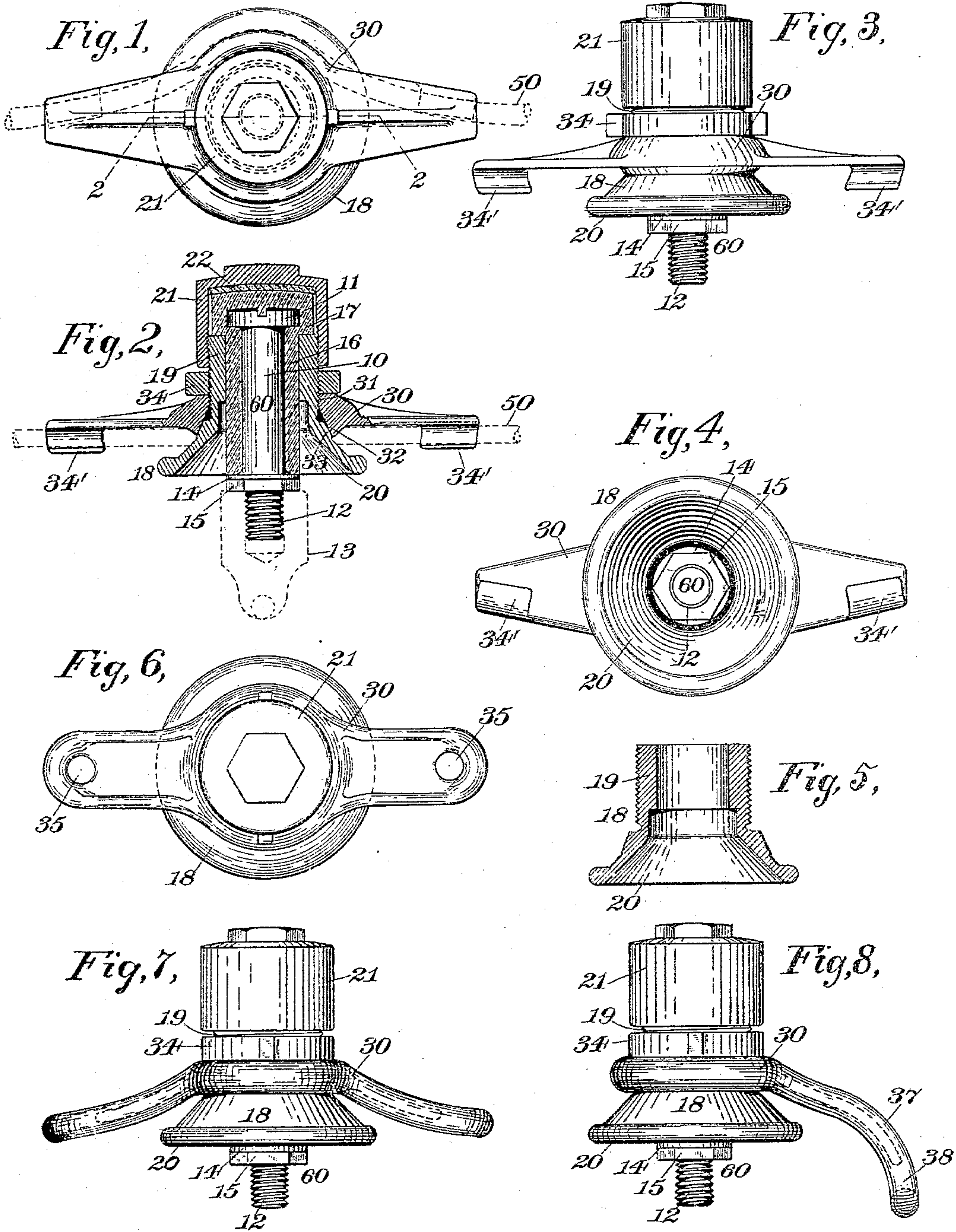


(No Model.)

F. X. CICOTT, W. J. BELCHER & F. C. BILLINGS.  
INSULATED SUPPORT FOR TROLLEY LINES.

No. 545,151.

Patented Aug. 27, 1895.



Witnesses  
J. L. Edwards Jr.  
Fred. J. Dole.

