J. L. R. BROWN.

COVER FOR CRUCIBLE FURNACES.

APPLICATION FILED APR. 28, 1909.

975,506. **Patented Nov. 15, 1910.**

Fig. 1.

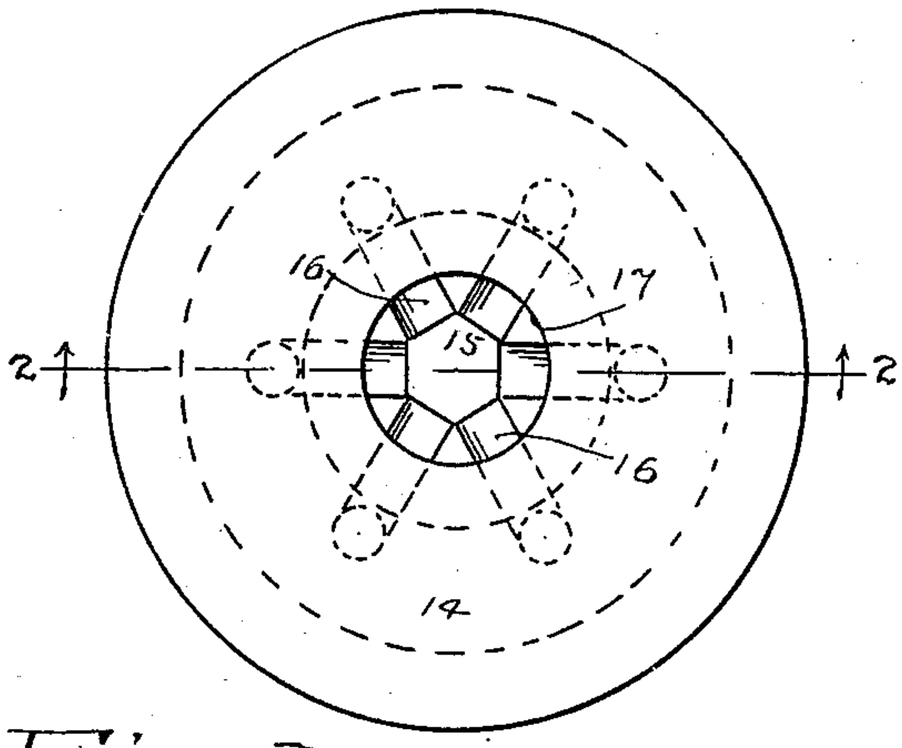


Fig. 2.

