

No. 828,570.

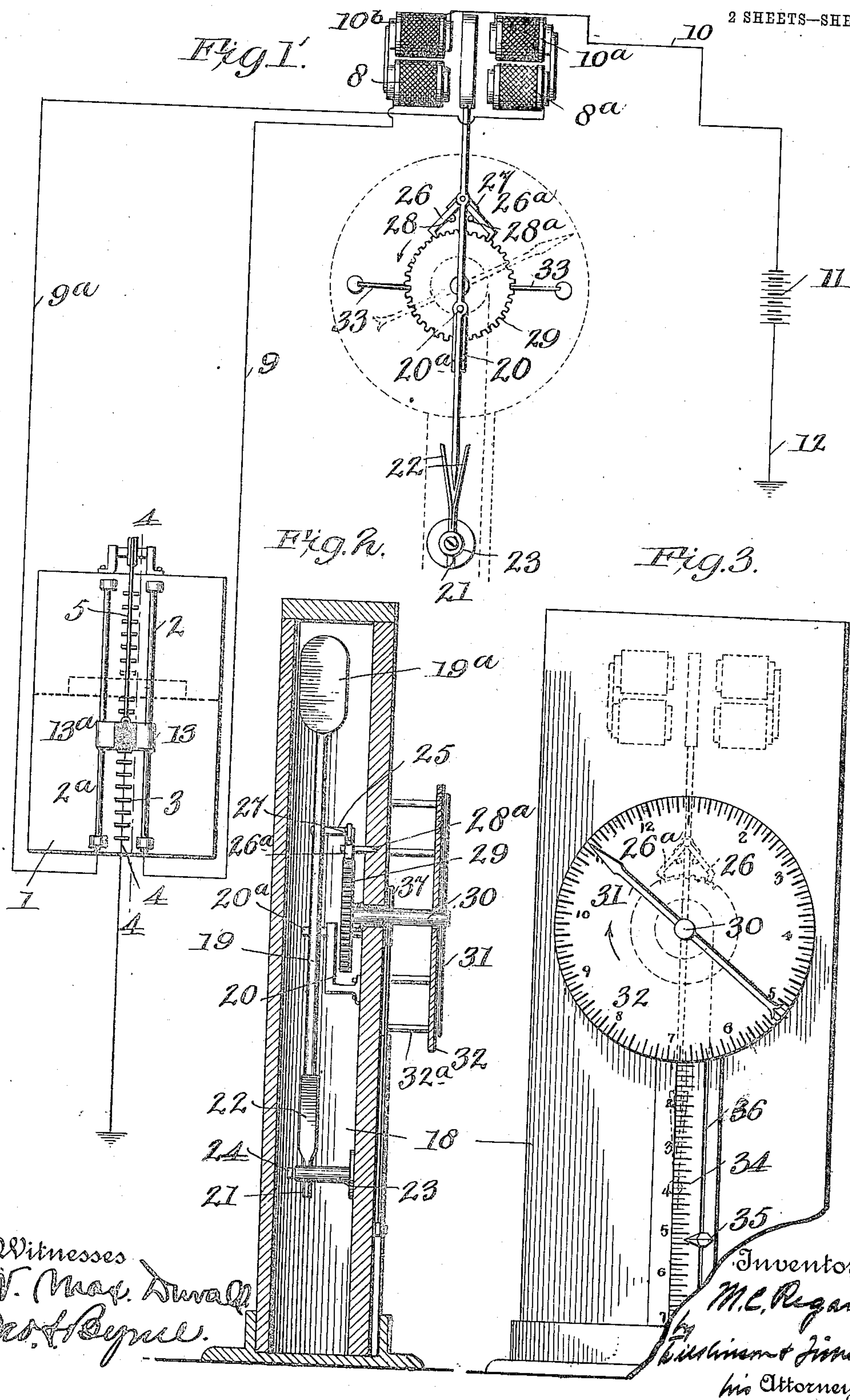
PATENTED AUG. 14, 1906.

M. C. REGAN.

ELECTRICALLY OPERATED INDICATOR.

