

(No Model.)

H. P. BALL & C. A. LIEB.
TROLLEY BREAKER.

No. 542,228.

Patented July 9, 1895.

FIG. 1.-

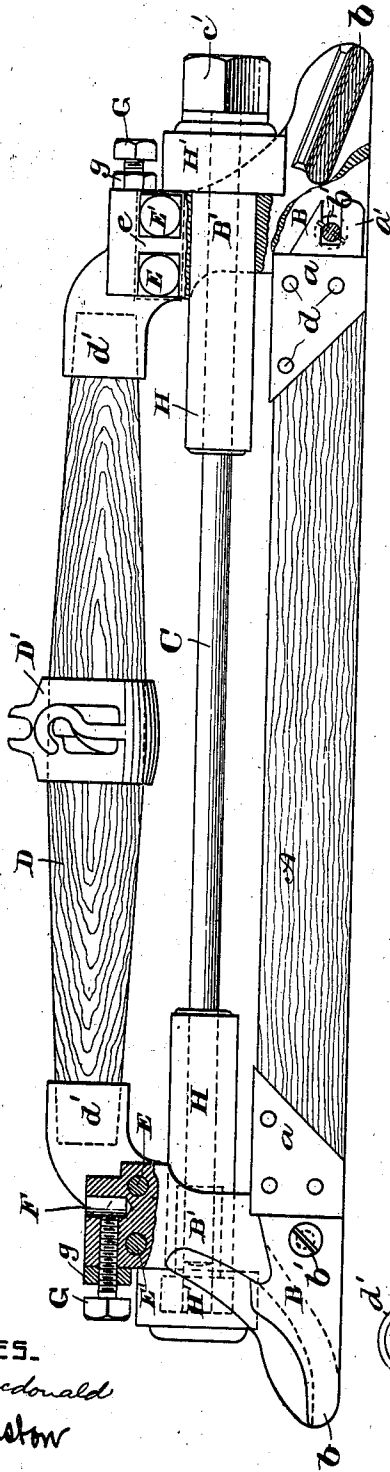


FIG. 4.-

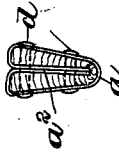


FIG. 3.-

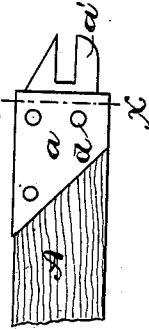


FIG. 2.-

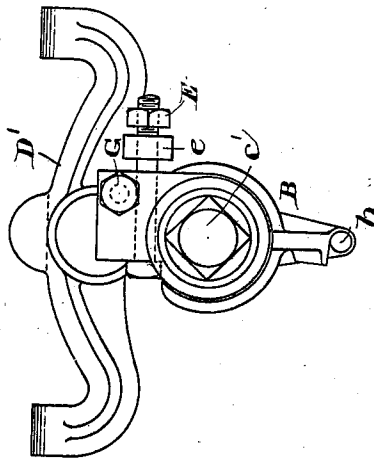
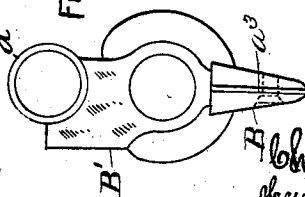


FIG. 5.-



WITNESSES.

A. F. Macdonald

J. G. Johnston

INVENTORS.

Charles A. Lieb and
Henry P. Ball, by
Geo. R. Burgett,
att'y.

UNITED STATES PATENT OFFICE.

HENRY PRICE BALL AND CHARLES ADAM LIEB, OF NEW YORK, ASSIGNORS
TO THE GENERAL ELECTRIC COMPANY, OF SCHENECTADY, NEW YORK.

TROLLEY-BREAKER.

SPECIFICATION forming part of Letters Patent No. 542,228, dated July 9, 1895.

Application filed August 8, 1894. Serial No. 519,719. (No model.)

