(No Model.)

M. D. LAW.

INSULATOR.

No. 532,160. Patented Jan. 8, 1895.

Fig. 1.

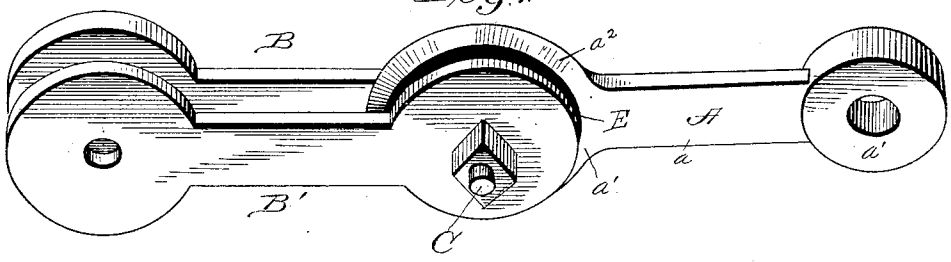


Fig. 2.

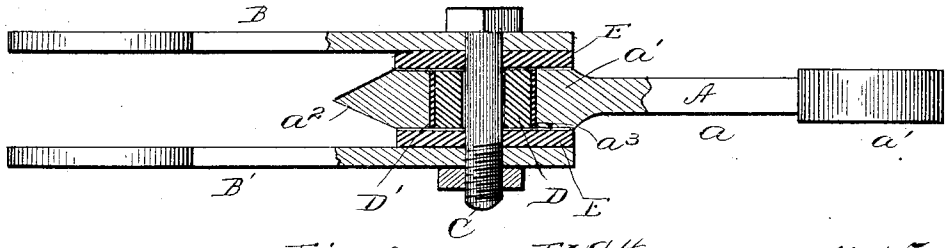


Fig. 3.

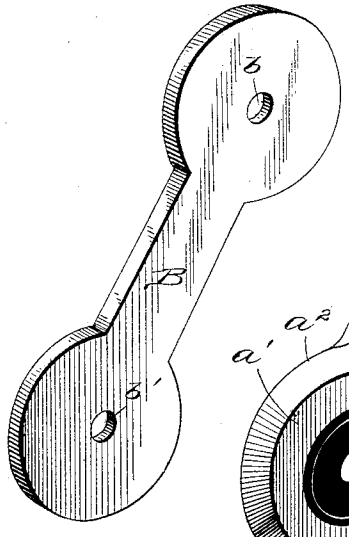


Fig. 4.

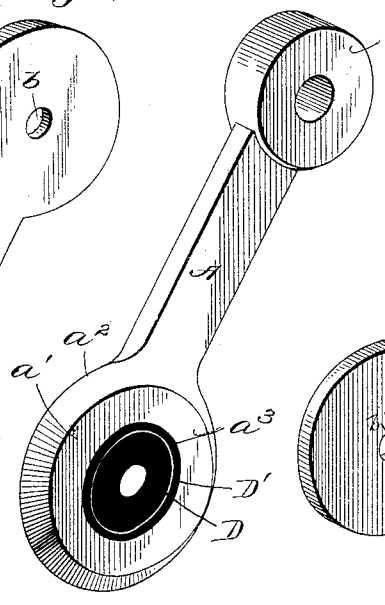
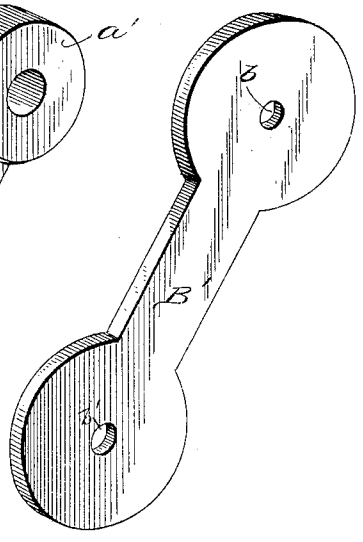


Fig. 5



Witnesses:
J. M. Fowler Jr.
K. H. Banks.

Inventor:
Myron D. Law
By Dayton, Poole & Brown
his Attys.

UNITED STATES PATENT OFFICE.

MYRON D. LAW, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO ALBERT G. WHEELER, OF CHICAGO, ILLINOIS.

INSULATOR.

SPECIFICATION forming part of Letters Patent No. 532,160, dated January 8, 1895.

Application filed August 29, 1893. Serial No. 484,309. (No model.)

To all whom it may concern:

Be it known that I, MYRON D. LAW, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Insulators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to strain and other insulators for electrical conductors, or electric wiring generally.

Strain insulators now in use, comprising interlocked metal eyes or links embedded in insulating material, have proved unserviceable and unreliable owing to the fact that under extremes of temperature the metal eyes or links will, by their expansion, split the surrounding body of insulating material, or by contraction shrink away from said insulating material and permit the entrance of moisture between the metal and insulating material, which results in the disintegration of the latter and the consequent destruction of the insulator as a whole.

The object of this invention is to avoid the objections here noted, and provide a strain insulator that will remain serviceable under opposite extremes of temperature.

