Building Beautiful Boxes with Your Band Saw

14 Step-By-Step Projects & Patterns

Lois Keener Ventura

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by Lois Keener Ventura

POPULAR WOODWORKING BOOKS
CINCINNATI, OHIO
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 Published by Popular Woodworking Books, an imprint of F+W Publications, Inc., 4700 East Galbraith Road, Cincinnati, Ohio 45236. First edition.

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11 10 09 08 07 10 9 8 7 6

Library of Congress Cataloging-in-Publication Data

Ventura, Lois Keener.
Building beautiful boxes with your band saw / by Lois Keener Ventura.
p. cm.
ISBN-13: 978-1-55870-522-7 (pbk.: alk. paper)
ISBN-10: 1-55870-522-8 (pbk.: alk. paper)
1. Woodwork. 2. Wooden boxes. 3. Band saws. I. Title.
TT200.V48 2000 99-39179
745.593--dc21 CIP

Edited by Jeff Crump
Production coordinated by Emily Gross
Cover designed by Beckmeyer Design
Interior designed by Mary Barnes Clark
Photography by Lois Keener Ventura

Metric Conversion Chart		
To Convert	**To**	**Multiply By**
Inches	Centimeters	2.54
Centimeters	Inches	0.4

Dedication:

To Peter

Acknowledgments

My special thanks go to:

My husband, Peter, for keeping the workshop tidy, the tools in tune and for teaching me meticulous technique, and whose steady hand penned the patterns and assisted with the photography; Ma and Dad Keener, for supplying the first workshop and putting up with years of sawdust and late work nights (I confess, Dad—those are linseed oil stains on the carpet!); Mom and Dad Ventura for being caring, involved and supportive; my many family members for their encouragement; Adam Blake, editor; Knothome Designs' / Wooden It Be Nice's loyal patrons and collectors.

Thanks also to Keener Hardware, Sundance Creations and Ritenour Lumber.

About the Author

Lois Keener Ventura has been woodworking most of her life. In the eight years that she has been designing band saw box art, she has earned three awards and many invitations to juried art shows. Her boxes are owned by collectors across the United States and in a dozen countries all over the world. She also serves on the Artists' Market Advisory Committee for the Three Rivers Arts Festival in Pittsburgh, Pennsylvania.

Amid the rolling mountains and rocky river gorges of southwestern Pennsylvania is where Lois makes her home. She studies the workings of nature and explores the habitat she shares with mountain laurel, hemlock, her cats and her husband, Peter.

Visit her Web site at www.Knothomedesigns.com

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The Art and Heart of Woodworking

Some people think woodworking is just a craft and not an art. Not so! I've always felt that there's an artist that hides in the heart of every woodworker, waiting for that one inspiration to set it free. But in what form does inspiration come and where will it lead? Maybe it's the magic of color and grain patterns fashioned by nature in wood that moves one to imitate its grace. Or it could be something more humble—like one of those projects that didn't turn out quite right, but it was such a pretty piece of wood you decided to save it; perhaps you "fixed" it into something completely different and were glad you spared it from the kindling pile. Inspiration is individual—it can appear in countless forms.

For me, inspiration is tall and green. All my life I've loved to climb trees. It's impressive to feel the strength of a living object that bears my weight as if it was no more than the weight of a bug. Then a breeze brushes by and I sway with the flexibility within that strength. Up high, my perspective changes. First, at close range, I follow the form of the sweeping branch upon which I sit, or the flutter of a leaf, the sprouting of new growth, a snake posing as a vine. Beyond the leafy crown, distant things appear motionless. But soon my eye catches and follows movement: contours of the landscape; the river ribboning back and forth among valleys and hills; the metamorphosis of a cloud; and beyond my field of vision but within imagination's range, the creatures that materialize and vanish amid the peaks, valleys and froth of ocean swells and surf. Shapes and motion everywhere! You can see

now that the boxes in this book were created, in more than just the raw material sense, from trees.

Band saw box art will spark your interest in woodcraft and kindle your creative skills. With this woodworking style, you can liberate yourself from the safe structure of the ruler and free your imagination to be your guide. These fourteen contemporary box designs all require the same basic techniques, yet each one offers its own personality and degree of work involved. Each project is an abstract representation of a natural form expressed in fine craft. Through smooth, fluid lines the form conveys an organic sense of motion in the wood while preserving its function as a box. Many talented artisans create many styles of band saw boxes: whimsical, rustic, technical. With this particular style, you will learn how to make the wood move, how to make it grab your eye and pull it around every curve, how to give it life and character.

Chapters one through five detail how to turn out a gallery-quality piece. Years of trial and error have taught me the quickest and easiest ways to perform each step. I think back to when I began experimenting with band saw boxes and can't believe how many times I did it the hard way. The information in these chapters will spare you the mistakes I've made, and pragmatic tips are added to simplify the process so you can fully enjoy the experience of band saw box art.

The Creativity sidebar in chapter four dispels the myth that creativity is some innate quality that only those few so blessed possess. I'll explain what I did to come up with these designs and how you can do it, too.

The purpose of chapter six is to ease you through the incidentals of each box design. Because the technique involved with this style requires freehand experimentation, I offer some suggestions and options that will help you save time or add a personal touch. The photos provide you with the basic models as guides to the shaping process.

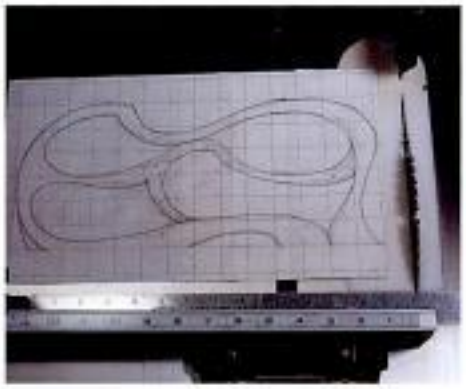
A brief summation of the steps as detailed in the first five chapters is included with the patterns. It will be easy to copy and follow

while in the workshop. You can refer back to the appropriate chapters for tips once you dig into your project.

So be prepared to reveal the artist within because your first completed band saw box may be your inspiration. When this happens, take a chance. On impulse, try something with a project that's not in the plans. Dare to create a different drawer pull, or cut a curve there instead of here. This is when the creativity that's in us all begins to nudge its way out into the open in its first small ways. The joy you experience the first time you modify an existing design with that little custom something of your own initiates an unexpected growth. From there it's just a matter of time before ideas swirl like dust devils right out of the grain of curly cherry. Experiments evolve into successes; successes are perfected. Then, after you buff that last coat of finish, you pause in reverence of the natural beauty of the wood. Smiling with silent satisfaction, you run your hand over the surface of the piece of yourself that shimmers softly before you. This is the heart of woodworking.

As a forty-year-old and as a kid at heart, I still love to climb trees. So as a woodworker, part of my duty is to give back to that which has brought me so much joy and inspiration as well as sustenance. Each year I take pleasure in planting and nurturing a half-dozen or so saplings in my yard. (I'll have one dense forest to climb in thirty years!) I use only local, abundant wood species for my work; I do not buy imported, endangered or rainforest species. I finish my projects with natural, petroleum-free oils. I encourage woodworkers everywhere to preserve earth's arboreal treasures for future generations of tree-climbing kids so that when their inspiration comes, they can know the pleasure, beauty and art of our craft.

PART 1



Techniques Techniques Techniques Techniques



Techniques

Chapter 1

Getting a Good Start

Some projects overwhelm us with jigs and bits and blades that we know we'll probably use only once. So we abandon that project in disappointment before it ever gets started and move on to something else.

Not so with band saw box art! You can create beautiful band saw boxes with a minimum of tools for a maximum of pleasure. Better yet, it's easy to get a good start. Following is a list of required tools and accessories. Optional tools and accessories are listed also, because, while not absolutely necessary, they will help to get the job done more quickly and easily. Both lists offer suggestions on types, sizes and brands. The appendix provides contact information for mail-order distributors that carry many of the products mentioned here, some of which are available nowhere else. Of course, you will familiarize yourself with the instruction manual before operating any tool.

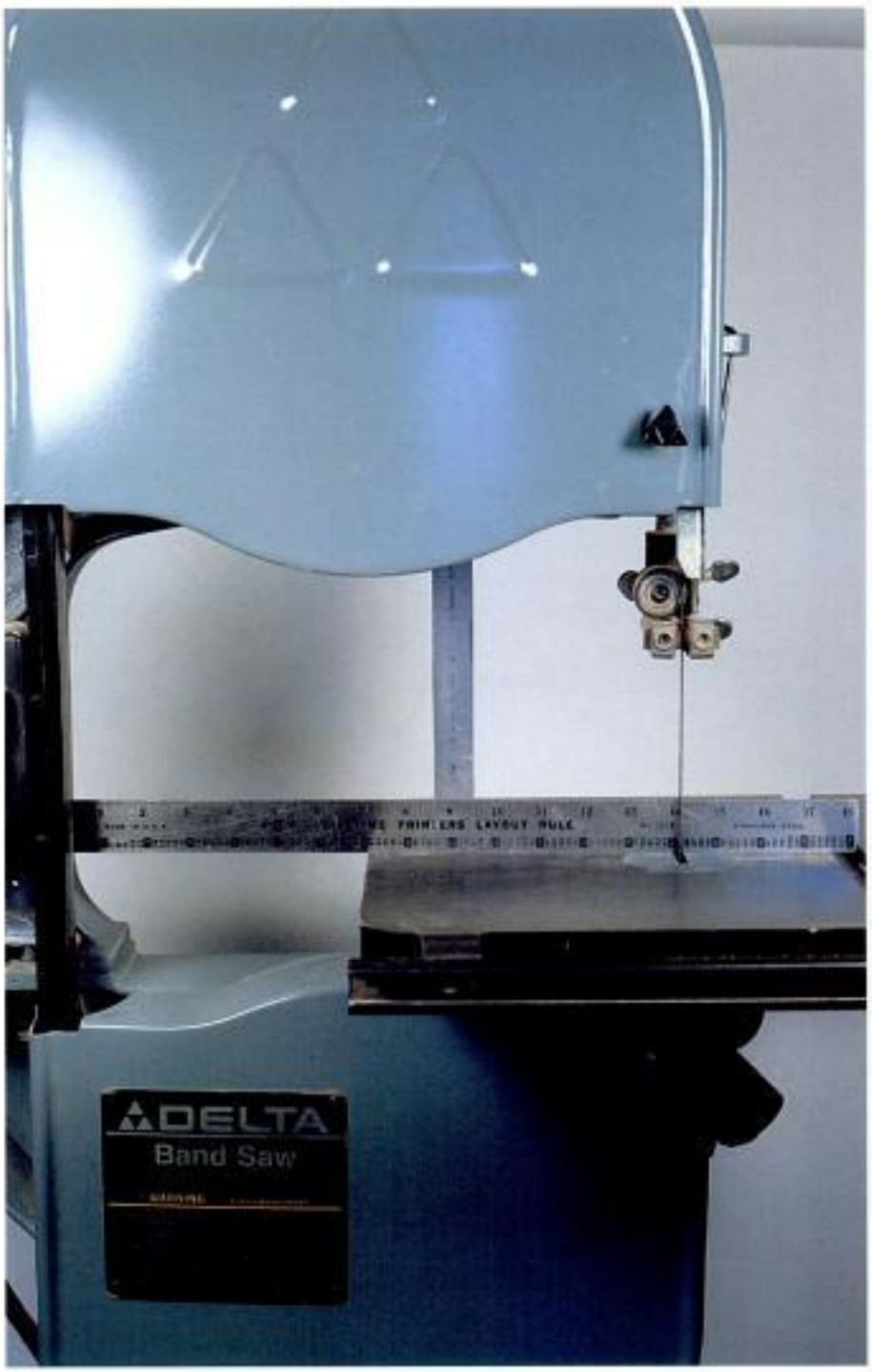


Photo 1-1 Make certain your band saw's clearances are adequate for the box design you decide to make.

REQUIRED TOOLS AND ACCESSORIES

Table Saw, Rip Blade, Rip Fence, Miter Gauge with Extension and Stop

You'll get the best results with a standard rather than a thin kerf rip blade. Be sure to check the fence, blade and miter gauge for 90° accuracy before you start.

Band Saw, Rip Fence

A 14" (35.6cm) throat and 6" (15.2cm) clearance are required to make all of the patterns in this book (Photo 1-1). You can get by with a 10" (25.4cm) throat on all but three of the designs, but I wouldn't recommend anything smaller. Make sure the table is square to the blade.

Band Saw Blades

The really nice thing about these designs is that you avoid the hassle of changing blades on your band saw. A ⅜" blade with 10 TPI (teeth per inch) is all you'll need. I've tried many brands, sizes and types for these particular boxes, but I've always come back to the ⅜". It's the only one I use for these boxes now. When correctly tensioned, it will rip thick stock smoothly as well as cut sharp curves. A ½" blade cuts too roughly, and a ¼" blade can't handle thick wood. Keep a spare blade handy for those unexpected (and unnerving) breakages. See Woodcraft Bands, Inc. in appendix.

Belt Sander

Any 6"x48" sander with a tilting belt and worktable is fine. With the same features, a 4"x36" sander is OK too, as long as it's bolted down tightly to the bench top. If the guard covers the top cylinder, tilt the belt to its vertical position, with the table at 90° to the belt, and remove the guard (Photo 1-2).

Sanding Belts, Abrasive Belt Cleaner

Either a 60- or 80-grit belt will do for coarse sanding; 120- and 180-grits are needed for medium and fine sanding. Purchase an abrasive belt cleaner, otherwise known as "rubber stick," if you don't already have one. You'll need to touch it against the running belt or drum to unclog it once in a while.

Drill Press, Drill Bits, Countersink

Only the *Lotus* design requires any drilling; however, this tool is fairly

Photo 1-2 You will use your belt sander in its vertical position, with the table at 90° and as close to the belt as possible.

indispensable for drum sanding if you don't have an oscillating drum sander. For the *Lotus* design, a ¼" spade bit, a 3/16" brad-point bit, a ⅜" bit and a ½" countersink will be needed.

Portable Drill
Any portable drill will do, but an angle drill is the easiest to handle for the work you'll be doing here. An electric drill will serve you better than a cordless one (Photo 1-3).

Sanding Drums and Sleeves
Coarse, medium and fine sleeves for your 1", ¾" and ½" drums are all you'll need for most designs.

Clamps
Hand screws are your most essential clamps. You'll need at least two 10" clamps; four are better. A few 6" C-clamps, bar clamps or short pipe clamps, and Quick-Grip-style clamps are a great help as well (Photo 1-4).

Glue
Use either light or dark wood glues, depending on the wood.

Palm Sander
For the type of sanding that a band saw box needs, nothing comes close to the comfort and weight of the Porter-Cable 330. The cushy pad does an excellent job with rounding curves and edges. If you do a lot of curved work, or if you plan on making several of the

Photo 1-3 An angle drill is the easiest on your wrist for freehand shaping techniques.

Photo 1-4 Hand screws are your foundation clamps for these projects, but having a variety of clamps available is ideal.

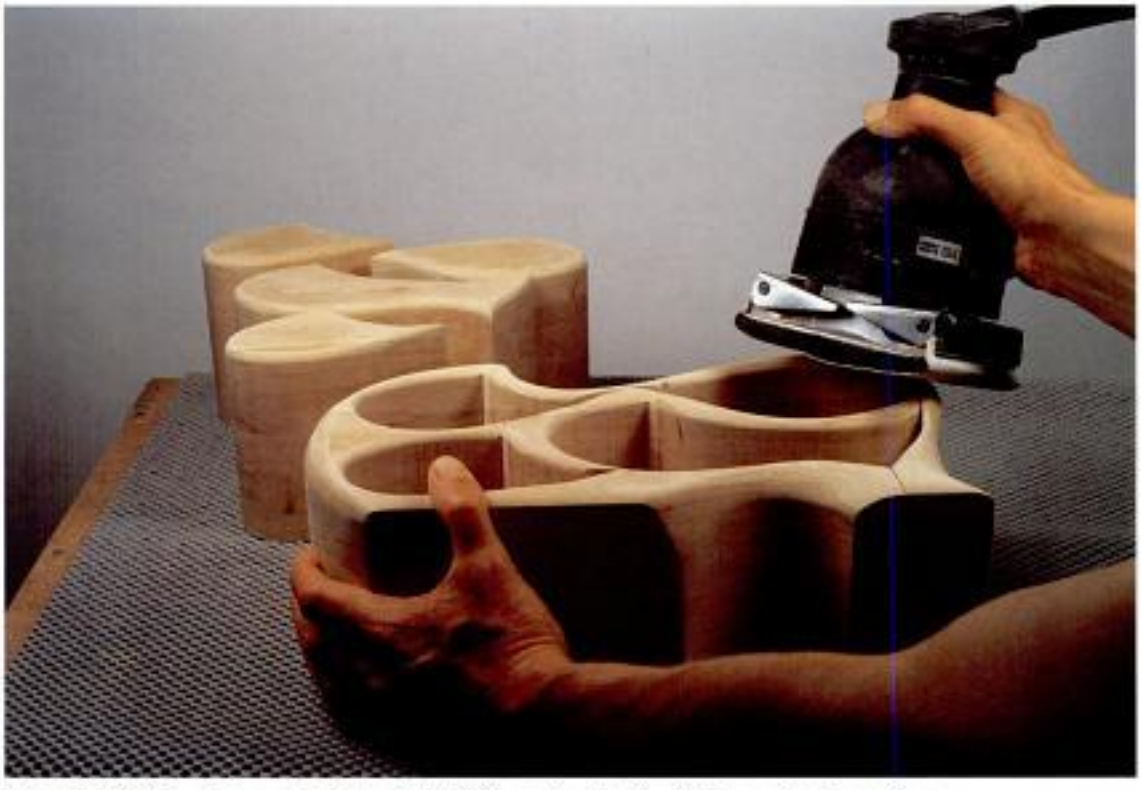


Photo 1-5 Tried and true, the Porter-Cable 330 can't be beat for this type of palm sanding.

designs in this book, you shouldn't go without the Porter-Cable 330 (Photo 1-5).

Sandpaper
The grits you'll use are 80, 120, 150, 180 and 600. I've tried just about every type of sandpaper out there. For the best durability, I've stuck with the following ones: 80-grit white silicon carbide; 120-grit aluminum oxide with zinc stearate coating; 150- and 180-grit silicon carbide. They are well worth the little extra money you pay for them. Use 600-grit wet or dry black silicon carbide for wet sanding the oil finish (Photo 1-6).

Photo 1-6 Smoothing and shaping operations are simplified with the proper varieties of sandpaper.

Wood Chisel(s)
The chisel that works the best is a ¼" bevel edge. Up to ½" will work, but I only use the ½" when I'm too lazy to sharpen the ¼".

Glue Scraper
Any scraper, shavehook or old chisel.

Square, Ruler
It would be nice to completely abandon measuring tools, but alas, you still need them once in a while. Anything much bigger than a 6" or 9" square becomes cumbersome with this smaller work.

Photo 1-7 Top-quality, environmentally friendly oils will reward you with a natural, professional-looking finish.

Oil Finish
I recommend Livos and Bioshield brands of linseed and resin petroleum-free finishes. See chapter five and the appendix for details (Photo 1-7).

Shellac
A half pint is plenty.

Drawer-Lining Kit
This specialized item can be ordered from DonJer Products. It is available in an array of colors. See chapter five and the appendix (Photo 1-8).

Dust Collection, Dust Mask, Eye Protection
I put these on the required list even though you can make boxes without them. Since a lot of the shaping will be done with sanders, the dust will fly. Watch for tips throughout this book.

Pattern Copy, Carbon Paper
Photocopy the pattern(s) of your choice, and use carbon paper to transfer the drawing to the wood.

Photo 1-8 Suede–Tex spray flocking is the core of your DonJer drawer-lining kit. It comes in a variety of colors.

Optional Tools and Accessories

Planer, Jointer

If you want to have complete control over board thickness, and if you want the economical benefits of buying rough-sawn stock, then this is the way to go. You'll need a 6"-wide jointer for these patterns.

Thickness Sander

A serious woodworker may want to consider investing in one of these. It is an invaluable time-saver for most projects. For the amount of laminating I do, I couldn't do without it. I use 80-grit paper most of the time, but 120 will provide a really fine laminating surface.

Router, Router Table, Router Bit

A ¼" roundover bit in your plunge router is helpful for rounding drawers and drawer-cavity edges.

Oscillating Drum Sander

This is a great tool for sanding the inside and outside of your box and for roughing out finger slots in drawers.

Inflatable Drum Sander

This is a useful tool for all the curves you'll be shaping, if you'll be doing enough to justify the cost.

Flap and Strip Sanders

I don't use these. If you have them, you may want to try them; however, with these boxes, I find them to be more trouble and expense than they're worth.

Respirator

An Airmate hood with filter unit is great light-weight dust protection. I didn't realize how much I'd appreciate dust-free eyes, face and hair until I bought one. Most of the professional woodworkers and serious hobbyists I know wonder how they could have done without one for so long.

Chapter 2

Wood Preparation

You have your tools, now you must choose your wood. You may think assembling a mere block of wood needs little planning, but you'll see what some forethought and care can do to strengthen and beautify your box.

Photo 2-1 The wood grain of *Aurora*.

WOOD SELECTION

Nobody but a woodworker knows that selecting stock can be as personal as choosing a wardrobe. As with your clothes, you have your own taste in color and pattern. Another consideration is this: Wood is a precious gift from the earth, so try to utilize the entire board and create as little waste as possible. Conservation saves you money in board feet as well.

You'll be using 4/4 kiln-dried lumber to laminate into a block; 5/4 is optional. Why don't we just use solid stock 4" (10.2cm) or 5" (12.7cm) thick? Kiln-dried stock offers you the best stability. This style of woodworking is smooth, organic and contemporary; the cracking and checking inevitable with solid air-dried blocks is suited to a more rustic style than this, plus you'd hate to do all that work and have a drawer crack or fall apart next winter! What about softwoods? The characteristic blotchiness of finish and easy denting lend softwoods to a more rustic style.

Hardwoods work best, but avoid very hard wood like hickory or apple. With all the sanding involved in this style of work, you'll be glad you passed them over. Avoid oak and elm as well if you decide to use a colored drawer lining. The colored adhesive tends to bleed through the pores and out onto the finished end-grain sides. I like to use cherry, walnut and the figured maples the best, but use whatever is abundant in your area and that you like the best. The boxes shown in this book are all either cherry or walnut, except for *Pisces*, which is poplar—one of the few interesting pieces of poplar I've ever found.

When selecting wood, keep a few things in mind. Many people reject a board because it has sapwood on one side or on the edges. That's fine because it leaves more for me! A laminated block with sapwood streaks running through it in patterns makes a striking band saw box. Also, don't hesitate to dig to the bottom of the stack for the most highly figured stock. Small knots can add interest to your box whether they're right on the front or folded into the laminations. Avoid large or loose knots and cracks and badly twisted or cupped boards. A little cupping is to be expected on sapwood pieces—just be certain that planing won't leave your stock too thin. The object is to select stock thick enough that it can be kept at around ⅞" (2.2cm) when planed. Obviously, if you buy stock that's already finished, 13/16" (2cm) will have to do.

Try to select boards 5' (152.4cm) long or more, as you will be cutting the continuous length for laminating. Most of the designs in this book require no less than 53" (134.6cm) of clear stock. Widths of 6" (15.2cm) or 7" (17.8cm) will work fine for most boxes, just be certain there are no cracks hiding along the edges of narrower boards. A few of the designs use only 4"-wide by 4'-long (10.2cm x 121.9cm) stock, so don't always overlook the shorter, narrow boards.

For aesthetic purposes, you will want to use one length of board. Why? You'll be laminating this board into the block that will be the foundation of your box. Striving for continuity of color and bookmatching end grain and sapwood in your lamination will enliven your finished box with vibrant patterns and streaks of color, accentuating its many curves.

If you choose to have your sawmill or lumber center surface your stock, refer to the surfacing section in chapter two. Now that you've chosen your stock, it's time to start cutting.

