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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 as current collecting brushes.

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

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 rarefied 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 contact with another member, such as a rotating slip ring or commutator, will have a relatively long wearing life when it is made of a graphitic or carbonaceous material intimately combined with silver sulphide. It has been found that a contact element made of a pressed and sintered or fired mixture of finely divided powders of graphitic material with a metal of high electrical conductivity, such as copper or silver, and sulphur or a silver sulphide, provides a particularly desirable combination.

I have found that this type electrical brush contact element preferably includes a block formed of a mixture including 15 to 30 percent finely divided carbonaceous material such as graphite, a metal such as finely divided silver, and 2 to 10 percent sulphur. In some instances, the sulphide may be used directly by adding powdered silver sulphide to a mixture of graphite and powdered metal, mixing, heating, and pressing the mixture together and thereby forming a metallic sulphide mixed with graphite and metal. In thus making a contact element, the carbonaceous material is mixed with 60 to 80 percent powdered silver and sulphur and is pressed in a mold at 10 to 50 tons per square inch pressure and is then heated in a reducing atmosphere, such as hydrogen, at a temperature between 650° and

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700° C. One of the most useful combinations of these metals for use as a commutator brush comprises about 24 percent finely divided carbonaceous material added to about 71 percent powdered silver and about 5 percent sulphur. I have found that silver sulphide provides remarkably better qualities for use in current collecting contact elements than copper sulphide. This is even the case where the contact element comprises a mixture of copper and graphite. For instance, I have found that a contact element including 30 to 15 percent carbonaceous material, 35 to 60 percent copper, and 40 to 20 percent silver sulphide provides a very good commutator brush having a long wearing life in dry atmosphere. More specifically, I have found that such a contact element comprising about 24 percent graphite, about 40 percent copper, and about 36 percent silver sulphide has a longer life in dry atmospheres than similar brushes of other proportions of materials.

While I have described particular embodiments 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 arrangements 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 as new and desire to secure by Letters Patent of the United States is:

1. An electrical contact element including 30 to 15 percent carbonaceous material, 35 to 60 percent copper, and 40 to 20 percent silver sulphide.

2. An electrical contact element including about 24 percent graphite, about 40 percent copper, and about 36 percent silver sulphide.

3. An electrical contact element including about 20 percent graphite, about 55 percent copper, and about 25 percent silver sulphide.

4. The method of making an electrical contact element including mixing about 20 to 30 percent finely divided carbonaceous material to about 60 to 80 percent powdered silver and about 2 to 10 percent sulphur, pressing the mixture in a mold at several tons per square inch pressure, and heating it in a reducing atmosphere at a temperature between 650° and 700° C.

5. The method of making an electrical contact element including mixing about 24 percent finely divided carbonaceous material to about 71 percent powdered silver and about 5 percent sulphur, pressing the mixture in a mold at several tons per square inch pressure, and heating it in a reducing atmosphere at a temperature between 650° and 700° C.

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