

No. 711,521.

Patented Oct. 21, 1902.

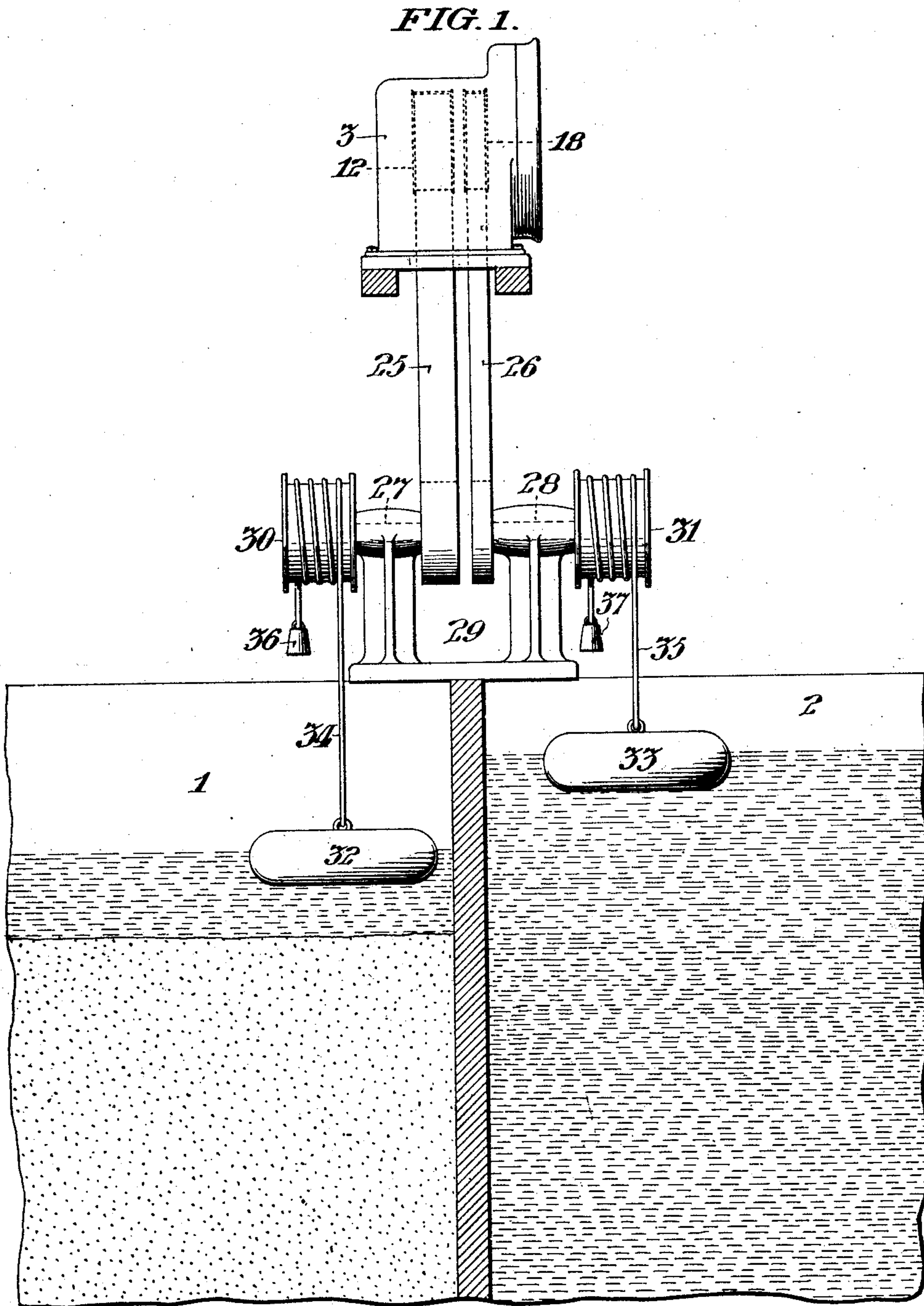
C. L. PARMELEE.