ROUGH SIZING

Refer to your pattern for the box dimensions and stock size, then choose your wood to allow a little extra width for ripping off imperfections like splits or large, loose or cracked knots along the edges. As mentioned earlier, small knots are OK and can even add to your box's character. The stock length allows 2" (5cm) or 3" (7.6cm) extra for squaring the end before you cut and for saw kerfs as you cut. Don't be too stingy with this measurement or you may be disappointed when your last cut leaves the board a little too short. Remember to look for that exquisite figuring or sapwood streak for the front of your box (Photo 2-2). It's helpful to envision the face of the box at either end of the board where you'll begin the bookmatch, but sometimes the most figuring for the box face is somewhere in the middle. That's OK, too. We'll see how we work with the box face in the section on lamination.

Prepare your stock for easier handling during surfacing by rough-cutting off any extra length with a circular saw or handsaw; or if the board has relatively straight edges, you can use your table saw (Photo 2-3).

Photo 2-2
Keep your project dimensions in mind in order to minimize waste when selecting stock. Also remember that a board with sapwood can become a stunning band saw box.

Photo 2-3 Rough-cut off any extra length prior to surfacing. This makes long stock easier to handle while planing and jointing.

"What size boxes can I make?"

If you want to make an 8"-deep (20.3cm) box, you'd better have a band saw with 8" (20.3cm) clearance. And unless you plan your design carefully, you'll have a tough time cutting out a 20"-long (50.8cm) box on a band saw that has a 14" (35.6cm) throat. If you want to make smaller boxes with tighter curves than the ones in this book, you may have to go with a ¼" blade. You will probably have to change to a heavier blade to do the ripping because a ¼" blade will most likely bow out as you rip, leaving you with a curved back surface that will wobble as you cut the drawers out. If you don't want to change blades, your block will have to be thinner front to back and narrower top to bottom (or side to side if it's a vertical design).

TIP

If you use a thickness sander for surfacing, it is much easier to cut longer boards into sections first, according to the instructions provided. There are several reasons for this. Some workshops may not have room on either side of the sander to clear a 6' (182.9cm) board. But most importantly, longer boards tend to be slightly bowed or twisted, and by cutting the board into its sections first, you can avoid sanding it down too thin to accommodate those twists and bows. The sections with those lumps and bumps from twisting can be sanded further, while the flatter ones can be set aside and retain their thickness (Photo 2-7). Always number the sections on one edge to keep track of your bookmatching pattern.

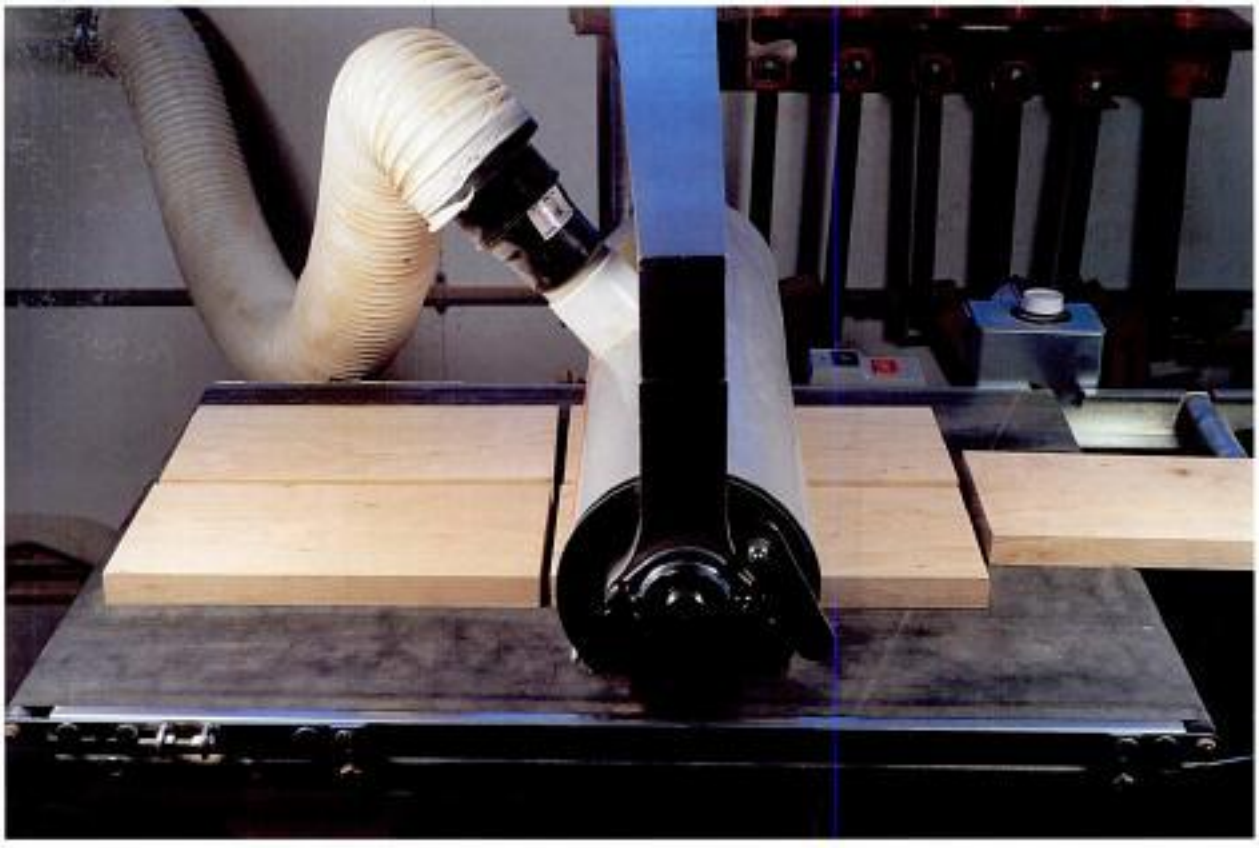


Photo 2-7 If you use a thickness sander to smooth out planer ridges, cut longer boards to size first. This will prevent oversanding due to unseen twists or bows in long boards.

CUTTING AND BOOKMATCHING

Your board will need to be cut into five even sections if you're using 4/4 stock. If you've opted to use 5/4 stock, you'll only need four sections. First, square the end of the board that you've chosen as the first section by crosscutting a little bit off. Refer to your pattern for box length. Measure out from the table saw blade to set the stop on your miter gauge extension to the box length plus ¼" (6mm) waste allowance (Photo 2-8). Proceed by cutting the entire board into even sections (Photo 2-9). As you cut the sections, lay each successive one out in a row as if reassembling the board.

Beginning with the section you've chosen to be the front of the box (preferably at one end of the board), fold the sections together back and forth, accordion style, bookmatching the end grain until they are together as a block (Photo 2-10). Now you'll begin to get an idea of the pattern of the grain and sapwood.

Option: If you've selected one of the middle pieces to be your box front, you can either take that section out of your bookmatching and place it in front of your block or simply experiment with any arrangement of the sections. There is no right or wrong way. Bookmatching has an aesthetic value to it, but an experiment will often surprise you with some neat grain and sapwood patterns.

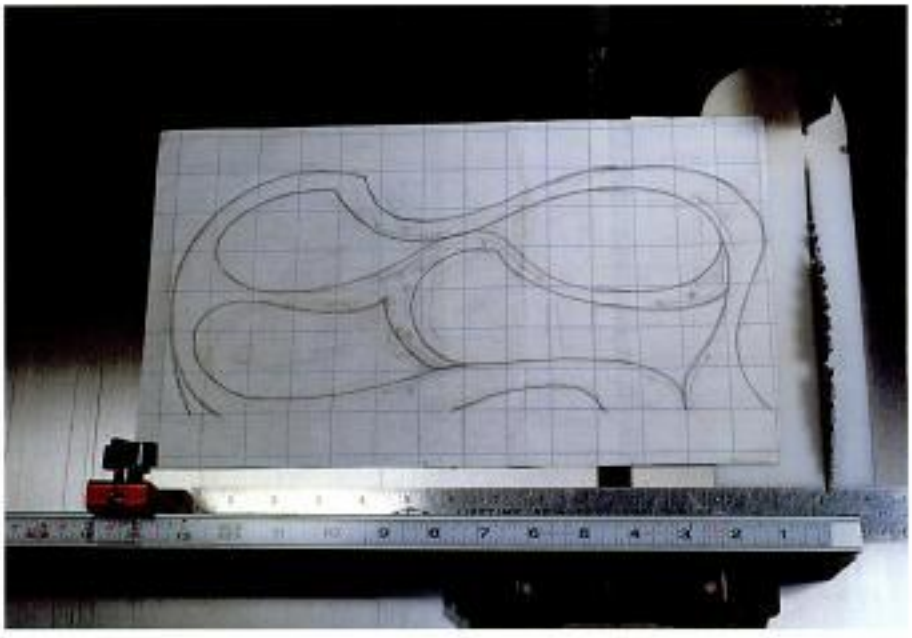


Photo 2-8 Allow ¼" (6mm) beyond the pattern length for waste at the edges.

Photo 2-9 Keep the pieces in order as you crosscut the board into five even sections.

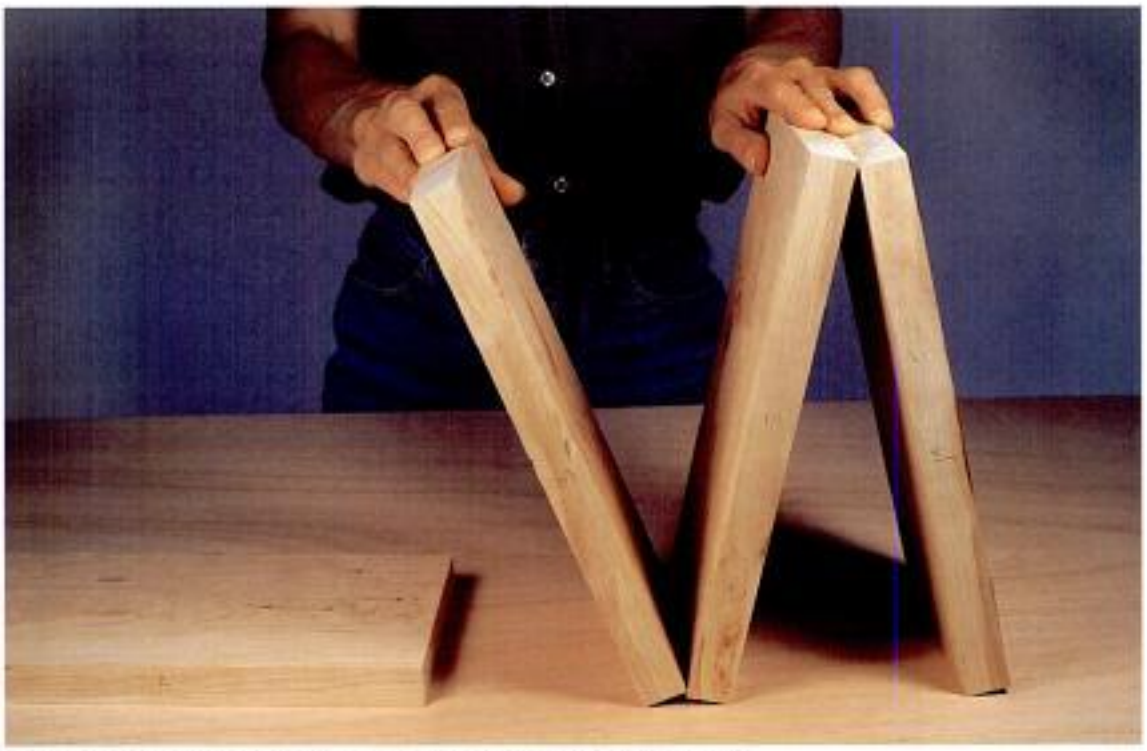


Photo 2-10 Bookmatching the sections creates interesting grain patterns.

TIP

Stand your stack of pieces on edge to view all sides, then choose a top and bottom. If necessary, hold the pattern up to the front. Will you be cutting off any nice grain with the waste? Is the bookmatching neater on this edge or that? Mark the top and front of your block. I suggest that you number the sections on the edges so they don't get mixed up during the gluing or thickness-sanding processes.

LAMINATING

Gather your block, glue and clamps on your workbench or table. Protect your bench from glue spills with a ¼" (3mm) piece of Masonite or any flat piece of wood. (I use an old piece of Formica tabletop to protect my worktable from glue spills.)

Begin by spreading glue thoroughly over the entire surface of each block section. Make certain there are no dry spots. An inexpensive glue roller bottle is helpful for this. Make sure the sections are in order as you sandwich them together (Photo 2-11). Take care not to spread glue on the outside front or outside back surfaces. The amount of glue you use is important as well: too much and your pieces will slide around all day while you try to clamp them; too little and you may later find the pieces you have cut out are beginning to come apart. Apply just enough and you'll see a little squeezing out from the edges as you clamp.

Once the glue is on, stand your sandwiched block on its end grain with its long edge facing you. Resting a hand-screw clamp on the work surface, fit the first clamp to the block end that's down (Photo 2-12). The pieces will slide a little, but work with them, gradually tightening the clamp until the pieces are fairly straight. The

Photo 2-11 A roller helps you spread glue thoroughly and evenly over the pieces to be laminated.

Photo 2-12 Hand-screw clamps work best for keeping the pieces from sliding around while you clamp. Clamp the ends first. Use the threaded bar as a straight edge to keep the pieces as even as possible with each other.

threaded bar on the inside of the clamp can act as a straightedge to help you keep the pieces in line. Before you tighten this clamp down hard, flip the block over and clamp the other end in the same fashion. The goal with these first two clamps is to get all the pieces as even as possible before your glue starts to dry. Tighten both clamps until the glue squeezes out and the sections show no gaps. Don't worry if they're a little off—this is why you allowed extra width and length. The next step is to get another clamp or two (or four if it's a really long block) in the middle. Short pipe clamps, C-clamps, bar clamps or a hand screw or two work fine here (Photo 2-13). Now you can take a break while the glue dries overnight. Twelve to twenty-four hours of drying time is recommended, depending on temperature and humidity.

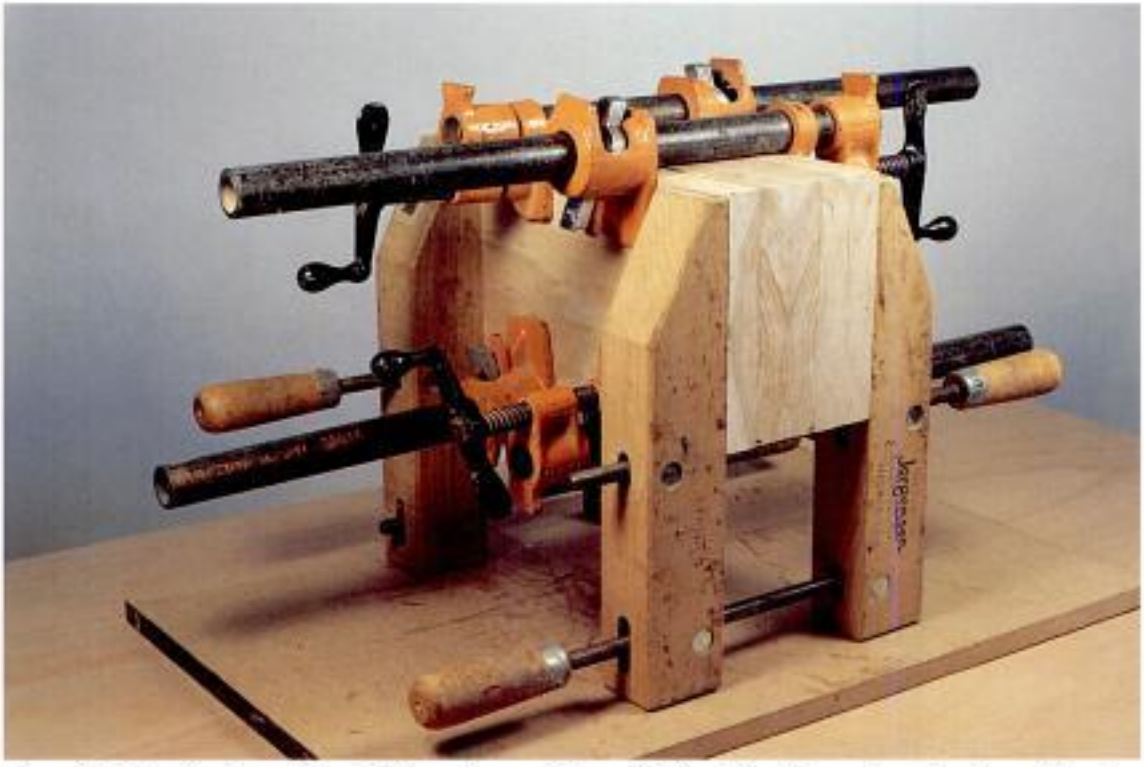


Photo 2-13 A well-clamped block will provide you with a solid foundation for your band saw box. Allow the glue to dry overnight before unclamping the block.

TIP

If you're not accustomed to working with hand-screw clamps, you may feel frustrated and clumsy with them at first. Don't let the urge to use some other type of clamp cloud your judgment. Compared to other clamps, hand screws are especially valuable because they help prevent the wood from sliding around during the clamping process. Here's what I do: I'm right-handed, so when I lay the clamp on the bench with its jaws facing away from me, I always keep the screw handle closest to me at my right hand. Lefties may choose to keep the left handle closest to them. By following this very simple procedure, you'll quickly become adept at closing the back of the jaws first, adjusting the project pieces, then tightening the front with the screw closest to you.

TIP

Occasionally, you may have pieces with a lot of twist to them that just won't clamp tightly. When this happens, clamp as directed, but once the center clamps are on, remove one hand screw at a time, replacing each with two strong pipe clamps or C-clamps. These clamps can apply more force, thus flattening out the sections.

TIP

Since a few of the steps in the making of band saw boxes require glue-drying and finish-drying times, plan a small project to work on while you wait. Or plan to do your gluing and clamping at the end of the day so you can let it dry overnight. Better yet, use this time to select and prepare the wood for your next band saw box project.

SQUARING THE BLOCK

Once the glue is dry and the clamps are removed, you are ready to square your block. This isn't as hard as it sounds, and all you're really doing is flattening one side. There are two ways to do this, but first, you need to scrape most of the dried glue bumps off one long edge of your block. You can use any kind of scraper or chisel.

The easiest way to get a flat edge is on the jointer. Make sure the jointer fence is at 90° to the table. Joint very small amounts from the scraped edge of the block to avoid chipping. Remove only enough to get all the sections on that side flat, even and square with the fence (Photo 2-14).

The second way to square your block is with the table saw. This way is a little tougher, but it works well if you don't have a 6" jointer. Raise the blade so that it is slightly higher than half the thickness of your block. Set

Photo 2-14 Jointing is the easiest way to square one side of the block.

Photo 2-15 If you use the table saw for squaring, be sure not to rip more than a blade's width off the block.

the fence to remove less than a blade's width of material from the block edge. You may have to screw a taller extension board on the fence if the fence is less than half the height of the block. Rip the long edge of the block, flip it over, then rip the second half (Photo 2-15). You'll probably have to do this on both edges before one is flat. Test the block for flatness on your saw table as you're working. Be extra cautious with this method of squaring since, due to the height of the blade and your block, you must remove the guard.

Your final task in this phase is to transfer the pattern to the block face. Do this with your pattern copy and carbon paper. Go back over the carbon lines with a pencil for clarity (Photo 2-16). Now it's time to move over to your band saw.

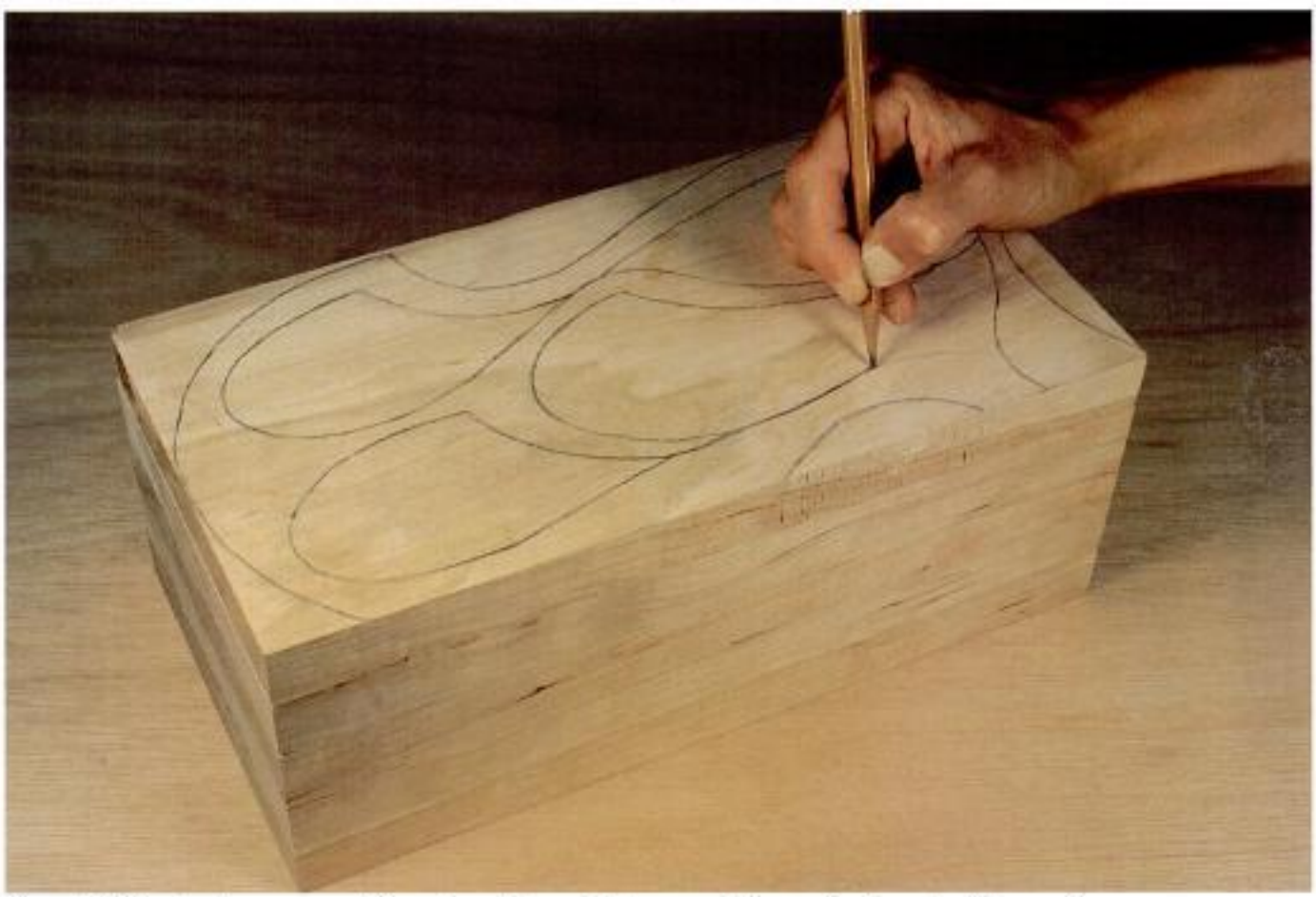


Photo 2-16 Carbon lines smear and blur with sawdust, so it helps to go back over them heavily with a pencil.

Chapter 3

Band Sawing, Gluing and Clamping

PREPARING YOUR BAND SAW

You'll find that a few extra minutes of fidgeting with your band saw will mean the difference between a fair cut and a great cut. Here are a few tips for when your saw isn't cutting as smoothly as you know it can.

• Clean the tires. Bumpy tires will give you bumpy cuts. Spin the wheel a few times, applying even pressure on the tire with an old piece of 120-grit sandpaper. This will remove the "crumbs" that get pressed into the tire. Then wipe it clean with a rag (Photo 3-2).

• Make sure the table is square with the blade and the fence (Photo 3-3).

• Reset the cool blocks and bearing each time you raise or lower the guide.

