Metal Accent Ring

Done Right

Bill Ooms

Pink and Silver Bowl, 2013, Pink ivory, sterling silver, 2" (5cm) diam.

Combining metal with wood—two materials with distinct properties—can spell trouble due to wood movement, unless you employ some thoughtful engineering. This bowl, constructed using a technique described in this article, has successfully survived extreme humidity changes. The wood shows no sign of cracking because the metal was configured to stretch and retract with the wood.

Ill effects of humidity change

1 African blackwood box with sterling silver filigree insert in the lid, constructed in an arid location.

2 The wood lid expanded after exposure to high humidity, allowing the silver ring's edge to become visible.

Metal and wood don't normally mix well—just like water and oil. The reason is that wood expands and contracts significantly with changes in moisture, while metal does not. This can lead to cracking of the wood, breaking or stretching of the metal, gaps between the metal and wood, and other similar problems. However, with a little thoughtful engineering and clever design, one can overcome many of these problems.

Some things that don't work

Here's an example of something that doesn't work. *Photo 1* shows a box with a threaded lid made from African blackwood. The size is 2" (5cm) in diameter, and the wood was "Arizona dry" (which means a moisture content of about 4% measured with a moisture meter). The top of the lid was recessed and a round ring of sterling silver was inset into a groove with some silver filigree work soldered inside the ring.

Since this was the first time I tried this technique, I decided to test what would happen when the piece was subjected to higher humidity. In order to simulate "New Orleans wet," I put the piece in a plastic bag with a damp sponge for two weeks. The result is shown in *Photo 2*. The wood (both the top and bottom of the box) expanded by about 0.100" in diameter, but the silver did not change size. Not only did the metal ring become visible, but also a gap of about 0.050" formed between the silver and the wood, which allowed the captive ring to nearly fall out.

You can also imagine what would happen if the silver was first fitted to wood that was acclimated to a higher-humidity environment. If you took it to Arizona, within a few weeks the wood would shrink and the metal would not—the wood would crack.

A solid metal band around the exterior of a shape will either stretch or break at the solder joint as wood expands when going from dry to humid. Alternately, if the wood goes from wet to dry, a solid metal band around the exterior of a shape will loosen and fall out of any retaining groove.

A flexible solution

One solution that works well is to make the metal flexible and springy. *Photo 3* shows some decorative sterling silver gallery wire that can be purchased from jewelry suppliers. On the left, you see the unmodified metal strip, and on the right you see the modifications I've made by sawing through the solid portion at the bottom at ⅛" (3mm) intervals. The silver is annealed to half hard, so it is springy. The sawn gaps allow ▸

Put some spring in your ring

3

Sterling silver gallery wire shown without and with small saw cuts (left and right sides, respectively). This step is key to adding flexibility to a metal accent ring.

4

Sawing cuts at ⅛" (3mm) intervals with a jeweler's saw.

5

After sawing, the band is flexible and springy.

Retaining ring with a groove

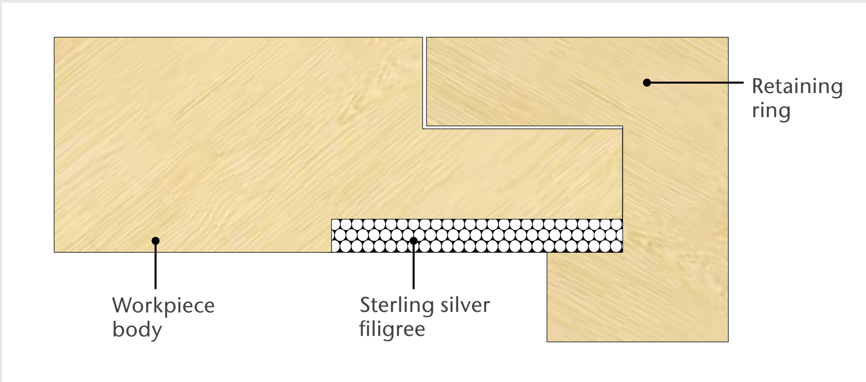
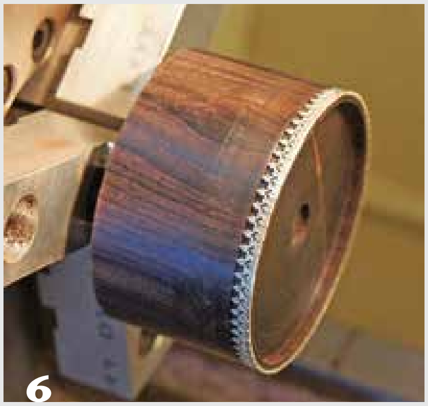


