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MULTIPLE ALLOYS

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6 Claims. (Cl. 75—168)

The present invention relates to multiple alloys of magnesium with zinc and/or aluminium containing at least 80% of magnesium.

The known alloys of magnesium with aluminium and/or zinc containing more than 80%, generally more than 85% of magnesium (electron, dowmetal) do not exhibit a sufficient resistance to corrosion by water or even by damp air, and cannot be used at all when in continuous contact with sea-water. Various attempts have been made to render the surfaces of these metals more resistant by applying coatings, but such attempts failed since corrosion often takes place to an increased extent when the superficial protective layer is damaged.

The primary object of the invention is to provide alloys which are more resistant to corrosion and which at the same time will have a greater strength than the known alloys. This object of the invention is attained by the addition of further additional metals to the alloys, namely antimony or bismuth or both of these metals amounting in general to not less than 0.05% and not more than 2%.

The most diverse alloys of the kind referred to containing antimony or bismuth have proved distinctly superior, when exposed to the action of a 3% solution of common salt, to alloys of the same kind which do not contain antimony or bismuth; whilst the alloys containing antimony or bismuth showed an almost unaltered surface, the samples devoid of antimony or bismuth were strongly corroded on carrying out the comparative tests.

In general the lower limit of efficiency is given by additions of 0.05%, and it is preferable not to exceed the upper limit of 2%.

From their position in the electrochemical series antimony and bismuth are more valuable than magnesium, and moreover do not form a solid solution with the latter; the assumption therefore would rather have been that the addition of these metals to the known alloys of magnesium would involve decreasing their resistance to corrosion.

When treated by the process of the present invention, the strength of the magnesium alloys is increased by 10 to 20% by the said additions, without the elongation decreasing. As the magnesium alloys of the kind hitherto known (electron) have a comparatively small strength, this constitutes a further advance of considerable importance, the more so as the specific gravity of the alloys is scarcely increased to any perceptible extent by the small amount of the added metals.

Furthermore, the alloys according to the invention show in comparison with similarly composed known electron alloys an increase of the permanent impact strength by 50%.

The alloys may be used as cast alloys or mechanically worked alloys and may be improved by thermal treatments.

The amount of the additions to the magnesium may be shown by the following examples:

Al 3%, Sb 0,5%; Zn 2%, Sb 1%; Al 2%, Zn 1%, Sb 0,5%; Al 3%, Zn 1%, Sb 0,3%; Al 4%, Zn 1%, Sb 0,5%; Zn 1%, Bi 0,3%; Al 5%, Zn 3%, Bi 0,5%.

I claim:—

1. A low specific gravity magnesium base alloy consisting of from 80 to 98.95 per cent of magnesium, from 1 to 18 per cent of aluminum, and a metal selected from the group consisting of antimony and bismuth in an amount from 0.05 to 2 per cent.

2. A low specific gravity magnesium base alloy consisting of from 80 to 98.95 per cent of magnesium, from 1 to 18 per cent of aluminum, and from 0.05 to 2 per cent of antimony.

3. A low specific gravity magnesium base alloy consisting of from 80 to 98.95 per cent of magnesium, from 1 to 18 per cent of aluminum, and from 0.05 to 2 per cent of bismuth.

4. A low specific gravity magnesium base alloy consisting of from 80 to 98.9 per cent of magnesium, from 1 to 18 per cent of aluminum, antimony more than 0.05 per cent, and bismuth more than 0.05 per cent, the total content of antimony and bismuth being not more than 2 per cent.

5. A low specific gravity magnesium base alloy containing from 80 to 98.9 per cent of magnesium, 1 to 18 per cent of aluminum, and a metal selected from the group consisting of antimony and bismuth in an amount from 0.05 to 2 per cent, the alloy being more resistant to corrosion than an alloy of the same composition but not containing a metal selected from said group.

6. As a new article of manufacture, an article resistant to corrosion and formed from an alloy containing magnesium and aluminum, the magnesium being present in an amount of from 80 to 98.9 per cent, the aluminum being present in an amount of from 1 to 18 per cent, and the alloy containing from 0.05 to 2 per cent of a metal selected from the group consisting of antimony and bismuth, the alloy being more resistant to corrosion than an alloy of the same composition but not containing a metal selected from the said group.

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