Sculpt your own hardware

HAVE YOUR WAX DESIGN CAST IN SOLID BRONZE

BY HAROLD GREENE

I began creating my own bronze hardware after I looked in vain through various catalogs for a large, decorative pull for a cabinet that would attach to one door, yet be centered on both doors. The bronze pull I ended up making complemented the piece so perfectly that I've since made dozens of designs using this simple yet creative process.

Working with wax

After drawing front and side elevations of the hardware (in this case two eucalyptus-leaf pulls for the drawers of a desk), I often make wooden mock-ups and use hot-melt glue to attach them in place to get the proportions just right.

I use microcrystalline wax to make my original model. It's readily available from art-supply companies or Amazon.com and usually comes in a 1-lb. to 3-lb. block. Break some off and melt it at around 180°F in a double boiler (the wax is flammable). Pour it into a container formed from aluminum foil that is roughly the shape of the casting. Once the wax hardens, it's ready to carve.

Wood-carving gouges and utility knives are great for roughing out the shape, while a variety of tools including dental instruments are excellent for fine details. Mistakes can be fixed easily by adding hot wax and then reworking the area. You can smooth a rough area by applying a propane torch for a split second, and minor blemishes can

FROM WAX TO BRONZE

There are several methods of casting bronze, the simplest of which is the lost-wax process. Create a design in wax, and then ship it to a foundry. There, the design is dipped in plaster-like slurry, which is baked into a shell. The wax original is melted out and molten bronze poured in to make an exact copy of the original. After the rough casting is returned, you can give it a number of different finishes.

1) CARVE THE WAX ORIGINAL
Melt microcrystalline wax into a rough mold, and then sculpt the design that you want.

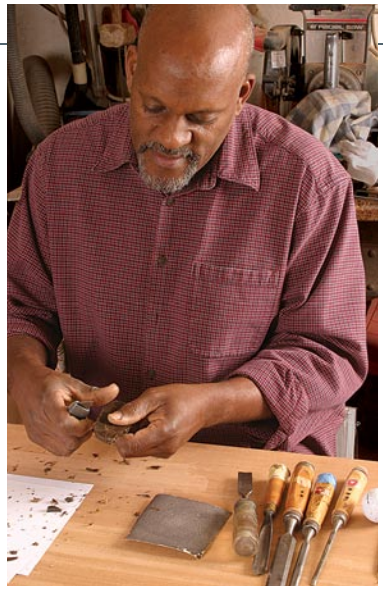
2) SEND IT OUT
The piece you get back from the foundry will require filing and cleaning.

3) CHOOSE A FINISH
You can leave the piece with an antique appearance, or give it a bright polish or a chemically induced patina.

Photos: Mark Schofield

Sculpt the wax

Make the blank. *Melt some wax in a container set in heated water and then pour the wax into a foil form slightly larger than your desired casting.*

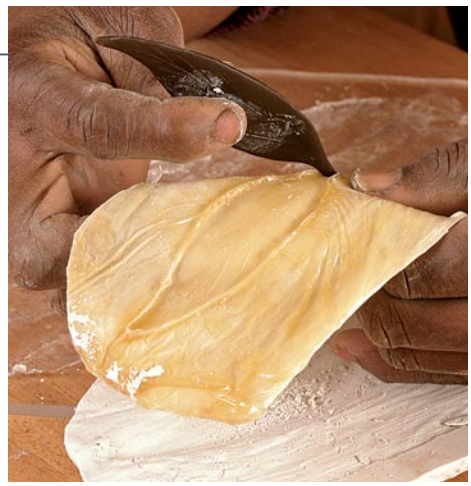


Sculpt the shape. *Use a utility knife to shape the outline of the wax original. You can use almost any cutting tool to refine the shape and add details.*

Create a mold of the original

Apply liquid latex. *Use melted wax to stick the originals to Plexiglas, and brush on 10 coats of liquid latex, allowing each coat to dry.*

A plaster cradle. *To create a support for the mold, pour plaster of paris over it and then flatten the top of the plaster with melamine.*



Clean up the mold. *After the plaster dries, remove the original from the mold, and trim any latex overhang before using the mold.*

Make copies and add posts

Pour wax copies. *With the latex mold supported by the plaster cast, pour in liquid wax to create new pairs of leaves.*

Pour some posts. *To create wax posts for the pulls, seal one end of a piece of copper pipe with masking tape and then pour in some wax (left). Heat the copper to extract the posts. Cut the post material into suitable lengths and attach them to the back of the pulls using hot wax (above).*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At the foundry

When your wax sculptures get to the foundry, wax rods and pouring cups are attached to ensure that the bronze will be able to flow through the mold. The wax structure is dipped into a green liquid (1), very fine powder is poured over it (2), and then it is hung up to dry. These steps are repeated six or seven times using increasingly coarse sand to build up a ceramic shell. The shell is placed into a steam chamber to melt out the wax, baked in a kiln, and finally has molten bronze at 2,100°F poured into it (3). When the bronze cools, the mold is cracked open (4), the bronze supports are cut away, and the castings are returned to you. You can look for a foundry near you or go to www.theoriginalcastfoundry.com and contact them for an estimate. This pair of leaves cost about $50.

be removed by rubbing the surface with your warm fingers.

