

UNITED STATES PATENT OFFICE.

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ALLOY.

SPECIFICATION forming part of Letters Patent No. 632,443, dated September 5, 1899.

Application filed July 27, 1898. Serial No. 687,052. (Specimens.)

To all whom it may concern:

Be it known that I, ROLLA C. CARPENTER, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented an Improvement in Alloys, of which the following is a specification.

The principal object of my invention is to provide a composition of matter made by using a tempering-alloy of such a nature that, mixed with zinc, it shall produce a composition of metals especially valuable for antifrictional purposes and which will also possess the characteristic properties of hardness, unusual strength of resistance to distortion from impact, pressure, or extension, or some or all of these strains, making it also highly valuable for other purposes, and which will also melt readily at a comparatively low temperature, flow freely, and shrink very little in cooling, so that it may be cast or poured into boxes of cast-iron or other hard material or in a surrounding case, shell, or journal-box, or owing to its great strength it may be used for the journal-box itself or other purposes.

To this end my invention consists of a composition of matter made, preferably, by combining a tempering-alloy composed of copper and aluminium in such proportions that the copper shall always be in excess of the aluminium, with zinc as the preponderating metal in the composition, thereby obtaining new and valuable qualities in the composition.

This tempering-alloy is prepared by first melting the copper in a suitable furnace and then, while the temperature of the copper is but slightly above the melting-point, adding gradually the aluminium, at the same time thoroughly mixing it with the molten copper by stirring. The mixture is then ready for use as a tempering-alloy, or may be permitted to cool and be used at will. The melting temperature of this alloy as thus formed is considerably less than that of either of its ingredients, and it is in a condition so that it can be combined with the basic metal to form the composition for antifrictional purposes or for other uses, as required. This is accomplished by first melting the tempering-alloy in a suitable furnace and then adding gradually the zinc—the predominating or basic metal—while the temperature of the tempering-alloy

is but slightly above the melting-point, at the same time thoroughly mixing it with the molten alloy by stirring. The basic metal may be added either in the solid or melted condition. The composition is then ready for use in the various arts to which it is adapted. I have found that to make a useful and valuable alloy of said three metals for the uses and purposes herein indicated the following proportions, by weight, are best—viz., two to ten parts aluminium, five to twenty parts copper, and one hundred parts zinc; but however much the quantities of the aluminium and copper may vary within these limits it is necessary that the copper shall always be in excess of the aluminium. The operation of mixing these metals so as to form a permanent alloy is a difficult one, and unless the process of manufacture be of essentially the character outlined a satisfactory alloy or composition cannot be produced.

The process of manufacturing the tempering-alloy is one of great difficulty and requires special furnaces and no little skill on the part of the operator. The second operation of combining the tempering-alloy with the basic metal can be performed with the apparatus found in the ordinary brass-foundries and by operators of ordinary skill and intelligence. As the tempering-alloy constitutes only a relatively small part of the total, the cost of manufacture is by this operation sensibly lessened without deterioration of the quality of the composition. This method of manufacture also results in producing a composition of more uniform quality and of superior excellence.

I am aware that aluminium and copper have been used in the arts in various combinations and proportions with one or more other metals, and I do not wish to broadly claim such compositions. I am also aware that aluminium and copper have both been used with other metals in such proportions that the resulting composition would be wholly unsuited for the purposes hereinabove noted, and I do not wish to claim such proportions; but in no case have the said two metals been mixed with a third, as in the method described in this specification, nor in such a proportion as to produce the properties of the composition which I have discovered and described.

I am also aware that numerous patents have been issued in which the metal (tin) is combined with aluminium; but such a combination is very weak under strains or pressure
5 and quite unsuitable for the purposes of this invention. I am also aware that a patent or patents have been issued for compositions in which the copper is present in less amount than the aluminium; but such proportion produces a crystalline structure, which is not
10 suitable for the purposes of this invention.

There have been alloys of copper, tin, and zinc, such as in Schoenberg's patent, No. 179,616, and some of copper, tin, zinc, and aluminium, such as in Cothias's patent, No.
15 589,935. My composition does not contain tin and is entirely different in proportions and qualities. The radical difference in proportions of the three elements from alloys heretofore produced enables me to dispense with the
20 use of tin as an additional costly ingredient with all its attendant disadvantages and at the same time enables me to secure properties and results not heretofore attained with alloys containing tin. Any combination of
25 tin and zinc does not make a stable alloy, and repeated meltings tend to separate it into its component parts—the tin from the rest of the composition—and thereby ruining the alloy.
30 My composition has the advantages of stability, cheapness, strength, fluidity when

melted, and better adaptability to the uses and purposes specified. I believe my invention of the composition hereinabove described eliminates for the first time the objectionable
35 qualities above referred to and combines the desirable qualities of a composition valuable for antifrictional and other purposes without weakening the structure, but at the same time maintaining a low melting-point. 40

I claim and desire to secure by Letters Patent of the United States—

1. The herein-described composition of matter consisting of a tempering-alloy of copper and aluminium, the copper always being
45 in excess of the aluminium, combined with zinc, the latter being in excess of both the copper and aluminium combined.

2. The herein-described composition of matter, consisting of an alloy of copper, aluminium and zinc, the copper being in excess
50 of the aluminium, and the zinc being in excess of the copper.

3. The herein-described composition of matter, consisting by weight, of zinc, one
55 hundred parts; copper, five to twenty parts; and aluminium, two to ten parts.

ROLLA C. CARPENTER.

Witnesses:

GEO. L. PRICE,

WM. HAZLETT SMITH.