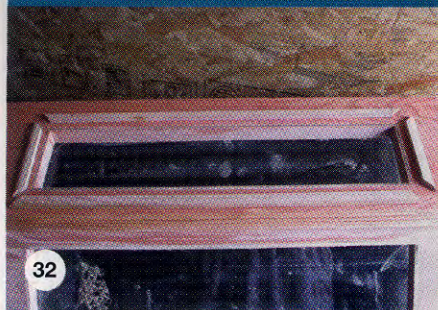
The configuration of the return pieces is shown in **Fig. 35**. Glue only the two elbows together with the piece of 1" pipe (**a-b-c**), and the threaded

end to the other piece of pipe (**d-e**).

With a straightedge and a grease pencil draw a line along the bottom of the aquarium, tracing the overflow (**Fig. 36**).

Begin drilling a $1\frac{5}{8}$ " hole in the corner of the aquarium floor, $\frac{1}{2}$ " from each wall. Do not drill all the way through from the top side, as breaking through could tear off too much material on the underside and prevent a good seal with the bulkhead fitting.

Drill upwards through the aquarium floor to complete the hole. Once



this hole is completed, place the assembled elbow (without the threaded adapter) into the corner where the two front pieces of glass meet, and draw a circle around the elbow to mark the position of the two front holes. Drill these holes using the same method as the first.

We use standard 1" bulkhead fittings (Fig. 37), regularly used in hot tubs and whirlpools. Make sure the washer goes with the head, not the bolt. It is not easy to hold onto the head of the bulkhead while threading it, so I screw the overflow pipe into it before installing. Line the threaded part of the bulkhead with silicone to ensure a watertight seal (Fig. 38).

Once the bulkhead fitting is in place and screwed in tightly, lay a bead of silicone around the head to further waterproof the whole fitting. Fig. 39 shows all the bulkhead fittings in place.



Screw the overflow pipe into the bulkhead fitting without using glue (Fig. 40-a). You might need to remove this pipe someday to retrieve an errant fish.

Place plumber's glue on the threads of each of the two threaded fittings before inserting bulkhead fittings into the return tubes. Screw them in tightly for a watertight seal, which is important here because these tubes hold the electrical cords and water return. Attach the elbows also using plumber's glue, making sure they fit into the

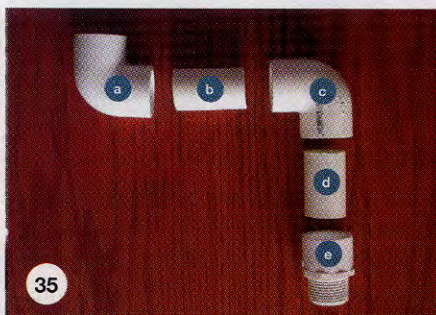
corners of the glass fronts. This will allow them to remain fairly hidden from the outside (Fig. 40-b&c).

Apply a bead of silicone along the two sides and bottom of the overflow (piece Q) and place it in the back corner of the aquarium (Fig. 41). In this photo, background material has already been applied to the overflow. Press to seal.

Place a length of pipe into each elbow to measure. Each piece of pipe needs to be 1" above the top of the glass. Glue into place. Next, glue an elbow onto one piece of pipe, which will be on the opposite side of where you plan to place the lid. If you are not sure, you can do this after you attach the lid, or just dry-fit the elbow.

The rest of the story

We construct custom lighting and filtration for all our aquariums, but this model lends itself to a commercially available product. Installation instructions will be included. Any good aquarium store will be able to help you select lights, a filter (ask for overflow system, not undergravel) and pump to install in your aquarium. You will need 24" of 1 1/8" polyvinyl tubing to connect the filter to the overflow pipe and the pump to the return, located at the front of the aquarium, furthest



from the wall where you attached the lid. The lights are mounted to the underside of the lid; the electrical cord for the lights runs down the electrical return located at the front of the aquarium closest to where you attached the lid. One power strip, placed inside the bottom compartment, is all that is necessary to power the lights and pump.

If you are a first time aquarist, freshwater fish are relatively inexpensive. There are hundreds of varieties and they are easy to care for. Saltwater aquariums require a little more atten-

tion. We recommend purchasing a dozen inexpensive damsels for the adjustment period, which ranges from two to six weeks. During this time you

can familiarize yourself on the care and feeding of more complicated (and expensive) species. 🌊



Is Bigger Better?

If you want to build a larger aquarium, you'll have to consider factors other than floor space and whether you can fit it in through your doors and up your stairways. An aquarium filled with water might be much heavier than you think. In addition to the weight of the aquarium, saltwater weighs 8.3 lbs. per gallon; and then there's the weight of any sand or coral you add for decoration.

To calculate the number of gallons a particular aquarium will hold, multiply the height by the length and then by the depth of the actual tank portion. Divide this figure in inches by 231, the number of cubic inches in a gallon.

For example, take an aquarium is 72" long x 22" wide x 32" deep. The calculation for the amount of water it holds: $72 \times 22 \times 32 = 50,688$. The result divided by 231 = 219.4 gal. Now we can calculate the weight: $219.4 \text{ gal.} \times 8.3 = 1,821 \text{ lbs.}$

	1,821 lbs. of water
+	150 lbs. of sand and coral
+	250 lbs., the weight of the aquarium
	2,221 lbs. total weight

If you divide this figure by the area of floor space the aquarium will rest on, you will get the amount of weight per square inch for comparison; in this case 1.4 pounds. A standard refrigerator weighs about 325 lbs. supported by 1,020 square inches of floor, making it about a third of a pound per square inch.

If your home sits on a concrete slab, weight will not be

an issue, but for those with wood sub floors or living spaces on other levels, asking a contractor whether the space will support such an aquarium is advisable.

Another significant factor for larger aquariums is the thickness of the glass. We had a glass engineer calculate the necessary thickness for the height of the clear cut, annealed glass, and the standard is as follows:

- for up to 26" of viewing height, the glass should be $\frac{1}{2}$ " thick
- for 26"-36" of viewing height, the glass should be $\frac{3}{4}$ " thick
- for 36"-48" of viewing height, the glass should be 1" thick.

If you consider that the fish will only swim 2"-3" above your tallest piece of coral, it might help you determine the desired depth of your aquarium.

And by the way ...

If you are in the Orlando, Fla., area, Disney World has several of our custom aquariums in their hotels, and Florida Hospital has one in the lobby. Our favorite Orlando customers were Donald and Robin Royal, formerly of the Orlando Magic. In Jacksonville, we built the aquarium in the Wolfson Memorial Children's Hospital and the one in the head office of the Jacksonville Jaguars. We've shipped completed units to Pennsylvania, Mississippi, Alabama and Chicago.



MATERIALS

WOOD

- (2) sheets 1" fir plywood
- (1) sheet 1/4" oak plywood
- (2) 8' pieces of 1" x 2" oak
- (2) 8' pieces of 1/2" x 3/4" base shoe
- (1) door

ADHESIVES

- wood glue
- (1) gal. System Three general purpose epoxy
- (7) tubes Dow Corning 732 black silicone
- (1) gal. contact cement

GLASS

- 3 pieces of 1/2" clear cut (no edge work), annealed glass: measure height from bottom of tank to 2" above the opening;

measure width on front panel from inside corner to inside corner; measure width on sides from corner to back minus 1"

HARDWARE

- (1) box 2" x 1/2" crown staples
- (1) box 2 1/2" deck screws
- (1) box 1 3/4" deck screws
- (2) European Hidden Hinges
- (1) 24" piano hinge
- 1 1/4" finish nails

PVC

- 10' section of 1" PVC
- (3) 1" bulkhead fittings
- (3) 1" male adapters
- (6) 90° elbows
- (1) can PVC glue

Bob and Jacquie Goad

Bob and Jacquie Goad live with their two sons, Andrew, 9, and Robin, 6, in Oklahoma. Woodworking is a family affair, and they spend much of their free time in the shop building, carving and sharing their art with others. Andrew has constructed his own bed, made gifts for Christmas and helped finish the aquarium in this article. You can contact the Goads at bobgoadcarvingmaster@yahoo.com.



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WOOD Magazine
March, 2004

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Call for entries to the

WOODCRAFT[®]
magazine

For the second in our contest series, we chose a classic item that helps you organize your desk: a stamp roll dispenser. If you can't find inspiration in the clever ideas below, or the short projects that follow, you're sure to be motivated by our amazing prizes.

Entering is FREE, FUN and EASY, so try it today!

Think **Small** Win **BIG** Stamp Holder Contest

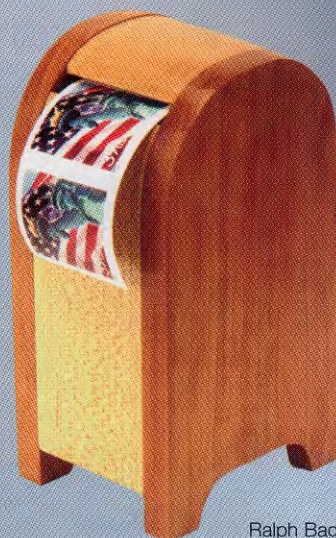
Prizes Valued at
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Vern Bonham



Kerry Pierce



Ralph Bagnall



Ralph Bagnall



John Garton & Joe Adkins

HOW TO ENTER

When your stamp holder is complete, submit photos via e-mail to Contests@WoodcraftMagazine.com by March 1, 2007.

- Finished size of project must be smaller than 5" x 5" x 5".
- Entry should include your name, address, contact information (including e-mail, if available) and a description of the project (overall dimensions, materials used, theory, etc.).
- Entry should also include up to five digital or scanned photos, with descriptions. Include hidden attributes or special features that may not be visible from photos. Jpeg format is preferred.

CONTEST RULES

- One entry per person, must be the original and sole work of the entrant, and new construction done for this contest.
- Wood must be the primary medium for construction.
- Finished size must be smaller than 5" x 5" x 5" (would fit in a box 5" x 5" x 5").
- Employees, directors and franchisees of Woodcraft Supply, LLC, Woodcraft Franchise, LLC, and the immediate family members or members of the same households of such employees, directors and franchisees and co-sponsors are not eligible to enter.
- Contest offered only in the United States and its territories to legal United States residents. Void where prohibited by law.
- Contest promoters are not responsible for late, incomplete or misdirected entries.
- By entering this contest, you agree that Woodcraft Magazine may use your name, likeness and/or project photos for publicity without additional compensation.
- Prizes may not be substituted or redeemed for cash.

JUDGING

Entries will be judged based on design, craftsmanship, and degree of difficulty. Design considerations include function, appearance, originality, materials selection and engineering. Craftsmanship considerations include surface preparation, appropriate and well-executed finish, and overall construction. Top 20 finalists will be contacted to send their projects to Woodcraft Magazine for final judging and possible use in an upcoming Woodcraft Magazine feature. All judges' decisions are final.



1st PRIZE
SawStop 10" table saw



2nd PRIZE
Sjöbergs Duo
workbench



3rd PRIZE
Rikon mini-lathe

CREATIVITY WINS THESE CONTRIBUTORS OUR STAMP OF APPROVAL

It's just a small problem to tackle: a wooden stamp holder with serious desk appeal. Here's how some woodworkers "thought small."

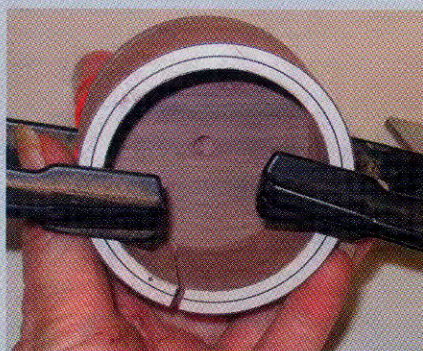
First-Class Classic

by Diana Thompson



This box is made of black walnut, my favorite hardwood. It's quite dense, and cutting a 1¼"-thick piece on the scroll saw can be difficult. I put clear packing tape on the bottom before

Step up to the scroll saw to create this round hardwood box with an ornamented lid. Its clever but simple construction might surprise you.



2. Make sure the hole you drilled in the box bottom is toward the inside. Use more than the two clamps shown here.

You'll need a piece of 1¼" x 3" x 10" stock for the remaining pieces. Cut out the box bottom from the pattern.

With a 15/64" drill bit, drill the center hole in the box bottom only three-quarters of the way through. (If you happen to go all the way through, all is not lost. The dowel will show on the bottom, but that's no disaster. Just don't turn it upside-down!)

Remove the pattern.

Apply a small bead of glue to the underside of the box sides and clamp the box bottom into place (Fig. 2). Allow to dry at least an hour.

Once it's dry, cut around the interior line. Your box will look like Fig. 3.

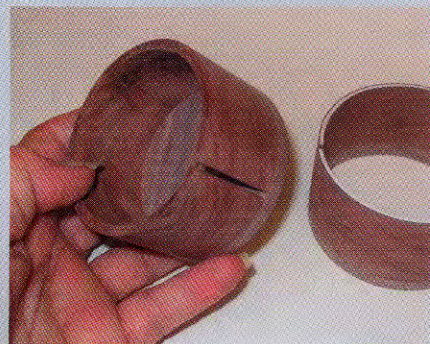


1. Carefully sand the box sides smooth inside and out with 200- and 400-grit paper after cutting.

cutting to lubricate the blade and help prevent burning the wood. I used a #5 single-tooth blade for this job. A reverse-tooth slows down the saw action when cutting thicker pieces, but works great for cutting the box top and bottom.

Use plenty of adhesive to apply the "box sides" pattern to a piece of 1¼" x 3" x 3" stock. Cut around the outside lines, leaving the pattern glued on and the inside line intact for later use (Fig. 1).

If your pieces do not come out perfectly round, shape them on a disc sander. Just be sure to keep the piece moving as you sand to avoid having flat spots.



3. Cut on the interior line, through both thicknesses at once. The discarded piece is shown on the right.

BOX SIDES

1 1/4" stock

Cut around the outside lines only, leaving the interior line intact. Do not remove pattern after cutting.

BOX BOTTOM

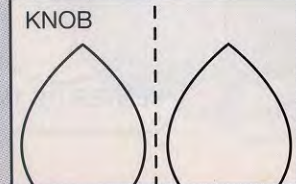
1/4" stock

Do not remove pattern until center hole is drilled. Use 15/64" drill bit. Do not drill all the way through.

LID UNDERSIDE

1/4" stock

Cut out only the interior section, and save it for a later step. Use 1/4" drill bit.



Apply the "lid underside" pattern to 1/4" stock. Drill a small blade entry hole and cut out the center section of the lid underside only. Do not yet cut up to the outside line, drill the center hole and remove the pattern. Set the center aside for later use. Apply a small bead of glue to the underside and clamp the piece to another piece of 1/4" stock (Fig. 4). Allow to dry at least an hour, again using more clamps than are shown here. Once the piece has dried, cut around the outside line in the same manner as you did the box sides and bottom.

Place the center back into the lid underside and drill the center hole all the way through both pieces with the 1/4" bit. The center section can now be discarded and the pattern removed.

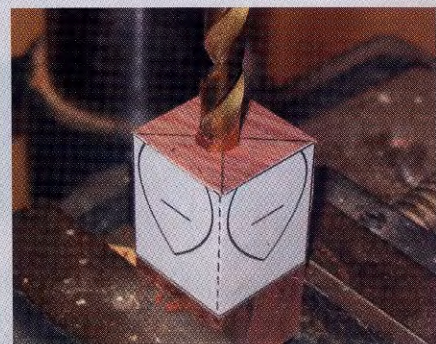
Fold the knob pattern along the dashed line. Apply adhesive to the reverse side and wrap it around two sides of a 3/4" x 3/4" x 1 1/2" piece of stock. Place the block into the drill press vise upside-down (Fig. 5). Mark the center and with the 1/4" bit, drill 3/8" deep.

With a #5 blade, cut one side of the pattern (Fig. 6). Gently pinch the block together and place 3/4" cellophane tape around it to hold the knob inside the block. Cut the other side of the pattern in the same manner and remove the knob from the block.

