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ELECTRICAL CONTACT

Chester Tietig, Covington, Ky.

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This invention relates to a permanently lubricated electrical contact.

The object of the invention is a porous metal object of any shape desired for use as an electrical contact, and such object of whatever shape contains within its pores a filling of a fireproof or substantially fireproof lubricant. By "fireproof" is meant not that the lubricant can not be burned but that it will not continue to burn. In other words, while it may have a flash point, it has no fire point.

The lubricant may be either solid or liquid and may be either of a waxy, oily, or non-oily nature. The porous metal is preferably that made according to the process described in my U. S. Patent No. 2,133,761 but may also be porous metal having pores ranging in size from being just visible under a common magnifying glass up to a size of $\frac{1}{16}$" diameter. While bronze is preferred as a contact material, I do not limit myself in any respect to the composition of the metal. Silver alloys, hard metal sintered products such as buttons or other shapes made partially from tungsten powder or even from metal carbides of extreme hardness may be used, if they have the required porosity. By "porosity" I mean not mere surface pits but a porosity that is characteristic of sintered products made from powdered metals. Any recognized contact metal having such pores can be used.

The lubricants which I am about to describe may be caused to impregnate objects of the above description by placing the lubricants in a vessel, liquefying them if necessary, placing the objects in the liquid and then exhausting the air above the liquid to create a partial vacuum. This treatment will cause the air to leave the pores of the metal and the liquefied lubricant to take its place. If especially heavy impregnation is desired, the vacuum treatment just described may be followed by a pressure treatment, i. e., by pumping air into the vessel so as to place a superatmospheric pressure upon the top level of the liquid so as to force additional lubricant into the pores.

Of the non-oily lubricants, I prefer to use glycerine or glycol. The kind of glycol may be ethylene or propylene, the former in the form which comes into the market under the trade name "Prestone." The glycerine or glycol may be used pure or slightly diluted with water. However, the water admixture should not be greater than 25% by weight. The glycerine or glycol may contain a very small amount of colloidal graphite in suspension. Preparations of this material which may also be used are made by the Acheson Graphite Company at Port Huron, Michigan.

A second kind of lubricant which I may use is a mixture of difficultly volatile chlorinated product such as dichlorethylene containing from 25 to 50% of its weight of light lubricating oil. Other chlorinated products of approximately the same degree of volatility and capacity for dissolving lubricating oil may be used.

If a solid lubricant is desired, I may use any of the various grades of chlorinated naphthalene sold under the commercial name "Halowax". Of these, I prefer to use the grade known as #2025. Other specific products which may be used are Halowax Oil #1000, Halowax #1013 and Halowax #1014. One of these products is liquid, notably Halowax Oil #1000.

After impregnation, the contacts made according to my invention are particularly useful in automatic electrical apparatus where sticking contacts have long been a problem.

I prefer to use the glycerine containing contacts for low voltage duty. For high voltage duty, the oily or waxy lubricants can be used, since the small amount of resistance introduced into the electrical circuit by the presence of a thin film of these lubricants is of no consequence. Glycerin and glycol are electrically conductive. "Nulomoline," a recognized glycerin substitute, may also be used.

I claim as my invention:

1. A metallic object which is a sintered conglomerate of powdered metal having a multiplicity of pores throughout its mass, said pores being impregnated with a lubricant which is mobile when warm and which has no fire point.

2. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with glycerine.

3. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a glycol.

4. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a polyhydric alcohol containing not more than three hydroxyl groups.

5. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a substance comprising a liquid chlorinated hydrocarbon and a light lubricating oil.

6. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a substance comprising dichlorethylene and a light lubricating oil.

7. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a substance comprising chlorinated naphthalene.

8. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a substance comprising a liquid product of chlorination of naphthalene.

9. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with Halowax Oil No. 1000.

10. An electrical contact which is a product of the sintering together of powdered metal, and which has a multiplicity of pores, said pores being impregnated with a liquid electrically conductive lubricant.

11. An electrical contact which is a product of the sintering together of powdered metal particles and which has a multiplicity of pores, said pores being impregnated with a liquid electrically conductive lubricant, said lubricant carrying a colloidal graphite in suspension.

12. A metallic object which is a product of the sintering of finely subdivided metal particles and which has a multiplicity of pores extending throughout its mass, said pores being impregnated with a homogenous mixture of a halogenated hydrocarbon and a liquid hydrocarbon lubricant.

CHESTER TIETIG.