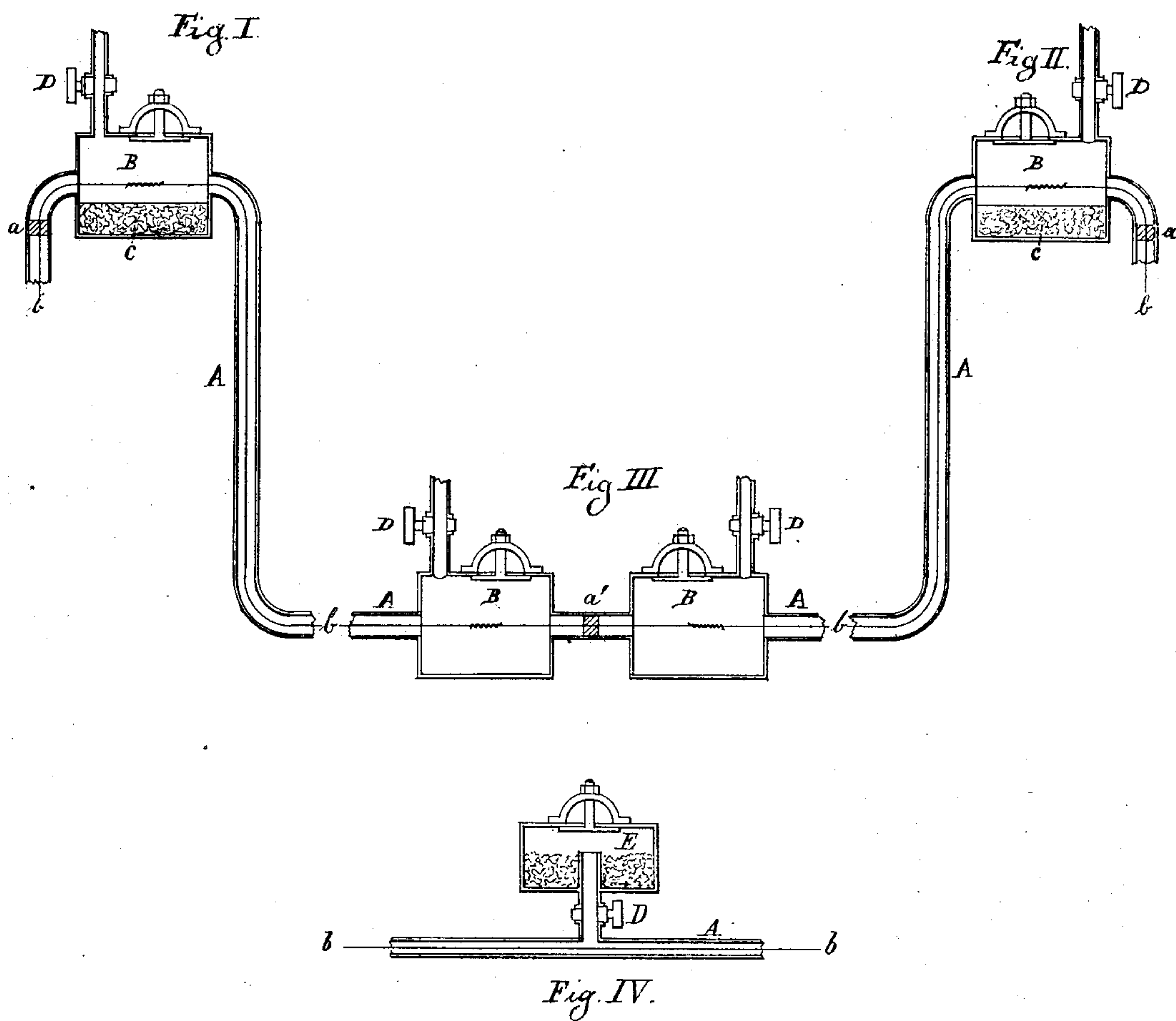


(No Model.)

E. A. HILL.
INSULATING UNDERGROUND LINES.

No. 257,165.

Patented May 2, 1882.



Witnesses;
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INSULATING UNDERGROUND LINES.

SPECIFICATION forming part of Letters Patent No. 257,165, dated May 2, 1882.

Application filed June 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. HILL, a citizen of the United States, residing at 100 Market street, Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Method of Insulating Underground Electric Conductors; and I do hereby declare that the following is a full, clear, and exact description of such improvements.