APPLICATION FILED JAN. 12, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

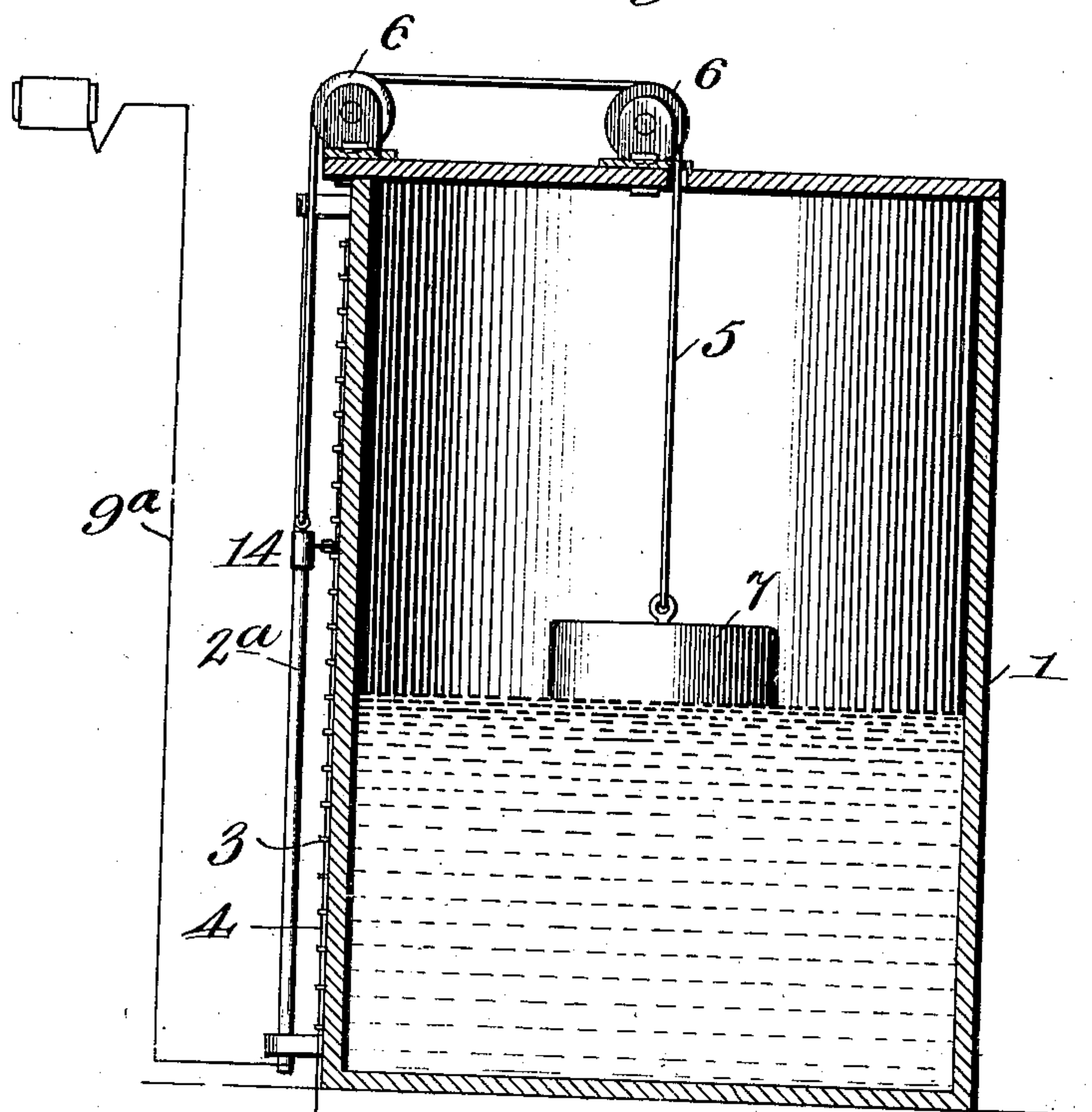


Fig. 6.

