

Pewter, I Hardly Know 'er

OR

Casting Pewter Drawer and Cabinet Knobs

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2 Day Workshop



Description:

Figurines are one of the most common forms the unusual metal of pewter takes in the modern day. This 2 day workshop will explore the world of pewter beyond those iconic dragons and wizards. Using wax, plastic toys and other found materials, students will design a unique drawer pull or cabinet knob, then cast it in pewter. Finishing techniques will include sanding, patination, and inserting a drawer pull/cabinet knob mechanism.

Objectives

Day one: Students will carve wax and or create models from found objects. Then make a rubber mold.

Day two: Cut open molds, cast pewter, clean up, patina and drill inserts.

Material needs

Students should collect **little** plastic toys or other non-porous objects. These can be cut apart and put back together to create weird hybrid models.

Safety:

- Dust masks, single use rubber gloves, safety glasses

For Models:

- [Wax carving tools](#)
- Variety of hard and semi hard carving waxes, and/or soft hand sculpting waxes. (Red/pink Spru wax work)
- Alcohol lamps or candles
- Spiral blades
- jewelers saws

For Molds/Casting

- Clear solo cups (small medium and large sizes)
- Plastic knives and spoons
- X-acto knives and blades

Metal clean up and finishing:

- Bench pins
- Spru Cutter or Jeweler's Saw frames with #3 or #4 saw blades
- Files (coarse teeth) pewter dedicated
- Sandpaper 320 grit (collection to share)
- Sanding Sticks 320 grit (collection to share)
- [Pewter patina](#)
- Steel wool (000 grit)
- Paint brushes medium size (to apply patina)
- Renaissance wax
- [screw inserts](#) (at least one per student)
- 5 minute epoxy
- Sicks to stir epoxy
- #B drill bit (to fit screw insert)

- R-98 pewter ingot ([link](#)) (½ lb per student minimum)
- [Rebound 25 silicone rubber](#)
- [Ease release 200](#)
- Fine powdered graphite
- Small, cheap paint brushes (a few)
- Rubber bands
- [Crucible for pewter](#) and torch to melt it, or [hot plate](#) with steel pot and metal ladle
- 12" long, ¼" Dowel rod, or wood stick of similar size (no varnish or oils)
- Flat plate/pan to put molds on when pouring (sheet pan works)
- drill press and drill press vice to hold 3 dimensional objects while drilling

Possible additions:

If doing a soldering demo:

- [Lead free low temp solder](#)
- Dedicated pewter soldering pan
- [Stay clean flux](#)
- Small torch tip (Smith Mini: #4) (Smith Silversmith torch with acetylene: 00)

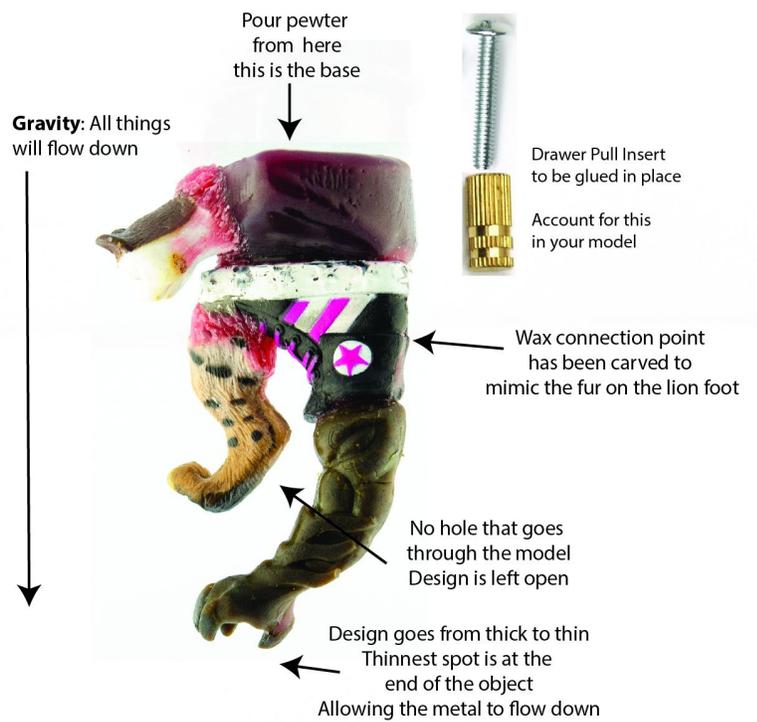
THE Step by Step PROCESS

Step 1: Building Models

Cutting apart plastic toys with your wax blades and other found materials can be used along with various caring and sculpting waxes to make your models. Experiment, this is the fun part!

