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H. A. BATE

HOT TOP FOR MOLDS

Filed July 31, 1924

FIG. 1.

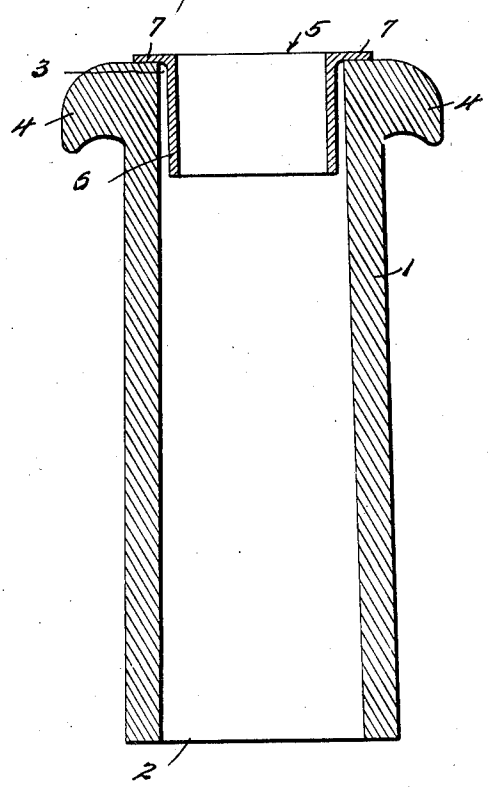
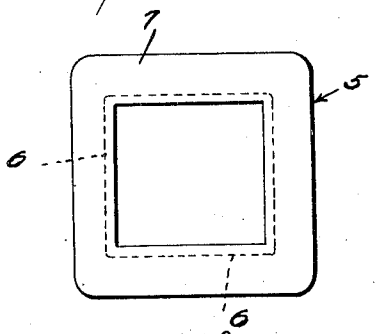


FIG. 2.



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UNITED STATES PATENT OFFICE.

HARLEY A. BATE, OF LACKAWANNA, NEW YORK.

HOT TOP FOR MOLDS.

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To all whom it may concern:

Be it known that I, HARLEY A. BATE, a citizen of the United States, residing at Lackawanna, in the county of Erie and State of New York, have invented certain new and useful Improvements in Hot Tops for Molds, of which the following is a specification.

My invention relates to hot tops for molds for use in casting steel ingots and one of the objects of the invention is to provide a device of this character which can readily be placed in position on any make of mold.

A further object is to provide such a device which is at least in part fragile so that in separating the ingot and mold, the fragile portion of the mold will break and not hinder such separation.

With these and other objects in view my invention consists of certain novel and peculiar features of construction and combination of parts, as hereinafter more fully described and particularly pointed out in the claims.

Referring to the drawing for a more complete disclosure of the invention:

Fig. 1 is a sectional elevation showing the hot top in place on the ingot mold; and

Fig. 2 is a plan view of the hot top.

Any shape of ingot mold may be used, but that shown is the present day commercial ingot mold 1 which is larger inside at the bottom 2 than it is at the top 3. Ears 4 are provided thereon for engagement with a suitable hoisting device or ingot stripping machine in the customary manner. The hot top 5 is preferably made of refractory material and comprises sides 6 and flanges 7. The hot top is placed on the mold in the position shown, before the ladle of molten steel is brought over the mold. The mold is then poured or teemed substantially full of molten steel, care being taken not to overflow the top of the mold. The metal will usually be poured up to within two or more inches of the top of the mold. As regular cast iron molds are used, the molten steel will solidify in the regular manner and, of course, will form a pipe along the central axis and in the upper half of the steel ingot. As the hot top will be made of material which is usually at least partly refractory, the molten steel will not chill or solidify in the hot top as soon as it will in the cast iron mold. In other words, the steel in the hot top will stay molten longer than any other part of the ingot of steel and this will feed the pipe which is being formed in the part of the mold below the hot top, thereby decreasing the percentage of pipe in the ingot.

If the material from which the hot top is made is not heavy enough to hold it in place, when the mold is filled with molten steel, weights, such as pieces of scrap, can be placed on the flanges for this purpose. The main purpose of the flanges on the hot top is to hold it in place and prevent it from dropping to the bottom of the mold.

In the prior art, hot tops having flanges have been used heretofore. The hot top in such cases, however, holds a portion of the molten metal, which feeds the pipe, above the top of the mold. In such a construction it is necessary to seal the flange where it rests on top of the mold, otherwise the molten metal will flow out when the cavity in the hot top is being filled. When metal flows over the top of a mold, the ingot inside cannot be stripped or removed because, as shown in Fig. 1, the present day commercial ingot mold is larger at the bottom than the top. With my hot top, the molten metal is only poured within two or more inches from the top of the mold. In stripping, the flanges being sufficiently fragile, will break readily. The only labor that is necessary is to put them on the mold and place weights on the flanges to keep the hot top from rising or floating while the ingot is teemed. Inasmuch as my hot top fits loosely in the mold, no special fit is required and it can be readily applied within limits to any ingot mold. On account of the fact that the flanges of the hot top break in stripping the ingot, a new one must be used with each ingot that is cast. It will be clear, too, that no additional labor is necessary in the stripping operation by using a hot top of my construction.

The shape of the sides 6 of the hot top which extend down into the mold may vary with the shape of the mold on which the hot top is used. The flanges 7 which rest on top of the mold may vary in shape and location and may be on one or a plurality of sides, or on one or a plurality of corners, depending upon the design of the top of the mold on which the hot top is used. The flange instead of being flat may be any con-

venient shape, such as curved, or may be only a heavy bead, so long as it will hold the top in place and from falling down into the mold.

The material of which the hot top may be made can be any refractory, semi-refractory, or non-refractory material, such as clays, siliceous materials, magnesite, dolomite, lime, ores, minerals, slag, asbestos, molding sands, bauxite, core mixtures, cement, concrete, etc. It must be a material that does not chill the molten metal as the cast iron of the mold does; in other words, the hot top must be made of a material that will keep the metal inside of it molten long enough until the metal in the balance of the ingot has solidified. The hot top might be made of a compound, which when it comes in contact with the molten metal will start a heat evolving reaction, thus keeping the metal in the hot top molten or increasing its temperature.

The hot top or any part of it may be reinforced with any design of reinforcing either for strength or to increase its weight. While in the preferred form, my hot top is made in one piece, it can be made in a plurality of pieces.

I claim:

1. The method of reducing piping in cast ingots comprising supporting a loosely fitting hot top on the mold, pouring metal into the mold to a point just below the top of the mold and thereafter severing a portion of the hot top to permit stripping of the ingot from the mold.

2. The method of reducing piping in cast ingots comprising supporting a loosely fitting hot top on the mold, pouring metal into the mold to a point just below the top of the mold and thereafter severing the supporting means for the hot top in stripping the ingot from the mold.

3. The method of reducing piping in cast ingots comprising supporting a loosely fitting hot top on the mold by means of a portion of the hot top which rests on the top of the mold, the sides of the hot top depending into the mold and the upper portion of the hot top being on substantially the same level as the top of the mold, pouring metal into the mold to a point just below the top of the mold and thereafter severing a portion of the hot top in stripping the ingot from the mold.

4. In combination with an ingot mold, of a hot top fitting loosely in the top of the mold with its top flange substantially flush with the top of the mold.

In testimony whereof I affix my signature.

HARLEY A. BATE.