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Floral Vase

Percula Clown Fish

Chest Was

Civil War Chess Pieces



Grizzly Path



Majestic Reflections



Howling Wolves



Peanut Elephant Puzzle

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Civil War Chess Pieces
Train Shelf



Double-Sided Key Tag





Wooden Perfume Holder (no pattern for this project)



Family Photo Frame

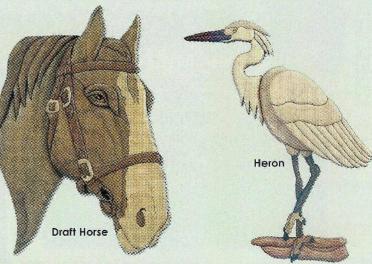
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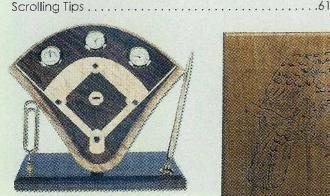
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Turning project:

"Take Me Out To The Ballpark" Weather Station Desk Set



Blue Fronted Amazon



The Lighthouse



Tabletop Timepiece





Train Shelf





Wall Mount For Telephone Center (no pattern for this project)



ON THE COVER: The Draft Horse, featured in this issue, is an exceptional intarsia project from an exceptional designer, Allen Martinson. Although Al tragically passed away in March 2001, he had completed a number of exclusive projects for Creative Woodworks & Crafts. We are pleased and honored to continue to share Al's craft with our readers and we think Al would be pleased too. To quote his wife, JoAnn,"Al was very proud of his association with you and so happy when his project 'Black Hills Whitetail Buck' was on the front cover of your magazine (October, 2000)." Three years later, AI's work is still bringing people pleasure. Here at Creative Woodworks & Crafts, Al remains one of our favorite designers.

Blue Fronted Amazon

by Patty Beach



Wood: soft maple or wood of choice—one piece 1/2" x 11" x 12-1/4"
Tools: scroll saw with assorted blades: drill

with bits Sandpaper, assorted grits Temporary-bond spray adhesive Sawtooth hanger Finish of choice

INSTRUCTIONS

Copy the pattern and transfer it to the selected stock, attaching it with spray adhesive. Bore blade entry holes in the waste areas of the pattern. Make all cuts, remove the pattern and thoroughly sand the piece. Apply finish of choice to the wood and attach a sawtooth hanger to the back. Hang and enjoy!



The Lighthouse

Pattern Located in Full Size Pattern Section No. 2!

Pattern Located in Full Size

by Mark Wilson

SUPPLIES

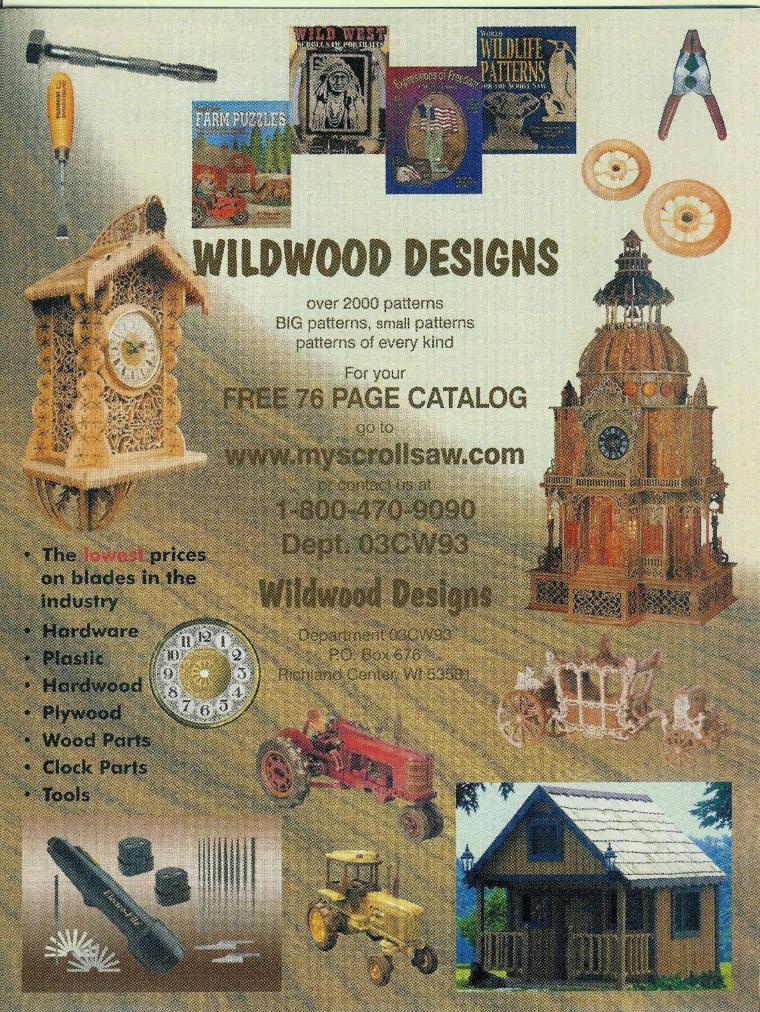
Wood: Baltic birch or wood of choice one piece 1/4" x 9" x 10" Tools: scroll saw with assorted blades; drill with bits

Sandpaper, assorted grits Temporary-bond spray adhesive Finish of choice

INSTRUCTIONS

Copy the pattern and transfer it to the stock, attaching it with spray adhesive. Bore blade entry holes in the waste areas of the pattern. Make all cuts, beginning with the smallest holes first and working up to the larger holes. Sand as needed. Apply finish of choice. Hang and enjoy.





COMING NEXT ISSUE!

Don't miss the next issue of Creative Woodworks & Crafts! On sale August 5, 2003



Create this Grizzly Bear from Patty Beach



Turn this handy Brush Handle from Joseph Herrmann.



Scroll this Patriotic Shelf from Dan Fenelon



Craft this handsome Bar from Cindy Stewart



Saw the Rhino from George Ahlers



Don't miss a single issue of Creative Woodworks & Crafts!

Issue No. 94 goes on sale August 5, 2003 Issue No. 95 goes on sale October 7, 2003 Issue No. 96 goes on sale November 11, 2003 Wood Ornaments goes on sale September 2, 2003

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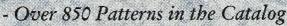
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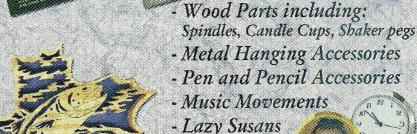


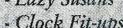


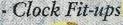


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Pattern Located in Full Size Pattern Section No. 1!

GRIZZLY PATH

by Dave Sutton

SUPPLIES

Wood: hardwood of choice—one piece 1/4" x 10" x 15" Tools: scroll saw with assorted blades; drill with bits Sandpaper, assorted grits Temporary-bond spray adhesive Finish of choice

INSTRUCTIONS

Copy the pattern and transfer it to the selected stock, attaching it with spray adhesive. Bore blade entry holes in the waste areas of the pattern. Make all cuts, beginning with the inside and working toward the perimeter.

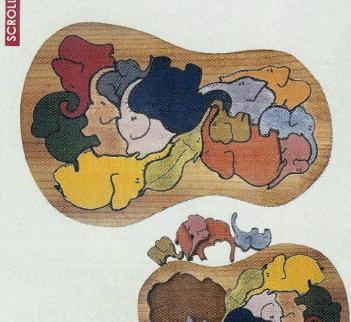
Remove the pattern and thoroughly sand the piece. Apply finish of choice to the wood and enjoy!



Pattern Located in Full Size

Peanut Elephant Puzzle

by Robert Taylor



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SUPPLIES

Wood: white pine or wood of choice—one piece 1" x 8" x 12" (for the frame and puzzle pieces); plywood or wood of choice—one piece 1/8" x 12" x 8" (for the backer) Tools: scroll saw with reversed tooth blade No. 07; drill with 1/8"-Dia. bit Small clamps Wood glue Tack cloth Sandpaper, assorted grits

Temporary-bond spray adhesive Clear spray finish of choice Paintbrushes of choice Paints of choice

INSTRUCTIONS

Copy the pattern and save original for later use. Affix the pattern to the 1" x 12" x 8" piece of wood using spray adhesive. Using a 1/8"-Dia. drill bit, drill a hole as marked on the pattern. Make sure that your saw table is square to the blade. Cut the inside frame away from the puzzle. Release blade from saw to remove puzzle frame. Leaving the pattern on, glue the bottom piece of wood to the puzzle frame and clamp together. After the glue has dried, cut the outside of the frame. This will ensure both boards are cut exactly the same. Cut the interior pieces apart, Sand any rough edges and use a tack cloth to remove dust from pieces. Paint the puzzle pieces as desired. Put the puzzle together and spray lightly with finish of choice to seal.



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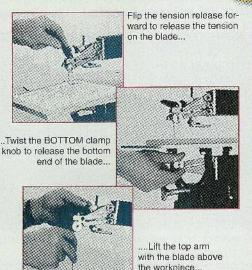


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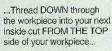




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Tabletop Timepiece

by Dirk and Karen Boelman of The Art Factory



SUPPLIES

Wood: cherry or wood of choice—one piece 1/2" x 5-3/4" x 10-1/4" (for the upright), two pieces 1/2" x 2-1/2" x 3-3/4" (for the legs), one piece 1/2" x 6" x 6" (for the base); maple or wood of choice—two pieces 1/2" x 3-1/4" x 3-1/4" (for front and rear overlays). Tools: scroll saw with blades; drill with bits including a 2-3/8"-Dia. Forstner bit (optional); clamps

Temporary-bond spray adhesive Sandpaper, assorted grits

Wood glue

Four No. 6 x 3/4" brass flat head mounting screws

2-3/4"-Dia. floral clock insert requiring a 2-3/8"-Dia. mounting hole*

Finish of choice

*Available from The Art Factory, P.O. Box 701, Platteville, WI 53818; (800) 566-6394; www.theartfactory.com.

INSTRUCTIONS

Use the full-size patterns to cut all pieces on a scroll saw.

The project is designed to hold a 2-3/4"-Dia. clock insert which requires a 2-3/8"-Dia. mounting hole. The hole can be drilled with a Forstner bit, or carefully sawn on a scroll saw.

The rear overlay does not need a hole through it; make it a solid disc. Slightly round over the outer edge on the front and rear overlays with sandpaper.

After sawing the components, touch up any imperfections with needle files, rasps, sandpaper, knife, etc.

Drill holes for mounting screws. Dry fit the upright and leg pieces to the base. Make adjustments as needed.

Begin assembly by gluing the overlays to the front and back of the upright. Clamp together until dry.

Locate and drill pilot holes in bottom of the upright. Attach the upright to the base with glue and wood screws, making sure it stands straight/perpendicular to the base.

Locate and drill pilot holes in bottoms of the leg pieces. Apply glue to the joints between the upright and base, and fasten securely together with wood screws. Clamp together until dry.

Apply finish as desired. We applied Natural Watco Danish oil.

Install the clock insert and proudly display your timepiece for all to enjoy.





Howling Wolves

Designed by George Ahlers and sawn by Wes Demarest



INTRODUCTION

Because we received a lot of positive feedback from a previous project (the bear cut into a piece of slab wood) we are following up in a similar vein with this one. The bear was cut from a piece of hemlock slab because the color was similar to the natural color of a grizzly bear and the convolutions of the wood added greater dimensional interest to the finished piece.

The primary problem in selecting the wood is obtaining a slab that will fit under the arm of your scroll saw and still have enough unevenness for dimensional interest. The Eclipse scroll saw was used to cut the last project because it has a 1-1/2" depth of cut; however, this project is larger than that saw's throat, so an Excalibur with a 30" throat was used. The depth of cut was therefore limited to about 3/4". Of course any saw can be used to cut these projects; just adjust the size of the pattern on a copy machine, then plane the back of the slab so that it will fit under the top blade clamp.

The piece we chose for this project is a walnut slab that came from an injured tree. Notice that, at the top, the wood is discolored and has turned very dark which will add extra emphasis to the tree line.

SUPPLIES

Patterns Located in Full Size Pattern Section No. 1!

Wood: walnut slab or wood of choice—one piece 3/4" x 11" x 17"*
Tools; scroll saw with Olson PGT No. 5 or Steebar PTT2; drill with
bits including 1/16"-Dia, brad point** and 1/16"-Dia, x 1-3/4"
parabolic drill bit**** (if using thick wood); wood chisel;

Dremel rotary tool: sharp gouge Temporary-bond spray adhesive Assortment of sandpaper through 320-grit Wood alue

1/4"-Dia. dowel Finish of your choice Saw tooth hanger

Mushroom or other accent of your choice

*The project pictured here was sawn from slabbed stock and the dimensions can vary considerably. The project can also be made from ordinary dimensional lumber. Slab wood for this project is available from: Midhurst Lumber & Sawmill, 66 Snover Road, Sussex, NJ 07461-3219; 1-973-875-2633; www.midhurstlumber.com. Stock and species vary from day to day.
**Available from: Woodworker's Supply of Wyoming, 1108
North Glenn Ave., Casper, Wyoming 82601-1698; 1-800-645-9292. Order Part No. 824-185: Hex Shank Brad point Drill Bit.
***Available from: MSC Industrial Direct Co., Inc., 75 Maxess Road, Metville, NY 11747-3151; 1-800-645-7270; www.mscdirect.com. Part #: 78564564

INSTRUCTIONS



Step 1. Remove any loose bark from the slab with a wood chisel. I left some that was still secure to add a bit more visual interest.



Step 2. Sand the surface smooth up to 120-grit.



Step 3. This slab tapered from top to bottom with the bottom being thicker. Locate a point where the wood becomes too thick for the saw and establish a line just above it. This will be the base of the pattern.



Step 4. Cut a relief line with a chisel and remove some stock so that the pattern is a bit recessed. This will give your saw a little more clearance.



Step 5. Transfer the pattern to the wood with spray adhesive and bore blade entry holes with a 1/16"-Dia. brad point bit. This substantially reduces drill run out because this type of bit doesn't walk when entering the wood and is little affected by the grain of the wood.



Step 6. Finish drilling the holes with a 1/16" x 1-3/4" long parabolic drill bit.



Step 7. Cut the interior detail with an Olson PGT No. 5 or Steebar PTT2 scroll saw blade. Back out of the interior sharp corners and detail and spin the wood in such a way that the teeth go into the waste part of the design so as not to mar the finished edge.



Step 8. Tilt your saw table to about 2°. The direction you tilt the table and cut around the design determines whether the part will either sink into the board or protrude from the face. The less the angle, the more the piece will protrude from the surface. Conversely, the greater the angle, the less it will protrude from the surface. If your table tilts to the left, cutfing clockwise allows the part to recess, and cutting counterwise will allow the part to protrude.



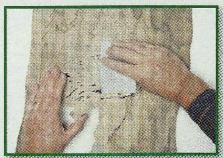
Step 9. Clean up some of the finer detail after the piece is cut free from the main design.



Step 10. We chose to add a little more detail to the faces with a *Dremel* rotary tool.



Step 11. Remove any remaining bark with a sharp gouge.



Step 12. Sand the surface up to 320-grit for an oil finish.



Step 13. We apply our oil finish to the front and back surfaces prior to gluing. Slab wood will soak up a lot of oil. Be sure to allow several days between coats so that the oil can cure.



Step 14. Apply glue to the areas of contact, then slide the cutout pieces into position and let the glue cure overnight.



Step 15. Secure the project to a workbench protected with a foam pad and hand plane the back side so that the project will hang flush with a wall.



Step 16. We chose to use an old mushroom I found growing on a dead log to add a little foreground detail. If you use the same, allow it to dry several months, then saturate it with Danish oil several times to kill any living insects, larvae or eggs that may be residing in it. My wife, Alice, actually preferred to use a sculpted piece of wood, but I held out for the mushroom. The choice is yours. I used a Dremel Moto-Tool with a rotary bit to shape the mushroom for a final fit.



Step 17. The only thing left to do was to mount the mushroom to the project with a 1/4" dowel and a bit of wood glue. Fasten a saw tooth hanger to the back and you are done.



Double-Sided Key Tag

by John Polhemus





SUPPLIES

Wood: mahogany or wood of choice—two pieces 1/8" x 2" x 4" (for the front and back); plywood—one piece 1/8" x 2" x 4" (for the middle piece)* Tools; scroll saw with assorted blades; drill with 1/16"-Dia., 1/8"-Dia., and 3/16"-Dia. bits Instant set glue
Sandpaper, assorted grits
3/16" head chain and evelet**

*Note: dimensions can vary depending upon the name being sawn.

**Available at most hardware stores

INTRODUCTION

This is a key tag that reads correctly from both sides after you cut it. Two styles are shown here, one with solid letters and one with open letters. I used a software product called *Woodtrax* to create the letter patterns.

INSTRUCTIONS

You will need two pieces of the wood of your choice that are 1/8" thick and a piece of 1/8" plywood (for extra strength) between them. Mahogany was used for the key tags shown (see Fig. 1). Stack saw the name on the

two outside pieces of the key tag, but not the plywood. A drop of instant set glue on the waste area at the end of the key tag holds them together well (see Fig. 2). Make the inside cuts (see Fig. 3), then the outside cut (see Fig. 4). Glue one of the side pieces to the 1/8" plywood and cut around it as shown in Fig. 5. Glue the other side piece to the reverse side of the plywood. Soften and even the edges with sandpaper. In the edge of one end, drill a 3/16"-Dia. hole. Start with a 1/16"-Dia. bit, then move to a 1/8"-Dia. bit, and finally use the 3/16"-Dia. bit. This hole will receive the 3/16" bead chain and eyelet. Put instant set glue in the hole, then push one bead fully into the key tag.

The software product named Woodtrax mentioned in this article is advertised on page 19 in this magazine. Two computer programmers who are also scrollers have created a SIMPLE program that those who don't love messing with computers can use. It was not created to compete with raster-based or vector-based graphics programs or the ability to move letters closer or farther apart in a word processor using the kerning settings. It was created for people who don't care or don't want to have to learn what raster, vector and kerning are. Don and Michelle created it so even an idiot could easily make word patterns, then had me try it to prove an idiot COULD do it! If you want a fast and easy way to make patterns for cutting names and word related projects like the key tags, Woodtrax is for you. This product will easily pay for itself at one craft show. It's worth checking out!

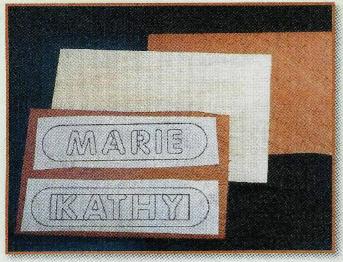


Fig. 1. Collect the materials and attach the patterns.

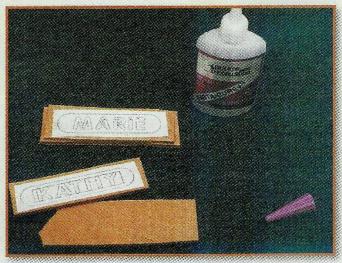


Fig. 2. Stack the outer pieces for sawing. A drop of instant glue on the waste area of the wood will help to hold the stack together.



Fig. 3. Make the interior cuts.



Fig. 4. Saw around the perimeter of the pattern.



Fig. 5. Glue one of the side pieces to the middle piece and saw it to shape.



CANDLE SCONCE

by Dan and Ray Wilckens of Wilckens Woodworking



SUPPLIES

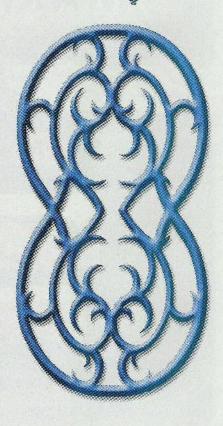
Wood: walnut or wood of choice—one piece 1/4" x 3-1/2" x 3-1/2" (for the bracket), one piece 1/2" x 5-1/2" x 3-1/2", one piece 1/2" x 8" x 16" (for the backer)

Tools: scroll saw with assorted blades; drill with bits
Sandpaper, assorted grits
Temporary-bond spray adhesive Wood glue
Candle cup of choice
Finish of choice

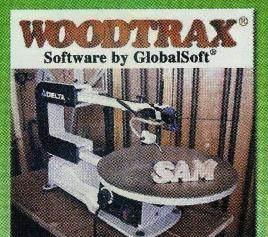
INSTRUCTIONS

Copy the patterns and transfer them to the selected stock, attaching with spray adhesive. Bore blade entry holes in the waste areas and make all cuts, beginning with the inside and working toward the perimeter.

Thoroughly sand the piece. Glue the shelf and bracket in place on the backer. Glue the candle cup to the shelf. Apply finish of choice to the wood and enjoy!



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Patterns Located in Full Size Pattern Section No. 1!

Floral Vase

designed by John Nelson and sawn by Wes Demarest



Wood Works With Rit!

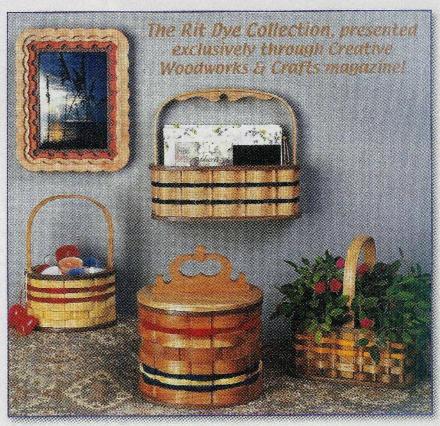
Rit

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The five scroll saw projects shown to the right were designed by John Nelson exclusively for *Creative* Woodworks & Crafts. All five were made with Rit Dyes and were featured in recent issues of *Creative* Woodworks & Crafts.



These five projects have appeared in the five recent issues of Creative Woodworks & Crafts!

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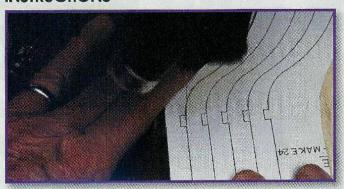
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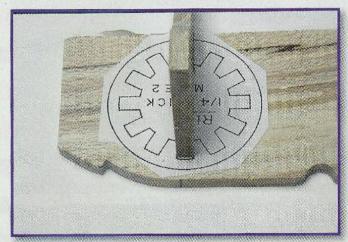
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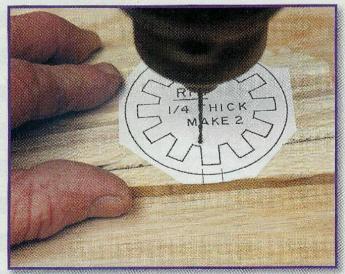
INSTRUCTIONS



Step 1. Size the stock and apply the patterns to the wood with spray adhesive, then cut the pieces with a blade you are comfortable with. In this case, we are using a *Woodrunner* No. 5R. Be sure to make your turns in the waste area; otherwise, you will leave a mark in a visible portion of the side.



Step 2. Be sure to compare the thickness of your material to the design. If there is any variation, mark the pattern with a fine ballpoint pen.



Step 3. Drill a 1/16"-Dia. hole in the ribs and cut the waste portion free, cutting to the line according to any adjustment marks you may have made on the pattern.



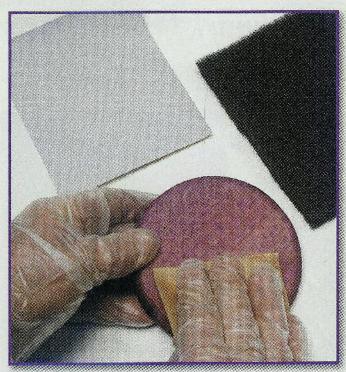
Step 4. Remove the pattern from the pieces. My wife, Alice, had a hard time getting an even color on this project; the problem was the residue left by the spray glue. I soaked the paper with mineral spirits and let it become completely loosened before I removed it. Then I rewiped them several times with fresh mineral spirits and a clean rag. All surfaces were sanded up to 320-grit, and we still had a problem with the residue. Do not use steel wool because any residue that remains in the wood will cause a rust mark. Besides that, sycamore will take on a gray colorcast when used with steel wool.



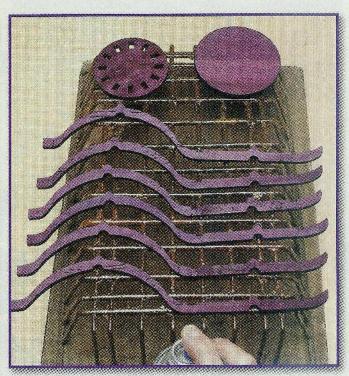
Step 5. Protect your work area with newspaper and/or plastic before you start the dying process. Wear protective gloves and use only glass or stainless steel containers for the dye. We used liquid *Rit*[®] dye, but the powdered dye works just as well. If you are not familiar with *Rit*[®] dye, order the free instructions they offer. Be sure to experiment on several pieces of scrap wood and understand that, once the dye is on the wood, there will always be color there. You can modify it by adding other colors over it, or reduce it by rinsing and even bleaching, but a little will always remain.

