1,616,855

Feb. 8, 1927.

W. T. HURST

SLAG CASTING APPARATUS

Filed Feb. 11, 1926

Fig. 5.

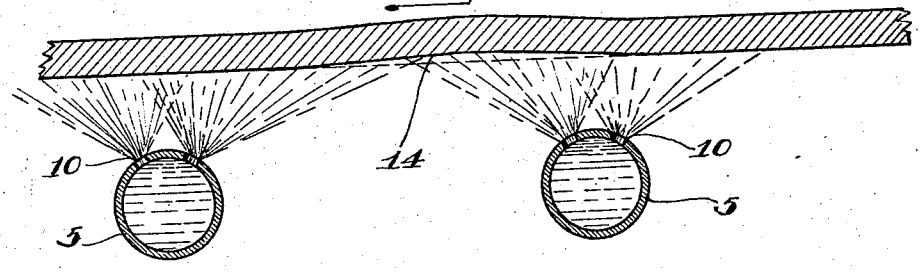


Fig. 1.

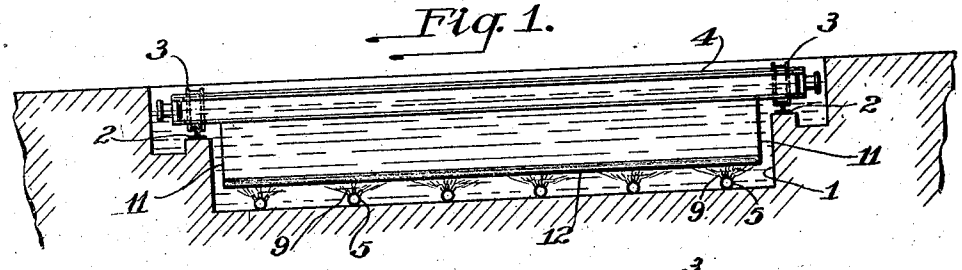


Fig. 2.

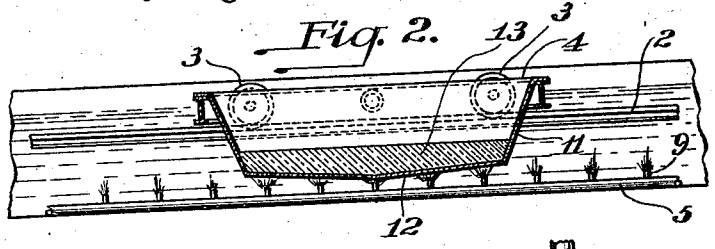


Fig. 3.

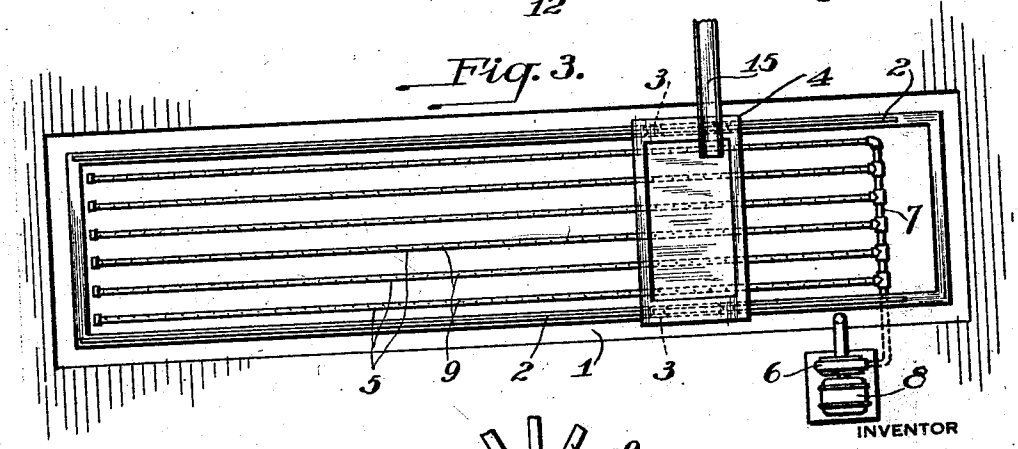
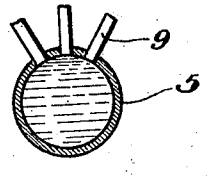


Fig. 4.



WITNESSES

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Patented Feb. 8, 1927. 1,616,855

UNITED STATES PATENT OFFICE.

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SLAG-CASTING APPARATUS.

Application filed February 11, 1926. Serial No. 87,584.

My invention relates to apparatus for treating slag of blast and other metallurgical furnaces, and is an improvement on the apparatus disclosed in my Patent No. 1,402,363 granted January 3, 1922.

In the aforementioned patent there is disclosed a process for solidifying molten slag by a rapid cooling in which receptacles or containers are suspended in quenching pits and which have associated therewith runners or troughs for conducting the slag from a furnace to the receptacles.

