

No. 658,013.

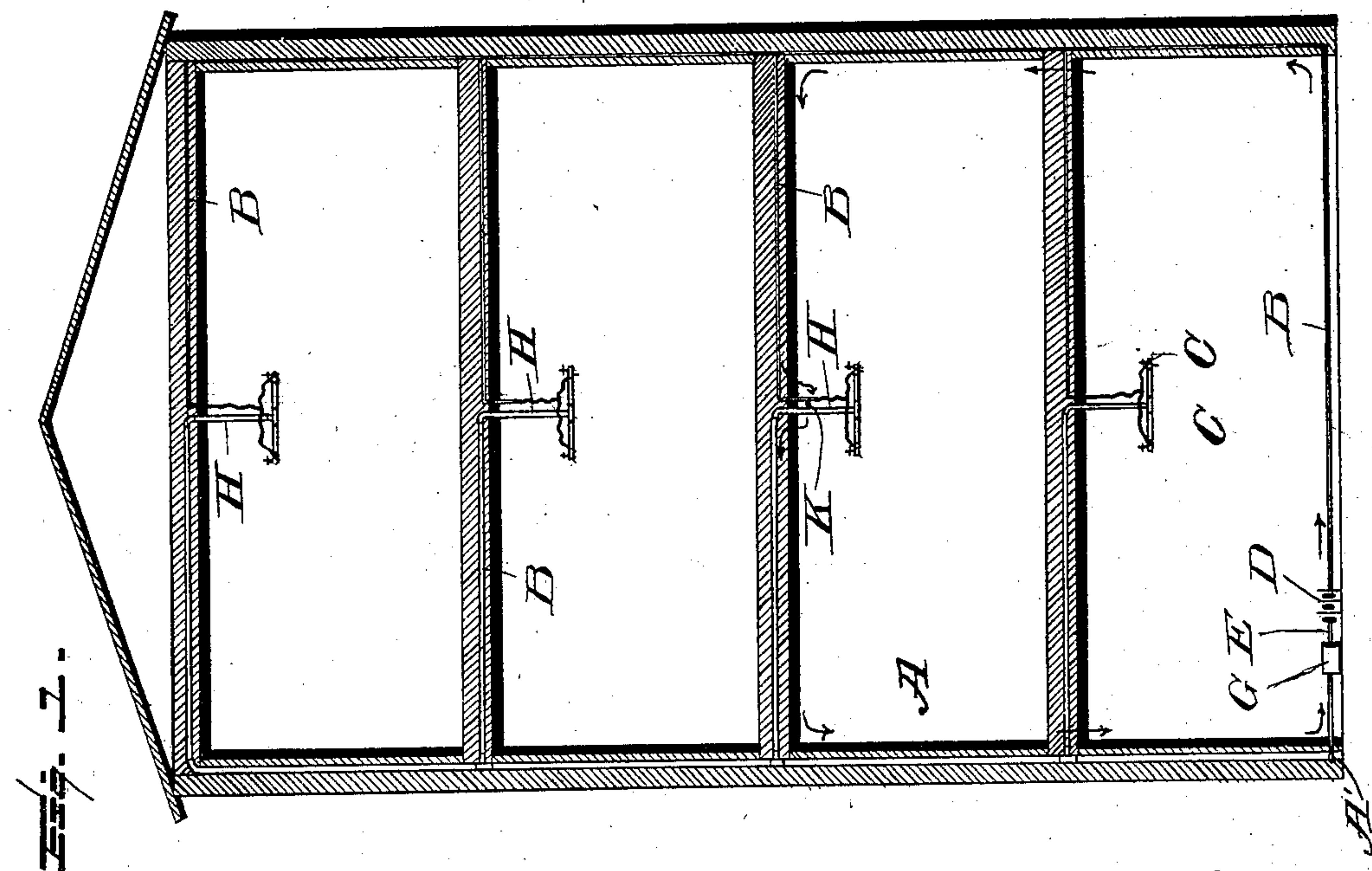
