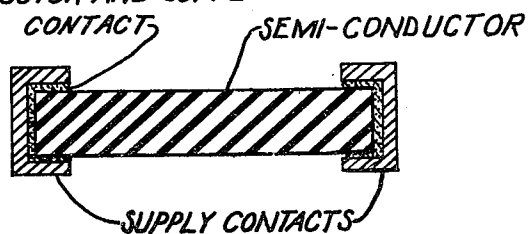


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SEMICONDUCTIVE RESISTANCE PROVIDED
WITH METAL CONTACTS
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INTERMEDIATE LAYER OF METAL
OF SEMI-CONDUCTOR AND SUPPLY



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SEMICONDUCTIVE RESISTANCE PROVIDED
WITH METAL CONTACTS

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Upon mounting current supply contacts on resistances made of semi-conductive material for example of either reduced or non-reduced oxides, a so-called blocking layer is frequently formed, which becomes manifest by dependance of the resistance on the voltage and dependance of the resistance value on the direction of current. A further disadvantage may be that the union is mechanically insufficient. Readily adhering contacts can be mounted on a semi-conductive resistance without the formation of a blocking layer by applying by vaporization the metal which is contained in the semi-conductor as the cation, for example zinc with resistances made of zinc oxide, but it is difficult or sometimes impossible to secure further connections to such a contact layer by welding or soldering.

According to the invention it is possible to mount metal contacts on resistances made of sintered, semi-conductive material, the conductivity of which is due to a divergence in stoichiometry owing to the presence of an excess of metal, without the aforesaid disadvantages occurring, by the use of an intermediate layer constituted by a metal mass which contains both the metal in which the semi-conductor is built up and the metal of which is made the contact body to be mounted or with which the latter is coated. The union is then brought about by a heating operation, in which the intermediate layer melts or sinters.

If desired, other metals may be added for the purpose of reducing the sintering or melting temperature respectively and of improving the flowing capacity.

The metal may be used as a mixture or as an alloy, for example in the pulverulent condition and is applied, preferably with the use of a plastic binder, as a paste to the ends of the resistance. The contact body to be mounted is then slipped on it, after which the metal-containing intermediate layer is caused to sinter or to melt respectively.

A resistance constituted by a sintered magnesia mass in which particles of partly reduced titanium oxide of the composition of TiO_x (x between 1.6 and 1.7) are embedded to the extent of about 3%, may have mounted on it copper or copper-clad iron current supply contacts with the aid of a mixture of Cu, Ti and Sn in a molecular

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ratio of 55:10:2. For this purpose about 10 grams of this mixture is worked with a solution of 2 grams of cresol-formaldehyde resin in 10 cm.³ of alcohol, into a paste. After a thin layer of it has been applied to the ends of the resistance and copper contact tags have been slipped on it the assembly is dried and then sintered at about 1000° C. in pure hydrogen.

For mounting contacts constituted by a tinned iron tag to resistances substantially made of CdO, use may be made, for example, of an alloy of Cd and Sn in a molecular ratio of 4:1.

In this case the union may be brought about by melting at about 250° C. in nitrogen.

What we claim is:

1. An electrical resistance comprising a body of sintered magnesia containing about 3% of particles of reduced titanium oxide having the formula TiO_x wherein x is between 1.6 and 1.7, copper contact members secured to said body of semi-conductive material, and an intermediate layer between said metal contact members and said body of semi-conductive material for securing the metal contacts to said body of semi-conductive material, said intermediate metal layer consisting essentially of copper, titanium, and tin in a molecular ratio of approximately 55:10:2 respectively.

2. A method of manufacturing an electrical resistance comprising the steps of applying a layer of metal to selected portions of a body of semi-conductive material which departs from stoichiometry and contains a metal to increase the conductivity thereof, said layer of metal containing as a constituent thereof the metal contained in said semi-conductive material, applying metal contact members over said metal coated portions of said semi-conductive body, said metal contact members being made of a metal which is contained in said metal layer, and heating said body in an inert atmosphere to fuse the intermediate metal layer into the metal contact members and said body of semi-conductive material to firmly secure the metal contact members to said body of semi-conductive material.

3. A method of manufacturing an electrical resistance comprising the steps of applying a layer of metal to selected portions of a body of semi-conductive material which departs from

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stoichiometry and contains a metal to increase the conductivity thereof, said layer of metal containing as constituents thereof the metal contained in said semi-conductive material and a metal to reduce the melting temperature thereof, applying metal contact members over said metal coated portions of said body of semi-conductive material, said metal contact members being made of a metal which is contained in the intermediate metal layer, and heating the body in an inert atmosphere at a reduced temperature to fuse the intermediate metal layer into the metal contact members and said body of semi-conductive material to firmly secure the metal contact members to said body of semi-conductive material.

4. A method of manufacturing an electrical resistance comprising the steps of applying a paste containing metal in a pulverulent state to selected portions of a body of semi-conductive material which departs from stoichiometry and contains a metal to increase the conductivity thereof, said paste containing as a constituent thereof the metal contained in said semi-conductive material, applying metal contact members over said paste covered portions of said

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body of semi-conductive material, said metal contact members being made of a metal which is contained in the metal of said paste, and heating the body in an inert atmosphere to fuse the metal contained in said paste into the metal contact members and said body of semi-conductive material to firmly secure the metal contact members to said body of semi-conductive material.

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