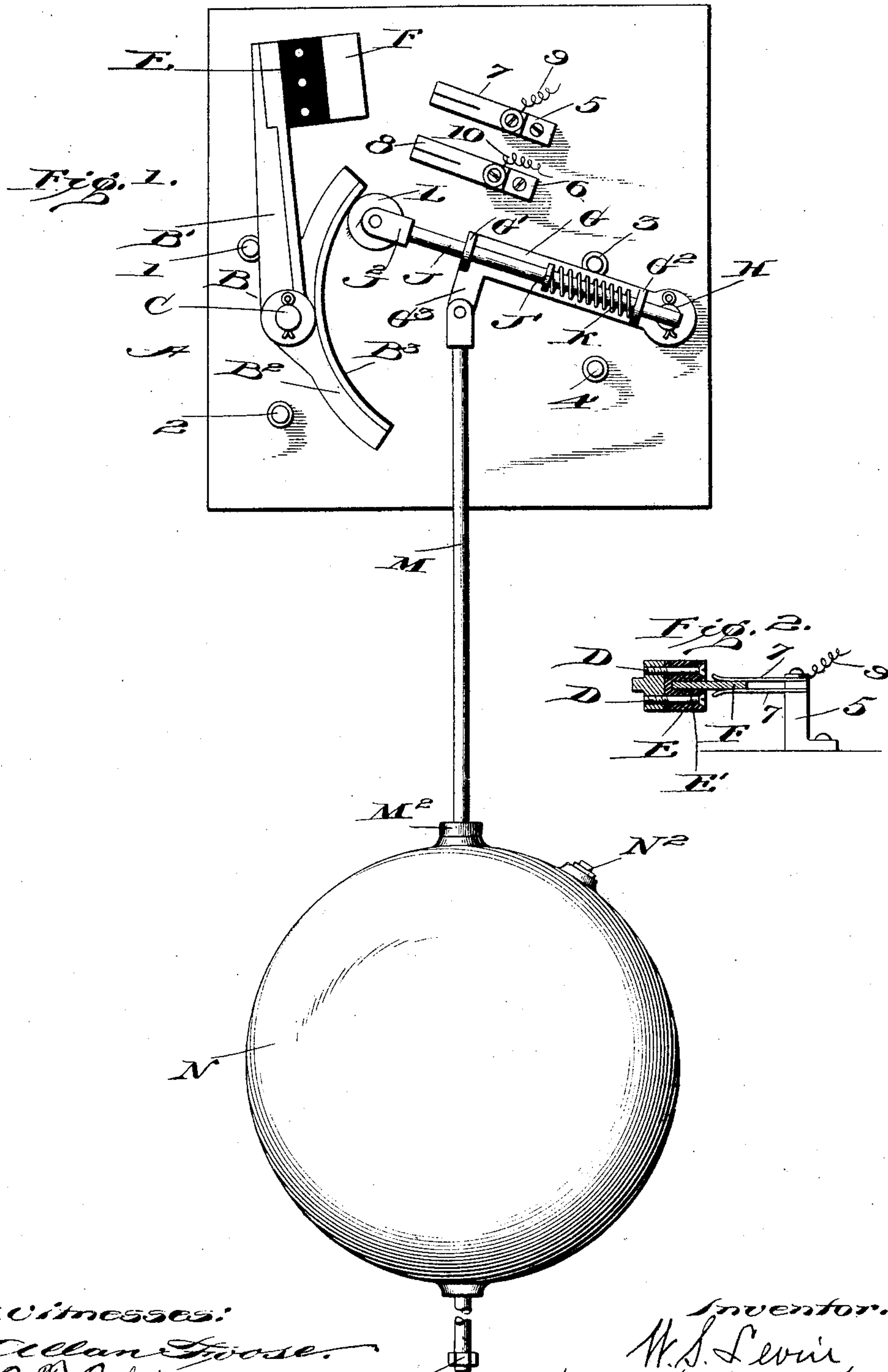


W. S. LEVIN.  
ELECTRIC SWITCH.

APPLICATION FILED MAR. 28, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:  
Oscar L. Gorse.  
C. T. Collett.

