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UNITED STATES PATENT OFFICE

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ALLOY.

No Drawing. Original application filed February 21, 1921, Serial No. 446,618. Divided and this application filed August 11, 1922. Serial No. 581,242.

My invention relates to alloys, particularly to fusible alloys such as used for the protection of electrical devices, and has for its object the provision of an improved alloy of this character.

My improved alloy is particularly applicable for use as a protective device in electric flat irons, such, for example, as described and claimed in my copending application, Serial No. 446,618, filed February 21, 1921, now Patent No. 1,439,979, of which this application is a division.

Considerable difficulty has been experienced in providing a fusible alloy that is not affected by oxidation upon repeated melting and solidifying. It is also desirable that the alloy have a quick break down from the solid to the liquid state, that is, the alloy should change from a solid to a liquid without going through an intermediate granular or mushy condition. Ice upon melting gives a very good example of this characteristic, the change to a liquid taking place without any noticeable intermediate condition.

In carrying out my invention I have provided an alloy composed approximately of 90% zinc, 4% bismuth and 6% aluminum. These proportions are not necessarily absolute but should be adhered to within reasonable limits. In order to obtain the best results the metals should be as nearly pure as possible. The metals are mixed while in a molten state.

I have found that for best results the mixture of zinc, bismuth and aluminum should contain all the bismuth that it will absorb. The proportions given above may result in a slight excess of bismuth, whereby the condition of saturation with bismuth is assured. Any such excess, which may contain small quantities of zinc and aluminum, settles to the bottom of the crucible while the mixture is in the liquid form, and upon solidifying is separated by a rather distinct line of demarcation with respect to the remaining portion of the mixture. The excess can be easily removed from the cast ingot by a sharp blow with a hammer, and can be used in the preparation of another batch of alloy.

This alloy has the desirable features previously mentioned in that it is to a large degree non-oxidizable, and the transition from a solid to a liquid takes place quickly

and without going through a granular or mushy condition to any considerable extent. The melting point of this alloy is approximately 750 degrees F. and is practically constant in the transition from the solid to the liquid state and vice versa. A change in the proportions of the metals given does not materially affect the melting point until the change assumes considerable magnitude.

I have thus provided an alloy the characteristics of which are not affected to any great extent by repeated melting and solidifying. Its action in operating the control mechanism with which it may be associated is quick and definite when the melting temperature is reached, due to its quick break down. This latter feature is of especial advantage when using the alloy for securing a control member embedded therein and for releasing the member when a predetermined temperature is reached. Such control mechanism to which my alloy may be applied is disclosed in my aforesaid copending application.

While I have described a specific embodiment of my invention in accordance with the provisions of the patent statutes, it should be understood that I do not limit my invention thereto, since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A fusible alloy consisting predominantly of zinc, the remainder consisting principally of aluminum and bismuth in quantities sufficient to lend their properties to the alloy.

2. A fusible alloy consisting principally of a zinc base and substantial amounts, but less than 10% each, of bismuth and aluminum.

3. A fusible alloy consisting predominantly of zinc, the remainder consisting principally of at least 5% of aluminum, and approximately 4% of bismuth.

4. A fusible alloy containing approximately 90 per cent zinc, 4 per cent bismuth and 6 per cent aluminum.

5. A fusible alloy having a melting point of approximately 750° F. consisting princi-

pally of a zinc base, a metal having the properties of aluminum, and bismuth to the point of saturation.

6. A fusible alloy consisting predominantly of zinc, the remainder consisting principally of a small amount of aluminum and bismuth to the point of saturation.

7. A fusible alloy having a quick breakdown consisting predominantly of zinc, the remainder consisting principally of small amounts of aluminum and bismuth.

In witness whereof, I have hereunto set my hand this first day of August, 1922.

EARL H. RICHARDSON.