

UNITED STATES PATENT OFFICE

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ELECTRIC CONTACTING ELEMENT

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2 Claims. (Cl. 200—166)

This invention relates to electric contacting elements of the type comprising welding electrodes, contactor contacts and the like. The present application is a division of my co-pending application Serial No. 329,829, filed April 15, 1940.

An object of the invention is to improve electric contacting elements such as pressure exerting welding electrodes for resistance welding, electric contactor contacts and the like.

Other objects of the invention will be apparent from the following description taken in connection with the appended claims.

The present invention comprises the combination of elements, methods of manufacture, and the product thereof brought out and exemplified in the disclosure hereinafter set forth, the scope of the invention being indicated in the appended claims.

While a preferred embodiment of the invention is described herein, it is contemplated that considerable variation may be made in the method of procedure and the combination of elements without departing from the spirit of the invention.

The present invention contemplates electric contacting elements formed of copper alloys containing tellurium and age-hardening ingredients therein. I have found that tellurium imparts to copper and copper alloys a number of desirable properties, particularly low contact resistance and reduced tendency to stick or weld to surfaces with which electric contact is made. I have also found that tellurium can be added to copper in substantial quantities without greatly reducing its electric conductivity.

I introduce the tellurium together with age-hardening ingredients into the copper base so as to produce an age-hardened, tellurium-bearing, copper base alloy. For age-hardening ingredients almost any of the intermetallic compound forming materials of the prior art are suitable. For example, the tellurium bearing copper alloy may contain .1 to 10% of one or more of the phosphides, beryllides, silicides and aluminides of chromium, zirconium, beryllium, titanium, nickel, cobalt, iron and manganese. In case nickel, cobalt, iron or manganese are used I prefer to use

the silicides, phosphides and beryllides of these materials. In these alloys tellurium may be present in amounts from .05 to 3%.

The age hardening alloy thus formed may be hardened by a suitable heat treatment such as by quenching from a temperature between 600 degrees C. and 1000 degrees C. and subsequently aging at a temperature between 250 degrees C. and 600 degrees C. for a period of from one-half hour to several hours. The aging not only increases the hardness and the annealing temperature but also raises the electrical conductivity and strength. Hence these age-hardened alloys are particularly well suited for pressure exerting resistance welding electrodes.

One of the outstanding advantages of using tellurium with copper and copper alloys resides in the fact that the tellurium reduces the electrical conductivity of the copper or copper base alloys only very slightly. This is probably due largely to the fact that tellurium does not form solid solutions with copper. In fact, it is possible to detect as little as .025% tellurium microscopically as a free phase. This free phase is not pure tellurium, but is an intermetallic compound of copper and tellurium having the formula Cu_2Te .

While the present invention, as to its objects and advantages, has been described herein as carried out in specific embodiments thereof, it is not desired to be limited thereby but it is intended to cover the invention broadly within the spirit and scope of the appended claims.

What is claimed is:

1. An electric contacting element containing .05 to 3% tellurium, .1 to 10% of an intermetallic compound selected from the group consisting of the phosphides, beryllides, silicides and aluminides of chromium, zirconium, beryllium, titanium, nickel, cobalt, iron and manganese and the balance substantially all copper.

2. An electric contacting element containing .05 to 3% tellurium, .1 to 10% of an intermetallic compound selected from the group consisting of the silicides, phosphides and beryllides of nickel, cobalt, iron and manganese and the balance substantially all copper.

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