To all whom it may concern:

Be it known that we, HENRY PRICE BALL and CHARLES ADAM LIEB, citizens of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Trolley-Breakers, of which the following is a specification.

Our invention relates to line-section insulators for trolley-lines, commonly called "trolley-breakers;" and it has for its object to provide an insulator of the kind described, which shall be at the same time strong and light and capable of easy repair without being removed from its position in the line, and also effective in its insulating qualities. To this end we arrange our insulator by making its lower and upper parts of wood, while the intermediate part, which serves to sustain the strain of the trolley-wire, is formed of metal. The end pieces securing the parts together are also formed of metal, the intermediate metallic part being carefully insulated from them, so that no current can leak across the insulator, while the two wooden bars are so connected in place that they may be readily removed and new ones substituted in their place without taking the insulator from its place in line, as already pointed out.

The accompanying drawings show an embodiment of our invention, and therein—

Figure 1 is a side elevation, and Fig. 2 an end view, of our improved trolley-breaker. Fig. 3 is a detail showing the construction of the lower arm; and Fig. 4 is a section upon the line X X of Fig. 3, showing the manner of supplying the metallic envelope. Fig. 5 is a vertical cross-section through one of the end pieces of the trolley-breaker.

A is the lower bar of the insulator, made of wood and having metallic envelopes *a a* thereon. (Better illustrated in Figs. 3 and 4.) This metallic envelope is formed with re-entering folds *a'*, adapted to secure it firmly in place, and through the folds and the wood are passed rivets or screws *d d*. A slotted tongue *a'* projects from the envelope, the whole being stamped out of a single piece of sheet metal and turned over to the form desired.

B B show the end pieces or heads of the trolley-breaker formed of a composition, such

as brass or bronze. The heads B B are each provided with a socket *a'*, open at the bottom and inner end of heads B, in which is located a slotted tongue *a'* of the arm A, the tongue *a'* being adapted to be moved into and out of position in the socket *a'* vertically through the bottom of head B. Screws *b'* pass through these heads and engage in the slotted tongue *a'* of the bar A to secure it in vertical position. Passing through these heads is a central bar C of iron, carefully insulated from the heads by a sleeve H of any appropriate insulating material. For this purpose, however, we prefer the insulating material known in the art as "Liebite," as it is readily molded in place under heat and pressure and then becomes adherent to the bar. Enlarged heads H' H' of this material are also formed to inclose the head of the bar C. One of these heads may be formed by upsetting the bar, or may consist of a large sleeve-nut having an interior thread, the particular construction being immaterial.

A nut *c'* projects beyond the other end of the trolley-breaker and forms a means of regulating the compression of the bar C, securing the two heads B B together. In the heads are formed grooves *b*, which are intended to receive the trolley-wire which passes up through these grooves, and is then held in place by the plates *e*. The bolts *EE'* being then tightened the plate *e* is forced against a part of the surface of the head B, with which it registers, and the trolley-wire is firmly clamped in place. A hole of proper size, indicated at F, is also provided, in which a feeder-wire may be inserted and secured in place by a set-screw G, provided with a lock-nut *g*, as best shown in section at the left in Fig. 1.

The upper or compression member of the trolley-breaker (which is, in reality, a truss in its construction) is indicated at D, and is also formed of wood, having ends finished to register with the sockets in the heads B. (Shown in dotted lines at *d' d'*.) A span-wire hook D' is also shown having a central opening embracing the bar. This is of ordinary construction, however, and forms no part of our invention in this particular case.