I have found that in solidifying slag by the aforementioned process, the intensive heat of the molten slag has a tendency to form heat pockets underneath the receptacle which act as an insulation in preventing proper contact of the quenching fluid and frequently causes burning of the receptacle body. The heat pockets are created by the accumulation or trapping of steam caused by indentations in the surface of the receptacle and by the comparatively slow quenching action of the fluid relative to the intensity of heat dissipation through the walls of the receptacle.

It is among the objects of the present invention to overcome these difficulties by the provision of adequate quenching facilities which in addition to the quenching fluid in which the receptacle is suspended consists of means for agitating the quenching medium. I have also discovered that the shape of the receptacle influences the effectiveness of quenching and accordingly I have devised a form of receptacle which enhances the quenching effect.

In carrying out my invention I utilize the system for receiving the slag from the furnace and conducting it to a receptacle similar to that disclosed in my patent.

The receptacle in accordance with the present invention is provided with inclined side walls converging at a slight inclination at the center line of the base, constituting the bottom of the receptacle, to permit the escape of steam bubbles. In the quenching pit I provide a system of pipe lines communicating with a source of fluid pressure which are adapted to emit jets of water or other suitable quenching fluid in the direction of the receptacle thus assuring adequate circulation of the quenching medium contained in the pit.

In the accompanying drawing constituting a part hereof, and in which like reference characters designate like parts, Fig. 1 is a side elevational view of a receptacle in a quenching system for treating molten slag embodying the principles of my invention; Fig. 2 is a cross sectional view thereof; Fig. 3 is a plan view; Fig. 4 is a view partially in section and partially in elevation of a pipe line for conducting the quenching fluid to the receptacle; and Fig. 5 is a diagrammatic view illustrating a portion of the receptacle and quenching means for acting upon it to prevent the formation of heat pockets.

Referring to Figs. 1, 2 and 3 of the drawing, the structure therein illustrated comprises a quenching pit 1 provided with tracks or rails 2 adapted to receive a plurality of flange wheels 3 supporting a receptacle 4. The pit 1 is adapted to hold the quenching liquid, preferably water, and is filled so that the quenching liquid extends beyond the layer of slag deposited in the receptacle 4.

Underneath the receptacle I provide a plurality of pipe lines 5 which are shown connected to a centrifugal pump 6 by a feed pipe 7, the pump being actuated by a motor 8 or any other suitable prime mover. The pipes 5 are provided with nipples, Figs. 1, 2 and 4, or with orifices 10, Fig. 5, for the purpose of emitting a jet of quenching fluid in the direction of or against the surface of the receptacle 4.

In Fig. 2 I have illustrated the receptacle 4 as having inclined side walls 11 and a converging bottom 12 to permit the escape of steam bubbles that have a tendency to form around the portion of the receptacle surrounding the molten slag 13 thus further preventing the forming of heat pockets.

As shown in Fig. 5 the walls or bottom of the receptacle may be of irregular shape having pockets or indentations 14 caused by warping or handling in use. By utilizing the orificed pipe lines in accordance with my invention the jets of quenching fluid are directed to the entire surface of the receptacle and into the indentations 14 and in addition assures the circulation of the quenching fluid contained in the quenching pit.

In utilizing my slag-treating system the molten slag is run into the receptacle by a runway or trough 15, and the receptacle being immersed in the quenching fluid of the pit immediately absorbs the heat which is dissipated through the walls 11 and the bot-

tom 12. By the utilization of the circulating system herein shown and by virtue of the converging inclined shape of the base and walls of the receptacle steam bubbles are not permitted to accumulate, as is the case where a straight bottom receptacle is employed without a fluid pressure system.

It is evident from the foregoing description of my invention that the method and apparatus for treating slag disclosed therein provides a simple and efficient means for rapidly quenching the molten slag without producing detrimental effects on the receptacle.

Although I have described a specific embodiment of my invention, it will be obvious to those skilled in the art that the receptacle may take on various forms and the fluid pressure system utilized for producing a circulation of the quenching medium may be rearranged or adapted to cooperate with the receptacle in other ways than that shown without departing from the principles herein set forth.

I claim:

1. Apparatus for treating molten slag comprising a quenching pit adapted to contain water, a receptacle for receiving molten slag suspended in said pit, and a plurality of pipe lines disposed in said pit for emitting jets of quenching fluid under pressure against said receptacles.

2. Apparatus for treating molten slag comprising a quenching pit, a receptacle suspended in and partially submerged by quenching fluid in said pit and a plurality of jets for providing circulation of the quenching fluid in said pit and particularly around the submerged portion of said receptacle.

3. Apparatus for treating molten slag comprising a pit containing a quenching fluid, a receptacle suspended in and partially submerged in said pit, said receptacle being shaped to prevent accumulation of steam around its submerged portion and a plurality of jets for directing quenching fluid against the submerged portion of said receptacle to effect circulation of the quenching fluid.

In testimony whereof, I sign my name.

WILLIS T. HURST.