INDICATING DEVICE FOR FILTERS, WATERWORKS, &c.

(Application filed Aug. 27, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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FIG. 2.

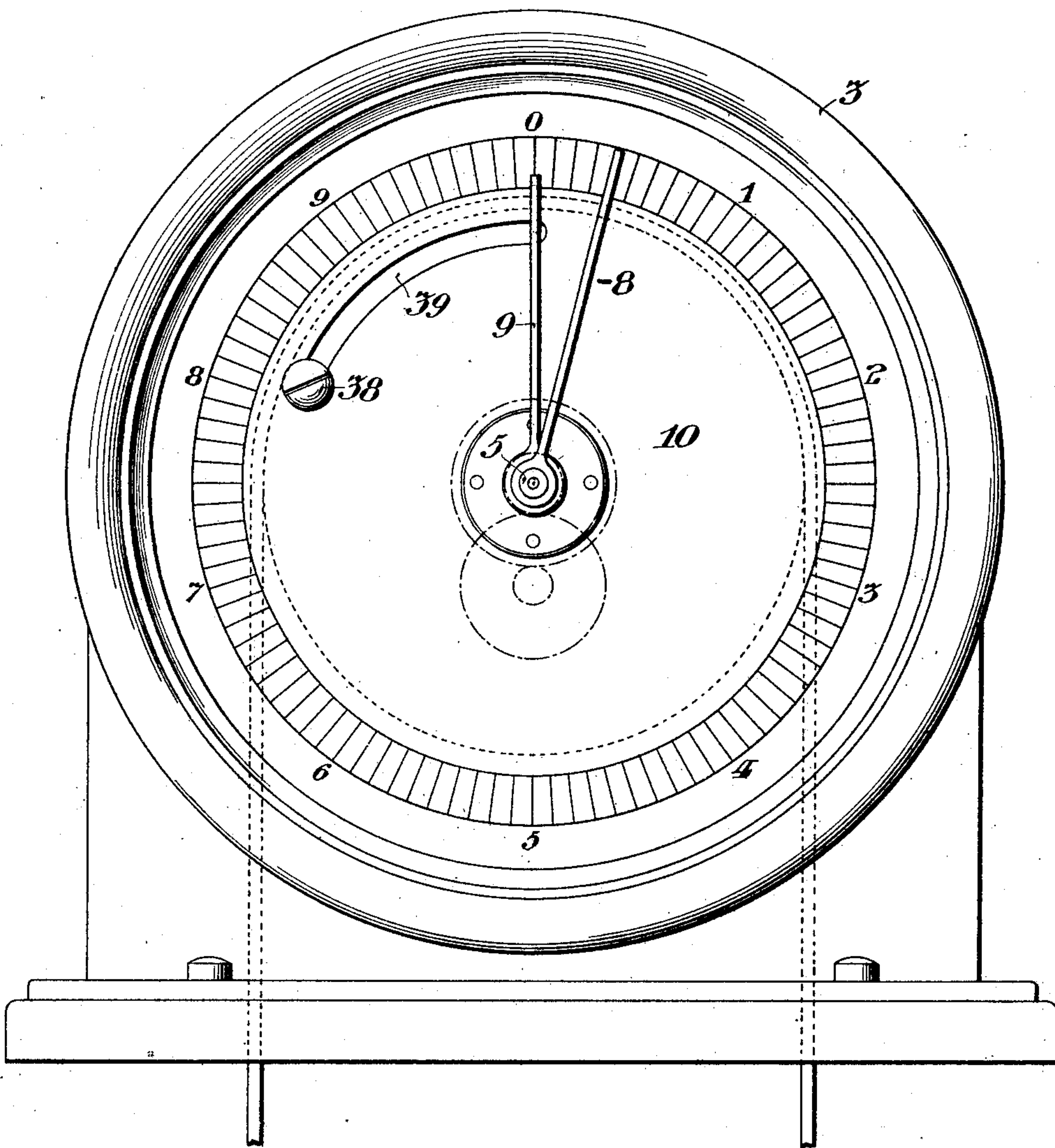


FIG. 4.



