

(No Model.)

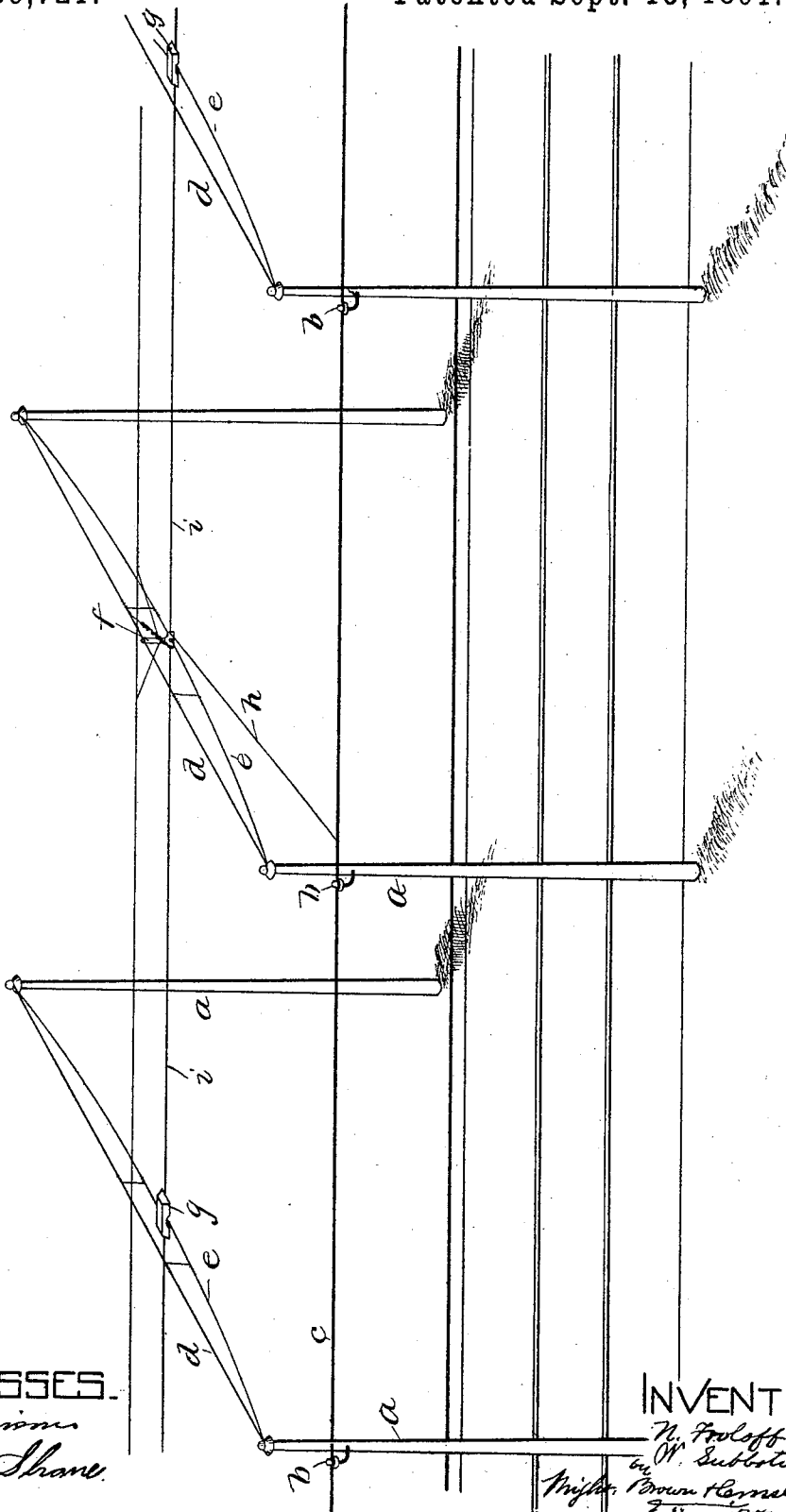
2 Sheets—Sheet 1.

N. FROLOFF & W. SUBBOTIN.
SAFETY CUT-OUT FOR OVERHEAD WIRES.

No. 459,721.

Patented Sept. 15, 1891.