Twist the dowel into



4. Cut roughly around the outside line on the underside of the lid before gluing it to another piece of stock.



5. Make sure the top and bottom of your stock are level before drilling.



6. For the second cut, clamp the blocks together, but not so tightly that they interfere with the blade movement.

the bottom hole of the box, making sure it is snug in the hole and doesn't fall out when turned upside-down. Place the lid over the dowel and make a mark 3/4" above the lid (Fig. 7). Cut the dowel at this mark.

Check to make sure the knob will sit down over the dowel and flush to the lid. Adjust the length of the dowel as needed. Lift the lid off, leaving the dowel in place. With a small brush,

apply glue to the inside of the hole in the lid. Slide the lid back over the dowel. Apply glue to the protruding dowel section, inside the knob, and the base of the knob. Slide the knob onto the dowel. Allow the assembled box to sit overnight to ensure it is securely glued into place.

I used sandpaper to soften the sharp edges around the lid and the box bottom just a bit. Sand the entire box with 220- then 400-grit sandpaper.



7. Mark the dowel $\frac{3}{4}$ " above the lid before trimming to size.

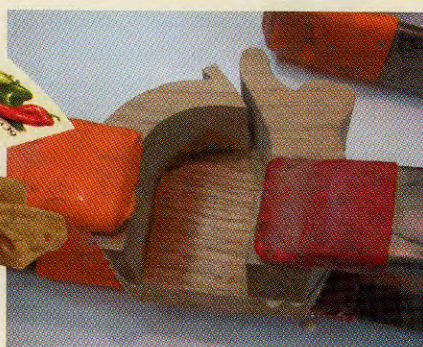
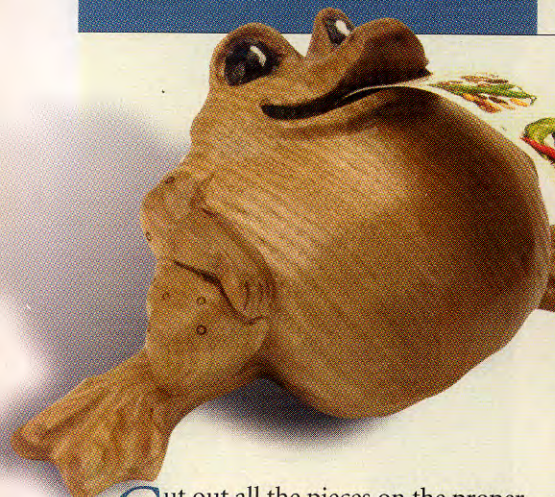
Wipe off the dust with a damp cloth or tack cloth. Apply a wood sealer if desired, then sand again and wipe the dust off once again. Apply several coats of a clear finish of choice, sanding between coats with the 400-grit sandpaper. I've used Krylon Crystal Clear finish.

—Diana Thompson is a pattern designer and woodworker from Theodore, Ala., who has written several books on scroll sawing.

Leapin' Letters

by John Garton & Joe Adkins

Ribbit! John and Joe use power carving tools to make this funny frog, but you can carve it by hand if you'd rather.



1. When gluing the center to the first side, make sure to leave open the mouth/stamp slot.



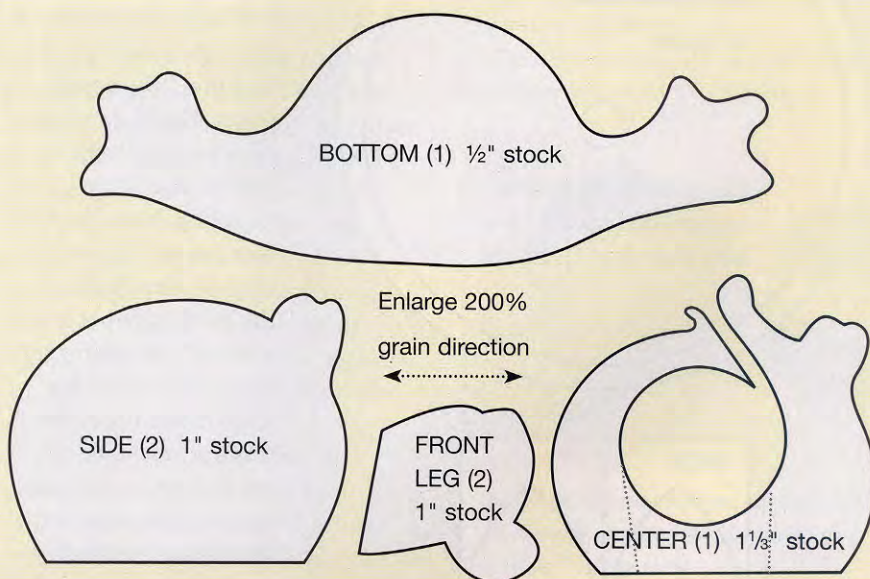
2. Double-check that the frog's legs are facing the proper direction. It's easy to get them on backwards.

Cut out all the pieces on the proper stock thickness using the patterns. Make sure the grain is going in the right direction.

Sand the inside circle smooth, then cut out the bottom section of the center piece in the dotted lines.

Glue these two pieces to one side piece (**Fig. 1**). Remove excess glue after clamping. Once glue dries, glue the second side piece on to form the cavity for the stamp roll. Allow the whole assembly to dry, then glue front leg pieces on both sides (**Fig. 2**). Make sure these pieces are located as far back as they can go on side pieces and they are glued facing the proper direction.

After the glue has dried, sand flat the bottom part of the top piece. This will make for a tight joint. The pivot



Leapin' Letters continued

point and hinge for the frog is a 1" x 16 galvanized nail with a flat head, but don't connect the two pieces yet. The pressure applied to the joint and nail while carving can cause it to loosen. So do this later after some initial carving and sanding.

Mark guidelines on the blank, and with a rough-cutting rotary tool remove wood from areas of eye, nose, mouth, front legs and back legs. Round over throat and belly, beginning to form a ball. Mark where the top portion of frog meets the bottom and carve the flippers on the rear legs. You can use a ball bit to remove wood between toes, leaving a ridge for toes and a web between them.

Mark a line to be undercut from below the mouth's lower jaw back around head, over shoulders and down the back. This will distinguish the head from the rest of the body. Cut the eyes with an outward slant so frog isn't looking straight ahead.

The frog looks better with bulging eyes. Make an inverted U-shaped mark on the eyes, and cut away enough wood from around the U that it stands out from the rest of the eye. Round the



U over to form a bulging eye inside a socket.

Extend the mouth to the sides with a slight upturn at the end.

Your frog is a brave little fellow, so give him a backbone. Carve an elongated V, starting at the base of the eyes and meeting at the tail. Then extend the jawline (previously mentioned) back and down following alongside the V. This will give you three ridges and plenty of backbone to face rising stamp prices. Undercut the front legs from the knees and cut three fingers into the hand. Add nostrils and dimples to the face.

Give the carving a good sanding.

To attach the bottom to the top, find the center on the backside of the bottom piece and measure about 1/4" in from the back edge. With a small drill, make a hole just large enough for the nail. Make the nail fit tightly.

Turn the piece so you're working with the underside of the bottom piece. Countersink another hole halfway down the previously made hole. Make this hole just large enough for the nail head.

—John Garton and Joe Adkins are self-taught woodcarvers living in Petersburg, W.Va. See more of their work at gartonoriginals.com.



Carving profiles pictured at 50% of final size.



Lettuce Hold Your Stamps

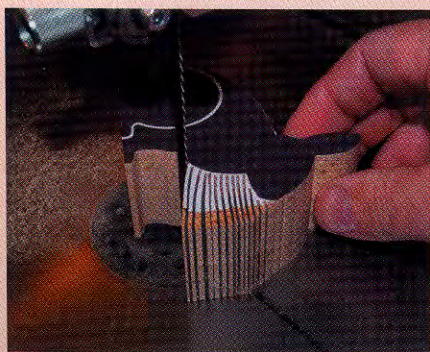
by John English

A simple bunny silhouette and brass screws that double as eyes and a pivot point make this a perfect project to make with a kid.



The idea for this box came from my youngest son, who suggested the image of a bunny nibbling away at a string of stamps. Being an obedient parent, I found a photograph of a rabbit, played with it on the computer and created the silhouette pattern. The concept is a simple bandsaw box, which is in essence a block of wood that is sawn apart and then re-glued.

I began construction by face gluing a couple of pieces of $\frac{3}{4}$ " thick hardwood to create a blank that is $1\frac{1}{2}$ " thick. It should be large enough to attach a photocopy of the pattern to one face,



1. Feather the edges with numerous short cuts so the blade doesn't bind in tight corners.



2. The body of the rabbit can be cut wide or narrow to accommodate stamps or address labels.



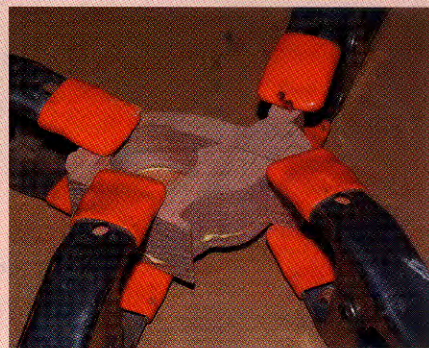
3. Center the hole on the circle that denotes the rabbit's hind leg.

using a spray craft adhesive.

Next, I sawed the box to shape (Fig. 1). Then I reached for the bandsaw fence to remove both faces (Fig. 2),

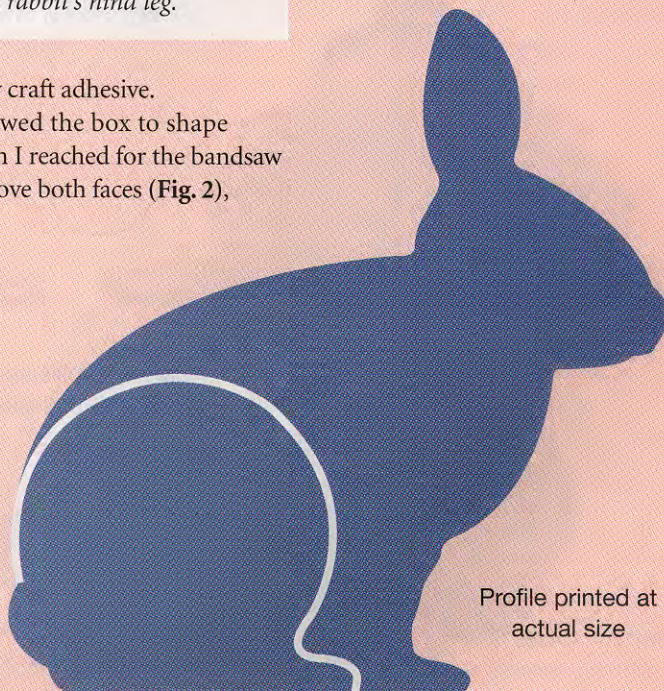
leaving a body that is a minimum of 1" thick.

I drilled a hole through the body for the roll of stamps, using a 35mm



4. Glue only one face to the main body of the rabbit.

Forstner bit (Fig. 3). This is the same bit used for European cabinet hinges, and the hole is centered on the circle that denotes the rabbit's hind leg. Then it was back to the bandsaw to cut the rabbit's gullet, a continuous line from

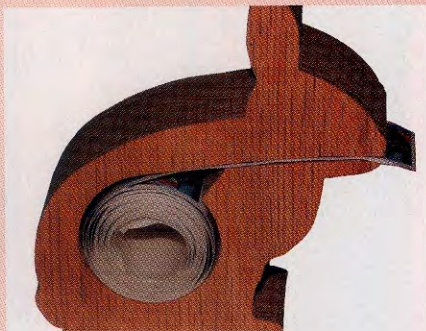


Profile printed at actual size

Lettuce Hold Your Stamps continued

the mouth to the stomach, through which the stamps will travel. This should be kept as straight as possible to avoid snags. I also created a small funnel where the stamps leave the stomach, just to avert potential hang-ups.

After gluing one face to the body



5. Make sure the stamps will feed through the slot freely before attaching the second side piece.

(Fig. 4), I checked how the stamps fed (Fig. 5). It's better to fix or rebuild around a problem now, than after the project is complete.

Following a thorough sanding, I predrilled for two $\frac{5}{8}$ " brass dome screws for the eyes. The bit was about two-thirds the diameter of the screw. Then I re-drilled the hole in the door eye, making it large enough for the screw to pass through, applied a couple of coats of spray lacquer, and installed the screws when the finish was dry. The rabbit's right side is a door through which he can be reloaded with a new roll of stamps.

—John English has written or co-authored four woodworking and how-to books, and publishes Woodezine, an online woodworking magazine.

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MISSION-STYLE FRAMES MINUS THE MITERS

BY RALPH BAGNALL

Only your imagination will limit the picture frame variations you can make with this useful project - made easier with a special jig.

My wife recently came home with an interesting mission-style picture frame she wanted me to reproduce for her. It consisted of twin rails using half lap joints in the corners rather than miters. This lent a substantial but graceful look with just a small amount of stock.

Looking it over, I saw that with a few modifications, it would make a fun and useful weekend project.

The store-bought frame uses two different sets of parts. Simple square pieces form the outer rails, and a different set milled to include the rabbet for the artwork make up the inner rails. By milling the rabbet after assembly, both sets of rails can be made exactly the same way.

Now typically, I would form the half

laps by milling a wider piece of stock, cut the dadoes, then rip the stock down to create the square pieces. For this project, I decided to build a simple jig to cut the half laps after the stock was ripped. Here's why. First, I wanted to use offcuts and other scraps I already had. Second, I was planning on making a number of frames of different sizes. Each frame requires sides and ends, so the measuring and marking for the half laps was looking like a long haul.

The jig cuts the half laps oriented from the ends of the stock. One setup is all you need to cut all the parts, even if you are making different-sized frames at the same time.

In fact, altering the lengths of the individual parts is the only adjustment needed to make frames of varying sizes.

Stock preparation

The double frame allows for using smallish off-rips, but as always, stock preparation is the key to success. The stock must be square, straight and true, with no knots or blemishes. Any warp or twist after assembly will stick out like a sore thumb.

Begin by resawing the scraps to $\frac{3}{4}$ " x $\frac{3}{4}$ ". This gives plenty of room for





jointing and planing the stock to true it up. Plane them down to $\frac{1}{2}$ " thick and $\frac{5}{8}$ " wide. The frame members will ultimately finish at $\frac{1}{2}$ " square, but I learned a long time ago to cut my half laps first, then plane and/or sand the parts to fit. This is far easier than milling all the stock then trying to set up your dado stack to the exact width of your carefully milled parts.