To this end the invention consists in the matter to be hereinafter described in detail, and then pointed out in the claims at the close of this specification.

In the accompanying drawings, Figure 1 is a perspective view of a strain insulator embodying my improvements. Fig. 2 is a side elevation, partly in section, of the same. Figs. 3, 4, and 5 are detail perspectives of the parts of the insulator detached.

My invention, broadly considered, embodies the principle of protecting the insulating material by metal casings or shields forming part of the insulator, thereby avoiding the liability of disintegration from exposure to moisture, or damage through contraction of the metallic parts of the insulator, and also of providing clearance space between any inclosed metallic part and the surrounding body of insulating material, thereby avoiding any liability of said surrounding insulating material to split upon the expansion of said inclosed metallic part.

The form of mechanical devices designed to carry out my invention, which is illustrated in the drawings, comprises a central link A and side links B, B′ secured thereto at one end by a bolt C.

The central link A, comprises a shank a at each end of which is formed a boss a' pierced transversely to receive a pin or bolt or other connecting device. The boss a' at the outer or free end of the link may, if preferred, be finished in the form of a hook to engage a link or shackle. The boss a' at the inner end of the link A, is preferably, to give strength at this point, provided with an exterior central fin or web a^2, while the transverse opening therein is enlarged to form a circular chamber a^3 within which is seated a body of insulating material, through a central aperture of which the connecting bolt C passes. This central aperture in the insulating material is of such greater diameter than the securing bolt C, that under no circumstances can the metal of the bolt expand laterally to a sufficient degree as to exert an outward pressure upon said insulating material.

Heretofore in conducting successful experiments as to strain, and as to insulation, the insulator used within the chamber a^3 of the boss a' comprised a ring or tube D of vulcanized fiber, surrounding the bolt C, and a separate ring or tube D′ of sheet mica interposed between the tube D and the walls of the chamber a^3. The ring or tube D′ has been made of a size and thickness to fit tightly within the annular space between the periphery of the insulator tube D and the surrounding walls of the chamber a^3, and when so applied serves to center said insulator ring D within the chamber and maintain it in position, while adding to the efficiency of the insulators, by reason of the superior qualities of the mica as an insulating material. In this connection I would state that my purpose in employing a ring of vulcanized fiber next to the securing bolt C is to use an insulating material of great strength to withstand the strain to which it is subjected, as it will be apparent that the entire strain to which the insulator, as a whole is subjected, is brought

upon the body of insulation (D and D′) interposed between the securing bolt C and the walls of the chamber a^3 of the link A. It will be understood also that I do not intend to confine myself to the employment of vulcanized fiber in this connection as other homogeneous insulating material may be found to be equally, or more advantageous.

The side links B and B′ of the insulator comprise lengths of metal provided at the ends with apertures b b', those b at the inner end being designed to receive the securing or clamping bolt C, by means of which said links B and B′ are connected with the link A.

I do not wish to confine myself to the employment of two links B and B′ to form one end or member of the insulator as it will be seen that a single link bifurcated at one end to straddle the boss a' at the inner end of the link A, may be used, if preferred.

Disks E of mica are interposed between the sides of the boss a' at the inner end of the link A, and the side links B and B′, thus entirely avoiding metallic contact between the links forming the opposite ends of the insulator.

It will be apparent that the tubular insulator D may be of such length as to extend beyond the walls of the chamber a^3 and abut against the side links B B′, thus dispensing with the mica insulating disks E, or said insulator may be made in two parts, each provided with a flange to lie between the side links B B′ and the central link A.

It will be observed that in the insulator described the exterior parts of the insulating material or those which are exposed at the outside of the insulator rest between opposing metal parts which are held or clamped against them so as to prevent access of moisture to the inner portions of the insulator. Thus in the particular construction illustrated in the drawings, the marginal parts of the perforated disks or washers E are clamped between the opposing surfaces of the links so as to prevent moisture passing between the links and said washers and thus reaching the interior of the insulator. The feature of construction last referred to obviously enables those parts of the insulating material which surround or inclose any of the metallic parts to be loosely fitted thereon without danger of the admission of moisture between the parts; that is to say, in the construction illustrated, the sleeve D may be fitted loosely on the bolt C so as to avoid liability of injury to the said sleeve by expansion of said bolt under the action of heat, any access of moisture to the surfaces of the sleeve and bolt being prevented by the clamping of the metallic parts against the margins of said washers E. No breakage of, or injury to the insulator by expansion lengthwise of the bolt C can obviously occur because such expansion will merely serve to lessen rather than increase the pressure on the inclosed insulating material. Such expansion lengthwise of the bolt will, however, have no effect to loosen or open up the joints between the margins of the washers E E and the metal parts between which they are clamped because said metal parts will expand under the action of heat and contract under the action of cold, practically to the same extent as will the bolt C. An important advantage is however gained by the use of a mass of mica, either in its natural form or formed by sheets of mica cemented together, as a material for constructing said washers for the reason that the same is slightly compressible when pressed flatwise or at right angles to the sheets or layers composing it, so that it may slightly decrease or increase in thickness under the expansion or contraction of the metal parts between which it is clamped without opening any joints for the admission of moisture.

