

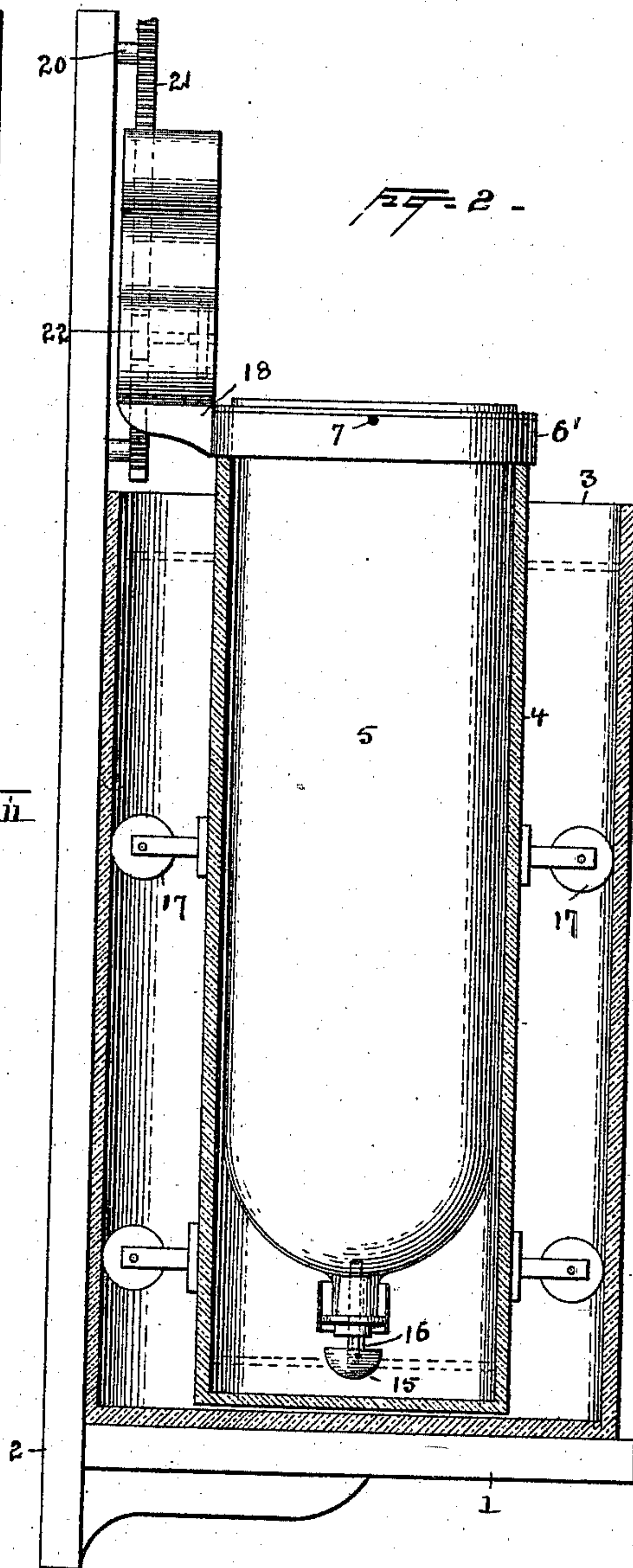
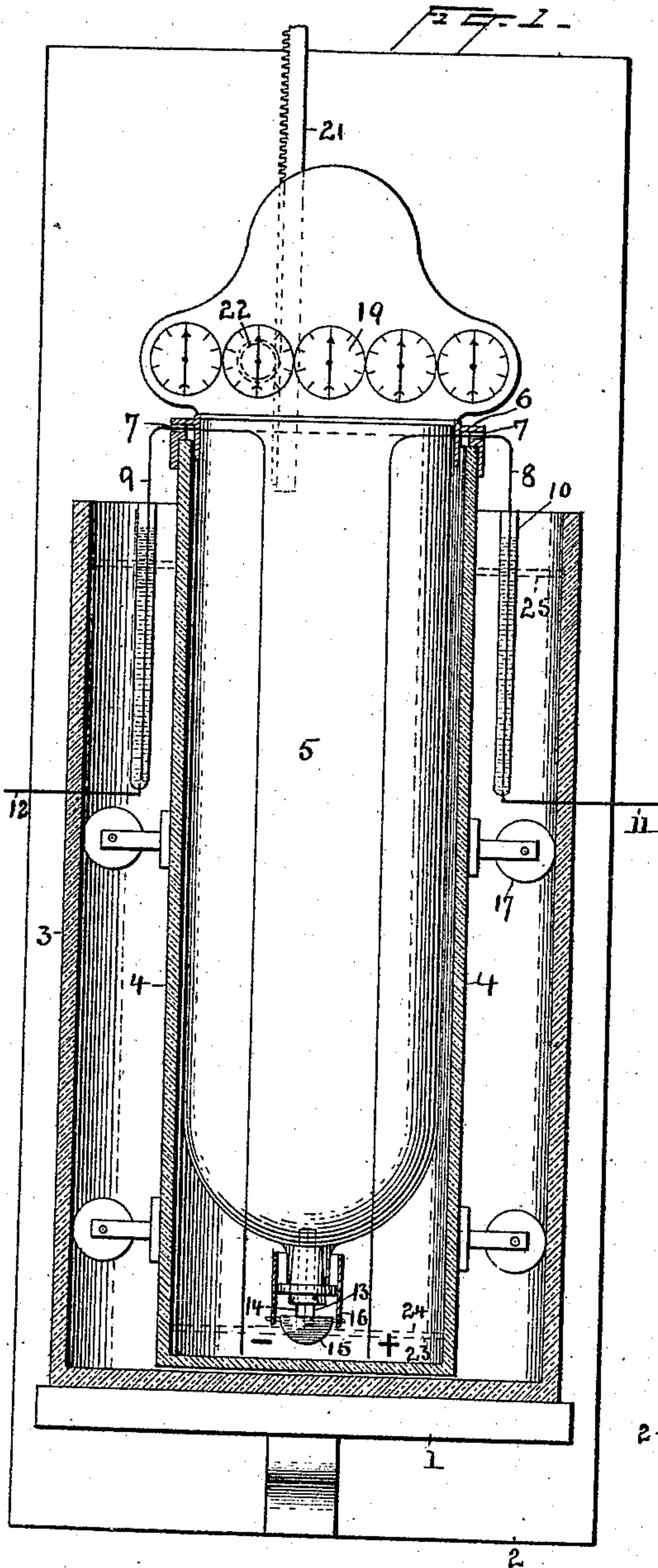
(No Model.)

