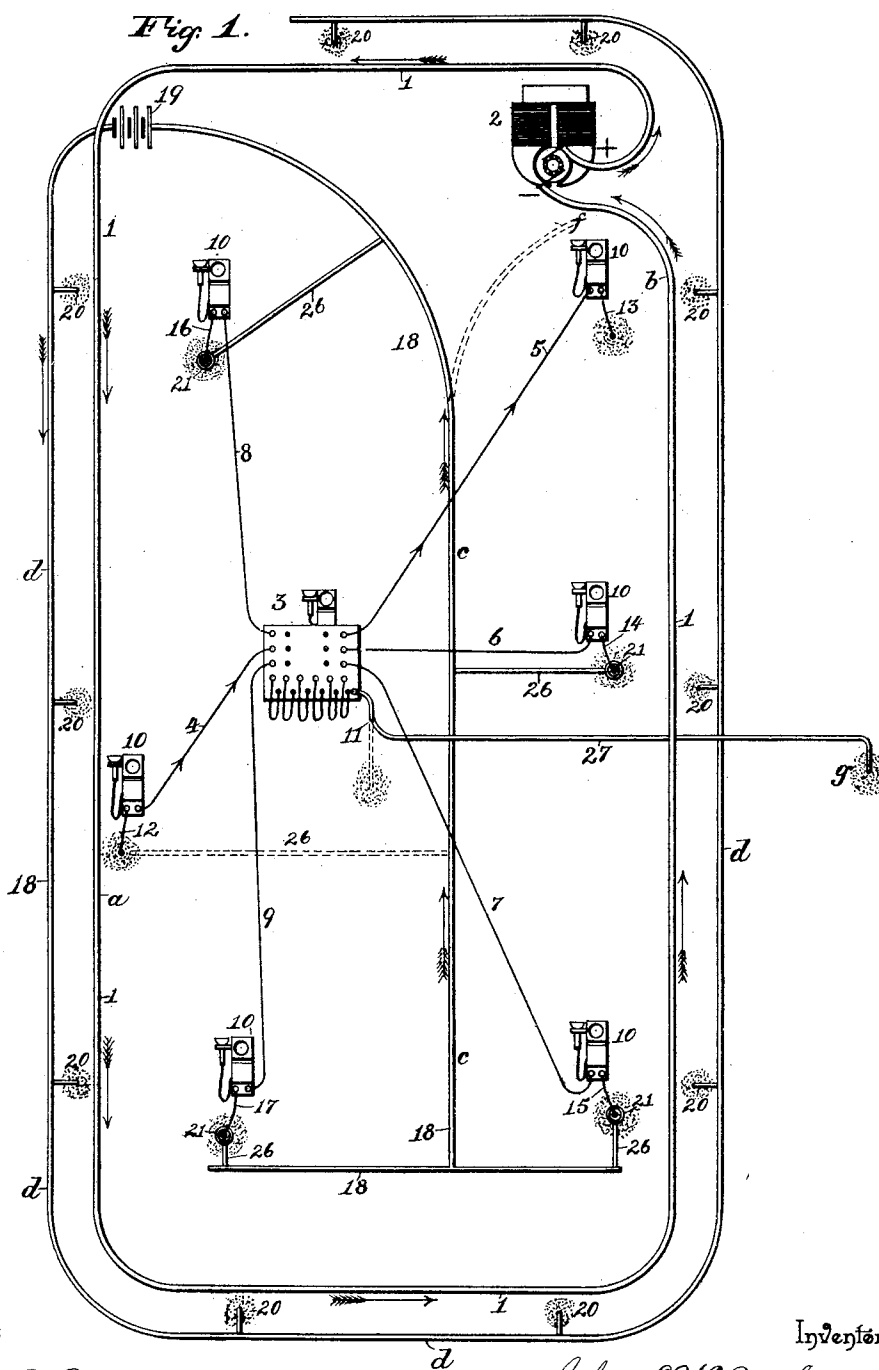


J. L. W. ZIETLOW.  
PROTECTOR FOR TELEPHONES.

No. 464,643.