The employment of the outer sleeve or tube D′ of mica in addition to the inner sleeve or tube D is of advantage because affording a continuous layer of mica, which is one of the best known insulating materials, between the said metal parts of the insulator, while at the same time giving ample strength to the parts, it being obvious that, inasmuch as said sleeve is made of a strong and non-friable material, the heavy strain coming on the small central aperture of the sleeve D by lateral pressure of the bolt thereon, will be safely sustained by the sleeve and will be distributed upon said mica sleeve D′ through the medium of the larger external surface of the said sleeve D so that said bolt will have no tendency to break or fracture the mica as might occur in case the bolt rested directly in contact with the same.

An advantage gained by the use of a bolt and links arranged as illustrated is that the bolt enables the parts to be clamped at any desired angle with relation to each other. It is not, however, intended that a pivotal or swinging joint shall be made between the links, the necessary clamping together of the metallic parts for the purpose of excluding moisture precluding any movement of the same relative to each other.

It will of course be understood that the main features of my invention as above described may be carried out by the use of metallic parts of other forms than links and that the mass of insulating material may be of other form than shown. Certain of the specific features illustrated are, however, in themselves novel and valuable and are herein specifically claimed as part of my invention.

I claim as my invention—

1. An insulator comprising metallic parts, means for clamping the same together, and insulating material interposed between the parts, which material, in the portions thereof subjected to strain in the use of the insulator, consists of rubber fiber or other homogeneous insulating material and in the portions thereof subject to the clamping action of the metallic parts, by which moisture is excluded from

the interior of the insulator, is formed of sheet mica, substantially as described.

2. An insulator comprising outer metallic parts and an inner apertured metallic part, a securing bolt passing through the aperture of the inner part and engaging the outer parts, a sleeve of rubber, fiber or other homogeneous insulating material located within the aperture of the inner part and surrounding the bolt and separate rings or washers of sheet mica interposed between the said inner and outer parts and which are clamped flatwise between said parts by the action of said bolt to exclude moisture from the interior of the insulator, substantially as described.

3. An insulator comprising outer metallic parts and an inner apertured metallic part, a securing bolt passing through the aperture of the inner part and engaging the outer parts and acting to clamp said parts together, a sleeve of rubber, fiber or other homogeneous insulating material located within the aperture of the inner part and surrounding the bolt and perforated disks or washers of sheet mica interposed between the said inner part and the outer parts and closely surrounding the bolt at their inner edges, substantially as described.

4. An insulator comprising outer metallic parts and an inner apertured metallic part, a securing bolt passing through the aperture of the inner part and engaging the outer part, a sleeve of rubber, fiber, or other homogeneous insulating material located within the aperture of the inner part and surrounding the bolt, and perforated disks or washers of sheet mica interposed between the said inner part and the outer parts and which are clamped between said parts by the action of the bolt to exclude moisture from the interior of the insulator, said sleeve being made to loosely fit the bolt but being adapted to take the strain coming on the parts in the use of the insulator, substantially as described.

5. An insulator comprising outer metallic parts, an inner apertured metallic part, a securing bolt passing through the aperture of the inner part and engaging the outer parts, a sleeve of rubber, fiber or other homogeneous insulating material surrounding the bolt within said aperture and adapted to take the strain coming on the parts in the use of the insulator, a second sleeve of mica surrounding the first sleeve, and perforated disks or washers of sheet mica applied between the inner and outer metallic parts and clamped between the same by the action of the bolt, to exclude moisture from the interior of the insulator, substantially as described.

6. An insulating support for electric conductors embracing two metallic members provided at their meeting ends, one with a tubular chamber, and the other with a lateral connecting bolt, said chamber being lined throughout with an insulating sleeve through which the connecting bolt passes, said sleeve being supported by the surrounding chamber against the lateral pressure of the connecting bolt, substantially as described.

7. An insulator for electric conductors, comprising a tubular body of insulating material, an interior metallic part located within said tubular body, an exterior metallic part surrounding the said tubular body and extending from end to end of the same, attaching or holding means attached to the inner metallic part, and provided with plates which are located at both ends of the tubular body, rings or washers of insulating material located between the said plates and the ends of the said exterior metallic part, and holding or attaching devices upon said exterior metallic part, substantially as described.

8. An insulating coupling for electric conductors comprising links coupled at one end by a bolt, one of said links being provided with a chamber within which the coupling bolt is seated, and insulating material lining the walls of said chamber and provided with an aperture for the reception of the coupling bolt, but of greater diameter than said bolt, substantially as described.

9. An insulator comprising a central link provided at one end with a chamber, side links, a coupling bolt, and insulating material fitting closely within the chamber of the central link and provided centrally with an aperture of greater diameter than the coupling bolt, substantially as described.

10. An insulator comprising a central link provided at one end with a chamber, side links, a coupling bolt, insulating material loosely surrounding the coupling bolt and fitting closely within the chamber in said link, and disks of insulating material interposed between said central and side links, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

MYRON D. LAW.

Witnesses:
C. CLARENCE POOLE,
TAYLOR E. BROWN.