T. E. ANDERSON.

FAULTFINDER.

APPLICATION FILED NOV. 25, 1908.

934,874. Patented Sept. 21, 1909.

Fig. 1.

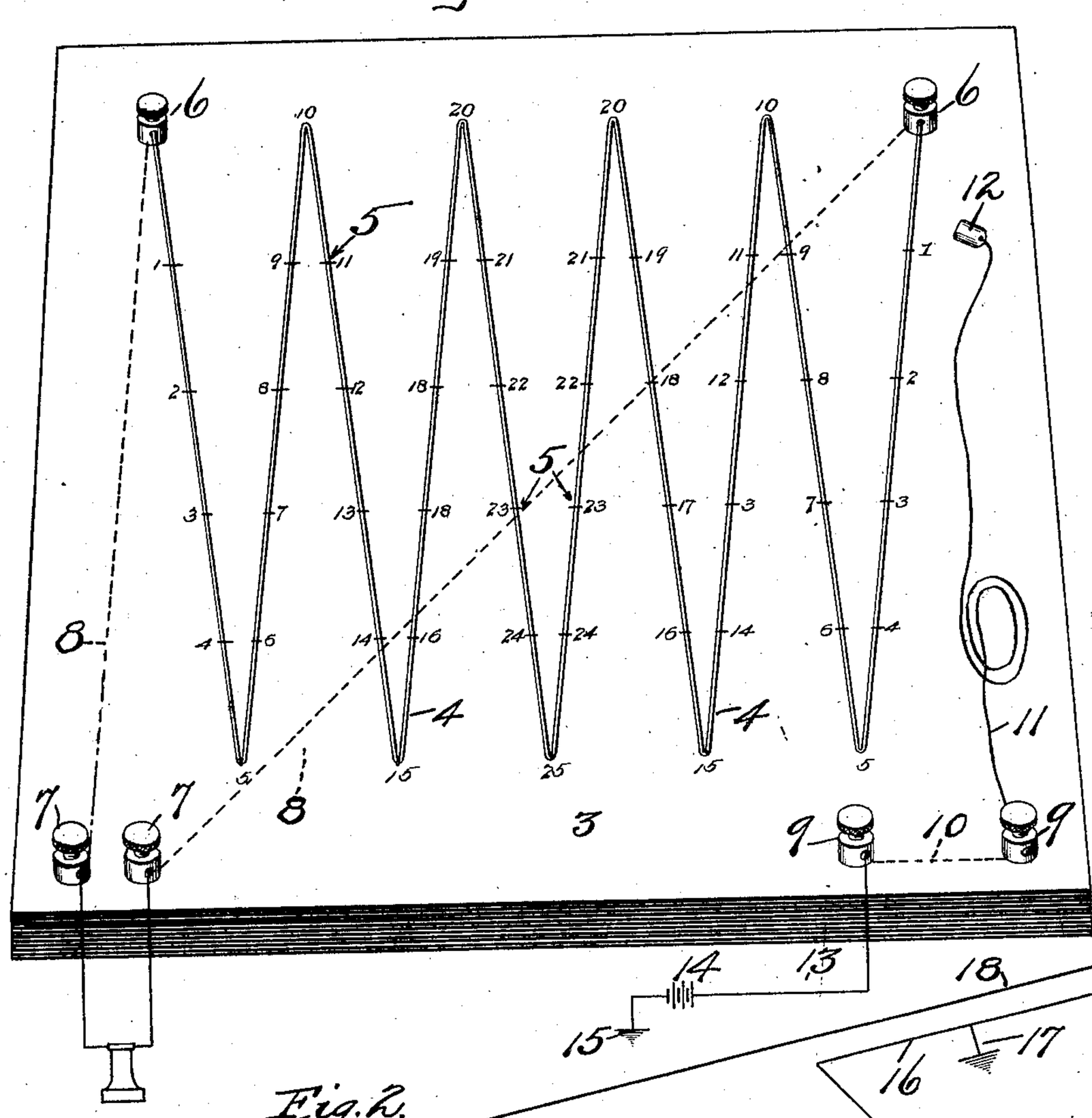
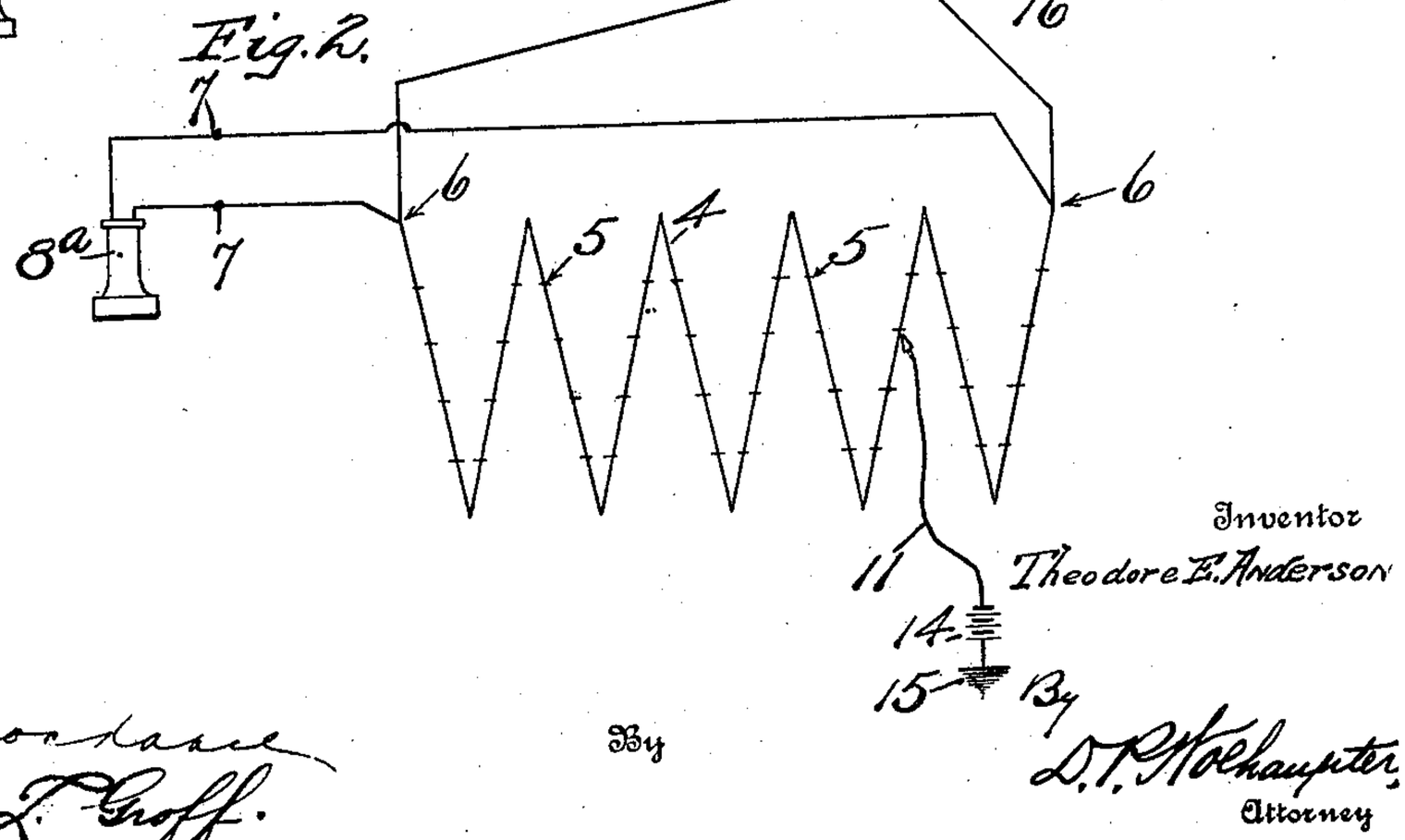