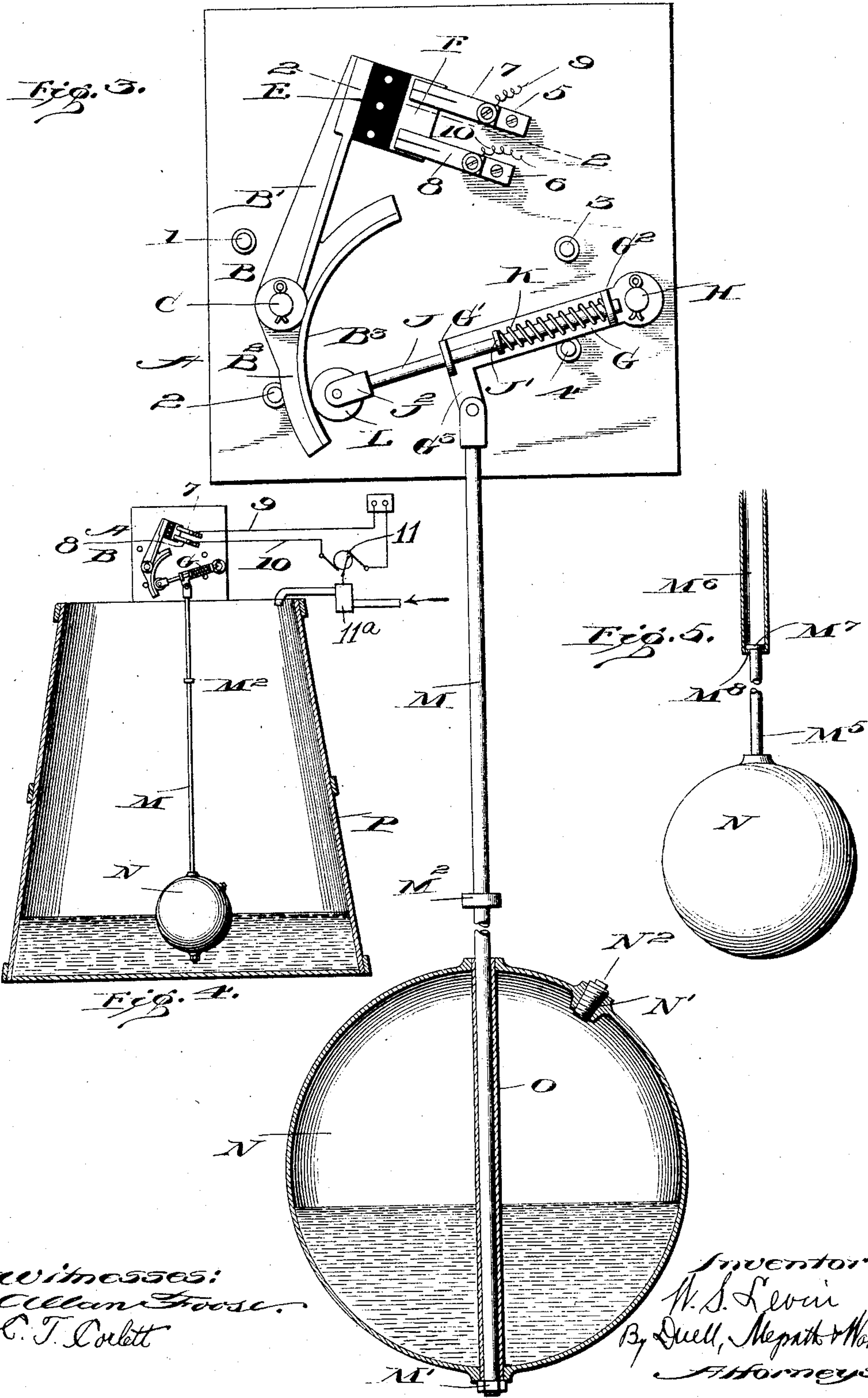
Inventor:  
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2 SHEETS—SHEET 2.



Witnesses:  
Allan Thorse.  
C. T. Corlett

Inventor:  
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# UNITED STATES PATENT OFFICE.

WALTER S. LEVIN, OF NEW YORK, N. Y.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 776,521, dated December 6, 1904.

Application filed March 28, 1904. Serial No. 200,244. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER S. LEVIN, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in electric switches, and particularly to that class of switches which are moved automatically and positively in one direction or another to close or open a circuit.

My invention is especially adapted to be operated by a float in a tank containing water or other liquid to open and close a circuit at the high and the low water marks, at which points the switch is opened or closed to stop or set in motion a motor which may be connected to a pump which forces the liquid into the tank. I have shown my invention connected to such a tank, although it is to be understood that I do not limit it to this particular use.

The object of my invention is to make a simple, cheap, efficient, and positively-operated automatic switch of the class described.

Other objects will appear from the hereinafter description.

I attain the several objects of my invention by the mechanism illustrated in the accompanying drawings, which form a part of this specification.

