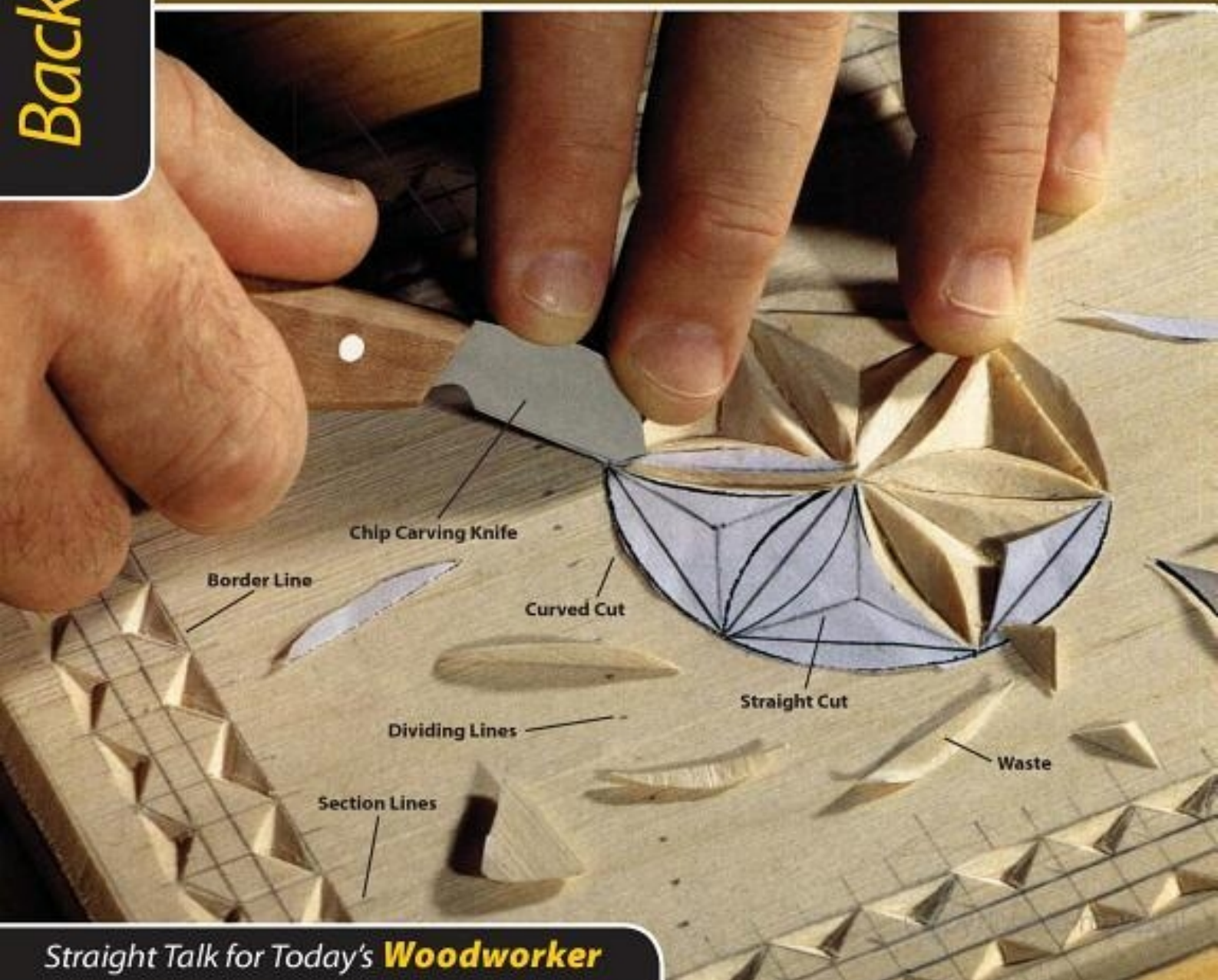


Woodworker's Guide to **Carving**



Back to **Basics**

Woodworker's Guide to

Carving



Back to **Basics**

Woodworker's Guide to

Carving

*Straight Talk for Today's **Woodworker***



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From Russia with love
Puika

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Contents

Introduction	8
<i>Chapter 1:</i> Carving Tools	12
<i>Chapter 2:</i> Getting Started	40
<i>Chapter 3:</i> Incised Carving	58
<i>Chapter 4:</i> Relief Carving	82
<i>Chapter 5:</i> Carving in the Round	122
Index	156



What You Can Learn



Carving Tools, p. 12

Despite the enormous variety of tools at a woodworker's disposal, most carvers perform their work with a dozen or so tools.



Getting Started, p. 40

Nothing takes the place of practice, but you can master the basics of carving with a few deft movements of a chisel.



Incised Carving, p. 58

To the uninitiated, chip carving may seem complex but it is actually a fairly straightforward process, with room for infinite variation.



Relief Carving, p. 82

The techniques of relief carving can be applied to a variety of subjects from bowls to scenery.



Carving in the Round, p. 122

Whether the piece is a bust, a wildlife carving, or a design element on a claw-and-ball foot, you should undertake a careful study of the project before beginning.

Chip Carving

As a small child I was fascinated with every aspect of wood: its feel, its smell, and the ever-changing beauty of its grain. From as far back as I can recall, my father supplemented the family income by pursuing his passion of furniture refinishing and antique restoration. And, from the age of five, under the watchful eye of my Norwegian grandfather who lived with us, I was tutored in carving wood. Thus began a wandering journey that would bring a lifetime of joy, excitement, challenges, and friendships.

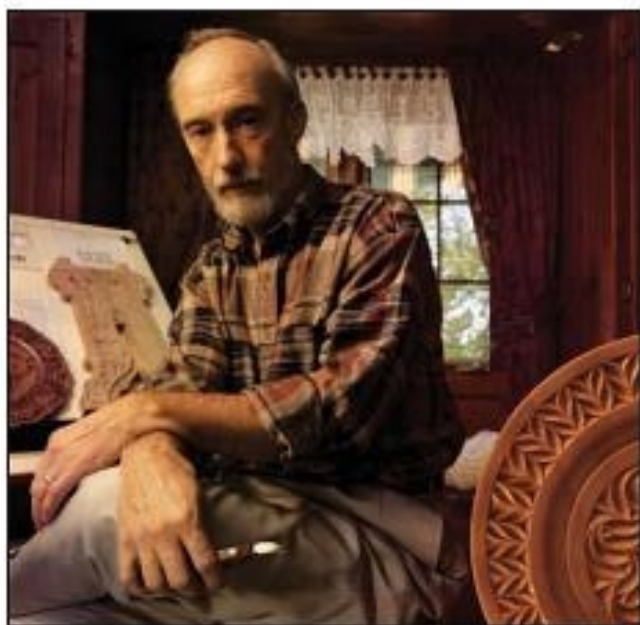
Working with wood, from topping trees to boatbuilding, was an activity I continued into adulthood and the one that gave me my greatest pleasure. So when the opportunity to study in the woodcarving center of Brienz, Switzerland, presented itself, I thought the world had stopped to let me on. This was the chance of a lifetime.

The experience of carving in the midst of masters whose skills were rooted in centuries of knowledge and tradition proved exhilarating. Learning carving from these craftsmen included acquiring discipline and an appreciation of art and architecture, particularly Gothic styles, upon which much of chip carving is based. I had the added good fortune of studying close to ancient castles and cathedrals, where I could observe firsthand design concepts and theory put into practice.

I was easily drawn to a Swiss method of chip carving primarily because it seemed to represent the essence of simplicity. Though this style was relatively unknown in North America at that time, I realized that with only two knives and a basic understanding of technique anyone could, in a relatively short period of time, produce amazingly satisfactory work.

Perhaps my enthusiasm for chip carving has been the spark that ignited similar fires in so many others I've had the pleasure of teaching throughout the years. If it is true that we teach that which we love to learn the most, then carving, particularly chip carving, has been the most perfect vocation for me.

- Wayne Barton



Wayne Barton is the founder of The Alpine School of Woodcarving, and author of several books on chip carving published by Sterling Press, including *New And Traditional Styles of Chip Carving*. He lives in Park Ridge, Illinois.

Traditional Tlingit Carving

My mother was often upset at my fascination with knives. Like many young boys, I was constantly reminded of the danger of playing with them. But to me, the serrated steak knife that I snuck out of the drawer as an eight-year old was simply a tool to be used for carving wooden blocks into Tlingit Northwest Coast forms.

My earliest exposure to wood carving was a demonstration given in elementary school. My first project was a simple wooden halibut hook. That hook started me on a search through museums and bookstores, collecting information on traditional Northwest Coast art forms. That same year, I began making bentwood boxes in the traditional manner of my people: Cedar planks are left to steam all day in an open pit over a fire buried with layers of spruce branches, skunk cabbage leaves, and seaweed. The cedar planks are then pliable and can be bent to form a four-sided box with only one seam.

Wood carving classes were not simple to find in most small Alaskan communities 23 years ago, so for the most part I practiced the skills on my own. In the early 1980s, I was fortunate to be hired by the Ketchikan Totem Heritage Center as a tour guide and demonstrator. The opportunity at the Center to study and practice carving, and to learn the Tlingit culture, gave me insight into the art form, its meaning, and message.

In the case of the 20-foot totem pole in the picture, I first drew the plans of the totem on paper and then carved a small wooden model. The figures on the model were then measured and sketched to scale onto the pole, working from the bottom up. Each figure was roughed out and finished before moving to the next highest one, using many different kinds of adzes, such as straight adzes, gutter adzes, and lipped adzes. I painted each figure as I move up the pole.

The steps taken to learn my craft have been many, starting with years of practice devoted to the study of design, drawing, painting, and most importantly, the capability to shape these designs into a piece of raw cedar. The finished product, whether it be a totem pole, a bentwood box, a ceremonial mask, or a bowl must convey the past, present, and future of the Tlingit people.

- Tommy Joseph



A member of the Tlingit tribe, Tommy Joseph is a carving instructor at the Southeast Alaska Indian Cultural Center in Sitka, Alaska.

A Charles II Bellows

From the time man discovered that he could fashion something from wood other than a spear or a truncheon, he has been hard at work carving, both as a trade and an avocation. Today, wood carving is in a state of flux. Even the keen amateur working in his hobby shop appears to be moving away from the use of gouges and sweeps toward small hand-held motor tools that seem to disintegrate wood very efficiently in any grain direction. On the workbench and shop floor, wood chips and shavings are being replaced with very fine sawdust.

So let us throw out the anchor right now and carefully mix ingredients from old carving techniques with newer recipes to create a type of carving that should last at least a century or more, enjoying the labors as we proceed. The fireplace bellows shown at right is a perfect example of this combination. A bandsaw, drill press, router, lathe, and sanding equipment will quickly execute the foundation work. Then comes carving the design into the face of the bellows. This is the fun part—the jelly in the donut.

The bellows can be made from maple, cherry, walnut, or oak. However, since this is a Charles II-period design, it only seems appropriate to use the white oak that was widespread in the British Isles in the 17th Century. The pattern shown was glued onto the front board blank with rubber cement, and a colored felt-tip pen was used to delineate the background areas. With my drill press pulley belt system arranged for its highest chuck speed and a small two-fluted ball mill adjusted to take off $\frac{3}{16}$ to $\frac{1}{4}$ of an inch, the colored background area was quickly removed.

This is where the real enjoyment began. Using a variety of flat and skewed gouges, the entire background area was worked over. Next, I formed the raised, rounded relief areas, carefully cutting with the grain, leaving attractive shiny areas in the wake of the work. A fine-pointed knife and a metal dental pick cleaned up slivers of wood in the corners.

The front and back boards were routed around their respective edges to accept the leather flap valve; three or four tacks held the $\frac{1}{8}$ -inch leather in place. A piece of leather was also tacked at the hinge point of the front board in a slot. Then I drilled a one-inch-diameter hole in the nose end of the combined front and back boards, before gluing the nozzle—which was turned on a lathe—in place. After a light sanding, I stained the wood, and 24 hours later applied a coat of Watco natural satin wax. The result was a durable finish—and an eye-catching, functional bellows that should be helping to light fires for a long time to come.

—Ted Kona

Ted Kona is a former mechanical engineer who taught woodworking to Boy Scouts for 50 years. He is currently a member of the National Wood Carvers Association and a regular columnist for *Chip Chats* magazine. Kona lives in Beverly Hills, Michigan.



Carving Tools

The tools of the carving trade, laid out in their entirety, may at first seem overwhelming to the novice, for the variety and choice is immense. However—and fortunately for the beginner—few tools are needed to start carving. Even professional wood carvers, with hundreds of tools at their disposal, perform the majority of their work with a dozen or so tools. The three fundamental types of carving tool are the chisel, which has a straight blade; the gouge, which has a curved blade; and the knife. Additional tools that are frequently used include draw knives and scorps, which are essentially curved drawknives that greatly ease the creation of concave forms.

Chisels are either flat, skewed, or veiners. The flat chisel is immediately recognizable. Its simple flat cutting edge is a must in any toolbox. The skew chisel has a blade angled to the right or the left for cleaning out corners. Veiners create a deep, round cut, and V-tools form angled grooves.

Gouges scoop out concave surfaces, but also can be used to shape convex forms. Making grooves should be left to V-tools, rather than attempting this with small gouges.

Knives are useful in all carving work. A relatively short-bladed knife is the main tool for chip carving. In other types of carving, a knife can become an effective surrogate

for many tools. A sharp pocket knife is a perfectly acceptable carving tool, although it will lack the precision of more specialized tools. The basic tools of the carving trade are shown starting on page 14.

In addition to the chisels, gouges, and knives, you will also need some accessories to get you started. These range from files, rasps, planes, and mallets, to clamps to secure the workpiece in place.

Of course, a cutting tool is only as good as its edge, and sharpening is as important to carving as the tool itself. There are many sharpening techniques and tools, and much disagreement over the best among the experts. As with most aspects of woodworking, there is no one right way to do the job; the goal is the same no matter what the technique—a razor-sharp cutting edge. A detailed discussion of how to sharpen carving tools begins on page 20. Study this section thoroughly. Your enjoyment of the craft will depend upon it.



Wooden mallets are classic elements of the carver's tool box. The flat-faced carpenter's mallet (above, left) has its face angled relative to the handle, making it easier to control. The cylindrical carver's mallet (above, right) will not slip, since it strikes on one narrow spot only, due to its oval face.

As you begin grinding the cutting edge of a carving tool, a thin line of reflected light will appear at the tip of the blade. Once the reflection disappears—as it almost has in the photo at right—you have sharpened the bevel to the edge, and should remove the gouge from the grinder.



A Collection of Carving Tools



Macaroni tool

Possesses three working surfaces at right angles to each other; can be used as a V-tool or a gouge.



V-parting tool

Two-sided, V-shaped blade used for outlining, performing detail work, or adding texture to backgrounds.



Dogleg chisel

Blade tip offset at 90° angle from blade shaft; used for paring flat recesses and working in restricted spaces.



Straight gouge

Features a curved cutting edge with a straight tip; a mainstay in every wood-carver's toolkit.



Spoon gouge

Spoon-shaped blade forms concave surfaces; ideal for working in restricted areas.

Carver's knife

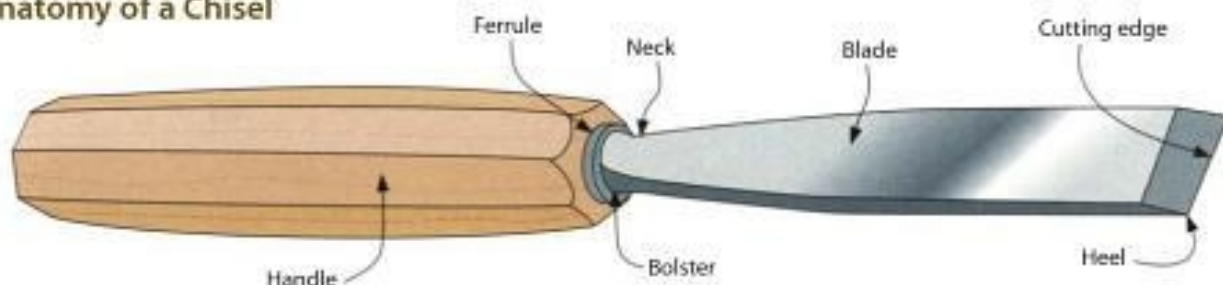
Used for chip carving, outlining relief work, and carving details. The blade varies in shape.



Bent-back gouge

An upside-down spoon gouge with a convex rather than concave cutting edge; used for undercutting and shaping where space above the cut is limited.

Anatomy of a Chisel



Fishtail gouge

The blade's flared tip is ideal for cleaning out corners and undercutting, particularly with limited clearance.



Bent gouge

Similar to a straight gouge, but with a gradual curve along the blade length; used primarily to clear waste from concave surfaces.



Skew chisel

Features a flat, angled cutting edge for fine detail work.



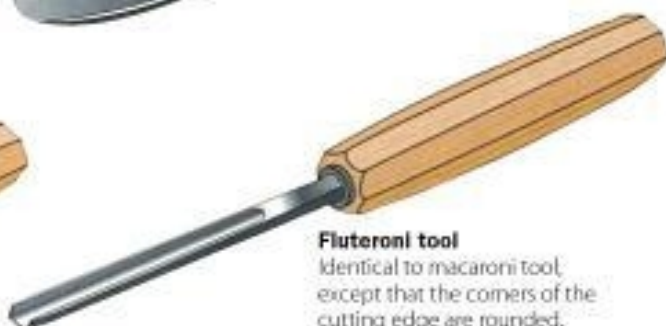
Straight chisel

Flat-bladed carving tool with bevels on inside and outside surfaces for rounding convex surfaces and removing backgrounds.



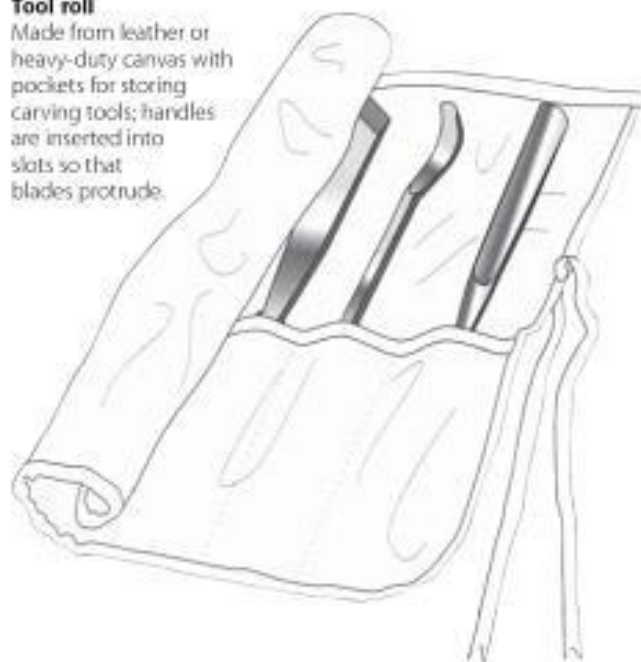
Fluted tool

Identical to macaroni tool, except that the corners of the cutting edge are rounded.



Tool roll

Made from leather or heavy-duty canvas with pockets for storing carving tools; handles are inserted into slots so that blades protrude.



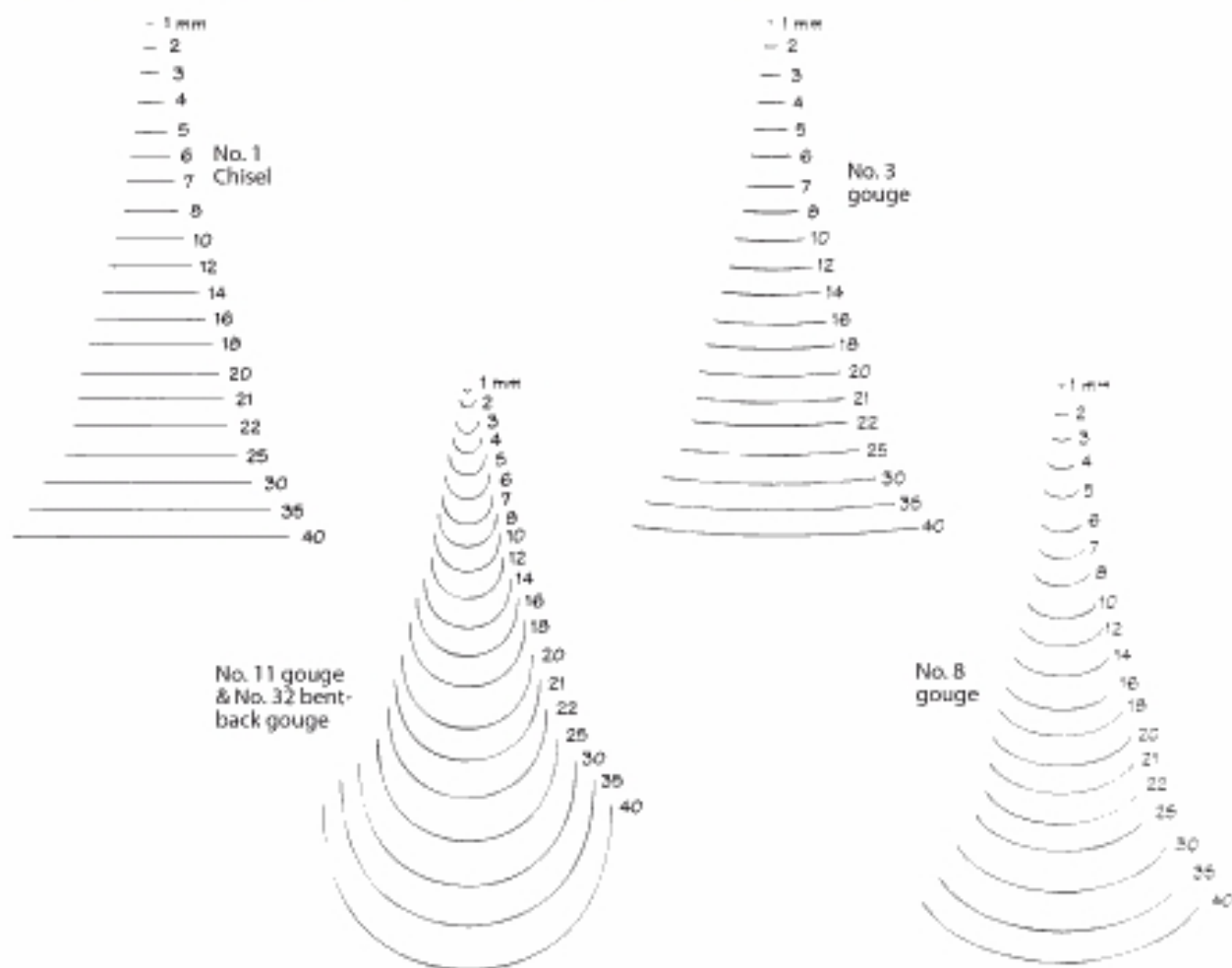
Different handles often reflect the origin of a chisel. The Swiss gouge, shown on the left, features a large, bulbous-shaped handle. The conical-shaped handle (second from left) is typical of French-made chisels. Octagonal handles (center) are commonly used by German toolmakers. The two chisels on the right have turned handles—a favorite shape of English carving tools.

Carving Tool Sweeps and Sizes

Carving tools are divided into three groups: Chisels, gouges, and V-parting tools. In each group, tools are distinguished by the shape of the blade (straight, spoon, V-parting, and so on); by the width of the cutting edge (2 mm to 35 mm); and by the degree of curvature, or sweep, of the blade (No. 1 to 40). The number increases with the degree of blade sweep. Straight, dogleg, and skew chisels all have flat cutting edges and so are assigned No. 1. V-tools are assigned a number according to the angle, ranging from 45° to 90°. Straight, spoon, bent, and fishtail gouges share the same range of sweeps. Specialty tools like bent-back gouges and macaroni

tools carry their own numbers. A good basic set of chisels includes flat chisels, gouges, and V-tools as well as a carving knife. More advanced carvers would add bent-back gouges and other special types, as well as additional sizes of the standard types. Ultimately, the specific size and shape of a given chisel makes it the best tool for a given job. As a result, most professional carvers own a complete set of chisels in all sizes. They may also include cutting tools such as adzes and spokeshaves for large pieces, such as life-size figures. Some carvers even include tiny surgical tools in their collection for extremely small pieces.

Carving Tools: Sweeps and Sizes (Shown Full Size)



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Basic Carving Tool Kits

Beginner

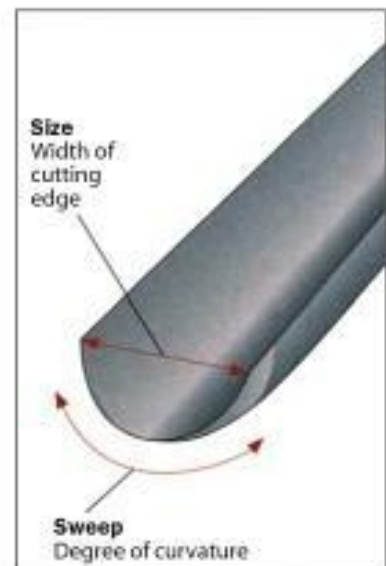
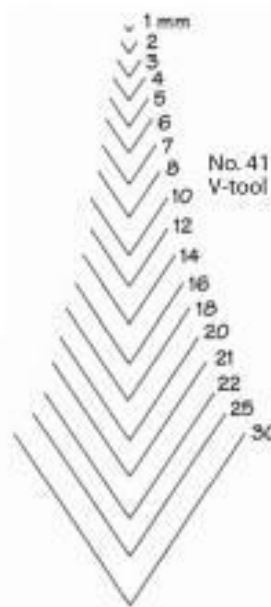
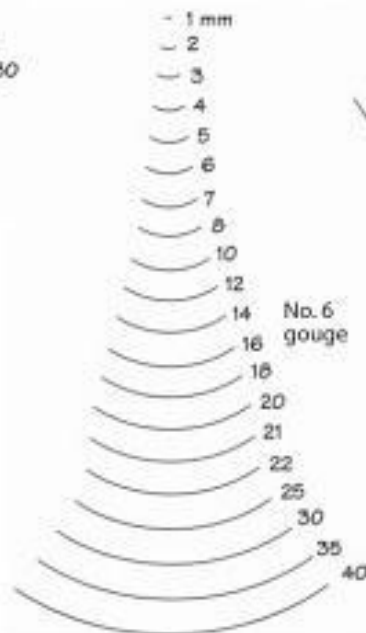
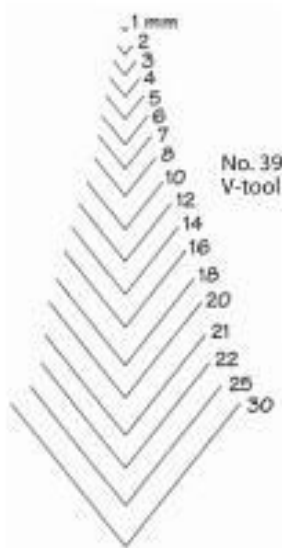
- Chisels: No. 2—6 mm and 12 mm
- Gouges: No. 3—6 mm, 12 mm, and 25 mm; No. 8—25 mm; No. 11—4 mm, 6 mm, and 12 mm
- V-tools: No. 39—4 mm, 6 mm, and 12 mm

Advanced

- (In addition to the beginner's set)
- Gouges: No. 3—35 mm; No. 11—2 mm; No. 16—35 mm; No. 32—8 mm
 - V-tools: No. 42—16 mm; No. 43—6 mm

Chip carving

- Chip carving requires a cutting knife, which does most of the work, and a stabbing knife, which is intended specifically for embellishing chip carvings.



Carving Accessories

Additional Carving Tools

Riffler

Used for difficult or delicate sculpting of wood, especially where a fine finish is required.



Needle rasps

Small rasps used for defining details.



Concave rasp
For shaping concave surfaces.



Rasp

Available in varying degrees of coarseness.



Micro plane

Inexpensive alternative to rasps.



Spokeshaves

For shaving smaller pieces of wood.



Push knife

Similar to a drawknife, but works on the push stroke; easier to use since it allows you to work with the stock simply butted against a solid surface, thereby saving the need for a shaving horse or other elaborate clamping arrangements.



Draw knife

Used for shaving; requires a clamping system such as a shaving horse.

Block plane

A small plane for end grain and delicate planing jobs.



Bench plane

Used for levelling larger surfaces.



A Carver's Mallet

A carving mallet can be made on a lathe. Start with a blank of face-glued stock larger than the finished mallet; hickory, maple, beech, and oak work well. Mount the blank on the machine and set the tool rest as close as possible to the workpiece. Switch on the machine and round the corners of the blank with a roughing-out gouge. Holding the tip of the gouge against the blank, slowly raise the handle until the cutting edge begins slicing into the wood

and the beveled edge is rubbing against the stock. Rough-shape the mallet, moving the tool from side to side, leaving a shoulder where the head will join the handle (below). Finish shaping the blank using





Wood burner

Different shapes of tips are available to create a range of decorative effects; resulting colors can vary from light brown to black.

Bench hold-down

For securing carving blocks to a bench top; fits into a bench dog hole.



Carving bolt

Fastens a workpiece in place from underneath; eliminates clamps that can get in the way.



Punches

Used for creating small patterns and delicate textures in carvings.

Hold-down clamp

Can be bolted to a work surface for securing carving blocks.



Carpenter's mallet

Angled face allows for easier control.



Mallet

A common, all-purpose mallet.



Bench dogs

Hold workpiece in position on workbench.

the same technique with a fingernail gouge (right). The handle of the mallet shown has a small nub at the end to provide a better grip.

Once the shaping is done, leave the mallet on the lathe, move the tool rest out of the way, and smooth the surface of the wood with 80-grit sandpaper, moving to progressively finer grits. Then finish the mallet with tung oil. Finally, remove the mallet from the lathe, saw off the waste wood at the ends, and sand and finish the end grain.



Sharpening Techniques

Good carving is achieved only by using properly sharpened tools. The highest-quality chisel, knife, or gouge will produce inferior results without proper sharpening. This section demonstrates the sharpening skills and tools you need to practice the craft.

The sharpening tools and accessories that you use should be chosen with care. Using a carborundum grinding stone, for example, can damage your chisel because it will overheat the cutting edge, rendering it too soft to cut properly. The high speed of most stationary grinders adds to this problem. The solution is to use rubber grinding wheels containing tiny fragments of industrial diamonds, and to buy or build a slow-speed grinder.

To test the sharpness of the cutting edge of your tool after following the sharpening instructions in this chapter, make a cut on the end of a piece of scrap wood. Working across the grain, the blade should slice evenly through the wood, producing a curl of waste wood and leaving behind a smooth surface. Also note the sound that the blade produces: A razor-sharp carving tool will make a clean, hissing sound as it slices through the wood.

Mastering the skill of sharpening your carving tools will provide one part of the basic knowledge a wood-carver requires. The other part—the fundamentals of carving—is discussed in chapter two.

Common Sharpening Do's and Don'ts



Too much on the edge

This will create a double bevel that will not cut properly.



Too much on the heel

This will produce a concave bevel that will cause the chisel to gouge into the wood.



Proper angle

This produces a flat bevel, with the correct angle of between 15° and 35°.



Uneven bevel

Makes the chisel difficult to control and produces uneven cuts; caused by sharpening the bevel in some areas more than others.



Slanted gouge or V-tool

The cutting edge is angled forward instead of being perpendicular to the shaft, as is desirable.



Hook on a V-tool

This point of excess metal forms at the apex of the V during the initial sharpening; it must be ground away.

Sharpening Tools and Accessories



Stationary grinder
Aluminum oxide wheel turns too fast for most sharpening, but is useful for truing badly nicked carving tools.



Cotton polishing wheel
Used in place of a strop to polish and hone cutting edges.



Rubber grinding wheel
The best type of grinding wheel for carving tools; tiny bits of diamond are embedded in the wheel, providing the abrasive necessary for sharpening.



Strop
Polishes the edge of a tool after it has been ground.



Polishing compound
Abrasive dabbed in small quantities on cotton wheels for polishing.

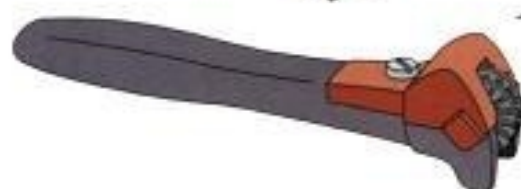


Bench stone
Any oilstone or water-stone used to sharpen carving tools.



Diamond hones
More durable than traditional bench stones.

Auger file
Used for sharpening small, hard-to-reach cutting edges.

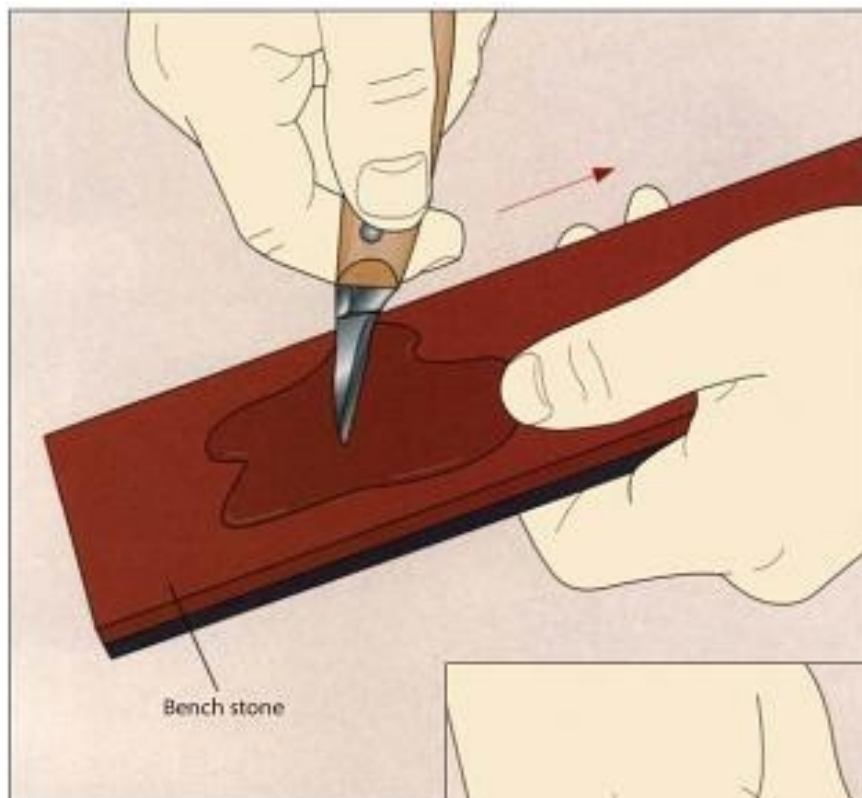


Wheel dresser
Used periodically to true the surface of a grinding wheel.

Honing cone
Used for sharpening gouges.

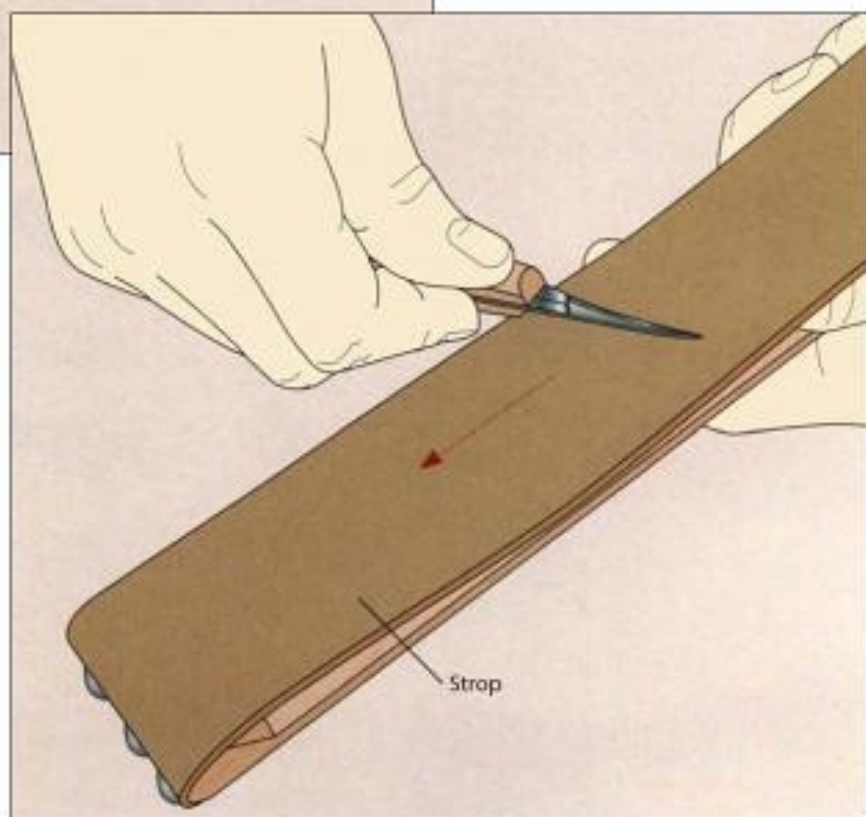


Sharpening a Knife



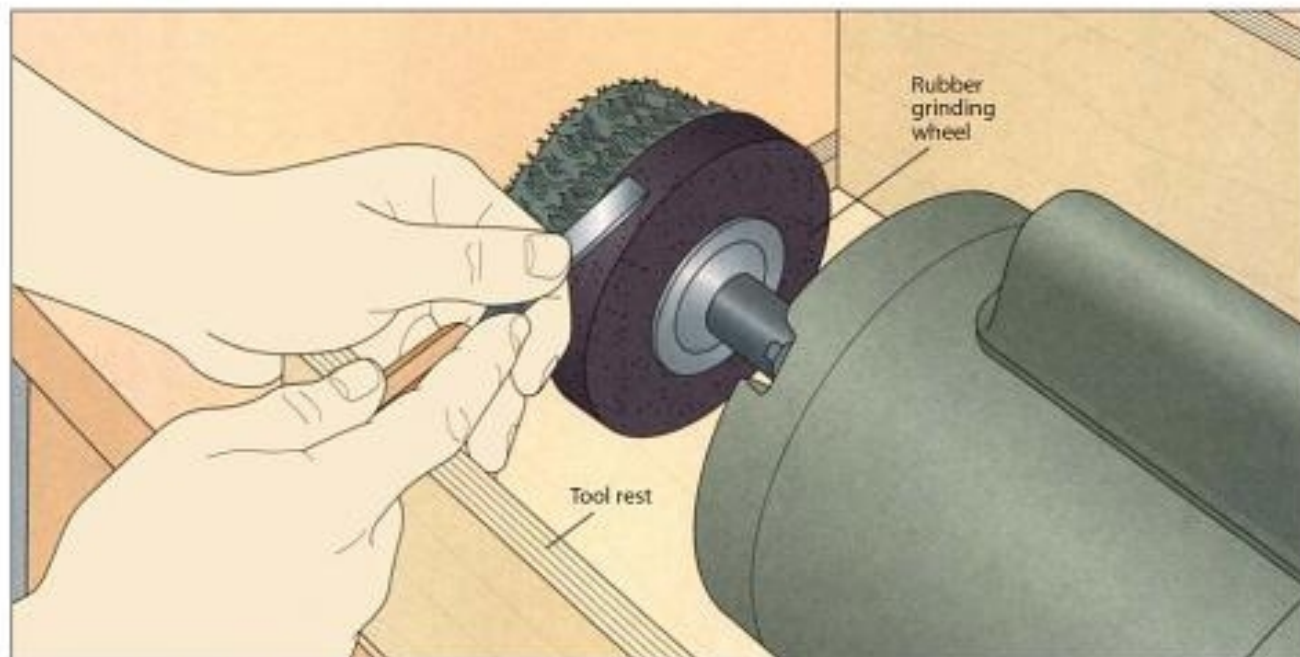
Honing the cutting edge

Apply the appropriate lubricant to your sharpening stone, then hold the blade of the knife at a 15 to 35 degree angle. A lower angle is more suitable if you are working with softwood; a higher angle will work better with hardwood. Slice toward yourself as if you were trying to slice a piece from the stone, making sure you keep your other hand well clear of the cutting edge (*left*). Then make a cut in the opposite direction. Continue, alternating the direction of your slicing.

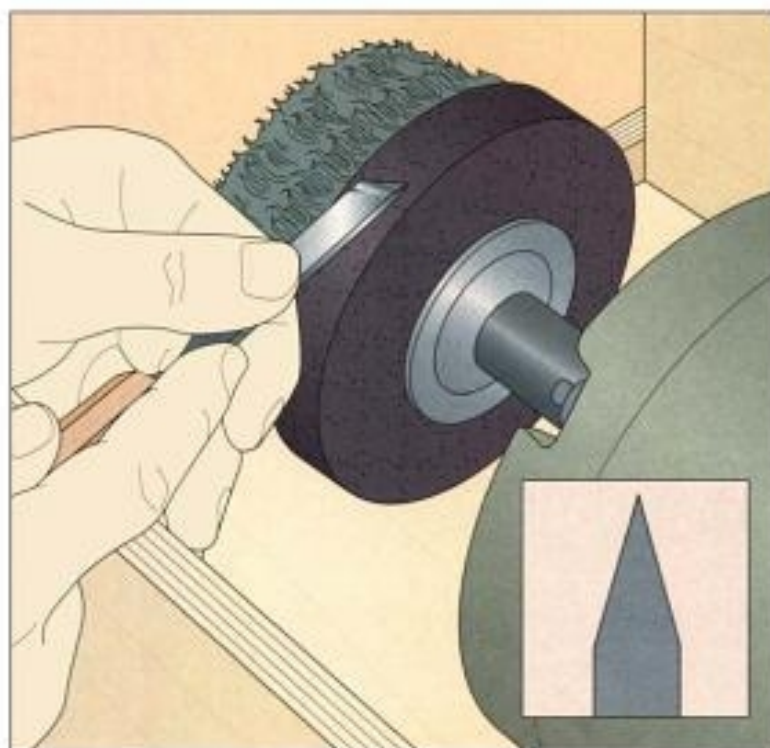


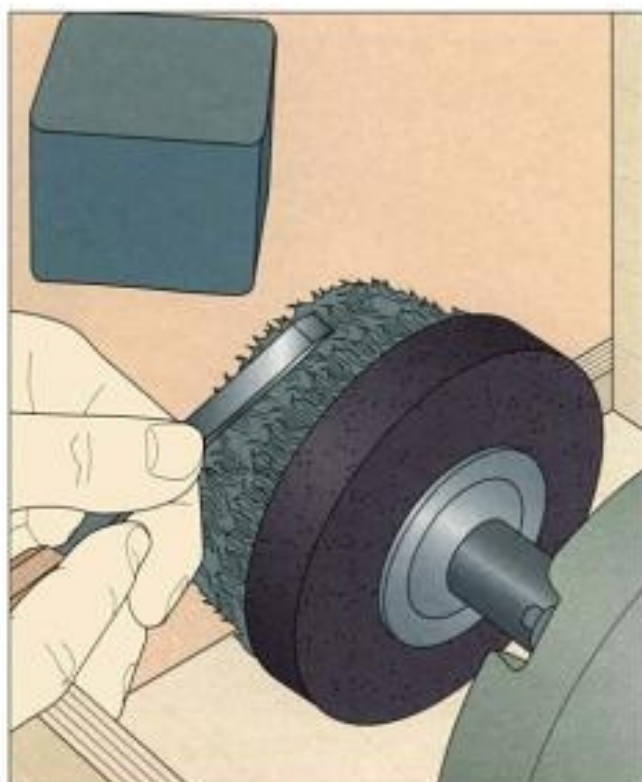
Stropping the knife

Sharpening will create tiny burrs on the cutting edge that can be removed with a leather strop. Holding the strop in one hand, draw the blade across the strop away from the cutting edge (*right*). (Stropping into the edge will cause the knife to cut the strop.) Repeat the process on both sides of the blade.

Sharpening a Chisel on a Grinder**Honing the cutting edge**

Install a rubber grinding wheel and a cloth wheel on a bench grinder. Holding the blade between the index finger and thumb of one hand, set the handle on the tool rest and start grinding at the heel of the bevel. A thin edge of reflected light will be visible at the tip of the blade (*above*). Draw the chisel down the grinding wheel until the extreme end of the cutting edge touches the grinding wheel. At this point, the thin line of the reflection will disappear. The final bevel should vary between 15 and 35 degrees, with a steeper angle required for cutting hardwoods. A skew chisel is sharpened the same way (*left*), except that you need to perform the process on both sides of the blade since it has a bevel on each face (*inset*).





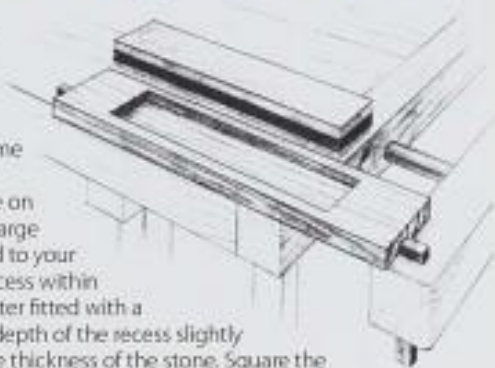
Buffing the chisel

Apply some polishing compound to the cloth wheel on your grinder while it is spinning. Then hold one side of the chisel edge against the wheel (*right*). Flip the chisel over and polish the opposite side. This will remove any small burrs left by the honing process.

Shop Tip

A sharpening-stone holder

Carvers must sharpen their tools frequently. To make the process more convenient, build a permanent home for your stone. Outline the sharpening surface on a piece of solid wood large enough to be clamped to your bench. Then plow a recess within the outline using a router fitted with a straight bit; make the depth of the recess slightly more than one-half the thickness of the stone. Square the corners of the recess with a chisel and store the stone in the holder. When you need to sharpen, simply secure the board to your workbench.



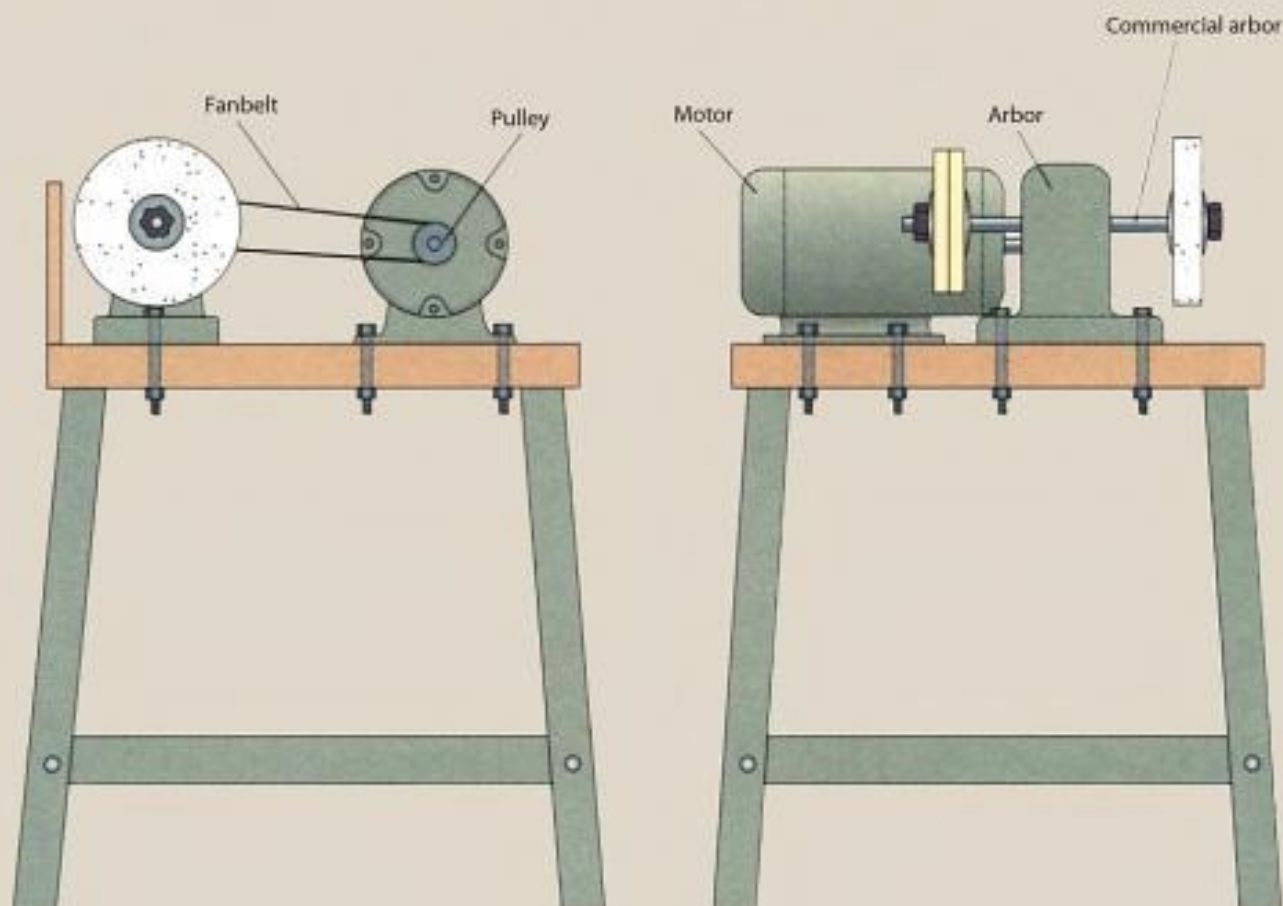
A Bench Grinding Station

This shop built grinding station rotates the wheel so the grinding surface turns away from the operator, contrary to the rotation of a standard bench grinder. This is better for carving tools as it allows a lighter touch of the blade against the grinding wheel to hone the cutting edge, which in turn prevents overheating the tool. This station also permits you to reduce the wheel's speed simply by increasing the size of the pulley on the arbor.

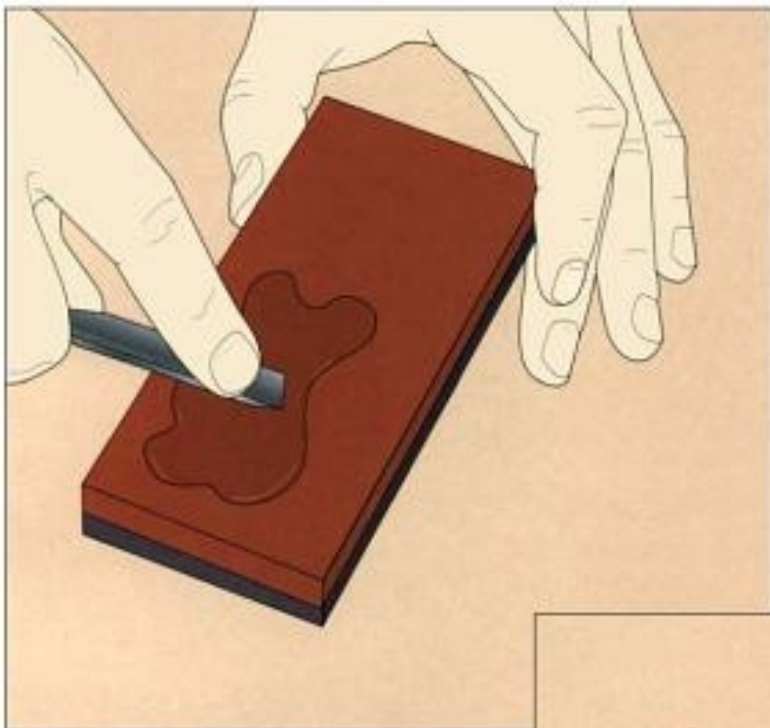
Bolt a 1/4-horsepower motor to the rear of your work surface. The surface should be at least an inch thick—preferably two inches—and stand 30 to 36 inches off the floor, depending on your height and the level at which you like to work. Mount a small pulley on the motor.

Use a commercial arbor to mount the grinding wheels. The arbor should be bolted so its pulley is in line with the motor pulley. The pulley on the arbor should be sized to reduce the revolutions of the motor to between 800 and 1,100 rpm on the grinder. So, if the motor rotates at 1,750 rpm, you will need roughly half that speed for the grinding wheels. Therefore, the diameter of the pulley on the arbor should be twice that of the pulley on the motor.

A V-belt transfers power from the motor to the arbor. Make sure the arbor is positioned so the belt is taut and you have a space four inches wide in front of the grinding wheel to mount a tool rest. (Some arbors come equipped with their own tool rest.)



Sharpening a Chisel on a Bench Stone



Grinding the edge

Apply the appropriate lubricant to the bench stone, then place it on a work surface. Grasp the stone with one hand. With the other hand, hold the blade with the bevel flat on the stone. Rub the cutting edge in a circular motion (*left*). Do not rock the chisel or hold it at too steep an angle or you will end up forming a double bevel on the blade.



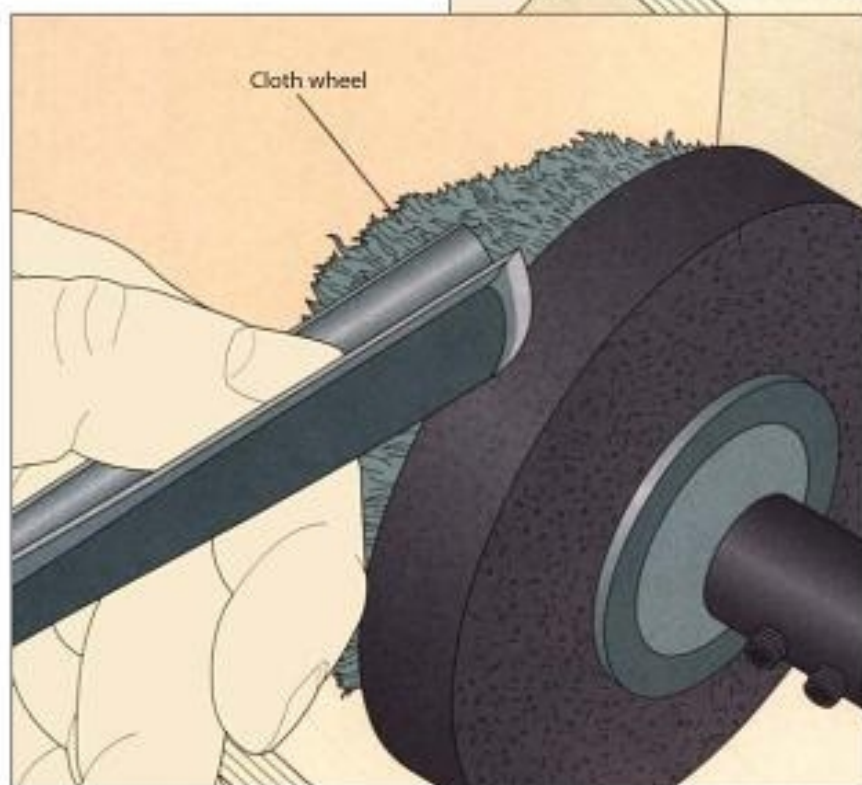
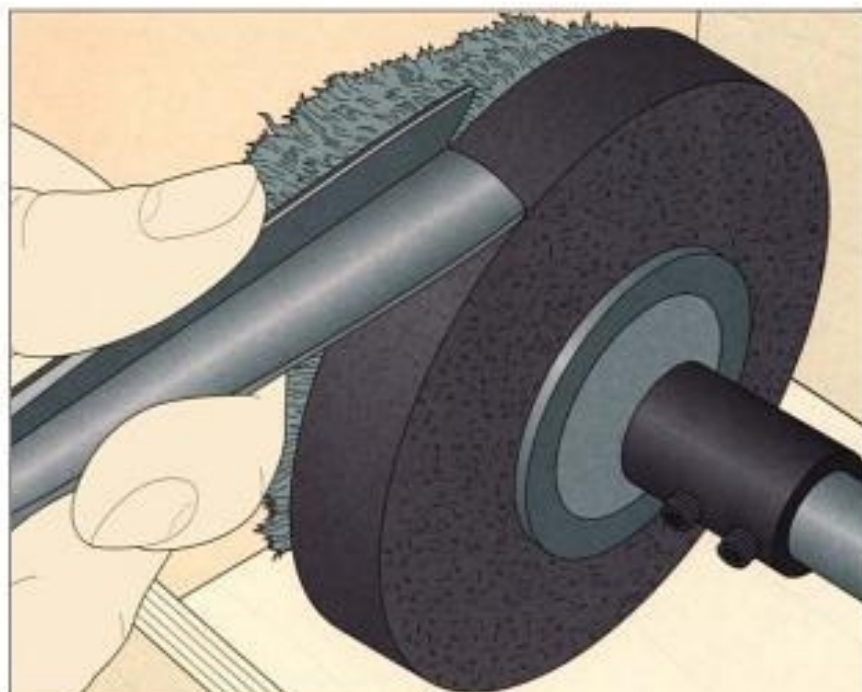
Polishing the cutting edge

Use a leather strop or the buffing wheel of a bench grinder to polish both sides of the blade. If you are using a strop, hold it in one hand, while drawing the edge of the chisel toward you (*right*). Draw both the top and bottom across the strop several times, to remove any tiny burrs, and the bevel is polished to a fine edge.

Sharpening a V-Tool

Grinding the edges

Treat the cutting edge as if it were two separate flat chisels (see page 23). Start grinding at the rear of the heel of the bevel. A thin line of light will appear at the tip of the blade. Slowly draw the chisel down the wheel until the tip of the cutting edge touches the wheel. The reflected light should disappear.



Removing the point

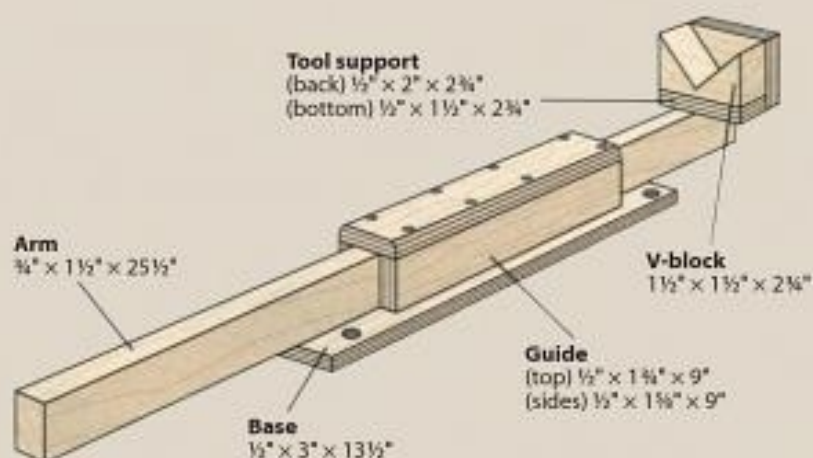
After grinding the two edges of the V-tool, a slight hook will form where the edges meet (see page 20). Remove this point by resting the V-tool on the grinding wheel, with the hook just touching the wheel. Rock the tool gently from side to side until the point is removed (left). Then buff both sides of the cutting edge on a cloth wheel.

