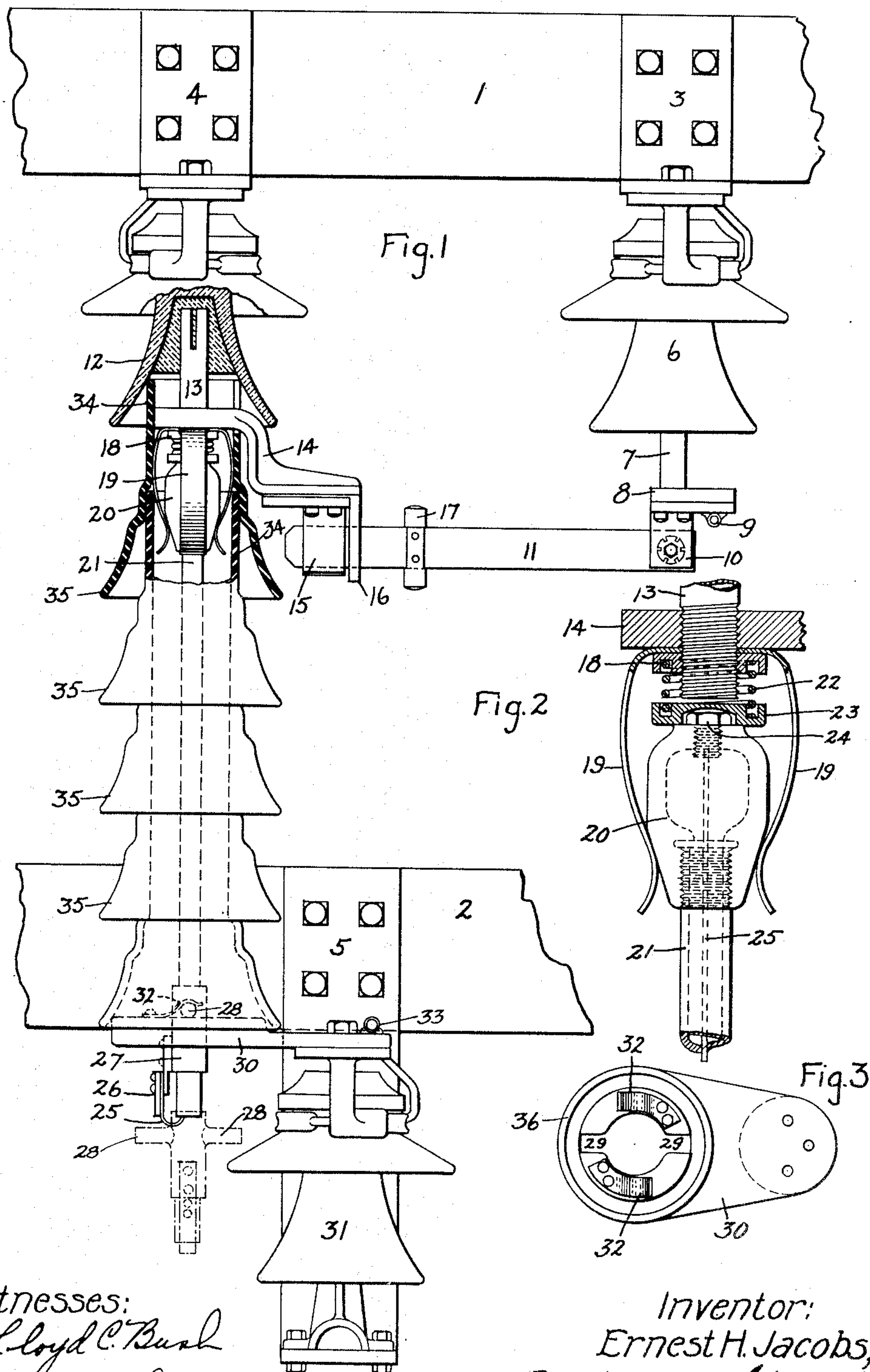


E. H. JACOBS.  
WEATHERPROOF HIGH TENSION FUSE.  
APPLICATION FILED AUG. 20, 1909.

947,239.

Patented Jan. 25, 1910.



Witnesses:  
Lloyd C. Bush  
Marcus L. Byng.