Referring now to the drawings for a fuller understanding of my invention, Figure 1 illustrates a side view of my switch connected to a float, the float being shown at its highest position on the float-rod and the switch moved to break the circuit. Fig. 2 is a cross-section on line 2 2 of Fig. 3, showing the contact-plate carried by the switch-lever in engagement with the circuit-contacts. Fig. 3 is a side view of the switch connected to the float, the float being shown in section and at its lowest position on the rod and the contact-plate in engagement with the circuit-contacts to make the circuit. Fig. 4 is a view on a smaller scale than the prior figures, showing the switch mounted at the top of a tank, the tank being shown in section and the float at the low-wa-

ter level and the circuit closed. In this view is also shown diagrammatically the motor and the circuit. Fig. 5 shows a modification of the connection between the float and rod to which it is attached.

In the drawings the same reference characters denote the same parts in the different views.

The part lettered A represents a base of non-conducting material on which the switch mechanism is mounted.

B is the switch-lever, secured to the base by the pivot-pin C. This lever consists of the straight arm B' and the curved arm B<sup>2</sup>, which are here shown as made or cast in one piece, although they may be made, if desired, in separate pieces and properly connected to move together. The arm B<sup>2</sup> is provided with a curved side face B<sup>3</sup>, on which a roller, to be hereinafter described, moves. Secured to the free end of the arm B' by bolts D is an insulation-piece E, having a groove E' therein, into which is secured a contact-plate F. G is another lever pivoted to the base by the pivot-pin H.

G' and G<sup>2</sup> are lugs having holes therein, through which passes the rod J.

K is a spiral spring surrounding the rod, one end of which rests against the lug G<sup>2</sup> and the other end against the collar J' and which tends to force the rod longitudinally in one direction.

One end of the rod J is bifurcated, as shown at J<sup>2</sup>, and between the legs of the bifurcated end is pivoted the roller L, which is kept in contact with the side face B<sup>3</sup> of the lever B by the force of the spring K.

G<sup>3</sup> is a finger or lug, to which is pivoted the rod M, to which the float N is connected. Secured at the lower end of this rod is a nut or stop M'. M<sup>2</sup> is a flange or another stop secured on this rod above the float.

The float N is preferably spherical and hollow. This float is partially filled with water through the opening N', closed by the plug N<sup>2</sup>. To permit the float to hold the water and move up and down on the rod M, a tube or sleeve O passes through the float and surrounds the rod M, as clearly shown in Fig. 3 of the drawings, there being a tight connection



tion between the float and the ends of the tube O where they are connected. In the modification shown in Fig. 5 the float N is rigidly secured to the lower end of a rod M<sup>5</sup>. M<sup>5</sup> is  
 5 a hollow rod or tube, the hollow end of which is pivoted to the lug G<sup>3</sup>, as shown in other figures of the drawings. The rod M<sup>5</sup> telescopes in this tube M<sup>6</sup>, and the upper end of the rod M<sup>5</sup> is provided with a flange M<sup>7</sup>, which rests  
 10 against the inturned end of the flange M<sup>8</sup> of the tube M<sup>6</sup> when the float is in its lowest position.

1 and 2 are stops secured to the base A to limit the movement of lever B, and 3 and 4  
 15 are stops, also secured to said base, to limit the movement of lever G. Also secured to this base by brackets 5 and 6 are the contact-fingers 7 and 8, each of these fingers consisting of a pair of plates separated a short distance and between which the contact-plate F  
 20 is moved to make the circuit.

9 and 10 are the circuit-wires, which lead to the motor 11. (See Fig. 4.)

P is the tank containing the water or other  
 25 liquid on which the switch is mounted and in which the float connected to the switch rises and falls as the liquid is taken from or supplied to the tank.

A pump with connections is diagrammatically shown at 11<sup>a</sup> in Fig. 3 of the drawings.

The operation of my device is as follows: Suppose the parts to be in the position shown in Fig. 4 of the drawings, with the float at  
 35 the low-water level and the switch closed to operate the motor. In this position the roller L is pressed against the lower end of the arm B<sup>2</sup> by the spring K and holds the plate F in contact with the fingers 7 and 8. In this position the motor will operate a pump (not shown) to force the water into the tank. As the water is forced into the tank the float will rise on the rod M until the upper end of the float comes in contact with the stop M<sup>2</sup> on the  
 45 rod M. As the water continues to rise, the float, by the upward pressure of the water against its outer surface, will force the rod M upward, and thus move the lever upward on its pivot H, causing the roller L to move  
 50 up along the curved face B<sup>3</sup> of the arm B<sup>2</sup>. As the distance between the pivot-pin of the lever G and the point of contact of the roller L on the arm B<sup>2</sup>, as shown in Fig. 3, is greater than the distance between the said pivot and the inner face of the arm B<sup>3</sup> opposite the pivot  
 55 C<sup>2</sup> the float forces the lever G and the roller L upward against the tension of the spring K until the roller is moved above the pivot-pin C, when the spring K will force the rod J to the left, and as the roller L, carried by this rod, is in contact with the inner surface B<sup>3</sup> of the arm B<sup>2</sup> it will also be thrown to the left and the contact-plate carried by the arm B' will be moved from between the contact-fingers 7 and 8 and the circuit broken and