The use and operation of our improved trolley-breaker will be readily understood from the preceding description. It is erected by

attaching it to the span-wire by the hook D'. The trolley-wires are then inserted through the channels *b b* and brought around the bolts E E' and between the plate *e* and the surface of the metallic end piece B, after which the bolts are turned until the wire is firmly secured in place. If desired, it may be soldered into metallic connection, although this is not essential, as good contact is made by the pressure of the bolts. Feeder-wires are then inserted in the holes F and secured in place by the set-screws G, after which the span-wire is adjusted to bring up the trolley-breaker into alignment. The only part of the device subject to wear is the bar A, which, by reason of flashing as the trolley passes over it, in time becomes too weak or gets out of shape, so as to render the trolley liable to jump; but it may be readily renewed without disturbing the other parts of the trolley-breaker by removing the screws *b'* to permit the tongues *a'* to be drawn down out of the slots *a''* in the metallic end pieces B, and a new one may be inserted and the screws *b'* replaced to hold the bar A in place. In use longitudinal strain will tend to cause the upper bar D to be compressed by the upper portion of the heads B and the lower portion of the heads B to separate from the shouldered ends of the bar A. In this connection the slotted tongues *a'* are adapted to have an end-wise play on the screws *b'*, thereby permitting of an extension of the bottom member A.

The advantages of our improved construction are apparent, being lightness, with the increase of distance between the trolley-wire sections sufficient to insure a complete separation, (so that no arc will follow the trolley from one section to the other of the wire,) and ease of adjustment and repair. By our improved construction we get a weight less than two-thirds that of many trolley-breakers now in use, at the same time increasing the distance from one section to the other of the trolley-wire to double that of the ordinary patterns, and also getting great strength by reason of the tensile strength of the bar C.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A trolley breaker comprising metallic end-pieces, compression and extension members having their ends located in the metallic end-pieces, and a middle brace or bar being longitudinally adjustable and adapted to compress the parts in place.

2. As a new article of manufacture, a trolley breaker or line section insulator for electric conductors, consisting of metallic end pieces secured together by a central bar C of metal, insulated from such pieces and having an upper and lower bar of wood adapted to act as compression and extension members respectively, and means, substantially as described, for permitting the end pieces to move outwardly on the ends of the extension member and yet retain the latter in place.

3. A trolley breaker consisting of metallic end pieces and three longitudinal bars arranged in a vertical plane and spaced from one another, the top bar being a compression member and the lowest bar an extension member, said bars having their ends connected to and insulated from the metallic end pieces, and the lowest bar being removable from the metallic end-pieces without disturbing the other parts of the trolley breaker.

4. A trolley breaker consisting of metallic end pieces, three longitudinal bars, one of the outer ones of which is a compression member, and the other an extension member, means for permitting the end pieces to move outwardly on the ends of the extension member and yet retain the latter in place, the said three longitudinal bars being spaced from one another and having their ends connected to and insulated from the metallic end pieces, and means for adjusting the middle bar longitudinally.

5. As a new article of manufacture, a trolley breaker comprising an upper bar D of wood, a span wire attaching member D' thereon, a central bar C of metal, a lower bar A of wood having a metallic envelope *a* upon its ends, and metallic end pieces B, B; the central bar being insulated from the metallic end pieces and provided with adjustments for its length, whereby the insulator may be taken down or assembled without removing it from its place.

6. In a trolley breaker or line section insulator, a lower bar as A, of an insulating material, provided with metallic envelopes *a* having slotted tongues *a'*, the metallic envelopes being formed in a single piece.

7. In a trolley section insulator, the combination with the metallic end pieces B having a socket in their inner face, of the bar A of insulating material having the metallic envelopes *a* at its ends, with the open-ended slotted projection *a'* engaging and secured in the sockets in the pieces B.

8. A trolley section insulator composed of the following parts; end metallic pieces to receive the trolley and feed wires, having sockets on their lower inner face, a bar of insulating material sheathed with metal at its ends and detachably secured in the sockets of the end pieces, an intermediate metallic rod detachably secured to the end pieces and insulated therefrom, and a removable top-bar of insulating material carrying a metallic span wire bracket, the end pieces of the insulator being provided with plates and bolts for clamping the feed wires thereto.

In witness whereof we have hereunto set our hands the 27th day of July and 2d day of August, 1894, respectively.

HENRY PRICE BALL.
CHARLES ADAM LIEB.

Witnesses:

J. M. ZAPATIA, Jr.,
W. H. MOTT.