2 Sheets—Sheet 1.

J. W. T. OLAN.  
ELECTRIC CURRENT METER.

No. 470,441.

Patented Mar. 8, 1892.



Witnesses  
Norris S. Clark.  
W. F. Oberle

Inventor  
J. W. T. Olan,  
By his Attorneys  
Syer & Seely.

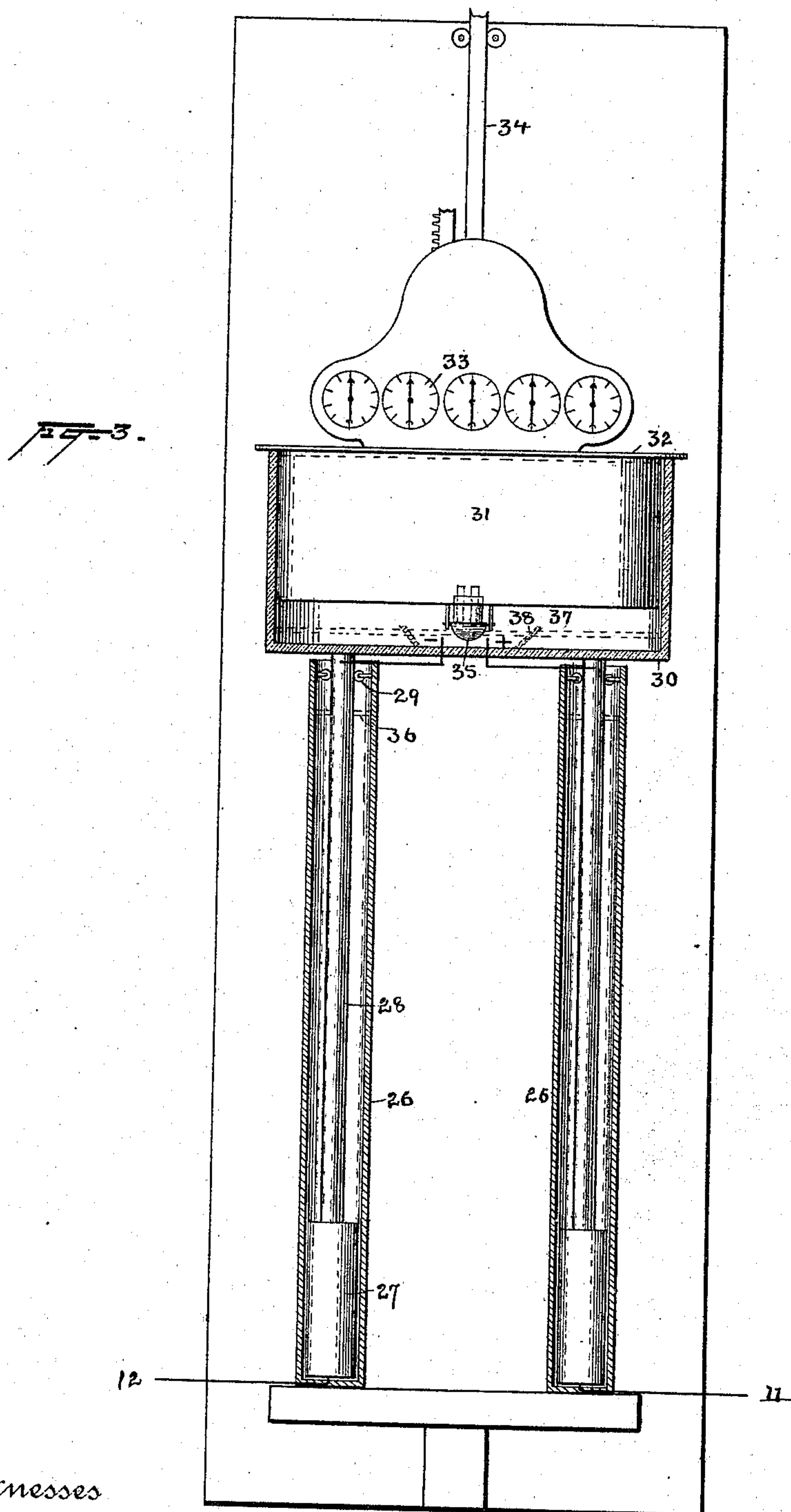
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# UNITED STATES PATENT OFFICE.

