

UNITED STATES PATENT OFFICE.

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COMPOSITE METAL.

936,339.

Specification of Letters Patent.

Patented Oct. 12, 1909.

No Drawing.

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To all whom it may concern:

Be it known that I, JOSEPH GRENVILLE MELLEN, a citizen of the United States, residing at New York city, county of New York, State of New York, have invented a new and useful Composite Metal, of which the following is a specification.

This invention has for its object to produce a new, useful, inexpensive and easily workable composite metal or alloy which I have designated under the general term duralum and which is adapted for general use as an anti-friction metal for bearings, etc., and for use in castings for motor cars, motor boats and explosive and other engines where lightness combined with great hardness and strength are required. It is very much lighter than ordinary Babbitt metal and bulk for bulk costs about half as much.

In brief, my novel composite metal is of approximately the same specific gravity as aluminum and very much harder and stronger, it being particularly adapted to resist great crushing strain. For the purposes for which light castings are required it is much superior to iron as it will stand even greater compression and does not dent under blows, and while fully as light as aluminum it is wholly free from the objectionable qualities of aluminum.

Other important advantages of my novel metal are that it runs freely in casting and that it machines well. It will plane, mill and turn easily and does not clog a file. It is an excellent general working metal on account of its hardness and strength and if used in place of iron in marine explosive engines will save approximately forty per cent. in weight.

With these and other objects in view I have invented and produced the novel composite metal or alloy which I term duralum and which consists of the following metals combined in substantially the proportions stated. In one hundred parts by weight, aluminum, 79 parts; magnesium, 11 parts; phosphorized copper, 10 parts.

By phosphorized copper I mean a well known metal comprising approximately one-half of one per cent. of phosphorus and ninety-nine and one-half per cent. of copper.

In making my novel metal, the aluminum is raised to or above the melting point and the magnesium and copper are added.

It is of course well understood that mag-

nesium is approximately half the weight of aluminum, and that copper is much heavier than aluminum. The use of magnesium and phosphorized copper in substantially the relative proportions stated hardens and imparts excellent working qualities to the composite metal and the magnesium counteracts the extra weight of the copper, so that the composite metal is of practically the same weight as aluminum but without the objectionable features of aluminum and with qualities of hardness and workability peculiar to itself.

I wish it distinctly understood that the proportions of the metals above stated may be varied within reasonable limits without departing from the principle of the invention. In practice, the proportions of phosphorized copper and magnesium relatively to each other are kept about the same so as to have the magnesium counteract the extra weight of the copper and leave the weight of the composite metal practically the same as aluminum. By increasing the quantity of aluminum relatively to the magnesium and copper, the composite metal is made softer and tougher without appreciably changing its weight. By decreasing the quantity of aluminum relatively to the magnesium and copper, the composite metal is made harder and more brittle but without appreciably changing its weight.

Having thus described my invention, I claim:

1. The herein-described composite metal consisting of aluminum, magnesium and phosphorized copper.

2. The herein-described composite metal consisting of the following metals in substantially the proportions stated: by weight—aluminum, 79 parts; magnesium, 11 parts; copper, 9 998/1000 parts; phosphorus, 2/1000 parts.

3. The herein-described composite metal containing a compound of aluminum, magnesium and phosphorized copper and being characterized by its great lightness, hardness, strength and workability.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH GRENVILLE MELLEN.

Witnesses:

A. M. WOOSTER,
S. W. ATHERTON.