(No Model.)

H. CARMICHAEL.

STRAIN INSULATOR.

No. 600,063. Patented Mar. 1, 1898.

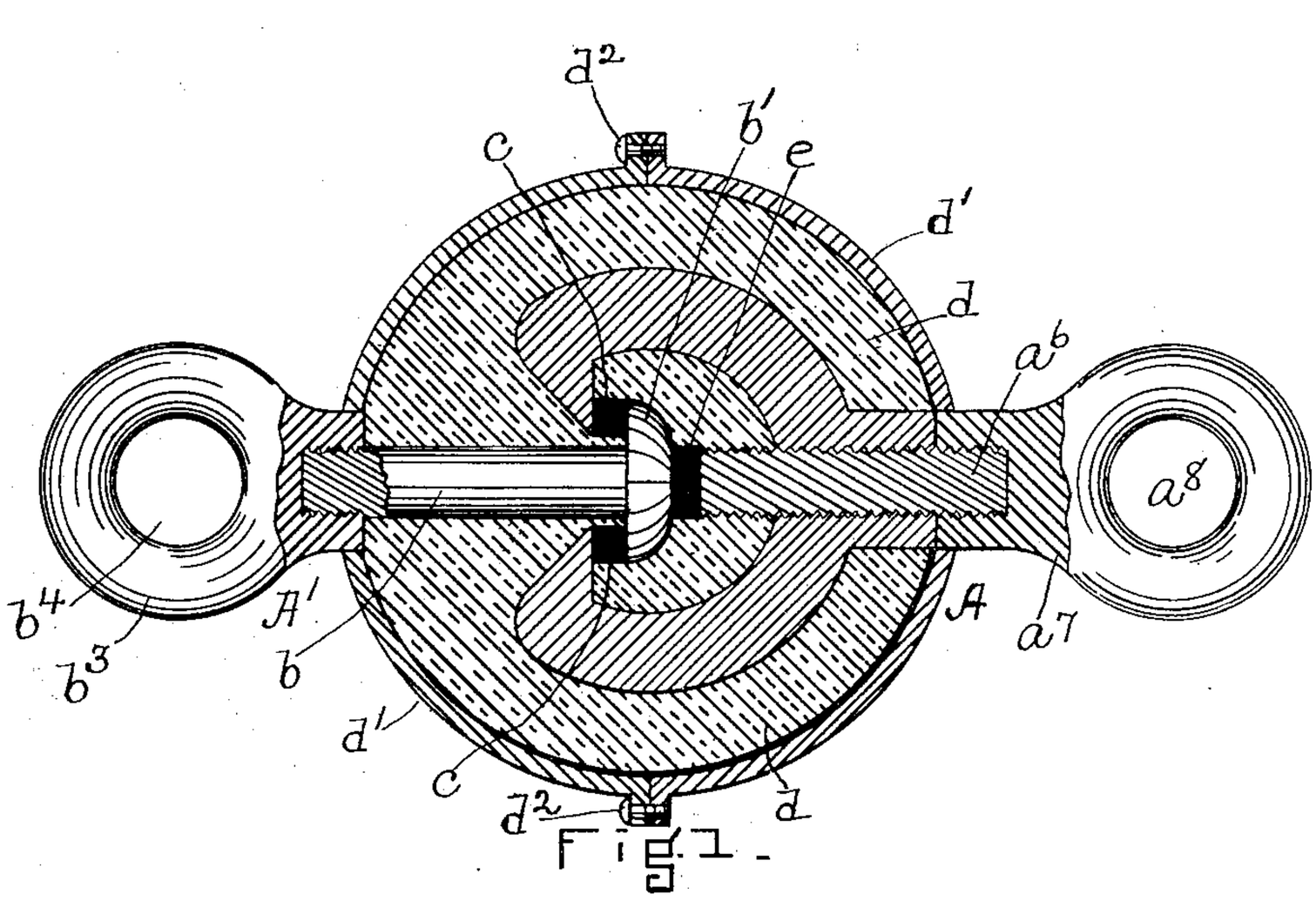

Fig. 1.

