

H. W. FISHER.
WATERPROOF CABLE.
APPLICATION FILED JAN. 29, 1912.

1,037,883.

Patented Sept. 10, 1912.

FIG. 1.

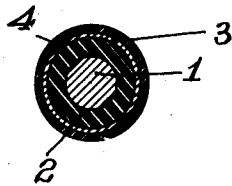


FIG. 2.

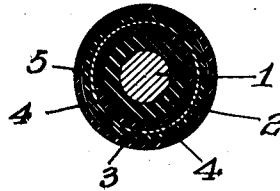


FIG. 3.

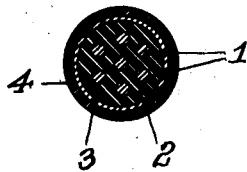
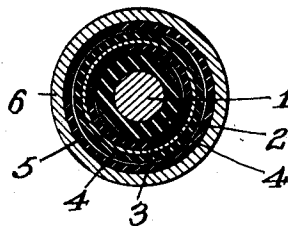


FIG. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY W. FISHER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO STANDARD UNDERGROUND CABLE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

WATERPROOF CABLE.

1,037,883.

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed January 29, 1912. Serial No. 674,052.

To all whom it may concern:

Be it known that I, HENRY W. FISHER, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Waterproof Cables, of which improvement the following is a specification.

The use of a layer of asphaltum, surrounding an electrical conductor, has been variously suggested both for insulating purposes and as a water-proofing layer. It has been found that, in order to render the asphaltum layer in and of itself effective to resist electrical discharge, the layer must be of such thickness that the conductor, owing to the manipulation of the cable in service, is liable to become so eccentrically disposed within the said layer that points of weakness may develop. Hence, such a use of asphaltum in electrical conductors has been unsatisfactory. When asphaltum has been used as a water-proofing layer, in cables as heretofore constructed, it has been surrounded by braid or other material which absorbs the asphaltum and, extending into and through the body thereof, affords paths for the ingress of moisture into the insulating coverings of the cable to their evident detriment.

As a water-proofing agent, as well as an acid-resisting agent, it is well known that asphaltum has certain properties which are desirable in the construction of electrical cables; and these properties have not been fully obtained in such cables as they have been constructed heretofore.

It is the object of my invention, which relates to electrical cables, to combine, with their several coverings, a layer of asphaltum in such a manner that the layer will be fully effective to resist the encroachment of water and acid to the insulating portions of the cable. To such an end I have found that a relatively thin layer of asphaltum may be held in an unbroken and continuous film, which will be impervious to water and which will resist the action of acid, by incasing the said layer between layers of non-absorbent materials.

My invention consists, therefore, in adding to an insulated electrical conductor a layer of asphaltum incased between such material.

While I do not wish to limit myself to any

specific non-absorbent material, as a casing within which the asphaltum layer may be disposed, I have found varnished cloth to be the most desirable material. Such cloth is well known to those skilled in the art, and consists of a cambric tape treated with varnish, whereby the surface of the cloth is rendered smooth and impervious, and its fibers protected so that they cannot absorb substances with which they may come in contact.

It will be readily understood that my invention is capable of various embodiments in order to meet the requirements of service. Therefore, as a part of my specification, I show on the accompanying drawing several cross-sectional views of cables illustrating different constructions.

In the several figures like numerals are used to designate like parts.

In Figure 1, which illustrates the simplest construction of my improved cable, the conductor 1 is surrounded successively by a body of insulation 2, a layer of asphaltum 3, and a wrapping of varnished cloth 4. The conductor may be of any desired form, that is, it may be a single wire or a stranded conductor. The insulation may also be of any desired form, such as several wrappings of tape saturated with insulating compound, or it may consist of a body of rubber. But, whatever the insulation may be, it is desirable to have its exterior surface of such a character that it will not absorb the superimposed layer of asphaltum 3. It will be observed that the asphaltum layer will be incased between two non-absorbent layers, and that, in view of such particular disposition, it will form an uninterrupted seal or film around the insulation, which seal will effectively resist the ingress of water and acids.

