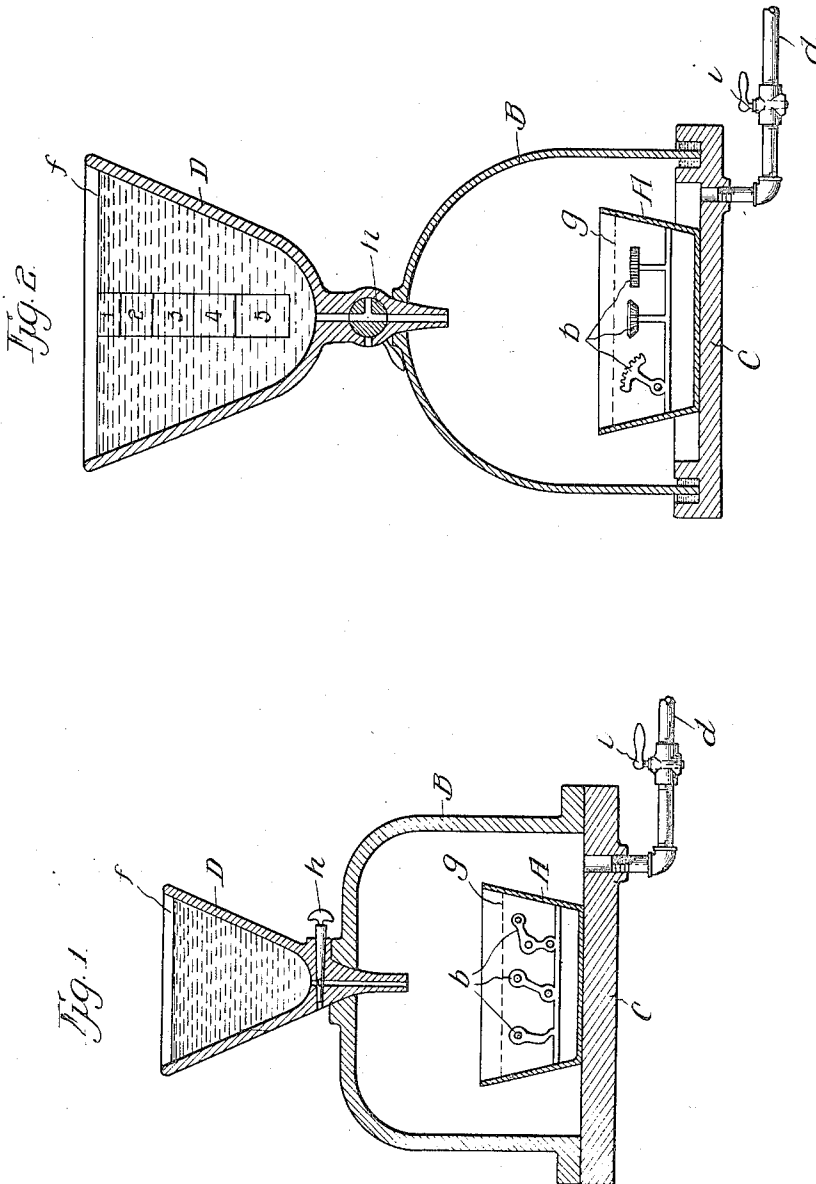


V. LOUGHEED.
 PROCESS FOR MAKING MOLDS FOR CASTING.
 APPLICATION FILED AUG. 18, 1919.

1,320,770.

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Witness:
A. Burkhardt

Inventor:
 Victor Lougheed,
 by *Harvey Knight*
 atty

UNITED STATES PATENT OFFICE

VICTOR LOUGHEED, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO ENTERPRISE
FOUNDRY COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF
CALIFORNIA.

PROCESS FOR MAKING MOLDS FOR CASTING.

1,320,770.

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To all whom it may concern:

Be it known that I, VICTOR LOUGHEED, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Process of Making Molds for Casting; and I do hereby declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

With the type of molds which have been used for many years for the production of dental inlays, vases, ornaments, etc., and an essential feature of which consists in setting the mold material around a wax or other pattern, which is easily melted or destroyed by heat, there are certain practical difficulties in pouring or applying the mold material so as to avoid air bubbles upon the patterns, the presence of which is seriously objectionable in that they constitute unintended extensions of the mold cavity, which result in corresponding blemishes and imperfections in the castings subsequently made therein.

