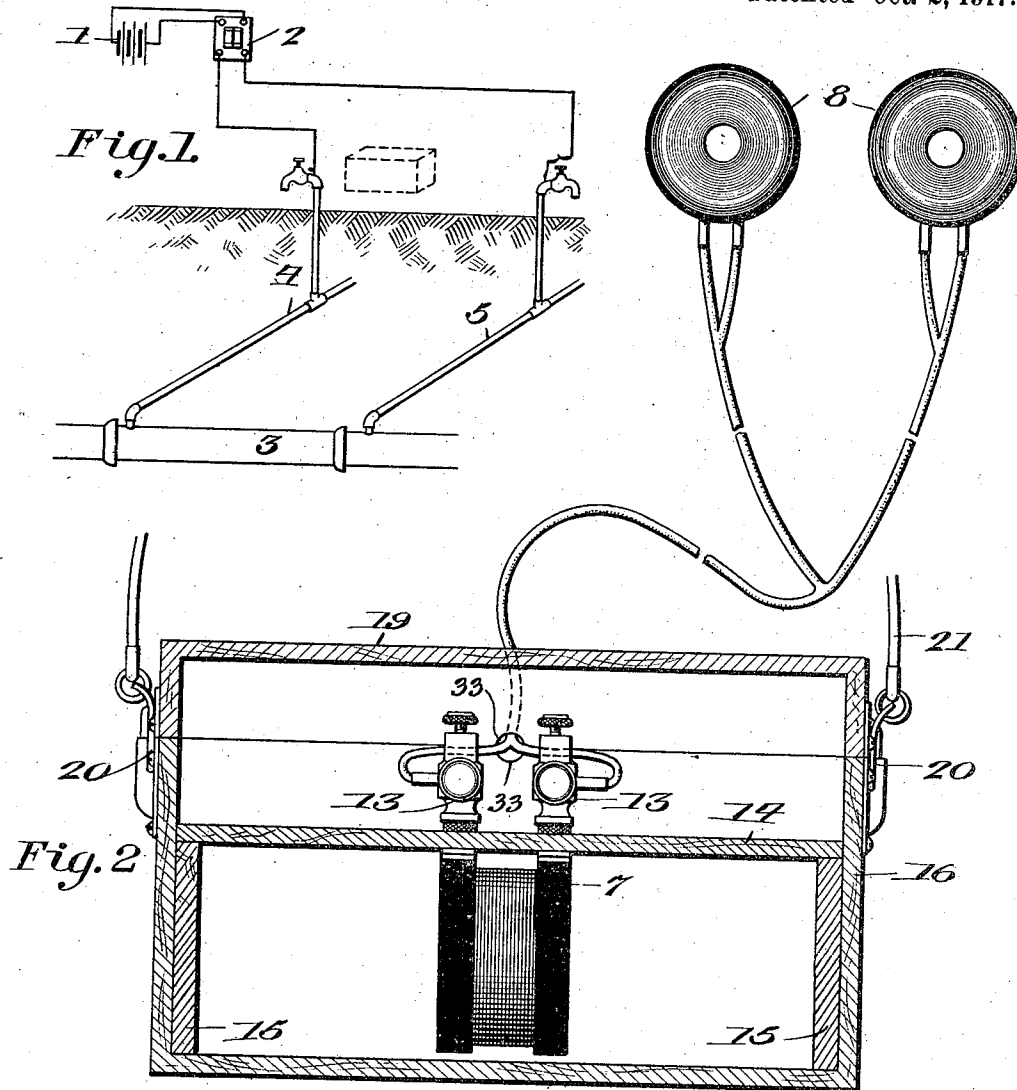


E. H. GROVE.
ELECTRICAL MEANS FOR LOCATING CONCEALED PIPES.
APPLICATION FILED AUG. 21, 1912.

1,241,963.

Patented Oct. 2, 1917.



Witnesses

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UNITED STATES PATENT OFFICE.

EDWARD H. GROVE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-EIGHTH TO ALBERT MARKS, ONE-EIGHTH TO RALPH A. KERN, ONE-EIGHTH TO JOSEPH F. KREAMER, AND ONE-EIGHTH TO WILLIAM F. SULLIVAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

ELECTRICAL MEANS FOR LOCATING CONCEALED PIPES.

1,241,963.

Specification of Letters Patent.

Patented Oct. 2, 1917.

Application filed August 21, 1912. Serial No. 716,285.

To all whom it may concern:

Be it known that I, EDWARD H. GROVE, citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Electrical Means for Locating Concealed Pipes, of which the following is a specification.

