

master class





Over the past several years, I've tried to push the limits of traditional stringing patterns, which are basically a combination of straight lines and regular arcs, into freer, more organic forms that have a lot more life. Using patterns to guide a Dremel tool with end-mill bits gave me a new design vocabulary free of geometric constraints. To add realism and vitality to these designs, I taper the lines, routing adjacent sections with bits of different diameters, then smoothing the transitions between them by hand. The inlay on this chest that I made for my wife, Elizabeth, illustrates this effect.

After working out the design full size on paper, make several copies. Spray-mount one copy to a piece of ½-in.-thick MDF and cut out the pattern using a scrollsaw with a no. 9 blade. Mark the end points of the lines in the design, but continue cutting to the edge of the pattern or merge into another part of the design. Reassemble the pattern pieces and make registration marks between them to show how they align.

When you cut a groove, the shank of the bit rides directly against the MDF pattern. As long as you keep the tool moving the pattern will hold up. Leave it in one place too long, however, and you'll burn a notch into the material. To avoid creating a noticeable starting point, tilt the Dremel before turning it on, and pivot the bit into the work along the same line you'll be cutting. Entering the work from the side results in a small entry slot that can easily be avoided. To finish a groove, cut the power to the Dremel but keep the tool moving, sliding back into an area previously cut as the rotation winds down.

## The necessary tools

The tools needed for this type of work, although somewhat esoteric, are readily available and reasonably priced. For many years, I've used a Dremel mounted in a Stewart-MacDonald router base combined with a foot-operated on-off switch to free up my hands. Spindle rotation speed is very important. I run mine at a full 35,000 rpm and have found that many of the European models, or the hanging, extended-shaft varieties, don't spin fast enough.

To cut the grooves for this type of inlay, I use precision two-fluted end mills sold by [drilltechnology.com](http://drilltechnology.com). The company's owner, Bill O'Grady, and I have come up with a solid carbide product that performs well. The bits I typically use are 1/40, 1/32, 3/64, 1/16, 5/64,

$\frac{3}{32}$ ,  $\frac{7}{64}$ , and  $\frac{1}{8}$  in. For this particular project, the widest I used was  $\frac{7}{64}$  in.

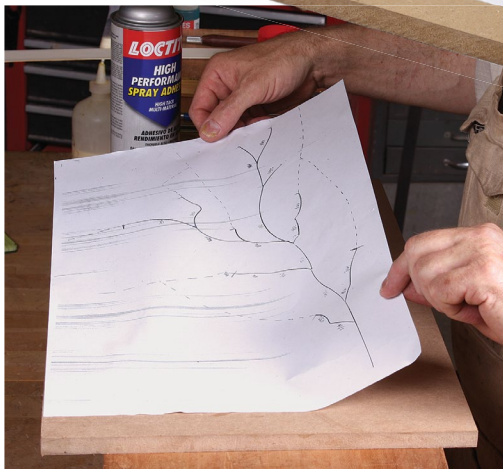
Although down-cut bits would seem a logical choice for this type of work, I avoid them. They are great for setting larger inlays but have a much shorter lifespan when doing line work because they don't evacuate the dust surrounding the bit, and the cutting edges overheat and dull quickly. Consequently, I stick with upcut bits combined with quality hardwoods, and I have never had a problem with lifting fibers.

—S.L.



## The pattern is crucial

**Start with the design.** After working out the design on a piece of paper, spray-mount a copy to a piece of  $\frac{1}{2}$ -in. MDF. On the design, mark out where the grooves will transition from one width to another.



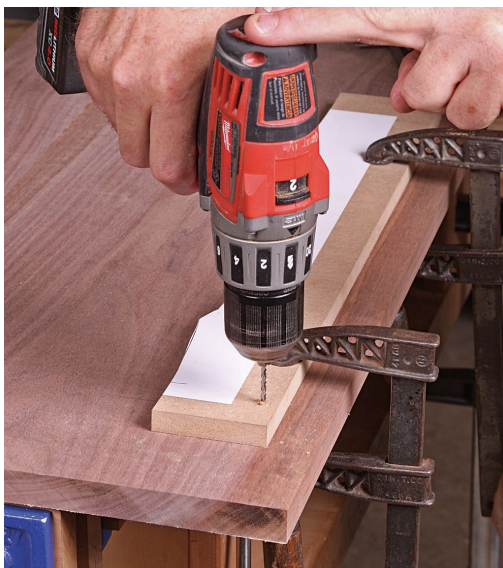
### Cut it apart using a scrollsaw.

Mark the ends of the branch with a pencil but continue cutting to the edge of the pattern or merge into another cut. Reassemble the pattern and make registration marks between the pieces to show how they best align.