Figure 1. Cross-section drawing of the retaining ring joint.



6

The silver band inset in a recess cut on the metal lathe.

7

Cutting the groove in the retaining ring on the metal lathe. When the retaining ring is installed, this groove conceals the small cuts in the silver ring, allowing only the decorative filigree to show.

the annealed silver band to be very stretchy (like a spring or rubber band).

I first measure the correct length of the gallery wire and make a solder joint (ensuring the pattern matches at the joint). Then I use a jeweler's saw to make the cuts at ⅛" intervals (*Photo 4*). The proper technique for sawing is to keep the blade near vertical and cut only on the downward strokes. It only takes two or three strokes to cut through the metal at each point.

When the cuts are completed, you have a stretchy metal band that will expand and contract with the movement of the wood (*Photo 5*).

To keep the silver ring in place (and to hide the cut marks), I turn a wooden retaining ring. The configuration is illustrated in *Figure 1*. I use a metal lathe to cut a precise groove in the wood, as shown in *Photo 6*. Note that the end of the cylinder is recessed to receive the retaining ring. This gives me some edge grain for gluing (like a half-lap joint), rather than using an unreliable endgrain glue joint. Using a metal lathe makes it easier to control the dimensions precisely.

The groove in the retaining ring is cut with a parting tool on the metal lathe (*Photo 7*) just deep enough to cover the cut portions of the silver, leaving the uncut portions exposed. Not visible in the photos are alignment marks on the matching pieces of wood so I can glue the retaining ring with the grain perfectly aligned. I'm careful not to get glue on the metal—I want the metal to be free to float under the retaining wood.

Another design option is to cut a narrow groove into the body of the workpiece to receive the bottom, cut portion of the silver band (*Photo 8*). For the purpose of illustration, I've used a piece of cut silver that was not soldered into a ring. This more clearly shows how the band tucks into the groove. I turn the groove using a custom, narrow parting tool ground from a piece of high-speed steel to a thickness matching the thickness of the gallery wire. Then, on the metal lathe, I cut the depth of the groove so the wood just covers the cut portion of the silver. With this design, the retaining cap simply holds the soldered ring in the groove. Again, I take care to orient the grain so it matches when the retaining ring is glued in place. I'm careful not to get glue on the metal, as I want the metal to be free to float in the captive groove.

Other techniques

Wood doesn't move much in the direction of the grain of the wood. So another technique that works well is to cut shallow grooves in the wood with an end mill that are primarily in the longitudinal direction. The width of the groove is just slightly narrower than the diameter of the wire I want to inlay (about 0.001" smaller). The depth of the groove is also slightly less than the diameter of the wire. Then, using a leather mallet, I gently tap the twisted sterling silver wire into the groove.

The egg box in *Photo 9* shows how these techniques can be combined together. ■

Bill Ooms learned woodworking from his father. After a career as an engineer, Bill became a full-time woodworker. He works with rose engine and ornamental turning, which combines his woodturning skills with his math and engineering background. For more, visit billooms.com.

An alternate method

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An alternate method of retaining the silver ring while hiding the small cuts—this time with the concealing groove cut in the lower body of the workpiece, rather than in the top retaining ring.

Longitudinal metal inlays

9

Black and Silver Egg, 2014, African blackwood, Maple, brown ivory, sterling silver, 5" × 3" (13cm × 8cm)

This egg employs a combination of techniques to safely add metal with wood. In addition to holding flexible silver rings in concealed grooves, it also features inlaid silver in strategically placed channels.