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[54] COATED GRAPHITE MOLD

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[56]

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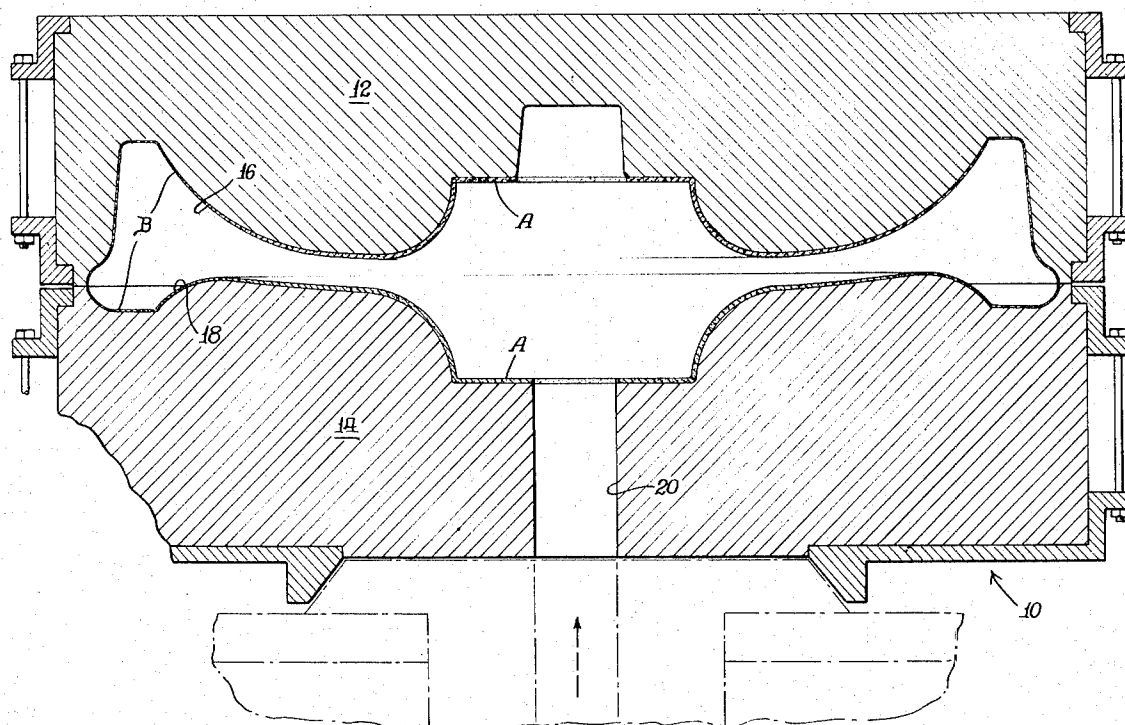
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[57]

ABSTRACT

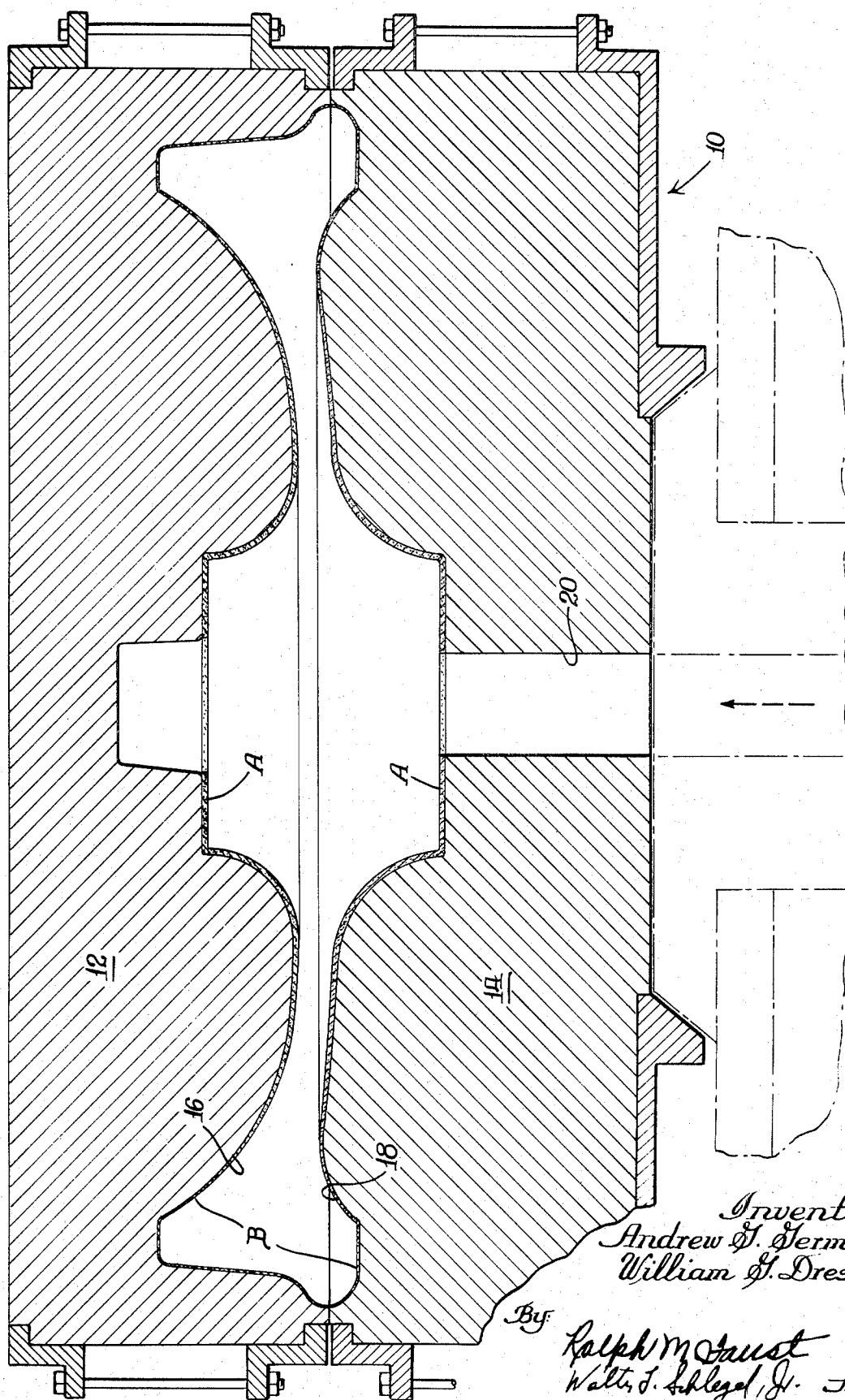
A coating for the casting surfaces of a generally circular graphite mold, the coating thickness varying inversely as the distance from the centerline of the mold.