Gouge-Grinding Jig

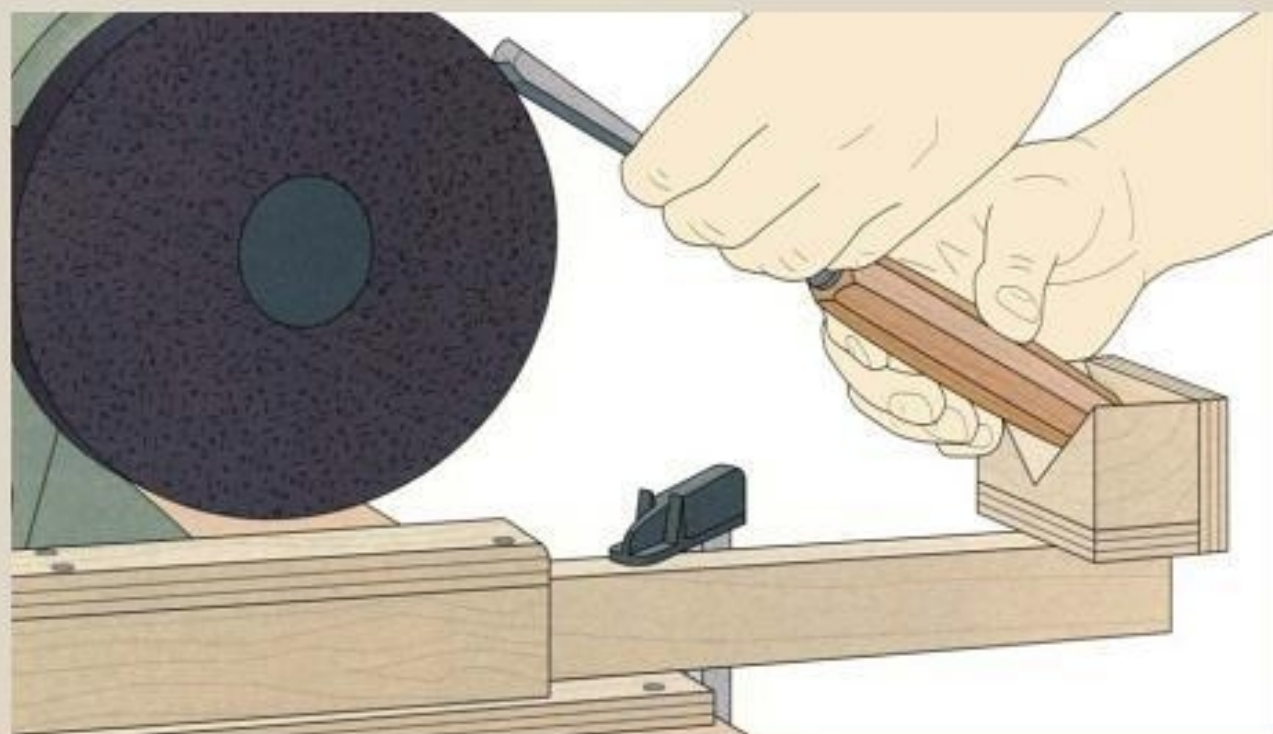
The jig shown at right allows you to hold a gouge at the correct angle for grinding. The dimensions will accommodate most gouges. Cut the base and guide from $\frac{1}{2}$ -inch plywood. Screw the guide together and fasten it to the base with countersunk screws. Make the guide opening large enough for the arm to slide through freely.

Cut the arm from 1-by-2 stock and the tool support from $\frac{1}{2}$ -inch plywood. Screw the two parts of the tool support together, then fasten the bottom to the arm flush with one end. For the V-block, cut a small block to size and saw a 90° wedge out of one side. Glue the piece to the tool support.

To use the jig, secure it so the arm lines up directly under the grinding wheel.



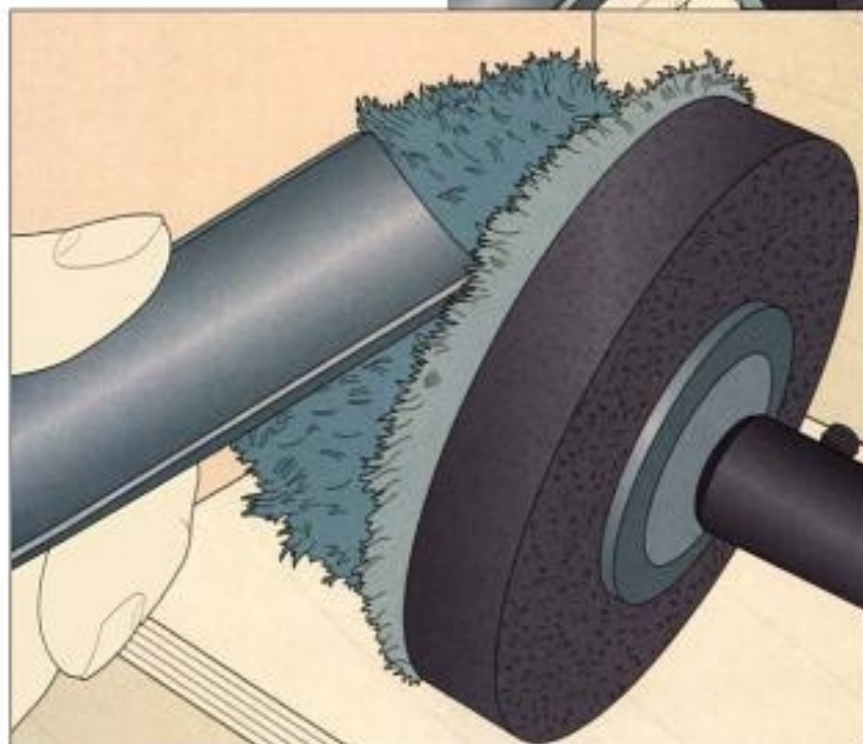
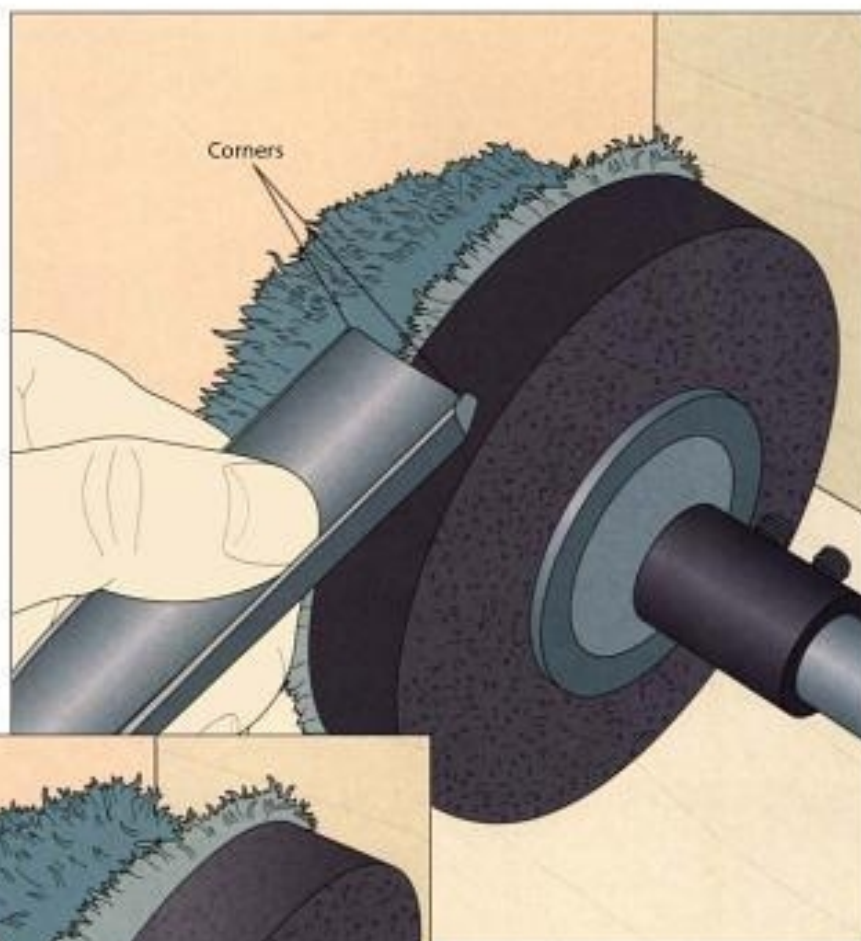
Seat the gouge handle in the V-block and slide the arm so the beveled edge of the gouge sits flat on the grinding wheel. Clamp the arm in place. Then, with the gouge clear of the wheel, switch on the grinder and reposition the tool in the jig. Roll the beveled edge across the wheel (*below*).



Sharpening a Gouge

Honing the cutting edge

Holding the blade between the fingers and thumb of one hand, set the heel of the bevel on the wheel. Roll the gouge from side to side, grinding as evenly as possible. Slowly draw back the gouge, sliding it down the surface of the grinding wheel as you continue a sideways rolling motion. A thin line of reflected light at the extreme edge of the gouge will be visible until you begin grinding the extreme edge. This sliver of light will disappear, indicating you have reached the edge (*right*). Do not slide the gouge any further, or you will create a double bevel. Make certain that the edge is perpendicular to the shaft—it should not jut forward, nor recede beyond the corners of the cutting edge (see page 20). These corners should be pointed, not rounded.



Polishing the cutting edge

Polish the cutting edge of the gouge with a cotton wheel (*left*). You can buff the inside face, but do not attempt to grind it. Grinding could change the geometry of the gouge and reduces the carving ability of the tool.

Sharpening Techniques

Carving tools are supplied in various degrees of sharpness. In Great Britain, blades are given a basic grind before they are sold (*photo, page 31*), needing only to be honed and polished before use. North American manufacturers, on the other hand, supply carving tools in a wide range of conditions, from fully sharpened to crudely—and sometimes improperly—ground. The majority of new carving tools require some grinding before they can be whetted, honed, and polished to a razor-sharp edge. The two main goals of grinding are to thin the dull side of the cutting edge (*inset below*) and provide the correct bevel angle for the tool. To avoid drawing the temper as you grind the metal, a wet-wheel

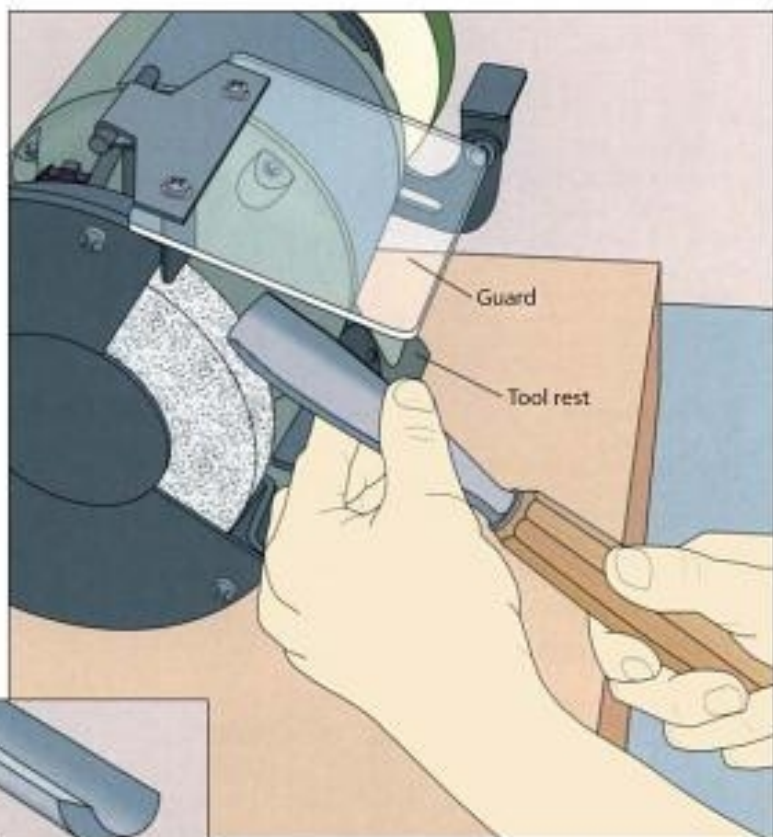
grinder is the best choice. If you are using a dry wheel, the tool must be cooled with water frequently.

Grind the bevel to an angle between 20° and 30° and make certain it is flat. The bevel must extend across the entire width of the blade and be square to the tool's edges. In general, a lower bevel angle will produce finer cuts, but its thin cutting edge will tend to break during use, particularly in harder woods. To strengthen the edge, hone an inside bevel with a slipstone (*page 33*). Carvers generally try to grind the lowest bevel angle that still resists breaking. Ultimately, only experimentation and experience will teach you what angle is best for your tools and style of carving.

Grinding a Carving Tool

Grinding a gouge blade

Grind the bevel on a gouge blade using a grinder with a medium-grit wheel. Position the guard properly, adjust the tool rest to the desired bevel angle, and turn on the machine at its slowest setting. Holding the blade between the index finger and thumb of one hand, set the blade on the tool rest and advance it until the bevel is flat on the wheel. (If you wish to alter the bevel angle of the cutting edge, hold the blade against the wheel at the desired angle.) With your index finger against the tool rest, roll the blade on the wheel until the entire edge is ground (*right*). Continue, checking the blade regularly, until the cutting edge has been thinned (*below*) and the bevel angle is correct. Dip the blade in water occasionally to prevent it from overheating. Use the same technique for chisels and V-parting tools, but move the blade from side to side straight across the wheel.



Courtesy Veritas Tools 1990

Most carving tools require some grinding before they can be honed and polished to a razor-sharp edge. The British-made tools shown at right (from left to right, a chisel, a skew chisel, a gouge, and a V-tool) have been ground properly and are ready for final sharpening. The edges are fairly sharp with none of the dullness shown in the inset on the previous page. The bevels are flat and square to the edges of the tool.



Sharp tools are essential for carving wood. Not only will they improve the quality of your work, they will also make it more enjoyable. Once you have ground the proper bevel on your tool (page 30), you will need to hone and polish the blade before it is ready for work.

For carving chisels, both sides of the blade must be whetted, or honed, on a benchstone, and polished on a strop as shown on page 32 and 33. The procedures for gouges and V-parting tools are a little more involved. In both cases, the outside bevel must be whetted. Depending on the quality of the bevel you produced on the blade, you may first have to use a medium stone and then move to a fine stone to achieve the desired sharpness. If the bevel has been properly ground, a fine stone should suffice.

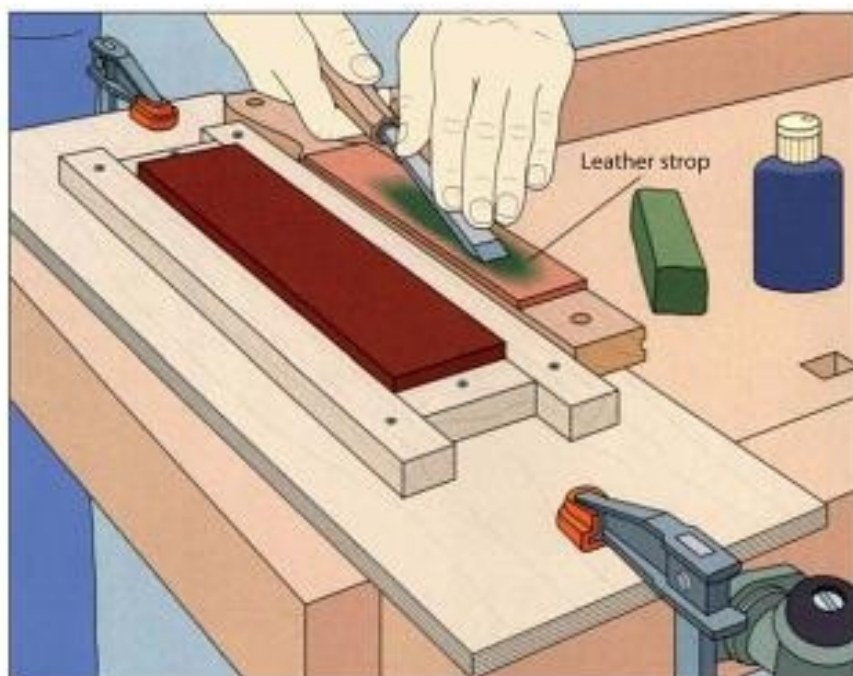
The whetting process will raise a burr on the inside edge of the blade, which is honed away with a slipstone. This second process creates a slight inside bevel on the blade that strengthens the cutting edge. The angle of the inside bevel can be anywhere from 5° to 10°. Once the inside bevel is honed, the outside edge may need to be honed to a final edge with a slipstone. If the edge is sufficiently keen, however, both the inside and outside bevels are simply polished with a strop or the buffing wheel of a bench grinder. The steps for sharpening a V-parting tool are shown on page 34; for a gouge, see page 36.

Sharpening a Carving Chisel



Honing the cutting edge

Lay a combination medium/fine stone on a plywood base, screw cleats alongside the stone to keep it from moving, and clamp the base to a work surface. Lubricate the stone with a few drops of light machine oil until it pools on the surface. Start by holding the blade with the outside bevel flat on the stone and slide the cutting edge back and forth until the rough grinding marks have disappeared (*above*) and a burr has formed on the inside edge. Flip the tool and repeat the procedure to hone the inside bevel. Both bevels should be about 20°.



Polishing the cutting edge

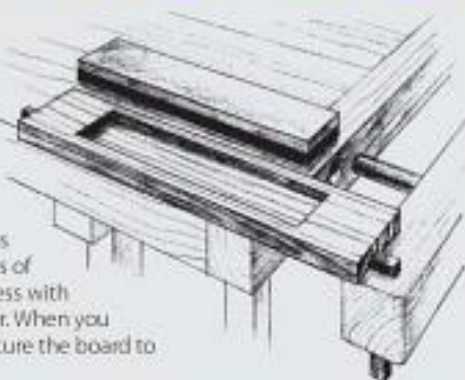
Use a leather strop or the buffing wheel of a bench grinder to polish both sides of the blade. If you are using a strop, you can fasten it to the base alongside the sharpening stone. Apply a light coating of polishing compound to the strop, hold the chisel with the outside edge on the leather, and draw the chisel toward you in long strokes, keeping the bevel flat (*above, left*). Lift the tool at the end of each stroke.

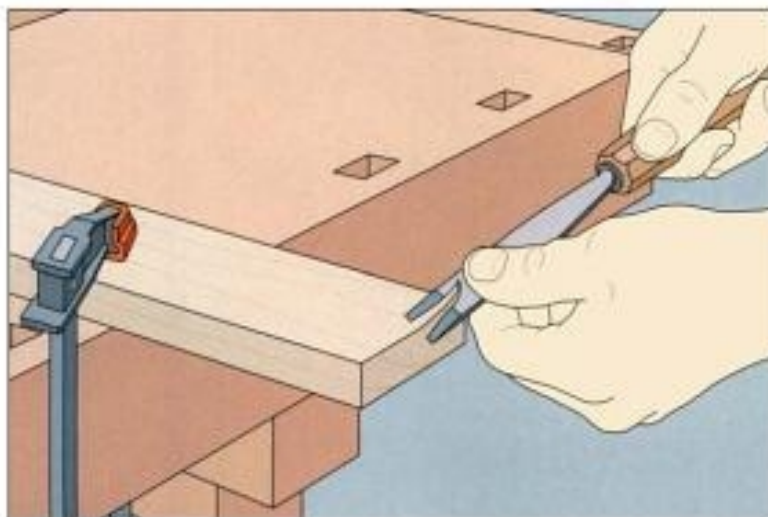
To polish a blade with the buffing wheel, hold the chisel almost vertically, with the bevel flat against the buffing wheel (*above, right*). Move the chisel from side to side slowly as the wheel polishes the bevel. Whether you are using the strop or the wheel, continue until the burr remaining from the honing process disappears and the bevel is polished to a fine edge. Repeat on the other side of the blade.

Shop Tip

A sharpening-stone holder

Carvers are constantly sharpening their tools. To make the process more convenient, build a permanent home for your stone. Outline the sharpening surface on a piece of solid wood large enough to be clamped to your bench. Then plow a recess within the outline using a router fitted with a straight bit; make the depth of the recess slightly more than one-half the thickness of the stone. Square the corners of the recess with a chisel and store the stone in the holder. When you need to do some sharpening, simply secure the board to your workbench.



**Testing for sharpness**

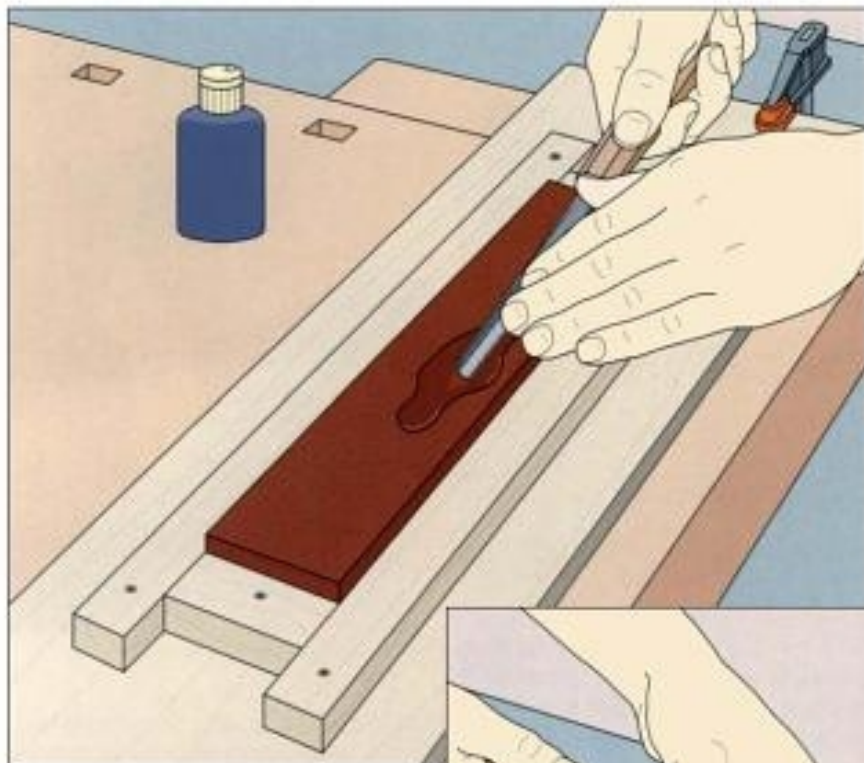
There is no guarantee that the first sharpening of the blade will produce the keen edge required for carving. When you have completed the first steps, clamp a piece of pine or another softwood to the work surface and cut across the grain of the board. The blade should shear the wood cleanly without tearing out the fibers. Also note the sound that the blade produces; a razor-sharp carving tool will make a clean, hissing sound as it slices through the wood.

Shop Tip**Slipstones and strops for inside edges**

The inside edges of carving tools—particularly gouges and V-tools—can be difficult to hone and strop. If you do not have a slipstone or strop of the correct shape, you can fashion a substitute for honing a gouge by wrapping a dowel with 600-grit sandpaper (near right). For V tools, attach the paper to a piece of scrap wood with an outside edge shaped like the inside angle of the blade. Use glue to secure the sandpaper in place. Contoured strops can be improvised by fastening a strip of leather to a suitably shaped wood block. A simpler option is to fold a strip of leather to fit the inside edge of the gouge or V-tool (far right).



Sharpening a V-Tool

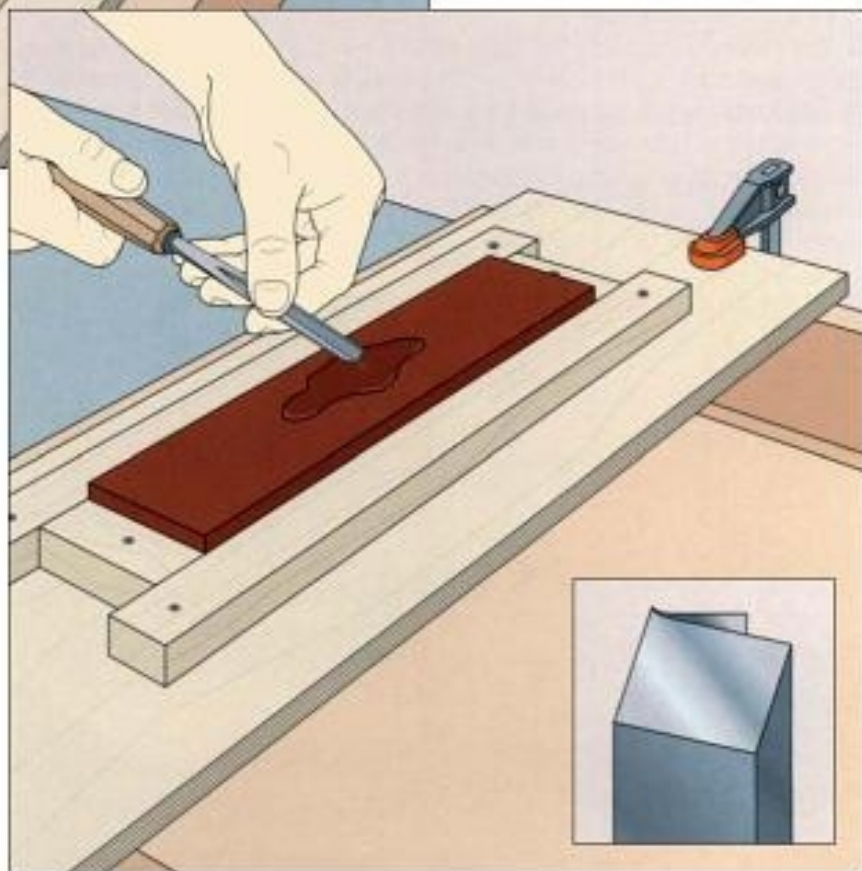


Whetting the outside edges

Sharpen each side of a V-tool separately. Hone one outside bevel as you would a chisel (page 26), moving the blade back and forth along the length of a saturated oilstone and keeping the bevel flat on the stone. Repeat on the other side of the V (left). Stop working when you have removed the rough marks from the ground edge and a small burr forms on the inside of the edge. To feel for the burr, run your finger gently across the inside edge of the blade.

Removing the hook

When you sharpen the outside bevels of a V-tool, a hook of excess metal will form at the apex of the V (inset). This hook must be ground away before you hone the inside bevel. Holding the tool on the stone, roll the corner across the surface (right). Move the tool from end to end along the stone until you wear away the hook and an outside bevel forms at the apex of the V. As much as possible, try to blend the bevel with the outside bevels on the sides of the V, forming one continuous beveled edge. This process will create a burr in the center of the inside edge, which is later removed.

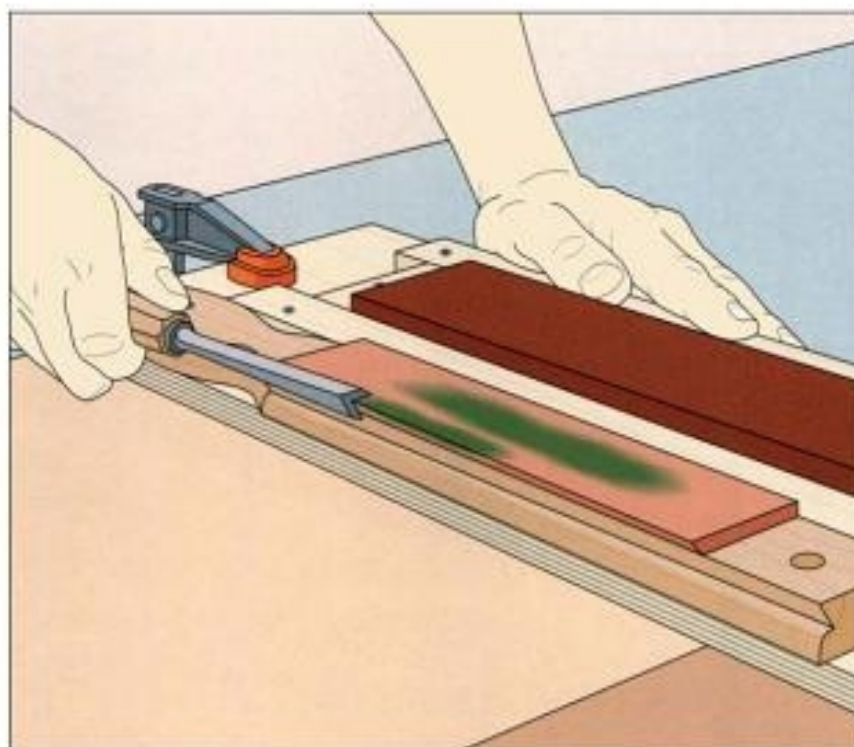


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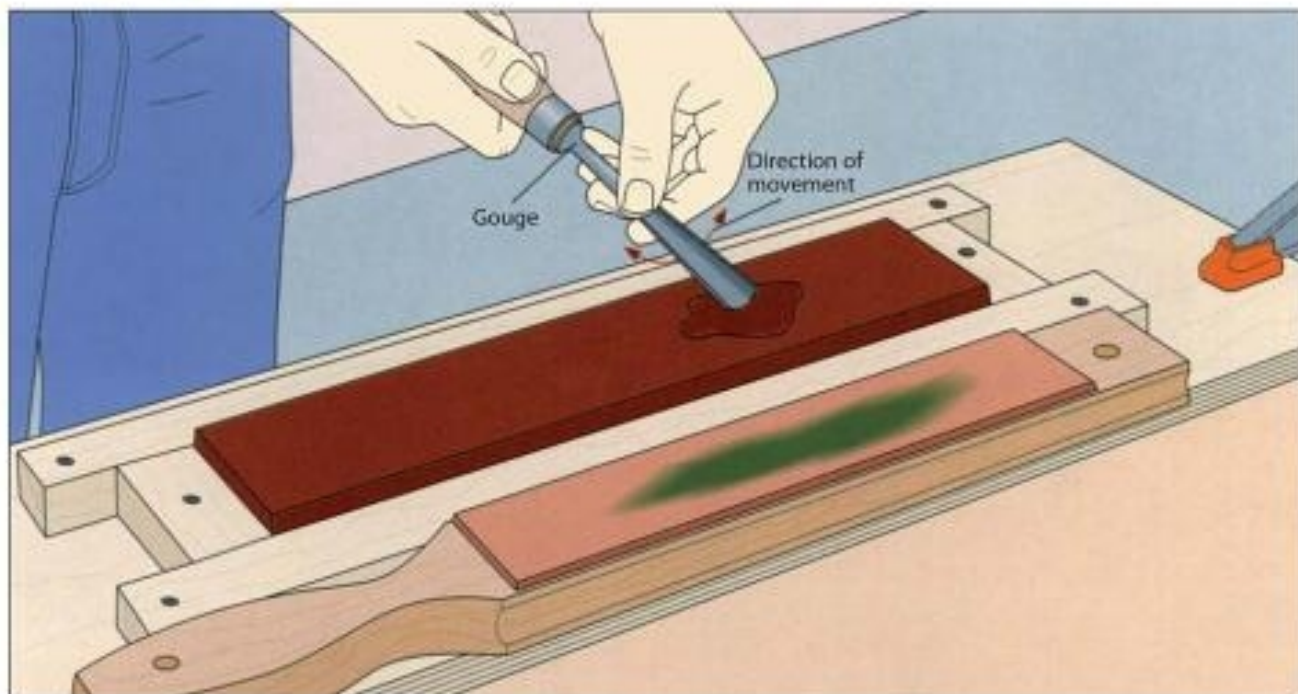
Honing the inside bevel

To remove the burr and hone an inside bevel, use a triangular slipstone that matches the angle of the V-tool blade as closely as possible. Clamp the stone securely in a bench vise and saturate it with oil. To avoid crushing the stone, do not overtighten the vise. Then, with only the end of the blade's inside edge in contact with the stone, draw the tool forward and back applying light downward pressure (*above, left*).



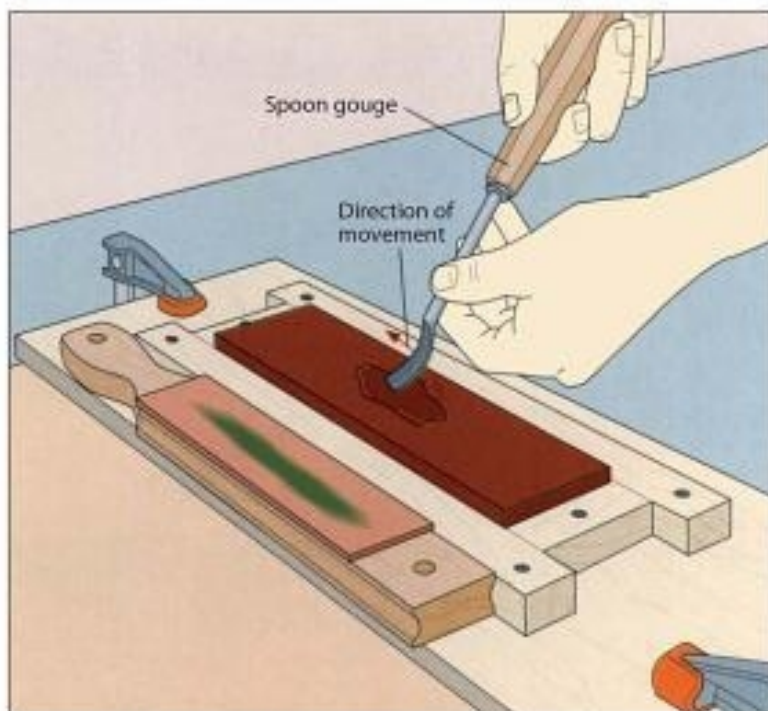
Check the inside edge of the blade periodically until the burr is removed and a slight inside bevel forms. To finish, polish the outside of the edge with a leather strop or a bench grinder polishing wheel (*page 27*). To polish the inside edge, cut the side of a commercial strop to match the interior angle of the V-tool and draw the tool along the angled edge (*above, right*).

Sharpening a Gouge

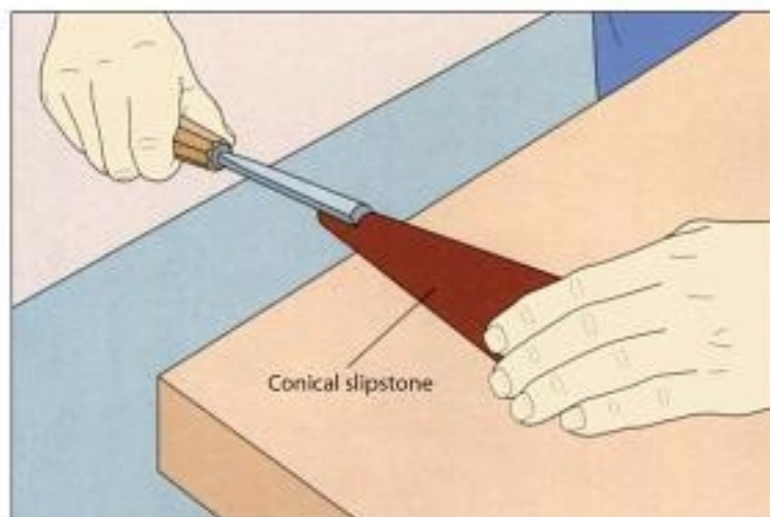


Whetting the outside bevel

Saturate an oilstone as you would to sharpen a chisel (page 26), then set the outside bevel of the gouge flat on the stone. Starting at one end, move the blade back and forth along the stone with a rhythmic motion, simultaneously rolling the tool so the entire bevel contacts the sharpening surface (*above*). Avoid rocking the blade too far, as this will tend to round over its corners and blunt the cutting edge. Continue until the bevel is smooth and a burr forms on the inside edge of the blade. The same technique is used to sharpen a front-bent, or spoon gouge, but you will need to hold the tool at a much higher angle to keep the bevel flat on the stone (*right*).



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**Honing an inside bevel**

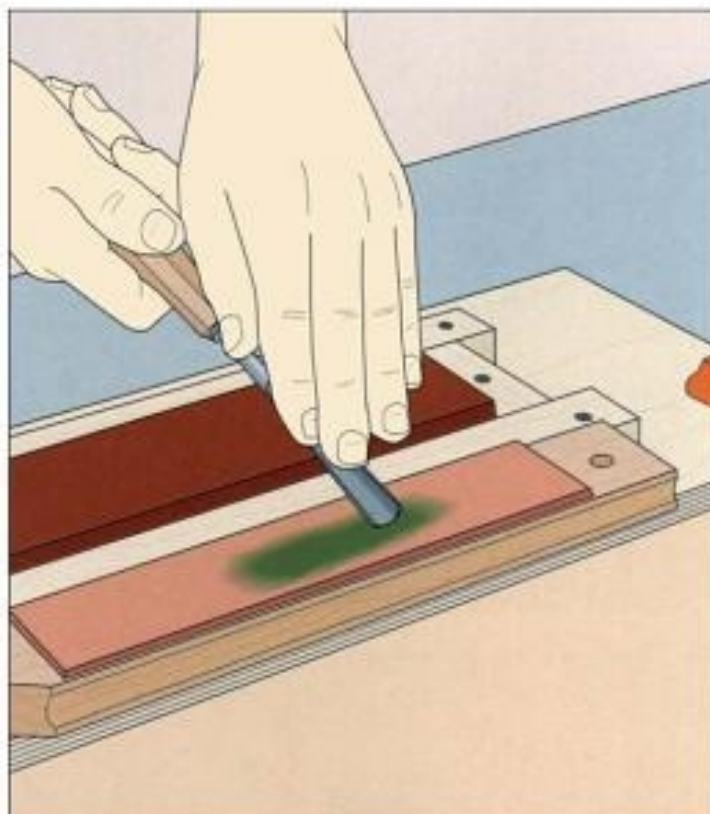
Once you have sharpened the gouge blade's outside bevel, use a conical slipstone to hone a slight inside bevel on the blade and remove the burr. Put a few drops of oil on the cutting edge of the gouge, then move the blade away from you across the stone. To avoid dulling the outside edges of the blade—and bringing the cutting edge close to your fingers—the blade should only contact the narrow portion of the stone (*left*). Continue until the burr is removed and an inside bevel of 5° to 10° forms.

**Refining the outside bevel**

Use a fine slipstone to refine the gouge's outside bevel and remove any burr that may have formed during sharpening. Apply a few drops of oil to the cutting edge, then hold the slipstone in one hand and set the bevel flat on its surface. Draw the tool from side to side along the stone, rotating the blade to hone the bevel (*above*). To protect your hand, work only in the middle portion of the stone. Continue honing until the burr is worn away.

**Polishing the inside bevel**

Use a folded piece of leather to strop the inside bevel of the gouge. Spread some polishing compound on the leather and fold it so its edge matches the inside curve of the gouge. Draw the blade along the leather repeatedly to polish the inside bevel (*above*). You can also do the polishing using a shaped wood scrap (*page 39*).

**Polishing the outside bevel**

Use a felt wheel on a grinder or a leather strop to polish the outside bevel of the gouge. To use a wheel, move the tool rest out of the way, turn on the tool, and hold a stick of polishing compound against it for a few seconds. Then, holding the gouge handle firmly in your right hand, pinch the blade with the fingers of your left hand and set the bevel flat against the

wheel. Making sure the blade only contacts the lower half of the wheel, lightly roll the tool across the wheel to polish the bevel (*above, left*). If you use a strop, spread some polishing compound on it, then use the same rolling technique as before to polish the outside bevel (*above, right*). Check the inside bevel; if a burr has formed, repeat previous step.

Setting Up to Work

Once your tools are sharp, carving requires little preparation other than selecting a suitable wood for your project. The chart on page 42 lists a number of carving woods and their relevant characteristics. In general, soft, fine-textured woods with straight grain are best for small projects and detailed work. Dense hardwoods with fine textures accept details well, but require greater force to cut.

Once you have chosen your wood, use carbon paper or a graphite tracing to transfer your pattern to the carving block (page 40). Keep the pattern on hand after you have drawn it on the workpiece so that you can continue to transfer details to the wood as the carving progresses. Securing your work is the final step before carving. Several effective methods are shown starting on page 44.

Finally, remember that a well-honed carving tool can inflict a serious wound. As much as possible, keep your hands behind the cutting edge and cut away from your body. And, for the sake of your safety and your work, do not use tools with dull or nicked blades.



The contours of a cabriole leg are shaped with a spokeshave. The leg is held in a bar clamp, which is secured to the work surface by a hand screw and two quick-action clamps. This setup exposes the entire front surface of the leg for shaping.

Shop Tip

Using wood scraps for stropping

Instead of a leather strop or a buffing wheel, you can use shaped wood scraps to strop the cutting edges of your carving tools. Cut a groove in one board that matches the convex edge of a gouge (near right); cut the reverse shape for the concave edge of the blade (far right). You can use the gouge itself to perfect the shape of the scraps. To use a wooden strop, spread some polishing compound on the contoured surface and draw the cutting edge along the wood.



Getting Started

To learn the rudiments of carving takes an afternoon; to master the craft can occupy a lifetime. However long, the journey from novice to master can be eminently enjoyable, yielding many successful and satisfying pieces. Fortunately, you can master the basics of all carving with a few deft movements of a chisel. As explained starting on page 48, these strokes are based on several rules: Carve with the grain, work toward the waste and not the form, and carve from the shortest length of grain toward the longest. The moves are simple, but nothing can take the place of practice. With enough experience you will learn by the feel and even by the sound of a chisel slicing through the wood whether you are following these simple rules.

Choosing the most appropriate species of wood for a given project is as important in carving as in any other type of woodworking—perhaps more so, since you cannot rely on the power of a tool to do the work for you. Start with fine-grained softwoods, such as basswood. Then, as your skill develops, you will be able to carve the more challenging, highly figured hardwoods. A list of the most commonly used carving woods is shown on page 42.

With experience, a carver's workshop may change. In any case, it is quite simple compared to a woodworking shop, which often has three or more major machines and a stable of power tools and hand tools. As shown on page 43 you can do quite nicely in a space large enough for a workbench and a tool chest. With a little

more space, you can add another work surface and a band saw—a helpful device for reducing blanks to rough size for carving.

Firm clamping is essential for safety, but it poses special problems, because of the irregular shapes with which a carver frequently works. A workpiece that shifts can cause the carver to lose control of a chisel, damaging the piece or causing an injury. Two helpful shop-built jigs are shown on pages 46 and 47 that will satisfy many of your clamping needs.

Working safely with a sharp tool means always keeping both hands behind the blade. It is best to lay out your chisels with the edges facing away from you, to avoid nasty cuts as you reach for a tool. Remember to wear sturdy shoes. A gouge or other tool that drops from a workbench can do considerable damage to unprotected feet. Since carving should be done standing up, try to work with carpeting or an anti-fatigue mat on the workshop floor. Your feet, legs, and back will notice the difference, especially if you work for several hours at a time. The padded surface will also protect the edges of your tools should you drop one.



Behind every successful wood carving lies a precise, detailed pattern. Transferring the pattern to a workpiece can be done in a number of ways; for designs that are not scaled and are the same size, a sheet of carbon paper taped to the blank (above) does the trick.

This carving of a bear is supported on a shop-built carving arm. The jig, shown on page 46, allows a workpiece to be positioned at whatever angle is most comfortable.



Wood for Carving

The best carving woods are close-grained. Softwoods, with little figure in the grain, are easier to use for novices. As a carver's experience grows, more difficult stocks, such as burlled hardwoods, become suitable choices. In general, soft, fine-textured woods with straight grain are best for small projects and detailed work.

Hardwoods, such as oak and walnut, make excellent carving woods, because they leave a smooth, defined surface. Their hardness, however, makes them difficult wood for beginners to work. Lime, pear, and basswood are straight-grained and easily worked by novices, but they are also favorite choices of experienced craftsmen

too. Whatever your choice, remember to select wood that is well seasoned.

The nature of the finished project also affects the choice of wood for a project. A door panel, for example, would best be carved from oak or mahogany, because durability is an important factor for such a piece. A purely decorative carving, such as the bear on page 41, should be made from a wood capable of holding fine details, such as lime or basswood. Another consideration is the density of a given wood. A very heavy wood, such as lignum vitae, will render large pieces heavy and unwieldy.

Carving Woods

Woods	Characteristics
Apple	Reddish brown to light red; hard with fine grain; carves well
Basswood	Creamy white darkening to creamy brown; soft with fine texture; carves very well
Birch	Creamy white to pale brown; hard with fine texture; straight-grained pieces carve well
Butternut	Medium light brown; moderately soft with somewhat coarse texture; carves very well
Cedar, aromatic	Reddish brown; moderately soft, very fine-textured; carves well
Cherry, black	Reddish brown to deep red; hard with fine texture; carves moderately well
Holly	White to grayish white; very fine texture; carves well
Jelutong	Light yellowish white; soft, very fine-textured; carves exceptionally well
Mahogany, Honduras	Light reddish brown to medium red; hard with medium coarse texture; carves well
Maple, soft	Cream to light brown; moderately hard with fine texture; carves well
Oak, white	Light tan with yellowish tint; hard with coarse texture; carves with difficulty
Padauk	Deep red to purple-brown with red streaks; hard with moderately coarse texture; carves moderately well
Pear	Pinkish brown; hard with very fine texture; carves very well
Pine, sugar	Light cream; soft with fine texture; carves very well
Poplar	White sapwood to pale brown heartwood; soft with fine texture; carves well
Purpleheart	Deep purple; hard with moderate to coarse texture; carves moderately well
Rosewood, Indonesian	Golden brown to dark purple-brown with black streaks; hard with medium texture; carves moderately well
Sycamore	Pale reddish brown; hard with fine grain; carves moderately well
Teak	Golden brown to rich brown with darker streaks; hard with coarse texture; carves well
Walnut	Dark brown to purplish black; moderately hard with medium coarse texture; carves very well

A Carver's Workshop

The two layouts of carver's workshops shown below demonstrate the flexibility of the craft of carving. The small shop on the right is suitable for a craftsman with limited space. The larger studio boasts additional work surfaces, as well as dedicated band saw and bench grinder stations.

Work surfaces should be wide and long enough so that chisels can be laid out in a row. The tools are positioned by frequency of use, with the most-often used on the left, and the less frequently used tools on the right. The blades face away from the carver for safety. At each step of the carving process, the tools that are immediately involved are positioned alongside the left-hand end of the workpiece with their blades facing away.

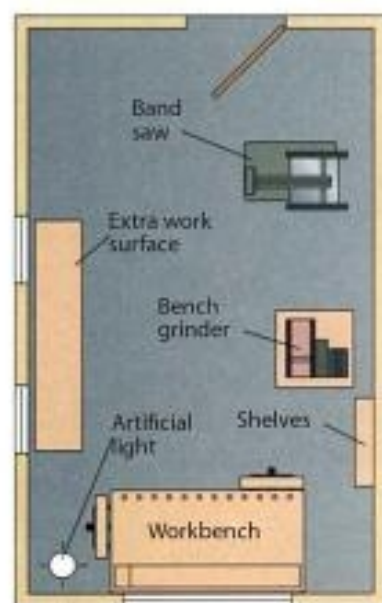
Lighting must be ample but must also cast shadows, unlike the flat light of a cabinetmaker's shop, so that wood texture and carving details are visible to the carver at all times. In each shop layout, the main work surface faces a window, with an artificial light at right angles to the window.

Carver's benches should be extremely sturdy, as they will be constantly subjected to aggressive pulling and pushing motions. In addition, these benches should be weighted or anchored, so as not to shift as the carver puts pressure on the workpiece.

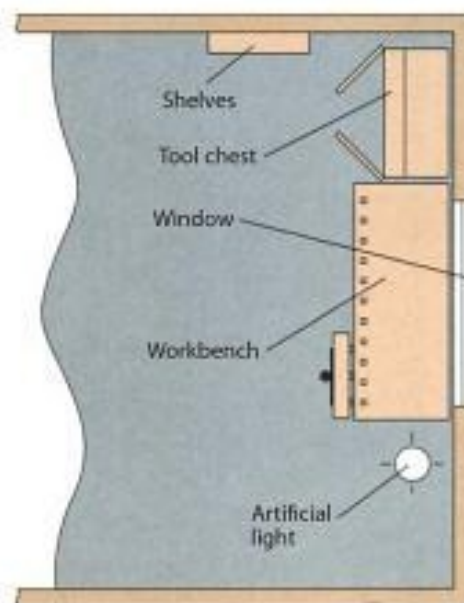


This hold-down clamp fits into a workbench recess originally intended for a bench dog.

Medium-Size Shop



Small Shop

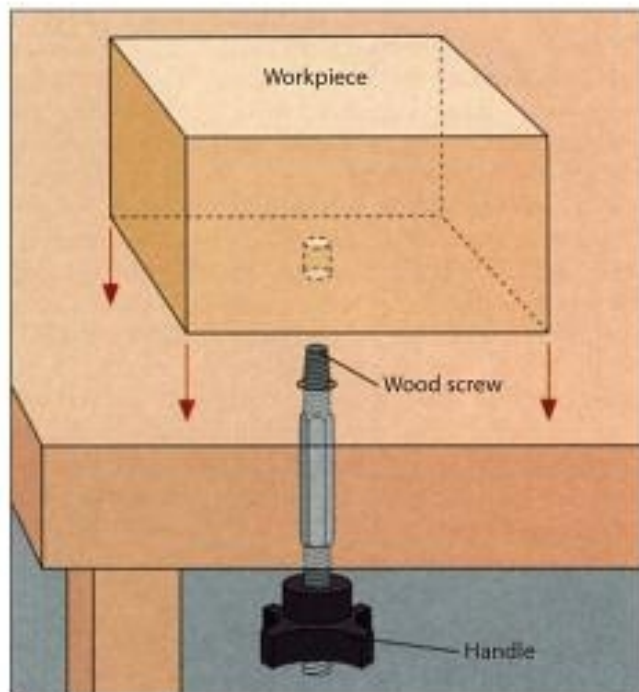


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Some Clamping Techniques

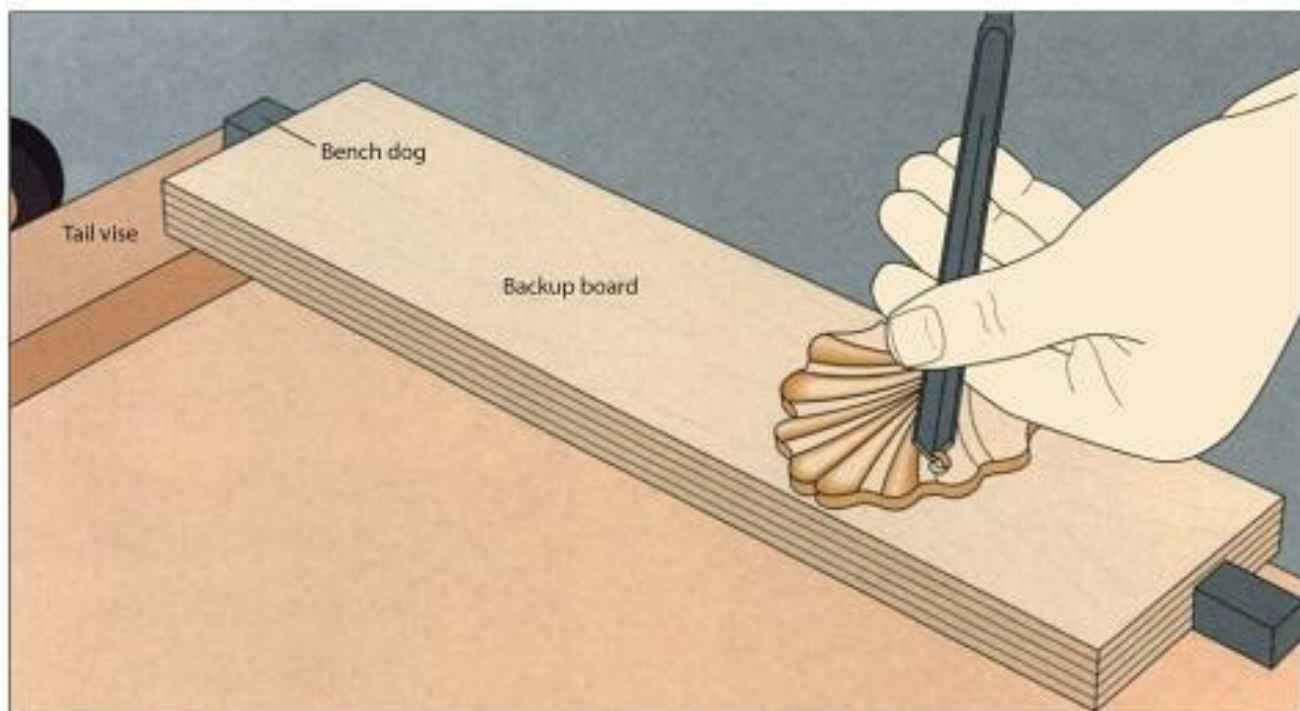
A carver's screw

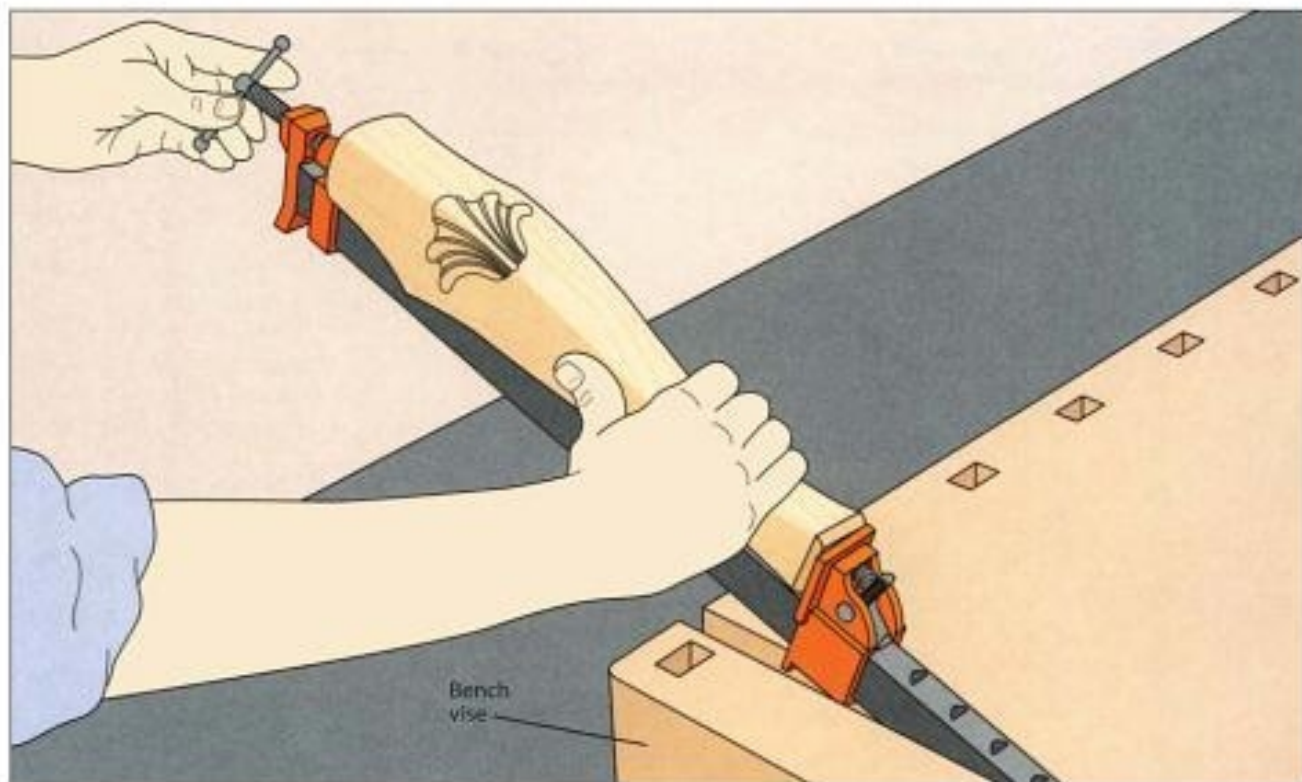
This clamps the workpiece in place, and is especially suitable when the finished item will have a flat, uncarved base. Drill a hole into the base of the workpiece, slightly smaller than the wood thread on the carver's screw. The screw is then pushed through a hole in the workbench (*right*). This hole should be just large enough to accept the shaft of the carver's screw. If the bench hole is too large, the workpiece will move. Screw the stock onto the wood screw, then tighten the handle at the other end until the workpiece is held firmly against the bench. The unthreaded length of the carver's screw must be shorter than the thickness of the top of the workbench.



Clamping a relief carving with bench dogs

Fasten the blank to a backup board, using glue and newspaper. Butt the board against a bench dog set in a hole along the edge of the workbench. At the other end, a bench dog is fitted into the tail vise, which is tightened until the workpiece is held firmly in place (*below*).





Shop Tip

Securing your bench

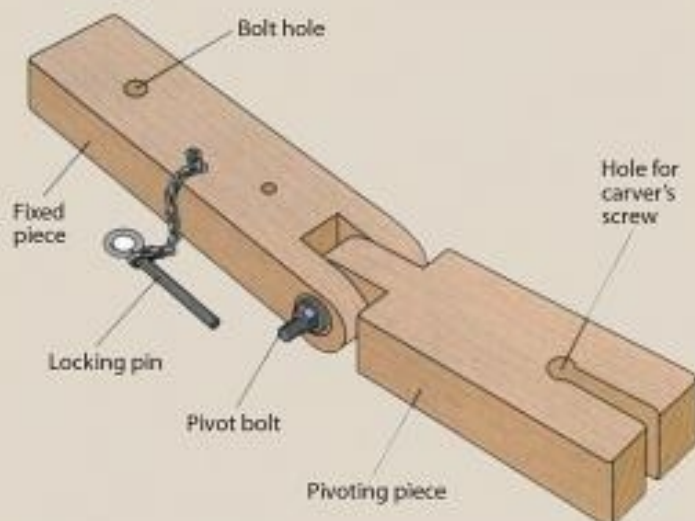
A workbench that may be sturdy enough for most woodworking tasks can prove unstable when subjected to the forces required to carve some hardwoods. To increase the stability of your bench, add cinder blocks to the lower shelf, or bolt the bench to the floor of your workshop.



Securing irregularly shaped workpieces

To clamp awkward pieces like the cabriole leg shown above, secure them in place with a bar clamp and then install the clamp in a vise (above). This will allow you to reach all the exposed surfaces of the workpiece. Rotate the leg in the clamp as necessary.

Carving Arm



Two Clamping Supports for Carving

Carving is much easier when you have the right clamping devices. The carving arm shown above can be pivoted to enable you to work on all parts of a carving block. The carving stand (*far right*) will allow you to secure odd shapes upright in a comfortable position. Both are secured to a workbench; both are simple to build.

The carving arm, shown in use on page 41, is made from a 24-inch-long piece of 2-by-4. Cut it in half, then saw a notch 3 inches long by 1½ inches wide in one piece. In the other half, cut a tenon that will fit into the notch. Then round over the leading edge of the tenon so it will not rub when the pivoting piece is rotated.

Fit the tenon into the notch, then drill a ¾-inch hole through the two pieces for a 4-inch bolt that will serve as a pivot. Bore the hole with a drill press, or use a portable drill with a try square as a guide to make sure the hole is perpendicular to the piece. Insert the bolt with washers and hand tighten it.

Bore two holes in the fixed piece of the jig: one for a bolt that will secure the jig to the workbench and a second one for a locking pin that will prevent the jig from rotating on the bench. Drill a hole in the pivoting piece for a carver's screw, then saw a notch from the end to the hole, as shown. The screw can be made from a large hanger bolt (*right*) having a wood screw at one end and a machine

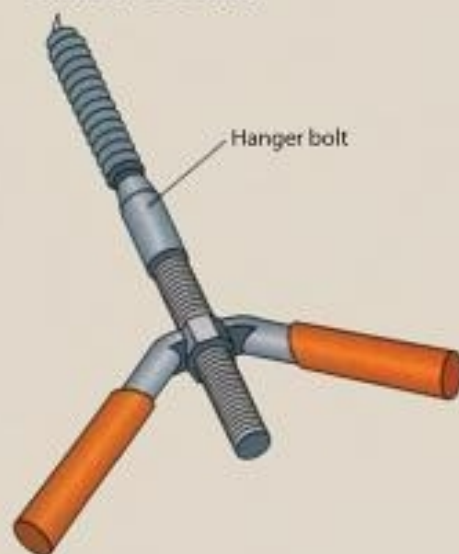
screw at the other. Get a machine shop to weld small steel rods to a suitably sized nut to serve as a handle.