Fig. 1-



WITNESSES.

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J. A. McShane.

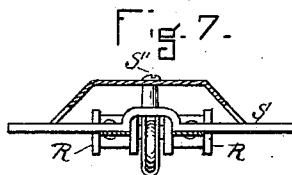
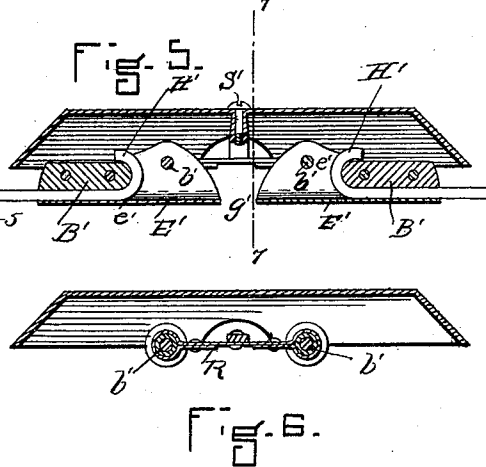
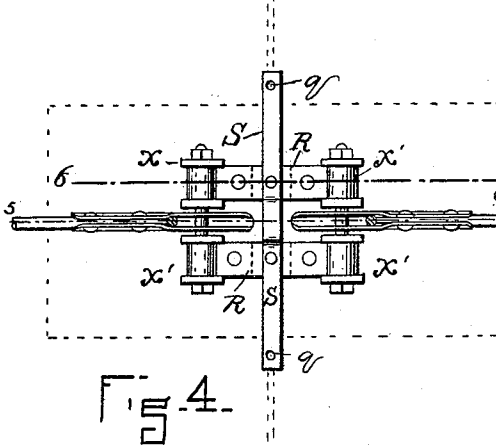
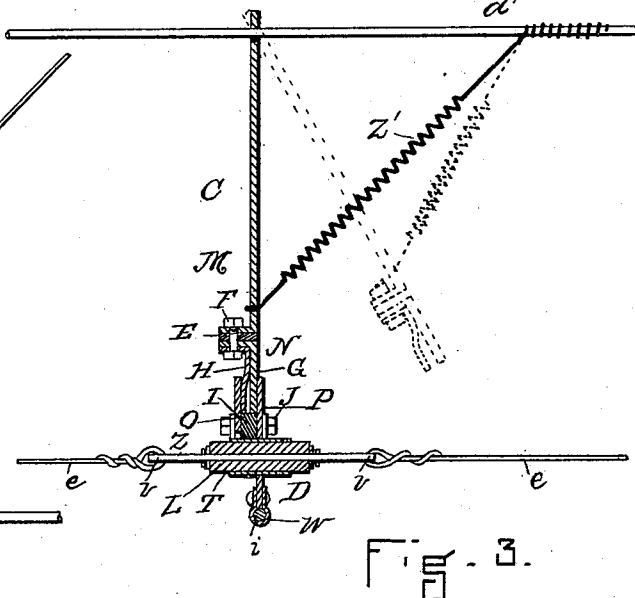
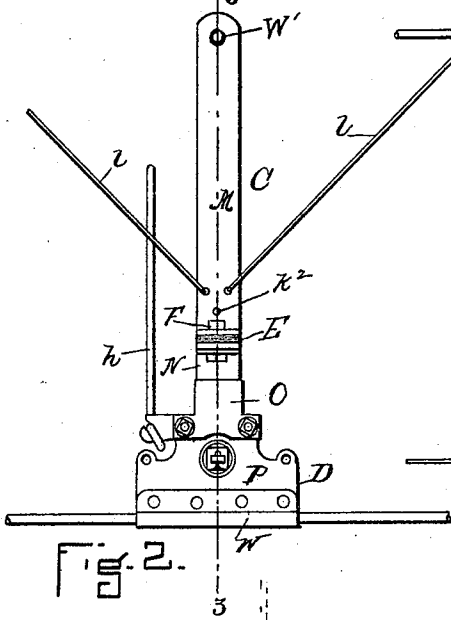
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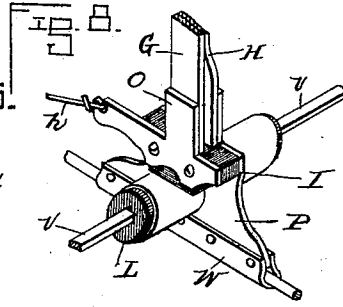
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UNITED STATES PATENT OFFICE.

