UNITED STATES PATENT OFFICE.

ROBERT HIRSCH AND HERMAN MEMINGER, OF MILWAUKEE, WISCONSIN.

COMPOSITION AND PROCESS OF PRODUCING SAME FOR COMMUTATOR-BRUSHES.

SPECIFICATION forming part of Letters Patent No. 510,341, dated December 5, 1893.

Application filed January 28, 1893. Serial No. 459,937. (No specimens.)

To all whom it may concern:

Be it known that we, ROBERT HIRSCH and HERMAN MEMINGER, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Compositions and Processes of Producing the Same for Commutator-Brushes; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates particularly to that class of commutator brushes which are composed of one or more sections, bars or strips of the lubricating and scouring composition hereinafter particularly described, and of one or more metallic strips or sections which afford a metallic contact with the commutator and increase the conductivity of the brush. The metallic portion of the brush may be applied to the composition by electro-deposition or otherwise in the form of an enveloping casing or in the form of intermediate strips, bars or plates as specified in an application made and filed by us of even date herewith, Serial No. 459,936.

Our present invention consists essentially of the lubricating and scouring composition above referred to and of the process of producing the same.

To produce our improved composition we make a paste of starch, taking about two ounces of starch to twelve ounces of water and boiling the same together; into this paste we introduce about one pound of pulverized or powdered graphite containing from two to four ounces of tripoli, pumice stone or other similar scouring material, and mix the same thoroughly into a thick paste, which is then pressed in molds or otherwise formed into bars, strips or sections of the desired shape and dimensions. The bars, strips or sections thus produced are then baked to burn and carbonize the starch, and finally they are immersed in hot bees-wax, paraffine or other suitable wax, until they have absorbed as much as they will hold. The sections are now ready for use and may be assembled in a brush with the metallic conducting portions as above stated. When the metal is to be applied to the composition by electro-deposition the bars, strips or sections, after being formed of the desired shape and dimensions, are preferably heated until they begin to smoke, thus partially carbonizing the starch contained therein, and are then immersed in hot wax, one pound of the composition to about three ounces of wax, which binds the graphite together and prevents its dissolution or disintegration in the plating bath. They are then placed in a bath and plated with copper or other suitable metal. After they have been plated with metal they are assembled in brushes when the brushes are composed of a plurality of sections, and bound together by a casing or coating of electrically deposited or mechanically applied metal. The brushes thus formed are baked or burned to complete the carbonization of the starch contained in the composition, and are then immersed in hot wax and permitted to absorb as much as they will hold. The wax serves as a binder to hold the graphite together and prevent its disintegration and the formation by the abrading action of the commutator of a powder which tends to fill the interstices between the commutator sections and thereby short circuit the machine. When, however, the composition bars, strips or sections are not to be plated by the electro-deposition of metal, but are to be employed without metal or with metallic conducting parts, the preliminary baking and soaking in wax for the purpose of putting them in suitable condition for the plating bath are omitted.

As above stated different kinds of scouring material may be used as an ingredient of the composition, and the proportions thereof to the other ingredients of the composition will be varied according to the quality of the scouring material, more of the finer and less of the coarser and more gritty varieties being used.

It will be observed from the foregoing explanation of the process of producing the composition that the starch serves mainly, if not entirely, as a binder for holding the pulverized graphite together and preserving the form which is given to it during the subsequent steps of the process, and that being subsequently reconverted by the baking or burning operation into carbon the finished product is composed essentially, if not en-

tirely, of graphite, a small proportion of a more or less gritty scouring substance like or similar to those hereinbefore mentioned, and wax which serves as a permanent binder for holding the other ingredients together in proper form.

It is obvious that brushes may be made of one or more sections either with or without the metallic portions constructed and arranged as hereinbefore set forth.

We claim—

1. The process of producing a composition for commutator brushes which consists in forming a stiff paste of pulverized graphite, a scouring substance, starch and water; forming the paste thus produced into bars, strips or sections of the desired shape and dimensions, in then baking or burning them until the starch is carbonized and in finally saturating them with wax, substantially as and for the purposes set forth.

2. A composition for commutator brushes consisting of pulverized graphite, a relatively small quantity of a powdered scouring substance and wax which serves as a binder to hold the ingredients together in proper form, substantially as and for the purposes set forth.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

ROBERT HIRSCH.
HERMAN MEMINGER.

Witnesses:
W. N. STEWART,
JOHN H. HURLEY.