Cutting to length

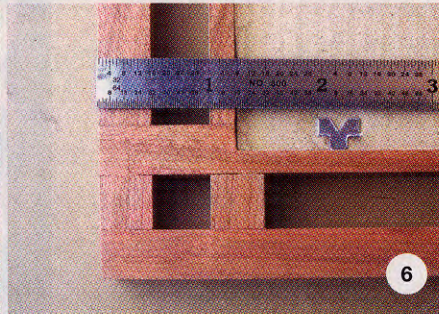
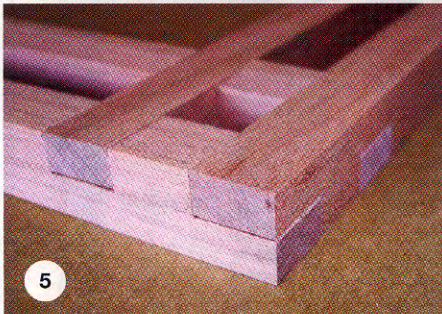
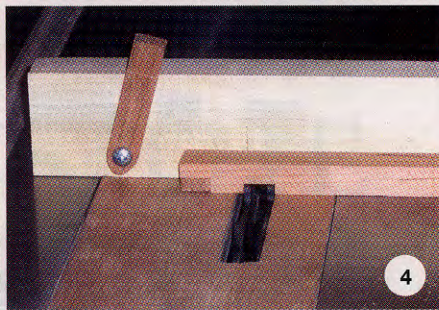
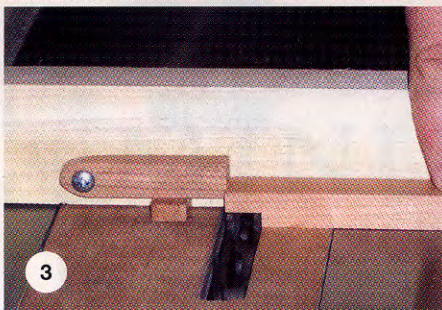
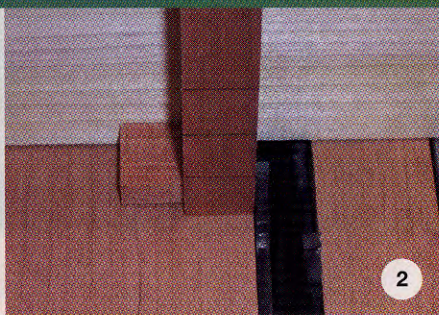
With all your stock at $\frac{1}{2}$ " by $\frac{5}{8}$ " it is time to crosscut the pieces to length. Determining the lengths is simple: All you need to know is the overall size of the picture being framed, including any borders or mats, then add $2\frac{1}{2}$ ". For example, an 8" x 10" photo in a standard 11" x 14" mat needs a frame $13\frac{1}{2}$ " x $16\frac{1}{2}$ ". So for this frame, crosscut four pieces at $13\frac{1}{2}$ " and four at $16\frac{1}{2}$ ". Couldn't be simpler.

With all the parts sized and cut to length, it's time to mill the half laps. But first, we'll build a jig.

Building the jig

The half lap jig is really a modified box joint jig. Set up a stacked dado for a $\frac{1}{2}$ "-wide cut at a depth of about $\frac{1}{4}$ ". Test the depth with a leftover piece of your prepared stock. Cut one end, then turn the cut upward and cut again. The two should just meet in the middle, but not overlap (**Fig. 1**).

With the depth set, clamp a straight piece of hardwood to the miter gauge as



a backer and make one pass through it. Unclamp the backer, and fit a small block into the groove to act as an index key. With the key in place, align the backer so that the key is $\frac{1}{2}$ " to the side of the dado stack. I used the $\frac{1}{2}$ " side of the stock itself to set the spacing (**Fig. 2**).

Securely clamp or screw the backer to the miter gauge. It must not move. Two dados are needed on each end of the parts. The key sets the inner cut, but for the end cut, I added a flip stop. It is simply a small block with a hole drilled in one end for a pivot screwed onto the backer so that the end opposite the pivot is exactly aligned with the edge of the dado stack.

Cutting the half laps

Now it's simply a matter of cutting all the half laps. Flip the stop down, slide the part over until it meets the stop

and cut (**Fig. 3**). Flip the stop out of the way, slide the part over until the open half lap you just cut is resting over the key and cut again (**Fig. 4**). This process is done to both ends of each part.

Again, because the jig indexes the cut from the ends, all the parts, even from different frames, can be cut in the same setup.

With all the half laps cut, it is time to size the width of the parts to fit. I used my benchtop planer, taking very shallow cuts. Here, it is very important to make sure that your planer is set up properly to avoid snipping the ends of the parts. I always test with my leftover material at each new depth setting before planing my good stock.

If you own a drum sander, you can make the last few passes there, but careful attention with a properly set planer will give you a good fit.

The fit should be snug when the parts are slid together, but you should not need to force them. One note: hand sanding to fit is risky, because it is very difficult to achieve uniform results across the part.

Assembly

Assembling the frames is quite easy. I applied a thin layer of glue to each half lap using a small brush. Squeeze-out in and around all those meeting edges is a pain to clean up, so apply the glue sparingly. Another potential problem is that too much glue in a good snug joint has no way to squeeze out either, so it can hold the joints open.

Clamping can be as simple as using spring clamps, but I prefer using parallel wooden clamps. There are four points of contact in each corner (**Fig. 5**), and the wide wooden jaws span them all nicely.

Milling the rabbet

Once the glue has cured, make sure the overlapping pieces are all flush. I made seven frames at the same time, and for some reason one of them needed a bit of touchup. A sharp block plane makes short work of cleaning up the edges.

The rabbet that will accept the artwork and glass is $\frac{1}{4}$ " x $\frac{1}{4}$ " (**Fig. 6**). If you plan to use a double mat, you may want to increase the depth to $\frac{15}{16}$ ".

I used a rabbet bit in the router table. To minimize chipping, you may want to use a larger bearing first to make a shallow cut, then re-cut with the proper size bearing. You can also set the bit shallow and raise it to final height.

Square up the corners of the rabbet with a chisel (**Fig. 7**). Be sure that the frame is solidly supported underneath; otherwise you risk splitting the parts.

Final steps

The simplest method of hanging these frames is a pair of small eye hooks and picture wire. I prefer the frame to hang flat to the wall, so I milled in hook slots using a keyhole bit (**Fig. 8 w/inset**).

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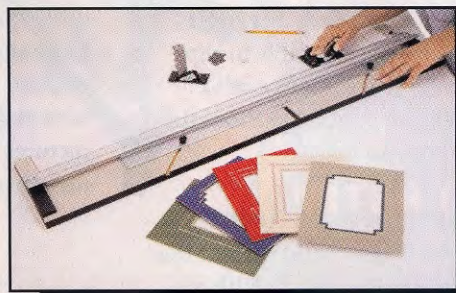
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I marked the center of one end and one side with low tack tape, then again on the router table, I carefully guided the bit into the outer rail then backed it out. Take care not to hit the inner rail when backing out of the cut.

I tried a couple of different finishes for these frames, including spray shellac in a can, danish oil, water-based poly sprayed from my HVLP system, and spray paint. All gave good results. The narrow surfaces don't tend to show flaws easily.

The easy way to add the glass to the frame is to have a local glass shop cut your glass to size. Since the rabbet is fairly shallow, you'll need 1/8"-thick glass.

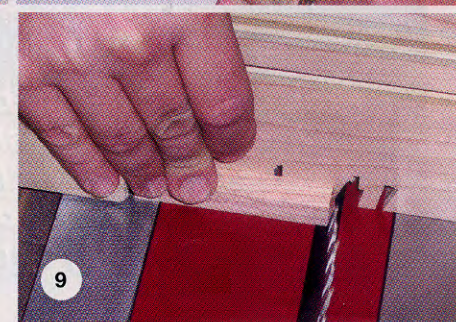
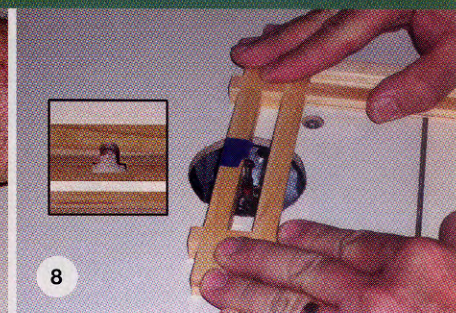
In my house, with kids and pets, we prefer using 1/8" acrylic. Many home centers carry standard picture sizes precut. Many will also cut pieces to size for you.

Cutting your own is quite easy too. To minimize chipping, use a clean, sharp 60-tooth blade. Triple chip grind is best, but alternating top bevel works very well too. Use a zero-clearance insert for proper support. Cut the plastic to the same size as your mat.

Cutting thin materials like this requires a few safety notes. Use the blade guard. The thin plastic will want to ride up the front of the blade and the guard helps hold it down to the table. Keeping the blade a bit higher than normal minimizes this effect. Thin stock may also be able to slip under the rip fence. A piece of 1/4" ply can help keep the edge above the bottom of the rip fence.

Variations on a theme

One of the interesting benefits of this project was experimenting with the

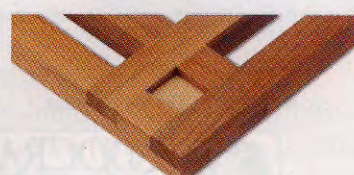
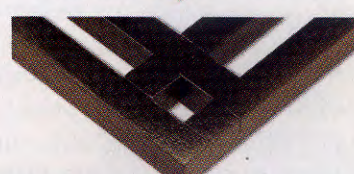
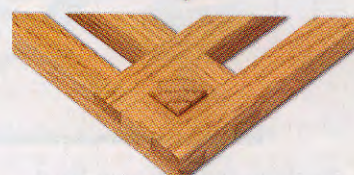
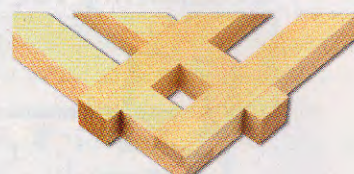
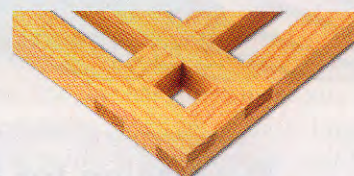


frame styles. Different finishes and details, and even making new parts, allowed me to play with all sorts of different looks.

Giving the frame a gloss black finish creates an Asian look, or the oak frame can be further distinguished as mission style by adding pyramid pegs to the corner holes. The cherry frame can be accented with maple blocks set low into the corner holes. Make them with a table saw, a simple stop system, equal lengths of stock, and (for pyramid pegs) the saw blade set at the desired angle (Fig. 9). I added a bit of extra length to the inner rails of the maple frame to get a more contemporary look.

Once you get familiar with making the basic frames, try figuring out different changes and designs. Have fun with it! They may not all turn out well, but you'll learn a lot about design elements.

This turned into a fun and useful project. I hate making frames generally, but my new technique enabled me to make the frames shown here in a weekend. I have many more pictures to frame, but I don't dread the task anymore.

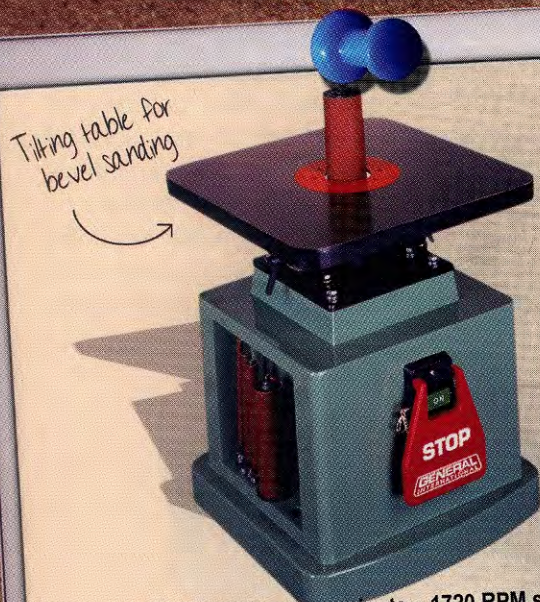


Ralph Bagnall

A professional woodworker for 20 years, Ralph Bagnall builds reproduction furniture in his home shop, and has been teaching and writing for the past several years.



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Portable Writing Desk

Chad Boehlke, North Platte, Neb.
Patterned after a Georgian-style 1800s original, this 24½" x 16" x 5" desk features a mahogany box and inlaid sides of walnut and eucalyptus. To prevent warping, Boehlke used ¼" birch plywood for the writing surface.

Liquor Cabinet

Craig Thibodeau, San Diego, Calif.
Curly maple, quartersawn maple and Honduran mahogany are combined in this 29" x 34" x 16" liquor cabinet that features an adjustable shelf for glassware above the liquor and an upper drawer for bar tools. The outside finish is water-based lacquer; inside is shellac. The piece won two first-place awards in the 2005 Design in Wood Show.



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Coral Bowl

Ed Kelle, Long Island, N.Y.

Kelle crafted this 7"-diameter, 3½" tall bowl from spalted maple, turning it approximately ⅝" thick, finishing the inside with lacquer and then buffing it. He shaped the outside on a sander, used a Dremel tool for extensive texturing, and applied color with thin washes of oil paint. A rounded bottom design gives some motion to the piece.



Mission Sideboard

Bob Gasperetti, Mount Tabor, Vt.

Gasperetti's Arts & Crafts-style cherry sideboard also works as an entertainment center or credenza. Features include two drawers, two interior shelves, frame-and-panel-construction, and a hand rubbed oil finish. It was part of the Guild of Vermont Furniture Makers' entry in the 2006 Vermont Fine Furniture and Woodworking Festival.

"Ethereal Earth"

Brian McEvoy, Edmonton, Alberta

McEvoy's Alaskan yellow cedar Earth sculpture is 20" high, 6" in diameter and ⅝" thick, with countries carved and handpainted to scale. The oceans are pierced for a fragile look; to highlight the oceans, the inside of the sphere is airbrushed with iridescent paints. Finish is acrylic ink and lacquer.



Angle Clamping Jig

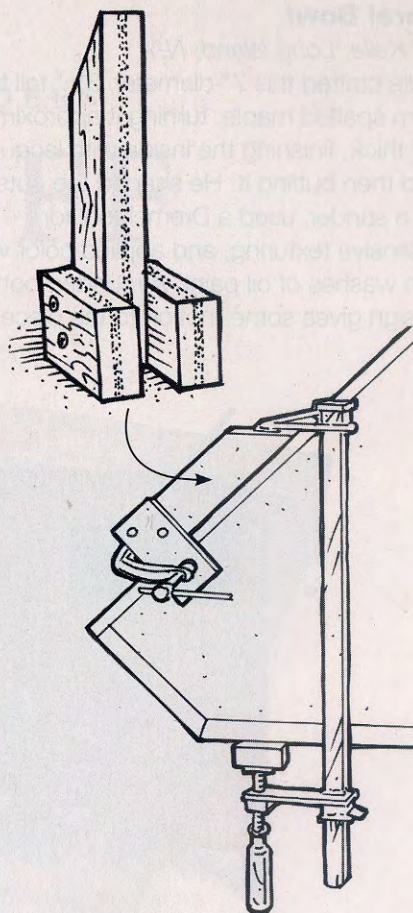
AS I WAS MAKING A CORNER

CABINET out of birch plywood with cherry facings and five-sided shelves, I encountered a problem. My design called for gluing cherry facing strips to the front edges, which I would then shape. However, the long front edge of the shelf had no opposing parallel edge to use for clamping. I developed this jig so I could clamp the facings to the front edge of the plywood.

I made the three-part jig (tongue and two cheeks) from scrap plywood. The tongue is about 7" long and 1½" to 1¾" wide and should be made from the same thickness of plywood as the workpiece to which you will be clamping the facing. Cut the tongue to give a 45° end. The final length should be about twice as long as that of the cheeks, so that a bar clamp and a C-clamp do not interfere with each other. Make the two cheek pieces from scrap the same width as the tongue and about twice as long as the width (3-3½"). Screw and/or glue the cheeks to the tongue with a mitered edge facing away (sort of like a miter saw gone awry) to form a cradle.

To use the jigs, slide one onto the workpiece and move it up or down the long edge until the mitered edge is directly opposite the desired clamp point. Use a C-clamp to clamp the cradle tightly to the workpiece. A long bar clamp will then span the two parallel clamping surfaces. I used one of the jigs near the back corner and positioned two down the length, giving three points for clamping.

—Willard Anderson, Chapel Hill, N.C.



Perfect Circles

WHENEVER I HAVE A PROJECT that calls for a number of arced cuts on either a bandsaw or scroll saw, I use a circle template to match up any circular cuts. Then I use the appropriate size Forstner bit to make that arc. This process avoids the need for sanding, improves accuracy and gives a more aesthetically pleasing appearance.

It's wonderful for something like a Chippendale mirror that has many small arcs.