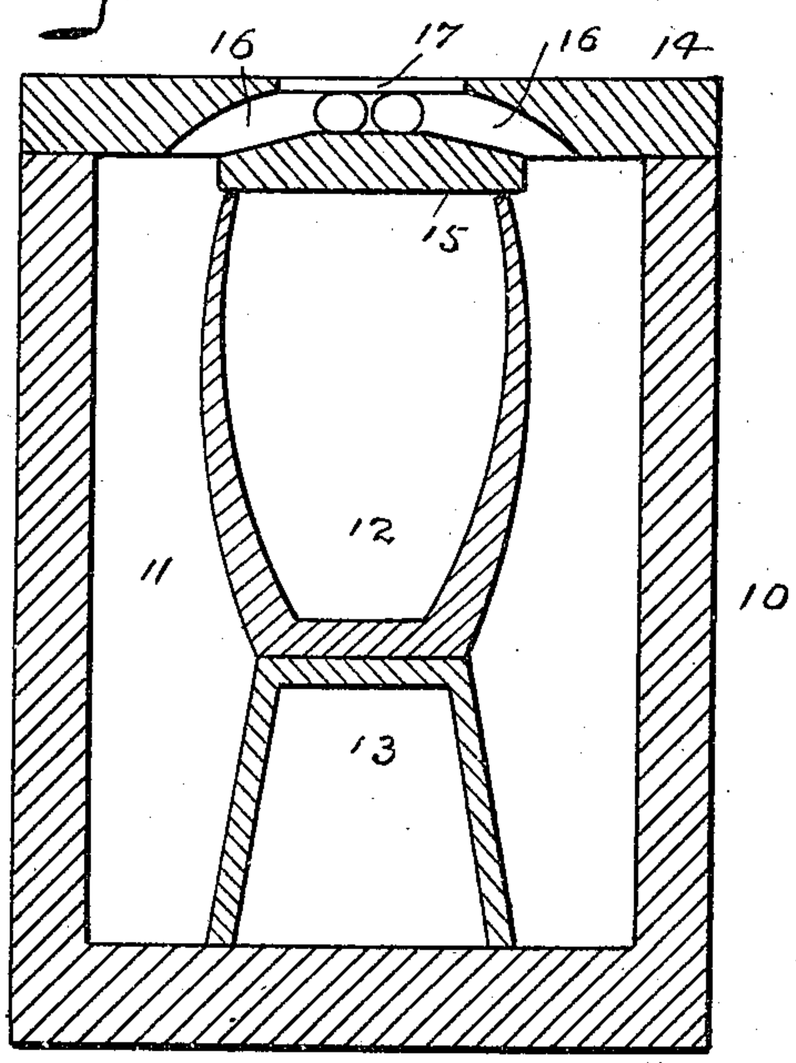


Fig. 3.

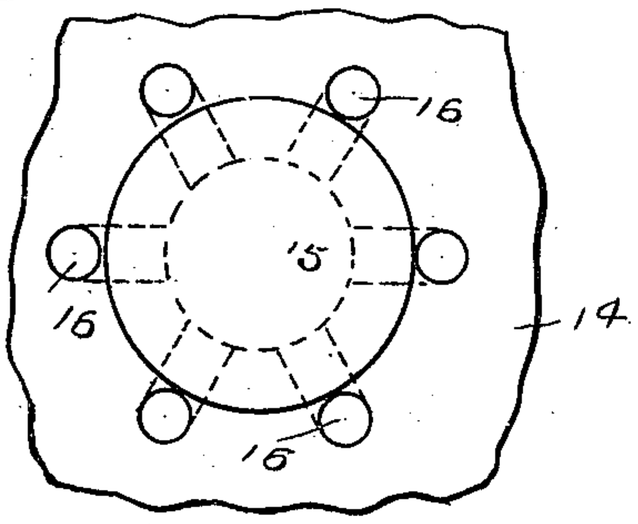


Fig. 4.

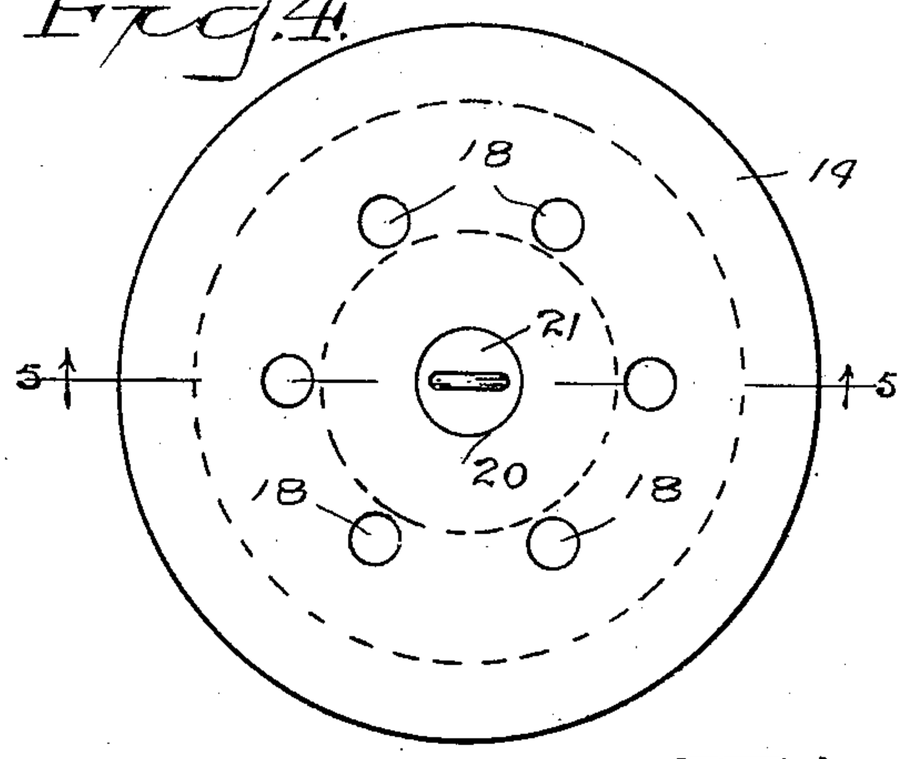


Fig. 5.