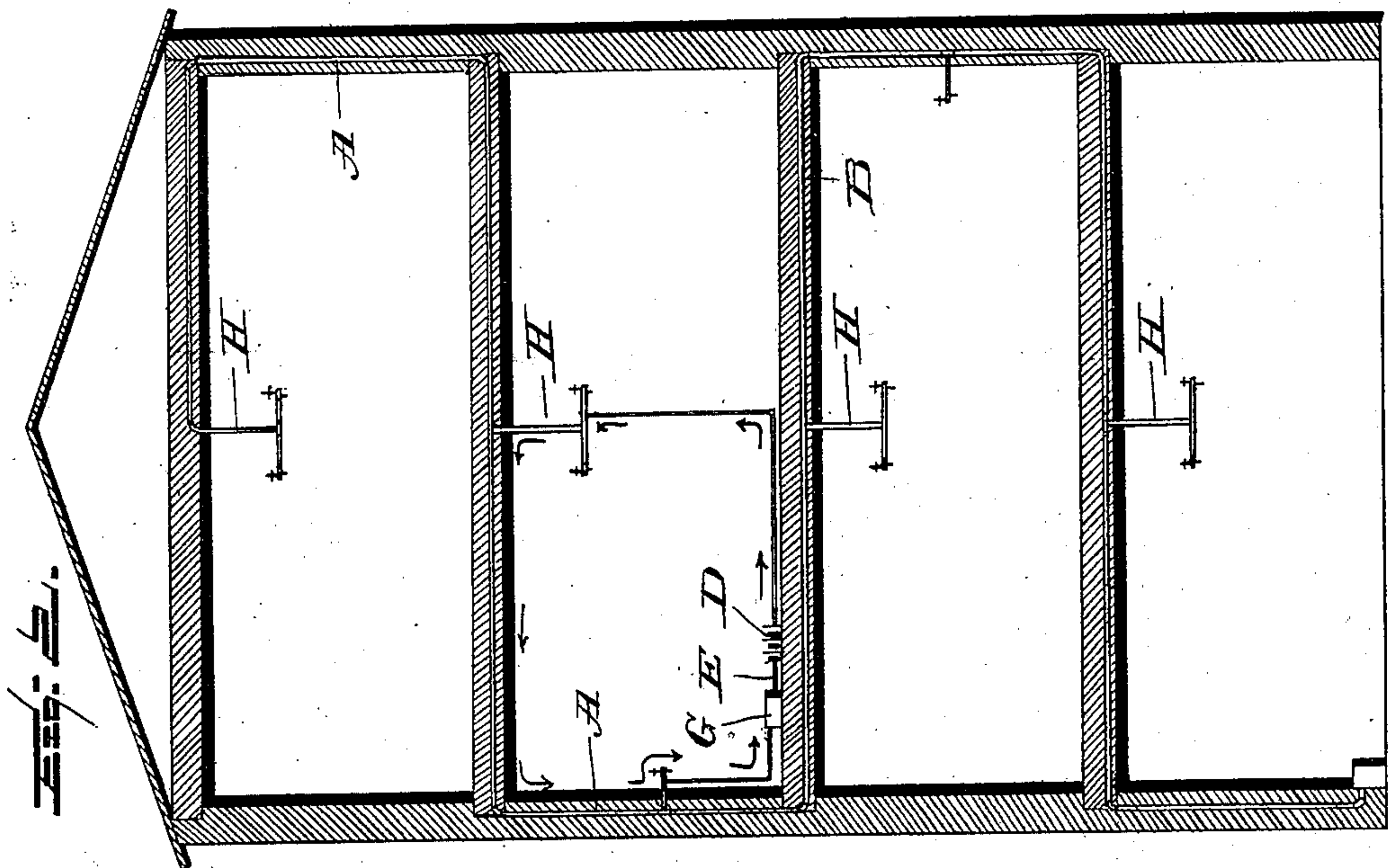
Patented Sept. 18, 1900.

