106-76 CROSS REFERENCE EXAMINER
106/76

Patented Oct. 13, 1931 1,827,426

UNITED STATES PATENT OFFICE

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MOLDING MATERIAL AND MOLD

22-188

No Drawing. Application filed January 25, 1930, Serial No. 423,551, and in Sweden January 31, 1929.

When casting complicated objects one usually proceeds in preparing a model of the object to be cast in wax, or some other easily fusible substance, whereafter this model is embedded in a doughy, refractory mass, which usually is a mixture of clay and sand, to which may be added gypsum. After the setting of the mass the model is melted out by heating to the fusion point of the wax or other material and the remaining hollow refractory body is then burnt at a temperature of 700–800° C. It is then ready to be used for casting.

A refractory mass as above stated however, cannot be used for casting metals or metal alloys, of a high melting point, such as precious metals and their alloys, steel and steel alloys, or other metals and alloys, whose melting points are 1200°–1400° C. or higher. For casting such metals or alloys, quite other qualities of the molding material are required than for casting bronze or similar alloys. Beyond an absolute constancy of volume and denseness throughout the whole mass at the above named elevated temperature, a corresponding high refractoriness is required. The mass, moreover, must not contain water of crystallization, or other substances, which due to the elevated temperature or due to the reaction caused by the contact with the metal, develop gases, which would give rise to porosity in the interior of the casting.

The present invention has for its object to produce a molding material which can be used for casting bronze, or similar alloys, as well as metals or metal alloys having a considerably higher melting point.

According to the invention a molding material is used for preparing the mold which comprises the following substances:

1. One or more refractory substances such as quartz or substances having the same degree of refractoriness,

2. A cement, for instance Portland cement,

3. One or more silicates sintering at a lower temperature than quartz and cement, preferably water-glass.

This mixture has been found to correspond in many respects to the above indicated requirements for a molding material for molds used for casting metals, or metal alloys having high melting points. The quartz contributes in a high degree to the refractoriness of the mass. The cement serves as a binder of the mass and for gaining the desired consistency of volume before burning, and the silicate serves as a binding means during and after the burning of the mold. By the burning, any remainders of wax are melted out, and the water of crystallization, taken up by the cement during the binding, is driven out.

However, a mixture of the above mentioned constituents, although in many respects very suitable, has the inconvenience of solidifying so quickly after having been stirred in water, because of the rapid reaction, that difficulties arise in covering the wax model with the mixture. Moreover, a portion of the silicate (if a liquid silicate is used) is deposited on the surfaces of the mold in the form of needleshaped crystals, which during the subsequent burning of the mold are sintered together to a glass-hard, rough surface, impenetrable for air and any other gases, whereas the interior portions of the mass become spongy because of the absence of silicate.

However, I have found, that if a suitable amount of glycerin is added to a mixture of the above mentioned substances, the reaction in the mass will be damped, and the mixture will not solidify so quickly. Furthermore, the silicate will not crystallize on the surface during the binding and drying of the mass, but will rest equally distributed in the mass, which thus will be stable and uniform throughout.

The proportions of the substances employed in the molding material may of course be varied within certain limits without affecting the result.

My invention is also applicable to the production of cores for some molds, on account of their greater stability than the cores used at present, which usually are composed of a relatively slack mass consisting of a mixture of sand, clay, ryemeal and molasses.

What I claim is:—

1. Molding material, consisting of a mixture of solid substances suspended in a suitable liquid, said mixture comprising a highly refractory material, a cement, a silicate and a glycerine.

2. Molding material consisting of a mixture of solid substances suspended in a suitable liquid, said mixture comprising quartz, cement, a silicate and a glycerine.

3. Molding material consisting of a mixture of solid substances suspended in a suitable liquid, said mixture comprising quartz, cement, a silicate sintering at a lower temperature than quartz and cement, and a glycerine.

4. Molding material consisting of a mixture of solid substances suspended in a suitable liquid, said mixture comprising quartz, cement, water-glass and a glycerine.

5. Casting molds and cores for sand molds prepared by the spreading of a liquid mass, consisting of a mixture of a highly refractory material, a cement, a silicate and a glycerine, over a model of easily fusible material of the object to be cast, said liquid mass after binding, drying and the melting out of the model being burnt at a temperature of 900°–1200° C.

6. Casting molds and cores for sand molds prepared by the spreading of a liquid mass consisting of a mixture of quartz, Portland cement, water-glass and a glycerine over a wax model of the object to be cast, said liquid mass after binding, drying and the melting out of the wax model being burnt at a temperature of 900°–1200°C.

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