

UNITED STATES PATENT OFFICE.

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PREPARING MAGNESIUM AND ALLOYS THEREOF FOR CASTING.

No. 906,820.

Specification of Letters Patent.

Patented Dec. 15, 1908.

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To all whom it may concern:

Be it known that I, PAUL RAKOWICZ, a subject of the German Emperor, and a resident of Griesheim-on-the-Main, Germany, have invented certain new and useful Improvements in Preparing Magnesium and Alloys Thereof for Casting, of which the following is a specification.

This invention has for its object to prepare magnesium and alloys thereof for casting by melting the same in such manner that it shall be free from waste by oxidation, or burning, without resorting to the use of complicated devices, or fluxes, which either increase the cost of the manufacture and render it difficult, or injuriously affect the properties of the metal, or alloy.

In the processes hitherto known for melting magnesium or magnesium alloys, troublesome operations have had to be resorted to, to prevent oxidation, or burning, which operations are not only costly, but affect the metal, or alloy, injuriously. In the specification of the German Patent No. 110,178 a process is described for melting in a vacuum, or in an atmosphere of inert gases, by means of an electric heating device, the casting being afterwards cooled in carbon dioxid. In the process described in the specification of the German Patent No. 122,312 these means are done away with, and fluxing agents known since Wöhler's time, (see *Annalen der Chemie und Pharmazie* 138, 1866, page 233) are employed. The fluxing agents prevent waste by oxidation, or burning, but they exert an injurious effect on the metals or alloys.

The process in accordance with this invention obviates the use of the aforesaid means and also the use of fluxing agents, and constitutes a great advance over the methods hitherto known.

In the process in accordance with this invention, it is of especial importance that the melting point of magnesium should not be much exceeded. This is obtained by first putting into the crucible, or the like, in which melting is effected, a small quantity of the magnesium and, when this is brought just to the melting state adding gradually more magnesium in small quantities at a time, so that there is always solid magnesium in the melt so long as melting down is being proceeded with, so that the melt has at most a pasty consistence. In this way

there is no oxidation, or burning, of the magnesium, such as would otherwise be the case, as magnesium, when heated to just above its melting point, combines with the oxygen and nitrogen of the air. When the melt is to be poured it is stirred after its removal from the fire just before casting. In this way the metal, which was before in a pasty state, receives from the walls of the melting crucible, or vessel, such heat as to give the metal a suitable fluidity for the casting operation without any oxidation, or burning, taking place.

If alloys of magnesium are being made the melting point of the magnesium should likewise not be much exceeded during the melting down. This can be done in two ways viz:—either the magnesium is first melted in the manner hereinbefore described and pieces of the metal to be alloyed therewith are previously heated at most to the temperature of the magnesium bath and are then introduced thereinto; or a small quantity of magnesium is heated by itself to the melting point and pieces of the metals to be alloyed therewith and previously heated at most to the temperature of the bath are introduced thereinto alternately with further pieces of magnesium. Before casting the melted alloy is dealt with in the manner described with regard to magnesium alone. When alloying metals are used whose melting points are much below, or near to, the melting point of magnesium, the process can be employed for making alloys with any proportions of the respective metals, but when alloying metals are used whose melting points are much higher than the melting point of magnesium, the process can only be applied with such proportions of the alloying metal that the melting point of the alloy is below, or near to, the melting point of magnesium. This applies for instance to copper up to an alloy of 25 per cent. of magnesium and 75 per cent. of copper, because the melting point, of such an alloy is only 575° centigrade (*Metallurgie* 1904 page 132 and *Boudouard Bulletin de la Société d'Encouragement* 1903 page 200).

I claim:—

The herein described process of preparing magnesium and alloys thereof for casting and avoiding waste by oxidation or burning which process consists in first heating the magnesium or alloy thereof while melt-

ing down to a temperature below the oxidizing or burning point of magnesium or alloy thereof, then just before pouring or casting removing the melting crucible from the fire and stirring its pasty content until the latter has been rendered fluid by the heat from the walls of said crucible as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL RAKOWICZ.

Witnesses:

ERWIN DIPPEL,
MICHAEL VOLKS.