the motor stopped and the admission of water to the tank consequently discontinued. This movement of the arm B' to the left is arrested or stopped by the pin 1 and the upward movement of the lever G by the stop or pin 3. As  
 70 the water is forced out of the tank the float will move down the rod M until it strikes the stop M'. When the water reaches the low-water mark, the weight of the float and the water contained therein pull the lever G down  
 75 and cause the roller L to move down on the track B<sup>3</sup>. When the roller L is pulled down below the pivot-pin C, the lower part of the arm B<sup>2</sup> of the lever B will be moved to the left by the action of the spring K, the arm B'  
 80 to the right, and the contact-plate into engagement with the contact fingers or terminals 7 and 8. The circuit will then be completed and the motor put in operation. The movement of the arm B' to the right is limited by the stop 2 and the downward movement of the lever G by the stop 4.

When the modified construction shown in Fig. 5 is used, as the water rises in the tank the rod M<sup>5</sup> telescopes into the tube M<sup>6</sup> until  
 90 the float strikes against the lower end of the tube M<sup>6</sup>, at which time the lever G is moved upward. As the water is withdrawn from the tank the float moves down with the water, pulling the rod M<sup>5</sup> out of the tube M<sup>6</sup>  
 95 until the flange M<sup>7</sup> strikes against the flange M<sup>8</sup> of the tube M<sup>6</sup>, and further downward movement of the float pulls the lever G in the opposite direction. All of this will be readily understood by reference to Fig. 5 of the  
 100 drawings.

I use a hollow float partially filled with water, as shown, as I have found this kind of a float to be most efficient. At the low-water mark the weight of the float and the water  
 105 therein readily and quickly pulls down the lever G against the thrust of the spring K, and the contact-plate F will be quickly brought into engagement with the fingers 7 and 8 as soon as the roller L is pulled below the pivot  
 110 C. This float also moves upwardly about as readily and efficiently as though it did not contain water to force the parts in the opposite direction to open the contact when the water in the tank reaches the high-water mark.  
 115

While I have set forth here what may be considered the best or preferred embodiment of my invention, I do not wish it to be understood that I limit myself to the exact construction herein shown and described, as various changes may be made by any one skilled in the art without departing from the scope of my invention. One of the obvious changes is that the roller at the end of the rod may be dispensed with and the rod bear directly on  
 120 the curved part of the pivot-lever.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, 130



contact-terminals, a contact-plate adapted to complete a circuit between said terminals, a pivoted lever carrying said plate and independent of said circuit, a second lever pivoted adjacent to the first lever, a rod carried by and movable longitudinally on the second lever, one end of said rod bearing against the first lever, said rod adapted to be moved from one side to the other of the pivot of the first lever when the second lever is rocked on its pivot, means for keeping the end of the rod in contact with the first lever and to rock the said lever on its pivot as the rod is moved from one side to the other of the pivot, whereby the contact-plate is moved into or out of engagement with the terminals, a tank, a float in said tank, and a connection between said float and said second-mentioned lever whereby the same is moved in accordance with the condition of water in said tank.

2. In an apparatus of the class described, contact-terminals, a contact-plate, a pivoted lever carrying said plate, a second lever pivoted adjacent to the first lever, a rod carried by and movable longitudinally on the second lever and insulated from said contact-plate, one end of which bears against the first lever and adapted to be moved from one side to the other of the pivot of the first lever when the second lever is moved on its pivot, a spring for keeping the end of the rod in contact with the first lever and to rock the rod on its pivot when the said rod is moved from one side to the other of said pivot, whereby the contact-plate is moved into or out of engagement with the terminals, a tank, a float in said tank, and a connection between said float and said second-mentioned lever whereby the same is moved in accordance with the condition of water in said tank.

3. In an apparatus of the class described, contact-terminals, a contact-plate, a pivoted lever having an arm carrying said plate and adapted to bridge the same across said terminals and provided with a cam-surface, a second lever adapted to act upon said cam-surface, a tank adapted to contain water, and means between the tank and the second lever adapted to move said lever so that the rod will be moved from one side to the other of the pivoted point of the first lever at the high and low water marks of the tank.

