

UNITED STATES PATENT OFFICE.

WALTER RÜBEL, OF BERLIN, GERMANY.

MAGNESIUM-ZINC ALLOY.

982,022.

Specification of Letters Patent. Patented Jan. 17, 1911.

No Drawing.

Application filed April 25, 1910. Serial No. 557,510.

To all whom it may concern:

Be it known that I, WALTER RÜBEL, a subject of the King of Prussia, German Emperor, residing in Berlin, Beusselstrasse 27, Germany, have invented certain new and useful Improvements in and Relating to the Manufacture of a Magnesium-Zinc Alloy, of which the following is a specification.

It is known that owing to the development of the airship and in the construction of submarine and torpedo vessels a brisk demand has arisen for a material of very low specific weight but which will still present adequate strength. In cases where lightness is of especial importance, some constructors use aluminum. This material presents a number of defects some of which are that in the lathe it cannot be worked at all without employing oil or soapy water and it likewise presents far less resistance to atmospheric influences than was heretofore thought.

Now it has been found to be possible to manufacture a light metal meeting all requirements by alloying magnesium with zinc. As is known magnesium is specifically a very light metal. It has, however, heretofore been quite impossible to employ it for any constructional purposes because it is very liable to produce reaction, and, for example, decomposes water even at 30° in forming hydrate of magnesium. Its mechanical properties likewise do not fulfil practical requirements. Now these defects have been obviated in a very surprising manner in that it is possible to convert magnesium into a very valuable, high grade but light material, the specific weight of which is approximately 1.8, by alloying with relatively small quantities of zinc.

An alloy consisting of 96% of magnesium and 4% of zinc when cast presents a resistance of from 15 to 25 kilos; when rolled from 25 to 35 kilos with a coefficient of expansion varying from 8 to 12%. Satisfactory alloys may be obtained from not more than 99 per cent. nor less than 94 per cent. of magnesium and not less than 1 per cent. nor more than 6 per cent. of zinc. In

the case of materials that are to be rolled or pressed the zinc should preferably not exceed 3%.

It is not necessary to use pure zinc. Satisfactory results can be obtained from zinc alloys containing a percentage of copper, or of aluminum, or of such metals of the iron group as iron, nickel, chromium and manganese.

The alloy may be prepared in a wrought iron retort over an ordinary coal fire. The retort should be provided with a well fitting cover. The magnesium is first placed in the retort and when this has melted the zinc (which may advantageously be previously heated) is added; it melts at once and combines with the magnesium. A readily fusible material is thus formed which can be cast in the usual manner and which after casting presents an entirely smooth surface; very little oxidation occurs on casting. It will be understood that the melting of the magnesium must take place with the exclusion of air.

As already stated, the alloy obtained can be wrought and rolled and presents the fracture of fine steel. Some mechanical constants have been enumerated above by way of example.

Various degrees of hardness and corresponding coefficients of expansion can be obtained. The alloy can readily be wrought and cast and be turned like brass or copper without the use of soap or petroleum and it also resists the action of air and water perfectly.

I claim:

A magnesium-zinc alloy consisting of not more than ninety-nine per cent. nor less than ninety-four per cent. of magnesium and not less than one per cent. nor more than six per cent. of zinc.

In witness whereof I have signed this specification in presence of two witnesses.

WALTER RÜBEL.

Witnesses:

HENRY HASPER,
EMIL KITTERTESCH.