NICHOLAS FROLOFF AND WILLIAM SUBBOTIN, OF BOSTON, MASSACHUSETTS.

SAFETY CUT-OUT FOR OVERHEAD WIRES.

SPECIFICATION forming part of Letters Patent No. 459,721, dated September 15, 1891.

Application filed February 7, 1891. Serial No. 380,571. (No model.)

To all whom it may concern:

Be it known that we, NICHOLAS FROLOFF and WILLIAM SUBBOTIN, both of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Overhead Electrical Conductors, of which the following is a specification.

Our invention relates to trolley-wires and the means for supplying the same with an electric current, the object being to so connect the trolley-wire with the supply-wire that in the occurrence of a break in the trolley-wire there will be no leakage in electricity, nor will there be any interruption in the flow of the electricity in the trolley-wire due to such break at any point other than the point of fracture and for a definite distance each side of such point, nor will there be danger of accident due to the falling of a live wire. We obtain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a section of a system of overhead wires provided with our device. Fig. 2 is a side elevation of a part of our safety device for hanging the trolley-wires and for supplying the same with electricity. Fig. 3 is a vertical sectional view of the same on the line 3 3, Fig. 2, the wire *h* for supplying the current to the plate O being omitted. Fig. 4 is a top plan view of our device for rendering each section of the trolley-wire entirely independent of the remainder of such wire, the cover (indicated by the dotted lines) being removed. Fig. 5 is a vertical sectional view of the same on the line 5 5 of Fig. 4, having the cover in place. Fig. 6 is a vertical sectional view of the same on the line 6 6 of the Fig. 4, with the cover in place. Fig. 7 is a vertical sectional view of Fig. 5 on the line 7 7. Fig. 8 is a perspective view of the lower part of the safety device.

Similar letters refer to similar parts throughout the several views.

The standards or poles *a*, Fig. 1, are the ordinary supports used in the erection of trolley-wires and are provided near their tops with insulators *b*, from which the delivery-wire *c* is suspended. The standards or poles *a* are furthermore supplied at their tops with caps from which the wires *d* and *e* extend

and to which in turn are affixed the safety device *f* and the insulators *g*.

h is a wire by means of which the electricity is conducted from the delivery-wire *c* to the trolley-wire *i*.

The insulators consist of a device, herein-after explained, by means of which that part of the trolley-wire included between such insulators is detached or isolated from the rest of the trolley-wire in the event of a break in the latter.

The safety device *f* consists of two parts C and D. Part C consists of two metallic sections M and N, which are insulated from each other by the insulating medium E, which is held in place by the bolt F. Section N of the part C consists of a metal sheet G and a metallic spring H, Fig. 3, which are held in place between the plates or jaws O and P of the part D by friction. Part D, Figs. 2 and 3, consists of two metallic plates O and P, of which the sheet P is in electrical connection with the trolley-wire *i* by means of the ear W, and plate O is in electrical communication with the delivery-wire *c* by means of the conducting-wire *h*.

The plate O is secured to the plate P by means of bolts J, a block I of insulating material being inserted between the two plates and the bolts being suitably insulated, in order that plates O and P may be in electrical communication with each other only through the parts G H. Electrical communication is finally established between the delivery-wire *c* and the trolley-wire *i* through the medium of the conducting-wire *h*, the plate O, the spring H, the plate G, and the plate P. A cover may be soldered to the plate O and another to the plate P, the two disconnected from each other, to protect the parts against ice, snow, and rain. Covers for a like purpose may be provided for other parts of the device wherever needed.

In the plate P at T is a metallic tube, which contains some suitable insulating material L, through which is passed a rod or bar Z, having at its extremities holes or loops *v*, through which the suspending wires *e* are passed and to which they are secured.