4. In an apparatus of the class described, contact-terminals, a contact-plate, a cam adapted to move said plate into engagement with said terminals, a tank adapted to contain water, a float positioned therein, and connections between said float and said cam whereby the latter is actuated by said float to force said contact-plate against said terminals when the water has reached the low-water mark in said tank and retract the same at high-water mark.

5. In an apparatus of the class described, contact-terminals, a contact-plate, a cam insulated from said plate and adapted to move the

same into engagement with said terminals, a tank adapted to contain water, a float positioned therein and connections between said float and said cam whereby the latter is actuated by said float to force said contact-plate against said terminals when the water has reached the low-water mark in said tank and retract the same at high-water mark.

6. In an apparatus of the class described, contact-terminals, a contact-plate, a pivoted lever having an arm carrying said plate and adapted to bridge the same across said terminals, a cam operatively connected to said lever, and a float having means adapted to move said cam.

7. In an apparatus of the class described, a plurality of terminals, a contact-plate adapted to bridge the same, a cam adapted to move said contact-plate into and out of engagement with said terminals, means adapted to actuate said cam, stops upon said means, and an adjustable float adapted to engage said stops and actuate said means.

8. In an apparatus of the class described, an electric switch, a cam adapted to operate said switch, a tank adapted to contain water, a float positioned therein and connections between said float and said cam whereby the latter is actuated by said float to force said contact-plate against said terminals when the water has reached the low-water mark in said tank and retract the same at high-water mark.

9. In an apparatus of the class described, a contact-plate, a cam adapted to actuate said plate and insulated from the same, a rod adapted to move said cam, stops upon said rod, a float slidably mounted upon the same between said stops, a tank adapted to contain water and in which said float rests, and means whereby said cam is operated upon the engagement of said float with the uppermost of said stops to cause said contact-plate to open an electric circuit and upon engagement with the lowermost of said stops to cause said contact-plate to close said circuit.

10. In combination, a base-plate, a curved lever pivotally mounted thereon, a lever-arm controlled by said first-mentioned lever, a contact-plate carried thereby, contact-terminals mounted upon said base-plate with which said contact-plate is adapted to coact, a lever pivotally mounted upon said base-plate adjacent said curved lever and provided with a plurality of perforated lugs, a rod slidably mounted upon said last-mentioned lever within said lugs, a spring normally pressing the same into operative engagement with said curved lever, said lever carrying said rod being so positioned with reference to said curved lever as to swing from one side to the other of the pivot thereof and throw said contact-plate into and out of engagement with said terminals.

11. In combination, a base-plate, a curved lever pivotally mounted thereon, a lever-arm controlled by said first-mentioned lever, a con-



tact-plate carried thereby and insulated therefrom, contact-terminals upon said base-plate with which said contact-plate is adapted to coact, a lever pivotally mounted upon said  
5 base-plate adjacent said curved lever and provided with aligned perforated lugs, a rod slidably mounted upon said last-mentioned lever within said lugs, a spring normally pressing the same into operative engagement with said  
10 curved lever, said lever carrying said rod being so positioned with reference to said curved lever as to swing from one side to the other of the pivot thereof and throw said contact-plate into and out of engagement with said  
15 terminals.

12. In apparatus of the class described, a plurality of terminals, a contact-plate adapted to bridge the same, a cam adapted to move said contact-plate into and out of engagement  
20 with said terminals, means adapted to actuate said cam, stops upon said means, and an adjustable float adapted to engage said stops and actuate said means, said float being watertight and provided with an opening whereby  
25 its weight may be varied by the admission of water.

13. As a new article of manufacture, a base-

plate, two contact-terminals mounted upon said plate, a contact-plate adapted to coact with said contact-terminals, a curved arm pivotally and detachably mounted upon said base-  
30 plate and having a rigid extension to which said contact-plate is secured and from which it is insulated, stops adapted to limit the movement of said curved arm, a lever pivotally and  
35 detachably mounted upon said base-plate, perforated lugs extending from said lever, a rod slidably mounted within said lugs, a spring engaging a shoulder upon said rod and tending to force the same toward said curved arm,  
40 an antifriction-roller interposed between said rod and said curved arm, and stops adapted to limit the movement of said swinging lever in two positions in one of which said rod acts upon said curved lever at one side of the pivot  
45 al point of the same and in the other of which it acts upon said curved lever at the other side of said pivotal point.

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

WALTER S. LEVIN.

Witnesses:

HELEN M. SEAMANS,  
ALLAN W. FOOSE.