Feb. 16, 1926. 1,573,313

V. A. GIESEY

HOT TOP FOR INGOT MOLDS

Filed August 2, 1924

Fig.1.

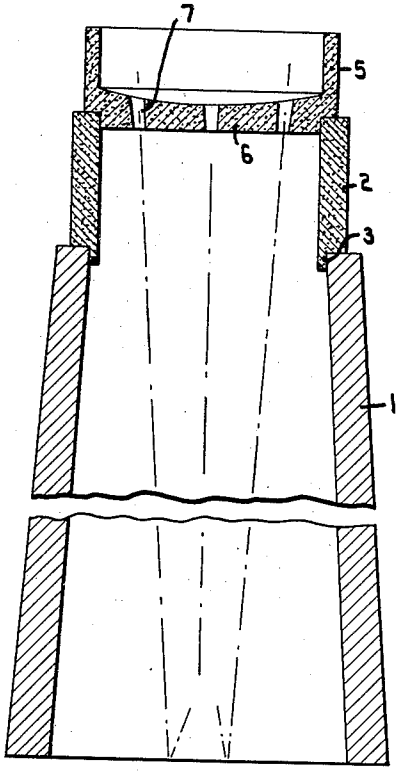


Fig.2.

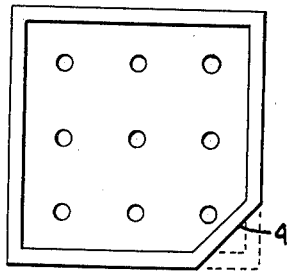


Fig.3.

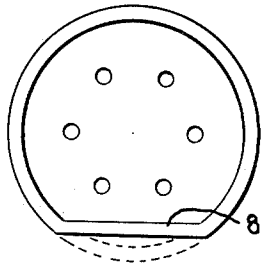
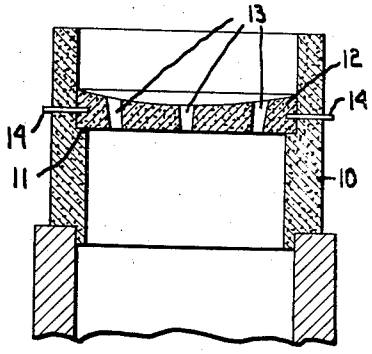


Fig.4.



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UNITED STATES PATENT OFFICE.

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HOT TOP FOR INGOT MOLDS.

Application filed August 2, 1924. Serial No. 729,717.

To all whom it may concern:

Be it known that I, VICTOR A. GIESEY, a citizen of the United States, and a resident of Cleveland Heights, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Hot Tops for Ingot Molds, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to a new and improved pouring spout for ingot molds of the type more commonly known in the trade as "hot tops." The purpose of such pouring spout is to prevent splashing of the stream, with the resultant formation of oxide where the particles of the metal splash against the sides of the mold, and also to prevent the formation of air bubbles in the central and upper portion of the ingot. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claim.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a vertical central section through an ingot mold with one type of my pouring spout in position thereon; Fig. 2 is a plan view of one type of pouring spout designed for a square ingot mold; Fig. 3 is a similar view showing the pouring spout for a round ingot mold; and Fig. 4 is a central vertical section through another form of pouring spout.

In Fig. 1 there is shown an ingot mold 1, into which the metal is to be poured, and at the top of this mold I mount a pouring spout consisting of a tubular portion 2 provided with a recessed shoulder 3 at its lower end fitted snugly within and against the upper inner edge of the ingot mold 1. One corner 4 of this tubular section 2 is cut away as shown in Fig. 2 to permit the operator to watch the interior of the ingot mold and to determine when the mold is filled with metal.

On top of the section 2 I mount a receiving chamber 5, which is formed with a saucer-shaped bottom 6 provided with a series of openings 7 therethrough, these openings being shown in Fig. 2, and being disposed in a converging relation so that the stream of metal passing through the holes will converge and meet at a point adjacent the bottom of the ingot mold 1. In operation the molten metal is poured from the ladle into the receiving chamber 5, the aggregate area of the holes 7 through the bottom of this chamber being substantially equal to or greater than the area of the stream striking the chamber so that the metal is allowed to flow away from this chamber about as rapidly as it is received therein, and no appreciable amount of metal is at any time held within this chamber.

The small streams of metal flowing through the holes 7 in the bottom of the chamber 5 are each of small cross-sectional area and there is no appreciable head on these streams so that the velocity of the streams is low and the splashing of the metal at the point of impact of the streams on the bottom of the ingot mold or against the rising metal therein is very greatly reduced. The result is that substantially no metal splashes against the walls of the ingot mold, there to be suddenly cooled and oxidized, as is the case where a single stream of metal is allowed to fall from the ladle into the mold. In addition to this advantage the fact that the streams converge and always strike the surface of the rising metal in the mold at a point adjacent the center of it tends to still further prevent splashing of the metal and also greatly minimizes the amount of air which is carried down into the molten metal by the falling column and there trapped to remain in the form of air bubbles in the finished ingot.

The ladle operator can watch the rising metal in the mold through the opening at the corner of the mold provided by the cut-off corner 4 and can then stop pouring when the metal has reached the top of the ingot mold proper, although the metal may be allowed to rise to a point adjacent the top of the tubular intermediate chamber 2 if desired, thus increasing the total amount of metal in the final ingot, and allowing for a waste portion which may be cut off and discarded if found to contain too many air bubbles. It will be understood that the metal in an ingot mold cools in layers from the outside in toward the center, and the

metal around the center and at the upper end of the ingot cools last, and in cooling shrinks, thus making this portion of the ingot porous and often unuseful. If the ingot is of the same length as the mold a portion of this ingot must sometimes be cut off to remove this porous upper central portion of the ingot, and by allowing the metal to arise above the top of the mold an extra portion can be added to the length of the ingot which will contain approximately all of this porous metal.

In Fig. 3 I have shown a pouring spout for use with a round ingot mold, and in this form, one side 8 of the section 2 is cut off to allow the same inspection of the metal in the ingot as is provided by the cut-off corner 4 in the type of spout shown in Figs. 1 and 2. In Fig. 4 I have shown another form of spout, in which a single tubular member 10 serves the double purpose of receiving chamber and spacer. This tubular member 10 is provided with a shoulder 11 at about its vertical center, upon which there may be removably placed a saucer-shaped plate 12 provided with openings 13 for the passage of the metal into the mold, while this plate may be held in position by means of removable pins 14.

The particular advantages of my improved pouring spout are that it is extremely simple in its construction and easy to apply to the ingot mold, while the convergence of the small streams produced by intercepting the metal from the ladle in a receiving chamber and then passing it through inclined openings removes the danger of splashing against the sides of the ingot mold and greatly reduces the porosity of the upper central portion of the resulting ingot.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by the following claim or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

In a pouring top for ingot molds, the combination of a tubular member removably mounted upon an ingot mold and in alignment therewith, and a transverse partition in said member provided with a plurality of convergent openings therethrough, the axes of such openings when projected falling against the bottom of said mold adjacent the center thereof.

Signed by me, this 29th day of July, 1924.

VICTOR A. GIESEY.