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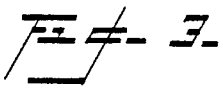
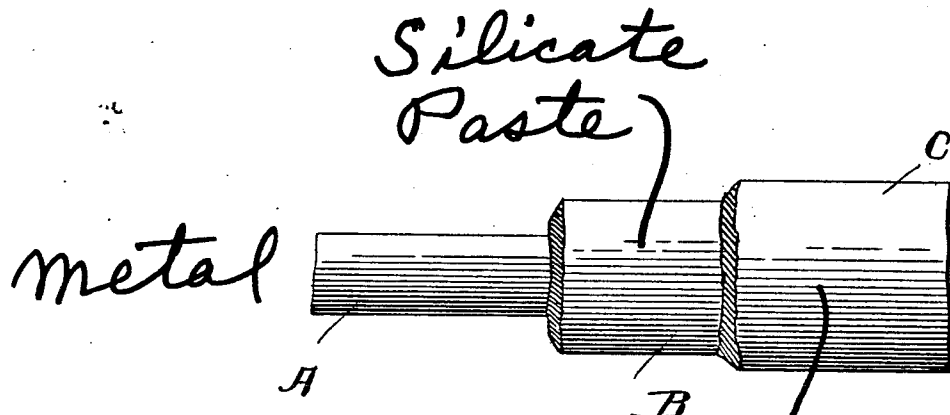
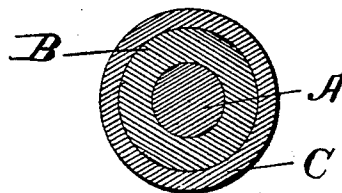
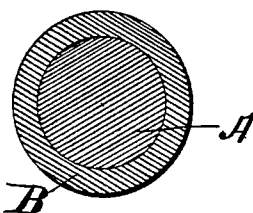
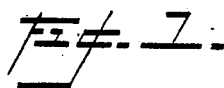
(No Model.)

H. G. O'NEILL.
INSULATED CONDUCTOR.

No. 533,607.

Patented Feb. 5, 1895.

201-64



{ Lime,
Albumin,
to
Lactic
acid

WITNESSES:

G. Johnson.
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INVENTOR

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BY

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UNITED STATES PATENT OFFICE.

HENRY G. O'NEILL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO EDWARD JEWELL, OF SAME PLACE, AND CHARLES W. WELCH, OF STOUGHTON, MASSACHUSETTS.

INSULATED CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 533,607, dated February 5, 1895.

Application filed March 22, 1894. Serial No. 504,714. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. O'NEILL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Means for Insulating Conductors and Resistances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to protect conductors and resistances, especially those used in rheostats and electric heaters, from injury by oxidation, fusion, electrolysis, short circuits or crystallization. Such evils are often caused by condensation of atmospheric moisture, by dampness due to evaporation in ironing, by the water used in cleaning articles or utensils to which the resistance is attached, by the action of electrical currents, tending to crystallize the conductor or resistance and make it brittle, and by the dangers due to abnormal currents or changes of current which will sometimes occur. Burning out most often occurs at the junction of a feed wire with the resistance. This also, by the same means, it is proposed to remedy. To this end, I inclose the resistance in a paste of powdered silicates, preferably silicate of magnesia, silicate of soda, or a mixture of the two. This covering will protect the resistance against burning out and preserve it by an annealing action and by gradually conducting the heat away from it; also it will not crack nor flake away so as to expose the wire; but on the other hand such a covering is not impervious to water, and, by itself, involves the risk of oxidizing the resistance or short circuiting the current. To guard against this I provide the said covering with means of waterproofing the same. Such means consist of a waterproof coating applied outside of it, or the ingredients of such coating may be mixed with the paste aforesaid, answering the same purpose.

In the accompanying drawings Figure 1 represents a cross-section of a resistance having the form of a straight bar, surrounded by a protective coating as aforesaid; and Fig. 2

represents a similar view of the said resistance surrounded by a protective covering and an external waterproof covering as described. Fig. 3 is a broken longitudinal view of the form shown in Fig. 2.

A designates the resistance, B the inner coating and C the outer coating. The composition of the former as already stated consists of a paste made from some finely powdered silicate or silicates molded on the said resistance. It does not require for its solidification any such extreme heat as is necessary in firing enamel, but forms a cement having a high coefficient of heat, forming a close contact with the resistance and absorbing gradually the heat thereof, so as to prevent its fusion and any injurious overheating. When the heating current is withdrawn, this cement by reason of its high specific heat cools the resistance by conduction and exerts a preservative annealing influence, which will prevent crystallization and brittleness; whereby after long use the resistance will be found still in its normal state, bright, and not easily broken. Such a cement, however, without other safeguard, is not impervious to water, and therefore means of waterproofing it must be employed. To this end, I incase the said coating B in an outer coating C, Fig. 2, which may be a mixture of line albumen and dilute lactic acid; or the same result may be attained by mixing these waterproof ingredients with the paste first above described.

Sometimes, to secure better adhesion to the resistance I add powdered black oxide of manganese and silicate of potassium to the said paste.

I am aware that waterproof and fireproof enamel has been used to insulate resistances; but this is inapplicable to many delicate devices by reason of the intense heat required in such processes. Moreover it does not exercise any annealing influence or conduct away the heat sufficiently to save the wire from fusion in a strong intense current; also, it cracks and scales off exposing the enclosed resistance to injury.

Protoxide of magnesium, fire-clay, plaster of paris and asbestos have been used as insulators, but all are permeated by water and

air and crack or shrink under heat. Soap-stone has likewise been formed into a covering for electric conductors, and is free from some of these defects, but will not by itself adequately protect the wire or resistance against oxidation and the other evils due to access of air and moisture.

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

1. A covering for electric conductors and resistances consisting of a paste composed of powdered silicates and rendered waterproof substantially as set forth.
2. A covering for electric conductors and resistances consisting of insulating cement having a high specific heat and rendered waterproof substantially as set forth.

3. A covering for resistances consisting of two coats, the inner coat being composed of a paste of powdered silicates and the outer coat composed of a water proofing mixture for the purpose set forth.

4. A covering for resistances consisting of two coats, the inner coat being composed of a mixture of silicate of magnesia and silicate of soda in solution and the outer coat consisting of a mixture of lime albumen dilute and lactic acid substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY G. O'NEILL.

Witnesses:

EDWIN W. PIERCE,
PELETIAH R. TRIPP.