J. G. MARSHALL.

ELECTRIC FURNACE.

APPLICATION FILED OCT. 10, 1914.

1,149,203. Patented Aug. 10, 1915.

Fig. 1.

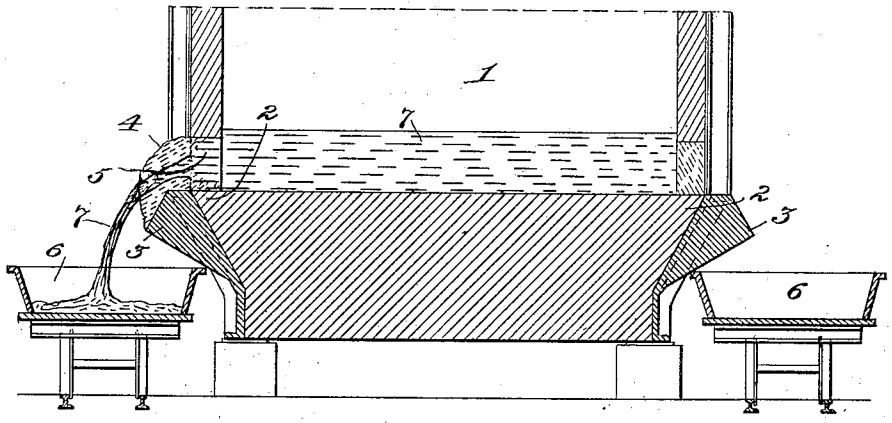


Fig. 2.

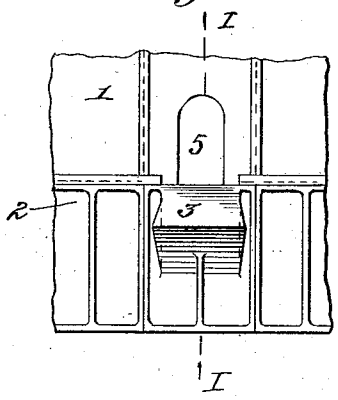
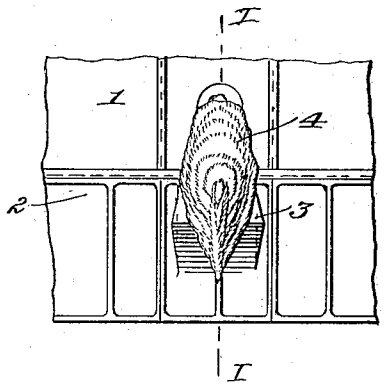


Fig. 3.



Witnesses:
Joseph W. Harris
E. Daniels

Inventor:
James G. Marshall,
by Symmes Townsend & Buckenstein,
Attys.

UNITED STATES PATENT OFFICE.

JAMES G. MARSHALL, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO UNION CARBIDE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF VIRGINIA.

ELECTRIC FURNACE.

1,149,203. Specification of Letters Patent. **Patented Aug. 10, 1915.**

Application filed October 10, 1914. Serial No. 865,977.

To all whom it may concern:

Be it known that I, JAMES G. MARSHALL, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

This invention relates to electric furnaces and has for its object the arrangement of the furnace which will allow an accumulation of the material from the furnace to form a layer on the tapping-spout and be automatically maintained, thereby eliminating all expense for repairs to the front of the furnace, or to the tapping-spout, and will at the same time deliver the product in the proper receptacle without wasting it by spilling it on the floor.

In operating electric furnaces great expense and inconvenience usually result from the ordinary arrangement of the tapping facilities; the tapping-spout, being exposed to the molten material, usually melts out if made of metal, or oxidizes away if made of carbon or other substance of that character. Repairs to the spout, or renewals, in addition to causing an interruption in the operation of the furnace, are costly and usually very inconvenient to make.

In the accompanying drawings, Figure 1 is a vertical section of the furnace on the line I—I of Figs. 2 and 3, showing the molten material pouring through an accumulation of chilled matter, and also of an unprotected tapping-spout; Fig. 2 is a front view of the unprotected tapping-spout; and Fig. 3 is a front view of a protected tapping-spout after discharging the furnace, showing the accumulated chilled layers of product.

In Fig. 1, the furnace 1 is designed with an overhung hearth 2, which allows the receptacle or chill 6, for the molten metal or product, to project under the furnace and permits the tapping-spout 3 to be merely a projection insuring the molten metal or product entering the chill, the spout being so placed that under ordinary conditions, it is not exposed to the direct heat from the molten metal or product coming from the furnace but is protected by a layer of chilled material 4. This is particularly true of a carbid furnace where the carbid on leaving the furnace chills rapidly. An accumulation of carbid 4 occurs at the front of the tapping hole and constitutes a supplementary self-formed tapping-spout supported by the tapping-spout 3; the molten carbid 7 passes out of the tapping hole 5 and through the accumulation of material 4 on the tapping-spout 3. The tapping-spout, however, is not exposed directly to the heat, and is therefore not burned out, but lasts for an indefinite period. The accumulation on the tapping-spout may be partly burned away, but is automatically replaced at each tap by the molten material 7 coming from the furnace becoming chilled and adhering to the material which has already accumulated thereon. After removing the charge, the tap-hole is plugged as usual.

The spout is a metal block and may be made of cast iron; Fig. 3 shows the layers of carbid 4 which have become solidified on the spout 3. Successive amounts of carbid drawn from the furnace come through this accumulation of carbid which serves as a supplementary spout and delivers the molten material directly into the chill or ladle 6, underneath; the spout simply supports this chilled carbid and practically no repairs are necessary in order to keep the front of the furnace in good condition for continuous operation.

By the terms "difficultly-fusible," and "heat-insulating," as used in the claims, it is intended that the product used as a supplementary tapping spout 4 shall be more difficultly fusible than the material of which its supporting block 3 is ordinarily made and that it shall be a sufficiently poor conductor of heat to serve as a protector to the supporting block from the high temperature of the stream of molten product.

While the improved tapping-spout is particularly advantageous in electric furnaces, it is obvious that it is also advantageous in many other types of furnace.

I claim:—

1. In an electric furnace for making difficultly-fusible products, a self-formed spout of the chilled product of said furnace, and a support for said spout.

2. In an electric furnace, a hearth whose wall has a tapping hole therein, a metal block below said tapping hole and having an outwardly projecting upper surface, a self-formed spout of the chilled difficultly-fusible heat-insulating product of said fur-

nace, the block serving as a support for the said self-formed spout.

3. A carbid furnace, comprising a hearth, a spout formed of chilled carbid, and a support for said spout.

4. A furnace comprising a hearth, and a carbid spout leading therefrom.

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

JAMES G. MARSHALL.

Witnesses:
SIDNEY OTIS,
GEO. R. RUDD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."