The dye can be applied by brushing, wiping or immersing. I have found that it is more readily absorbed if you wet the wood before applying it. Yes, it will raise the grain and undo a planned tight fit on the joints you cut, but a little sanding will bring the fit back. The end grain will absorb far more color than the edge grain and may necessitate wetting the end grain first or using a sealer to reduce the absorption and yield an even color.

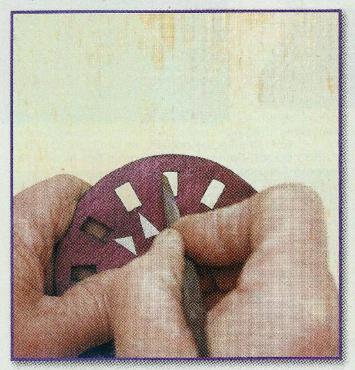
Deep, rich colors are more easily achieved by immersing the pieces; however, you can make repeated applications with a brush and get similar results. Heat the solution to 170°F and try to hold it at that temperature while you are working with it. The beauty of Rit® dye is the range of colors you can get by mixing or diluting various colors and the shading you can achieve by varying your application technique. The possibilities are limitless.



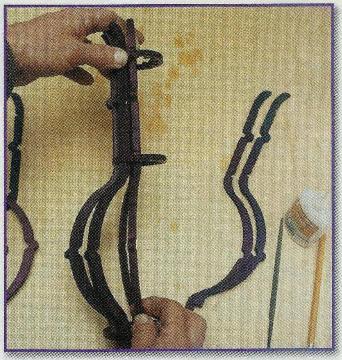
Step 6. Allow the wood to dry, then sand lightly with 320-grit sandpaper or *Scotch Brite*. Try not to remove too much color, but if you do, it can be re-applied with a brush. Be sure to rinse each piece in clear water to remove any surface dye residue. If you do not, the color will bleed through the finish.



Step 7. Apply the finish at this point, making sure to get even coverage on all surfaces. Open grained wood such as sycamore will absorb it unevenly (with the end grain soaking it quicker than the edge grain). Apply several light coats rather than one or two heavy ones.



Step 8. Test fit every piece and make any adjustments to insure a proper fit. We keep several small sets of files on hand just for such work.



Step 9. Assemble the pieces after you have made sure each joint fits without forcing. I apply a drop of Cyanoacrylate glue to all but two joints; that way, we can display something inside the vase such as the flowers shown in this project. The unglued pieces can be removed and the item cleaned or changed without breaking any components.



"Take Me Out to the Ballpark" Weather Station Desk Set

by Ed Barry



SUPPLIES

Wood: red oak or wood of choiceone piece 1/2" x 9" x 10" (for the backer); walnut or wood of choice—one piece 3/4" x 5" x 9-1/2" (for the base), one piece 3/4" x 3" x 3-1/2" (for the upright), one piece 1/4" x 8" x 8" (for the field pieces), one piece 1/8" x 3" x 3" (for the bases); birdseye maple or wood of choice—one piece 1/4" x 5-1/2" x 5-1/2" (for the infield pieces); aspen or wood of choice—one piece 1/8" x 1/4" x 12-1/2" (for the foul lines) Tools: scroll saw; No. 2/0 blades; drill with bits including a 1-3/8"-Dia. Fostner bit; router with 1/4" cover bit and bearing; palm sander: screwdriver; wood clamps Temporary-bond spray adhesive Yellow wood alue Sandpaper, assorted mediumand fine-grits 2" wide packaging tape Mini-clock insert Mini-thermometer insert Desk Set Pen Desk Set Note Clip Tack cloth Clear spray lacquer finish of choice

INTRODUCTION

The wood selections are suggestions only. However, keep in mind that the beauty of this project is based on the contrasting woods.

INSTRUCTIONS

Make and Assemble

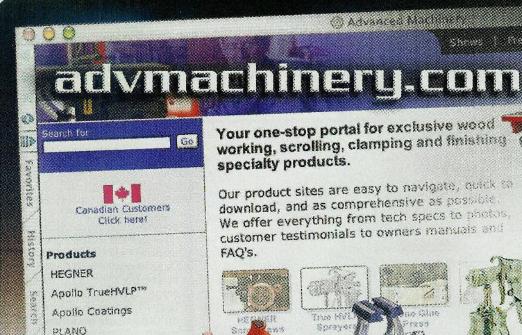
Make a few copies of the pattern and retain original for future use. You will probably want to stack cut this project to maintain an accurate match on the cutout sections. Orient the wood to coincide with the pattern cutouts. Secure the stack with packaging tape and attach the pattern to the stack with spray adhesive. Start by cutting out the foul lines first. Take your time, as it is important to keep these lines straight for a good fit. Next, drill pilot holes in inconspicuous spots such as a corner in the infield and the bottom of the pitcher's mound. Cut the mound out next and then the infield areas. Cut foul lines from the aspen to fill in the cut out areas on the field. Cut out bases and pitcher's rubber from 1/8" walnut. Drill out 1-3/8"-Dia. holes with Fostner bit where indicated in the outfield. Cut out the backer piece. Cut the base and upright to size and rout the

outside edges. **Tip:** rout the end grain first to minimize tear out. Sand as necessary.

Drill a pilot hole and countersink from the bottom of the base and glue and screw the upright to the base. Drill and countersink a hole in the oak backer, but DO NOT attach it to the upright at this time. Assemble all field pieces except the pitcher's mound, infield grass area, and bases on the oak backer. Once this assembly is dry, glue and screw the oak backer board to the upright. **Note:** make sure you countersink the screw so that the grass area and pitcher's mound fit flush with the rest of the field. When the upright is secured to the backer, glue the grass area and mound in place. Sand as necessary. Next, orient and glue the bases in place on top of the field.

Finishing

Finish sand all surfaces and wipe with a tack cloth. Spray with clear lacquer spray. Let dry and repeat for two more coats. Drill holes for note clip and pen set and install. Insert the mini-clock, thermometer and hygrometer. Enjoy!



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Majestic Reflections

by Dirk and Karen Boelman of The Art Factory



Make the shelf

Attach pattern to wood and stand the side pieces on end over the areas to be notched out of the shelf (B). Use a fine line red ink pen to trace the outline on the pattern. This will ensure a better fit, as you can now saw on the red lines. Again, smooth out any imperfections. Use the router with roundover bit to shape the top and bottom edges along the front and sides. Test fit the side pieces in the cutout areas, and make adjustments as needed. Drill holes for the screws.

Make the bottom piece

Saw a rectangle shaped piece 2-7/8" x 12" for the bottom (C). Use the roundover bit to shape front edge along the sides and bottom.

Make the top ornament

Use the pattern to cut the top ornament (D) to shape. The ornament also needs to have the rabbet cut into the back of the bottom edge, but the rabbet should be cut further into the material than the side pieces. You may need to use a combination of rabbeting bits and straight bits to create a 1/4" deep x 3/4" wide lip.

Assemble the mirror frame

Next, test or dry fit the parts of the frame together. Use a sander to true-up the ends of the side pieces and the sides of the top ornament, adjusting to make perfect joints between these pieces. Set the shelf over the ends of the side pieces, and adjust the notches as needed. The side pieces should be flush

along the back of the shelf. Also, use a carpenter's square to check that the side pieces stand perpendicular (90°) to the shelf. Measure across the bottoms of the side pieces, between the notches in the shelf, and across the area just below where the pieces start to curve. These spaces should be equal. The top ornament can be moved as needed to adjust the space.

To strengthen the joints at the top between the ornament and the side pieces, install hardwood dowel pins. **Tip:** if a doweling jig is not available, you can measure and mark for dowel holes as follows: With the parts in correct position, draw

INSTRUCTIONS

Make the side pieces

Photocopy and attach the patterns to the selected stock. Cut the side pieces (A) to shape on a scroll saw. Smooth out any humps, bumps or other imperfections with sandpaper, files, rasps, etc. Use a router with a rabbeting bit to make the rabbet which will hold the mirror and backer (see the **Plan View Drawings**). Shape the front edges with a router and 1/4" roundover bit. Drill pilot holes for the screws.

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BILL OF MATERIALS					
Part	Description	Size in inches	Quantity		
red oak	or wood of choice				
Α	Side pieces	3/4 x 5-3/4 x 18	2		
В	Shelf	3/4 x 3 x 14-3/4			
С	Bottom	3/4 x 2-7/8 x 12			
walnut	or wood of choice				
D	Top ornament	7/8 x 2-1/2 x 3	1		
E	Eagle body	1/2 x 6-1/2 x 16			
pine or	wood of choice				
F	Eagle head and tail	1/2 x 4 x 7	1		
populai	r or wood of choice				
G	Trees	1/2 x 4 x 11-1/2			
hard m	aple or wood of choice				
H	Wolf	1/2 x 5-3/4 x 11			

SUPPLIES

Tools: table saw (or similar); scroll saw with blades; drill with bits; router with rabbeting and 1/4" roundover bits; doweling jig; carpenter's square: clamps Temporary-bond spray adhesive Sandpaper, assorted grits Wood alue Fine line red ink pen Cardboard or plywood—one piece 1/8" x Mirror Plexiglas* 9-1/2" x 16-1/4" Two 1/4"-Dia. hardwood dowel pins Four No. 6 x 1-1/4" brass flat head wood screws Compass, trammel bar, etc. Five clips/cleats and hardware (for holding mirror and backer in place) Picture hanging wire Two small screw eves

a line perpendicularly across the joint. Transfer the line across the surface to be joined using a carpenter's square. Measure 3/8" from the back edge of each piece, make a mark for a centerpoint, and indent with an awl. Drill 1/4"-Dia. holes approximately 5/8" deep into both parts. Test for fit. Ream out holes, if needed, to adjust fit. Repeat procedure for both side pieces.

When satisfied with fit, apply glue in the holes and on the

surfaces to be joined. Squeeze all together while placing the notches of the horizontal shelf over the bottom areas of the side pieces. This will help hold the side pieces in correct position. Clamp all together until dry.

When dry, install wood screws in the ends of the side pieces and fasten securely to the shelf with screws

and glue.

Make the mirror and backer and bottom piece

Use the frame assembly to make a pattern for the mirror and backboard. Measure the width and height of the opening and draw a rectangle on a sheet of paper. (This will be approximately 9-1/2" x 16-1/4".) Use a compass, trammel bar, etc. to draw a circle at the top. First, cut out the pattern to test for fit. Make adjustments on pattern, then transfer the pattern and cut the mirror and backboard to fit.

Install wood screws through shelf into the bottom piece. Fasten securely together with glue and screws.

Make the pattern pieces

Use the full-size patterns to cut the eagle, wolf and tree sections from different wood species. An alternative is to stain or paint each piece as desired. **Note:** the eagle can be made from contrasting woods. To ensure that the head, body and tail sections fit together almost perfectly, stack the contrasting woods and saw them simultaneously.

Refer to the photo and **Plan View Drawings** for position the wolf, eagle and

tree sections. Glue the pieces to the shelf and side pieces of the frame. Clamp together until dry.

Finish of choice

Apply finish of choice (we used Natural Watco Danish oil).

When dry, install the mirror and backboard. Attach small

when dry, install the mirror and backboard. Attach small clips or cleats to the rear of the frame with screws to hold all in place. Attach two small screw eyes to the backs of the side pieces, and fasten a length of picture hanging wire between them to hang your completed hall mirror.

bottom with screws (typ.)

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Plan View Drawings

Fasten with dowels (typ.)

Fasten the shelf to the

Side view

Patterns Located in Full Size Pattern Section No. 1!

Family Photo Frame

by Marilyn Carmin of Heartland Creations



SUPPLIES

Wood; wood of choice—two pieces $1/4" \times 12" \times 24"$ (one for the overlay and one for the backer)

Tools: No. 2 scroll saw blades (20 teeth per inch); drill with No. 58 bit Temporary-bond spray adhesive

12" x 24" frame*

Clear spray finish

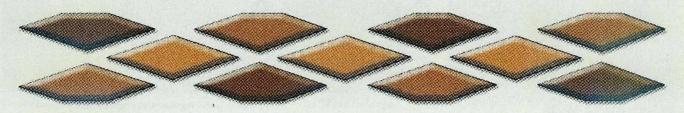
Double-faced tape

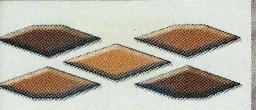
Glazier points (available at hardware stores)

*Note: this is not a standard size, so you may need to have one made or cut frame molding yourself.

INSTRUCTIONS

Using the spray adhesive, transfer the pattern to the selected wood. Hint: this is a good pattern to stack cut; several pieces can be made at once. Drill blade entry holes for all inside cuts on the overlay piece. Cut the piece to shape and sand as needed. Stain the backerpiece a contrasting color. Spray all wood with clear finish. Cut photos to size. Use double-faced tape to hold the photos in place on the contrasting wood. Insert into frame using the glazier points to hold in place.







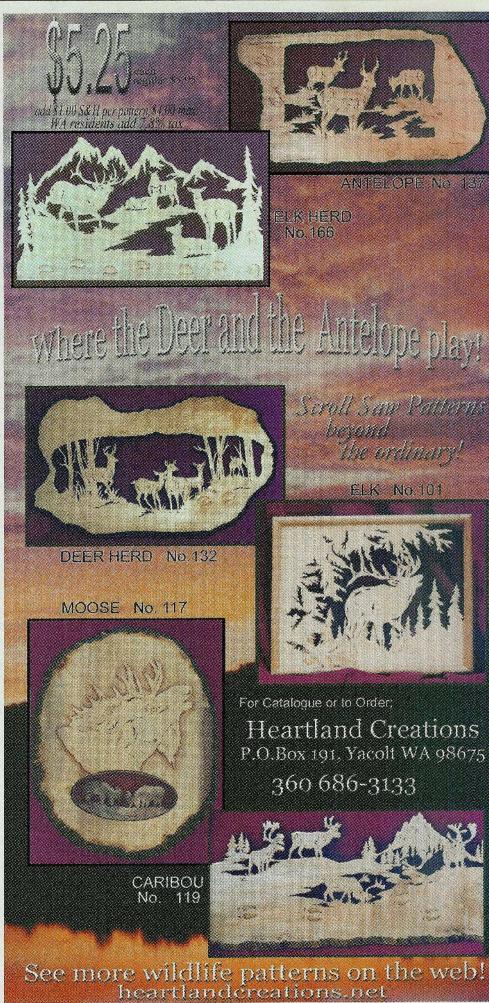


MARILYN CARMIN

ARTISTIC ALL HER LIFE, SHE STARTED CREATING SCROLL SAW DESIGNS IN 1877. THE SUBJECT OF MARILYN'S WORK 15 ALWAYS WILDLIFE.

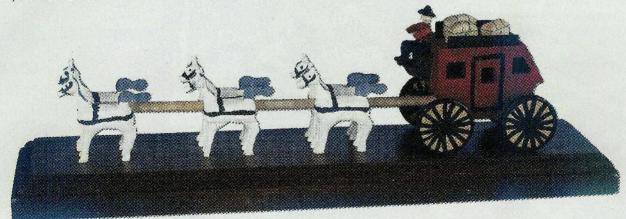


AS A CHILD IN
SOUTHERN CALIFORNIA,
HER PASSION WAS
ALWAYS FOR ANIMALS,
TO HER SISTER'S
DISMAY, SHE WOULD
OFTEN INVITE
SOME OF HER
FRIENDS TO SPEND
THE NIGHT.



The Western Stagecoach

by Henry Donald Berns



SUPPLIES

Wood: basswood saw blocks or soft plain-grained wood of choice—one piece 3/4" x 1-1/4" x 10" (for the horses), one piece 1-1/8" x 1-3/4" x 5" (for the coach body), one piece 3/4" x 3/4" x 7" (for the stage driver, the driver's arms and the luggage trunks), one 1" wide x 5/16" thick stick (for wheel gluing fixture), one 3/4" thick stick (for scroll saw fence), one piece 1/2" thick (for mounting base)

Tools: table saw for cutting saw blocks; scroll saw capable of making 1-3/4" thick cuts; No. 5, No. 2, and No. 2/0 scroll saw blades; drill press or hand drill; 1/8"-Dia, and 1/16"-Dia, drill bits; awl to make starter holes for the drill bits; rotary sander (optional); small needle or riffler files

Fingernail emery boards and fine-grit sandpaper Two small C-clamps (for holding scroll saw fence stick) Package of big sewing needles to hold painted items Piece of *Styrofoam* to hold paint needles

3/4"-Dia. wood dowel rod (for wheels)

1/8"-Dia, wood dowel rod (for coach fongue)

White glue and super glue

Masking tape to cover saw cuts when doing other view cutting

Green file folder or similar stiff paper for alternate mounting base

Black fine point permanent marker pen

Clear polyurethane spray to seal raw wood items Acrylic paints of choice: Black, Brown, Gray, Red, White, etc.

INSTRUCTIONS

Pattern preparation

Photocopy the patterns and cut around the rectangular outline block for each set of side/front view patterns. **Note:** for the coach body, the top view will not be glued on the saw block. Fold the paper on the line between the front and side views and crease the fold with the backs of the two views together. **Note:** the fold line for the coach body is at the front of the foot rest and at the end of the axles.

Sawina

The deep saw cuts for the coach body need to be done with a large No. 5 blade. The horses can be done with a No. 2 blade. The much smaller and detailed stage driver and luggage trunks need to be done with a much smaller No. 2/0 blade. If you have a variable speed saw, it is best to use a slower speed for these small items so you don't cut too fast and have better control. One view of the item is cut first, and then masking tape is put over the saw cuts to hold the block together while the other view is cut.

The major challenge in sawing the coach body is to keep clean, square comers and flat surfaces on the finished item. It is very important to keep the saw blade perpendicular to the saw table; it should be checked with a quality square. Be sure to keep the proper tension in the blade so it makes straight cuts in the thicker dimension of the saw block.

If the saw block for the horses is about 10" long, all six horses can be cut from the same block. Saw blocks must always be longer than the pattern being cut so as to allow you to get a good grip on them away from where the cutting is being done.

Saw out the six horses first as they will be easier to do, and allow you to become familiar with 3-D sawing techniques. Begin sawing with the side view and remove the material from between the front and back legs of the horse. Continue the sawing in the front view and remove the material from between the left and right legs. Finish the front view cutting by going around the outside of the front view.

Continue the work on the horse by putting masking tape over the saw cuts or the front and back of the saw block. Give the sides of the block a gentle squeeze as you put the tape over the saw cuts. Make sure the bottom of the unfinished horse piece is still lined up even with the end of the saw block. It can shift up or down a small amount since it has been cut free.

Finish the side view cutting by going around the body. Fig. 1 shows a horse after sawing has been completed. The end of the saw block can now be cut and sanded square again, and the patterns for the next horse can be put in place. Repeat the sawing procedure to make six horses.

The stage driver is very small and may be difficult to saw unless you are an experienced scroller. It involves cutting the arms separate from the body. The arms are very small parts

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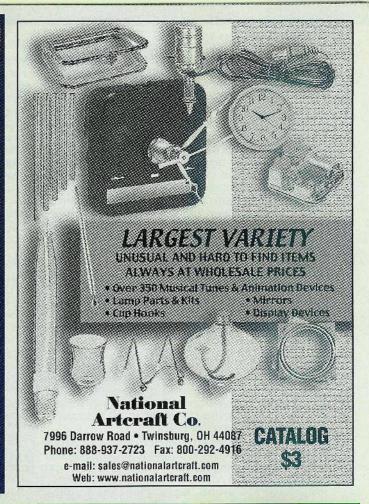


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Projects Editor Wes Demarest.

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and can "get away" from you if you are not extra careful while you are cutting. It will help to put masking tape on each side of the saw blade to cover the opening in the saw table. This will keep the little pieces from falling out of the bottom side of the saw block as you are cutting. It is important to keep all the little pieces in place until all the sawing is done. This will keep the arms in place inside the block.

Begin with the driver's body. Glue the pattern set on the saw block with the feet at the end of the block as seen in Fig. 1. The first step is to cut between the legs in the front view. Next, finish the front view by going around the driver's body. Put the masking tape on the front and back of the saw block. Finish sawing by doing the side view cutting. It is best to start this final cut at the toe of the foot so the final sawing is easier at the back of the foot. Square up the end of the saw block so it can be used to make the arms.

Glue the patterns for the arms on the saw block with the hands next to the end of the block. Cut the side view first. After taping, use care in cutting the front view so there will be a flat area at the top of each arm where they will be glued to the driver's body. After cutting one of the arms in the front view, stop and add more tape to keep all the little pieces in place while the second arm is finished. If you don't do this, some of the little pieces can shift inside the saw block while you cut the other arm. After cutting around the second arm, it is easier to remove the arms from the saw block if the end of the block is cut off at the top of the patterns. Remove the tape and the arms will be free from all the little pieces. Sand the end of the block square again so the luggage trunks can be cut from the same saw block.

Glue a luggage trunk pattern set on the saw block with the bottom of the trunk at the end of the saw block. Cut the end view first, tape and then cut the front view. Square up the block and repeat to make three luggage trunks. Saw the stagecoach to shape. Fig. 2 shows the window cutting details.

Front view cutting is done in two steps. Start by cutting above the left axle, but only to the side of the coach body. Then go to the other side and cut into the saw block above the right axle. When you get to the side of the coach body, turn up and follow the cut around the front view.

Fig. 3 shows the top view cutting lines that have been drawn on the seat area of the coach body as shown in the top view pattern. This cutting will be done with the bottom of the front and back axles resting on the saw table. Begin at the front edge of the seat and do both sides. Then cut in from both sides to remove the two corners and complete the coach body sawing. Fig. 3 also shows the hole that has been drilled above the center of the front axle for the coach tongue.

Cutting wheels

The wheels are cut about 1/16" thick from the end of the 3/4" wood dowel rod. Fig. 4 shows a wheel being cut with the No. 5 blade in the scroll saw. A 3/4" thick stick of wood has been C-clamped to the saw table to make a fence so all the wheels are the same thickness.

Finish work

After each item has been cut out, there will be some fuzz on the edges where the saw blade exited the cut at the bottom of the saw stroke. This can be removed by lightly sanding with an emery board or a narrow strip of fine-grit sandpaper. This should be about all that is needed for the luggage trunks.

A rotary sander can also be used if one is available. A small diameter (about 1/8" or smaller) fine stone is best for finishing. A coarse stone (about 1/4"-Dia.) will quickly round the corners of the body where more material is removed. The stones need to be "shaped" with a blunt point at the end. This will help in working on small details on legs, arms, or the neck



Fig. 1. Saw blocks ready for cutting and the 3-D items after sawing is done.

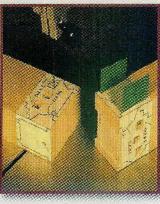


Fig. 2. Saw cut #1 cuts the material out of the windows. Shims are put into the saw kerf to help hold the unfinished coach body in place in the saw block.



Fig. 3. Top view cutting lines have been drawn on the seat area. Note the tongue hole has been drilled above the front axle.



Fig. 4. Scroll saw setup for cutting wheels and the wheel gluing fixture.

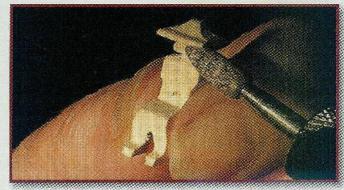


Fig. 5. A rotary sander can be used to do some of the finish work. The blunt end of the stone is being used to finish details of the stage driver's head.

area of the stage driver as seen in Fig. 5. Finish up with a small diameter fine stone. Where necessary, the final finishing can also be done with the emery boards, strips of sandpaper, or small needle or riffler files.

At this point, glue the arms in place one at a time. Put a drop of super glue on the surfaces to be joined and press and hold the arm in place for a moment while the glue sets up. It may help to "touch" the arm in place to get the super glue spread evenly on the mating surfaces, and then put the two parts together a moment later. The stage driver's arms should both be extended to the front.