—Kevin Martin, Cincinnati

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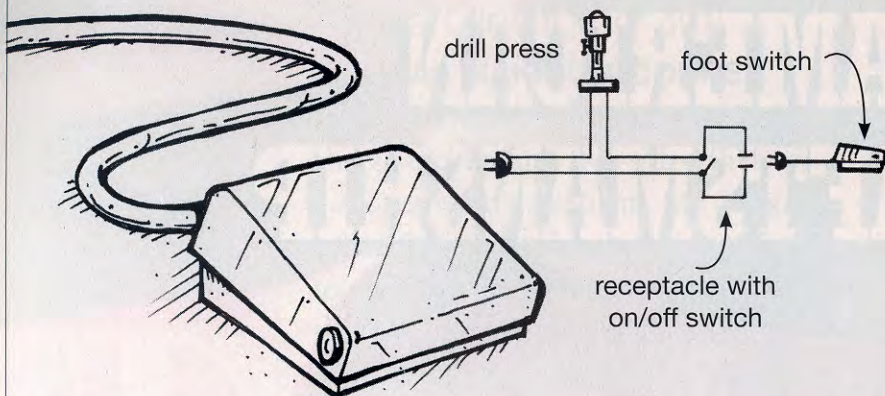
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Drill Press Step Switch

I READ WITH INTEREST Abe Litman's solution to insuring removal of the drill press key in the July 2006 issue and decided to share a solution I have used for some time.

I have a switch on the side of the drill press cabinet that turns the motor on and off. With the switch off, I plug in a step switch in the outlet under the switch which allows me to turn the motor on or off by stepping on it. It works very well when using large drill bits.

I hope this is helpful to other readers.

—Robert H. Hays, Chicago

Computer-Magnet Featherboard Holder

I FOUND A SIMPLE SOLUTION TO THE PROBLEM OF CLAMPING A FEATHERBOARD TO MY TABLE SAW in an unlikely place – inside a malfunctioning computer. When I disposed of the computer, I first removed the hard drive for security purposes. Inside the hard drive container I found two extremely powerful magnets.

After making all the necessary cuts to the featherboard, I cut out the profile of the magnets using a $\frac{3}{8}$ " Forstner bit deep enough so the magnet was flush with the featherboard. The magnets hold the featherboard with more force and less clutter than a number of clamps.

—Jerald E. Larson, Irmo, S.C.

Yardstick Compass for Tabletops

MY EXPERIENCE WITH BUILDING FURNITURE ITEMS that require round tabletops yielded an idea that enables me to easily make tops of various sizes.

Take a wood yardstick and drill a nail hole at the 1" mark, making sure it is located in the center of the rule. Then, if you prefer a 6" radius, drill a larger hole (to accommodate a pencil) at the 7" mark, again centering the hole on the ruler. Next you can tap the nail into the center of your board blank (preferably into the underside of what will be the top) and push the pencil to form the 12" circle.

You can use the same ruler for any radius up to 34". If you have too many holes in the ruler or if they are too close together, simply use a new ruler. They are available at most home supply centers for just pennies. The only trick is to make sure the pencil fits tightly in the hole and is held straight when making the circle. After that, it is a simple matter of bandsawing the blank and sanding down to the pencil mark for a perfect edge.

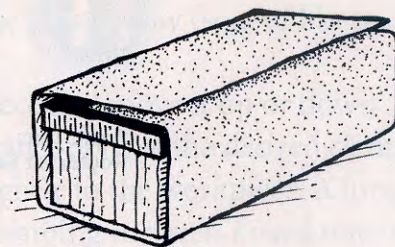
—Jim Wolff, Berlin, Wis.

We would like to congratulate Willard Anderson for sending in our favorite tip of the issue, his angle clamping and set up. For submitting the best tip, he'll receive a \$100 Woodcraft gift certificate.

Woodcraft Magazine pays \$100 for every submission used in Tips & Tricks. The submitter of the best tip of the issue also receives a \$100 Woodcraft gift certificate. If needed, your tip should include a photo or drawing to help explain your idea. Your artwork doesn't have to be perfect; we'll have our illustrators redo all drawings. Send your tips, tricks and jig ideas, along with your contact info, to:

Tips & Tricks
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Editor@WoodcraftMagazine.com



Blackboard Eraser Sanding Block

SANDING BLOCKS CAN BE JUST PLAIN BLOCKS OF WOOD, blocks

padded with cork, felt or whatever. I have used all of the above but I have found that a blackboard eraser with sandpaper wrapped around it works the best for fine sanding and sanding before recoating.

—Alex K. Nadler, Swansea, Ill.



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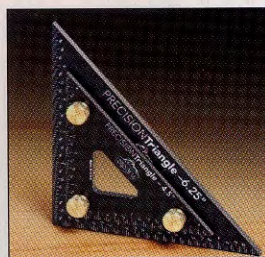
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{ meet Thomas Lie-Nielsen }

A TOOLMAKER'S VISION

BY KERRY PIERCE

Thomas Lie-Nielsen has pursued his passion for manufacturing high quality hand tools for the past 25 years, building a well respected tool brand and a successful business.



Thomas Lie-Nielsen will likely be remembered as a visionary in the world of toolmaking. For the past quarter century the founder, president and head tool designer of Lie-Nielsen Toolworks has successfully proven that high quality hand tools can be manufactured. Likewise he and his employees continue to meet the challenges of growth while consistently producing some of the most highly respected tools in the woodworking field.

What is it like to have your name on the front of the building and every tool and every piece of packaging around every tool? As the company founder who still conceives every product the company offers, whose presence is felt everywhere in the manufacturing plant and the company's small office area, Thomas Lie-Nielsen has to be "on" all the time, fully involved whether greeting

a customer or a company employee or a magazine writer. He meets that challenge with a remarkably consistent personality: patient, personable, articulate, and profoundly knowledgeable about the toolmaking world.

Tom's office is large, cluttered and unfinished. Like the Lie-Nielsen Toolworks itself, it is a work in progress. The floor is awash with boxes of parts, books, and tools. One such box is a wooden crate filled with perhaps a dozen very dusty LN #9s in a style he no longer makes, a style distinguished by bronze bodies and wood stuffing. It is the same plane recently auctioned on the Internet for considerably more than its original purchase price. The crateful now in Tom's office had been in storage for several years, and the contents are waiting to be cleaned up and sold to

buyers on a waiting list.

His desk is not what you expect to find in the office of one of the leading figures in American craftwork. A panel of laminated hardwood has been thrown casually across three two-drawer OfficeMax-style filing cabinets with a kneehole space between two of the cabinets.

Scattered across the desk top are stacks of paperwork, a phone, a laptop, and of course, tools. One looks like the Stanley #71 router but with a heavier post and without the strange little collar the Stanley Company used to hold the tool's irons in place. It is – I later learn – a prototype of the LN #71, a tool Tom hopes to bring onto the market sometime in the next few months. Also on the desk are prototypes for an LN #271 (a smaller router) and a small shoulder plane with an adjuster.



it right now, and they want it perfect. That's a very hard thing to achieve immediately, right out of the gate.

"I've tried to do things slowly and methodically and deliberately."

Tom Lie-Nielsen has succeeded in a field which has consumed some of his competitors. The recent demise of the Shepherd Tool Company, despite the quality of their concept, points to the difficulty of succeeding as a maker of high-quality hand tools. It is, Tom explains, a lot like furniture making, a "very hard way to make a living". How has he done it?

"A single-minded obsession for 25 years," he answers with a grin. "And when I started, I had a lot of time, and I didn't have any financial commitments – no children, no mortgage – so I was able to spend a lot of time learning how to make things.

"Plus I didn't have the Internet. (Without it) I was able to pursue what I wanted to do in obscurity. Slowly, as I felt more and more capable, I exposed myself to a bigger market. In those days, when you brought out a new tool, it wasn't like everybody in the world knew like that." He snaps his fingers. "Slowly people would find out about it in catalogs and magazines. Today the exposure a toolmaker has is both a blessing and a curse. If you're in business, and you're on the Internet and people order something, they want

Building a tool brand

At the same time he was building his product line – which began with a single tool, a variation of the Stanley #95 – Tom Lie-Nielsen was also building his business skills. He realized early on that it wasn't enough simply to manufacture tools. He must also manufacture them in a way that ensured consistent quality, and he must develop mechanisms for maintaining customer satisfaction after the tools were in the hands of those customers. Plus, he has made an effort throughout his career to restrain the natural impulse to add to his catalog too many new products too quickly, an impulse he believes may have contributed to the struggles of some other contemporary toolmakers.

The #95 was followed by a skew block plane and a ½" infill shoulder plane offered as a kit. He then turned his attention to the Lie-Nielsen version of the Stanley #1, a tool prized by collectors because of its rarity. Although it wasn't his original intention to produce Lie-Nielsen versions of the entire Stanley numbered sequence of bench planes, at some point after the appearance of the

#1, Tom realized he had solved many of the technological problems in bench plane manufacture and that expanding his line to include the whole Stanley #1-#8 sequence would be a natural extension of work he had already done.

Each of the Lie-Nielsen bench planes is based on the Bed Rock line of Stanley planes, the style widely considered to be the best of the antique bench planes offered by the Stanley Company. The Bed Rock line offered the ease of adjustment Bailey-style users had previously enjoyed. Plus it added a larger area of machined metal at the frog/plane body interface, making irons bedded in a Bed Rock more stable than those bedded in the other bench planes Stanley offered. These classic Bed Rocks are the tools of choice for both modern users and collectors of Stanley antique planes. To the many functional virtues of the classic Stanley Bed Rock, Tom added improved metallurgy in the plane's five castings, thicker irons, higher machining tolerances (in particular flatness) and an improved breaker.

He also made an early and continuing commitment to aesthetics. Realizing that when a craftsman spends \$300-400 on a bench plane he wants more than efficient operation; he also wants something that appeals to the soul. As a result, Tom focuses considerable attention on his tools' aesthetics, on the way each one looks on the shelf and feels in the hand.

The Lie-Nielsen look

The Lie-Nielsen bench planes, for example, include the distinctive flat-topped sidewalls consumers have come to associate with the Bed Rock line. But unlike the rosewood knobs and totes on the original Bed Rocks, the Lie-Nielsen planes feature American cherry, and most of his bench planes have bodies cast from bronze, not the iron of the Stanley original. Also, every part of every Lie-Nielsen plane

"I've tried to do things slowly and methodically and deliberately."

— even the head of every screw — is buffed and polished to a soft inviting sheen. The result is a tool that evokes the classic Stanley Bed Rock while simultaneously asserting its identity as a product of the Lie-Nielsen Toolworks.

Owners of growing businesses inevitably experience periods when it is necessary to commit often borrowed financial resources in the hope that somewhere in the unseen future a planned expansion of space or manpower or product line will somehow work out.

The Lie-Nielsen Toolworks has experienced several such periods. "Right now," Tom explains, "is a case in point. We've grown a great deal in the last two years physically and in terms of numbers of employees. (They currently have 80.)"

Physical growth involved the recent construction of a large building on the company's site in Warren, Maine. This new building was essential in order to tame the chaos that had developed in the company's manufacturing areas in recent years — the inevitable result of trying to pack a #8-sized product line into a #4-sized manufacturing space. With the recent addition of saws and

chisels to the Lie-Nielsen catalog, there simply wasn't room for the company employees to work efficiently.

Unconventional solutions

The management of Lie-Nielsen Toolworks — in particular Tom Lie-Nielsen himself and his company Vice President Joe Butler — have looked for unconventional solutions to the problem of manufacturing high-quality tools at reasonable prices. For example, while you will find some high-tech (and expensive) tooling on the shop floor, particularly in the new chisel area, more often you will find either reconditioned antique machinery experiencing a second life or consumer-grade machinery employed unexpectedly in a manufacturing setting. In the bench plane area — for instance — machinist Louis Natale drills the holes in the bronze frogs for various LN bench planes on a row of Grizzly drill presses stabilized by a few 2x4s. The construction is distinctly — and refreshingly — old school. It's production work the way you would sketch it out on the back of an envelope over a cup of coffee.

This brand of unconventional thinking has been applied even to the task of adding shop space. Lie-Nielsen

Toolworks employees — borrowed from their work as toolmakers — erected the new manufacturing building in a kind of 21st-century barn raising. The interior work — the drywall, the wiring, the plumbing — was then done over a period of months by a small team of LN employees on long-term loan from their regular jobs.

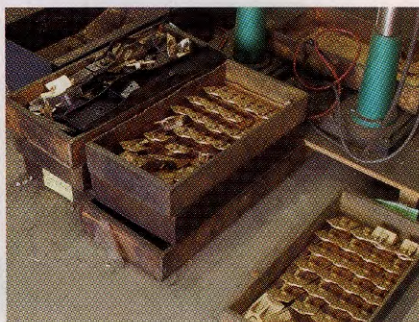
This unorthodox approach to tooling and the expansion of the physical plant was done in order to keep costs down. Plus, they don't have, in Tom's words, "a lot of managers running around."

Another decision — to adopt a Japanese operating style called "lean manufacturing" — has allowed the company to reduce materials inventory and consequently the need for expensive space to store that inventory. Instead of ordering — and then warehousing — large amounts of raw materials, they have standing orders at their suppliers for frequent deliveries of small batches of these materials.

The small-batch concept also extends to the way things happen on the shop floor. Instead of making 500 #7 jointers over a period of several weeks, the bench-plane group



Chris Gamage is one of three LN employees who produce scrub planes. Here, he's filing the mouth on a copy of the LN version of the Stanley 40 1/2.



These crates of bronze frogs for #4s rest near the base of a row of Grizzly drill presses Louis Natale uses to drill holes in the frogs.



Tammy O'Donnell packs and ships every product that goes out the door. Notice the racks of boxed planes on the shelves behind her and DVD stacks in the right foreground.



Employees at the Lie-Nielsen Toolworks manufacturing facility in Warren, Maine, produce some of the most respected hand tools in the woodworking field.



Lie-Nielsen employees, on loan from their respective jobs, recently constructed a new manufacturing facility to meet the demands of the growing tool business.



Jeffrey Hope (at left) does instructional videography at Lie-Nielsen Toolworks. Wolfgang Busse (at right) does photography and design for LN catalogs and advertising.

will complete a small batch on, for example, Monday, and then Tuesday switch to #8s and on Wednesday to something else. This means it isn't necessary to find storage space for large numbers of #7 frogs waiting for the next step in the manufacturing process.

Revenue gaps

Although unconventional operating methods can reduce a negative cash flow, by themselves these methods won't turn red ink black. When a business expands its product line, work force, or physical plant, there is an inevitable gap between funding these expansions and enjoying the revenue they generate.

For example, at the time of this interview, Tom was several months into the planning of three new products, the two routers and the new shoulder plane mentioned earlier. During the months the company's design team – consisting primarily of Tom and the pattern maker Mark Swanson – work on these new tools, their efforts generate no income. During the weeks in which new shop procedures are designed and put in place to make possible the manufacture of these new tools, employees involved generate no income. The same is true for those employees involved in crafting catalog and Web site entries for these new tools.

While the time spent developing three new products might have only a modest effect on the company's financial bottom line, the construction of a large new manufacturing facility – like the one LN employees recently erected – has a much more consequential effect. Because your name is on the front of the building and on every tool that goes out the door that effect is not just an abstraction on the company's balance sheets, it's also a powerful force in your emotional life. How does Tom handle those periods when his business seems to be hemorrhaging cash through every door?

"That's been one of the hardest things," he says. "I've got a commitment to my employees (he's never laid anyone off) and their families, who are relying on me

– not to mention my own family. It's particularly scary in the context of the outside world. When the first Gulf War happened, the phones just stopped ringing. The same thing happened on 9/11.

"Larger companies in the field can afford to make mistakes I can't afford to make. I'm not saying my competitors don't have sleepless nights, but this (Lie-Nielsen Toolworks) is a small business that has gotten big but in many ways remains a small business."

A respected brand

Although I imagine Thomas Lie-Nielsen to be a first-rate craftsman, when you step back to take an appreciative look at what he has created, the skillful manipulation of woodworking



A Tool Is Born - Creating tools to meet the needs of woodworkers

Tom is planning to introduce three new tools this fall: two routers and a shoulder plane. While the shoulder plane was pretty well in hand at the time of this interview, he was still working out some of the details for the two routers, in particular what irons he should include as part of the router packages. "Right now I'm working on how many configurations of blades we need to offer," he said. "Probably, there will be several – three or four different widths – some straight and some pointed."

