Precise tools for drawing curves

BY MICHAEL FORTUNE

I use all manner of curves to spring my furniture to life. Once I've nailed down the design, I like to create full-size drawings of any curved parts. These make it easier to transfer the pattern to a template or to the workpiece. Having accurate drawings of curved parts also makes it easier to visualize joinery details and ultimately to cut those parts.

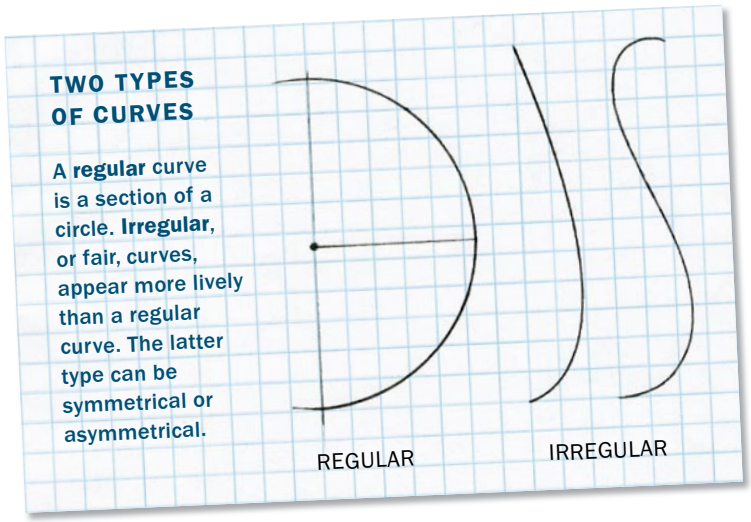
I'll show you how to draw both regular and irregular curves (see drawing, below), and then how to transfer those drawings to your work. My methods are simple and effective, and the tools involved won't cost an arm and a leg.

Use a compass for regular curves

When drawing a circle or a section of a circle, it's hard to beat a compass for simplicity and accuracy. There are different types, and your choice will be based on the size of the arc you need.

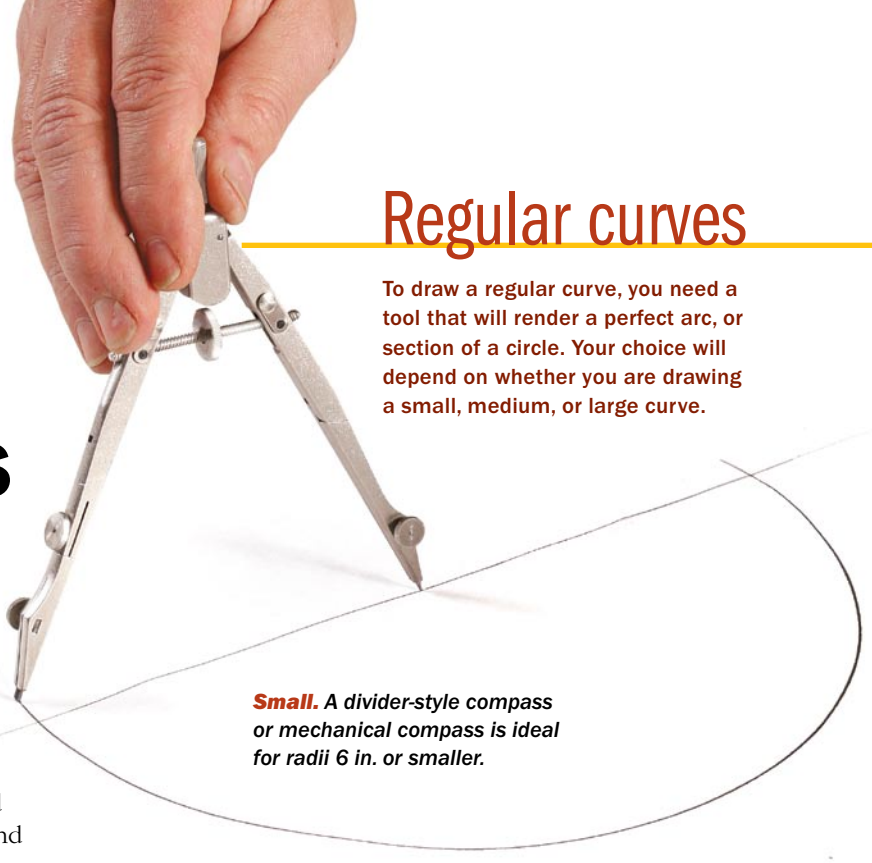
Small radii, usually up to 6 in., are best drawn with a divider-style compass. The most basic compass uses a standard pencil as one leg of the divider. These are available at office-supply stores and woodworking stores for as little as $3.