Inventors:  
Frank X. Cicott,  
Warren J. Belcher,  
Frederic C. Billings.  
By their Attorney,  
F. H. Richards



# UNITED STATES PATENT OFFICE.

FRANK X. CICOTT, OF NEW YORK, N. Y., AND WARREN J. BELCHER AND  
FREDERIC C. BILLINGS, OF HARTFORD, CONNECTICUT, ASSIGNORS TO  
THE BILLINGS & SPENCER COMPANY, OF HARTFORD, CONNECTICUT.

## INSULATED SUPPORT FOR TROLLEY-LINES.

SPECIFICATION forming part of Letters Patent No. 545,151, dated August 27, 1895.

Application filed April 22, 1895. Serial No. 546,621. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK X. CICOTT, residing at New York city, in the county of New York and State of New York, and WARREN J. BELCHER and FREDERIC C. BILLINGS, residing at Hartford, in the county of Hartford and State of Connecticut, citizens of the United States, have invented certain new and useful Improvements in Insulated Supports for Trolley-Lines, of which the following is a specification.

This invention relates to insulators for trolley-lines, the object being to provide an improved insulated support for carrying a trolley-wire, and which support is adapted to be assembled in the form of a straight-line hanger or in the form of a pull-off, either double or single, for maintaining the alignment of a trolley-line; and the invention is especially applicable to the insulation of a conductor of a high-tension main, such as an overhead conductor for an electric-railway system from the guy-wire, usually connected and supporting such high-tension conductor.

In the accompanying drawings, forming part of this specification, Figure 1 is a top plan view of the insulated support, showing a portion of the guy-wire in dotted lines. Fig. 2 is a longitudinal section of the same on line 2 2, Fig. 1, a part thereof being shown in full lines and a portion of the guy-wire and trolley-wire carrier in dotted lines. Fig. 3 is a side elevation of the insulated support. Fig. 4 is a bottom plan view of the device. Fig. 5 is a detail sectional view of the stud-protecting bell. Fig. 6 is a top plan view of a double pull-off for maintaining the alignment of the trolley-line. Fig. 7 is a side elevation of Fig. 6, a part thereof being in dotted lines. Fig. 8 is a side elevation of a single pull-off for maintaining the alignment of a trolley-line, a part thereof being shown in dotted lines.

Similar characters designate like parts in all the figures of the drawings.

The improved insulated support herein described consists, in the preferred form thereof herein shown, of an insulated stud for sup-

porting a trolley-line carrier, a bell-shaped protector held in said insulated stud by any suitable means and provided with a sleeve encircling said insulated stud, together with an interchangeable yoke provided with a wedge-shaped portion adapted to encircle said protector and to be tightly held thereon, said yoke being provided with means for the connection of a guy-wire.

The improved insulated support comprises a central stud 10, provided at its upper end with a head 11 and at its lower end with a screw-thread 12, adapted to be screwed into the carrier 13, employed to grasp or directly hold the trolley-line wire, as shown in Fig. 2. Said stud is also provided near its lower end with a head 14, having a polygonal portion 15, onto which a wrench may be applied to screw the stud in the trolley-line carrier 13. The upper head and cylindrical portion of this stud is covered and surrounded by any suitable insulating material 16—such as hard rubber—and in practice this material is preferably made about one-fourth of an inch in thickness throughout the extent thereof, so that, as shown in Fig. 2 of the drawings, the insulated material will form a thimble comprising a cylindrical portion and a head, said head having a circular flange 17, adapted to rest upon the upper edge of the sleeve 19 of the protector hereinafter described, said insulating material thereby forming, together with the stud, an improved insulator-stud, (designated generally as "60,") which the bell-shaped protector hereinafter described is adapted to encircle.

The protector, (indicated generally as "18,") comprises at its lower end a bell-shaped or flaring mouth 20, having a sleeve 19, screw-threaded on its exterior face and adapted to tightly encircle the cylindrical part of the insulated stud 60. The bell-shaped mouth of this protector protects the lower end of the stud from moisture, snow, and ice, thereby preventing the formation of a circuit between said bell-shaped protector and stud.