JOHAN W. TH. OLÁN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
EDWARD H. JOHNSON, OF SAME PLACE.

## ELECTRIC-CURRENT METER.

SPECIFICATION forming part of Letters Patent No. 470,441, dated March 8, 1892.

Application filed June 6, 1891. Serial No. 395,314. (No model.)

*To all whom it may concern:*

Be it known that I, JOHAN W. TH. OLÁN, a subject of the King of Sweden, residing at New York city, county and State of New York, have invented a certain new and useful Improvement in Electric-Current Meters, of which the following is a specification.

The present invention relates to the measurement of electricity; and the object of the invention is to produce a single apparatus which shall correctly record the current consumed.

The invention consists in the several features and combinations hereinafter set forth and claimed.

In the accompanying drawings, illustrating the meter, Figure 1 is a front view partially in section. Fig. 2 is a corresponding view at right angles to Fig. 1; and Fig. 3 is a front view, partially in section, of a modified form of the meter.

Upon a suitable shelf 1, extending over a base-board 2, is supported a vessel 3, preferably of glass and cylindrical. Within said vessel and concentric therewith is a second vessel 4, which in turn contains an inverted flask-shaped cylindrical vessel 5, supported from the upper edge of the vessel 4 by the flanged ring 6. This ring rests on a second ring 6', which is provided with two perforations 7, through which wires 8 9 are passed. These wires pass down between the vessels 4 and 5 to the bottom of the former vessel and constitute the + and - terminals of the meter. The opposite ends of the wires extend down into tubes 10, which contain mercury. From the bottom of these tubes extend the wires 11 12, which are the circuit-wires. The neck of the vessel 5 is provided with two outlet-tubes 13 14, one slightly longer than the other, and below them is a cup 15, pivoted a little at one side of a central line, so that it tends to tilt slightly. This arrangement is practically the same as described in my patent, No. 455,575, dated July 7, 1891. The cup is supported by the arms 16, depending from the neck of the vessel.

17 are guide-rollers carried by the vessel 4 for the purpose of holding it centrally within the outer vessel as it moves up and down.

Extending from the ring 6' is a bracket 18,

which carries the dials 19 and the wheel-work of a meter mechanism, which may be of any well-known or suitable construction and which need not be shown in detail. Mounted on posts 20, rising from the plate 2, is a stationary rack 21, which gears with a wheel 22 on one section of the meter. It will be understood that the sections of the meter represent units, tens, hundreds, thousands, &c., in the ordinary manner.

When this apparatus is to be used, an electrolytic solution is placed in the vessel 4, filling it to the line 23, and over the solution is placed a thin layer of oil 24 or other material to prevent evaporation. The vessel 5 is filled with distilled water or other suitable liquid. A quantity of heavy liquid is then placed in the outer vessel, filling it to the line 25, and over this is also placed a layer of oil. The parts are so proportioned that the liquid displaced in the outer vessel by the vessel 4 and all that it carries will sink it to the position shown in the drawings, and in such position it will be nicely balanced. When current is sent through the circuit 11 8 9 12 electrolytic action will take place between the terminals + and -, the gas produced rising between the vessels 4 5 and escaping. As the level of the liquid falls the cup 15 will tilt, allowing a small quantity of water to flow out of the vessel 5 until the original level of the electrolytic solution is regained. It will be seen that in this way the weight carried by the vessel 4 is continually decreasing. Consequently said vessel is raised by the buoyant effect of the liquid in the outer vessel, and as it moves upward the wheel 22 of the meter is turned by means of the rack 21. The circuit is maintained complete by the wires 8 9, which can move freely up and down in the mercury in the tubes 10. When the vessel is raised as far as it is designed to move for a single complete operation of the meter, the liquid in the vessel 5 may be renewed, the wheel 22 and rack 21 disengaged, and the parts be made to assume the position shown in the drawings, when the operation described will be repeated, the index-hands being reset to zero or being allowed to advance from the point at which they were left by the preceding operation, as preferred.



