

L. McCARTHY.
INSULATOR.
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1,035,212.

Patented Aug. 13, 1912.

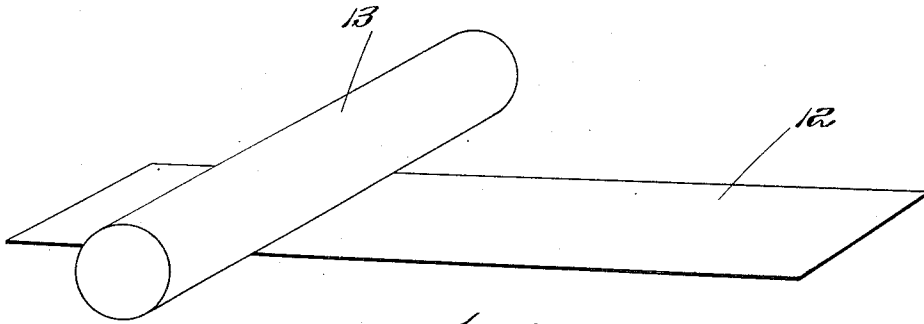


Fig. 3.

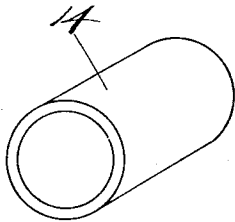


Fig. 4.

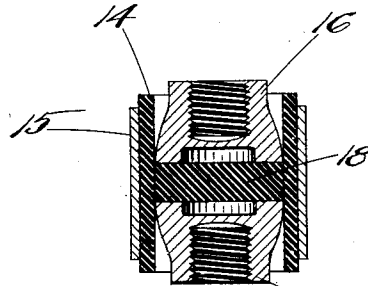


Fig. 5.

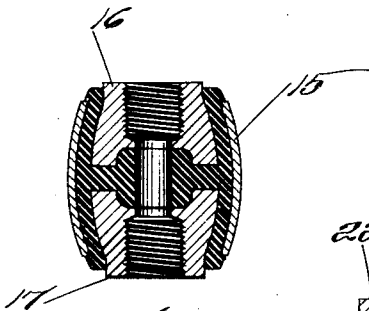


Fig. 2.

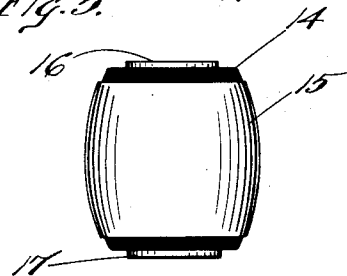


Fig. 1.

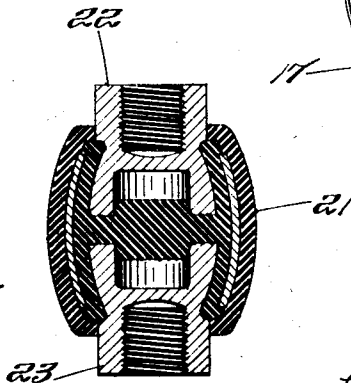


Fig. 6.

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UNITED STATES PATENT OFFICE.

LOUIS MCCARTHY, OF BOSTON, MASSACHUSETTS.

INSULATOR.

1,035,212.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS MCCARTHY, citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented a certain new and useful Improvement in Insulators, of which the following is a specification, reference being had therein to the accompanying drawings.

My present invention has for its object a new and improved insulator capable of withstanding an electric current of relatively high voltage and of being made in various forms. Some of these forms are insulating couplings to be used to support electroliers, electric light fixtures and the like; ball strains; and trolley wire insulators, the principle of operation being the same in all forms.

It is well known to those skilled in the art that natural mica constitutes an insulating material of great excellence, and it has been usually utilized in insulators either in superposed layers in its natural state or in a comminuted state mixed with some suitable gum, such as shellac and forming a composition capable of being molded. It has been found however that when the first of these methods is employed, there is a tendency for the electric current to follow the air spaces in the layers of mica. This difficulty is obviated by the use of the molded composition but on the other hand the molded composition does not have as high resistance. It has also been found that if leaves of natural mica are carefully overlapped so as to break joints and are held together by some suitable insulating adhesive such as shellac, the whole being subjected to pressure, an insulating material is formed which has a much greater insulating power than either natural mica or molded mica composition. The great advantages of this kind of insulation, however, have never been made use of in insulators of the types referred to above.

The insulator embodying the present invention is constructed by forming a tube of the said insulating material by overlapping leaves of mica held together by a suitable insulating adhesive such as shellac; then inserting the tube thus formed in a suitable metallic shell and putting in place the end members and a suitable insulating washer between the opposing faces of the end members, and then contracting the metallic shell onto the inclosed parts in the presence of

heat thereby solidifying the insulation and converting the parts into a substantially unitary structure. In practice, I find it convenient to make up the insulating material in the form of flat sheets, which when heated may be rolled into the shape of a tube. In testing insulators made in this manner, it is found that the electric current which tends to run through the washer between the end members comes against the wall of the tube of overlapped leaves of mica which are practically impenetrable to the electric current, and that the electric current will jump across the outside of the insulator before the insulating tube will be punctured.