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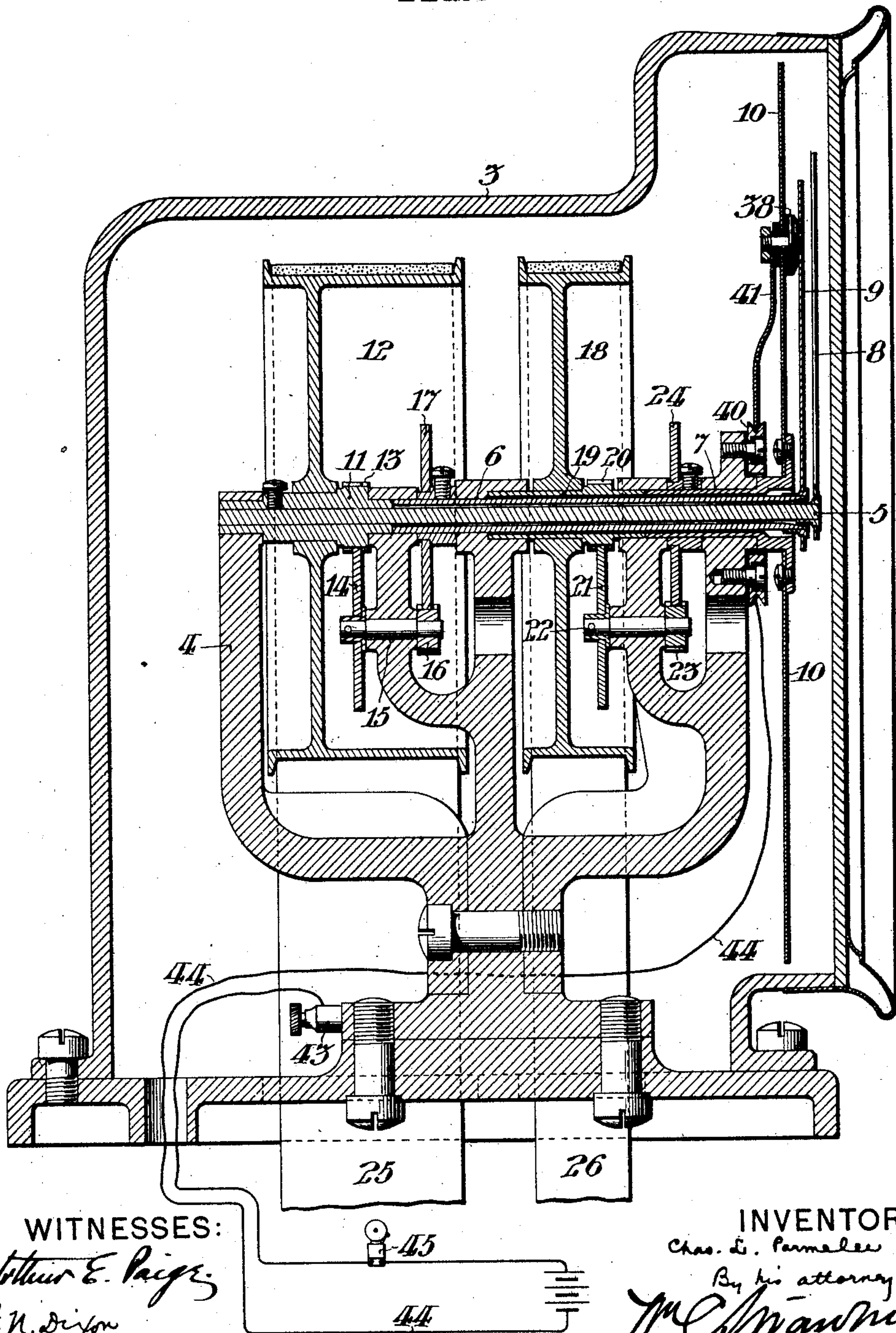
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4 Sheets—Sheet 3.

FIG. 3.



