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 APPARATUS FOR FORMING CASTINGS.
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985,080.

Patented Feb. 21, 1911.

Fig 1

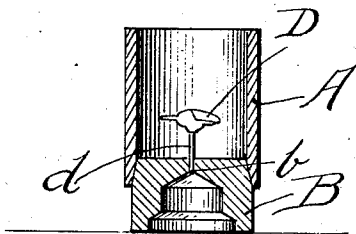


Fig 2

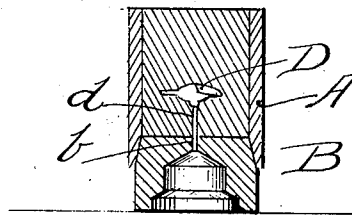


Fig 3

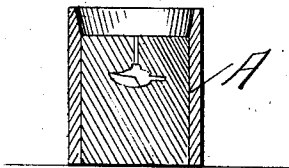


Fig 4

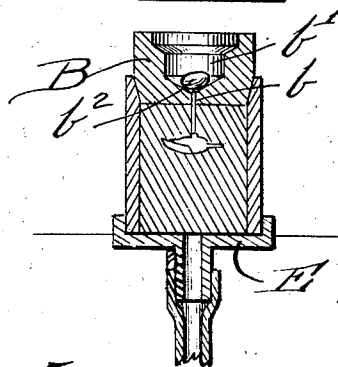
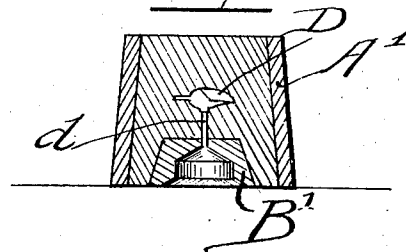


Fig 5



WITNESSES

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING CASTINGS.

985,080.

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To all whom it may concern:

Be it known that we, THOMAS G. VERNON and REUBEN C. BROPHY, citizens of the United States, and residents of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Forming Castings; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

In dental work and in many other arts and professions it is necessary at times to form (by means of casting) small articles to a desired shape. This particularly is true with the dental profession, inasmuch as more recent practice demands that the inlay for filling cavities shall be cast to the desired form from a wax model, and then be cemented in place. The object of this, of course, is to secure perfect accuracy and fit and consequent durability. So, too, in securing dental crowns upon roots it has become the practice to cast to the proper form a metallic body adapted to be inserted and cemented in the root and to engage thereon, either by casting or otherwise, the porcelain facing.

Various methods have heretofore been employed for accomplishing the work described, in some instances, a crucible is molded in a suitable body or block of plaster of Paris or the like containing the impression or other mold and the casting metal is then melted in the crucible by means of a blow pipe and flows into the mold to fill the same. The necessary manipulation for this purpose requires such accuracy as to render the work almost beyond the ability of a very large number in the profession and in consequence, the results are frequently imperfect and unsatisfactory.

The object of this invention is to afford an exceedingly cheap, simple and effective method and apparatus for casting dental and other inserts, inlays and devices and to afford in connection and for the purpose of carrying out the method hereinafter set

forth, apparatus capable of being operated readily without previous experience and without requiring a high degree of manual dexterity.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a view in vertical section illustrating the preliminary or first step preparatory to forming the mold. Fig. 2 is a similar view showing the wax model embedded in the molding material or plaster of Paris. Fig. 3 is a similar view but showing the flask in upright position with the crucible removed preparatory to heating the flask to cause the absorption of the wax of the model and sprue. Fig. 4 is a similar view but showing the crucible in place with a pellet of metal therein in process of melting. Fig. 5 is a modified form of the device.

As shown in the drawings: A, indicates a metallic sleeve or casing, which, as shown, is cylindric or shaped as the frustum of a cone, though not necessarily so, and indicated by A—A'. B—B', indicate what we may term the crucible, and which, as shown, consists of a block of any suitable metal or composition capable of being heated to a temperature sufficiently in excess of the melting point of the metal to be cast to enable a sufficient quantity of said metal to be melted from the heat of the crucible, and if desired, independently of the use of a blow pipe. For low fusing metals, cast iron may be used. For higher fusing metals, any suitable composition or alloy may be employed to afford a permanent crucible and heat retainer.

As shown, referring to Figs. 1 to 4 inclusive, the casing or sleeve is tapered outwardly in its upper end to receive the complementally tapered inner end of the crucible therein, as shown in Figs. 1, 2 and 4, and said crucible, as shown, is provided with a central cavity extending from the top inwardly to near the bottom of the crucible and tapering downwardly at the bottom to a central sprue aperture *b*. The cavity or crucible formed in the crucible is relatively

large at the top and tapers inwardly somewhat abruptly to a central bore b' , which extends inwardly to the beginning or top of the conically inclined bottom, thus centralizing the pellet b^2 , of the metal above the sprue aperture when in place.