The invention will be fully understood from the following description taken in connection with the accompanying drawings and the novel features will be pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is an elevation of an insulator embodying my invention. Fig. 2 is a vertical section of the insulator shown in Fig. 1. Figs. 3 to 5 inclusive illustrate the successive steps in the process of making the insulator shown in Figs. 1 and 2. Fig. 6 is a section of another form of insulator embodying my invention.

Referring now to the drawings, and particularly to Fig. 3, there is shown at 12, a flat sheet of insulating material composed of many thin leaves of natural mica superposed and overlapping and held together by a suitable insulating adhesive such as a solution of shellac, the whole being compressed in the presence of heat to densify it. This insulating material in flat sheets is a well known article of commerce, sometimes called micanite or compressed mica. Therefore it will not be described at greater length. This sheet is then heated, preferably on a hot table, sufficiently to soften the insulating adhesive and is then rolled about an arbor or core 13 to form a tube as shown at 14 in Fig. 4. The arbor or core 13 is then withdrawn, the tube 14 is placed inside the metallic shell 15 (see Fig. 5), and the two metallic end members 16 and 17 separated by a washer 18 of insulating material are put in place within the tube 14. The washer 18 is preferably cut from a sheet of the insulating material of the kind already described. The two end members are preferably made in the form of a frustum of a cone and placed base to base for a reason to

be later explained. The parts thus assembled are then preferably heated sufficiently to soften the insulating adhesive contained in the insulating material and the whole is
 5 subjected to a very heavy pressure in suitable dies. This heavy pressure contracts or lessens the diameter of the ends of the metallic shell 15 as seen in Fig. 2 shaping the insulation to the shape of the end members,
 10 embedding the shell in the insulation somewhat and leaving the insulation in the finished insulator under pressure from the metallic shell. The pressure applied to form the shell also draws the proximate faces of
 15 the end members 16 and 17 closer together by reason of the conical shape of the end members and so compresses the washer 18 of insulation between the two end members causing the washer to fill completely any
 20 irregularities in the proximate faces of the end members. By this step the separate parts of the insulator are converted into a rigid unitary whole having good mechanical strength. I believe that the forming of
 25 the insulation under pressure and in the presence of heat sufficient to soften the insulating adhesive does not do injury to the individual leaves of mica forming the insulation, but that these leaves slide slightly on
 30 each other so that in its finished condition the leaves of mica still overlap each other and present a nearly impenetrable obstruction to the electric current.

The insulator may afterward be covered
 35 with plastic insulating material in the well known manner if desired. A covered insulating joint is shown in Fig. 6, the covering being designated 21. In this insulator the end members 22 and 23 are made somewhat
 40 longer.

What I claim is:—

1. The improved insulator comprising two end members, a washer of insulating material separating the opposing faces of said
 45 end members, a tube surrounding said end members and composed of a sheet of overlapping leaves of mica wound upon itself in convoluted form, so as to provide a plurality of superposed layers of said sheet
 50 with the extended surfaces of the mica leaves arranged substantially transverse to the natural or disposed direction of flow of the current, and a shell outside of the said tube.

55 2. The improved insulator comprising two end members, a washer of insulating material separating the opposing faces of said end members, a tube surrounding said end

members and composed of a sheet of overlapping leaves of mica wound upon itself
 60 in convoluted form, so as to provide a plurality of superposed layers of said sheet, and a shell outside of the said tube, said shell being contracted at its ends so as to subject said convoluted tube to heavy pres-
 65 sure between itself and said end members.

3. The herein described improved insulator consisting of inwardly enlarged end members with their bases toward but separated from each other, a shell encircling said
 70 end members, a tube of insulating material interposed between said shell and said end members and composed of overlapping leaves of mica adhesively held together, and with the extended surfaces of the mica
 75 leaves arranged substantially transverse to the direction of flow of the current, a washer of insulating material interposed between said end members and also composed of overlapping leaves of mica adhesively held
 80 together, with the surfaces of the mica leaves also transverse to the direction of flow of the current, said shell being contracted at its ends and thereby tightly gripping the said tube of insulating material, so
 85 as to hold the same against the said end members under heavy pressure.

4. The herein described improved insulator consisting of inwardly enlarged end members with their bases toward but separated from each other, a shell encircling said
 90 end members, a tube of insulating material interposed between said shell and said end members and composed of a plurality of layers of overlapping leaves of mica adhesively held together, and with the
 95 extended surfaces of the mica leaves arranged substantially transverse to the direction of flow of the current, a washer of insulating material interposed between said
 100 end members and also composed of a plurality of layers of overlapping leaves of mica adhesively held together, with the surfaces of the mica leaves also transverse to the direction of flow of the current, said
 105 shell being contracted to its ends and thereby tightly gripping the said tube of insulating material, so as to hold the same against the said end members under heavy pressure.

In testimony whereof I affix my signature, 110
 in presence of two witnesses.

LOUIS McCARTHY.

Witnesses:

GARDNER W. PROUTY,
 LLOYD DOTY.