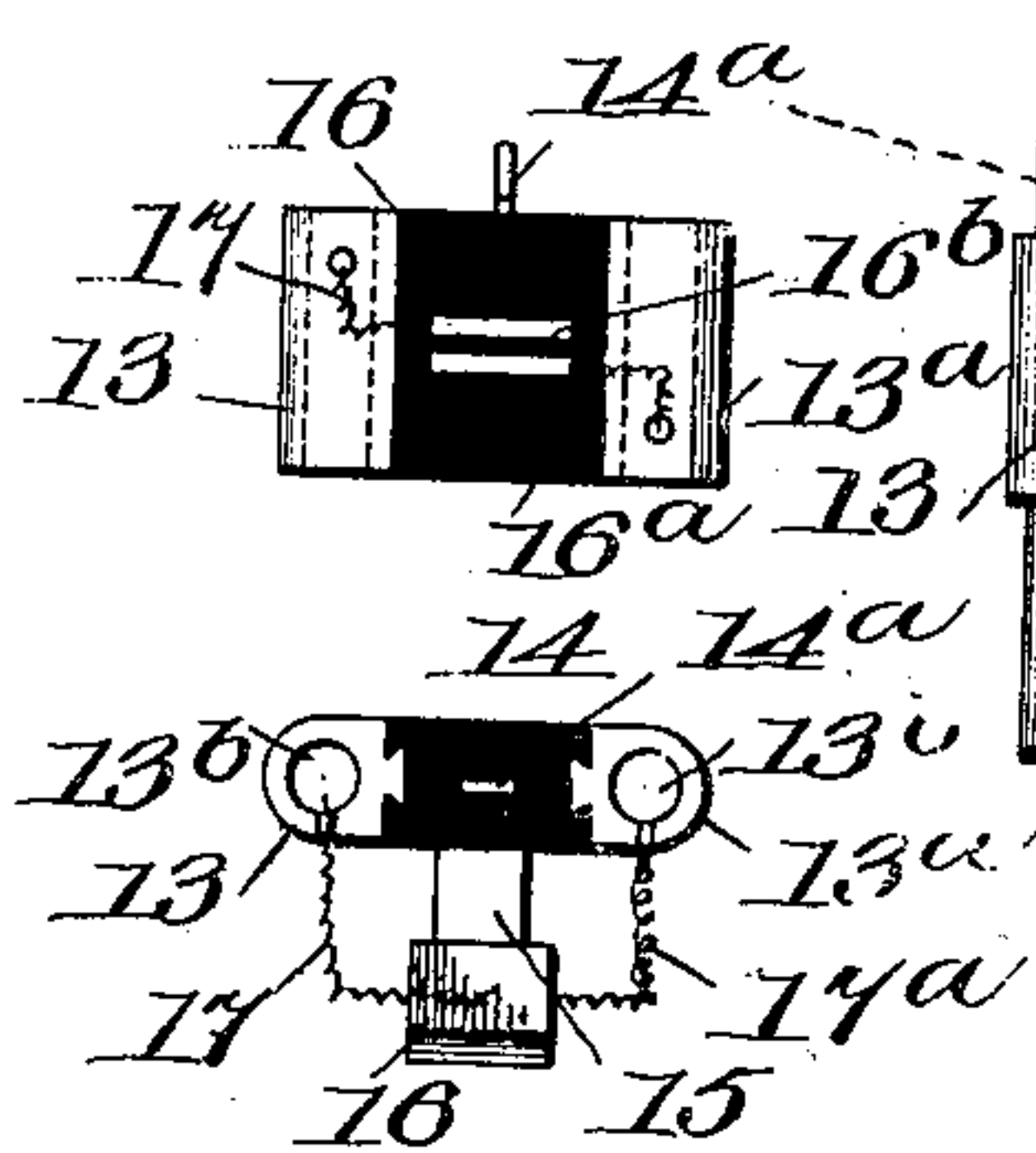


Fig. 5.

