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METHOD OF COATING FERROUS METALS WITH ALUMINUM

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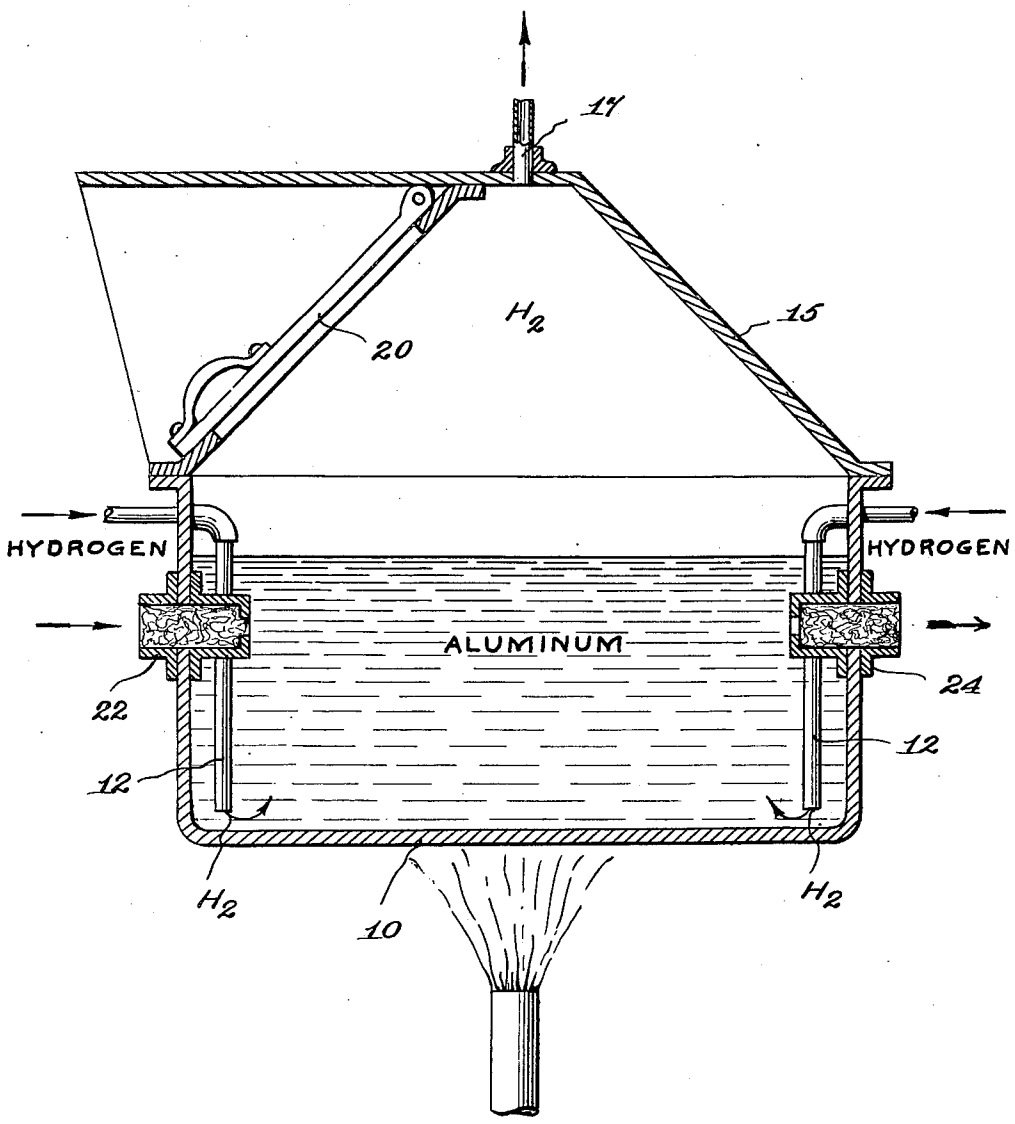

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METHOD OF COATING FERROUS METALS WITH ALUMINUM

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1 Claim. (Cl. 117—114)

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This invention relates to methods of coating metals with aluminum, or other metals, by immersion in molten baths of the coating metal, and provides improvements therein.

Metals in continuous forms (wire, strips, sheets, etc.) have been successfully coated on a commercial scale with aluminum, and also with other metals, by suitable pre-treatments. But previous methods have not been altogether satisfactory for coating articles such as castings, stampings and forgings. The present invention provides a successful and satisfactory method for coating such types of articles with other metals, especially with aluminum.

In my Patent #2,082,622, dated June 1, 1937, it has been disclosed that articles may be coated with aluminum by pre-packing with hydrogen. A more simple method for coating articles like castings and the like has been sought. Such a method has been discovered, and is set forth herein.

According to the present invention, articles are immersed or dipped in a molten bath of the coating metal, at ordinary coating temperatures, through which hydrogen is constantly bubbled, and the super-saturation of the bath with hydrogen brings about an adherent coating of the coating metal on the basis metal which is to be coated.

Having discovered the satisfactory working of the invention with articles such as castings, it has been further discovered that the method of the present invention works equally well in coating basis metals in continuous form, such as wire, strips and sheets.

An apparatus suitable for use with the present method is shown in the accompanying drawing, which is a vertical cross-sectional view.

An example of coating iron and steel castings with aluminum is as follows:

Aluminum is melted in a suitable pot, such as the pot 10 illustrated. Aluminum melts at about 660° C., and the aluminum bath is ordinarily maintained at a temperature of 50 to 100 degrees above its melting point. Hydrogen is constantly introduced into the mass of the molten aluminum, pipes or tuyères 12 discharging into the body of the molten aluminum below its surface being used for introducing the hydrogen, the latter super-saturating the molten aluminum, bubbling through it, and escaping at the surface. A hood 15 with an offtake 17 is advantageously provided over the pot 10. A trap-door 20 is provided for giving access to the molten aluminum. Castings are wired, or put into a ladle

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or basket, and immersed in the molten aluminum. The castings may be moved about in the bath (stirring action) to advantage. Before immersion, a hoe is used to remove or skim any dross from a portion of the surface of the molten aluminum through which the castings are to be introduced into the bath. The time of immersion will depend on the mass of the castings. Sufficient time is allowed for a thin alloy of the basis metal and of the aluminum to form, which is from less than one minute to several minutes. Upon removal, the castings carry with them an adherent coating of aluminum.

To coat basis metals in continuous form, wire, for example, the wire is passed continuously into the pot 10 through an orifice 22 which opens inwardly below the surface of the molten aluminum, and the wire may pass out of the bath through a similar exit orifice 24.

No special pre-treatment of the basis metal is required. Cleaning in accordance with good practice to prevent fouling of the bath and to remove scale, dirt, oil-films, etc. is recommended in most cases.

Examples of other coating metals are, zinc, cadmium, tin, lead, bismuth, antimony, magnesium, indium, barium and strontium; and examples of other basis metals are stainless steel, nickel, copper, molybdenum, and tungsten.

What is claimed is:

A method of coating basis metals, comprising continuously introducing streams or jets of hydrogen below the surface of a molten bath of aluminum, in quantity in substantial excess of the quantity capable of being absorbed by the molten aluminum, and maintaining said quantity, so that there is always a surplus of hydrogen in the bath, and immersing ferrous basis metal in an ordinary state, capable of absorbing hydrogen from the molten bath, in the molten bath of aluminum containing said excess of hydrogen.

COLIN G. FINK.

REFERENCES CITED

The following references are of record in the file of this patent:

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