

One-of-a-kind pulls

CAST CUSTOM HARDWARE
FROM ANY OBJECT

BY SCOTT GROVE

When I got tired of the stock items available in stores and catalogs, I discovered cold metal-resin casting. Today, I use it to create distinctive cabinet pulls, finials, inlay, and even small boxes.

Casting is as easy as baking a cake, and the beauty of this technique is that you can make a master pattern from almost anything, from a hand-sculpted piece of wood to a found object like a pinecone. With the addition of clay, the possibilities are truly endless. And you can do it all for less than \$5 apiece.

The casting material is a mix of metal powder and resin that has the feel and durability of real metal, with the look of bronze, steel, copper, etc.

I'll cover the basic concepts as I cast a pinecone pull. But this is just a small sample of what you can do. Once you have the process down, let your imagination run wild.

What you can cast, and what you can't

The master is the original object or model that a mold is taken from. This is what your casting will look like—exactly—including pores, wrinkles, and even wood grain.

The master doesn't have to be a durable object; it only has to be strong enough for a mold to be taken. So you can use hot-melt glue, clay, or whatever works to create a temporary



Before and after. Grove makes a master (top) out of a found object like a pinecone or makes one out of wood, in this case adding beads and bark for a beautiful effect. He then uses the master to make a mold, which is used to create the final castings (bottom) from a mix of resin and metal powder.

WHAT YOU NEED

There are a host of supplies for casting, but these are among the easiest to use for small pieces like furniture pulls. All are available from Smooth-On.com.

SILICONE MOLD MATERIAL ▶
Mold Star 16 Fast
Trial unit (2 lb.), \$30



▶ **URETHANE CASTING MATERIAL**
Smooth-Cast Onyx Slow
Trial size (2.2 lb.), \$25

▶ **METAL POWDER** ▶
Bronze powder (brass, copper,
aluminum, and nickel-silver
also available)
1 lb., \$26



MAKE A MASTER...

A found object like this pinecone makes a beautiful custom pull, but only after a few steps are taken.



Fill deep crevices. This will make the mold easier to remove. Use sulfur-free modeling clay and wipe off the excess with petroleum jelly.



Add a mounting post. Again, clay works well and can be textured with modeling tools. This mounting post will double as the pour spout for the casting process.



Add a vent if needed. The stem of the pinecone will point upward during the casting process, trapping an air bubble. A thin dowel, supported by more clay and attached with hot-melt glue, provides an air vent.

assemblage. Everyday oil-based clays contain sulfur, which inhibits the curing process of some mold compounds. So I use sulfur-free clay, available from art-supply stores and casting suppliers. And I use vinyl gloves, as latex also can inhibit curing.

Thin areas and minimal contact points are a potential area of failure. For example, if you place a marble on a flat surface with the goal of combining the two, there will be a very small point of contact between them, and the little sphere will break off. But it is easy to use clay to beef up the weak point.

As you plan, you must also think about how the object will be mounted. The easiest approach is to incorporate areas or elements that will be drilled and tapped for screws and bolts. For this, you need enough meat at the attachment point, for example, at least $\frac{3}{8}$ in. of material to support a No. 8-32 bolt.

Plan for the pour

Before you can call your master complete, you need to think past making the mold to when you flip the mold over and make a casting. Start by determining where the pouring spout or spouts will be. It should go on the back side of the item, in an unseen or less-seen area. On pulls, I often use the attachment points as spouts.

Not every casting will release all of its air bubbles out of a single spout, so air vents

...THEN USE IT TO MAKE A MOLD

A yogurt container works great for a small 3-D object, while melamine boxes can be made for flatter objects. Attach the master to the bottom with hot-melt glue.



Mix and pour. Mix the two-part mold material thoroughly, and pour it into one spot on the bottom of the container, never on the object itself. Tap the sides to release bubbles. A line in the cup marks the best place to cut the mold open later.



Strategic cuts. Groove made cuts at both ends of the pinecone with a long razor knife, feeling for the vent dowel at one end and the surface of the pinecone at the other, and cutting down only as far as necessary to extract the object.

CASTING A PULL

A rubber band will re-close round molds, while rectangular ones can be clamped lightly. Do a first casting without metal powder to reveal any problems and extract debris from the mold. Add metal powder for subsequent castings.



Dust and shake. Dusting the mold with metal powder ensures that the metal color will be even on the outside of the casting. Cover the spout and vents, and shake to coat all surfaces. Then shake out the excess powder.



Add the metal powder. Mix up the two-part urethane and then mix in the metal powder. Don't go thicker than the consistency of honey. Pour in the mixture slowly and steadily.

may be needed. These are easy to make, usually by attaching a wooden dowel to the master.

Making a mold

While there is a wide variety of molding material to choose from, I recommend Smooth-On's Mold Star 16 Fast, which has a low viscosity so it pours and releases bubbles easily. Also, it is very flexible so molds are easy to remove. The "Fast" means it offers 6 minutes of working time—perfect for small items like hardware—and takes only 30 minutes to cure.

The first step in making a mold is mounting your master into a "mold box." Typically, I mount it with the pour spout and vent pointing down, using these ports to suspend the master in the middle of the box so it will be completely encompassed by the



ADD FINISHING TOUCHES



Easy out. The pliable silicone mold material makes it easy to remove castings.



Trim the casting. The urethane resin can be worked like wood. Groove sawed off the vent, trimmed off the paper-thin flashing at the seams, sawed off some of the base, and then flattened it on a disk sander.



Drill and tap. The castings can be drilled and tapped easily for common bolt sizes.

compound. Leave at least $\frac{1}{2}$ in. of space on all sides and on top. This mold box can be simple, like a plastic cup or a plywood or melamine box.

If you make a box, seal the inside corners with clay, caulk, or hot-melt glue so the compound won't leak out. Also, I fasten the master to the bottom of the box with hot-melt glue so it won't move or float.

To avoid mixing up too much mold compound and wasting it, I do some simple math to calculate the volume of the container. You can also pour water in and pour it out to measure.

The casting process

For small parts like the ones seen here, I use a two-part urethane resin called Smooth-Cast Onyx Slow, also made by Smooth-On. It allows 5 minutes of working time, and cures hard in 90 minutes. I use the black color (onyx) for the darker metal powders, such as bronze, copper, and brass, but a white variety for lighter metal powders such as aluminum and nickel-silver.

Before I make my first metal casting, I always do a preliminary one with the urethane resin only, to test the quality of the mold and clean out any residue. This also helps to check for seam alignment and vent performance. If you discover an area of air entrapment, a vent can be drilled through the mold after the fact, so don't worry. □

Scott Grove designs and makes furniture in Canandaigua, N.Y., and teaches widely.

Online Extra

To see more tips and tricks for metal-resin casting, go to FineWoodworking.com/extras.



Burnish and add depth. Burnish with steel wool to reveal the metal, and then wipe dark shoe polish or black wax into the cracks and crevices to add depth and detail.