Inventor:  
Ernest H. Jacobs,  
By Allen H. Davis  
Atty.



# UNITED STATES PATENT OFFICE.

ERNEST H. JACOBS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## WEATHERPROOF HIGH-TENSION FUSE.

947,239.

Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed August 20, 1909. Serial No. 513,777.

*To all whom it may concern:*

Be it known that I, ERNEST H. JACOBS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Weatherproof High-Tension Fuses, of which the following is a specification.

This invention relates to transmission lines carrying electric current of high tension and its object is to furnish such lines with thermal cut-outs which will be effectually protected from the weather and yet will be capable of rapid renewal when ruptured by an abnormal rush of current. In a device of this kind several conditions must be met to insure successful operation. For instance, the fuse is necessarily out of doors, and therefore it must be so thoroughly insulated that no storm of rain, sleet or snow can cause a breakdown to ground. Moreover, the insulation must be able to withstand not only the working potential but the excessive potentials due to lightning or to surges caused by switching. It must also be able to stand the heavy momentary rush of current which follows the arc developed at the instant the fuse ruptures. The fusible element must be easily removable and replaceable with a minimum of danger to the linemen, and when it volatilizes the blast of burning gases must not occur in proximity to combustible or conducting portions of the system.

My invention aims to meet these requirements and to this end it comprises the combination with a main line and a branch conductor of a connection between them including an inclosed expulsion fuse and an upright waterproof, weatherproof housing for said fuse composed of a plurality of bells made of insulating material, nested one inside another and covering substantially the entire fuse. The housing is stationary, but the fuse is removable therefrom in a downward and lengthwise direction, being retained by spring contact clips at its upper end and a bayonet joint fastening at its lower end. A large disconnecting switch of the knife blade type is placed in series with the fuse, so that the branch line can be opened, if necessary, without removing the fuse.

In the accompanying drawings, Figure 1

is an elevation, partly in section, of an embodiment of my invention which has been put in practice; Fig. 2 is a sectional elevation of the bulb, the spring contacts and buffer at the upper end of the fuse, and Fig. 3 is a plan view of the support for the lower end of the fuse and its housing.

The device is preferably mounted on and between two cross-arms 1—2 of a pole, tower or other line-carrying structure, preferably by means of brackets 3—4 secured to the upper arm 1 and a bracket 5 secured to the lower arm 2. Depending from the bracket 3 is an insulator 6 of any approved design, having a downwardly extending pin 7 to whose lower end is attached a plate 8 to which the line wire 9 is fastened. The plate 8 is provided with a hinge clip 10 to which is pivoted the blade 11 of the disconnecting switch.

The bracket 4 supports another insulator 12 having a downwardly extending pin 13 to whose lower end is secured a laterally-projecting support 14. A contact-clip 15 for the blade 11 is attached to this support and adjacent thereto is a spring safety-clip 16 for holding the blade closed. A cross-piece 17 on said blade enables the line-man to open and close the disconnecting switch with a pole carrying a hook at its upper end.

The pin 13 projects below the support 14 and is screw-threaded to receive a nut 18 which clamps up against the support a sheet of metal having a plurality of downwardly projecting spring contact fingers 19. The upper end of the casing for the inclosed expulsion fuse engages with said fingers. Said casing is preferably composed of a stout metallic bulb 20 from which extends a tube or arc chute 21 of insulating material. The convex surface of the bulb enables it to wedge apart the fingers when thrust up between them, so as to insure a good electrical connection between the support 14 and the bulb. A buffer is interposed between the end of the pin 13 and the bulb, consisting preferably of a helical spring 22 soldered at one end to the nut 13 and at the other to a cap 23, which preferably has a recess for the head of the plug 24 screwed into the top of the bulb.

The fusible wire or strip 25 is soldered at its upper end to said plug and runs down through the arc chute 21 to a tip 26 to which



it is soldered. This tip is attached to a metallic sleeve 27 surrounding the lower end of the chute. Radial arms 28 project in opposite directions from the sleeve and are adapted to pass up through slots 29 in a shelf or lower support 30 secured to an insulator 31 mounted on the bracket 5. By giving the chute 21 a quarter turn the arms will engage, by a bayonet-joint action, with spring contact clips 32 secured upon the upper side of the shelf 30. The branch conductor 33 is connected to the shelf so that the circuit from the line wire is completed through the disconnecting switch-blade 11, the upper support 14, the contact fingers 19, bulb 20, fuse wire 25, sleeve 27 and shelf 30 to the branch wire 33.