A mechanical compass is a more refined tool. Costing about $10 to $20 at office-supply stores, it uses a special pencil lead



Regular curves

To draw a regular curve, you need a tool that will render a perfect arc, or section of a circle. Your choice will depend on whether you are drawing a small, medium, or large curve.



Small. *A divider-style compass or mechanical compass is ideal for radii 6 in. or smaller.*

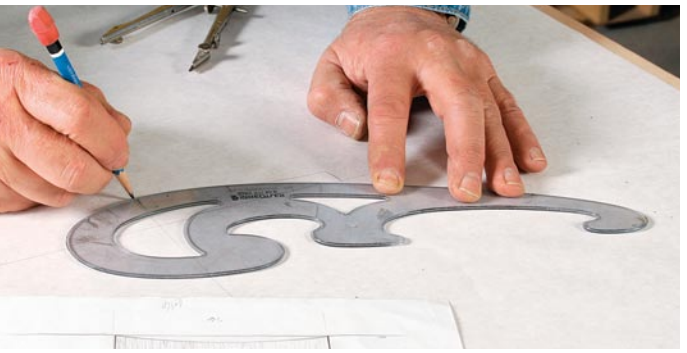
Medium. *A beam compass is a two-part drawing tool that attaches to a strip of wood. It can render curves from 1 in. to several feet in diameter.*

Supersize. *Heavy-duty beam compasses are attached to thicker stock to draw ultralarge-diameter arcs.*

Photos: Thomas McKenna

Irregular curves

Irregular curves appear more natural to the eye, and it takes some specialized tools to draw them.



Small. *Use french curves to render small details such as door handles or knobs.*

Large. *Drawing bows, both symmetrical (yellow) and asymmetrical (green), are bent into shape by tensioning and locking the strap.*

Parallel. *To add thickness to a curved part such as a drawer front, you need to draw two lines that are evenly spaced apart. Simple metal washers or shopmade MDF versions work well.*

in a holder that's sharpened along the outside at a 30° angle. To maintain that point, you can use a fine-grit sanding block or a sharpening stone. Choose a hard lead (2H), which will hold its point longer than soft lead and will render a finer line.

Beam compasses, or trammels, are used to draw radii from 1 in. to many feet. A beam compass has two separate heads that are mounted on a beam, usually wood. One head has the radius point and the other holds the lead or scribe that draws the arc. Again, use a hard lead and sharpen it in the same manner as the lead in a mechanical compass.

You can buy more robust beam compasses (available from www.toolsforworkingwood.com or www.generaltools.com) that can be attached to thicker, sturdier beam stock, allowing you to draw large arcs with radii from 5 ft. to 10 ft. These are ideal for working with curved dining tables or other large pieces.