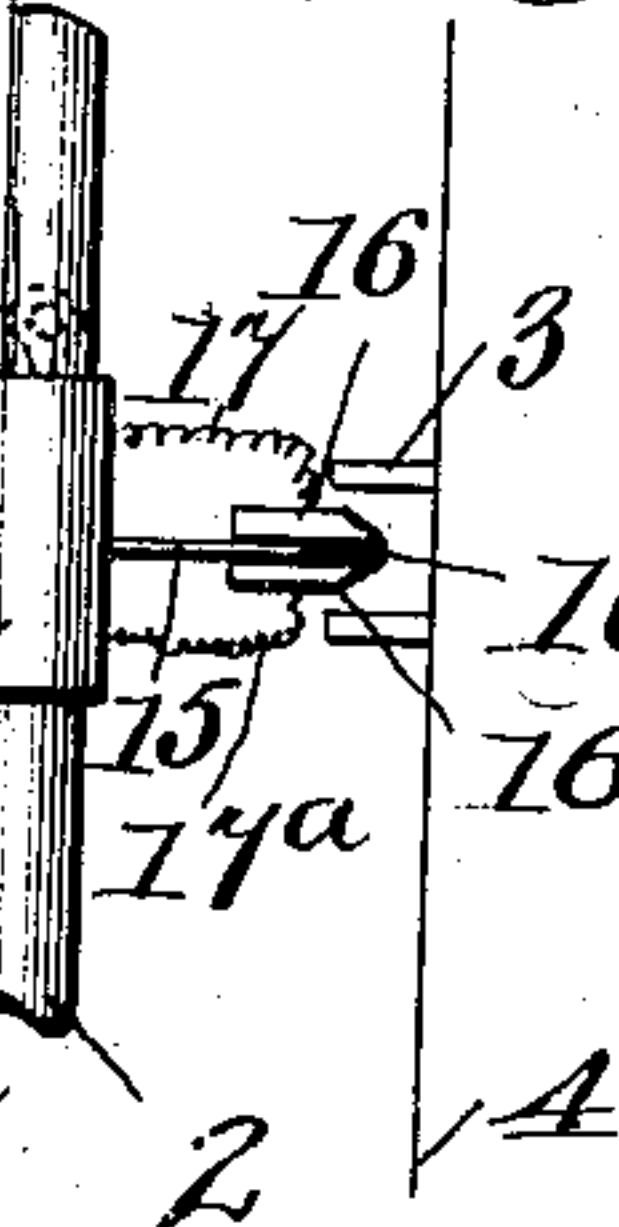


Fig. 8.