F. T. IDDINGS & D. H. WASHBURN.
METHOD OF LOCATING CONCEALED WATER PIPES.

(Application filed Dec. 2, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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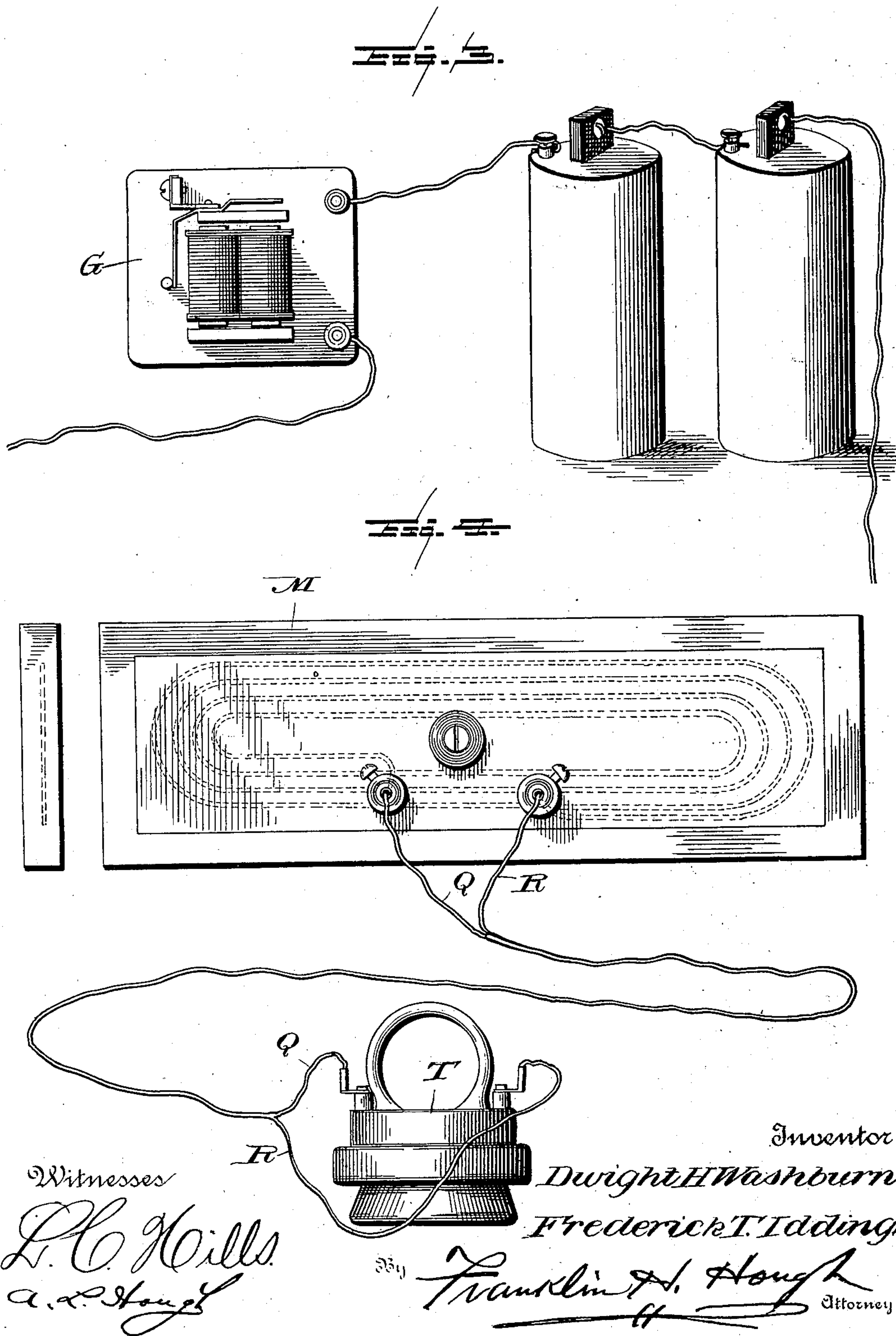
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UNITED STATES PATENT OFFICE.

FREDERICK T. IDDINGS AND DWIGHT H. WASHBURN, OF WASHINGTON, DISTRICT OF COLUMBIA; SAID IDDINGS ASSIGNOR TO SAID WASHBURN.

METHOD OF LOCATING CONCEALED WATER-PIPES.

SPECIFICATION forming part of Letters Patent No. 658,013, dated September 18, 1900.

Application filed December 2, 1899. Serial No. 739,039. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK T. IDDINGS and DWIGHT H. WASHBURN, citizens of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Methods of Locating Concealed Pipes, &c.; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a certain new and useful method or process for tracing and locating concealed pipes—such, for instance, as gas or water pipes—which are hidden within the walls or ceilings of buildings, thus obviating the necessity of unnecessarily tearing out partitions, walls, or other construction in order to secure access to the pipes.

The primary object of the invention resides in the application of the process to the use of plumbers in tracing and locating either gas or water pipes which are concealed by construction of buildings.

The invention further contemplates the provision of an induction device for use in cases in which the resistance of the conductor is great.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, like letters of reference indicating the same parts throughout the several views, and in which—

Figure 1 is a central vertical section taken through the various stories of a house, showing the electrical wiring and gas-piping, the battery and electrical-circuit interrupter being shown in circuit with the wiring and piping. Fig. 2 is a similar view showing our apparatus in connection with the system of gas-piping for the purpose of locating the position and direction of the pipes. Fig. 3 is a view of an ordinary battery and electric-circuit interrupter. Fig. 4 is a detail view of

the explorer, showing the connection of the telephone-receiver therewith.

Reference now being had to the details of the drawings by letter, A designates in Fig. 1 a gas-piping running throughout the several stories of a house and embedded in the walls, as shown.

B designates an electric wiring running through the various partitions and walls and connected to pendants for lighting the gas, which are secured to the various gas-chandeliers.

