

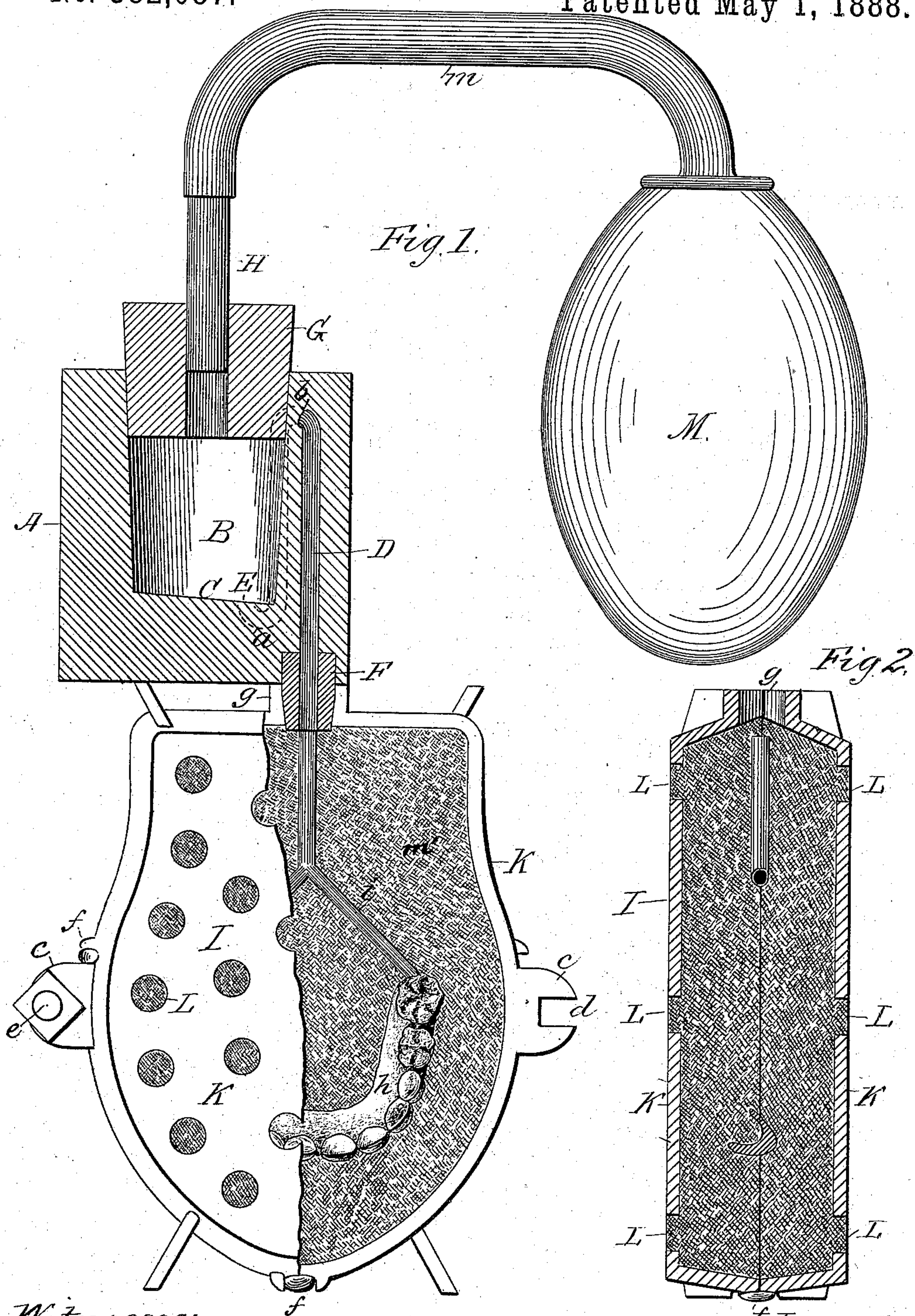
(No Model.)

J. E. HOLMES.

CRUCIBLE.

No. 382,087.

Patented May 1, 1888.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## CRUCIBLE.

SPECIFICATION forming part of Letters Patent No. 382,087, dated May 1, 1888.

Application filed February 1, 1887. Serial No. 226,076. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH E. HOLMES, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Crucibles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to crucibles for melting metals, and more particularly to crucibles that are adapted for use in connection with a flask containing a mold and an air-injector for forcing the molten metal into the molds; and it consists in the construction and arrangement of the several parts, which will be more fully hereinafter described, and pointed out in the claims.

The apparatus is adapted to be used in melting, molding, and casting metals of any specific gravity and which fuse at either high or low degrees of temperature, some of which require pressure to cause them to fill solidly all parts of the mold.

My invention consists, essentially, in the construction of the crucible in connection with the mold and flask, and the discharge or outlet passages of the said mold, as also in the details of construction and combination of parts, which will be more fully hereinafter described and claimed.

The objects of my invention are, first, to provide an apparatus combining a crucible in direct connection with a mold in the interior of the flask, whereby rapidity in the formation of crowns, bridges, and dental plates used in dentistry is obtained; and, secondly, to construct the several parts in a simple and effective manner, strong and durable, and which will be easily handled and readily understood. I attain these objects by the construction illustrated in the accompanying drawings, wherein like letters of reference indicate similar parts in the several views, and in which—

Figure 1 is a side elevation, partly in section, of my improved combined apparatus. Fig. 2 is a transverse vertical section of my flask.

