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METHOD OF POURING INGOTS

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1 Claim. (Cl. 22—189)

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This invention relates to the pouring of ingots and to a novel composition for coating the interior of ingot molds prior to teeming molten metal thereinto.

It has long been the practice to apply a coating to the interior of ingot molds to prevent the formation of scabs in the surfaces of the ingots as a result of the splashing of liquid metal against the mold walls during teeming. Tar is perhaps the material most widely used for this purpose but it is objectionable because of the large volume of smoke it produces when the molten metal comes into contact with it, as well as other reasons. We have invented a novel mold-coating composition which is free from the objectionable characteristics of tar and other materials which have been used for the purpose, and possesses numerous additional advantages.

In general terms, our improved method consists in coating the molds with a mixture of ground bituminous coal and a vegetable binder such as starch, dextrin or cereal flour mixed with sufficient water to provide a fluid wash which may be applied by a spray gun. We may employ any bituminous coal for the purpose of our invention but prefer a high-volatile coal having low ash and sulphur contents. The coal is ground to the size of small granules but not too fine. The particles should be of such size that nearly all, say 95%, will pass through a 40-mesh screen while not more than 50% will pass through a 200-mesh screen.

The binder may be starch, dextrin or the flour of a cereal grain, e. g., wheat, rye or corn. Among the latter, corn is preferred. Whatever the binder, it is obtained in pulverized form and thoroughly mixed with the dry coal. Water is then added to the dry ingredients to form a paste and this is then thinned with additional water to bring it to a state of ready flowability. The ranges of the proportions of the several ingredients are given in the following table showing several examples, the last of which is the preferred practice.

Example No. and Binder Used	Coal, lbs.	Binder, lbs.	Water, gals.
1. Starch	135–165	20–25	35–40
2. Dextrin	90–100	8–9	30–35
3. Corn Flour	90–110	8–10	20–25
4. Corn Flour	100	10	20

Cereal flour for use in our mold coating is prepared by decorticating the kernels, freeing

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them from the germ, steaming them until about 40% of the starch is converted into sugar, then drying and grinding them to flour.

According to our invention, the mold coating may be applied either to cold or to warm ingot molds, preferably by means of a spray gun fed from a tank containing the mixture in a state of agitation by means of compressed air jets or otherwise. The coating is applied to the interior surfaces of the mold until they are uniformly and continuously coated. This requires about one and one-half pints of the coating for an average size steel-mill ingot mold which corresponds substantially to 270 square feet of mold surface per gallon. With the described practice, an ingot mold can be properly coated in about six seconds, producing a coating which is ready for instantaneous use.

In addition to the economy and ease of application mentioned above, our mold-coating composition has several other advantages. When properly applied, it repels splashes, sprays, surges, etc., which strike the mold wall, causing them to fall back into the ingot body rather than adhering to the mold wall to create surface imperfections. The coating remains on the mold wall throughout the time it is needed and does not burn off with a flash with the first splash of the metal in the mold. It burns just ahead of the rising steel and maintains the reducing atmosphere throughout the ingot pouring time.

Our coating produces a pronounced deoxidizing action at the surface of ingots, since the coating carries a high percentage of carbon and remains on the mold wall until the steel comes in contact with it.

A point of exceptional practical importance is the freedom of our mold coating from obnoxious fumes. During the mold-coating process no fumes are evolved which are in any way objectionable nor any obnoxious smell. When molds are cold, no odor at all is observed, and when they are on the hot side, an odor resembling that of toasted bread can be observed.

We claim:

In a method of pouring steel ingots, the steps including making a composition consisting essentially of granulated bituminous coal of a size such that 95% will pass through a 40-mesh screen but not more than 50% will pass through a 200-mesh screen, flour ground from steamed corn kernels and water, in the proportions of about 100 pounds of coal, about 10 pounds of flour and about 20 gallons of water, coating the interior walls of an ingot mold with

said composition and teeming liquid steel into the mold, said coating having the property of remaining substantially unaffected above the level of the steel in the mold and burning off progressively just ahead of the steel surface as it rises, thereby affording a pronounced deoxidizing action at said surface.

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