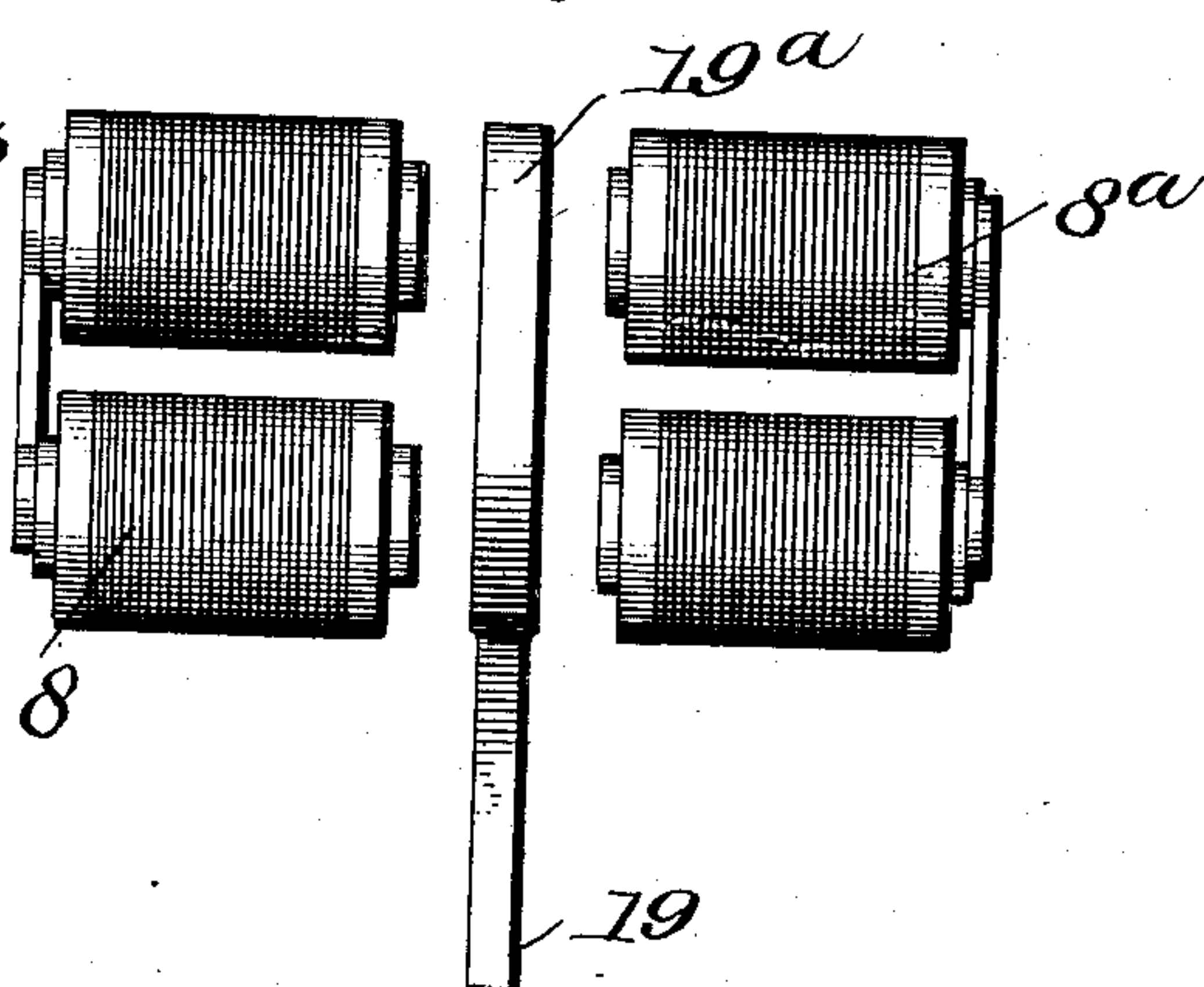


Fig. 7.

Witnesses  
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# UNITED STATES PATENT OFFICE.

MICHAEL C. REGAN, OF THE UNITED STATES ARMY.

## ELECTRICALLY-OPERATED INDICATOR.

No. 828,570.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed January 12, 1906. Serial No. 295,813.

*To all whom it may concern:*

Be it known that I, MICHAEL C. REGAN, electrician and sergeant of the United States Army, stationed at Fort Totten, in the State of New York, a citizen of the United States, have invented certain new and useful Improvements in Electrically-Operated Indicators; and I do hereby 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.

This invention relates to improvements in apparatus for registering the movements of bodies, fluid or otherwise, at a point or points distant from the moving body being registered; and to this end the invention consists of means operated by the moving body and forming a contact for making and breaking an electric circuit controlling an electromechanical registering apparatus.

While the invention might be utilized with various kinds of moving bodies the position of which it is desired to register, still it is more particularly designed for use as a tide-indicator or as means for registering the rise and fall of fluid in a tank or reservoir. For the purpose of disclosure, however, and for convenience of illustration, in the accompanying drawings I have shown the invention associated with a tank or reservoir disclosing a practical embodiment of the invention and its application, the particular features of novelty being pointed out in the claims.

Referring to the drawings, Figure 1 is a diagrammatically-arranged view, showing the electrical connection between the indicating apparatus and the distant tank or reservoir, the indicating apparatus being shown in rear elevation. Fig. 2 is a transverse longitudinal sectional view through the indicating apparatus of the casing, the indicating-dial being shown in section, but the rest of the apparatus being shown in end elevation with the electromagnets omitted. Fig. 3 is a front elevation of the indicating apparatus. Fig. 4 is a sectional view on the line 4 4 of Fig. 1, the contacting shoe, however, being shown in side elevation. Fig. 5 is a detail view, in side elevation, of the contact-shoe and showing its association with the contact members. Fig. 6 is a front elevation of the contact-shoe and its sliding support. Fig. 7

is a plan view of same, and Fig. 8 is a detail fragmentary view of the armature and its co-operating electromagnets.

