Oct. 24, 1950 C. A. REAMS 2,526,687

CAST IRON MELTING VESSEL WITH GRAPHITE PLUGS THEREIN

Filed Sept. 14, 1945

Fig. 1

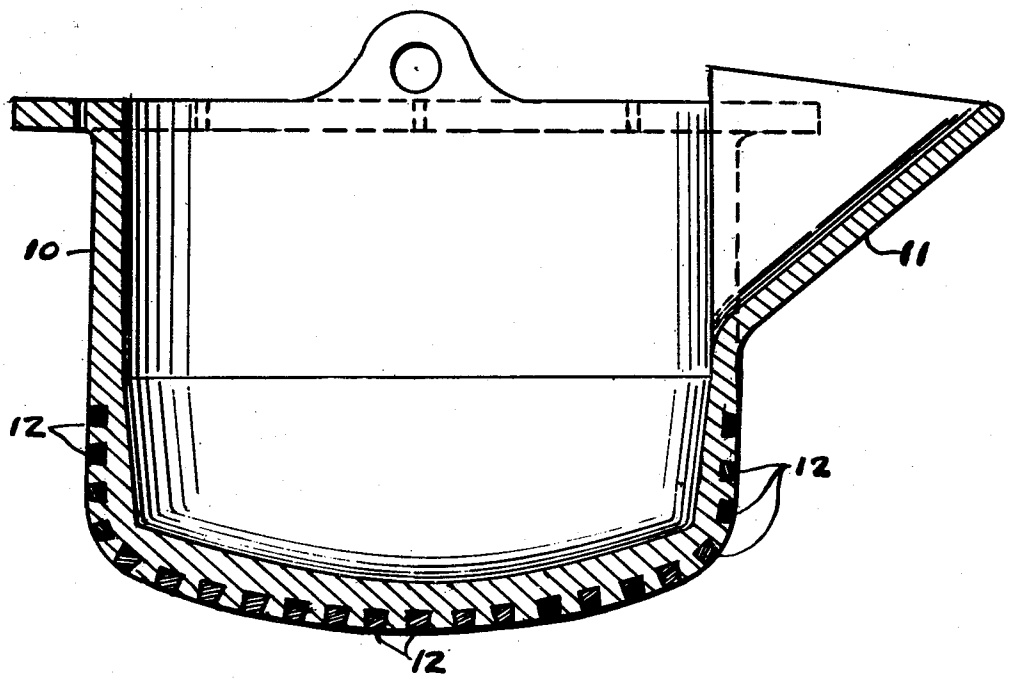
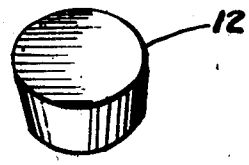


Fig. 3



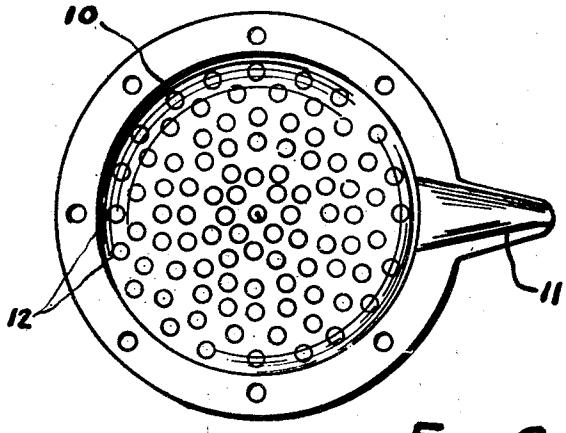


Fig. 2

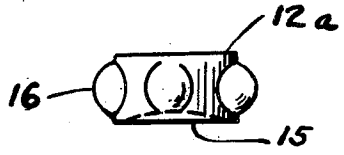


Fig. 3a

Inventor
C. A. Reams
By Merriam & Hare
Attorney

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CAST IRON MELTING VESSEL WITH GRAPHITE PLUGS THEREIN

Clinton A. Reams, Washington, D. C.

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1 Claim. (Cl. 266—39)

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The invention relates to method and means for improving the exposed or firing surface of metal articles which are subjected to a high degree of heat or the cooling of same relatively faster than the normal rate of cooling of such metal article. Articles faster heated including metal pots or crucibles, heating plates of all sorts, furnace elements, retorts, reverberatory furnaces and the like, and articles faster cooled are ingot molds, cored molds, permanent molds, and the like. It is, of course, desirable from the standpoint of economy to make such articles of as cheap materials as possible, such as cast iron, but where inexpensive materials have been used in the past rapid changes of temperature, which necessarily take place incident to their use, cause much cheaper materials to crack. Accordingly, it has been found necessary in many instances, as for example in the case of pots or crucibles for melting of non-ferrous metals, such as aluminum or magnesium or their alloys, where a high speed of heating at the beginning of the "heat" or "melt" is of prime importance, and the holding of the heat without fluctuation equally as important, to employ and use relatively expensive materials (for the pots or crucibles) such as chrome alloys instead of the relatively inexpensive cast iron.