But you need to consider the following:

1. **Think about how gravity will affect your pour.** Hold the model upside down, and if there is any object that would ask the metal to flow downwards and then back upwards again, that area will not want to cast. Sprues can be added if necessary to help fill these, but you'll have a blemish to clean from where the sprue is removed.
2. **To Spru or Not to Spru.** Think about how you will be pouring the metal. For our Drawer pulls, the base is the most logical place to pour, but a spru system can also be used to fill the model. Sprues will have to be cut off later.



Sprues can also be used to help fill parts of the model that will defy gravity.

3. **Thickness of your model.** The pewter is a rather thick metal and will not pour into anything that is too thin. $\frac{1}{8}$ " is the thinnest you can get.

Also, if you have a really thin sprue that opens up to a really thick spot, that might not work. The pewter may cool before it gets all the way through the thin area.

4. **Holes that go through the model.** This is not impossible, but can cause challenges when cutting your objects out. A solid form is encouraged the first time around. If you do need a hole, larger ones are better than little tiny holes.
5. **Consider the application of the final piece.** We are making drawer pulls, which will require a hole be drilled into the bottom. Look at the hardware you will be using and make sure that your model will accommodate it without being too close. Better too big than too small.

I often consider a base for the model to sit on, and that is where the hardware will go.

6. **Model cannot be made from porous materials.**

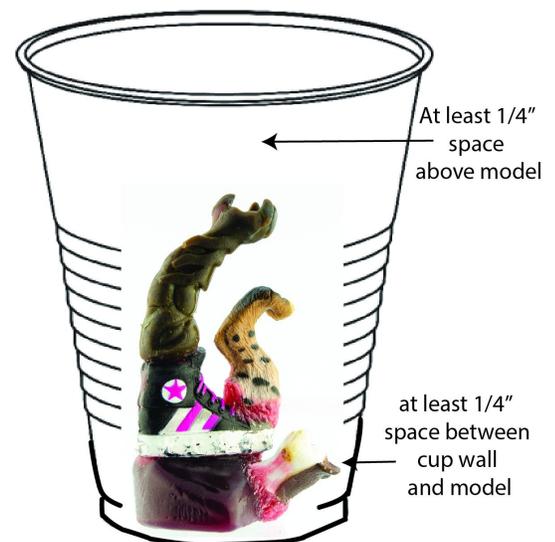
However, these materials can be sealed a number of ways such as dipping into molten wax or an acrylic lacquer.

Materials that cannot be used for the model include: Latex, sulfur clays, newly cast polyester, epoxy or urethane rubber. These will inhibit the silicone from curing.

7. **The final surface.** Use your carving tools to blend the parts of the model. You want it to look like a single object, not a bunch of individual objects that have been smashed together. Use an artist's eye for detail here.
8. **Consider your mold walls.**

We will be using solo cups. Therefore you need to make a model that will fit inside the cup with at least a $\frac{1}{4}$ " **between your model and the mold wall.**

If you can make any size mold wall around your model (let's say with Legos) then build your model to whatever size you'd like



Step 2: Securing model to the base

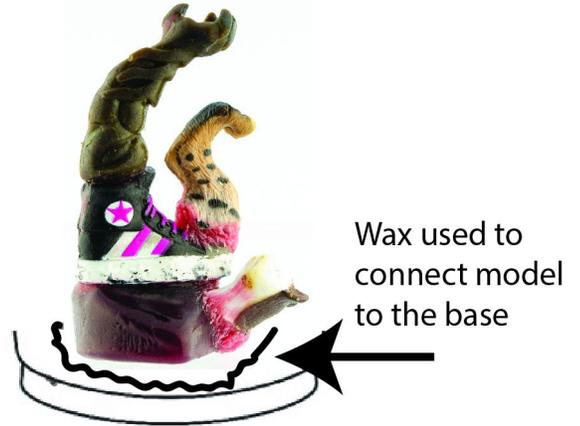
1. Find an appropriate material for your mold walls. We will be using clear solo cups, but I often use Legos.
2. Your model will need to have at least $\frac{1}{4}$ inch of space around it for the mold wall. Be selective. You don't want to waste the expensive rubber.
3. Attached the base of your model to the bottom of a cut off cup. Now the walls are not in the way.