1 is a tank or reservoir provided with the exterior longitudinally-disposed parallel guide-rods 2 and 2<sup>a</sup>, and a plurality of contact members 3 extending along said tank between said guide-rods and connected together by the grounding-wire 4.

5 is a cable operatively connected at one end with a contact-shoe, hereinafter referred to, thence passing over suitably-journaled sheaves or pulleys 6 and connected at its other end with a float 7, adapted to be operated by the rise and fall of liquid in the tank.

8 8<sup>a</sup> are electromagnets forming a part of the indicating apparatus, and the coils of these respective magnets at one end are connected, by means of the line-wires 9 9<sup>a</sup>, with the guide-rods 2 and 2<sup>a</sup>, while the other ends of the coils are connected by the wire 10 and its branches 10<sup>a</sup> and 10<sup>b</sup> with a battery 11, grounded, as at 12.

Referring to the contact-shoe previously mentioned, this consists of the metallic members 13 13<sup>a</sup>, insulated from each other by the central member 14, to which they are dovetailed or otherwise suitably connected. These metallic members are apertured, as at 13<sup>b</sup>, to slidably engage the rods 2 2<sup>a</sup> and be guided thereby. The central member 14 is provided with a hook 14<sup>a</sup> for suspending the same from one end of the cable 5.

15 designates a resilient arm secured at one end to the insulating member 14 and at its other end carrying the metallic contacting plates 16 16<sup>a</sup>, forming the contacting faces for the shoe and insulated from each other and from said spring-arm 15 by suitable insulation 16<sup>b</sup>.

17 17<sup>a</sup> designate wires connecting the respective upper and lower contact-plates 16 16<sup>a</sup> with the metallic sections 13 13<sup>a</sup>.

Referring to Figs. 1 to 3, 18 designates a casing for the indicator, in which is located an oscillating rod 19, one end of which carries an armature 19<sup>a</sup>, disposed in the field of the electromagnets 8 and 8<sup>a</sup>, heretofore mentioned. This rod 19 is pivotally supported by pin 20<sup>a</sup> on the bracket 20, secured to the casing, and the lower end of the rod is disposed in engagement with any suitable spring tending to return the rod to its normal vertical position.



In the drawings the spring is represented at 21 as comprising a base member split or forked to form the resilient spring-arms 22, between which the end of the rod 19 is disposed. The integral end of the spring is adjustably secured within the supporting-post 23 by the set-screw 24.

25 is a pin carried by the rod 19 and forming an axis for the pawl members 26 26<sup>a</sup>, pivotally secured thereto, 27 designating springs controlling said pawl members. These pawl members are adapted to ride on pins 28 28<sup>a</sup>, mounted on the casing.

29 is a ratchet-wheel, operatively associated with said pawls, journaled on the spindle 30, the outer end of which carries a pointer 31 for the indicating-dial, 32 32<sup>a</sup> indicating supports for said dial.

33 designates a pair of springs engaging the teeth of the ratchet-wheel on opposite sides thereof for preventing rotation of said wheel except upon actuation of the armature and rod.

So far has been described a construction whereby the indicating means employs a dial and pointer at a specific point. It may be desirable, however, to give the same readings on a straight scale, such scale being either located on the casing or in another part of a building. For the purpose of illustration, however, it is shown on the casing, being designated at 34 and cooperating with a pointer 35, carried by a cable 36, one end of which reeves around a spool 37, carried by the spindle 30, any suitable weighting means for said cable 36 being provided and also any suitable guiding means for said pointer 35.