The company does no formal polling in order to identify new products for manufacture. The choices are driven by Tom's own interests and by input from a group of trusted woodworking craftsmen.

He doesn't choose new products based on the expectation of big sales. "I'm interested in filling a woodworker's need. The router plane may be a fairly moderate seller, but I think it's a really important tool. And if people get used to the idea (of excavating with a hand router as opposed to a machine router) more people will want one."

"We make the butt mortise plane, and people ignore it. They don't really understand it, but it's a great tool. And if you can show somebody how to use it – and they have a need for it – it's wonderful. It's a tool that we make a few hundred of a year, but I'm glad we do."

Sometimes the unveiling of a new tool can be delayed by manufacturing problems. "In the case of the router, it's not really difficult, but in the cases of some other tools, we've had to work out new technologies to get something on the market."

A new tool begins as an idea, often loosely modeled on a classic Stanley. That idea is then converted to drawings which are then rendered as a model crafted by Mark Swanson.

The model is then studied, not only for functionality but also for aesthetic appeal. When Tom is satisfied with the wood model, the tool is then reproduced in plastic multiples, which are assembled, in groups of two to a dozen, into a match plate. The foundry then works from the match plate.

This reliance on physical models, rather than computer simulations, is important to Tom.

"Some new tools," he explains, "like a lot of other products, look like they were designed on a computer – because they were. I think it's much more human, and therefore more appealing to me, to have a tool that was designed to be comfortable to hold and aesthetically attractive and do its job well – all at the same time."



or metal-working tools is irrelevant. What Tom has crafted isn't an object, but a company, a brand known and respected by virtually everyone in the woodworking field.

For example, during a recent meeting with Woode Hannah in Louisville, Ky., the subject turned to tools, and Woode crossed the room, pulled open a drawer on his bench and revealed a small collection of Lie-Nielsen planes. At other locations and times Maine furniture maker Charlie Durfee gestured proudly at a small grouping of Lie-Nielsen planes on a shelf, and craftsman Charles Murray pulled open drawer after drawer of Lie-Nielsen bench planes, shoulder planes and block planes in Canal-Winchester, Ohio.

What's remarkable is not so much the quality of those tools – which is a given – it's the esteem with which Lie-

Nielsen Toolworks is regarded in the woodworking field by customers as well as competitors.

Larry Williams, one of the owner/operators of Clark and Williams, a Eureka Springs, Ark., company which makes high-quality wooden planes in the 19th-century manner, said of competitor Tom Lie-Nielsen: "Thomas is as solid and honest as his tools. Contemporary woodworkers and toolmakers are indebted to his leadership in building and improving a mature woodworking technology."

For 25 years, Tom Lie-Nielsen has been in the forefront of the toolmaking field. He was the first to demonstrate – for those of us working with wood in the closing decades of the 20th-century – that it was possible to manufacture hand tools built to a high standard. When other toolmakers were unable or unwilling to take the risks that would have moved them from their garage workshops into the dedicated facilities that permit the manufacture of tools in the numbers required by a national market, Tom took those risks.

Kerry Pierce

Pierce has been a professional furniture maker for more than twenty years. He is the author of 10 woodworking books – including the recently published "Authentic Shaker Furniture" – as well as dozens of magazine articles.



{ A GROUP REVIEW }

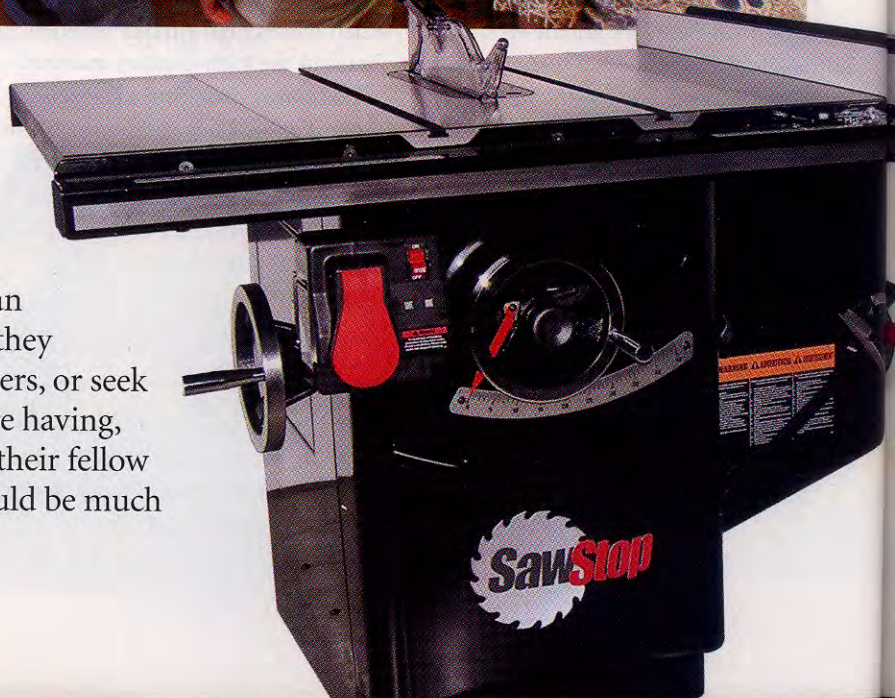
SAFETY FIRST

Some die-hard Texas woodworkers give their impressions of the safety-conscious SawStop Model 31230 10" cabinet saw.

BY JIM DERBY



IT'S USUALLY 10 TO 20 EXPERIENCED WOODWORKERS who meet every Monday night at Johnny Jones' home workshop in Boerne, Texas, a community in the beautiful Texas hill country 10 miles north of San Antonio. They bring samples of what they have been working on to show the others, or seek advice on a particular problem they are having, or just generally "shoot the bull" with their fellow woodworkers. This Monday, there would be much to talk about.



Yet another good reason to get together

The Hill Country Woodworkers Guild, also known as the "Monday Night Woodworkers," has been meeting for 10 years in Johnny's workshop. Members come from a radius of 100 miles, and attendance averages 18 men and women a week. At their meetings they have demonstrations, show DVDs on woodworking and turning, and work on projects. Of course, there is also a lot of discussion. If there are 18 members present, there will be at least 30 opinions on any subject!

The shop itself is large enough to accommodate the big group and well equipped with some very fine old three-phase equipment, a 16" jointer, an 18" planer, 20" bandsaw, a Oneway lathe, and a collection of more than 200 hand planes and antique tools that reflect Johnny's interest in the history of fine craftsmanship.

Projects of the group have ranged from making toys for Christmas to the completion of 16 Maloof-style rocking chairs. Members are active in a number of area groups, the Alamo Woodturners (San Antonio), the Hill Country Turners (Kerrville), and the Southwest Association of Turners. Some members of the group show their work at the annual Texas Furniture Makers Show at Kerr Arts & Cultural Center in Kerrville, and the Texas Mesquite Association Show.

Recently, Johnny asked me to visit the group. He said that Mike Sauder, owner of the five Woodcraft stores in Texas, was going to demonstrate a new 3hp SawStop table saw that Johnny was considering buying. The unique feature of the SawStop, he explained, is the brake that stops the blade instantly if a conductive material such as human flesh disrupts the low voltage, high frequency signal that is induced in the blade.

When I arrived at his shop on a hot August evening, Johnny was beaming. He had just decided to purchase the saw, and he and Mike had installed it that afternoon.

"What made you buy it?" I asked.

"I had heard about the safety aspect, but when I finally got to see it last week in operation, I saw how well it was built. I have had a Powermatic for about 15 years, which I felt was the finest saw on the market until I saw the SawStop. This is a little heavier; the trunion that holds the blade in place is 50% larger; the tabletop is machined flat, and I'm guessing that this saw weighs 150 lbs. more than the old saw," enthused Johnny.

Johnny, who lost half of the middle finger on his left hand seven years ago in a saw blade accident, went on: "Because I have so many people working in this shop, the liability factor came into play. This saw is truly amazing. In addition, the instruction manual is the most complete and clearly written and illustrated that I have ever seen."



"The SawStop has to be the most revolutionary tool to be added to a woodworking shop in our lifetime" —Mike Sauder



"Even if it didn't have the safety features, it is a top-quality saw." —Ron Wilde



"I not only bought one for myself, I bought one for my son." —Johnny Jones

SawStop Model 31230 Tech Specs

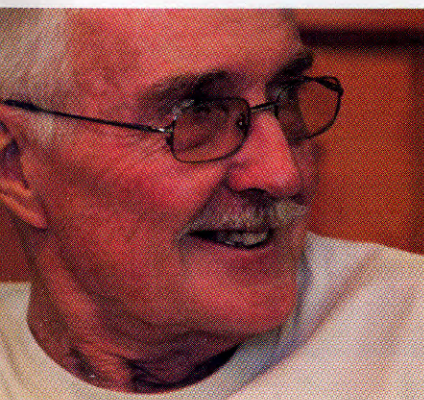
Overall saw dimensions	44"w x 34"d x 34"h	Riving knife/spreader thickness	2mm
w/optional fence and 36" rails	69¼"w x 36½"d x 34"h	Blade guard	polycarbonate
w/optional fence and 52" rails	85¼"w x 36½"d x 34"h	Blade tilt	left
Cabinet footprint	20"w x 25"d	Blade kerf	3mm
Weight (varies with motor)	530 lbs.	Motor (all 50-60Hz, TEFC)	3hp, 1 phase, 230V
w/optional fence, 36" rails and table	635 lbs.		5hp, 1 phase, 230V
w/optional fence, 52" rails and table	685 lbs.		5hp, 3 phase, 230V or 480V
shipping weight	640 lbs. (saw only)		7½hp, 3 phase, 230V or 480V



"The SawStop is both heavy duty and smooth. I stood a nickel on edge, started the saw, made a cut, and the coin didn't move." —Rusty Fennell



"As far as features, I couldn't come up with anything better." —Tom Ridout



"A very impressive piece of equipment. Quality construction, well-thought-out engineering, user friendly, plus the amazing safety blade stop. Every woodworker will appreciate all of its features." —David Thomas

The first impression

Mike and Johnny, who had done the heavy work of unpacking and setup, told me about their first impressions while other group members prodded, measured and peered at the table saw. Though very heavy, Mike said, "It is very well packed in a reinforced wooden crate."

Johnny was amazed that no initial adjustments were needed. "Everything fit," he said. "We didn't have to tweak anything."

"One wing came on the saw straight and level," Mike said. "The other went on without adjustment, as did the extension table."

Considerable safety

Mike then demonstrated the main safety aspect of the saw — its contact detection and braking system — by running a sheet of plywood and holding a hot dog, simulating a finger, across the cut. When the blade sensed Mike's body electrical resistance through the hot dog, the brake instantly stopped the blade and it retracted below the tabletop. Examining the hot dog, we could all see that it had received a slight nick that would have hardly needed a Band-Aid.

I asked Joe Ripkin, one of Johnny's neighbors who had just witnessed the test, for his reaction. "I was amazed that the blade stopped that quickly, and looking at that little nick on the hot dog was also amazing. I have a Powermatic and the premium you would pay for this machine is well worth it for safety," he said.

After the demonstration Mike removed the blade and the aluminum brake, and we could all see that the blade rotation had stopped almost instantly as only one tooth had popped off before the brake embedded itself into the blade.

The braking system, while obviously the most spectacular safety feature, is not the only one. The riving knife, curved down to closely match the profile of the blade, is a serious upgrade from the traditional splitter. Its design keeps it so close to the spinning blade that it seriously reduces the chances of the back teeth grabbing the workpiece and sending it flying back toward the operator. The knife is easy to attach and retracts with the blade, making it very easy to use.

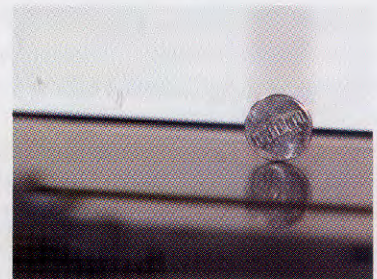
Other features

After the demonstration, we performed a number of tests. We checked the flatness of the tabletop with a straightedge and feeler gauge and determined that it was excellent. We checked the run-out on the blade (to see how parallel it was to the miter slots), and it checked out to be within .0005". With an accurate 90° square we determined that the miter slots were dead on with the blade.

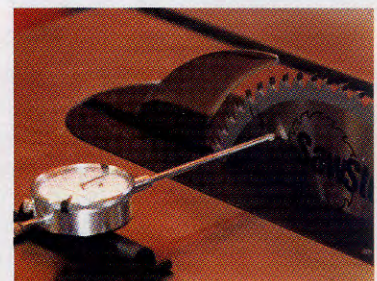
The tabletop of the 31230 is the most spacious of any similar one on the market



THE REVIEWERS LOOKED HARD for flatness and alignment discrepancies, but found none.



VIBRATION WAS MINIMAL TO NONEXISTENT, which allowed this nickel to stand undisturbed while the motor ran.



OUT OF THE BOX and without adjustment, the blade proved to be parallel to the miter.

and the optional extension table (which Johnny had sprung for) adds additional surface area of 40" x 30".

Someone wondered out loud whether a piece of wet wood could set off the braking system and force an unnecessary brake cartridge replacement to the tune of about 80 bucks.

Before cutting that wet wood, one can place the SawStop electronics into test mode, make a test cut on the wood and the saw will tell if it is OK to cut in safe mode or if you will need to place the saw in bypass mode. If the saw is placed in bypass mode and then turned off, when you restart the saw it will automatically reset itself back in safe mode. You can also test and cut some soft metals with the SawStop.

Mike told us that the saw's electronics are protected from day-to-day power fluctuations by an internal surge protector. To be safe and to guard against lightning strikes he suggested that the saw be unplugged or turned off at the breaker during periods of inactivity.

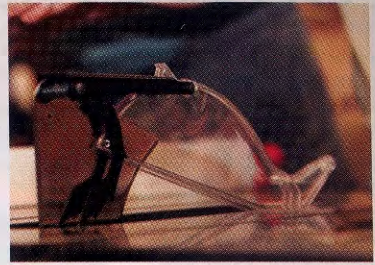
Conclusion

I asked Tom Ridout, who helped Johnny install the saw, what impressed him. Tom responded, "All of it! It's an incredible saw. It is much better built than what I have been using. Its smooth castings are flat. It is easy to set up. Everything went together perfectly."

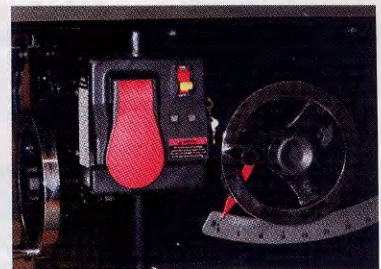
"Beyond the obvious and exceptional safety aspects of this saw, it is one of the best engineered and built power tools that I have seen," Rusty Fennell decided at the conclusion of our meeting. "I believe that its quality and accuracy will meet or exceed any 10" cabinet saw out there."

To date, over 4,000 saws have been sold, priced from \$2,799 to \$3,500 (depending on options), with 94 "finger saves" documented. For additional information and complete specifications, go to www.sawstop.com.

—Jim Derby is president of the Kerr Arts & Cultural Center, sponsor of the Texas Furniture Makers Show in Kerrville. For information go to www.kackkerrville.com.



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SACRIFICING ITSELF AND THE BLADE, the cartridge eliminates the danger in about 1/200 of a second. Blade momentum is used to retract the blade below the table, and the power to the motor is shut off. The cartridge mechanism (available for standard or dado blades) is a single-use component that costs about \$80 and must be changed after activation. Replacement is no more complicated than changing the blade.