Painting

The various wood parts of the oroject need to be sealed and painted before assembly. Fig. 6 shows a horse, the coach body, the stage driver, a luggage trunk and a wheel after being sprayed with clear polyurethane; it also shows a painted coach body and a wheel with the spokes drawn with a black fine tip pen. The items have been mounted on the sharp end of long sewing needles. The items can be set to dry with the head end of the needle pushed into a piece of Styrofoam. The needle makes an easy handle by which to hold each item while you are painting its details. (The author would like to give thanks to his wife Marilyn for her diligent work in doing the careful color painting for this project.) Refer to the photo to paint the pieces.

The coach wheels need to have a black rim and black spokes. The wheels can be left natural with the polyurethane sealer and the rim and spokes added with a permanent black fine tip pen as seen in Fig. 6. Make 16 spokes in the wheels. First do vertical and horizontal spokes. Then keep dividing the space between the spokes to get 16. Make a black or gold center hub. Don't paint the hub on the inside of

the wheels where they will be glued in place.

The horses can be painted many ways. The horses shown in this article are white with gray manes and tails. The bridle and harness can be gold or black. There are lots of choices on colors! The coach body can be red and then the outline of the door on each side can be black. You can give more detail to the cargo rails on top (maybe a brown leather seat, etc.). If you are real good at painting, you can add many details.

The luggage trunks need dark lines to indicate the edge of the lid and the straps that go over the top as seen in the finished project photo. These can be made with a lead pencil or a fine tip permanent black marker. Refer to the photo to paint

the pieces.

Assembly

The wheels can be glued to the ends of the axles easier if a gluing fixture is used. Fig. 4 shows the coach body sitting on the glue fixture in position for gluing wheels in place. The glue fixture is simply a 5/16" thick piece of wood that is narrower than the axle length. Note: the wheels are glued on after the painting is completed. Clean any paint, pattern material or glue off of the ends of the axles before gluing. Be careful to keep the ends perpendicular to the axle. Setting the bottom of the axles on the wood strip will hold them at the right height at which to center the wheels on the ends of the axles when they are glued. This will also insure that all four wheels sit evenly on the mounting base. Be careful that the wheels are properly centered fore and aft.

Put a drop of white glue on a scrap of paper and use a toothpick to transfer a small dab of glue to the end of each axle and the center of the wheel. This will avoid a glue run on

the wheels when they are glued to the axles.

The coach and the horses need to be mounted on a base piece. The base used in this article is a piece of walnut 1/2" x 2" x 7-1/2" that has been given a clear finish. The top edge has been given a "bead cut" with a router. Many different kinds of bases could be used. A 2" x 7-1/2" piece of green file folder can also be used as a mounting base.

Glue the coach in place on the type of base you choose. The coach and horses need to be positioned on the base so there is equal space in front of the horses and behind the coach. Use the toothpick method again to transfer a small amount of glue to the bottom of each wheel where they touch the base.

The coach tongue is simply a 4-1/2" long, 1/8"-Dia. dowel rod fitted into the 1/8"-Dia. hole that was drilled above

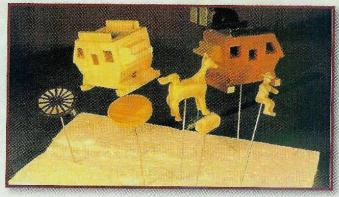


Fig. 6. Individual parts can be mounted on sewing needles and Styrofoam for painting.

the front axle, as shown on the pattern and seen in Fig. 3. The front end of the coach tongue will be glued to one of the two lead horses at the same time as you glue the back end of the tongue into the hole in the coach. Put the tongue in place with no glue to determine the proper position of the front horses on the base in front of the coach. The front end of the tongue should match the harness and be halfway up on the belly of the front horses. Glue only one of the front pair of horses in its proper place on the base. As noted above, transfer just a tiny dab of glue to the bottom of each leg. Let the glue for this first horse dry before you glue the tongue in place.

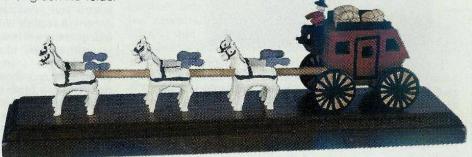
The height of the front end of the tongue should be at the widest place on the horse's belly so it can be easily glued in place. Lay the assembly on its side for this gluing step so the tongue will not fall out of position. You can lay the wheel-gluing fixture under the side of the coach wheels to keep the assembly in position for this step. If you use the heavy paper base, make sure it is not bent while gluing the tongue in place. The front end of the tongue will fit against the belly of the first horse. Glue the tongue in place by placing the back end in the hole in the coach and the front end against the

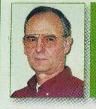
belly of the front horse.

After the glue in the previous step is set up, set the base upright to complete the assembly. Use a toothpick again to put a dab of glue on the front end of the tongue where the second horse will fit against it. Put a tiny dab of glue on the bottom of the feet of the second horse and put the second horse in place beside the first one. The other four horses are then positioned to divide up the remaining space. The space between each pair should be similar to the space between the front of the coach and the first pair of horses. Use a toothpick to put a tiny dab of glue on the bottom of the feet and where the belly of each horse contacts the tongue.

Put a finy dab of glue on the bottom of the stage driver where he sits on the coach seat. Arrange the three luggage trunks where you want them between the cargo rails on top of the coach. Pick them up one at a time and glue them in

place.





WES' WORKSHOP

Subject: Who couldn't use an extra hand?

by Wes Demarest

Talk is cheap

Several years ago I was in the middle of a project and really needed an extra set of hands to hold an odd-shaped compartmented box I was working on for which my bench vise didn't quite work. I instantly thought of a *Black & Decker* Workmate. One of those would be perfect for the job at hand! Off I went to my local tool supplier, but as luck would have it, the only one they had in stock was an imported version. The associate explained that it was "as good, if not better" than the *Black & Decker*, and also "cheaper". I took his word for it, made the purchase, and went back to my shop, smiling all the way.

As with most tools and equipment, some assembly of my lucky purchase was required. It soon became very obvious in the light of my shop that "cheaper" was the operative word in this scenario, which blew "better" right out the window. I won't bore you with more of my disappointment other than to say that I still have the thing and I still hate it.

Nothing like the real thing, baby

I recently acquired the Workmate® 375, the latest version of the *Black & Decker* Workmate®. Maybe my luck has finally changed for the better. Though the Workmate® 375 also required assembly, all that is needed was a 10mm wrench and a No. 2 Phillips head screwdriver.



Some assembly required.

I opened the box and was immediately impressed with the quality of the parts as I laid them on my bench. Now, if only all the parts are actually in the box and they fit properly, I'll be really impressed. Guess what? Even I could understand the directions and assembled it in no time at all without cutting myself on any sharp edges. I think this is the first thing I put together lately that hasn't been christened with a bit of my blood.



The heart of the assembly. The pivot bolt and link bar.

The heart of the assembly is the pivot bolts and link bars. Just squeeze the release handle and it opens smoothly. Once opened, it remains locked without any tendency to wobble.



The Workmate® 375 provides a stable and versatile work surface.

When I first noticed the feet arrangement, I felt that if there would be any problem it would be with the whole assembly sliding on the floor while in use. Not so—it stays put unless you are pounding on something, but I don't think it was intended for heavy pounding.

Nailing birdhouses and the like will not be a problem.

If you look at the bottom of the legs, you will notice wheels and a red pad. When the unit is in place, the wheels are not in contact with the floor or ground so there is a solid, four-point rest when in use. Its wheels are a great asset when you move it and, like its predecessors, it stands flat against a wall when not in use. The work surface is plastic, not a wood composite, and should hold up under damp working conditions and saw blade nicks.

The Workmate® stands 29" tall in the open position, has a closed work surface of 14-1/2" x 23" that opens 4-1/2". The top has holes provided for pegs that swivel, allowing for the gripping of large flat surfaces, and has a working capacity of 350 lbs. All in all, I think it is well engineered, solidly built and should provide a number of years of service.

WES' WOOD PILE

Eastern White Pine

by Wes Demarest

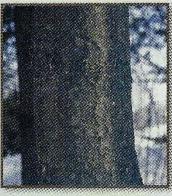


Bastern White Pine, Pinus strobes, also known as Northern White Pine, Pin Blanc, Weymouth Pine, and Soft Pine grows in upper clevations from North Central and Bastern Canada, across all of New England, south to Northern Georgia and west to the Great Lakes states. It is also reported that there are sporadic growths in the upper clevations of Mexico and Guatemala.

This is the only pine with a sheath of 5 needles. They are 3" to 5" long, soft and bluish-green in color, and are shed every two years. Walking in a stand of pines offers a degree of pleasure that cannot be experienced in any other type of forest or wood lot. The needles and pitch on the bark emit a fragrance that instantly cases the soul, and the whisper of the wind in the branches is like the sound a mother makes in a troubled



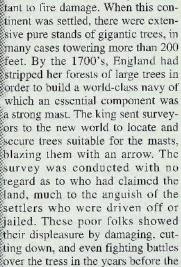
baby's car. In fact, I read a book a number of years ago which professed that by meditating under an Eastern White Pine, your spirit would gain strength and confidence greater than in any other location—something about pyramids and shapes and the like. I've never learned to meditate, but I enjoy walking among the white pines just the same.



The bark is also rather distinctive in that there are two types. The young trees have a smooth, greenish bark that is not resistant to fire damage.

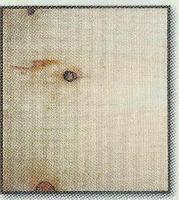
The bark of the older trees is fur-

rowed, dark brown and quite resis-



Revolutionary War. While nearly all of the old growth trees had fallen to the ax and saw by the late 1800's, the present growth is still impressive, often attaining heights up to 150 feet and diameters over 4 feet.

The wood of this tree is a delight to work. It is light in color and weight; the heartwood slightly darker than the sapwood and the growth rings are at times indistinct. It works easily with hand or machine tools and takes any finish; however, it may have a blotchy appearance when stained. This can be prevented with the use of conditioners or gel stains. The wood air-dries very well, but this will not "set" the pitch. The wood must be heated to 170° for 12 to 24 hours in order to set it; otherwise, it will bleed out and at the



very least be unsightly, and at the worst make a mess on a carpet or other finished surface. You can see a pitch pocket near the left edge of the photograph. In this case it has been set by kiln drying.



This is an example of pitch in an air-dried piece. It stays solid at lower temperatures, but starts to run as the temperature climbs. This will be used in an upcoming project, but I am letting as much of the pitch bleed out as possible before it goes into the kiln.

The wood is reported to be subject to decay, but there are a numerous houses and barns that are several hundred years old that were built and sided with it. They are still in good condition.

However, the wood has been properly maintained and dampness has been properly controlled throughout its life.

Eastern White Pine should be milled as soon as possible after harvesting, even if it is cut in the winter, although winter harvesting will buy you a little time. The reason for this is that there is a microorganism that stains the wood blue and the warmer the temperature, the faster and deeper the color develops. Also, during this time insects lay their eggs under the bark and, upon hatching, the grubs start mining the logs. You can tell what is going on without cutting the log because you can hear them chewing the wood and leaving piles of sawdust. A 12" wide green board will shrink approximately 1/4" when dried to 12%. The same board, when seasoned, will move 5/32" between 6% and 12%.

The cones are distinctive to the species, running from 4" to 8" long and slender, and the seeds provide an important food source for squirrels and birds. Eastern White Pine has many uses, including log cabins,

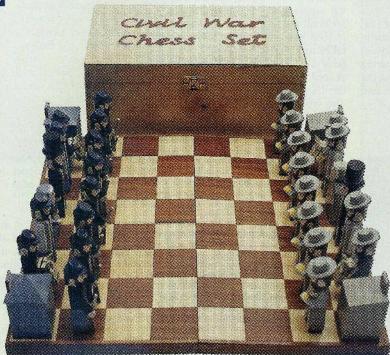
millwork, sashes and jambs, paneling, cabinets, furniture, matchsticks, and rough framing. Gooseberries and currents host the white pine blister rust that will attack any white pine within 1/4 mile and will eventually kill the tree, so you berry lovers have to be careful. The species is also subject to attack by the white pine weevil, which deforms the top of the tree, altering its growth and lowering its quality.





Civil War Chess Pieces

by Ralph Sinnott



Make the soliders

Take a scrap piece of wood and cut out a piece to make a shoulder on it 3/8" from the end. Use this as a gauge to mark a center line on the 3/4" round rod. Turn the rod around and mark another center line directly opposite the first. These lines will be used as reference lines for the nose, ears, etc. Twenty-eight heads are required, but making them end-to-end will make handling the small pieces easier, so cut fourteen 1-1/2" long pieces from the rod.

Cut small triangular pieces off the ends of the head pieces to form chins. Use a traveling jig made out of scrap timber or mdf, as shown in **Fig. 1**. Allow a piece of the jig to hold the round rod tightly at each side. Keep the center line uppermost and turn the rod to make a cut at the four corners.

Bore 1/8" holes for the noses. Here, a simple jig will position the round rod correctly (see **Fig. 2**). Glue the 1/8" dowel rod in and cut it off 1/16" from what will be the face of the chess piece (see **Fig. 3**).

Cut a "V" with sides at 45° in a piece of scrap wide enough to clamp to the table of the drill stand. Cut a similar "V" in a narrower piece. Clamp one of the head pieces in between the two "V" cuts, position it under a 3/8" drill bit, and bore a hole for the neck piece 3/8" deep (see **Fig. 4**). Keeping the wide piece with the "V" clamped to the stand, turn the head piece round, clamp the other "V" to it and bore again. Repeat with the other head pieces. Cut the heads and sand them round (see **Fig. 5**).

To make the ears, use a plane or sandpaper to flatten a short piece of 1/4"-Dia. dowel. Cut 1/16" long pieces from the rod. Glue these to the head. Transfer the patterns and cut the bodies to shape (see **Fig. 6**) bore 3/8"-Dia. holes to recieve the dowel which will attach the heads. Attach the heads to the bodies.

SUPPLIES

Wood: Finnish birch, plywood, mdf or wood of choice—one piece 1/4" x 2-1/2" x 14", one piece 1/16" x 1-1/4" x 32", one piece 5/8" x 1-1/8" x 84", one piece 1/8" x 1" x 24"

Tools: scroll saw with assorted blades; drill with bits

3/4"-Dia. x 24" long dowel

3/8"-Dia. x 24" long dowel

1/4"-Dia. x 6" long dowel

1/8"-Dia. x 6" long dowel Sandpaper, assorted grits

Acrylic paints to make the following colors

(Example: Navy Blue + White = Light Blue); Black, Brown, Cream, Fawn, Flesh, Gray,

Light Blue, Navy Blue, White, Yellow Acrylic gloss varnish

Fine point gold marker



Make the hats

For the kepis of the Union soldiers, stack pieces of 1/16" plywood and cut twelve to the pattern of the combined peak and base of the hat (see **Fig. 7**). Cut the tops, 5/8"-Dia. at the widest part, out of 3/8" thick material with the scroll saw table tilted at 15°. Glue the bases and tops together and paint them. Then glue them to the heads. When the glue has set, put the heads into a holder and with the aid of a traveling jig, cut off the top of the hat, leaving 1/4" at the back and 1/8" at the front (see **Fig. 8**). Complete the painting.

Before cutting the brim and base for the slouch hats of the Confederate soldiers, a curl to the brims is to be formed. Take two pieces of aircraft-grade 1/16" plywood, each 1-1/4" wide and at least 8" long. Put them in water, bring the water to a boil, take them out while hot, and bend them in a former. This consists of two 1/2" strips glued to a base 1" apart. With the plywood in position, it is clamped down, two pieces at a time, with a 5/8" wide block (see Fig. 9).

Cut the plywood into 1-1/4" lengths, stack the pieces, and cut the 1-1/8" diameter brims. The tops are the same as those of the Union soldiers. Glue the parts together, paint them, and glue them to the heads.

Make the arms

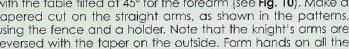
These are cut from 1/4" plywood. First cut a strip 1-1/4" wide, then cut it at right-angles into pieces 1/4" wide. A total of forty of these arms are required, four others, 1-3/8" long, are needed for the two kings. Mrs. Lincoln's arms are thinner; make these when you are ready. The left arms of the

Confederate soldiers have to be cut to the pattern provided with the table tilted at 45° for the forearm (see Fig. 10). Make a tapered cut on the straight arms, as shown in the patterns. using the fence and a holder. Note that the knight's arms are reversed with the taper on the outside. Form hands on all the arms with two saw cuts and rounded corners. Paint the arms.

The Union soldiers have half of their right hands cut away to form a seating for the rifles. The position of the angled cut is shown in the pattern; place the fence to guide it and carefully cut 1/8" deep across the hand with the table tilted at 15°. Rather than use the scroll saw for the tricky cut along the arm, I suggest removing the waste with a craft knife. Make a simple template to ensure that you glue all the arms at the same angle (see Fig. 11).

Make the rifles

Make a stack of eight pieces, each wide enough for two rifles, and cut out all that are required. Clean them up and paint them. Glue those of the Confederate soldiers across their chests before gluing on the arms. For extra strength, glue the rifles of the Union soldiers to the hands with epoxy resin.



The rear rank pieces

With the soldiers completed, turn now to the other pieces. Because the knights and bishops are the same, apart from their hats and coloring, either make templates or use the first one you cut as a pattern. The kings and queens are different, and so must be treated individually. The top of the Union tent is cut from a piece of wood 1-3/4" square using a traveling jig and making four cuts at an angle on the end of the wood. For safe handling, a length of about 6" should be used (see Fig. 12). Alternatively, the Union tent can be made the same as the Confederate one. The flags will distinguish them, but you should make them different colors anyway.

Now all you need is a chess board (look for instructions in an upcoming issue).

Dr. Ralph Sinnott retired from an education career in West Midlands, England. Since then, he has devoted much of his time to woodworking and writing articles about his projects. He has won several medals and prizes in woodworking competitions. He says that as he has become older, his projects have become smaller-thus he tends to do more scroll sawing.



Fig. 1. Forming chin.



Fig. 2. Boring for nose.



Fig. 3. Cutting nose to size.



Fig. 4. Boring for neck.



Fig. 5. Cutting heads.



Fig. 6. Cutting body of soldier.



Fig. 7. Cutting base of Union hat.



Fig. 8. Cutting slope on hat.



Fig. 9. Bending plywood for Confederate hats.



Fig. 10. Cutting arms with table tilted.



Fig. 11. Template to give angle of arm.



Fig. 12. Cutting roof of tent.

Whittle Your Way into the Banking Business

By Tom Dewe

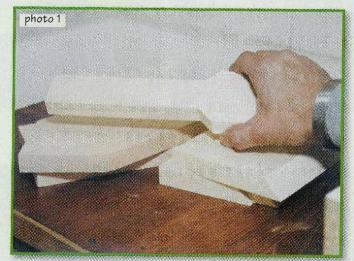


A little imagination, a few boards, and some sharp tools are all you need to create a wooden bank that makes a great child's gift. The banks pictured in this article were made using dimensional lumber, with details carved into the wood rather than added on individual pieces. Painting brings out the details, and a coat of oil or varnish completes the job.

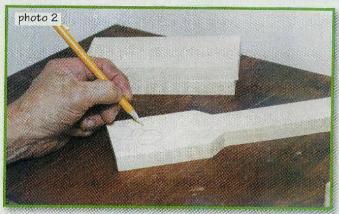
Softwoods such as basswood, butternut, aspen, or pine, as well as harder woods including maple, birch and oak can be used to make the basic structure. It might be a simple gable-roofed house, a castle, a log cabin, or even a replica of an old outhouse! Part of the challenge—and fun—is devising a clever way for a child to open the bank and get at their growing savings!

If you haven't carved before, the good news is that the techniques required for this kind of work are simple and quickly learned. At the least, you'll need a good quality knife with a sharp blade and a small chisel. It is also helpful to have a small V-tool, a second chisel with slightly rounded corners, and a small carver's gouge.

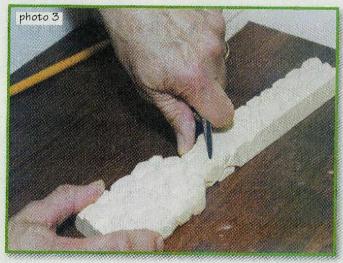
The first step is to choose your design, which can be anything you imagine—from realistic to whimsical. Cut out the wood parts and make sure they fit together well, but don't assemble them yet (see photo 1). Next, create



the design to be carved into the wood, and sketch it directly onto the boards (see photo 2). This can be done freehand with a ruler and square, or created on a computer, printed out, and traced on the boards using carbon paper.



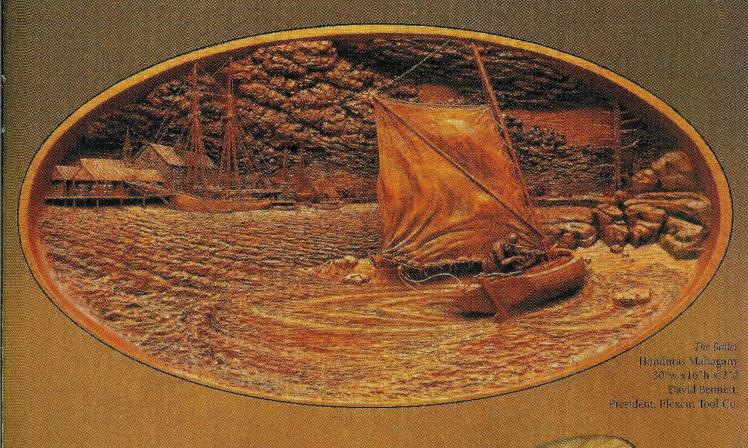
Now you are ready to make chips. It's best to begin with stop cuts (see photo 3). Use your sharp knife to cut straight down along all of the lines you've traced on each board. You're essentially repeating everything you did with pencil or carbon paper, tracing the pattern into the wood rather than onto it. These stop cuts form guidelines for creating relief images of your bank's features.



The next steps are intended to give shape to your design by making some details stand out and recessing others. For example, work around the outlines of a window, cutting away the wood along your stop cut to reveal the frame. Do the same thing on the inside, recessing the panes to expose the outer frame and the mullions. You'll need to be aware of the grain structure in each board so that you can cut with, rather than against, the grain and avoid gouging the wood. With a little practice you'll soon have a feel for the wood (see photo 4).

Create roof tiles or shakes in the same manner, with stop cuts across the roof to represent the courses of shingles, staggered V-cuts to define individual shingles, and angled chisel cuts at the bottom of each course to form the shadow line and give dimension to the shingles. Siding, bricks or stones are simulated in the same way. Chisel out on one or both sides of stop cuts as necessary to form the shapes in your design (see photo 5).

Flexcut^o... An American Original



The simple pleasure of good tools...

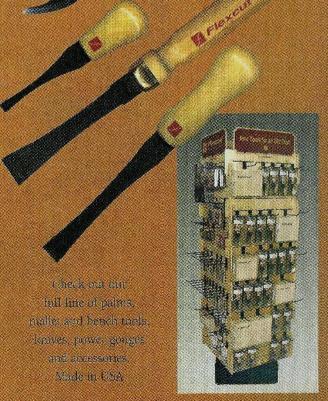
Our tools are designed by woodcarvers for woodcarvers.

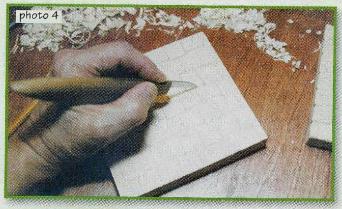
That's why our tools really hold their razor sharp. edge and our flexible high-carbon shanks give you maximum control-every cut.

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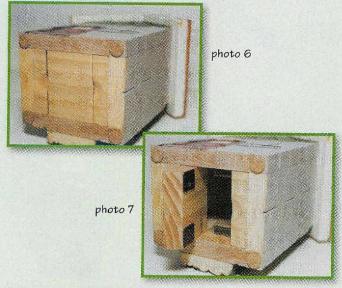




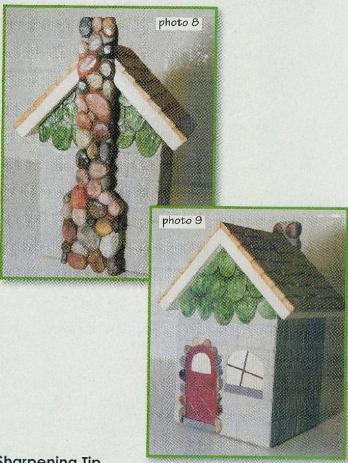


Use a gouge or rounded chisel to create surface texture on large areas such as siding or stones. This removes the perfectly flat surfaces from sawn boards and helps give the finished piece a monolithic look. Note that sandpaper is not used. Sanding removes the characteristic blade marks of a carving and destroys the details that make it interesting.

