Patented Nov. 17, 1936 2,061,370

UNITED STATES PATENT OFFICE

2,061,370

HEAT RESISTING ARTICLE

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No Drawing. Application January 7, 1935, Serial No. 735. In Germany January 18, 1934

2 Claims. (Cl. 75—124)

This invention relates to new and useful iron alloys of the heat resisting type containing aluminum and sometimes chromium and a metal or metals of the rare earths group, and a method for preparing such alloys.

Alloys consisting of chromium up to 30%, aluminum 0.1 to 11.5%, remainder iron, have been proposed to be used as heating wires in electrically heated furnaces. These alloys can be used at higher temperatures than chromium-nickel alloys which hitherto were generally used for heating elements; however their workability with aluminum contents exceeding 6% is unsatisfactory. It has been attempted to diminish the grain size and thereby to improve the workability of these alloys by adding thereto certain elements such as titanium, zirconium or cobalt. However all these additions do not improve the heat resisting qualities of the alloys because they deteriorate the dense mixture of aluminum and chromium oxide firmly adhering to the surfaces of the heating elements and produce pulverulent and brittle oxides.

Numerous experiments of the inventor have shown that for the production of elements for which a high resistivity to heat is required, even after they are worked and have been exposed to elevated temperatures for a long while, alloys are suitable containing besides iron aluminum 0.1 to 11.5%, chromium 0 to 30% and a metal or metals of the rare earths, especially cerium 0.05 to 2%. The metals of the rare earths favorably influence the durability and the life of the aluminum-iron or chromium-aluminum-iron alloys which in themselves are already highly resistive to heat. For instance, it was found that the durability, i. e. the time required until burning out at 1200° C. of an alloy consisting of chromium 30%, aluminum 5%, remainder iron, could be trebled by the addition of 0.2% cerium.

The cerium may preferably be added in the form of the so-called "cerium mixed metal" containing, besides cerium, other metals of rare earths in various proportions, for instance, lanthanum, dysprosium.

The quantity of the rare earth metals preferably amounts to 0.05 to 2%.

The rare earth metals are preferably added a short time before casting in order to reduce as far as possible the waste of these metals. The rare earth metals may be introduced into the ladle or into the casting-jet.

I claim:—

1. Heat resisting articles in wrought condition containing aluminum 0.1 to 11.5%, chromium up to 30% and metals of the rare earths 0.05 to 2%, the remainder being substantially iron.

2. Heat resisting articles in wrought condition containing aluminum 0.1 to 11.5%, chromium up to 30% and cerium 0.05 to 2%, the remainder being substantially iron.

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