(No Model.)

P. H. HOLMES.

ELECTRICAL CONDUCTOR.

No. 482,177. Patented Sept. 6, 1892.

FIG. 1.

FIG. 2.

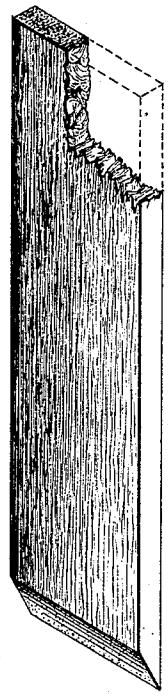


FIG. 3.

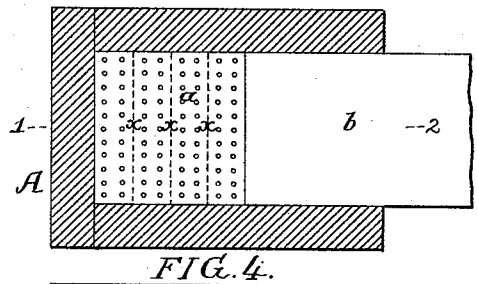
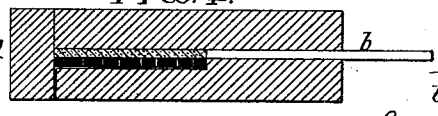


FIG. 4.



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UNITED STATES PATENT OFFICE.

PHILIP HENRY HOLMES, OF GARDINER, MAINE, ASSIGNOR TO THE HOLMES FIBRE-GRAPHITE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

ELECTRICAL CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 482,177, dated September 6, 1892.

Application filed January 2, 1892. Serial No. 416,858. (No model.)

To all whom it may concern:

Be it known that I, PHILIP HENRY HOLMES, a citizen of the United States, residing in Gardiner, Kennebec county, Maine, have invented certain Improvements in Electrical Conductors, of which the following is a specification.

The object of my invention is to construct an improved electrical conductor, more particularly such as commutator-brushes and arc-light pencils.

In the accompanying drawings, Figure 1 is a perspective view of an arc-light pencil or stick made in accordance with my invention. Fig. 2 is a similar view of a commutator-brush, also made in accordance with my invention. Fig. 3 is a diagrammatic sectional plan view illustrating the manner of producing the conductor; and Fig. 4 is a section on the line 1 2, Fig. 3.

In making my improved conductor I prefer to make it of the composition set forth in the application filed by me on June 2, 1891, Serial No. 394,887, in which plumbago in a finely-divided state is combined with fiber and compressed and united by a suitable binder.

The main feature of my present invention consists in so making the conductor that it will be stratified or laminated and the strata will be disposed in planes parallel with the direction of flow of the electrical current through the conductor (if it may be so expressed) when the latter is used in an electric circuit. This I do by making a plastic mass, preferably of plumbago, fiber, and water, and add thereto a suitable granular mineral substance, such as gypsum, and after thoroughly mixing the compound I place it in a mold A, Fig. 3, having in the bottom, top, or side (as the case may be) a series of small passages. Then upon forcing a plunger *b* into the mold under heavy pressure the water or other fluid in the compound will be forced to pass out through the small openings *a* to waste, the fiber and the granular material acting as a filter and preventing the escape of the plumbago, while the particles of fiber and plumbago will be turned in the direction of flow of the water, and will thereby be caused to lie parallel or substantially parallel with the face of the plunger. When the material is removed from the mold, it is dried, so as to completely rid the mass of any moisture, and is then submerged in a drying-oil, which when it hardens, preferably under heat, binds the mass together.

The oil treatment may be omitted in cases where the strengthening and toughening of the composition resulting from such treatment are not essential; or, on the other hand, when the oil treatment is used the fiber may in some cases be omitted from the compound.

In making commutator-brushes or arc-light pencils the pressure is exerted in a direction transversely to the length of the desired article, so that the strata, lying in planes parallel with the face of the plunger, will, when the commutator is shaped as shown in Fig. 2, or the arc-light pencil is shaped as shown in Fig. 4, lie in planes parallel with the direction of flow of an electric current through the conductor when the latter is in use. I have found that a conductor with the strata so arranged offers less resistance to the electric current than one in which the strata are in planes transverse to the flow of the current.

Another advantage gained by the disposal of the strata in the manner above described is that in commutator-brushes the strata are presented on end to the commutator, so that the commutator-brush does not wear away so fast as it would if the strata were arranged in a different manner.

I claim as my invention—

1. An electric conductor composed of particles of plumbago disposed in strata which lie in planes parallel with the direction of the current.

2. An electric conductor composed of particles of electric-conducting carbon and divided fiber disposed in strata which lie in planes parallel with the direction of the current.

3. An electric conductor composed of particles of electric-conducting carbon united by an oil-binder and disposed in strata which lie in planes parallel with the direction of the current.

4. An electric commutator-brush composed

of particles of conducting-carbon, such as plumbago, disposed in strata, which lie in planes parallel with the direction of the current, and are thus presented on end to the commutator when the brush is in use, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PHILIP HENRY HOLMES.

Witnesses:
HENRY HOWSON,
EUGENE ELTERICH.