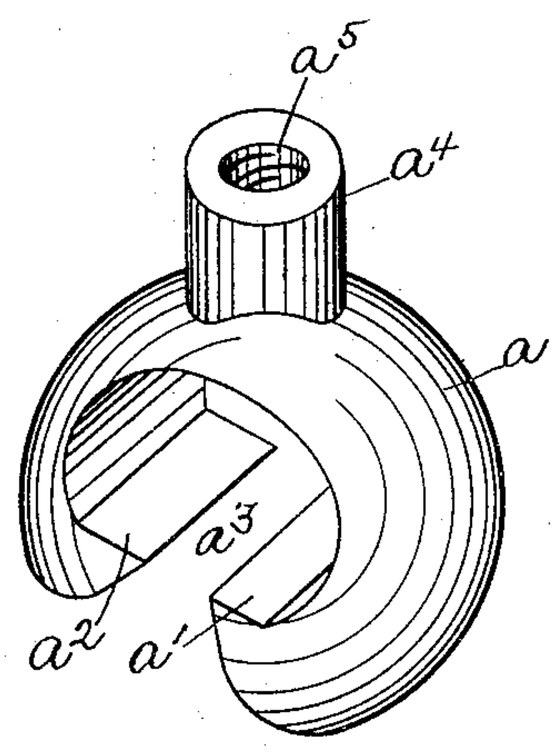

Fig. 2.

WITNESSES.

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HENRY CARMICHAEL, OF MALDEN, MASSACHUSETTS.

STRAIN-INSULATOR.

SPECIFICATION forming part of Letters Patent No. 600,063, dated March 1, 1898.

Application filed June 13, 1895. Serial No. 552,657. (No model.)

To all whom it may concern:

Be it known that I, HENRY CARMICHAEL, residing in Malden, county of Middlesex, and State of Massachusetts, have invented an Improvement in Strain-Insulators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a novel strain-insulator of that class now commonly employed in the overhead construction of electric railways and to a novel method of making the said insulator.

Strain-insulators of the class referred to are composed of two interlocking metallic members separated from each other by non-conducting material, the purpose of which is to insulate or electrically separate the said metallic members. These strain-insulators when suspended in operative position are in practice subjected to a severe or great tension, usually about two thousand pounds, and in the summer time the insulator is subjected to the heat of the sun, which heat is estimated to approximate 140° Fahrenheit.

Under the conditions imposed upon strain-insulators in practice it has been found that the insulating material enveloping and separating the metallic members of the majority of insulators becomes cracked, which cracks penetrate or extend through the mass of insulation material to such distance as to permit water or moisture to enter them and effect an electrical connection between the metallic members of the insulator, thereby destroying the efficiency and usefulness of the device for insulating purposes.

It is the purpose of this invention to provide a strain-insulator of a novel construction in which the objectionable features above referred to are avoided, and in accordance with this invention the strain-insulator is provided between the metallic members with an insulation which is incompressible at or about the temperature and tension of use, so that when the completed insulator is subjected to the working strain at a temperature approximating 140° Fahrenheit the insulating material separating the metallic members is not compressed, but remains practically immovable, and as a result the mass of insulating material enveloping the metallic members and the insulation between them is not subjected to movement when the insulator is in use, and consequently is not cracked or opened for the admission of moisture to the metallic members of the insulator. The insulating material separating the metallic members of the insulator and which is incompressible at the temperature and tension of use may and preferably will be of a superior quality to the insulating material which is used as an enveloping material for the said metallic members, and therefore a superior and cheap insulator may be obtained. The incompressible insulation separating the metallic members may be subjected in the process of manufacture of the strain-insulators to a compression substantially equal to or greater than that to which it is subjected in practice, or the said material may be made of a character which is incompressible under the tension of use. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 represents in section and elevation one form of strain-insulator embodying this invention, and Fig. 2 a detail in perspective to be referred to.

The strain-insulator herein shown as embodying this invention is provided with two metallic members A A′, which may be of any suitable or usual construction, but in the present instance each member is shown as composed of a plurality of parts.

The member A, as herein shown, consists of the substantially spherical or ball-shaped body a, open at its center and sides and provided with the inwardly-extended arms or ledges a' a^2, separated by the slot or opening a^3, the said spherical or ball-shaped piece having a boss or projection a^4, through which and the piece a extends a threaded hole or opening a^5. The threaded hole or opening a^5 has extended through it a threaded rod a^6, upon the outer end of which is screwed the threaded hollow end of an eyepiece a^7, provided with an eye a^8.