This must be very secure!

4. Spray the model with **Ease Release 200**. Let dry for 5 minutes.

Step 3: The First Coat of Rubber (catching the details)

5. The first coat of rubber is the most important because it will be catching all the details of the model.
6. Put on disposable rubber gloves, and an apron. Lay out paper on your station.
7. Begin to mix up about a **tablespoon** of Rebound 25 Silicone rubber.
8. **Don't allow Part A to get into the Part B container and vice versa.** Equal parts A and B. Mix for 1 minute with a plastic knife
9. **You have about 10 minutes of working time for the remaining steps.**
 - a. Carefully use your plastic knife to brush a thin layer of rubber onto all surfaces of your model. Be gentle, we don't want the model to fall off the base.
 - b. Once you've gotten a good layer watch it closely for the next 5 minutes or so and use the knife to pop any bubble that are starting to show themselves.
 - c. After 10 minutes the rubber will begin to thicken. You must stop touching it at this point. You do not want to risk pulling off the base layer.
 - d. Keep your mixed solution for now. You can use it to check the consistency of your base layer without having to touch it.



Step 4: The Rest of the Mold

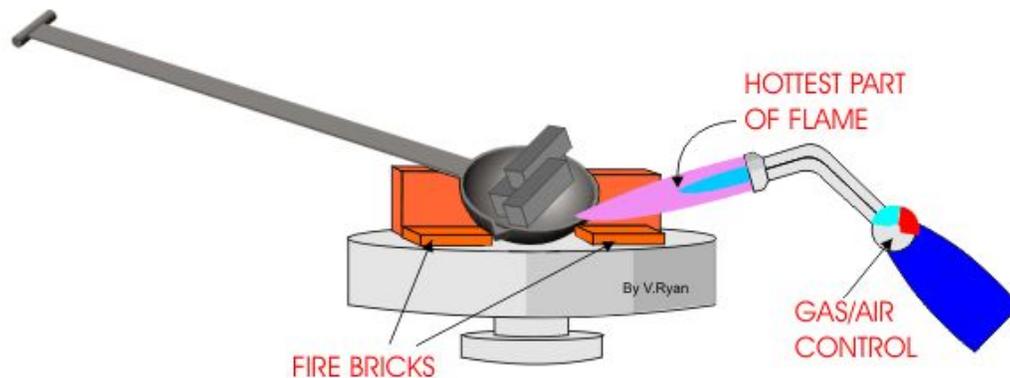
10. Once the first coat of rubber has hardened (7 hours is good, but can push it to less if you **have** too) you can make the rest of the mold.
11. Put the model and the base it's connected to, into a fresh cup. Now you have walls for you mold.
12. Make a note of the orientation of your model. You will be cutting it open later but won't have the luxury of being able to see it. So make a sketch, take a picture, and use a sharpie to note the orientation of your model.
13. **DO NOT ADD ANYMORE EASE RELEASE**
14. Mix more of your silicone rubber. Now we need to fill the container at least ¼" over the top of the model.
15. **Mix for 3 minutes** this time (because there is way more material). You need to make sure it is **completely mixed!** If you see swirls of white or pink, its not ready. Try not to make so much that your mixing cup is totally full. It is very hard to mix that much. Go for a half full cup. You can always mix more.
16. Pour the rubber into the cup, but **not directly onto the model.** Hold at a slight angle, and pour slowly off to the side of the object. This will allow the model to be slowly swallowed by the rubber from the bottom up. This will help prevent large air pockets from forming.

17. If you didn't mix enough, that's fine. Just mix a little more and top off the mold. No need to wait.
18. If you made too much, share. Often I have more than one mold to fill at any time so I always have a place to utilize the excess rubber I mixed that I may have. You don't want to waste that expensive rubber.
19. Let cure overnight.