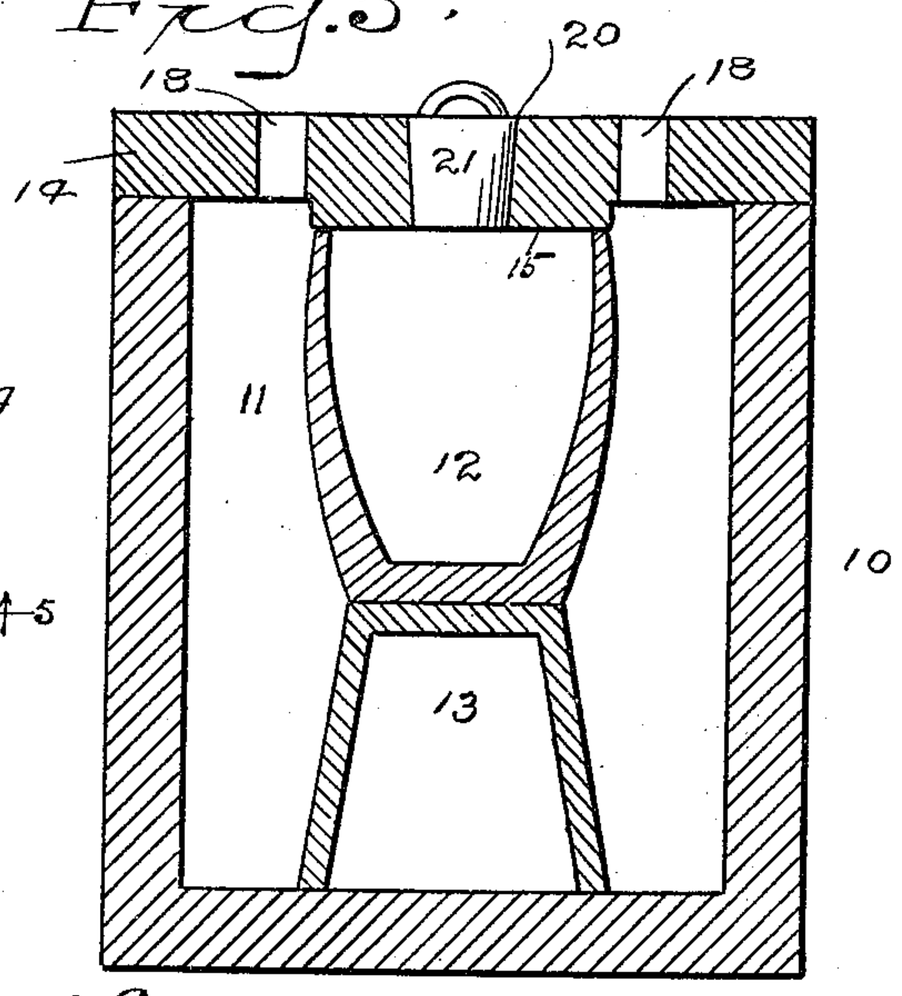
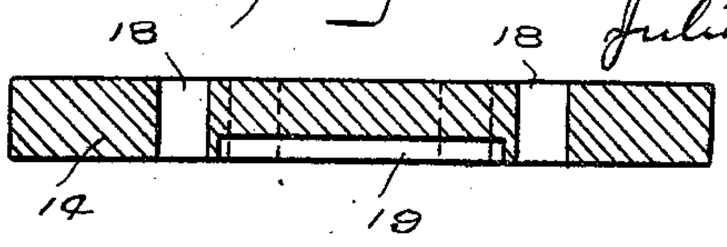


Fig. 6.



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COVER FOR CRUCIBLE-FURNACES.

975,506. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed April 28, 1909. Serial No. 492,741.

To all whom it may concern:

Be it known that I, JULIAN L. R. BROWN, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Covers for Crucible-Furnaces, of which the following is a specification.

This invention relates to the class of furnaces which are especially adapted for melting metal in crucibles, and has for its object to provide a cover for the furnace that will also serve as a cover for the crucible and will prevent the flame from coming in contact with the metal in the crucible and thereby prevent oxidation and serious loss of metal. In furnaces of this character it has heretofore been the practice to leave a space between the cover and the top of the crucible and to provide an opening in the center of the cover through which the products of combustion may escape. The result has been invariably that instead of merely passing the top of the crucible and out through the central hole in the cover, the flame would curve over the top of the crucible and downward into the crucible and into contact with the molten metal therein and would then rise in a central current and pass out through the central hole in the cover. This direct contact of the flame with the molten metal has caused appreciable loss of the metal through oxidation. The loss has been so great in fact as to constitute an important item in the cost of refining all metals and in the refining of the precious metals the loss has been serious.