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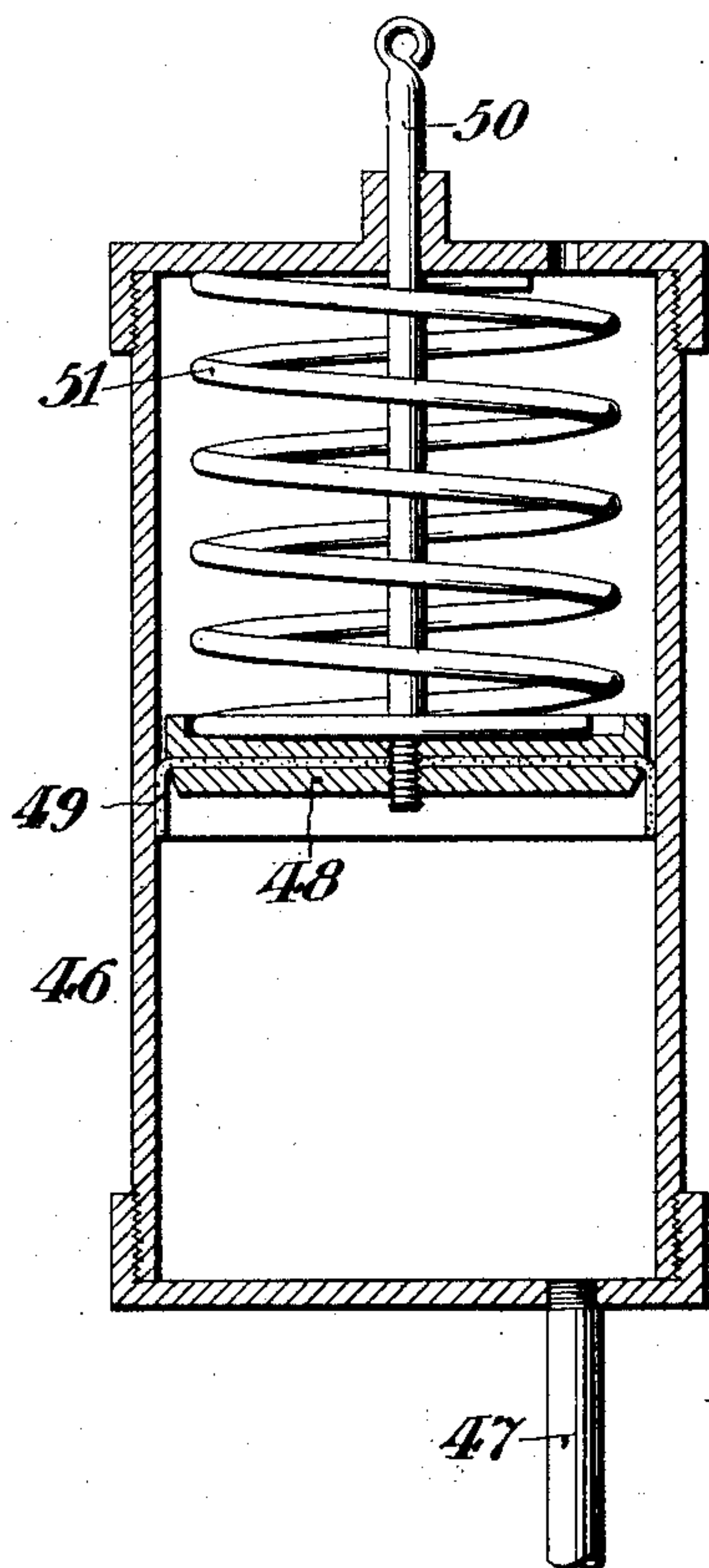
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4 Sheets—Sheet 4.

FIG. 5.



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UNITED STATES PATENT OFFICE.

CHARLES L. PARMELEE, OF ORANGE, NEW JERSEY.

INDICATING DEVICE FOR FILTERS, WATERWORKS, &c.

SPECIFICATION forming part of Letters Patent No. 711,521, dated October 21, 1902.