I have found that by the use of plugs of special high conductive carbonaceous or graphitic material distributed at intervals and exposed throughout the exposed or firing surface of the article, it is possible to employ relatively inexpensive materials, such as cast iron, instead of the relatively expensive cast alloy metals, such as alloys of chrome or other heat-resistant metals. It has been found in practice that articles formed of such relatively inexpensive materials such as cast iron or the like which have been provided with such high conductive carbonaceous or graphitic material inserts will withstand rapid changes of temperature without cracking. In forming the inserts for lower temperature use it is convenient to cut slices or plugs from sticks or cylinders of high conductive graphitic material or the like. I have found that suitable high conductive materials are those known under the trade-name "Karbate," having a graphitic base, such materials being particularly suitable as having a heat conductivity greater than that of many commonly used metals, including cast iron. The same applies to the dissipation of heat from molds and mold faces, cores and the like, from which the rate of heat transfer is greater than the cooling rate of the cast iron. The invention is not to be considered

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as limited to the use of "Karbate" as other high conductive carbonaceous or graphitic materials may be substituted therefor without departing from the spirit of the invention, this material being referred to simply by way of illustration as representing a suitable high conductive carbonaceous material.

Such materials are described in the handbook of National Carbon Company, Inc., copyright 1945, entitled "Carbon, Graphite and Karbate Products," and are referred to on page 56 thereof as carbon and graphite products made impermeable by special treatments which eliminate permeability and increase the strength of the base material. "Karbate" No. 10 series is a carbon base material, and "Karbate" No. 20 series is a graphite base material. These materials are described as being resistant to reaction with most acids, alkalies and solvents, and useful under widely varied temperature conditions. The heat conductivity of the "Karbate" No. 20 series (graphitic materials) is described as well over that of other chemically resistant materials, including that of various metals.

While such materials when used alone in the manufacture of vessels and the like are not recommended where temperatures materially above 170° C. are employed, nevertheless, when these materials are used as inserts in metal surfaces, as herein set forth, such inserts are found to withstand higher temperatures than would vessels composed of "Karbate" alone.

The invention will be more readily understood by reference to the accompanying drawings and the following detailed description which are intended as illustrative only rather than as limiting the invention to the specific details herein set forth.

In the drawings:

Fig. 1 is a vertical section of a melting pot embodying the invention, parts being shown in elevation;

Fig. 2 is a bottom plan view of the same;

Fig. 3 is one form of the carbon insert or plug;

Fig. 3a is a detail view showing a modified form of graphitic insert or plug.

Referring first to the application of the invention to a melting pot as shown in Figs. 1 and 2, the reference numeral 10 denotes a melting pot which may be formed of cast iron. The completed pot is shown provided with the usual pouring spout 11. The shape of the pot may be varied as desired without departing from the spirit of the invention.

On the exterior or firing side of the pot, which

is directly exposed to heat a plurality of preformed plugs 12 of high conductive graphitic material, such as "Karbate" are inserted so as to be flush with the outside of the pot. The plugs are preferably sown partially through the mold to provide a bond as the metal is cast.

A slightly modified form of plug is shown in Fig. 3a as represented by the reference numeral 12a. This plug is hollowed out at the bottom 15 so as to provide a larger surface to be exposed to heat and is provided with a bead 16 which is adapted to serve as an anchoring means to hold the plug in position within the metal body of the pot 10a.

Melting pots having such plugs will not crack during rapid changes of temperature and it is possible to heat the pots very rapidly from cold room temperature to the temperatures necessary for melting the materials contained therein. This property is of great advantage in non-ferrous plants where speed in heating aluminum or magnesium pots is of paramount importance.

While the invention is described above in connection with melting pots it is obvious that the invention is not limited to this particular application, and in its broader aspects my invention contemplates the use of graphite or like high conductive carbon plugs inserted on the firing sides of any metal surface which are to be exposed to high temperatures. Thus, not only are pots included within the scope of the invention, but other articles such as plates, furnace elements and the like, and reverberatory furnaces. The plugs may be included in the bottoms, walls, roofs or any intermediate surface of such articles.

The invention has been described in detail for the purpose of illustration, but it will be obvious

that numerous modifications and variations may be resorted to without departing from the spirit of the invention.

I claim:

A cast iron melting pot having spaced plugs cast in the outer firing surface thereof, said plugs being formed of graphitic material having a heat conductivity greater than that of cast iron.

CLINTON A. REAMS.

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