Before you put the carved boards together, remember to cut a slot somewhere to receive coins. This is also the time to decide how the money will be removed. A simple hinged door on the bottom will suffice, or you might want to devise a secret sliding panel or door to make it more interesting. Another option is to cut out a round hole in the bottom, and then make a circular plug to fit, holding it in place with cupboard door magnets mounted inside before the bank is assembled (see photos 6 and 7).



Once you have formed the design in the wood and determined how funds will be withdrawn from your bank, assemble the structure using glue and a few finishing nails—taking care to pre-drill the holes. Set the nails below the surface, and fill holes with wood filler. Finally, purchase a few jars of acrylic paint from a hobby or craft store, and give your bank a paint job (see photos 8 and 9). Thinning paints with water will result in semi-transparent coverage; this makes the wood grain and carving details more visible. A light wash over the paint with wood stain thinned in mineral spirits gives it a weathered look and softens bright colors. Protect your bank with a satin wipe-on polyurethane finish. Alternately, linseed oil or Danish oil can be used to create a soft patina over the painted wood.



Sharpening Tip

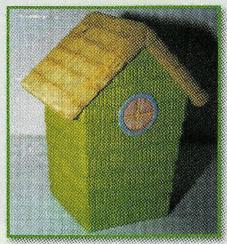
Keep your carving blades at optimum sharpness with a leather strop that has been coated with a sharpening compound. Once a knife, chisel or V-tool has been properly honed on a stone, you can keep the edge at peak sharpness with just an occasional strop. This is done by placing the blade flat on the leather and drawing it away from the sharp edge in a smooth, repetitive motion.

About the Writer

Tom Dewey is a carving hobbyist and technical communications writer. He enjoys various carving projects including designing and building carved banks for his grandchildren and other family members and friends. He may be contacted at 5411 Mt Normandale Drive, Bloomington, MN 55437; 952-831-2192; or tomdewey@deweycomm.com. 🙀

Other Bank Styles







Knot-free Swedish pine was used to create this whimsical bank for a little girl. The roof is intended to look like layered straw.







This bank was carved to look like a gingerbread house with candy cane pillars.



The shape and carved details of this bank are intended to convey the look of a medieval castle. Money is withdrawn through a secret slide-out panel at the bottom of the tower.



This castle's door slides up for savings access - but only after a paper clip has been pushed into a hidden pinhole to release a spring-loaded latch (made from a length of hacksaw blade).



Here is a pair of carved book-ends.

Playing With Matches

By Kathy Morawski, Associate Editor



How is it that small things can have such a big impact? According to Zu Liang, it's all in the details. Viewers of his matchstick carvings are often amazed by the carver's attention to and skilled handling of minute details. While expected in carvings of a greater scale, it is surprising on matchstick-sized miniatures.

Zu Liang

It's the little things in life

Zu's appreciation of miniatures began with his childhood collections of small toy cars, trains and robots. The more details these items displayed, the better. He admits it became an addiction, and two decades later, his collections are still growing.

In describing his self-appointed obsession with the minute, Zu explains it's due to the way he focuses on the details in objects. An ordinary cardboard box isn't just a box of cardboard to Zu. Rather, he is consumed by the wrinkles, rips, cracks and folds that individualize its surface.

Thinking outside the box

Zu studied graphic design and computer animation in college, but the matchstick carvings came to light during his earlier school days.

Near the end of eighth grade, Zu won an industrial shop award for building the largest and strongest bridge made from matchsticks. His instructor then gave him a huge bundle of matchsticks, hoping it would inspire the building of more bridges over the summer vacation. Zu had other ideas, went to the other extreme, and an unusual hobby was born.

The matchstick carvings are always representations of recognizable images, such as cartoon characters or animals. Many of the subject ideas arrive by the request or suggestion of others, so Zu will create at least two carvings of each subject and keep one for his own personal collection.

Though Zu generally views his carving work as a personal hobby, he does create carvings for gifts and limited commissions. His last commission involved carving a matchstick groom and bride for a couple's wedding.

"It's all in the details."

Less is more

Even with his tools, Zu is a minimalist. He carves using only an X-acto knife with No. 11 blades and finishes the detail with very fine-grit sandpaper. He's been using the same techniques since 1987 and says, "All these years and I've never cut myself." He doesn't use any type of device, other than his hands, for holding the stick as he carves, because he says it offers more control and a better feel of the wood and blade. An average carving will take approximately an hour to complete and then he'll paint the piece, again only using his hands to hold the stick as he works. Both water- and oil-based paints are applied for different color contrasts by using a No. 000 spotter brush. If that brush isn't small enough, Zu will make his own brush or alter a brush by stripping most of the bristles from it.

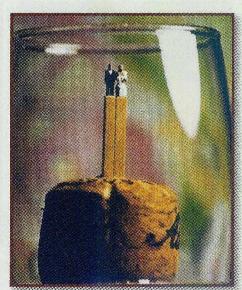
Even with an obsessive eye for detail, Zu admits he has never used any type of magnifying tool while working on his pieces. He jokingly adds that he's selective with the number of carvings he produces only to prevent blindness.

Seeing is believing when focusing on Zu's carvings. It's his attention to detail that captures the viewer's attention.

Zu Liang, of Monroeville, PA, can be reached at cowboyzu1@yahoo.com.



An assortment from Zu Liang's personal collection of matchstick carvings.



Commissioned for a wedding, these matchstick carvings grace the top of a cork which had been inserted into a champagne glass.

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Secret Compartment Key Chains

by Joseph M. Herrmann of Timber Treasures



SUPPLIES

Wood: Dymondwood or wood of choice—one piece 1" x 1" x 3"

Tools: chop saw; pen drilling vise; drill press with 10mm drill bit; pen insertion tool; pen knife; mandrell with bushings; lathe with assorted chisels; disc sander; handheld electric drill with Velcro sanding system, buffing system; pen assembly press

Danish oil

No. PK-1067 Secret Compartment Key Chain Kit, \$2.65 ea.*

No. PK-1110 Dymondwood Blank Assortment. \$16.70/6*

No. SG-THICK Thick Superglue, \$3.95 ea.*

No. SG-THIN Thin Superglue, \$3.95 ea. plus postage*

*Available from: Steebar Corp., (973) 383-1026, www.penmakingsupplies.com.

INTRODUCTION

Over the years, I've had a lot of people request that I make needle cases and toothpick holders. In fact, there have been enough requests that I seriously researched

the procedures involved in making them.

The more traditional ones are made entirely of wood and resemble little turned boxes. Turned boxes, however, require a high tolerance between the body and lid in order to be successful. If the fit is too loose, the lid falls off and if it is too tight...well, you know what happens. I eventually decided that they just were not profitable enough to make when you factored in the labor involved.

Then I found these "Secret Compartment" key chain kits and I knew that I had the problem solved! These kits can be made without the key rings for use as needle cases.

But, if you leave the ring on, "Uncle Bud" will always have a place to store an extra toothpick to replace the one that he usually has hanging out of his mouth!

Wood selection

As with other kits, I made this key chain from a small

piece of scrap like those we all have laying around the shop. Most often, I try to make them from high color woods, so I use a lot of Dymondwood and Colorwood. (Colorwood is similar to Dymondwood except that the colors are more in the pastel range and it is not resinimpregnated.) Unlike some of the other kits, key chain colors do not seem to be gender specific. Highly figured woods also sell well and wood from around knots and other defects are great sources for this material.

Design considerations

I usually make these key chains not as a single, straight tube, but shaped more like a large barrel. I just think it looks better design-wise. I also do not turn a lot of "curliques" and other small details into the wood, because of the time factor involved. Plus, I do not like a turning that appears to be too "busy"; I think that this detracts from the beauty of the wood and looks too amateurish. Simple is always best, but then again, that's just my opinion.

Preparing the blank

Whenever I use Dymondwood, I cut the blank about 1/4" to 3/8" longer than the tube. This permits me to salvage the blank in case the Dymondwood "blows out" the end during the drilling procedure. I use my chop saw to cut my blanks to length, but other methods can be used—they can even be cut by hand. In fact, Steebar sells a mini-aluminum mitre box with a small saw (No. PK-1241, \$16.75) to do just that! Note: in a recent Creative Woodworks & Crafts article on making Corian® pens, the author recommended using a small amount of water in the hole to dissipate the heat in order to prevent similar "blow outs" in the material. I tried it again here and I can't say that it actually helped for certain, but it surely can't hurt!

It is critical that you preserve as much of the material as possible when you turn it to round. Therefore, drilling the hole dead center is important. Connect the corners of the blank to locate its center and set the drilling vise up on the drill press so the point of the bit hits the center of the blank.

This kit uses a 10mm tube. Chuck a 10mm drill bit in the drill press and drill the hole. Be sure to raise the bit often to clear the chips and to dissipate the heat generated by drilling.



Parts for the key chain.



Luse a thick superglue to secure the tube in the blank. I have had good luck with this method over the years. However, I have noticed that occasionally the tubes do come loose and require re-gluing.

Recent advances in adhesive technology have produced different glues that other pen makers are using with excellent results. One such product is the new group of polyurethane adhesives. They are even being touted as a "stick to anything" glue! I have not used them, so I can't really comment on their effectiveness; but enough people are using them for me to seriously consider doing so myself.

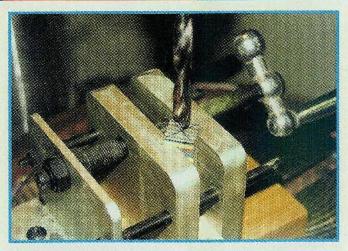
Thread the tube onto the tube insertion tool, apply the glue, and push it into position in the blank. I always stand the blank vertically on my workbench until the glue sets—about 15 minutes should do it.

Trim off any excess material on the chop saw, cutting up to, but not touching, the brass tube. Remove any glue that might have seeped into the ends of the tube with a sharp pen knife.

I always like to flood the two surfaces that show the veneers with superglue to bond any of the joints that might have separated because of the heat generated during drilling. I use the thin superglue for this task.



The blank is mounted on the lathe mandrel with 1mm bushings. Extra bushings are used to fill out the remaining length of the mandrel.



Locate the center of the ends of the blank and drill a 10mm hole through the blank using the drill press.

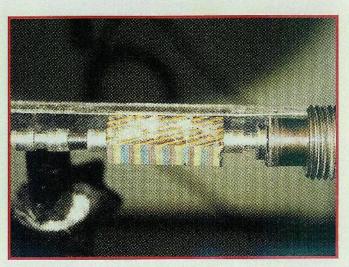
Mounting the blank on the lathe

Because the tubes are hollow, a mandrel system must be used to mount the blank on the lathe. I like to keep the turnings as close to the headstock of the lathe as possible and I use any extra bushings to "fill out" the remaining unused length of the mandrel bar. I think this eliminates much of the vibration that leads to chatter. This chatter tends to produce turnings that aren't very smooth and that are difficult to sand.

Turning

Once the blank is securely mounted on the mandrel, I begin the turning process with a sharp roughing gouge. I turn the blank until it just comes into "round" and all the flat spots have been removed. Hopefully, the outside diameter of the blank will fall somewhere close to 5/8" in diameter. If it doesn't, you can simply turn it into a smooth cylinder whose outside diameter matches that of the end bushings. This is certainly better than throwing away the blank and starting over—after all, someone will eventually purchase it!

I remove the key chain blank from the lathe at this point and I make sure that the brass tube is perpendicular to the wood. I do this on the disc sander. Be sure to support the blank with a mitre gauge and be careful

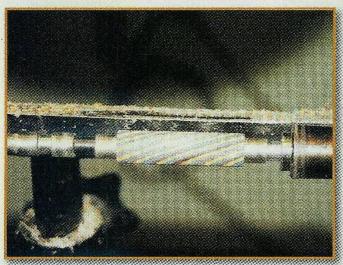


I use thick superglue to secure the tube in the blank. Be sure to "rough up" the shinny tube with a small piece of 120-grit abrasive paper before applying the glue—it sticks better.

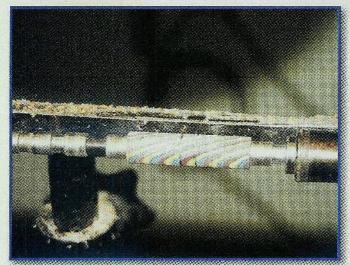
continued from page 45

only to remove enough material to expose the ends of the tube. Work slowly; you will be able to hear a definite change in the sound once the disc contacts the metal tube. Remount the blank on the mandrel. (**Note:** *Steebar* sells a 10mm barrel trimmer specifically for the 10mm tubes: No. PK-1129, \$17.80.)

Measure in 1" from each end. Turn a large bead shape that connects the left-hand line with the outside of the bushing. Remember, a bead is curved, not tapered! Be careful not to undercut the bushing. I find that a sharp skew works best for this procedure, but it can be done with a gouge as wel. Whatever you do, don't "scrap" the shape into the blank. Most likely, it will chip and tear and will be very difficult to sand. Turn the other end in a similar manner, this time starting at the right-hand pencil mark. You will have a short, 1/4" wide section remaining that will be blended into the beads during the sanding operation.



Turn the blank round, hopefully to around 5/8" in diameter.



Measure in 1" from the ends of the blank. This marks the starting point for the two beads which make up the project's shape.

Sanding and finishing

Although the key chain can be sanded by hand, I prefer to powersand it. I use a padded, Velcro sanding system and start with a 320-grit disc. I finish up with a 400-grit disc. It took less than 10 SECONDS to sand the project

using this method.

I like to apply a liberal coat of Danish oil to my blank, wait several moments and then wipe off all the excess oil, I find that toilet paper works great for this...so much so, that I actually mounted an inexpensive toilet paper roll holder on my lathe!

I usually allow the blanks to dry for several hours, preferably overnight. Then I use the three step buffing process that I've detailed in other articles: The first wheel is charged with a *Tripoli* compound. *Tripoli* is slightly abrasive and will remove any superficial scratches that remain. The second wheel is charged with a White Diamond compound that removes any excess *Tripoli* and begins the polishing process. The third wheel is charged with Carnuba Wax, which polishes the project to a high shine.



Beads are formed. The straight center section will be blended in during the sanding operation.



Pre-assemble the ring, upper cap, and the threaded bushing and press it into place with the pen assembly press. Press in the bottom cap in the same manner.

Assemble the parts

Attach the key ring to the upper cap and screw it into the upper stop. I like to pre-assemble these parts because I think that it makes it easier to line them up with the grain in the wood. Decide whether you want these parts either parallel or perpendicular to the grain and line up the parts accordingly. Press them into the tube with the Steebar pen press. Attach the bottom stop in the same manner.

I fill the tubes with round, wooden toothpicks because I market them as toothpick holders. But I tell people that they can be used for needle cases as well. I sell them in the \$12.00 to \$15.00 range, depending on from what material the blank is turned. Again, know your market!

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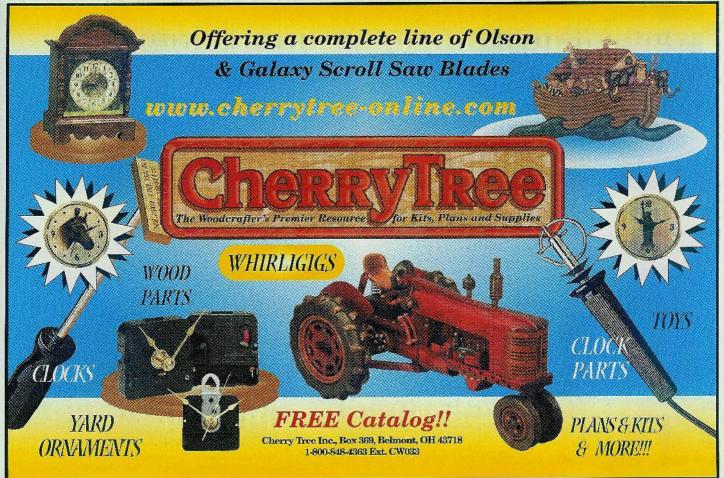
Part Number	Teeth per inch	Corian	Hardwood	Acrylic
AB #2/0	30	n/a	Marquetry	n/a
AB #2	23	up to 1/8"	up to 1/4"	up to 1/8'
AB #4	16	up to 1/4"	up to 1/2"	up to 1/4'
AB #5	16	up to 1/4"	up to 3/4"	up to 1/4'
AB #7	14	up to 1/2"	up to 1"	up to 1/2'
AB #9	14	up to 1"	up to 11/2"	up to 1"
AB #12	12	n/a	up to 2"	n/a
Metal	Metal			
MAB #3	42	up to 1/8"		
MAB #5	36	up to 1/4"		

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Wooden Perfume Holder

by Barry Gross, Mr. Solid Surface of BG Artforms



SUPPLIES

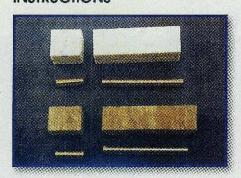
Wood; wood of choice or any type of acrylic and Corian® material—one piece 1" x 1" x 6"
Tools: Mini lathe; drill press; pen vise; barrel trimming tool; pen insertion tool; pen assembly press
Sandpaper, assorted grits (including 150, 220, 320, 400, and 600)

Wax paper Behlen Woodturner's Finish Triple EEE polish Perfume Pen Kit #PKPERF*

Hot Stuff CA Glue**-thin viscosity
Hot Stuff Super "T" Cyanoacrylate glue** (CA
glue)-medium viscosity bonds in approximately
15 to 30 seconds

*Available from Penn State Industries, www.pennstateid.com; (800) 377-7297. **Available from BG Artforms, 2189 Philip Drive, Bensalem, PA 19020; (888) 717-4202; or visit their website at www.bgartforms.com. Photos and descriptions of these sanding and glue products can be found on BG Artforms' website.

INSTRUCTIONS

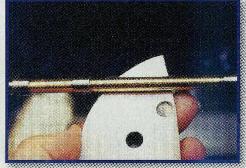




Step 2. Drill the blanks using a pen vise. This tool is used to assure a straight bore directly through the center of each blank.



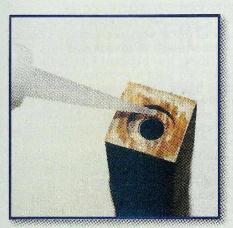
Step 3. When using a wooden blank, it is recommended that you coat the inside of the blank with thin CA glue. This is done for two reasons: first, if the material is 'punky" inside it will penetrate the wood and make it more stable; the second reason is to give the pen tube a better surface with which to bond with the wood.



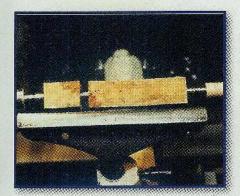
Step 4. Place the pen tubes on the mandrel and rough them up by lightly scratching the surface of the tube with a piece of sandpaper. This is done so the glue has a better surface with which to bond with the wood.



Step 5. Place the scratched up tube on the insertion tool and coat the tube with Hot Stuff CA glue. This is done by placing a small amount of glue on some wax paper and then coating the tube. Insert the tube into the blank, going in and out and then turning the blank around and going in and out of the other side in order to thoroughly coat the inside of the tube. The Hot Stuff CA glue is used here because it dries in 30 seconds, giving you a chance to thoroughly coat the inside of the tube.



Step 6. Once the tubes are dry inside the pen blanks, use the barrel trimming tool to square the ends of the tube with the pen blank.



Step 7. Place the prepared tubes on the mandrel with the appropriate bushings for the perfume kit. Make sure that the tool rest is approximately centered to the blanks. Note the orientation marks on each pen blank. This is done where you first cut the blanks in order to align the grain properly.



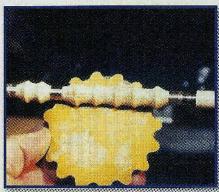
Step 8. Use a roughing gouge to turn the square blanks down to round cylinders.



Step 9. Mark the rounded cylinders where you want to make your beads or coves to give the perfume holder some character.



Step 10. Use a small spindle gouge or a *Spindlemaster* to create the coves and beads.



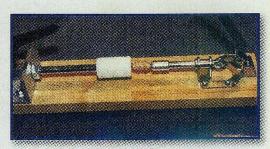
Step 11. Sand your piece as necessary to give it a smooth finish. Sanding to 600 or higher is not necessary; however, it only takes a few minutes more and your piece will look terrific!



Step 12. Everyone has their own technique for applying finish. I start by applying *Triple EEE* cream with a cheese cloth and then *Behlen* Woodturner's Finish using a paper towel.



Step 13. Arrange the finished pieces and the parts as per the manufacturer's instructions.



Step 14. Using the pen press, assemble the perfume holder as per the instructions found in the kit.



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Wall Mount for Telephone Center

by Scott Edgar





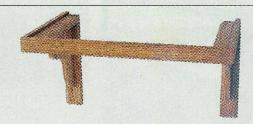
Well, it didn't take long to figure that something additional was needed for the telephone center I built in the last issue of Creative Woodworks & Crafts. Everyone that saw the telephone center wanted one, but several people said their phone jack was located on a wall away from their counter. If you have a limited amount of counter space, or your phone jack is not nearby, then the wall bracket may be the thing for you. It is easy to build and will give you additional choices for locating your phone.

This design provides a strong shelf, not fancy or frilly, that we have found has several other uses around our house in addition to acting as the telephone center. So, even if you did not build the telephone center in the previous issue, you still may want to try your hand at building this shelf.

Measure twice, cut once

Before starting this project, verify the dimensions of your phone center. The outside measurements of mine were 11-5/16" deep x 19-9/16" long. Take these measurements at the bottom trim.

Cutting all three pieces for the frame at the same time will ensure that all the frame pieces will match. First, cut the front piece 3/4" x 1-1/2" x 23" long, and two pieces 3/4" x 1-1/2" x 14" long. These will all be cut to the correct length after putting the rabbet in each piece. Set up a rabbet bit in your router and cut the rabbet in the upper inside corner of each piece, as shown in **Fig. 1**. After completing the rabbets, cut



the three to the correct length as shown in Fig. 2. The corners should be cut to 45°.

The shelf bracket (D) is cut from 1/2" plywood (see Fig. 3). Trace the shape from the full-size pattern and cut using a band saw or scroll saw. Use hot glue or double-sided tape to hold the pieces together while cutting.

The uprights (C) should be cut next (see **Fig. 4**). Cut two pieces 3/4" x 2" x 12" long. Set up your router and cut a roman ogee edge into the bottom outside corner of each piece. Cut a 1-1/8" deep, 3/4" wide notch in the outside upper corner. The top frame end will fit into this notch and the top of the upright will be flush with the rabbet. You should now cut in the 1/2" wide, 1/8" stopped groove. The groove can be cut by first drilling a sequence of 1/2" holes with a Forstner bit and then carefully straightening the edge with a chisel (see Fig. 5). Note: Fig. 6 shows the outer edge of the groove. This is the one that will be seen. Fitting the bracket into a stopped groove has two purposes: the shelf is stronger because the more downward pressure that is exerted the tighter the support will be pressed into the groove; and second, the groove will make a neater joint between the upright and the bracket. Finally, drill the required hole for the size wall anchors you will be using to attach the shelf to the wall.

Cut two pieces 3/4" x 1-3/8" x 11-3/4" long each for the supports (E). The end frame (B) and the supports (E) will be glued together with a couple of "0" biscuits for each side. You should cut all four slots for the biscuits (two for each end of the shelf) but don't glue them together yet (see Fig. 7). Keep in mind when you cut the biscuit slots in the end frame that the top of the support (E) will be flush with the bottom of the rabbet in the end frame (B). You will have to reset the biscuit depth for the slots in the end frame.

What's a joint like you doing in a place like this?

I haven't read much about using dowel joints lately, but I found they definitely have their place in woodworking. A strong glue joint is hard to achieve when gluing the end of a workpiece, because the glue will get drawn into the end grain. Biscuits work well, but many times the piece is to narrow

		LL OF MATERIALS	1000000
	rt Description	Size in inches	Quantity
oa	k or wood of choic	e	944, 33
A	Front frame	3/4 × 1-1/2 × 21-3/4	1
В	End frame	3/4 x 1-1/2 x 13 1/4	2
С	Upright	3/4 × 2 × 12	2
D	Bracket	1/2 x 7-7/8 x 8-1/2	2
E	Support	3/4 x 1-3/8 x 11-3/4	2

SUPPLIES

Tools: scroll saw ar band saw with 1/4" or thinner blade; drill press; miter saw; table saw; router with roman ogee bit and rabbeting bit; 3/8" and 1/2"-Dia. Forstner bits; dowel centers; "0" biscuits; biscuit jointer; 1/2" chisel Wood glue
Hot glue or double-sided tape
Sandpaper
3/8"-Dia. x 8" dowel

Finish of choice

for a biscuit. Dowels, however, will increase the strength of a joint and can be used in relatively small areas.

