Aug. 1, 1933. R. T. HURLEY 1,920,699

METAL DIE

Filed Aug. 20, 1932

Fig. 1.

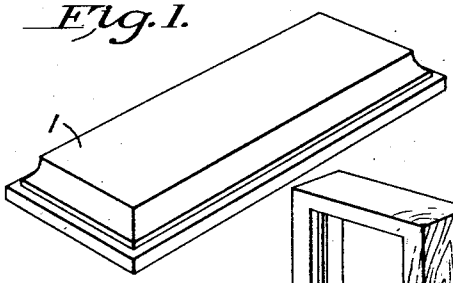


Fig. 2.

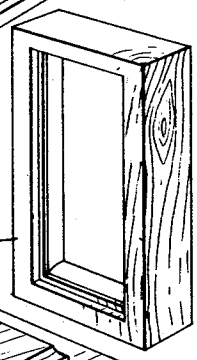


Fig. 3.

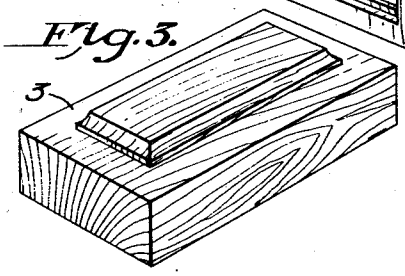


Fig. 4.

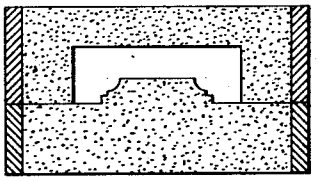


Fig. 5.

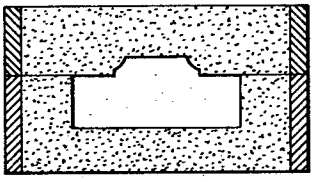


Fig. 8.

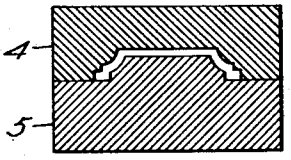


Fig. 6.

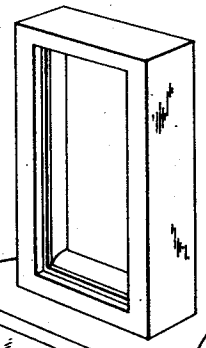


Fig. 7.

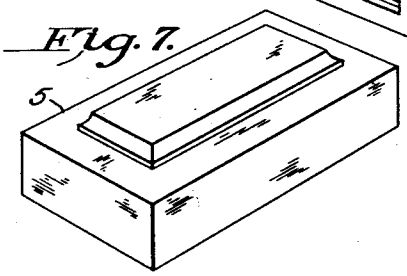


Fig. 9.

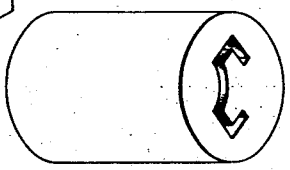
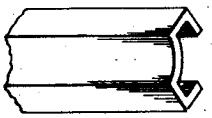


Fig. 10.



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UNITED STATES PATENT OFFICE

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METAL DIE

Roy T. Hurley, Dobbs Ferry, N. Y.

Application August 20, 1932. Serial No. 629,603

3 Claims. (Cl. 22—136)

A main purpose of this invention is to eliminate the expense and difficulty incident to the ordinary method of die casting certain articles of irregular conformation. One object of the invention is to use certain alloys of copper and beryllium in a way that will make them suitable for casting dies of the character mentioned above, it having been discovered by me that alloys of copper and beryllium in the proportions of about 1% to 10% of beryllium are peculiarly desirable for the foregoing purpose.

