(No Model.) **M. H. HATHAWAY & J. KELLEHER.**

A. L. HATHAWAY, Administratrix of M. H. HATHAWAY, Deceased.

INSULATOR FOR TROLLEY WIRES.

No. 493,713. Patented Mar. 21, 1893.

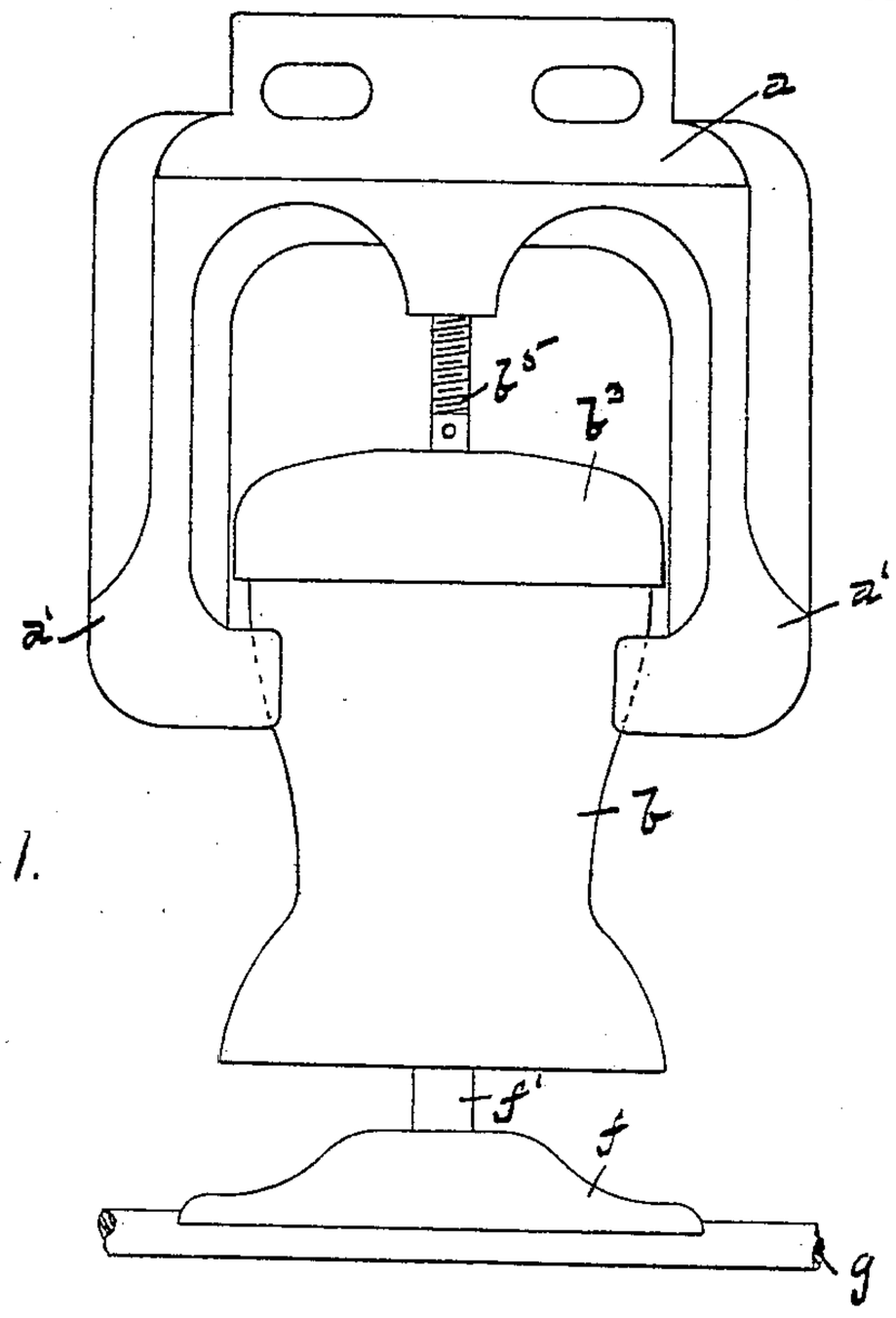

Fig 1.