At any suitable location—as, for instance, in the basement of the house—is located a battery D, one pole of which is connected to the electric wiring B, and its other pole is connected by wire E with the electric-circuit interrupter G, which latter in turn is connected to the piping A at A'. The connections thus being made, it will be observed that a complete circuit is formed through the medium of the electric wiring, gas-piping, the electric-circuit interrupter, the short circuit, and the battery. In the drawings we have indicated the short circuit, which it is desired to locate by our improved apparatus, by letter K in Fig. 1, being between the downwardly-extending electric wire connected to the chandelier in the second story and the pipe H. There being a short circuit, the current of electricity will travel in the direction of the arrows. In order to determine the exact location of this short circuit, an explorer M, Fig. 4, is employed. This explorer, for which we claim no invention, as substantially the same device is in use for other purposes, consists of a large coil of properly-insulated wire wound about a central core in longitudinal folds and suitably incased. To the casing are secured two connecting-posts N N, having connection, respectively, to the two ends of the coil of wire of the explorer. To these posts are secured the conductor-wires Q and R, which in turn are connected to the telephone-receiver T.

The connections between the piping, electric wiring, battery, and circuit-interrupter having been made the operator places the

telephone-receiver to his ear and with his other hand places the explorer over the surface of the wall and moves it about until the explorer comes sufficiently near to the circuit, so that the current in the circuit will induce a current in the coil of said explorer. The moment the explorer approaches the circuit the electric-circuit interrupter will be heard plainly through the telephone. The noise of the interrupter will be heard louder as the explorer approaches the circuit and as the length of the explorer approaches a position parallel to the length of the circuit, in which position the buzz of the interrupter is heard most distinctly. When the neutral zone of the explorer is immediately over and parallel with the circuit, the buzz of the circuit-interrupter is not heard, as the electric current of the circuit ceases to induce a current in the coil of the explorer. When this condition obtains, the operator has determined the direction in which the circuit runs, which is in a line longitudinally and centrally through the explorer. The operator then can trace the circuit to the ceiling of the particular story, and if by turning his explorer over the surface of the ceiling he is not able to hear the buzz of the interrupter he is aware that there is no short circuit in the story of the house that has been examined. Going to the second story, for instance, the same operation is repeated. Locating the vertical direction of the circuit, he finds that on pushing the explorer over the surface of the ceiling the buzz of the interrupter is plainly heard, and by manipulating the apparatus he determines the direction in which the circuit runs horizontally in the ceiling, and consequently knows that the short circuit is still beyond the point at which the explorer is located. By moving the explorer along the horizontal pipe in the ceiling the circuit is traced down the pipe leading to the chandelier, and after passing the point of the short circuit the buzz of the interrupter ceases to be heard, by which the operator knows that the direction of the current has changed. By turning the explorer at right angles and slightly manipulating same the exact location of the short circuit is determined.

When our apparatus is used for tracing the direction of the gas-piping of a house, as illustrated in Fig. 2 of the drawings, the connection is made, for instance, between the interrupter and the battery, as before, one pole of the battery being connected to the chandelier and the interrupter connected to any other part of the piping, as to the wall-bracket burner. Then by the use of the explorer, manipulated in the same manner as hereinbefore described, the exact location of the direction of the gas-pipe may be determined.

While we have for the purpose of describing our invention shown an interrupter con-

sisting of an ordinary buzzer commonly used by electricians, it is at once evident that any form of instrument adapted to either induce or interrupt a current may be substituted therefor. It will also be understood that in certain cases, such as underground conduit-work, a simple buzzer connected in this manner would not furnish a current of sufficient potential, and in such case we would use an induced or alternating current of high potential. We attain this result either by the use of an induction-coil in connection with the buzzer or by using the discharge of the buzzer-coils by connecting the two ends of the circuit with the two ends of the wire on the buzzer-coils and connecting the two wires from the battery with the two binding-posts on the buzzer. In some cases it may be necessary to connect a condenser in series with the buzzer-coils to prevent the short-circuiting of the coils, which would be the case if the resistance of the circuit to be tested is small.

We are aware that it has been proposed to detect faults or grounds upon electric distributing systems, especially electric railways, by means of a telephone and indicating-coil and do not seek to cover such broadly; but so far as we are aware we are the first to provide for the location of pipes concealed within a building, thus obviating the necessity of tearing out the walls or plastering in order to locate such pipes.

Having thus described our invention, what we claim to be new, and desire to secure by Letters Patent, is—

1. The herein-described method of tracing and locating pipes concealed within the wall or floors of a building, which consists in charging the pipes with electricity, throwing an electric interrupter into the circuit, moving an explorer over the surface of the wall or floor and inducing a current in the latter as it approaches the circuit and changing the position of the explorer to indicate the direction in which the pipe extends, substantially as described.

2. The herein-described method of tracing and locating pipes concealed within the wall or floors of a building, which consists in charging the pipes with electricity, throwing an electric interrupter into the circuit, then changing the position of the explorer until the induced current therein ceases, thus indicating that the explorer is immediately over and in line with the pipe, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK T. IDDINGS.

DWIGHT H. WASHBURN.

Witnesses:

A. L. HOUGH,

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