In order to hold the protector 18 in its proper place on the insulated stud 60, in prac-



tice, an inverted cup-shaped clamping-nut 21 is preferably screwed onto the upper part of the sleeve 19 and entirely covers the insulating material 16, surrounding the head of the stud; but any suitable means may be used for holding the protector in the insulated stud. In practice a suitable packing 22 of fibrous material—such as leather—is preferably disposed between the inner side of the cup-shaped clamp and the top face of the insulated material, so that a more perfect fit of the parts will be secured without too great pressure at any one point and the consequent compression of the insulated material. A yoke 30, having the interior upper portion of its circular opening screw-threaded, as at 31, is adapted to screw onto the screw-threads of the sleeve 19. Below the threaded portion 31 the yoke is provided with a downwardly-projecting conical or wedge-shaped portion 32, adapted to engage with a corresponding wedge-shaped portion or beveled bearing 33, and be tightly clamped onto the protector 18. In practice these wedge-shaped bearings are formed relatively acute, so that they will bind upon each other with a relatively great resistance when the yoke is screwed down upon the sleeve, so that the locking effect of the collar or check-nut 34, hereinafter described, will be greatly multiplied, and the yoke will have a positive hold upon the protector 18, so that said protector cannot be turned out of place nor tend to turn the stud and thereby gradually release the trolley-line carrier 13. A check-nut or locking-collar 34 is adapted to be screwed onto the sleeve 19 of the protector above the yoke 30 and rests thereon and prevents the yoke from gradually working loose from the protector and becoming separated by the swaying of the trolley-line and hanger-lines. The yoke 30 is provided with guides 34' at or near its ends, said yoke being carried by a straight-line cross-wire, as 50, as indicated by dotted lines, Figs. 1 and 2, which wire, after passing through the guides 34', is deflected around one side of the protector, and is held therein by means of the groove formed by the inclined exterior face of the protector and the wedge-shaped portion of its yoke.

In the modification shown in Figs. 6 and 7 the yoke is provided, at or near its outer ends, with apertures 35, to which the guy-wires of the trolley-line are connected, whereby the support may be used as a double pull-off, if desired.

In the modification shown in Fig. 8 the yoke has but one arm, as 37, which is curved in downward direction, the lower end thereof being, in practice, preferably on the same plane as the lower portion of the trolley-wire carrier 13, so that said support will not be pulled out of its vertical position when the guy-wire is connected. This arm is provided, at or near the lower end, with an aper-

ture 38 for the connection of the guy-wire, whereby the support may be used as a single pull-off, if desired.

In the use of this invention the lineman carries a number of the various yokes (shown, respectively, in Figs. 3, 6, and 8) in connection with the other parts of the device, so that when desired to use the support as a straight-line hanger, a yoke similar to the yoke shown in Figs. 1 to 4, inclusive, is screwed onto the sleeve of the protector. When the device, however, is to be used as a double pull-off, it is only necessary to screw onto the sleeve of the protector a yoke similar to that shown in Figs. 6 and 7, and when the device is to be used as a single pull-off a yoke similar to the one shown in Fig. 8 is screwed onto the sleeve of the protector, so that by the use of the different yokes heretofore described, in connection with the other parts of the support, the device can be assembled as a straight-line hanger, or as a double pull-off, or as a single pull-off, as may become necessary in stringing a trolley-line. By this interchangeability of the different parts a materially smaller number of pounds of metal can be carried by a lineman, as it will be only necessary to carry a number of different yokes in connection with the other parts of the support, and it will not be necessary, as is now ordinarily the case, to carry entirely separate and complete devices for the different purposes.

By the interchangeability of this device, in practice, where, by constant use or other means, a part or parts become worn or broken, such part or parts can be easily and quickly replaced at a very small cost of time, labor, and expense.

We claim as our invention—

1. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud, and having a flaring lower portion; a separate yoke provided with means for connection with a guy-wire, and adapted to encircle the flaring lower portion of said protector and be wedged on said flaring lower portion, substantially as described.

2. In an insulated support of the class specified, the combination with the insulator-stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud comprising a sleeve and a flaring lower portion; a separate yoke provided with means for connection with a guy-wire, and adapted to fit on to both the sleeve and flaring lower portion of the protector, and be wedged on said flaring lower portion; and means for wedging said yoke thereon, substantially as described.

3. In an insulated support of the class specified, the combination with the insulator stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud com-



prising a sleeve and a flaring lower portion; a separate yoke provided with means for connection with a guy-wire, and adapted to fit on to both the sleeve and flaring lower portion of the protector, and be wedged on said flaring lower portion, substantially as described.

4. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector adapted to encircle said stud, and having a portion of its outer surface beveled; a yoke provided with means for connection with a guy-wire, and adapted to fit said beveled surface, and be clamped thereon; means for clamping said yoke on said protector; and means for clamping said protector on the insulator stud.

5. In an insulated support of the class specified, the combination with an insulator-stud adapted to support a trolley-line carrier; of a protector for the stud provided with an exteriorly screw-threaded sleeve for encircling said stud, and with a flaring lower portion; a yoke provided with means for connection with a guy-wire and with a screw-threaded portion adapted to fit said screw-threaded sleeve; and with a flaring interior surface adapted to be wedged on the flaring portion of said protector, substantially as described.

6. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector for the stud provided with an exteriorly screw-threaded sleeve adapted to encircle said stud, and having a portion of its outer surface beveled; a yoke provided with means for connection with a guy-wire and adapted to screw onto said screw-threaded sleeve, and fit said beveled surface, and be clamped thereon; and means for clamping said protector onto the insulator stud.

7. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector for the stud provided with an exteriorly screw-threaded sleeve for encircling said stud, and a beveled surface below said sleeve; a yoke provided with means for connection with a guy-wire, and having an interiorly beveled surface, said yoke being adapted to be screwed onto said sleeve, and be clamped on the beveled surface of the protector; means for clamping said protector onto the insulator stud; and means for preventing the rotation of the yoke.

8. In an insulated support of the class specified, the combination with an insulator-stud adapted to support a trolley-line carrier; of a protector for the stud provided with an exteriorly screw-threaded sleeve adapted to encircle said stud, and with a flaring lower portion; a yoke provided with means for connection with a guy-wire and with a screw-threaded portion adapted to fit said screw-threaded

sleeve; and with a flaring interior surface adapted to be wedged on the flaring portion of said protector; means for wedging the yoke thereon; and means for clamping the protector on to the insulator-stud, substantially as described.

9. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector for said stud provided with a beveled outer surface; a yoke provided with means for connection with a guy-wire and adapted to be clamped onto said beveled surface of the protector, and form a groove for holding a guy-wire; means for clamping said yoke on said protector; and means for clamping said protector onto the insulator stud.

10. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector having an exteriorly screw-threaded sleeve adapted to encircle the insulator stud, and also having an exterior-beveled surface; a yoke provided with means for connection with a guy-wire, and adapted to screw onto said sleeve, and also having an interior-beveled surface clamping on to the beveled surface of the protector; a check-nut for clamping said yoke on the protector; and an inverted cup-shaped clamp adapted to screw onto said protector, and clamp the same onto the insulator stud.

11. In an insulated support of the class specified, the combination with an insulator-stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud, and having a flaring lower portion; a separate yoke adapted to encircle the flaring portion of said protector and be wedged thereon; and provided with an arm on one side thereof adapted for connection with a guy-wire; and means for wedging said yoke on to said protector; substantially as described.

12. In an insulated support of the class specified, the combination with an insulator-stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud, and having a flaring lower portion; a separate yoke adapted to encircle the flaring portion of said protector and be wedged thereon, and provided with an arm on one side thereof adapted for connection with a guy-wire; means for wedging said yoke on to said protector; and means for clamping said protector on to the insulator-stud, substantially as described.

13. In an insulated support of the class specified, the combination with an insulator stud adapted to support a trolley-line carrier; of a bell-shaped protector for said stud provided with an exteriorly-beveled surface; a separate yoke provided with means for connection with a guy-wire, and having an interiorly-beveled surface adapted to bear on



the beveled surface of the protector, and form a groove for holding a guy-wire; and means for clamping said yoke on said protector.

14. In an insulated support of the class specified, the combination with an insulator-stud adapted to support a trolley-line carrier; of a protector adapted to encircle said stud, and having a flaring lower portion; a yoke also having a flaring interior surface, and adapted to be wedged on the flaring lower portion of the protector, and provided with a downwardly-projecting arm at one side thereof adapted to connect with a guy-wire; and

means for wedging said yoke on to the flaring portion of said protector, substantially as described. 15

FRANK X. CICOTT.

WARREN J. BELCHER.

FREDERIC C. BILLINGS.

Witnesses to signature of Frank X. Cicott:

F. S. KENFIELD,

H. H. WINDSOR.

Witnesses to signature of Warren J. Belcher and Frederic C. Billings:

FRED. J. DOLE,

H. E. BILLINGS.