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ELECTRICAL MAKE AND BREAK CONTACT

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This invention has to do with electrical contacts and is concerned more particularly with the provision of a novel electrical contact made of a combination of refractory or rare metals.

At the present time, various metals or their combinations are used as contacts for making and breaking electric circuits, as for instance, silver, platinum, iridium, rhenium, tungsten and carbon which are the respective representative elements most commonly used for the purpose. The silver group, for instance, is used where high conductivity is essential, where the heat developed at the point of contact is small or where such heat is reduced or dissipated by the size of the contacting faces or by the use of cooling means, and where mechanical friction in the contacting operation prevents unevenness resulting from fusion and removes oxidized particles which would cause increased resistance.

Platinum, iridium, and rhenium, representing the next group, are better suited for contact purposes as they have a higher melting point and are not subject to oxidation. On the other hand, their cost and physical characteristics somewhat limit their use and accordingly, they are principally used for making and breaking circuits for currents of higher tension and small intensity.

Tungsten and carbon represent elements having the highest known melting points and this makes them highly desirable for contacting operations. However, tungsten and carbon form tungsten carbide which has a lower melting point and these elements are therefore limited in their uses for contact purposes and are suited only for use in certain low current, high frequency applications.

The element tungsten itself is very hard, but is easily oxidised, and under the influence of the excessive heat which is often developed during the make and break operations, the contact faces, due to slight fusion stick together. This phenomenon, commonly called "freezing", appears to arise because of the physical structure of contacts made of tungsten, since such contacts usually have a grain count of between 5,000 and 70,000 per square millimeter and the pitting and oxidation of tungsten contacts start at the grain boundaries.

With these considerations in mind, we have discovered and developed a new composition, essentially composed of tungsten and osmium or a combination of tungsten and other refractory metals, preferably having the form of a single crystal throughout its physical structure, since in that form pitting at a particular place on the surface of the contact is retarded.

The present invention is accordingly directed to the provision of a new contact formed of a composition of tungsten and another metal, the contact overcoming various disadvantages above pointed out in connection with the prior contacts.

In the new contact, elements of a high chemical purity are employed, and we have obtained very satisfactory results with a metal composition containing approximately from one tenth to two and one-half percent of osmium while the remainder of the composition is composed of tungsten. Preferably, the contact of the invention consists of a single crystal since a contact in this form is found to have desirable physical characteristics.

While satisfactory results have been obtained by the use of a combination of tungsten and osmium in the proportions above specified, we may substitute other metals in suitable proportions for the osmium, examples of such substitutes being zirconium, thorium, vanadium, tantalum, and boron.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A metallic body adapted for use as an electrical contact which consists of from 0.1% to 2.5% of osmium and the remainder tungsten.

2. An electrical contact consisting of a body formed of from 0.1% to 2.5% of osmium and the remainder tungsten, the body having the form of a single crystal and thus devoid of grain boundaries throughout.

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