Application filed August 27, 1901. Serial No. 73,440. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. PARMELEE, a citizen of the United States, residing in the city of Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Indicating Devices for Filters, Waterworks, Water-Power Plants, &c., of which the following is a specification.

Various plants are in operation at present where the difference between two liquid levels or between two pressures is of importance and is made a matter of regular observation, both as a record of actual conditions and as a guide in operation.

It is the object of my invention to provide a simple, accurate and positively operating mechanism, which shall show at all times the absolute pressure, head or level of the given bodies of water, and sources of pressure, and also the relation of two of such bodies or sources of pressure to each other, the indicating mechanism being of such character that the information referred to is rendered perceptible at a glance.

In the accompanying drawings I show, and herein I describe, an apparatus which embodies a good form of my invention. Other forms differing therefrom in mechanical construction, but arranged to operate upon the same general principle, and secure a like result, may, of course, be resorted to without departure from the spirit of my invention.

In the accompanying drawings:

Figure 1 is a view in side elevation of an apparatus illustrating a typical application of my invention.

Figure 2 is a view in face elevation of the dial and associated hands and the case which incloses the dial mechanism.

Figure 3 is a central vertical sectional elevation through the dial casing and dial mechanism.

Figure 4 is a detail of the contact plate and associated binding post.

Figure 5 is a view in vertical sectional elevation of a container in communication with a source of pressure, and a form of follower employed in connection therewith.

In Figure 1 of the accompanying drawings I have illustrated the employment of the apparatus to indicate the respective water heads or levels within a filter basin 1 and the res-

ervoir 2 associated with such basin, and, for the purpose of receiving and transmitting to the indicator the movements occasioned by change of the level or head of the two bodies of water, and which the indicator translates or expresses by the movement and position of the hands and dial shown,—floats are borne upon said bodies of water, and connected by suitable trains of gearing to the dial mechanism.

Hereinafter I refer to said floats as followers, and by such term intend to cover not only floats, but any other devices adapted to be affected by liquid levels or various pressures, and to transmit through suitable intervening media, corresponding impulses to the dial mechanism. For use in connection with pressures a hollow coiled spring would be a convenient form of follower.

In Figure 5 I have illustrated a modified form of follower, and shown it as employed in association with a container supposed in communication with a source of pressure. In the structure shown in said figure, 46 is a vertically disposed cylindric chamber, supposed in communication through the pipe 47 with a body of water or source of pressure more or less remote from the chamber. As a result of the communication established through the pipe 47, the water in the container 46 will by its rise and fall indicate the pressure, or head of the remote body referred to.

48 is a piston of any suitable character, packed, if desired, by a suitable cup leather, 49, and preferably provided with a vertical stem 50, extending through the cap of the chamber. A light spiral expansive spring 51, disposed between the cap of the chamber and the piston, maintains the piston head in contact with the water in all the variations of elevation of the latter. Water pressure exerted on the piston elevates the latter, and compresses the spring; when the water level is lowered the spring causes the piston to follow down; in each case the distance traveled by the piston will be proportional to the pressure or level of the water in the chamber.

Any suitable flexible or other connecting device may be attached to the stem 50, led to a drum 30 or 31, and engaged therewith in the manner in which the flexible connections 34,

35, are in Figure 1 shown as engaged with said drums. It will, of course, be understood that, depending upon the location and character of the bodies of liquid in connection with which the apparatus is to be employed, two of the container chambers 46 may be employed, or one of them may be used while the other relation indicating follower may simply float in a body of water such as shown in Figure 1.