Patented Dec. 8, 1891.



Witnesses

*Roy C. Baven*  
*Roy A. Dayton*

By his

Attorneys

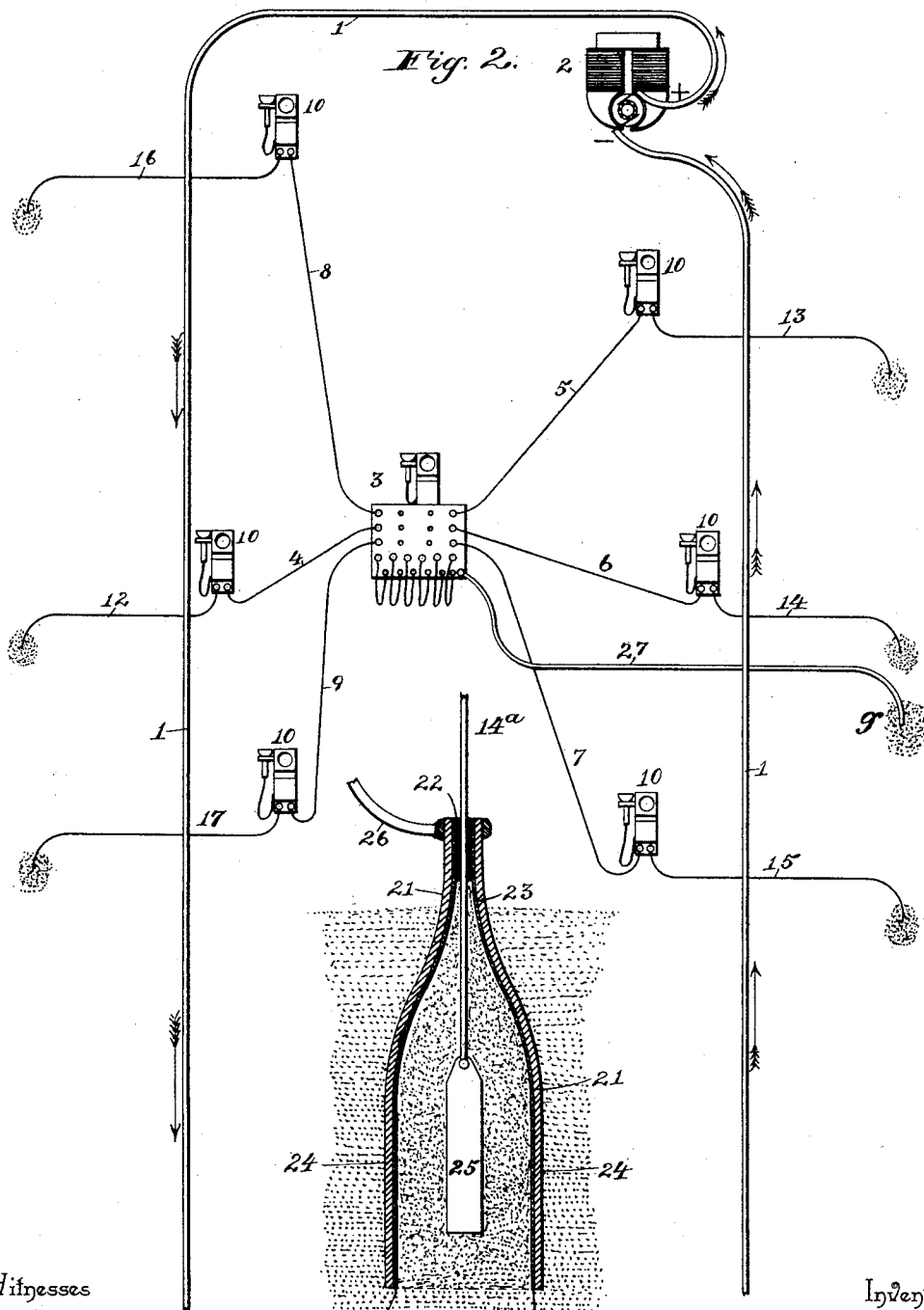
*John L. W. Zietlow*  
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Inventor

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Witnesses

Inventor

*Wm. C. Brown*  
*Ray H. Dayton*

*Fig. 3.*

By his Attorneys

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# UNITED STATES PATENT OFFICE.