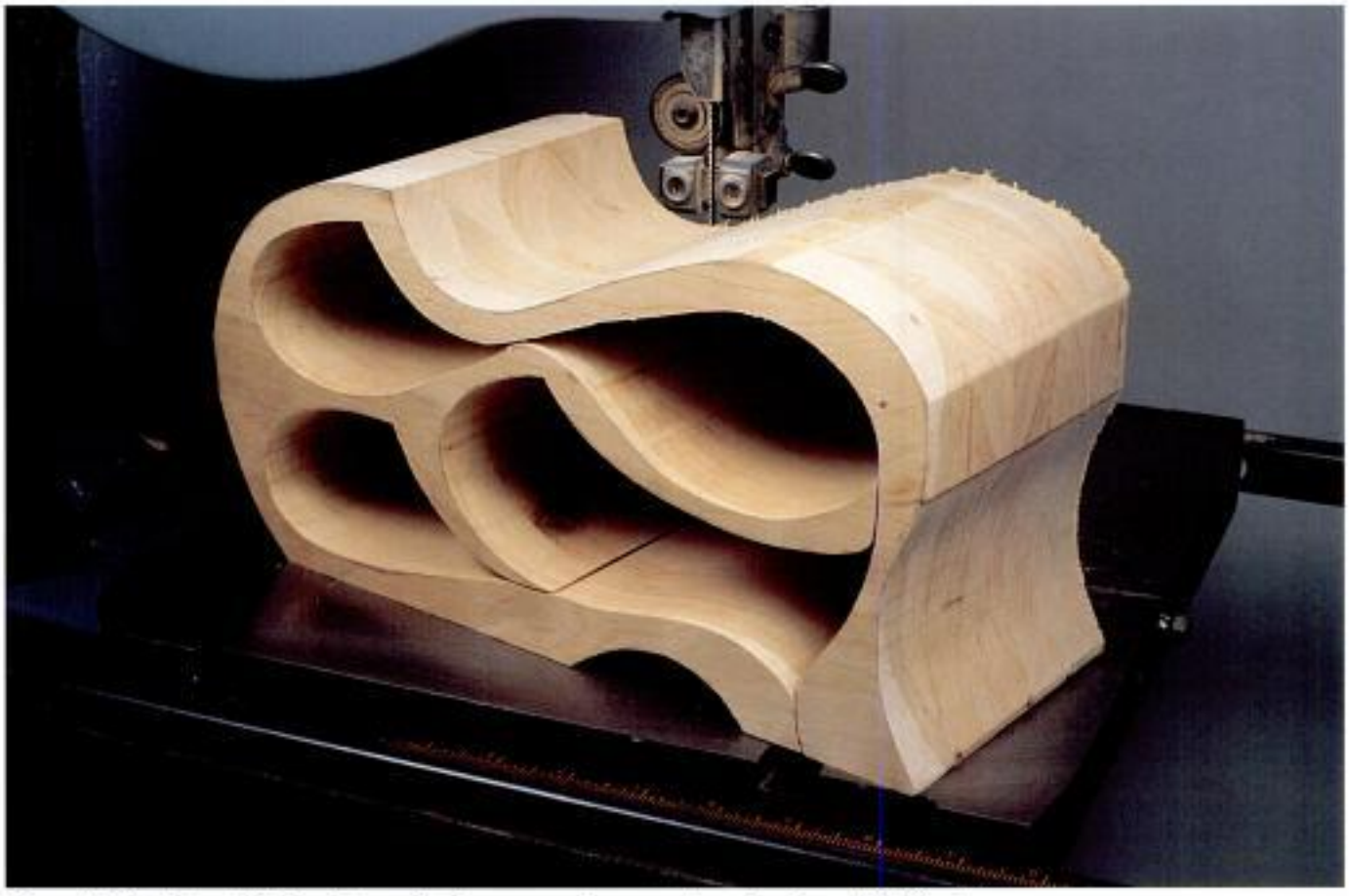
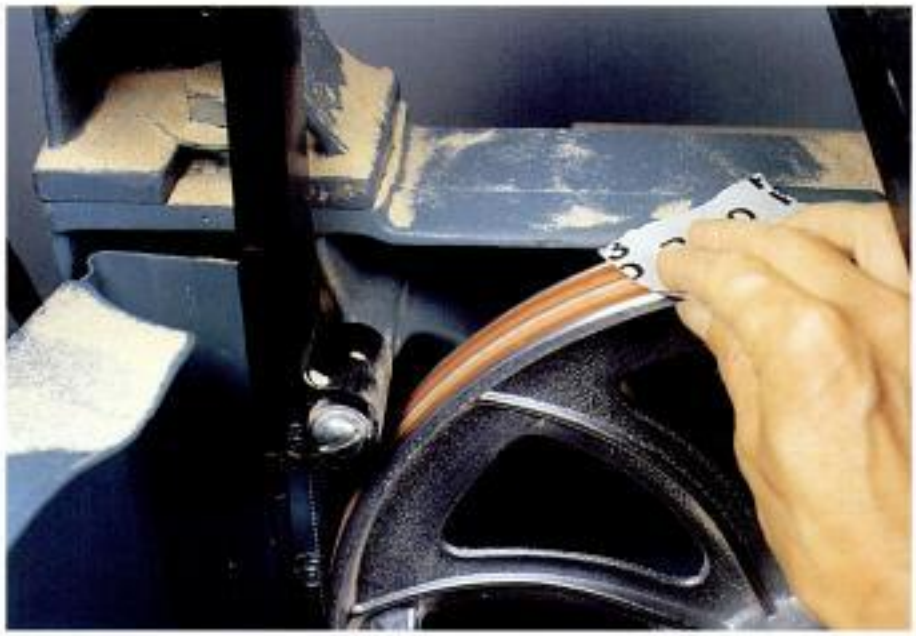


Photo 3-1 Your box will look a bit rough when you cut the outer shape, but fear not! The best is yet to come.

Photo 3-2 Clean band saw tires will improve the quality of your cuts.



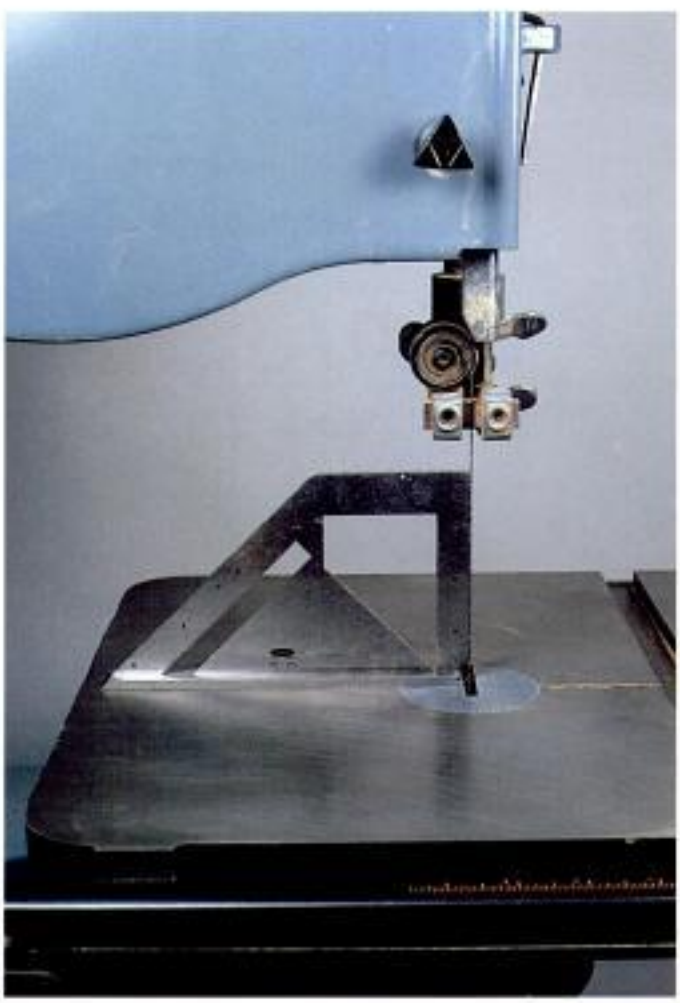


Photo 3-3 Double-checking for squareness now will save you problems later.

Photo 3-4 A clean, lubricated blade offers less resistance when making thick cuts. This reduces the chance of the blade bowing while you cut.

There usually is a small amount of play in the guide when you raise or lower and retighten it. This often causes a slight skew in your previous block or bearing adjustments. Thus, readjust them to keep them as close as you can to the blade without altering the blade path.

• Always keep your guide down as close to your work as possible.

• Use a sharp, clean blade. Good blades are elusive, so I've listed some blade sources in the appendix. A blade lubricant keeps the teeth clean a little longer. I regularly brush my teeth with an old toothbrush even if there's only a little buildup on them, but then I'm finicky about blade hygiene (Photo 3-4).

• Test the tension. Your tension guide is a start, but all blades are a little different. Practice on a piece of scrap before cutting into your project.

The Back

Set the fence so that it's ¼" (6mm) from the blade. Put the block on the table with the flattened edge down and the back of the box toward the fence. After making all the appropriate guide adjustments, you're ready to rip the back off your block (Photo 3-5). Use slow, even pressure when ripping. If you try to cut thick wood too fast with a ⅛" 10-TPI blade, the blade will bow and the wood block will rock on its back while you're cutting the drawers out. (Remember, we use this blade

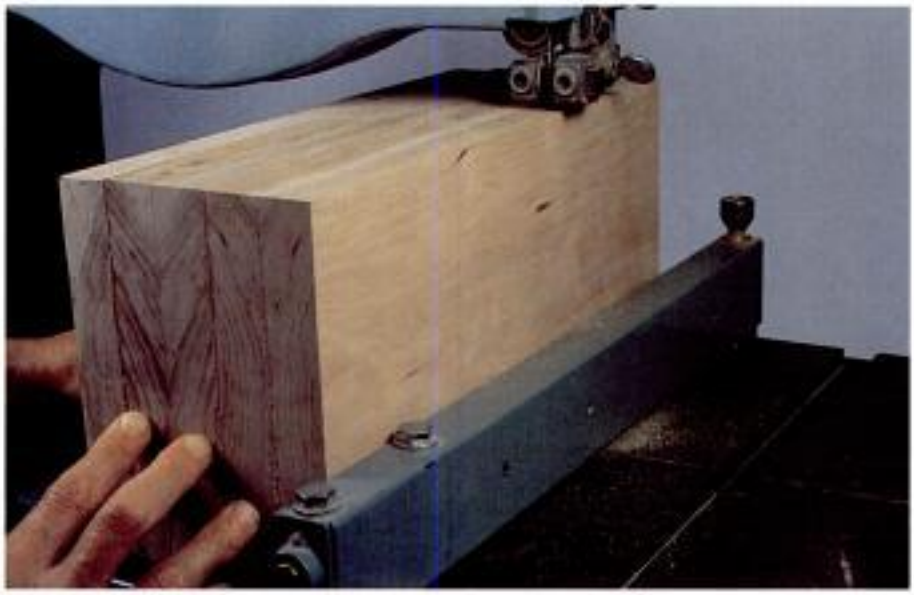


Photo 3-5 Rip ¼" (6mm) off the back of the block. A slow, steady feed rate will give you a smooth, straight cut.

BAND SAWING SEQUENCE

This is the part you've been waiting for. Surprisingly, band sawing is the quickest part of the whole procedure. But that's what makes this a great tool—it saves time. There's no real technique involved in band sawing. It's like driving; just slow down around the bends so you don't lose control. If you stray from the lines, slow down and ease yourself back on track. Band sawing quickly becomes instinctive.

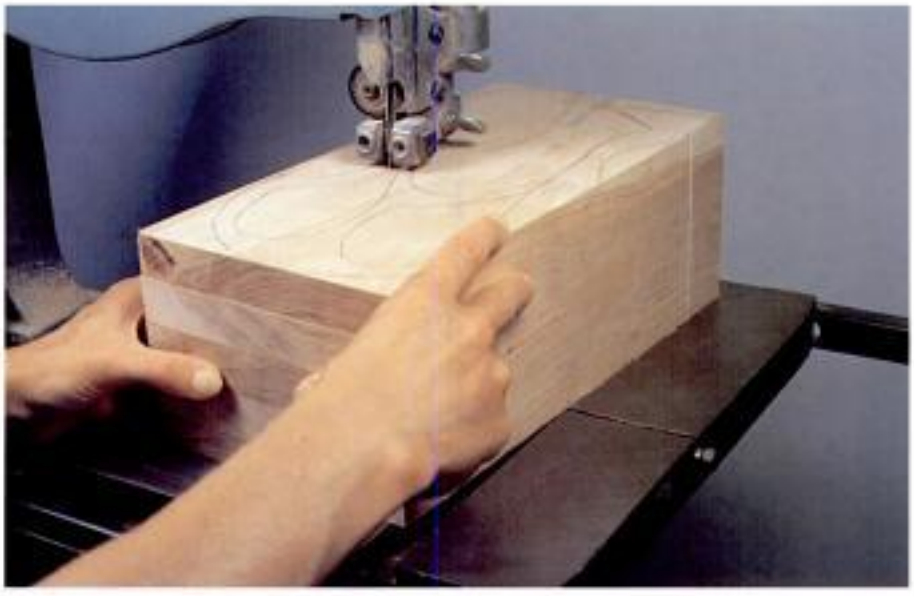


Photo 3-6 When cutting out the drawers, take your time around sharper curves so the blade doesn't stray from the lines. Let the blade come to a full stop before backing out of a cut.

IMPORTANT

Some cuts require you to stop and back the blade out of the kerf or to back the blade into the kerf to begin the next cut. Always turn the saw off when backing the blade in or out and when removing drawer blocks. For the open-ended drawer designs such as *Cobra*, *Tides* and *Pisces*, cut off the excess from the end of the drawers according to the pattern lines (Photo 3-7). Cut off the excess box body at the entrance kerfs for the *Boa* and *Cobra* drawers (Photo 3-8). When you're finished cutting out the drawers, set the box body aside.

Note: Do not cut the finger slots out of the *Cobra* or *Boa* drawers yet. This step will be covered in the next chapter.

Photo 3-7 Before you begin cutting apart the drawer blocks, and while your guard is still at the proper height, cut the waste off any drawers whose pattern requires it.

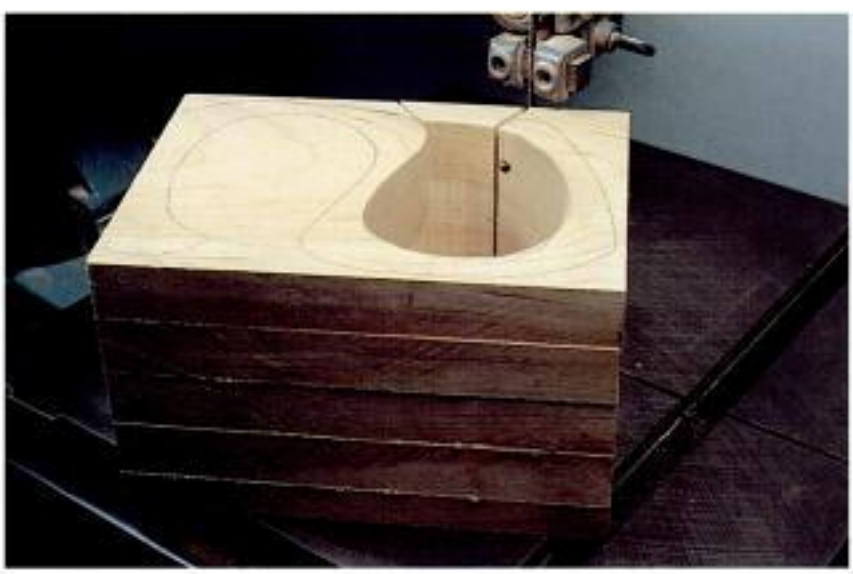


Photo 3-8 On the *Boa* and *Cobra* designs, you will need to back out of the round drawer cuts, remove the blocks, then cut the waste piece off to open the end of the drawer cavity.

to get a smoother cut than say, a ¼" blade, and to save the time it takes to switch blades.) Set the back piece aside for now, and remove the rip fence.

The Drawer Blocks

Lay the wood block on its back and adjust the guide, cool blocks and bearing. Refer to your pattern's cutting sequence. Follow the lines, cutting slowly around the sharper curves (Photo 3-6). Remember not to panic if you stray slightly from the line. The lines are free-form enough that a slight slip of the blade works right in.

The Drawer Backs

Set the fence so that it's ¼" (6mm) from the blade. Adjust the guide to the height of the tallest drawer. Since the drawers do not have a flat side to rest on the table while ripping, it's best to keep the most stable side on the table. For the drawer blocks that have no stable side, simply hold on tightly, keeping the block firmly against the fence. Keep an eye on the position of your fingers at all times. Rip the back off the drawer block and set it aside (Photo 3-9). This is a little scary if you've never done this type of cut before, but you'll find after a few cuts it's not all that difficult. As long as the blade is sharp and you feed the wood slowly, they should cut as smoothly as those pieces that have stable sides.

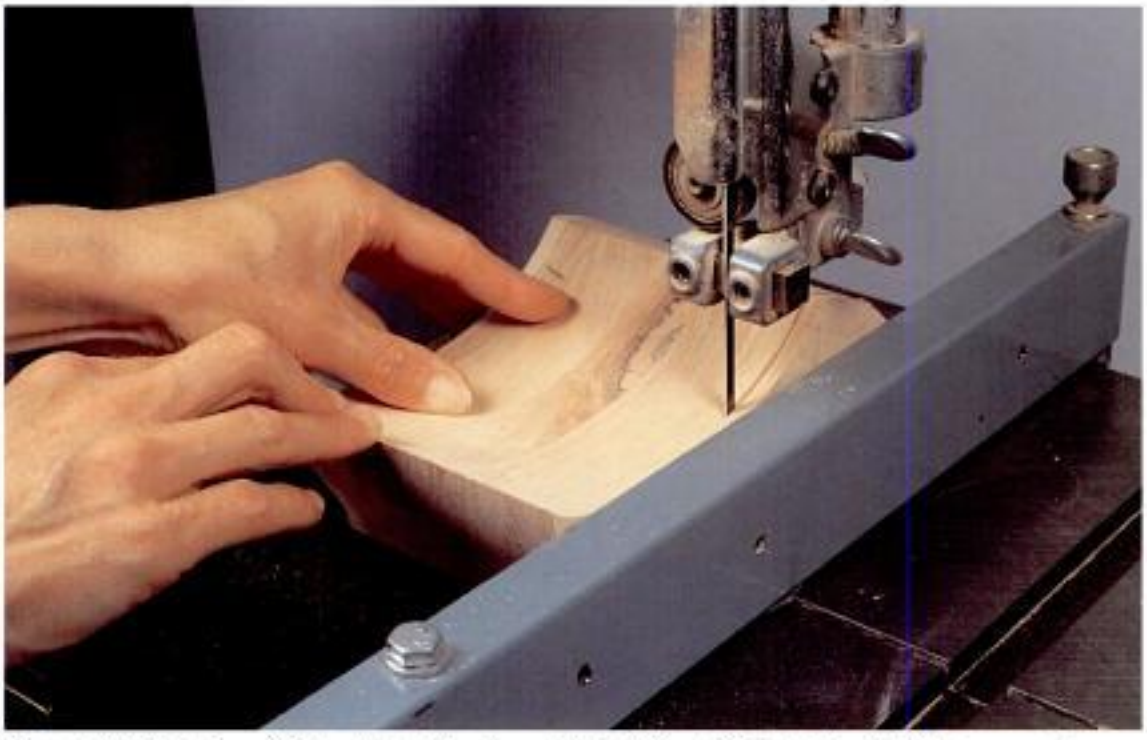


Photo 3-9 Rip ¼" (6mm) off the backs of the drawer blocks. When finished with all the blocks, reset the fence to ½" (1.3cm) and rip the drawer fronts off.

"How many drawers do I want in this box?"

The more drawers you want, the smaller they have to be. It helps to doodle both short, round drawers and long, narrow drawers to get an idea of how they will affect the entire box shape and movement. Don't forget that if you want divided drawers, they will probably have to be bigger to accommodate two or more sections.

The Drawer Fronts

Set the fence so it is ½" (1.3cm) from the blade, and repeat the procedure for ripping off the drawer backs but rip the fronts off instead. Set them aside, and remove the fence.

The Drawer Insides

Refer to the pattern as a guide for drawer divisions. Take the drawer block "guts" (that is, without their fronts and backs) and insert them into their respective cavities in the box body so they're flush with the front. With a square and pencil, mark the side and bottom cuts on the drawer

"Will my 3/16" blade cut the curve on this drawer?"

There are diagrams out there that tell you the diameter curves that each size blade can cut. Don't believe them. All ¼" blades are not alike, nor are all ¼" or ⅜" blades. Even ones by the same manufacturer can vary slightly in the set of the teeth, thus affecting the size curve you can make. My best suggestion for you is to practice with the blade you want to use and always design your curves a little wider to allow for slight variations between blades.

You can purchase a small grinding stone with a handle that rounds the hard back edge of your band saw blade, allowing you to cut tighter curves. Most catalogs have these in their accessories sections.

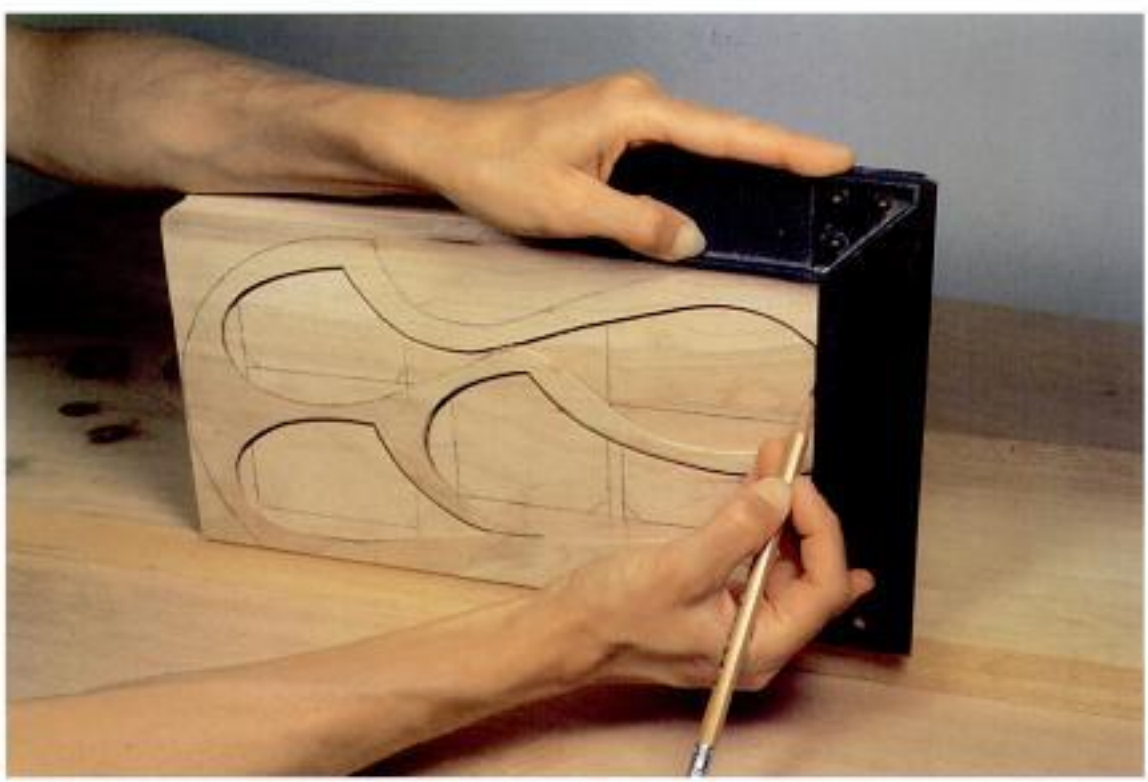


Photo 3-10 The easiest way to mark straight sides and bottoms for the drawer hollows is to square them in relation to the outer block.

blocks so that the inside walls and floor of each drawer are square with the sides and bottom (or top) of your box (Photo 3-10). You can freehand the corner curves, or you can use a compass, a spray can lid, a piece of a dowel rod, or any small round object to mark the curve.

Lay one of the drawer "guts" on its back on the band saw table, and make the proper adjustments to your guide. Cut out the insides, slowing around the curves (Photo 3-11). Keep an eye on your fingers at all times. Save the inside scrap for some small future project or commit it to your woodstove.

