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CORE MATERIAL COMPOSITION, MOLD
CORE, AND PROCESS FOR MAKING
MOLD CORES

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This invention pertains to mold cores used in casting aluminum and magnesium, to the process of making such cores, and to a composition from which such cores may be made.

In casting the light metals, aluminum and magnesium, it is necessary to provide adequate venting for gases formed as the metal is poured. Where cores are necessary as a part of the mould venting by the usual means is impractical in some cases and impossible in others. It is highly desirable to dispose of the gases formed as the mold is filled so that the casting will be free from blow holes and will fully conform to the mold. While the core material must be sufficiently porous to absorb or transmit gases for venting, it must also be of a texture which will resist the flow of melted metal and present a mold wall impervious to the melt. In addition the core must be friable, and easily broken down for removal after casting.

In view of the foregoing one of the objects of my invention is to provide a composition of materials which can be easily and quickly mixed with a small amount of water to form a moldable core material which can be hardened and dehydrated by baking at a low temperature for a short time;

A second object is to provide a composition of materials, as above stated which, after baking, will provide core which will absorb and conduct away all gases ordinarily released when pouring molds with light metal such as aluminum or magnesium, and at the same time have a surface which will resist pressure of the melted metal and keep its shape at all times during pouring; and

A third object is to provide a core made, as above mentioned, which is readily friable after the casting has cooled.

Other objects will appear, hereinafter.

I attain the foregoing objects by the methods and in the manner, hereinafter explained.

First, I make a uniform mixture of expanded "Perlite," screened to a uniform size and a binder of natural powdered rosin 11 parts, synthetic urea-formaldehyde resin 40 parts, and ordinary siliceous clay 49 parts, by weight. Preferably these ingredients are mixed in the proportion of 95 to 97 percent perlite and 5 to 3 percent binder. However binder can be added up to 50 percent by volume. The ordinary siliceous clay as above referred to is clay containing approximately thirty-four (34) percent SiO_2 and varying quantities of iron oxide, aluminum, lime and magnesia, approximately 66 percent.

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The perlite is first screened to remove oversized particles, then re-screened to remove dust and undersize particles. The size of the selected particles varies according to the finish of the mold surface desired, but ordinarily the size compares with that of granules of sand ordinarily used. The binder is then added and worked well into the dry perlite.

Second, I add sufficient water to make a clinging mix; one that will bear and retain a given impression when properly tamped.

Third, after forming a core of this damp mix, it is baked at a temperature of about 600 degrees Fahrenheit until dehydrated and carbonized. This takes from one half hour to one and one-half hours, depending on the size of the core. Due to the nature of the perlite no shrinkage takes place.

This core may be surfaced in the usual manner to obtain a smoother finish, if desired, but is ordinarily ready for use without further finishing when cooled.

After being installed in a mold, and after casting a core made as above described, it may be broken by a few sharp blows and will readily disintegrate so that it can easily be blown out of the casting.

The nature of expanded perlite, which is a new product, is such that gases produced when and as the metals, above mentioned, fill the mould are readily absorbed directly into the core body, or conveyed thru the core to a place of disposal. Core venting is not necessary, and castings made show no tendency toward the formation of blow holes or gas pockets.

The binder specified, however, is best suited to the use here contemplated, and while the amount mixed in with the perlite is not critical, it should not ordinarily exceed ten (10) percent. Any greater amount is wasteful and unnecessary.

The term "resin" or "natural resin" as used herein is intended to mean the dry sap of pine trees, or the like, whether in a fresh state or after treatment by heat, such as "rosin." The expression is used to distinguish this substance from artificial or synthetic resin.

In view of the foregoing, I wish to be limited only by the following claims:

I claim:

1. A core forming composition for aluminum casting molds consisting of 90 to 95 percent classified expanded perlite and 10-5 percent of a binder composed of approximately 11 parts rosin, 40 parts synthetic urea-formaldehyde resin, and 49 parts siliceous clay, by weight.

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2. The method of making a mold core for casting aluminum, and the like, consisting in mixing about 95 percent expanded perlite granules with 5 percent binder composed of natural resin 11 parts, synthetic urea-formaldehyde resin 40 parts, and siliceous clay 49 parts, and adding sufficient water to make a clinging mix; then baking the resultant composition until dehydrated and until the binder has carbonized.

3. A core form for molds for casting aluminum and the like, composed of expanded perlite 90-95 percent and a carbonizable organic binder to maintain the shape of the core 10-5 percent, said binder being composed of natural resin 11 parts, synthetic urea-formaldehyde resin 40 parts, and clay 49 parts, by weight.

4. A core forming composition for aluminum mold cores consisting of 90 to 95 percent classified expanded perlite, together with 10 to 5 percent of a binder composed of 11 parts pine resin, 40 parts synthetic urea-formaldehyde resin, and 49 parts silicious clay, by weight.

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