In the form of device illustrated in Fig. 3 are used two tubes 26 in place of the vessel 3. (Shown in Figs. 1 and 2.) Within said tubes are floats 27, of hard rubber or other suitable material, carried at the bottom of metal rods 28, which are centrally guided by suitable rollers 29. The rods 28 carry a cup-shaped vessel 30, which contains a second concentric vessel 31. The vessel 31 is provided with a flange 32, which rests on 30. The meter mechanism 33, engaging with the rack on the base-board, as already described, is supported by a bracket rising from vessel 30.

34 is a rod to steady and guide the meter. The vessel 31 is provided with outlet-pipes and with a cup-float 35, as described, in connection with Figs. 1 and 2. This vessel, when in use, contains distilled water. The terminals + and - in this case may enter from the bottom, and may be connected directly to the metal rods 28. The circuit-wires are connected to the bottom of the tubes 26, and the circuit is maintained closed by the mercury or other liquid surrounding the rods 28, and which, when the apparatus is in the position shown, rises about to the line 36.

The line 37 indicates the top of the electrolytic solution in the vessel 30. Instead of placing the solution directly in the vessel 30, so that it shall cover the entire bottom thereof, I may form a small cup-shaped chamber at the center, as indicated at 38.

The operation of this apparatus is substantially the same as that already described.

What I claim is—

1. The combination, in an electric meter, of a vessel containing a liquid, a balanced float in said vessel and movable therein, said float having a forward movement only while the meter is in use, means for disturbing the balance in accordance with the current measured, so that the float will move, and a recording mechanism operated by said movement, substantially as described.

2. The combination, in an electric meter, of a vessel containing a liquid, a balanced float in said vessel and movable therein, said float having a forward movement only while the meter is in use, one part of a recording mechanism moved by the float, and a co-operating stationary part of the recording mechanism, whereby as the float moves the recording mechanism is advanced, substantially as described.

3. The combination, in an electric meter, of a vessel containing a liquid, a balanced float in said vessel and movable therein, a vessel carried by the float and containing a liquid, means operated by the current to be measured for changing the weight of liquid carried by the float, whereby the balance of the float is disturbed, and a recording mechanism operated by movement of the float, substantially as described.

4. The combination, in an electric meter, of

a vessel containing a liquid, a balanced float in said vessel and movable therein, a vessel carried by the float and containing a liquid, a device covering the outlet of the latter vessel, but movable to allow the escape of liquid to disturb the balance of the float, and a recording mechanism operated by movement of the float, substantially as described.

5. The combination of a vessel containing a liquid, a balanced float in said liquid, and containing an electrolyte, terminals in the electrolyte connected to the circuit carrying the current to be measured, a vessel carried by the float and also containing a liquid, an outlet therefor controlled by the electrolyte, and a recording mechanism operated by the float, substantially as described.

6. The combination of a vessel containing a liquid, a balanced float in said liquid and containing an electrolyte, terminals in the electrolyte connected to the circuit carrying the current to be measured, a vessel carried by the float and also containing a liquid, an outlet therefor controlled by a float in the electrolyte, a part of recording mechanism carried by the float, and a co-operating stationary part of the recording mechanism, whereby as the float moves the recording mechanism is advanced, substantially as described.

7. The combination of a vessel containing a liquid, a balanced float in said liquid and containing an electrolyte, terminals in the electrolyte connected to the circuit carrying the current to be measured, a vessel carried by the float and also containing liquid, an outlet therefor controlled by the electrolyte, a recording or indicating mechanism comprising suitable dials and wheels, and a stationary rack engaging with said mechanism, whereby as the float moves the mechanism is operated, substantially as described.

8. The combination of a suitable rack-bar, a meter mechanism in gear therewith and a float carrying said meter mechanism, and means for varying the weight of the float, said means being controlled by the current to be measured, whereby the float is moved and through the rack-bar advances the meter, substantially as described.

9. The combination, in an electric-current meter, of a float, a recording mechanism and a propelling device therefor, one of the two latter parts being stationary and the other being carried by the float, and means for moving the float in accordance with the current to be measured, said float being movable in one direction only while the meter is in use, whereby the recording mechanism is advanced, substantially as described.

This specification signed and witnessed this 4th day of June, 1891.

JOHAN W. TH. OLÁN.

Witnesses:

CHARLES M. CATLIN,  
J. A. YOUNG.