

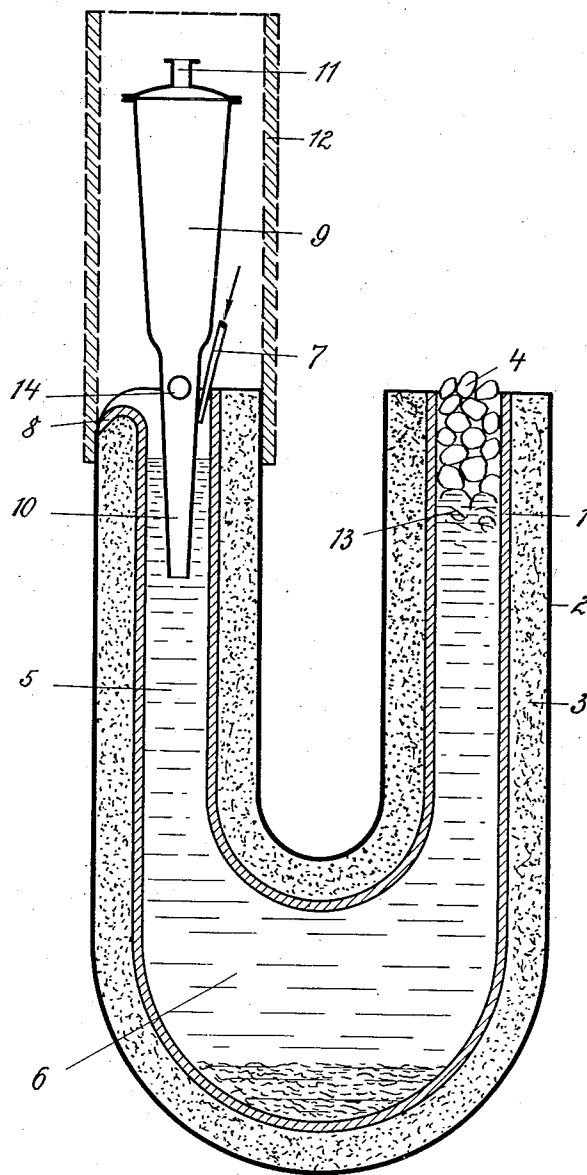
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H. GERDIEN

PROCESS FOR MELTING LIGHT METALS

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UNITED STATES PATENT OFFICE.

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PROCESS FOR MELTING LIGHT METALS.

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To all whom it may concern:

Be it known that I, HANS GERDIEN, a citizen of the German Republic, residing at Berlin-Grunewald, Germany, have invented certain new and useful Improvements in Processes for Melting Light Metals, of which the following is a specification.

In metal casting, it is rather difficult to free the casting material from gas bubbles as well as from oxides and other impurities. This difficulty is particularly inconvenient for materials, which are viscous at melting temperature, so that the specific lighter or heavier ingredients can be separated but slowly. Many easily meltable light metals have the further drawback that they burn at their surface, when exposed to the atmosphere, and when heated above the melting-point.

The present invention provides improved means for appropriately melting such light metals, particularly aluminum and preparing same for casting. For this purpose according to the invention, a melting-pot is provided, which essentially consists of a U-shaped tube, into one shank of which the mixture is introduced and from the other shank of which the molten mixture is taken-off, appropriate contrivances serving for the latter operation.

The accompanying drawing shows an appropriate constructional form of the subject matter of the invention, in a longitudinal section.

A U-shaped tube 1 of fire-proof material, for instance aluminum oxide, is disposed in a much wider U-shaped tube 2 of a mechanically resistible material such as iron, the space between both U-shaped tubes being filled out by pulverized stamped-in magnesium oxide or other material useful for this purpose, so that the inner U-shaped tube 1 cannot burst under the pressure of the molten material therein.

The whole melting-pot is heated from outside.

Into one shank 13, the mixture 4 is introduced from above, the latter being taken-off in molten condition from the other shank 5. The lower portion 6 of the pot, connecting the two shanks 13, 5 is widened, so that when molten material is taken-off the speed of flow in portion 8 is rather low and impurities of great specific weight, such as for instance nitrides and oxides, can set-

tle at the bottom of the same. In this widened portion 6 exists also a higher hydrostatic pressure, which is of particular value in the casting process, as it is known in the art that by its influence flaws in the molten material are avoided. The homogenous molten mixture thus purified ascends then in the shank 5, which is exposed to greater heat than the other shank, 13; so that the material is sufficiently superheated to become as thinly liquid as is required for casting purposes.

To prevent burning of the molten material at its surface, when exposed to the atmosphere, it is protected by a gas, inert with respect to the molten mixture, such as for instance argon or hydrogen, which may be supplied through pipe 7.

For casting, the shank 5 may be provided with a pouring spout 8.

Preferably, however, the molten material is taken-off below its level where, owing to the hydrostatic pressure, the material is still more homogenous and its temperature higher. To cast, for instance, bars for rolling, a chill 9 can be used which has a conical dipping end 10 and an upper suction orifice 11, at which the air or gas is sucked-off from the interior of the chill, so that the molten material ascends therein. As soon as the chill is sufficiently filled, the dipping end 10 is shut-off and taken out of shank 5. The material taken off can then be slowly cooled in the chill while air is shut-off from the latter.

A ball 14 of corundum (molten aluminum oxide) having a free play in the conical dipping end 10 of the chill serves preferably for shutting-off the dipping end when the chill is filled, the ball acting as a check valve by allowing the entrance of molten material by the suction effect at the orifice 11 while it falls down owing to its higher specific weight when the suction ceases, and thus closes the chill at its lower end.

Preferably, the chill 9 is pre-heated, which can be easily effected by surrounding the same by a tubular extension 12 put upon the iron tube 2 at the shank 5 of the melting-pot. Of course, the chill can also be heated separately by any suitable means.

The improved melting-pot is particularly adapted for melting aluminum, though it can, of course, be used for any other metallic and non-metallic materials requiring a similar treatment during the casting process.

What I claim, is:—

1. Process for continuously melting light metals, consisting in continuously supplying the mixture to be melted to the open shank of a heated U-shaped vessel of suitable height and drawing the molten mixture from the end of the other shank.
2. Process for continuously melting light metals, consisting in continuously supplying the mixture to be melted to the open shank of a heated U-shaped vessel of suitable height and drawing the molten mixture from the end of the other shank, and surrounding the end of the last-mentioned shank with an atmosphere inert relatively to the molten mixture.
3. Process for continuously melting light metals, consisting in continuously supplying the mixture to be melted to the open shank of a heated U-shaped vessel of suitable height and drawing the molten mixture from the end of the other shank and in reducing the speed of flow of the molten mixture in the central portion of said vessel to permit the settling of undesired admixtures at the bottom thereof.
4. Process for continuously melting light metals consisting in continuously supplying the mixture to be melted to the open shank of a heated U-shaped vessel and drawing the molten mixture from the end of the other shank, said other shank being heated to a temperature higher than that to which the remainder of the vessel is heated.

In testimony whereof I affix my signature.

HANS GERDIEN.