"Will I be cutting something off that's not supposed to be cut off?"

Once in a while, I'll be working on a really cool idea when I realize if I follow the cuts as drawn, I'll cut the whole box in half! This sounds brainless, but when you become immersed in an idea, the obvious can float right past you. If you make two or more entrance cuts, remember that the drawers cannot connect with a decorative (or functional) kerf.

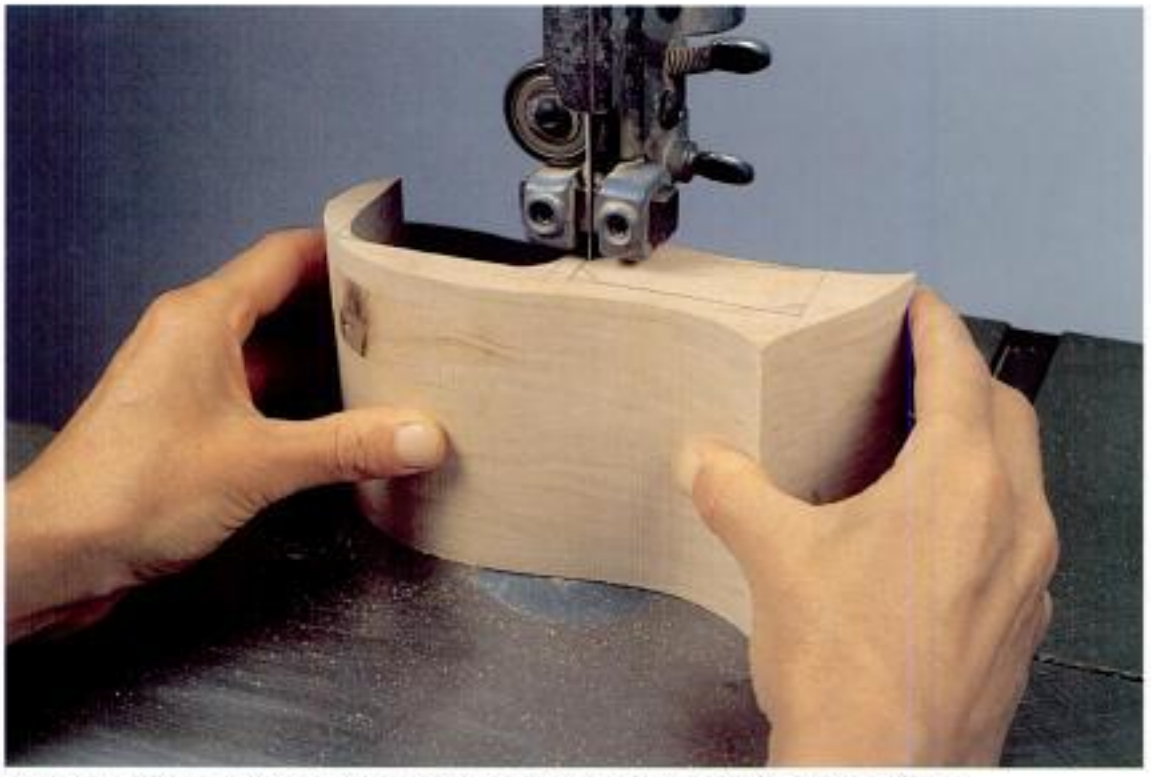


Photo 3-11 If you cut slowly, you can achieve sharp curves when hollowing out the drawers.

TIME-SAVING TIP

If you have an oscillating drum sander, you will want to sand the drawer cavities in the box body before gluing the back piece on (Photo 3-12). If you don't have one, the process of sanding the drawer cavities is covered in chapter four. I use a coarse sleeve followed by a medium sleeve on a 1" drum and hand sand later with fine-grit paper. You may choose to progress to the fine drum. The object here is to sand enough so that your oil finish won't end up looking dry and fuzzy on coarsely sanded wood, but not so much that you have created a large gap when you put the drawers back in. The reason I don't recommend sanding with drums on your drill press is that it's just about impossible to see what you're doing on the inside or to get that oscillating motion while holding onto your box. If you don't oscillate, the drum edges can leave aggravating grooves that can't be sanded out without changing the shape of the drawer cavity.

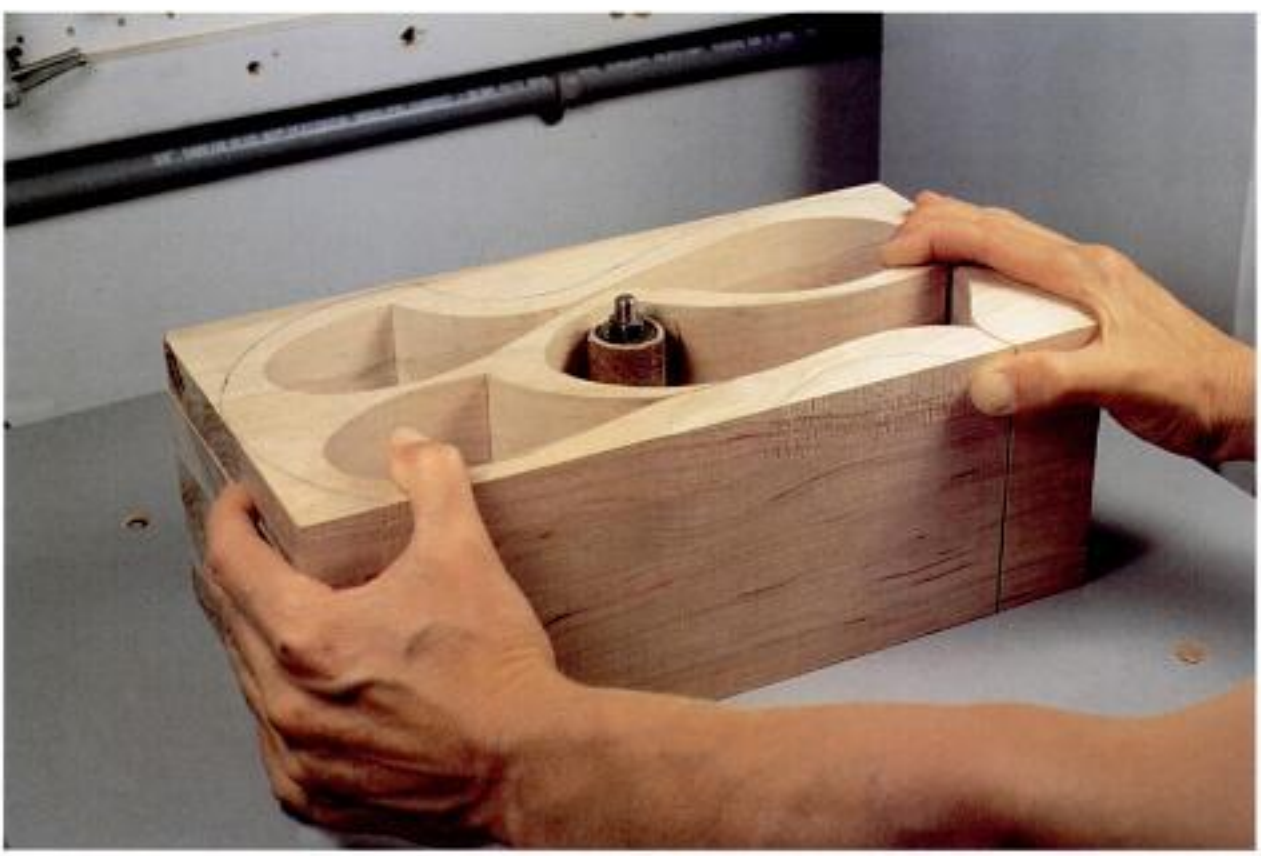


Photo 3-12 The oscillating drum sander makes quick work of sanding the drawer cavities before you glue the back onto the box. While not a required tool, the oscillating drum sander is nice to have around.

GLUING AND CLAMPING

Return to your gluing area. Gather your hand-screw clamps, small bar or Quick-Grip-style clamps, and all your box parts. The object is to glue certain parts back together with relative accuracy so that you don't have to sand off too much wood to get them smooth and even. This goes mainly for the drawers, since you'll be cutting the box shape out after you glue it back together.

The Box Back

To glue the back piece back onto the box body, first be sure the top and bottom match up. Here's a helpful hint for gluing the back of the box: spread the glue thoroughly, as you normally would when gluing, but fall

TIP

Occasionally, the entrance kerf in a design like *Tsunami* or *Wind Tree* will bind closed. If this happens, scavenge or cut a flat, matchstick-size wood scrap or piece of veneer about ½" (1.3cm) shorter than the depth of the box. Gently pry open the bound saw kerf and insert the small scrap through the back of the box until it is flush, making sure it is hidden from all angles of view (Photo 3-13). This will make it easier to chisel out the kerf on the box front later. At other times, these kerfs may open up a little. If this happens, use a small Quick-Grip-style clamp from either end of the block to close the kerf back to blade thickness while you glue and clamp the back piece on. Don't clamp the entrance kerf all the way closed; you'll need enough room to chisel the kerf into shape later on.

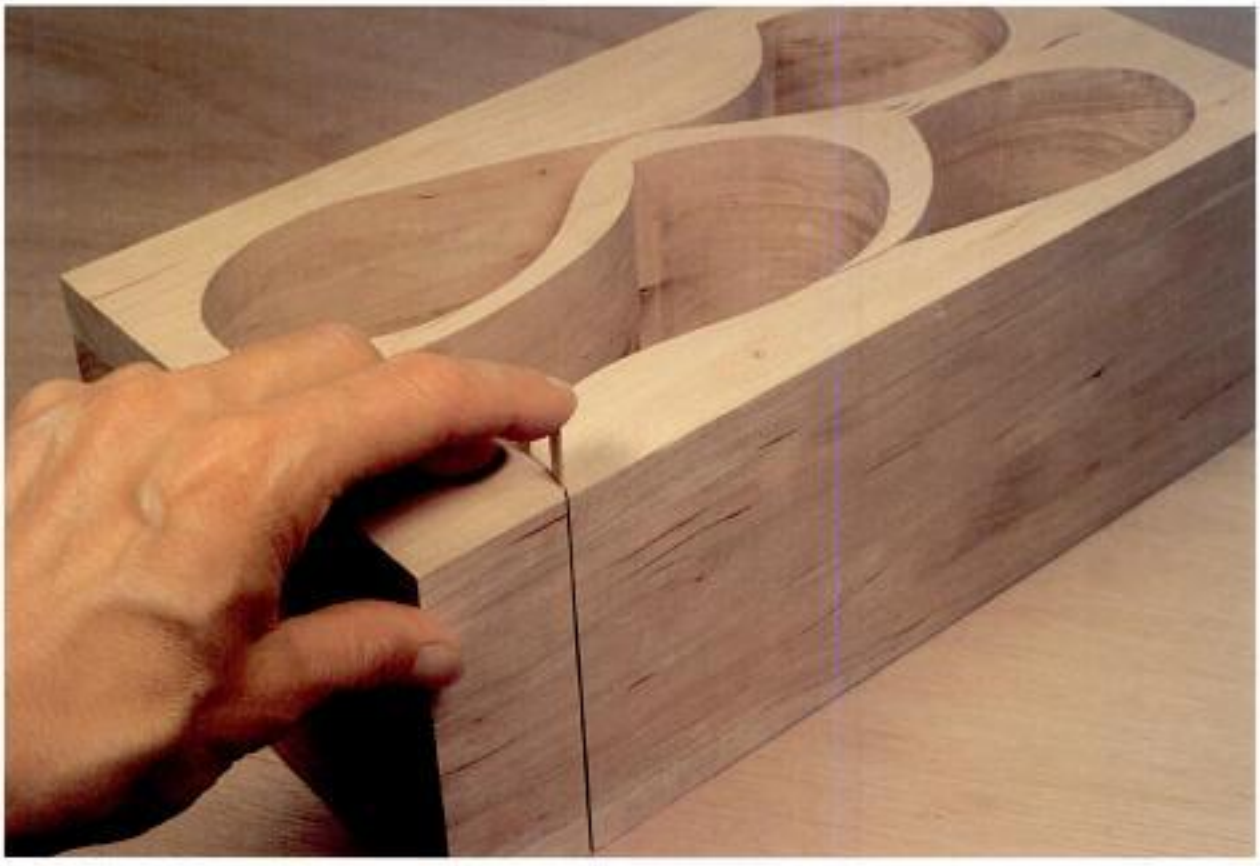


Photo 3-13 The occasional bound kerf is easily remedied with a sliver of veneer or scrap.

just a little short—approximately ⅛" (3mm)—of the back of the drawer cavities (Photo 3-14). When you clamp the back to the body, you'll have a minimal amount of glue squeezing into the drawer cavities, and there will be less glue to chip off the inside back when you're doing the final touches on your box. Clamp the back on with hand-screw clamps in the same manner as when laminating the block. It would be wise to add a couple of scrap blocks for the middle clamps if you're not using hand screws here. This is to ensure even pressure distribution to the block's center—to the thin parts surrounding the drawer cavities (Photo 3-15).

Photo 3-14 Avoid spreading too much glue right to the edges of the drawer cavities. Otherwise, you'll have to chip the dried glue off the insides of the cavities.

TIP

Some woods, like walnut, oak or elm, will leave fibrous "hairs" in the drawers where the cut is with the grain. A couple light swipes with a piece of 120-grit sandpaper will remedy this problem. If not removed, the drawer-lining material will feel rough.

Photo 3-15 When clamping the thin back to the body, use a couple scrap blocks to ensure even contact with all box edges.

The Drawers

Gluing and clamping the drawers is a bit more tricky, but once you become adept with the hand-screw clamps, it's a quick process. If you try to use other types of clamps, you'll only become frustrated when the pieces slide around.

On your gluing surface, gather the parts to one of the drawers and make sure they all match up correctly. Spread the glue thoroughly on the front and back of the inner "gut." Again, don't use too much glue or the front and back pieces will slide excessively as you try to clamp them, and you'll be chipping off gobs of glue from the inside of the drawer later (Photo 3-16). Align the drawer fronts and backs in their proper places as accurately as you can, and set the assembled drawer on your gluing surface. Just as you did when laminating the block, rest your hand-screw clamp on the gluing surface while you clamp the drawer together (Photo 3-17). You will have to adjust and readjust your pieces to get them to clamp together as accurately as possible. On longer drawers, you may have to use a small Quick-Grip or other clamp at the end. Repeat this procedure with the remaining drawers. Allow the glue to dry two to three hours or longer.

Photo 3-16 As with clamping the back on, use discretion when spreading glue to the inside edges of the drawer parts in order to avoid chipping it off later. However, it's always good to see a little glue coming out of the outer sides to know the bond is good.

Photo 3-17 A hand screw and a flat surface simplify the task of clamping drawers. In most cases, you'll have to work with the pieces to keep them even while you clamp.

CUTTING THE BOX BODY AND DRAWER PULLS

This step is always exciting for me. I get to see the results of my bookmatch lamination. More times than not, I smile with satisfaction as the patterns of grain and sapwood flow with the shape of the box, drawing my eye to new delights around every curve.

Set the band saw up as before and cut the box shape. Cut slightly outside the line to allow for sanding and shaping. You don't need the cut to be as smooth as was necessary when cutting out the drawers since you'll be able to belt sand more without affecting the fit of any pieces. But don't get me wrong—the smoother and more accurate the cut, the less you'll have to sand. Portions of the thin back will jut out from the open-ended drawer cavities and must be shaped to match the pattern. Always keep the back side down against the table. You will have no lines to follow since you cut them off with the drawers, so this is a "guess cut" based on the pattern's dotted lines (Photo 3-18). I always cut these small and shape them later on the drum sander.

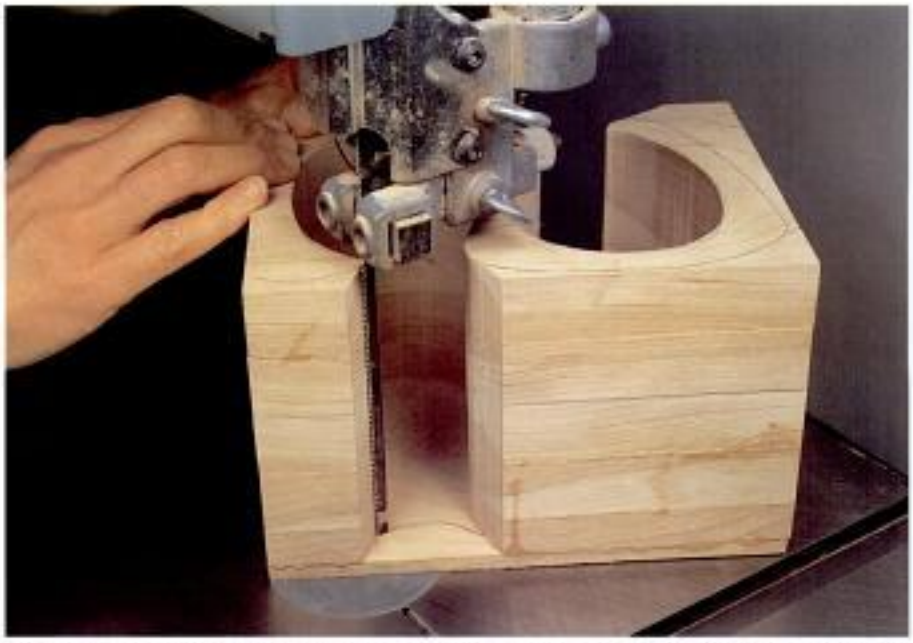


Photo 3-18 Cut the back piece at the open drawer ends slightly small so you can sand it to shape with the drums later.

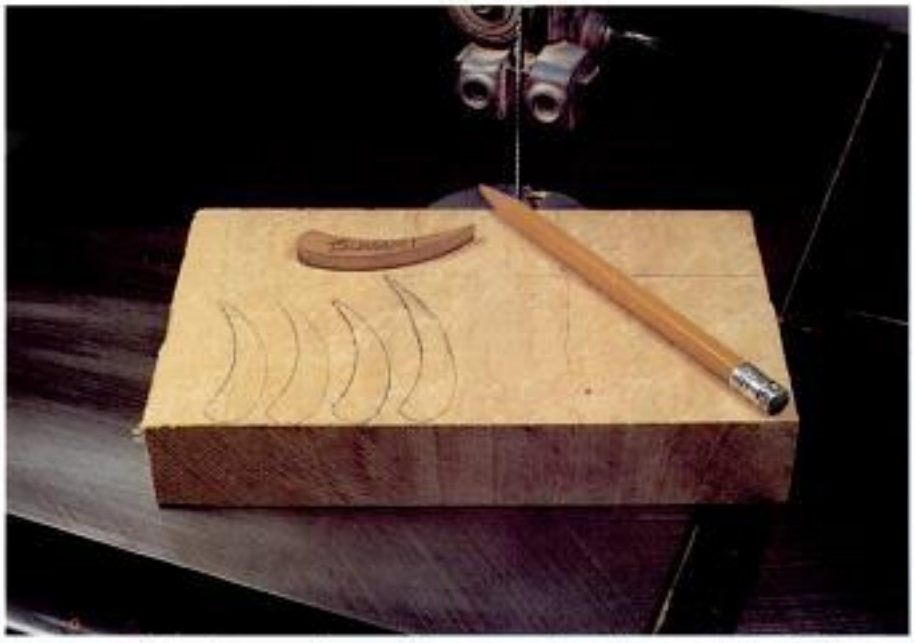


Photo 3-19 If you plan to make several boxes, consider making a template for the drawer pulls. You can use the same template for *Whale Play, Pisces, Minnow, Surf, Cetacean Migration* and *Lotus*. For *Tsunami* and *Wind Tree*, simply use your template for the basic shape, and freehand minor adjustments according to the drawer sizes.

Photo 3-20 Always use a push stick or equivalent to assist in cutting out the tiny drawer pulls.

For the drawer pulls, all you need is a ¾"- (1.9cm) to 1"- (2.54cm) thick piece of scrap. This can be an offcut from your original stock or a contrasting wood—anything you like. You can use the pattern or cut a template out of ¼" (3mm) Masonite to transfer the shape to your wood (Photo 3-19). I advise using a small scrap as a push stick when cutting these tiny pieces (Photo 3-20). Now you can detension your band saw and give it a rest. Move all your pieces over to the belt sander to begin the shaping process.

Chapter 4

Sanding

THE ART OF SHAPING WITH A BELT SANDER

I know one other woodworker who "carves" with his belt sander. We both agree it's an art in itself. Once you try this technique, you'll soon find yourself experimenting, breaking free from that monotonous, routed edge or that painfully chiseled curve. With practice, you'll learn the versatility of this tool.

This first section shows you how to freehand curves and edges and alleviates any fears you might have about removing too much wood. If you have an inflatable drum sander, you may wish to try it with some of the techniques discussed here. To start, adjust the belt sander to the 90° vertical position, with the table as close as possible and at 90° to the belt. Attach a 60- or 80-grit belt, and hook up your dust collection.

There's no firm sequence; the steps are fairly interchangeable. Sometimes I go back and touch up an outer shape I'm not happy with, having shaped some edges in the meantime. I'm always working back and forth, shaping a little here, rounding a little there.

TIP

For dust collection while belt sanding, punch a small hole near the end of the hose on the dust collector. Use an S-hook or piece of twine to rig it up so it hangs fairly close to the underside of the sander table without being too close to the belt. On my Grizzly, I just S-hook the hose to the slot on the disc sander cover so it hangs a little below and to the side of the table. Make sure the hose doesn't touch the belt (Photo 4-1).

Photo 4-1 Shaping with a belt sander creates great clouds of dust. You can cut down on the dust by simply hooking your dust collector hose beside or beneath the table while using the sander in the vertical position.

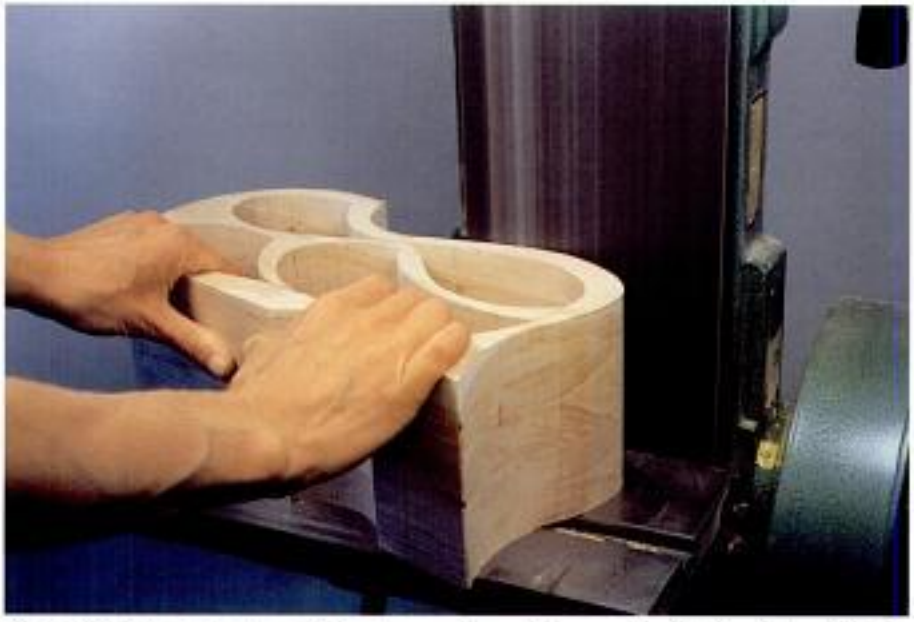


Photo 4-2 The outer curves of the box can be quickly smoothed with a 60- or 80-grit belt.

Photo 4-3 Create smooth, concave surfaces by working the box against the pull of the belt, front to back over the top cylinder.

The Box Body

With one end of your box resting on the table, begin by smoothing out the bottom. Then, lay the box on its back and smooth out all the rough band saw lines and shape the curves using the pencil lines as a guide (Photo 4-2). You may need to flip the box onto its front if your sander has a disc that gets in the way. If so, just check your pattern lines from time to time.