### Proper positioning.

The bottom piece of the pattern aligns the entire form. Latta installs a couple of registration pins along the bottom segment so that he can remove and remount it in the same place on the workpiece. On the blanket chest, these pins were positioned so the holes fell under its waist molding.



go south, so I always work out the line thicknesses, intersections, and cut sequences on a test piece of  $\frac{1}{2}$ -in. MDF. If that goes well, I repeat the process on a slab of hardwood, making any changes indicated by my first attempt. Once I feel comfortable, I do the actual piece. If I haven't had a successful attempt on a test piece, what insanity would make me believe it will magically come together on the real piece?

Having established the line weights and transitions, start by cutting the narrowest segments of the grooves. You may have to assemble and disassemble the pattern several times to cut all of the grooves. During this part of the process, I use clear tape to hold the segments together. You can run the narrow segments into where the wider grooves will be cut, because the wider groove will cover the narrow one. To speed the work, I use a couple of Dremels set up with different-size bits. Once done with the smaller bits, I change to larger bits. It is important to cut all the grooves at the same depth (a light  $\frac{1}{16}$  in.). Color-coded depth collars help keep the diameters sorted and make for an effortless bit change without the need to reset the depth. I sand or chisel the edge of the groove to smooth the transition between segments. It doesn't take much, because the shoulder between segments is only  $\frac{1}{128}$  in. or so.

When cutting grooves, look for natural break points (such as offshoots) for individual pieces of stringing. Ending cuts in the path of intersecting cuts makes for really fluid transitions. Ideally, a long run on the branch should be fitted with a long single piece of stringing tapered down from the fattest point. It is not unusual to waste a few strips trying to get a good fit.

### Make the stringing

The stringing is made from holly (or a wood of your choice) sliced into strips on a bandsaw or tablesaw at a heavy  $\frac{1}{16}$  in. thick. Too thin will fold and flex too easily and too thick will be difficult to cut and bend. The relationship between the thickness of the stringing and the depth of the groove is crucial, because when installed, the stringing should be a hair (only a few thousandths of an inch) proud of the surface.

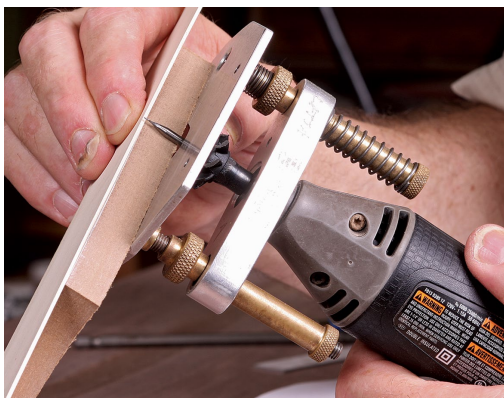
Stringing can be cut to width with a straightedge and X-Acto knife or with a slicing gauge and fixture. For my straightedge, I have a thick 2-in. by 24-in. ruler with sandpaper applied to the bottom to prevent slipping. I will often use double-sided tape



## Router bit rides the template

### **Adjust the height of the bit.**

Measuring against the template and a piece of inlay stock, set the bit so that the groove will be just slightly shallower than the veneer thickness.



### **Hands-free start and stop.**

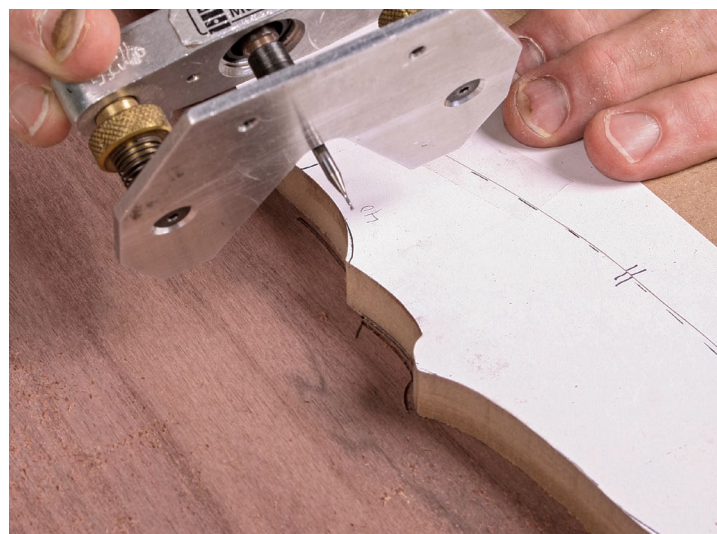
Latta uses a Dremel mounted in a Stewart-MacDonald router base and equipped with a foot switch for on and off (right). He starts by cutting the narrowest grooves (below).



## Add pieces to continue the pattern

### **Keep track of the bit size.**

To make things easier, Latta uses two Dremels set up with different-size bits. You may have to assemble and disassemble the pattern several times to cut all of the grooves. Use clear tape to hold the segments together. The wide and narrow grooves will blend together, so the narrow grooves can be started within the range of the wider grooves (below).



### **Smooth the transition.**

When moving from one width to the next, sand or chisel the edge of the groove to smooth the transition. Keep in mind that the shoulder between segments is only  $\frac{1}{32}$  in.