A waterproof and weather-proof housing of insulating material surrounds the fuse casing, extending from the shelf 30 up to the insulator 12. This housing consists preferably of a tier of tubular sections 34, preferably made of fiber, and each provided with a flaring bell or petticoat 35 into which the upper end of the next lower section fits with a tight joint. The top of the upper section is received in the petticoat of the insulator 12, and the bell of the lowermost section seats over a circular flange 36 on the shelf 30, concentric with the tube 21. The superposed sections are of sufficient diameter to permit the bulb 20 to pass up through them readily, and leave an ample air space between said bulb and said sections. The housing is a rigid structure independent of the fuse casing. The fuse casing with its inclosed fuse is thrust up through the hole in the shelf 30 until its bulb is grasped by the contact fingers 19 and abuts against the buffer cap 23. In this position the arms lie just above the shelf 30 so that they can be engaged with the spring clips 32 by giving the chute a quarter turn. When the fuse blows, the blast of flame and vapor rushes down through the arc chute at one side of the insulator 31 and far enough away to do no damage. The fuse casing is readily disengaged and removed for refusing, without disturbing the housing. The flaring bells on the housing give ample protection to the joints between the sections, and afford a long creepage surface between the upper support 14 and the shelf 30; a large portion of said surface being always dry.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

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

1. The combination with a line wire and a

branch wire, of an inclosed expulsion fuse connecting the same, and a sectional housing of insulating material inclosing said fuse.

2. The combination with a line wire and a branch wire, of an inclosed expulsion fuse connecting the same, and a sectional housing of insulating material inclosing said fuse, said housing being open at the lower end to admit said fuse.

3. The combination with a line wire and a branch wire, of an inclosed expulsion fuse connecting the same, a sectional housing of insulating material inclosing said fuse, and a disconnecting switch in series with said fuse.

4. The combination with a line wire and a branch wire, of an insulator for the line wire, a switch blade connected to line and pivotally supported by said insulator, an insulating tubular housing, a connection for the branch wire at one end thereof, and an inclosed expulsion fuse removably secured in said housing and closing the circuit between said switch and branch wire.

5. The combination with a line wire and a branch wire, of an inclosed expulsion fuse connecting the same, and a housing for said fuse consisting of a plurality of superposed tubular sections of insulating material jointed together.

6. The combination with a line wire and a branch wire, of an inclosed expulsion fuse connecting the same, and a housing for said fuse consisting of a plurality of superposed tubular sections of insulating material jointed together, each section having at its lower end a flaring bell protecting the joint with the next lower section.

7. The combination with a line wire and a branch wire, of insulators respectively supporting said wires, a shelf on the branch wire insulator having a slotted opening, a tier of tubular sections of insulating material resting on said shelf, an inclosed expulsion fuse housed by said sections and depending through said opening, an insulator receiving the upper end of said tier, and connections between the line and branch wires including said fuse.

8. The combination with an insulator, of contact fingers and a buffer supported thereby, an inclosed expulsion fuse having a bulb engaging said fingers, a shelf having a slotted opening, a fuse-inclosing arc chute having radial arms adapted to pass through said opening, contact clips on said shelf adapted to be engaged by said arms by a quarter turn of said chute, line and branch wires, and a connection between said wires including said fuse.

9. The combination with an insulator, of contact fingers and a buffer supported thereby, an inclosed expulsion fuse having a bulb engaging said fingers, a shelf having a slotted opening, a fuse-inclosing arc chute hav-



ing radial arms adapted to pass through  
said opening, contact clips on said shelf  
adapted to be engaged by said arms by a  
quarter turn of said chute, line and branch  
5 wires, a connection between said wires in-  
cluding said fuse, and a housing for said  
fuse composed of a tier of tubular sections  
of insulating material, each having a bell

receiving the upper end of the next lower  
section.

In witness whereof, I have hereunto set  
my hand this 19th day of August, 1909.

ERNEST H. JACOBS.

Witnesses:

BENJAMIN B. HULL,  
THOMAS W. NOONAN.