The common practice in the technique of making dental inlays, vases, and the like, by the *cera perduta* process is to paint carefully with a small, soft brush an initial coating of the mold or investment material over each pattern before completing the mold by adding the entire quantity of mold material. This procedure has been made to serve satisfactorily in cases where the forms were simple or the expense immaterial; but because of the time that it consumes, and because of the practical impossibility of coating thoroughly the interior details of deep recesses and cavities, it is not practicable for the production, upon a commercial scale, of castings for machine parts.

The object of my invention is to provide a simple, reliable, and thoroughly practical method for quickly, completely, and properly coating with a fluid, semi-fluid, or plastic mold material the interior and exterior surfaces of the most complex and intricate pattern. I attain this object, and thus economically and unfailingly obviate the usual difficulties with air bubbles, by placing upon a suitable mounting one or more patterns in an air-tight vessel, from which the air is

subsequently exhausted so as to produce a vacuum, during the maintenance of which the mold material is allowed to flow into the vessel.

In my experience I have found it unnecessary to go to extreme lengths in the way of securing very high vacua, a relatively low vacuum or small exhaustion of air being found sufficient in any given case to prevent the formation of air bubbles of objectionable or apparent size. Also, I have found that the most practical way to proceed is to measure approximately the exact quantity of mold material necessary to cover the pattern or patterns in the vessel to the depth required, and then to let the inflow of the final portion of this quantity of mold material automatically open the vessel to the atmosphere, and so relieve the vacuum immediately upon the completion of the pouring of the mold. It is obvious, however, that an indefinitely large supply of mold material might be used, and, after a measured portion thereof has been admitted to the vessel, further supply shut off, and air thereby promptly admitted. Hence, I do not confine myself to any particular details of the procedure, but may follow any one of a number of possible modifications of the general scheme so long as the essential feature is maintained of admitting air and relieving the vacuum with sufficient promptness after the mold is poured to prevent the liquid portion of the mold material from vaporizing and giving up dissolved gases under the reduced pressure, and producing the very condition that it is sought to avoid.

The accompanying drawings illustrate by vertical sections two forms of apparatus for use in practising the present invention, Figure 1 showing a form in which the funnel capacity determines the quantity of mold material that enters the flask and when the air seal is broken; and Fig. 2 showing a form in which the capacity of the funnel is sufficient for charging a plurality of molds, and in which the supply of mold material to the flask, as well as the breaking of the vacuum, is controlled by the valve.

In its preferred form, the method of applying my invention is illustrated in Figs. 1 and 2, in which A is a flask within which the patterns *b*, *b*, *b*, are mounted upon a

suitable base. B is a vacuum bell or similar suitable vessel mounted upon the plate C, through which passes the pipe *d* leading to a vacuum pump, the contacts between bell
 5 B and plate C being sufficiently intimate, or a suitable sealing means being provided to prevent leakage of air to the bell. D is a funnel having its stem *e* extended into the
 10 bell B and filled to the line *f* with a quantity of mold material sufficient to cover the patterns *b, b, b* in the flask A to the level *g*, but adapted to control the delivery of the
 15 mold material into the flask A by the stopcock *h*. If, now, the air be exhausted through the pipe *d*, the stopcock *i* be closed, and the stopcock *h* be opened, the mold material in funnel D will flow into flask A, and air will be immediately admitted after the
 20 charge to relieve the vacuum in bell B, either automatically as in Fig. 1, or by turning the three-way valve to the venting posi-

tion as in Fig. 2. Thus, the condition hereinbefore specified will have been realized.

I claim:

1. The process of forming molds, which
 consists in applying the mold-forming material to a pattern while in a sub-atmospheric environment. 25

2. The process of forming molds, which consists in introducing a pattern into an inclosure, reducing the pressure within the inclosure, to below atmosphere, and delivering the mold-forming material to the pattern by the suction resulting from such reduction in pressure. 30

3. The improvement in the process of molding a mold, which consists in applying the mold-forming material to the pattern *in vacuo*. 35

Signed at Chicago, Illinois, this 25th day
 of July, 1919. 40

VICTOR LOUGHEED.