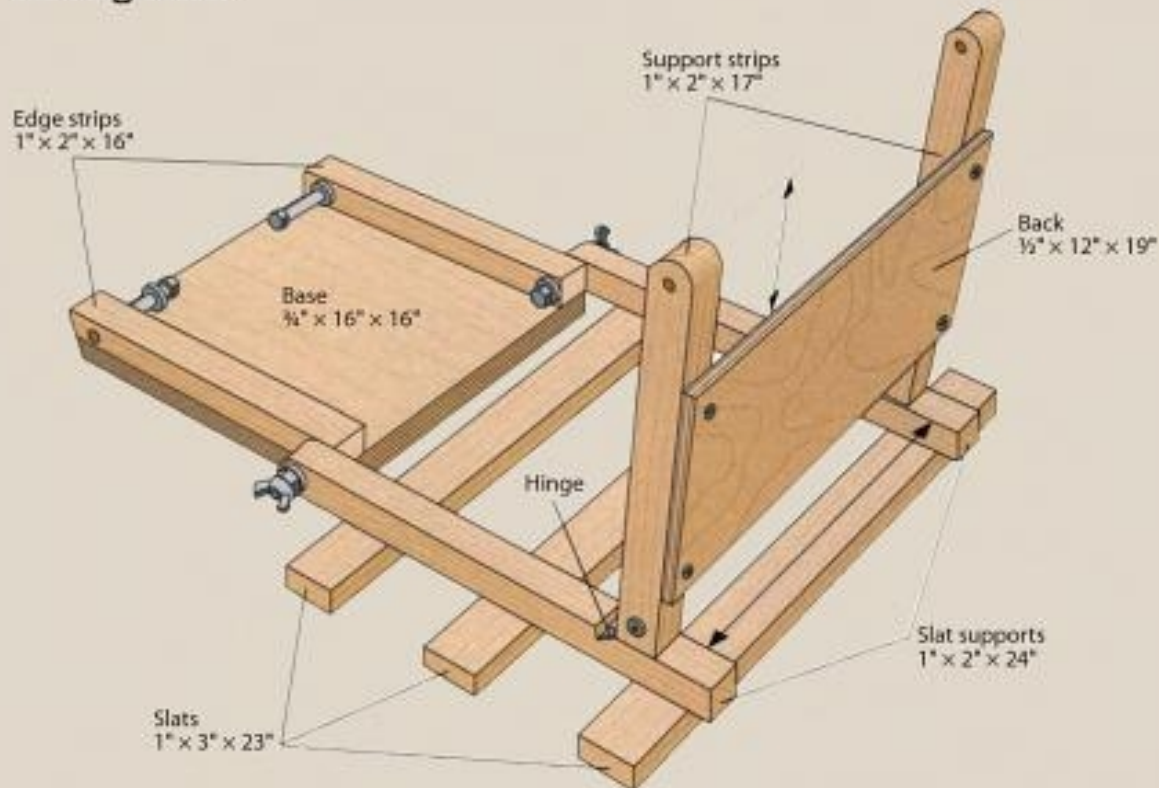
To use the jig, bolt the fixed piece to your bench, then drill a hole in the bench for the locking pin and insert it. (If you do not want to drill any holes in your workbench, secure the fixed piece with two clamps.) Attach the workpiece to be carved to the carver's screw, clamp the screw in the pivoting piece, then pivot the jig to the right angle and tighten the pivot bolt securely.

It is important to carve with the workpiece upright as much as possible. If you work with your stock lying down, the change in perspective will affect how you form the work, inevitably causing distortions.

The carving stand shown opposite eliminates this problem by creating a support that keeps work upright. It is also portable, and its use of slats as a clamping surface means odd shapes are more easily clamped in place.

Carver's Screw



Carving Stand

This jig consists of a base of 3/4-inch plywood, with two strips of wood screwed flush along each edge. The back of the support is also made from 3/4-inch plywood, with two pieces of 1-by-2 stock fastened to the shorter edges. The work surface consists of two slat supports, spaced 16 inches apart, onto which three slats are fastened an equal distance apart.

Cut a small triangular notch out of the slat supports for butt hinges to secure the supports to the support strips for the back. Install the hinges and make sure the back part pivots freely. Drill holes to join the edge strips of the base to the slat supports with 3/4-inch diameter, 2 1/2-inch-long bolts.



To use the jig, clamp the base to your workbench and secure the back support strips to the edge strips of the base with bolts. Then clamp the workpiece to one or more of the slats.

Basic Carving Strokes

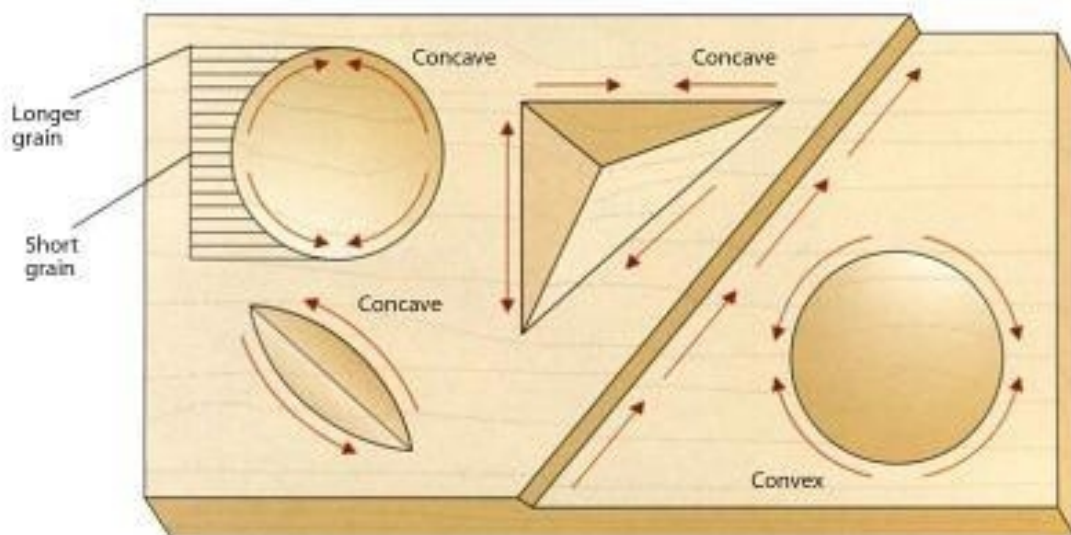
One of the fundamentals of carving is to work with the grain rather than against it. One master carver compared the strokes to petting a dog: Moving your hand in one direction, the fur feels smooth; moving it in the opposite direction causes the fur to rise up. Similarly, when you carve, working with the grain will produce clean shavings and a smooth surface; working against the grain will cause tearout and a jagged surface. Also remember to cut so that you work from shorter grain to longer grain in the piece you want to keep, as shown in the round concave shape in the upper left of the illustration below. You can only really learn these differences by practice. Work on a piece of scrap stock and notice how the cutting action changes as you shift the position of your tool. Then try the carving exercise below.



The relief carving above is a good practice exercise for new carvers. The techniques for making it are shown starting below.

The Basic Carving Exercise

Direction of Carving



Grain direction

The exercise shown above demonstrates the direction in which your chisels must move to achieve the form. By practicing this series of exercises, you will master most of the basic carving moves. Notice how you must change direction while carving

most shapes. Transfer this pattern onto a piece of basswood about 2 inches thick, 6 inches wide, and 12 inches long. The elliptical shape in the lower left-hand corner is a test of your new skills once you have attempted the other forms.

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Carving a Convex Shape

Terracing the surface

Clamp the workpiece to a work surface, using a wood pad to protect the stock. The first part of this exercise involves cutting a bevel diagonally across the workpiece and removing one-half inch or so of waste from the right-hand side to create a raised part that will be refined into a circular convex shape in the middle of the terraced part. Grasp a 12-millimeter No. 3 gouge with a power grip: Your left hand holds the shaft of the chisel with the palm down and the thumb near the handle, while your right hand firmly grasps the handle. Working from the shorter to the longer grain, remove the bulk of the waste from the edge of the cut (*right*), then use a 12-millimeter No. 39 V-tool to form a clean beveled edge. Switch back to the gouge to clear away most of the waste from the terraced part, carving to within a half inch or so of the convex shape.



Defining the convex shape

Switch to a 12-millimeter No. 11 gouge and grasp the shaft of the chisel with your left hand, palm up. The gouge should rest in the crook formed by the first and second knuckle of your index finger. The remaining fingers of your left hand curl along the side of the gouge. Your thumb rests firmly on top of the shaft. Your right hand grasps the handle of the gouge with the index finger extended, and the end of the handle butted up against the heel of your palm. Carve so that you work from the shorter to the longer grain of the finished piece (*left*). Always cut away from the desired shape toward the waste.

Paring out the waste

Finish clearing out the waste with a 12-millimeter No. 3 chisel. By defining the edge of the convex shape first, you can pare away the waste surrounding it without fear of chipping into the form (right). Note how the edge is cut down to the final depth. This provides a guide and prevents unwanted chipping.

**Rounding over the top**

Use a 25-millimeter No. 3 gouge upside down to start forming the basic curvature of the surface (*above*). Take small chips off near the top, until the curve starts to become better defined.

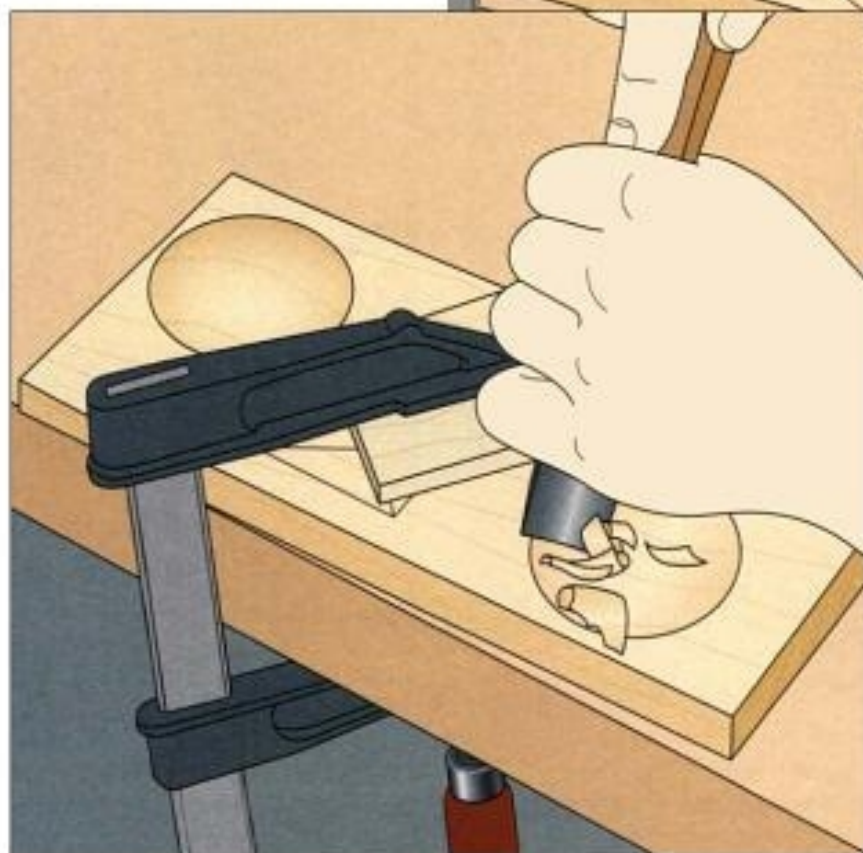
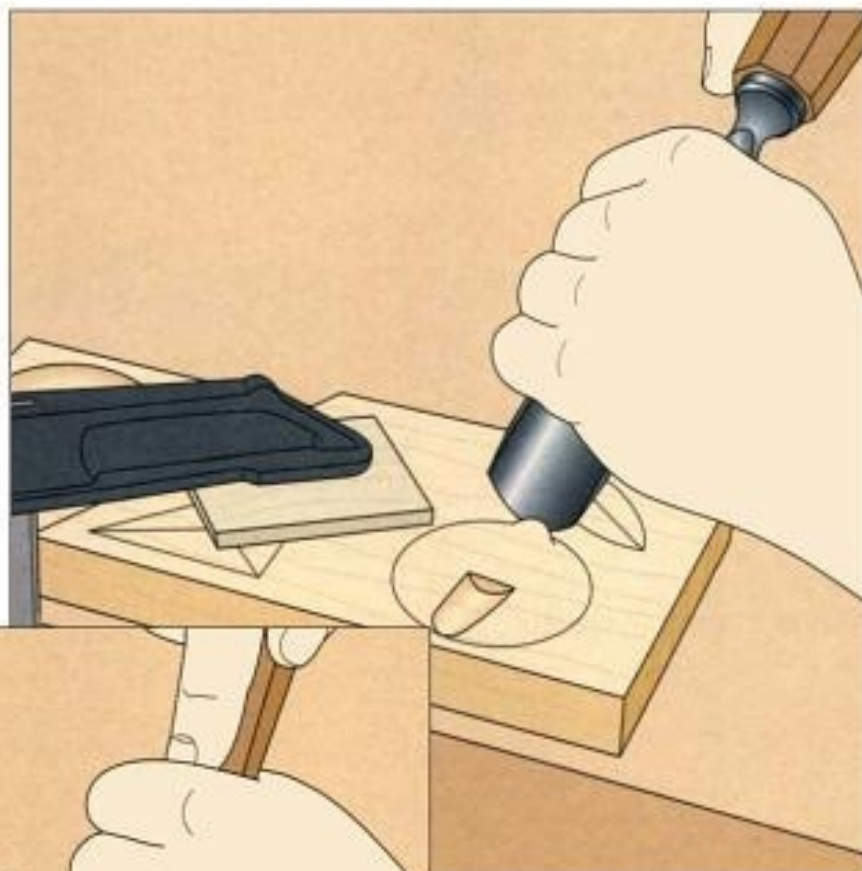
**Improving the curve**

Once a slight curve appears, flip the gouge right side up and carve so you produce larger chips closer to the circumference of the circle (*above*). Continue until the curve meets the flat area around the base of the convex shape. Clean up the point where the two surfaces meet with a 4-millimeter No. 39 V-tool.

Carving a Concave-Shaped Bowl

Cutting a center groove

Clamp the workpiece in place, with a wood pad to protect the surface. With a 25-millimeter No. 8 gouge, cut a groove across the center of the circle, perpendicular to the wood grain. This indentation will allow you to carve out the remainder of the waste more easily. Beginning at one edge, cut toward the center of the circle. Then carve the other half starting at the opposite side (*right*). You do not need to cut the groove initially to the final depth. It is better to carve the groove to a shallower depth, then pare away the waste, as described in the next step.



Carving toward the center

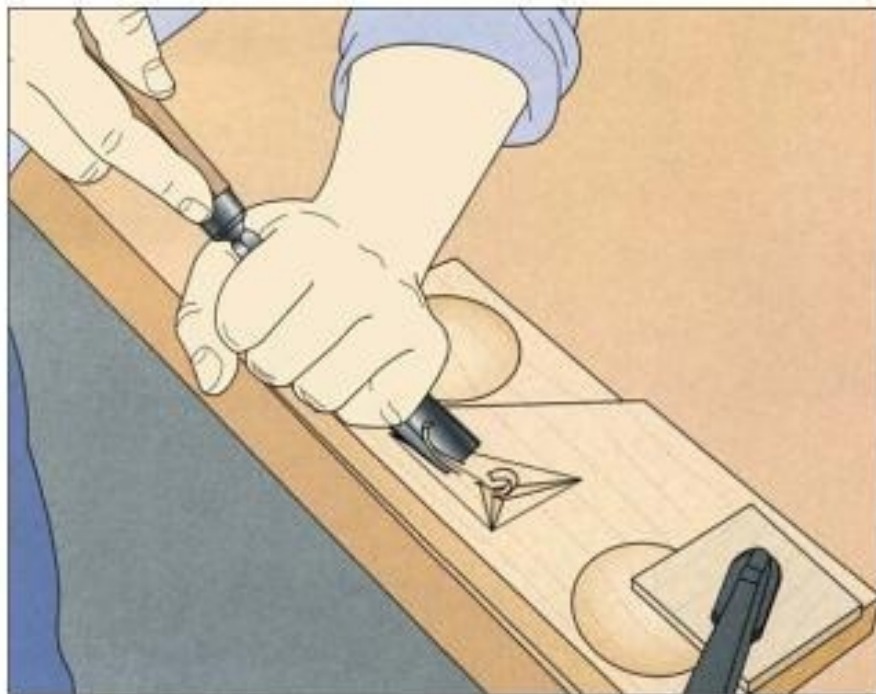
Working from the shorter to the longer grain (see the illustration on page 48), carve a bowl-shaped depression toward the center of the circle (*left*). Cut additional grooves across the grain and pare away the waste until the concave shape is roughed out.

Smoothing out the bottom

To finish off smoothing out the bottom, carefully scoop out thin shavings of waste, working across the grain with the gouge (*right*). Use the same grip you used to terrace the surface of the board (*page 49*).



Carving a Convex Triangle



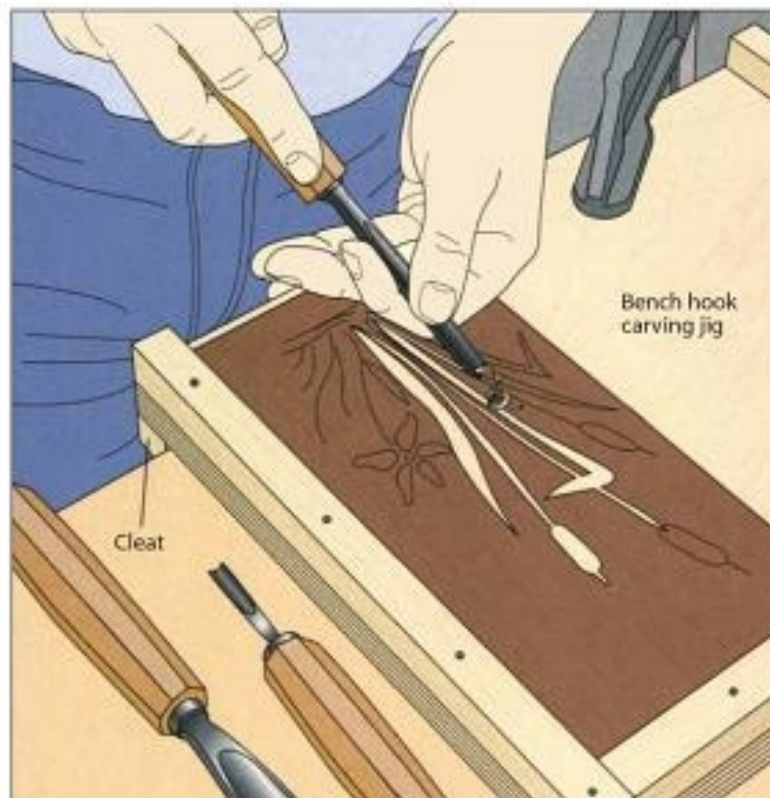
Carving the center grooves

As with carving the concave-shaped bowl (*page 51*), you need to cut grooves in the center of the triangle to make it easier to remove the waste. Use a 12-millimeter No. 39 V-tool to carve a groove from each corner to the middle of the shape (*above*).



Paring the waste

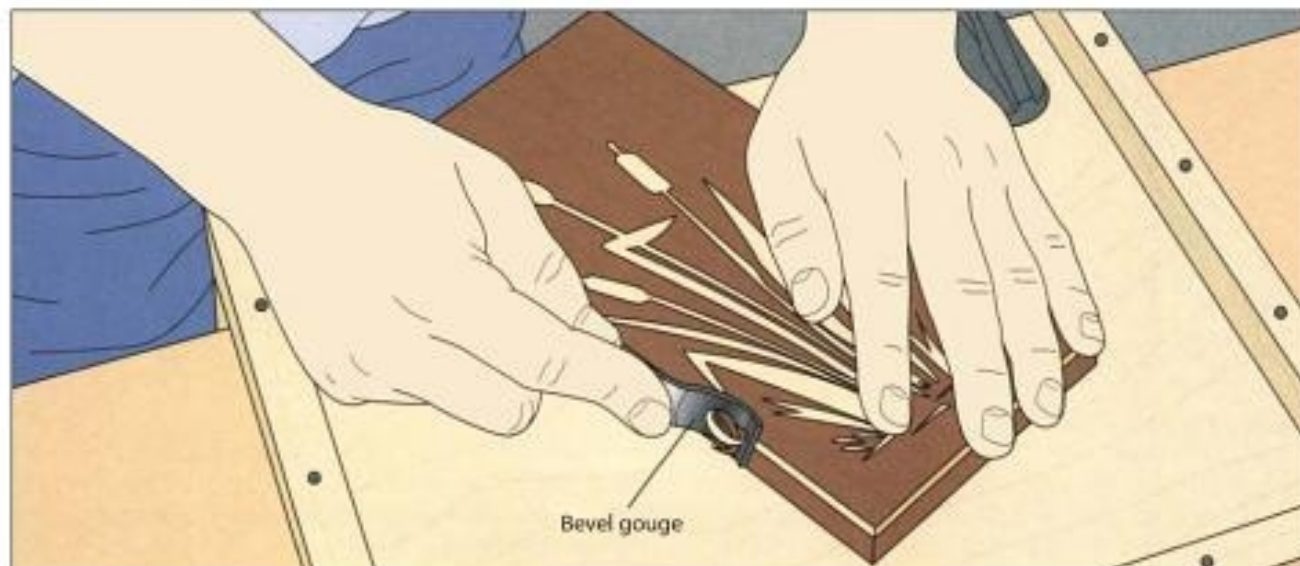
Switch to a 12-millimeter No. 3 chisel to carve away the waste from the edges of the form. Pay close attention to the grain, working in the direction shown in the illustration above. Make additional center grooves as necessary and continue removing the waste until you have reached the final depth and the shape is complete.

Beginner's Exercise: Carving a Bullrush Scene**Carving the rushes**

This exercise is designed to give you some confidence in wielding the chisels and will yield a finished carving relatively quickly. Begin by building the bench hook carving jig shown on page 65. Then apply a dark stain to a small panel of softwood such as basswood. Place the jig on the workbench with the cleat butted against the bench and clamp the device in place. Sketch a drawing of rushes on your workpiece, or transfer a design using carbon paper (page 56), then set the workpiece in one corner of the jig. Use a 12-millimeter No. 39 V-tool to carve out the fine lines, revealing the light wood beneath (left). The wider area, such as the leaves, can be carved with a 25-millimeter No. 3 gouge. Carve only deep enough to reveal the wood beneath the stain.

Beveling the edges of the frame

To create the effect of a frame, draw a bevel gouge along the edges of the workpiece. This will create a bevel of lightly colored wood, contrasting with the stained wood of the workpiece (below).



Principles of Design

Conveying the three-dimensional nature of a carving on a two-dimensional plan is a challenge. By using such techniques as creating cross-sectional views of the piece at various points on the pattern, as shown in the illustration below, or making models from clay, you can visualize how a finished carving will look and how you should approach carving it.

Before you even pick up a chisel, make sure you have a full-size pattern. If you are working with a drawing or an existing pattern, you may need to change its size. This is easily done by using a photocopier with a reduction and enlargement feature. If you do not have access to a machine or if you are working on a design larger than the biggest sheet of paper that a photocopier will accept—typically, 11 inches by 17 inches—you will need another way to enlarge or reduce your design. Two simple methods for doing this are shown on the following page. Once you have your full-size pattern you need to transfer it to your workpiece. As shown starting on page 56, there



A hallmark of Queen Anne, rococo, and Regency furniture styles, the acanthus leaf is both an excellent design for sketching and a demanding relief carving exercise. Cross sections drawn on the sketch (below) provide a quick visual reference when carving the leaf's overlapping lobes and serpentine curves (above).

are three ways to do this. The first uses carbon paper, the second, a template, and for the third, the pattern itself is bonded to the wood.

Laying Out a Pattern



Drawing cross-sectional views

Draw a full-size design of the piece you plan to carve, including all the details you intend to include. The example shown above is an acanthus leaf, a classical Greek design that has been a favorite with carvers for centuries. Then draw cross sections at points where the shape and thickness change; these are

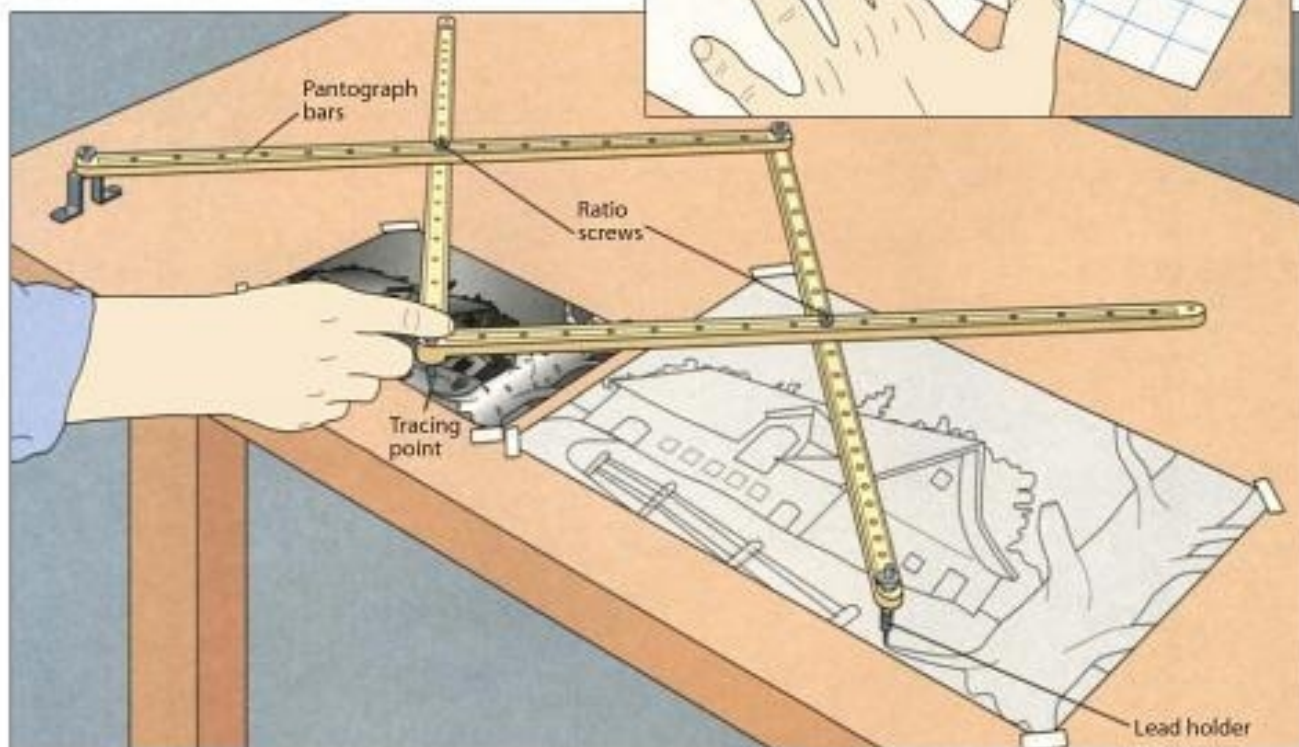
indicated by the shaded areas in the illustration. There is no rule for doing this; the sections are simply aids. Cross-sections are invaluable at helping you conceive the shape and changing thickness of the piece, especially with a design that includes several convex and concave shapes in each cross section.

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Making a Scaled Pattern

Enlarging with graph paper

Draw a grid of squares over the pattern, using a ruled straightedge to make all the squares exactly the same size. The smaller you make the squares, the easier it will be to reproduce the pattern. Then, on a blank sheet of graph paper, make a larger grid, increasing the size of the square by the proportion you wish to enlarge the pattern. For example, if you need a design that is twice the size of the pattern, make the second set of squares twice as large as the first. To produce the design, draw in each square of the enlarged grid the part of the pattern that is in the corresponding square of the smaller grid (*right*). To produce a design smaller than the original pattern, follow the same steps, but make the second grid smaller than the first one.



Re-scaling with a pantograph

To enlarge a pattern, place the original under the tracing point and position a piece of blank drawing paper under the lead holder. Adjust the ratio screws to give the desired enlargement. (Most pantographs have the ratios marked beside the holes in the pantograph bars.) Then trace the

pattern with the tracing point. The lead will make an enlarged copy on your blank paper while you trace. To reduce a pattern, reverse the positions of the tracing point and the lead, placing the original under the tracing point and the piece of blank drawing paper under the lead holder.

Copying Patterns on the Workpiece

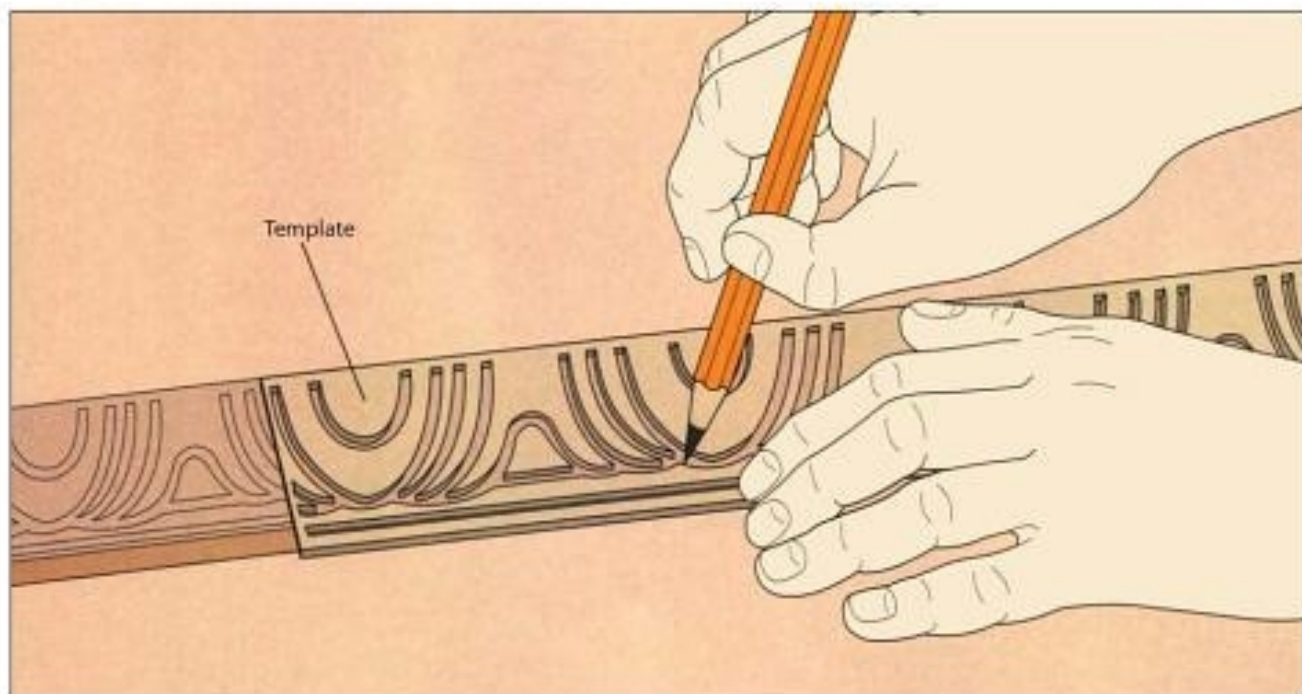
Transferring patterns with carbon paper

Place a piece of carbon paper on a workpiece, then tape the pattern over it, with the design in the intended position. Remember to take grain direction into consideration. For a three-dimensional carving, align delicate parts of the design parallel with the grain; this will reduce the chance of their being broken off; two-dimensional carvings with lines that run mostly in one direction should be aligned with the grain. Trace over the design with a sharp pencil (*right*).

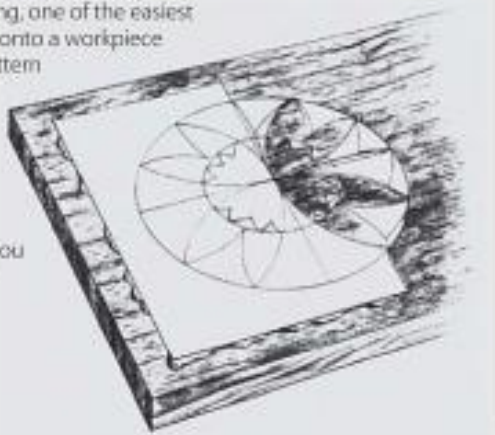
Finishing the layout

Lift the carbon paper away from the workpiece, leaving the pattern still taped. Lift the pattern and check that the design has transferred clearly (*below*). If not, replace the carbon paper and retrace the pattern.



Using a Template**Shop Tip****Carving through a paper pattern**

With relief and chip carving, one of the easiest ways to transfer a design onto a workpiece is simply to draw your pattern on tracing paper, then glue it with rubber cement to the wood. Carve through the paper and sand away any remnants of paper after you have finished.

**Transferring a pattern using a template**

If you are carving a repeating pattern, create a template from a thin sheet of cardboard. Draw the pattern on the template, then cut it out with a craft knife. Lay out the first length to be carved, and draw in the lines with a pencil. Remove the template, align the end with the part already copied, and trace the next set of guidelines (*above*) until the design is completed.

Incised Carving

One of the most striking features of European country furniture is the abundance of chip carving. Almost everything in rural homes—and often the houses themselves—are decorated with rosettes, borders, and other designs carved into the wood. Known as *kerbschnitzen* in Germany and Switzerland, it dominated interior designs throughout Northern Europe for hundreds of years. Patterns, designs, and motifs were shared so extensively between peasant craftsmen that national styles became blurred and are now difficult to identify.

To the uninitiated, chip carving (page 62) may seem complex, even intimidating, but it is actually a fairly straightforward process, with room for infinite variation. For the beginner, it is an excellent introduction to wood carving. You do not need to make a large investment in tools. In fact, almost all projects can be executed with an inexpensive pair of knives. The basics can be grasped in a few hours, and you will quickly learn tool control as well as techniques for keeping your knives perfectly sharp. Mastering the art can provide a satisfying challenge for a lifetime.

One of the most popular applications of the basic technique is carved borders (page 70). Whether on the lid of a jewelry box or on the rim of a decorative plate, chip-carved borders

provide an impressive finishing touch to many woodworking projects. Rosettes (page 66) offer an even greater challenge, both in laying out and carving.

An enchanting combination is a rosette center surrounded by a chip-carved border, as shown in the photo on the opposite page.

You can also use incised carving for lettering and sign making (page 74). While it is possible to make well-formed lettering with a router, fine details such as the serifs on Roman letters are tricky. With a bit of practice you can produce superior letters by hand—and avoid the noise, dust, and expense of a router.

Incised carving is one of the last bastions of the hand tool. It is impossible to duplicate by a machine with any degree of fidelity. Once you conquer the basics of incised carving, you will have a potent tool to add a handcrafted touch to all your woodworking projects.



Because it is so closely associated with European peasant craftsmanship, chip carving is sometimes dismissed as relief carving's less fashionable country cousin. One look at the incredibly intricate detail on the chip-carved jewelry box shown above should quell any such delusions. It was made by renowned chip carver Wayne Barton.

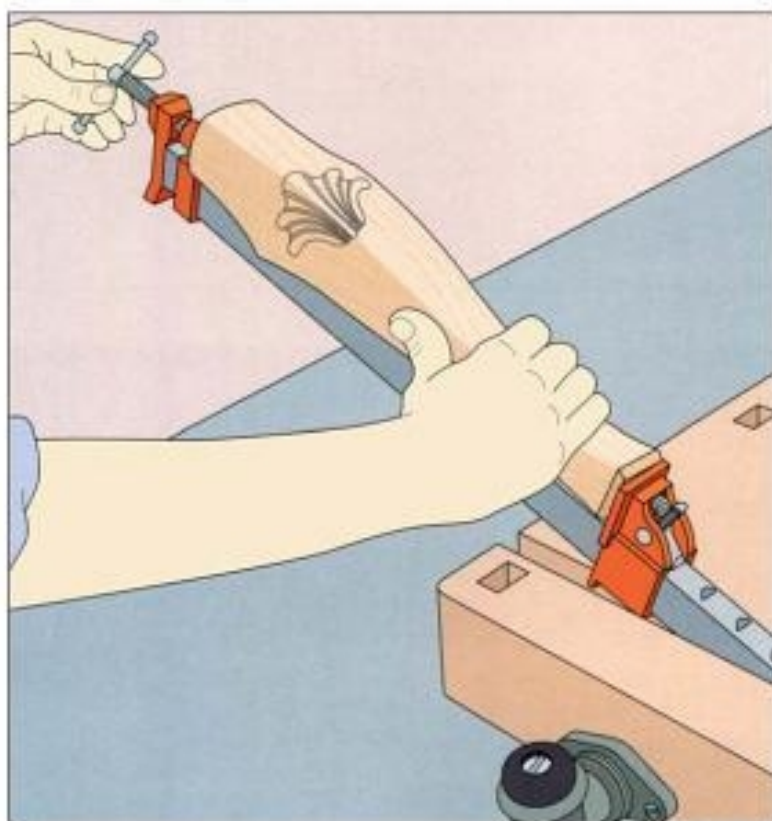
One of the most popular chip-carving patterns, the rosette, has countless variations. The carving knife that is being used to cut out the design at left features a flat-sided handle, which provides better control when making angled cuts. The steps for making a rosette are shown starting on page 66.





Using clamps

To secure a flat carving block to a work surface, glue it to a wood base, then secure the assembly with C clamps (*above*). The base should be wider and longer than the workpiece. Place newspaper between the base and the carving block; this will enable you to pull the pieces apart easily when the carving is completed. Let the glue cure for at least an hour before carving.

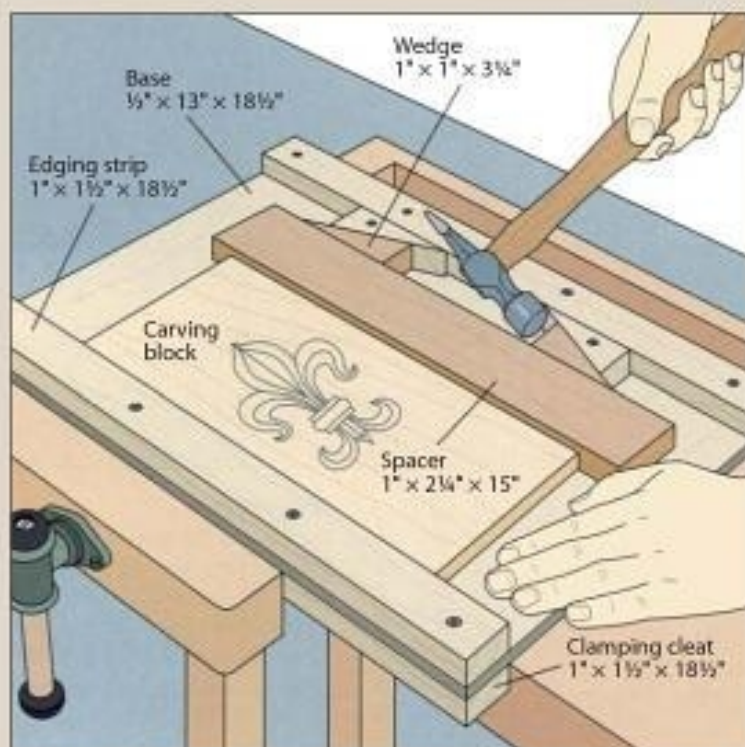


Securing irregularly shaped work

To clamp down awkwardly shaped workpieces like the cabriole leg shown at left, begin by securing the leg in a bar clamp. Then fix the clamp in a vise. Rotate the leg in the clamp as necessary.

A Jig for Securing Thin Work

The benchtop jig shown at left allows you to clamp a thin carving blank. Cut the base from $\frac{1}{2}$ -inch plywood and the remaining pieces from solid stock. Refer to the illustration for suggested dimensions, but be sure the base is longer than the workpiece and the spacer is long enough to butt against its entire front edge. The edging strips should be thicker than your stock. Screw them along the edges of the base and fasten two wedges flush against one strip as shown. Screw a cleat along the bottom of the base so the jig can be clamped in a vise. Set your stock on the base, butting one edge against the edging strip opposite the wedges. Butt the spacer against the opposite edge and slide the two loose wedges between the spacer and the fixed wedges. Tap the wedges tight to apply clamping pressure (*right*).



To improve their efficiency, wood-carvers traditionally start a project by laying out all the tools they plan to use along the far edge of the carving block. The tools are positioned by frequency of use, with the most-often used on the left, and the less frequently used tools on the right. The blades face the carver for quick recognition. At each step of the carving process, the tools that are immediately involved are positioned alongside the left-hand end of the workpiece with their blades facing *away*.



Basic Cuts

The three- and six-cut triangles are the basis of chip carving. Though a very simple form, they should not be undervalued. European craftsmen have used chip carving for decorating all sorts of household objects for over a thousand years.

Usually the sides of a chip are cut at an angle of about 65°. But they are sometimes made even steeper. In a triangular chip this can cast a longer shadow giving the illusion of a deeper chip. The chips do not have to be very deep. For most projects, 1/4 inch is adequate. In fact anything deeper than 1/4 inch makes carving much more difficult and looks unattractive.

It is crucial that the knife have a straight, razor sharp blade. For best results, hone the blade at an angle of about 10° on a 4000 or harder stone then strop it on a leather strop. For more information about sharpening your knives, see page 22.

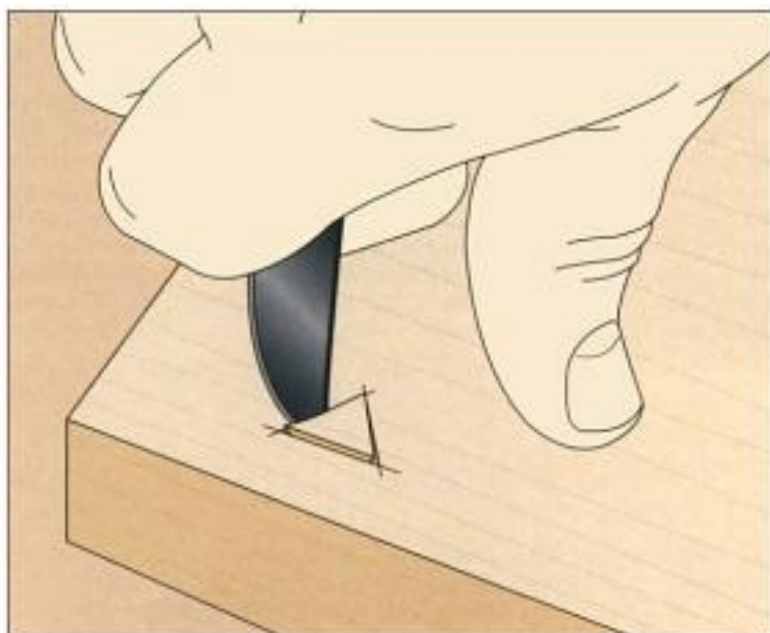


One of the beauties of chip carving is the economy of tools required. A couple of good knives and perhaps a V-tool can get you through most projects.

Three-Cut Triangle

Cutting the first two sides

The first and second cuts are called stop cuts. To make this cut, hold the knife and position it as shown, setting the point in the far corner of the marked-out triangle. Pull the blade along the line, increasing the depth as you go to the middle (right) and then easing the blade out of the wood. Use your whole arm to make the cut. Do not pull the knife toward your thumb like you are peeling a potato; this can result in a nasty cut. Many carvers hold their knife with the lower part of their thumb pressed against the handle to prevent this hazard.

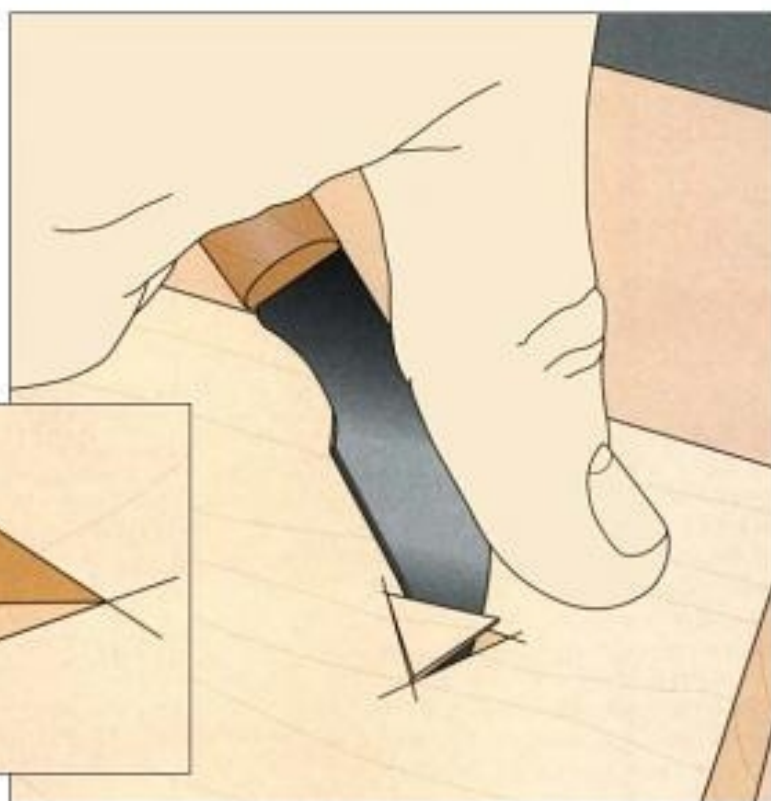
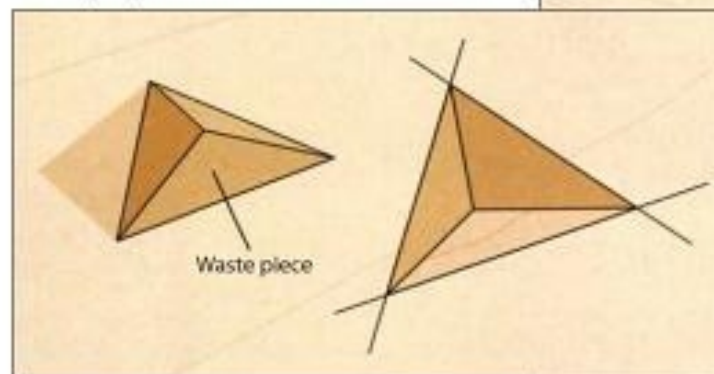


**An alternative method**

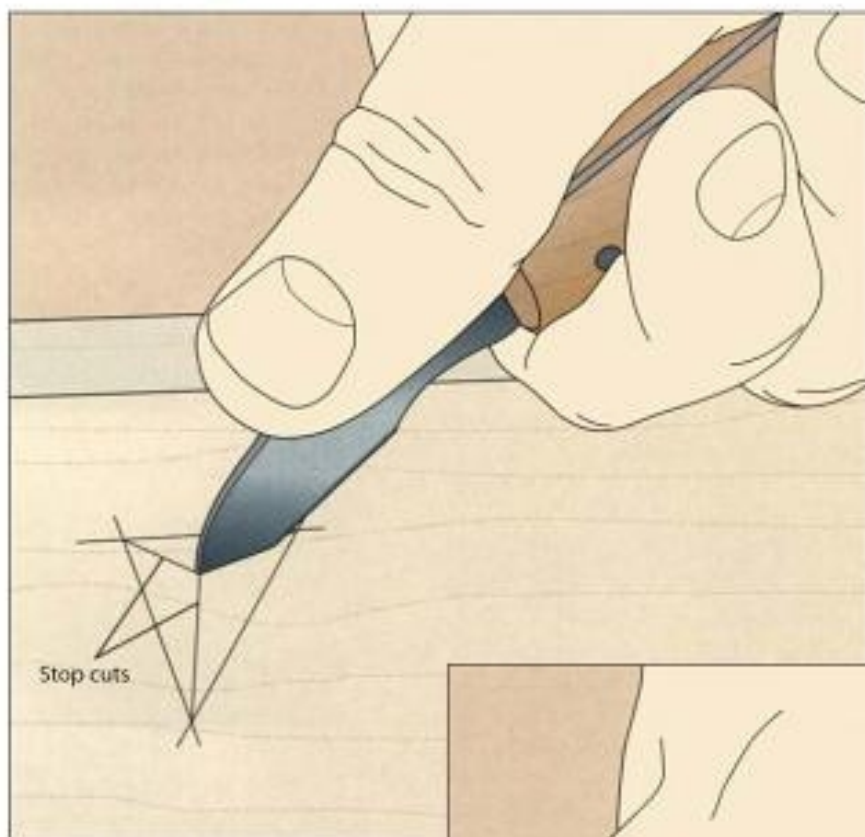
Cuts that parallel the grain can be difficult, since the blade tends to wander off track. For maximum control, some carvers push the blade into the wood, using their second hand to guide the cut (*left*), while others use the same pulling stroke as before. Experiment on a piece of scrap wood to learn which method is most comfortable for you.

Making the final cut

The final cut cleans out the waste and is always made at an angle. For this, imagine where the stop cuts on the other two faces ended and angle the knife to meet them. With practice you will get a feel for this. To make the cut, hold the blade at the correct angle with the tip in the far corner. When you meet the stop cuts, the waste should pop free as a tiny pyramid-shaped piece of wood (*inset*). Do not try to cut too deeply; $\frac{1}{8}$ inch or so at the deepest point should suffice to free the waste.



Six-Cut Triangle

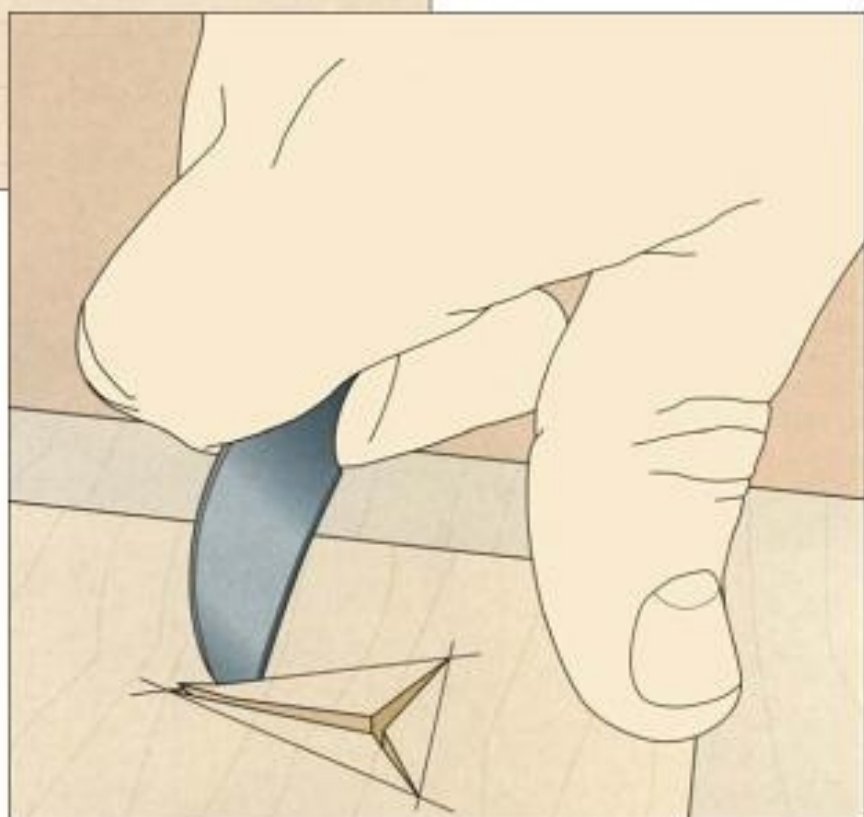


Making the stop cuts

The six-cut triangle is generally used to form larger triangles. Three stop cuts are made, then the waste is removed in three small triangles. First draw the triangle, then decide where the deepest part of the cut should be—normally at the center. Draw lines from this point to each of the three corners. To make the stop cuts, position the tip of the knife on the intersection and align the blade over one of the marked lines. Push the knife into the wood to the correct depth, then pull it toward the corner (*left*), decreasing the depth evenly as you go. At the corner, the blade should be at surface level. Repeat for each line.

Removing the waste

The stop cuts divide the triangle into three smaller triangles. Remove each of them separately using the same technique for removing the waste of a three-cut triangle (*page 63*). To make the cut, slide the knife along the line, pushing the tip in deep enough to meet the stop cuts (*right*). Depending on the size of the cut and the angle, you may want to hold the knife as shown here, or on *page 63*. Again, do not cut too deeply; $\frac{1}{8}$ inch or so at the deepest point is about right.



Curved Cuts**Making the stop cuts**

As with six-cut triangles, most curved cuts require that you first make a stop cut to the correct maximum depth. In the example shown—a rosette petal—the stop cut is made down the center of the object. Start at one end of the shape and pull the knife along the line (*above*). Increase and lessen freehand pressure as needed to control depth. In this case, the cut starts at zero, reaches maximum depth in the middle, then rises back to surface level.

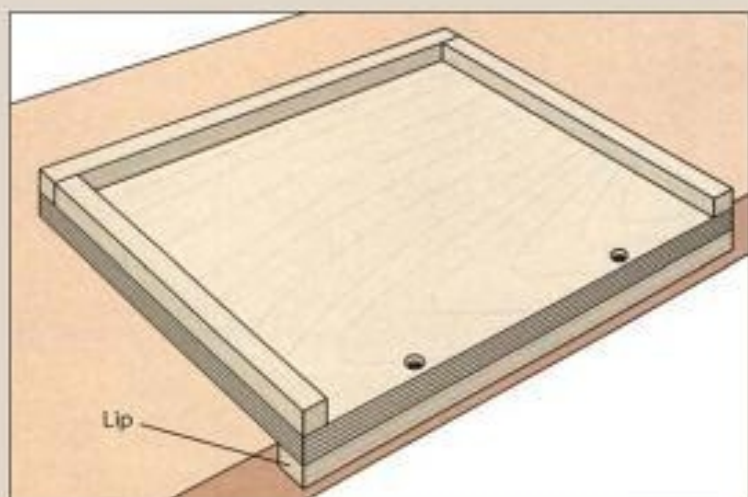
**Removing the waste**

Remove the waste from a curved cut much as you would from any other chip-carved shape. The knife must slice into the wood at the correct angle so the tip meets the lower limit of the stop cuts, freeing the waste piece. To make the cut, position the blade tip at the point of the shape then move it along the line. Use your knife hand to control the angle and twist of the blade. Use your thumb to control the depth and to move the cutting edge. The visible part of the blade should stay on the line while the tip cuts along the bottom of the stop cut. With practice, you will acquire the feel to tell where the blade tip is.

A Bench Hook Jig

Chip carving requires you to be constantly moving and turning the board to get the right angle. This makes it impractical to clamp the stock. One simple solution is to use a shop-built bench hook. As long as you cut away from yourself, it will hold the carving in place.

To make the device, fasten some $\frac{3}{4}$ -inch-square stock to three edges of a piece of $\frac{3}{4}$ -inch plywood 12 inches square. Next screw a length of $\frac{3}{4}$ -by-1-inch stock to the underside of the board flush with the front edge. This will serve as a lip to keep the jig in place.



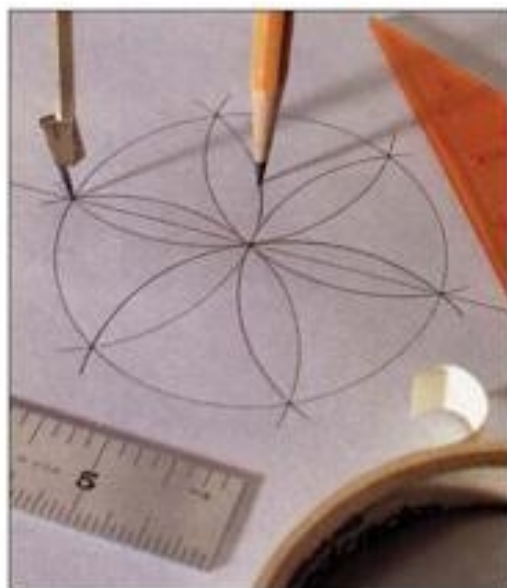
Rosettes

The rosette is an ancient pattern dating back to pre-Christian Europe, with symbolic meaning that has been obscured by time. The popularity of the design betrays its importance, however. The rosette was the classic motif of European peasant furniture, found not only on furniture, but also carved on doorways for good luck.

The gallery below shows six typical rosette designs. You can enlarge them to whatever size you need or you can create your own designs. The drawing of all rosettes starts with plotting a circle, which is then divided into a number of equal sections or sides.

The techniques for sketching hexagonal and 12-sided spiral rosettes are shown on the following page. Sketch the designs on paper, then experiment with different details before marking up the carving.

There are two versions of most designs depending on what part is removed. For example, the procedure on pages 68 and 69 shows removing the petals to lower their pattern. But you could also choose to cut away the opposite material and leave the flower raised. The two could also be combined. The only limit to the designs you create is your own imagination.



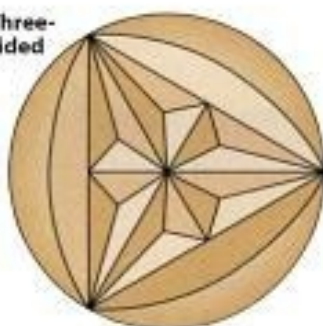
A compass is used to create, then divide a circle, the foundation of every rosette. European peasants could easily improvise a compass with a couple nails and a piece of string.

Gallery of Rosette Designs

Spiral



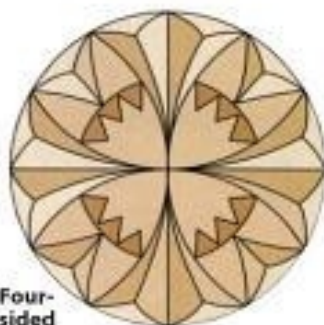
Three-sided



Four-sided



Four-sided



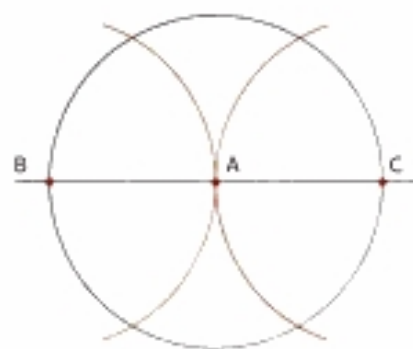
Five-sided



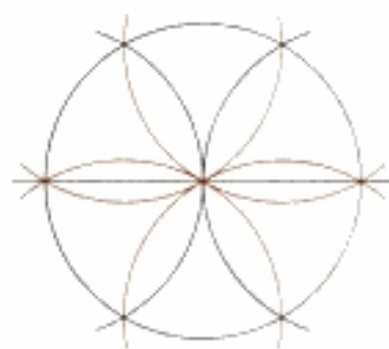
Six-sided (Hexagonal)



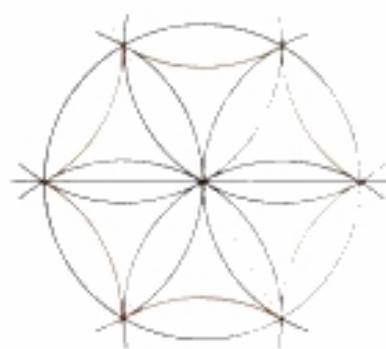
Copyrighted material

Sketching a Hexagonal Rosette

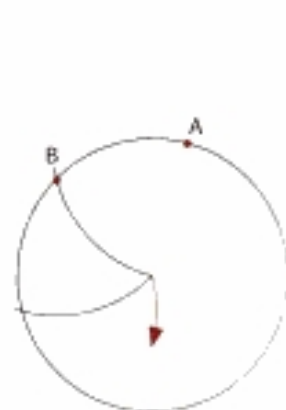
1—Draw a circle around point A, then two semicircles centered at B and C with the same compass setting.