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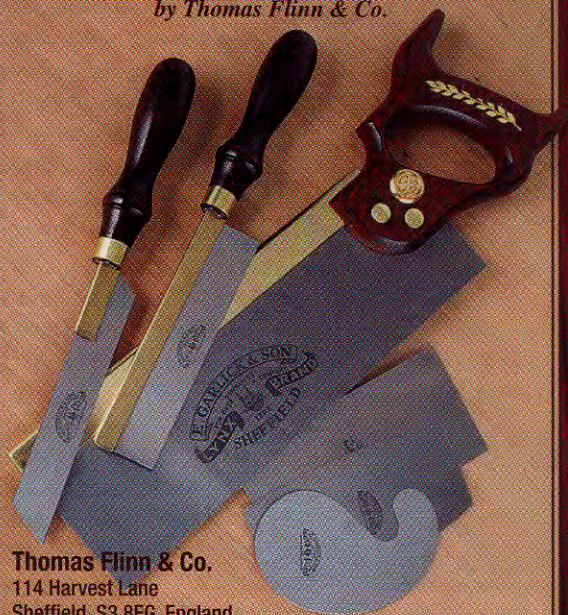
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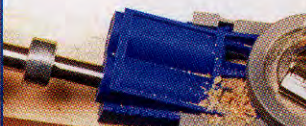
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SPINNING WHEELS

BY TIM RINEHART



NOW THAT THE JET SLOW SPEED WET SHARPENER has been on the market for a while, I guess this isn't a new tool review. Then again, you might say this never was a new tool at all.

Unless you live under a woodworking rock, you have heard this sharpener called a knockoff, an imitator or a price-point answer to a good-but-expensive machine.

There is no hiding the fact that it looks a great deal like the Tormek, works similarly, and has similar jigs. This puts me in a bit of an awkward position. I have been around the woodworking industry for a long time. I own a Tormek and know and respect the inventor and his representatives. I also have reviewed a lot of Jet equipment in the past and own several Jet machines. I'll try to be as objective as possible and let the chips

fall where they may.

The "new-tool question" is not unique to this sharpener. Look around your shop: table saws, bandsaws, almost every major woodworking machine is similar in design, distinguished only by features. Why?

Sometime in the past, someone came up with a great design that worked better than the competition and was economically feasible to manufacture. Even if the design was protected, eventually that protection expired and similar machines came to market. Some were better, some worse; but any good design eventually gets copied. It is not only machinery, it's your computer and its software, your microwave – that seems to be the natural evolution of an invention.

OK, I'm off my soapbox now and on to making tools sharp.

Accessories and Instructions

The package from Jet which I tested came with the standard accessories: support arm, stone grader, straight edge jig, honing compound, existing angle measuring device, angle measuring device and instructional DVD. The kit package also contained a machine cover and two-drawer base.

After watching the DVD, setup (which is really only mounting the pre-trued grinding wheel and prepping the leather-covered honing wheel) took only minutes. The DVD features Ernie Conover, one of the best instructors in woodworking. Ernie covers all phases of the sharpener, including setup and use of the optional jigs.

Watching the DVD with Ernie's concise and easy instructions will quickly have you using your sharpener. But the old guy in me still wants a printed manual. I don't have a DVD player in my shop. Six months from now when I pull out a jig I haven't used since I first played with the machine, I don't want to have to go to the house and watch a DVD. I would rather just have printed instructions for a quick review.

Jet v. Tormek: Similarities

The Jet is very similar in overall appearance to the Tormek, and there are a lot of similarities in use.

Each has a large wet bath grinding wheel on the right side, a honing wheel on the left and a support arm for locating the different tool jigs with two positions on the main housing to mount the support arm. The latter feature allows the jigs to be used with the stone turning into or away from the tool edge.

They both use stone graders which alter the surface of the stone to imitate a coarse surface for fast material removal or a finer finish surface, and both use jigs to ensure proper grinding angles.

Uniquely Jet

So what is the difference? Actually, the Jet has several unique features.

The Jet uses a DC motor with replaceable brushes, which performed flawlessly while I tested the machine (and I was the third tester/abuser of this particular unit). I let it run continuously for several hours between uses. The motor never heated up enough to be uncomfortable to touch. I could slow the motor with a large turning tool, applying far more pressure than you would ever use in normal sharpening.

The motor shaft drives directly against a rubber-covered wheel inside the honing wheel. As the drive wheel glazes or gets wet, you can increase the pressure of the shaft against the drive wheel with the "torque adjuster." Just turn the exterior mounted knob until the slippage stops. Like most of the Jet's distinguishing features, this is clever and simple.

One of the biggest differences to me was the speed control. The speed can be dialed in from 90 to 150 rpm. I felt being able to increase the speed for reshaping reduced my grinding time and definitely was a plus when honing. The Jet grinding wheel seems to cut faster than my Tormek wheel, and by increasing the speed I could quickly remove metal without feeling like I needed to press the tool into the wheel. Also, I could dial the speed down to slow the process when sharpening small carving tools.

Jet added the speed control as a means of compensating for the stone decreasing in diameter from wear, but in reality the value of changing the speed is to match the grinding speed to your application.

Water splash shields on the top of the Jet sharpener and a wide flange on the tank catch more water than my Tormek. Not all, but more. Maybe it's me, but I manage to splash water around the machines and up my arm every time I sharpen. There is just less mess with the Jet. The main body of the Jet also has end panels that keep water and general debris out of the machine.

The main body of the Jet has a small built-in drawer

which is great for storing the grading stone, honing compound and a black felt marker. Simple, but useful. Also, the cover has a flap so you can expose the handle to move the machine with the cover on.

Reader's Choice

I think the argument over which is better will continue in shops, stores and woodworking Web sites. Just like: "Which table saw should I buy?" or "Which fence is best?"

The Jet sharpener sharpened every tool I tried and performed without a hitch while I had it – the same thing my Tormek has been doing for eight years. I'm afraid the decision is yours. The time tested and proven machine, or the new machine with some unique (for now) features.

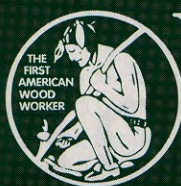
— Tim Rinehart is a contributing editor to Woodcraft Magazine.



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SMALL WONDERS

BY EARL K. LEWIS, II



TBM 115 Drill Press



MOF Plunge Router



FKS/E Table Saw

MY JOB AS AN ENGINEER entails designing and building prototypes of parts (some of which are quite small) out of metal and plastic. Naturally I developed an interest in building small parts out of wood, and I've started to really enjoy making dollhouses and miniature furniture, as well as small boxes.

The Tao of Small

As my expertise (not to mention my hobby) lies in small parts, I was asked to evaluate some of Proxxon's miniature tools. And boy, did I enjoy it. Serious model makers would be impressed with the performance of these little machines, and might even find them invaluable time-saving devices. They are not perfect, but dollar for dollar, they belong in your shop if you are building small projects of any kind.

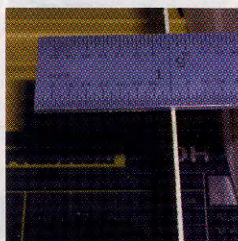
At the time I was asked to test out these tools, I was already the proud owner of a Proxxon FKS/E table saw. I plan later to share some modifications that I believe enhance the performance of this fine tool overall. But first, the others.

The Planer

I started with the miniature planer (DH 40) and was pleasantly surprised at the amount of power it can deliver. I found that it is capable of making a maximum cut at about 0.030". This worked the machine pretty hard, so I tried a little less than half that (0.010") and it cut about everything from poplar to hickory with no problem at all. Best of all, the cuts came out really smooth, requiring almost zero sanding.

The maximum width of material you can fit through the planer is a little over 3 1/8"; maximum thickness is 1 1/2". I found the adjustable, calibrated hand wheel to be a big plus. I used the planer to make many thin boards for dollhouse furniture and some trim for jewelry boxes.

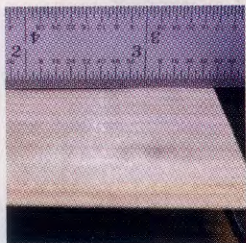
After running it through its paces, I decided to find out



what the minimum thickness of a planed board would be for this machine. I ran my test piece down to a thickness of 0.080", the planer performing flawlessly. After that, I tried gluing the leading edge of another piece to the previous piece and planed it down to see how thin

I could make the machine cut before it began to peel up the wood fiber of the top piece. The micro adjustment allowed me to reach about 0.020" before I started to notice any degradation in the surface. I used poplar for this experiment, which is fairly soft and probably would have curled up and shredded if I'd gone much farther.

If I were to add anything to the planer, it would be an outfeed support extension for planing long parts. Shown here is the end of a long piece that tipped downward at its end; as I continued to plane the part, it became progressively worse. An outfeed support might have prevented this.

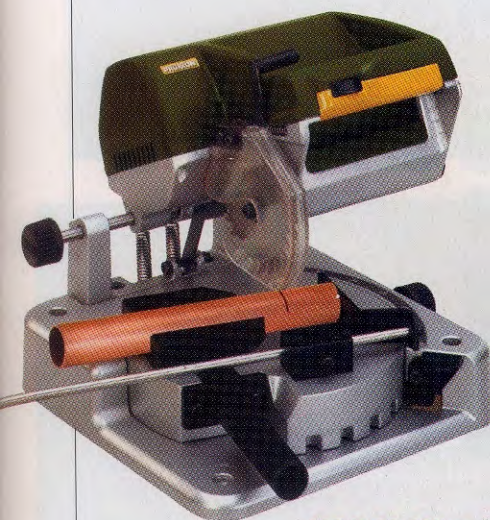


One thing I found a bit confusing at first – and this is probably a little petty – was that the indicator below the

for comfort. But the vice in this machine eliminates that situation. The vise works well on round, square or flat, thin stock.

I do have one small complaint, which arose from placing a piece in the saw with the extension bar in use to cut multiple pieces to size. When the cut finishes, the blade frequently grabs the part and slings it around until it flies across the room. During this activity, it contacts the spinning blade several times, causing considerable damage to the part. I found a way to eliminate this by placing a piece of scrap wood under the workpiece. Masking tape may also be desirable to help affix the workpiece to the scrap.

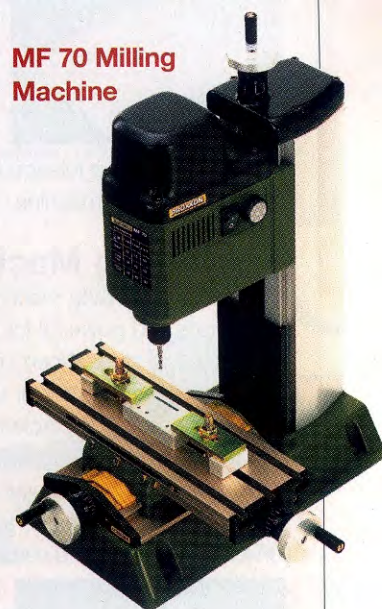
I believe they could fix this problem by making a plas-



KGS 80 Miter Saw



DH 40 Planer



MF 70 Milling Machine

crank handle shows "+" and "-" symbols which mean the opposite of what I thought they meant. Turning the handle toward the "+" removes stock and toward the "-" increases the stock opening for thickness.

The Miter Saw

Next, I worked with the miter saw (KGS 80). When I first looked at the saw, I wondered why they didn't make it into a compound miter saw. But I quickly realized that it would not have been much use, because it is a very small saw, after all.

I was really impressed with this saw and its ability to cut small parts accurately and consistently. I especially like this saw because I have always used a 10" miter saw, which frequently means my fingers are a little too close

to the blade. A plastic support under the saw area that could be removable and replaceable, or making the stop fit between the vise jaws and beyond to regulate part length on the vise end.

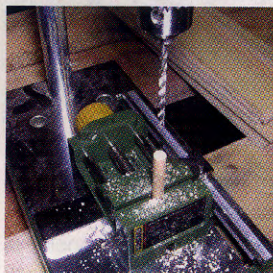


magnet I have been looking for!

All in all, the miniature miter saw is a great tool for cutting small parts that are delicate and hard to handle. It could literally save your fingers when it comes to trimming small parts down to size.

The Drill Press

The drill press (TBM 115) is the one tool I would not change anything about. It is capable of performing excellent work on any level. The accuracy in the spindle was far better than I had hoped for; it registered zero movement, making it perpendicular to the base at all times. The variable speed was at least as easy (maybe easier) to change as on any larger drill press.



The optional vise really is a great addition to the drill press. It made holding small parts a breeze. The adjustable bar on the base of the drill made drilling holes in a line simple and accurate.

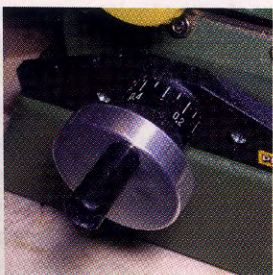
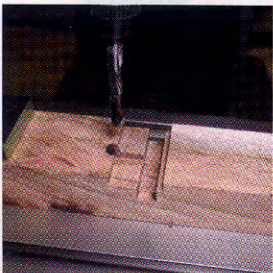
This small drill press has all the features of a full-size drill press and very surprising power for a small machine.

The Milling Machine

Next came the milling machine (MF 70). It too was extremely accurate and powerful for its size. It even performed effortlessly on steel. When I first used it, the gibbs needed some adjustment, but after that it did an excellent job.

The speed is adjustable from 5,000 rpm to 20,000 rpm, and the power it delivers is incredible. It is capable of performing much like a full-size mill, even on this small scale.

The table movement is about 5½" right to left by 1½" forward and back. The vertical adjustment is about 2¾",



which is adequate for making small parts for lots of projects.

I gave the mill a thorough workout on the X, Y and Z axes. I then attached the vise from the drill press. It mounted a little bit forward and limited travel on the mill, but was a great addition for holding small parts.

The only thing I would change would be to knurl the adjustment handles so that you can gain a firm grip and adjust the table in small increments.

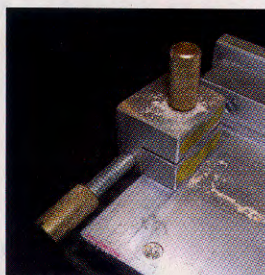
The Plunge Router

The plunge router (MOF) is the newest of the miniature tools I tested. As with the other members of its Proxxon family, it is very precise. The motor ran smoothly and had an amazing amount of power.

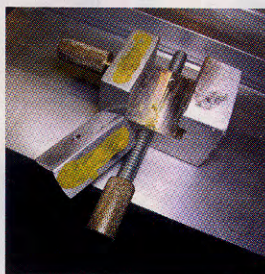
However, the plunger has excessively strong springs for such a small tool, resulting in a lot of error on initial contact with the work surface. Also, the slide of the plunger has a certain roughness to it – if you look closely, you can actually see the roughness on the plunger rods.

Overall, though, this is still a very handy tool to have if you are making dollhouse furniture or other detailed small pieces.

The Table Saw



Finally, I'd like to share the changes I made to my Proxxon table saw. I added a fence extension to help guide the part a little farther past the blade. This modification is not completely necessary; it just makes it a little easier to make an accurate cut.



I also made a small micro-adjuster that clamps onto the table for adjusting the fence. The ¼-20 threads on the adjustment screw really make this valuable because every full turn equals .050" and every half turn makes a .025" adjustment.

Wrapping Up

I really like what I have seen in Proxxon's line of miniature tools. I can only imagine the possibilities for professionals such as architects, prototype builders or anyone who must perform small-scale, precision work.

I built a prototype for a new product I designed and used the tools extensively for the project. This involved not only exterior walls for appearance but also included interior support walls and functional latches, all made from ABS plastic.

I completed the project in two days. I attribute this accomplishment to the Proxxon tools in this article — especially the table saw.

— Earl K. Lewis II is an engineering manager for Skuttle Indoor Air Quality Products in Marietta, Ohio. His wood projects are mostly made from scrap wood salvaged from skids. He enjoys woodworking and fishing.