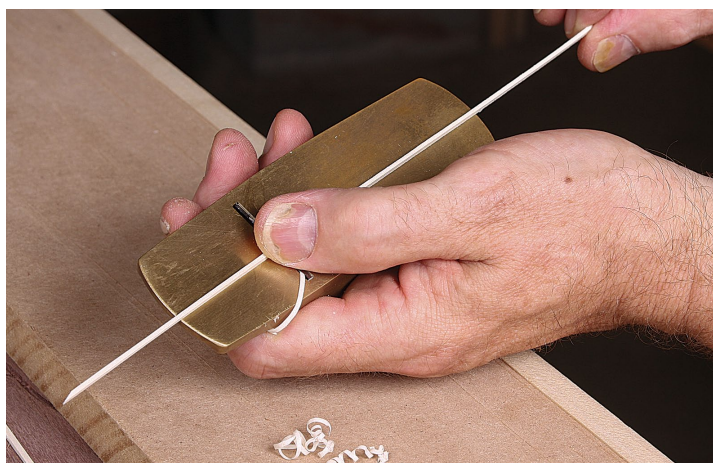




## Prep the stringing



**Cut the stringing.** Using a slicing gauge with a shopmade fixture (MDF with a small lip attached), butt the stringing to the lip and start slicing at the bottom, working your way to the top. For a cleaner edge, cut halfway through and then flip the material and finish the cut from the other side.



**Taper the strips.** The strips can be tapered with a small block plane. Pull the strip across the blade. There is a lot of fitting and trial-and-error here. Be prepared to break some strips and have to redo them.



**Heat helps manage tight curves.** If there are any tight curves, bend the stringing on a hot pipe before you glue it in place.

## Glue it in and trim it flush



**Glue it in.** Once the stringing fits, glue it in using yellow glue. Latta uses a Monoject 412 syringe to put glue in the channel, and presses in the stringing with a metal ruler.



**Run through intersections.** Glue in the stringing so it lands beyond intersections, and then use a chisel or a gouge to cut it back to perfect length.



**Flush it up.** As you go, smooth the stringing down to the background surface with a block plane, chisel, sanding block, or card scraper.



# master class continued

to apply a strip of wood to the top of the rule to serve as both a handle and a guard should the knife slip. If you use a slicing gauge, you'll need a piece of MDF about 6 in. by 28 in. with a small lip on the edge. Butt the holly against the lip and start slicing at the bottom, working your way to the top—this keeps the stringing from buckling. With thicker stringing stock, I often go halfway through and then flip the material to come in from the other face. This leaves a cleaner edge that's less likely to break on a curve. I taper the strips with a small block plane. It is not difficult, but it is not unusual to ruin a strip and have to start another.

Once you know the stringing will work, glue it in place. I use yellow glue in a Monoject 412 syringe. When the glue is dry, flush the stringing to the surface using the method you prefer, whether it's a chisel, handplane, sanding block, or card scraper.

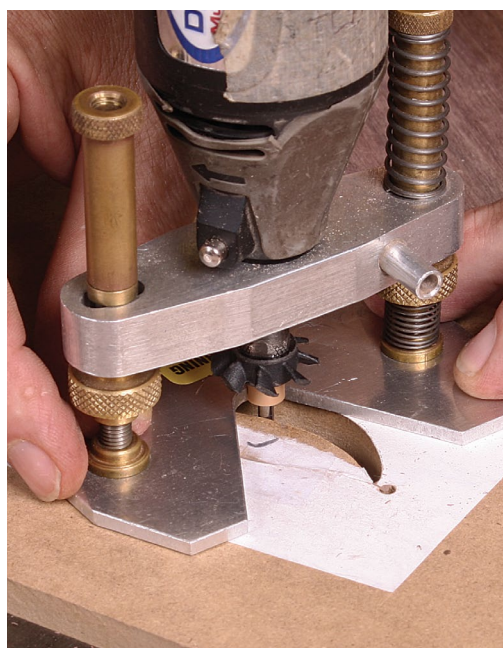
## Add the leaves

In this piece, the leaves are single thicknesses. Their stems are tapered, however, and I cut the grooves for them by hand with a shallow gouge. Make a template with the cutout shape of the leaf silhouette, and an insert for the center vein. After you adjust and clamp the template where you want it, start by routing the center vein. With a shallow-sweep gouge, extend this line out to form the stem. A single piece of stringing makes both the stem and central vein. Once the outer border has been routed, inlaid, and dried, you can flush it to the background.

For more complicated leaves, such as the double leaf or the leaf with a flipped tip, the pattern is a little more complicated. The pattern for the double leaf has two inserts to help define the shape. Tackle them one line at a time as you would with the single leaf. □

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## A pattern for leaves



**Position the leaf.** Clamp the template on the workpiece where you want the leaf, put in the insert (above), and tape it in place. Then rout the center vein (left), inlay the stringing, and trim it flush. Repeat the sequence for each outside edge of the leaf (below).