2 Claims, 1 Drawing Figure



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COATED GRAPHITE MOLD

Many articles having generally circular configuration, such as steel railway car wheels, trolley wheels, muller rolls, gears and the like, are cast in graphite molds having a centrally located ingate so that the poured metal flows from the mold centerline outwardly toward the periphery. In order to protect the casting surface of the graphite mold from excessive erosion and also to eliminate defects on the surface of articles cast in such molds, the surfaces of the mold are provided with a refractory coating of, for example, quartz, zircon, cristobalite or the like. Such coatings are generally applied by spraying the mold casting surfaces with a slurry of the coating material suspended in water. The spray is applied to a heated mold so that the water evaporates leaving a uniform coating of the solid material.

While such coatings are effective when casting articles such as slabs or billets in graphite molds, they have not been completely satisfactory in eliminating laps, wrinkles, and discontinuities in the surface of circular cast articles such as railway car wheels.

The principle object, therefore, of the present invention, is to provide an improved coating for a graphite mold, having a generally centrally located ingate, which is utilized for casting generally circular articles.

A further object is to provide a mold coating which will substantially decrease surface defects in articles, such as railway car wheels, cast in a graphite mold having an ingate substantially coincident with the centerline thereof.

Other objects and advantages will be apparent from the following description and drawing of which the single FIG. illustrates schematically a sectional view through a typical railway car wheel mold embodying the features of this invention.

Referring to the drawing, a mold 10 includes a graphite cope portion 12 and a graphite drag portion 14. Opposed casting surfaces 16 and 18 are machined in the cope and drag respectively and together form a casting cavity for the casting of, for example, railway car wheels. It will be understood that only the portion of the mold forming the casting cavity has been shown, other portions accommodating centering, clamping, and the like being omitted because they are well known in the art and are not part of this invention. As is known in the art, the mold may be filled by top pouring or bottom pouring and in the present instance an ingate 20 is shown in the drag 14 so that molten metal may be forced under pressure into the mold from a tank (not shown) positioned beneath the mold.

Prior to assembly into a mold unit, the casting surfaces 16 and 18 of the cope and drag are spray coated as described hereinafter.

The coating material is preferably finely ground quartz suspended in water as a carrier. Cellulose gum and/or V-gum is utilized to hold the quartz in suspension as is well known in the art. A typical spray which has been used comprises about one hundred pounds of finely ground quartz, about 20 gallons of water, about 1 pound of V-gum, and about 2 ounces of cellulose gum. As stated earlier, zircon, cristobalite, or aluminum-oxide may be substituted for the quartz. The slurry is sprayed onto the casting surfaces of the mold which has been preheated to a temperature preferably in the range of 375° F to 425° F although satisfactory results may be obtained when the slurry is applied to a mold heated to a temperature in the range of about 250° F to 450° F.

The critical aspect of this invention is that the thickness of the coating must be inversely proportional to the distance from the center of the mold. In other words, the thickness of the solids deposited on the cope and drag surfaces at points A must be about 0.030 inch $\pm$ 0.006 inch, while the coating thickness at points B must be about 0.005 inch $\pm$ 0.002 inch. The variable thickness coating may be applied in any desired manner but the preferred method is to place a series of copes, or drags as the case may be, on a conveyor and pass them through an oven to be preheated to the desired temperature as stated heretofore, then rotating them in a spray booth under a plurality of two or three spray nozzles positioned radially of each other relative to the mold part. The spray pressure and nozzle position are adjusted to provide the desired coating thickness across the casting surface.

It has been found that utilization of a variable-thickness coating, as described above, on the casting surfaces of both the cope and drag of a graphite mold, substantially eliminates surface defects in articles cast in such molds.

I claim:

1. A generally circular mold including a graphite cope and a graphite drag and having an ingate aligned with the axis of the mold, the entire casting surface of the cope and drag having a sprayed coating thereon applied as a slurry of water and a refractory and having a final thickness which varies inversely as the distance from the center of the mold, the thickness at the radially inner portion of the mold being in the range of about 0.024 inch to 0.036 inch and the thickness at the radially outer portion of the mold being in the range of about 0.003 inch to 0.007 inch.

2. A mold according to claim 1 wherein the mold coating material is a finely ground refractory taken from the group including quartz, zircon and cristobalite.

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