A set of dowel and tenon centers makes the construction of accurate dowel joints almost foolproof. They are inexpensive, use no electricity and are easy to use. Drill the hole for the dowel in the workpiece, insert the correct size dowel center, and press or lightly tap the end to mark the piece to be joined. The point in the center will mark the exact location for the hole. Drill the hole and you are ready for the dowel.

As you put the shelf together, you will need to drill the dowel holes. First drill the 3/8" dowel holes in the notch on the outside edge of each upright (see Fig. 8). Use a dowel point to locate the hole in the end frame. The upright should be flush with the back end of the end frame. Glue the uprights to the frame ends, making sure they are square (see

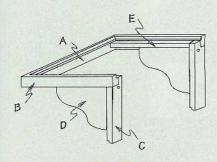
It's now time to dry fit the support (E) and the front frame to the glued-up ends. You should drill the dowel holes in the front ends of each support. With the support clamped in place, install a dowel point and mark the location for the dowel in the front frame (see Fig. 10).

Now glue the support to the end frames and the bracket into the groove and against the frame end.

Finally cut the dowel to fit, glue, and clamp the front frame on each end frame and support.

The wall bracket frame is now ready for the telephone center; you can now sand, finish to match and mount it to the wall, Make sure it is firmly attached.

If you are going to modify this design for a shelf, you will need to shorten the length of the end frames and supports by 4-1/4" each. This will provide you with a 9" deep heavy-duty shelf. Cut a piece of 1/2" plywood to fit into the frame. After cutting to fit, use a straight bit in your router table to cut a 1/4" deep rabbet in the three outside edges so the plywood will fit flush with the top of the frame.



Assembly Drawing

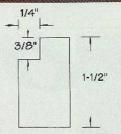


Fig. 1. End view of pieces A and B. Cut a rabbet on the inside upper corner of each piece.

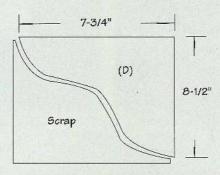


Fig. 3. Cut the shelf brackets.

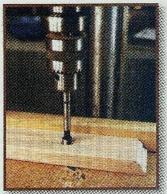


Fig 5. Begin making the stopped grooves in the upright pieces.



Fig 7. Prepare to join the supports to the end frames

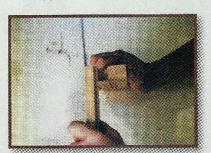


Fig 9. Glue the uprights to the end frames

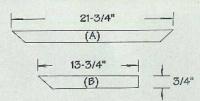


Fig 2. Cut the frame pieces to length.

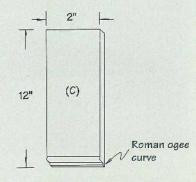


Fig. 4. The uprights.

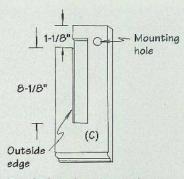


Fig. 6. Cut the stopped groove in the upright piece

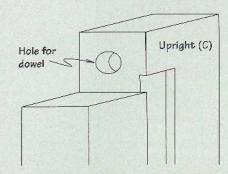


Fig. 8. Bore the hole in the upright which will receive the dowel that connects the frame to the upright.



Fig 10. Join the front frame to ends

INTARSIA PROJECT

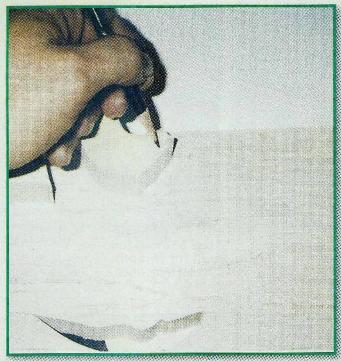
Heron

Patterns Located in Full Size Pattern Section No. 2!

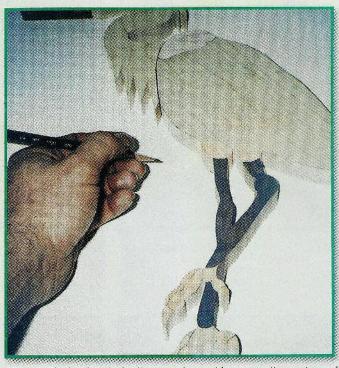
by Darin Liles of Shirley, AR



INSTRUCTIONS



Step 1. Start by tracing pattern onto tracing paper. This will allow you to better select your stock for the wood grain. Transfer the head and neck first. Begin cutting them to shape and use the previous piece to make a more accurate cut line.



Step 2. Fit the body to the neck, making sure the edge of each piece is sanded to 90° for a better fit. Cut and fit the legs and feet to body.





Step 3. Start rounding the larger pieces with a drum sander.



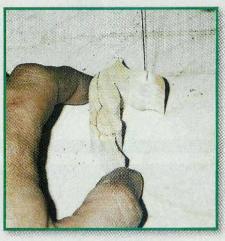
Step 4. For sanding the neck area, a Dremel Moto-tool with a sanding drum works best.



Step 5. The Electro-File works very well for smoothing up after the Dremel Moto-tool.



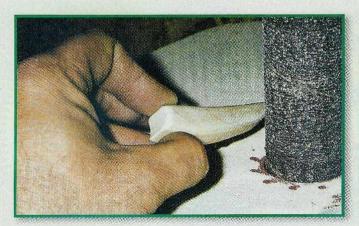
Step 6. Next, drill a hole for the glass eye and dry fit it.



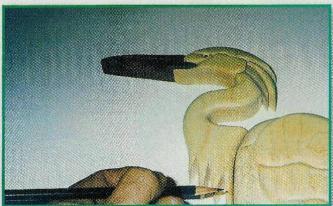
feet.



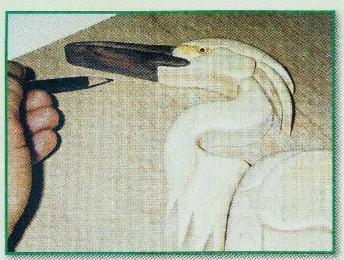
Step 7. Cut and fit the talons to the Step 8. After all is rounded, sanded and fit together, apply Danish oil. Glue the head, body, and leg pieces together.



Step 9. Cut out and round the wing section.



Step 10. With the 5-minute epoxy, glue the wing together. After dry, glue the wing to the body.



Step 11. Place the bird on the 1/4" plywood and trace it out. Cut on the inside of the line at a slight angle.



Step 12. Glue the intarsia to the backer board. Clamp it or use a brad nailer to fasten it in place.



Step 13. Apply a clear coat to the piece with either a clear or matte finish. Attach hanger of choice, hang and enjoy!

Wood so good you won't want to cut it!

work. All the plies are birch, with no inner voids so the edges finish beautifully. Our Scroll-PLY is always clear and perfect on one face, though the back may have an occasional plug. Just call for special sizes!

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12"	' x 24"	2.40	1.90
24'	' x 24"	5.00	4.50
1/4" Sc	roll-Ply		
12"	' x 12"	1.50	1.25
12"	' x 24"	3.00	2.50
24'	' x 24"	6.25	5.50
1/2" Sc	croll-Ply		
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	12"x16"	4.30	5.70	6.70
POPLAR	12"x20"	5.40	7.20	8.50
ASH	12"x12"	4.20	5.60	6.60
	12"x16"	5.60	7.50	8.80
BASSWOOD	12"x20"	7.00	9.30	10.90
BIRCH	12"x12"	5.20	6.90	8.10
OAK	12"x16"	6.90	9.20	10.80
BUTTERNUT	12"x20"	8.60	11.50	13.50
MAPLE				
	12"x12"	6.50	8.70	10.20
WALNUT	12"x16"	8.70	11.60	13.70
PURPLEHEART	12"x20"	10.90	14.50	17.10
CHERRY				
	12"x12"	7.90	10.50	12.40
SATINWOOD	12"x16"	10.50	14.00	16.50
MAHOGANY	12"x20"	13.10	17.50	20.60

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DRAFT HORSE

Patterns Located in Full Size Pattern Section No. 2!

by Alan Martinson

SUPPLIES

Wood: butternut—one piece 3/4" x 8" x 26"; mahogany—one piece 3/4" x 4" x 12"; aspen one piece 3/4" x 4" x 12"; Western red cedar one piece 3/4" x 8" x 8"; walnut—one piece 3/4" x 4" x 4"

Tools; scroll saw with assorted blades: drill press with assorted sanding drums and sanding mop; oscillating spindle sander (optional); pneumatic sander (optional); palm sander

Graphite and white transfer paper fracing paper (optional)

Wood glue Masking tape

Masking tape
Assortment of clamps
Clear finish of choice

Hanger of choice.

INSTRUCTIONS

Transfer the pattern

Trace the pattern onto tracing paper. Having the pattern on a relatively transparent sheet will allow you to better judge the grain direction of each piece as you lay it out. Use the graphite paper (or if the wood you are using is very dark, the white transfer paper) to trace the pattern onto the workpiece.

Cut and fit

With a scroll saw, cut the pattern pieces to shape. As you cut each piece, try to stay just outside the traced line. This will provide room to sand the edge once all cuts have been made. Sand each piece using the sanding drums or oscillating spindle sander. Be sure to sand to 90° on each edge which will join with another. Use the finished edge of each cut and sanded piece to trace a more accurate cut line on the adjacent piece (or pieces), thus ensuring a tight fit. Use masking tape to hold the pieces together after they are cut and fit.

Shape, assemble and finish

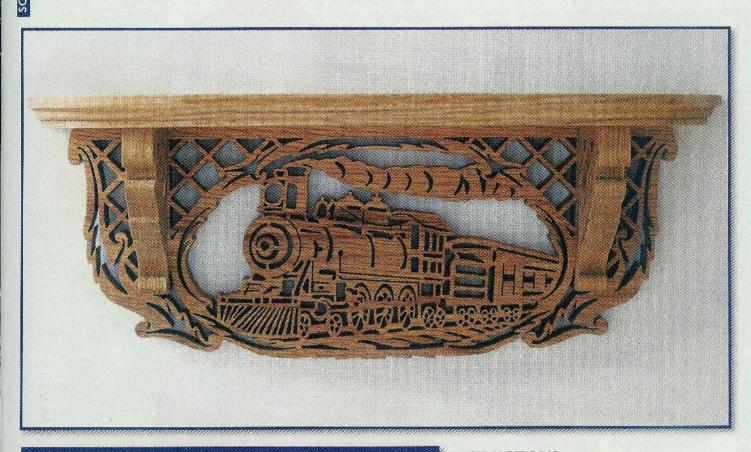
Once all pieces have been cut and fit, begin contouring them. Various sanding implements can be used to accomplish this. Smooth each piece with a sanding mop until you are satisfied with its shape. When satisfied, reassemble the pieces on the backer board and trace around the assembly. Saw the backer to shape, cutting slightly inside the line.

Glue the pieces in place. Start in the middle and work your way outward, applying small amounts of glue on the lower portions of each piece. Try to avoid letting any excess glue squeeze out.

When dry, apply three or four coats of clear finish, sanding lightly between each application. Attach hanger and enjoy!

Train Shelf

by Matthew Romack



SUPPLIES

Wood: oak or wood of choice—one piece 3/4" x 5-1/2" x 19" (for the shelf), one piece 3/4" x 6-1/2! x 17" (for the back), two pieces 3/4" x 3-3/4" x 4-5/8" (for the sides)

Tools: scroll saw with blades; drill press with 1/16" bit Temporary-bond spray adhesive or rubber cement Wood alue

Clamps

Sandpaper, assorted grits

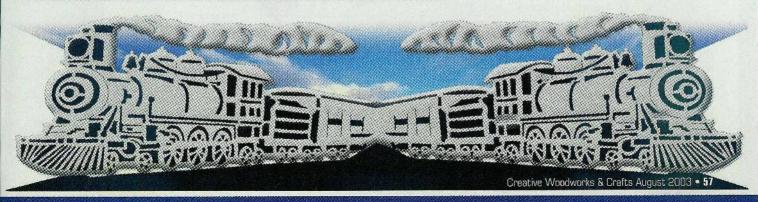
Finish of choice

Two 1-1/2" wood screws (optional)

INSTRUCTIONS

Attach the patterns to the wood using spray adhesive or rubber cement. Bore 1/16" blade entry holes. Make all cuts. Remove patterns and sand as needed.

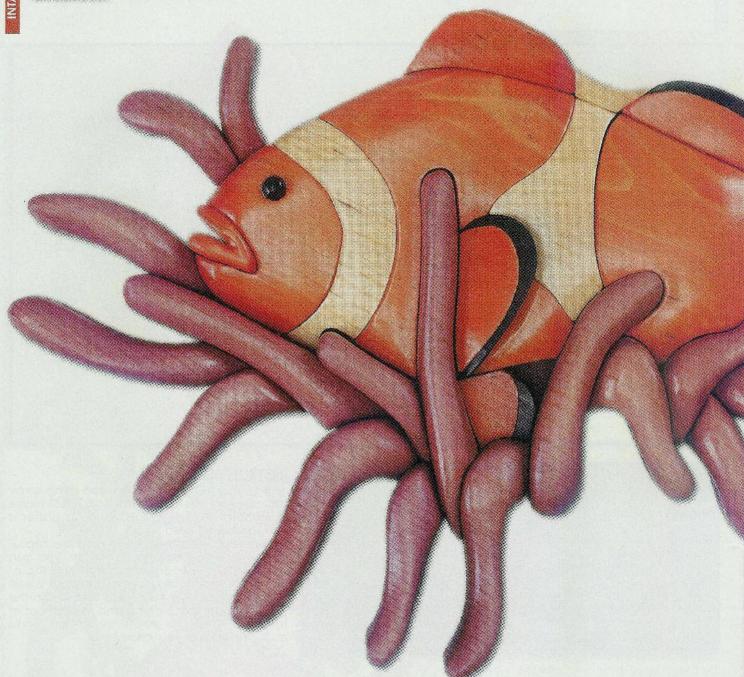
Glue and clamp the shelf onto the top of the back piece. For extra strength, you can add two 1-1/2" wood screws from the top of the shelf into the solid areas of the back piece where the sides go. Next, glue and clamp the sides onto the back piece and the bottom of the shelf. When the glue is dry, unclamp and apply the finish of your choice.





Percula Clown Fish

by Lynn Reno



INTRODUCTION

This colorful Percula Clown fish was completed using segmentation techniques. So for those of you that have seen intarsia projects, but didn't feel up to the task, here's a way to help you get the look in a different way.

INSTRUCTIONS

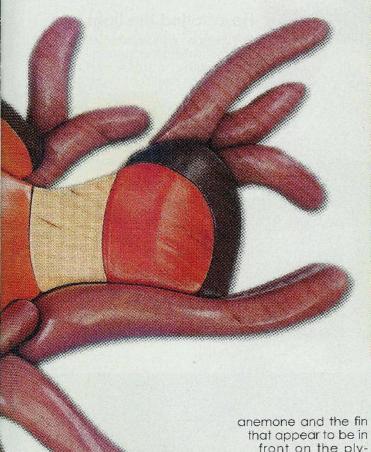
Cut the pieces

Use the spray adhesive to attach a copy of the pattern

to the wood. Cut the pieces that are whole, or in front, first, then the pieces that are partial, or behind. Cut the pieces out individually, rather than following the pattern lines aimlessly. Make a mark on the rear of each piece to help prevent shaping the wrong side. Drill the hole for the eye. Remove the paper, any residual adhesive, and burrs from the backs.

Shape the pieces

Using double-sided tape, put the pieces of the



SUPPLIES

Wood: pine or other wood light in color—one piece 3/4" x 8-1/2" x 12-1/2": Baltic birch plywood—one piece 1/4" x 8-1/2" x 12-1/2" (for the backer), one piece 1/4" x 6-1/2" x 11" (for the riser)

Tools: scroll saw; No. 5 blades; drill press; 1/4"-Dia. drill bit; flex-drum sander; spring clamps

Temporary-bond spray adhesive

Double-sided tape Tack cloth

Old paintbrush

Acrylic paint—Orange

Rit® dye*—Black, Purple Wax paper

Wax paper

1/4"-Dia. x I" dowel (for the eye)

Very fine sanding sponge

Finish of choice

nonger

*For more information on Rif" dyes contact Rif" Consumer Affairs, P.O. Box 21070 Indianapolis, IN 46221 1070: (317) 231-8044, 9:00 to 4:00 Eastern Time.

anemone and the fin that appear to be in front on the plywood for the riser, matching up the wood grain to place them properly.

Using a ballpoint pen refill (it fits in the tight spaces

easily), draw the outline of the pieces. Cut out just to the inside of your drawn line.

Shape with a medium-grit sleeve on the flex-drum sander. Sand the front pieces first, the fish second, then the pieces behind the fish, using the shaped pieces to determine the height of other pieces. Make some of the anemone fingers look like they are coming from under or behind, make a depression in some of them so they look like they are flowing, and round the edges. Taper the fin toward the front of the fish. Taper the fish toward the top, bottom, and front. Make the tail fin look like it is curving around to the side. Take enough wood off the bottom fin so that it appears to be under the fish. There is a piece to the right of the bottom fin toss it. Mark the height of the top of the fish along the edge of the top fins. Taper them down to that point, adding a bit of concavity to them. Round the mouth and dowel for the eye.

Sand all pieces with increasingly finer grits, finishing

with the 220-grit sleeve. Clean up any rough edges. Use tack cloth to remove the dust.

Finishing

Stain the orange pieces with a wash using 1/2 orange acrylic paint and 1/2 water. For the black pieces, mix 2 tbsp black dye into 1 cup hot water. For the purple pieces, mix 2 tbsp purple dye into 1 cup hot water. Allow to cool. Use an old paintbrush to apply. I also stained the riser purple. Allow to dry thoroughly. There will be some raised grain; however, if you sand now, you risk exposing some bare wood, so don't worry about that now.

Fit a 1/4"-Dia. dowel into the hole for the eye so it sticks out from the surface. Cut extra from backside. Glue pieces to riser. Glue all the pieces together on top of a piece of wax paper with a copy of the pattern underneath to help with placement. Allow glue to set.

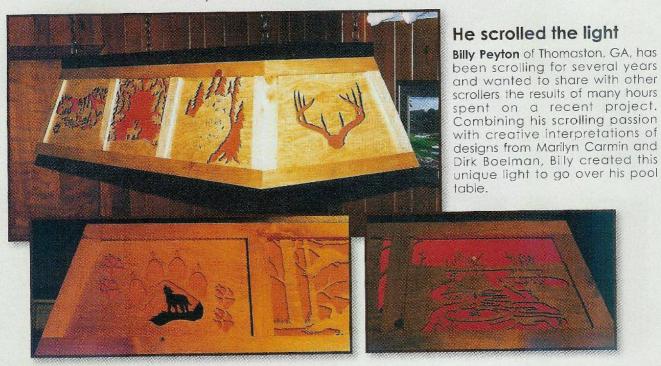
Trace the outline onto the backer. Don't cut out the open spot from the piece you tossed-stain that spot purple. Cutting at an angle, cut out backer just to the inside of the outline.

Spread wood glue on the backs of all the pieces. Secure the backer to the project with spring clamps. Remove the clamps after 20 minutes or so.

I used *Deft* semigloss lacquer finish for my project. I spray on two coats, then sand lightly with a very fine sanding sponge. This will take care of the fuzzy grain and protect the color. Remove any dust and spray a third coat, and even a fourth if you like. Attach hanger to back.

Reader's Gallery

These woodworkers may take time out for recreation and vacations, but they're never far from the call of the wood.





Hooked on slabs

Leland Smith of Crescent, IA, found a tree slab while vacationing in Colorado and used it to create this version of Leader of the Pack, designed by George Ahlers. The last we heard, Leland was so inspired, he cut and slabbed a walnut tree, purchased a sander, and was patiently waiting for the wood to dry so he could make more...



Teach a man to fish...

Chuck Tyler of Somerset, KY went fishing for Striped Marlins in Cabo San Lucas, Mexico, with his brother and sons. Not only did everyone catch Marlins, they also later received intarsia Marlins made by Chuck as Christmas presents! Shown, from left to right, with multiple Marlins from a Robert Hlavacek, Sr. design, are Brian, Chuck, Dan, and Scotty.

Have a project you'd like to share with other readers? Submit photos and a brief description to editors@woodworksandcrafts.com or to Creative Woodworks & Crafts, Attn: Editors/Reader's Gallery, 243 Newton-Sparta Road, Newton, NJ 07860.



SCROLLING TIPS

by Robert J. Hlavacek, Sr. of Wildlife Intarsia Designs

I'm sure by now that most of you, the fans of *Creative Woodworks & Crafts*, have heard about the technique of placing clear, 2"-wide package tape on your scroll saw project before cutting it out.

If this tip is new to you, the benefits of this process are smoother cutting, longer blade life, and most importantly, the elimination of burnt cut edges. To demonstrate this, I placed a piece of tape down the center of a 3/4"-thick cherry board and proceeded to cut it with a No. 7 blade. As you can see in **Fig. 1**, the first 3/8" or so of the board is okay. At that point, the blade heated up enough to discolor the edge. As soon as the blade reached the taped section, the cut became much smoother and the burning stopped. Once the cut passed the taped section, the burning began again. I don't know who conceived this great idea, or how or why it works, but it does,

Problems and solutions

A few minor problems arise when you use tape on your project. These are: the buildup of static electricity which will attract sawdust to the pattern, a slippery surface, and glare from the shine of the tape.

Eliminate the static problem by wiping the surface with a fabric softener sheet, the same type that you toss in the clothes dryer to remove static from your laundry.

To get traction on that slick surface, use rubber fingertips (see Fig. 2). You can use them on all fingers or just a few and still have a couple left over as the box I purchased was a package of twelve (see Fig. 3). They come in various sizes, and you can buy them at a minimal price at your local office supply store.

And finally, if you find the glare from the tape bothersome, one very light coat of *Delta* or *Krylon* matte spray varnish will solve the problem. Both products dry extremely fast and reduce the glare considerably.

I hope you find these tips helpful in making your scrolling project more enjoyable.

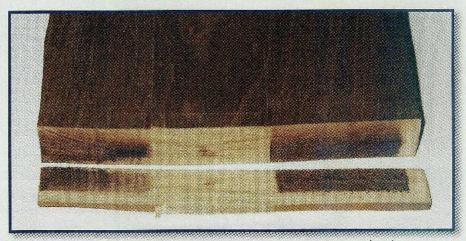


Fig. 1. Notice the difference in the edges when cutting taped and untaped portions of a wood block. Burning results on non-taped areas.

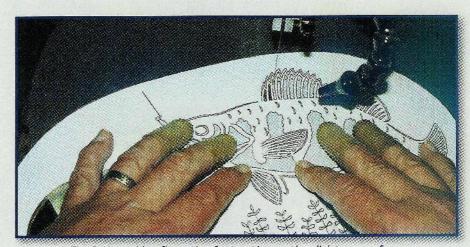


Fig. 2. Use rubber fingertips for traction on the slick tape surface.



Fig. 3. Purchase a supply of rubber fingertips for a small cost at your local office supply store.

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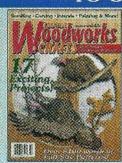
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JANUARY 1999 Dragon Shelf, Slotted Ornaments, British Naval Flintlock (Intarsia), & more!



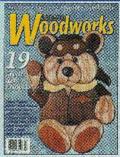
MARCH 2001 Wild Turkeys, Fretwork Music Box, Nascar Plaque, 3-Dragons Nightlight, Fretwork Cross Candleholder, Grizzly Bear, Hawk, Sharpening Carving Tools, and much more!



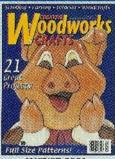
MARCH 1999 King Penquins (Intarsia), Lion Inlay, Queen Anne Fretwork Frame, and more!



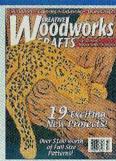
Patriotic Plague Breadboard, K-9 Rookie Desk Set. Ram Mini Clock Fretwork Shelf, Two Lighthouses and more!



JUNE 2001 Loons Intarsia, Wolf Clock, Golf Desk Set, Duck Lamp, Horse Plaque, and more!

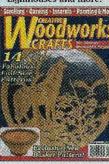


AUGUST 2001 NASCAR Shelf, Pumpkin Puzzle, Five Robins Clock, Mission Bench, Victorian Sled, and more!