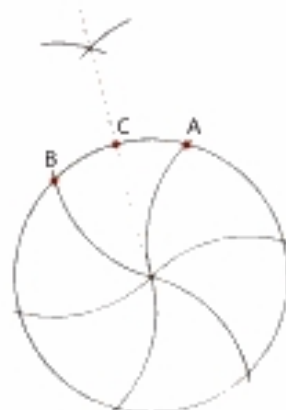
2—Centering the compass on each of the six intersections, draw a semicircle (shown in red).



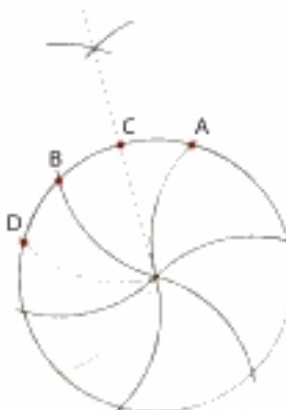
3—Draw outer arcs (shown in red) freehand, then draw lines (shown in yellow) connecting opposite intersections on the circumference.

Plotting a Twelve-Sided Spiral

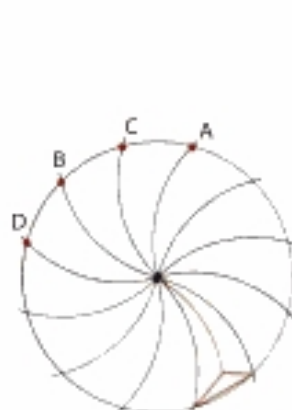
1—Draw a circle of the correct radius. With the same compass setting, place the point anywhere on the circle—say A—and draw an arc from the center to the circle. Place the point where the arc intersects the circle—B—and draw the next arc. Continue until you have drawn six arcs.



2—Place the compass point on A and draw an arc outside the circle. Draw a similar arc with the point resting on B, intersecting the first arc. Connect the intersection to the center of the circle (shown as a dotted line in the illustration above), bisecting the arc AB at C.

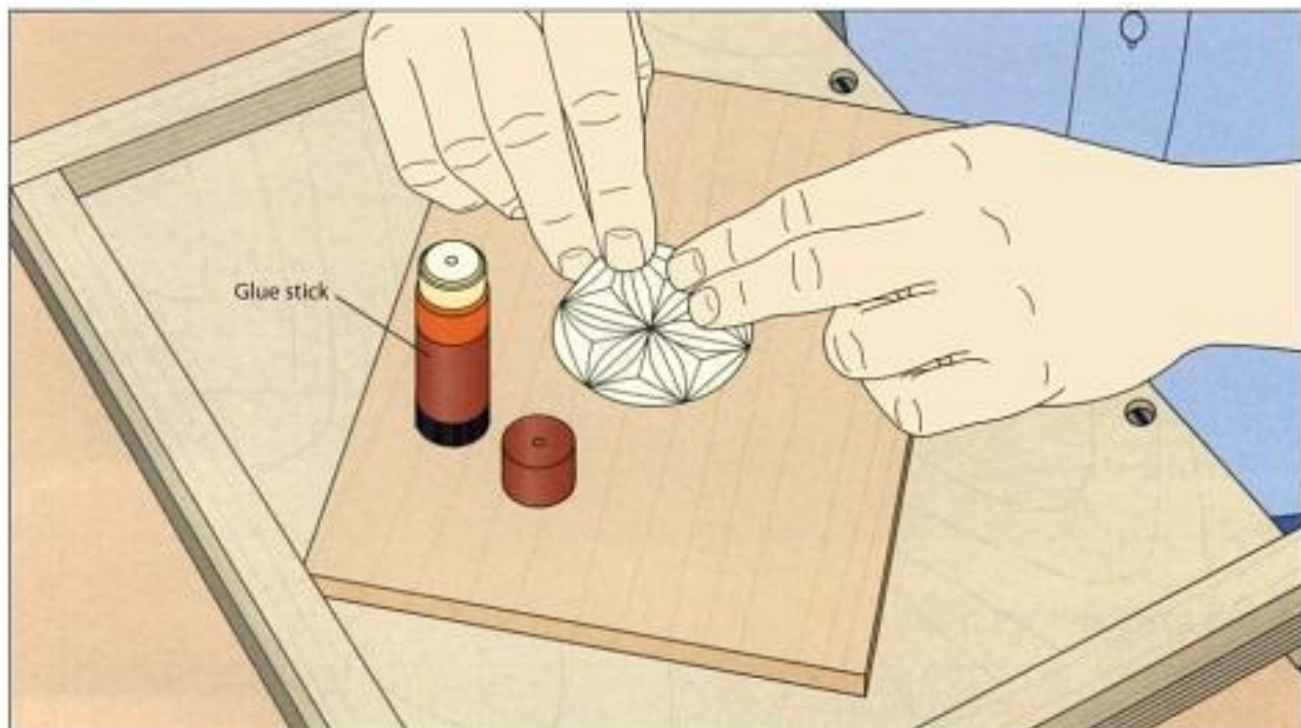


3—Place the compass point on C and draw an arc (shown in blue) from the center to the circumference of the circle. Draw another arc (shown in yellow) using the intersection of the previous arc and the circumference of the circle—D—as the center. Continue in this manner until you have a total of six more arcs, dividing the circle into 12 equal parts.



4—Divide each of the 12 sections into three sections as shown by the red lines in the illustration above. The easiest way to do this is freehand.

Carving a Hexagonal Rosette

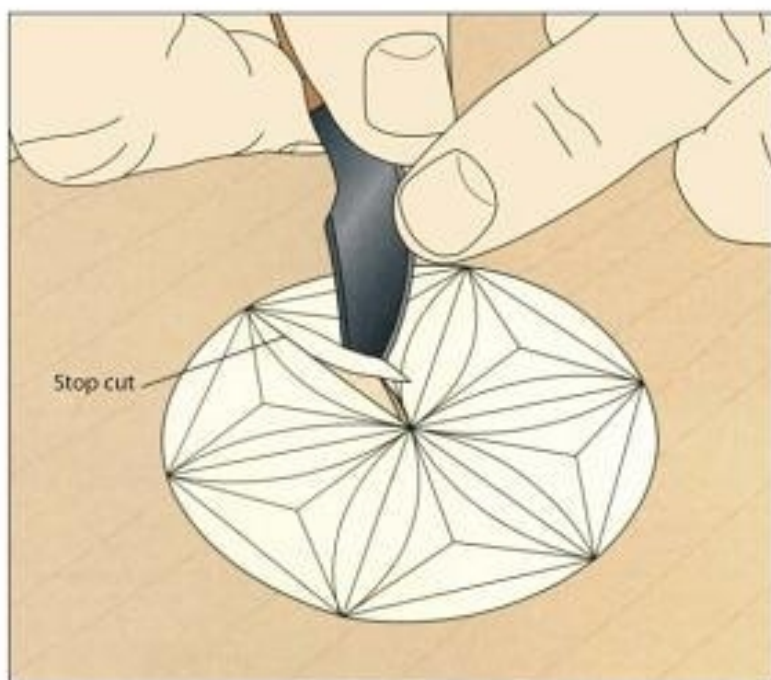


Attaching the pattern

Draw or photocopy the design onto a sheet of paper and trim away the excess. Mark the workpiece to show exactly where you want the pattern to go. Apply adhesive to the marked area with a glue stick. To attach the pattern accurately, line up one edge with the marked area, then roll the pattern onto the workpiece (*above*).

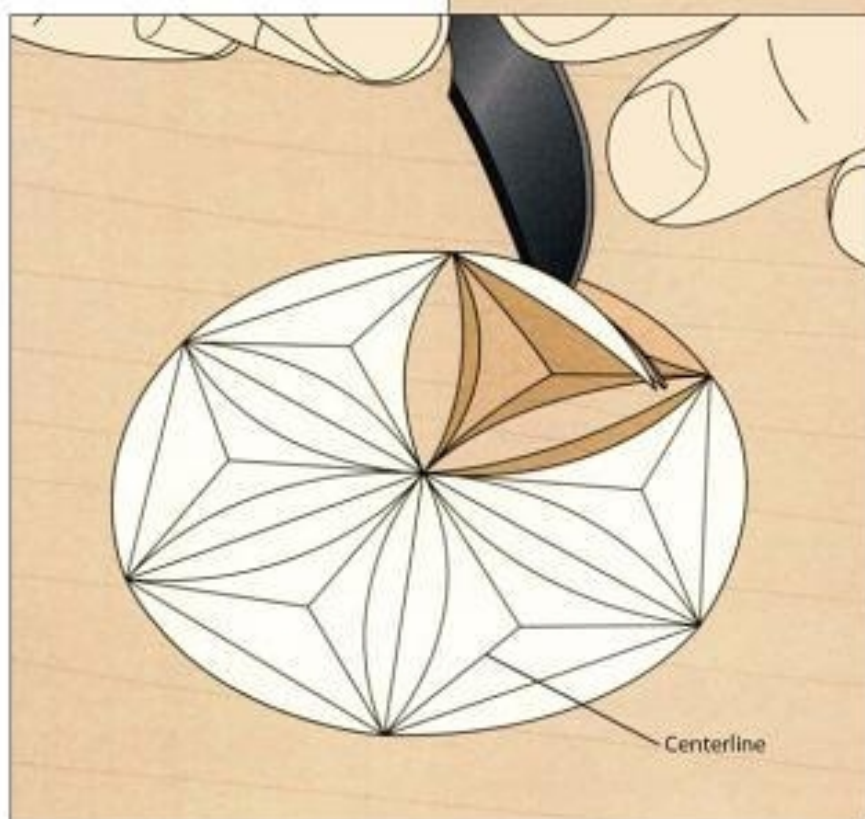
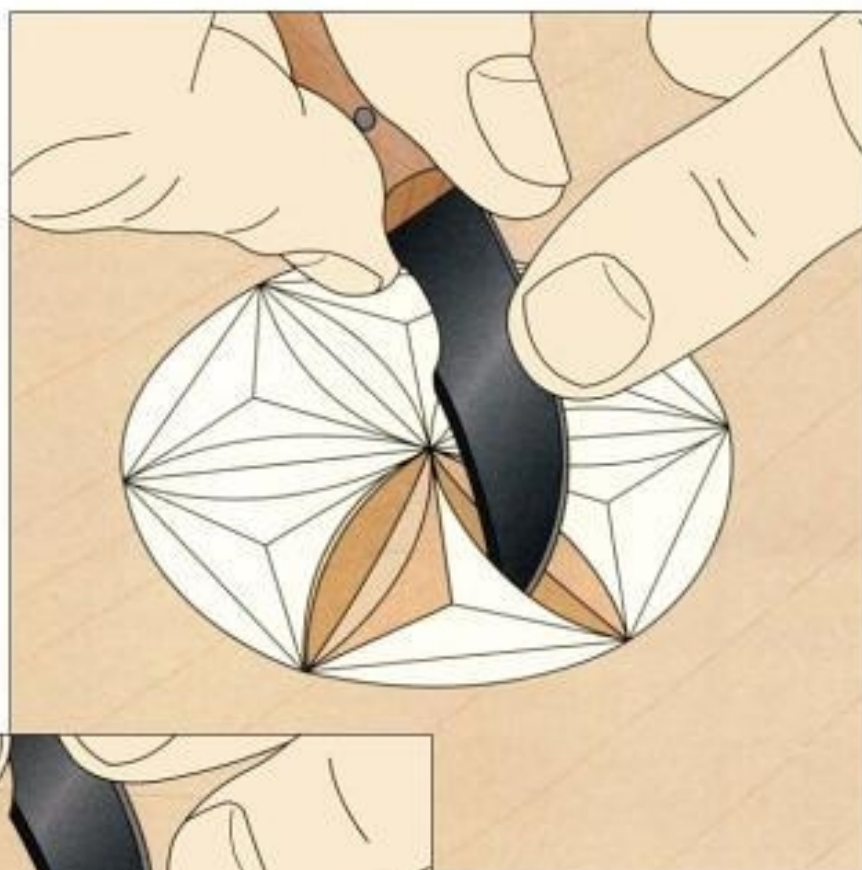
Removing the petals

The petal waste can be removed using the curved cutting techniques shown on page 65. Cut out each petal in two sections. First, make a vertical stop cut down the center, smoothly varying the depth from zero at the tips to $\frac{3}{8}$ inch in the center in a smooth curve. Then remove each half with an angled cut. Use your knife hand to control the depth and twist of the blade, while the free hand pushes it through the wood (*right*). Keep the heel of your hand on the workpiece to steady the cut.



Cutting the triangles

Each of the triangles is basically a six-cut triangle (page 64) with two curved edges. Make a stop cut along each of the central lines of the triangle. Work from the center out, going from a depth of about $\frac{3}{16}$ inch to zero at the corner. Remove the waste by sliding the knife along the curved line (right). Be sure to hold the blade at the correct angle so it meets the bottom of the stop cuts.

**Cutting out the edge section**

The outer arcs that form the perimeter of the rosette are basically half-petals and can be cut out using the same technique. Make a vertical cut along the straight edge, varying the depth as before. Next, remove the waste with an angled cut along the circle that intersects the stop cut. The chip should pop free (left). Then repeat for the five remaining parts of the rosette. Finally, peel off the remaining paper and sand away any residue with 220-grit sandpaper wrapped around a block.

Borders

Decorated borders are surprisingly effective embellishments. Even something as simple as a double row of three-cut triangles can dress up an otherwise plain piece of furniture. Perhaps the most popular use of borders is for decorating box lids, particularly jewelry boxes. The gallery below shows chip-carved border designs of varying degrees of sophistication. Laying out a border properly is half the challenge.

Experienced carvers can draw a border directly on the wood with little forethought. Beginners may consider outlining the surface onto a sheet of graph paper to see whether the proportions are pleasing. You can then experiment with different combinations until you find a pattern that complements the size of the workpiece. Transfer this pattern to the stock with a combination square and pencil.

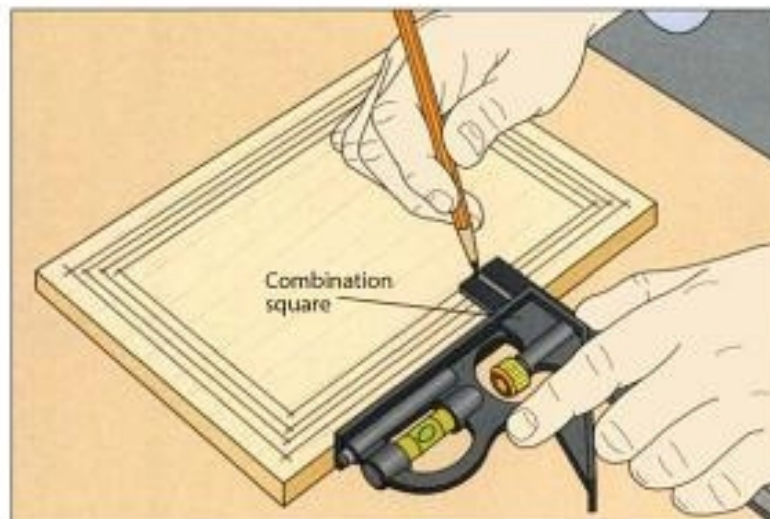


Layout is crucial to border carving. The carving shown in the photo at left was divided into approximately 1/4-inch squares. The long lines were drawn first then sectioned into smaller squares. These sections are an important guide when cutting the chips. Notice that the squares are half the width of the chips.

A Sample of Border Designs



Copyrighted material

Laying Out a Border**Drawing the border lines**

Once you have decided on the layout (see *previous page*), transfer the lines to the workpiece with the aid of a combination square. To draw each line, first set the rule to the correct distance from the edge of the stock to the first line—actually slightly less to allow for the pencil lead thickness. The lines in this example are spaced $\frac{1}{4}$ inch apart. Hold the base of the square against the workpiece edge and the pencil against the ruler end and slide the two along the board. Since soft wood mars easily, remember to press lightly. Repeat the procedure to draw any additional lines (*left*).

**Dividing the lines**

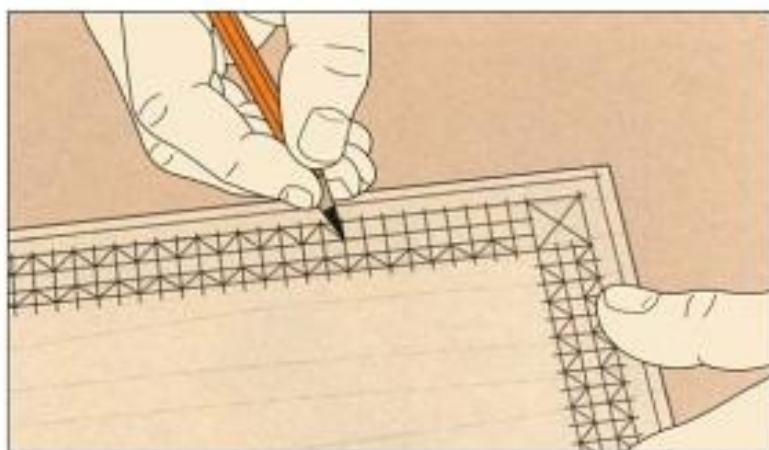
Divide the lines into sections according to your design. The exact size of the sections is not as important as getting them exactly equal. In this case they are all spaced $\frac{1}{4}$ inch apart, except for the corners, which are $\frac{1}{2}$ inch squares. To divide the lines, use an old carpenter's trick for marking a board into equal parts. Set the ruler on the workpiece with one end on the innermost short line. Pivot the ruler until one of its $\frac{1}{4}$ -inch marks touches the opposite short line. Then make a mark at every $\frac{1}{4}$ -inch point (*above*).

**Drawing the sections**

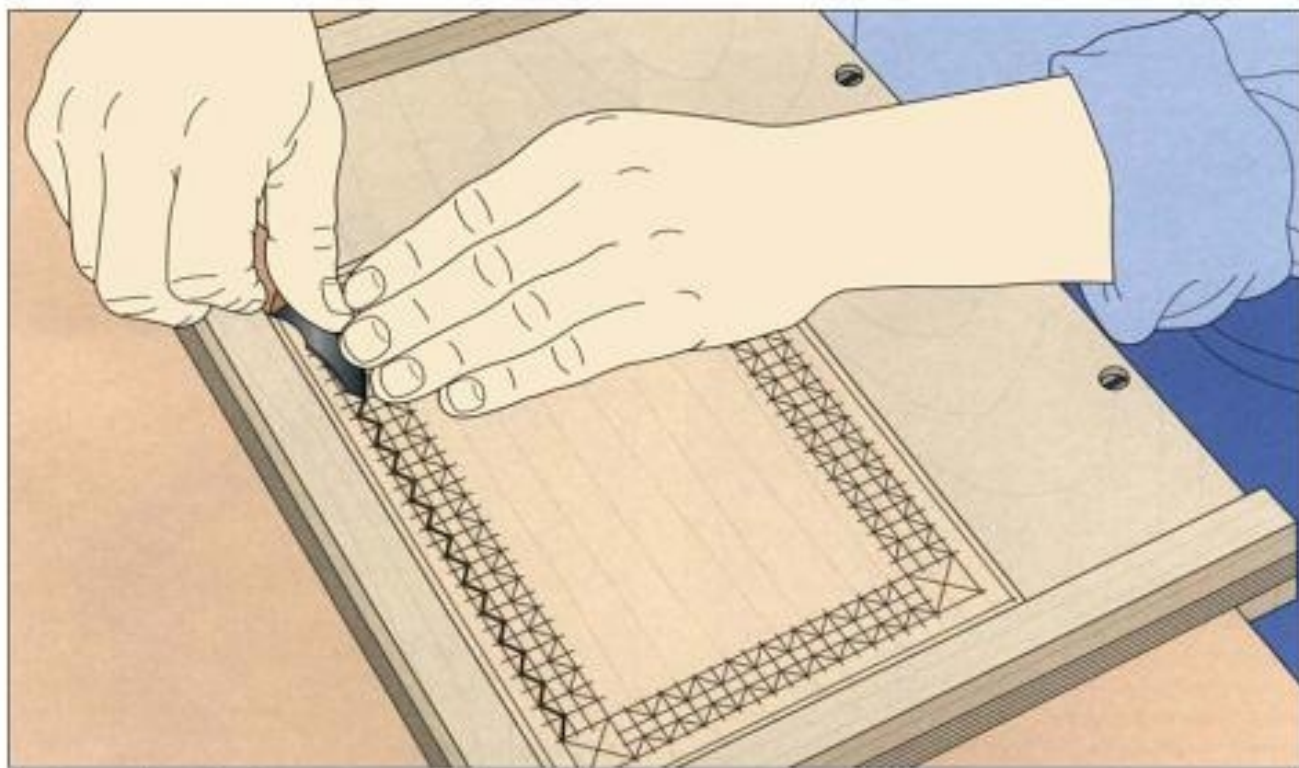
Use a combination square to mark out the sections. Set the base of the square against the long edge of the workpiece and line up the ruler with one of the marks made in the last step. Draw the dividing lines across border marks (*above*). Do not draw the line right across the board since any excess will have to be sanded off.

Filling in the sections

Once the sections have been defined, all that remains to finish the layout is to fill in the squares. For this example it is simply a matter of drawing in alternating diagonal lines (*right*). For some of the designs on page 70 this step may be more complicated, but the small size of the squares makes freehand work fairly easy.



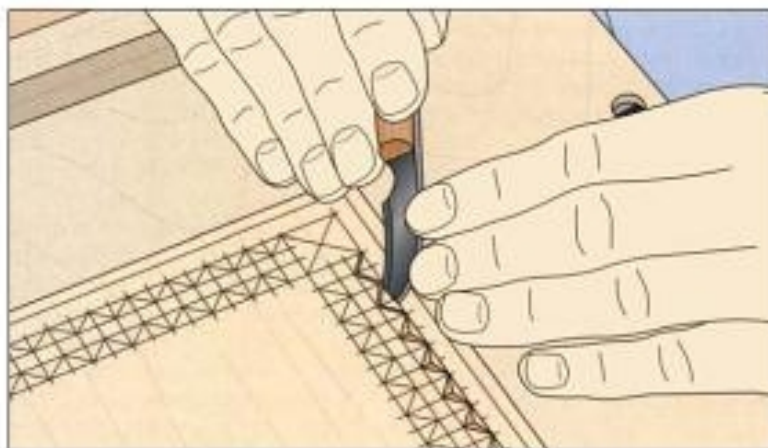
Carving a Border



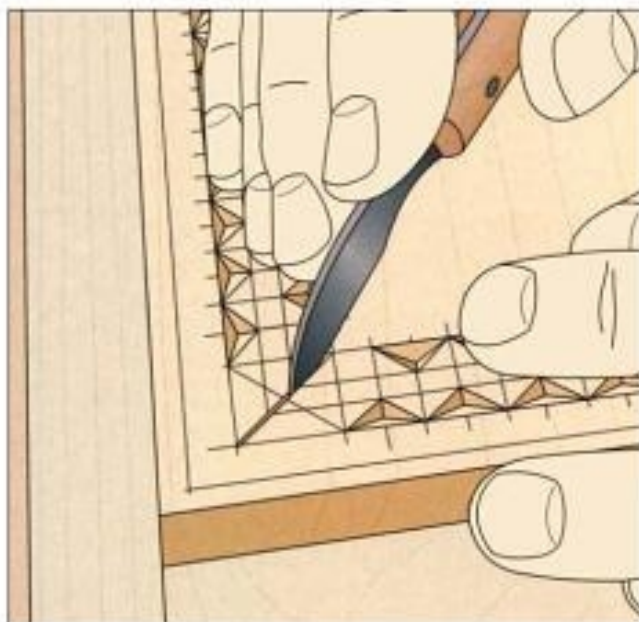
Cutting out the triangles

The triangles are removed with the standard three-cut technique (*page 63*). Begin by making the two stop cuts. Position the blade over the first line with the tip in the corner. For this design, the stop cuts should be made nearly vertical, so hold the blade without much angle.

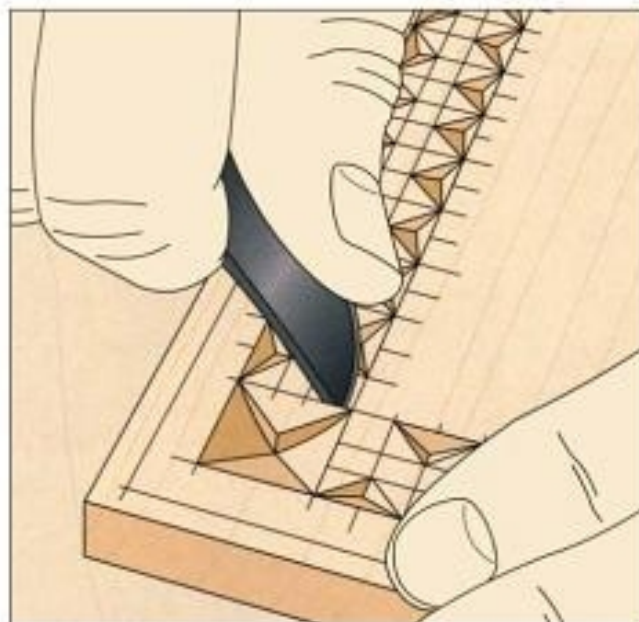
Push the tip into the wood to a depth of $\frac{1}{8}$ inch at the middle; then, cut back toward the opposite corner. The depth of cut should decrease evenly to zero at the end. Use your free hand to guide the blade and push it into the wood (*above*).

**Removing the waste**

Finish each triangle with an angled cut that frees the waste chip. Cut along the line, holding the blade at a fairly low angle so the tip will meet the bottom of the stop cuts (*left*).

Carving the Corner Sections**Making the stop cuts**

The recessed square is made in a similar fashion to the six-cut triangle. First, the stop cuts are made so they meet at the same depth in the center. This divides the area into four small triangles. Make the stop cuts in four strokes. Begin with the tip of the knife on the center of the square with the blade lined up with one of the lines. Push the tip of the knife into the wood to a depth of $\frac{3}{16}$ inch, then pull it straight to the corner and upward (*above*). Repeat for each section, turning the board as necessary.

**Removing the waste**

Remove the waste by cutting out each of the four little triangles in turn. To take out each section, position the tip of the blade on the line and at the correct angle to meet the stop cuts. Push the knife into the wood (*above*) and pull it into the opposite corner, using your free hand if necessary to guide and move the blade.

Lettering

Sign-making with incised lettering is one of the most popular uses of incised carving. It takes time to learn and even longer to master. This probably explains the widespread use of router-based lettering systems. But these are expensive and cannot create the level of detail obtainable with hand carving. Even a simple alphabet like the one shown below would be impossible to make with most template systems.

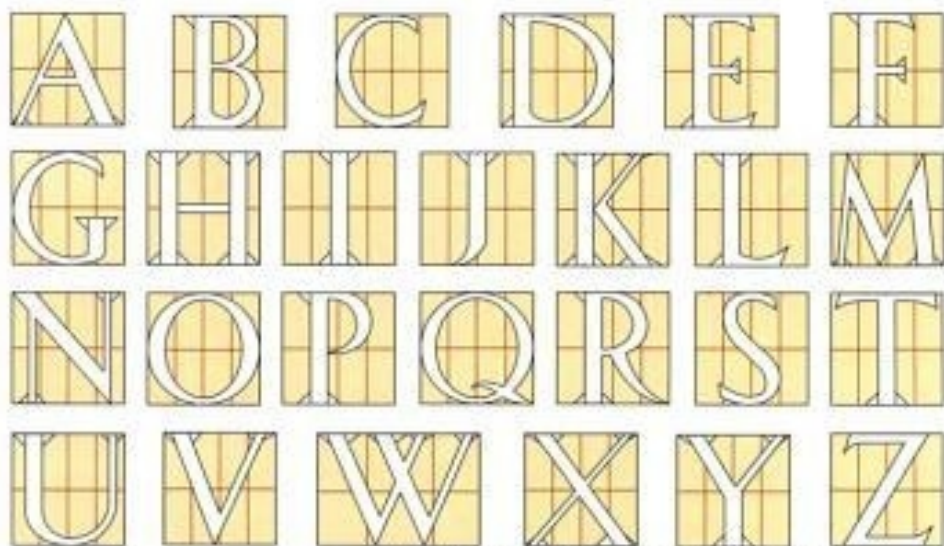
Choosing the style of letter—or font—is the first step of making a sign. Any art store will have books showing dozens of type styles. The alphabet below is a good choice for many projects—interesting, but not too fancy. For a challenge, consider an Old English alphabet.

Laying out the letters takes some care. There is more to it than giving an equal space for each letter, or even an equal gap between each letter. Some letters, like As and Vs, actually overlap other letters. A simple solution to this is to use cutout paper letters (see opposite page). Find the best arrangement through trial and error.



A sanding block is used to remove any splinters and pencil or carbon paper marks around the letters in a sign. Using a block will keep the letter edges crisp. Holding the sandpaper in your hand will tend to round over the edges.

Sample Roman Alphabet



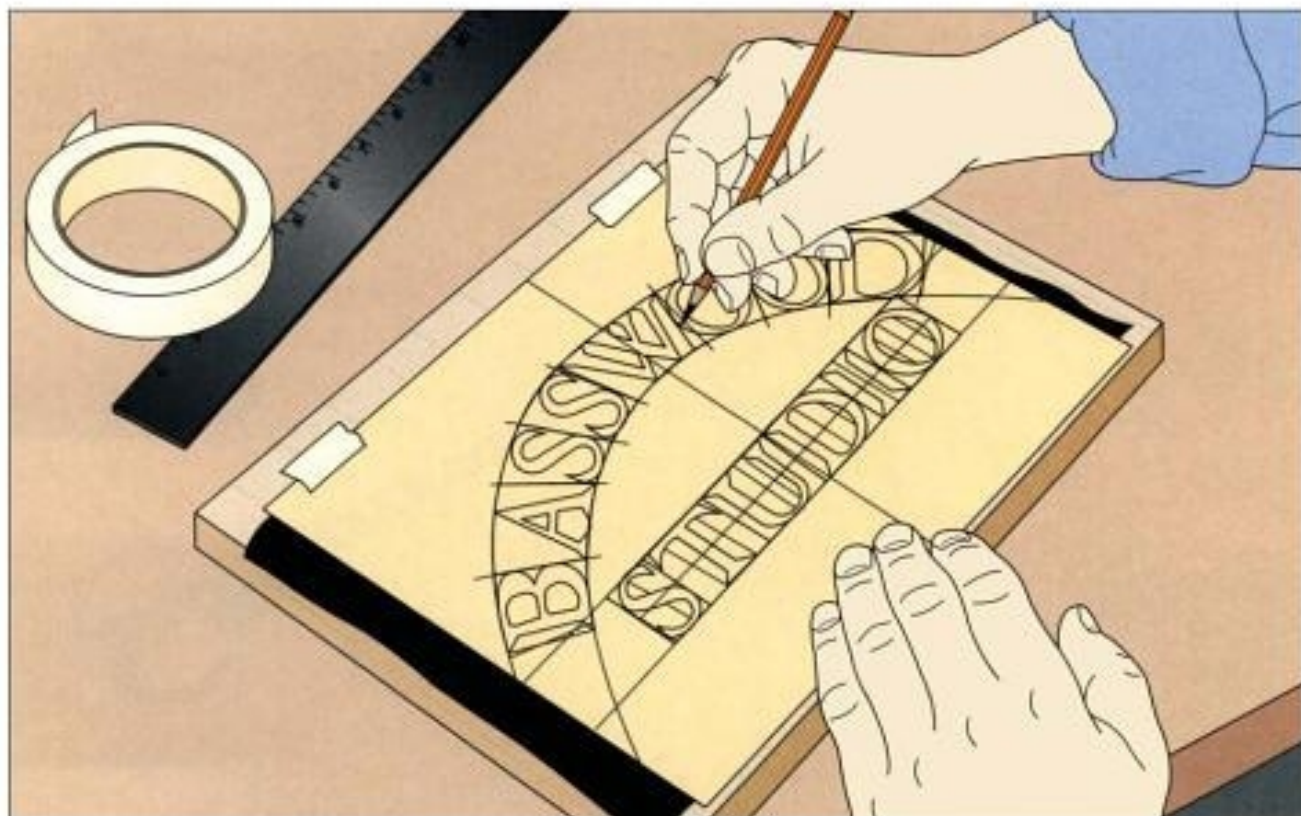
Used with permission of Sterling Publishing Co., Inc.,
387 Park Ave. S., NY, NY 10016 from *Chip Carving Techniques
& Patterns* by Wayne Barton, © 1984 By Wayne Barton.

Carving a Lettered Sign**Shop Tip****Curved layout**

A curved layout is more complex than working with straight lines. The start and ending points as well as the radius of the curve, can affect how much room you have to fit in the words. Lay out the letters on a sheet of paper, then draw a vertical centerline to help you orient the letters. Lay them out in an approximation of the desired arc. Adjust a compass to draw the lower edge of the arc. Assemble the letters on this line. If there is too much space, decrease the radius; if the words need more room, lengthen it. Redraw the line and test the fit. To move the words up or down, shift the compass as necessary along the centerline.

**Laying out the letters**

Enlarge the facing page on a photocopier to get the letters of the size you want, then cut out the blocks. Trim the narrower letters, like I and S. Draw two parallel lines to mark the top and bottom limits of the letters. Set out all the letters you need, then adjust them until you have the proper spacing. Remember that certain combinations, like Vs and As, can overlap slightly. Make a small pencil line to mark the letters' positions, then glue them all in place.

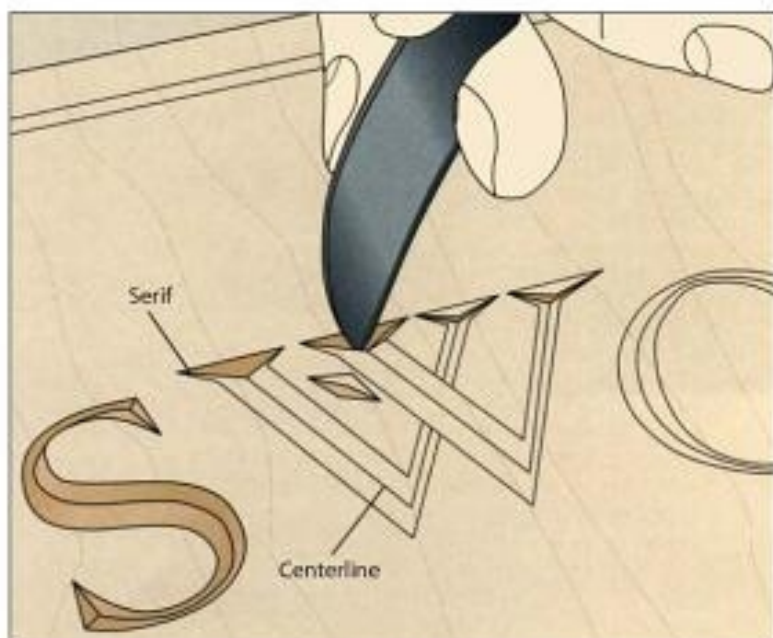


Transferring the letters

Transfer the letters to the sign with carbon paper. Position the pattern exactly where you want it on the board and tape it in place. Slide a sheet of carbon paper under the pattern, then trace the letters.

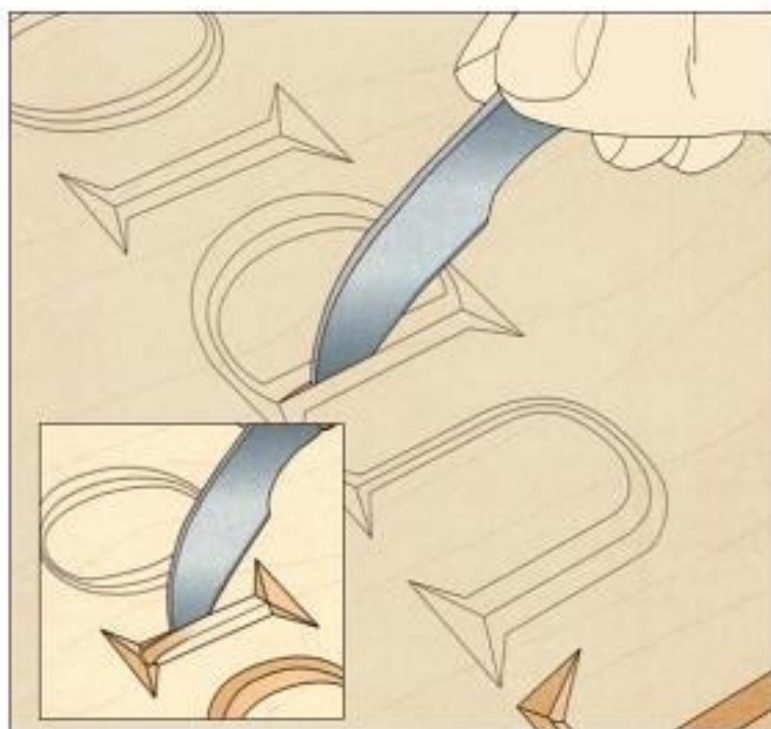
Cutting the serifs

Letter cutting is very similar to six-cut chip carving, especially when cutting out the serifs, the decorative flourishes at the ends of letters. Draw centerlines down the length of the letters and in the serifs, as shown. Cut out the serifs first with a variation of the six-cut triangle (see page 64). Make a stop cut into each of the center-lines. Cut to a depth of about $\frac{3}{16}$ inch. Remove the waste in the little triangles, exactly like a regular six-cut triangle.



Making the stop cuts

Perfectly straight cuts several inches long can be as hard to master as curves. The trick is to focus your eye on the line just in front of the blade. With a bit of practice your hand will naturally follow your eye. Cross-grain cuts are easier than those parallel to the grain, which tends to pull the blade off-track. Start with the knife tip at the bottom of the serif then pull it towards the other end (*right*) at a consistent depth of about $\frac{1}{8}$ inch. Use your free hand to help move the blade and keep it under control. Remove the waste with a straight cut along the marked line (*inset*). Angle the blade so the tip will reach the bottom of the stop cut.

**Making special angled cuts**

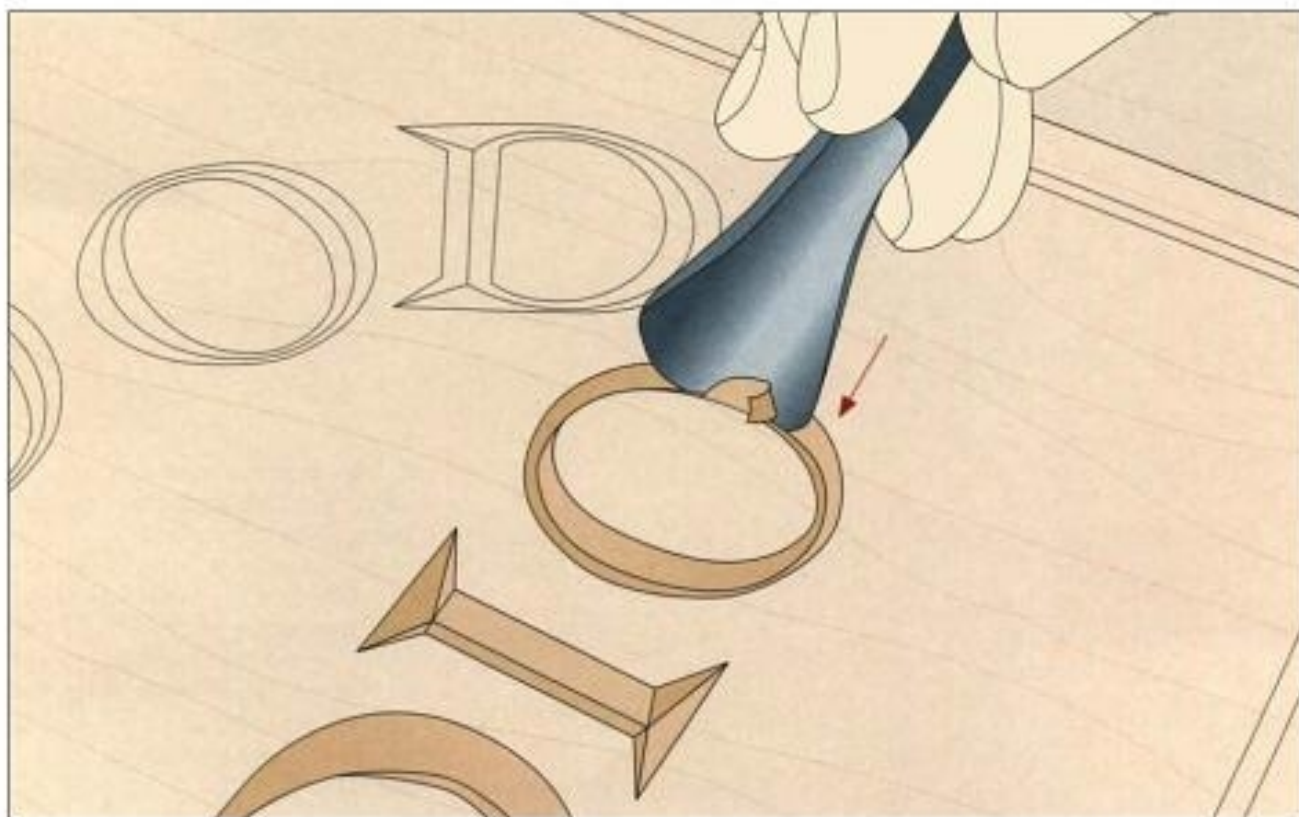
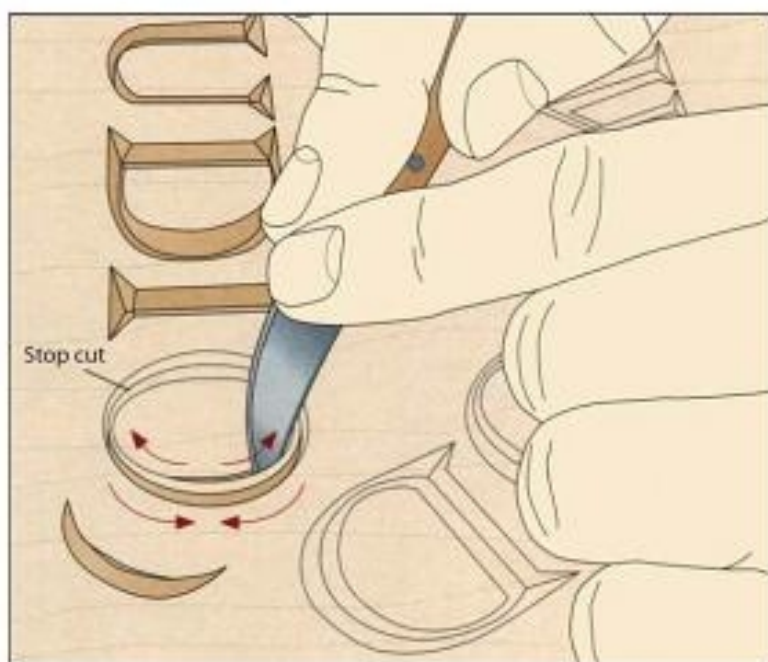
Letters like Ws and Vs have pointed elements. Try to remove the waste in one piece to get as clean a cut as possible. First make the stop cuts as usual. The cuts should not overlap at the point, but meet cleanly. In the example shown, remove each section of waste in two strokes, working in the directions shown by the arrows. Cut at an angle to meet the stop cuts and free the chip. Cut away the other half with a standard straight cut (*left*).

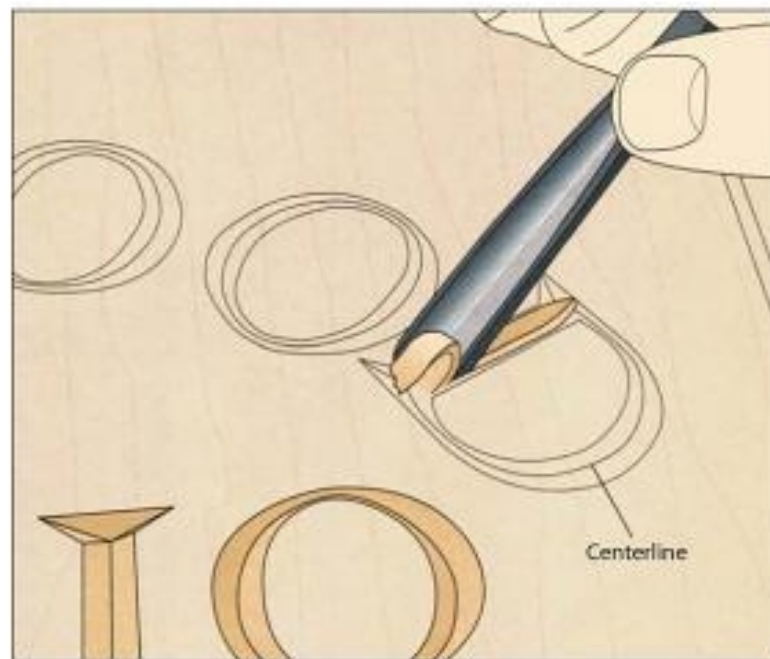
Cutting circles

Circles are a challenge to cut since you must deal with constantly changing grain direction. First make the usual stop cuts around the circle. Remove the waste by making an angled cut along the curve (*right*). The arrows show the direction you must cut in order to work with the grain.

Cleaning curved sides

It can sometimes be difficult to make a clean edge at the point where you change cutting direction. One way to remove stray fibers is with a gouge. Select one that matches the radius of the curve and clean up the side with a few downward cuts (*below*).



Working with a V-Tool**Cutting straight lines**

Some carvers who work frequently with a V-tool find that it also serves well for incising letters. Lay out the letters and draw centerlines, then incise the letters in a few shallow passes, increasing the depth with each cut (left).

Cutting curves

Cutting incised curves with a V-tool takes a fair bit of practice. The problem is that, because of the shape of the tool, if one edge is cutting with the grain, the other is cutting against it. To minimize this problem, work so that you are cutting with the grain on the outside of the letter, as shown by the arrows in the illustration (below). Make a final pass to trim the sides of the groove, moving the tool in the opposite direction of the arrows.



Carved Moldings

Carved moldings have been used to decorate furniture for centuries. In fact, experts are able to determine when and how a molding was cut by looking at its style and shape. The most common carved molding styles include the Gothic, which is deep-cut with a wide range of irregular shapes, and the Renaissance and Jacobean varieties, which feature more uniformly patterned work, built up from a fixed sequence of shallow cuts.

The first requirement for carved molding is a molding blank formed from an appropriate-size piece of stock. You can make a blank by hand with gouges, but for long sections, it is quicker to use a router or shaper. Before carving the molding, begin on a test piece and establish the sequence of cuts that will provide the desired result. For example, to produce the egg-and-dart molding shown on this and the following page, outline the eggs first, then shape them, and finally carve the darts. As a rule of thumb, molding should be

carved with as few cuts as possible, making each one clean and decisive. Try to design the molding to suit the sweeps, or curves, of your tools, rather than the other way around. Carve one set of elements, such as the eggs, along the entire length of molding before changing tools and carving the second series of elements. This will streamline the carving process and help give the result uniform appearance.



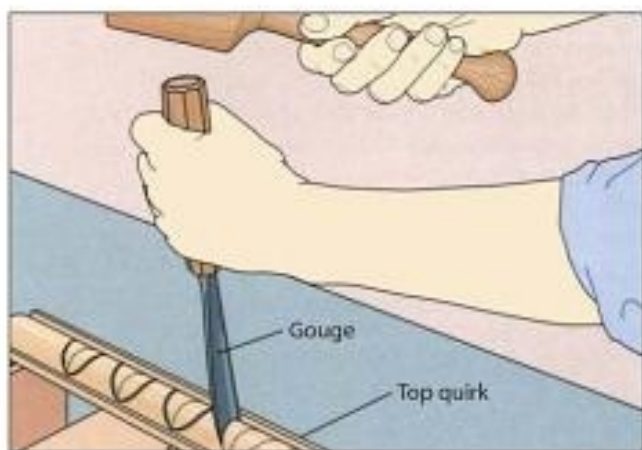
The egg-and-dart pattern shown above was carved in ovolo-shaped molding. The piece on the right is finished; the sample piece on the left shows the progression of required steps. Acanthus motifs at the corner will allow the mitered ends to butt together cleanly.

Carving an Egg-and-Dart Molding



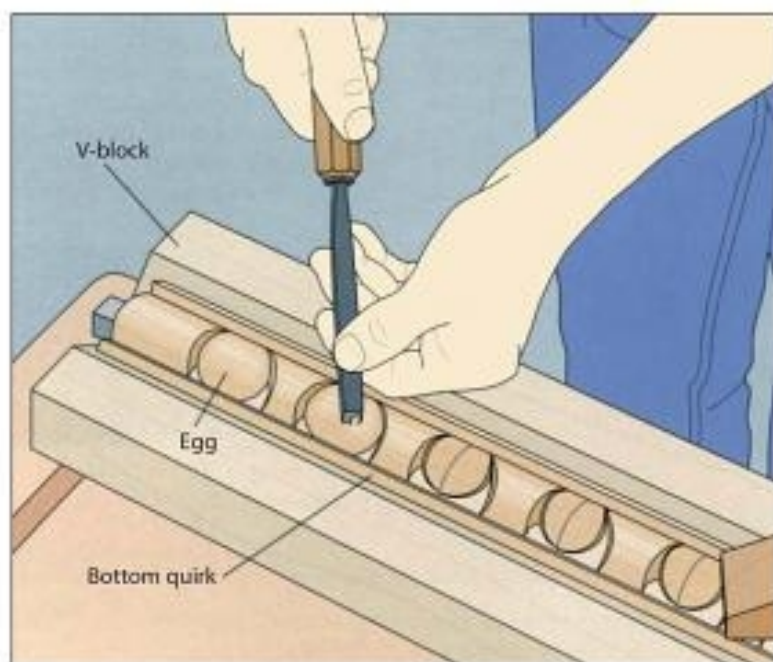
Marking the eggs

Prepare a carving blank; the one shown above has an ovolo design—a type of quarter-round bordered by ridges called quirks. Secure the blank to your workbench, using bench dogs to keep the entire top face accessible. Mark the center of the eggs along the length of molding using a try square and a pencil (*above*). Space the marks at intervals of about 2½ inches.



Outlining the eggs

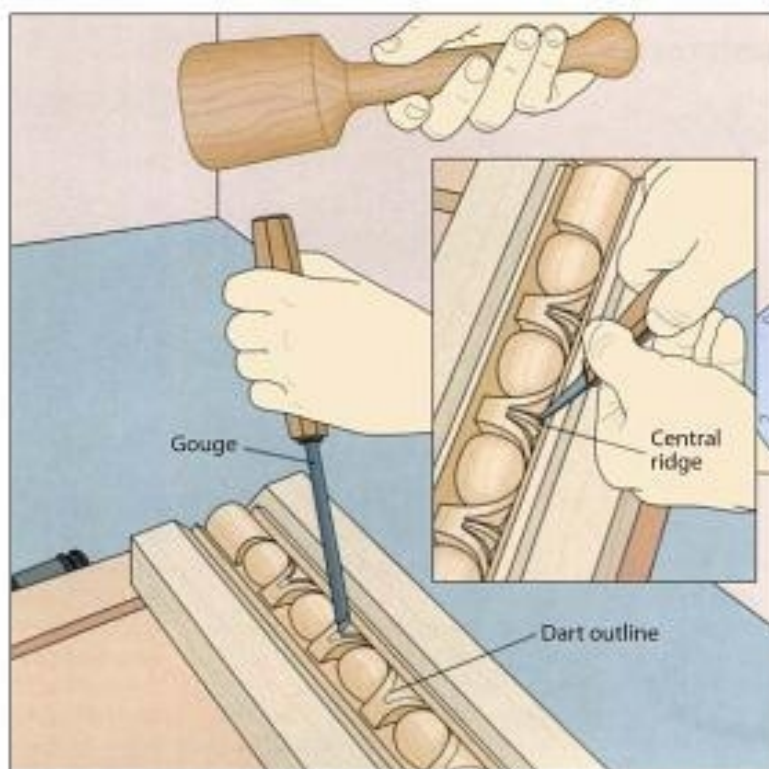
Once you have marked the location of the eggs, use a gouge to outline their edges. Choose a gouge with a sweep that matches the desired curvature of the eggs. Holding the tool with the corner of the cutting edge just touching the top quirk, tap the handle lightly with a mallet to cut the outline around the egg. The cuts should slope slightly inward toward the center. Repeat the cuts to outline the remaining eggs along the length of molding (*above*).

**Shaping the eggs**

Cut a 90° V-block jig on the table saw to hold the blank securely while allowing access to its top face. Clamp the molding in the V-block and use bench dogs to hold the block on the bench. With the same gouge used before, make a vertical cut to widen the outline around the eggs. The width of the cut should be $\frac{1}{4}$ inch at the bottom quirk, gradually narrowing until it closes up at the top quirk. Once all the eggs are outlined, they can be shaped with a shallow-sweep (No. 3 or 4) straight gouge. Starting with the gouge nearly horizontal, raise the handle slowly as you carve from the top down to round the sides of each egg to the outline. Use only hand pressure except where difficult grain demands light taps with a mallet. Carve each egg the same way, then use a narrow gouge or carving chisel to give the eggs a final shaping (left).

Carving the darts

Each dart consists of a central ridge flanked on either side by a triangular hollow. The hollows are carved with three cuts, producing a curved triangular chip which should come away easily. First, outline the darts between the eggs with a pencil. Then, using a gouge with the appropriate sweep, carve the curved outside edges of all the hollows. Holding the tool vertically, tap it with a mallet to cut to the desired depth, then repeat the cut on the other side of the dart (right). Once all these curved cuts are made, use a straight chisel to carve the sides of the central ridges. Angle the tool at about 60° to start and lower the handle slightly as you tap the blade with a mallet. This will create a curved slope on each side of the ridges. Continue the cut until the blade meets the curved edge of the hollow. Make the last cuts with a small carving knife along the bottom edge of the hollows—flush with the top quirk—on each side of the dart (inset). Wedge the waste chip out of the hollow with the knife.



Relief Carving

No one knows when relief carving was invented, but it might well have occurred when an ancient carver made a simple but important leap of imagination: Rather than carving a shape into a board, why not remove all the wood around the shape to leave it standing proud of the surface? This modest innovation opened up a new realm of realism in carving, with its own techniques and inspirations.

Examples of relief carving have been found in ancient Egypt and in the Greek, Roman, and Byzantine empires. Celtic and Scandinavian cultures used wood far more extensively and produced some of the most elaborate, fanciful carvings ever created. Norwegian artisans, for example, used motifs of endless, interlaced, dragonlike figures to decorate even modest household items like tankards and chests. By the Middle Ages, northern Europeans began mixing natural themes like leaves and vines with the symbols of Christianity.

The first project in this chapter, a shell design (page 87), is in keeping with the ancient tradition of drawing on nature for inspiration and decoration. The shell became a particularly popular form during the 18th Century, appearing on cabriole legs, highboys, and blockfront desks. There

are infinite ways to vary the design; the gallery on page 84 hints at some of this diversity. The example shown starting on page 87 is actually fairly advanced with its shell-within-a-shell design. Using the techniques in this chapter, even the beginning carver will be well armed to try any shell design.

Low relief carving, like the barnyard scene on page 106, is all about tricking the eye. The distance between the background sky and the tree in the foreground is scarcely more than $\frac{3}{8}$ inch, but the scene appears much deeper. The process uses techniques like undercutting behind the roof and the tree to create shadows that give the illusion of depth. This and other techniques that can be applied to a variety of subjects are explained starting on page 108.



The acanthus leaf is the classic example of borrowing from nature for artistic forms. The numerous curves make it a considerable challenge for the carver to avoid cutting against the grain.

Creating the illusion of depth in a relief carving involves several techniques, including undercutting. Here, the carver uses a skew chisel to pare away wood where the tree meets the background, making the tree appear as though it is separate from the rest of the carving. The result is a more realistic, three-dimensional look.



Fans and Shells

Applied shell carvings supply a splendid finishing touch for many styles of furniture, adding an elegant bit of detail. In fact, authentic Queen Anne and Chippendale reproductions often require them.

An accurate drawing of the desired form on the workpiece is crucial. The problem is that in the process of carving the shell, the lines are shaved off and must be redrawn continually. While this cannot be avoided, it can be made more convenient by transferring the drawing to a sheet of clear acetate. These are available in any office supply store. The design can be drawn directly on the plastic. Also, you can photocopy the design directly onto special plastic sheets. This is the method used for both relief carving projects in this chapter.

To prepare the carving blank, transfer the shell design to the $\frac{3}{4}$ -inch-thick stock, then cut it out on a bandsaw. Saw out the shape by making a curved cut, passing just outside the tips of the shell rays. Make a few release cuts into the waste between the long rays, then saw out the waste. Next, cut out the round tops of the longer rays. Be sure to leave the flat space that marks the transition between convex and concave rays.



A Philadelphia highboy exhibits both convex and concave shells. The shell has been a popular motif since the 18th Century.