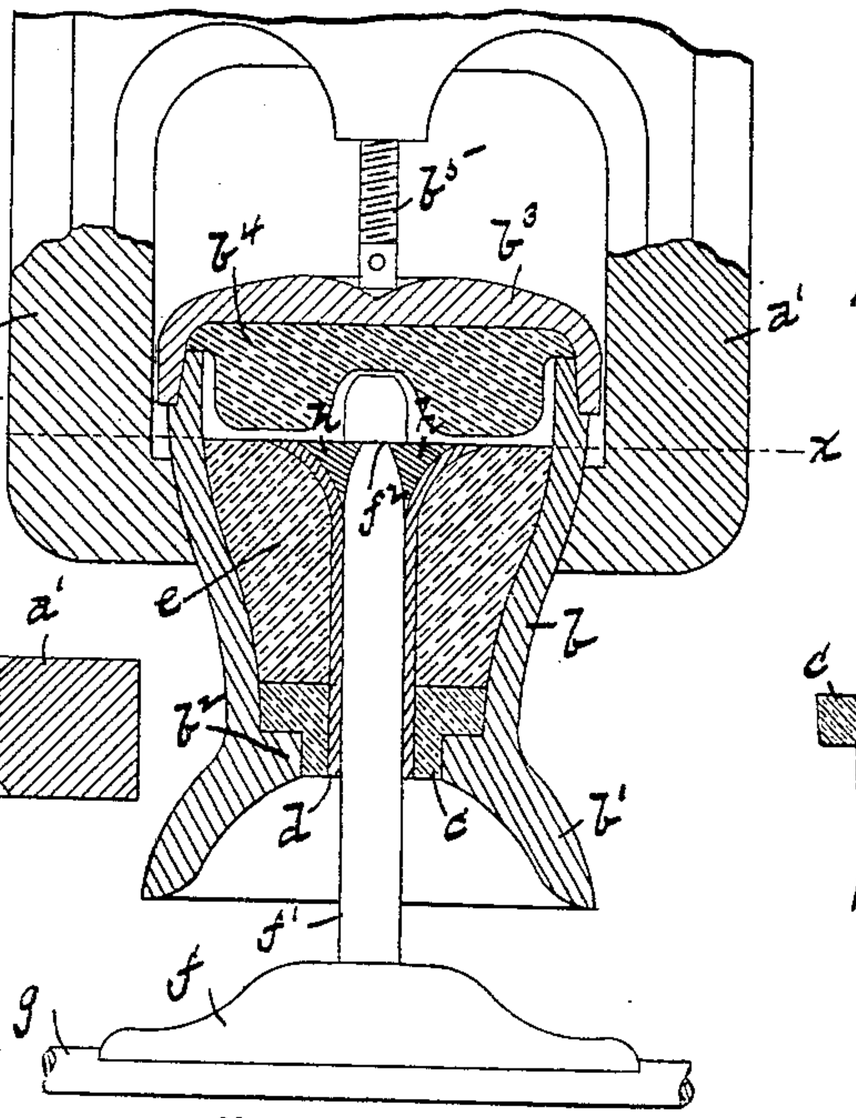

Fig 2.

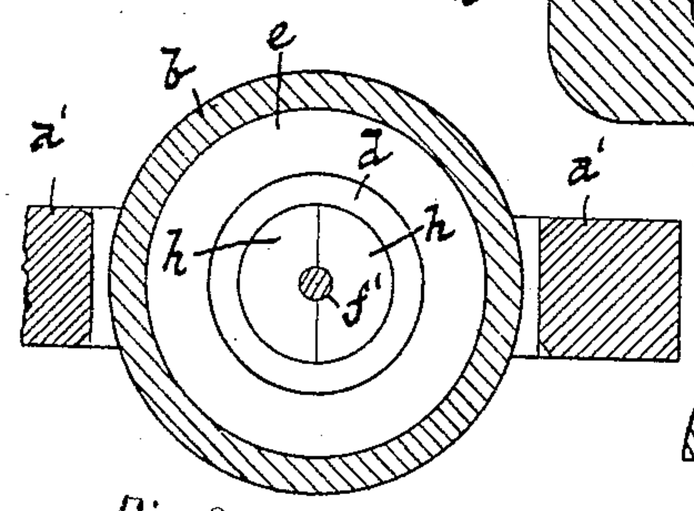

Fig 3.