The concave curves can be shaped by working the box against the direction of the belt, over the top cylinder (Photo 4-3). Keep the wood moving to avoid sanding large, unwanted dents into the gentle curves. Sand out all band saw lines. You may opt to sand the concaves on the oscillating drum sander using a large-diameter drum (Photo 4-4).

Don't forget to sand the back and front of the box. By now, they will have some dents from all the clamping and sawing. Be careful while sanding the box front: the belt tends to grab the thin-cut edges around the drawer cavities. When doing any belt sanding, rest your box on the table as much as possible, or work upward against the belt direction, but never feed the wood into the belt with too much pressure.

Now comes the fun part of shaping your box. Begin by grinding down the hard edges of the box front and back

Photo 4-4 Another option is to sand the inner curves on the oscillating drum sander.

Photo 4-5 Shape the edges by working the box at an angle and upwards against the belt. By working the piece side to side and front to back, you can quickly rough your box into a more rounded shape.

against the belt. Work the concave edges at an angle over the top cylinder (Photo 4-5). As you do this, roll the box to round the edges, always working upwards against the pull of the belt and front to back over the top cylinder. The difference between rounding edges with the belt sander and using a router is that, with a belt sander, you will take more wood off where it's thicker and less where it's thinner, rounding more here and less there. A router makes a uniformly rounded edge around the entire perimeter of the box. The belt sander creates the illusion of a more organic shape, instead of just a rectangular block with some curves cut into it.

You can roll and twist the box at the same time over the top of the belt (Photo 4-6) so that the concaves are exaggerated by a broader curve on the left and a sharper curve on the right (Photo 4-7). To do this, you must begin by standing to the left of the sander. All in the same motion, roll the box's top right side toward you (and bottom left side away) while slowly working the whole piece left to right over the top cylinder. Repeat the procedure until you're satisfied with the depth of the cut. You can reverse this motion while standing at the other side of the sander. Shape the back edges as well. Don't be afraid to dig in, and don't worry about getting these ground edges smoothly rounded yet—you'll do that later with the palm sander.

Photo 4-6 Try rolling and twisting the concaves over the cylinder to exaggerate the curves.

"Do I have the right sanding equipment to handle this shape?"

If you own every type of sanding equipment available, or if you don't mind hand sanding, by all means try some more intricate shapes. I rarely design something with curves that won't fit a 3" drum or the top cylinder of my belt sander. There will be a few designs you'll come up with that you like so much they're worth the extra effort. The *Lotus* and *Wind Tree* boxes are examples of this.

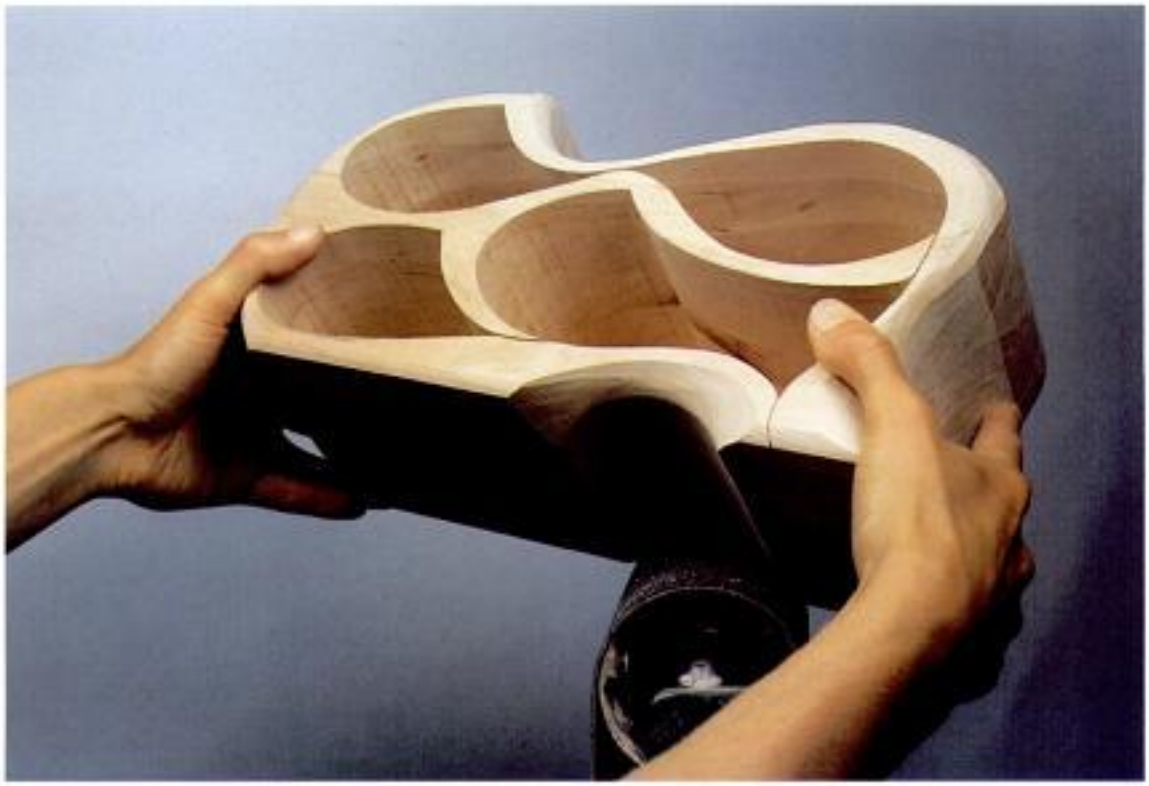


Photo 4-7 See the effect created by the rolling and twisting motion.

Photo 4-8 Sand the drawers carefully and thoroughly, but don't remove too much wood.

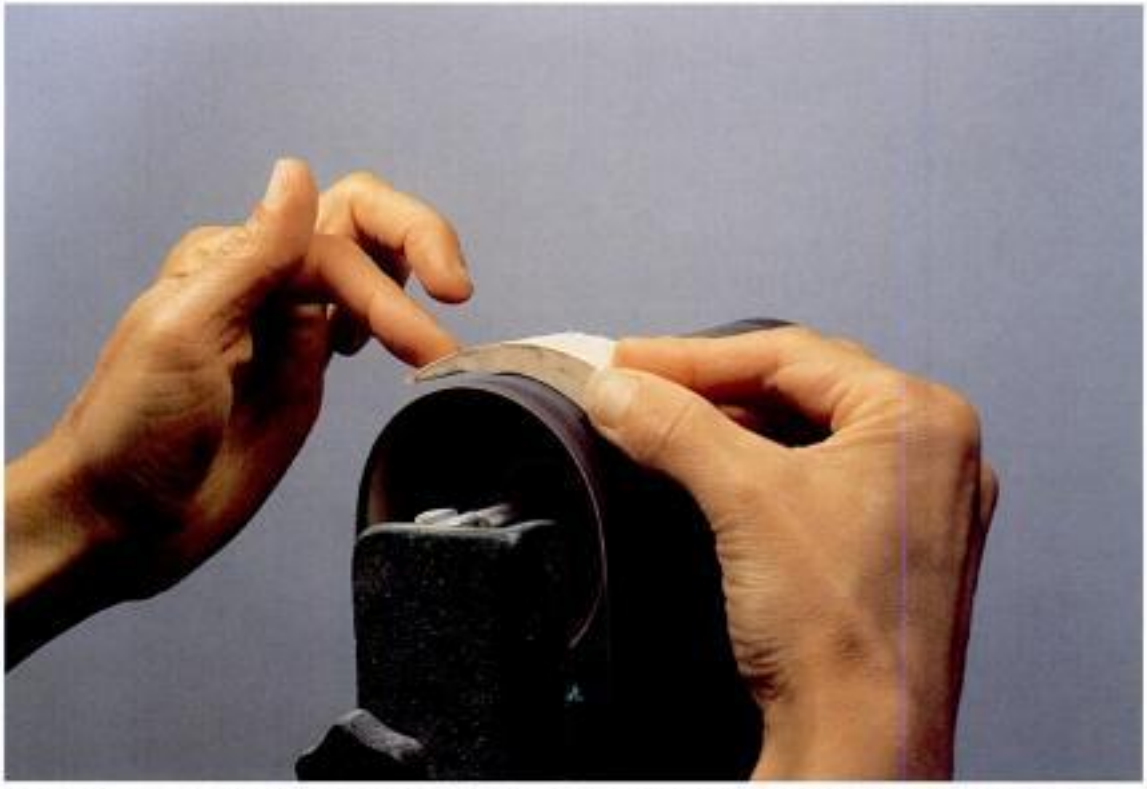


Photo 4-9 The tiny pulls require delicate fingertip sanding. In other words, sand the pull, not your fingers!

The Drawers

Belt sanding the drawers requires a little more care. The object is to get the saw lines and bumps out without removing too much wood. Remember, you still have three grits of belt sanding, in addition to finish sanding, to do. Although loose-fitting drawers are inevitable with this style of work, large gaps can detract from the aesthetics. Saw and sanding lines are the mark of an amateur sander, as I see when looking at one of my first band saw box prototypes. The idea is to sand them well, but don't overdo it.

Exercise more caution when working with the drawers. The sander likes to grab one out of my hands from time to time, slamming it from table to floor. Worse than startling me, it dents up my hard work! So hold onto them while you feed them gently into the belt, then you can get the feel for how much pressure you can use. Smooth out the back first, then do the sides and front the same way you did the box body (Photo 4-8). You may choose to rout the front edges on the router table once you've finished belt sanding since, for the drawers, the rounded-over edges can remain even all the way around (see Photo 4-14). In some cases, you may choose to curve either end of the drawer front to follow a curve in the box before routing. If you don't have a router, you can simply grind a rough roundover with the coarse belt and soften it later, beginning with coarse paper on your palm sander.

Note: If you're working with a divided drawer, don't try to sand the divider on the belt! Belt sanders love to crunch these thin edges up. The dividers will be sanded later with the palm sander.

TIP

To save my fingertips, I often let a pull go to fall where it will rather than attempt to pick it off the moving cylinder once it's sanded down.

The Drawer Pulls

Your dexterity is put to the test when you shape the drawer pulls. Touch the back of the pull to the belt to get it nice and flat for gluing to the drawer surface. Sand the concave of the outer shape (Photo 4-9), then add some depth by working the front of the pull upwards against the belt to taper the thin end down to a point. Be sure to leave the thick end deep enough to grip once it's on the box (Photo 4-10). Finally, round the front edges. These will be rough too, but you'll hand sand them smooth later.

With your rough shaping done, it's time to progress to the 120-grit belt on your belt sander. You'll use a slightly different technique now. You can eliminate all those coarse, cross-grained sanding lines by running your box and drawers grain upwards against the pull of the belt (Photo 4-11). Sand the concaves over the top as before, and don't forget the bottom, front and back. You do not have to do anything with the shaped edges at this time. I always repeat this procedure quickly with the 180-grit belt because in the end, it saves time with palm sanding by getting a lot of the deeper 120-grit lines out. I also sand the pulls with 180-grit to make the hand sanding easier.

Photo 4-10 You can add depth to the drawer pulls by rounding them with a curved taper.

Photo 4-11 Hold the box or drawers tightly as you sand out the cross-grained lines. Use an upward motion against the face of the 120-grit belt. Repeat this process using the 180-grit belt to lessen your palm sanding later.

Photo 4-12 Round over the drawer opening with a ¼" roundover bit.

Photo 4-13 As an option, or if you don't have a router, you can roughly round over the openings with a coarse sanding drum in your portable drill. 80-grit on the palm sander will quickly smooth it out.

Before Palm Sanding

There are four brief steps to complete before you begin palm sanding. First, rout or grind the front inside edges of the drawer cavities. Use the ¼" roundover bit with the router to do this (Photo 4-12); if you don't have a router, you can use a 1" sanding drum with your portable drill to grind a bevel that you can round over with coarse paper on the palm sander (Photo 4-13).

Second, if you've chosen to rout the front edges of the drawers, do so now on your router table with a ¼" roundover bit (Photo 4-14).

Third, if you didn't sand the insides of the drawer cavities with an oscillating drum sander before gluing the back of the box on, you will need to do it now with your drill and sanding drums (Photo 4-15). Using the 1" drum with coarse and medium sleeves, sand the cavities just enough to get the heavy saw lines out. You may choose to progress to the fine grit. The object here, as with the oscillating drum sander, is to sand enough so that the oil finish won't look dry and fuzzy on roughly sanded wood, but not so much that you have a large gap when you put the drawers back in. Use the ½" drum to get into the tighter angles. You won't be able to get all the way into some of the angles or all the way to the inside back of the box, but those parts are unnoticeable when the box is finished.

Finally, the rough cuts on the thin box backs—where the open drawer-ends of the *Pisces*, *Cobra*, *Boa*, *Aurora*, *Leaf*, *Surf* and *Tides* are—will need to be smoothed out with either the oscillating drum sander (Photo 4-16) or the portable drill and drums. Sanding drums on the drill press will work, too. The drawer backs will show from the back of the box with these designs, so make sure they're sanded well.

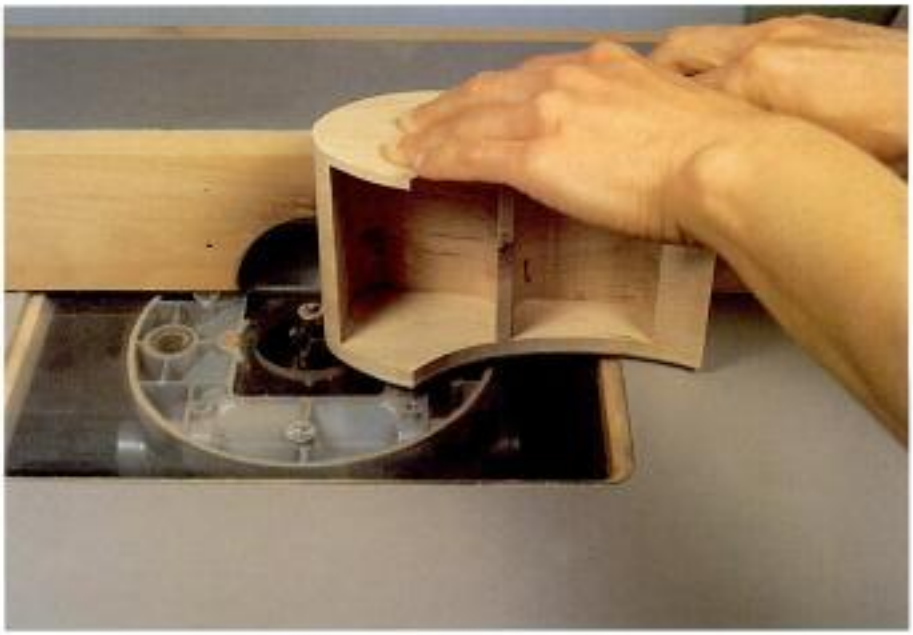


Photo 4-14 Rout the drawer fronts with a ¼" roundover bit.

Photo 4-15 If you didn't use the oscillating drum sander previously, sand the drawer cavities with your drums and portable drill.

Photo 4-16 Sand the rough back at the open drawer ends smooth using either your oscillator, drill press or portable drill.

TIP

For dust collection while palm sanding, clamp the dust collector hose to the edge of the surface on which you'll be sanding. A slip-resistant rubber pad on the bench or table will help to protect your box while you work.

Photo 4-17 To collect dust as you palm sand, you can make a stock-style hose-holder with scrap wood, corner braces and screws. Or you can simply clamp the hose to the edge of your workbench.

PALM SANDING

Perhaps the most important step in the final stages is palm sanding. Your diligence with this step will reflect the difference between an elegant, professional-looking piece and just another interesting woodcraft. Here you'll see your box transform from rough work into a flowing work of art.

Have your quarter squares of 80-, 120-, 150- and 180-grit and your dust collection at the ready. With 80-grit on your palm sander, round over and smooth all the box and drawer edges, including the drawer cavity edges, the open-ended drawer areas that were too awkward to sand previously, and the drawer dividers (Photo 4-18). To some, the drawers may seem difficult to sand, but you'll find they're the easiest things. When you are satisfied, proceed to 120-grit and sand the entire box and drawers. This grit is important because it gets out any remaining belt sander lines and dents and scratches your box has acquired through handling thus far. Even though you belt sanded with 180, don't skip over the 120 here; there will still be deeper lines that the 180-grit belt did not remove. I find this part the most exciting, as the box is now taking on its fluid, smooth shape. Continue on to 150-grit, and make sure to sand out all marks from the previous grit.

At this time, sand only the drawers that require drawer pulls with 180-grit to prepare them for gluing on the pulls. Since you'll be shaping the finger slot drawers later (for *Cobra* and *Boa*), wait until you're done carving the slots to palm sand them with 180. To save time, you'll palm sand the box body with 180 after the following steps, while the pulls are drying on the drawers.

Photo 4-18 The rough shaping you did with the coarse grit on the belt sander can be quickly softened and rounded with 80-grit paper on the palm sander. Then you can sand the entire box and drawers with a succession of 120-, 150- and 180-grit papers.

Photo 4-19 A sharp chisel makes easy work of rounding over in the saw kerfs.

Photo 4-20 Beginning with coarse paper, soften the chiseled kerfs.

CARVING AND HAND SANDING

I'm definitely not an expert with chisels, and you don't have to be either. For the most part, I leave them to the professional wood carvers. Just a few scrapes with a sharp wood chisel where a router or sander won't go are all that's required on these boxes. If you're intimidated by chisel carving, only five of the designs—*Airborne, Whale Play, Tsunami, Wind Tree* and *Lotus*—require it.

All you need to do is roughly round over the saw kerfs that run up from the bottom entry point and between the drawers (Photo 4-19). That's it. Take a piece of 80-grit sand paper, slide it a little into the kerf, and use it to round over and smooth any hard edges. Then do the same with medium and fine grits (Photo 4-20).

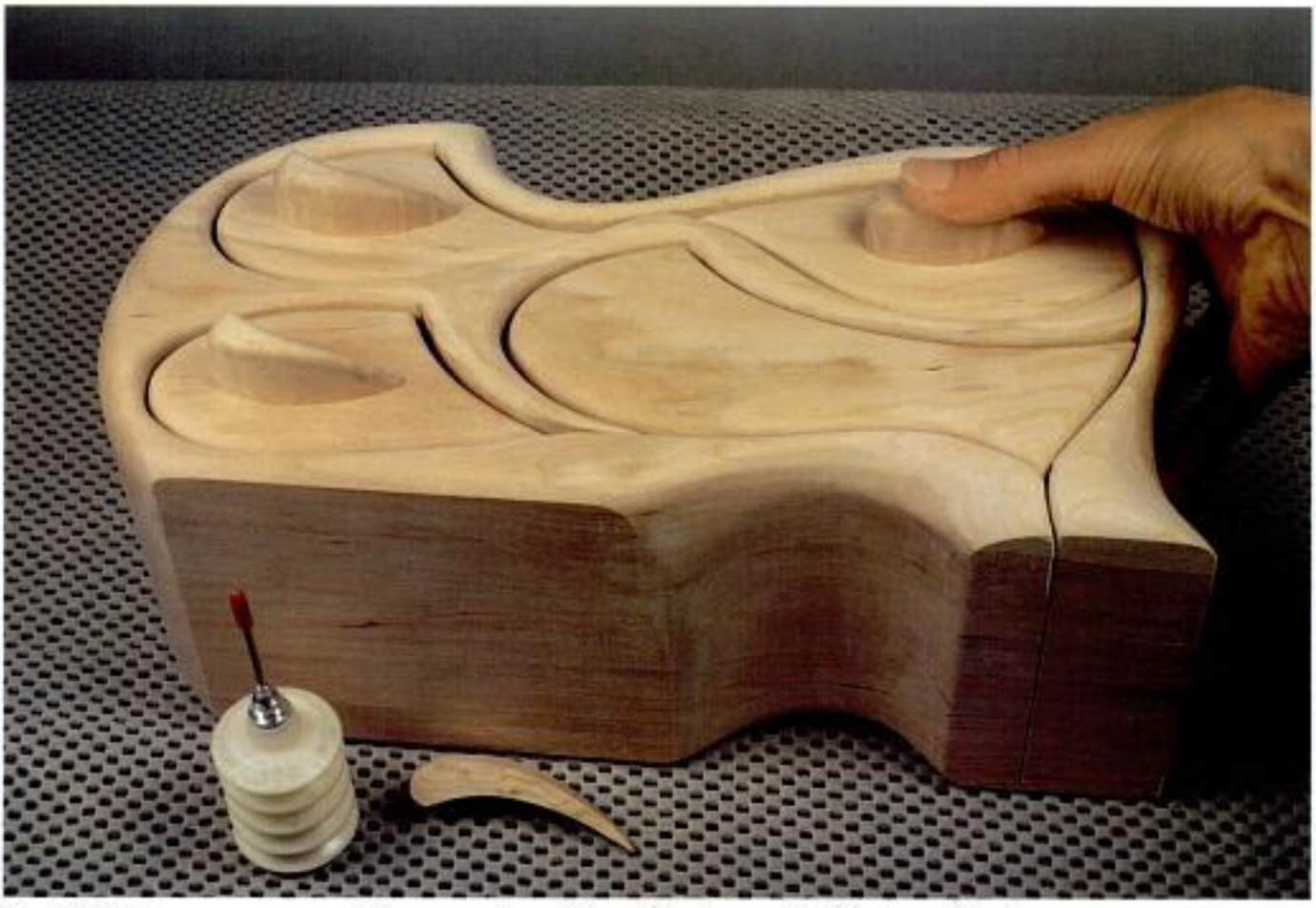


Photo 4-21 Use your pattern as a guide to eye up the positions of the drawer pulls. If you're careful when you spread glue on the pulls, you can avoid most or all of the squeeze-out.

Drawer Pulls

Hand sand the drawer pulls with 120-grit followed by the 180-grit until smooth. Put all the drawers in the box and lay it on its back. This way, you'll be able to eye up the positions of the pulls. (You want to do this on a rubber mat or cloth to spare all your hard sanding work.) Dab a small amount of glue on the back of a pull. Spread the glue fairly thinly and evenly over most of the surface, barely avoiding the edges. Using your artist's eye, position the pull onto the drawer front (Photo 4-21). Your pattern will guide you here. Apply hand pressure to each one for a minute or two, and make sure it doesn't slide around until the glue firms up. Let them dry at least an hour before applying the finish.

Finger Slots

To shape the finger slots for the *Cobra* and *Boa*, use a coarse sleeve on your 1" sanding drum. Insert the drawer into its cavity, and mark the edges of the slot on both the drawer and the box (Photo 4-22). For the drawers, use either the oscillating drum sander or the portable drill. Sand the slot down to about half the diameter of the drum—about ½" (1.3cm) down from the top of the drawer—rounding the edge to the inside of the drawer (Photos 4-23, 24). When carving the slot on the box, angle the

Photo 4-22 When you mark the finger-slot positions for the *Cobra* and *Boa* designs, make sure you won't be cutting into the side of the drawer.

