

UNITED STATES PATENT OFFICE

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COATING MOLD

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4 Claims. (Cl. 22—192)

My invention relates to a coating for molds in which molten metal is cast.

The main object of my invention is to provide an improved coating for the molds of continuous casting machines by means of which molten blast furnace iron is converted into pigs.

Such casting machines consist essentially of one or more endless chains or belts of trough shaped metal molds which receive molten iron at one end of their flight, carry it through water sprays and discharge it as solidified pig iron at the other end. During their return flight the molds are inverted, that is, their openings face downward and it is common practice to spray them at some point in this portion of their travel with a coating material. The main functions of this coating are: to prevent the pigs sticking to the molds, to prevent excessive chilling of the pigs and to prolong the life of the molds. The usual method of applying the coating is to pass the molds over a tank containing the coating material and to spray the same onto the molds by means of steam ejectors located in the tank.

My improved mold coating is essentially a water suspension of an oily substance and a finely divided refractory pigment. As the latter of these two constituents I prefer burnt dolomite and my preferred practice is to maintain an excess of same in the coating tank and to agitate the mixture with steam. To the suspension thus formed I prefer to add raw coal tar in the ratio of one part of tar to four parts of the dolomite wash. This forms a light brown mixture in which the tar is easily maintained by agitation in a finely dispersed condition.

The main function of the oily constituent is to waterproof the deposit formed on the molds by the coating and it will therefore be evident that the proportions of oil and pigment for best results may vary within rather wide limits depending on the properties of the oil, the average temperature of the molds, etc. The novel improvement constituting the basis of my invention is the combination in aqueous suspension of a pigment with an insoluble heavy oil and I therefore do not wish to be limited to a particular pigment or oil or to the proportions thereof set forth above. While I prefer burned dolomite as the pigment, various other finely divided refractory substances such as common lime or fire clay may also be successfully used. In place of tar, any other heavy oil such as a heavy fraction of petroleum may be used. By "heavy oil" I refer to oils of high boiling point such as are commonly used alone as mold coatings.

The coatings for pig molds which hitherto have been most widely used are aqueous suspensions of dolomite, common lime or fire clay. Coatings of this kind build up a deposit of soft porous material on the surface of the molds which normally becomes quite thick—perhaps a half inch or more on certain parts of the mold. This deposit successfully protects the molds, prevents the pigs from sticking and protects them from excessive chilling. Such coatings, however, are subject to a serious disadvantage in that they retain a certain amount of moisture unless special provisions are made for drying the molds between the coating tank and the pouring trough. The amount of this moisture—or rather the rate at which it is evolved is generally insufficient to cause explosions or serious spattering of the molten iron; but it is sufficient to cause a slow boiling action in the metal for some time after it is cast. The result of this action is an oxidation of certain constituents of the iron and a porous condition of the finished pig. This oxidation and porosity is not only undesirable from a metallurgical standpoint but it adversely effects the appearance of the product and reduces its sales appeal. It has also been stated in various U. S. patents that basic materials which adhere to pig iron cast in such coatings are detrimental to cupola melting practice.

To overcome these defects it has been proposed to substitute tar or other heavy oils for the lime or clay wash. Although the use of tar eliminates the oxidizing effects above referred to it has been found that it does not prevent pigs sticking to the molds. It also produces an objectionable amount of smoke and flame when it comes in contact with molten iron. For these and other reasons it has never been widely adopted as a coating for pig molds.

The failure of tar to prevent sticking is readily explainable if we bear in mind that pig molds inevitably become distorted and roughened in service so that they contain reentrant crevices and pockets. A coating to be satisfactory should therefore build up a deposit of sufficient thickness to fill out these surface inequalities. My improved coating builds up a deposit almost if not quite as thick as the plain pigment coating which at the same time retains so little water that boiling of the molten iron is avoided. Examination of the deposit produced by my coating shows that the tar is burned out of the surface layer only and that a considerable part of it is driven into and absorbed by the underlying mass—thereby filling the pores of same and pre-

venting the absorption of water. When molten iron is poured into molds coated with my coating there is practically no smoke or flame and boiling of the metal ceases in a few seconds. Thereafter the metal lies as quietly as in tarred molds.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The process of coating pig casting molds which consists in repeatedly applying thereto a wash consisting of an aqueous suspension of a refractory pigment and a heavy oil and in casting pigs in said molds between successive applications of said wash.

2. The process of coating pig casting molds which consists in repeatedly applying thereto a wash consisting of an aqueous suspension of

burned dolomite and a heavy oil and in casting pigs in said molds between successive applications of said wash.

3. The process of coating pig casting molds which consists in repeatedly applying thereto a wash consisting of an aqueous suspension of burned dolomite and tar and in casting pigs in said molds between successive applications of said wash.

4. The process of coating pig casting molds which consists in repeatedly applying thereto a mixture containing about 80% of an aqueous suspension of burned dolomite and about 20% of tar and in casting pigs in said molds between successive applications of said mixture.

ALEXANDER H. FOSDICK.

20	95
25	100
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35	110
40	115
45	120
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60	135
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70	145
75	150