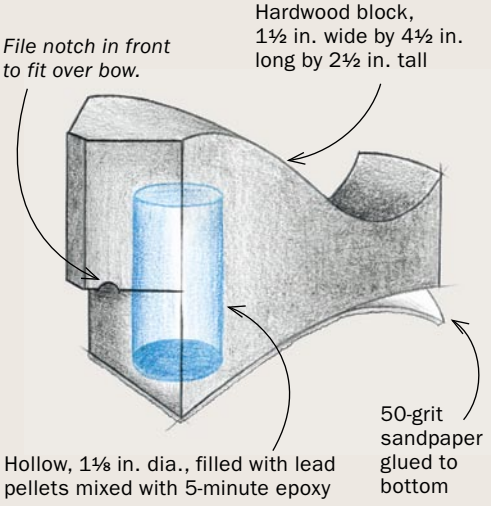
Use french curves and bows for irregular shapes

Small irregular curves, such as those found on the feet of cabinets or on door handles, can be drawn using french curves. They are made of plastic and are often sold at art-supply stores in sets of three (the largest is 12 in. long) for about $10.

For larger irregular shapes, I have come to rely on easily

WHALE OF A HOLD-DOWN

These weighted hold-downs are easy to make, but if you prefer, you can buy them online from boatbuilding supply stores (search for "spline weights").



Heavy helping hands. *It's tough to hold the bow and trace a line at the same time. If you don't have a helper, use spline weights, often called whales by boatbuilders, to keep the bow still as you scribe the curve.*

Drawings: John Tetreault

From paper to project

To transfer full-size drawings to a blank, you can stick the pattern right on the piece, trace the shape over carbon paper, or reproduce the shape using a drawing bow.

Attach the pattern to the workpiece using spray adhesive. *This method works especially well when making templates from MDF or hardboard, but avoid using it on the actual workpiece. The glue makes the surface gummy and may cause problems with finishes. Use double-sided tape instead.*

Retrace using carbon paper. *Tape the carbon paper and pattern to the workpiece and simply trace along the lines firmly. When you lift off the paper, the pattern is perfectly reproduced.*

Don't have carbon paper? Try this. *Use a soft lead pencil to shade over the lines of the drawing on the back. Then tape the pattern to the workpiece and retrace.*

adjusted drawing bows. The bow has a stick that's bent under stress and held in that shape with a string or strap. This versatile tool works for both symmetrical and asymmetrical curves. Drawing bows do not generate a consistent radius; instead, the curve is always straighter at the ends than in the middle.

I've been making my own wooden bows for years. But these bows tend to develop a kink or two and a twist along the length over time. Drawing bows made with carbon-fiber-impregnated plastic are much more consistent and reliable than the shopmade wood versions. Lee Valley (www.leevalley.com) sells two versions: asymmetrical and symmetrical. The stick of the asymmetrical bow is tapered in thickness to generate the asymmetry.

Re-creating shapes on the workpiece

Once you have the drawings done on paper, you need to get them to the workpiece. I like to draw my pieces full size, so transferring is fairly easy to do.

One way is to attach the drawing directly to the workpiece using spray adhesive. Then simply cut out the pattern following the drawing. This technique is great for making templates, but unless you make a copy of the drawing, you lose it.

Another way is to lay a sheet of carbon paper on the project and tape the drawing in place on top. Then it's a simple matter of retracing the lines. A variation of this involves scribbling with a soft pencil lead (HB, 2B) on the back of the drawing and retracing the pattern on the workpiece (see photos, bottom left).

My favorite method of transferring irregular curves from a full-size drawing is using the drawing bow. I reconstruct the important straight lines (as reference lines) on the project or template. Then I stretch the drawing bow to the appropriate shape, use a pencil to mark the tangent, or end, points of the curve on the bow, and move it to the workpiece, aligning the end-point lines with the straight lines on the project (see photos, right).

Once you have the pattern in place on your workpiece, you can move to the bandsaw and start cutting the curves. (For more on this, see my article on pp. 34-39). □

Re-create the curve using a bow. *First find the curve's end points (where the curve meets a straight reference line) on the pattern and transfer those to the bow (top). Next, re-create the reference line on the workpiece (or use a straight edge of the piece), align the marks on the bow with the reference line, and trace the shape.*