

UNITED STATES PATENT OFFICE.

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POLARITY-INDICATOR.

No. 802,702

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FREDERICK W. MANGER and CHARLES E. AVERY, citizens of the United States, and residents of the city of Jersey City, Hudson county, New Jersey, have invented certain new and useful Improvements in Polarity-Indicators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The object of this invention is to provide a simple, compact, and durable instrument, which may be conveniently carried in the pocket, by which the direction of the current flowing through an electric circuit may be readily determined.

A practical embodiment of our invention in a preferred form is illustrated in the accompanying drawings, in which—

Figure 1 is a slightly-enlarged external view of the instrument. Fig. 2 is a central longitudinal section, and Fig. 3 is a transverse section, on the line 3 3, Fig. 2.

Similar reference characters are employed to designate like parts in all the views.

The instrument in the form illustrated comprises a hermetically-closed glass tube A, provided with two electrodes B and C, one at each end. The electrodes are usually made of platinum and are sealed into the ends of the tube, so as to project well into the tube and extend slightly beyond the ends thereof. The tube A is filled with a suitable liquid or chemical solution, which is decomposed and becomes discolored at the negative pole by the passage of electric current through the liquid, and recombines, assuming its normal color when the current ceases to flow, this property of certain chemical solutions being well understood by those skilled in the art to which our invention pertains. The tube A is inclosed in a case preferably constructed of hard rubber, and in the form shown comprises the central cylindrical portion D and the removable ends or caps E and F. The ends of the cylindrical portion of the case are exteriorly screw-threaded and the caps are correspondingly threaded to screw over them. The central portion of the case D is provided with an opening G, through which the action of the current on the contained liquid may be observed. The caps E and F are of slightly-

greater diameter than the body D of the case, and between the projecting ends of the caps is inclosed a revoluble cylinder or shield H, which is provided with a sight-opening I, corresponding with the opening in the case D. By rotating the shield H, which is usually made of stiff metal to carry the opening I past the opening G in the case, the tube A will be protected against breakage. To prevent a too free movement of the shield, a helical spring J is mounted in a recess in the case to bear against the inner surface of the shield, thus creating sufficient friction between the shield and the case to retard the rotatory movement of the shield.

Binding-posts K and L, or other suitable contacts are carried by the caps E and F. To insure a perfect contact between the inner ends of the binding-posts and the electrodes, we interpose between the post L and the tube a small mass of tin or other conducting metal foil M. At the opposite end of the instrument we employ similar foil contacts, one contacting with the post K and the other with the electrode B, and interpose between them a conducting-spring N. This serves to hold the contacts firmly together, while the spring will yield sufficiently to prevent the breaking of the tube by any endwise pressure produced by the screwing on of the caps.

To prevent the tube A from turning in the case D, we provide a small projection *a* on the side of the tube at one end and form a slot *d* in the interior surface of the tube into which the projection *a* extends. This projection *a* may be conveniently formed in closing the filling-opening of the tube A.

If the terminals of an electric circuit or the adjacent ends of a current-carrying conductor be connected to the binding-posts K and L, the liquid in the tube immediately adjacent to the negative pole will be discolored, and the direction of the current can be instantly determined.

Modifications in the form and arrangement of the parts of the particular form of instrument which we have herein shown and described will suggest themselves to those skilled in the art, and all such as may be made without departing from the spirit of our invention we intend to cover by the appended claims.

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

1. In a polarity-indicator, the combination
5 of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, removable ends for the case, contacts
10 carried by the ends of the case and metallic connections between the contacts and electrodes.

2. In a polarity-indicator, the combination
15 of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, screw-caps forming ends for the case, contacts carried by the caps and metallic
20 connections between the contacts and electrodes.

3. In a polarity-indicator, the combination
25 of a transparent tube hermetically closed and containing a suitable liquid, an electrode sealed in each end of the tube, an inclosing case for the tube provided with a sight-opening, screw-caps forming ends for the case, contacts carried by the caps and yielding metallic connections between the contacts and
electrodes.

4. In a polarity-indicator, the combination
30 of a transparent tube hermetically sealed and containing a suitable liquid, an electrode sealed in each end of the tube, a case for the tube, provided with a sight-opening, contacts carried by the case in metallic contact with
35 the electrodes, and a revoluble shield for the sight-opening in the case.

5. In a polarity-indicator the combination
40 of a transparent tube hermetically sealed, an electrode sealed in each end of the tube, an inclosing case provided with a sight-opening, caps of greater diameter than the case secured thereto, a revoluble shield for the sight-opening fitted between the projecting caps, and
45 contacts carried by the caps in metallic connection with the electrodes.

6. In a polarity-indicator, the combination
with a transparent tube containing a suitable liquid and carrying an electrode at each end, a case for the tube, ends for the case, and a
50 conducting-spring arranged between one end of the tube and the end of the case to exert a yielding pressure on the tube.

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POLARITY INDICATOR.

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Fig. 1,

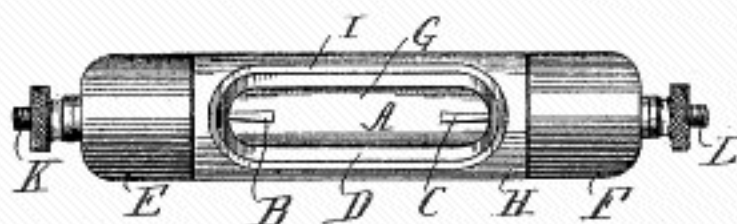


Fig. 2,

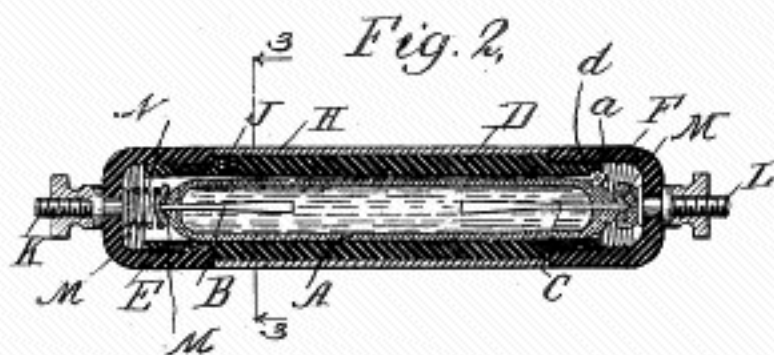


Fig. 3,



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