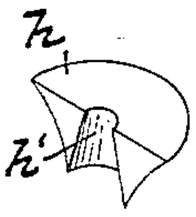

Fig 4.

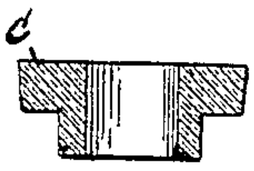

Fig 5.

Witnesses
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UNITED STATES PATENT OFFICE.

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INSULATOR FOR TROLLEY-WIRES.

SPECIFICATION forming part of Letters Patent No. 493,713, dated March 21, 1893.

Application filed April 2, 1892. Serial No. 427,464. (No model.)

To all whom it may concern:

Be it known that we, MERRILL H. HATHAWAY, of Springfield, in the county of Hampden and State of Massachusetts, and JOHN KELLEHER, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Insulating-Hangers for Trolley-Wires, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Our invention relates to devices for supporting overhead trolley wires in what are known as "overhead" systems of propulsion of street and other cars by electricity.

The objects of our invention are to provide a hanger for this purpose which, while affording perfect insulation to the wire, will possess great strength and durability; which cannot be broken by the contacts of the trolley wheel therewith; which will be entirely protected from moisture; and, the parts of which can be locked together by a simple upward movement of one part within the other.

To these ends our invention consists in the hanger constructed and operating as hereinafter fully described and particularly pointed out in the claims.

Referring to the drawings, in which like parts are designated by like letters in the several figures, Figure 1 is a side elevation of a hanger embodying our invention. Fig. 2 is a vertical section thereof. Fig. 3 is a cross-section taken upon line x—x of Fig. 2. Fig. 4 is a detail view of one of the wedge blocks. Fig. 5 is a vertical section of the insulating bushing.

The letter a designates the yoke, having the depending arms a', which is adapted at its upper end to be rigidly secured to a bracket-arm or span wire as the case may be, and forms the support for the other parts of the hanger, said yoke being preferably composed of iron or other metal. At their lower end the arms a' of said yoke have their adjacent faces concaved transversely and tapered vertically, to adapt them to serve as a seat for the shell or casing b, which is preferably composed of metal, and which is substantially cup-shaped or tapers gradually from its upper end toward its lower end where it terminates in the depending, bell-shaped flange b'. Said shell or casing is thus adapted to be rigidly supported between the arms of the yoke, and, at the same time, to be readily removed therefrom by raising it from its seat and withdrawing it laterally from between the arms. Near its lower end the shell b is provided with the internal, annular flange b^2, upon which rests a bushing c composed of any insulating material, preferably hard rubber or other fibrous material, which bushing is bored to receive a tube d, preferably of metal, which projects upwardly within the shell and has its upper end flared outwardly as shown. The bushing c projects downwardly between the face of the flange b^2 and said tube thus perfectly insulating the latter at its lower end, while, surrounding said tube above said bushing, is a lining or block of insulating material e, which perfectly insulates the upper portion of the tube and affords vertical support thereto by reason of the flaring upper end thereof. Said lining or block e can be previously molded to the desired form from any suitable insulating material and then be inserted within the shell, in which case the tube d is afterward inserted by passing it downwardly through the lining and bushing c, or the tube can be first inserted and the material of which the lining is composed poured into the shell in plastic form and allowed to harden about the tube, as may be most convenient, and the bushing c and lining e can be formed integral with each other if desired, it being essential merely that the tube d shall be entirely insulated from the shell and yet be retained within the latter in such manner as to be capable of supporting a considerable weight. The shell b is provided with a removable cap or cover b^3, preferably of metal, the inner side of which is provided with a lining b^4 of insulating material, which cap closely fits upon the shell in such manner as to exclude all moisture from the latter. Any suitable means for locking the cap in position upon the shell can be employed, the means shown by us consisting of a screw b^5 entering a tapped hole in yoke a and adapted to be lowered upon the

cap, said screw being provided with a squared lower end or with a spanner-hole as shown, to enable it to be readily raised and lowered.