In operation, assuming that the level of fluid in the tank has fallen, the shoe will have correspondingly been elevated, and (referring to Figs. 1 and 4 to 7) it will be seen that the contact-plate 16 will have engaged a contact member 3, closing the circuit of the electromagnet 8 through the grounded wire 4, contact-plate 16, wire 17, metallic member 13, guide-rod 2, line-wire 9, wire 10, and branch 10<sup>b</sup>, battery 11, and grounded wire 12.

The electromagnet 8 being excited, the armature 19<sup>a</sup> is attracted thereto, rotating the ratchet-wheel 29 one notch in the direction of the arrow through the pawl 26, the pawl 26<sup>a</sup>, riding on the pin 28<sup>a</sup>, being elevated out of contact with the teeth of the ratchet-wheel so that when the armature is released the pawl 26<sup>a</sup>, returning to its initial position, will not tend to rotate the ratchet-wheel in the opposite direction. Vice versa, if the fluid rises in the tank the magnet 8<sup>a</sup> will be excited in the same manner through its electrical connections, and the armature being attracted to the right, Fig. 1, will operate the ratchet-wheel 29 by the pawl 26<sup>a</sup> in a reverse direction, the pawl 26 riding on the pin 28 in the same fashion as heretofore described with reference to the pin 28<sup>a</sup>. The spring-arms 22

will tend to center the armature-rod and hold the pawls in normal position relative to the ratchet-wheel.

Having thus described the invention and one of its methods of application, what I claim is—

1. In an electrical indicator, the combination with a shoe and means for operating same by the motion of the moving body being registered, of a plurality of contacts disposed in the path of travel of said shoe, a resilient connecting member attached to said shoe, said shoe comprising a pair of contact-plates insulated from each other and from said connecting member, an indicator, electromagnets cooperating with said indicator to move same in reverse directions, and electric-circuit wires interposed between the correlated contact-plates of said shoe and said electromagnets, substantially as described.

2. In an electrical indicator, the combination with a shoe, of a plurality of contacts disposed in the path of travel of said shoe, a pair of vertical, parallel bars arranged in front and one on either side of said contacts, a plate embracing said bars and adapted to slide up and down thereon, said plates having a central portion of insulating material, a resilient member embedded in said insulating material and connecting said shoe with said plate and means whereby the shoe may be brought into and out of engagement with the contacts by the movement of the body to be registered, substantially as described.

3. In an electrical indicator, the combination with a shoe and means for operating same by the motion of the moving body being registered, of a plurality of contacts disposed in the path of travel of said shoe, said shoe comprising a pair of contact-plates insulated from each other; an indicator, electromagnets cooperating with said indicator to move same in reverse directions, and electric-circuit wires interposed between the correlated contact-plates of said shoe and said electromagnets, substantially as described.

4. In an electrical indicator, the combination with a pointer and indicator-scale, of a ratchet-wheel connected with said pointer, an oscillating armature-rod adjacent said ratchet-wheel, a pair of pivoted pawls on said armature-rod cooperating with said ratchet-wheel, fixed pins engaging said pawls on their underneath faces to elevate said pawls from said ratchet-wheel upon the oscillation of said armature-rod in one direction beyond the normal, diverging spring-arms tensioned to force said rod to its normal position, spring-arms arranged one on either side of said ratchet-wheel and engaging the teeth of said wheel to prevent its accidental displacement, a pair of electromagnets arranged on opposite sides of said armature-rod, and electrical connections for exciting said magnets from a distant point, substantially as described.



5. In an electrical indicator, the combination with a pointer and indicating-scale, of a ratchet-wheel connected with said pointer, an oscillating armature-rod adjacent said ratchet-wheel, a pair of pivoted pawls on said armature-rod cooperating with said ratchet-wheel, fixed pins engaging said pawls on their underneath faces to elevate said pawls from said ratchet-wheel upon the oscillation of said armature-rod in one direction beyond the normal, a spring member cooperating with said armature-rod tensioned to force

said rod to its normal position, a pair of electromagnets arranged on opposite sides of said armature-rod, and electrical connections for exciting said magnets from a distant point, substantially as described. 15

In testimony whereof I affix my signature in presence of two witnesses.

MICHAEL C. REGAN.

Witnesses:

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CHARLES E. THAYER.