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TAPPING PLUG FOR METALLURGICAL FURNACES

Filed June 25, 1927

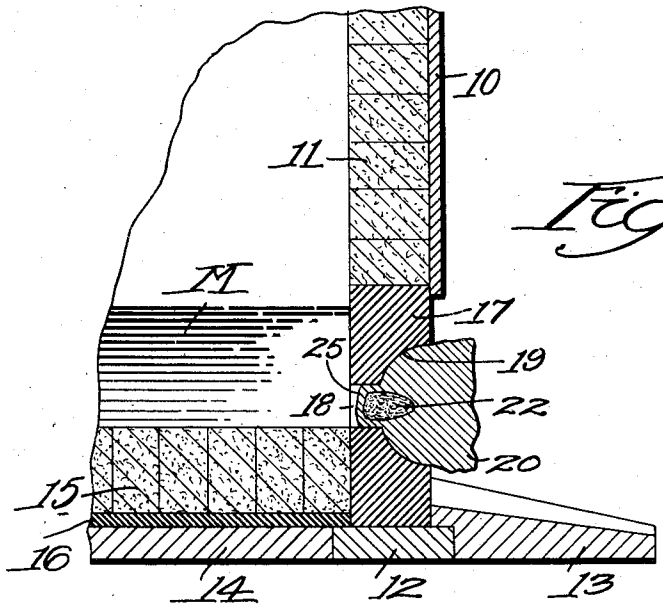


Fig. 1.

Fig. 2

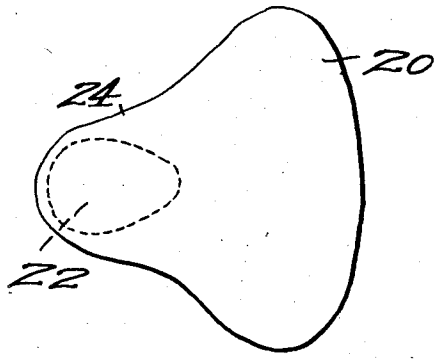
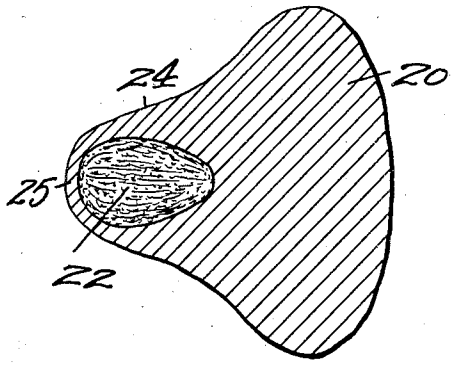


Fig. 3



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UNITED STATES PATENT OFFICE.

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TAPPING PLUG FOR METALLURGICAL FURNACES.

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This invention relates to a tapping plug for a metallurgical furnace and has particular application to furnaces for melting non-ferrous metals. It is customary to close the tapping outlet in a furnace for melting ferrous metals with a plug of moist fire clay or other similar material, forced into the tapping outlet, but this manner of closing a furnace is found unsatisfactory when used in connection with non-ferrous metals such as brass or copper. These non-ferrous metals chill quickly and the contact with the moist clay frequently results in forming a plug of solid metal in the inner end of the tapping outlet, which metal can be removed only with considerable difficulty.

It is the object of my invention to provide a tapping plug for metallurgical furnaces which will not substantially chill the adjacent molten metal, either ferrous or non-ferrous, and which may be quickly and easily removed when desired.

My invention is hereinafter described in detail and will be more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings in which

Fig. 1 is a sectional elevation of certain parts of a metallurgical furnace to which my invention may be applied;

Fig. 2 is a side view of my improved tapping plug; and

Fig. 3 is a sectional side elevation thereof.

Referring to Fig. 1, I have shown portions of a furnace particularly adapted for melting non-ferrous metals, the furnace comprising a shell or casing 10 having a fire-brick lining 11, a bottom frame 12 supporting a tapping spout 13, and a bottom member 14 supporting a fire-brick lining 15, preferably having a layer 16 of non-conducting material thereunder.

A rectangular block 17 of fire-brick or other suitable material is built into the side wall of the furnace and is provided with a tapping outlet 18 having a bell-shaped or enlarged outer portion 19. The outlet 18 is substantially on the level with the top of the bottom lining 15. The parts thus far described form no part of my present invention, which relates particularly to the construction of the tapping plug 20 which I have shown as inserted in the bell-shaped mouth 19 of the block 17 to close the outlet 18.

The plug 17 is molded from moist clay or other similar and suitable plastic but non-combustible material. The plug is molded of a shape adapted to be secured to the end of a staff by which it may be inserted in the outlet 18 in the usual and well known manner, when it is desired to stop the flow of the molten metal M.

The particular novel feature of my improved tapping plug consists in the insertion of a portion 22 of cotton waste or other easily carbonized material in the reduced end portion 24 of the plug 20. The material 22 is preferably entirely enclosed within the walls of the plug 20, and is commonly protected at the end of the plug by a relatively thin layer 25 of clay or other non-combustible but plastic material.

When the plug is inserted in the block 17, the material 22 is forced into the outer end of the outlet passage 18, and the body of the plug is forced into the bell-shaped mouth 19, sealing the opening and preventing access of air to the material 22. This material 22 is, however, only thinly protected from the molten metal M, which imparts sufficient heat to the material 22 to thoroughly carbonize the material. Even if the material 22 comes in direct contact with the metal, the effect is substantially the same.

The material 22 remains in place after carbonization preventing contact of the metal M with the moist clay forming the body of the plug 20, and the chilling of the metal is thus effectually prevented.

When it is desired to tap the furnace, the clay in the bell-shaped mouth 19 is broken out in the usual manner and as soon as air reaches the carbonized material 22, said material is immediately consumed, leaving the outlet passage 18 practically free and clear for the flow of metal.

I thus effectually seal the outlet passage when desired, while at the same time I prevent the possibility of chilling the metal and forming a solid plug of metal in the outlet passage or tapping hole.

While I have indicated a combination of clay and cotton waste, it will be understood that any suitable plastic but non-combustible material may be substituted for the clay and that excelsior or fine straw or hay or any other easily carbonized material may be substituted for the cotton waste.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein shown and de-

scribed otherwise than as set forth in the claims, but what I claim is:—

1. A tapping plug for a metallurgical furnace comprising an outer portion of plastic and non-combustible material, and an inner portion of carbonizable material.

2. A tapping plug for a metallurgical furnace comprising a body of non-combustible plastic material having a reduced end portion, and a portion of carbonizable material inserted in said reduced end portion.

3. A tapping plug for a metallurgical furnace comprising a body of non-combustible plastic material having a reduced end portion, and a portion of carbonizable material inserted in said reduced end portion and entirely enclosed by said non-combustible material.

4. A tapping plug for a metallurgical furnace comprising a body of clay having a reduced end portion, and a portion of cotton waste inserted in said reduced portion and protected therein by a relatively thin covering of clay.

In testimony whereof I have hereunto affixed my signature.

DANIEL CUSHING.