A represents a crucible made of any refrac-

tory material, but preferably of plumbago, and may be either straight or tapering in form, with the chamber B therein tapering from top to bottom. The melting-chamber B is in the center of the crucible and has an inclined bottom, as shown at C. The walls of the chamber are made thick, for the purpose not only of retaining within the chamber heat to the greatest possible degree, but also to afford sufficient space for the outlet-passage. The outlet-passage D, which commences at the outlet E, the lowest point of the floor C, is semicircular in form, as at *a*. From the point *a* the passage extends upward nearly to the top of the pot, where it again takes a semicircular turn, *b*, and then descends in a straight line to the bottom. The mode of forming this passage in the crucible when constructing it is as follows: A core or former is made from a piece of stout cord thoroughly saturated and coated with mucilaginous or other sticky substance, but preferably with common bill-posters' paste, which when dry will cause the cord to set stiffly and in any form given it. This former is placed in position, when the plumbago or other suitable material is molded around it to form the part. The part is then burned in a proper kiln, which reduces the core or former to ashes and leaves an open passage through which it may easily be blown out.

A tubular nipple, F, of suitable material and tapering in form, is cemented within a recess formed in the base of the crucible and forms a continuation of the outlet-passage D and extends downward below the base of the crucible about half an inch. A tubular stopper, G, preferably of soapstone, and also tapering in form and made to fit accurately into the top of the melting-pot B, is provided with a metal tube, H, which may be several inches in length.

I is a metallic molding flask in shape preferably that as illustrated in Figs. 1 and 2, and is composed of two detachable parts, K K. The sides of the flask are perforated with circular openings L. On either side of both parts of the flask are suitable ears or lugs, *c c*, with slots *d* therein for the purpose of receiving the bolt *e*, which firmly holds both sides of the



flask together when in use. At the bottom and over each set of lugs or ears are suitable clamps, *f*, which are also for the purpose of more firmly keeping both sides of the flask in place. A circular opening, *g*, is formed at the top of the flask, which forms a socket to receive the nipple *F* of the crucible when in use.

*M* is a rubber bulb or air-injector with a rubber pipe, *m*, attached thereto, which is connected with the tube *H* in the tubular stopper *G*. This bulb and tube are attachable and detachable at will, and are for the purpose of forcing the molten metal into the molds.

The mode of operating my combined device is exceedingly simple, and is as follows: The mold *h*, which is of the exact shape or construction of the metallic dental plate to be produced, is formed of wax having the necessary or desired teeth embedded therein, and has the shape of that part of the mouth which is to be supplied with the dental plate. This mold is first placed in the plastic mass of plaster of paris, *m'*, in one side of the flask, which is to be previously filled up therewith, even and smooth. Then when the plaster becomes sufficiently hardened, which only requires a few minutes, its smooth surface is oiled or otherwise lubricated, so as to permit of its easy separation from the plaster in the other side or half of the flask, which is filled in the same manner as the side first named. Then the branched duct *i*, which extends from the opening *g* to the mold *h*, is formed in two parts in the opposing surfaces of the plaster in the respective sides of the flask. Then the two sides of the flask are placed together and allowed to so remain until the plaster therein becomes sufficiently hardened to retain the impression of the mold. Then the sides of the flask are separated on the line of the plaster having the lubricated surface, so as to expose the mold. Then the wax is removed by picking it out or by the use of hot water, leaving the teeth embedded in the plaster. Then the two halves or sides of the flask are placed together again and secured and the flask introduced in the furnace to dry, which is rapidly effected by reason of the openings or perforations in the sides of the flask causing a rapid evaporation of the water with which it is mixed. After the plaster has become thoroughly dried the mold is ready for use. The metal to be used is then placed in the crucible, which in turn is placed in a suitable furnace and kept there till the metal becomes thoroughly fused. The crucible is then removed from the furnace and placed upon the top of the flask, and the nip-

ple *F* is inserted into the opening or socket *g* of the flask, thus forming a continuous duct for the metal from the chamber *B* of the crucible to the mold *h*. The soapstone stopper *G*, having the bulb or air-injector connected therewith, is then inserted into the mouth of the chamber *B* of the crucible. By firmly pressing the bulb the air is forced into the chamber through the pipes *m* and *H*, causing a pressure upon the molten metal, which is thus forced through the ducts *D* and *i* into the mold. This pressure upon the metal should be maintained until the metal has set in the mold; but the connection between the mold and the nipple should be broken while the metal is still in a fluid state in the crucible and when the pot and passage *D* are thoroughly emptied. When the metal becomes cool in the mold, it occupies the same space that the wax formerly occupied, and constitutes the complete dental plate or casting. It is removed by separating the two halves of the flask and picking it out from the now dry and brittle plaster and matrix, which is of no further use, as the work is completed all except the polishing of the dental plate or casting.

Having thus described my invention and the mode of constructing and operating the same, what I claim as new, and desire to secure by Letters Patent, is—

1. A crucible having a central melting-chamber and a discharge-passage extending from the bottom of the melting-chamber through the side wall to a point near the top, and thence to an opening in the base of the crucible, substantially as described.

2. A crucible having a tortuous discharge-passage in its wall and a discharge-opening in its base, substantially as described.

3. A crucible provided with a tortuous discharge-passage in its wall, a discharge-opening in its base, and a nipple embedded in said base and forming a continuation of said discharge-opening, substantially as described.

4. The combination, with the crucible *A*, having the tortuous discharge-passage in its wall and the discharge-opening in its base, of the tubular stopper *G*, the tube *H*, the rubber pipe *m*, and the air-injector *M*, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH E. HOLMES.

Witnesses:

TOM R. STUART,  
E. L. WHITE.