Making multiples of the same design

You could stop here and mail the wax original to the foundry, but even if you only want a single casting, I urge you to make a copy in case the original is damaged or the casting goes wrong. Of course, some pieces, like chests of drawers, require a set of four, six, or eight pulls, and the same number of wax copies.

To make a copy you'll need some liquid latex rubber (Mold Builder from www.eti-usa.com) and a piece of Plexiglas or melamine. Attach the wax original to the Plexiglas with melted wax. Make sure there are no voids under the piece.

Brush on a thin coat of latex, making sure no pools form in the crevices. Extend the latex about an inch around the original to form a kind of flange. You want the latex to contact the entire surface of the wax, so use a hair dryer to blow out any bubbles on the wet surface. Let the latex dry until it appears translucent, and then repeat this step nine or 10 times.


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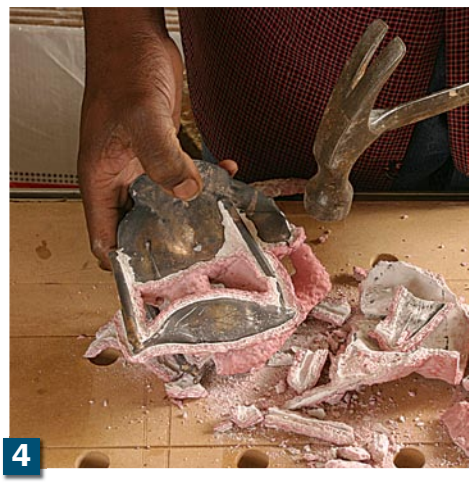
Next, make a support for the mold, which will be quite flexible. Mix up some thick plaster of paris and pour it over the latex mold while it is still attached to the Plexiglas. While the plaster is wet, flatten the top with a piece of melamine or plastic to make a flat bottom for when the mold is flipped over. When the plaster is dry, remove it from the latex, peel the latex mold from the Plexiglas, remove the wax original, and place the mold into the plaster support. Now you can make multiple wax forms.

Spray the surface of the mold with silicone lubricant or cooking spray. Then pour some melted wax into the mold. Let the wax cool thoroughly before removing it from the mold. Check the mold for any wax residue, and then repeat the process until you have as many wax copies as you need plus a spare or two.

The final step is to allow for the posts that will be drilled and threaded to connect the pull to the cabinet. I pour melted wax into a section of copper pipe, and when it is hard, heat the outside of the pipe with a propane torch until the wax stick can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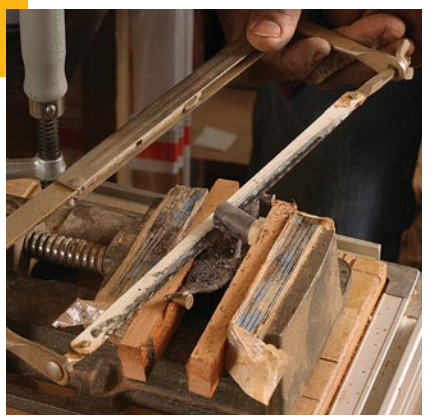
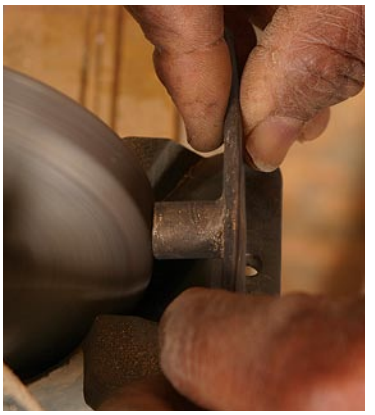
Clean up the casting





Clean up the casting. *You'll need to remove the remains of pouring rods attached at the foundry. Use a hacksaw, and then flatten the base of the pull's post on a grinder or with a file.*

Tap a hole. *After drilling a hole in the end of the post, use taps to prepare it for a 10/32 threaded screw that will secure the pull to the drawer front.*

be pushed out. Attach a short section to each pull using melted wax.

Clean up and finish the bronze

When the casting returns from the foundry, you'll need to remove any metal spurs and flatten the ends of the posts using files or a grinding wheel. Then drill and tap the post for a standard 10/32 screw thread.

Now remove the oxidation using steel wool, wire brushes, and fine sandpaper. You can stop at any time, leaving an antique appearance with the recesses still dark, or you can proceed to the buffing wheel and polish the surface to a bright bronze finish and lacquer it.

A third choice is patination, or the enhancement of bronze by the chemical application of color. Two chemicals I use are ferric nitrate to produce reds and browns, and cupric nitrate for greens and blues. You can buy these and find more information on chemical patination at www.sciencecompany.com.

After heating the polished pull with a propane torch, spray 1 tsp. of the chemical diluted in 8 oz. of water onto the hot surface. Continue to alternately heat and spray the surface until you achieve the color you want. After the pull has cooled, buff the surface with 0000 steel wool and then add a coat of paste wax to give it a mellow gloss and protection. □

An antique look. *Use steel wool and fine sandpaper to remove casting oxidation from the pull. Leave some areas dark for an aged look.*

Burnished bronze. *Using compound on a buffing wheel gives the pull a mirror finish.*

A quick patina. *Heating the pull with a propane torch and then spraying on diluted chemicals can give the metal a range of colors.*