

Compression mold manufacturing method

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1. Introduction

I have looked at a large number of molds in order to organize the compression molds ⁽¹⁾. It is sometimes possible to see how the mold is made in a series of operations. Below will be the summary report.

2. Outline of mold making method

In principle ⁽²⁾, mold is hand-carved from a piece of gun metal plate with a chisel. Almost no separate part can be embedded. However, only conical holes for embedding glass gemstones (which become conical projections in the mold) are embedded with separately made parts.

Some molds seem to have been made by casting, though a little. In this regard, the intention of production and specific production methods, etc. are not yet known.

The following is describing the manufacturing method that has been found from the mold survey ⁽³⁾.

(1) Manufacturing sequence

The four-piece mold shown in Fig. 1 seems to be a mold which manufacturing was interrupted for some reason, so the manufacturing process can be known. The lower left cavity is scraped around with a milling cutter, and the right two cavities are scraped all over. On the top left, in contrast, chisels have completed the sculpting cavity. From this, it can be estimated that the underhole is machined first and then engraved by hand.

Fig. 1: Example of multi-piece die during manufacturing

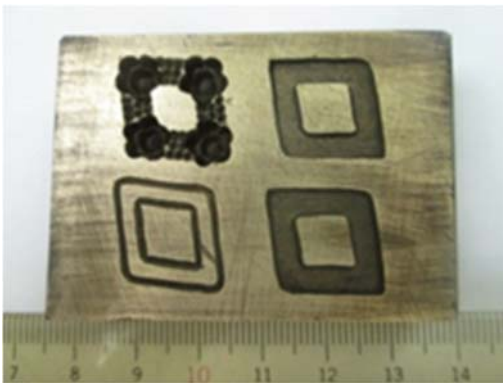


Fig. 2: Example of marking



(2) Marking

In the mold of Fig. 2, a scar is seen in an extension space. First, a cavity is engraved and manufactured experimentally, and it is estimated that the manufacturing of the second cavity has started.

As shown in Fig. 3, as a special example of a marking, the undercut is marked with a punch on the mold surface.

Fig. 3: Undercut section



It seems like a mark was made to recognize that there is an undercut part at the time of molding, rather than a mark for the mold carving work, because the punch has been hit.

(3) Use of parts

Fig. 4 shows the mold of the broach stand. Glass gemstones are attached to each hole after molding and used as broach. The hole for embedding the gemstone is a conical separate part. It is installed with a hole after cutting. In this example, it can be estimated that almost the entire process can be machined by changing the gemstone hole into a separate part. However, since the mold is fitted tightly to the mother mold, high processing accuracy is required.

The back of the mold confirms the corresponding small trans-pore. It is highly probable that this was provided for removal when replacing the conical parts. There are no examples of using other parts except gemstone holes.

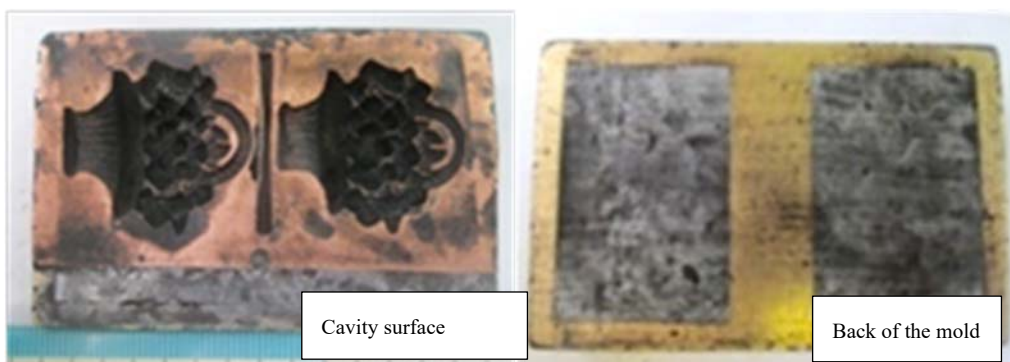
Fig. 4: Broaching base mold



(4) Cast molds (see Fig. 5)

Although the number is very small, several electroformed molds are stored. This technique applies thick plating on the model of the same shape as the product, and makes it a cavity. There are many examples of electroless nickel plating, but copper is used here. Thick plating is removed from the model, placed on a mold made of gun metal, and the back side is backed up with lead. The process of electroless copper plating, the reason for its use, and the model desorption method are not known. Casting molds are often made by modeling products when the formal molds are not in time. Since all types are used, it can be presumed that they were made for the time of the emergency.

Fig. 5: Example of an electroformed mold



(5) Refurbishment

Some modified molds are also housed.

Fig. 6 shows lead (or lead alloy) poured into the center.

Since this part of the cavity is unnecessary, it can be estimated that the lower melting metal was poured for refurbishment.

In a similar example, there is a type of bracelet with the length adjusted by pouring lead into one end of the mold.

Fig. 6: Example of partially filled cavity with lead



3. Summary

This paper describes a mold manufacturing method obtained through observation of compression molds in celluloid house storage. It was conventionally said to be hand carving by chisel. This point was confirmed once again. In addition, the following points were clarified.

- (1) Machining was sometimes used for drilling.
- (2) Machined parts were used when there were many protrusions of the same shape like a gemstone hole.
- (3) There was a casting mold which seemed to be electroforming.
- (4) The unnecessary portion of the cavity was first covered by lead (alloy).

Further investigation will be continued to further investigate the actual state of molding technology.

4. References

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