

## UNITED STATES PATENT OFFICE

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## ALUMINIUM ALLOY

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## 1 Claim. (Cl. 75-142)

This invention relates to an aluminium alloy consisting 2 to 5% magnesium, 6 to 14% zinc, 0.2 to 2.5% copper, 0.1 to 2.0% nickel, 0.01 to 1.5% iron, 0.1 to 1.0% silicon and the remainder aluminium. The new alloy may also contain a trace to 1.5% manganese, a trace to 0.5% titanium, a trace to 1.0% lithium. The object of the invention is to obtain an aluminium alloy which has a very great tensile strength especially when subjected under heat treatment.

The new alloy may also contain a small quantity of cobalt, molybdenum, vanadium, tungsten or beryllium without appreciable change of the natures.

Example of the alloy showing percentages of the elements employed and also tensile strength and elongation when the alloys are subjected under a mode of tempering and annealing are given as follows:

|    |                                       |      |
|----|---------------------------------------|------|
| 20 | Mg                                    | 2.5  |
|    | Zn                                    | 9.0  |
|    | Cu                                    | 1.0  |
|    | Ni                                    | 1.0  |
|    | Fe                                    | 0.2  |
| 25 | Si                                    | 0.6  |
|    | Al                                    | Rest |
|    | Tensile strength kg./cm. <sup>2</sup> | 57   |
|    | Elongation %                          | 11   |

As will be seen from the above example, the new alloy has a very great tensile strength which is hardly obtainable in known aluminium alloy.

As to mutual actions of the elements for the new alloy, it is supposed as follows. A part of magnesium may combine with silicon to form

magnesium silicide, and another part of magnesium may be alloyed with a part of zinc and a part of aluminium to form various three elemental alloys of different percentage. Further copper and nickel may be alloyed with iron. These chemical compounds and alloys may crystallize out in the main element, viz., aluminium and may be uniformly distributed therein. Further, when manganese is employed, this manganese and titanium not only act as reducing agents, but also hinders the growth of particles of zinc-manganese-aluminium alloys and also of copper-nickel-iron alloy so that the distribution of the alloy may be promoted.

Also, as shown in the example, the smaller percentage of iron gives a greater hardness. This fact is supposed to be that alloys of iron and other elements may be of smaller hardness as compared with the alloys containing no iron so that an alloy having smaller percentages of less hardness may have a greater hardness. Also, it is supposed that iron has a tendency of decreasing the tensile strength and elongation while this drawback is eliminated by using silicon or silicon and manganese in a greater percentage.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

An aluminium alloy consisting of 2 to 5% magnesium, 6 to 14% zinc, 0.2 to 2.5% copper, 0.1 to 2.0% nickel, 0.01 to 1.5% iron, 0.1 to 1.0% silicon and the remainder aluminium.

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