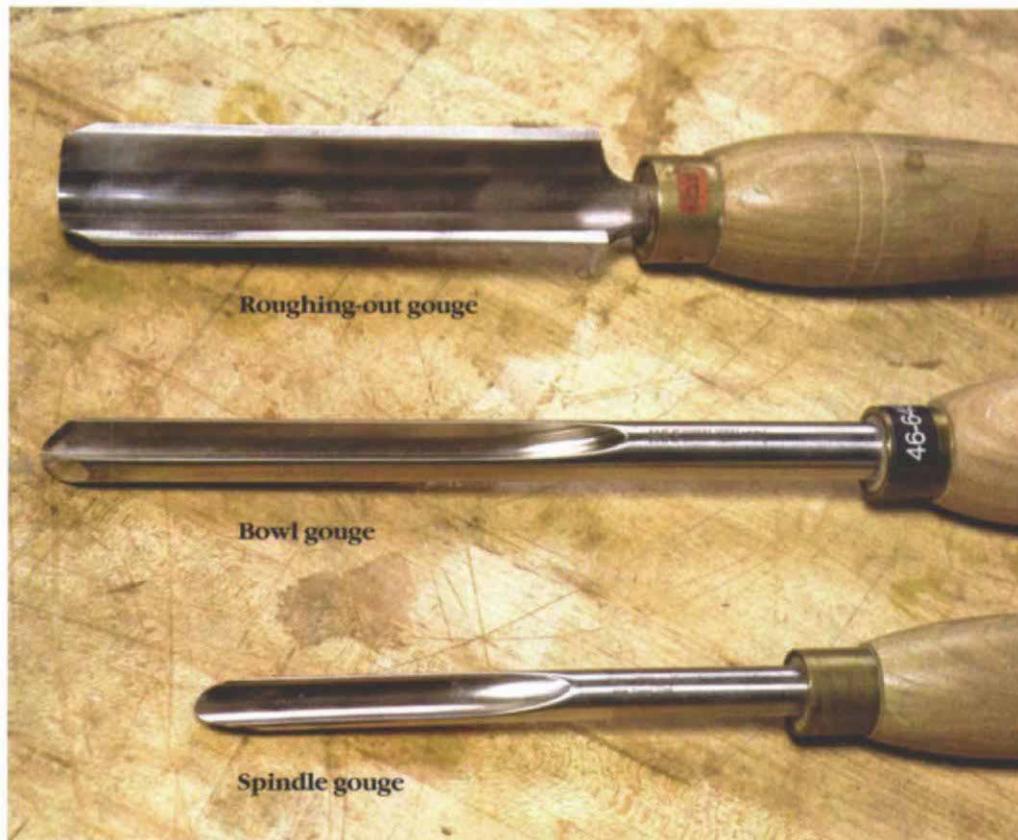


Gouges for the Lathe

Selecting and sharpening spindle, bowl and roughing-out gouges

by Ernie Conover



I'll never forget King Heiple, the orthopedic surgeon who signed up for one of my turning classes a few years ago. When I called the class to gather round as I demonstrated a new technique, he was the student who was right by my side, carefully studying my every move. Then he would go over to his lathe and do what I did, except he did it better. Not many of us are blessed with the ability to master a new skill so quickly. But I have noticed that anyone who learns how to handle a gouge with aplomb will be far along the road to mastering turning itself.

Gouges can be divided into three categories: roughing-out, bowl and spindle (see the photo above). When viewed in cross section, all are U-shaped, but their similarities end there.

Roughing-out gouges are the biggest of the bunch. They're used to make square stock round (see the top photo on the facing page). Spindle gouges have the shallowest flutes. They're used for finely shaping the details on legs or posts (see the top photo on p. 72). Bowl gouges have the deepest flutes and are employed when shaping vessels in faceplate turning (see the top photo on p. 73).

Knowing a little about how gouges are

made and what they're used for can help in deciding which types you need to add to your turning arsenal.

You'll need some tools and jigs to reshape and sharpen the gouges. Even premium tools leave the factory with a grind that's only a caricature of the proper shape. That problem has plagued turners for more than a century. J. Lukin wrote of spindle gouges in his book, *The Lathe & Its Uses*, published in 1868: "When purchased, they require grinding, the bevel being too short. It is essential that this tool have a long bevel. It is impossible to do good work with the standard form of the tool which is, nevertheless, of frequent occurrence in the workshops of amateurs."

