

TECH TIP

Reproducing Small Parts A Quick Way to Make Patterns

During your restoration, have you come across a situation where you have a good sample of a part, but you need two, three or more of them? Is the part in question small and perhaps has some unique shape that machining it using conventional methods seems not practical? Even if machining were possible, when you consider the cost of certain machine tools and cutters would the final cost be prohibitive? In most situations you only need a few and there is not likely to be any demand that would warrant investing in these machine tools. This method for reproducing small parts is borrowed from the construction trade where artisans recreate ornate wood carvings or designs that may be found on a decorative mirror or possibly even a fireplace mantel.

The part shown here is a thumb screw fastener used on the battery and tool box covers on a running board splash apron. The size is relatively small and has little or no detail etchings, but its shape is odd. The thin Tee section along the curved body is one piece. Piecing something like this together is possible, but would take more time than it would take using this method. The process begins with a good examination of the part and just how it would be made. The first clue is the threads that were tapped into the center. These are the threads that hold the thumb fastener when screwed into the running board covers, but they'll have another use during the process. The next clue is the middle section where the diameter is much less than that of the thumb portion. That sharp edge around the circumference will make it difficult to pull out of a mold. Also notice the notch on the end that will hold a clip to keep or encapsulate this thumb screw onto the running board cover. Knowing we will make a mold of this part and parts need to eventually easily slide out, the middle section is built up using simple brown wrapping paper and held in place with masking tape. Photo 1 shows the original part and the same part with the middle section built up.

The convenient way to mold this part was to hang it upside down inside a wax paper cup and pour the Smooth-On rubber mold compound into it. Photo 2 shows the part in the cup with the front of the cup cut away to illustrate the relative proportion of the part and the area around the cup. This minimizes the rubber needed to make the mold. Also shown in photo 2 is the cured rubber mold after it has been removed from the cup and the part removed. The Smooth-On rubber mold compound when dry has a shore hardness rating of 30 which is like a thick mixture of mashed potatoes. This is a significant consideration when it comes time to remove the part from the rubber mold. The rubber can stretch and still retain its shape. The Smooth-On white plastic resin is filled into the mold and allowed to fully cure before removing it from the mold. The cured pattern is shown on the right in photo 1. Notice the masking tape tear line in the middle portion. This detail was captured by the rubber mold compound when it cured around the original part which illustrates this process' ability to retain the detail of the original part.

Now that the part has a sturdy pattern (in plastic) it can be sent out to a caster for sand or investment castings. If the part's size is a significant concern, a high build coating can be applied to the plastic pattern which will account for any shrinkage during the casting process. The rough castings can be easily machined for the threads in the center and using those same threads, can then hold the part while turning down the middle portion for the captive clip notch. The final step is to chrome plate the parts.

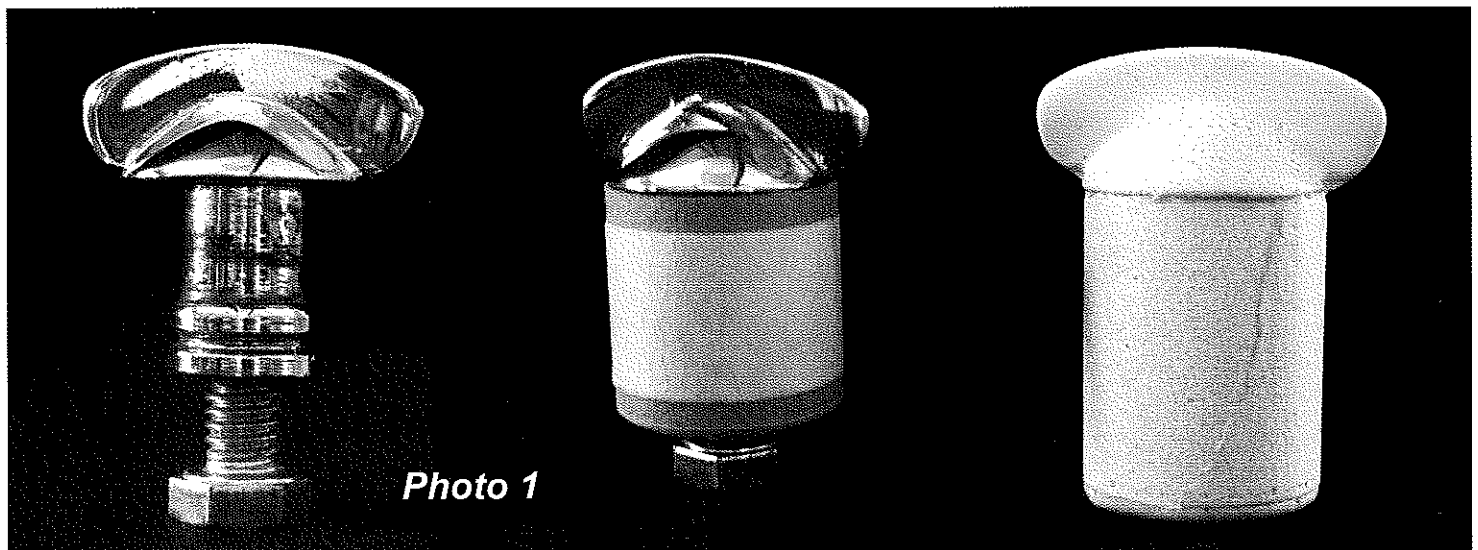


Photo 1

Products used: Smooth-On Rubber Mold Compound, PMC-121-30
Smooth-On fast cast white plastic, Cast-300

Summary & Notes.

1. Apply (spray) a light coating of mold release onto the part before pouring the rubber molding compound. Use mold release spray or Pam cooking spray.
2. Note how the smooth-on products are mixed together. Some use volume ratios and others use weight ratios.
3. Practice on a few scrap parts or even hardware bolts to become familiar with the rubber molding compound before attempting the final part. Once accustomed to the process, it goes rather quickly and making patterns becomes quite easy.

References:

1. Smooth-On Plastics, 2000 Saint John Street, Easton, PA 18042, (800) 762-0744, Fax (610) 252-6200, Tech Help (610) 252-5800 Website: <http://www.smooth-on.com>

Photo legend:

Photo 1 (Thumb_screw_combo.jpg) – Left is the thumb screw to be molded, center is the same screw with the middle section built up with brown paper & masking tape, and on the right is the plastic pattern as it came out of the mold.
Photo 2 (Thumb_screw_mold.jpg) – Left is the thumb screw held upside down while the rubber molding compound is poured into the paper cup (note: front of the cup is cut away to show thumb screw). Right is the rubber mold after curing and removed from the paper cup. The mold is now ready for the Smooth-On white plastic resin.