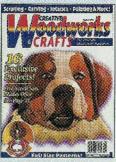


OCTOBER 2001 Angelfish Intarsia, Wedding Ensemble, Carved Pup, Bluegill with Lily Pad, Sweetheart Box, and more!





APRIL 1999 Orca Ornament, New Basket Design, Bear, Piano Music Box, and more!



AUGUST 1999 Dog Intarsia, Pheasant Collector's Plate, Love Birds Clock, and more!



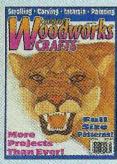
OCTOBER 1999 Wolf Intarsia, Eagle Dreamcatcher, Cougar, Whitetail Buck, "Bless Our Home" Silho, and more!



NOVEMBER 1999 Two Lighthouse Mini Clocks, Dragon, Butterfly Band Saw Box, Mini Grandmother Clock, and more!



JUNE 1997 Tiger and Eagle Mini Clocks. Midnight Snacker (Raccoon) Intarsia, Fretwork Eagle, Carving a Frame Christopher Mantel Clock, and more!



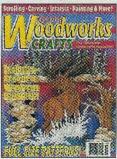
AUGUST 1997 Intarsia Cougar, Cardinal Mini Clock, English Pipe Box, article on Marvin Kaisersatt- "Carver of the People", Two Wolf Scroll Saw Projects, and more



Praying Hands and RV Mini Clocks, Dinosaurs 4-Pack Toy, Santa Fe Pueblo Fabulous Fretwork Clocks. and more!



SCROLL WORLD 100% Scroll-Saw Projects! African Mini Clock, "Crown of Thorns" Wall Shelf, Fall Harvest Relief Plaque, Impala Antelope Intarsia, Nature's Way Plague, and more

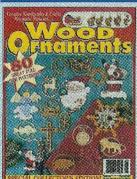


DECEMBER 1997 Scrolled Baskets, Family Tree, Thunderbird Silhouette, Carving a Santa Ornament, and more!

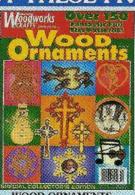


MARCH 1998 Fretwork Trivet, Scrolled Phone & Accessory Stand, Northwoods Nightlight, and more!

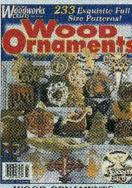
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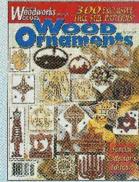
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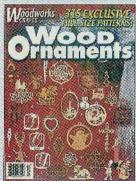
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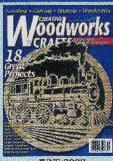
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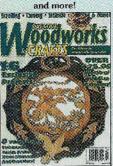
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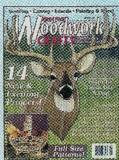
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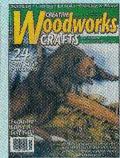
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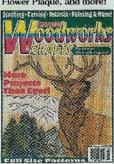
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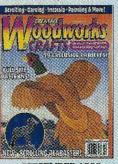
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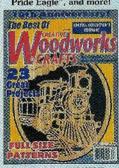
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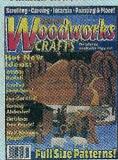
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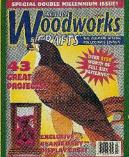
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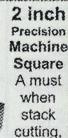
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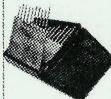
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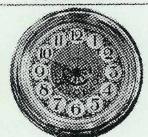


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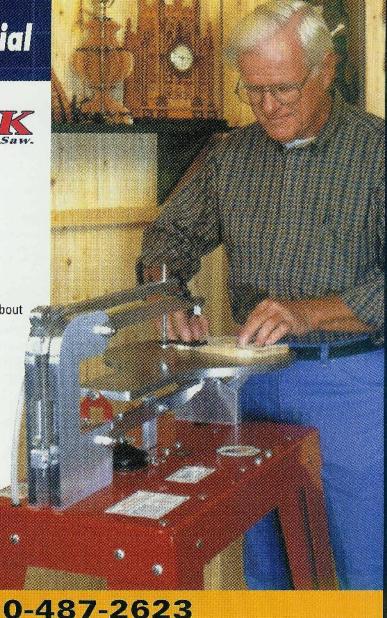


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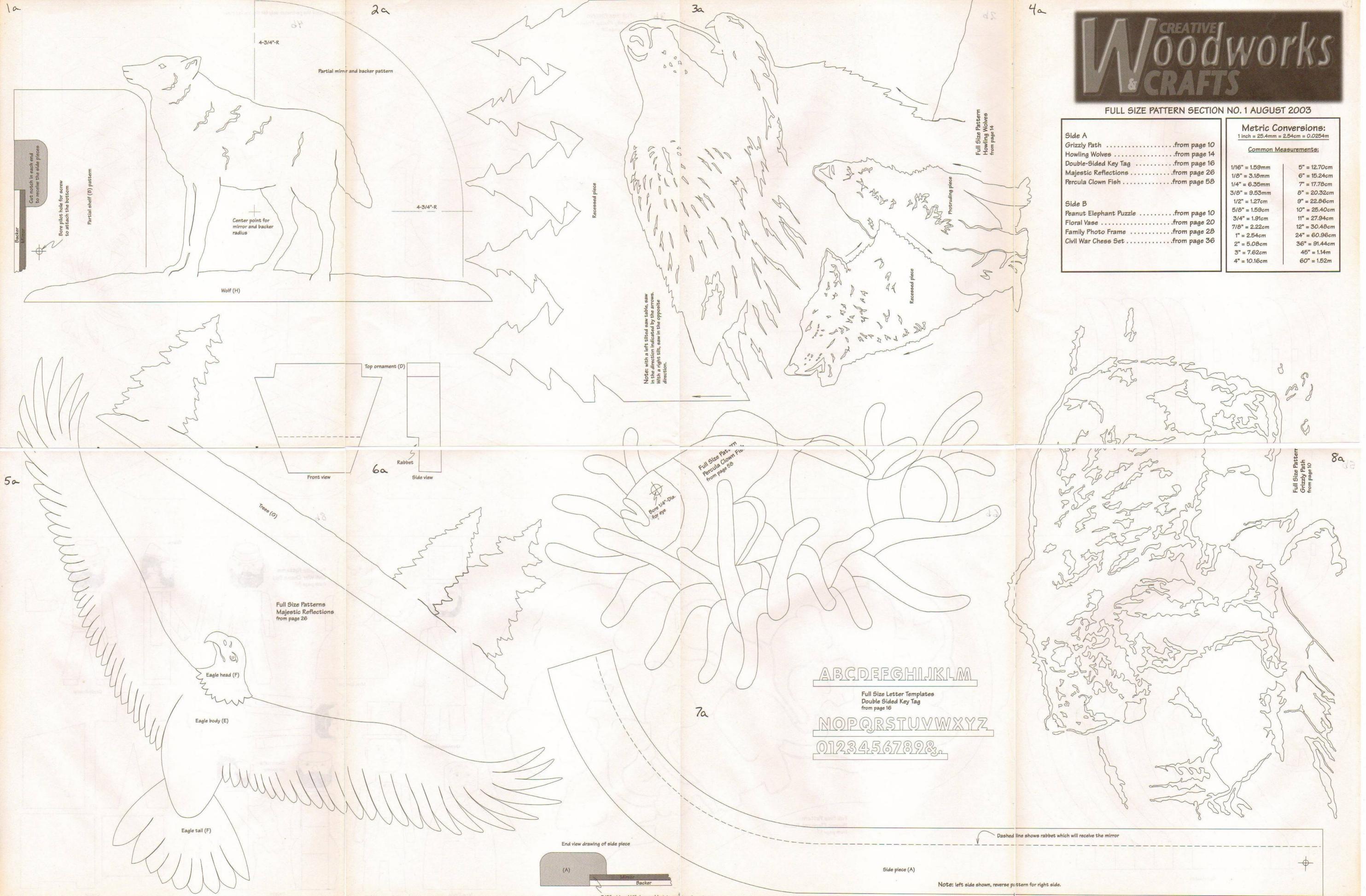
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Side B

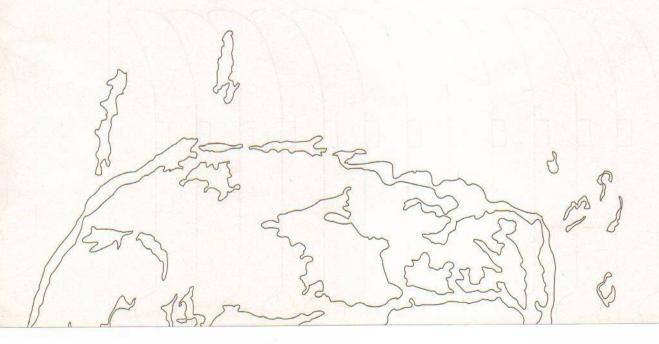
Peanut Elephant Puzzlefrom page 10
Floral Vasefrom page 20
Family Photo Framefrom page 28
Civil War Chess Setfrom page 36

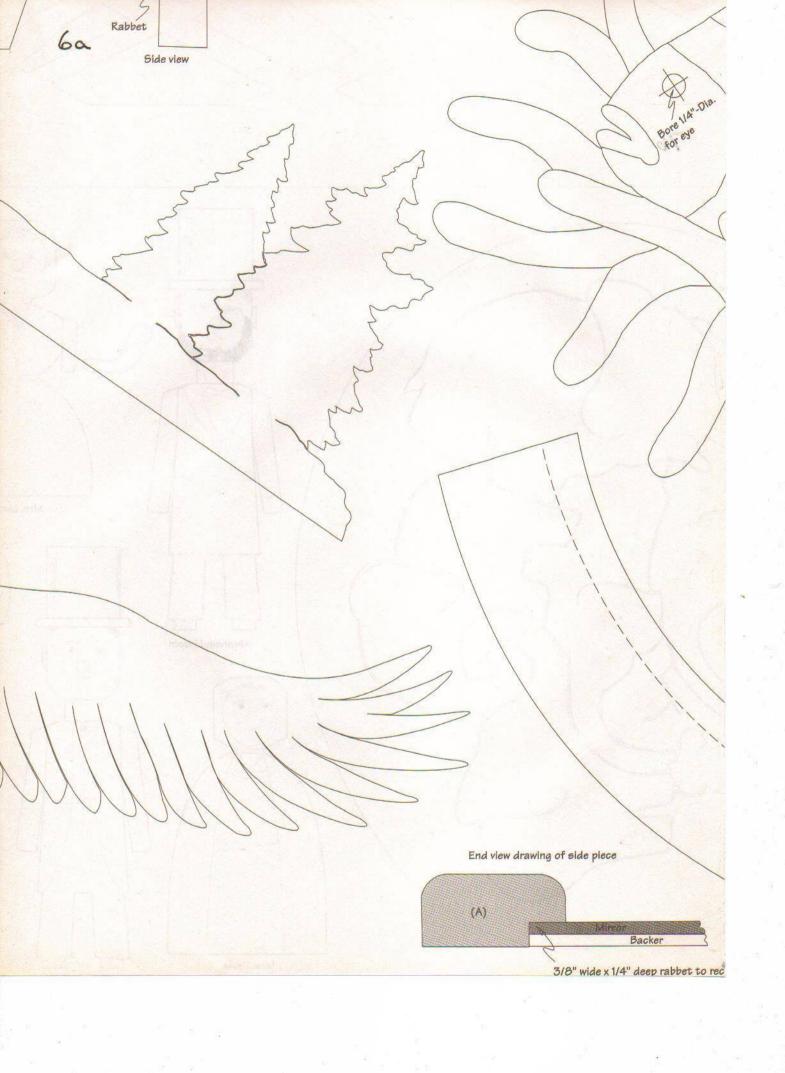
Metric Conversions:

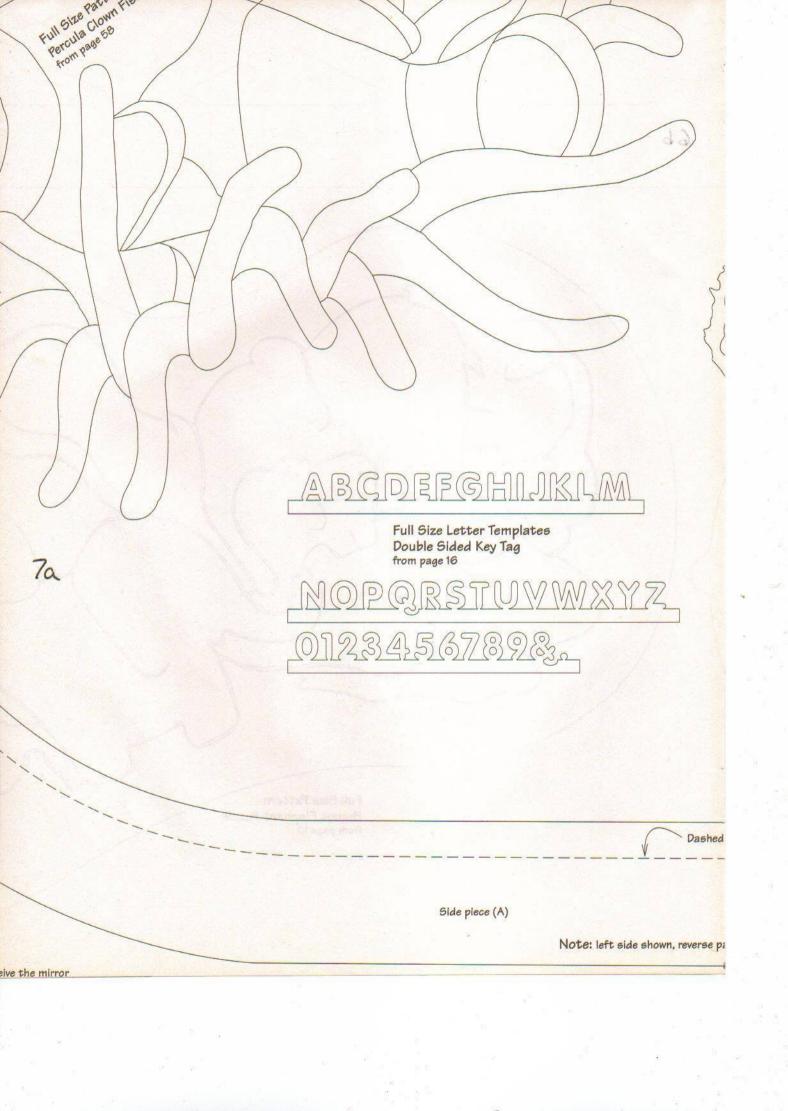
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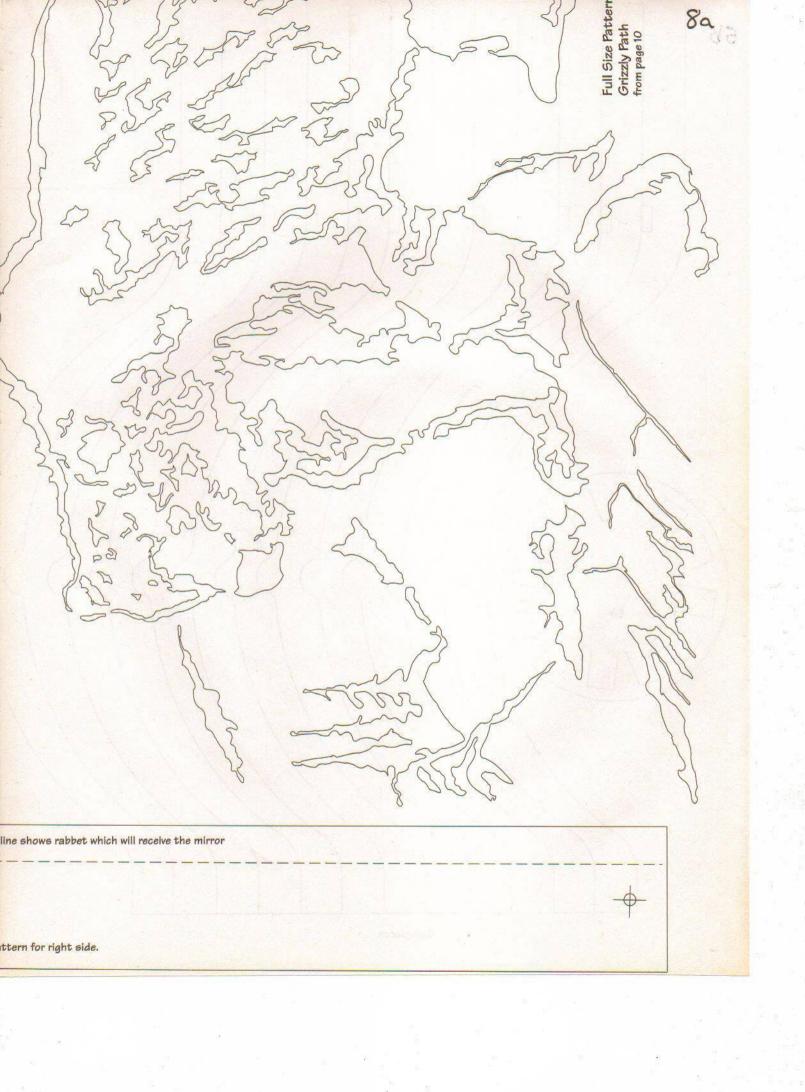
Common Measurements:

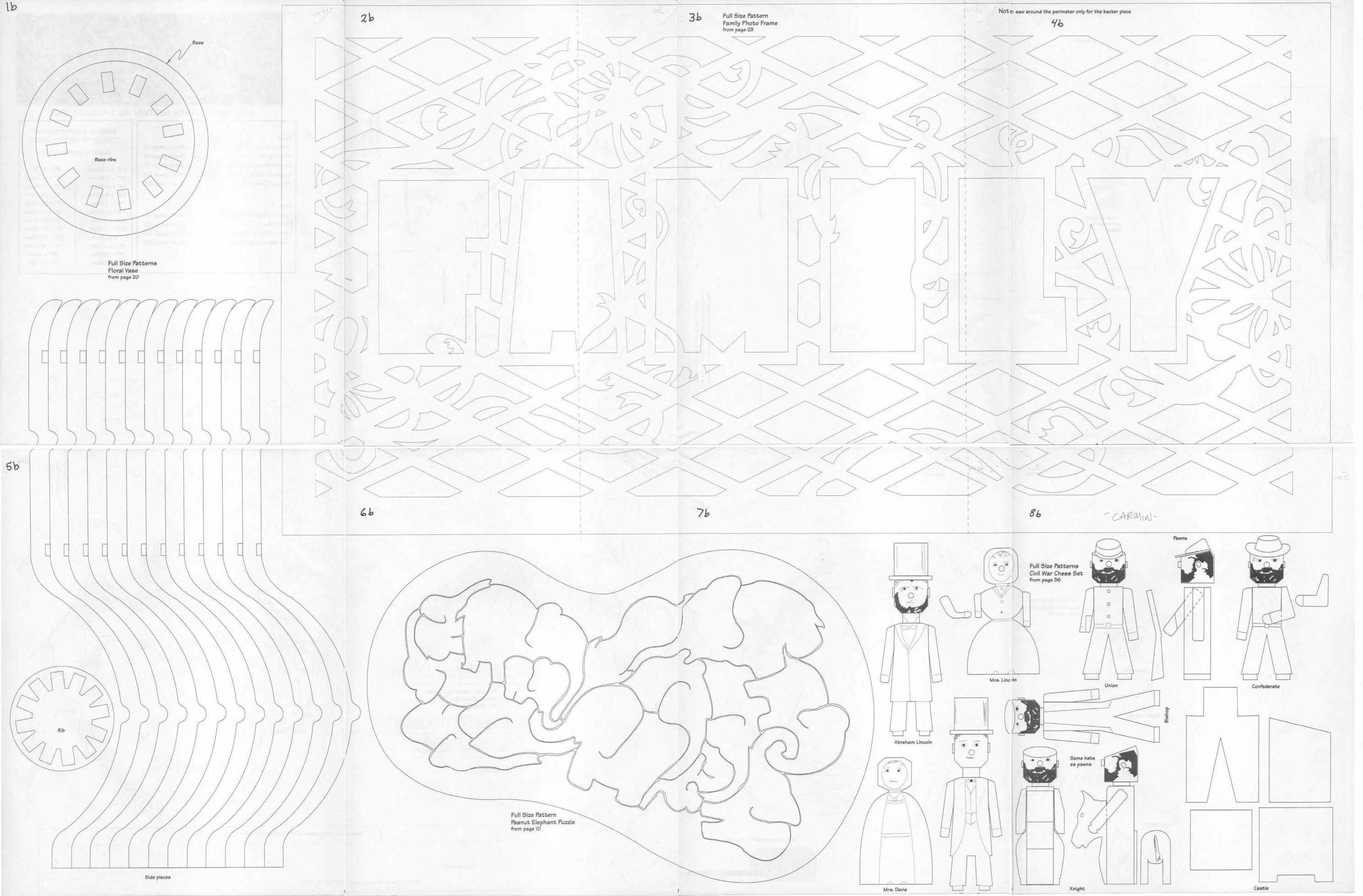
1/16" = 1.59mm 5" = 12.70cm 6" = 15.24cm 1/8" = 3.18mm 1/4" = 6.35mm 7" = 17.78cm 3/8" = 9.53mm 8" = 20.32cm 1/2" = 1.27cm 9" = 22.86cm 5/8" = 1.59cm 10" = 25.40cm 3/4" = 1.91cm 11" = 27.94cm 7/8" = 2.22cm 12" = 30.48cm 1" = 2.54cm 24" = 60.96cm 2" = 5.08cm36" = 91.44cm 3" = 7.62cm45" = 1.14m 4" = 10.16cm 60" = 1.52m