Gallery of Shells and Fans

Queen Anne
scallop
shell



Regency
flower



Chippendale
shell



Chippendale
scallop
shell



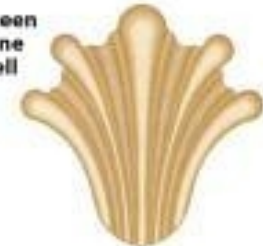
Queen
Anne
fan



Louis XIV
shell



Queen
Anne
shell



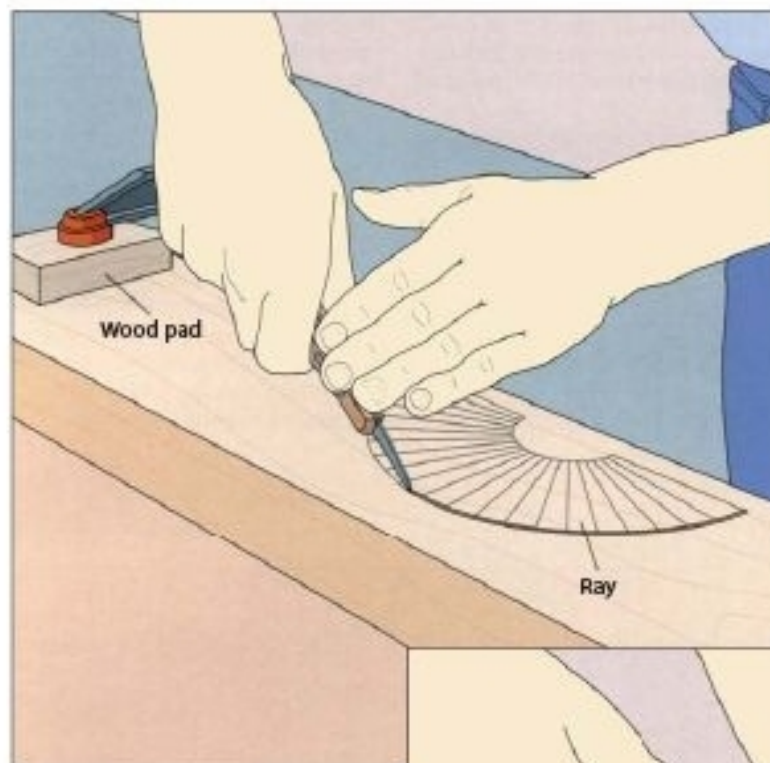
Queen Anne
sunburst



Louis XIV
shell



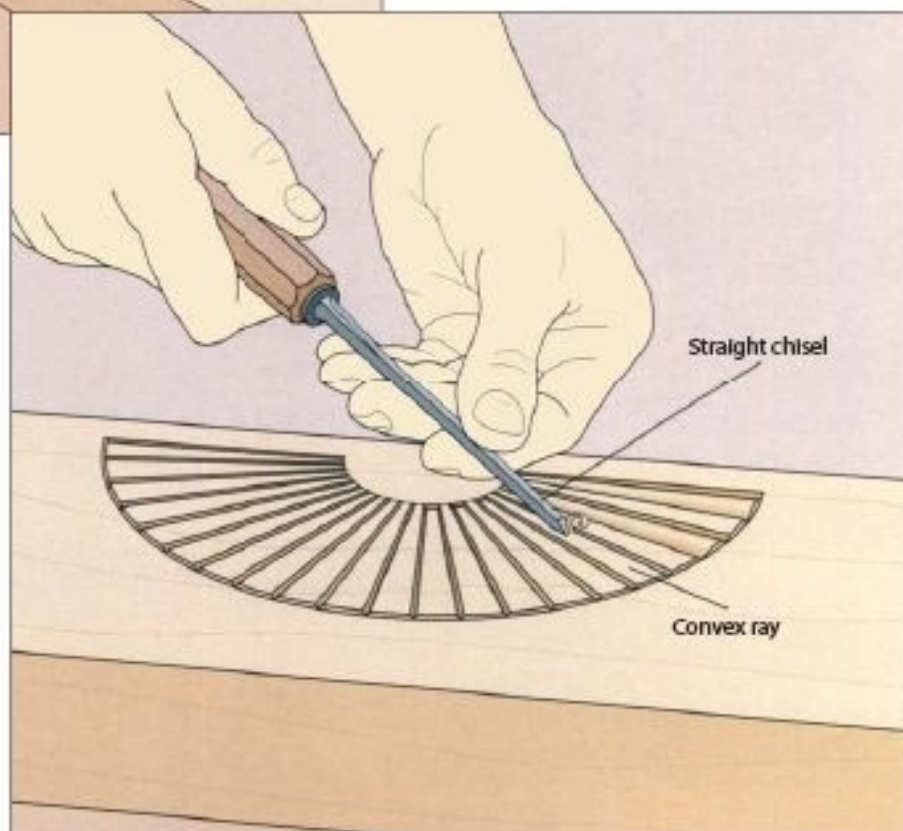
Copyrighted material

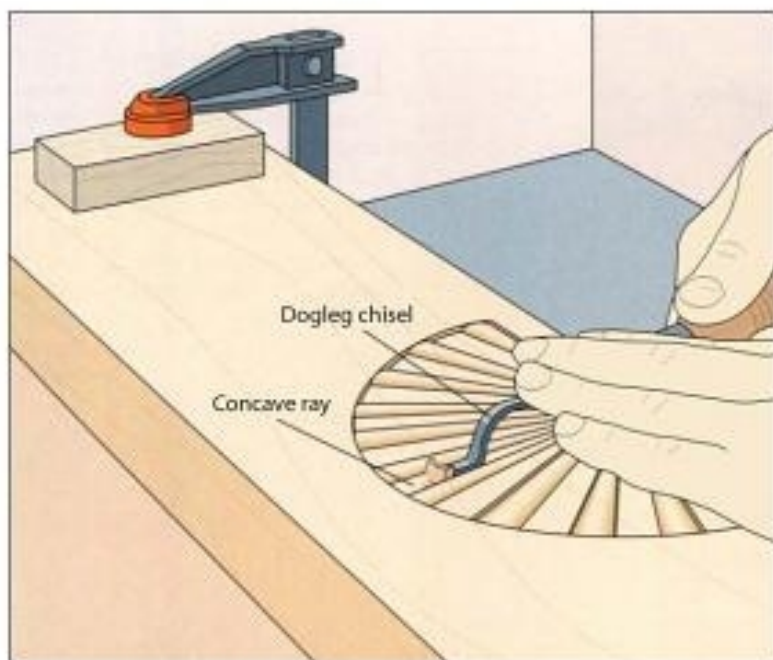
Carving a Fan**Designing and outlining the fan**

Secure your carving block to a work surface, protecting the stock with wood pads. Outline the fan full-size on a sheet of paper, then transfer the design to the carving block (page 89). To design a simple fan, like the one shown at left, start by drawing a semicircle, then use a compass to divide it into equal segments, or rays. The width of the rays is a matter of personal choice and will depend on the size and style of the fan. For this design, you will need an odd number of rays to accommodate the alternating convex and concave ray layout. Once you have transferred the outline to the block, cut lightly around its perimeter with a sharp carving knife (left).

Carving the convex rays

Use a V-parting tool to pare a groove on each of the layout lines dividing the rays. Always cut with the wood grain, reversing your cutting direction if necessary. Then, starting with the first ray at one side of the fan, use a narrow-blade straight chisel to round over the corners of every second ray. These will be the convex rays. Make several cuts on each ray, first creating a faceted surface, then a gently rounded one (right).





Flattening the concave rays

Once you have rounded the convex rays, flatten the concave rays flush with the bottom of the convex rays. Use a narrow straight chisel for the thin portion of the rays and a dogleg chisel for the wider portion near the perimeter of the fan (*left*).



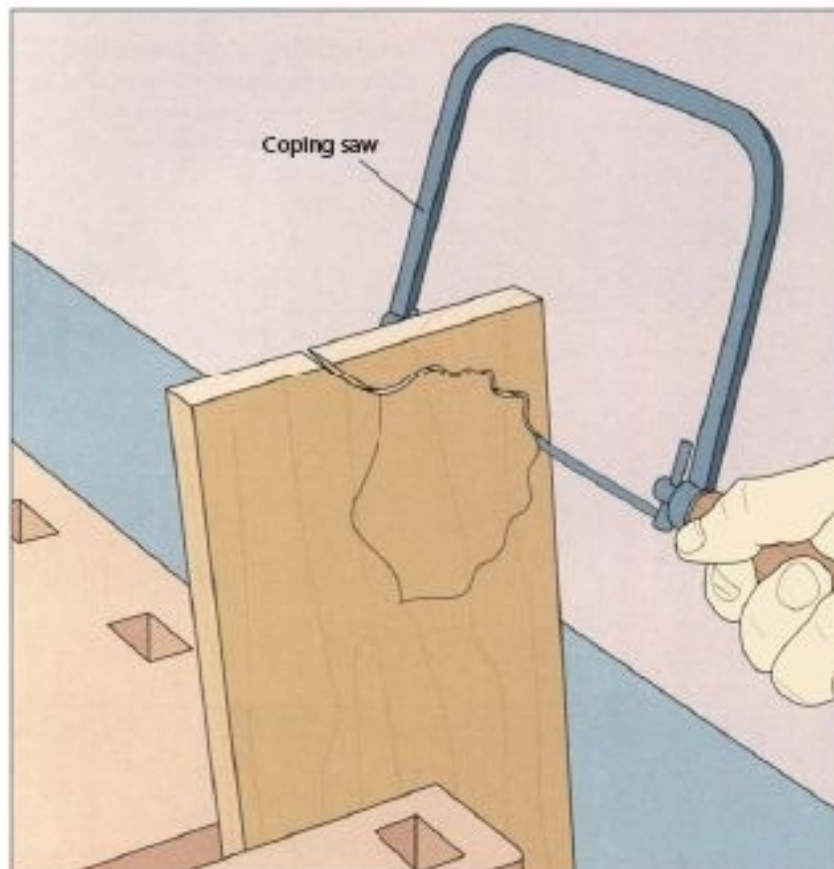
Rounding the concave rays

Once all the concave rays have been flattened, round their centers. Use a narrow veiner to carve the narrow sections (*above*); switch to a No. 5 or 7 gouge for the wider portion of the rays. Leave a $\frac{1}{8}$ -inch shoulder on each side of each ray.

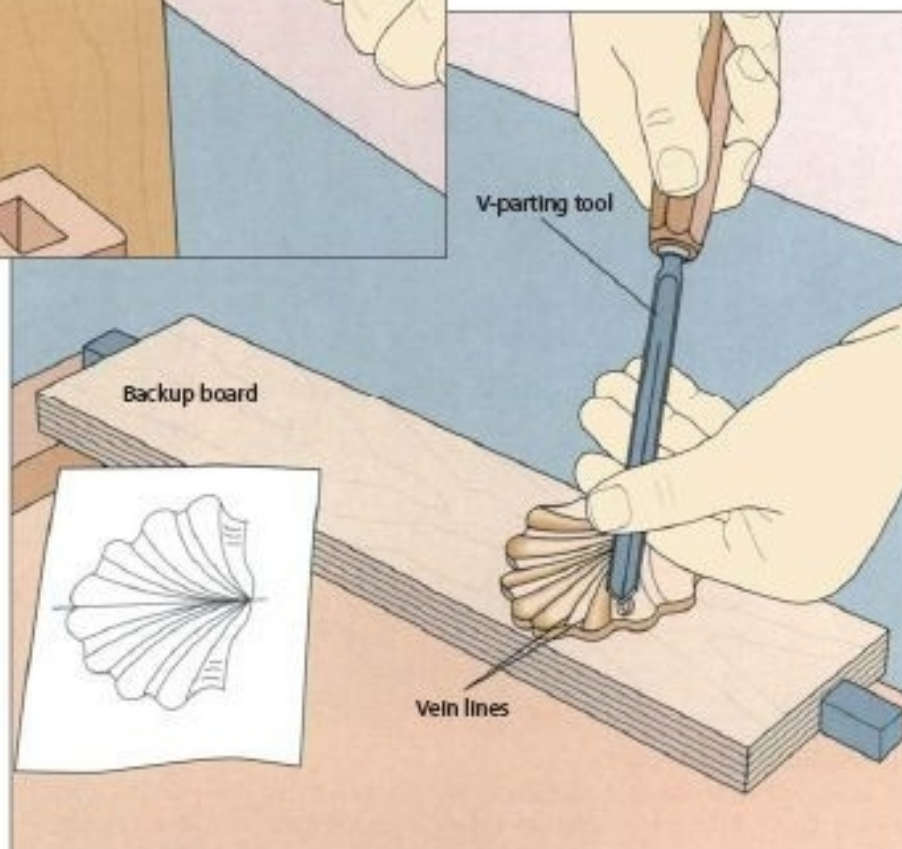


Setting in the circumference

Once you have shaped the rays, use a carving knife to trim any remaining waste from the perimeter of the fan (*above*). Then, starting with 100-grit paper, sand the fan surface with progressively finer grits to give the wood a smooth finish.

Carving a shell**Cutting the carving blank**

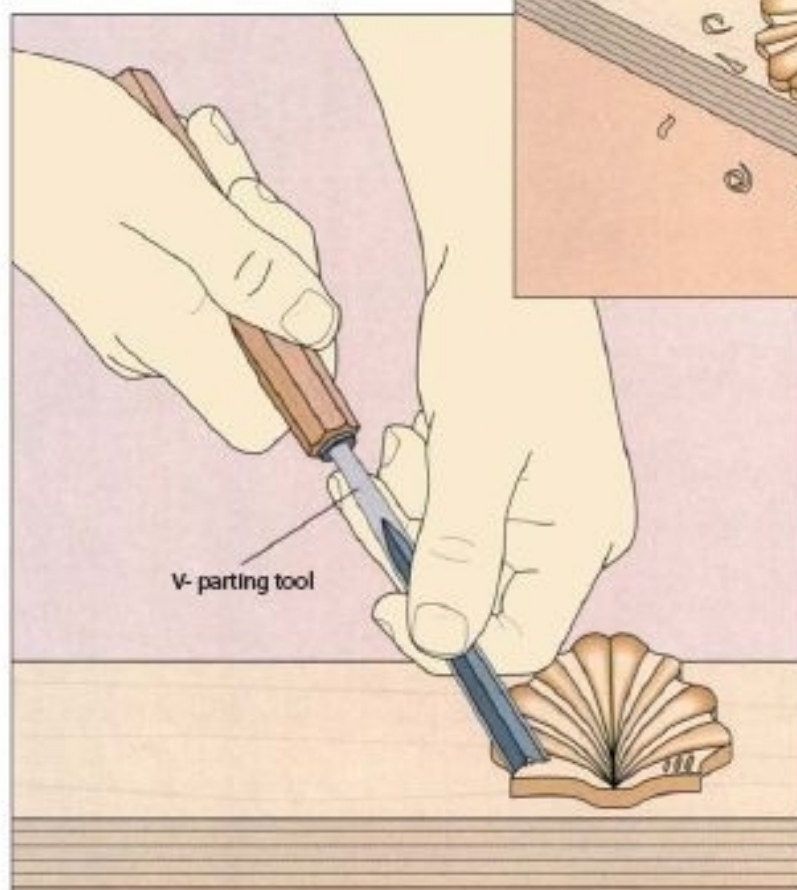
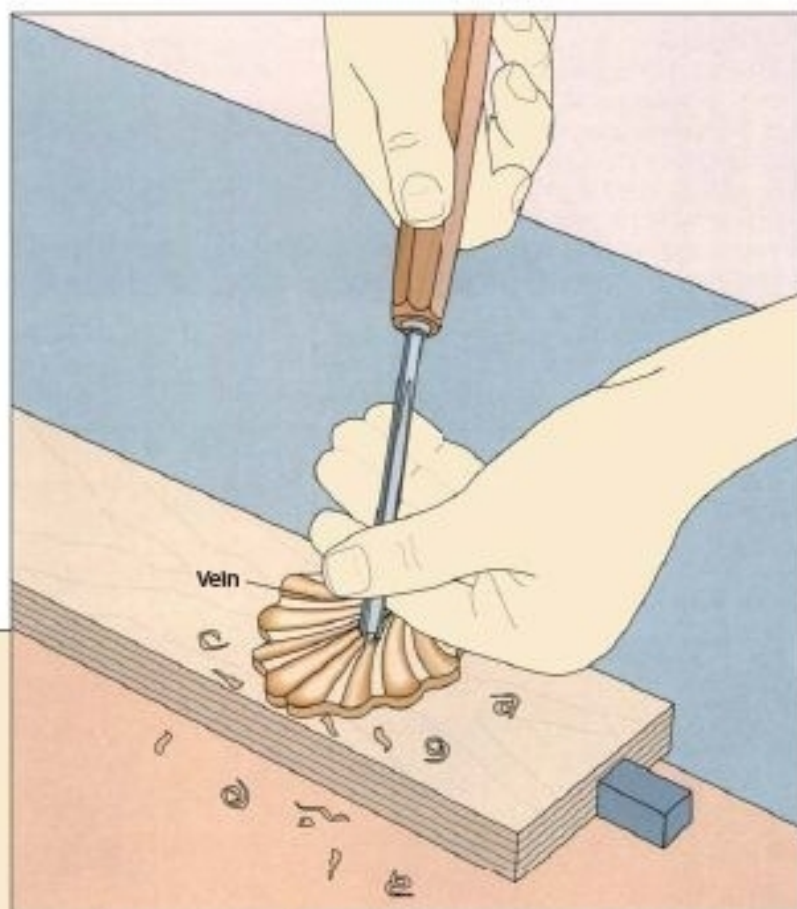
Draw the shell pattern full-size on a piece of paper, then transfer your design to a wood blank of the desired thickness (page 89). Secure the blank in a bench vise and use a coping saw to cut it out (left). If the saw blade is binding in the kerf at the tightest parts of the outline, cut to the edge of the board to release the waste. This will give the blade more maneuverability as you continue the cut.

**Sculpting the shell surface**

Fasten the blank to a backup board, using glue and newspaper or a screw, and clamp the board to a work surface. Start sculpting the surface of the shell using a low-sweep gouge (No. 3 or 4). Once the shell is gently rounded, transfer the vein lines from your pattern to the blank and use a V-parting tool to etch the lines into the wood (right). Make all the cuts in the direction of the wood grain.

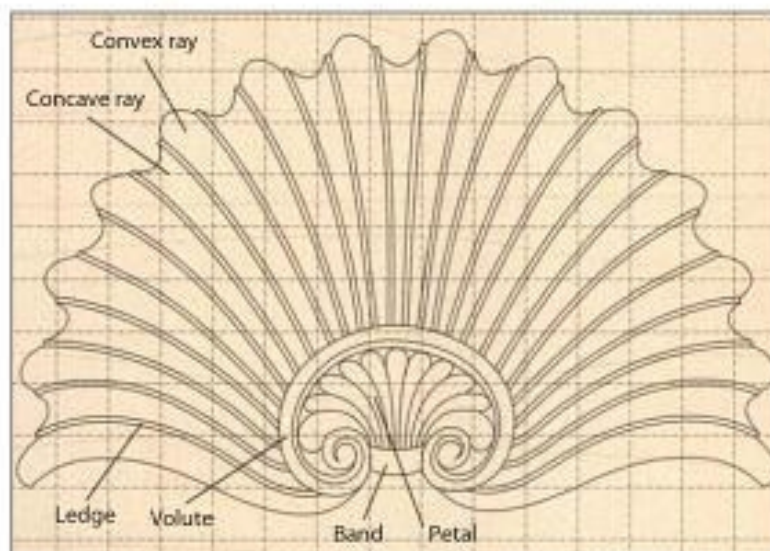
Rounding the rays

Once all the veins have been cut, use a No. 3 or 4 gouge to round the corners between the vein lines. Start by making the surfaces of all the rays convex (or crowning outward). To finish carving the pattern, carve a concave valley into every second ray with a narrow No. 7 or 8 gouge (*right*). (For the design shown, the two rays at the center line remain convex.) The result will be that the surfaces of adjacent rays will curve in opposite directions, alternating between convex and concave. Carve carefully at the edges of the blank to avoid tearout.



Carving the veins in the wing

Use a V-parting tool to carve the veins in the wings at the bottom of the shell. Make all your cuts with the wood grain; with the workpiece shown at left, this involves carving down from the top of the shell. Once you are satisfied with the shape of the shell, smooth the surface lightly with progressively finer grits of sandpaper, or use a riffler. Remove the workpiece from the backup board.

Transferring the Pattern and Starting Work**Rounding over the edges**

After cutting out the outline as close as you can with the band saw, secure the shell blank to a temporary backing with double-sided tape and clamp the assembly to a work surface. Clean up the edges with a 12-millimeter No. 3 gouge. Then use the gouge to round over the curved edge of the shell (*below*). Remove the waste from the whole edge in several passes. Round over the entire edge slightly with the first pass, cutting with the grain, then increase the radius with each following pass. Check the edge for smoothness and consistent curve by running your fingers frequently along it. This is more reliable than checking by eye alone.

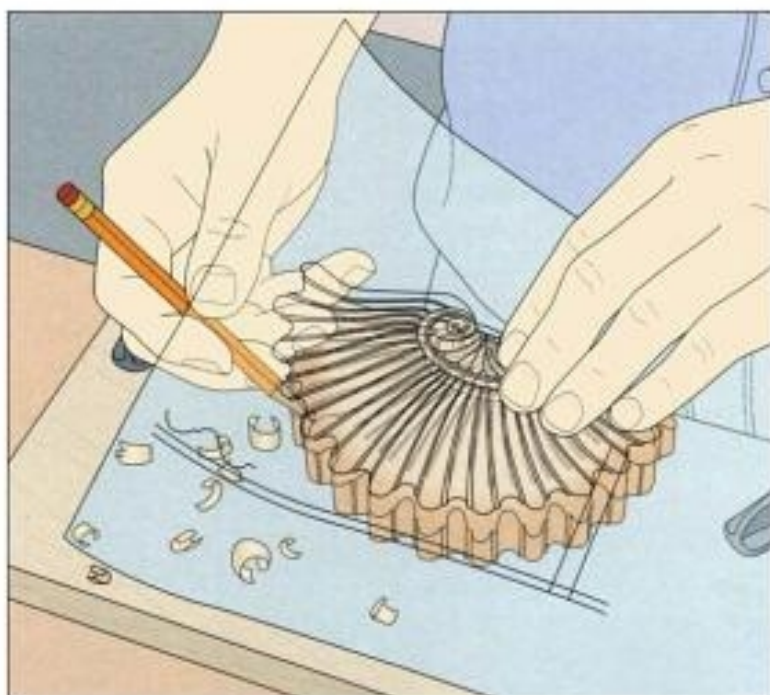


Retracing the pattern

A good portion of the shell drawing will be removed when you round over the edge. Since the pattern is on a clear transparency, however, it is a simple matter to redraw the lines. Reposition the sheet on the shell, lining it up over the volute. With a sharp pencil in hand, lift up the transparency just enough to allow you to trace directly under the pattern (*right*). This is a handy technique that should be used whenever necessary throughout the project.

Defining the inner shell

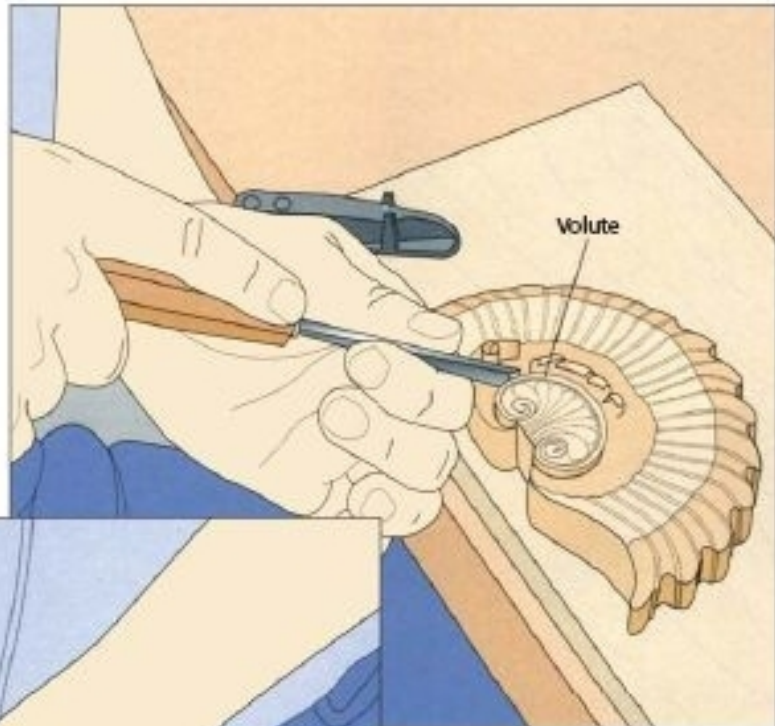
Use a 12-millimeter No. 39 V-tool to delineate the small, inner shell from the rays of the larger, outer shell. Start by cutting a groove that stays just outside the edge of the inner shell. Deepen the cut in successive passes to a depth of about $\frac{1}{4}$ inch.



Forming the Outer Shell

Contouring the shell

The shell rays slope down as they approach the inner shell in a somewhat serpentine shape. Starting about an inch from the shell's edge, round over its profile in very slight shavings with a 20-millimeter No. 4 or No. 5 gouge, cutting toward the inner shell. In successive passes increase the depth of cut as you get closer to the base of the rays. You will end up with a series of semidetached waste pieces at the edge of the inner shell. Remove these with a 12-millimeter No. 39 V-tool (*right*), cutting along the base of the volute with the tip of the tool.



Cutting the concave rays

Redraw the rays after contouring the shell, then hollow out the grooves that form the concave rays. Mark a series of Xs on each of the concave rays to avoid hollowing out a convex section by mistake. Cut out the concave rays with a 12-millimeter No. 11 gouge (*left*). Do not try to remove all the waste at once; instead, make several passes. Work the tool from the volute toward the shell tips as much as possible to get a clean cut. The base of the rays, however, must be grooved by cutting toward the volute and leaving a rough edge.



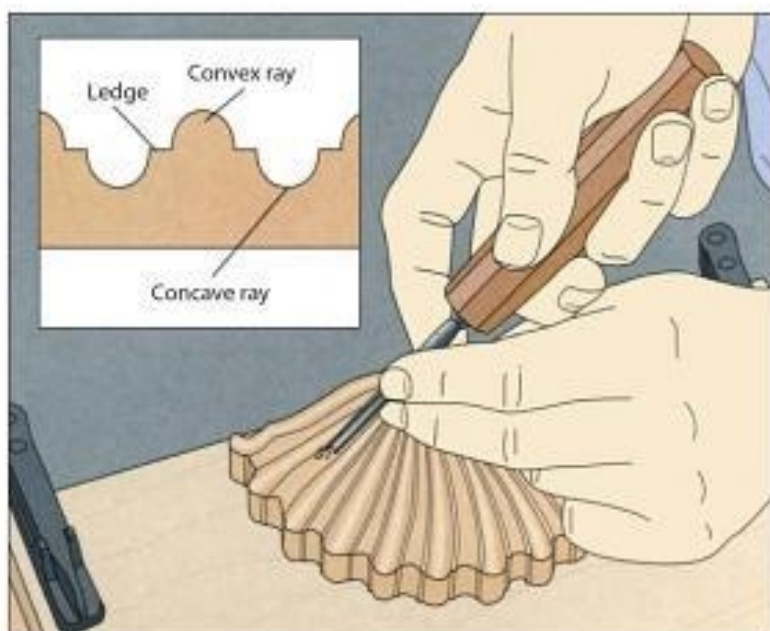
Separating the inner shell

Hollowing out the concave rays will leave a collection of semi-attached shavings protruding from the edge of the volute. To keep the base of the rays as clean and crisp as possible, remove them with a carver's knife (*left*). Use a downward stroke to cut off the waste shavings cleanly. At this point, round over the convex rays to approximate shape with a No. 3 gouge or a No. 33 bent-back gouge. Remember to work with the grain, always cutting downhill.

Refining the Rays

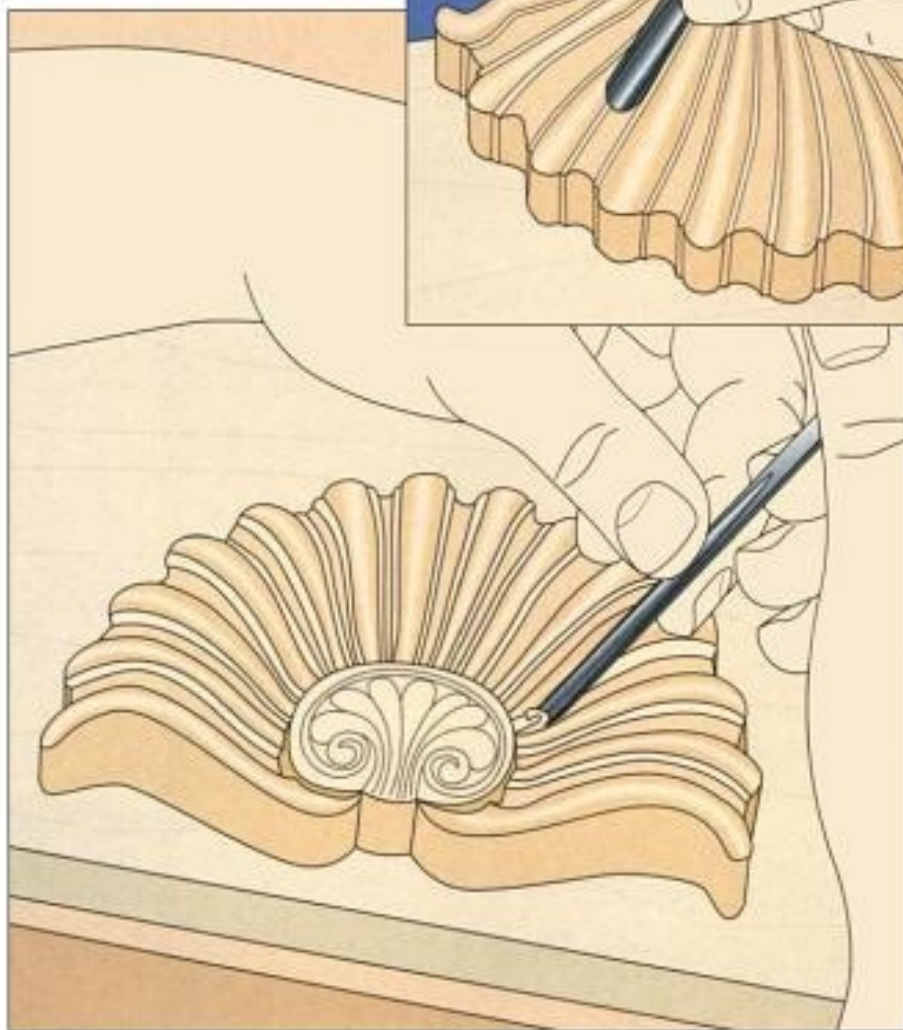
Cutting a transition ledge

Separate the convex and concave rays with a small ledge (*inset*). Use a small No. 11 gouge to cut the ledge into the side of each convex ray (*right*). Notice that the ledge is halfway between the top of the convex ray and the bottom of the concave ray. Use a 6-millimeter No. 39 V-tool to sharpen the transition between the ledge and ray. Make the ledges as smooth as possible, and at the same height from ray to ray.



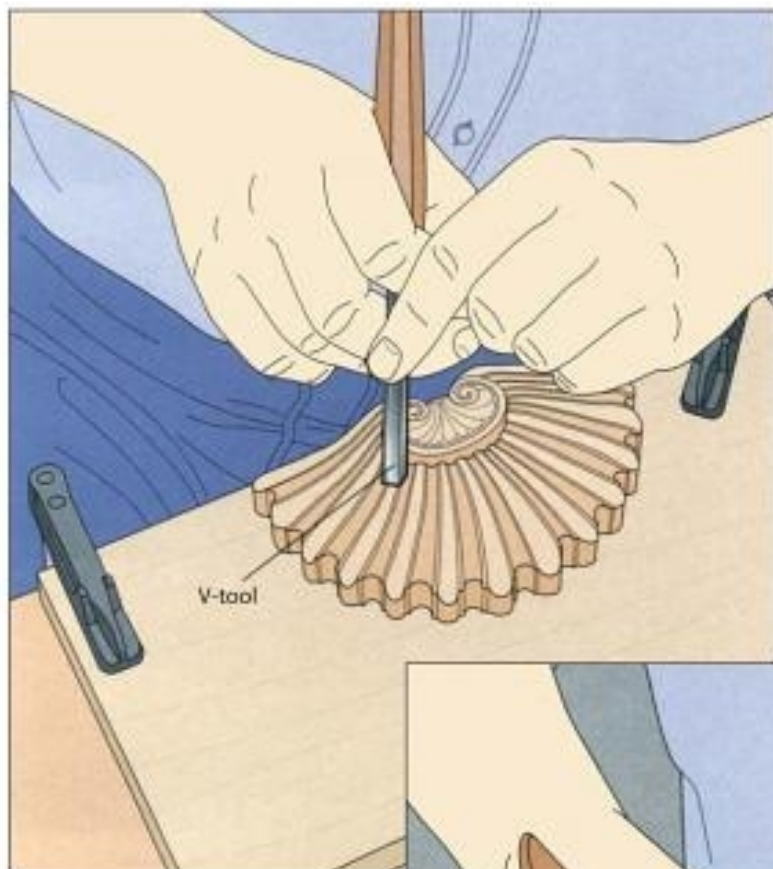
Deepening the grooves

Use a No. 11 gouge to deepen the concave rays. This will make the ledges more pronounced. Choose a gouge that is close to the desired radius of the groove. Be very careful to avoid digging into the ledge. Shave down all the concave rays a little at a time to reach a consistent, uniform depth (*right*). Use your fingers to feel for any bumps or irregularities and trim them smooth.

**Refining the ledges**

The gouge will leave a rounded transition between the ledge and the convex rays. Use a 4-millimeter No. 39 V-tool to flatten the ledge and produce a clean corner where these two elements meet. Position the tool so that one of its cutting edges lies flat on the ledge, with the tip in the junction of the ledge and the convex ray. Always work in a downhill direction: either toward the tips or the volute, as necessary. Refine the ledge in several passes, taking a fine cut each time (*left*). You may find that you are undercutting the convex ray a bit. This can be fixed in the next step.

Final Touches on the Rays

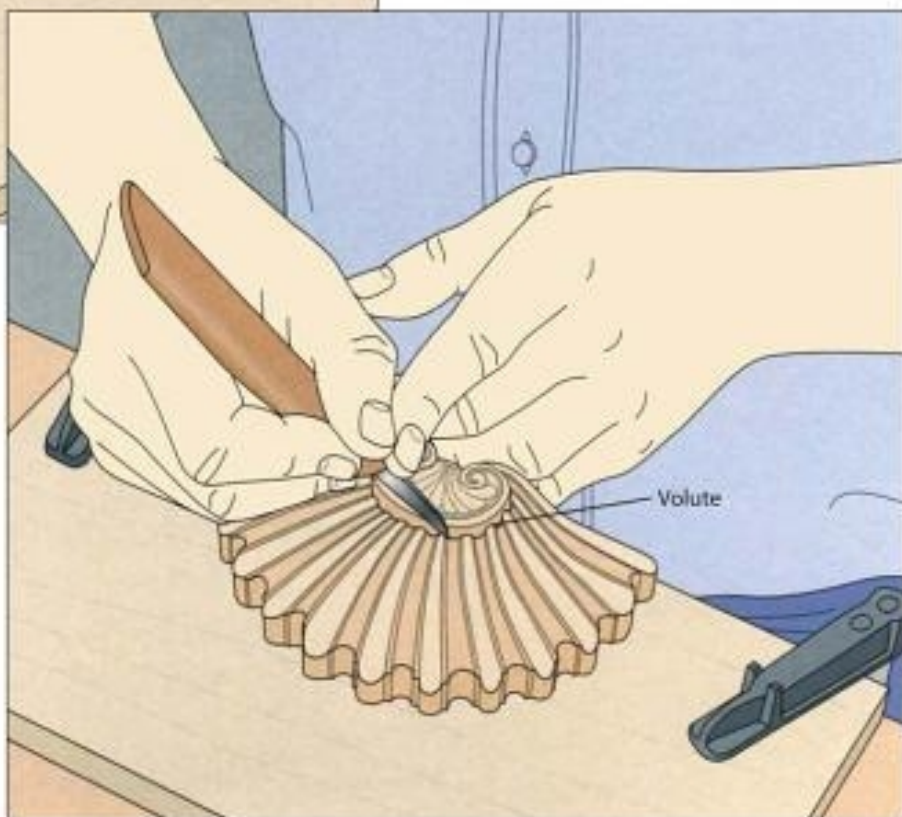


Smoothing the curves

Once all the large rays have been shaped, it is time to smooth the curves and make the rays consistent. Most of your tools will be needed at this stage. Use deep and shallow gouges to perfect the concave rays. Match the gouges to the radius of each section of the rays and take off the thinnest shavings possible. Use a V-tool to smooth the ledge (*left*). A No. 2 chisel or a No. 3 gouge can serve to remove any bumps and smooth over the convex rays. They should meet the ledge at a clean angle. With experience you should be able to produce a finished shape with tools alone. At first, however, you may have to rely on 220-grit sandpaper to achieve a proper smoothness.

Cleaning the ray base

The process of cutting with the grain toward the volute will leave burrs and splinters at the base of the rays. Alternate between a sharp carver's knife and the narrow gouges to clean up this area. The knife can be used to cut straight down to sever these bits free (*right*). Use the gouges to cut toward the volute as necessary.



Making the Inner Shell**Defining the volute**

Use a carver's knife to cut along the line marking the volute. This will clearly demarcate the volute from the inner design. It also prevents tearout. Outline all of the volute except the innermost part of the spiral (*above*). At a certain point, the waste area is too narrow and the radius is too tight to be cut cleanly. This area will be defined in a later step.

**Recessing the inner shell**

Use a V-tool to remove the waste to the volute, cutting to a depth of about $\frac{1}{8}$ inch. Hold the tool as shown, with one hand near the tip to give you more control and prevent slipping. Work the tool with the outside edge riding in the cut made by the knife (*left*). As before, stop when the radius of the volute gets too tight. Next, use a 6-millimeter No. 3 gouge to recess the rest of the inner shell. Cut close to the base of the volutes, but leave the fine cutting to the next step.

Refining the spirals

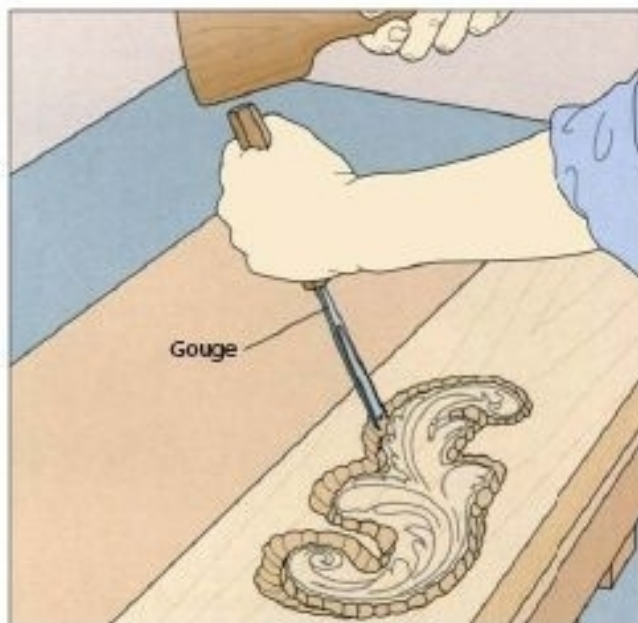
The volute ends in a spiral which is very narrow and has a tight radius. The trick is to cut the spiral with a gouge that matches the desired radius. Begin with a No. 8 and finish off with a No. 9. Hold the tip of the gouge on the cutting line and make a straight downward thrust with a slight rocking motion (*right*). Lift the tool and set it down further along the line, overlapping the previous cut. Work to the inner taper of the volute. Next, proceed outward, outlining the remaining part of the volute. Clean up the waste surrounding the volute with a veiner and a carving knife.



Rounding over the volute

Use a narrow No. 3 chisel to round over the edges of the volute (*left*). Take very light shavings to avoid gouging the workpiece. To produce an evenly rounded form, work from one end of the volute to the other, slowly bringing it into shape as a whole. Be sure to move the tool with the grain, cutting toward the center, as shown by the arrows.

Carving an Acanthus Leaf



Setting in the pattern

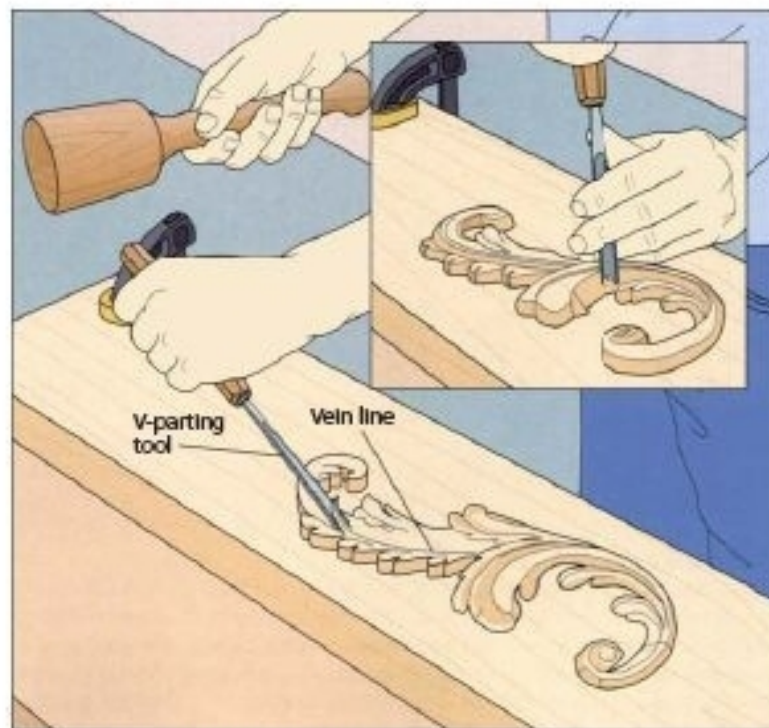
Draw your pattern full-size on a piece of paper, then transfer the design to your carving block (*page 89*). Each of the vein lines on the leaves or valleys between leaves should be represented by a pattern line. Clamp the board to a work surface and begin setting in the carving. Make a series of cuts around the outline using a V-parting tool, striking the tool with a mallet, if necessary. The resulting groove should begin $\frac{1}{4}$ inch outside the pattern; steer clear of any fine details for now. Next, use a gouge of relatively shallow



sweep (No. 3 or 5) with a mallet to widen the groove, angling the gouge to carve from the outside in (*above, left*). When the groove is roughed in, carve to the marked outline; at each point, use a gouge whose sweep matches the curve of the design. Also use a mallet to ensure that the outside edges of the carving are vertical (*above, right*). Continue the entire process, widening the groove and flattening the edges of the carving, until you have set in the background to the desired depth.

Removing the background

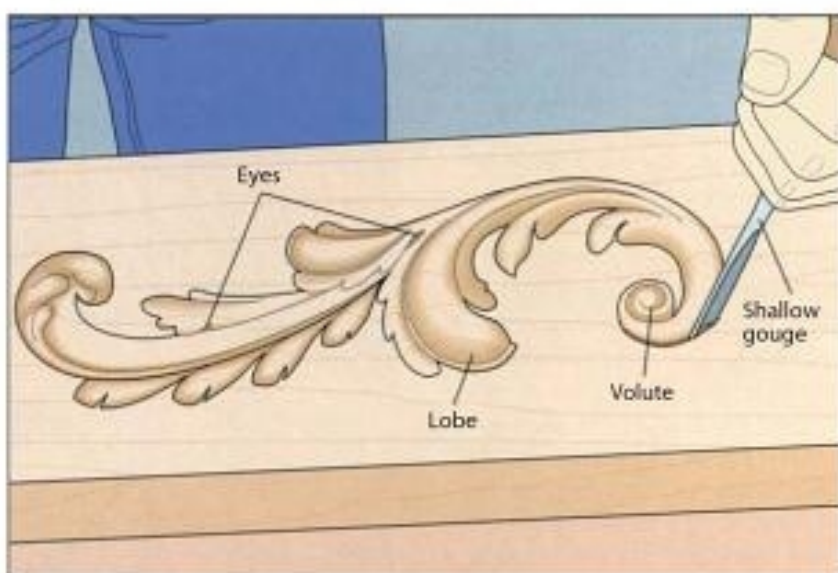
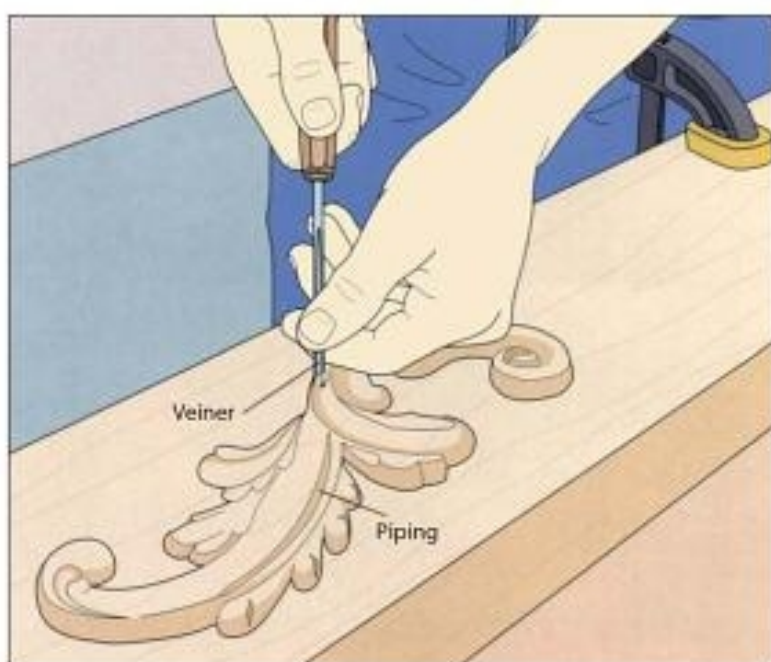
When the carving is set in, use a mallet and a straight gouge with a shallow sweep to remove the background. In the example shown here, the background will be removed from the entire surface of the workpiece. Starting at one end of the carving, hold the chisel vertically and perpendicular to the wood grain, and tap it with a mallet to break out a chip of waste wood (*right*). Move the tool laterally and back about $\frac{1}{4}$ inch, then make the next cut. Continue until you have reached the end of the workpiece and cut away the background to the required depth. Repeat at the other end of the carving and along the sides. Use a shallow-sweep gouge, holding the tool horizontally, to finish the background to the desired smoothness.

**Bosting in the carving**

Now you are ready to rough out the basic shape of the carving, a process called bosting in. First, use a V-parting tool with a mallet to carve the valleys between the leaves and the veins within them to the desired depth. These details are represented by pattern lines. Start at one end of each line and carve along its length. In difficult grain, you may need to stop partway through a cut and complete it from the other end of the line. In hard stock, use a mallet to tap the tool (*left*). Next, round off the sharp corners on the outside and inside of the carving to their rough shape. For the outside curves of the leaf, use a gouge of shallow sweep to carve in broad sweeps around the curves. Rough out the inside edges using a gouge with a deep curvature, carving down from the top (*inset*). Do not try to add detail or carve perfectly smooth contours at this point. The idea is simply to rough out the general shape of the work.

Carving the piping

When the work is rough-shaped, you can begin to carve the details, starting with the pipings and the eyes. Pippings are raised tubular segments created when adjacent sections are indented to suggest a fold in the leaf. Eyes (visible in the illustration below) are teardrop-shaped holes which simulate a fold between two overlapping leaves. Before carving the pipings and eyes, transfer any lines you may need from the pattern onto the workpiece. For the pipings, use a veiner to carve the valleys adjoining them. Work in the direction of the grain, using only hand pressure (*right*). Then use a narrow No. 5 gouge to smooth the edges of the pipings to the desired shape. Once the pipings are carved, cut the eyes. Use the veiner, but cut vertically, tapping the tool with a mallet.



Modeling the curves

Once you have completed the pipings and eyes, model the leaf. To round over the outside curves, use a shallow gouge and hold the tool convex-side down; use a spoon gouge with a deep curvature for the sharp interior curves (*above, left*). All your cuts should be long and sweeping, made with the grain. Next, round over the lobes at the ends of the leaves; they should seem to droop naturally.

The volute at the other end of the leaf should be stepped—high in the center and spiraling down into the body of the leaf. Continue modeling until you are satisfied with the shape of the work. Then, use a shallow gouge to undercut the carving. Remove $\frac{1}{8}$ inch of wood from the base of its edges, creating a shadow around the workpiece (*above, right*).

Linenfold Panels

Designed to duplicate in wood the folds of an altar cloth, the linenfold panel is one of the enduring styles of relief carving. Brought to England from continental Europe in the 15th Century, it caught on rapidly and today can be found on the walls of houses and churches, as well as on beds, cabinets, and chests.

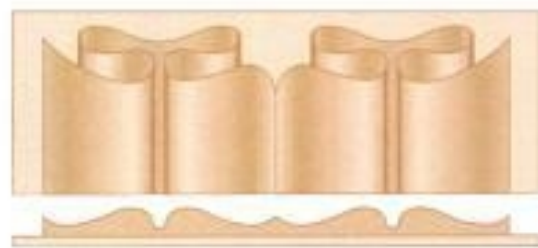
Carving linenfold involves two basic steps: First, the undulations of the folds are carved, then the ends are sculpted. The folds were traditionally cut with straight and curved hand planes that are extremely difficult to find today. The following pages demonstrate two alternative modern methods for producing the folds, one using a table saw (page 102) and a second using the saw along with gouges (page 103). The ends are sculpted with an assortment of carving tools (page 104).



The linenfold panel shown above, produced by a student at the school of Master Carver Ian Agrell, features the undulating folds and sculpted lacework that distinguish this centuries-old design.

There are hundreds of traditional linenfold patterns. In fact, woodcarvers covering a room with linenfold in centuries past would alter the design of each panel slightly. A sampling of the more common designs is shown below.

A Selection of Linenfold Designs



Face-on view

End view



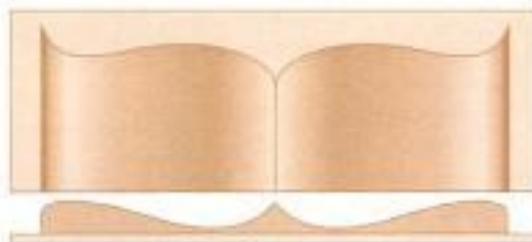
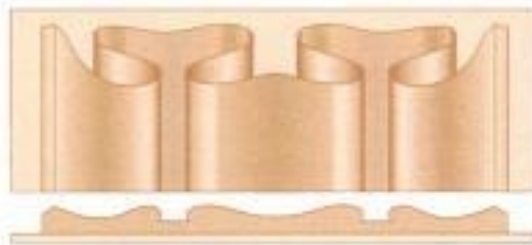
Face-on view

End view

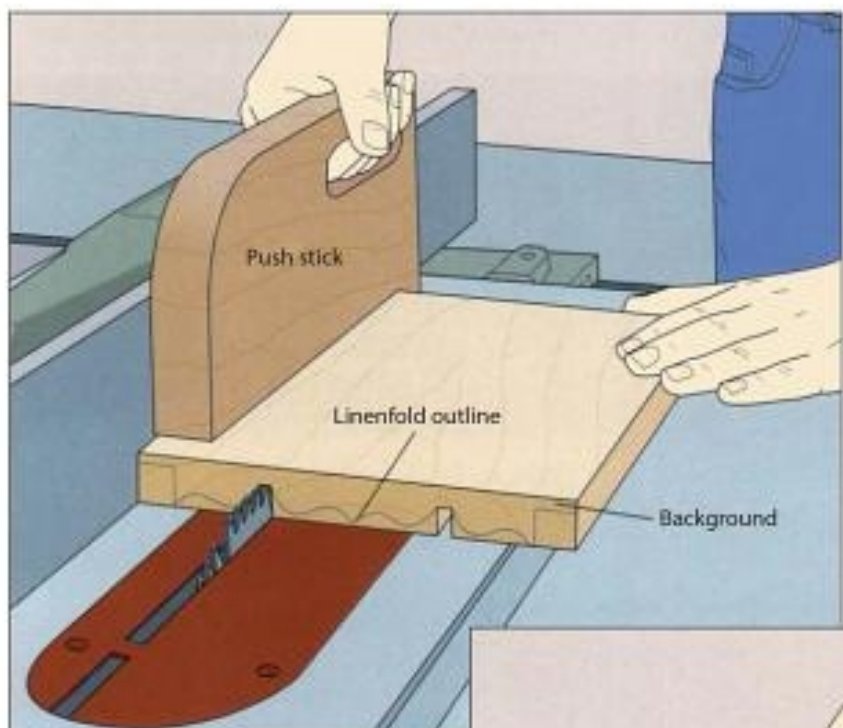


Face-on view

End view



Cutting the Folds on the Table Saw

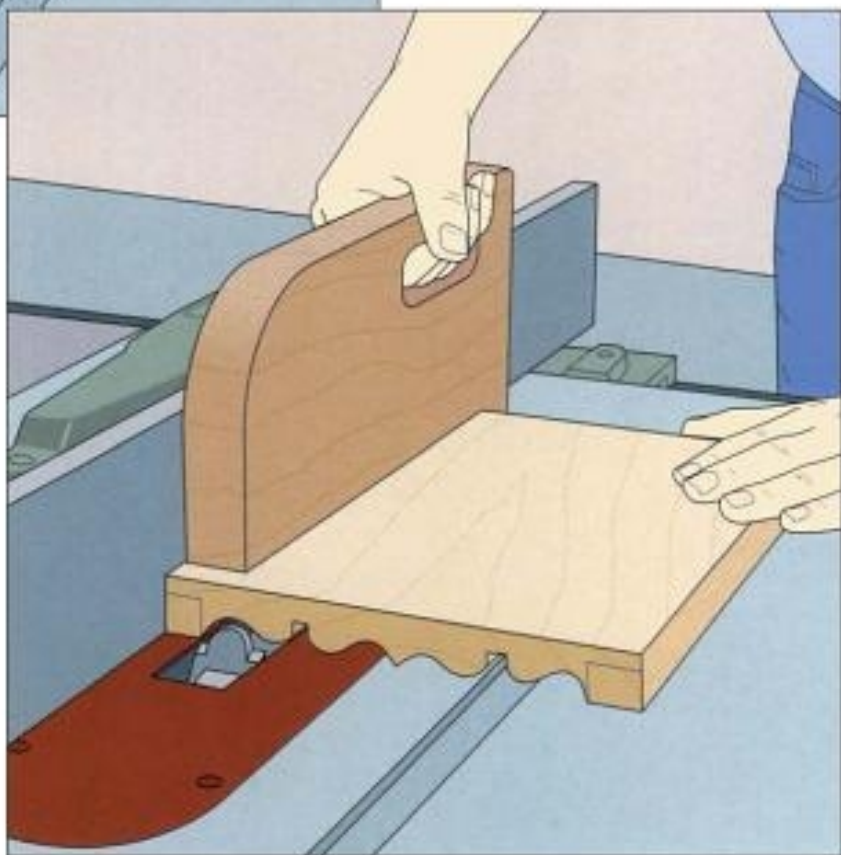


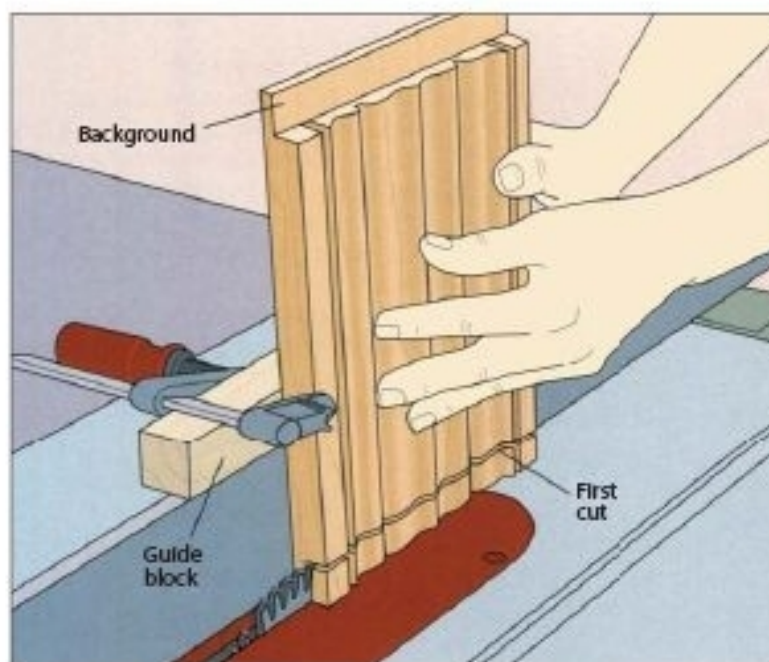
Cutting the deep grooves

Outline the linenfold pattern on both ends of your panel; also outline the background on its inside face. Start by cutting the deep grooves, as shown at left, then shape the folds and saw away the background. To cut the grooves, align one with the blade, butt the rip fence against the edge of the panel, and adjust the blade depth. Pressing the panel against the fence, use a push stick to feed the workpiece. For a wide groove, you may need to make more than one pass. For the pattern shown, cut the second groove by rotating the workpiece 180° and make a second pass (*left*).

Shaping the folds

The folds are shaped on the saw with a molding head fitted with the appropriate cutters. Since the contours on either side of the panel are mirror images of each other, the same cutter can be used to make both cuts—provided the workpiece is rotated 180° between passes. For each cut, use a molding cutter with the appropriate profile for one section of the outline. Position the panel face-down on the saw table in front of the cutter and adjust the cutting height to align the cutter with the marked outline. Then lower the cutterhead and make a pass that is no deeper than 1/8 inch, feeding the stock with a push stick. Reverse the board and repeat the cut on the other side. Make as many passes as necessary, raising the cutting height 1/8 inch at a time. Use the same technique to shape the other sections of the panel (*right*).

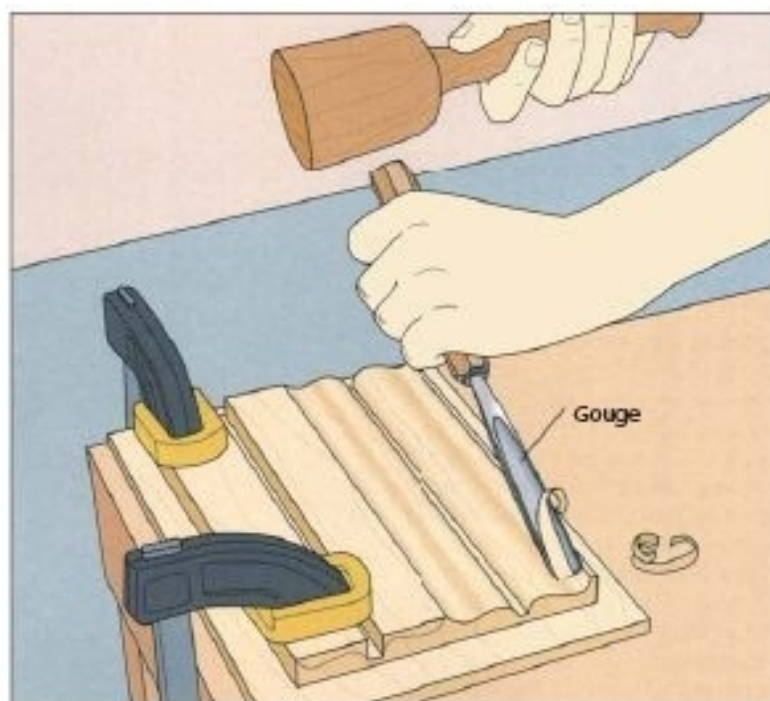


**Cutting the background**

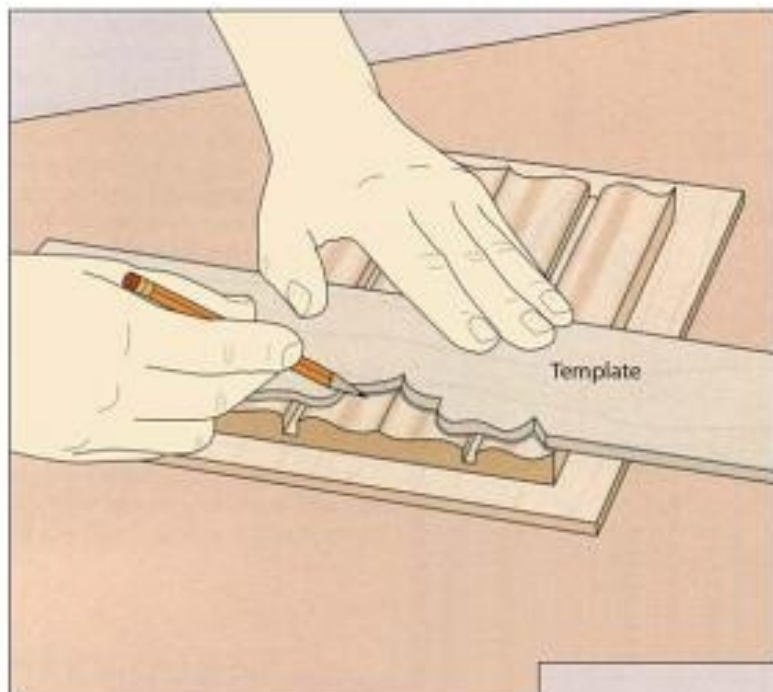
Once the contours of the panel are cut, remove the molding cutterhead and install a crosscut blade on the table saw. Cut away the background in two steps, first notching the inside face of the panel, then feeding it into the blade on end and on edge. To make the first cuts, set the blade height to the depth of the background and feed the panel, inside-face down, along the marked lines. Now hold the panel end-up on the saw table and align the blade with the bottom of the kerfs cut in the panel face. Clamp a guide block to the panel to ride along the top of the rip fence and, keeping the panel flush against the fence, feed it on end to remove one section of the background. Turn the workpiece over to cut the background at the other end (*left*). Repeat the process to remove the background from the edges.

Carving the Folds by Hand**Shaping the folds**

To shape the folds of a linenfold panel by hand, you first need to cut any deep grooves (*page 102*) and remove the background on the table saw, as shown in the previous section. Then clamp the panel to a work surface so you have access to one side and chip away at the waste in the folds using gouges with sweeps that match the desired contours. Work in a relatively straight line from one end of the panel to the other, tapping the tool with a mallet (*right*). Once the contours are rough-shaped, give them a final shaping, working the gouge with hand pressure only. Reposition the clamps to work the other side of the panel.