In the arrangement shown in Figure 1, I have, for the sake of simplicity of illustration, shown the dial casing as arranged immediately above the filter basin. It is, of course, to be understood that the dial casing and its associated parts will be located wherever the general arrangement and convenience of operation of the filter plant may dictate, suitable extension and modification of the connecting gearing being of course a matter within the province of the constructor. 3 is a dial casing of any desired form and proportion, conveniently provided with a front plate of glass. Within the casing is a supporting frame serving to support, free for rotation, and independently of each other, the arbor 5, sleeve 6, and the sleeve 7, said arbor and sleeves being arranged in the nested relationship shown. Affixed direct to the arbor 5 is the absolute level indicating hand 8. Affixed to the sleeve 6 is one of the two relative level indicating devices, namely, the hand 9. Affixed to the sleeve 7 is the other of the two relative liquid level indicating devices, namely, the dial 10. The dial and the hands constitute visual indicators which manifest to the operator the condition of the bodies of water in association with which the apparatus as a whole is arranged to operate. In the arrangement shown, the hands are arranged in front of the dial, and said dial and hands are axially coincident. Affixed to the rear portion of the arbor 5, through the medium of a sleeve hub 11, is a pulley 12. The sleeve 11 is conveniently provided with a driving gear 13 meshing with a driven gear 14 on a suitably supported counter-shaft 15, and said counter-shaft is provided with a driving gear 16, meshing with a driven gear 17, affixed to the sleeve 6. The proportions of the gears 13, 14, 16, 17, constituting a reducing gear, are such that, upon the rotation of the pulley 12, while the arbor 5 and the absolute level indicating hand 8, will have the same rotation as said pulley, the sleeve 6 and hand 9 will have a less rotation, approximately, in the arrangement illustrated, one tenth that of the arbor and hand 8. 18 is a pulley mounted upon and rotating with a hub sleeve 19, which sleeve is provided with a driving gear 20, meshing with a driven gear 21, carried upon a suitably supported counter-shaft 22. Said counter-shaft is provided with a driving gear 23, meshing with a driven gear 24, affixed, through a suitable hub, upon the sleeve 7.

The proportions of the gears 20, 21, 23, 24,

constituting a reducing gear, are such that upon the rotation of the pulley 18, the sleeve 7 and dial 10 will have a rotation approximately one tenth that of said pulley, the ratio between the sleeve 7 and the pulley 18 being the same as that existing between the sleeve 6 and the pulley 12.

25, 26, are endless belts, engaged with the pulleys 12 and 18, respectively, and also engaged with driving pulleys mounted upon shafts 27, 28, indicating in dotted lines in Figure 1, and which shafts, supported in suitable brackets or standards 29, are provided respectively with winding drums 30, 31. 32, 33, are the followers, connected respectively with cords 34, 35, wrapped upon the drums 30, 31. The distant ends of said cords are in the embodiment illustrated provided with weights 36, 37.

The dial 10 is shown as provided with a circumferential series of graduating marks and numerals.

The operation of the apparatus will be readily understood. Each follower train of connecting gearing, pulley and relative level indicating device, may, of course, move entirely independently of the other. The hand 9 and dial 10 are devices which indicate by their relation to each other the net difference of condition as between the two bodies of water. As the follower 33 descends it occasions the movement of the dial 10 to the left (Figure 2) and as it rises it occasions the movement of said dial to the right. As the follower 32 descends it occasions the movement of the hand 9 to the left; as it rises the movement of the said hand dial to the right.

Assuming for purpose of explanation, that the water levels shown in Figure 1 are in the normal and desired relation, the hand 9 and the dial 10 may occupy, if the apparatus is so arranged, the position shown in Figure 2, said hand 9 being vertical, and the zero point of the dial being uppermost and directly in line with it. If, then, both the levels are correspondingly lowered, the dial and hand will move to the left, maintaining a fixed relation, for the reason that the water levels maintain a fixed relation. If both water levels are correspondingly elevated, said dial and the hand 9 will correspondingly move to the right. If, however, the level in 1 is lowered or raised, while that in 2 is stationary, the hand 9 will move to the left or right as the case may be, the degree of separation of the hand from the zero point of the dial indicating the sum of the departure of the water levels from normal relation. If, at the same time the water level in 1 is lowered that in 2 is elevated, the dial moving to the right, of course, increases the distance between the zero point and the hand 9, and indicates such increased difference of the levels.

The hand 9 and the dial 10 thus move distances proportioned to the change of condition of the bodies of water with which they are respectively associated, and as they re-

spectively move one way or another their relation to each other is maintained in precise accord with the relation existing at the time between the bodies of water.