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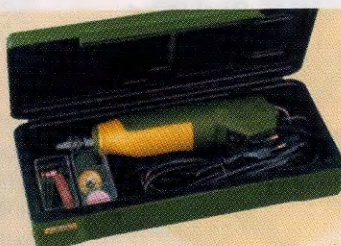
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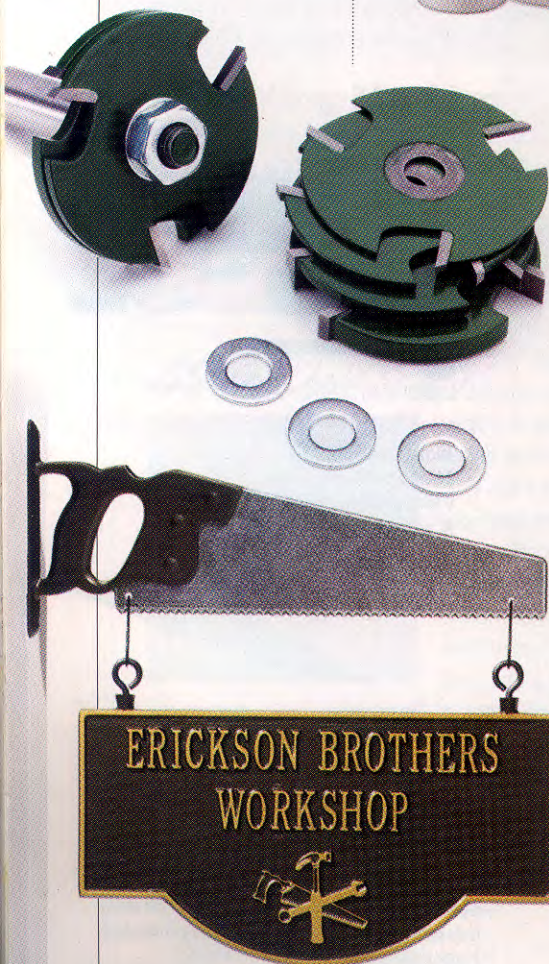
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Conquer The Square

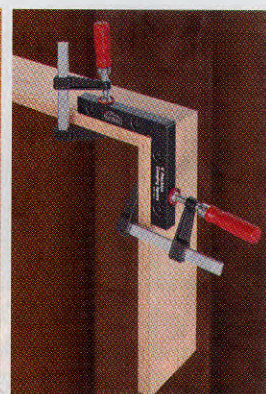
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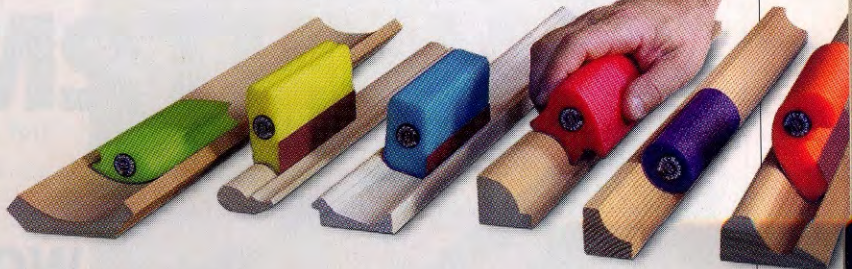
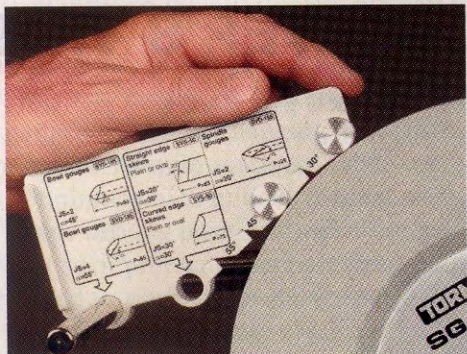


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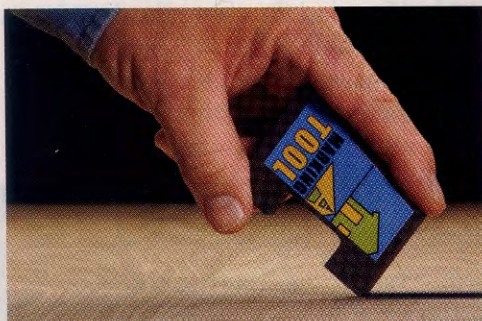
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WOODCARVER'S VISE

BY GEORGE SLACK

After years of design work and modifications, an engineer and a woodworker produced an innovative vise that offers woodcarvers great flexibility, especially for furniture-related carving. Obtaining a patent and deciding on a manufacturer are their next steps.

TIME IS MONEY IN THE FURNITURE-MAKING BUSINESS.

This applies to the amateur woodworker as well as the professional. I have had numerous carved pieces slip out of homemade clamps and jigs, and have even broken items while trying to hold and carve them.

I struggled for years to stabilize legs for chairs, tables, and case pieces in I-bar clamps and various jigs, all of which worked marginally well at best. I often thought if I could have a better holding arrangement that would shorten carving time and avoid damage, I could well afford the cost and quickly pay for it with reductions in labor time.

I approached Charles E. Jones, an accomplished mechanical engineer (who happens to be my cousin), with my problem. After some consideration, he felt he could develop an inexpensive vise that would do a better job than anything I'd tried so far.

The prospect of such an invention was exciting. I did a search at the U.S. Patent and Trademark Office for similar tools that would solve the problem and found only a wooden vise that was similar to what I had in mind. But from the drawings, it appeared not to work very well, and it didn't look durable.

Charles designed and built the original prototype way back in 1998, which today goes by the name of Big Red. We made two units: one painted with red primer and one of them given a final coat of yellow paint from a near-empty can of old



We are searching for stories about great woodworking products trying to make it into the mainstream. *No idea or project is too large or too small.* If the circumstances are interesting, we want to hear about it! Help others learn from your successes (or failures) by being featured in our new "Makelt2Market" department. Start the process by sending a brief description to: Editor@WoodcraftMagazine.com.

equipment paint. Both units were constructed from a steel fence post, and the other parts (hold-down plate, adjustment linkage and knobs) were constructed from shop scrap.

To our amazement, Big Red functioned well. But it had several shortcomings; for one, it was very heavy.

So the next version was constructed from aluminum. It took three prototypes before we had a lighter vise that exceeded Big Red's performance. It was very surprising how the functional problems changed by simply changing the construction materials. Aluminum doesn't slide very well against aluminum, which initially made it very difficult to change carving positions with this newer model. Most such problems were overcome as Charles evolved through the prototype series.

I used the aluminum vise for several years, and eventually it became obvious that if the vise was to be really functional it needed some additional features. I decided that both the head and tail should be movable, and the whole vise more user-friendly overall.

The length of the vise was also a problem. A long vise that would cover most furniture makers' needs would not function well in confined spaces and when carving short legs.

I discussed these problems, and a few others, with Charles, who promptly went back to the design board. I was ecstatic with the unique new design. After two more prototypes Charles and I evolved a design that works extremely well, is very user-friendly and has the following features:

- *It's modular in that the head, tail and rotational assemblies are removable to allow a different-length sliding bar to be installed.*
- *It has a minimum of knobs to turn to move the head and tail.*
- *It can be tilted continuously from a horizontal position to a full vertical position.*
- *The vise can be permanently mounted to a workbench or held in place with a C-clamp.*
- *While in use, it can be tilted with a single release lever.*
- *The carving article can be rotated.*
- *A hand lock on the tail stock allows for quick release.*



THE FIRST PROTOTYPE, affectionately named "Big Red," was moderately successful but cumbersome.

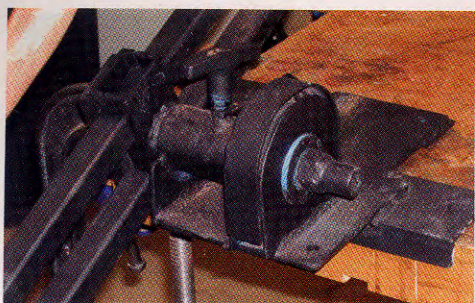


SUCCESSFUL USE OF THE SECOND VERSION provided testing and inspiration for further development.



THE LATEST PROTOTYPE has surpassed expectations and continues to impress woodcarvers with its usefulness.

As it turns out, Charles and I became a good design team. He is very patient and loaded with creative talent for design as well as the skills to bring that design into reality. I assumed the role of prototype tester and engineering advisor. Charles always quickly overcame the shortcomings I



AN INNOVATIVE BUT SIMPLE clutch mechanism makes for easy vise positioning.



THE ADJUSTABLE HEADSTOCK and tailstock increase the flexibility for positioning a workpiece.

pointed out, many of which would have been insurmountable problems to many designers.

After we finalized the design, we decided to celebrate. Charles, who had worked for nearly six months on the evolution of the latest vise, shared with me that he didn't believe that I was ever going to be satisfied. But on this, he was wrong. The vise is now ready to market.

The next challenge is to protect the invention with a patent. The patent office offers a variety of methods to protect an invention. From the beginning, it is important to maintain a research notebook keeping written progress during the development phases of the invention. This becomes a legal document that would be extremely valuable should invention ownership come into question.

Because the patent process is slow and costly the patent office offers a provisional patent. The filing fee can be as little as \$100 and gives protection for a term of one year. The total cost when an attorney handles the provisional patent process is approximately \$750. This is the approach we chose to take to give us time to determine if the product is viable in the marketplace.

The cost of a utility patent, which gives protection for 20

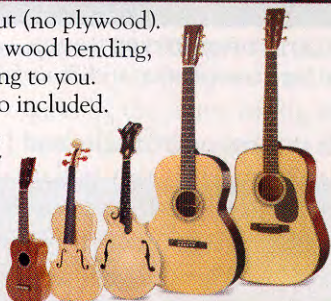
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years, requires an exhaustive patent search to be sure our invention is truly original and that we are not infringing on some other invention. This process will cost well over \$10,000 and perhaps as much as \$20,000. Once the utility patent is granted, there are maintenance fees: \$900 due at 3½ years; \$2,300 at 7¾ years and \$3,800 due at 11½ years.

To determine if the vise has a future in the marketplace, a detailed manufacturing cost analysis is needed, and a realistically estimated number of sales should be established. To help in this area, we approached Woodcraft Supply's product development department. After examining the vise and using it to carve, they decided it has market possibilities if the cost to manufacture is not excessive.

We have applied for a provisional patent and have asked three manufacturing companies to give a cost quotation for quantities of 100 and 1,000 units. One of the next decisions will be whether we want to do our own manufacturing and marketing, or license the right to manufacture and market to some other organization.

George L. Slack is a retired CIA senior executive who in 1987 decided to start a second career building high-end furniture. He owns and operates Period Furniture Workshops and since 1998 has offered a variety of classes in carving and 18th-century reproduction furniture.

Charles E. Jones is a mechanical design engineer with many years of experience as field service engineer. His skills over the years have been finely honed by design changes required to successfully install and bring on line large-scale manufacturing equipment.

For additional information, or to contact the developers, go to www.georgeslack.com.

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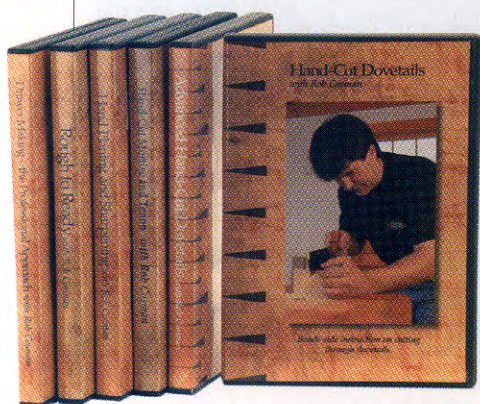
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Rob Cosman Woodworking DVDs

Canadian Rob Cosman shares his woodworking knowledge – gained from firsthand experience and working alongside master craftsmen like Dale Nish, Sam Maloof and Tage Frid – in a series of benchside DVDs that tackle topics like hand-cut dovetails.

A beginner's guide to through dovetails, "Hand-Cut Dovetails" demonstrates reliable, easy-to-follow techniques for cutting accurate hand-cut dovetails. The companion DVD, "Advanced Hand-Cut Dovetails," builds on the skills shown in the first dovetail video by showing how to cut the more difficult half-blind, houndstooth and mitered-edge dovetails.

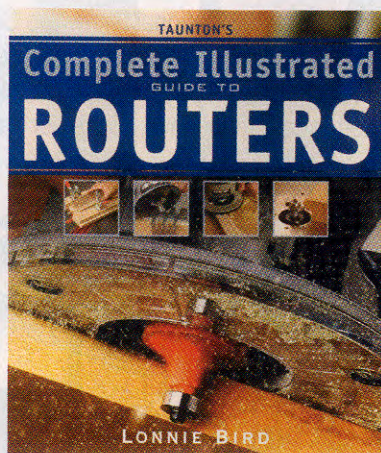
Other DVDs by Cosman include "Hand-Cut Mortise and Tenon," "Hand Planing and Sharpening," "Drawer Making

– the Professional Approach," and "Rough and Ready," instruction on dimensioning lumber from rough to smooth, flat and square on six sides. They sell for \$25-\$40. (877) 967-5966 robcosman.com; (800) 225-1153 woodcraft.com

Complete Illustrated Guide To Routers

BY LONNIE BIRD Get the most out of your router with this comprehensive reference guide written by a professional woodworker who operates his own woodworking school and designs router bits for top manufacturers.

Bird points out in his introduction that the router, although one of the simplest woodwork-



ing machines, is also one of the most versatile tools available. "Unleashing all this versatility basically depends on two things:

using the appropriate bit, and guiding the cut in the proper manner," Bird writes. After guiding the reader through tool selection, he demonstrates how to apply his advice in order to accomplish a host of woodworking tasks: basic operations, joinery and special shaping. More than 800 color photos and drawings illustrate Bird's detailed directions and explanations.

This 240-page, softcover book from The Taunton Press sells for \$24.95. (866) 452-5179 taunton.com



Carving for Kids

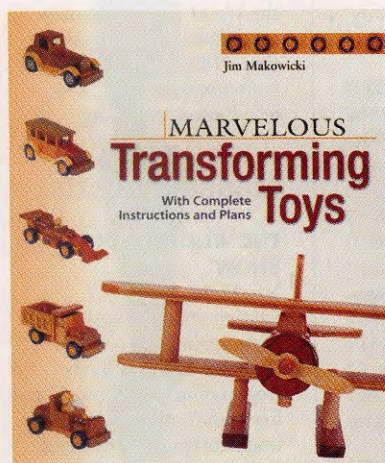
BY EDWARD TRUDEL Bringing the joy of creation to children is Trudel's theme in this book designed to educate the instructor about woodcarving and teaching children.

In the introduction Trudel

writes, "In today's disposable culture, the desire for learning the skills of an artisan seems to be diminishing. Why learn to carve a wooden spoon when you can buy one for a dollar?" Exposing children to woodcarving, Trudel writes, offers a positive method of self-expression that can lead to a career or a lifelong interest.

Trudel provides basic information about wood, carving tools and woodcarving skills along with 11 skill-building projects grouped into three age categories: 4-8, 9-12, and 13-17. He gives teaching tips and safety and supervision guidelines along with his detailed project instructions that are illustrated by more than 300 color photos.

This 96-page, softcover volume from Linden Publishing sells for \$16.95. (800) 345-4447 lindenpub.com



Marvelous Transforming Toys

BY JIM MAKOWICKI The author provides detailed instructions for building fine quality transforming toys children will enjoy assembling using pieces that go together in a variety of ways.

Although system toys such as

Tinker Toys and Legos have been around for a long time, Makowicki writes that his toys are different because each system part is an identifiable piece of the finished item, so a child recognizes what he is assembling right away. And the child can change the look of the toy easily by moving a couple of pieces.

Makowicki includes plans and directions for building six systems



with interchangeable components: boats, trucks, houses, planes, vehicles and ships, progressing from the easiest to the most complex projects.

This 224-page softcover book from The Taunton Press sells for \$24.95. (866) 452-5179, taunton.com

Basic Picture Framing

Edited by Amy Cooper, this volume should appeal to everyone interested in the processes of matting, mounting and framing.