The letter *f* designates the usual metallic ear, which is soldered or otherwise rigidly connected to the trolley wire *g*, said ear having the metallic stem *f'* formed integral therewith or secured thereto in any suitable manner, which stem preferably has its upper end slightly tapered as shown, and is provided just below said tapered end with the annular shoulder f^2. To engage said shoulder on the stem and afford vertical support to the latter within tube *d*, we provide wedge-blocks *h*, tapered to correspond with the taper of the upper end of the tube and having a flat upper surface. As shown said blocks have the form of two half-cones, each of which contains one half of a central orifice *h'*, which preferably decreases in diameter from the bottom toward the upper side of said blocks, and, at said upper side, is of substantially the diameter of stem *f'* below shoulder f^2. Said blocks being placed loosely within the flaring upper end of the tube *d*, are adapted to be raised by the end of said stem, as the latter is thrust upwardly within the tube, sufficiently to permit the stem to pass between them, until shoulder f^2 passes said blocks, whereupon they drop to the position shown in Fig. 2, beneath said shoulder, and securely lock the stem against downward movement. Said wedge-blocks are preferably made of metal and, in connection with the metallic tube *d* and stem *f'*, afford a very strong and durable support for the trolley wire, which is, at the same time, perfectly insulated.

In stringing a trolley wire, the yokes *a* are properly secured to the bracket arms, span wires or other supports provided for the wire, and the shells *b* are dropped into their seats in said yokes, with the wedge-blocks *h* resting loosely in the flaring upper end of the tubes *d*, and the caps or covers b^3 removed. The trolley wire, having the ear *f* and its stem *f'* soldered thereto, is raised to a position beneath one of the shells *b* and said stem is thrust upwardly within the tube *d* until its shoulder f^2 passes the upper end of the wedge-blocks as before described, whereupon the latter drop beneath said shoulder and lock the stem within the tube. Cover b^3 is then applied to the shell and screw b^5 is lowered thereon, and the linemen pass on to the next support, and so on until the entire wire has been strung.

It will thus be seen that the operation of stringing a wire is very greatly expedited as compared with the time consumed in such operation in connection with the forms of insulators heretofore employed. It will be observed, furthermore, that the wire, when so strung, is held, in the plane of each of its supports, against movement in any direction, the cover b^3 and blocks *h* preventing movement thereof vertically and the long bearing of stem *f'* within tube *d* preventing lateral movement thereof. Again, it will be noted, we provide a metallic bearing for the upper end of stem *f'* and thereby gain a strength and durability for said bearing which cannot be secured by making it from insulating material as heretofore, and which has to be renewed frequently in order to retain the stem within the shell. If for any reason it is desired to remove the stem *f'* from the shell it can be readily done by removing cover b^3, slightly raising the stem, and removing the wedge-blocks, which permits the stem to be withdrawn from the tube *d*. Another important advantage gained by our construction is the perfect protection from moisture afforded to the interior of the shell, the cover b^3 affording such protection to the upper end of the shell, and the flange *b'*, at the lower end thereof, the latter forming a perfect water-shed.

The screw b^5 not only securely holds the cover upon the shell but also holds the latter against vertical movement within the arms of the yoke, but it will be understood that other means for securing the latter result can be employed, or that the casing can be rigidly and permanently secured to the arms of the yoke if desired. We prefer the construction shown, however, because it enables us to insert a strip of insulating material between the ends of the yoke-arms and the shell and thereby prevent all possibility of a grounding of the circuit should the trolley wheel, by any means, be moved into contact with the shell and the wire at the same time.

As before stated, we prefer to make the shell of metal for the purpose of securing great strength and durability and enabling it to withstand the violent blows from the trolley wheel to which they are frequently subjected, but wood and other materials possessing rigidity and strength can be used therefor within the spirit of our invention. The particular form of the yoke *a* can of course be varied as may be desired. By adapting the stem *f'* to be connected to the shell by an upward movement simply, we are enabled to make said stem and the ear *f* integral with each other and thereby greatly facilitate the operation of soldering the latter to the wire as well as the operation of stringing the wire as before described.

