

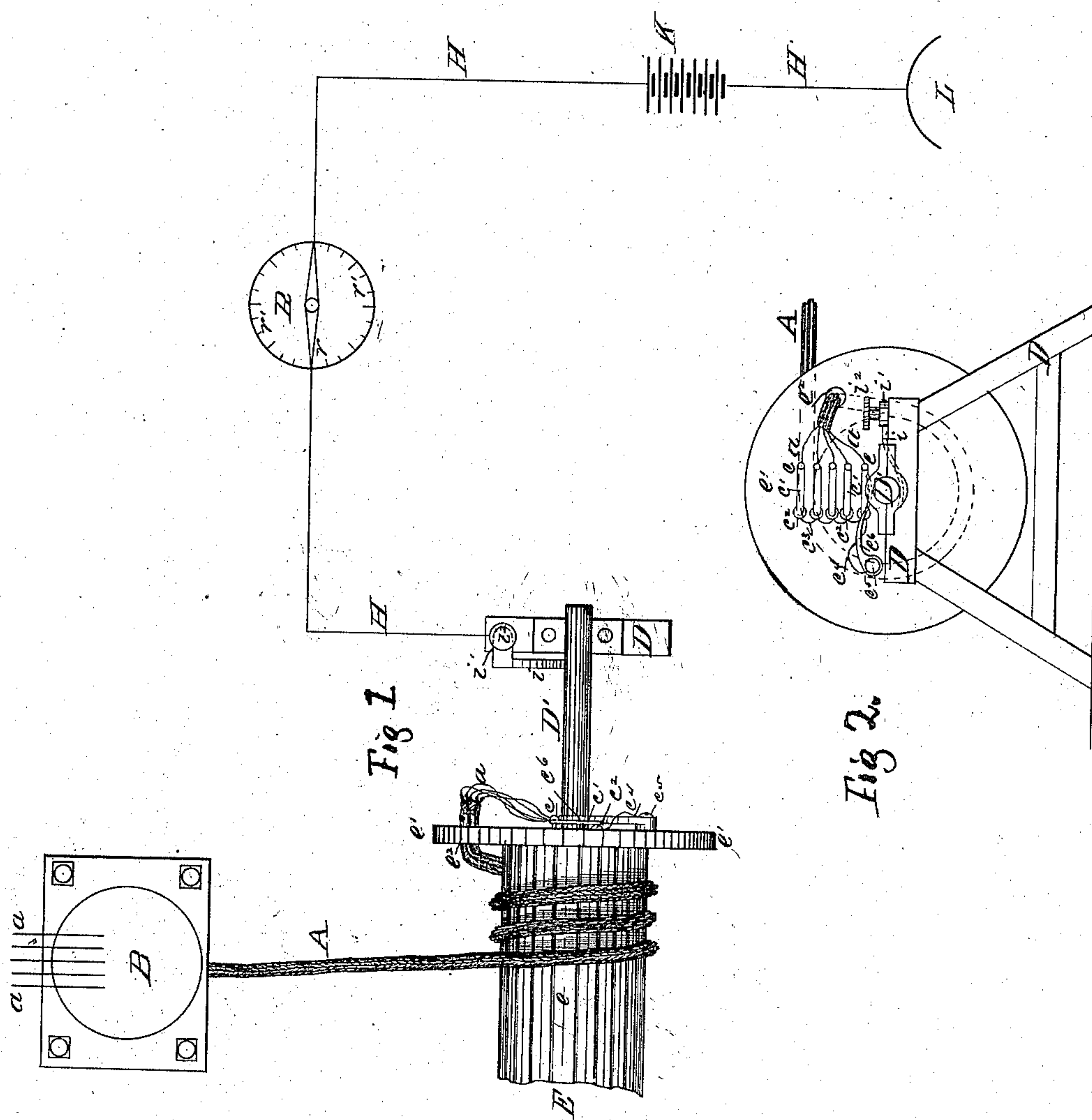
(No Model.)

H. VAN HOEVENBERGH.

ART OF TESTING LEAD COVERED CABLES.

No. 284,094.

Patented Aug. 28, 1883.



Witnesses

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ART OF TESTING LEAD-COVERED CABLES.

SPECIFICATION forming part of Letters Patent No. 284,094, dated August 28, 1883.

Application filed February 1, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing at Elizabeth, county of Union, State of New Jersey, have invented or discovered a new and useful Improvement in the Art of Testing Lead-Covered Cables; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a diagram illustrative of mechanical devices and electric-circuit connections employed in carrying out my invention; and Fig. 2 is an end elevation of the coiling-reel, illustrative of the circuit-connections and switch mechanism employed thereon.

My invention relates to the art of testing electrically lead-covered electric cables during the operation of applying the lead to or around the wires; and, in general terms, it consists in certain combinations of a lead-cable press and cable, an electric signaling device, and an electric circuit through the signal connecting the insulated wires and lead covering of the cable, whereby, upon the occurrence of a fault in the insulation during the application of the lead covering by the press, the circuit will be completed and the signal be actuated.

In the manufacture of lead-covered electric cables it is customary to make use of a machine known in the art as a "lead-press." In doing this the desired number of conducting-wires, covered or coated with some suitable insulating material, are carried through the tubular core or mandrel and the die of the press, and the lead—say at about 300° temperature Fahrenheit—is forced through the die onto or around the wires, enveloping them in a complete lead covering. In this operation of forming the cable an important element of danger is the high degree of temperature at which the lead is worked, by which the insulating material is melted, and the lead is rendered soft and easily impressed. It is therefore important and advantageous to provide some means of detecting faults or defects in the insulation as soon as they are formed, in

order, among other things, to locate them with accuracy and to facilitate their removal without unnecessary waste.