Carving the Ends

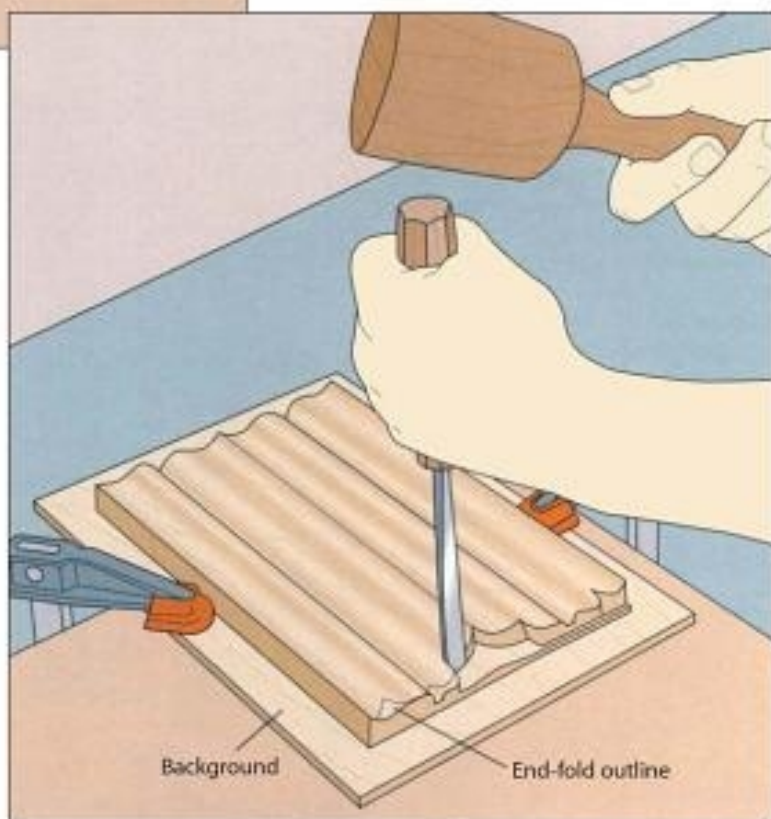


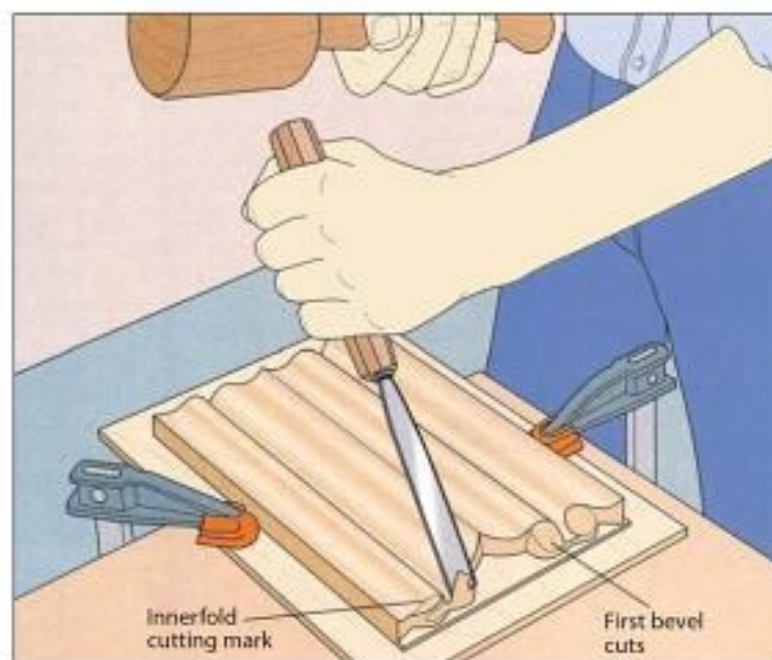
Outlining the end folds

Once the folds on the main part of the panel are done, you can carve the end folds. Copy your design full-size onto a piece of paper, and then transfer it to the panel; or, you can make a template, as shown at left. For the template, trace your design on a board and cut it out using a band saw or saber saw. Then, hold the template across the top end of the panel and use a sharp pencil to trace the outline of the end folds on the workpiece (left).

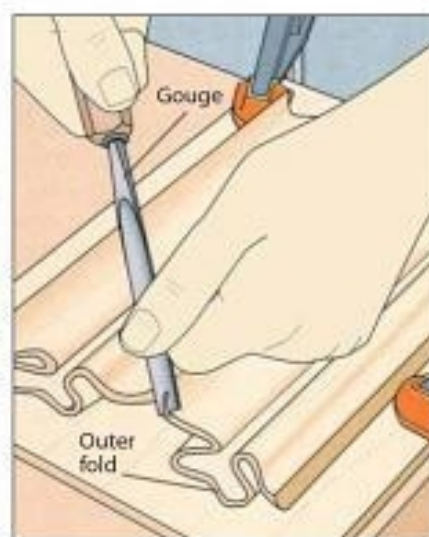
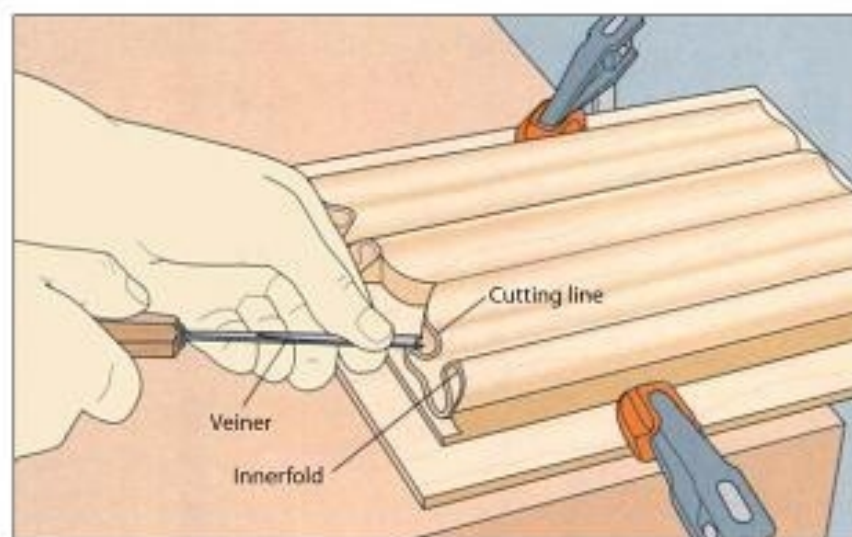
Setting in the end-fold pattern

The end-fold pattern is set in with gouges and chisels. The ends are defined first, then the inner folds are set in and sculpted. To define the ends, clamp the panel to a work surface and work from one edge of the panel to the other to chop away the waste. For each cut, hold a gouge or a V-tool with the appropriate curve vertically on the outline and strike the handle with a mallet (right). Cut down to within $\frac{1}{8}$ inch of the background. (This protects the background for now, but the waste will be removed later.)



**Setting in the inner folds**

Mark the inner folds on the end of the panel with a pencil. Then rough in the transition from the inside layer of the linen to the outside layer by making bevel cuts with a chisel. The cuts should all start at the marked cutting line and slope downward to within about $\frac{1}{4}$ inch of the background. For each cut, tap the chisel with a mallet, working from one side of the panel to the other (left).

**Sculpting the ends**

Once all the bevel cuts are made, mark the ends of the folds on the beveled end of the panel. Then begin sculpting the panel's end with a 60° V-parting tool, carving along the outline of the folds. Next, use a narrow veiner to remove waste from between the inner and outer folds, holding the tool horizontally (above, left). Undercut the folds slightly, leaving them about $\frac{1}{8}$ inch thick; use the veiner for the

inner folds and a gouge of moderate sweep for the outer folds. At the same time, remove the last of the waste from the background you left before. Finally, use the gouge to bevel the ends of the folds so they will catch the light (above, right). Sand any rough spots with fine sandpaper, making sure not to round over any edges created by the chisels.

Carving a Barnyard Scene

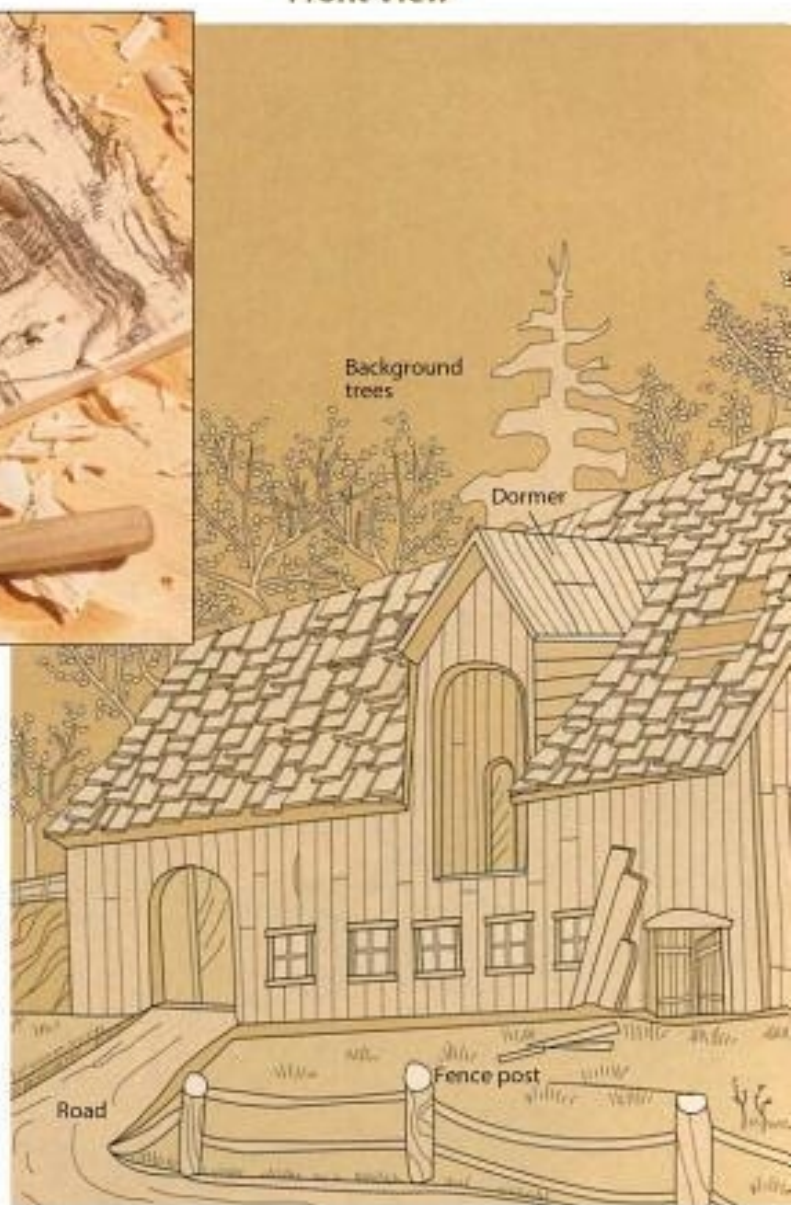
A low relief carving like the barnyard scene below is a study in the art of illusion. While the carving is actually fairly flat, the manipulation of perspective and other techniques give the appearance of depth. The process requires good planning, starting with an appropriate subject. While there are an infinite

number of possibilities depending on the experience of the carver, something like this barnyard scene is a good choice for a beginner because it has a clear background, middleground, and foreground. Also, having a subject like a derelict barn makes the job easier.

Front View



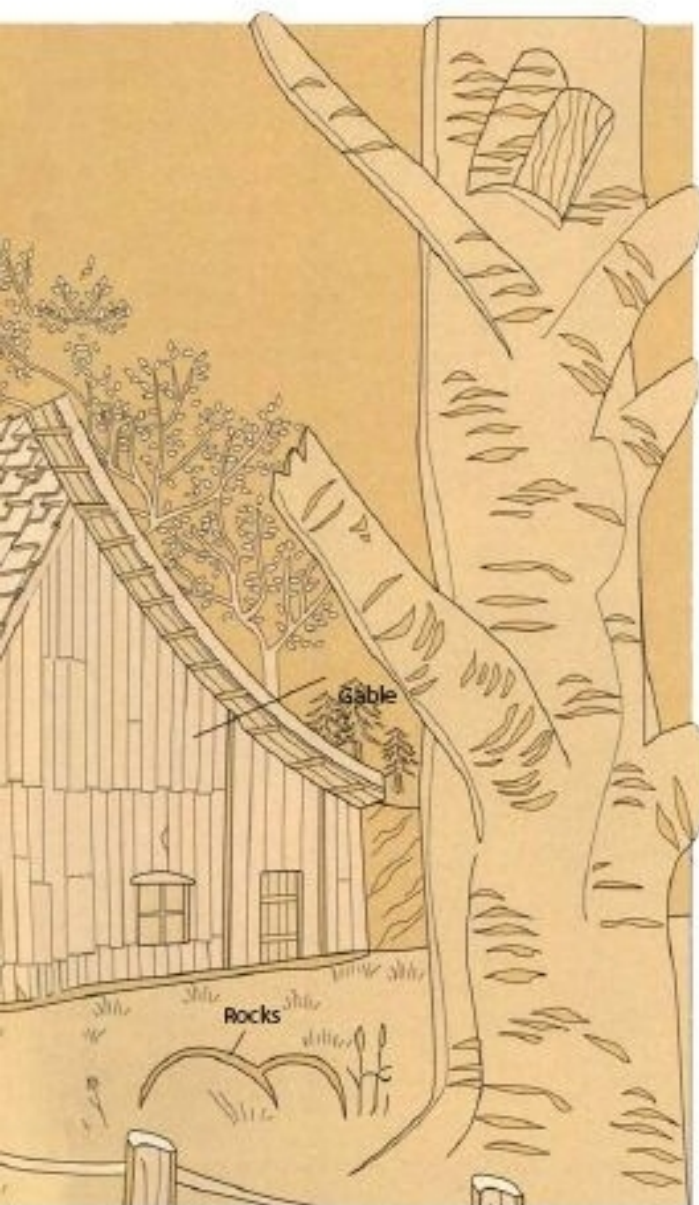
The branches of the background trees are being sketched on the nearly finished carving. Just like the shell, the barnyard pattern has been transferred to a sheet of clear acetate. This method makes it easy to sketch and resketch different elements when they are needed.



Copyrighted material

There is no need to worry too much about straight lines and crisp detail. The subject invites you to take a softer approach. Whatever the subject, reproduce it on acetate. This will save hours of resketching and greatly increase your accuracy. Take the time to study your sketch to determine the hierarchy

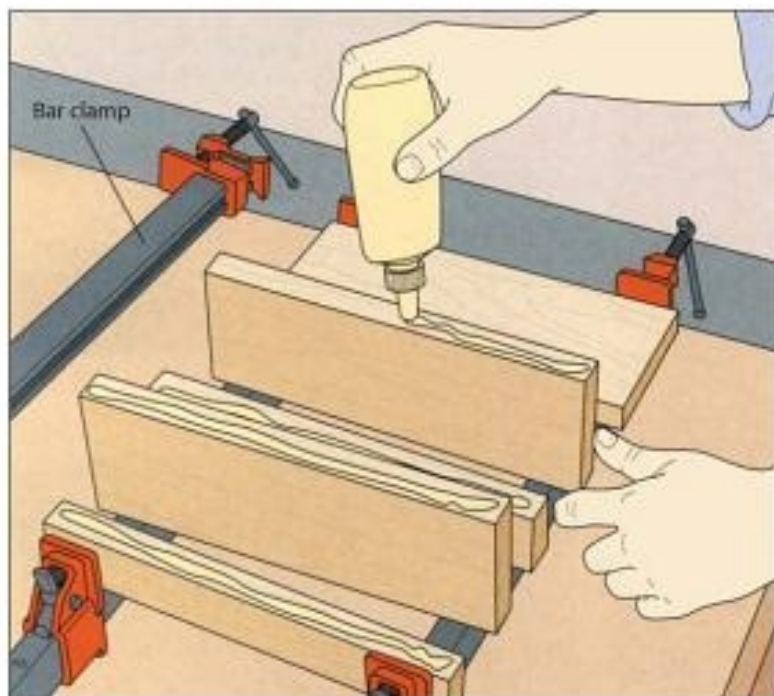
of elements. In the barnyard example, the lowest location is the sky followed by the background trees. The foreground should slope toward the barn. The dead tree is the highest element of the carving. These and other techniques are explained on the following pages.



Profile



Carving the Background



Gluing up the blank

As with all woodworking projects, wood movement is an important consideration when planning a relief carving. A wide panel is particularly prone to warping. You can solve this problem by edge-gluing several narrow strips to make the carving blank. Select pieces of $\frac{3}{4}$ -inch-thick basswood with straight grain and no figure. This will make for invisible joints as well as easy carving. After jointing the boards to produce a straight edge, place them on a pair of bar clamps and choose the best match to produce a seamless-looking blank. Turn all but the first board on edge and apply a bead of glue (left). Reposition the strips flat on the bar clamps and tighten them. Apply a third clamp across the top of the assembly. Tighten all the clamps evenly. After the adhesive has cured, trim the blank to the desired size. Finally, use a piece of acetate to transfer the design to the blank, as shown on page 89.

Defining the background

The background is created by removing waste wood from this area to the correct depth. The background has two levels, the trees and the sky. Mark two lines along the edges of the blank $\frac{1}{4}$ and $\frac{3}{4}$ inch below the carving surface. Begin by lowering the entire background to the tree level, $\frac{1}{4}$ inch below the surface. Define the limits by making a cut with a V-tool along the tree and the barn (right). Do not outline these elements by cutting straight down with a hammer and chisel. This crushes fibers, making it impossible to create a clean cut. Reach the final depth in several passes.





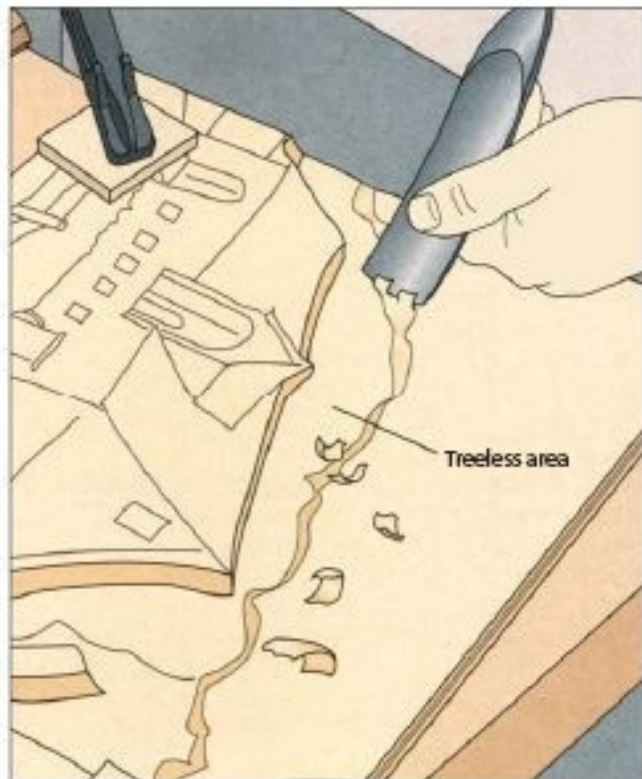
Lowering the background

With a 35-millimeter No. 3 gouge remove the waste to lower the background (*left*). Work across the grain for easier control of the tool, removing the waste in thin shavings. Alternate between this and the previous step until you reach the line marking the first level.



Defining the background trees

Use the transparency to redraw the treeline. Next, define the trees by lowering the sky just beyond their outline by another $\frac{1}{8}$ inch with a No. 8 gouge (*above*). Then use a wide No. 3 gouge to lower the entire sky area to its final level.



Blending the trees into the sky

Round over the edge of the tree level to imitate the shape of a real treeline. Use a medium No. 6 gouge to smooth the edges where they meet the level of the sky.

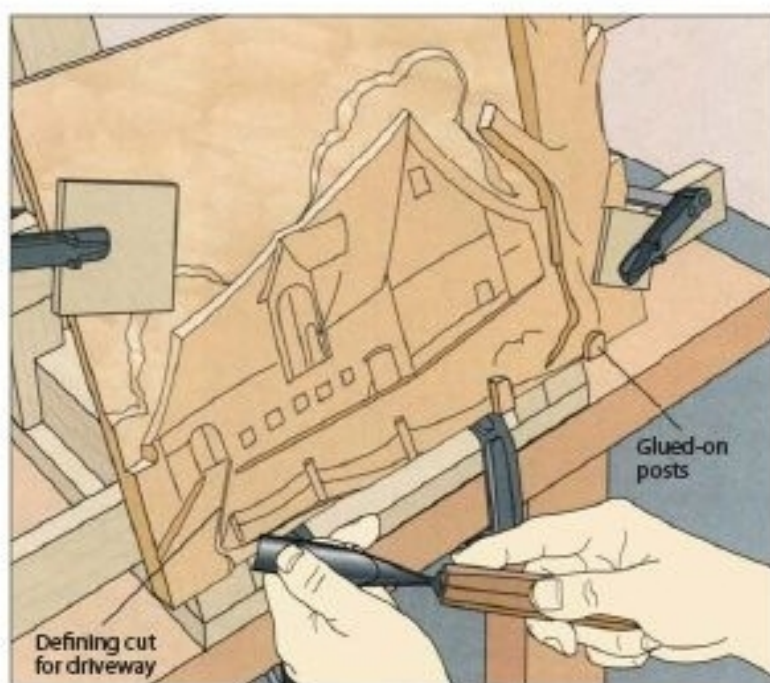


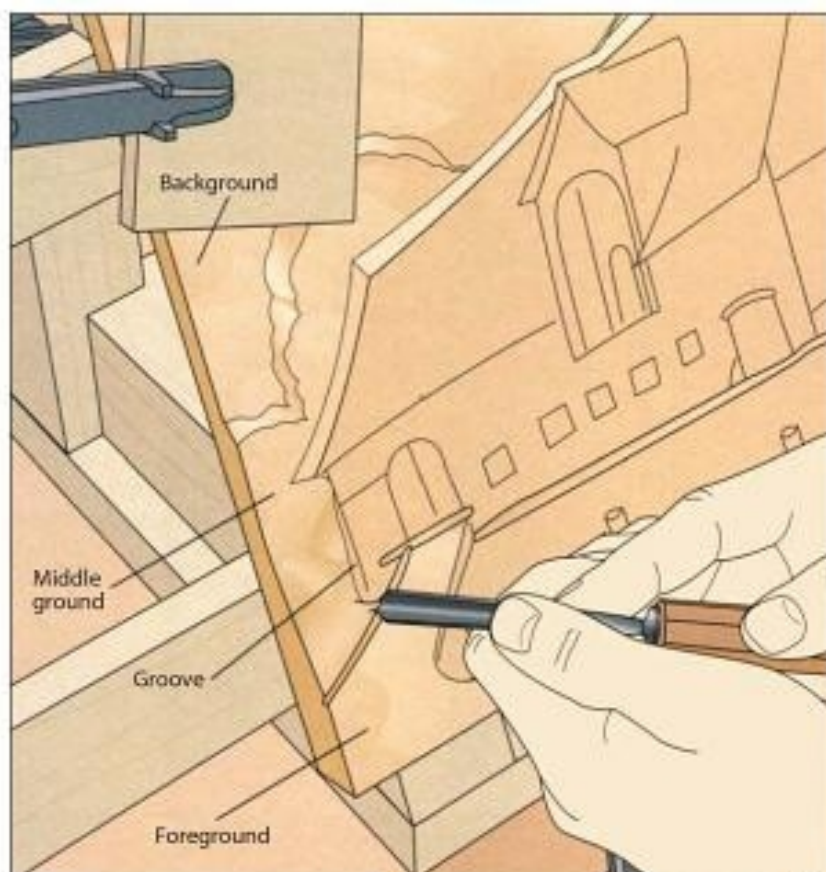
Planning ahead is essential to good relief carving. When carving the foreground you must be sure that raised elements such as the fence, rocks, and the road are not carved away. Isolate them with a few cuts of the V-tool. The foreground is then sloped toward the barn. A carving stand (page 47) like the one shown at the left is an invaluable aid for relief carving. The shadows cast by the carved details will change according to the orientation of the piece. A carving stand holds the board almost upright, so you can see the carving close to its intended presentation.

Carving Out the Foreground

Defining the road

Clamp a carving stand (see above) to your workbench and secure the board in place. The first step is to lower the road and the driveway to a uniform level. Define the road and the base of the barn with a cut of a V-tool to a depth of about $\frac{1}{8}$ inch—a bit deeper as you approach the barn. To recess the road, use a No. 3 gouge to remove the waste (right), paring away just enough wood so the road is slightly higher than the bottom of the defining cuts. This is also a good time to glue on two little blocks to serve as the two right fence posts.



**Carving the left landscape**

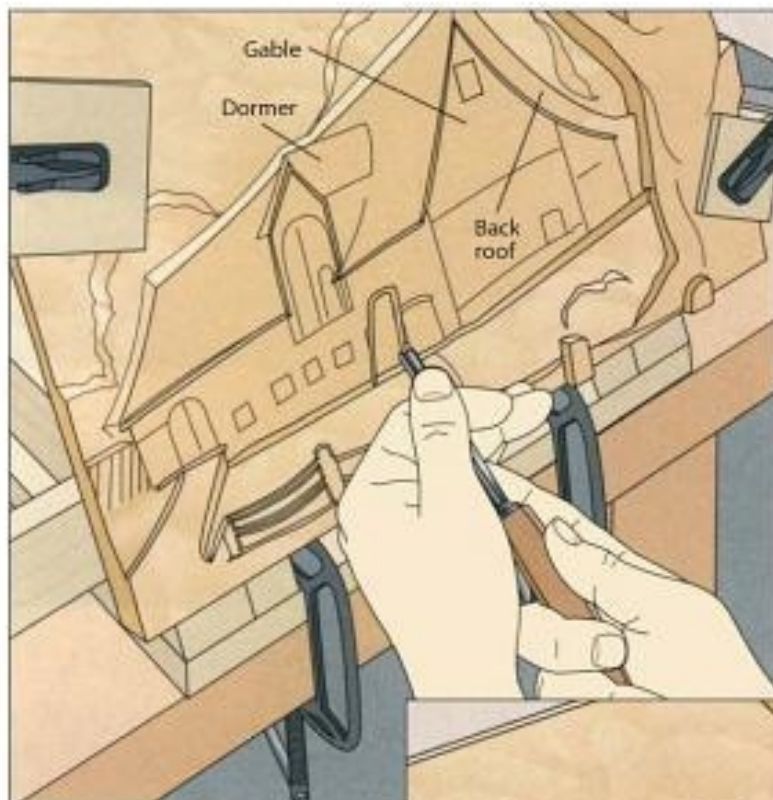
The ground to the left of the barn slopes from the road all the way to the horizon, dropping slightly from foreground to middleground to background. First define the left wall of the barn by cutting a groove with a V-tool (left). Then use a No. 3 gouge to remove the waste.

Sloping the main foreground

Prepare the foreground for carving by isolating those elements that must remain at full height, in this case, the rocks and the fence. At this stage you do not have to be too precise; cut as close as you feel comfortable with a V-tool (right). Next, slope the foreground toward the barn. At the very front, remove just enough wood to allow the fence to stand out. From there, work toward the barn, cutting slightly deeper as you go. Since you have already made a V-cut just below the base of the barn, the waste pieces should pop free.



Carving the Main Elements

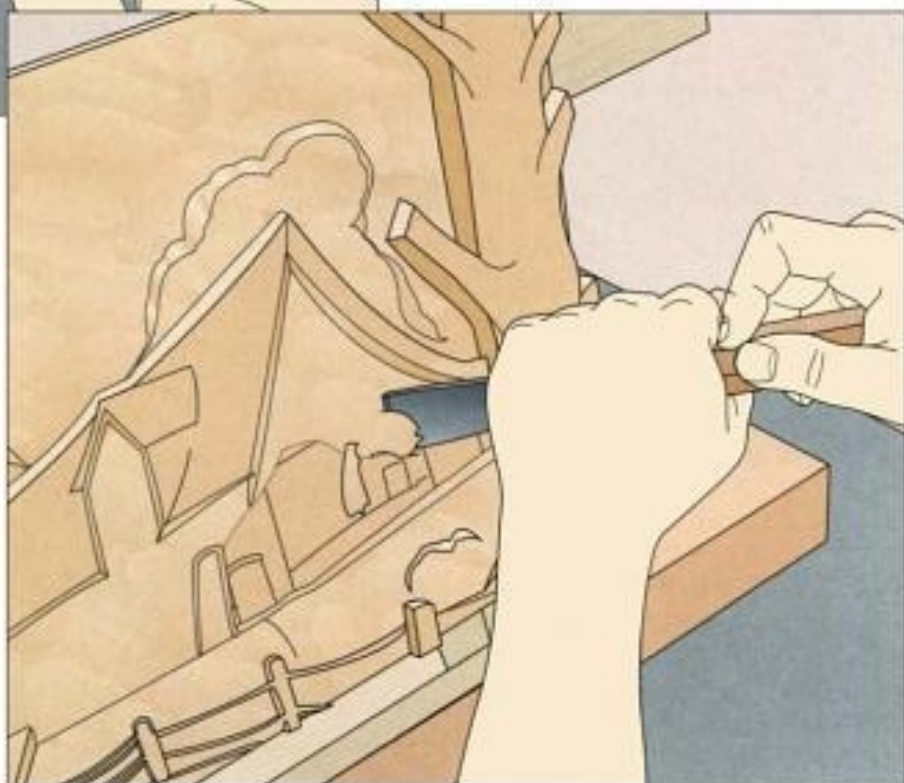


Defining the features of the barn

The outline of the barn was carved in the previous steps. Now use a V-tool to isolate the different elements that will stand out from the barn. Since the walls will be lower than the roof, identify the roof first. Use the V-tool to remove the waste from just below the roof line. Work along the edge and into the point of the gable. The groove should stop before the peak, allowing for the overhang of the roof, which extends past the gable. Cut a groove to define the back part of the roof on the right. Be sure to leave it at least a 1/4 inch thick to let you detail it later. Also define the inside of the dormer. The boards leaning against the wall are an added little touch. Cut around them with a V-tool (left).

Lowering the walls

Lower the walls to a uniform depth. Use a No. 3 gouge to remove the waste, working perpendicular to the grain wherever possible (right). This will make it easier for you to control the depth of cut and prevent the blade from digging into the wood. For the peak and other tight spaces, use a No. 2 skew chisel. Finally, redraw the barn details with the help of the acetate.



**Defining the doors and windows**

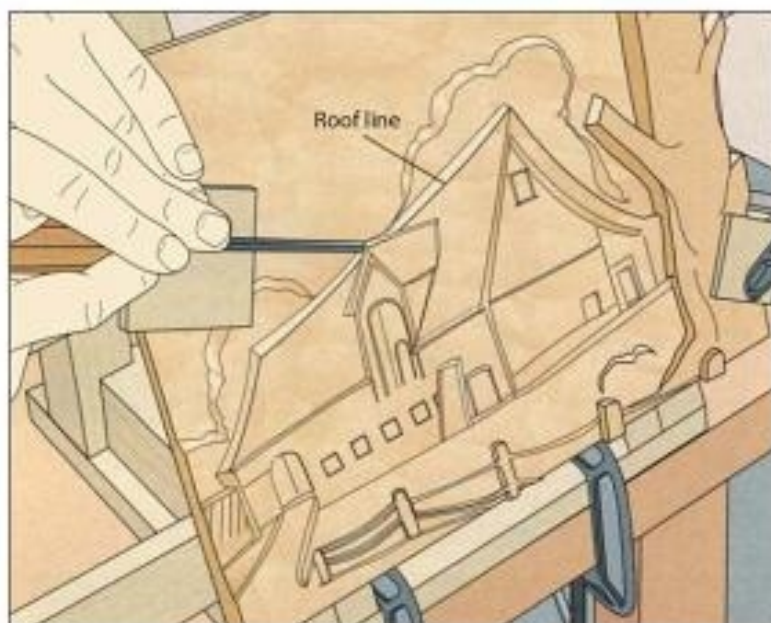
Use a craft knife or scalpel to define the doors and windows. Hold the blade perpendicular to the wood and cut smoothly along the line to the correct depth (*left*). Cut each line in two strokes, starting at each end and working toward the middle. This will allow you to cut cleanly into the base of each corner with the tip of the blade. Use your free hand to guide the blade. Also make a staggered cut along the line separating the end wall from the gable. This will mark the point where the siding boards on the gable overlap the ones below (*see photo, page 118*).

**Recessing the windows and doors**

Use a No. 3 gouge to remove the waste inside the windows and the doors. Cut with the grain, allowing the waste pieces to pop free (*above*). Shave all the recesses to the same depth. Finally, use the skew to slope the top ½ inch of the end wall into the line you cut in the previous step to give the illusion of the top boards overlapping the lower ones.

**Sloping the roof**

Separate the elements of the dormer from the main roof with a cut of a V-tool. To give an illusion of depth, the main roof must slope away at a slight angle from the bottom right to the top left. The edge of the roof—from the right peak, down the front, and along the eaves—must be left at its full thickness. Use a wide No. 3 gouge to remove the waste and slant the roof. Take out thin shavings to create an even slope that ends in a ¼ inch thickness at the top left corner.



Cleaning up the roof line

Outlining the barn will have left a slightly ragged edge that needs to be cleaned up. First, use a 6-millimeter No. 2 gouge to undercut behind the peak of the dormer roof where it extends past the main roof line (left). Then, with a wider No. 2 gouge, shave the roof line down to its proper size, undercutting slightly to form a sharp edge.



Trimming the overhang

The overhang helps add an illusion of depth to the carving. It is defined by the exposed underside of the back roof. When the walls were first lowered, the far roof was left fairly thick; now is the time to trim it. Use a No. 3 or No. 4 gouge 16 millimeters wide or so to trim the roof. Cut away the waste with slightly angled downward cuts (above). Take away very thin shavings to make a clean cut and avoid crushing the fibers.



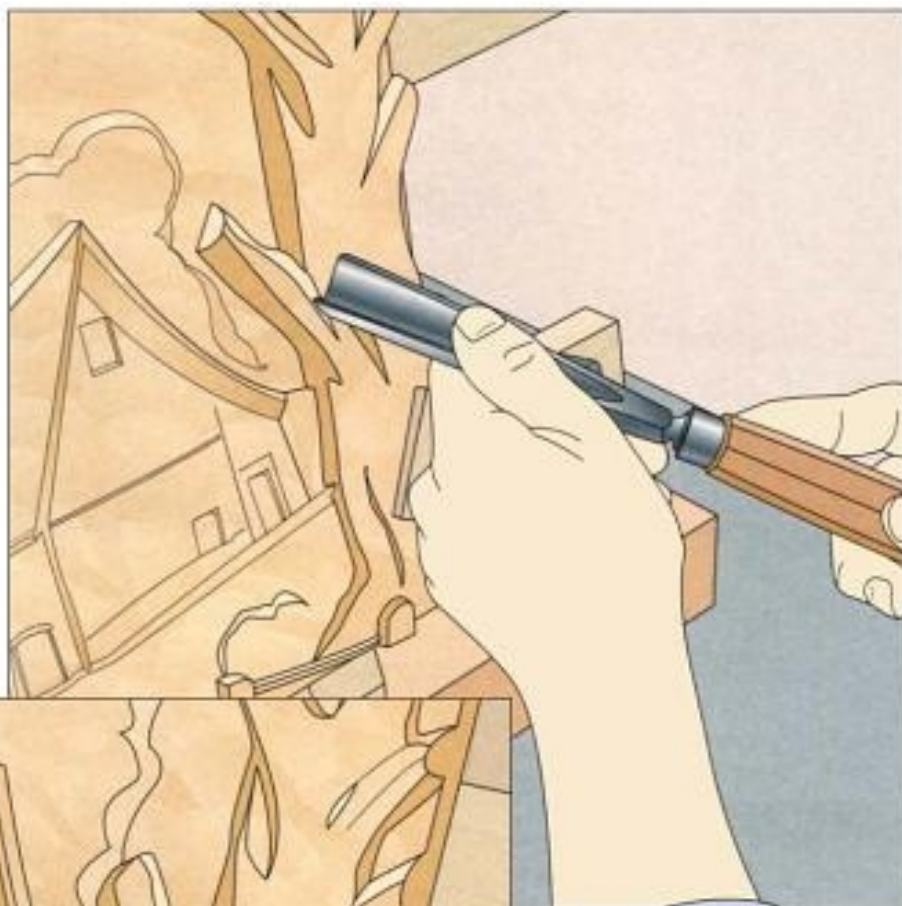
Refining the fence posts and rails

The fence posts and rails that were given their basic shape in step 3 need to be cleaned up. You can do this with a 6-millimeter No. 3 gouge, carefully paring away thin slivers of waste until the outline is sharply defined. Then use the tool to round over the small blocks that represent the foremost fence posts, which were glued on at the foreground stage.

Refining the Tree Shape

Defining the branches

Unlike the barn, which demands crisp lines, the tree needs a softer look. First, define the branches. A common mistake is to have all the branches stick out from the side of the trunk. In reality, some branches should start on the front face of the tree. This can be done by carving the crotch of a branch into the front of the trunk with a few strokes of your V-tool (*right*).



Contouring the tree

The branches and trunk can be shaped with No. 3 and No. 4 gouges of different widths. Do not just round over the edge, but arch the whole width of the trunk. Work from the centerline of the trunk toward the edges (*left*). Increase the radius slightly as you approach the edge. When rounding over the branches, be sure to work with the grain to avoid digging into the wood too deeply.

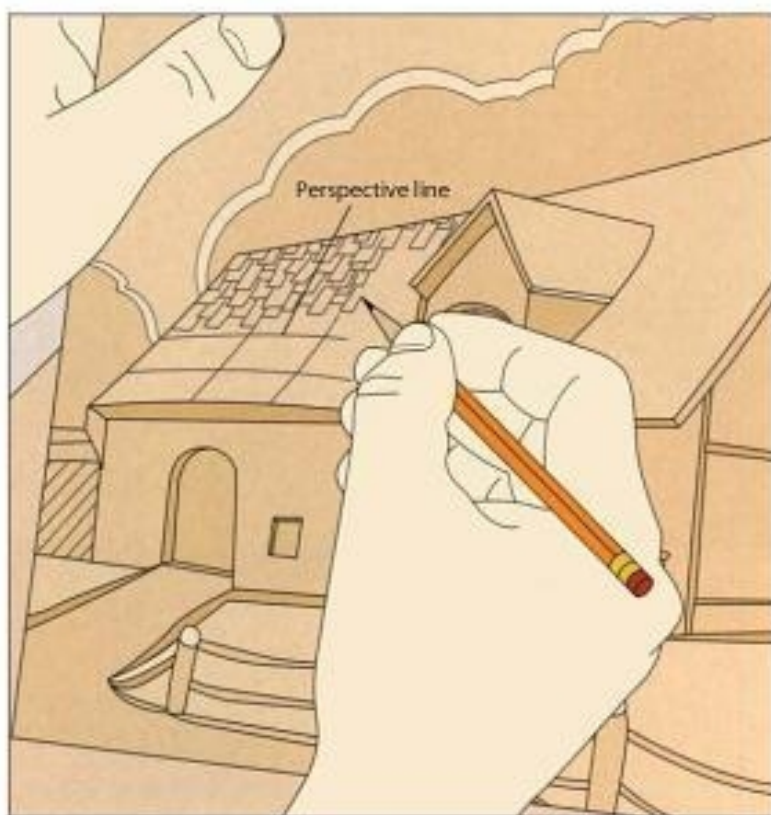


A small craft knife is used to undercut a shingle. This technique creates the look of overlapping pieces and is useful for other types of carving, such as certain bird feathers. Many carvers prefer to use a surgeon's scalpel with replaceable blades, available through medical supply houses. Experienced carvers can expertly fill a roof with shingles by eye. Beginners, however, will find that an accurate drawing showing the proper size and layout of the shingles is invaluable. You will have to redraw frequently to compensate for the undercutting of each row, which will remove some of the pencil lines.

Carving the Shingles

Laying out the shingles

The shingles get slightly smaller as they move from right to left. To help orient the shingles, draw some horizontal and vertical perspective lines. Next, fill in the shingles referring to the drawing. It may be possible to use the transparency, but for fine details this often proves difficult. Try to keep the same number of shingles between the lines, making them correspondingly larger as you move to the right. Remember that the shingles do not line up evenly along their bottoms, but are staggered.

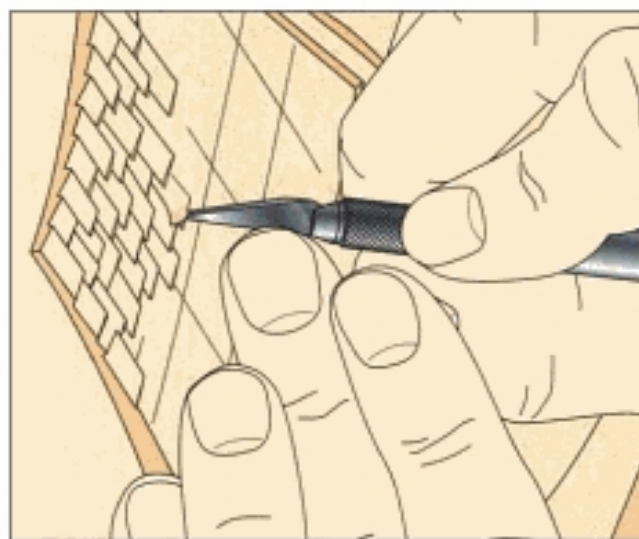


**Cutting the outlines**

Starting with the top row, cut the outlines of the shingles to define them. Holding the knife like a pencil, cut straight down into the wood along the lines (left). Do not worry about cutting too deeply; the following steps determine the amount of waste that will be removed.

**Angling the shingles**

Angle all the shingles to make them stand out and give the roof texture. Holding the knife at the correct angle, use your free hand to push the blade through the wood (above).

**Undercutting each row**

To give each shingle the correct slope, undercut each row right after cutting and angling it. This will set up the next row at the right pitch. Hold the knife fairly flat against the roof and slide it along the row. Rely on your free hand to push the blade into the wood (above). Keep the heel of this hand on the roof to give you maximum control and prevent cutting into the previous row. Take just a fine shaving. A common mistake is removing too much waste. Also remember to angle the cut slightly, starting slightly above the lower edge of the shingles. The highest point of all the shingles should be the original surface of the roof. Once the undercutting is complete, repeat to form the shingles in that row.

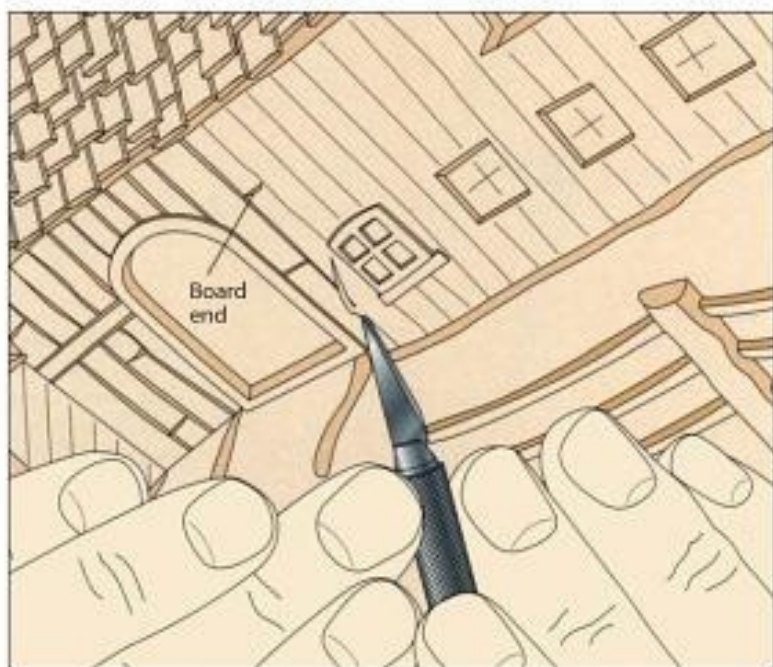


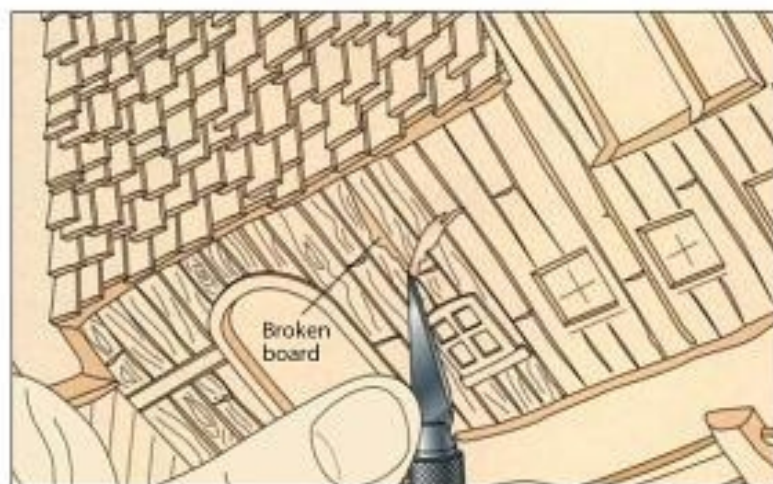
The panes of a window are delineated by cutting two crossing lines. Make each line with intersecting angled cuts to remove the waste in tiny strips. Notice how the lower wall boards have been recessed slightly toward the staggered ends of the upper gable boards. This makes the upper gable boards appear to overlap the lower ones. Each window frame has been outlined with a knife and the surrounding wood sloped toward it.

Detailing the Main Elements

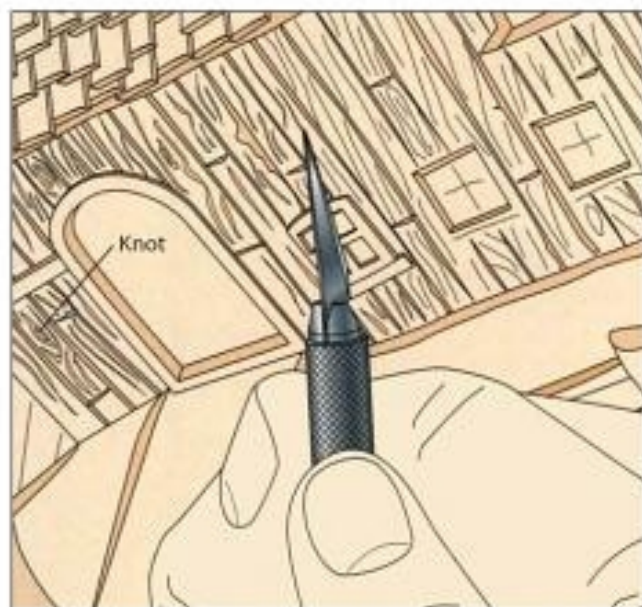
Defining the boards

The barn boards are separated from each other by taking out an extremely thin wedge of waste wood between them. To remove the waste in two strokes, first cut along the board line then make a matching cut at a slight angle to release the waste (*right*). As you approach each window, first outline the frame with your knife, then recess the nearby wood toward it to create a raised effect.



**Adding imperfections**

Incorporating small details will give your carving a more realistic look. One trick is to make some of the boards appear broken or missing. To break a board, first outline the jagged line, cutting along its length. Next, shave away most of the waste with an angled cut (*left*). Use a combination of intersecting vertical and horizontal cuts to clean out the waste. Other ideas are to create broken window panes or a hole on the roof. Remember that for any of these effects you need to make only a very shallow cut.

**Texturing the wood**

Texture the wood to resemble its grain with downward slices of the knife. Make some straight-grained and some wavy lines. Add small holes to represent knots. Double piercings in each board end can simulate the look of nail heads. To make the grain cuts, hold the knife like a pencil and carefully slice the patterns. Do not remove any waste. The effect of this procedure may seem almost invisible at first, but it will be much more noticable after finishing because the cuts will absorb more stain and darken (*photo, page 106*). Add grain marks to the fence posts and rails as well as the shingles.

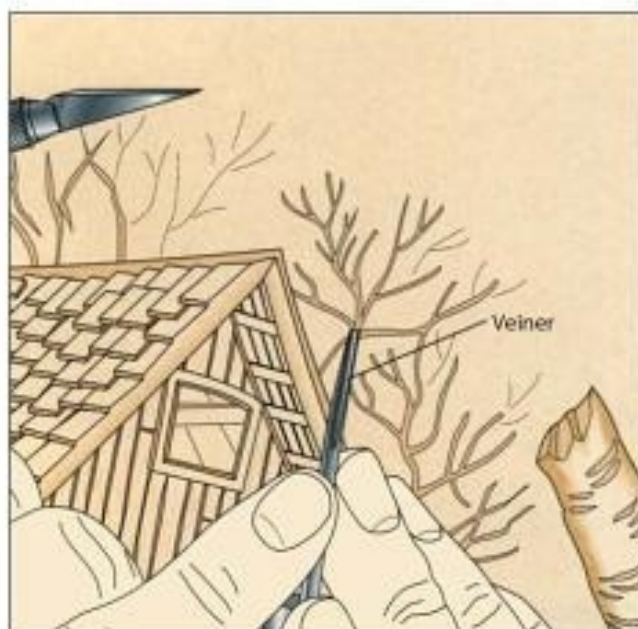
**Detailing the tree**

Each species of tree has its own individual look. The tree in this project is a birch, which features dark horizontal scars. Some broadleaf trees, like maple and oak, have deeply grooved bark, while some pines have overlapping, scale-like bark. Represent the scars on the birch tree by taking very fine cross-grain cuttings with a 6-millimeter No. 11 gouge (*above*).

A daisy punch adds a flower motif to the carving of the old barn. Punchwork creates the important final details, like flowers, leaves, and grass that are too fine to be made with knives and gouges. The tools are available from some woodworking stores and leather suppliers, or you can fashion your own.



Adding Final Details



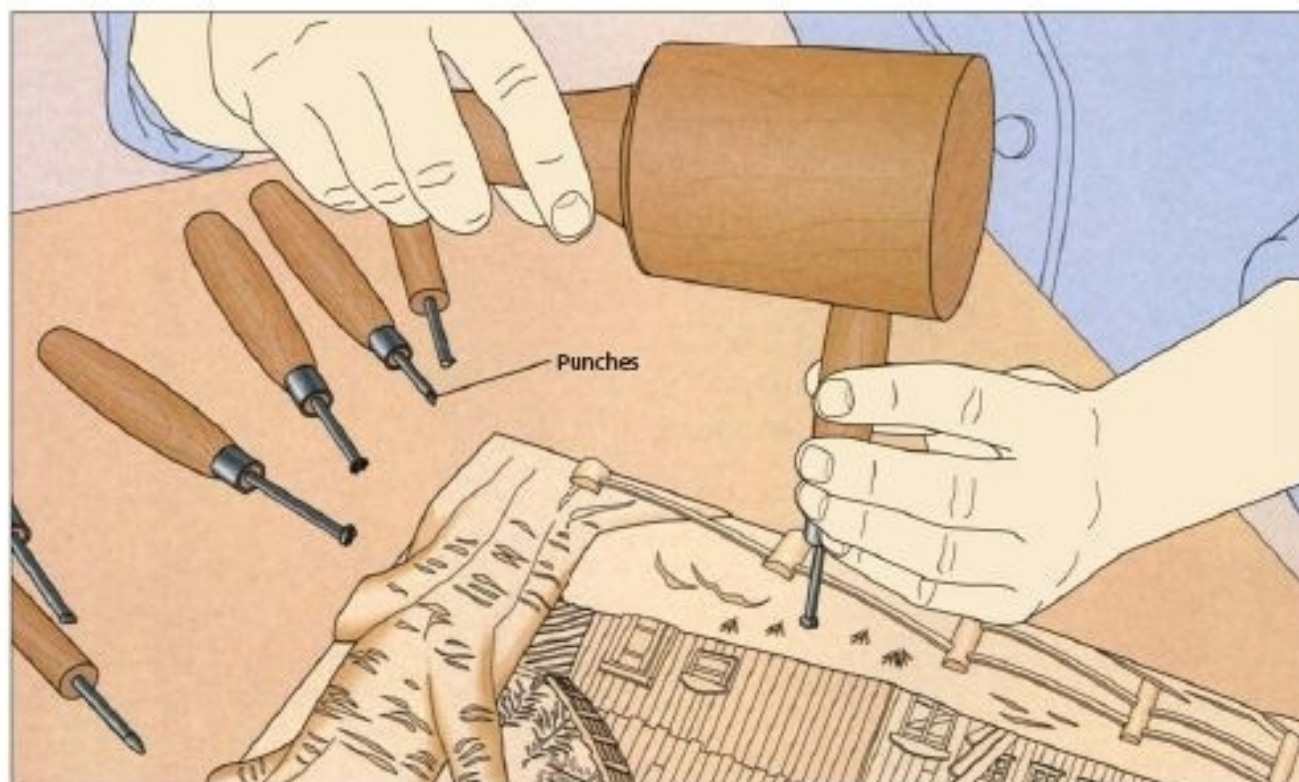
Carving the background trees

Trace the design on the acetate to draw the background tree branches. With a fine veiner, groove out the branches, taking a slightly larger cut for the bigger limbs. Hold the veiner in two hands to give you maximum control (*above*).



Making pine trees

With a bit of experience it is easy to make background pine trees with a V-tool. Practice first on a scrap board. To make the tree shape, start at the top, then "walk" the tool downward, alternating pressure from side to side. Because of its simplicity, this form is best kept fairly small, and placed in the background.



Shop Tip

Shop-made punches

Many punches can be made in the shop from nail heads. To make a punch, mount a 16d common nail in a vise. Scratch the desired shape on the head then rough it out with a regular bastard file. Use a set of very fine files to perfect the design. Mount the finished punch in a file handle.



Detailing with punches

A variety of punches can be used to detail the carving. Use one or two sizes of leaf-shaped punches to decorate the background trees. To make each leaf, hold the punch in the appropriate place on a branch and tap it lightly with a mallet. Rotate the punch so the leaves are not all oriented the same way. Also, change the angle of the punch slightly from leaf to leaf. This will cause all the leaves to reflect light a bit differently, creating a shimmering effect. Use the grass punch in the foreground to create clumps (*above*).

Carving in the Round

Carving in the round, or 3-D carving, differs in one obvious way from the other carving techniques shown in this chapter: The project must be conceived and worked on from all sides. Whether your piece is a bust, a wildlife carving, or a design element on a piece of furniture like the claw-and-ball foot shown in the photo at right, you should undertake a careful study of the project before beginning, including sketching front and side views. These can be transferred to the carving block, allowing you to band saw your piece to an accurately proportioned blank.

The claw-and-ball foot is thought to have been adapted from a traditional Chinese motif depicting a dragon's claw protecting a sacred pearl, representing wisdom and purity. The design was brought to England from China in

the 16th Century, and rose to prominence in the 18th Century as the favorite decoration for the feet of cabriole legs. The style remains popular on reproduction pieces today.

The steps shown below and on the following pages will enable you to create a traditional claw-and-ball. The dimensions are up to you; these and many other design elements are a matter of personal choice, depending on the piece of furniture being built and the effect you desire.

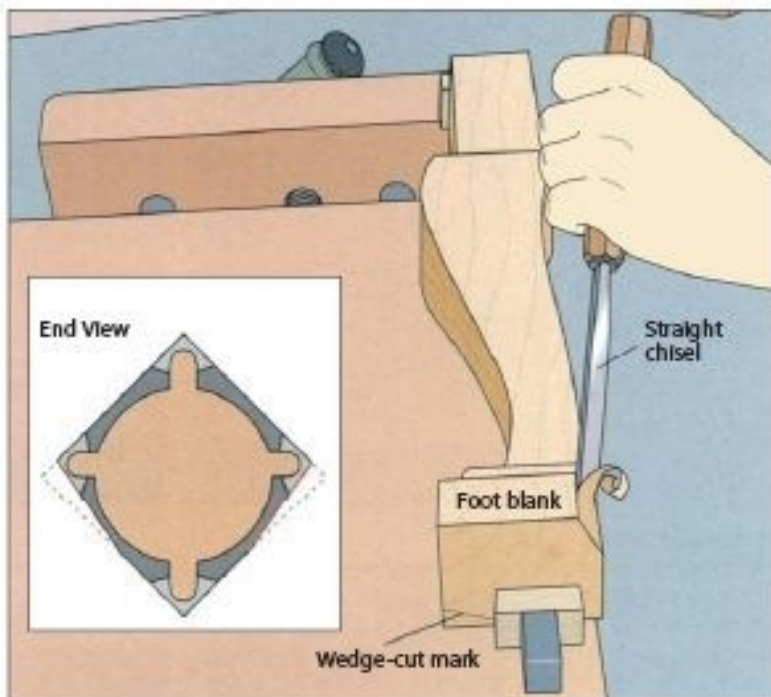


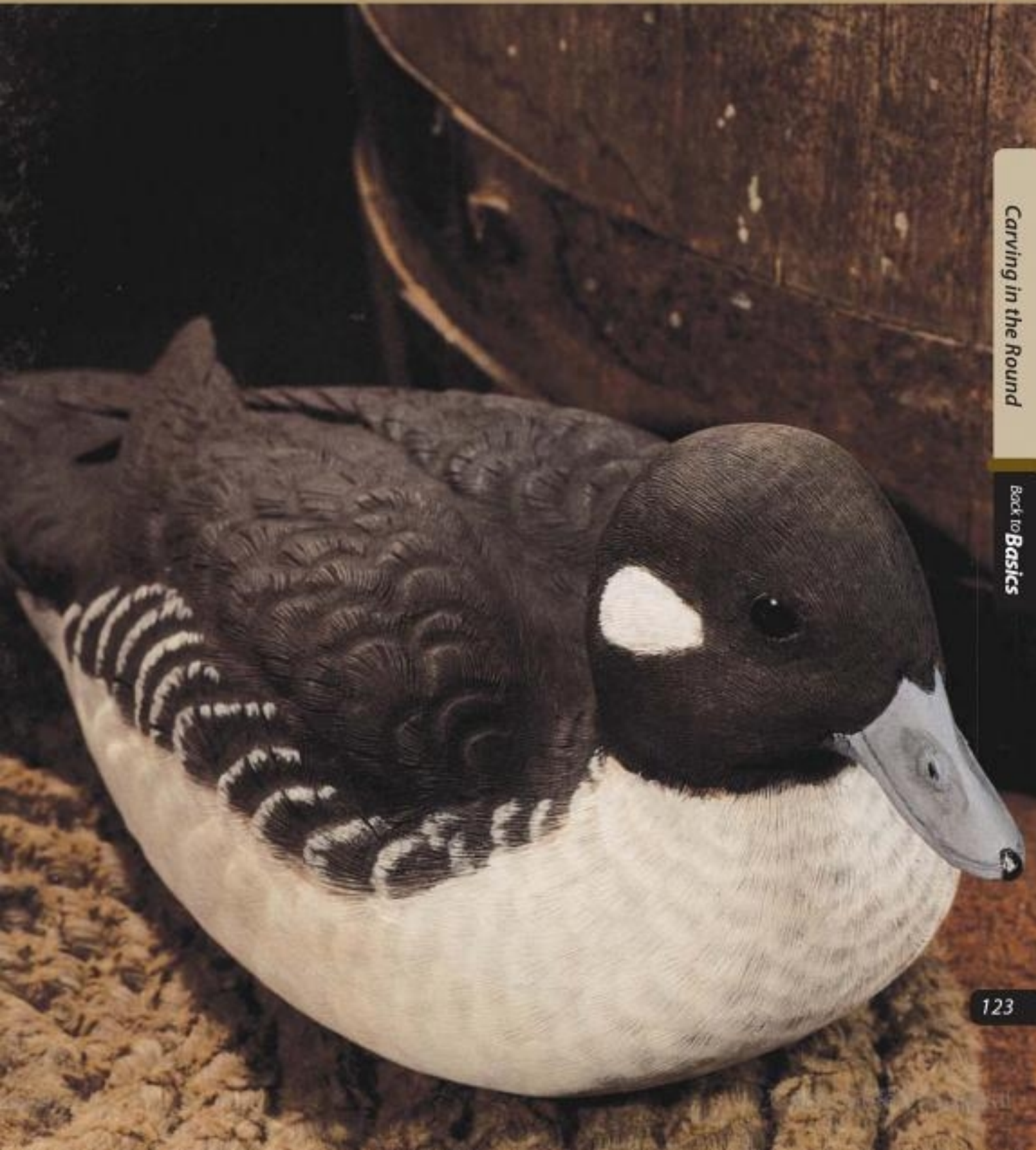
Once the lower portion of the claw-and-ball is carved, a shallow gouge is used to smooth the transition from the claw to the ankle of the cabriole leg before final sanding.