The member A′, as herein shown, consists of a rod b, provided with the head b', which enters the hollow body a of the member A and is interlocked therewith, the said rod b being inserted into the slct or opening a^3 and

being separated from contact therewith. The outer end of the rod *b* is shown as screw-threaded and is engaged by the threaded socket in the end of the eyepiece b^3, provided with the eye b^4.

The members A A′, in accordance with this invention, are electrically separated from each other by a layer or body *c* of insulating material, which is practically incompressible at the temperature and tension of use, which temperature is approximated to be about 140° Fahrenheit, and which tension in overhead electric railways as now commonly constructed is about two thousand pounds. This insulating material *c* is interposed between the head *b′* of the member A′ and the arms a' a^2 of the member A and may be made of solid material, such as porcelain, having its contacting surfaces made flat or smooth, or it may be of a material or composition capable of being compressed and which remains in its compressed condition.

The insulating material *c* when made of compressible material may be compressed in the mold in which the insulator is made and during the process of manufacture, or it may be compressed separately and then placed in the mold.

The insulation *c* may be made in separate pieces, or it may be made in one piece in the form of a washer.

The metallic members A A′ of the insulator are enveloped by a mass *d* of plastic insulating material, which may be of a cheaper grade than the insulation *c* and which fills the hollow body portion *a* of the member A and envelops both metallic members after the manner shown.

The mass *d* of insulating material is herein shown as spherical in form, but it may be of any other desired shape.

In order to prevent movement of the members A A′ away from each other, a second layer or body *e* of insulating material incompressible at the temperature and tension of use is inserted between the head *b′* and the rod a^6, and this layer or body when made of compressible material may be compressed in the manufacture by screwing upon the rod a^6, or it may be compressed before being inserted into the mold, or it may be composed of substantially incompressible material.

From the above description it will be seen that when the insulator is made the insulation *c e*, being substantially incompressible at the temperature and tension of use, will prevent movement of the metallic members A A′ toward or from each other, and therefore the mass *e* of insulating material will not be subjected to disruptive action or movement liable to produce cracks in it, which would permit the moisture to enter the said mass and effect a connection between the metallic members A A′. So, also, it will be seen that the mass *d* may be made of a substantially cheap or inferior grade of insulating material without sacrificing the efficiency of the insulator.

Inasmuch as movement of the metallic members A A′ of the insulator is prevented, as above described, the mass *d* of insulating material may be semisolid, and thus incapable of fracture—such, for instance, as tar mixed with other material—and when such a mass *d* is employed a non-conducting jacket or envelop *d′* may be used to retain the semisolid mass in the desired form.

The jacket *d′* may be made in two parts of porcelain or other suitable material, which parts may be secured together, as by screws or bolts d^2 or in any other suitable manner.

By the term "incompressible body" I desire it to be understood as meaning a body which when subjected to compression in one direction does not yield by movement in other directions in contradistinction to a body which when subjected to compression in one direction does yield or move in other directions.

By reference to Fig. 1 it will be seen that the insulation *c* is not walled or bound by the metallic members, so as to prevent lateral movement of the insulation *c* if said insulation were compressible at the temperature of use.

I claim—

1. A strain-insulator composed of interlocking members, one of which is provided with a head and the other of which is provided with a threaded opening, a threaded rod inserted through the said threaded opening, a layer of insulating material interposed between said interlocking members, a second layer of insulating material interposed between the threaded rod and the said head, the said threaded rod being adapted to place the layers of insulating material under strain previous to their being enveloped with the insulating material, and a mass of insulating material enveloping said members and layers and compressible at the temperature and tension of use, substantially as described.

2. A strain-insulator composed of interlocking metallic members, an interposed body of insulating material incompressible at substantially the temperature and tension of use specified, an enveloping mass of insulating material compressible at the temperature and tension of use, and an inclosing jacket for the compressible insulating material, substantially as described.

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

HENRY CARMICHAEL.

Witnesses:
JAS. H. CHURCHILL,
J. MURPHY.