In Fig. 2 the conductor 1 is surrounded successively by a body of insulation 2, a wrapping of varnished cloth 4, a layer of asphaltum 3, a wrapping of varnished cloth 4, and a braid 5. In this construction, the body of insulation, surrounding the conductor and having a non-absorbing exterior surface, includes also the first wrapping of varnished cloth.

The cable illustrated in Fig. 3 differs from that shown in Fig. 1 in that the core 1 consists of a plurality of separably insulated

electrical conductors. As in Fig. 1, the insulation, being rendered non-absorbent, is surrounded by a layer of asphaltum around which is a wrapping of varnished cloth.

5 I have found the electrical cables, thus far described, to be particularly well adapted for use in mines or like places, wherein the cables are usually subjected to the action of water which may have a quantity of acid intermingled with it. And when so used
10 such cables have certain advantages over the heretofore used lead-sheath cables, in that they combine cheapness and lightness in weight with effectiveness to resist water and acid. However, under some conditions of
15 service, it is desirable to cover my cables with a lead sheath as an additional safeguard against water and acid, or as a mechanical protection. Such a cable is illustrated in Fig. 4 wherein the conductor 1
20 is surrounded by successive layers of insulation 2, varnished cloth 4, asphaltum 3, varnished cloth 4, braid 5, and lead sheath 6. It will be observed of this construction that, in case the lead sheath breaks down,
25 the layer of asphaltum will protect the cable from injury by water and acid.

In another and limited aspect, my invention may be described as consisting of a
30 wrapping of varnished cloth about a layer of asphaltum. When so viewed, the asphaltum, in addition to forming a continuous layer around the insulation, forms a seal for the well known spiral opening between
35 the superimposed helical wrapping of the varnished cloth, which in and of itself is, to a marked degree, water-proof and acid-resisting.

By the term "asphaltum," as used
40 throughout this specification and claims, I mean to include the residue of petroleum distillation as well as native asphaltum, the two substances being substantially identical in characteristics and properties. I also
45 mean to include, under the term "asphaltum," certain compositions which contain a large proportion (approximately 80%) of unmodified asphaltum; for I have found that, while the unmodified asphaltum is ef-
50 fective to accomplish the result heretofore described, by combining certain ingredients

with it, better results may be had. The pure asphaltum may be compounded with softening substances such as petroleum or vaseline. I may also employ a small quan-
55 tity of rosin. The proportion of ingredients in the material may be varied, it being essential only that the compound contain such a quantity of pure asphaltum as will render it pervious to water and acid.

I do not wish to limit myself to cables shown herein, for obviously many other forms may be made without departing from the spirit of my invention, as set forth in the appended claims.

I claim as my invention:

1. An electrical cable, consisting of a conductor surrounded successively by a body of non-absorbent insulating material, a layer of asphaltum, and a covering of non-ab-
70 sorbent material, substantially as described.

2. An electrical cable, consisting of a conductor surrounded successively by a body of insulating material, a wrapping of varnished cloth, a layer of asphaltum, and a
75 wrapping of varnished cloth, substantially as described.

3. In an electrical cable, the combination with a conductor, of a layer of asphaltum incased between wrappings of varnished
80 cloth and surrounding said conductor, substantially as described.

4. An electrical cable, consisting of a conductor surrounded successively by a body of insulation having a non-absorbent ex-
85 terior surface, a layer of asphaltum, and a wrapping of varnished cloth, substantially as described.

5. In a cable construction, the combination of an electrical conductor, a body of
90 non-absorbent insulation adequate in and of itself to protect a current flowing in said conductor, a layer of asphaltum and a wrapping of varnished cloth, substantially
95 as described.

In testimony whereof I have hereunto set my hand.

HENRY W. FISHER.

Witnesses:

E. J. WARING,
TRACY D. WARING.

It is hereby certified that in Letters Patent No. 1,037,883, granted September 10, 1912, upon the application of Henry W. Fisher, of Pittsburgh, Pennsylvania, for an improvement in "Waterproof Cables," an error appears in the printed specification requiring correction as follows: Page 2, line 60, for the word "pervious" read *im-*
pervious; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of November, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.