A handy reference book, this 96-page volume features color photos (377) extensively, first to introduce the reader to a wide range of materials and then to give step-by-step instructions for matting, mounting, framing and hanging your favorite photos, paintings or needlework.

Directions for constructing a frame are provided, along with tips for buying a frame or using a kit to build one.

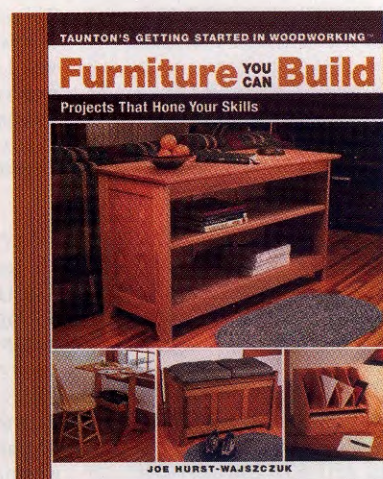
This softcover, spiral-bound book from Stackpole Books sells for \$19.95. (800) 732-3669, stackpolebooks.com; (800) 225-1153, woodcraft.com

Furniture You Can Build

BY JOE HURST-WAJSZCZUK In the fourth installment in the "Getting Started in Woodworking" series from The Taunton Press, the author offers eight projects you can build for your home, along with suggestions for a starter set of tools.

Each project gives step-by-step directions for construction, tips for working smart and safe, instructions for related skills such as making a crosscut sled, plans for jigs to make the work easier and finishing suggestions. The author also includes 45 drawings and 300 color photos to guide you in building a desk organizer, blanket box, storage bench, serving table, sofa table, bookcase, simple bed and desk.

This 176-page softcover book sells for \$19.95. (866) 452-5179, taunton.com; (800) 225-1153, woodcraft.com





CALENDAR

Classes, shows, exhibits focus on woodworking. Find more at woodcraftmagazine.com.

California

SOLO EXHIBITIONS

Bert Marsh (Through Dec. 30)

Hans Weissflog (Dec. 2-30)

**del Mano Gallery,
Los Angeles**

The works of internationally acclaimed woodturners Bert Marsh of England and Hans Weissflog of Germany are on display in separate solo exhibitions. Admission: Free. (310) 476-8508 delmano.com

TWO DAYS WITH DAVID MARKS

Dec. 2 + 3

Woodcraft of San Carlos

David Marks, host of "Wood Works" on the DIY TV network, will demonstrate tool sharpening and inlay techniques (Dec 2, tuition, \$200) and how to do gilding and chemical patination (Dec. 3, tuition \$200). Also: Author Yeung Chan will teach joinery (Dec. 9-10, tuition \$250) (650) 631-9663 stores.woodcraft.com/sancarlos

A CURATED EXHIBITION OF WORK IN WOOD AND FIBER

Jan. 13-Feb. 2

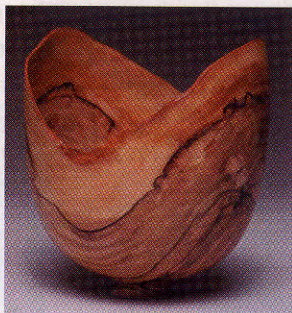
**del Mano Gallery, Los
Angeles**

This exhibit showcases works by 19 national and international wood artists including Jacques Vesery, Binh Pho, David Nittman, Vaughn Richmond, and Siegfried Schreiber. Admission: Free. (310) 476-8508 delmano.com

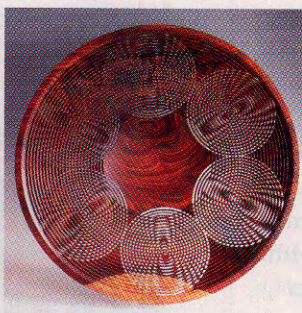
Colorado

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BERT MARSH'S "UNTITLED VASE," a 5¾" x 5¼" olivewood creation, and Hans Weissflog's "Untitled Vessel," a 4" x 18½" cocobolo piece, are part of the artists' separate solo exhibitions at the del Mano Gallery in Los Angeles during December.



Wood artists are included in this exhibition displayed on Concourses A, B and C and in the Jeppesen Terminal at the Denver International Airport. (303) 342-4200 flydenver.com

Delaware

"WOOD ART"

Through June 2007

**Wilmington Citizens Bank
Center Lobby, Wilmington**

This exhibit at the 919 N. Market St. site showcases wood art from the permanent collection of the Wood Turning Center in Philadelphia. (215) 923-8000 woodturningcenter.org

Florida

ANNUAL FLORIDA WOODTURNING SYMPOSIUM

Jan. 12-14

Lake Yale, near Eustis

Binh Pho, Andi Wolfe, Al Stirt and Stuart Batty demos will highlight this event that also includes workshops by

Florida turners and more.

Registration: \$115. (386)

985-5190 floridawoodturning.com

OFFSET TURNING WITH WALTER JONES

Jan. 21, 9 a.m.-noon

Woodcraft of Tampa

Learn the basics of offset turning from Instructor Walter Jones and take home a small statue. Tuition: \$60. Jones teaches other classes including Basic Woodturning (Jan. 7, \$100). (727) 532-6888 stores.woodcraft.com/clearwater

SPACE COAST WOOD- CARVERS SHOW & SALE

Jan. 28

**Eau Gallie Civic Center,
Melbourne**

Watch members carve in a competition for prizes and check out vendors. Admission: \$2 donation. (321) 952-5070 angelsteve@cfl.rr.com

Illinois

BENEFIT TOP-A-THON

Dec. 9, 10 a.m.-3 p.m.

Woodcraft of Peoria

Woodturners and woodworkers are invited to make tops, Christmas ornaments and toys for the Children's Home of Peoria. Materials welcome but not required. (309) 688-9663 stores.woodcraft.com/Peoria

Kansas

"CONNECTIONS: INTER- NATIONAL TURNING EXCHANGE 1995-2005"

Dec. 1-Jan. 28

**Dane G. Hansen Memorial
Museum, Logan**

This traveling exhibit celebrates the 10th anniversary of the residency program at the Wood Turning Center in Philadelphia. Admission: Free. (785) 689-4846 hansenmuseum.org; woodturningcenter.org

Massachusetts

THE WOODWORKS SHOW

Jan. 12-14

**Eastern States Exposition,
West Springfield**

Seminars and workshops (registration fees required) and free demonstrations feature woodworking experts. Check out new tools and equipment and view the gallery. Admission: \$10 (413) 737-2443 woodworksevents.com

North Carolina

MAKE A BEDSIDE TABLE

Jan. 28-Feb. 3

**John C. Campbell Folk
School, Brasstown**

Chris West will help students handcraft an Arts & Crafts style bedside table with a

CALENDAR

drawer. Tuition: \$442. Materials fee: \$125. (800) FOLK-SCH folkschool.org

Ohio

WOODWORKING WITH GLEN HUEY

Jan. 6, 9:30 a.m.-Noon

Woodcraft of Columbus

Learn about router jigs and fixtures and using the router to create joinery in this free class taught by author and professional furniture maker Glen Huey. Space is limited so register in advance.

(614) 527-7594 stores.
woodcraft.com/columbus

2007 SHAKER SERIES: BEGINNERS

Jan. 27-28, Feb. 24-25, March 17-18, 24-25

Woodcraft of Dayton

Beginners will build three pieces of fine Shaker fur-



STUDENTS WILL LEARN
to make this piece in the Offset Turning class taught by Walter Jones at Woodcraft of Tampa, Fla., in January.



ERIC STRONG WON FIRST PLACE for these madrone and walnut nightstands in the Oregon Guild of Woodworkers' fine woodworking exhibition and sale in 2005. The 2006 show is set for Dec. 9-10 in conjunction with the Best of the Northwest show.

niture in this series led by renowned furniture builder and author Glen Huey. Tuition: \$1,025. Intermediate Series: April 21-22, 28-29, May 19-20, 26-27, June 23-24 + 30, July 1, \$1,485 (937) 438-1282 stores.woodcraft.com/dayton

Oregon

BEST OF THE NORTHWEST/GUILD OF OREGON WOODWORKERS

Dec. 9-10

Oregon Convention Center, Portland

Guild members host a fine woodworking exhibition and sale as part of the Best of the Northwest Show produced by the guild and the Northwest Craft Alliance. Admission: \$6. (503) 310-4166 guildoforegonwoodworkers.com

Tennessee

THREE DAYS WITH DAVID MARKS

Jan. 12-14, 9:30-5:30 p.m.

Woodcraft of Knoxville

David Marks, host of "Wood Works" on the DIY TV Network, will teach three classes: Marquetry & Inlay Techniques, Jan. 12, \$200 tuition; Gilding & Patination, Jan. 13, \$200 tuition plus \$50 materials fee; and Bentwood

Lamination, Jan. 14, tuition \$200. (865) 539-9330 stores.
woodcraft.com/knoxville

MAKE A MEDICINE CABINET

Jan. 18 + Jan. 20

Woodcraft of Johnson City

Learn cabinet building basics by crafting a medicine cabinet from lyptus wood with Instructor Greg Goode. Tuition: \$135. Also: Build a Continuous Arm Windsor Chair with David Sapp, Dec. 1-3, \$695. (423) 282-9973 stores.woodcraft.com/johnsoncity

Virginia

SUGARLOAF CRAFT FESTIVAL

Dec. 8-10 + Jan. 26-28

Dulles Expo Center, Chantilly

Wood artists are among the 350 artisans participating in these festivals. Admission: \$7/three days. (800) 210-9900 sugarloafcrafter.com

CHIPPENDALE FURNITURE CARVING

Jan. 13

Woodcraft of Springfield

Period furniture expert George Slack will show students how to carve a shell with convex and concave rays. Tuition: \$150. (703) 737-7880 stores.woodcraft.com/springfield; georgeslack.com

TOOL SHARPENING CLINIC

Jan. 14

Woodcraft of Leesburg

Learn the basics of sharpening bench chisels, plane blades and other tools with period furniture maker George Slack. Tuition: \$150. (7-03) 737-7880 stores.
woodcraft.com/leesburg; georgeslack.com

Washington

CRAFTS AS A BUSINESS

March 16-17

Pratt Fine Arts Center, Seattle

This weekend workshop offers tips for artists and craftspeople who want to expand their business from a small scale to the next level. Tuition: \$160 (\$190 after Jan. 15) (800) 969-0869 info@businessofcrafts.com

Wisconsin

"CURRENTS 32: GORD PETERAN: FURNITURE MEETS ITS MAKER"

Through Jan. 1

Milwaukee Art Museum, Milwaukee

This exhibit showcases the furniture of Gord Peteran, a Toronto, Ontario, artist whose innovative work has won many awards and been featured in numerous exhibits. Admission: \$8. (414) 224-3200 mam.org

Woodcraft Magazine is happy to help publicize shows, classes and events of interest to woodworkers. Please send complete information on your event 60 days in advance to:

Events Calendar
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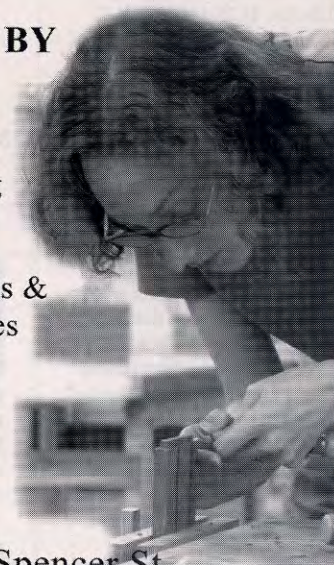
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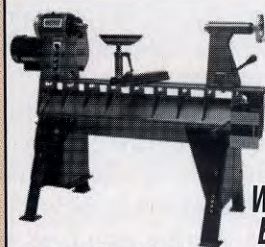
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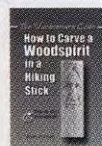
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The Yoke's On Me

by Tom Kerr

One summer, as I whittled away my time in a remote cabin in the Blue Ridge Mountains of Virginia, I got an unexpected call. Seems a friend of mine who knew that I took a keen interest in mountain crafts had passed my name along to a farmer in North Carolina who worked a team of oxen.

"I was wondering if you'd be interested in learning how to make a yoke, the ole-timey way?" the fellow asked. "I'll supply the wood if you'll carve it."

At first I thought I might be the victim of some kind of practical joke. But soon I was driving back to my cabin with a 5-foot, 12-inch-thick beam of hardwood poking through the open window of my car.

I used a felt-tip marker to draw the outline of the undulating yoke against the blocky, rough-milled basswood. Then I spent two weekends browsing through general stores, flea markets, and shops with signs that said things like "We Buy Junk but Sell Fine Antiques," searching for the appropriately obscure hand tools necessary to make it the old-fashioned way. The ones I was looking for went out of vogue around the same time that the tractor replaced oxen on most American farms. But I found what I needed, thanks to a slump in consumer demand for such labor-saving devices as drawknives and broad hatchets.

The chiseling began in late summer, and by the time the frost was on the pumpkin, I had managed to sculpt, file and sand that stubborn piece of wood into a yoke as pretty as you please.

The wood chips made great kindling, and as I sat beside my woodstove polishing the yoke with linseed oil, I became inspired. Nostalgia swept me back to the days when life was simpler, my predecessors worked the land with beasts of burden, and Appalachian homesteaders slow-cured their wood not in automated kilns, but by leaving it beneath a dry haystack for one full year.

Oops.

A robust crack – energized by the heat of the stove, no doubt – spread along the heartwood to snap me out of my idealistic trance.

"If you yoke a ton of Brown Swiss together with that thing, it will snap like a twig and could seriously injure both of them," their owner later acknowledged. "I should have cured that wood slower, instead of buying it from a lumberyard where they heat it up in a kiln. But these are impatient times, which I reckon is why I'm the only farmer in North Carolina plowing his fields behind a team of oxen.

"But thanks for trying."

For the next two years – and through three moves across state lines – I hauled that yoke around, determined to find some practical use for it. Too big for a doorstep, it was too small to use as a rafter beam and too curvy for a mantel or bookshelf.

I think it was Henry David Thoreau who said that firewood warms you twice – once when you cut and split it, and again when you burn it. So one cold night I got fed up and stuffed my yoke into the fireplace. I lit a fire at the base of it, and that Paul Bunyan-sized Yule log burned 12 hours straight, heating up the house so much I had to open windows.

Although I had slaved more than 100 hours on that project, I was somehow satisfied to watch it burn away the winter chill.

Yes, I had invested time, skinned knuckles, and a hundred dollars worth of tools, blades, and Arkansas stones for naught. But I did get \$15 worth of awesome cordwood out of the deal. Maybe I wouldn't have the last laugh, but I'd at least have a toasty chuckle.

A few months later I visited an antique shop to trade one of the yoke-making tools. As I entered the store, I overheard a customer ask the owner, "You don't happen to have an old ox yoke, do you?"

"No ma'am, I sure don't. Haven't seen one in years."

"Well, I'm decorating my summer home, and I would give anything to get my hands on one of those to hang on the wall of the den."

The store owner was piqued. "How much are you willing to pay?"

"Oh, I don't know. Three or four hundred dollars."

I held the door for her as she left and couldn't help but confess, "You know, I had one of those until recently. But it got burned up in a fire."

"What a shame!" she replied.

"Yeah. I was just thinking the same thing myself."



—Tom Kerr is a freelance writer who lives in the woods near Asheville, N.C. He still uses the same dovetailed pine toolbox that he bought at Sears as a 5-year-old boy, and says that they don't make them like they used to.



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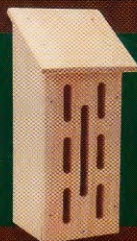
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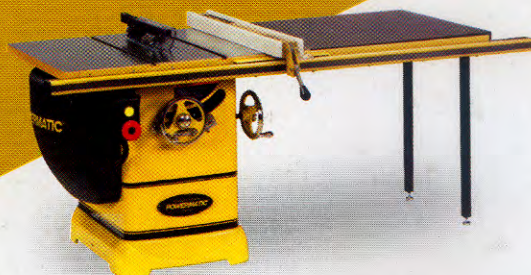


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