United States Patent Office

3,405,028
Patented Oct. 8, 1968

3,405,028

INSULATING AND REFRACTORY COMPOSITION AND ELEMENTS FOR THE LINING OF METAL CASTING MOLDS INCORPORATING SUCH COMPOSITIONS

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No Drawing. Filed May 17, 1965, Ser. No. 456,483
Claims priority, application France, Apr. 2, 1965, 11,715
3 Claims. (Cl. 161—162)

ABSTRACT OF THE DISCLOSURE

A lining for ingot hot tops, comprising an insulating layer in contact with the ingot top, and consisting of 15 to 40% by weight a comminuted silica, 15 to 45% by weight of fireclay, 4 to 12% by weight of kieselguhr, 7 to 15% by weight of wood flour, and 0 to 11% by weight of asbestos fiber, and a refractory layer consisting of 40 to 80% by weight of grains of 0 to 0.2 mm. of fireclay, 5 to 24% by weight of grains of 0.3 to 1 mm. of fireclay, 0 to 6% by weight of wood flour, and 0 to 11% by weight of asbestos fiber, the elements being agglomerated in each layer by means of a phenolic synthetic resin present in an amount between 7 to 11% by weight of the other elements of the layer.

It has already been proposed to incorporate with the lining of shrinkage holes or contraction cavities and of the tops of ingot molds used for casting metal, elements made of a material having as a base an insulating and/or exothermic composition. In U.S. Patent No. 3,344,838 dated Oct. 3, 1967, for "Method for Producing an Exothermic Lining for Ingot and Foundry Molds and Hot Tops," there is disclosed a method for forming runners, according to which the heat capacity of the insulating material is compensated by a layer of exothermic material extending in contact with the metal, in a manner such that the insulating layer may reach its temperature of equilibrium without removing any heat from the molten metal forming the runner.

In the case of the formation of runners on parts or ingots of a large weight, the heat capacity of the material forming the insulating lining elements of the shrinkage holes or of the top of the ingot mold is negligible with reference to the heat inertia of the metal mass forming the runners.

Furthermore, by reason of the substantial height required for the runners in the case of large ingots or large cast parts, the ferrostatic pressure exerted on the lining is such that the compositions ensuring a good thermic insulation are not sufficiently refractory and consequently the products forming such compositions are decomposed or disaggregated and the massive linings are crushed by the cast metal.

My invention has for its object to remove said drawback and it covers more particularly a lining, chiefly lining elements molded before their fitting in shrinkage holes and tops of ingot molds; according to my invention, said elements are constituted by a highly insulating layer in contact with the top of the ingot mold, which layer is lined by a refractory layer in contact with the metal.

The insulating layer has preferably the following composition:

	Percent by wt.
Siliceous sand or siliceous meal	15–40
Fireclay	15–45
Kieselguhr or light infusorial earth	4–12
Wood meal	7–15
Asbestos fibers	0–11

The above mixture is bound by a synthetic resin the percentage of which with reference to the total amount of solid products mentioned hereinabove ranges between 7 and 11% by weight.

The refractory layer has preferably the following composition:

	Percent by wt.
Fireclay in grains (between 0 and 0.2 mm.)	40–80
Fireclay in grains (between 0.3 and 5 mm.)	5–24
Wood meal	0–6
Asbestos fibers	0–11

This mixture which has a high refractory power is bound by a synthetic resin the percentage by weight of which with reference to the total amount of solid products listed above ranges between 7 and 11%.

For the formation of the total thickness in registry with the runners and also for certain other applications, the so-called insulating layer may also be used alone in difficult cases with the possible formation of a protecting coat thereon.

The lining is preferably supplied in the shape of preformed elements shaped by any suitable method, chiefly by molding a paste diluted with water, the percentages of water ranging between 25 and 750% by weight of the total amount of solid material. The paste may be drained without any risk of loss of any components during its shaping as provided by molding under pressure or else in association with filtering or in accordance with any other molding method without any risk of the water carrying away the non-soluble components. The lining elements when they have been given the desired shape may be dried at 180° C. with a view to cutting out the residual water that they may still contain.

In the case of a shaping of the elements by a filtering method the insulating layer or the refractory layer is first molded by settling over a suitable thickness after which the other layer is caused to settle on the first layer by filtration through the said first layer.

It may be mentioned that for the lining of the shrinkage holes registering with the runners for a steel ingot weighing 4 metric tons, I use plates 320 mm. high and 30 mm. thick carrying over their surface a refractory layer of a thickness of 8 mm. coated by an insulating layer 22 mm. thick.

The composition of the refractory layer was as follows:

	Percent
Fireclay (between 0 and 0.2 mm.)	76
Fireclay (between 0.3 and 1 mm.)	10
Asbestos of the amosite type	11
Sawdust	3

said solid materials being bound by means of a phenolic resin at the rate of 8% by weight

	Percent
Siliceous sand	33.5
Fireclay	44.5
Kieselguhr	5
Asbestos	6
Wood meal	11

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said solid materials being bound by 9% by weight of phenolic resin measured with reference to the total amount of solid products mentioned hereinabove.

The shrinkage hole, after soldification showed an excellent appearance, without substantial crushing of the lining.

The compositions disclosed hereinabove by way of example in a non-limiting sense may be modified to some extent within the scope of the accompanying claims.

What I claim is:

1. A premolded element chiefly for the lining of the shrinkage holes and the tops of ingot molds comprising an insulating layer constituted by 15 to 40% by weight of comminuted silica, 15 to 40% by weight of fireclay, 4 to 12% by weight of kieselguhr, 7 to 15% by weight of wood meal and up to 11% by weight of asbestos fibers, together with phenolic synthetic resin the amount of which ranges between 7 and 11% by weight of the total weight of the precedingly mentioned components and a refractory layer consisting of 40 to 80% by weight of fireclay of which the grain size is comprised between 0 and 0.2 mm., 5 to 25% by weight of fireclay of which the grain size is comprised between 0.3 and 1 mm., 0 to 6% by weight of wood flour and 0 to 11% by weight of asbestos fibers, and a phenolic synthetic resin the amount of which ranges between 7 and 11% by weight of the total weight

of the precedingly mentioned components, said refractory layer covering the insulating layer.

2. A highly insulating layer for incorporation in a lining chiefly for shrinkage holes and tops of ingot molds constituted by 15 to 40% by weight of comminuted silica, 15 to 40% by weight of fireclay, 4 to 12% by weight of kieselguhr, 7 to 15% by weight of wood meal and up to 11% by weight of asbestos fibers, together with phenolic synthetic resin the amount of which ranges between 7 and 11% by weight of the total weight of the precedingly mentioned components.

3. A refractory layer for incorporation in a lining, chiefly for shrinkage holes and tops of ingot molds, constituted by 40 to 80% by weight of grains of 0 to 0.2 mm. of fireclay, 5 to 24% by weight of grams of 0.3 to 1 mm. of fireclay, up to 6% by weight of wood meal, up to 11% by weight of asbestos fibres and a phenolic synthetic resin binder weighing between 7 and 11% of the total weight of the precedingly mentioned components.

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