JOHN L. W. ZIETLOW, OF ABERDEEN, SOUTH DAKOTA, ASSIGNOR OF ONE-HALF TO FRANCIS A. BURDICK, OF SAME PLACE.

## PROTECTOR FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 464,643, dated December 8, 1891.

Application filed March 31, 1891. Serial No. 387,153. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN L. W. ZIETLOW, a citizen of the United States, residing at Aberdeen, in the county of Brown and State of South Dakota, have invented a new and useful Protector for Telephones, of which the following is a specification.

My invention relates to a method for protecting telephones and telegraph-wires from the damaging influence of powerful electric currents, such as are carried by electric light and power circuits.

It is a well-known fact that telephone-lines which run in the vicinity of electric light and power circuits are influenced to a great extent by the powerful electric currents in these circuits, and in some instances this influence is so great as to interfere with the telephone-lines to such an extent as to render them practically useless. Heretofore it has been generally accepted as a fact that this disturbance in the telephone-wires was caused by the induction of electric currents in the said wires by the powerful current in the light and power circuits. It is well known, however, that such is not the case, but that these disturbances in the telephone-wires are caused by portions of the current from the light and power circuits which leak into the earth, and in seeking the shortest route to the opposite pole of their respective generators enter the telephone-lines through their ground connections and traverse the said wires to a suitable conducting medium—as, for instance, a ground connection at another point in the telephone system—near a point where it can pass to the light-circuit near the opposite pole of the generator, the battery operating the telephone serving to draw the powerful electrical current from the earth into the telephone-wire.

My invention consists in inclosing or partially inclosing the ground connections of the telephone-wires in a casing of metal of higher conductivity than the telephone-wire, and connecting the said casing by a wire of high conductivity with a conductor arranged to collect the leakage from the light and power circuit and carry it to suitable points where it can easily pass to the opposite pole of the generator, as will be hereinafter fully explained.

With the aforesaid objects, and such others as fairly fall within the scope of the invention in view, my invention consists of the organism of devices illustrated in the accompanying drawings, the peculiar construction, combination, and arrangement of which will be fully explained hereinafter and the specific points of novelty particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a diagram showing a system of circuits arranged in accordance with the preferred form of my invention. Fig. 2 is a diagram of another method of putting my invention into practice. Fig. 3 is a vertical sectional view of one of the protectors for the ground-wires, showing the ground-wire placed therein.

In Fig. 1 I have shown an electric light or power circuit, designated by the numeral 1, which may inclose a considerable part of a town or city, the current of which starts from the positive pole of a dynamo 2, and, after traversing the circuit, will return to the dynamo, entering the negative pole thereof. The direction of the current is shown by the feathered arrows.

Within the area inclosed by the light and power circuit is situated a telephone system having a central office 3 and any number of branch lines 4 5 6 7 8 9, each of which communicates with a station 10. At the central office is a ground-wire 11, and each of the stations 10 has a ground-wire 12 13 14 15 16 17. Now, supposing that the ground-wires 11, 12, and 13 and the branches 4 and 5 are unprotected, as is now the case, should there be a leak in the light or power circuit in the vicinity of the ground-wire 12, as at *a*, the current which leaves the main circuit will seek to find a way back to the dynamo, and in doing so will traverse the shortest route by the best conductors. The branch telephone-line 4 being in the direction in which the leakage is seeking to pass back to the dynamo, and the ground-wire thereof unprotected, the said leakage, or a part thereof, will pass into the ground-wire 12 and through the wire 4 to a ground connection nearer the negative pole of the dynamo—viz., the ground-wire at the central station. Should either of the branch telephone-lines 5, 6, or 7, which extend still