Carving a Claw-and-Ball Foot

Rough-shaping the blank

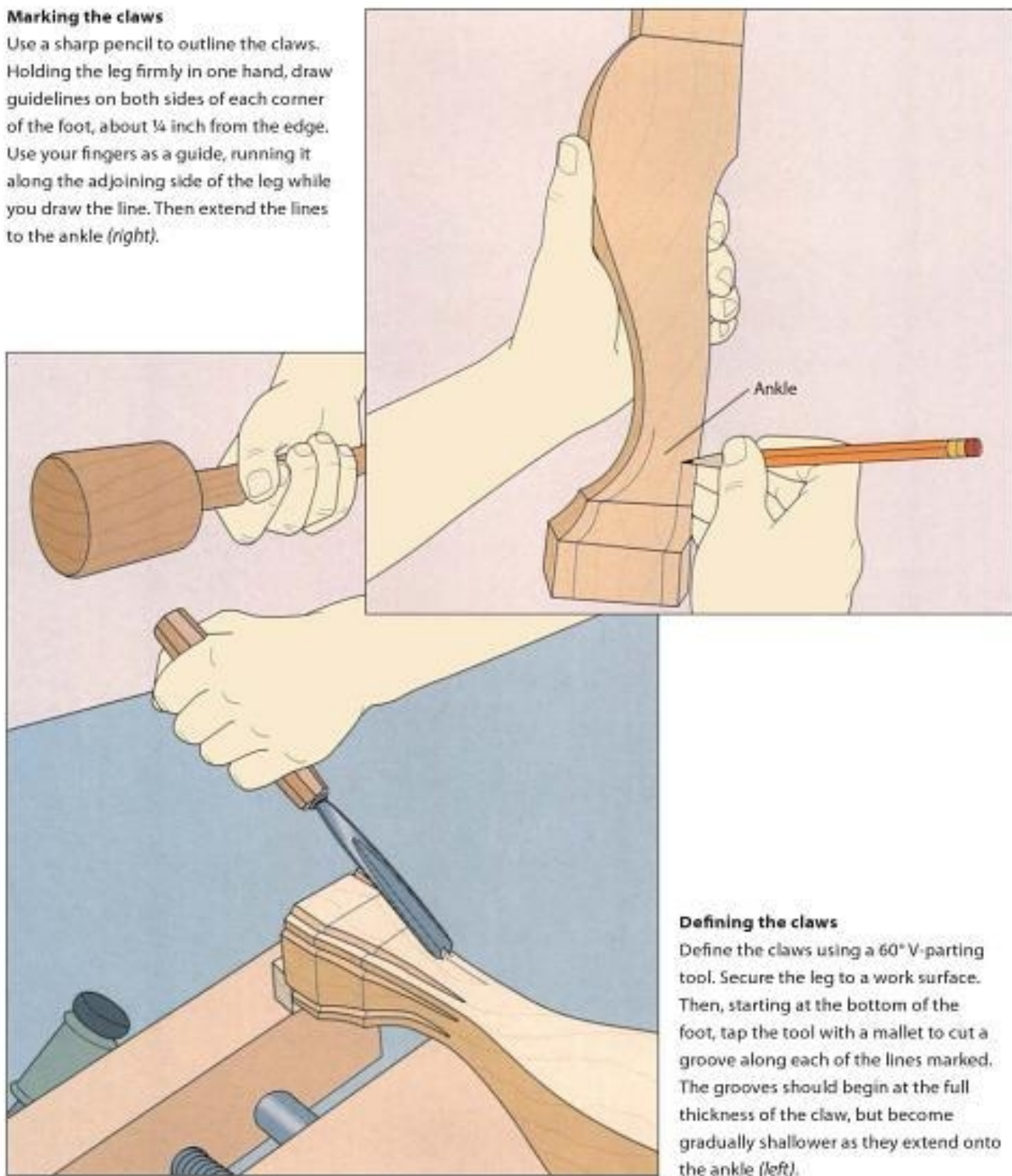
Cut a cabriole leg to the shape shown above, making sure the foot blank is larger than the finished claw-and-ball will be. The first step is to cut away a wedge from each side claw. The locations of these cuts are represented by the red lines in the end-view illustration of the leg (*inset*). The remaining waste, represented by the shaded gray areas, is removed later. To start, outline the wedge cuts on the top and bottom of the foot and secure the leg flat on a work surface. Then use a straight chisel with a mallet to cut away the wedges from the side claws (*right*). Cut to the marked line, then turn the leg over and repeat the cut on the other side.



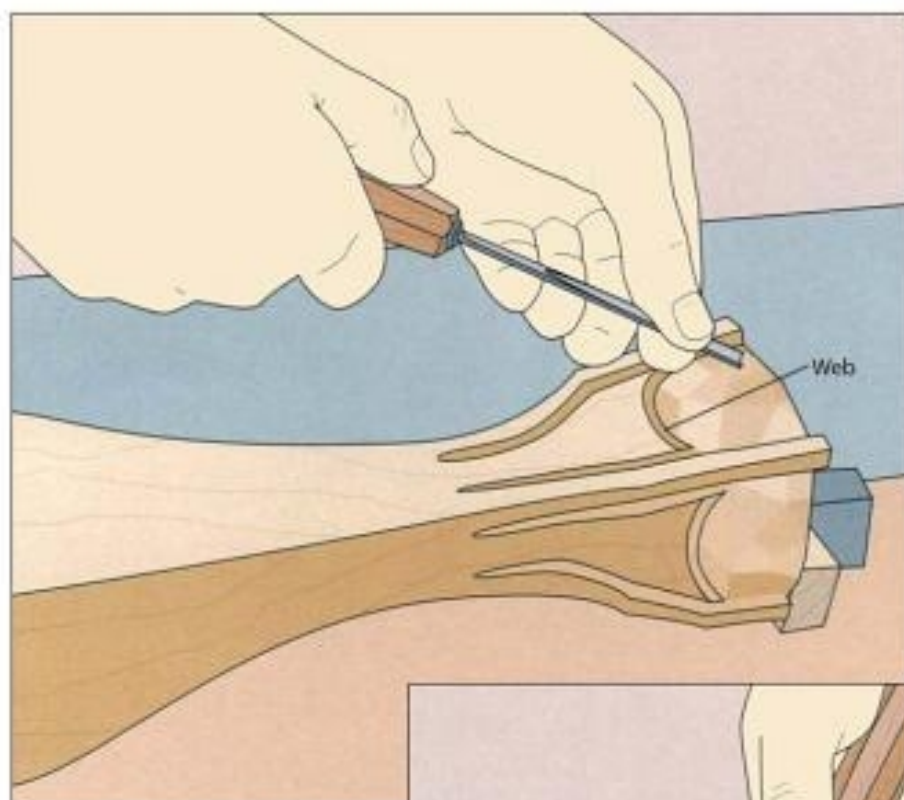


Marking the claws

Use a sharp pencil to outline the claws. Holding the leg firmly in one hand, draw guidelines on both sides of each corner of the foot, about $\frac{1}{4}$ inch from the edge. Use your fingers as a guide, running it along the adjoining side of the leg while you draw the line. Then extend the lines to the ankle (*right*).

**Defining the claws**

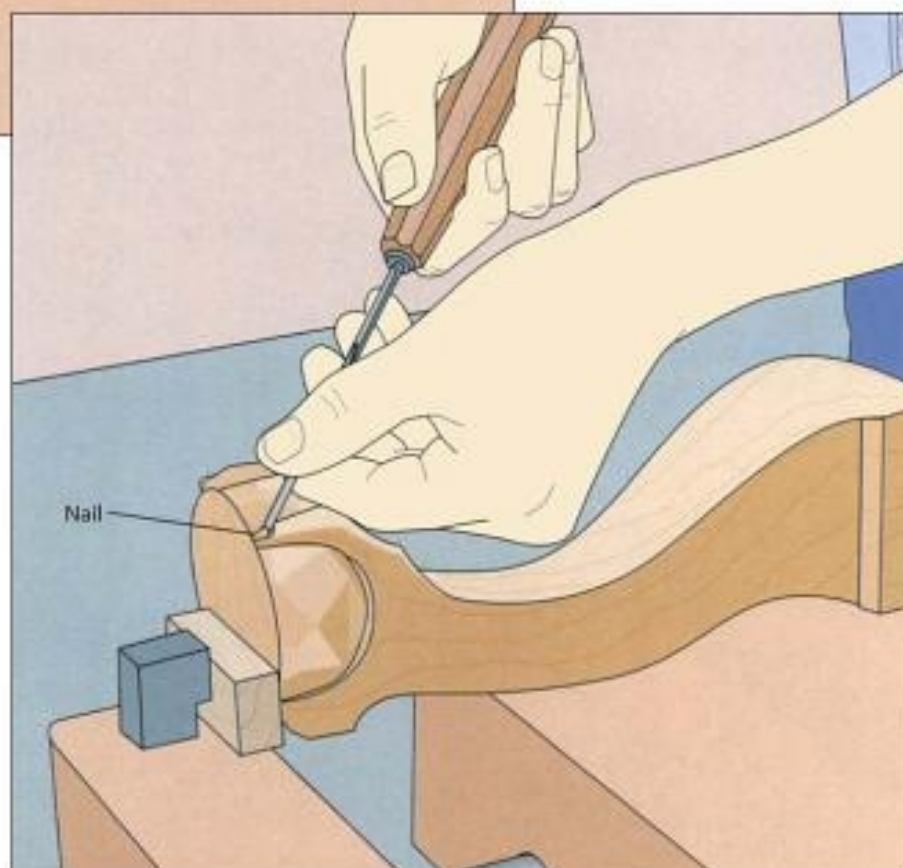
Define the claws using a 60° V-parting tool. Secure the leg to a work surface. Then, starting at the bottom of the foot, tap the tool with a mallet to cut a groove along each of the lines marked. The grooves should begin at the full thickness of the claw, but become gradually shallower as they extend onto the ankle (*left*).

**Roughing out the ball**

Once the claws are roughly formed, begin shaping the ball. First define its top edge—where the ball will meet the web—using gouges with the appropriate sweeps. Make each of these cuts across the grain by holding the tool vertically and tapping it with a mallet. Next, use a shallow-sweep gouge to round the ball (left). Work patiently; do not try to clear away too much waste with a single cut. Repeat the process on each side of the foot, repositioning the leg in the bench dogs or clamps as necessary.

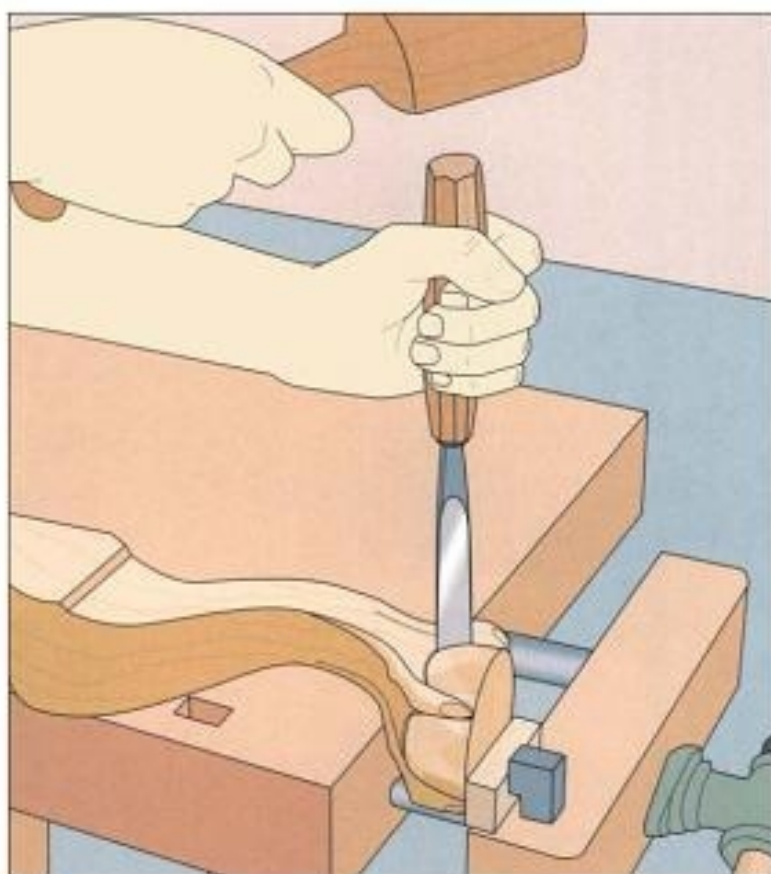
Detailing the claws

With the claw-and-ball roughed in, carve the details on the claws using narrow, shallow-sweep gouges. The claws should slope down smoothly from the ankle to the knuckles, and the thickness of the claws should conform to the curvature of the ball. Once you are satisfied with the shape of the claws, carve the nails and cuticles. Use a narrow gouge of the appropriate sweep to define the cuticle, cutting across the grain. Then carve the nail, sloping in toward the ball at the bottom of the foot (right). As a general rule, the cuticle should be located about $\frac{1}{2}$ inch from the bottom of the foot with the nail carved on it, tapering to $\frac{1}{8}$ inch high and wide at the bottom.



Defining the webbing

Once the claws are completed, choose a gouge with a sweep that matches the contours of the web to better define the transition between the ball and the web. Starting on one side of the foot, tap the tool with a mallet to cut around the top of the ball (*right*). Then, use a shallow-sweep gouge to give the ball a final shaping. Repeat the cuts on each side of the foot.

**Smoothing the claw-and-ball**

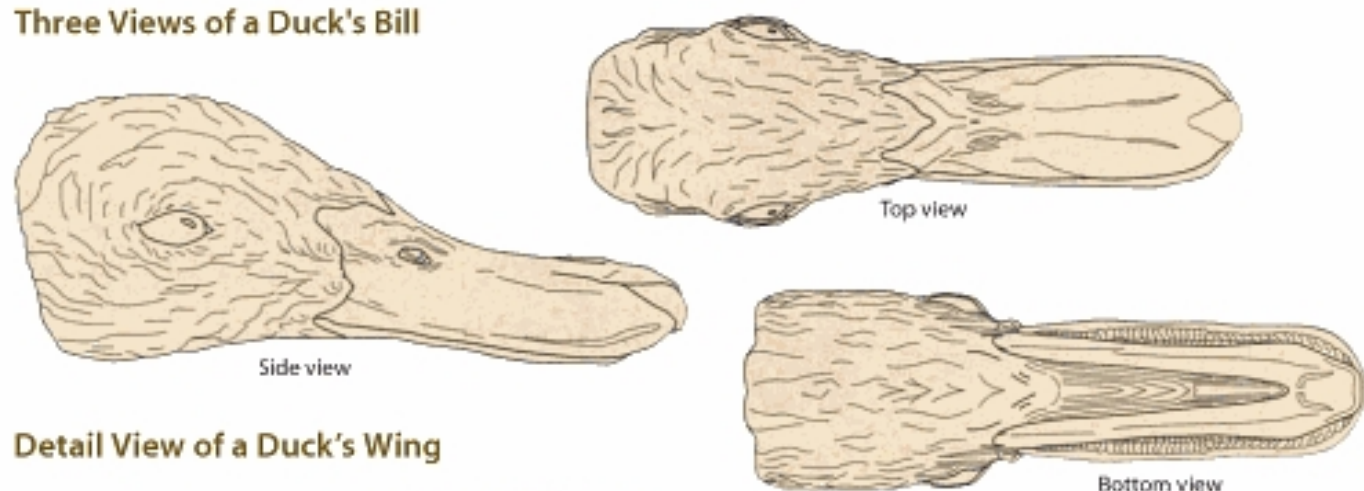
Use sandpaper to finish the claw-and-ball (*left*). For a smooth finish, use progressively finer grits. To reach the tight corners between the claws and the webbing, fold the paper and sand with an edge. If you wish, leave some of the tool marks visible.

Carving a Duck

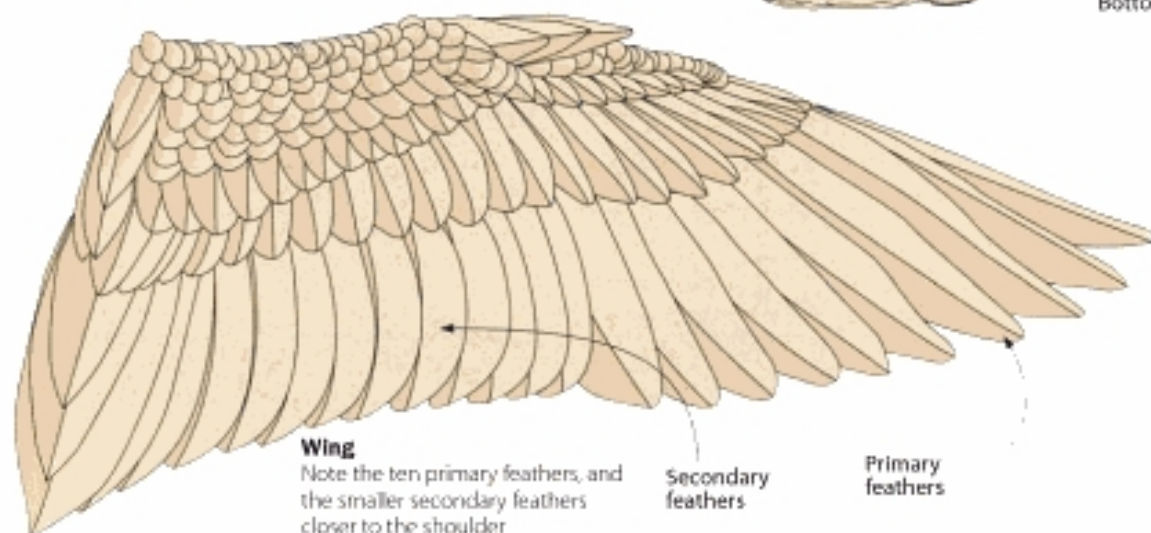
Wooden replicas of ducks and other wildfowl originated around the middle of the Nineteenth Century as decoys to attract birds to hunters. Today, carved lifelike decoys are also valued collectors' items.

The duck shown in this section is based on the actual proportions of a female bufflehead. For that reason, the templates and diagrams below are intended as precise guides. You can, however, create a more fanciful creation. Following the steps here will sharpen your control over your carving tools and develop your sense of volume and space—all of which are critical to carving in the round.

Three Views of a Duck's Bill



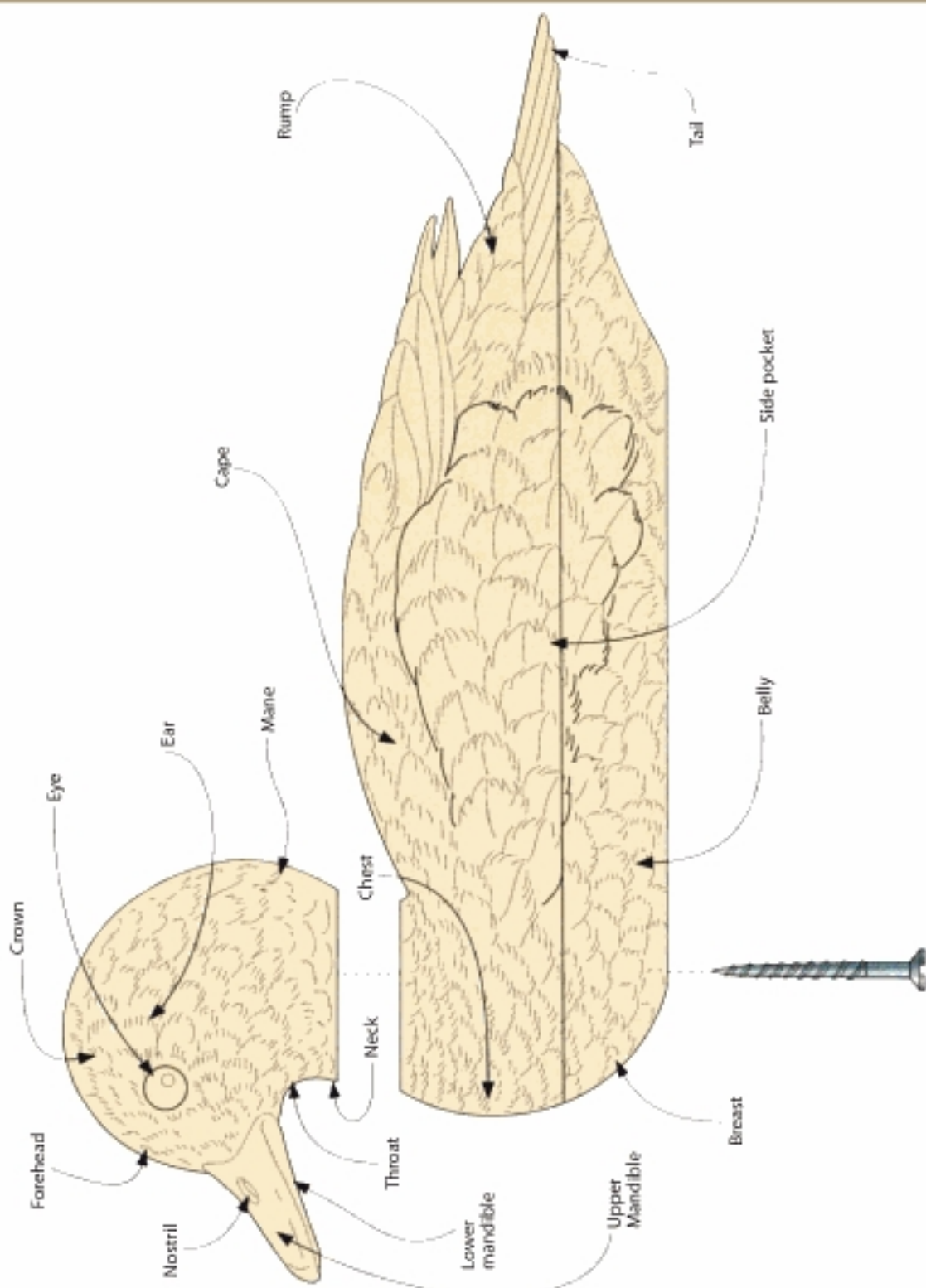
Detail View of a Duck's Wing



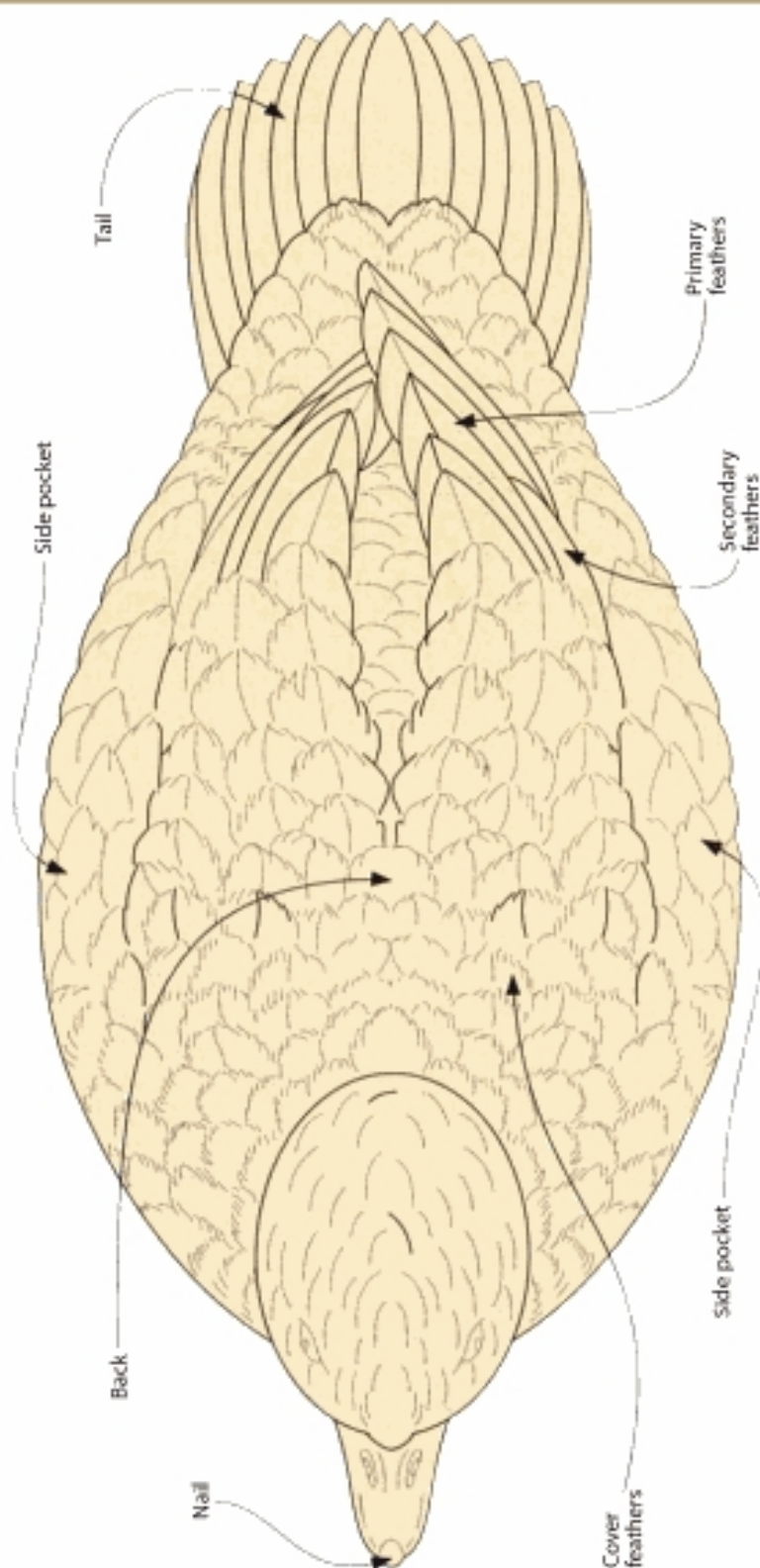
The underside of a duck's bill is a relatively complex structure. Use the illustration below to guide you. A spread duck's wing is also included, so you can better understand the structure of the folded wing shown on the templates.

Some specific parts of the duck may be less familiar. The nail is the hard point on the tip of the upper and lower mandibles of the duck's beak. The side pocket is the bulge of the duck's body that lies beneath the wing and shoulder structures. The primary feathers always number 10 on each wing, and are what the bird uses to fly. The secondary feathers are the smaller and more numerous feathers that fill out the wing.

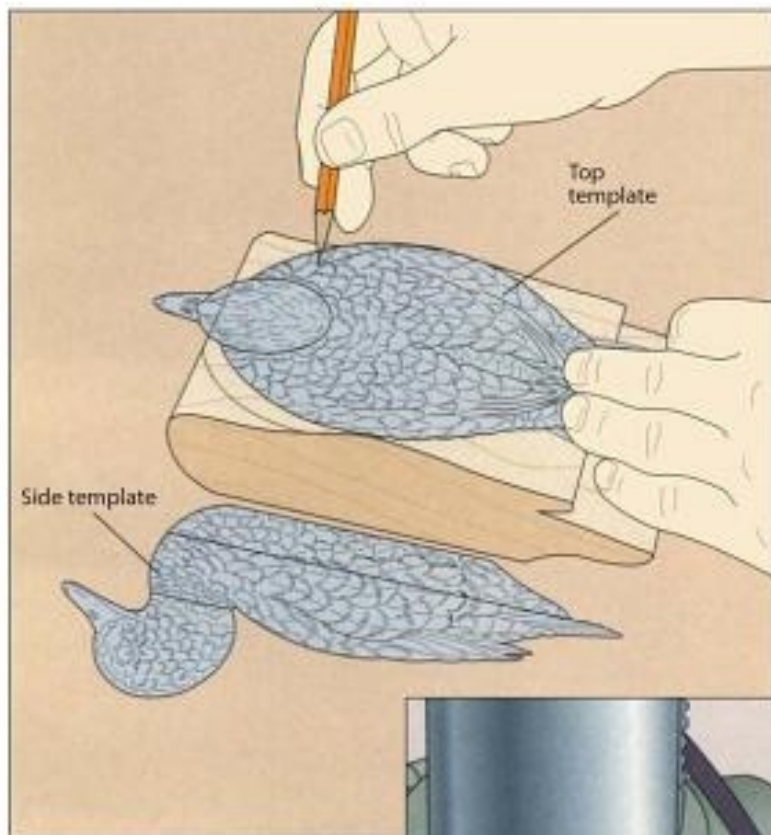
Side View Template



Top View Template



Preparing the Carving Blank

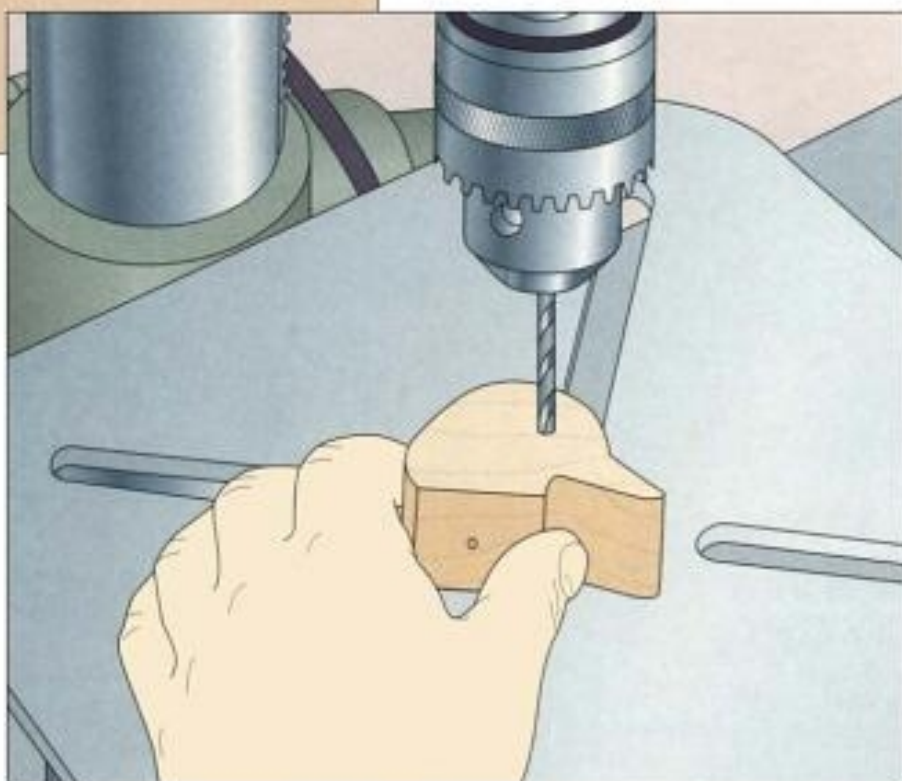


Laying out the design with templates

Make a blank for the duck's body from two pieces of wood—basswood is a good choice—2 inches thick and at least 10 inches square. Glue up another blank 3 inches square and 2 inches thick for the head. While the adhesive is curing, use the diagrams on page 128–129 to make top- and side-view templates. (Photocopying the patterns onto acetate works well.) Cut out the templates, and transfer the side view onto the carving block. Band saw the profile, then transfer the top template profile (*left*), and band saw this shape. Now cut the head to shape. Use a gimlet to make a hole in the bottom of each workpiece to accept a carver's screw (*page 135*).

Drilling the eye socket

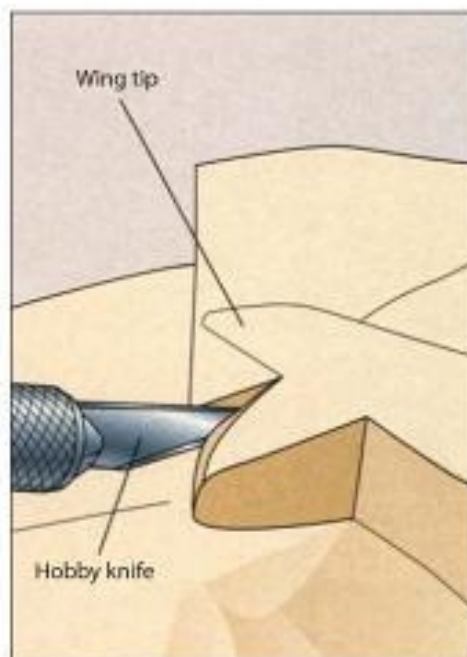
To ensure that the eyes of the duck will be symmetrical, drill a $\frac{3}{16}$ -inch hole right through the head (*right*), using the point taken from the head template as a guide.



Copyrighted material

Shaping the Body and Wings**Roughing out the wings and side pocket**

Begin by marking out the side pocket on each side by tracing it from the top and side templates. Mount the blank onto a carving arm jig with a carver's screw (see page 46), using nylon discs as spacers so the nut on the screw can be tightened firmly in place. Carve along the top line of the contour, which follows the wings, with a 12-millimeter No. 39 V-tool. Holding the gouge horizontally, carve along the line on the side of the blank corresponding to the top of the side pocket. Remove the waste, leaving a right-angled furrow, running along the curve of the wings and side pocket. Finish cleaning out the waste with the same V-tool (*above*).

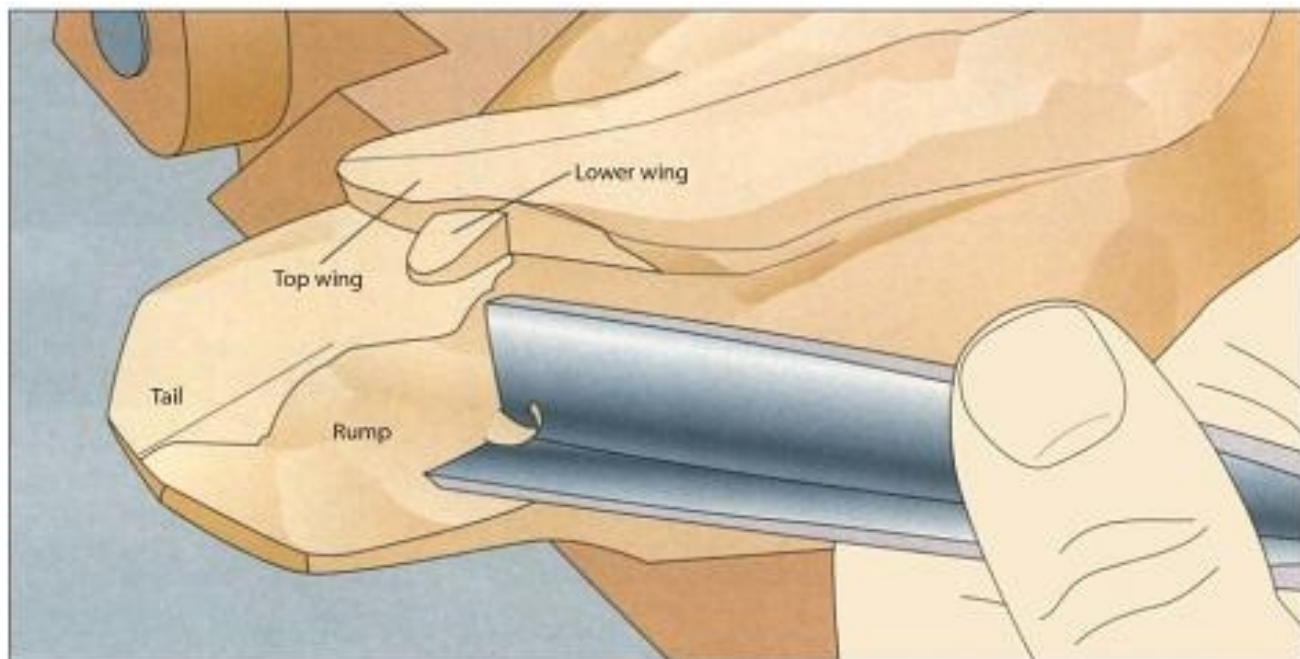
**Carving out the wing tips**

Carefully remove the waste from one side of the wing tips with a large V-tool. Use a hobby knife with a surgical blade to gently remove the waste from between the wing tips (*above*). Then carve away the waste from the second wing tip.

Rounding the side pocket

With the back of the duck's anatomy roughly carved out, you must refine its form by rounding the edges. Use a 35-millimeter No. 3 gouge to round the convex shapes (*left*), and a deep gouge, such as a 12-millimeter No. 11 gouge to smooth the concave edges, such as where the wings and side pockets meet.

Refining the Wings and Forming the Tail



Defining the top wing and tail section

One wing tip should be carved so it appears to rest on top of the other one. With a 12-millimeter No. 39 V-tool carve along the profile of this top—or dominant—wing to a depth of about $\frac{1}{4}$ inch, as indicated by the side template. Round the bottom wing so it gradually slopes down to meet the bottom of the tip of the dominant wing. To carve the furrow that marks where the rump ends and the tail begins, retrace the appropriate line from the templates. Use a 12-millimeter No. 39 V-tool to pare away the waste (*above*), as indicated by the templates. Then round and smooth the surface of the tail with a 12-millimeter No. 3 gouge.

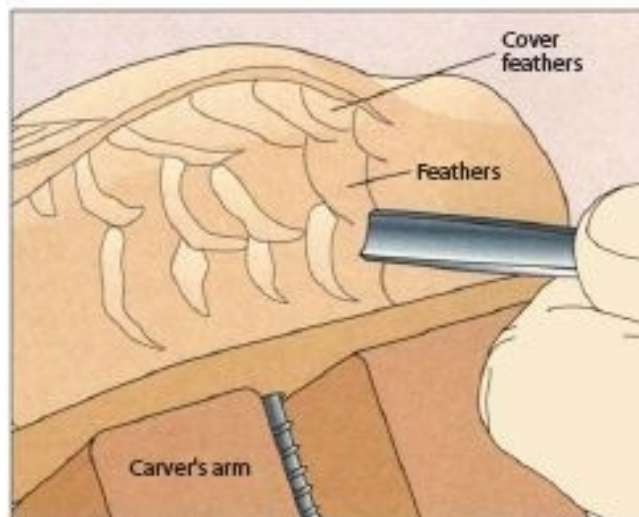
Carving the bottom surface of the tail

Unscrew the blank from the clamp and remount the workpiece upside down. Sketch in a guideline to indicate the bottom surface of the tail, which angles out from the rump. Use a 12-millimeter No. 11 gouge to carve out the waste (*right*).



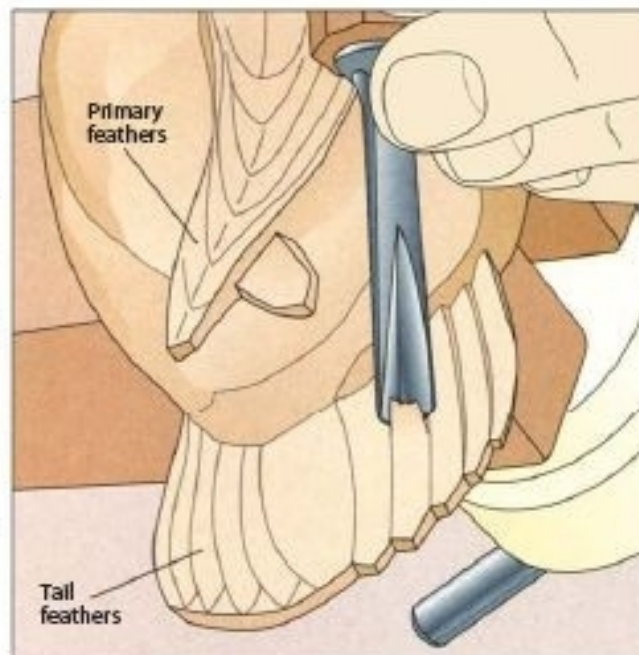
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Carving the Feathers



Carving the feathers on the side pocket and back

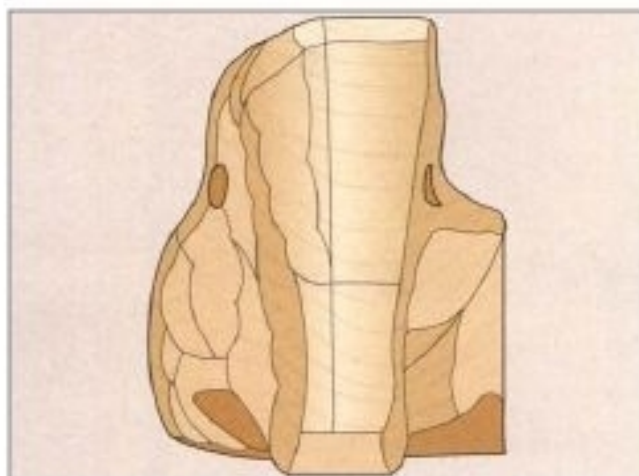
Begin by laying out the feathers on the side pocket and the back, including the cover feathers, as indicated on the template. This will give you a series of curves, indicating the tips of the feathers. Use a deep, narrow gouge, such as a 6-millimeter No. 11 to carve a groove along each line (*above*). Then, starting with the feathers closest to the rump, use a 12-millimeter No. 3 gouge to angle the feathers so they are scalloped, giving the appearance that the feathers in front are lying on top of the ones just to the rear.



Adding primary feathers and tail feathers

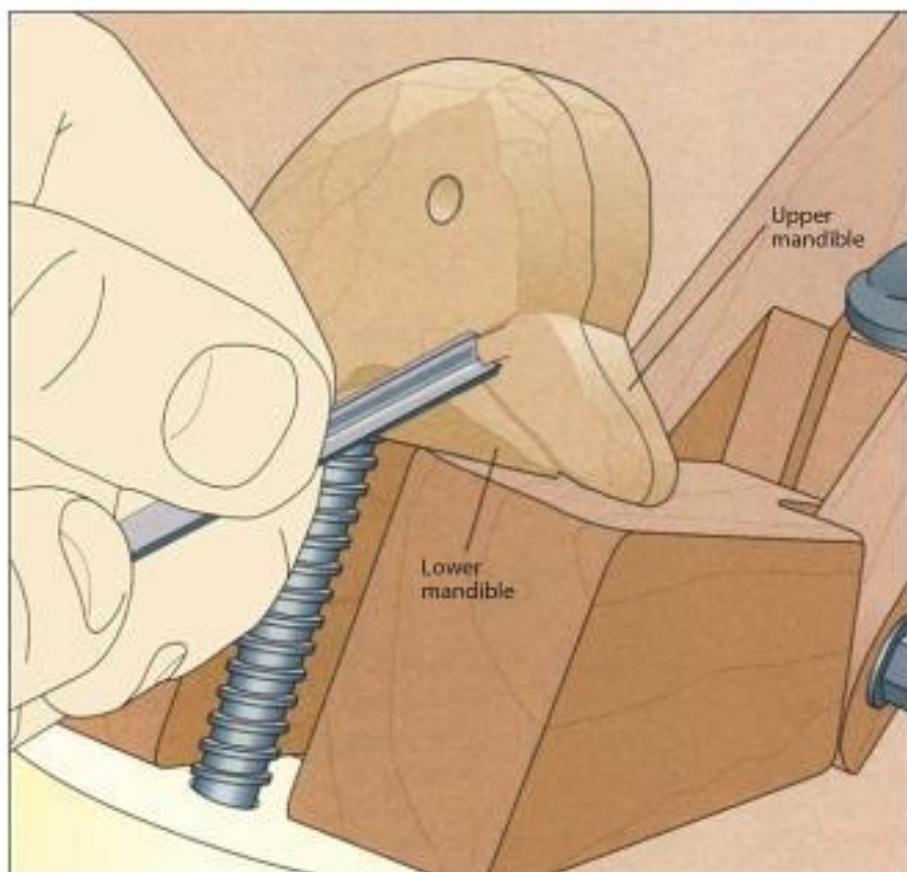
Use the top template to lay out the feathers on the top of the wing tips—the primary feathers—and the feathers on the tail. Cut these feathers out with a 6-millimeter No. 39 V-tool. The feathers nearest the center line are the highest, and create a layered effect toward the edge.

Carving the Head



Carving the head

Secure the head blank to the carving arm jig (*see page 46*). Use the side- and top-view head templates (*page 128*) to sketch in the head details. The cheeks bulge out at about the same height that the top of the beak begins. Pare away the waste from the upper part of the head with a 12-millimeter No. 3 gouge. Clean out the indentation above the cheek with a 12-millimeter No. 11 gouge, leaving this area clearly defined, as on the right side of the illustration at left. Sketch in the details of the head again, then refine the contours with a 6-millimeter No. 3 gouge, softening the curves, as on the left side of the illustration.

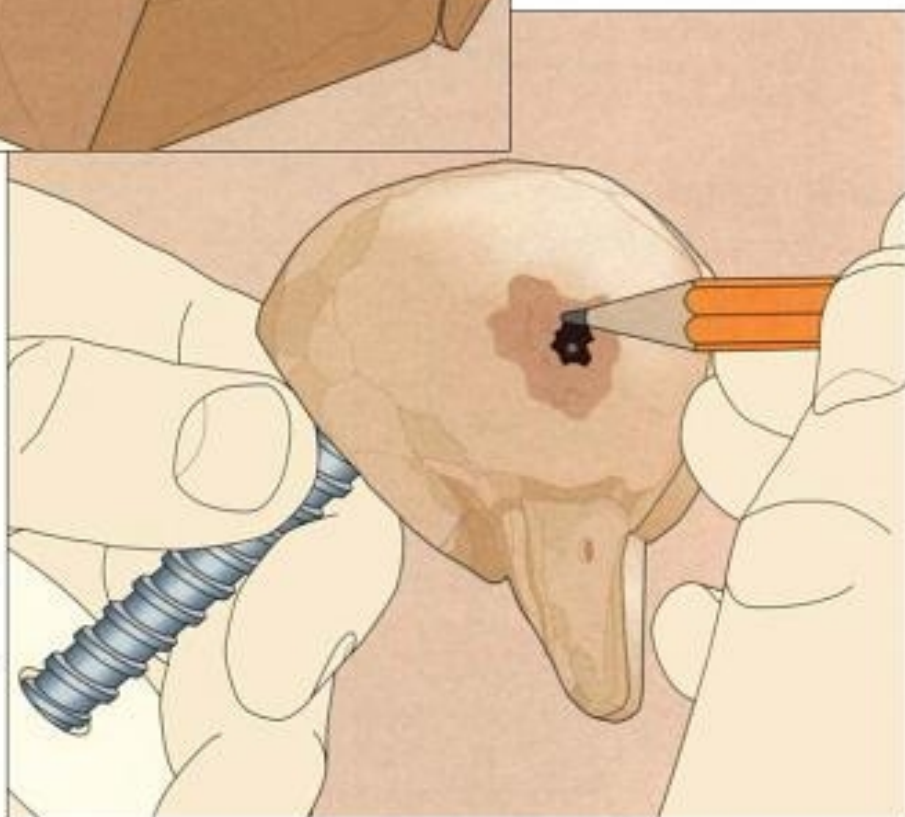


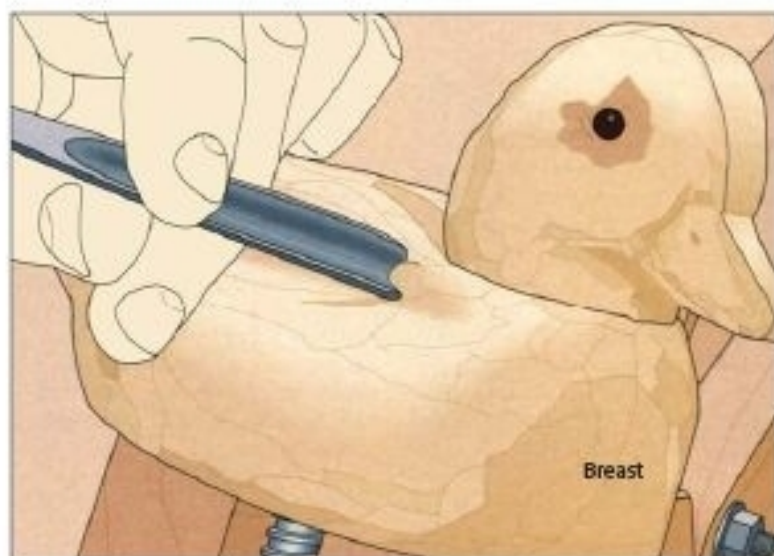
Carving the beak

Refer to the illustrations on page 128 for the correct design of the duck's beak. Use a 6-millimeter No. 39 V-tool to refine the shape of the beak. Use the same gouge to carve the lower mandible. Note the way it narrows and is shorter than the upper mandible, creating an overbite effect. Carve the line where the beak meets the forehead and chin so the head is rounded over into the beak (*left*). Then carve the bottom of the beak, referring again to the illustrations on page 128–129.

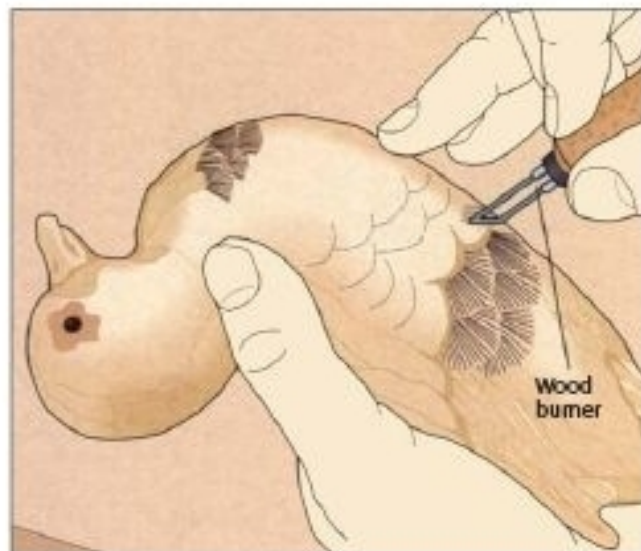
Adding the eyes

Drill a hole slightly larger than the eyes you have selected (see photo, opposite) into the eye hole you bored earlier. The eyes are held in place by acetone-based wood filler. (It is important to use acetone-based wood filler, as water-based filler will not wood burn properly.) Press the eye into place with a pencil eraser, then use the tip of the pencil to clear the excess putty away from the center of the eye (*right*). If the hole is too deep, add more filler. Do the same for the other eye, then look at the front of the head to make sure the eyes look even. Once the wood filler has dried, sand it smooth with the head, taking care not to scratch the eyes.



**Attaching the head**

Make a small hole in the base of the head with a gimlet. Drill a hole through the neck perpendicular to the flat area where the head meets the neck on the body. Test fit the head onto the body by screwing it on. Once you have chosen the position of the head, grasp a 12-millimeter No. 11 gouge like a pencil. Remove excess material from the breast, until it meets the neck. Carve the body and neck so the head merges smoothly with the body (left). If the joint between the body and head is not seamless, make a mark indicating the position of the head and remove the head. Then use a flat chisel to smooth the surfaces where the head joins the body until the joint is perfect and glue the piece in place.

Finishing**Adding texture with woodburning**

Fit a fine tip on your wood burner, and etch fine lines to indicate the tips of feathers (above). Note how the hand is supported by the middle finger. Where the shape of larger feathers has been carved, the woodburning pattern should cover each tip as a single feather. Where feathers have not been carved, use the same pattern, but smaller, to create the appearance of overlapping feathers, with only the tips exposed under those above.



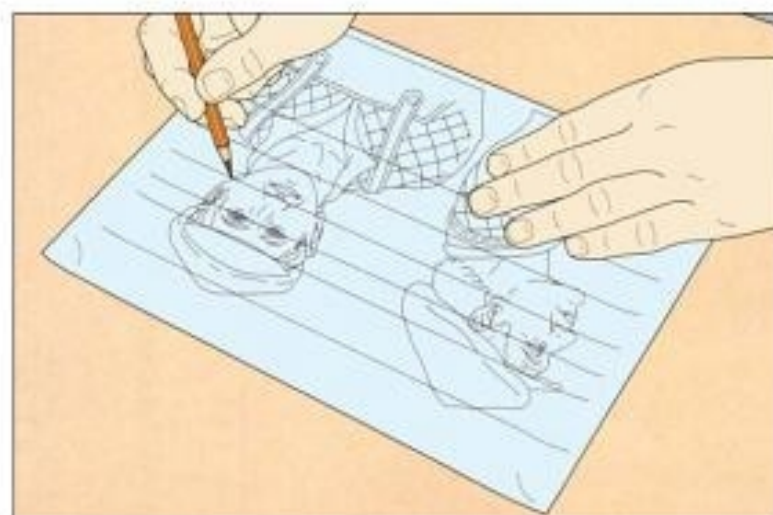
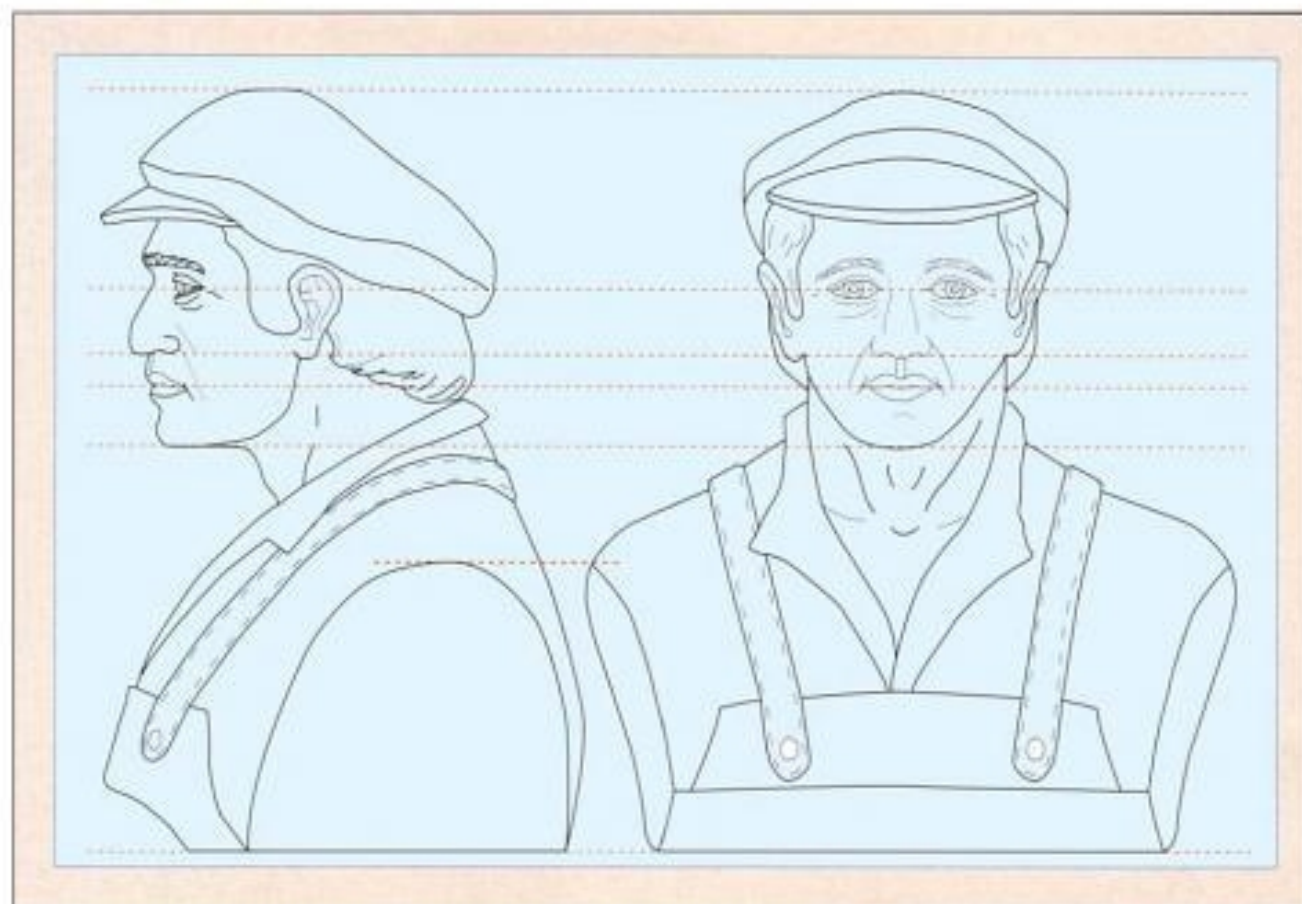
There are two types of eyes that you can use with your decoy: flint and colored. Both are available at hobby stores. The flint eyes require two coats of acrylic paint on the back of the eyes to simulate the actual color; colored eyes are simply set in place. Once the eyes are in position, the feathers can be added with a wood burner, creating a natural, lifelike appearance.

To make sure that the proportions are balanced and symmetrical, remember to stand back regularly and look at the workpiece as a whole. It is easy to become so engrossed in carving one detail—an eye or an ear, for example—that the symmetry of the whole piece is lost in the process.