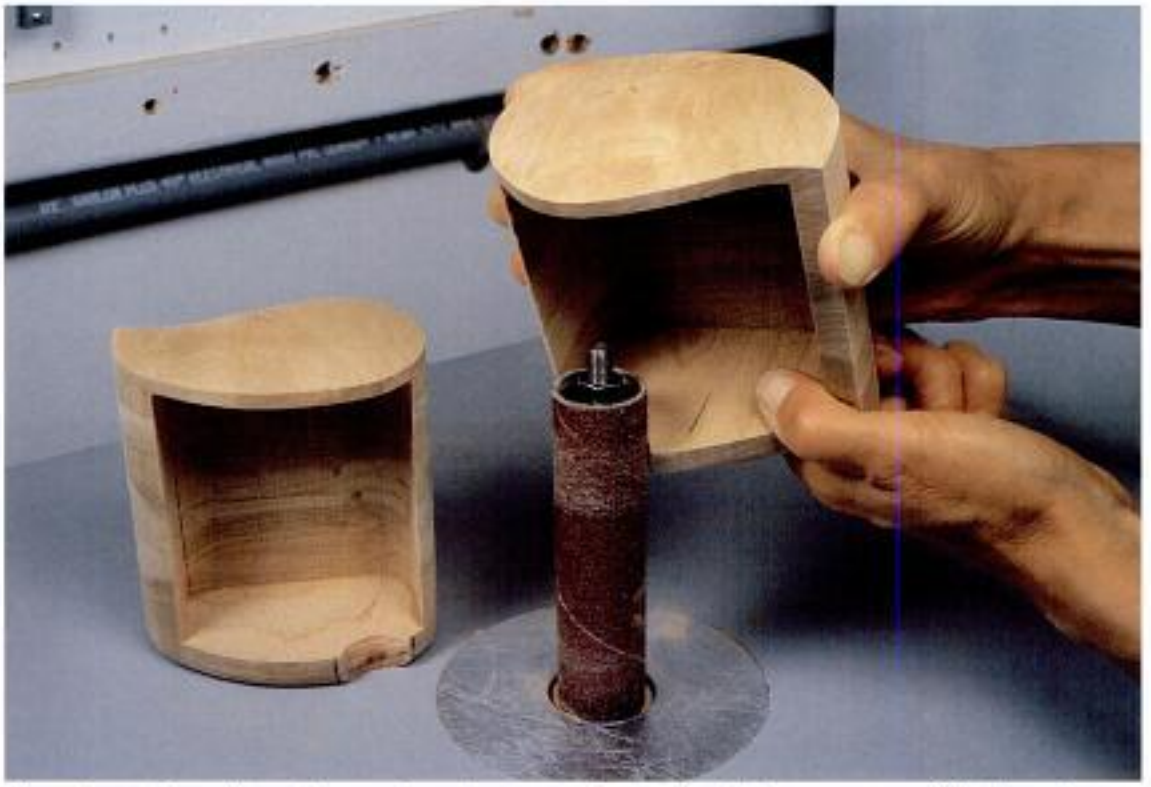


Photo 4-23 The oscillating drum sander, with a coarse sleeve on the 1" drum, can start off the finger slots.

Photo 4-24 The finger slots can also be cut using the drums on your portable drill. If you roughed the slots on the oscillator, you will still have to refine the slot shape with the portable drill since it allows you more control and range of motion.

drill at approximately 45° to the drawer cavity edge, rounding it to the inside of the box (Photo 4-25). Try the drawer in its cavity a few times while you work to make sure the slots line up. Test the slot for size with your own finger, and remove more wood if necessary. Finish up with a fine drum.

Now you can finish palm sanding everything with 180-grit and move on to hand sanding. For boxes with open-ended drawers, you will want to hand sand the places in the drawer cavities that the drawers don't cover. A final, light going-over by hand with 180-grit on all surfaces will allow you to smooth any hard edges, find any missed spots and soften the drawers' back and side edges and dividers. Don't forget the drawer cavities—a few light passes with 180-grit will help prevent the oil finish from appearing fuzzy on the inside.

With a sharp chisel, chip off the glue squeeze-out from inside the drawer cavities and (carefully) around the drawer pulls. Vacuum or dust everything off, and admire your work as you head for the finishing area.

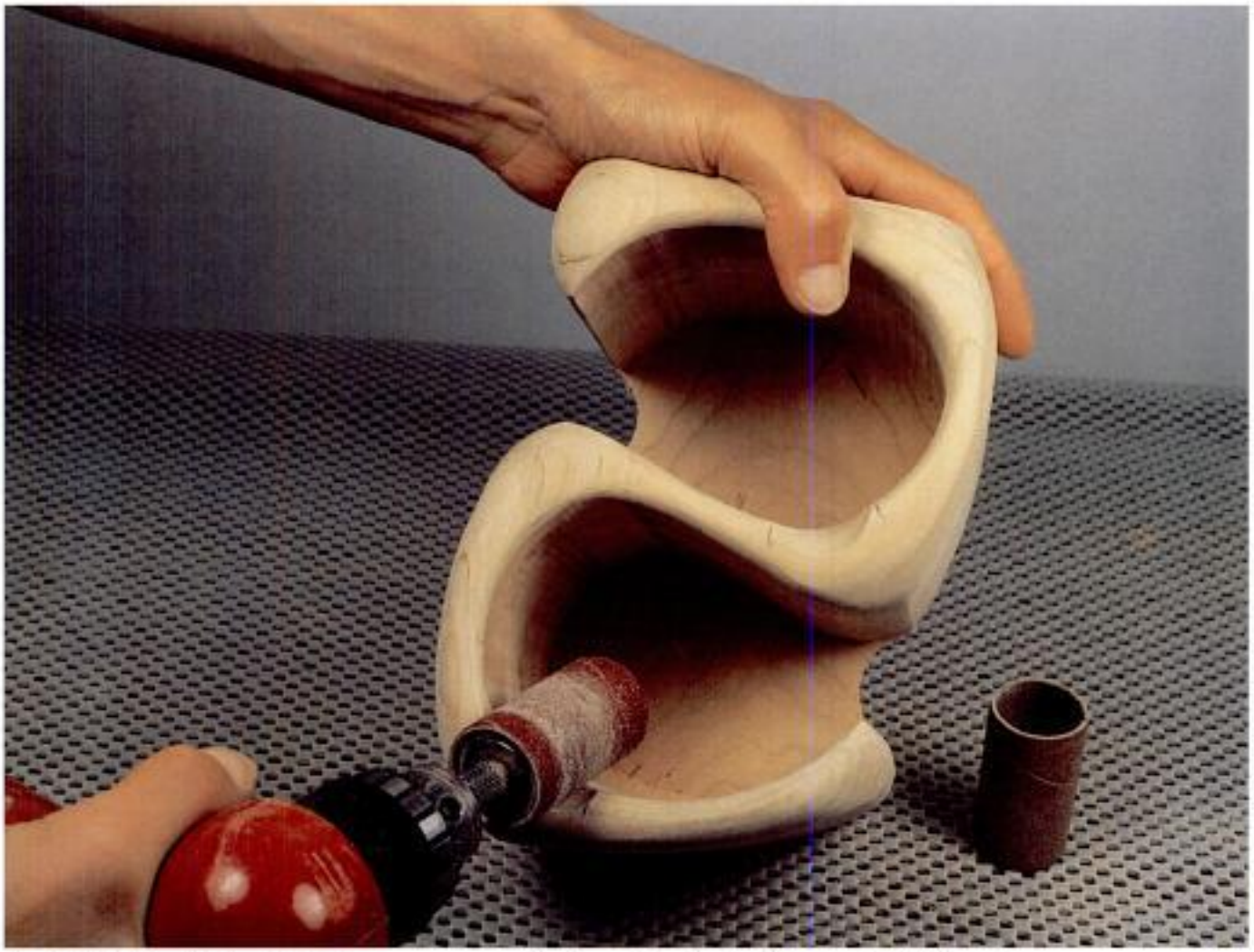


Photo 4-25 Shape the box slots in the same manner as the drawer slots. During the process, try the drawers to make sure the slots line up. Don't remove too much material!

Creativity

Creativity was a word I used to find intimidating. My parents encouraged me to be creative, but after I used the wall as a coloring book or various body parts other than my hands to play the piano, creativity became synonymous with punishment!

Whenever I've admired artisans' styles, I've felt they must have some mysterious power that allows their sublime concepts to manifest themselves as art. Gee, I had deep thoughts sometimes, but how to express them via something tangible was beyond my comprehension. I figured that I was just one of those people whose creativity gene was recessive.

Well, some artisans may use a mysterious power to create, but many of us take a more humble approach. To come up with a new box design, I've done sublime things like: doodled lazily on scratch paper until I noticed a shape I liked; or looked at an object and, since I have little drawing ability, drew it in a stylized, two-dimensional way, without all the detail and sharp curves or angles; or imitated on paper some swirling grain patterns I noticed on a pretty piece of wood. Then I modified the drawing to work with the band saw.

Over time, I refined my shapes with an eye toward the most efficient use of tools, the least amount of waste and—what we all love—the least amount of hand sanding possible. If I wanted some extra challenge, I'd add an angle or sharper curve that I knew would take some—but not too much—hand sanding.

There are countless things you can try with band saw boxes. If you are adept at carving, try some unusual carvings on your box. Another fun thing to try is to cut a broad, wavy curve across the front of your block before you cut the drawers out. I've done this with blocks I've laminated to six thicknesses. Save the offcut and use double-faced carpet tape to reattach it before you cut out the drawers. This way you can follow the pattern lines when cutting out the drawers. Then cut the drawer front off by following the curve you cut across the front but in about ½" (1.3cm). This variation is easier to do with designs that have finger slots rather than pulls because you need a flat surface to glue pulls onto (unless, of course, you want to match the back of the pulls to the curve on the box—good luck!). Or try this: Laminate a thin piece of contrasting wood onto the drawer fronts (see photo) or on the whole front of the block before you curve it.

There have been times I wasn't so pleased with the outcome of an experiment, but band saw box art is so versatile that most experiments end up as successes. Experimenting with your boxes can turn woodworking into wood-playing.

When you create band saw box art, you create something new with each finished piece. One might have your favorite species of wood, another might have fantastic sapwood streaks, while another might be your best design yet. Whatever their differences, there's one thing these distinctive boxes all have in common. Each box—in every curve and every drawer—contains a piece of its maker that will remain as unique and ageless as the wood itself.

You can dress up an otherwise bland piece of wood by laminating a thin piece of contrasting, figured wood onto the drawer front. The drawers can be shaped to have a protruding bubble effect as well.

"How do I come up with a shape?"

This is the toughest part. Mindless doodling has rewarded me with some of my most popular designs like *Whale Play* and *Tsunami*. Or you may imagine a more realistic shape or something you wish to represent. Follow the line of a rock, a cloud, a tree branch, a moth's wing, an amoeba, a mountain. Water is my favorite model because I enjoy its flowing motion. It becomes easier once you set forth some limits, such as box size or the number of drawers. Then you tend to scribble shapes bearing in mind how difficult the sanding will be or how deep you want the drawers to be. Envision saw kerfs that accentuate the flow of the box. Doodle different entrance cuts, different ways of connecting drawers and different directions to cut when following the box shape. You can refine the shape later on graph paper.

Chapter 5

Finishing Techniques

Photo 5-1 For best results, give the sealer coat an extra day to dry.

You've put all that work into perfecting your box, so now it's time to spray on a hasty couple of coats of lacquer and be done with it, right? Wrong! Would you want to put a dime-store finish on your gallery-quality piece? Well, some people would. After all, it is your work and you can finish it however you like. But if you want a fine, professional finish that shows off the natural wood with a soft luster (and that won't require as much time for finishing as for creating the box itself), hand-rubbed oil is the way to go. The mark of a true craftsman is a finished piece that feels like a satin sheet when you slide your hand over its surface.

OIL AND WET SANDING

One of the first questions woodworkers ask as they stroke a box that's in my display is, "What finish do you use?" My favorite finish is a brand called Livos (see the appendix for their information). Once I began using it, I couldn't go back to any other brand. This product contains citrus thinner instead of petroleum-based thinners and is much more pleasant to work with than common oil finishes. The aroma is of fresh oranges, and the linseed oil and plant resin base doesn't get sticky on your hands while you work with it, unlike other oil finishes. Its buildup is ever-so-slight, giving a soft satin glow to the wood without leaving a waxy or coated look. Best of all, it's safe for you and the environment. Livos products may seem costly when you look at the prices, but in fact they're quite economical—a little goes a very long way. The results are lovely, and I receive many compliments and inquiries about the finish I use.

Another eco-friendly finish company is Eco Design. I use their Bioshield sealer mixed with the citrus thinner at a 3:1 ratio for sealing, and Livos' Meldos hard oil full strength for the wet-sanding and finishing coats. I use the Bioshield thinned, but it's not necessary to thin it. I do so to stretch my supply of Bioshield. Meldos can be used as the sealer coat, too, should

Photo 5-2 A firm, wet sanding sets your box up for a fuzz-free finish. It's very important to wipe off the box after a few minutes, even if it looks dry. The same applies to succeeding coats.

TIP

When working with oil finishes, some woods will finish blotchy due to that particular board's characteristics. A firm buffing with superfine steel wool followed by a light paste waxing can remedy this occasional problem. However, a buffing wheel with a fine abrasive, like tripoli or white diamond, makes the job much easier. It also eliminates the need for waxing. If you do a lot of oil finishing, a buffing setup may be worth your investment. **Note:** Do not use white diamond on dark woods because it leaves a visible residue that sticks in the wood grain and is just about impossible to remove.

Photo 5-3 A buffing wheel with a fine abrasive can add extra burnish to an oil finish quickly and easily.

you decide to stick with one company's products. Kunos is another Livos oil I like because it builds up, so I can use fewer coats. It can be a better protectant than Meldos if applied more heavily. A couple drawbacks of Kunos are that it is considerably more expensive than Meldos and the resulting finish needs to be buffed to smooth the roughness.

If you choose to use these brands of oils, apply the sealer coat with a rag, buff off any excess (I use steel wool), and let dry 24 to 48 hours (Photo 5-1). Seal the drawer insides and drawer cavities as well, but do not apply any further coats to the insides of the drawers. (To save yourself time later, read ahead to Drawer Lining and Paste Waxing.) Thoroughly wet sand the first coat of Meldos to smooth and soften the raised, rough grain produced by the sealer coat. This will give your box its satiny feel. Buff completely dry (Photo 5-2). Don't forget those drawer cavities! This coat usually weeps, but wait five to eight hours before wiping again. Let this coat dry 48 hours. If before you apply the next coat, you come across any areas that may have wept a few little spots, buff them out lightly with 0000 steel wool. Then apply the next coat lightly and buff dry. After 24 hours, repeat with another very light coat. If you follow this procedure, you probably won't need more than three coats of Meldos, occasionally four. Allow the final coat to dry 24 to 48 hours before waxing.

There are several other good oil finish products on the market. Most wipe on with a rag then buff off with a clean cloth. Apply as directed; check after an hour or two for any spots that weep back out of the wood pores, and buff them dry. Adhere strictly to the product's drying time before applying additional coats. Usually with the second coat, you will need to wet sand to smooth out any fuzziness or raised grain that appeared from the first coat. Use 600-grit wet or dry paper to sand the freshly oiled box thoroughly, then buff dry with a clean cloth. Don't forget to wet sand the inside of the drawer cavities to keep them smooth and to take the finish better. Depending on the oil brand and the species of wood, you may need as little as two coats or as many as six. Consult the product label recommendations.

TIP

Weeping is a common characteristic of oil finishes. While most of the oil is absorbed into the wood pores, occasional spots seep back out to the surface where they appear as tiny, shiny dots. Often, these spots will reabsorb as the oil soaks into the wood, but once in a while there may be few that hang around.

There are a few simple measures you can take to avoid, or remedy, weeping. It's best to prevent weeping in the first place by thoroughly wiping the wood with a dry cloth within the specified time of oil application as per the finish's instructions. Periodically check the box for signs of weeping, and buff off any spots while they're still wet. It also helps to apply succeeding coats very lightly so that there is little or no excess oil to weep back out of the pores.

If you should end up with a few spots that have dried on the surface, simply remove them by buffing with superfine steel wool. Once they're removed, buff the entire area lightly with the wool, followed by a soft cloth to even out the finish.

With minimal effort your band saw box will radiate the beauty of hand-rubbed oil.

Photo 5-4 A large box can serve as a spray booth when applying flocking to the drawers.

DRAWER LINING AND PASTE WAXING

Since a fabric lining would be almost impossible to work with in these drawers, spray flocking is the way to go. DonJer, Inc. makes a very effective spray flocking to use as a drawer liner. It comes in several colors and is easy to use. Once applied to the insides of the drawers, the powdered Suede-Tex fibers feel like a soft, nappy lining of velour or suede. You'll find DonJer's information in the appendix. Note: I recommend a dust mask for this procedure.

You'll need a big cardboard box turned on its side to use as a mini spray booth to apply the flocking. Be sure to seal the inner flaps down to keep excess flocking from getting stuck behind them (Photo 5-4).

After the sealer coat of finish has dried, apply a sealer coat of shellac to the insides of the drawers. This can occur while the process of finishing the rest of the box is still ongoing. The shellac must be thoroughly dry before the drawers are lined. Once the shellac is dry, simply brush on the adhesive

Photo 5-5 Admire your job-well-done as you buff it to a soft sheen.

(don't be sloppy with this), and apply the flocking with the pump sprayer (much like an old-fashioned bug sprayer) as directed in the instructions accompanying the drawer lining kit. Let it dry overnight. Brush or vacuum lightly when dry.

Paste waxing is an optional step, but you'll find it adds a soft glow and feel to the wood, and it makes the drawers slide more smoothly. Livos makes a nice orange-scented, petroleum-free paste wax, but any brand will do. Apply the wax lightly to all surfaces of your box except the drawer cavities where the slightly rougher surface will catch the wax and leave a white residue when it dries. Let dry and buff well (Photo 5-5). As an added touch, you can stick adhesive-back felt circles on the box bottom. These help alleviate any wobble the box may have on an uneven surface. Last but certainly not least, place the box under a nice light, step back and admire your completed work!

TIP

If you ever have the problem of bad cuts and/or the necessity of heavy sanding to the point where the drawers have more than a small gap at the top, try this: Get some dark brown adhesive-back felt from your local craft supply store, and cut two narrow strips for each drawer about ¼" (6mm) shorter than the depth of the drawer cavities. Arrange the strips attractively, from back to front, on the bottoms of the drawer cavities so that when you insert the drawers, they slide and rest evenly on the strips. This makes the gaps appear uniform all the way around the drawers. If the gaps are smaller at the top when you do this, you probably don't really need the felt.

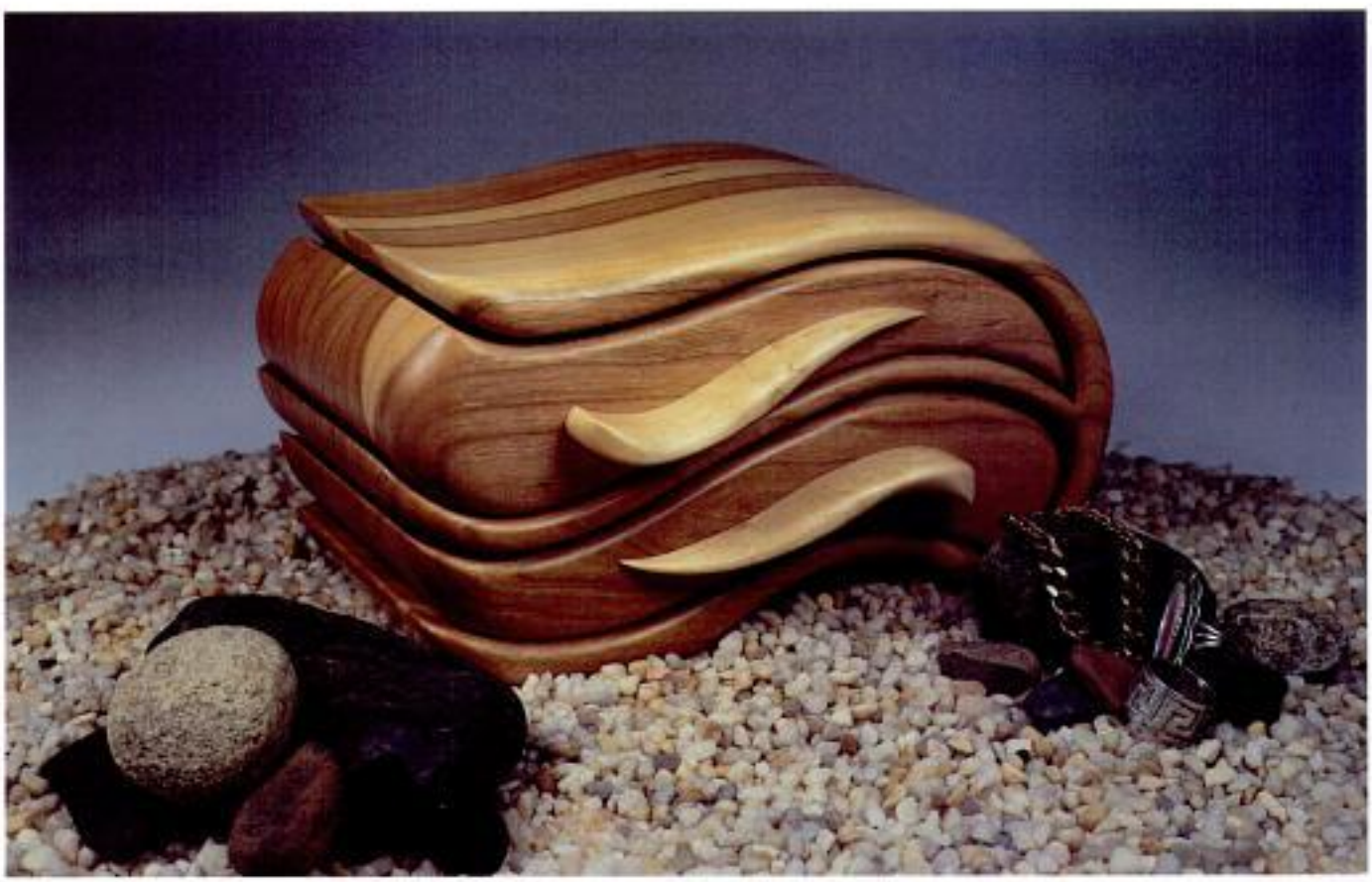


Photo 5-6 A good finish adds to the organic feel of a piece. Here, the *Tides* seems to glow.

Chapter 6

The Boxes

Although this style of band saw box art utilizes the same basic techniques for each design, the following special considerations will speed you through the peculiarities of each one. The stock dimensions for each box are based on the information about wood selection and preparation in chapters one and two. To reiterate, 4/4 rough-sawn stock should be planed no thinner than ⅞" (2.2cm) for a block laminated to five thicknesses, but 1⅛" (2cm) presurfaced stock will suffice—your box will just be narrower from front to back when finished. To make things easier in the box descriptions, I will refer to all these thicknesses as 4/4.

For 5/4 rough-sawn stock, plane it no thinner than 1⅛" (2.9cm) for a block laminated to four thicknesses; but 1" (2.54cm) will look OK, too. These thicknesses will be lumped together in the 5/4 stock dimensions.

Don't struggle too much over this measurement. Simply try to plane as little as possible off your 4/4 and 5/4 boards. Most blocks are fine when laminated to thicknesses of 4" (10.2cm) or more.

As a quick note, the rough width of some of the blocks will be 6¼" (15.9cm). Once you flatten one edge of the block on the jointer or table saw, the blocks will be 6" to 6⅛" (15.2cm to 15.6cm) and will clear the guard on band saws with clearance heights of 6" (15.2cm).

Tsunami

Surf, Minnow & Leaf

Surf, Minnow, Leaf
Nature displays her grandeur in the smallest of her creations.

These three single-drawer boxes are simple but unique, and make beautiful gifts. They also show that you can create abstracts with the smallest, simplest of shapes. The designs can be elongated if you want something a little bigger, and you can add a third drawer section if you wish. As with all band saw boxes, you can do most of the initial work and let the glue dry while you work on a larger project.

Minnow is the easiest of these three to make because of its simple shape. After you belt sand the body and drawer with a coarse grit, put the drawer in its cavity. Usually, the "tail end" of the drawer is a bit longer than the box. Simply lay the box on its back on the sander table, and round that end with the pieces together until they meet in a nice curve. You can shape this end and the bottom edges around from front to back, too. You don't have to drum sand the open end of the back piece as you must with the other open-ended boxes. Use the ½" drum to sand the sharp angle in the drawer cavity, and hand sand the open end of the drawer cavity on the bottom where your sanders won't reach.

After you cut the drawer out of the *Leaf* box, don't forget to cut the waste piece off the end of the drawer. This box has lots of curves to play with when shaping on the belt sander. Refer to the *Pisces* description and to chapter four for more details on shaping the concaves. Drum sand the curve into the back piece at the open end, and use the ½" drum in the sharp angle of the drawer cavity. Palm sand the concave on the top with a fine grit to remove the sanding circles that tend to show themselves in these surfaces once finished. Taper the drawer pull to one of its points (it doesn't matter which one—it looks OK both ways).