nearer to the negative pole of the dynamo, be connected with the wire 4, the leakage current from line 4 will pass into the line so connected, (supposing it to be line 5,) and traverse it to its ground connection 13, where it will again enter the ground and proceed to the nearest point of leakage, as at *b*, upon the wire 1, which leads to the negative pole of the dynamo. As all the branch telephone-lines are connected with the ground at the central station, the leakage coming over the line 4 will find its way through the ground to all of the lines 5, 6, and 7, which lead toward the conductor 1, leading to the negative pole of the dynamo, and thus interfere more or less with the working of all the lines 4, 5, 6, and 7. In order to prevent this leakage from the light and power wires from passing into the telephone-wires, I use a conductor 18 of high conductivity and arrange the same to extend longitudinally in the area inclosed by the light and power wires, as shown at *c c*, to collect the leakage from said wires and convey the said leakage to some point outside of the area inclosed where it cannot communicate with the telephone-wires. A battery 19 is placed in the circuit with the conductor 18 near the point where the said conductor passes outside of the area inclosed by the light and power wires, and the said conductor 18, after passing through the battery 19, extends along parallel with and outside of the light and power wires, as at *d d*, and is grounded at suitable points, as 20.

A casing 21 (clearly shown in Fig. 3) is placed around the ground-wires of the telephone-stations to protect them from the leakage currents in the earth. The casing 21 may be of any suitable shape, and is preferably smaller at the top, being just large enough to admit the ground-wire 14<sup>a</sup> and a suitable insulation 22 therearound, and the said casing is provided with a suitable coating of insulation 23, covering the entire inner surface thereof. Below the ground the casing 21 is enlarged, as at 24, to admit of earth being placed therein around the ground-plate 25 of the telephone-wire, and the said casing is made to extend into the earth a greater distance than the ground-plate of the telephone-wire. The casings 21 of the ground connections at the several telephone-stations are connected by a conductor 26 of high conductivity with the conductor 18, and any leakage currents which may be traveling near the said ground connections will be attracted by the high conductivity of the casing 21 and its connections and carried away from the ground-plate of the telephone. The battery 19 is arranged to cause a current of electricity to flow from the ground connections of the part *c c* of the conductor 18 to the ground connections of the part *d d* of the same conductor, which is situated outside of the area

inclosed by the light and power circuits, and the electro-motive force of the battery 19 is sufficient to cause it to attract any electric currents which may be passing in the earth near the vicinity of the casings 21 surrounding the telephone ground connections and deposit them in the ground at the points 20. Thus the portion *c c* of the conductor 18 is the collecting portion, and the portion *d d* thereof may be termed the "depositing" part. Instead of the conductor 18 being carried around and parallel with the light and power circuit, it may simply be carried to a point near the negative pole of the dynamo, as at *f*, where the current can communicate with the conductor leading to the negative pole of the dynamo, as shown in dotted lines in Fig. 1.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a system of ordinary electrical conductors, such as electric-light circuits, carrying currents of great strength, and a system of conductors, such as telephone-wires, carrying currents of less strength, of the grounded connections of the conductors carrying the weaker currents, an inclosing protector of high conductivity surrounding said grounded connections, insulation interposed between the protector and said grounded connections, and a conductor of high conductivity in circuit with a generator and connected with said surrounding protector and provided with ground connections outside the area of the conductors carrying the stronger currents, substantially as set forth.

2. The combination, with a system of electrical conductors carrying currents of great strength and a system of adjacent conductors carrying currents of less strength, of the grounded connections of the conductors carrying the weaker currents, an inclosing shell surrounding said grounded connections and provided with a reduced end or neck through which the said ground-wire passes and is insulated therefrom and with a lower enlarged open end between which and the grounded connections is interposed the earth, a lining of insulation covering the entire inner surface of said shell, and a conductor of high conductivity connected with the reduced end of said shell and placed in circuit with an electrical generator and provided with ground connections outside the area of the conductors carrying the stronger currents, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN L. W. ZIETLOW.

Witnesses:

ALLEN W. POWELL,  
F. A. BROWN.