

1

2,809,889

ALUMINUM BRONZE ALLOY CONTAINING BORON AND NICKEL

William G. N. Heer and Neil M. Waterbury, Toledo, Ohio, assignors to Owens-Illinois Glass Company, a corporation of Ohio

No Drawing. Application November 16, 1955, Serial No. 547,330

2 Claims. (Cl. 75-159)

Our invention relates to metal alloys and particularly to an alloy adapted to be applied as a surface coating or layer to a body of copper or copper alloy.

An object of the invention is to provide an alloy having properties adapting it for use as a surface layer or coating for copper or a copper alloy used for molding glass or other materials at a high temperature.

At the present day glass molds are commonly made of stainless steel, low carbon steel or cast iron. For molding certain glass articles a mold having higher heat conductivity than such materials is desirable. Copper or copper alloys having comparatively high heat conductivity have been proposed for such use but have been found unsatisfactory for molding glass, particularly as they lack the requisite hardness, are readily oxidized at the high temperatures to which they are subjected and have a tendency to stick to the molten glass. Attempts have been made to coat such a copper or copper base mold or molding element with a surfacing material known in the trade as "Colmonoy" (which is a boron alloy with nickel as a base metal) and which has been used successfully for surfacing glass forming molds. It has been found however that Colmonoy cannot be fused to copper on account of the comparatively high thermal coefficient of copper. When heated for fusing, the copper expands away from the Colmonoy and ruptures the mechanical bond, preventing satisfactory bonding.

The present invention provides an alloy having a copper base, is nonadherent to the molten glass, and is adapted for use as a surfacing material for a glass molding element. Such a copper base alloy can be effectively bonded to copper or a copper alloy. Our invention comprises a beta aluminum bronze containing boron, aluminum, nickel and having a copper base. The beta phase provides sufficient hardness and the aluminum and nickel give requisite strength and corrosion resistance. Such

2

an alloy has a microstructure somewhat similar to Colmonoy and a hardness of $40\frac{45}{45}$ Rc.

The preferred composition of such alloy is as follows:

	Percent
5 Aluminum -----	13
Nickel -----	13
Boron -----	2.8
Copper -----	71.2

10 Such an alloy can be combined with copper or a copper base alloy, as by flame spraying or casting, and has the desired properties adapting it for use in molding operations as above indicated and other uses particularly where high temperatures are involved.

15 The percentages of the several components may be varied within certain ranges as follows:

	Percent
Nickel -----	12-15
Aluminum -----	12-15
20 Boron -----	2-3
Balance copper or copper with small percentages of impurities.	

25 Modifications may be resorted to within the spirit and scope of our invention.

We claim:

1. An alloy having substantially the following composition:

	Percent
30 Aluminum -----	13
Nickel -----	13
Boron -----	2.8
Copper -----	71.2

35 2. A metal alloy comprising the following ingredients within substantially the following ranges of proportions:

	Percent
Aluminum -----	12-15
40 Nickel -----	12-15
Boron -----	2-3
Copper -----	67-74

References Cited in the file of this patent

UNITED STATES PATENTS

179,462	O'Neill -----	July 4, 1876
441,885	Meyer -----	Dec. 2, 1890
1,386,384	Beckert -----	Aug. 9, 1921
1,680,844	Becket -----	Aug. 14, 1928
45 1,986,209	Maas -----	Jan. 1, 1935