

UNITED STATES PATENT OFFICE.

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MOLD-COATING.

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Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that we, CHARLES H. HASLETT and ALBERT A. MENTZER, citizens of the United States of America, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mold-Coating, of which the following is a specification.

Our invention relates to improvements in the art of casting metal in sand molds, and relates more particularly to a coating or wash adapted for use in preparing the mold for the metal pouring operation.

In preparing molds for casting steel or other metals which, in molten form, are of a high heat and require a pouring under pressure, great difficulty has been had in forming the face of the walls of the mold so that when the metal is poured it will not "sweat" or run through the walls and render the casting unfit for use. Many experiments have been made and processes developed for the purpose of eliminating these disadvantages, but so far as we are aware none of them have proven successful, so that there is such uncertainty as to the results which will accrue upon the pouring of the metal as to render the cost of making castings from such metals excessive and time-consuming, by reason of the fact that in a majority of cases more than a single attempt must be made before obtaining a casting sufficiently perfect to enable the complete action, and even then the casting must be operated upon by workmen for a considerable length of time in order to place it in condition for machine work.

As an example, the molds made for casting gear wheels require the presence of a large number of reinforcements (some molds requiring at least four hundred pounds of nails or other form of reinforcing metal) in order to enable the walls to withstand the heat and pressure, and even then there is no certainty that the metal will be confined within its desired limits; in casting, the metal unites with the steel and requires a trimming of the casting to remove this metal. When cores are employed, and especially cores of comparatively small diameter, the molten metal sweats through the core and practically destroys the cavity or opening which is to be provided by the core; and where the core contains a metallic reinforcement, this reinforcement unites with the metal and renders it exceedingly difficult

to complete such cavity or opening. The coating or wash which forms the subject-matter of the present invention is designed to eliminate these difficulties, molds treated therewith requiring no metallic reinforcement and, so far as has been demonstrated by repeated experiments, preventing sweating and a running of the molten metal beyond the confines of the mold.

We have treated molds for castings of various sizes and shapes, including gear wheels where a casting pressure of from forty to ninety pounds has been employed; in preparing the mold for such casting we have employed no metallic reinforcement to the walls of the mold cavity, and the initial casting proved perfect. (This has been our experience with each mold which has been treated by us). We have also prepared cores for use in molds, coating them with the coating or wash, and the face of the core has, in each instance, withstood the pressure and heat so as to prevent sweating, even though the core was of small diameter and prepared without the use of reinforcements.

The coating or wash employed by us is composed of alum, preferably in powdered form, and water, thoroughly mixed, the alum being dissolved in the water in suitable manner as by the application of heat. The proportions of the elements may vary according to the character of the mold to be treated, one part of the alum to from sixty to one-hundred parts of water being employed. This form of coating or wash is employed when the sand contains a substance which acts to provide a body to the sand, a preferred form of such substance being the preparation known as glutrin used for this purpose. When the sand does not contain such body, we add glutrin to the wash in the proportion of about six parts of glutrin to one part of alum, thereby adding the body to the sand with the composition. When the latter form of the composition is provided, the component parts are placed in a receptacle, thoroughly stirred, and then subjected to the action of heat until the solution boils; after boiling for a period of time, preferably about an hour, it is allowed to cool and is then ready for use.

In preparing a mold for the pouring of the molten metal, the facing sand is provided to form the face walls of the cavity or of the core, depending upon the mold to be formed, as is usual. The facing sand pref-

erably is provided with the substance to form the body, such as glutrin, by being worked therein as is usual. After the mold has been completed in the usual manner, and the pattern removed, the exposed face or faces of the cavity or surface of a core are coated with the alum and water solution by any suitable means such as a swab, after which the mold is baked or skin-dried in a suitable oven for a short period. This baking operation causes the exposed face or faces of the mold cavity or core to become hardened, the depth to which the hardening extends depending upon the length of time the mold is baked, it not being essential, in order to provide the desired results, that the entire mold be dried or baked, we having obtained the desired result when the main portion of the mold remained damp or wet. This hardened surface does not destroy the porosity of the mold, but acts to prevent sweating or a running of the molten metal through the wall during the pouring operation. Where the facing sand is not primarily treated with the glutrin the composition containing the glutrin is employed, with equally satisfactory results, the glutrin supplying the body to the face of the mold.

After the casting has cooled, it is removed from the mold and that portion of the sand which adheres to the face of the casting is removed by the application of water, or the composition itself, the addition of water or the solution destroying the adhesion between the sand particles and the metal, thereby freeing the casting from the sand particles.

One feature in connection with the use of the composition in either of its forms indicated is the fact that while the face of the mold becomes exceedingly hard and difficult to destroy or affect when the mold has been baked, the application of either the solution

or water immediately destroys this surface or face and leaves the sand in condition for being again used. Our own experience has demonstrated the fact that the oftener the sand treated in this manner is employed in the making of castings, the more perfect will be the results obtained.

It is to be understood that by the term face walls we include the walls of a mold cavity or the surface of a core. We also desire it to be understood that the invention contemplates a composition with or without the glutrin, the latter being a preferred preparation for providing the body to the sand of the mold, it being understood that the particular form of the composition employed depends upon whether the sand contains such body before the making of the mold or if it is absent therefrom.

Having thus described our invention, what we claim as new is:—

1. A wash for treating the walls of a sand mold for making metal castings, composed of alum and water in solution form.

2. A wash for treating the walls of a sand mold for making metal castings, composed of alum and water in solution form, and a substance to provide a body to the sand of the mold.

3. A wash for treating the face walls of a mold for making metal castings, composed of a solution of alum, water and glutrin.

In testimony whereof, we affix our signatures in the presence of two witnesses.

CHARLES H. HASLETT.

ALBERT A. MENTZER.

Witnesses to signature of C. H. Haslett:

CARL W. ALLEN,

WILLIAM R. HANNER.

Witnesses to signature of A. A. Mentzer:

MAX H. SROLOVITZ,

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