While we have devised our improved hanger with especial reference to the support of trolley wires as described, it is obvious that it is adapted to be utilized as an insulating support for conductors of electricity generally, and we design to so apply it.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An insulating hanger for trolley wires consisting of a substantially cup-shaped shell having means whereby it can be suspended from a bracket-arm or other support and having an opening in the bottom thereof, a metallic tube extending upwardly within said shell, a lining of insulating material entirely

surrounding said tube within the shell, a metallic stem adapted to enter said tube and having at its lower end means whereby it can be rigidly secured to a trolley wire, and means substantially as described for securing said stem in position within said tube, substantially as set forth.

2. An insulating hanger for trolley wires consisting of a substantially cup-shaped shell having an opening in the bottom thereof and having located within said opening a bushing of insulating material, a metallic tube extending upwardly through said bushing into said shell and having its upper end flared outwardly, a lining of insulating material surrounding said tube within the shell, a stem adapted to be thrust upwardly within said tube and having at its lower end means whereby it can be secured to a trolley wire, said stem being provided with a shoulder at or near its upper end, suitable wedge-blocks adapted to enter the flaring portion of said tube and by their engagement with the shoulder on said stem retain the latter within the tube, and means, as a yoke, for suspending said shell from a suitable support, substantially as set forth.

3. An insulating hanger for trolley wires, consisting of a metallic shell having an opening in the bottom thereof and provided with a removable cap or cover lined with insulating material, a metallic tube extending upwardly within said shell, a lining of insulating material surrounding said tube within the shell, a metallic stem adapted to be thrust upwardly within said tube and having means at its lower end whereby it can be secured to a trolley wire, locking means for retaining said stem within the tube, and a yoke for suspending said shell from a bracket-arm or other support, substantially as set forth.

4. In an insulating hanger for trolley wires, a yoke adapted to be secured to a bracket-arm or other support and having depending therefrom two arms, a substantially cup-shaped shell adapted to be inserted between and supported by the arms of said yoke, said shell having an opening in the bottom thereof and a removable cap or cover at its upper end, a vertically movable screw entering a tapped hole in said yoke and adapted to be lowered upon said cap or cover to retain the latter upon the shell and to retain the shell between the yoke-arms, a stem adapted to be thrust upwardly through the opening in the bottom of said shell and carrying at its lower end an ear for securing the same to a trolley wire, a lining of insulating material surrounding said stem within the shell, and means for locking the upper end of said stem within the shell, substantially as set forth.

5. In an insulating hanger for trolley wires, a supporting yoke, a shell adapted to be suspended from said yoke, said shell being of a greater diameter at the top than at the bottom thereof and having depending from said bottom an annular bell-shaped flange, a tube extending upwardly through the bottom of said shell, which tube is entirely surrounded by a lining of insulating material, a stem adapted to be thrust upwardly within said tube and having at its lower end means for securing it to a trolley wire, said stem having a shoulder near the upper end thereof, and means at the upper end of said tube for engaging the shoulder on said stem and retaining the latter within the tube, substantially as set forth.

6. The insulating hanger for trolley wires herein described, consisting of a supporting yoke, a metallic shell adapted to be suspended from said support, said shell having an opening in the bottom thereof and having a removable cover lined with insulating material, a bushing of insulating material located within the opening in the bottom of said shell, a metallic tube passing upwardly through said bushing into the shell and having a flaring upper end, a lining of insulating material surrounding said tube within the shell, a metallic stem adapted to be thrust upwardly within said tube, said stem carrying at its lower end an ear for securing the same to a trolley wire and having near the upper end thereof a transverse shoulder, and a plurality of metallic wedge-blocks adapted to occupy the flaring upper end of said tube and to project beneath the shoulder on said stem for retaining the latter within the tube, substantially as set forth.

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JOHN KELLEHER.

Witnesses:
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SAMUEL DOCTOR.