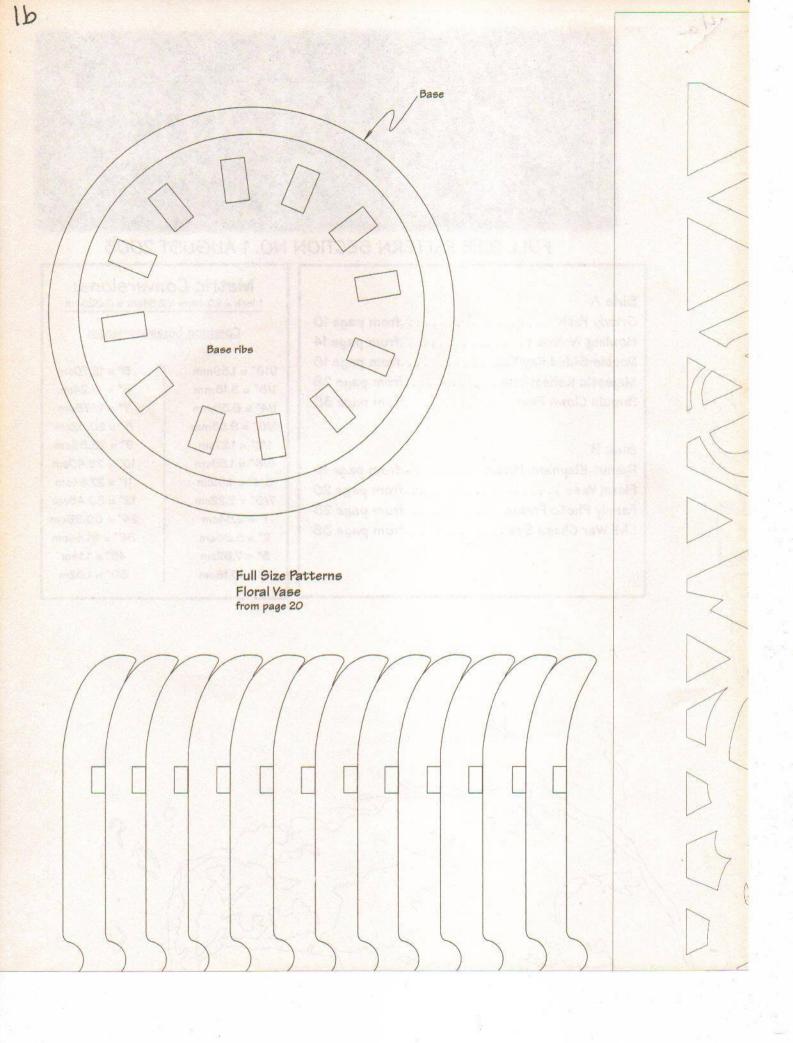


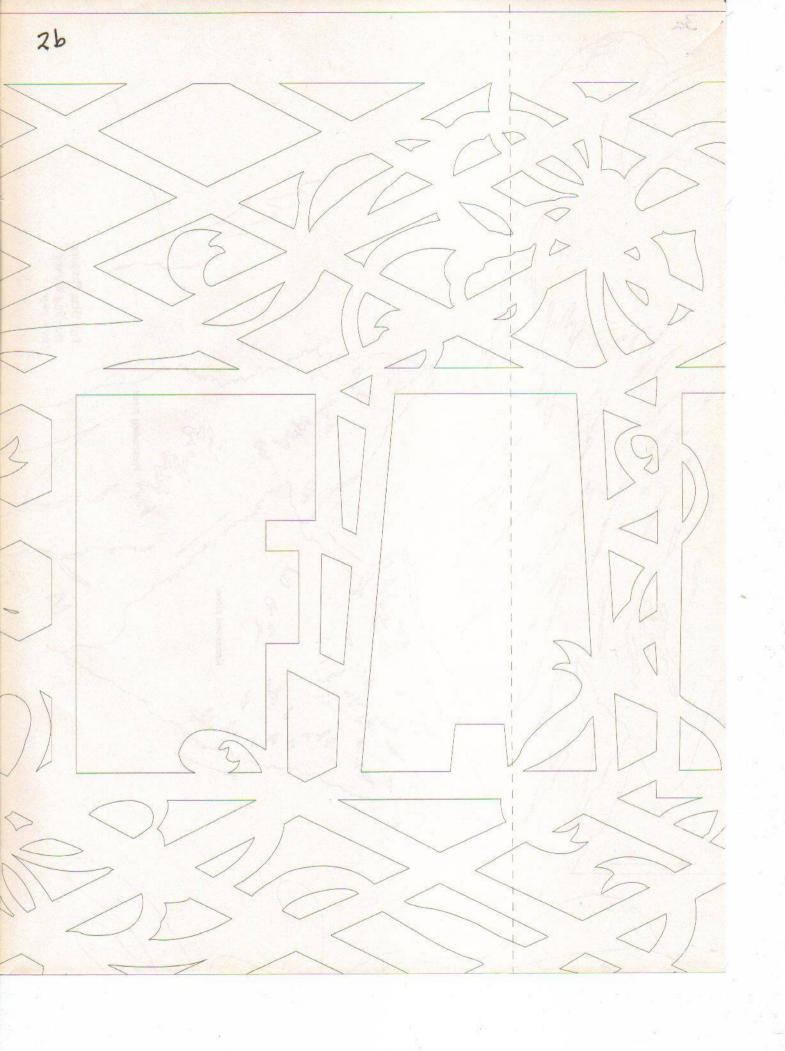


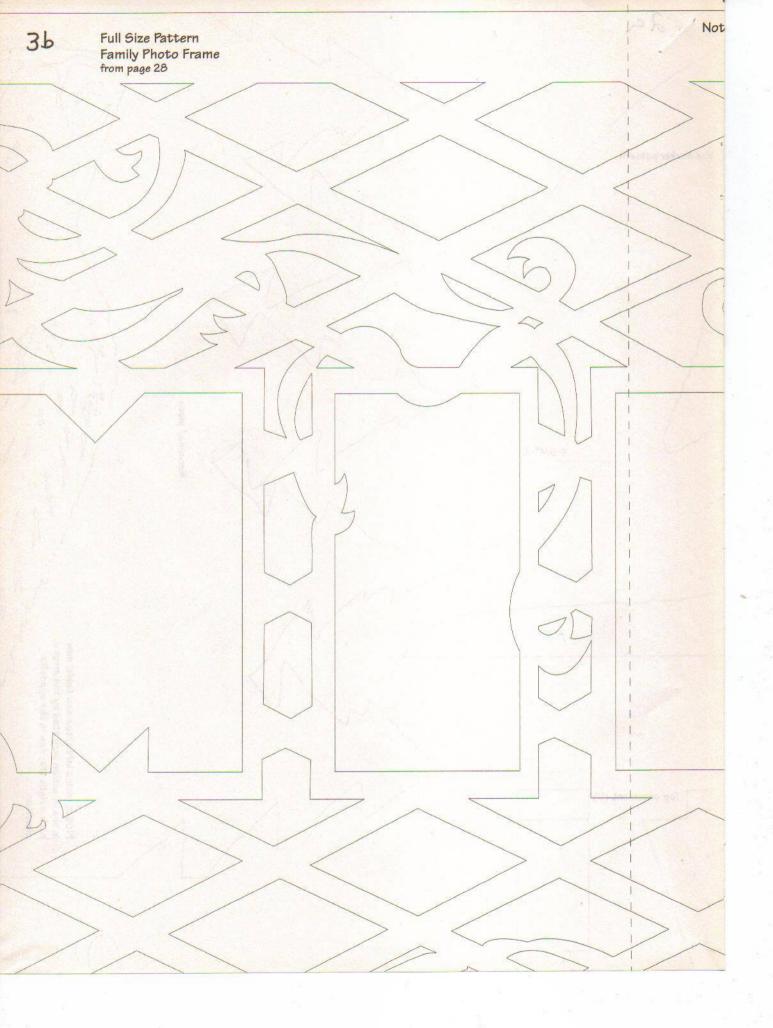


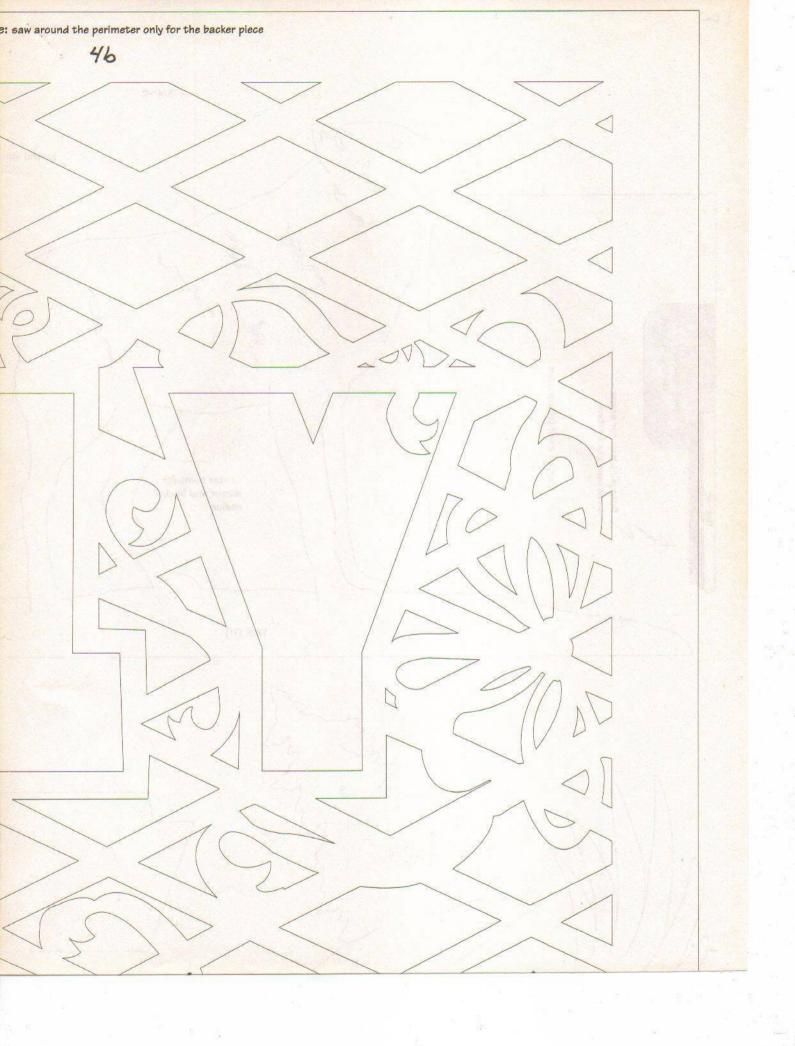


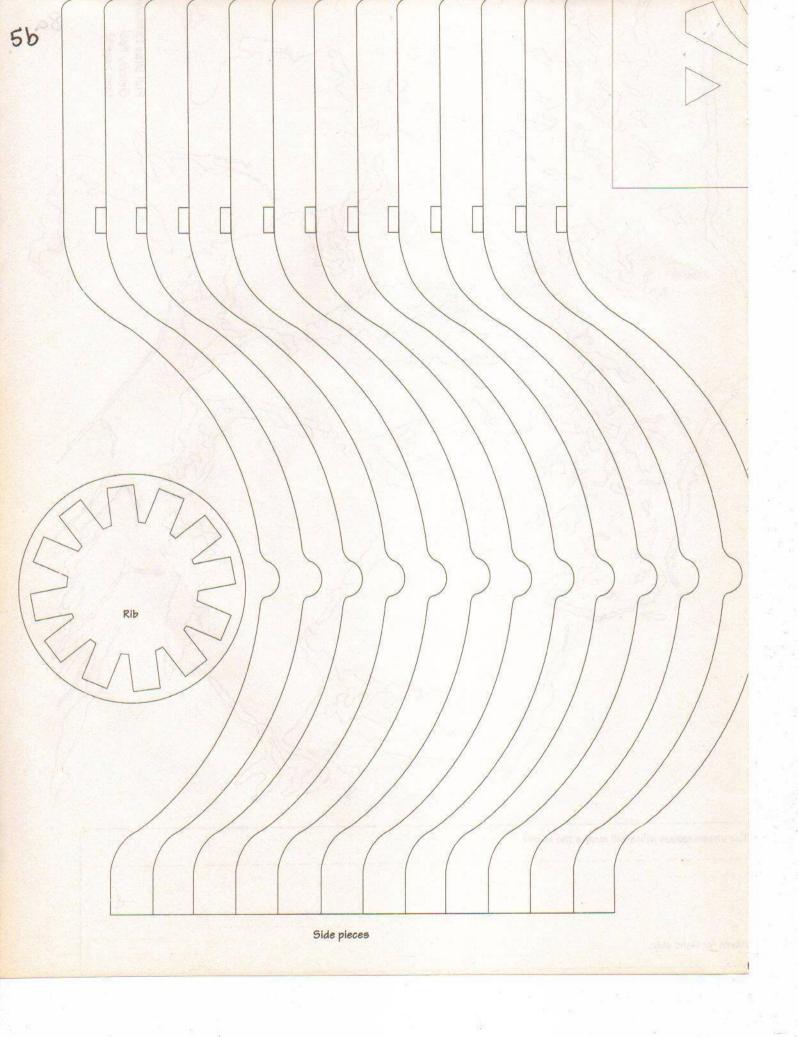


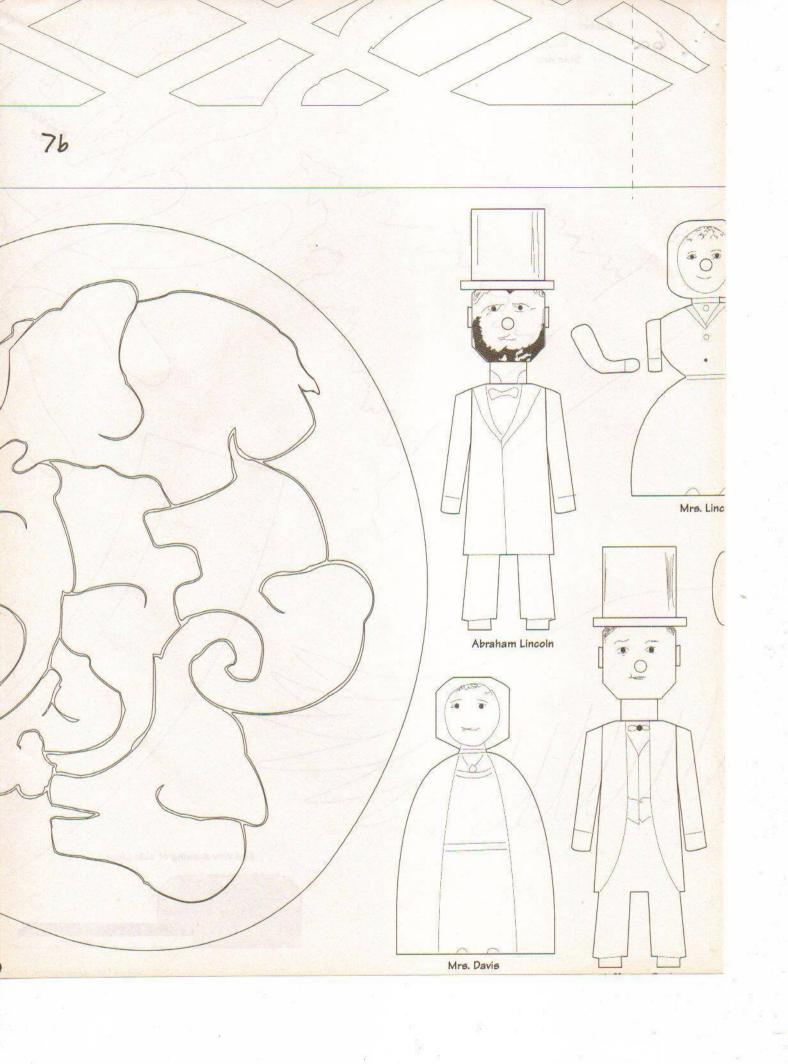


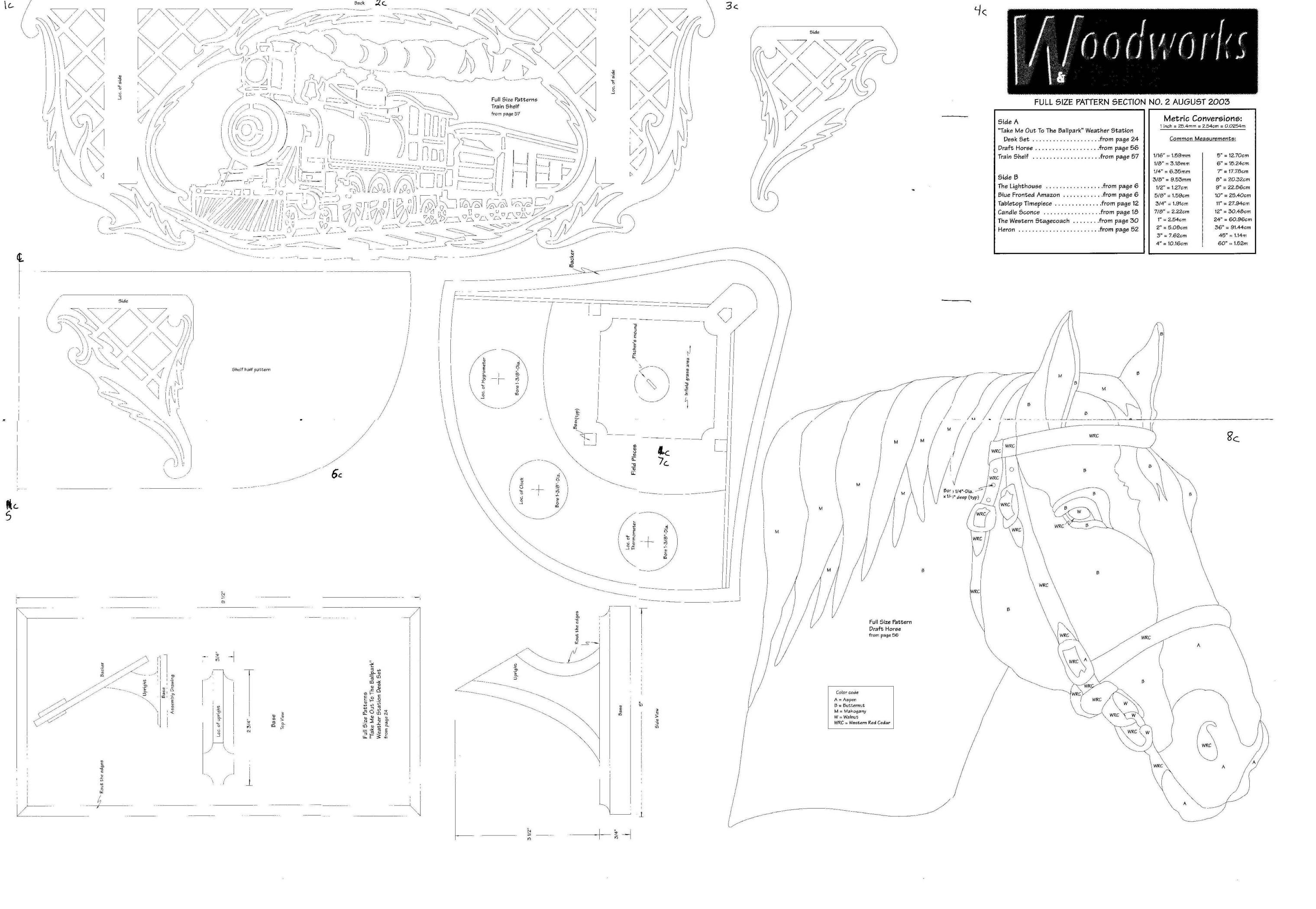


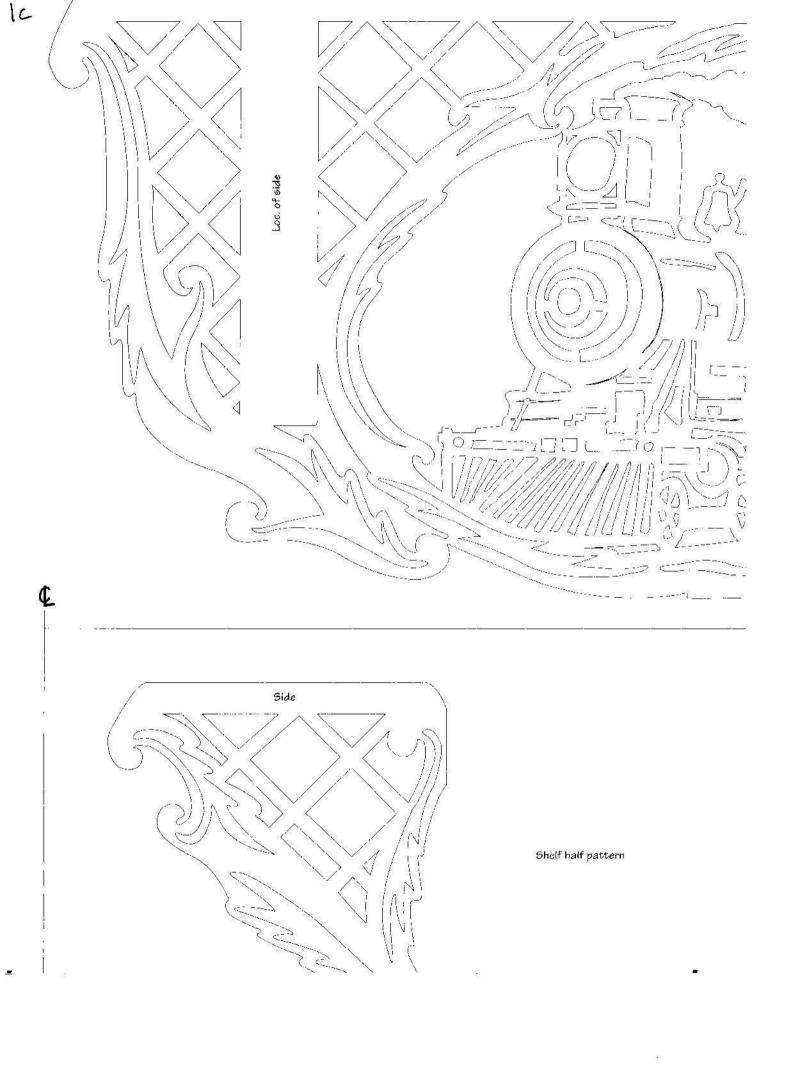


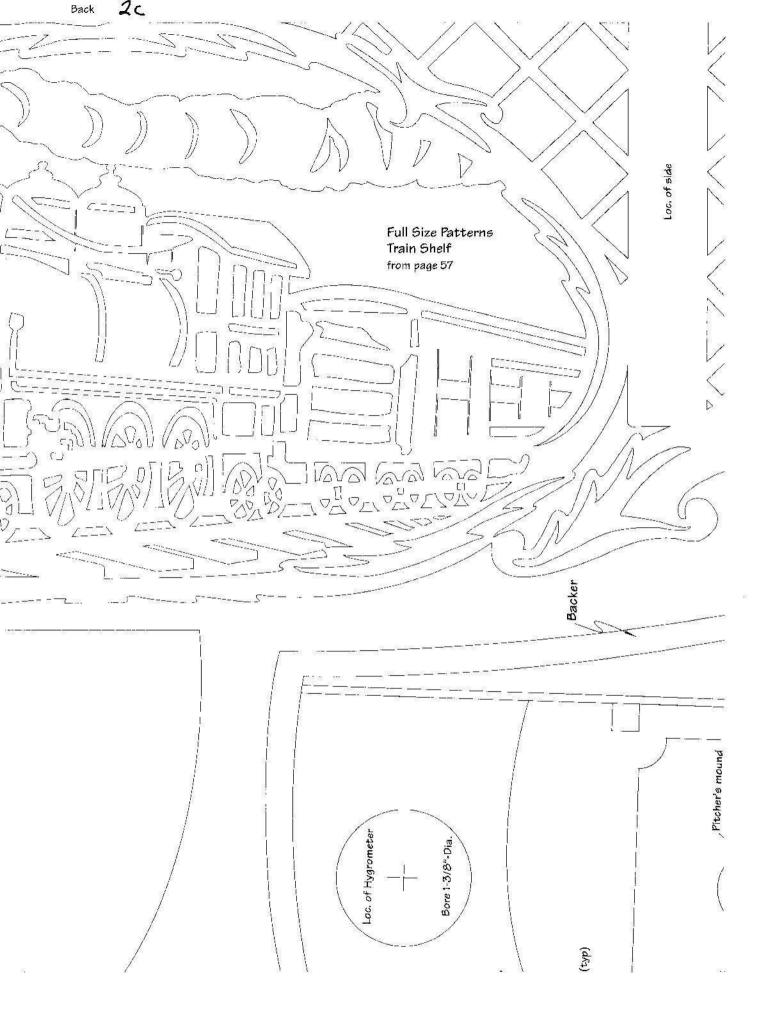














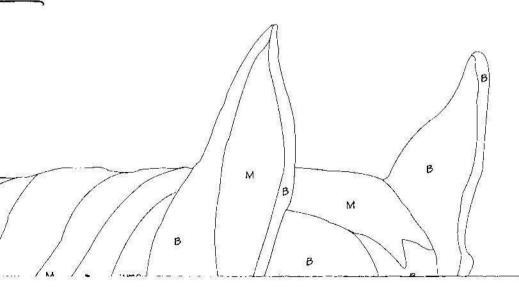
FULL SIZE PATTERN SECTION NO. 2 AUGUST 2003

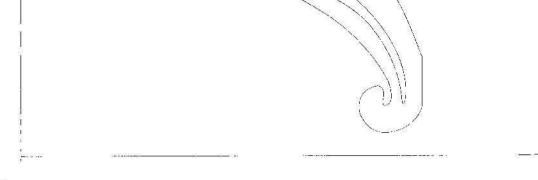
Metric Conversions:

1 inch = 25.4 mm = 2.54 cm = 0.0254 m

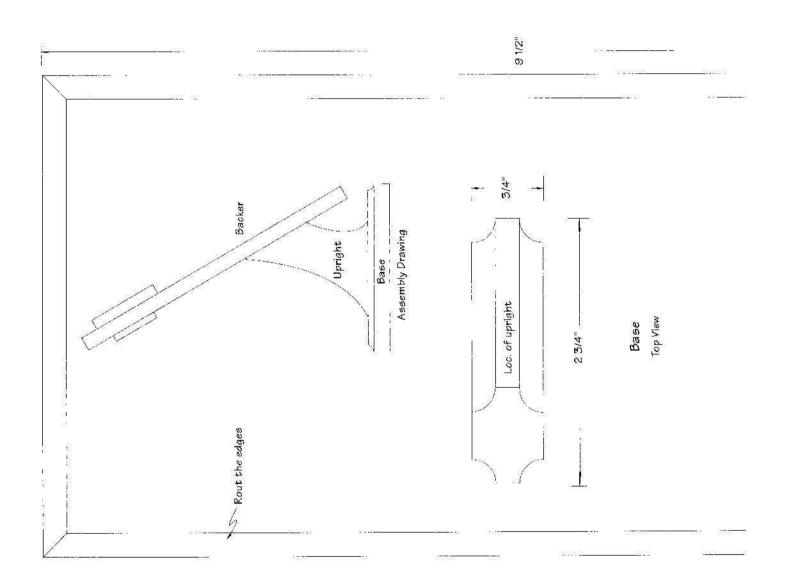
Common Measurements:

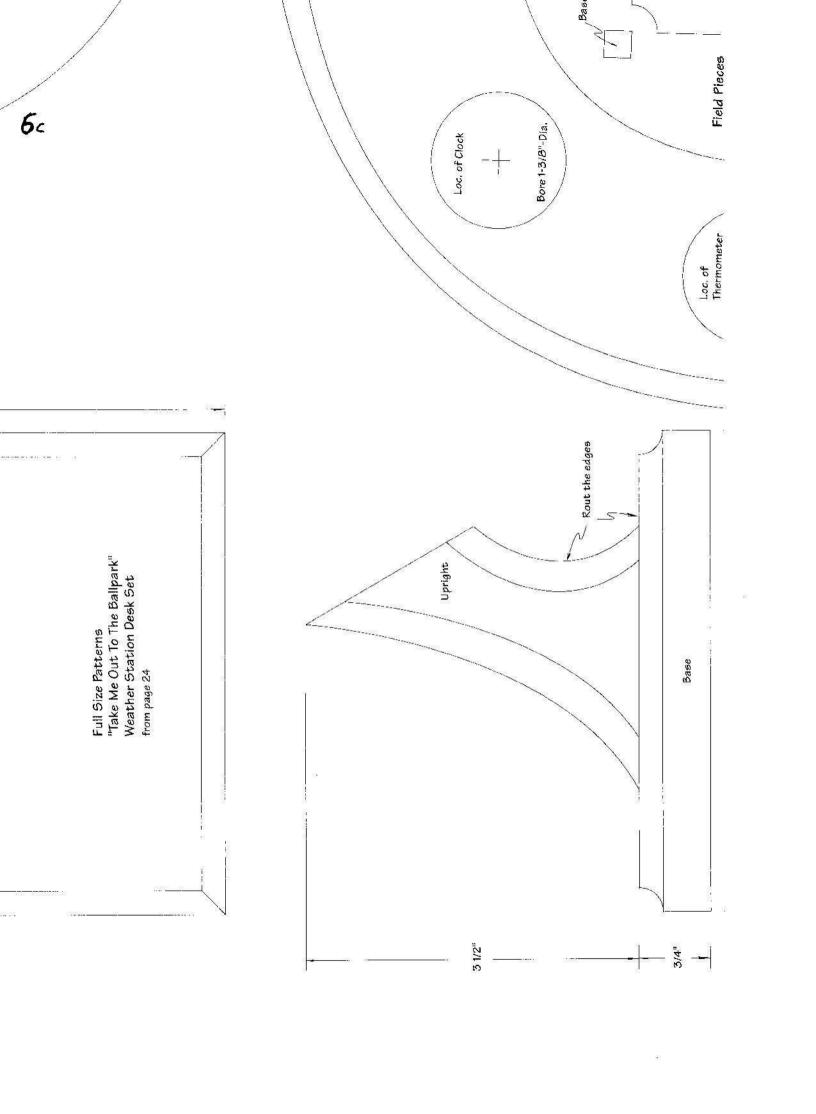
1/16" = 1.59mm	5" = 12.70cm
1/8" = 3.18mm	6" = 15.24cm
1/4" = 6.35mm	7" = 17.78cm
3/8" = 9.53mm	8" = 20.32cm
1/2" = $1.27cm$	9" = 22.86cm
5/8" = 1.59cm	10" = 25.40cm
3/4" = 1.91cm	11" = 27.94cm
7/8" = 2.22cm	12" = 30.48cm
1" = 2.54cm	24" = 60,96cm
2'' = 5.08cm	36" = 91.44cm
3" = 7.62cm	45" = 1.14m
4" = 10.16cm	60" = 1.52m

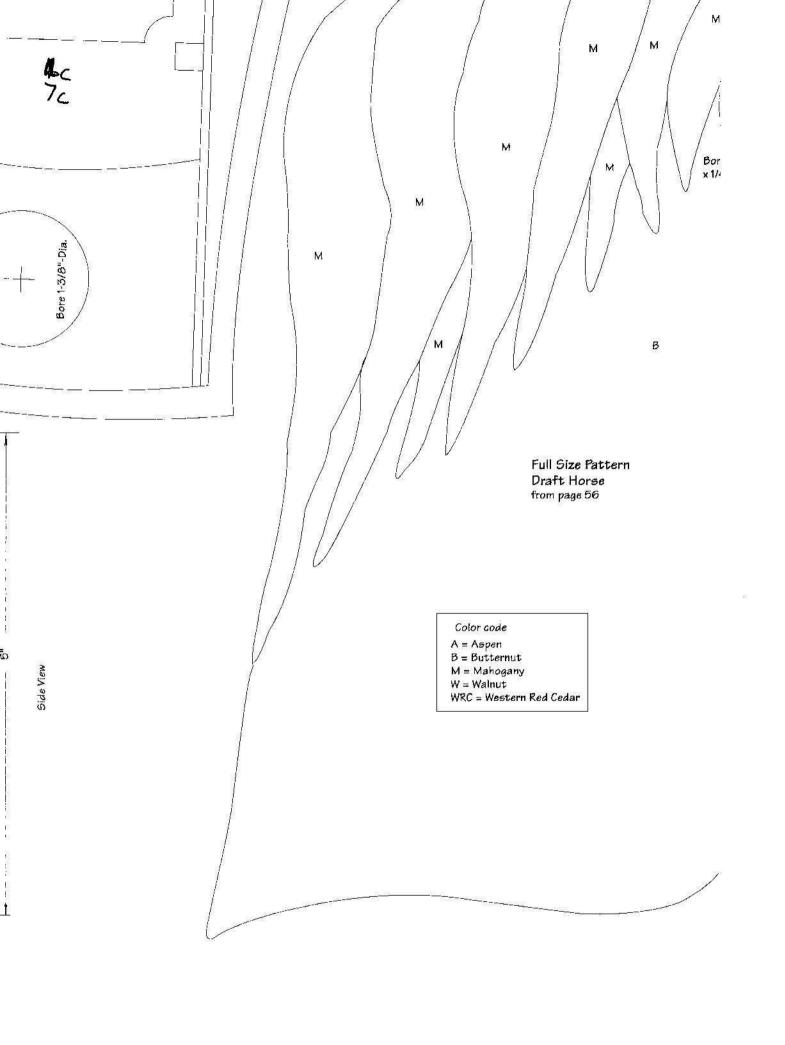


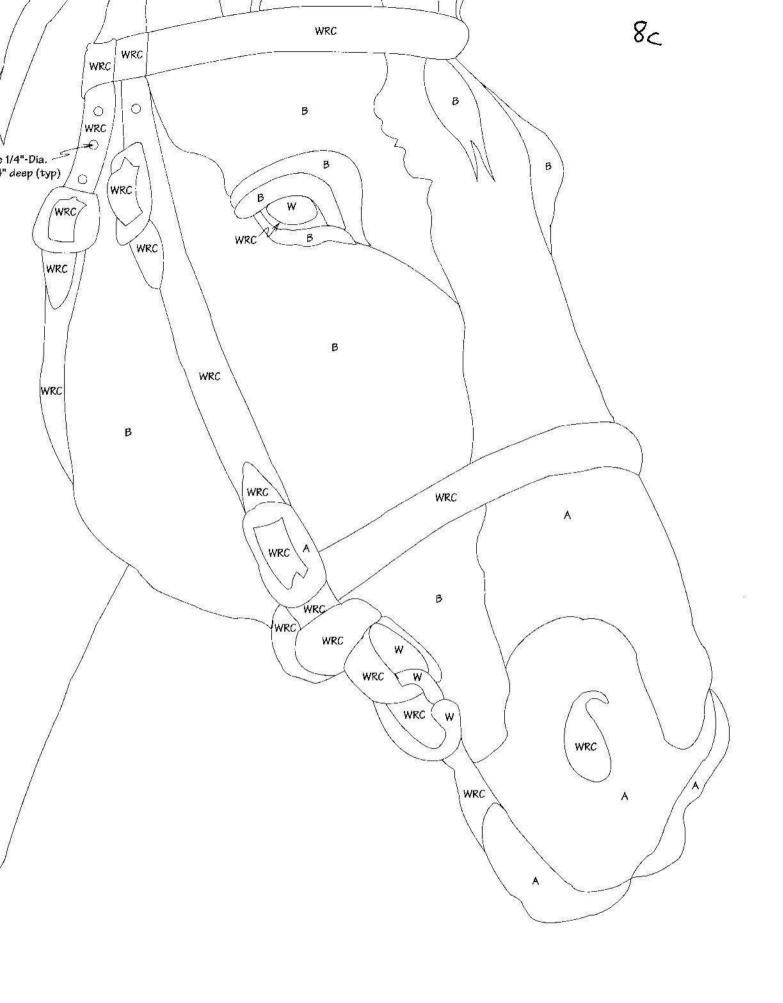


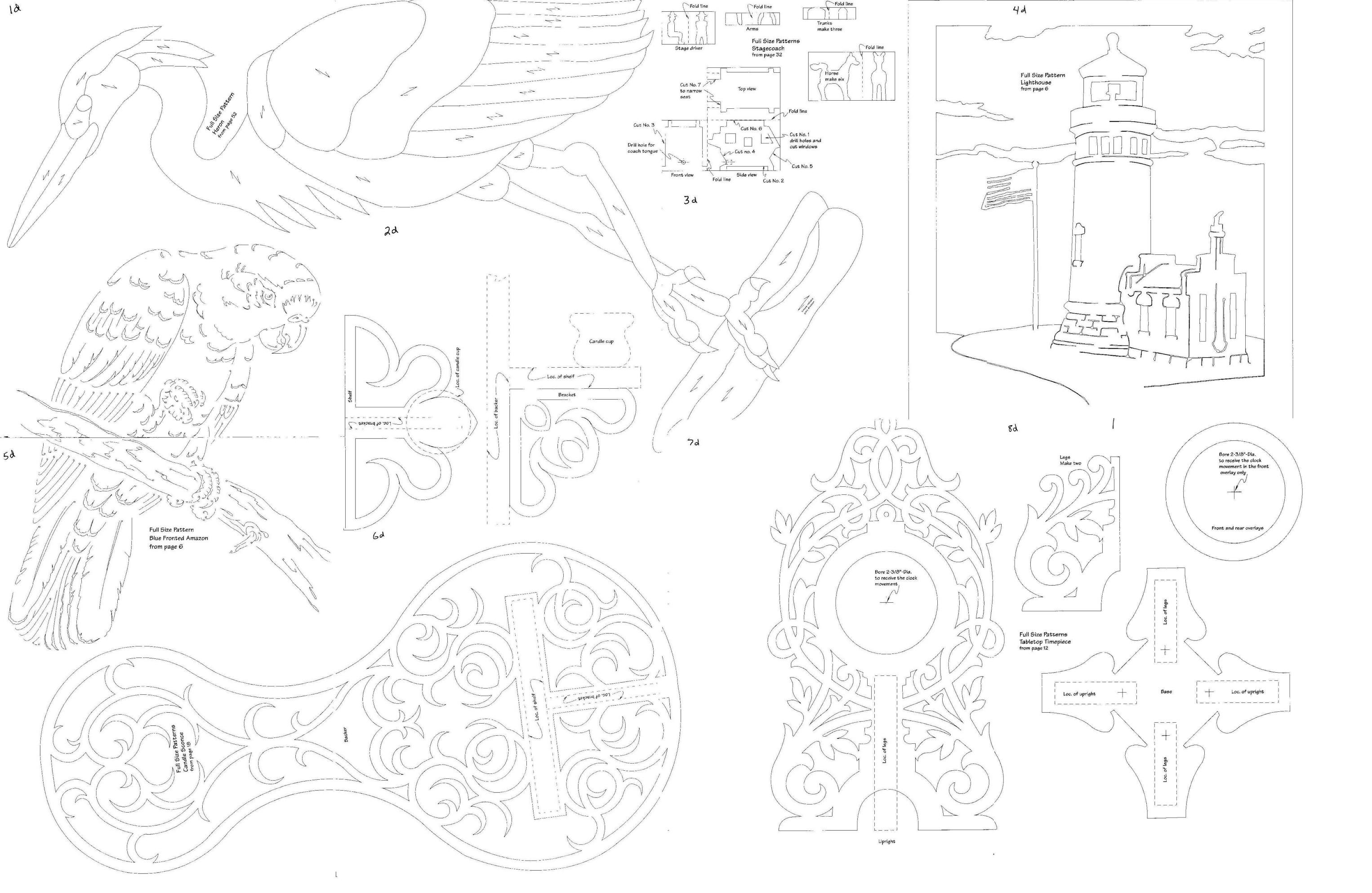


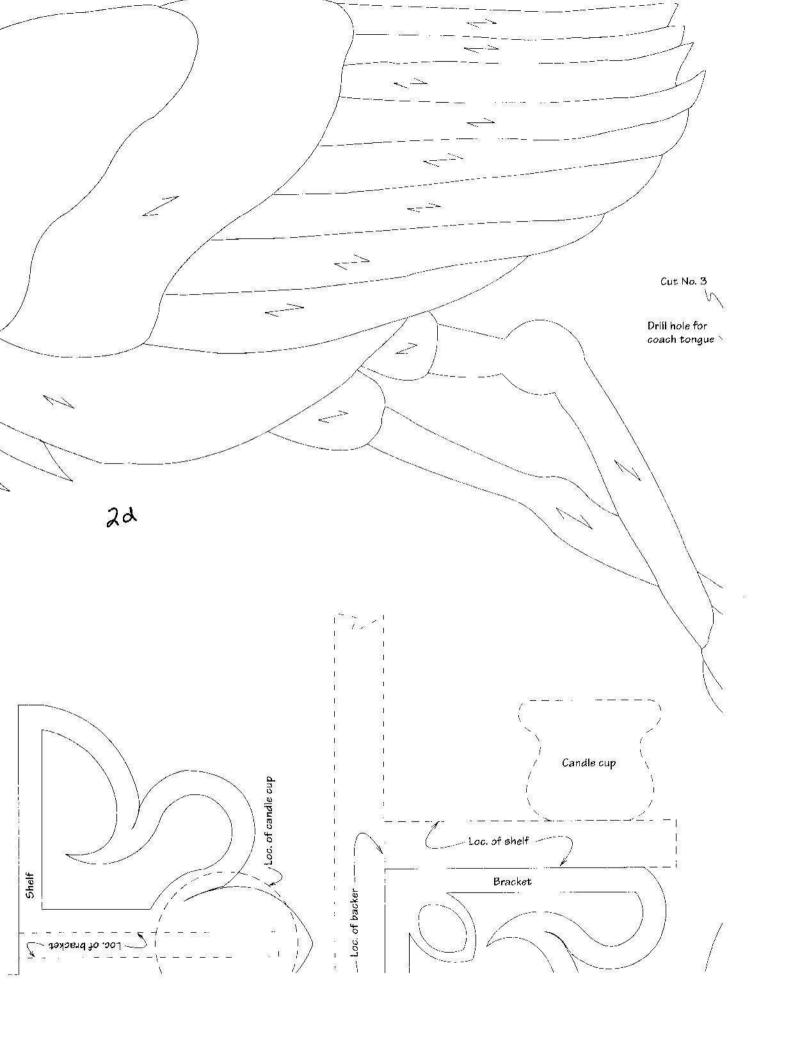


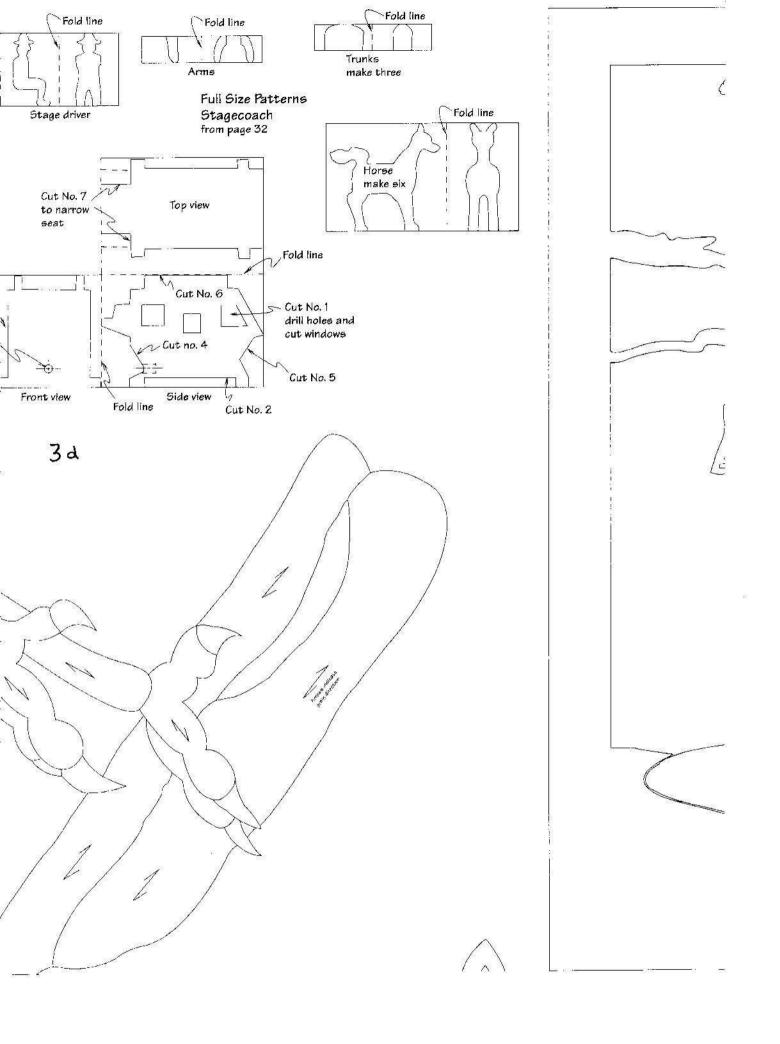


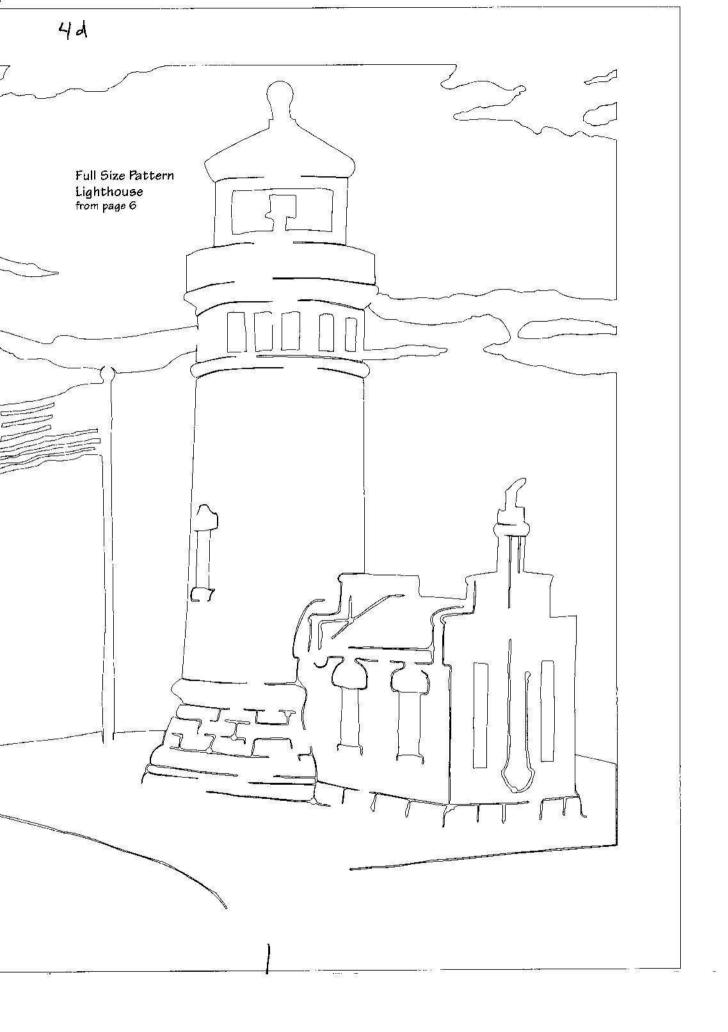


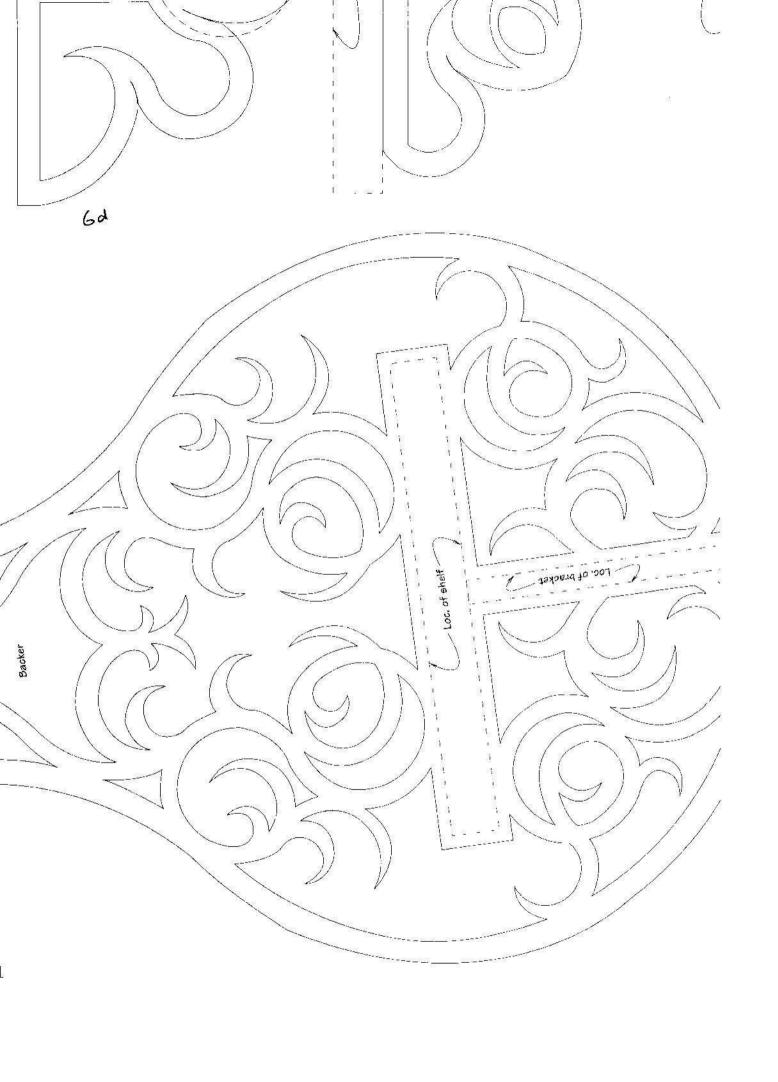


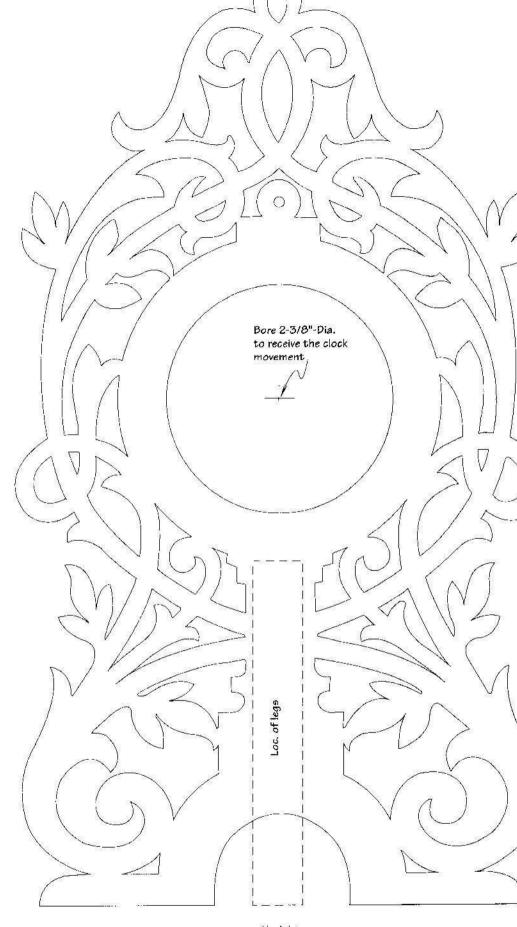












Upright