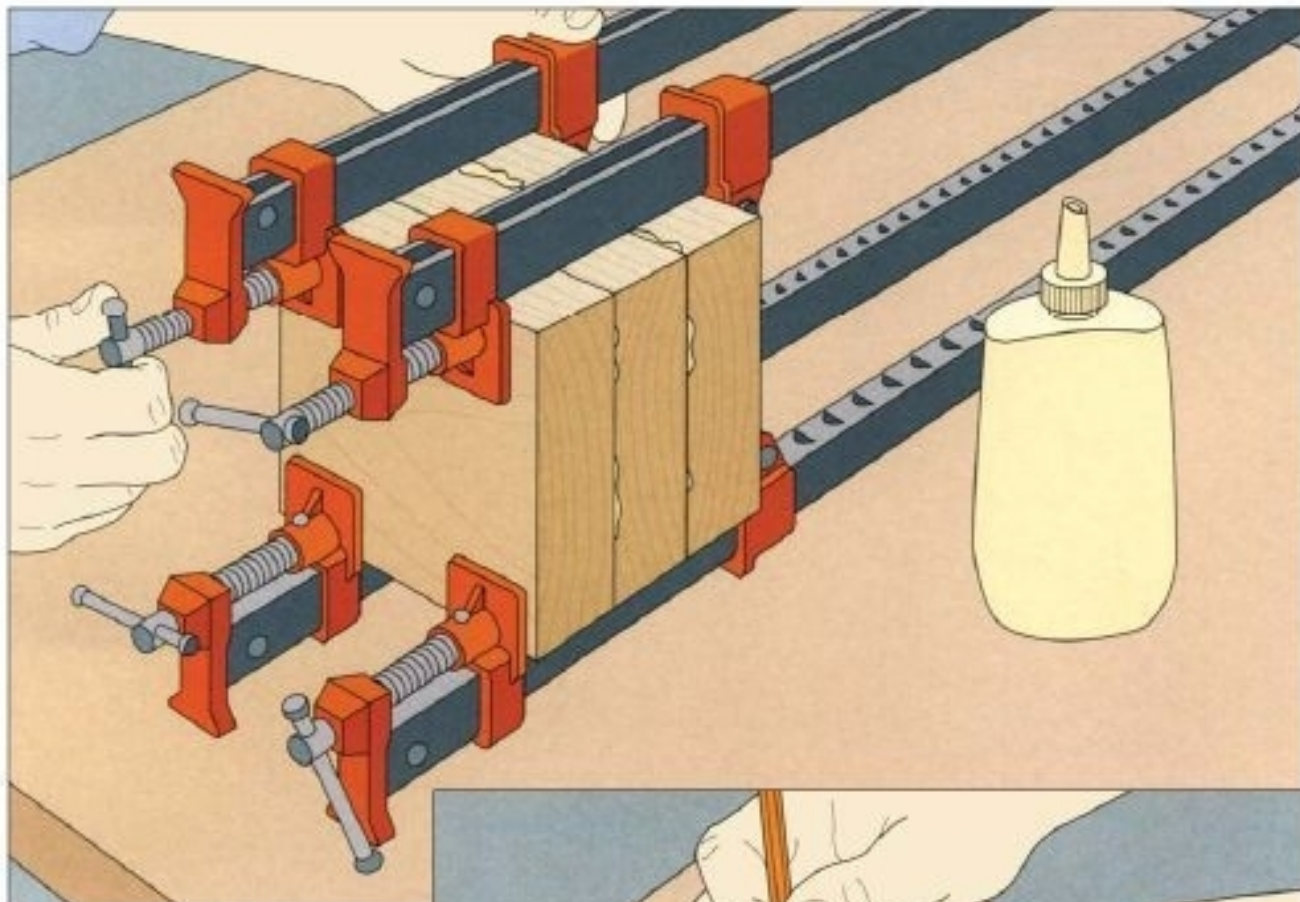
The bust of the old carpenter above was finished with a water-based stain to give the face a weathered look. The stain was applied with a brush and then buffed with wax after it had dried.

Figure 1 shows two diagrams of a man's head used for construction. The left diagram is a profile view, and the right diagram is a frontal view. Both diagrams include a grid of dashed lines and red arrows indicating measurements. The profile view has vertical measurements of 1/2, 1/4, 1/4, 1/4, and 1/4, and a horizontal measurement of 1/6. The frontal view has horizontal measurements of 1/5, 1/5, 1/5, 1/5, and 1/5, and a vertical measurement of 1/2. The diagrams are used to establish the proportions and placement of facial features for a realistic drawing.

Preparing Templates**Sketching a face**

Decide how large you want your finished bust to be, and lay out guidelines reflecting the proportions of the human face, as shown on the opposite page. These lines will help you create accurate drawings of your subject, by sketching the face and profile over them (left). You will need both a front and a side view. Transfer the drawings by photocopying your sketch onto acetate. If you wish to reproduce the bust of the old carpenter being carved in this section, simply use the templates shown above and transfer them to acetate.

Preparing the Blank



Gluing up the blank

Glue up a blank from pieces of wood roughly an inch and a half thick. Apply adhesive to each of the pieces and clamp them together (*above*) until the glue cures.

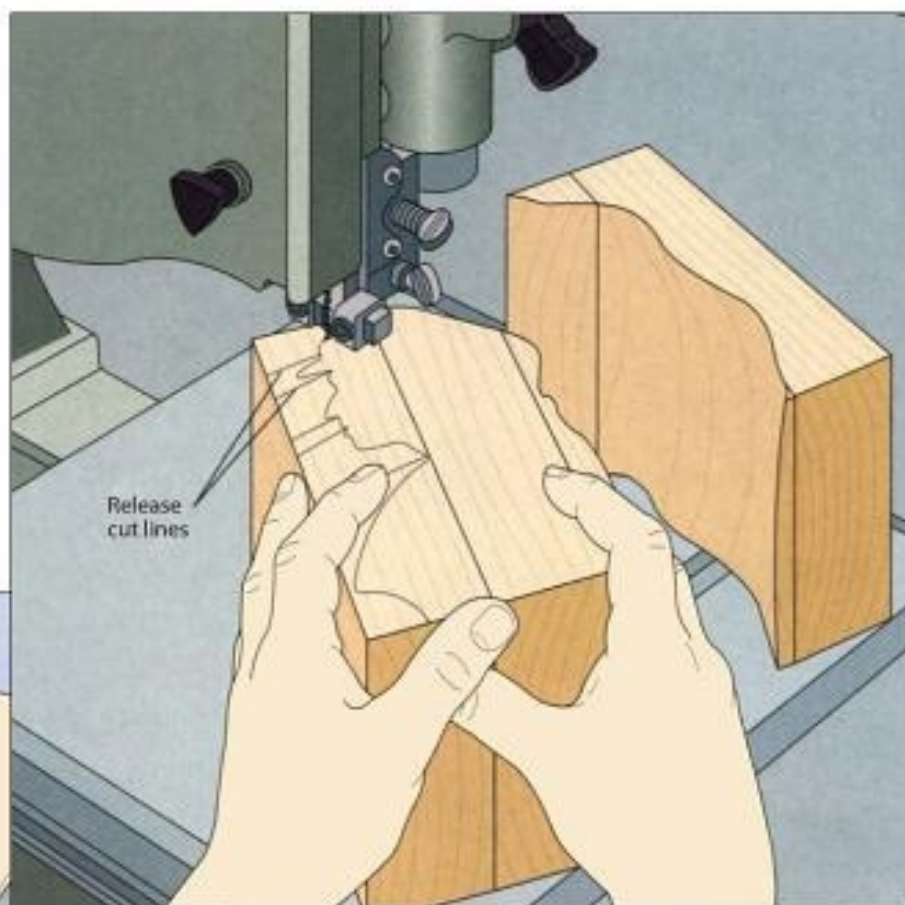
Tracing the profile

It is easiest to band saw the side view first, because this will leave a reasonably flat surface on the back of the workpiece for cutting out the front outline. Lay the template of the profile on the side of the carving blank and trace the pattern (*right*).

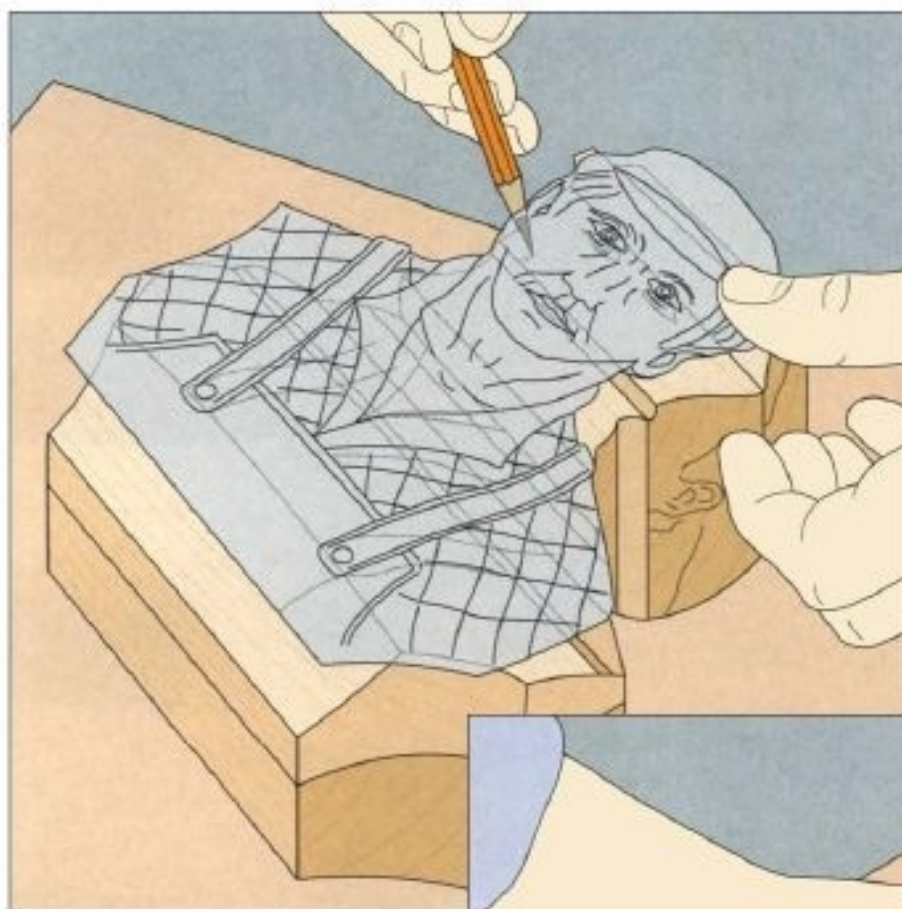


Cutting out the profile

Cut out the profile using a band saw. You should be able to cut the back part in one pass because the curves are not too tight, but the front will require some release cuts from the edge of the workpiece to the cutting line. This will enable the saw to cut along a tighter turn by facilitating the removal of waste wood. The exact location of these cuts is arbitrary, but try to make them to the sharpest parts of the curves, as shown at right.

**Tracing the front view**

Once you have cut the profile, trace the outline of the front view. Make certain that the eyes and other features on the front template are aligned with the side view. Most importantly, make sure the front template lies flat across the face of the blank as you trace its pattern (left). Do not bend the template to conform to the ridges and valleys of the profile, or you will distort the image.



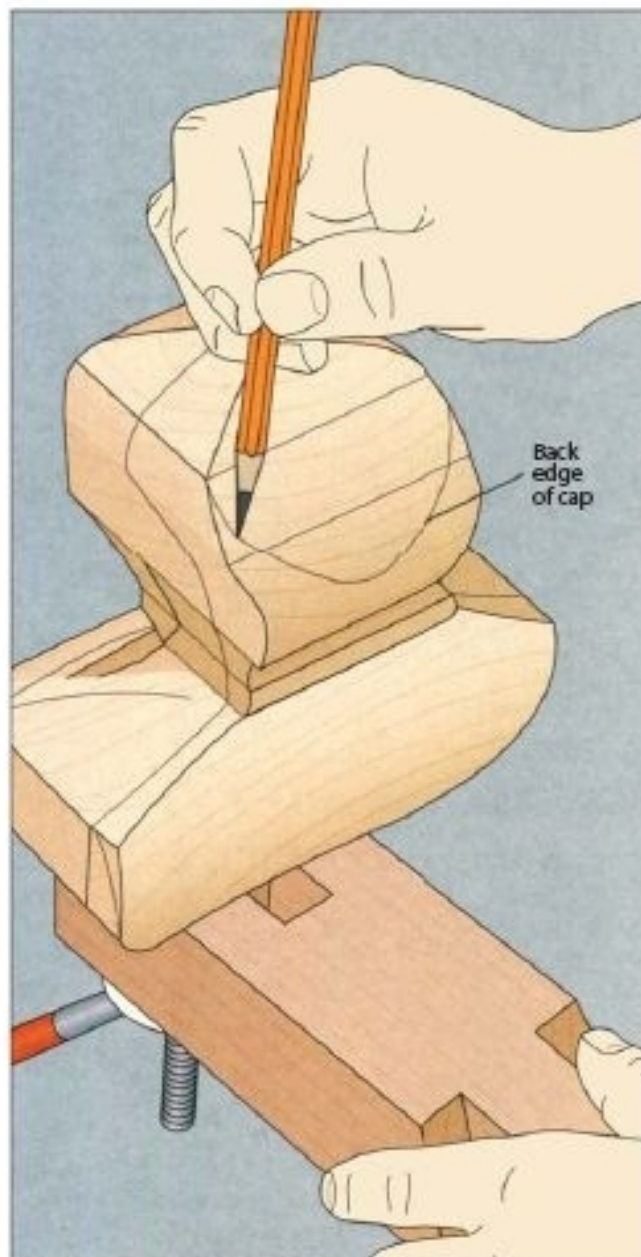
Retracing features on the blank

Once the face and profile of the bust have been band sawed roughly to shape, you will need to resketch the features that have been eliminated by the cuts. Hold the appropriate acetate template level on the blank and retrace the outline and various details, by looking through the acetate while you sketch the lines in beneath it (*left*).

Adding the hole for the carver's screw

Locate the hole for a carver's screw by drawing two diagonal lines from corner to corner across the bottom of the carving blank. Make the hole for the carver's screw with a gimlet (*right*). Unlike a standard drill bit, a gimlet has a tapered shaft, which will allow the carver's screw to fasten more securely in the blank without the risk of cracking the wood. As your work progresses, the original hole may loosen. In this case, make additional holes as necessary near the center of the bottom of the workpiece.



Roughing in the Form**Adding a top profile**

Sketch in lines indicating the rounded edges of the head and shoulders when viewed from overhead (*above*). Compare these lines with the template. Make sure that the line marking the circumference of the hat, for example, is as wide as indicated by the front template.



The roughly shaped form of the old carpenter has been fastened in place with the carver's screw. The features have been sketched in again, as they will be repeated throughout the project. The next step is to begin paring away the waste from the form, creating broad details.

Rounding the corners of the head and shoulders

Chisel away the waste you defined in the previous step. Use a 35-millimeter No. 3 gouge, striking the handle of the chisel with the palm of your hand (*right*).

**Chiseling in the back and suspenders**

Chisel the shallow depression on both sides of each suspender with a 25-millimeter No. 39 gouge (*below*). Sketch in the front suspenders, then continue the lines back by eye. Usually, carvers do not use a template for each side, as this can introduce errors if the templates are not perfectly matched.

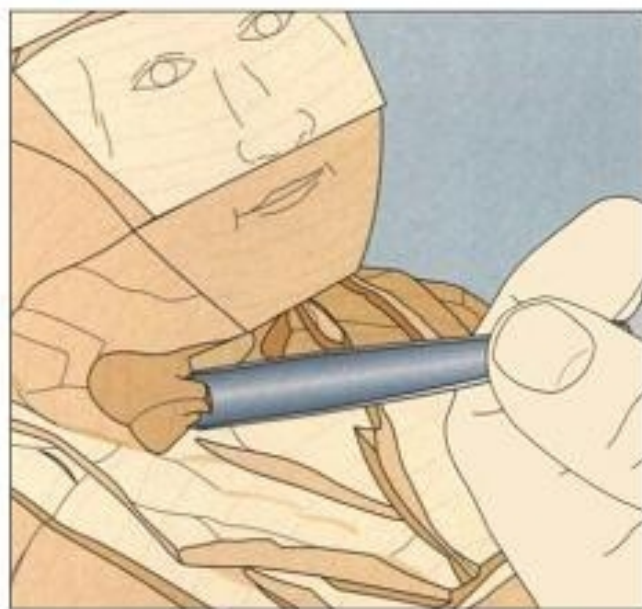


**Roughing in the collar**

Compare the front of your carving with the front template. Resketch the design as necessary. Delineate the edges of the collar with a V-tool, then remove the waste with a 12-millimeter No. 11 gouge (*left*). Note that the space between the collars is slightly deeper than the areas to either side of the collars, where they lie on top of the shirt.

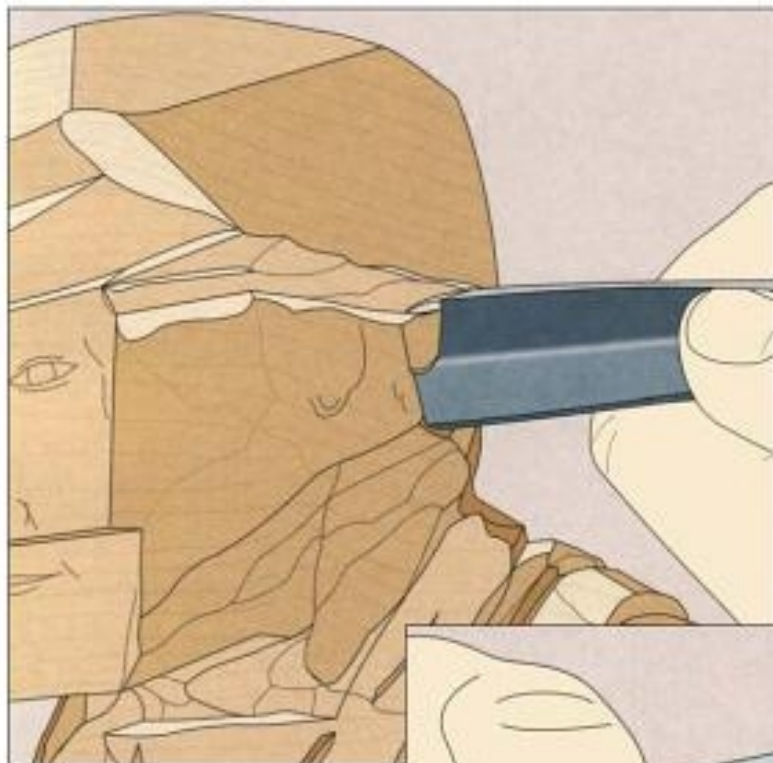
**Creating the outline of the face**

To begin defining the face, check the sketch of the face against the front template. The lines indicating the cheeks form a V, with its point at the tip of the chin. Pare away the waste with a 12-millimeter No. 3 gouge (*above*). The waste should be removed to the cheek lines at the front. The depth of waste pared away should decrease until it stops just at the joint where the ears will begin. If necessary, sketch in the profiles of either side of the head using the side template.

**Rounding the neck**

The pronounced roundness of the neck is best carved with a 12-millimeter No. 11 gouge. Sketch in the lines that you carved away in the previous step on both the front and sides. Carve away the waste (*above*), bearing in mind that the neck is longer directly beneath the chin and shortens over the shoulders. Be sure to leave enough waste so you can define the jaw without making the neck too thin.

Carving the General Forms of the Head and Cap

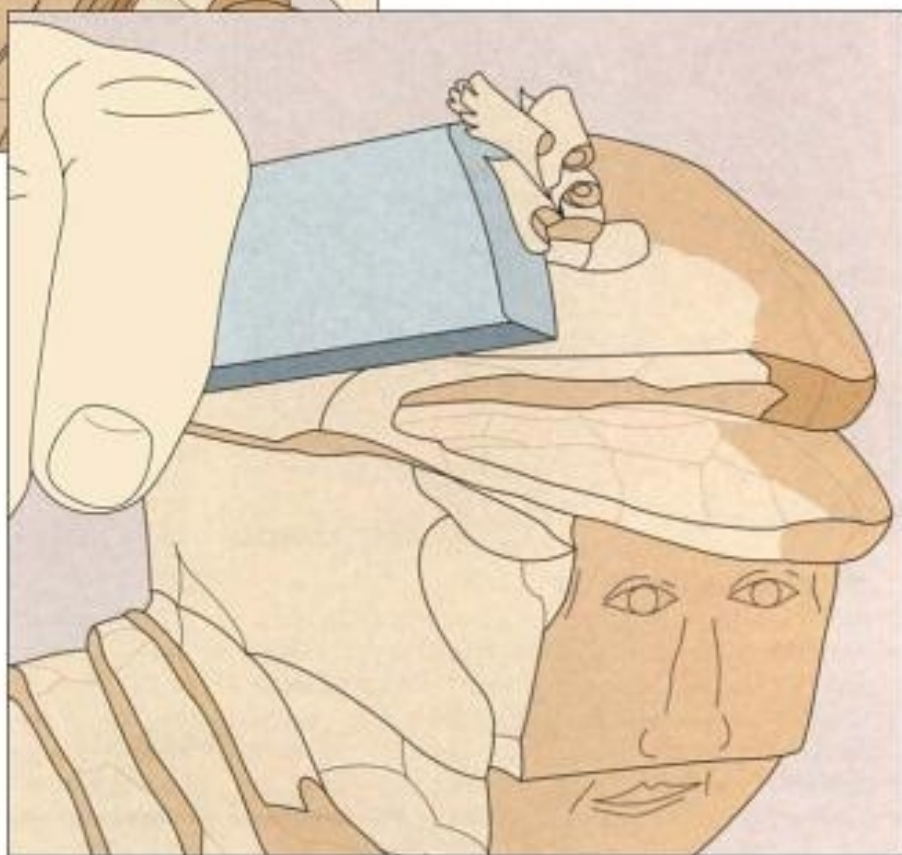


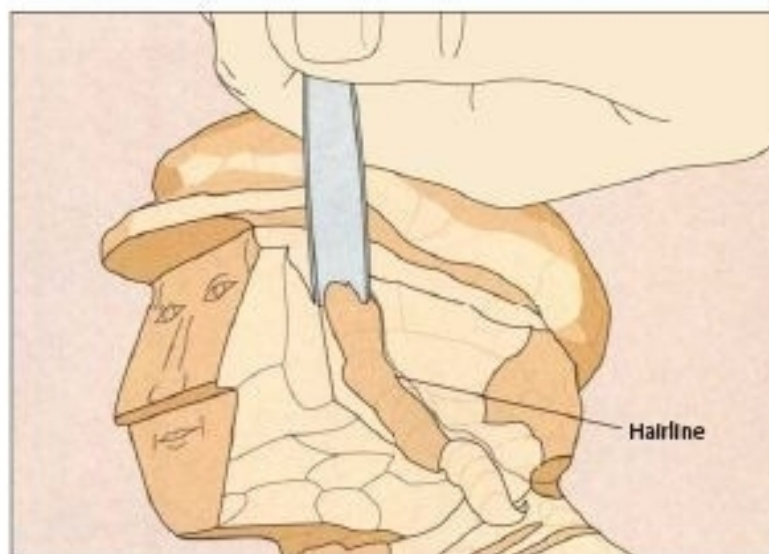
Roughing in the cap

Sketch the outline of the ears, hair, and cap. With a 12-millimeter No. 39 V-tool, carve along the line where the cap meets the hair (left). The lower surface, where the hair is located, should have a gentle curve downwards, while the point where the cap meets the head should be parallel to the ground.

Rounding the cap

Use a 35-millimeter No. 3 gouge to round the top of the cap. The normal way to remove waste is with the bevel facing down, resting on the work. However, you can also work with the gouge inverted, as shown at right. This method creates a smoother curve but it requires some care, since the gouge will have a tendency to nosedive into the wood as it follows the grain. Make certain the cutting edge is very sharp. Practice the technique on scrap wood until you feel comfortable with it.



**Adding the hairline**

Use the side template to draw the hairline, and use a 6-millimeter No. 11 gouge to remove the waste along the line (*left*). This material should be pared down to a depth of about $\frac{3}{16}$ inch. You can check this by comparing the carving to the front template.

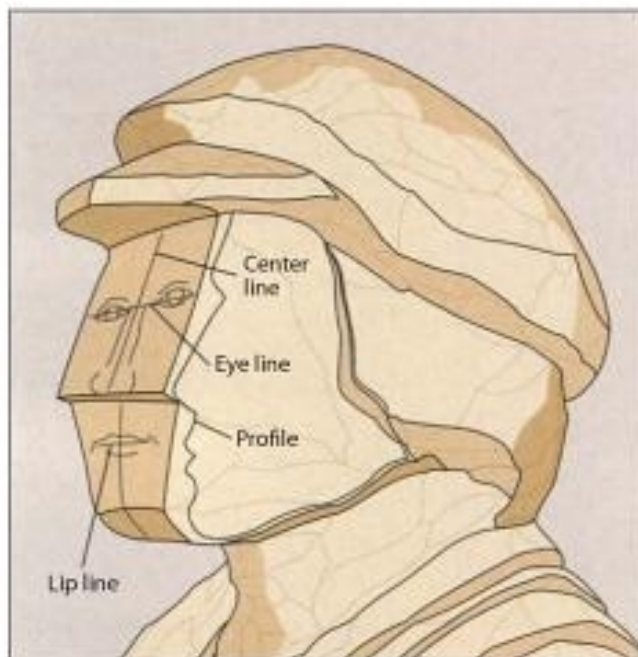
**Defining the cheeks**

Check the outline of the cheeks, neck, and hairline against the front and side templates. With a 6-millimeter No. 3 chisel, form the rounded curves of the cheeks, stopping at the hairline (*above*).

**Checking the size and symmetry of the features**

Use a pair of dividers to check the size and symmetry of the features. As the various parts of the face become more defined, you must be more precise in ensuring that they conform to the original pattern. Adjust the dividers against the template, then check the measurement against the carving (*above*). If a discrepancy appears, go back and repeat the step, recarving as necessary.

Refining the Face



Roughing in the eyes, lips, and chin

Sketch in the features of the face from the front template. Note the center line running down the middle of the face, which is perpendicular to the eye line and lip line (*above, left*). The guide lines will help ensure that the features are positioned correctly. Sketch in the profile from the side template. Use a 6-millimeter No. 11 gouge to chisel out



the furrows for the eyes, above the lips, and between the bottom lip and the chin to the depth indicated by the profile on the side of the blank. Use a 6-millimeter No. 39 gouge between the lips. Grasp the chisel as shown in the illustration (*above, right*), while guiding the tip with your other hand.

Forming the cheeks

If you hold the palms of your hands against your cheeks, you can feel how their planes meet at almost a 90-degree angle. To carve this shape, mark the center line again and add guide lines to define the edges of the eyes. These lines will also define the width of the nose, since the edges of the nostrils lie directly beneath the inside corners of the eyes (*see page 136*). Use a 12-millimeter No. 11 gouge to pare away the waste and form the cheeks (*right*). The depth to which you cut is indicated by the profile on the side of the blank. Be careful to leave enough waste to carve the cheek bones.



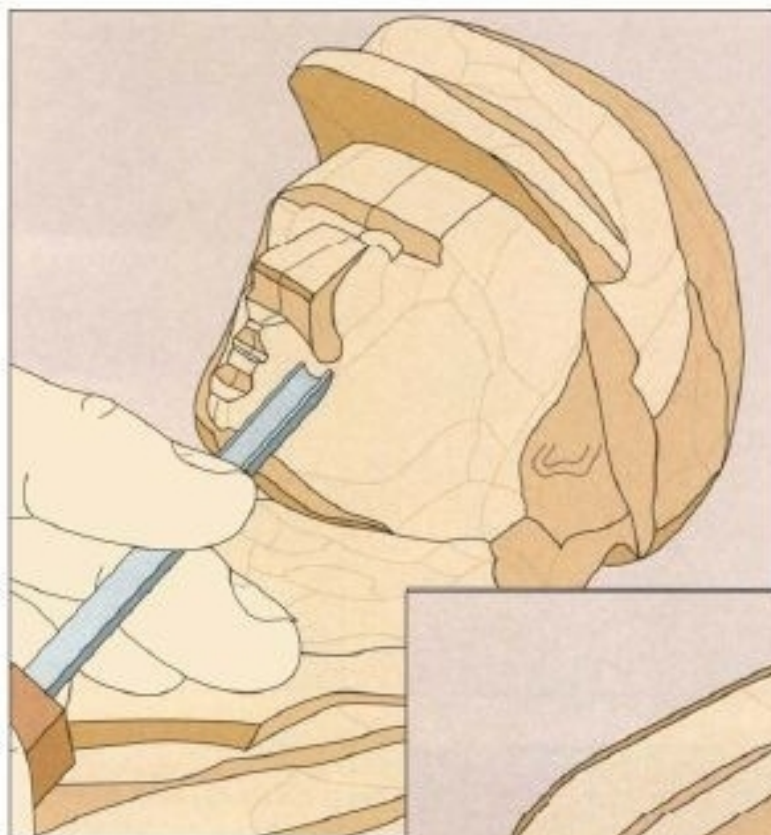
Roughing in the Facial Details

Smoothing the facial planes

The most rugged face contains curves where the features meet. Pare down the cheeks with a 12-millimeter No. 3 gouge (*right*). Repeat the process to round the angles slightly and to achieve a finer, smoother overall texture. Note how the forehead curves gently in front before angling back sharply just in front of the temples. The cheeks slant inward slightly from the cheek bones. Refer to the templates, resketching lines as necessary. Check the carving frequently from all angles, including the top and bottom, to ensure that the features are symmetrical.



Although the finer details have yet to be carved, the general features of the face, including the forehead, nose, and cheeks, are already apparent in this photograph. Before working on the nose, eyes, and ears you need to continue smoothing the general facial features, as described in the step above.



Adding the expression lines

Expression lines are creases in the face that begin in the curve of the nostrils and angle downward towards the jaw line, affecting the shape of the cheeks. These lines do not touch the corners of the mouth when the face is at rest, as in the old carpenter's face. Sketch in these lines, then carve them with a 4-millimeter No. 11 gouge (*left*). These lines become more pronounced as they approach the nose. Clean up the lines with a 4-millimeter No. 3 gouge.

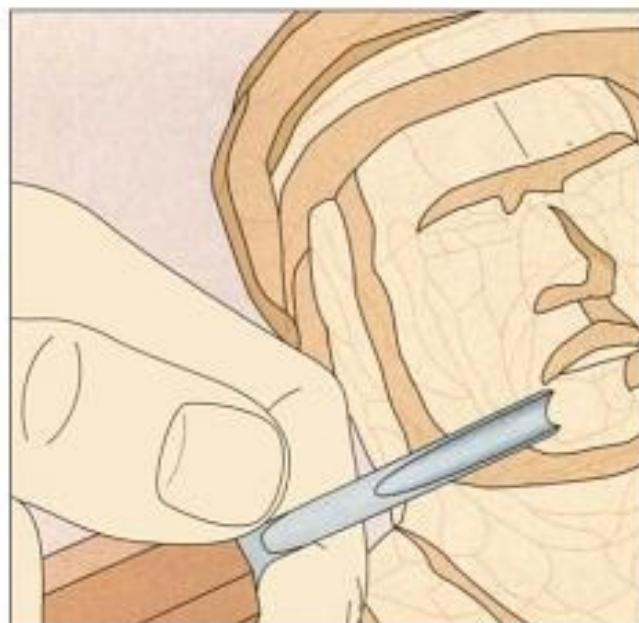
Carving the nostrils

Compare the carving with the template by means of dividers as frequently as necessary. Start by chiseling away the waste on either side of the bridge of the nose with a 12-millimeter No. 11 gouge. You should stop as you reach the nostrils and round them over. Undercut the nostrils with a 4-millimeter No. 3 gouge at the point where the expression lines meet the nostrils (*right*).



**Carving the lips**

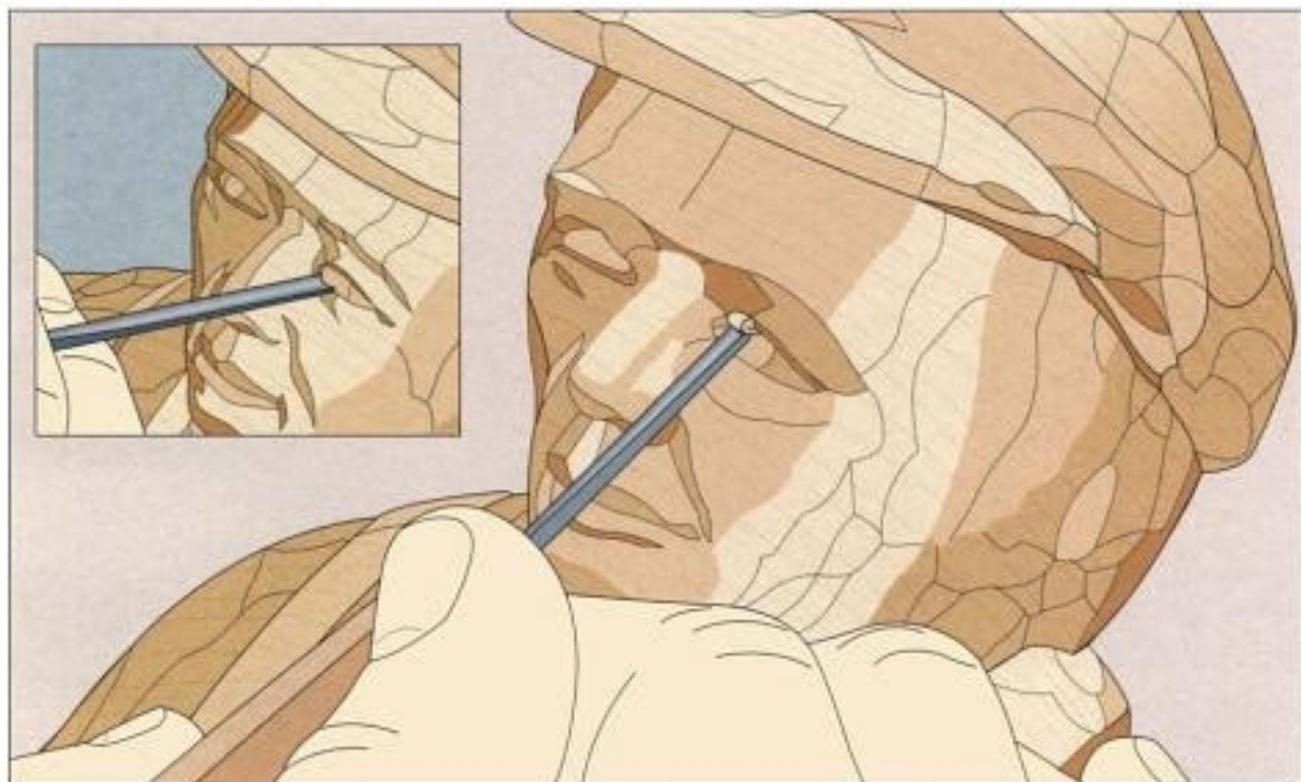
The detail of the meeting of the lips and the creases at the corners of the mouth are made with a V-tool. Use a 6-millimeter No. 39 V-tool to part the lips (*above*) and gradually taper the creases toward the edges of the mouth.

**Carving the chin**

Refer to the side template to help you round over to the correct profile. Use a 6-millimeter No. 11 gouge to round the chin and the space between the lip (*above*). Round the space between the upper lip and the nose, and add the small indentation above the upper lip, known as the septum.

Carving the Eyes**Forming the upper eyelid**

To make the eyes, perform the previous steps for one eye, then repeat for the other eye. Refer to the templates for the precise location of the eyelids and pupils. Use a 6-millimeter No. 11 gouge to round over the upper eye lid (*left*). Next, with your 6-millimeter No. 39 V-tool, carve a furrow from one corner of the eye to the other. This will produce the edge of the upper eyelid where it meets the eyeball. Use a 4-millimeter No. 2 chisel to shave away the waste below the upper eyelid, creating the round form of the eyeball. Then round over the bridge of the nose and smooth the sides above the nostrils.



Defining the upper eyelid

Carefully pare away the waste with a 4-millimeter No. 3 gouge to create the ridge that marks the bottom edge of the upper eyelid (*above*). Then refine and smooth the rounded shape of the eyeball with a 4-millimeter No. 1 chisel (*inset*). Repeat for the other eye.

Forming the curve of the upper eye socket

As before, carve one eye first, then repeat the steps for the other. Begin by creating a furrow just above the bottom of the top eyelid. Use a 4-millimeter No. 8 gouge to carve from one corner of the eye to the other (*right*).





Forming the curve of the lower eye socket

Add a furrow to the lower eye lid as you did to the top, using the same gouge (*above*). Grasp the tool like a pencil in your right hand, while using the thumb of your left hand to help guide the cut.



Final smoothing

Use a 6-millimeter No. 11 gouge to smooth the area below each lower eyelid. Carefully blend the curve at the bottom of the eye socket into the slight bulge of the cheek bone. Repeat steps for the other eye, finishing off with the final smoothing (*left*).



Positioning the pupils

Set the dividers with one pointer in the outside corner of one eye, and the other pointer in the inside corner of the second eye (*left*). This is the distance that should separate the pupils so the eyes will appear to look in the same direction. Mark the position of the pupils. Although this trick may seem simple, it is easy to end up with asymmetrical features if you skip doing it.

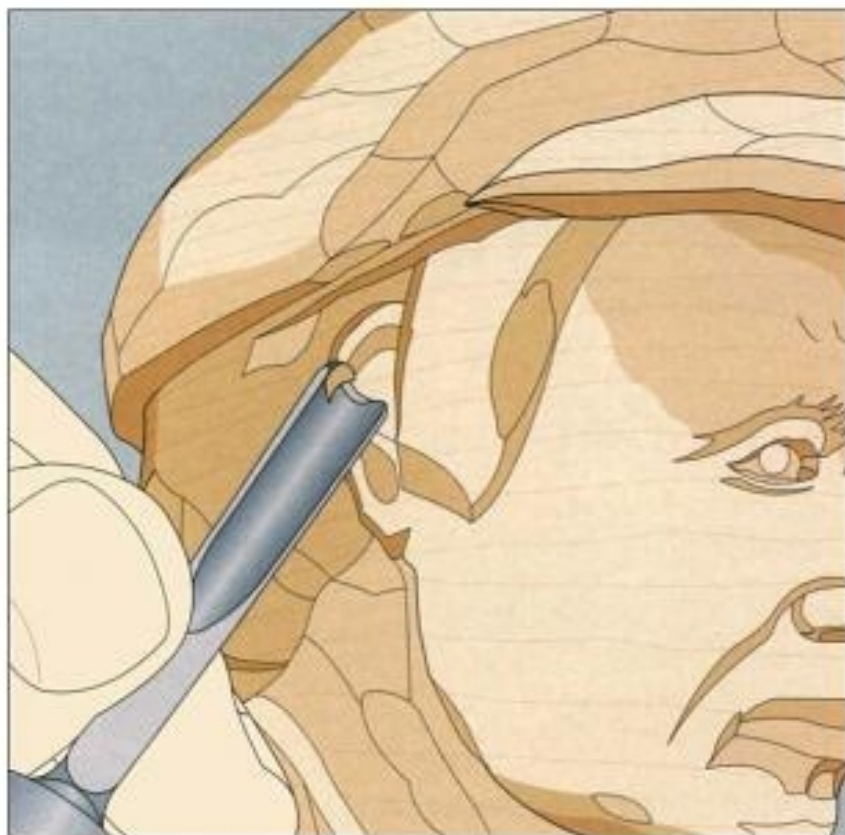
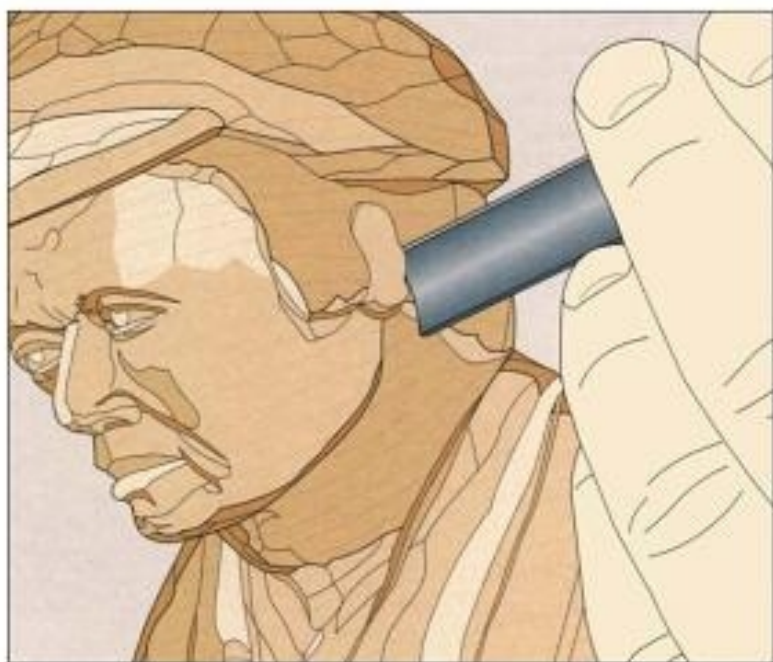


Adding the pupils

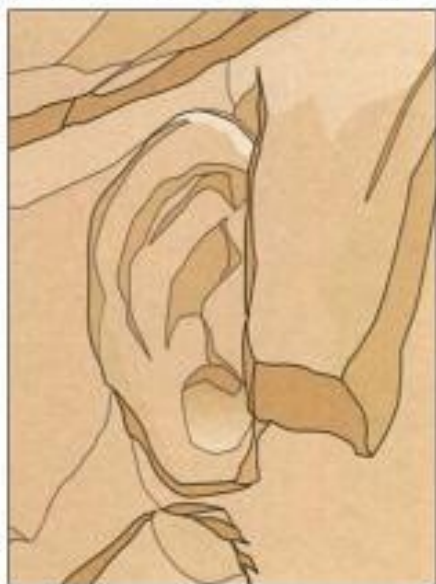
Now use a 4-millimeter No. 11 gouge to form the pupils. Pare away a small half circle to shape the bottom of the pupil (*right*), then pry out the top half with the gouge inverted to finish the job.

Shaping the hairline around the ear

Use a 12-millimeter No. 3 gouge to cut around the shape of the earlobe. Gently press the edge of the gouge into the wood along the edge of the earlobe (*right*). Next, carve away the waste, tapering the wood that will become the hair so it appears to curve beneath the bottom of the ear.

**Carving the interior details of the ear**

Use a 6-millimeter No. 11 gouge to carve the small ridges inside the ear lobes (*left*). The ear lobe can vary in refinement depending on how small the bust is. In this carving of the old carpenter, the detail is quite lifelike. Use it as a guide (*below*).



Final Details**Adding the hair and eyebrows**

To form the small curving lines that resemble strands of hair, use a 4-millimeter No. 11 gouge (*above*). Use the same tool to form the eyebrows, curving the hairs up and to the side.

**Undercutting the clothing**

Trim beneath the suspenders (*above*), overalls, shirt collar, and other bits of clothing with a hobby knife. You should also undercut the cap. This adds to the perception of depth and makes these items seem more realistic, and less as though they were carved from the same piece of wood as the rest of the bust.



The pounce wheel shown in the photograph at left was originally intended to mark lines such as hems when sewing. It also does double duty marking evenly stitched seams on the carving of the old carpenter.

Index

A

acanthus leaf, [82](#), [98–100](#)
 alphabet (lettering), [58](#), [74–79](#)
 angled cuts, [58–59](#), [68](#), [69](#), [73](#), [77](#)
 auger files, [21](#)

B

barnyard scene, [82–83](#), [106–21](#)
 background, [108–10](#)
 detailing main elements, [118–20](#)
 drawings/profile, [106–7](#)
 final details, [120–21](#)
 foreground, [110–11](#)
 main elements, [112–14](#), [118–20](#)
 overview, [106–7](#)
 refining tree shape, [115](#)
 shingles, [116–18](#)
 Barton, Wayne, [8](#), [38](#)
 bear, [40–41](#)
 bellows, [10–11](#)
 bench. See workbench
 bench dogs, [10](#)
 bench hold-down, [10](#)
 bench hook carving jig, [53](#), [65](#)
 bench planes, [18](#)
 bench stones. See sharpening
 bent gouges, [15](#)
 bent-back gouges, [14](#)
 beveling edges, [53](#)
 bevels and angles, on cutting tools, [20](#). See also specific sharpening tasks
 block planes, [18](#)
 book overview, [6–7](#)
 borders, [58](#), [70–73](#)
 Bullrush Scene, [53](#)
 bust. See human bust

C

carpenter's mallet, [10](#)
 carver's knife, [14](#)
 carver's screw, [44](#), [46](#), [140](#)
 carving. See also carving in the round;
 carving strokes; incised carving; relief
 carving
 about: overview of, [40](#)
 tools for. See sharpening; tools
 wood for, [42](#)
 carving arm jig, [40–41](#), [46](#)
 carving bolts, [10](#)
 carving in the round, [122–55](#). See also
 duck; human bust
 about: overview and history of, [122](#)
 claw-and-ball foot, [122–26](#)
 carving stand, [47](#)

carving strokes, [48–53](#)
 basic exercise, [48](#)
 beveling edges, [53](#)
 concave-shaped bowl, [51–52](#)
 convex shapes, [49–50](#), [52](#)
 general guidelines, [48](#)
 grain direction and, [48](#)
 paring out waste, [50](#)
 terracing surface, [49](#)
 triangle (convex), [52](#)
 chip carving. See also incised carving
 about: overview of, [58](#)
 basic cuts, [62–65](#)
 Wayne Barton on, [8](#)
 chisels
 about, [12](#)
 anatomy of, [15](#)
 basic kits, [17](#)
 handle type indicating origin, [15](#)
 sharpening on bench stone, [26](#), [31–33](#)
 sharpening on grinder, [23–24](#)
 sweeps and sizes, [16](#)
 types of, [14](#), [15](#)
 circles, [78](#)
 clamping techniques, [44–45](#), [60–61](#)
 claw-and-ball foot, [122–26](#)
 concave rasps, [18](#)
 concave-shaped bowl, [51–52](#)
 convex shapes, [49–50](#), [52](#)
 curved cuts, [65](#)
 curved letter layouts, [75](#)
 curves, cutting, [79](#). See also circles

D

design principles, [54–57](#)
 diamond hones, [21](#)
 dogleg chisels, [14](#)
 draw knives, [18](#)
 duck, [127–35](#)
 carving and attaching head, [133–35](#)
 carving feathers, [133](#)
 drawings of bill and wing, [127](#)
 finishing, [135](#)
 preparing carving blank, [130](#)
 refining wings and forming tail, [132](#)
 shaping body and wings, [131](#)
 templates, [128–29](#)

E

egg-and-dart molding, [80–81](#)

F

fishtail gouges, [15](#)
 fluteroni tools, [15](#)
 folds. See linenfold panels

G

gouges
 about, [12](#)
 basic kits, [17](#)
 grinding jig for, [28](#)
 sharpening on bench stone, [36–38](#)
 sharpening on grinder, [28–31](#)
 sweeps and sizes, [16–17](#)
 types of, [14–15](#)
 grinders
 bench grinding station, [25](#)
 grinding process described, [30–31](#)
 sharpening chisels on, [23–24](#)
 sharpening gouges on, [28–31](#)
 sharpening V-tools on, [28](#)
 stationary, illustrated, [21](#)
 wheels for, [21](#)

H

hexagonal rosettes, [67](#), [68–69](#)
 hold-down clamps, [19](#)
 honing cones, [21](#)
 human bust, [136–55](#)
 carving ear, [153–54](#)
 carving eyes, [149–53](#)
 carving general forms of head and cap,
[144–45](#)
 cutting out profile, [130](#)
 dimensions of human face and, [136](#)
 final details, [155](#)
 preparing carving blank, [138–40](#)
 refining face, [146](#)
 roughing in facial details, [147–49](#)
 roughing in form, [141–43](#)
 sketching face, [137](#)
 symmetry and proportions, [136](#), [145](#)
 templates, [137](#)
 tracing profile and front view, [138](#),
[139–40](#)

I

incised carving, [58–81](#). See also chip
 carving
 about: overview of, [58](#)
 basic cuts, [62–65](#)
 borders, [58](#), [70–73](#)
 carved moldings, [80–81](#)
 curved cuts, [65](#)
 lettering, [58](#), [74–79](#)
 rosettes, [58–59](#), [66–69](#)
 six-cut triangles, [64](#)
 three-cut triangles, [62–63](#)

J

jigs
 bench hook carving jig, [53](#), [65](#)
 carving arm jig, [40–41](#), [46](#)
 carving stand, [47](#)
 for grinding gouges, [28](#)
 for securing thin work, [61](#)
 sharpening-stone holder, [24](#)
 Joseph, Tommy, [9](#)

K

knives
 sharpening, [22](#)
 types of, [12](#), [14](#), [18](#)
 Kona, Ted, [10](#)–[11](#)

L

lettering, [58](#), [74](#)–[79](#)
 linenfold panels, [101](#)–[5](#)

M

macaroni tools, [14](#), [17](#)
 mallets, [12](#), [18](#)–[19](#)
 micro planes, [18](#)
 moldings, carving, [80](#)–[81](#)

N

needle rasps, [18](#)

P

pantograph, [55](#)
 patterns
 carving through, [57](#)
 copying on workpiece, [56](#)
 drawing cross-sectional views, [54](#)
 enlarging with graph paper, [55](#)
 laying out, [54](#)
 rescaling with pantograph, [55](#)
 templates for, [57](#)
 planes, [18](#)
 polishing compound, [21](#)
 polishing wheel, [21](#)
 punches, shop-made, [121](#)
 push knives, [18](#)

R

rasps, [18](#)
 relief carving, [82](#)–[121](#). See also barnyard scene; shells
 about: overview and history of, [82](#)
 acanthus leaf, [82](#), [98](#)–[100](#)
 fans, [84](#), [85](#)–[86](#)
 gallery of fans and shells, [84](#)
 linenfold panels, [101](#)–[5](#)
 rifflers, [18](#)
 rosettes, [58](#)–[59](#), [66](#)–[69](#)
 round carving. See carving in the round;
 duck; human bust
 rubber grinding wheels, [21](#)

S

sharpening
 about: overview of, [20](#)
 angles and bevels, [20](#). See also specific sharpening tasks
 chisels on bench stone, [26](#), [31](#)–[33](#)
 chisels on grinder, [23](#)–[24](#)
 do's and don'ts, [20](#)
 gouges on bench stone, [36](#)–[38](#)
 gouges on grinder, [28](#)–[31](#)
 knives, [22](#)
 polishing and, [24](#), [26](#), [29](#), [31](#), [32](#), [35](#), [37](#), [38](#)
 stone holder, [32](#)
 testing for sharpness, [33](#)
 thin line of reflected light when, [12](#)–[13](#)
 tools and accessories for, [21](#)
 V-tools on bench stone, [34](#)–[35](#)
 V-tools on grinder, [27](#)
 shells, [87](#)–[97](#)
 carving veins in wing, [88](#)
 components illustrated, [89](#)
 creating/hollowing petals, [97](#)
 cutting carving blank, [87](#)
 defining/making inner shell, [90](#), [95](#)–[97](#)
 forming outer shell, [91](#)–[92](#)
 gallery of fans and, [84](#)
 petals, [97](#)
 preparing to carve, [84](#)
 refining/final touches on rays, [92](#)–[94](#)
 retracing pattern, [90](#)
 rounding over edges, [89](#)
 rounding rays, [88](#)
 sculpting surface, [87](#)
 six-cut triangles, [64](#)
 skew chisels, [14](#)
 slipstones, [31](#), [33](#), [35](#), [37](#)
 spirals. See rosettes
 spokeshaves, [18](#)
 spoon gouges, [14](#)
 stop cuts, [62](#)
 straight chisels, [15](#)
 straight gouges, [14](#)
 straight lines, [79](#)
 stropping, [22](#)
 strops, [21](#), [33](#)
 sweeps and sizes of tools, [16](#)–[17](#)

T

techniques. See barnyard scene; carving in the round; carving strokes; incised carving; relief carving; shells
 templates, using, [37](#)
 thin work, securing, [61](#)
 three-cut triangles, [62](#)–[63](#)
 Tlingit carving, [9](#)
 tool roll, [15](#)
 tools. See also chisels; gouges; knives; sharpening
 about: overview of, [12](#)
 accessories, [12](#), [18](#)–[19](#)
 basic kits, [17](#)
 laying out, [61](#)
 safety tips, [39](#), [40](#)
 shop-made punches, [121](#)
 sweeps and sizes, [16](#)–[17](#)
 triangle
 convex, [52](#)
 six-cut, [64](#)
 three-cut, [62](#)–[63](#)
 twelve-sided spirals, [67](#)
V
 V-tools
 about, [14](#), [17](#)
 sharpening, [27](#), [34](#)–[35](#)
W
 wheel dressers, [21](#)
 wood
 choosing, [40](#), [42](#)
 types and characteristics, [42](#)
 wood burners, [19](#)
 wooden mallets, [12](#), [18](#)–[19](#)
 workbench
 about, [43](#)
 bench dogs, [19](#)
 clamping techniques, [44](#)–[45](#), [60](#)–[61](#)
 grinding station, [25](#)
 hold-downs, [19](#)
 jigs for. See jigs
 securing, [45](#)
 sharpening-stone holder for, [24](#)
 workshop, [40](#), [43](#)

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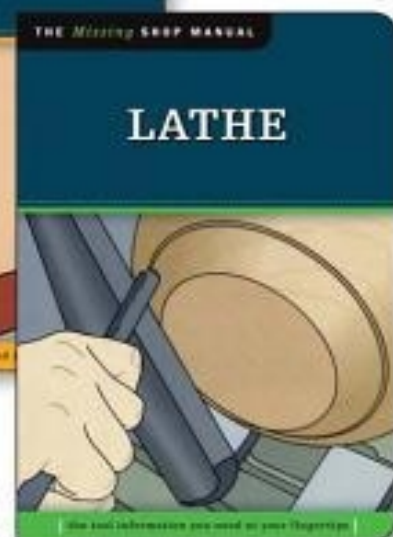
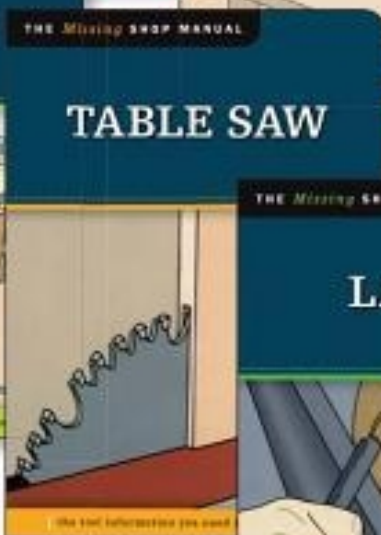
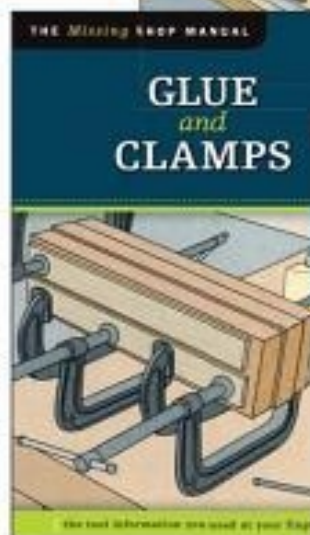
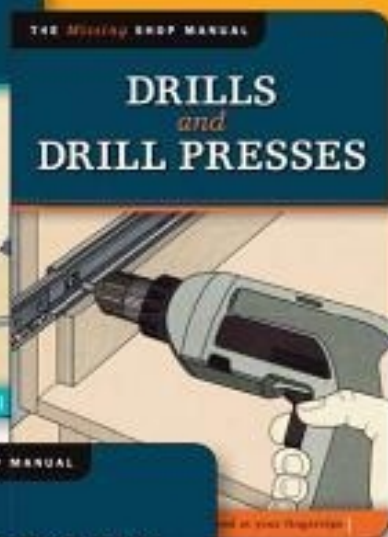
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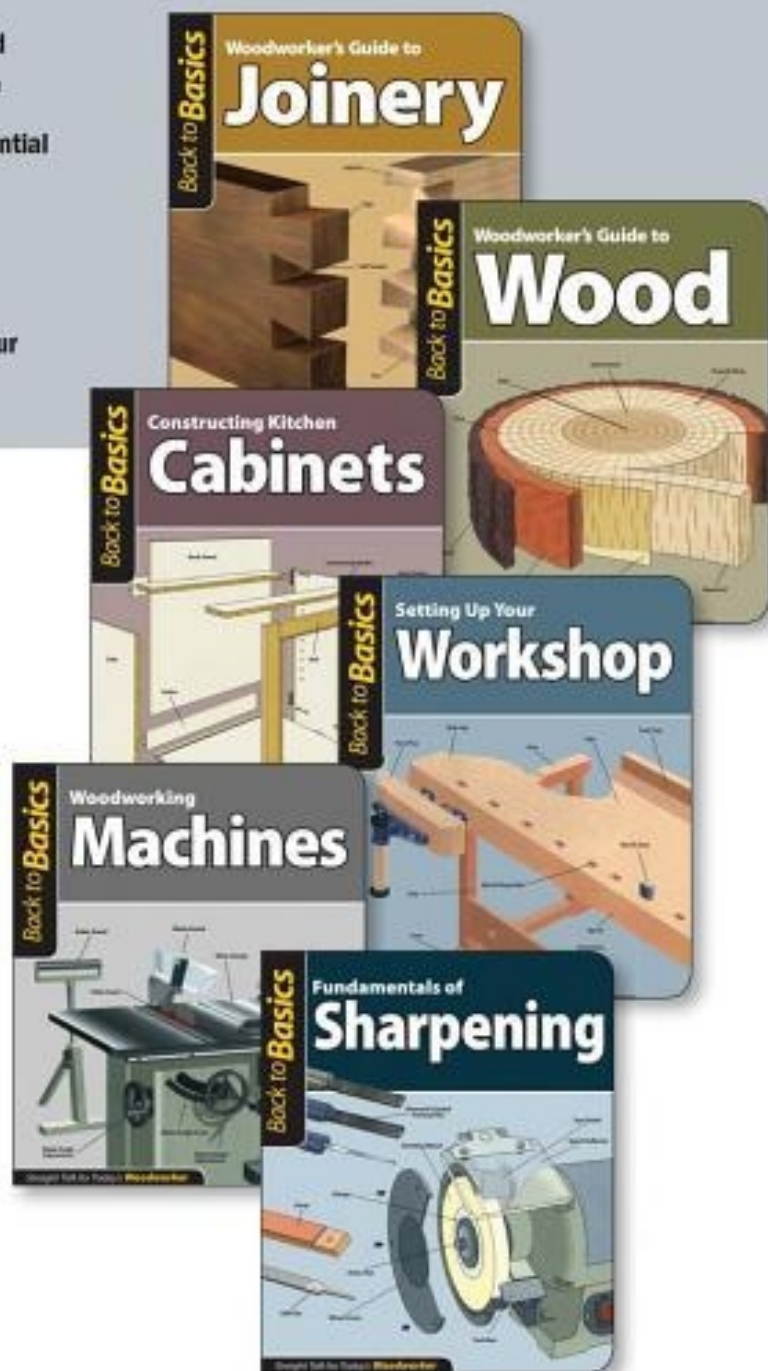
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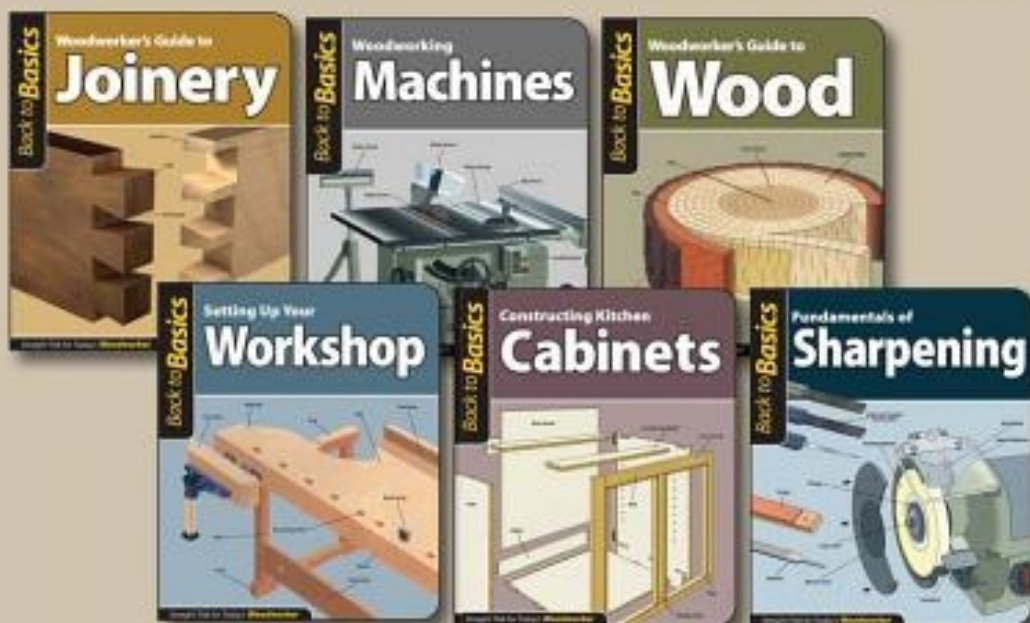
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