It is well known that a cotton or other textile covering is a good insulator of electric conducting-wires when dry. Practically such covering is much used as an insulator wherever the atmosphere surrounding such wires is not damp or liable to become so; but a much more expensive covering has to be employed for wires surrounded with a damp atmosphere, such as that in the pipes of underground or tunnel telegraph-wires. Aside from the material covering of a wire, the condition of the atmosphere surrounding it, as to its dryness or humidity, is known to affect favorably or unfavorably its insulation, dry air being regarded one of the best insulators, while as a dielectric standing in the list very low. Underground conducting-wires, if clothed with a loose covering of cotton or other fibrous or textile material inclosed in a sealed tube and surrounded by a dry atmosphere, should therefore be very efficiently insulated.

The object of my invention is to provide means that shall effectually produce and maintain dryness of atmosphere within pipes inclosing such wires. The method of accomplishing this object I will now proceed to specify, referring to the accompanying drawings, forming part of this specification.

Figures I and II represent a longitudinal sectional elevation of the extremities of a line of pipe; and Fig. III, a short length of the same pipe at some intermediate point, showing a subdivision of the line into compartments or sections, whereby in case of accident at any point derangement of a whole line of pipe or system of pipes is provided against.

A is the pipe; b, one wire running through the length of the pipe. If more than one is required, they are preferably not bound into a cable, but made to lie as loosely as possible in the pipe, and the texture of the covering

should be as open as possible consistent with keeping the wires from metallic contact with each other and with the pipe. Very near the ends of the line or of a section the pipe A is expanded into test-boxes B, with hand-holes or other convenient openings which may be closed air-tight for giving convenient access to the wire b. If desired, these test-boxes may carry charges of calcium chloride or other absorbent of moisture, as shown in Figs. I and II, C.

D represents short pipes fitted with air-tight stop-cocks inserted into the several test-boxes, Figs. I, II, and III, or near the test-boxes into the pipe A, as shown in Fig. IV. E, Fig. IV, is a box for containing air-drying material. It may, as necessity requires, be placed in constant or only occasional communication with the interior of pipe A, the pipe and stop-cock D being specially designed to afford this option.

a in Figs. I and II is a plug or plate plugging or sealing air-tight the outer extremities of the pipe A, and a', Fig. III, a similar plug or plate sealing between two adjacent sections.

In lieu of the plugs a and a', as shown in the drawings, a liquid or plastic material may be employed and placed in a U-pipe, forming a kind of trap which would yield to fluctuations of atmospheric pressure. As the conducting wire or wires pass through these plugs or traps, it is obvious they must be non-conductors of electricity.

The atmosphere of a line of pipe, or of a section thereof, may be dried by placing calcium chloride or other equivalent aqueous absorbent within receptacles in atmospheric communication with the interior of pipe A, and sealed up from communication with the external atmosphere. The test-boxes B may be employed as such receptacles, as shown at C, Figs. I and II, or separate boxes similar in construction may be connected with pipe D, as shown at E, Fig. IV. The last method possesses the advantage over the first that it allows drying or renewing the charge of calcium chloride whenever it becomes non-absorbent of moisture; but as the pipe and stop-cock D give facility for drying the charge in B, as well as the air and other contents of A, both kinds may be advisable in practice, though

the latter not constantly. When the pipe A is first laid and all the electrical connections are completed, before the air-drying material is placed, and before the line is put into practical operation, or at any time subsequently, after accident and repair, it is expedient to thoroughly dry the interior of the pipe A and the wires. This may be done by forcing air dried in any well-known manner through the entire section of pipe. After this is done reliance is to be placed upon the more or less perfect sealing of the pipes and the operation of the air-drying material in the several receptacles.

I am aware that artificially-dried air has been used when forced in a continuous current and under pressure through a pipe; but my construction is designed to avoid the expense of constantly maintaining a current and pressure.

I am also aware that air has been artificially dried before being introduced into pipes carrying naked wires; but no provision was made for maintaining a dry condition afterward.

My invention goes beyond this and provides, first, receptacles along the line for containing air-drying material, and, second, appliances

for redrying such material when occasion requires, the drying of the air being in a great measure subsidiary to drying the fibrous or textile covering of the wire.

I claim—

1. The pipe A, containing and inclosing air-tight one or more conducting-wires clothed with cotton or its equivalent and a dry atmosphere surrounding them, in combination with plugs *a*, and with one or more receptacles holding air-drying material in atmospheric communication with the interior of said pipe, substantially as and for the purpose specified.

2. The pipe A, containing one or more conducting-wires clothed with cotton or its equivalent, in combination with plugs *a*, and with pipes D for giving communication at will with outside air-drying appliances, substantially as specified.

3. The plug *a'* for subdividing the pipe A into sections, in combination with plugs *a*, with pipe D, and with appliances B E for drying the air, substantially as specified.

EDWARD A. HILL.

Witnesses:

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