The best gouges are made of high-speed steel

Gouges were first manufactured by forging and many are still made that way. High carbon steel is heated and hammered to the correct shape while hot. Premium gouges, made of high-speed steel, are machined into the proper shapes.

High carbon-steel tools—Only carbon is needed to make a good tool steel. But since the late 19th century, steelmakers have been

adding other alloying ingredients, such as manganese, phosphorus, silicon, vanadium and nickel, to their steels to make them tougher and more abrasion-resistant.

The heat-treating process is just as important as the basic steel. Soft steel is hardened and then tempered. When it arrives from the mill, steel is about Rc31 (Rockwell hardness scale). Most cutting tools need to be much harder if they are to hold an edge.

Heat-treating begins with hardening. The freshly forged tool is brought to cherry red and then quenched in water or oil. This leaves the steel at full hardness, about Rc64 for high-carbon tool steels. The steel is then tempered in a process called drawing.

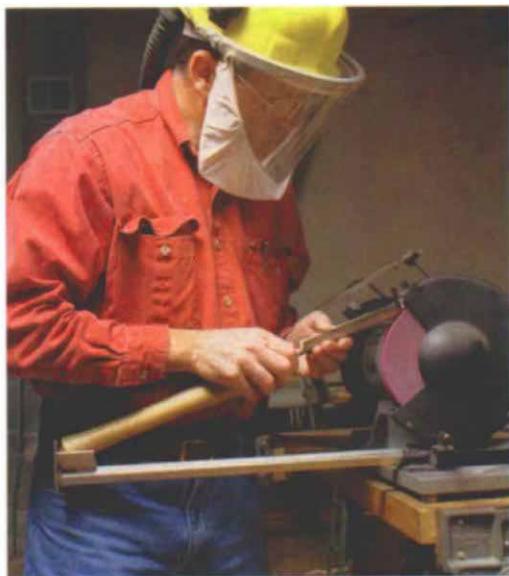
High-speed-steel tools—In 1868, steel-makers came up with high-speed steel (HSS) by alloying tungsten (and later large amounts of molybdenum) into their steels. Because HSS does not forge well, these gouges are usually machined from round bar stock.

High-speed steel does hold an edge longer than high-carbon steel, but its real virtue is that the turner no longer has to worry about overheating the tool during grinding. Temperatures above 430 °F begin to draw the temper of high-carbon tools,



Preparing spindle stock—A roughing-out gouge makes quick work of rounding a square billet

Grinding a roughing-out gouge—The heel of a roughing-out gouge's handle rides in a Oneway pocket jig's rest set for a 30° bevel. The author spins the tool between his fingers and applies even pressure against the grindstone.

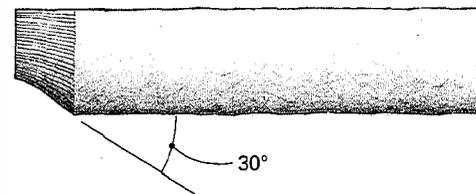
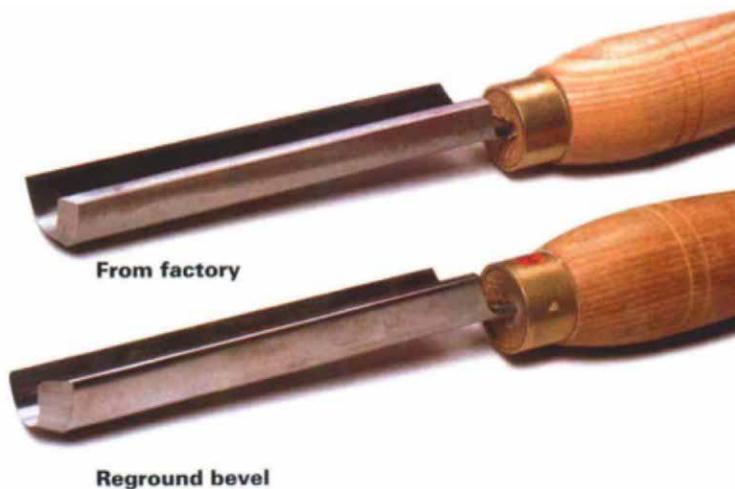


ROUGHING-OUT GOUGE

A roughing-out gouge can remove large amounts of material quickly. It's used for rounding billets and cutting cylinders and tapers. One roughing-out gouge will serve most needs; I recommend getting one that's between $\frac{3}{4}$ in. and $1\frac{1}{4}$ in. wide. Most high-speed-steel (HSS) roughing-out gouges come from the factory with square faces and medium bevels, about 45°. The tool works much better with a longer bevel of about 30° (see the drawing below).

