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METAL TONING AND TREATING CAPSULE

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3 Claims. (Cl. 75—93)

This invention relates to a new article of manufacture for the toning, refining and dross reduction of molten metal alloys which are repeatedly reheated or remelted, it being particularly applicable to the treatment of type metals. Usually these metals are alloys of tin, antimony and lead, and it has been found that in the reheating or remelting of such alloys, oxidation takes place, the various elements oxidizing in unequal proportions to form a dross which must be skimmed off the molten metal. It has also been found that various impurities or adulterants such as pieces of copper matrices sometimes find their way into the type metal. To avoid an inordinate building up of these foreign metals in the type metal, the latter from time to time must be refined or treated to remove these foreign metals with the dross, the refining agent by preference being inert as regards the metals going into the type alloy. In addition to the above, in the formation of the dross, it has been found that the molten metal adheres to the dross, and consequently a proportion of the fluid metal is skimmed off with the dross. Therefore, dross reducing compounds have been employed, comprising various combinations of ingredients which apparently embalm or surround the dross, or otherwise act, so that the liquid metal no longer wets and therefore adheres to the dross, consequently on skimming there is no appreciable loss of type metal.

The present invention has for its object to provide means for simultaneously adding toning metal, metal refining and dross reducing compounds (hereinafter referred to as metal treating compounds), in one operation, in predetermined measured quantities or proportions, the volume of metal to be treated, the volume of metal added, and the amount and nature of metal treating compounds being brought together in a balanced known relation. Heretofore, where the metal was toned, refined and the dross reduced in separate steps or processes, it was impossible to maintain an exact balanced relation, and the expense and time required were much greater than with the one step method made possible herein.

A further object of the invention is to produce in capsular form a shell of toning metal of desired alloy, enclosing a filling of metal treating compound of desired nature, the capsule or shell being so constructed that it will open to discharge or expel the metal treating compound without danger of such forcible rupture as to spatter or scatter the molten metal being treated and toned.

Another object of the invention is to provide a method of hermetically sealing treating compounds such as deteriorate on exposure to air, such as lithium oxide which is deliquescent, so that these reagents not heretofore available for practical use by type foundries and the like, may be employed by them in such form that they are perfectly preserved against deterioration for indeterminate periods of time.

Where the words "toning metal" are employed, it is to be understood that this means an alloy, usually of tin, antimony and lead, compounded together in such proportions as necessary to restore a balanced relation to the type metal to be treated, which has been thrown out of balance by the unequal oxidation of its ingredients. The capsules of the toning metal of the invention are, therefore, alloys of oxidizable ingredients in proper proportions to treat a known volume of type metal, and their employment results in extending the usable life of a quantity of such metal by maintaining an approximation of its original characteristics of hardness, sharpness of type cast, etc., for a much longer period of time than would otherwise be possible. One or more capsules are added to the molten type metal alloy in accordance with the volume or weight of such metal to be treated and the period of time such metal has been subjected to heat.

In carrying out the invention in practical form, hollow shells or capsules of alloy containing metal in predetermined percentage relationship, depending upon the nature of the metal or alloy to be toned, are formed, by stamping, molding, extruding, or by some other desired process. These shells are filled with a compound for treating and dross reduction, either or both, in liquid, powder or paste form, as desired, each capsule containing sufficient volume of the compound for a known volume of molten metal. The capsules, of course, may be made of any size and the walls of any thickness, depending on the amount of metal to be added and the quantity of treating compound desired. However, by preference, the capsules should be so proportioned that they will float on the surface of the molten metal until they have discharged the treating compound without danger of violent rupture as previously referred to.

The most practical method of producing the hermetically sealed capsules of the invention has been found to consist in extruding a tube of toning metal, and simultaneously filling the tube with the treating compound since by this method it is not difficult to fill the tube while excluding air. The tube is then subjected to the action of suitable dies or the like to collapse the walls of the tube at spaced points to form a series of

liquid tight compartments, and at the same time to sever the compartments to produce individual cylindrical capsules having their opposite ends flattened and compressed to provide liquid tight joints. By this method, the ends of the capsules comprise weakened areas, as compared with the balance of the capsule, and when such capsules are placed in molten metal to be treated, they immediately open or expand at their ends and release the treating compound at the surface of the molten metal. It is apparent, that the capsules may be made with their walls so thin that upon addition to the molten metal, practically immediate or instantaneous melting takes place without danger of forcible rupture, but obviously with thicker walls the capsules do not have to be so large to supply a predetermined weight of toning metal.

I claim:

1. The process of restoring the characteristics of a type metal alloy, the ingredients of which are not in proper proportion due to oxidation at different rates on repeated reheating in use, and the simultaneous treatment of such type metal alloy with a dross reducer, which consists in introducing a metal capsule, in which a dross reducer is incapsulated, into a molten bath of type metal alloy, the capsule wall being of type metal alloy whose ingredients are in proportion to the rate of oxidation of the corresponding ingredients of the molten type metal to be treated, and being meltable in such bath for homogeneous incorporation therein and the release of the incapsulated dross reducer, and thereafter skimming off the dross from said bath.

2. A capsule for the treatment of oxidized type metal alloy, said capsule consisting in a sheath of type metal alloy having its ingredients in proportion to the rate of oxidation of such ingredients in the heating of a type metal alloy, the capsule being adapted to be melted and homogeneously incorporated in a bath of such molten type metal alloy, and a dross reducing compound sealed in the capsule and adapted to be released by the melting thereof.

3. A capsule for the treatment of oxidized type metal alloy, said capsule consisting in a sheath of type metal alloy of lead, tin and antimony in proportion to the rate of loss of such elements caused by oxidation of a type metal alloy containing the same, said capsule being adapted to be melted and homogeneously incorporated in a bath of such molten type metal alloy, and a dross reducing compound sealed in the capsule and adapted to be released by the melting thereof.

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