The purpose of my invention is to provide for doing this by giving signal to the workmen whenever a fault occurs by means of an electric circuit completed through such fault.

In the drawings I have illustrated the insulated wires *a* as they enter the press *B* from suitable storing-reels, which are not shown, but may be of any suitable construction, and located with reference to the press as convenience or circumstances may suggest. The press may also be of any desired form and construction. Such devices, as well as their operation in forming the cable, are well known in the art, and therefore need not be described in detail. As the finished cable *A* is delivered from the press it is wound on a storing-reel, *E*. (Shown in plan, Fig. 1, and in end elevation, Fig. 2.) The body *e* and head *e'* of the reel are made of dry wood, or other suitable non-conductor of electricity, and the supporting-trestles *D* are also made of similar materials, whereby the cable is insulated from the metallic shaft *D'*, and the latter is insulated from ground. In order to make the desired circuit-connection with the wires *a* of the cable, its end is passed through a hole, *e''*, in the head *e'*, and the several wires are secured to separate posts *c*, which have electric connection with the pivoted switch-arms *c'*, which latter may be moved onto or off from the buttons *c''*, so as to make or break circuit-connection therewith. The buttons *c''* are connected by loops *c'''* with each other, and by wire *c''''* with post *c'''''*, spring *c''''''*, and shaft *D'*. The purpose of spring *c''''''* is to secure pressure-contact with the shaft—such that if the reel should turn somewhat on the shaft electrical contact will not be broken. Instead, however, of the connecting-loops *c'''*, separate wires may extend from each button to the post *c'''''*; or, if preferred, they may extend to and be connected with the shaft by wrapping or otherwise.

Ordinarily it is preferable to make the reel tight on the shaft, and in such case provision is made for continuing the electric circuit from the shaft by a contact-spring, *i*, secured in

convenient position to bear upon the shaft, as at i' , with binding-post attachment i'' , from which the line-wire H leads, through the helix of a galvanometer, R, to one pole of battery K, the other pole being connected, through wire H' and ground L, with the press B, which also has ground-connection through its foundation; or, if preferred, the line H' may pass directly to and make circuit-connection with the press.

The galvanometer R may be of any suitable form and construction, many such being known in the art, having, by preference, a deflecting needle, r , and graduated arc r' , whereby upon passage of electric current through its helix the needle will be moved a measurable distance, indicating by such movement, to some extent, whether the actuating-current be strong or weak, and as an inference therefrom, whether the fault in the cable is small or great. I do not wish, however, to limit my invention to the use of a galvanometer for giving signal of the passage of current over the circuit, as any of the known forms of electrical appliances for giving either ocular or audible signal or manifestation of such current may be employed. The circuit described will, when the cable is perfect, be normally open, having terminals in the insulated wires for one pole, and in the press, or more properly in the lead covering of the cable, within the press, for the other pole.

When, in the operation of applying the lead covering within the press, a fault or defect occurs in the insulation of any of the wires, circuit will be completed through such fault and electric current will pass over the same, actuating the signal and thus notifying the workmen of the defect as soon as it is formed, thereby fixing its location with precision and enabling them to remove it at once without loss of sound cable. If it is desired to locate the fault in a particular wire or wires, it may be done by opening and closing the switches c' and noting which of the wires gives opened and which gives closed circuit when its switch is closed, the latter being the defective wires.

Instead of a battery, K, for exciting or generating electric current, any known or suitable means may be employed for this purpose, and such equivalents I consider as coming within my invention.

The means herein described for indicating defects in the cable are simple, effective, and adapted to give much better results than can ordinarily be secured by reliance upon tests made after the cable is complete and has left the press, though it may be advisable to make such subsequent tests in addition to those made during the operation of applying the lead covering. By my invention the faults, if any, may be located and removed by ordinary workmen without the skill or experience

usually required to locate a fault in a line by methods ordinarily practiced by electricians; also, by removing the faults as they occur complications are avoided which may arise from the existence of two or more faults at different points; also, the faulty points may be reached conveniently before they are wound on the reel, and may be removed without the labor and expense of unreeling especially for that purpose. These are important considerations, practically considered, and render my invention an important improvement in the art of making and testing such cables.

I have referred to lead as the metal employed for covering the wires, that being the metal commonly employed for this purpose. I do not wish, however, to limit my invention to testing cables having this specific metal covering, but include therein cables covered with other or equivalent soft ductile metal or alloy, as tin, or a mixture of tin and lead, adapted to be applied to the wires of a cable by a press, substantially as herein described, and such metals or alloys are intended to be included within the term "lead-covered cables" as used herein.

I claim as my invention—

1. The combination of a lead-cable press and cable, an electric signaling device, and an electric circuit through the helix of the signaling device, having terminals in the insulated wires of the cable emerging from the press and in its lead covering within the press, substantially as set forth.

2. In combination with a lead-cable press and cable emerging therefrom, an electric-signaling device, a battery, and a battery-circuit connecting the insulated wires and lead covering of the cable through the signaling device and through the press, such circuit being normally opened by the insulating material surrounding the cable-wires, substantially as and for the purposes set forth.

3. In combination with a lead-cable press and cable emerging therefrom, a galvanometer, and an electric circuit through the galvanometer, having terminals in the insulated wires of the cable and in its lead covering within the press, substantially as and for the purposes set forth.

4. The combination of a lead-cable press and a cable emerging therefrom, an electric signaling device, an electric circuit connecting the insulated wires and lead covering of the cable through the helix of the signaling device and through the press, and a switch for opening and closing circuit-connection with the separate wires of the cable, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

HENRY VAN HOEVENBERGH.

Witnesses:

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