To begin grinding, set up your jig. The Oneway pocket jig, which I favor, has a V-shaped pocket welded to a square bar that slides into a mating piece attached below the grinder. The distance from the pocket to the wheel determines the bevel angle. As the pocket moves toward the grinder, the bevel length increases and the angle decreases.

Set the roughing-out gouge's handle in the pocket, lower the cutting edge against the grindstone and roll the tool between your fingers for an even bevel (see the photo below). If you plan to use the roughing-out gouge to cut large coves, ease the edges of the corner bevels against the grindstone so that you won't catch the sharp edges against the workpiece.



but HSS tools can be turned red hot, up to about 1,800°, without loss of temper. That means you can use grinding wheels without a water bath. The cost of an HSS tool can be two to three times that of carbon steel, but it's well worth it.

Round is better—Most turners prefer a gouge made of round bar stock: The point

of contact with the tool rest can be kept directly under the edge doing the cutting. Flatter tools have an oval-shaped bottom, and the contact point can be off to one side or the other, a less stable condition.

Combination gouges—Long, SS gouges whose flutes are deeper than those on spindle gouges but shallower than those

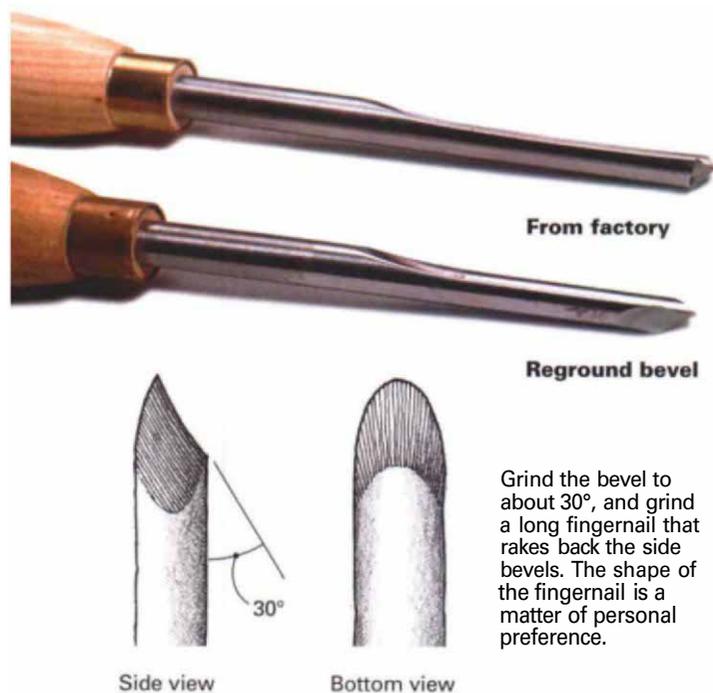
on bowl gouges have recently been introduced. The bevels on these gouges can be ground between 35° and 45° and will perform both faceplate or spindle work. However, these gouges do neither job as well as a dedicated gouge. Combination gouges cannot be ground to the really long bevel necessary for spindle work. Grinding a 30° side bevel creates a ragged burr on both

SPINDLE GOUGE

The best spindle gouges are made of high-speed-steel (HSS) round bar stock. They come from the factory with a very short bevel and a rather squarish profile at the tip, which makes it hard to get the point into tight quarters. I prefer to grind the sides into a fingernail profile with a rather long bevel. For spindle turning, the tool needs a long bevel of 25° to 30°. I also like a highly tapered profile, what I call a high-society fingernail shape, because the narrow point gets into tight places (see the drawing below). I know a good many turners, however, who do just fine with a rather blunt or workingman's fingernail. You may want to experiment to see what profile works best for the kind of work you do.

If you're just starting out, I recommend you buy two spindle gouges: 1/4 in. and 1/2 in. dia. For furnituremaking purposes, these will usually suffice.

Spindle gouges are sharpened using a pocket jig and a gooseneck clamp. Adjust the jig for a 30° bevel angle, and swing the gouge from side to side across the grinding wheel. A jig allows you to get a consistent grind that would be difficult to do freehand without a lot of practice.



sides of the fingernail where the metal has been ground too thin. If ground to a bowl-gouge contour, combination gouges lack sufficient flute depth to do a really good job. I find that they're best used for final cleanup on faceplate work.

Economy gouges—About 50 years ago, some large retailers began offering inexpensive lines of turning tools for hobbyists. These gouges have shorter and thinner blanks of steel and shorter handles. Such

tools are still around. Their cross section is very flat—so flat that they don't do a good job of rolling beads or cutting deep coves. It's best to avoid them.