Surf is very similar to *Leaf* in the shaping and sanding processes. Remember to cut the waste off the drawer end. One tricky spot on this box, much like the lower left end of the *Pisces* box, is cutting the back piece at the open end. Lay the box on its back—you can draw a line using the pattern as a guide—and begin the cut into the open end from the left. Closely follow the drawer cavity edge as you look down into the box from above, then make the curve exit along the line of the top edge. If you're at all intimidated by this cut, it's easy enough to shape this curve with the drum sander instead. Carefully sand the top surface of the little "foot" since the drawer doesn't cover it when finished. Shape the bottom and top concave edges as described previously. Taper the drawer pull to a point while leaving the thicker end deep enough to grip.

Minnow and Leaf

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 4"-wide by 48"-long (10.2cm x 121.9cm). With 5/4 stock for four thicknesses: 4"-wide by 38"-long (10.2cm x 96.5cm).

Approximate finished block face size
Cut the board into even 4"x9¼" (10.2cm x 23.5cm) sections.

Surf

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 4"-wide by 43"-long (10.2cm x 109.2cm). With 5/4 stock for four thicknesses: 4"-wide by 34"-long (10.2cm x 86.4cm).

Approximate finished block face size
Cut the board into even 4"x8¼" (10.2cm x 21cm) sections.

Whale Play

Whale Play
Gray whales are often seen playing off the shores of the Pacific coast.

Whale Play has been one of my most popular designs. It was also one of my first. It began as a simple spiral doodle. My pencil never left the paper, and lines began to overlap. Then I saw it. Among the scribbled lines, the crude shape of the drawers stood out. I reached for a clean piece of scratch paper and drew those lines without all the rest of the scribble—in a few minutes, the entire rough design was finished. There was no doubt in my mind what this shape resembled. Often in nature documentaries and books, I'd seen and read of the interaction of many species of whales as they intertwined and clicked their forms of communication. I refined the box shape with this in mind.

This box requires a little more chiseling and hand sanding in the kerfs than most of the others, but the effect of the continuous line makes it worth it. A peculiarity of this design is the tendency for the kerf to bind up before you back the blade out for the second cut. If this should happen, gently pry the kerf open with a small screwdriver as you back the blade out. Don't worry about the small nicks from the screwdriver as they will be sanded or routed off later. Turn the saw off to back the blade out before you begin the second cut.

This is an easy box to shape. Go heavy with the shaping on the thick outer edges, especially the right side where it's very thick. It will give you a nice overall rounded effect. When sanding the drawer cavities, use the ½" drum to get into the tighter angles, particularly in the top cavity. You can make a single template out of a drawer pull on this pattern and use it to make pulls for the *Cetacean Migration*, *Pisces*, *Surf* and *Minnow* boxes. Taper the drawer pulls in a broad curve down to the pointed ends.

Whale Play

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 53"-long (15.9cm x 134.6cm). With 5/4 stock for four thicknesses: 6¼"-wide by 42"-long (15.9cm x 106.7cm).

Approximate finished block face size
Cut the board into even 6¼"x10" (15.9cm x 25.4cm) sections.

Pisces

Pisces
The Fishes. The twelfth sign of the zodiac.

When I came up with this design, I knew what I saw but couldn't put a name to it. This happens often with new box titles. I had to actually make the box and look at it for a while, but still could not label what I saw in it. In desperation, I asked my mother what she thought. "Pisces!" she immediately said. She always read the daily astrological forecasts in the paper, and it came right to her. I saw it as soon as she said it and wondered why I hadn't thought of it. For once I had to admit it—Ma was right.

This is an elegant box and yet is comparatively easy to make. When shaping the concave edge on the bottom of the box front, stand to the left of the belt sander, and roll that edge towards you over the top cylinder. At the same time, turn the right edge towards you and the left edge away. (Refer to chapter four for more details.) Do this a few times to give this curve a nice narrow-to-wide sweep on the front of the box. For the back of the box, use the same motion, but move the left edge towards you and the right edge away while standing to the right of the sander. After you drum sand the curves in the back piece, put the drawers in to make sure no parts of the inside of the back piece are showing. And like *Whale Play*, taper and round the drawer pulls down to a point.

When palm sanding, pay extra attention to the gentle concave curve across the top. The palm sander likes to leave those annoying sanding circles there, so add a few extra passes with fine grit on the sander and by hand. You'll need to thoroughly palm and hand sand the drawer cavity bottoms near the open ends where the machine sanders leave lines or don't reach, at least to the point where the drawers cover any slightly rough spots.

Pisces

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 53"-long (15.9cm x 134.6cm). With 5/4 stock for four thicknesses: 6¼"-wide by 42"-long (15.9cm x 106.7cm).

Approximate finished block face size
Cut the board into even 6¼"x10" (15.9cm x 25.4cm) sections.

The Tides

The Tides
Earth's waters sway to ancient rhythms of the cosmos.

This is one of my newer designs. My lumber man has a lot of beautiful 6"-wide (15.2cm) stock with lots of sapwood, but with rough-cut lumber there are always many splits and knots along the edges. I wanted to come up with a 5"-wide (12.7cm) design to accommodate these boards but with a drawer capacity similar to that of the *Whale Play* and *Pisces* boxes. The long, thin lines and open ends on the same side leave room for longer drawers. The graceful pulls and extended to-and-fro motion represents the ocean's slow sweep into the coast line and back out again.

This is an easy box to make. Don't forget to cut the little waste piece off the drawer ends after you cut them out. And when cutting the outer shape, you'll have to take it slow around the sharp curve of the back piece at the open end of the bottom drawer cavity. An option is to grind it down with a coarse drum. Belt sand the bottom concave in the same way as *Pisces* and *Tsunami*. Use the ½" drum to get into the tight angle in the top drawer cavity. Taper and round the drawer pulls down to points.

The Tides

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 5¼"-wide by 53"-long (13.3cm x 134.6cm). With 5/4 stock for four thicknesses: 5¼"-wide by 42"-long (13.3cm x 106.7cm).

Approximate finished block face size
Cut the board into even 5¼"x10" (13.3cm x 25.4cm) sections.

Airborne

Airborne
Setting a small thought free gives it the chance to become *Airborne.*

Believe it or not, a turkey vulture was the model for this box. Although it's a rather homely scavenger on the ground, in flight it has a magnificent wingspread and soars on mountain thermals with grace equal to that of the raptors. I knew the fingered wingtips in the wood would involve a little more sanding but felt the design would be worth it. To simplify the sanding, I tailored it to accommodate the 1" sanding drums.

The curves beginning the drawer cuts are tight, so take it slow as you start each one. The bottom drawer's curve will need to be sanded with a small drum. I like to broadly round the curve on the left side of this box, even a little into the left sides of the drawers, to enhance the upward movement of the flared wings on the right side. Be sure to thoroughly drum sand those wingtips through all grits because it's tough to get in there with the palm sander. The portable drill with a coarse drum does a nice job of shaping between the fingered feathers and around to the front of the box. At the bottom, there's a lot of room to shape the concave hard to the left front. The kerfs are small and easy to chisel on this box. Taper the pulls so that the right side flares out with the wingtips.

Airborne

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 5¼"-wide by 53"-long (13.3cm x 134.6cm). With 5/4 stock for four thicknesses: 5¼"-wide by 42"-long (13.3cm x 106.7cm).

Approximate finished block face size
Cut the board into even 5¼"x10" (13.3cm x 25.4cm) sections.

Aurora

Aurora
Goddess of the dawn. Solar winds ruffle luminous curtains of magnetic activity in Earth's ionosphere.

I have a lot of fun experimenting with vertical box designs and thin lines. Sometimes I vary this design to have two, three or four drawers. Maybe your first attempt at a design modification can be to try it with five drawers. Or try making some of the drawers with two divided, smaller sections. Envision the drawer pulls as shooting stars dancing through the shimmering northern lights.

Aurora is much easier to make than it looks. The sanding is simple, and there isn't much shaping to do because of the thin lines. Just be a little delicate with the box body once you cut the drawers out since the wood will bend like an accordion until you glue the back piece on. When you glue the back on, make sure you use clamping blocks or a lot of big hand screws to ensure total contact with the shape of the box. Also, keep that accordion from compressing or bending as you clamp, so that the box body is relatively square to the back piece, or else you may find one drawer too loose while another doesn't fit.

You could probably get away with routing the outer edges as well as the drawer cavity edges. Then just do a little shaping on the bottom concave and the thicker edges of the open ends. Remember to cut off the waste on the drawer ends once you cut them out. The curves on the back piece at the open drawer ends can be done with the drum sander, as with the other open-ended drawer designs. These drawers are small enough that you can leave the pulls off and just push the drawers open from the back at the open ends. Personally, I like the pulls because of their visual effect with this design.

Aurora

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 55"-long (15.9cm x 139.7cm). With 5/4 stock for four thicknesses: 6¼"-wide by 44"-long (15.9cm x 111.8cm).

Approximate finished block face size
Cut the board into even 6¼"x10½" (15.9cm x 26.7cm) sections.

Tsunami

Tsunami
Ancient Japanese coastal monuments warn of these huge, geologically induced oceanic swells.

I had a rough shape and size in mind when I designed *Tsunami*. I wanted this four-drawer box to make a grand statement, so I started by doodling a sweeping "S" curve on its side. I liked the point on the wave crest and the big swell that pushed to the right. The drawers and pulls draw your eyes with their slingshot motion, and the saw kerfs pull you along like an ocean current. I've gotten some great effects with sapwood highlights on the top edges of this box. This is one of my personal favorites.

The three concave curves on this box lend themselves nicely to belt sander carving. If you angle, twist and roll the edges over the top cylinder of the sander with a fairly heavy hand, you can really accentuate these concaves. See the description for the *Pisces* box, and refer to chapter four for details. Heavily round over the top right curve on the front (top left on the back). Make sure you sand the flat surfaces of the concaves well with the medium and fine grits to take out most of the coarse lines and to make it easier to palm sand. This is most important with that sharp, top curve. Watch your fingers when you shape the small drawer pulls. Sometimes I just let them go to fall where they will to avoid sanding my fingertips.

When sanding the drawer cavities, use the ½" drum to get into the tighter angles. Pay attention to grain direction when chiseling the saw kerfs between the drawers. Try to chisel away from or directly across the end grain, but not into it. This will prevent you from splintering off too large a chunk. Most mistakes can easily be sanded out, though.

Tsunami

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 63"-long (15.9cm x 160cm). With 5/4 stock for four thicknesses: 6¼"-wide by 51"-long (15.9cm x 129.5cm).

Approximate finished block face size
Cut the board into even 6¼"x12¼" (15.9cm x 31.1cm) sections.

Cetacean Migration

Cetacean Migration
Many species of whales and dolphins travel north in summer to feed and south in winter to breed.

Another of my more recent designs, *Cetacean Migration* was designed to be the largest single-bodied box in my repertoire. The open ends allow the drawers to be a good size, and the drawer pulls remind me of little schools of fish traveling alongside pods of whales.

You need thick wood—around ⅞" (2.2cm) when planed, no less than 13/16" (2cm)—to keep this box from looking too long and flat when finished. Lots of clamps are required for a good lamination and for gluing the back piece on and the drawers back together. Otherwise, this is a very simple design to make. The open ends to these drawers are tiny, so it's basically up to you whether you want to sand or chisel them to get the best look on the rounded ends of the box body and back. I usually just sand any part that will show once the drawers are all in place.

When shaping on the belt sander, I like to broadly taper both ends of the box body from front to back, even catching the ends of the drawers. This creates the illusion of the whales rounding from front to back as well as up and down. You may choose to shape a concave on the bottom center where there's some wood to play with.

Use the ½" drum in the sharp angles of the drawer cavities, and make the pulls with your template from the *Whale Play* pulls.

Cetacean Migration

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 73"-long (15.9cm x 185.4cm). With 5/4 stock for four thicknesses: 6¼"-wide by 58"-long (15.9cm x 147.3cm).

Approximate finished block face size
Cut the board into even 6¼"x14¼" (15.9cm x 35.9cm) sections.

Wind Tree

Wind Tree
A symbol of strength and flexibility.

My husband and I work together creating different styles of boxes. The *Wind Tree* is our business logo design, so I decided to make it into a box. The winding kerfs create the illusion of wind swirling through the crown of a tree, and the design is my humble tribute to a most noble living thing.

The neat things about this box are the tight curves and thin lines. This means you'll have to cut slowly to avoid slipping off the lines. For the last cut on the top drawer, you need to turn the saw off and back into the kerf to begin the cut. An oscillating drum sander is very helpful with this box; or you can sand the sharp curves with the drums on your drill press. I like to carve the trunk in from the front to give it some depth. Sanding drums and a chisel will help you round over these tight curves that are too small for the belt sander. On the bottom thick part, you can carve out a hollow with the belt sander to add some movement and depth to the otherwise flat base front. That twisting and rolling motion over the top of the belt sander you use for the *Tsunami* and *Pisces* boxes can make the shape of the hollow perfectly follow the curve of the bottom drawer and entrance kerf. Don't forget to round taper the drawer pulls, and you'll need to hand sand a bit to get the drum lines out of the sharp curve of the tree trunk.

Wind Tree

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 58"-long (15.9cm x 147.3cm). With 5/4 stock for four thicknesses: 6¼"-wide by 46"-long (15.9cm x 116.9cm).

Approximate finished block face size
Cut the board into even 6¼"x11¼" (15.9cm x 28.6cm) sections.

Boa

Boa
To the ancient Egyptians, the snake symbolized the beginning and the end of time.

In the woodlands where I live, you can often mistake a black snake for a vine clinging to the side of a tree. It's such a delight when I discover it's not a vine at all but a living creature that seems to defy gravity with no hands, feet or claws. I'd been wanting to represent these sinewy reptiles in wood, and while experimenting with finger slots instead of drawer pulls on my boxes, I came up with the ideas for *Cobra* and *Boa*. The kinks in their bodies were the perfect spots to put the finger slots, and the vertical style allowed the drawers to be deeper to accommodate this different feature.

Take care when cutting out the drawers. Don't feed the wood too fast at the end of these cuts, or else you may have a deep line in the open end of the drawer cavity to sand out later. After you back out of these cuts, cut off the little piece at the open end of the box body to make it easier later when you cut the outside shape of the box. When cutting the outer shape, don't worry too much about cutting the sharp curves in the back piece cleanly. It's a lot easier to drum sand these to shape.

Refer to chapter four under the Carving and Hand Sanding section for instructions for shaping the finger slots. Be sure to round the slot down inside the drawer, so that when you insert your finger, it slides smoothly down into the drawer without feeling restricted by a hard edge. You can try a variation on this design by eliminating the finger slots altogether. Just drum sand the curves in the back of the box a little deeper where the open ends of the drawers are, and push the drawer open from the back.

Boa

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 5¼"-wide by 38"-long (13.3cm x 96.5cm). With 5/4 stock for four thicknesses: 5¼"-wide by 30"-long (13.3cm x 76.2cm).

Approximate finished block face size
Cut the board into even 5¼"x7¼" (13.3cm x 18.4cm) sections.

Cobra

Cobra

Cobra and *Boa* were conceived almost simultaneously, as tributes to the snake, the Eygptian symbol for time. Like *Boa*, *Cobra* has finger slots instead of drawer pulls, and the instructions are largely the same for both boxes. The primary difference is the additional drawer.

The top and bottom drawers require that you not feed the wood too fast at the ends of the cuts. This will save you from having to sand out deep lines from the open ends of the drawer cavities. Back out of these cuts, and then cut off the little pieces at the open ends of the box body. You will use your drum sander to achieve the sharp curves in the back piece, so don't worry about cutting these curves too cleanly with just your band saw. Don't forget to cut off the little waste piece from the middle drawer.

Again, refer to the Carving and Hand Sanding section for instructions for shaping the finger slots. Be sure to round the slot down inside the drawer, so that when you insert your finger, it slides smoothly down into the drawer without feeling restricted by a hard edge. You can try a variation on this design by eliminating the finger slots altogether. Just drum sand the curves in the back of the box a little deeper where the open ends of the drawers are, and push the drawer open from the back.

Cobra

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 5¼"-wide by 53"-long (13.3cm x 134.6cm). With 5/4 stock for four thicknesses: 5¼"-wide by 42"-long (13.3cm x 106.7cm).

Approximate finished block face size
Cut the board into even 5¼"x10¼" (13.3cm x 26cm) sections.

Lotus

Lotus
Flower of the pure land. As one of Earth's first flowering plants, the lotus is a Buddhist symbol for paradise.

If you're looking for a challenge you've come to the right box. This one will put your sanding skills and patience to the test, but when it's finished you'll be quite pleased. As my first original design, I made the left half of this box with four drawers and titled it *Germinating Box* to represent the beginning stages of the sprouting of a seed. When I found that it was impossible to sand between the drawers, I reduced it to three drawers and spaced them far enough apart to get the smallest oscillating drum to do most of the initial sanding. To finish the job, I use my fingers, dowels and flat stick scraps surrounded with sandpaper. The new design seemed to need a partner to give better continuity to the overall concept, thus the right half was created in its image. The base for this project is always different, so you can choose whatever shape and size wood you like. This is your chance to create a variation on the theme. I made one once that featured an abstract tree standing behind the boxes. It had four branches—two to hold a round mirror and two to hang necklaces on. You can, of course, make only one half of this box if you choose, since each side is unique in its own right. So you actually have three projects in this one versatile design.

If you choose to make the entire *Lotus* rather than the separate *Germinating Boxes*, I would suggest finding stock cut from the same tree for a good color and grain match. Sometimes at the sawmill you will find twin boards—that is, boards that were cut from the same tree one right after the other. It's when I find these boards that I make a special project like this, but any boards similar in color, grain and sapwood pattern will make a lovely *Lotus*.

Take your time when cutting the small drawers of these boxes since the curves are tight. To cut the outside box shape, you will first have to drill a ⅞" (2.2cm) hole at the sharp curve between the top and middle drawers (see photo on page 94). I don't recommend doing this with a portable drill because the holes are deep, and you may end up getting your bit stuck in there. Use a scrap board under your project to avoid drilling into the table. A fence behind your work adds stability. Plan the hole to be slightly away from the box shape lines to allow room for sanding. Before you begin, make sure the drill press is set to its slowest speed, and chuck the bit so that there is no wobble in the tip as it spins. The bit will probably only make it about half to two-thirds of the way through your block, so you must stop, raise the spindle back out of the hole, and turn off the machine. Raise the table with the block still in place so that the bit goes back into the hole as you crank the table up. Be sure the bit turns freely before you switch the machine on again, then drill the rest of the way through. When you cut the outside box shape, you can use the hole to turn around in, rather than trying to maneuver this very sharp curve with your ⅛" blade.

I like to shape the long "stems" that support the top drawers in from the front and back. This highlights the

Lotus

Left side:

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 60"-long (15.9cm x 152.4cm). With 5/4 stock for four thicknesses: 6¼"-wide by 49"-long (15.9cm x 124.5cm).

Approximate finished block face size
Cut the board into even 6¼"x11½" (15.9cm x 29.2cm) sections.

Right side:

Minimum finished stock dimensions
With 4/4 stock for five thicknesses: 6¼"-wide by 68"-long (15.9cm x 172.7cm). With 5/4 stock for four thicknesses: 6¼"-wide by 55"-long (15.9cm x 139.7cm).

Approximate finished block face size
Cut the board into even 6¼"x13¼" (15.9cm x 33.7cm) sections.

gentle curve that draws your eye to the top of the piece. With a coarse grit on your belt sander, carve out a sweeping concave from the front edge to a little shy of the first lamination thickness by going over the edge of the top cylinder. Round it over to the outside edge. Later, you can chisel and drum sand with the portable drill on the inside edge of the "stem" where the belt sander doesn't reach.

Sand the inner curves with all grits on the drum sander. The lines left by the drums in those tight spaces must be sanded out by hand. Sandpaper wrapped around a dowel works well for hand sanding those tight spaces, and a narrow, flat scrap does the same for the flatter parts in there.

Make the base as simple or elaborate as you want. It can be oval or round, symmetrical or amoeba-shaped, or maybe you could try a terraced pedestal. Use a ¾" (2.2cm) or thicker piece if you want to try a few belt-sanded shapes around the edges, but leave enough of a completely flat area on which to mount the boxes. Finish all pieces before assembling.

To mount the *Lotus*, position the pieces together on the base, angled or straight, to your own taste. Extreme accuracy is not necessary. Simply eye

If you're uncertain about your blade's ability to cut a tight angle in the outer box shape, drill a hole at the curve.

them up to where they look the best. Mark the positions of each piece in pencil. Make a note of the two thickest parts of each of the box bottoms, then mark the four corresponding spots on the base, and drill the 3/16" (5mm) holes through the base. Drill small countersinks for each hole on the base bottom. Tip the base up on its side, the bottom facing you and the front upwards, and hold the bottom of a *Germinating Box* up to its mark (take the drawers out first to avoid any mishaps). Insert an awl or other pointed object through the screw holes in the base, and tap a starting point into the box bottom. Do the same with the other box. Then drill pilot holes for the screws into the box bottoms with a ¼" bit. Drill deep enough so that the screws will not split the wood, but don't drill through the box bottom and into the drawer cavity. Erase any pencil marks from the top side of the base before you mount the boxes. Use a stack of books, short scrap boards or some other kind of support to lay the boxes on as you attach the boxes to the base with #8x1¼" or 1½" flathead wood screws. Select your screw length carefully so that it does not penetrate the box bottom into the drawer cavity.

Padded support protects and steadies the boxes while you mount the base. Remember to remove all drawers before you proceed.

PART 2

This section contains fifteen patterns for fourteen designs (one pattern for each *Germinating Box* in *Lotus*). The patterns are drawn to scale on 1" blocks.

Photocopy the patterns of your choice, enlarging as noted. Follow the instructions for wood preparation and band saw preparation in chapters one through three, then begin with the individual pattern steps outlined on the following page. Refer to the appropriate chapter for more detailed instructions and time-saving tips for each step.

Patterns and Instructions

BAND SAWING, GLUING AND CLAMPING

1. Cut ¼" (6mm) off the back of the block.
2. Cut out the drawers, referring to the sequence and direction of the arrows on the pattern. Stop the saw when you need to back out. Cut off the excess from open-ended drawers.
3. Cut ¼" (6mm) off the backs of the drawers.
4. Cut ½" (1.3cm) off the fronts of the drawers.
5. Cut the insides out of the drawer blocks, first marking your cut lines with a pencil, squaring them to the sides and bottom of the box.

5a. **Option:** Sand the drawer cavities on the oscillating drum sander.

6. Glue and clamp the back onto the box. Glue and clamp the drawer pieces back together.
7. When dry, cut the outside box shape. Cut out the drawer pulls.

SANDING

1. Belt sand all parts with 60- or 80-grit. Follow with 120- and 180-grit.

1a. **Option:** Rout the inside edges of the drawer cavities.

2. Drum sand the rough back edges of the open-ended drawer box designs.
3. Rout the front edges of the drawers.
4. Sand the drawer cavities with the drums on your drill (if you didn't use the oscillator).
5. Grind the drawer cavity edges slightly with a coarse drum on the drill (if you didn't use the router).
6. Palm sand the box and drawer edges with 80-grit.
7. Palm sand all parts with 120- and 150-grit.
8. Palm sand and hand sand the drawers with 180-grit.
9. Hand sand the drawer pulls with 120- and 180-grit.

