

UNITED STATES PATENT OFFICE

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CONTACT ELEMENT

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My invention relates to contact elements and particularly to such elements as are used with electrical apparatus for current collecting brushes and as bearing contact elements for supporting other relatively movable members.

An object of my invention is to provide an improved electrical contact element.

Another object of my invention is to provide an improved contact element as a bearing for a relatively movable member.

A further object of my invention is to provide an improved electric current collector contact element including a carbonaceous material and provided with an inorganic lubricant for the contact surface thereof.

Further objects and advantages of my invention will become apparent and my invention will be better understood from the following description, and the features of novelty which characterize my invention will be pointed out in the claims annexed to and forming a part of this specification.

It has been found that under normal atmospheric conditions with average humidity atmospheric water vapor and oxygen together provide one of the best known lubricants for the contact surfaces of carbon and metal-graphite brushes and similar bearing surfaces. It also has been found that electrical contact elements made of porous blocks of finely divided electrically conductive material such as carbon or metal graphite brushes tend to wear away very rapidly in dry or rarified atmospheres.

I have found that a relatively movable contact element such as might be used for an electrical brush contact or a relatively movable bearing element for sliding contact with another member, such as a rotating slip ring, commutator, or shaft, will have a relatively long wearing life when it is made of a graphitic or carbonaceous material intimately combined with zinc oxide. Various proportions of zinc oxide have been found to be useful in connection with such contact elements, and it has been found that a contact element made of a pressed and sintered mixture of finely divided powders of graphitic material with a metal of high electrical conductivity such as copper or silver, and zinc oxide provides a particularly desirable combination when the graphitic material and the metal are used in substantially equal parts such as about 40 per cent each and about 20 per cent of the mixture comprises zinc oxide. The zinc oxide should preferably be kept in the range of from 5 to 30 per cent of the total amount of material. In certain in-

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stances, it might be desirable to omit the metal in order to provide the desired electrical conductivity for the contact element.

While I have described a particular embodiment of my invention, modifications thereof will occur to those skilled in the art, and I desire it to be understood, therefore, that my invention is not to be limited to the particular arrangement disclosed, and I intend in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

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

15 1. An electrical sliding contact element including a graphitic material, and at least 5 per cent zinc oxide.

2. An electrical sliding contact element including a graphitic material, silver, and substantially 10 to 20 per cent zinc oxide.

3. A brush element including finely-divided carbon, copper, and at least 5 per cent zinc oxide.

4. A brush element including finely-divided carbon, a metal of high electrical conductivity, and substantially 10 to 20 per cent zinc oxide.

5. An electrical brush contact element including finely-divided carbon, copper, and substantially 5 per cent zinc oxide.

6. An electrical brush contact element including substantially 10 to 40 per cent finely-divided carbon, substantially 10 to 40 per cent metal of high electrical conductivity, and substantially 10 to 20 per cent zinc oxide.

7. A relatively movable contact element including a mixture of carbonaceous material and substantially 10 to 20 per cent zinc oxide.

8. A relatively movable contact element including a mixture of carbonaceous material and copper with substantially 10 to 20 per cent zinc oxide.

9. A relatively movable contact element including a mixture of carbonaceous material and a relatively high electrical conductivity metal with from 5 per cent to 30 per cent zinc oxide.

10. A relatively movable contact element including a mixture of substantially equal parts of carbonaceous material and a relatively high electrical conductivity metal with from 5 per cent to 30 per cent zinc oxide.

11. An element for sliding contact with a relatively movable metallic member, said element including a carbonaceous material, a high conductivity metal, and at least 5 per cent zinc oxide.

12. An element for sliding contact with a relatively movable member, said element including

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a pressed and sintered mixture of finely-divided powders of graphitic material, a metal of high electrical conductivity, and substantially 5 per cent zinc oxide.

13. An element for sliding contact with a relatively movable member, said element including a pressed and sintered mixture of finely-divided powders of carbonaceous material and at least 5 per cent zinc oxide.

14. An element for sliding contact with a relatively movable member, said element including a pressed and sintered mixture of finely-divided

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powders of substantially equal parts of carbonaceous material and a high conductivity metal, and from 10 per cent to 30 per cent zinc oxide.

15. An electrical brush contact element including substantially 40 per cent finely-divided carbon, substantially 40 per cent copper, and substantially 20 per cent zinc oxide.

16. A relatively movable contact element including a mixture of carbonaceous material and a relatively high electrical conductivity metal with substantially 10 to 30 per cent zinc oxide.

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