As is well known, die casting has not been used, as extensively as it would have been used, had it not often been necessary to incur considerable expense and difficulty in the production of the dies. This is particularly true of the use of die casting for reproducing articles, the designs of which involve reproducing irregular and unsymmetrical figures. It is also well known that the ordinary method heretofore employed is to hollow out of a block of solid metal a replica of the article to be cast and, of course, an article of any design having irregular lines and curvatures would require a vast amount of careful manipulation to re-produce in the casting a mold suitable for casting such an article. The expense incident to this method of obtaining dies has handicapped the industry and it is the purpose of the present invention to overcome that handicap by a simple and inexpensive method which has been developed due to the peculiar qualities of this alloy of copper beryllium.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawing.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, a drawing depicting a preferred typical construction has been annexed as a part of this disclosure and, in such drawing, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a perspective view of an article for which dies are desired in order to cast the article as cheaply as possible. Fig. 2 is a perspective view of the pattern of the female die. Fig. 3 is the pattern or model of the male die. Fig. 4 is a section of the mold for casting the female die casting. Fig. 5 is a section of the mold for casting the male die casting. Figs. 6 and 7 are detailed views of the two metal dies or molds produced from said molds. Fig. 8 is a sectional view of the assembled dies or molds. Fig. 9 is an elevation of an extruding die. Fig. 10 is a detail view of the article pressed from the extruding die.

Referring to Figure 1 the article for which a die casting is desired is shown to be somewhat simple in character but having curved and irregular lines. It is an article that could be used as a base for a clock or for many other purposes. It is apparent that to produce dies or molds for re-producing such an article in metal would require a mold to be made of such form and such characteristics that very careful and expensive manual work would have to be performed upon the mold. The most usual method heretofore employed for producing such a die casting would be to start with blocks of solid metal and dig out molds or cavities of such form as to conform with the lines and configuration of this article so that these could be used as molds or dies for casting an article of this kind.

By reason of the discovery that alloys of copper beryllium, comprising about 1% to 10% of beryllium and the balance of copper, have greasy characteristics and likewise readily become hard after solidification, has brought about this new method of producing dies for die casting purposes. The greasy character of the alloy renders it peculiarly suitable for casting in a mold or flask molds or dies for die casting, thereby eliminating the expense and difficulty incident to the ordinary method described above. To this end, in producing a die or mold for an article such as that shown in Fig. 1, it is necessary to have two patterns, viz. a male and female. A pattern for the upper half or the upper section of the article is shown in Fig. 3 and the lower half or lower section is shown in Fig. 2. These patterns may be made from wood or any ordinary material that is commonly used for pattern work. Thereafter, the pattern for the lower half or section of the article is placed in a flask and the sand packed therein in the usual way and the molten alloy of the said copper beryllium is poured into the flask to produce a casting, or one half of the complete die or mold. A similar operation is performed to produce a casting of the other section or half of the die or mold. Having the two complete sections of the die or mold it is apparent that any ordinary foundryman can assemble the two parts together to form a mold for the article, as indicated in Fig. 8, Figs. 6 and 7 indicating the two sections of the die or mold suitable for use in casting the article.

In Figs. 9 and 10 are illustrated the extruding

method of producing an article, the article being pressed from the copper beryllium die in the usual and ordinary way.

It is to be understood that the dies or molds are given the heat treatment set forth in my co-pending application Serial No. 600,687 and are given the ordinary die finishing treatment to make them suitable for die casting.

Referring to Figure 1, the article to be reproduced by the die casting process is indicated by 1. The female pattern or model is marked 2 and the male pattern or model is marked 3, these patterns being made from wood or any suitable material. The resulting metal female die casting is marked 4 and the resulting male die casting is 5 (Figures 6 and 7). These two patterns are cast separately by the usual and ordinary foundry practice and thereafter they are assembled to constitute the mold or die, as indicated in Fig. 8, for the final casting of the article.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention and, therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency of the following claims:—

Having thus revealed this invention, I claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of United States:—

1. As an improved article of manufacture a die, for forming articles of predetermined shape, made of an alloy of copper and beryllium in the proportions of 1 to 10 percent of beryllium and the balance of copper.

2. A die for die-casting formed of a metal alloy consisting of copper and beryllium in the proportions of 1 to 10 percent of beryllium and the balance of copper.

3. An extruding die formed of a metal alloy consisting of copper and beryllium in the proportions of 1 to 10 percent of beryllium and the balance of copper.

ROY T. HURLEY.