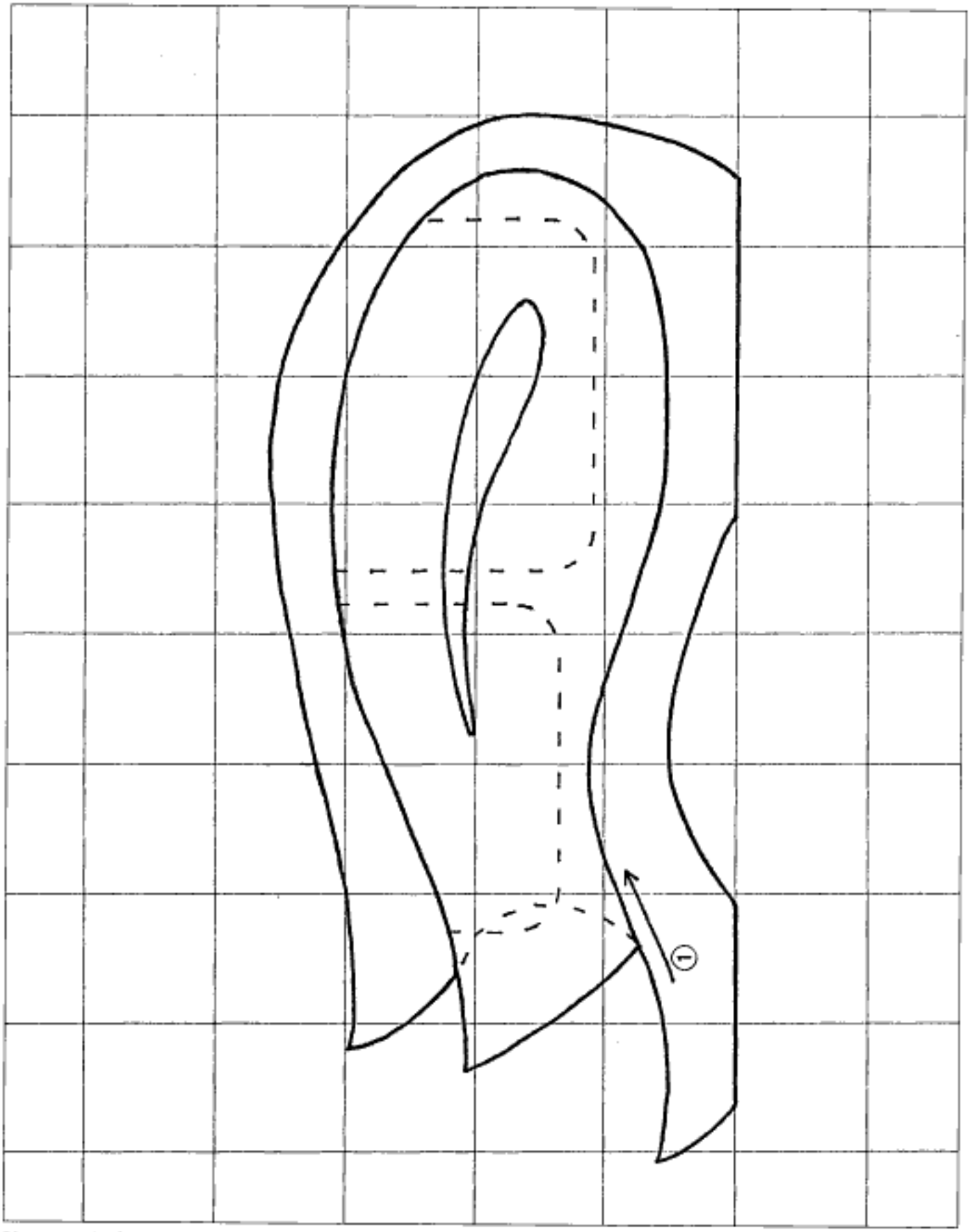
9a. Shape the finger slots on the drawers of the *Cobra* and *Boa*.

10. Place the drawers in their cavities, and glue the pulls on.
11. Use a chisel to round the saw kerfs of the entry cut and between the drawers. Hand sand with 80-, 120- and 180-grit.
12. Palm sand the box with 180-grit.
13. Hand sand to touch up any hard edges, rough spots or areas that the palm sander couldn't reach.
14. Chisel or sand excess glue from around the drawer pulls. Chip off any excess glue in the backs of the drawer cavities.

FINISHING

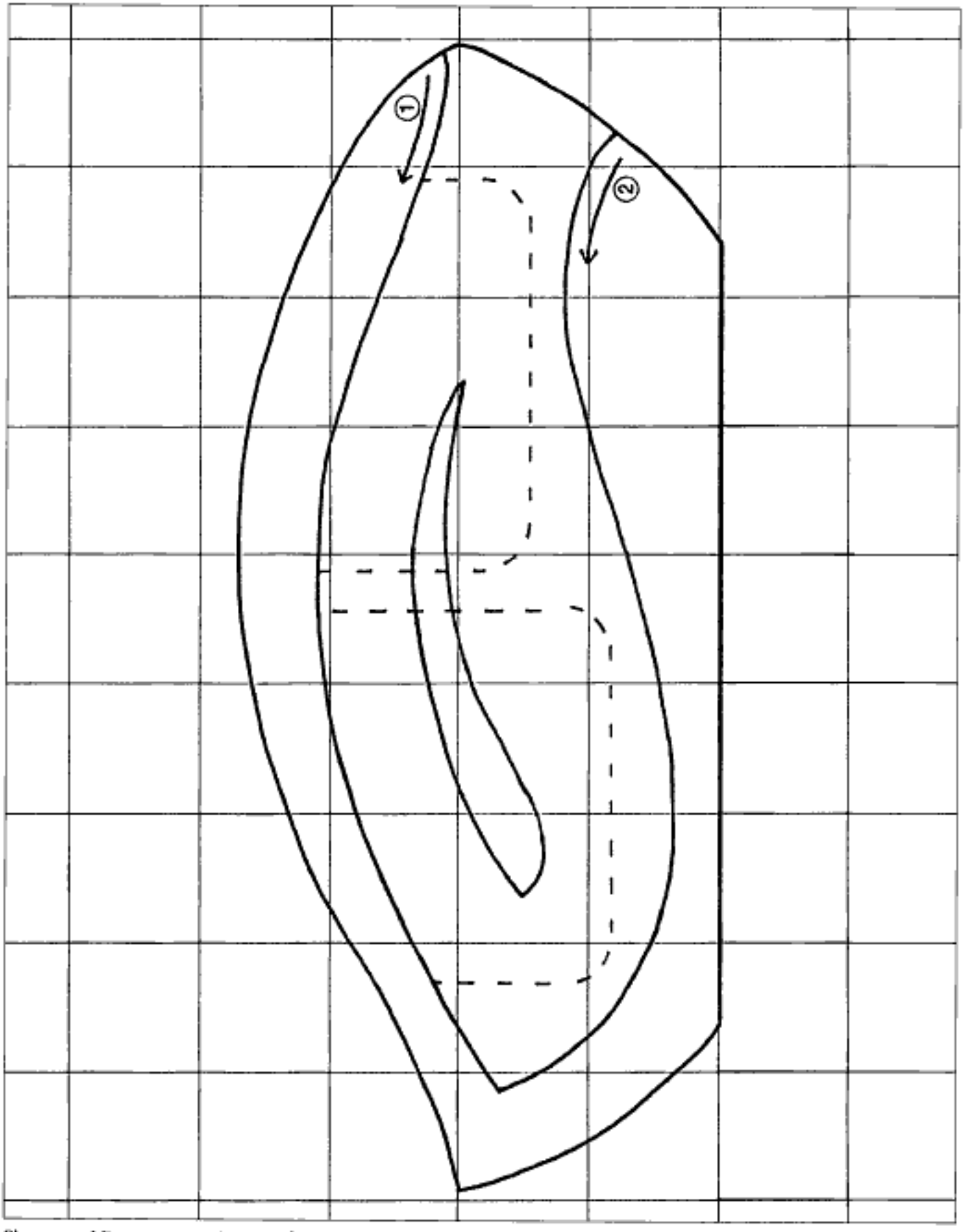
1. Apply your choice of finish.
2. Line the drawers.
3. Wax and buff the box and drawers.

Surf



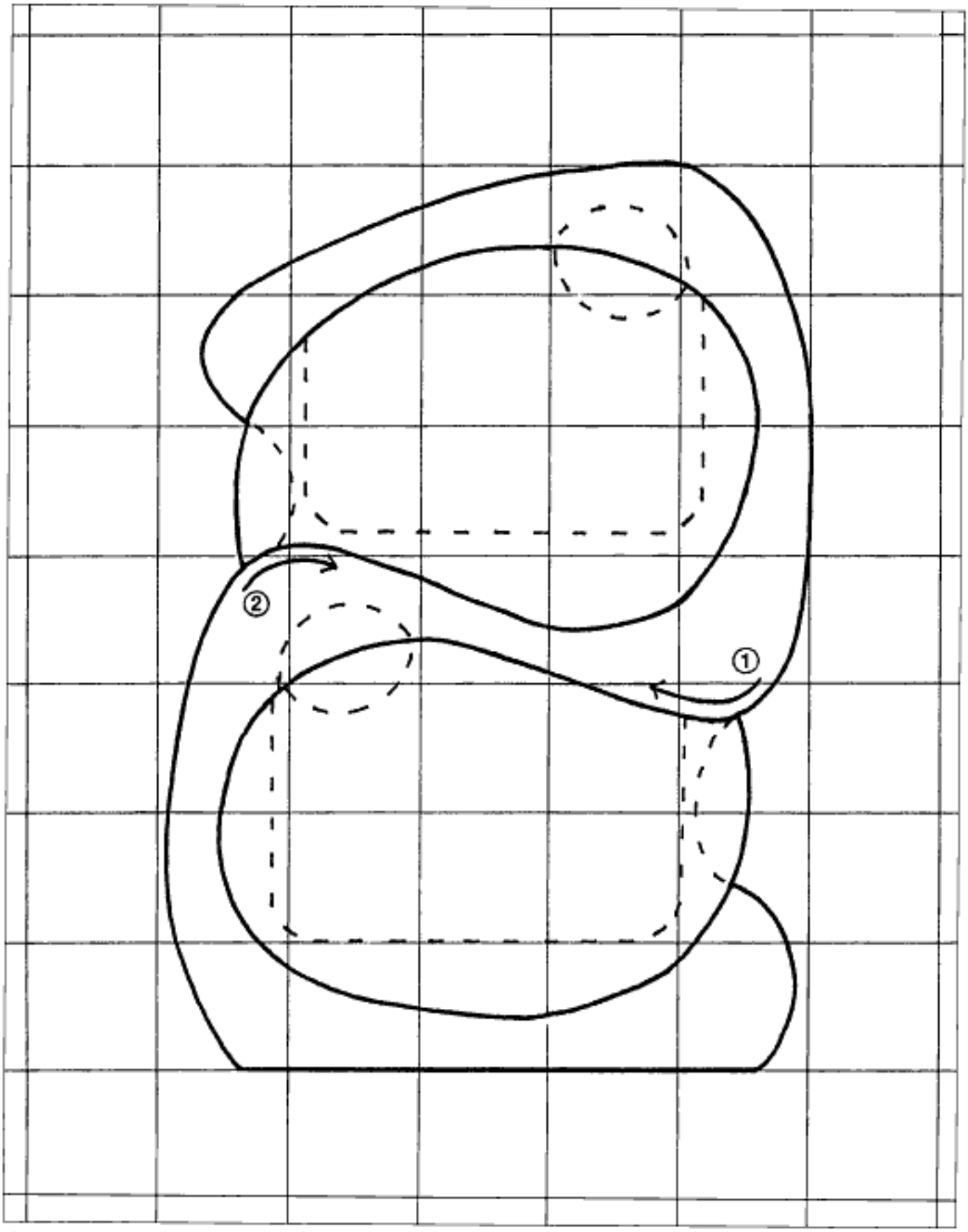
Photocopy *Surf* pattern 100% on photocopier.

Minnow



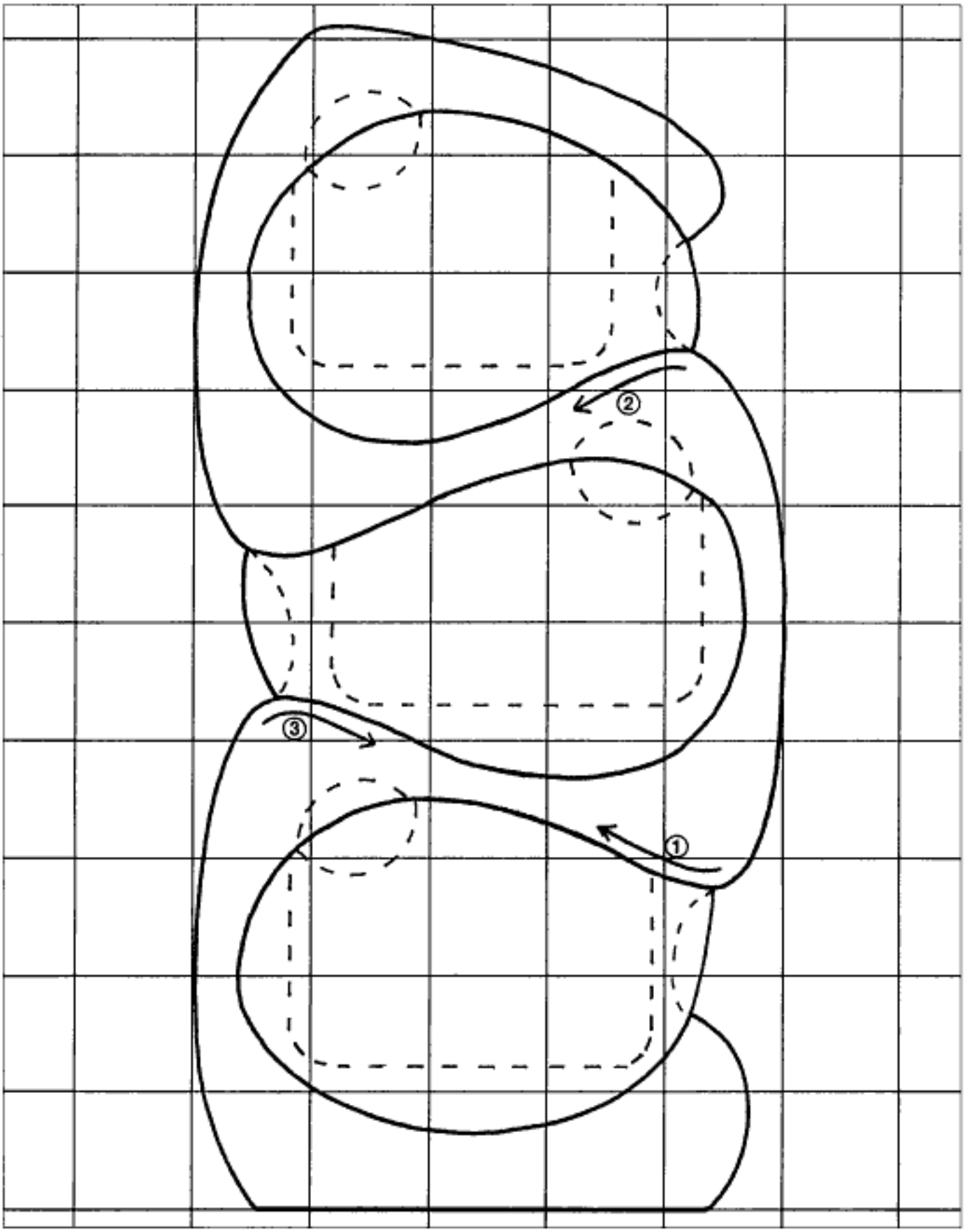
Photocopy *Minnow* pattern 100% on photocopier.

Leaf



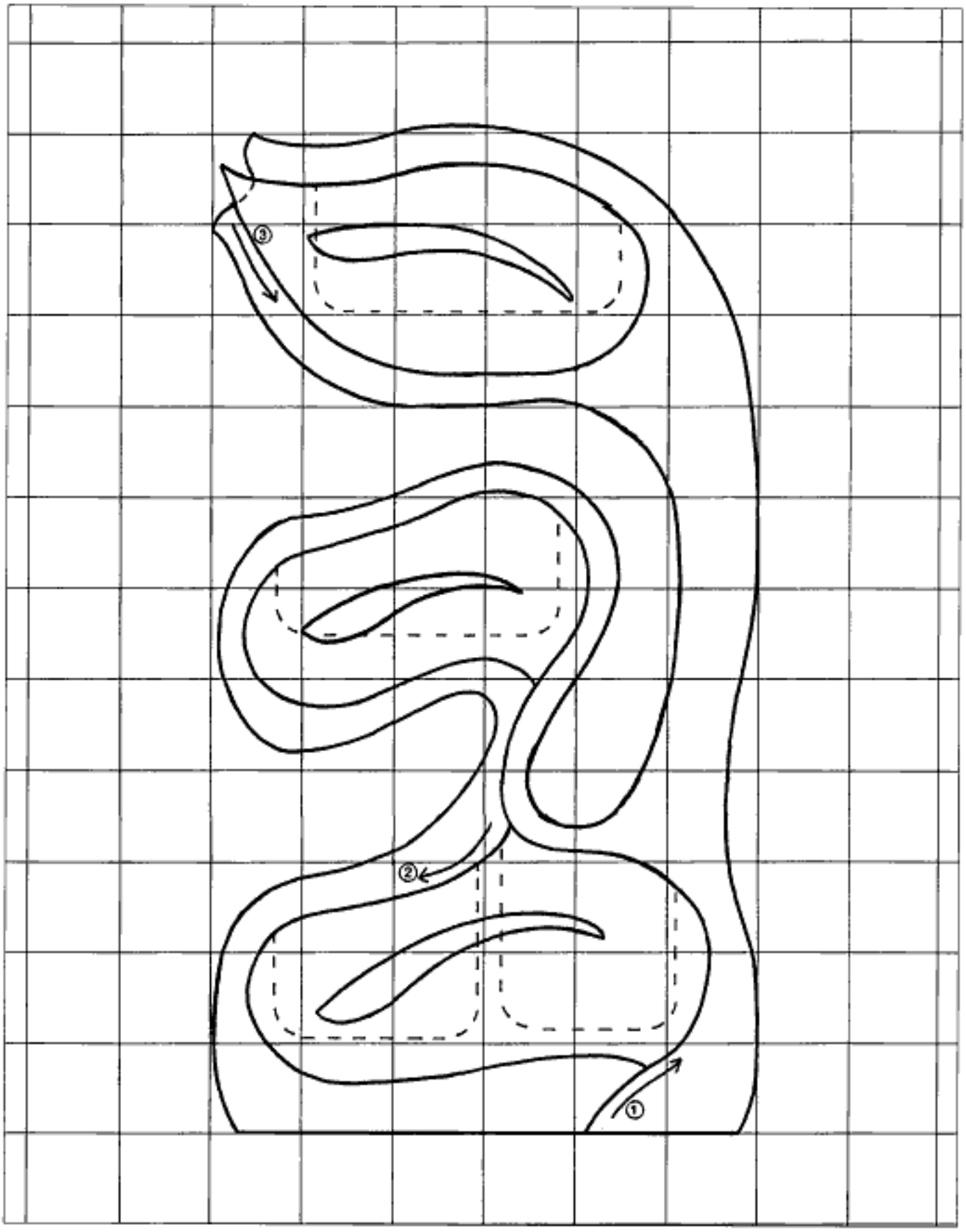
Photocopy *Boat* pattern 100% on photocopier.

Cobra



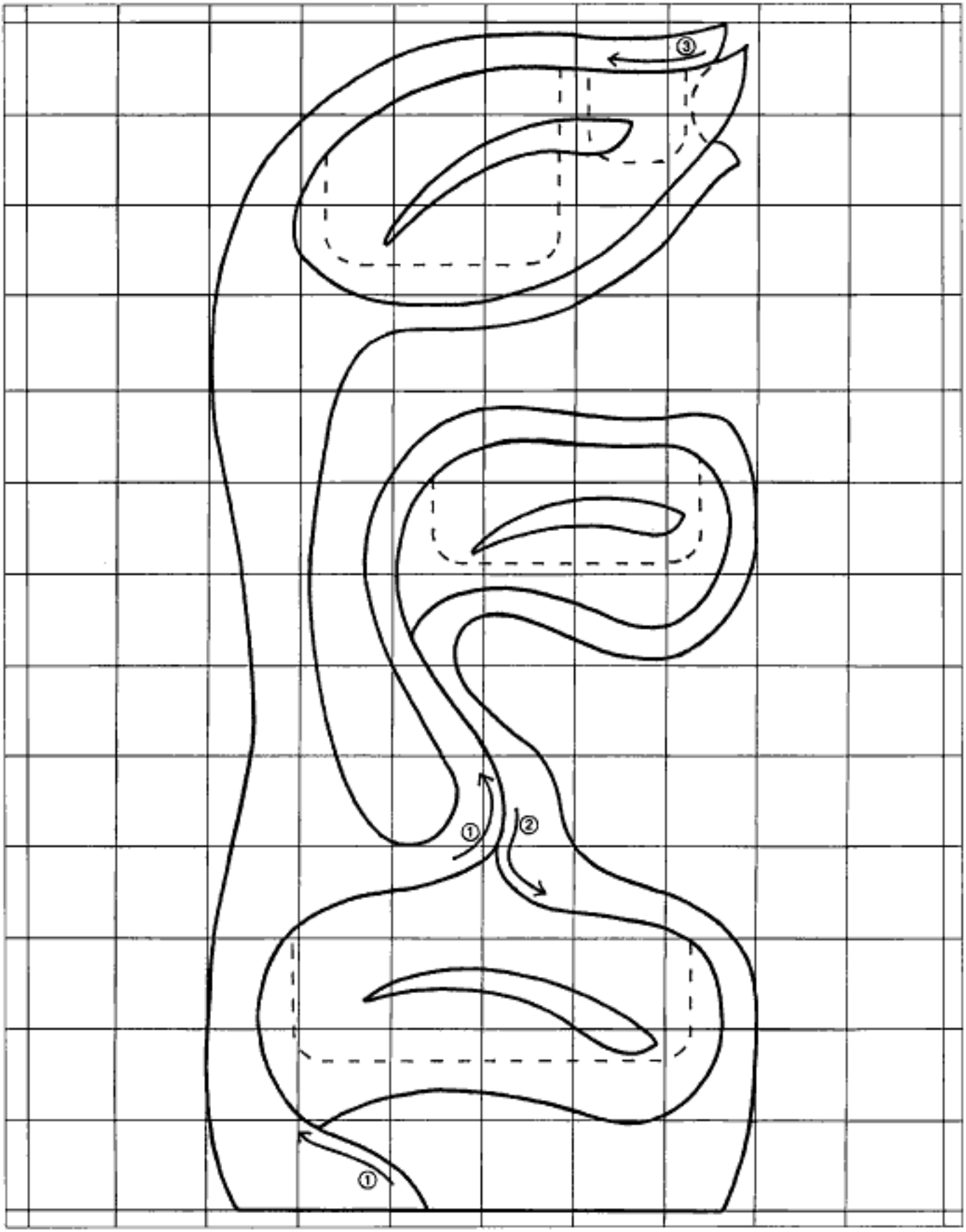
Enlarge *Cobra* pattern 111% on photocopier.

Lotus (left)



Enlarge *Lotus* (left) pattern 143% on photocopier.

Lotus (right)



Enlarge *Lotus* (right) pattern 143% on photocopier.

Sources

Mail-Order Sources for Tools and Supplies

Woodcraft Bands, Inc.
6159 Hwy. 421
Vilas, NC 28692
(800) 582-1328
Band saw blades.

Grizzly Industrial, Inc.
P.O. Box 2069
Bellingham, WA 98227
(800) 523-4777
www.grizzlyindustrial.com
They distribute a fairly inexpensive 6"x48" belt sander and other large power tools.

Klingspor's Sanding Catalogue
P.O. Box 3737
Hickory, NC 28603-3737
(800) 228-0000
www.sandingcatalog.com
Sandpapers, sanding belts and drums, the Porter-Cable 330 palm sander.

MLCS, Ltd.
P.O. Box 4053 / C-25
Rydal, PA 19046
(800) 533-9298
www.mlcswoodworking.com
Router bits.

LIVOS Phytochemistry of America, Inc.
P.O. Box 1740
Mashpee, MA 02649
(508) 477-7955
www.livos-us.com
www.woodtreatment.com
Natural oil finishes.

Eco Design Co.
1365 Rufina Circle
Santa Fe, NM 87505
(800) 621-2591
www.bioshieldpaint.com
Bioshield oil finishes and waxes.

DonJer Products Corp.
Ilene Court Bldg. 8
Belle Mead, NJ 08502
(800) 336-6537
www.donjer.com
Drawer lining kit.

Airware America
P.O. Box 975
Hwy. 54 South
Elbow Lake, MN 56531
(800) 328-1792
www.mid-web.com/airware
Dust helmets.