Tools for sharpening

Although I learned how to sharpen gouges by eye using a simple tool rest mounted on a bench grinder, I now prefer jigs for more accurate and consistent results.

Good jigs hold the tool at the proper angle when sharpening. Because lathe tools

are round or oval-shaped, you need to rotate or swing them to shape the bevel correctly. Doing this freehand takes more skill than turning itself. I can recommend two brands of jigs: Oneway and Glaser. Both will help guide the tool around the grindstone with a greater sense of control than is possible with only a simple tool rest.

Not all grinding wheels are alike—I use an ordinary bench grinder with aluminum oxide wheels for most of my grind-



Cutting coves and beads—Much of what's needed for furniture-making can be performed with a spindle gouge.



Jigs simplify the task of sharpening. Using a Oneway pocket jig and a gooseneck clamping fixture to hold the tool, the author swings a spindle gouge from side to side across the grinding wheel. Bevel angles are controlled by adjusting both the pocket jig's distance from the grinder and the angle on the gooseneck clamp.

BOWL GOUGE

Traditional bowl gouges were forged with a deep U-shaped bevel, which was ground all the way around to 45°. The cutting edge (what is called the face) of this tool is square to the shank.

Modern bowl gouges, machined from high-speed-steel (HSS) round bar stock, generally have parabolic-shaped flutes. Factory grindings of this tool vary greatly among manufacturers, but many come with a 45° bevel ground all the way around. Most turners find the tool's performance can be improved by modifying this shape (see the photos below right). I recommend doing this to the two primary bowl gouges you'll want to have in your tool kit: ½ in. and ¼ in. sizes.

Modified grind: I favor an asymmetrical grind where the sides of the flute are raked back 15° to 30° and the nose bevel is reground to 60° to 80°. This allows you to cut cleanly across the axis of rotation without catching the corners of the tool or digging in too aggressively.

This grind works well when turning the inside of deep bowls because the nose bevel does not lose contact with the wood when it makes the sharp transition from the side wall to the bottom of the workpiece.

I use the Oneway sliding pocket jig in tandem with a matching gooseneck clamping fixture to sharpen bowl gouges. I slide the clamp 1¾ in. beyond the tip of the gouge, tighten the lock screw and set the angle on the jig's arm. Different jigs have slightly different ways of adjusting bevel angles, so you'll need to refer to your instruction manual. On the Oneway jig, the gouge is held in such a way that the gooseneck's arm pivots inside the pocket jig. You grind the gouge by swinging it from side to side, maintaining even pressure against the grindstone.

Advanced grind: Many bowl turners grind the side bevels back even more and increase the length of the lower bevel, too. If you want a longer bevel, bring the pocket in closer to the grinder. If you want more rake on the sides, adjust the gooseneck accordingly.

In skilled hands, a gouge with this grind will cut through reverse grain with nary any tearout, but it negates much of the forgiving nature of a modified-grind bowl gouge. Instead of rolling out of trouble, it tends to dig in deeper. I urge you to become technically proficient with one of the other grinds before progressing to this one.

ing. New bench grinders usually come equipped with silicon carbide wheels, which are very hard and better suited for shaping garden tools.

When I do roughing work, I grind gouges on a 46-grit wheel. For finer cuts, I sharpen them on an 80-grit wheel. It's important to keep your grinding wheels trued and flat. For that, I use a diamond wheel dresser. If you will be grinding high-carbon steel tools, you'll need to keep the tool cool during sharpening by regularly dip-

ping it into a water bath to avoid drawing the temper. Bluing on high-speed steel won't affect the temper.

Finish by honing the edge

I always hone my spindle-turning tools after sharpening, but my bowl gouges usually get honed only when I'm ready to make final passes across a workpiece and want a really smooth surface.

For honing, I use a cushion-sewn buffing wheel impregnated with Dico SRC stain-

less buffing compound, which is available at most hardware stores. To buff a gouge, hold it downhill against the wheel, and touch up both the bevel and the back. Make sure the gouge is held tangentially to the wheel so that you don't round off the sharp cutting edge.

Ernie Conover directs and teaches wood-working at Conover Workshops in Parkman, Ohio. He is also the co-designer of the Conover Lathe.



Faceplate work—A bowl gouge allows the author to cut across the grain and create hollows and curves.



For a modified grind, regrind the nose to a steeper angle of 60° to 80°, and add side bevels of 35° to 45°.