5 The hand 9 of the dial 10, thus conjointly express the difference of level or head in a single presentation or reading. The apparatus is, therefore, in this respect, to be distinguished from indicating mechanisms in
10 which separate hands, independently traveling across the face of a dial, are employed, and in the use of which, a separate reading of the position of each hand upon the dial must be made, and a mental calculation or
15 comparison of said two readings be also made, to obtain the required result.

The hand 8, which happens to be arranged to have the same angular rotation as the pulley 12, indicates by its distance from any pre-
20 arranged fixed point in or in the vicinity of its path of movement, the absolute level of the water in the basin 1. The arrangement, for example, may be such that when all water is out of said basin and the follower 32
25 rests upon the bed, the hand 8 will occupy a vertical position, and that when said follower is elevated by water and in accordance with its height, said hand 8 will be correspondingly moved to the right from its vertical position,
30 thus indicating how far the follower has been elevated from the bed, and consequently how much water is in said basin.

For the purpose of indicating a maximum difference of head as between the water in 1
35 and that in 2, a point of special importance in connection with filter plants, where the maximum loss of head controls the time of washing the filter, I arrange for giving an alarm, as follows:

40 38 is an electrical contact button mounted in an arciform concentric slot 39 in the dial 10, adapted to be secured in any desired position in said slot, but insulated from the dial. 40 is an annular circumferentially grooved
45 contact plate, supported upon and conveniently insulated in any desired manner from, the frame 4. 41 is a conductor the upper end of which is secured to, and in electrical connection with, the shank of the button 38, and
50 the other end of which passes around or partly around the plate 40, lying in the circumferential groove thereof. In all positions of the dial, and in all sets of the button 38 in the slot 39, said button will be maintained in
55 circuit with the plate 40, but said button and plate are normally insulated from the dial and frame as explained. 42 is a binding post (Figure 4) engaged with the plate 40. 43 is a binding post secured to the frame 4 and in
60 circuit with the hand 9. 44 is a circuit wire connected up with the binding posts 42 and 43, and in circuit with a bell, electric light, or other signaling device, 45.

As will be understood, as the levels in 1
65 and 2 diverge and the two relative level indicating devices, that is to say, the hand 9 and dial 10, are caused to rotate in opposite direc-

tions, the hand 9 will in course of time encounter the button 38, and, closing the circuit, sound and operate the bell, light, or
70 other signaling device. The difference of level to be indicated by the operation of the alarm, may, of course, be predetermined by the set of the button in its slot.

Having thus described my invention, I
75 claim—

1. An apparatus for indicating the relative level of two bodies of water, for use in connection with filters, water works, water power plants, and the like, including two followers
80 capable of independent movement corresponding with changes of level of bodies of water with which they are associated, a dial, and an indicator, said dial and indicator being independently rotatable in both direc-
85 tions on a common axis, so that the position of the indicator upon the dial indicates in a single reading the relation existing between the two followers, and independent trains of mechanism through which movements of the
90 respective followers are transmitted to said dial and indicator respectively.

2. An indicating apparatus for filters, water works, water power plants, and the like,
95 including a pair of rotatable indicating devices, arranged to rotate at a predetermined relative motion upon a common axis, a rotatable device indicating absolute depth or level of a body of water, also rotatable on
100 said common axis, two independent followers, a train of mechanism through which the movements of one follower are transmitted to one of the said pair of indicating devices, and means through which the movements of the
105 other follower are transmitted to the other member of said pair of indicating devices, and also transmitted to the device for indicating the absolute depth or level of a body of water, substantially as shown and described
110 and for the purpose set forth.

3. An indicating apparatus for filters, water works, water power plants, and the like,
including a pair of relation indicating devices arranged for movement, independent
115 followers arranged to be affected by the change of level or pressure of two bodies of water or sources of pressure, independent trains of mechanism through which movements of said followers are transmitted to
120 said indicating devices, and means for operating an alarm when said indicating devices reach a predetermined reading.