The crucible B' , is substantially the same as the crucible B , with the exception that the outer walls thereof taper from the top downwardly at a suitable angle to permit the crucible to be bedded for its entire depth in the investing material and yet be readily removable.

The operation is as follows: In carrying out the method, we first prepare the wax model D , of the article to be cast and support the same upon a sprue d , which is inserted in the sprue aperture in the crucible, as shown in Figs. 1, 2 and 3. The casing or flask A , is then supported on the crucible, as shown in Figs. 1 and 2, and an investment of plaster of Paris or other suitable material is permitted to flow into the flask and in setting, completely fills the same without disturbing the model or sprue. The flask with the investment and model therein is then lifted from the crucible and is subjected to sufficient heat to thoroughly dry out the moisture in the investment, and, of course, melting the wax of the model and the sprue if of wax, thus, owing to the porous nature of the investing material the wax is entirely absorbed, leaving a perfect mold. Having driven off all the moisture from the investing material, the crucible B , or B' , is then raised to a temperature sufficiently high to insure the melting of the casting material of whatsoever kind, and is again returned to place on the flask, as shown in Fig. 4, the flask placed upon the bed E , of an exhaust or vacuum pump whereby the air is exhausted from the porous investing material, and of, course, through the sprue aperture b . As the pellet b^2 , in the crucible melts, it is forced down into the mold by atmospheric pressure, filling the mold to its entire extent, thus insuring a perfect casting.

Of course, it is not indispensable that the casing A , should fit to the crucible, for instance, the tapered flask A' , has a greater diameter at its larger end than the crucible, and in using the flask with a crucible of such relative proportions the crucible, of course, is embedded for its entire thickness in the investment. Owing to the taper or draw on the crucible, it is, however, readily elevated from the investment and the operation is in all respects as before.

Of course, the nature of the material (at least of which the crucible is composed) may vary through a very wide range, and although for most metals the blow pipe will

not be required in connection with our invention, the blow pipe may, of course, in any event be used to hasten the operation, should it be desired. Instead of the vacuum process direct pressure from above may be employed in any suitable manner utilizing steam, air, or gas as preferred.

Of course, too, details of construction can be varied in many particulars, and we have shown but one of several possible constructions embodying our invention. We therefore do not purpose limiting this application for patent otherwise than necessitated by the prior art.

We claim as our invention:

1. In a device of the class described a flask having an internally tapered end to contain the investment and model, a complementally tapered refractory crucible having thick walls and high thermal conductivity and having a sprue aperture in its bottom to register with a sprue aperture in the flask and capable of fusing its contents by its own heat.

2. In a device of the class described a flask having an internally tapered end, an externally tapered removable crucible fitted in the end thereof to afford the bottom while molding, communicating sprue passages in each, said crucible comprising a refractory body of high conductivity having thickened walls and capable of fusing its contents by its own heat.

3. In a device of the class described a sleeve tapered internally, a mold therein, a crucible tapered on its outer side adapted to tightly fit the sleeve and provided with a large cavity and a smaller cavity shaped to centralize a pellet therein.

4. In a device of the class described, a sleeve tapered internally, a mold therein, a crucible tapered externally adapted to tightly fit the tapered sleeve, said crucible comprising a metallic body provided with a cavity, said cavity being large at the top and tapering to a central bore having a conical bottom for centralizing a pellet and said crucible having a sprue aperture opening from the apex of the conical bottom there-through.

5. In a device of the class described a metallic casing open at both ends, a mold therein, a crucible secured in one end thereof and a tight fitting head secured on the opposite end of the casing adapted for connection with an exhaust pump.

6. In a device of the class described a sleeve tapered internally, a mold therein, a crucible tapered externally adapted to tightly fit the tapered sleeve, said crucible having a sprue aperture in its bottom wall and a cavity contracted to centralize a pellet of material above the sprue aperture.

7. In a device of the class described a sleeve tapered internally, a mold therein, a crucible tapered externally adapted to tightly fit the tapered sleeve, said crucible
5 having a sprue aperture in its bottom wall, a cavity contracted to centralize a pellet of material above the sprue aperture and means secured to the sleeve adapted for connection with an exhaust pump.

In testimony whereof we have hereunto 10 subscribed our names in the presence of two subscribing witnesses.

THOMAS G. VERNON.
REUBEN C. BROPHY.

Witnesses:

K. E. HANNAH,
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