My present invention wholly obviates this loss of metal by oxidation without in any way interfering with the melting of the metal. This I accomplish by providing a cover for the furnace which will also serve as a cover for the crucible and prevent the entrance of flame into the crucible and shall be provided with escape holes for the products of combustion which will cause the flame to come in contact with the sides of the crucible clear to the top of the crucible and then pass out without coming into contact with the metal.

In the accompanying drawing forming a part of this specification, in which reference characters are used to indicate the several parts,—Figure 1 is a plan view illustrating the preferred form of my novel cover; Fig. 2 a section on the line 2—2 in Fig. 1 looking in the direction of the arrows showing the cover in place on a furnace and a crucible within the furnace and resting upon a suitable base; Fig. 3 an inverted plan view of the central portion of the cover; Fig. 4 a plan view corresponding with Fig. 1, illustrating a modified form of the cover; Fig. 5 a section on the line 5—5 in Fig. 4 and corresponding with Fig. 2; and Fig. 6 is a section of a cover slightly modified from the form illustrated in Fig. 5.

10 denotes a crucible furnace which may be of any ordinary or preferred construction and 11 the combustion chamber, the portion of said chamber between the crucible and the wall of the furnace being usually called the flame-gap. I have not illustrated a burner for the reason that it is wholly immaterial so far as my present invention is concerned what type of burner is used. In practice a hydrocarbon burner is ordinarily used which is located in a chamber outside the furnace and the flame enters the combustion chamber 11 of the furnace through a suitable aperture (not shown) near the bottom of said chamber. This opening in practice is preferably placed obliquely to a radial line so that the flame will swirl around the crucible subjecting all portions of the outer surface thereof to the direct action of the flame.

12 denotes a crucible ordinarily made of graphite which rests upon a base 13 also ordinarily made of graphite.

14 denotes my novel cover which may be made of any suitable material as metal, brick, fire clay or graphite and may or may not be hinged to the furnace as preferred. The cover is of course left unfastened so that it may be lifted by the gases evolved if sufficiently powerful and thus prevent danger to the furnace. The essential features of the cover are that it is provided with a central portion adapted to be engaged entirely around by the top of the crucible, thereby preventing the entrance of flame into the crucible and that it is provided with escape holes in alinement with the flame-gap surrounding the crucible.

In Figs. 1 to 5, inclusive, the cover is shown as provided on its underside with a circular table 15 of approximately the diameter of the top of the crucible with which the top of the crucible engages, as clearly shown in Figs. 2 and 3.

In the preferred form illustrated in Figs. 1, 2 and 3, the cover is provided with a plurality of passages 16 outside of the table, which converge and lead into a central opening or escape hole 17 in the top of the cover.

In use the action of my novel cover is as follows: The flame will swirl around the crucible coming in contact with every portion of the outer surface thereof clear to the top and will pass the edge of the table and out through the passages and escape hole, there being no preventable loss of the heating effect of the flame, and this being accomplished without any contact of the flame with the metal and the consequent oxidation and loss of metal.

The form illustrated in Fig. 5 differs only in that instead of converging passages leading into a central opening and out, I provide a plurality of passages 18 outside the table and in direct alinement with the flame-gap which pass directly through the cover so that the flame is caused to come in contact with the entire outer surface of the crucible clear to the top the same as before. 20 denotes a central hole in the cover which may or may not be provided as preferred and which is closed by a plug 21.

The form illustrated in Fig. 6 differs from the form in Fig. 5 in that instead of a table to be engaged by the top of the crucible, I provide a central recess 19 in the underside of the cover which just receives the top of the crucible.

Having thus described my invention, I claim:—

1. A cover for crucible furnaces having a central imperforate table adapted to be engaged by the top of a crucible whereby the crucible is closed to the products of combustion, said cover having a plurality of passages therethrough outside of said table and disposed around the same to permit the escape of the products of combustion.

2. A cover for crucible furnaces having a central imperforate table adapted to be engaged by the top of a crucible whereby the crucible is closed to the products of combustion and passages outside said table and within the cover which converge and lead into a central opening for the escape of the products of combustion.

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

JULIAN L. R. BROWN.

Witnesses:

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