My present invention pertains to electrical devices for locating concealed water pipes, gas pipes and the like; and it consists in the highly efficient and otherwise advantageous device hereinafter described and definitely claimed.

In the drawings, accompanying and forming part of this specification:

Figure 1 is a diagrammatic view showing a magnetic circuit that is provided when my novel instrument is to be used in the location of a concealed pipe, and also showing by dotted lines the position in which the instrument is held, in order to apprise the operator of the location of said pipe.

Fig. 2 is a view showing the case in which the instrument is preferably carried, in longitudinal section, and also showing the instrument in elevation.

Similar numerals of reference designate corresponding parts in both views of the drawings.

Precedent to operating my novel instrument, I provide a suitable magnetic circuit such as shown in Fig. 1, in which a suitable source of electric energy 1 is arranged in a complete electric circuit with means 2 for maintaining an alternating current, a water main 3, and house service pipes 4 and 5 connected to the main and between which at any suitable point the source of energy and the means 2 are located. The potential of the said circuit need not necessarily be high, but there must be sufficient amperage in the circuit in order to enable the same to cooperate with my novel instrument, as hereinafter described.

In the present and best known embodiment of my invention of which I am cognizant my instrument consists in an exploring coil 7 electrically connected with one or more (preferably two) receivers 8 which *per se* may be of conventional or any other suitable construction or type without affecting my invention.

By preference the exploring coil 7 is equipped with binding posts 13 for the connection of the wires leading to the receiver or receivers, and is fixedly connected through the medium of the said posts to the top portion 14 of a frame of wood or other suitable material, which frame comprises, in addition to the top portion 14, end portions 15. The frame carrying the exploring coil or instrument is arranged in the body 16 of a case in which the frame snugly fits, so as to hide the exploring coil from view, and on the said case is removably fixed a cover 19, the fixture being effected by swinging fasteners 20 which serve for the connection of the ends of a cable 21 by which the instrument and the case inclosing the instrument may be conveniently carried and swung as a unit.

For the sake of convenience, the receivers 8 and the conductors between the same and the binding posts 13 may, when the instrument is not in use, be carried in the upper portion of the case body 16 and under the cover 19.

The practical operation of my instrument will be readily understood from the following:

Either one or both of the pipes 4, 5, comprised in the circuit shown in Fig. 1 may be expeditiously and accurately located through the medium of my novel instrument, the operator holding the instrument by the cable 21 and above the ground in the position shown by dotted lines in Fig. 1—*i. e.*, in a position at an angle to the pipes 4 and 5. While so holding the instrument and walking about, the operator swings the instrument in the direction of its length.

When swinging the device as stated, the operator may move along until, when he is directly over the sought pipe, the noise in the telephone receivers will be as loud at one limit of the swing as at the other whereupon he will be apprised of the position of the pipe.

An important feature of my invention resides in the fact that it operates efficiently while being swung above and out of contact with the ground, and also when swung above and out of contact with pavements, flooring and the like.

While I have entered into a detailed de-

scription of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention, it is obvious that in the future
5 practice of the invention such changes or modifications may be made as fairly fall within the scope of my appended claims.

As will be observed by reference to Fig. 2, the casing body and its cover are provided
10 with opposed notches 33 which form an opening for the passage of the electric connection intermediate the secondary of the induction coil and the receivers when the instrument is made ready for use.

15 When deemed desirable, a head-piece may be employed for holding the receivers to the ears of the operator. The said head-piece, however, forms no part of my invention, and I have therefore deemed it unnecessary to illustrate the same.
20

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

1. In a device for the purpose described,
25 the combination with a casing comprising a body, a removable cover, and fasteners for detachably connecting the cover to the body; the body and cover having an opening formed by notches in their opposed edges,
30 and the fasteners having swinging members, of a cable connected at its ends to said

members, an electrical instrument arranged in the body of the casing, a receiver, and a flexible conductor intermediate the instrument and the receiver and extending
35 through the said opening in the casing; the said receiver and conductor being adapted to be arranged in the casing when the device is not in use.

2. In a device for the purpose described,
40 a casing, an exploring coil therein, a telephone receiver outside the casing, conducting means connecting the exploring coil and said receiver, and a suspending means for the casing so connected thereto that the latter
45 may be swung in a plane passing through the axis of the exploring coil.

3. A device for the purpose described, comprising an exploring coil, a telephone receiver, conducting means between the ex-
50 ploring coil and the receiver, and suspending means for the exploring coil so connected thereto that the latter may be swung in a plane passing through the axis of the coil.

In testimony whereof I have hereunto set
55 my hand in presence of two subscribing witnesses.

EDWARD H. GROVE.

Witnesses:

EDNA JAMES SHREEHY,
C. W. FOWLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."