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CORE AND MOLD WASH

Julius J. Horak, San Francisco, Calif., assignor to Quandt Chemical Co., San Francisco, Calif., a corporation of California

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This invention relates to washes or coatings for application to foundry cores and molds in the casting of metals, particularly of metals which require a high degree of heat to melt them, and the principal object of the invention is to provide a wash of the kind mentioned which will be effective to prevent burning-in, erosion, or penetration of the metal into the sand of the core or mold, or fusion to metal molds, gasification, pitting of the surface, etc., all of which result in rough and defective castings requiring costly cleaning operations to make them serviceable.

Other advantages of my improved core and mold wash will appear in the following description.

As the fundamental requirements in a core wash for foundry use is a substance which can be applied to the surface of the core or mold which will resist the great heat of molten metal, many attempts to produce satisfactory mixtures of finely ground refractory materials with water or other liquid, together with a suitable binder, have been made. The various refractory agents used heretofore include silica, graphite, magnesia, lime, aluminum oxide, fire clay, etc., and the binders such as oils, molasses, sodium silicate, starch, glutrin, pitch, resins, etc., but while most of these mixtures appear to be suitable for some particular use, they utterly fail in other situations, so that it may be said that no universal core wash has heretofore been developed nor has any practicable wash been developed which would stand up properly under the intense heat of steel casting without causing defects in the castings.

The core wash which I have developed will stand all heats up to several thousand degrees, will permit of application of several coats and forced drying without cracking, develops no pinholes or rough spots on the castings, and always insures a smooth surfaced casting requiring the very minimum of cleaning operations to finish them, is an inexpensive mixture easily applied either by brush or spray, adheres either to sand or metal molds and cores, yet does not choke the necessary pores of fine sand cores and molds.

The important ingredient in my compound is finely divided mica, though its combination with the other ingredients seems necessary to get the full benefits of the invention. The other ingredients (in the formula as developed for highest heat resistance such as in steel founding) are talc, silica, and china clay (kaolin). The materials are all very finely ground, preferably to pass about a 250 mesh, or finer, and the preferred proportions are as follows:

	Parts	
Mica	3	Intimately mixed in a mixing machine.
Talc	1	
Silica	1	
China clay	2	

It is furnished in dry form to the foundryman who simply mixes some of the powder with water to the consistency of cream and applies it to the cores or molds by brushing, spraying or dipping. The above is the preferred mixture for use in casting steel where the temperatures run to about 3000° F. as the coating produced by the wash has been found to resist directly applied heats as high as 6000° F. for considerable periods of time without developing faults.

For use with metals pouring at lower temperatures, such as cast iron, brass, bronze, aluminum, aluminum alloys, and the non-ferrous metals generally, a modification of the compound has been found more suitable, and is as follows:

	Parts	
Mica	1	Intimately mixed as before.
Silica	2	
Graphite	1	

The graphite to be crystalline or amorphous and of a high graphitic carbon content.

It will be noted that clay has been omitted in this mixture, as it would tend to choke the pores of the very fine sands used in some non-ferrous casting. In use the powder is mixed with molasses water (about 1 part to 100 parts) and applied as mentioned. In place of molasses water any other binder commonly used in the foundry may be used.

The first formula given is self-bonding and after drying by the usual methods as by baking or torch will permit free handling of the cores and molds without danger of injury to the coated surfaces. The absence of any organic or oil binders is very important in steel castings as these are generally the cause of pinholes, blows and other surface defects.

The second formula incorporating graphite will reduce the formation of oxides on the surface of the castings, but is subject to objectionable absorption in steel castings, sometimes giving rise to hard areas, whereas with the cores and mold coated with the first mixture the castings are as smooth as good iron castings and homogeneous in quality.

If the wash is of proper consistency usually one coat will be found sufficient, but another coat or

two may be applied without danger of peeling, scaling, flaking, or cracking. In all cases sand cores protected with my improved wash will be found to collapse after casting and the sand to leave the casting easily without the aid of tools, with a result in smooth interior surfaces on the castings free from defects. The same result is secured on the exterior surfaces when the wash is applied to the molds.

The mica is chiefly responsible for the extraordinary results obtained with the compound and I believe it is due to the fact that this substance even though finely ground is of a scaly nature with the particles more or less in overlapping arrangement, but strange as it may seem the complete mixture appears considerably more resistant to extreme heats than any of the constituents alone.

There are several varieties of mica such as muscovite, paragonite, lepidlite, zinnwaldite, biotite, and phlogopite, all of which when sufficiently pure have been found to yield good results.

The talc raises the heat resistance and also aids in proper mixing of the powders, and the silica seems also to combine its influence with that of the mica in raising the heat resistance of the mass, whereas the clay combines the properties of heat resistance with that of a binder able to withstand high temperatures.

It will be evident from a consideration of the invention, that once the formula is disclosed it is possible for anyone to vary its proportions, or incorporate other ingredients, and any such variations coming within the spirit of the invention are intended to be covered in my appended claims, and while I use the words "coating for foundry cores" in my claims, this is descriptive merely and is intended to cover the mixture whether in the form of a liquid, paste or dry powder, also whether to be used on cores or molds of either sand or metal.

I therefore claim:—

1. A coating for foundry cores containing finely divided mica, talc, silica and clay.

2. A coating for foundry cores comprising substantially three parts of mica, one part of talc, one part of silica, and two parts of china clay, all in finely divided condition intimately mixed together.

3. A coating for foundry cores comprising substantially three parts of mica, one part of talc, one part of silica, and two parts of china clay, all in finely divided condition intimately mixed together and with enough water to make a paint-like mixture.

4. A coating for foundry cores containing mica and clay, the mica being in prepondering amount and both ground to very fine condition adapted to mix with water to form a cream-like mixture for applying to the cores.

JULIUS J. HORAK.