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

THEODORE E. ANDERSON, OF SUPERIOR, WISCONSIN, ASSIGNOR OF ONE-FOURTH TO CHARLES R. FRIDLEY, ONE-FOURTH TO FRED SPEECHLY, AND ONE-FOURTH TO SOLON L. PERRIN, ALL OF SUPERIOR, WISCONSIN.

FAULTFINDER.

934,874. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed November 25, 1908. Serial No. 464,457.

To all whom it may concern:

Be it known that I, THEODORE E. ANDERSON, a citizen of the United States, residing at Superior, in the county of Douglas and State of Wisconsin, have invented certain new and useful Improvements in Faultfinders, of which the following is a specification.

The present invention relates to means for finding faults in electric cables or lines, and the primary object is to provide a portable device that is very active and effective, is compact, and simple, neither containing nor including intricate mechanism of any kind, said means furthermore being of a character that will permit the successful use by persons comparatively inexperienced in electrical matters, as it requires no involved readings of a highly technical character, and no intricate computations and deductions.

The preferred form of construction is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective view of the device, showing certain of the features diagrammatically. Fig. 2 is a diagrammatic view, illustrating the manner in which the device is used.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

A base 3 is employed of hard rubber, wood, fiber or other suitable material, and on said base is located a resistance wire 4 of known quantity, preferably German silver. This wire is disposed in zigzag relation upon the upper face of the base and has marked contact points 5 disposed at predetermined distances apart and indicated by scale marks, as shown. The terminals of the resistance wire are connected to binding posts 6, to which a faulty cable can be connected, as hereinafter explained. Another set of binding posts 7 is employed, which posts are respectively connected as illustrated at 8 to the terminals of the resistance wire 4. To the binding posts 7 are connected the terminals of a common telephone receiver 8ª. Still another set of binding posts 9 are mounted on the base, these binding posts being electrically connected as illustrated at 10. To one of the binding posts 9 is attached a flexible insulated wire 11 having a contact element 12 at its free end, which element can be placed in engagement with any of the marked contact points of the resistance wire. The other binding post 9 constitutes means for electrically connecting to the contact element 12, one pole 13 of a source of electrical energy 14, such as a set of dry batteries, the other pole of said source of electrical energy being so arranged that it can be grounded as illustrated at 15.

The resistance wire 4 is of a predetermined length, for example, fifty inches, and the contact points are scaled preferably at one inch. In order to locate the trouble in a cable or line, the exact length of said cable is first determined, and one end thereof is connected to the end of a return cable. For instance, in Fig. 2, if the cable 16 is grounded at 17, the end of said cable 16 is connected to a return cable 18. The ends of the pair of cables are then attached to the binding posts 6. One pole of a six or eight dry cell battery, as 14, is connected to one of the binding posts 9, and the other pole is grounded. The receiver 8ª is then placed to the ear and the contact element or feeler 12 is moved along the resistance or bridge wire 4 until no disturbance is heard in the receiver. To determine the point at which the ground occurs, the length of the grounded cable 16 is multiplied by two, giving the length of the entire cable 16 and 18. This result is multiplied by the number on the scale at the silent point and divided by fifty, the entire length of the resistance or bridge wire. The result will be the distance in feet from the fault finder to the point of trouble. If the circuit is crossed, one side of the circuit that is in trouble is grounded, another wire or cable of an ungrounded and uncrossed set is connected to the other side of the crossed pair, and the instrument is used as stated above. The same rule and formula will apply to toll lines by using miles instead of feet. It will be understood that with this structure, the cables or the pairs of wires in the cable must be of the same size, but any sized wire can be measured, provided the wires of the pair are equal in size.

It will be evident that this structure is exceedingly simple, inasmuch as there is no complicated machinery or mechanism, and furthermore none of the elements are apt to become broken or deranged. However should the necessity arise, any element may be easily duplicated at slight cost. The

structure furthermore is so small and light that it can be readily carried about and can be placed in an overcoat pocket. Experience has demonstrated that the results obtained are absolutely accurate, and if desired can be figured down to inches. In addition to this any person who has a rudimentary knowledge of mathematics can use the device as there are no complicated readings or mathematical computations required. The structure is based upon the fact that where a wire is grounded, the current does not all escape into the ground, and if given a chance will flow over wires both ways from the point of ground. This fact is made use of by tying one end of the faulty conductor to a working conductor of the same denomination, and tying the other ends of the conductors to the fault finder. The current will then flow both ways from the ground and at some point, the flow will be equal or of equal resistance. The present device locates this point by indicating the point of no disturbance. When the point of no disturbance is found, the total length of the two conductors is multiplied by the number of inches shown on the bridge at the point of no disturbance, and is divided by the total length of wire on the bridge. While fifty inches has been found a suitable length by the resistance wire, any length can be used.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a fault finder of the type disclosed, the combination with a portable support of a predetermined length, of resistance material carried by the support, a scale located along the line of resistance material and comprising a series of consecutive indicating symbols disposed at spaced points and arranged in opposite directions from the ends of the line to an intermediate point thereon. means for connecting a faulty conductor on opposite sides of the fault to the terminals of the resistance material, an indicator connected to the terminals of the resistance material, a source of electrical energy, and means for grounding one pole of said source of electrical energy and engaging the other pole with the resistance at the different points indicated by the scale.

2. In a fault finder of the type disclosed, the combination with a support, of a line of resistance wire mounted thereon in a zigzag relation and having marked contact points located at predetermined distances apart, a set of consecutive indicating numerals arranged on the support at the contact points and extending consecutively from the ends to the center of the resistance wire, means for connecting a faulty conductor to the ends of the resistance wire, a telephone connected to the ends of the wire, a source of electrical energy, means for grounding one pole of said source, and means for engaging the other pole with the resistance wire at the different indicated contact points.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

THEODORE E. ANDERSON.

Witnesses:

WALTER W. SAVAGE,

S. J. MATHER.