4. An indicating apparatus, for filters, water works, water power plants, and the like,
125 including two relation indicating devices arranged for rotation, independent trains of gearing operatively connected with said devices, independent followers connected respectively with said trains of gearing, and an electric circuit, including an alarm, automatically closed when said indicating devices
130 reach a predetermined reading.

5. An indicating apparatus for filters, water works, water power plants, and the like

including a pair of relation indicating devices rotatable upon a common axis, the one in front of the other, the positions of which with respect to each other constitute or furnish a direct reading, rotatable axially arranged supports for said indicating devices, independent followers arranged to be affected by the changes of level or pressure of two bodies of water or sources of pressure, and independent trains of mechanism including reducing gears through which movements of said followers are transmitted to said axially arranged supports.

6. In an indicating apparatus, a rotatable dial, and a rotatable hand, both of said devices being mounted upon rotatable supports axially coincident, two pulleys, two trains of gearing by which said pulleys are respectively engaged with said rotatable supports, two followers adapted to be affected by change of level or pressure of two bodies of water or sources of pressure, and independent connections between said followers and the respective pulleys.

7. In an indicating apparatus, a rotatable dial and a rotatable hand, both of said devices being mounted upon rotatable supports axially coincident, two pulleys, two trains of gearing by which said pulleys are respectively engaged with said rotatable supports, two followers, independent connections between said followers and the respective pulleys, and a second rotatable hand, operatively connected with one of said pulleys and rotatable at a speed different from that of the hand first mentioned.

8. In an indicating apparatus in combination, a dial and a hand, rotatable supports on which said dial and hand are mounted, followers arranged to be placed in bodies of water or connected to sources of pressure, connections through which the movements of said followers are transmitted to said rotatable supports, a contact button mounted in said dial, and an electric circuit in which said button and said hand are included, and an alarm included in said circuit.

9. In an indicating apparatus, in combination, a dial and a hand, rotatable supports on which said dial and hand are mounted, followers arranged to be placed in bodies of water or connected to sources of pressure, connections through which the movements of said followers are transmitted to said rotatable supports, a contact button adjustably mounted on said dial, an electric circuit in which said button and said hand are included, and an alarm included in said circuit.

10. In an indicating apparatus, in combination, a dial and a hand, rotatable supports on which said dial and hand are mounted, followers arranged to be placed in bodies of water or connected to sources of pressure, connections through which the movements of said followers are transmitted to said rotatable supports, a contact button mounted in said dial but insulated from it, an annular contact plate mounted on the framework of the apparatus, but insulated from it, a conductor secured to said button and engaged with said plate, and an electric circuit, including an alarm, the line wires of which circuit terminate in binding posts secured to said contact plate and to a portion of the apparatus in circuit with said hand.

11. In an indicating apparatus, in combination, the hands 8, 9, the dial 10, the arbor 5, the sleeves 6, 7, the pulleys 12 and 18, the trains of gearing connective of said pulleys and said sleeves, the followers, and connections between said pulleys and said followers.

12. In an indicating apparatus, two rotatable devices, indicating devices mounted on said rotatable devices, independently rotatable pulleys, two trains of reducing gears through which the movements of the pulleys are transmitted to the said rotatable devices, two followers arranged to be placed respectively in two bodies of water or connected to two sources of pressure, means for transmitting the movement of the followers to said pulleys, and an indicating hand connected with and rotatable at the same speed as one of said pulleys.

13. In an indicating apparatus, two rotatable devices, indicating devices mounted on said rotatable devices, independently rotatable pulleys, two trains of reducing gears through which the movements of the pulleys are transmitted to the rotatable devices, two followers arranged to be placed respectively in two bodies of water or connected to two sources of pressure, means for transmitting the movements of the followers to said pulleys, and an electrical alarm the circuit of which is closed when the indicating devices have moved in opposite directions a given distance.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 23d day of August, A. D. 1901.

CHAS. L. PARMELEE.

In presence of—

GEO. E. BURROUGHS,
ROY O. GASSER.