

# UNITED STATES PATENT OFFICE.

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## ALLOY.

No. 803,921.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, FREDERIC W. MOFFETT, a citizen of the United States, residing at Bloomfield, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Alloys, of which the following is a full, clear, and concise specification.

The present invention relates to an alloy possessing the quality of a high degree of toughness combined with a low temperature of fusion and the further advantage of being slippery to such an extent that it is preëminently adapted for use as a bearing metal for journals and the like.

The essential ingredients of my new alloy are lead and sodium, and in its production I proceed as follows: A quantity of lead is melted in the usual manner and covered with a heavy flux—such, for example, as fluor-spar—and the sodium in suitable amount, varying from one-half of one per cent. to four per cent. of the quantity of the lead, is plunged through the flux into the molten metal. On account of the considerable difference between the specific gravities of the two metals I find it necessary to confine the sodium in a cage or other apertured receptacle, and I attach the latter to the end of the stirring-rod, so that the metal can be quickly introduced into the lead and at the same time be prevented from rising to the surface, where it might become exposed to free oxygen and be consumed. The process of mixing the two metals will be facilitated and the loss by oxidation reduced if the sodium is stirred vigorously into the lead at the moment of introduction, as described and claimed in a certain copending application filed by me on the 19th day of July, 1904, and numbered 217,238. Immediately upon the coalescing of the two metals the alloy may be poured and cooled and is then ready for use in the same manner as ordinary bearing or Babbitt metals.

The proportions of sodium may be varied considerably within the limits above given.

When containing the lowest percentage of those mentioned, the product alloy is much harder than lead, but still too soft for practical service as a journal or bearing metal, affording, however, an excellent material for plumbers' traps, thin piping, and other articles which are required to be both flexible

and tough. I have observed that increase of the proportion of sodium results in a decrease in the melting-point of the alloy and renders it at the same time more readily oxidizable. The latter feature is so pronounced that with the maximum proportion stated of four per cent. the product alloy oxidizes so freely as to require close protection against moisture in order to be serviceable at all; but it is extremely hard and tenacious. For general and practical use as a journal-bearing metal, however, the sodium should be added in the proportions of from about one per cent. to two per cent. of the amount of lead, which will result in an alloy having all the advantages of toughness and slipperiness hereinbefore mentioned and melting at a temperature well above that ever likely to occur in journal-bearings and at the same time not so high but that it can be melted in an ordinary ladle and safely poured into cast-iron journal-seats. The shrinkage on cooling will be found to be so slight as to be negligible, and the bearing when formed will require the minimum of lubrication, giving most satisfactory results. The alloy is tough and hard and is sufficiently elastic to have a decided metallic ring, and, furthermore, it is entirely free from the objections of flaking or mashing under heavy loads. My experiments have indicated that the best results for general purposes can be secured by adding approximately one and one-half pounds of sodium to one hundred pounds of lead, the melting-point of this mixture being about 585° Fahrenheit.

Other metals may be added to the alloy, if desired, or mixed with it during its manufacture for special purposes; but metals, such as antimony and bismuth or other ingredients which have a hardening effect on lead, will not be necessary and except in minute amounts will be injurious to the operation of the product as a bearing metal. Aluminium and tin, which are substantially indifferent in this respect, may be added in amounts up to about ten per cent. of the whole without seriously impairing the quality of the product; but these additions, while being objectionable on account of the extra expense, would not improve the efficiency of the alloy as a bearing metal or materially alter it otherwise except in weight and appearance.

Having described my invention, what I claim, and desire to secure by Letters Patent, is as follows:

1. As a new composition of matter, an alloy  
5 containing lead and sodium and containing sodium in the proportion of from one-half of one per cent. to four per cent. of the amount of lead, substantially as described.
2. As a new antifriction-bearing metal, an  
10 alloy composed of lead and sodium and con-

taining sodium in the proportion of one and one-half per cent. of the amount of lead, substantially as described.

In testimony whereof I have signed my name to the specification in the presence of two sub- 15 scribing witnesses.

FREDERIC W. MOFFETT.

Witnesses:

G. A. TAYLOR,  
H. G. KIMBALL.