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UNITED STATES PATENT OFFICE.

ROBERT HIRSCH AND HERMAN MEMINGER, OF MILWAUKEE, WISCONSIN.

COMMUTATOR-BRUSH.

SPECIFICATION forming part of Letters Patent No. 474,600, dated May 10, 1892.

Application filed December 11, 1891. Serial No. 414,720½. (No model.)

To all whom it may concern:

Be it known that we, ROBERT HIRSCH and HERMAN MEMINGER, citizens of the United States, and residents of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Commutator-Brushes; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to commutator-brushes for electric motors and dynamos; and it consists in a method of making the brush, as well as in the article itself, all as will be fully set forth hereinafter and subsequently claimed.

Our said invention is, in part, an improvement on that set forth in the application of *Robert Hirsch, filed October 29, 1891, Serial No.* 410,165, and our brushes designed to accomplish the same results as set forth in said application.

In constructing our present brushes we take refined clay and powdered graphite in the proportions of one and one-half pounds of the former to one pound of the latter and *mix them together in the presence of sufficient water to make a stiff paste*, and after *the ingredients are thoroughly* mixed the *mass is compressed into a bar* of proper height and width, according to the size and style of brush desired, and from this bar sections are cut off of any length or lengths desired. These sections are then dried and baked or burned like brick or tile in a suitable furnace or kiln protected from outside air. The baked sections are then immersed in a bath, preferably of linseed-oil, in a hot state until the sections have absorbed all the oil which they will take, which usually requires about half an hour, more or less. They are then dried and burned again in a furnace or kiln, in the shortest time. These reburned sections are now again heated and saturated with wax, (such as beeswax or paraffine,) the heat being sufficient to melt the wax and cause it to be absorbed. The brushes are now ready to receive a coating of metal, preferably copper, which may be applied in any suitable manner, preferably by the process of electro-deposition.

These brushes may either be used singly or a number of small brushes or sections may be placed side by side and united by a second film of electrically-deposited metal, as in the former application hereinbefore referred to.

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

1. The method of forming commutator-brushes, consisting in mixing together refined clay, graphite, and water into a stiff paste and compressing the same into bars, cutting the latter into sections of suitable lengths for brushes, drying and then baking or burning them in a suitable furnace or kiln protected from the outside air, then immersing the sections in oil or sugar solutions and absorbing the same, drying the brushes and burning them and letting them cool, then again heating them and saturating them with wax and absorbing the same, and then after the brushes are again cool covering them with a film of metal, substantially as set forth.

2. The herein-described commutator-brush, composed of a mixture of refined clay, graphite, carbonized oil or sugar, and wax covered with a metallic coating, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.