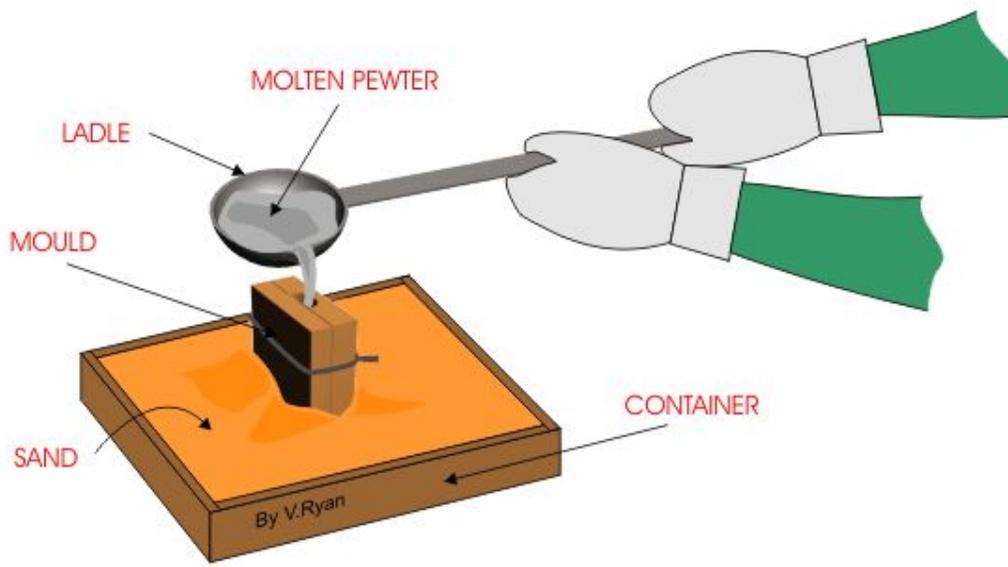
Step 5: Removing the model from the mold

20. Dispose of the plastic cup mold wall.
21. If you can, try to pry the base or the spru off of the model. Leaving an opening, and exposing more of your model. If you can take the whole model out do it!
22. Your model will likely be broken during this process.
23. Using a fresh x-acto blade slowly cut the mold open along one side the model. The cut should extend all the way from your model, to the wall of the mold. Consider what your model looks like, and cut along the center of it or in a place where a little line would be less noticeable.
24. Continue to cut lower and lower into the mold. Try to spread the rubber apart while you cut, it will cut much easier under the tension. Only cut a little ways down. If you can pull the model out, do it.
Our goal is to cut as little as possible of the mold.
25. If you need to cut more, start a new cut opposite of the first. Touching the other side to the model.
26. **Remove the model entirely.**
27. **Do not use water to wash it out.** You do not want any moisture in the mold. It will cause the molten pewter to expand/explode out of the mold.

Step 6: Casting the Pewter



**Image found at <http://www.technologystudent.com>*



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28. Using the super fine powdered graphite create a thin layer on the inside of the mold, where ever the model was.
29. Hold the mold upside down and remove any excess loose graphite.
30. Rubber band the mold together and check to see that your mold lines are connecting correctly.
31. Heat the pewter to about 460-465 degrees. (Either in a metal pot over a hot plate burner or in a small crucible). Keep a wooden dowel handy. Heat the metal until molten. If you feel a vibration with the wooden stick submerged into the metal, then it is slightly overheated. If you are casting a lot, a metal pot and a hotplate is the best solution. You need to use a metal ladle to pour.
32. Pour the molten metal into your empty, graphite covered mold. Pour evenly, don't let it dribble one plop at a time.
33. Allow to solidify (a minute or so based on the size).
34. With heat safe gloves pull the pewter object out of the mold. IT IS STILL HOT.
35. Quench it in the sink with some cold water for a few seconds.
36. If you like it, YAY. If not, melt it down and cast again.
37. Often the second cast is a little better because your mold is warm.

Step 7: Clean up and finishing

38. Files to clean up any areas that need to be filed down
39. Use sandpaper to smooth out the files areas, or any area you want a nice smooth surface.
40. Drill a hole into the base that will fit the drawer pull mechanism
41. Epoxy it into place (don't get glue everywhere).

42. Then patina you pewter until it's all very dark. Brush the patina chemical onto the surface. It will change immediately.
43. Finally, rub fine steel wool over the surface in small circles. This will highlight the raised areas, and allow the recessed areas to stay nice a dark, leaving a beautiful contrast.
44. Seal with a very thin layer of renaissance wax.