Z' is a spiral spring, one end of which is attached to the part C of the safety device at K, the other end being fastened to the sus-

pending wire d' for a purpose hereinafter set forth. At suitable points in the part C are fastened the two wire stays l , which prevent the undue movement or swaying of the upper part C of the safety device. Through the upper extremity of the part C is a hole W' , through which the suspending wire d' passes.

The isolating device, which is shown in detail in Figs. 4, 5, 6, and 7, is constructed as follows: It consists substantially of four hollow insulating-spools $x x' x' x'$, Fig. 4, connected in pairs $x x$ and $x' x'$ by the metallic bands R, which are in turn connected by the metallic yoke S, formed as shown in Fig. 7, which yoke is riveted to the bands R. Through the holes of the spools $x x' x' x'$ are passed two rods b' , joining the spools in pairs $x x'$, on which, between the spools $x x'$, is hung the wire-holders $E' E'$, isolated from each other by the space g' , each ear being provided between its folds with a block B' , so placed that the end of the trolley-wire i is brought through the tubular folding in the lower part of the ear e' and is bent upward in the form of a hook H' , clasping the block B' and being thus held in place. The whole isolating apparatus is suspended in its proper position by means of the wires E, which are suitably fastened through the holes q in the ends of the yoke S. This isolator is provided with a cap, as is indicated by the dotted lines y , Fig. 4, and in detail in Figs. 5, 6, and 7, to shelter it from the weather, the said cap being held in place by means of the screw S' , Fig. 5, which is screwed downwardly into the nut N' , which is suitably fastened in the center of the highest point of said yoke, as at F' .

Having thus explained the mechanism of our invention, we will proceed to describe the operation of the same.

As will be seen, the trolley-wire is divided into sections included between the "isolators" g , so called, because they isolate the sections. Each such section is supplied with electricity independently of every other section through the medium of the conducting-wire h and the safety device, as hereinbefore set forth. In the event of a break in any part of the trolley-wire i the weight of the wire on the farther side of the safety device from such break will cause a pull on the part D of the safety device in a direction toward the side where the wire is unbroken and will separate the said part from the part C of the safety device, owing to the plates O and P being drawn off the plate and spring G H, thereby breaking the electric circuit which was established through the medium of the said plates O, P, G, and H, and so severing the electrical communication between the delivery-wire c and the section of the trolley-wire i in which the break occurred, so that there will be no leakage of electricity to the earth due to the contact of the trolley-wire i at its broken end

with the earth, nor will there be danger of accident due to an electric shock in consequence of coming in contact with such wire. When the parts have been so separated, the part D does not fall owing to the supporting-wire e ; but it is moved laterally a slight distance by the weight of the trolley-wire at the unbroken side. The part C is prevented from moving in the same direction by the stay-wires l . At the instant of the separation of the parts C and D of the safety device, Figs. 2 and 3, the spiral spring Z' , acting upon the part C, draws it out of the way to the position as indicated by the dotted lines C' , Fig. 3, thereby entirely severing the current from the broken section of the trolley-wire, which current was established through the medium of the spring and plate H and G of the part C of the safety device.

It is to be observed that the breaking of the circuit or means of supplying a section of trolley-wire with electricity when the trolley-wire breaks is an important feature of our invention. It is also to be noted that changes may be made in the form and arrangement of parts comprising the improvement without departing from the nature or spirit of the invention.

Having thus explained the nature of our invention and described a way of making and using the same, though without attempting to describe all of the forms in which the invention may be constructed, we declare that what we claim is—

1. An overhead electrical conductor constructed in electrically-isolated sections, a wire for supplying an electric current to each of said sections, a circuit-breaker interposed between the trolley and supply wires and consisting of two parts frictionally engaged and adapted to be disconnected from each other by the breaking and sagging of the conductor, as set forth.

2. An overhead electrical conductor constructed in electrically-isolated sections, a wire for supplying an electric current to each of said sections, a circuit-breaker interposed between the trolley and supply wires and consisting of two parts frictionally engaged and adapted to be disconnected from each other by the breaking and sagging of the conductor and having a spring for deflecting one part of the circuit-breaker when the other part has been withdrawn, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 30th day of January, A. D. 1891.

NICHOLAS FROLOFF.
WILLIAM SUBBOTIN.

Witnesses:

A. D. HARRISON,
ARTHUR W. CROSSLEY.