

W. L. FITZGERALD.
ELECTRICALLY CONTROLLED INDICATOR.
APPLICATION FILED SEPT. 19, 1911.

Patented Nov. 18, 1913.

2 SHEETS—SHEET 1.

1,079,229.

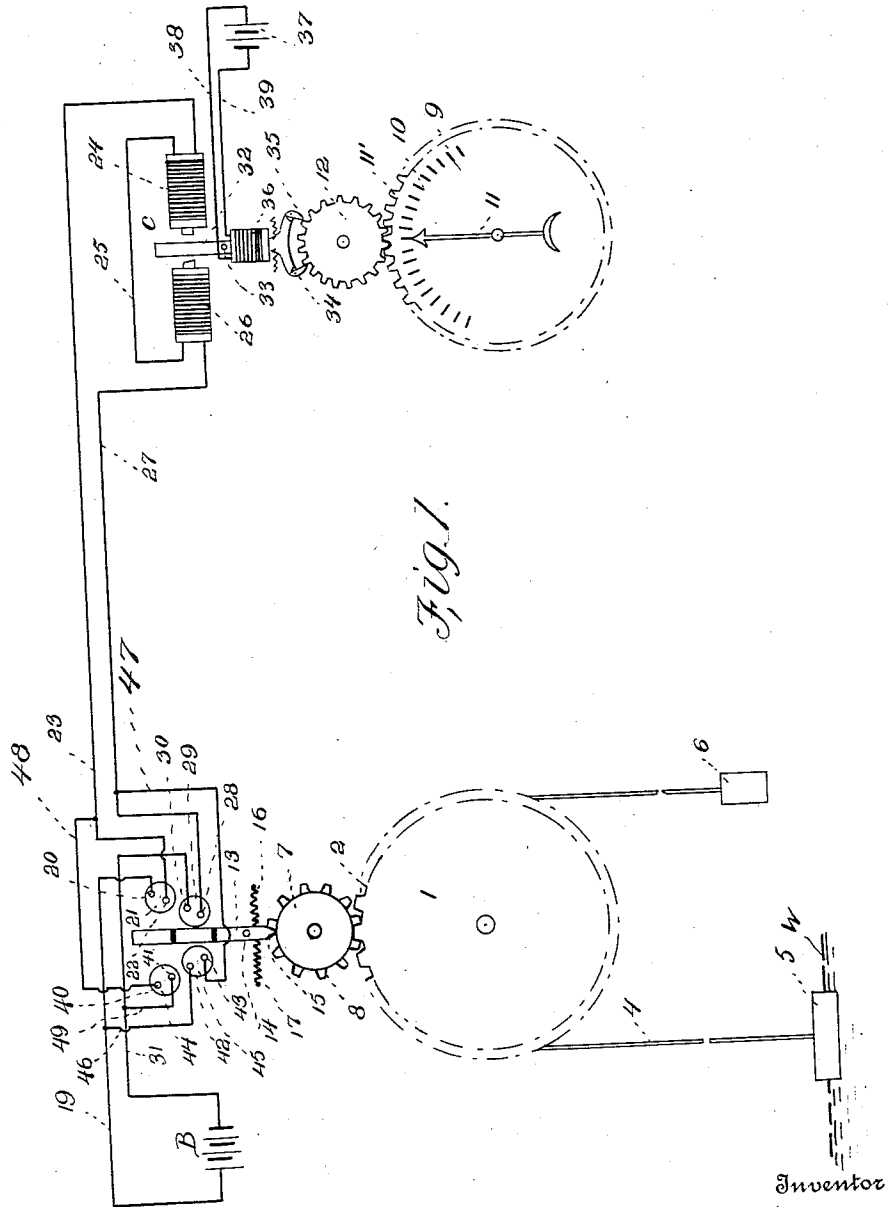


Fig. 1.

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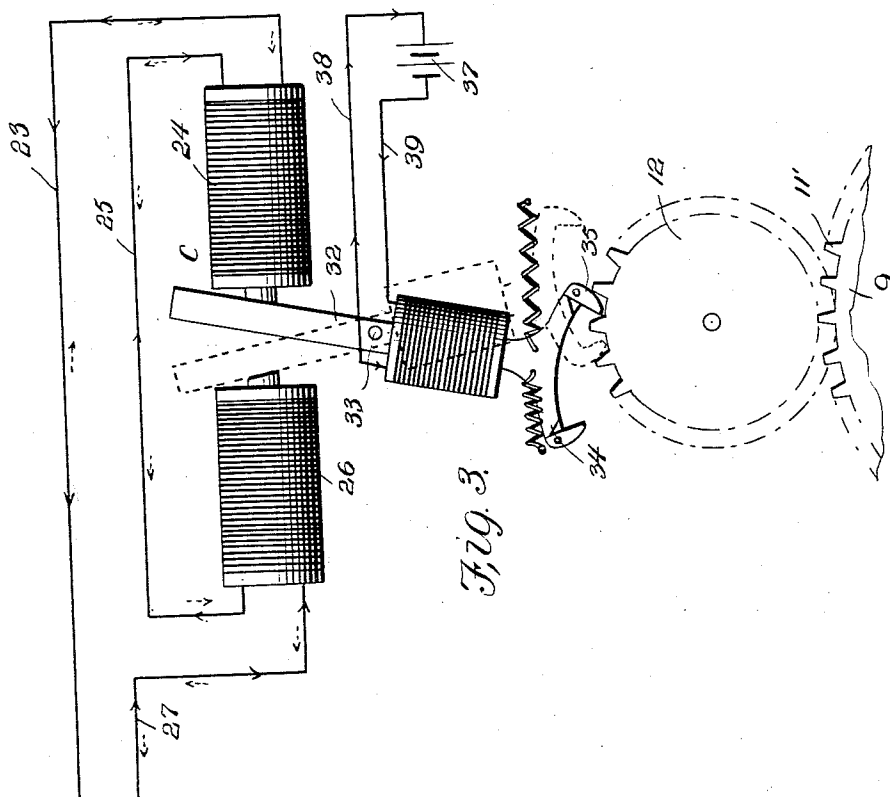


Fig. 3.

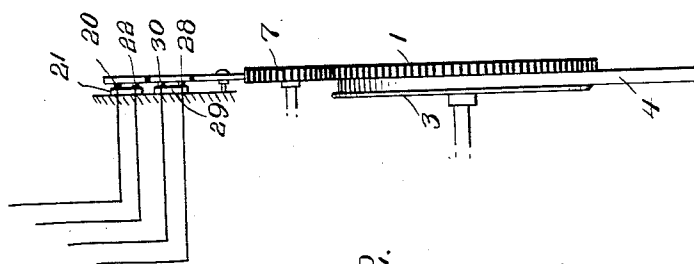


Fig. 2.

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UNITED STATES PATENT OFFICE.

WALTER L. FITZGERALD, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICALLY-CONTROLLED INDICATOR.

1,079,229.

Specification of Letters Patent.

Patented Nov. 18, 1913.

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To all whom it may concern:

Be it known that I, WALTER L. FITZGERALD, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Electrically-Controlled Indicators, of which the following is a specification.

10 This invention relates to an electric recorder or indicator and has particular application to electrically operated mechanism for indicating a movement of a fluid or other bodies.

15 In the present instance I have shown my invention as employed for indicating the rise and fall of a body of water, the indicating apparatus being located at a distance from the body being measured, but I wish it to be understood that the invention is not limited in its useful application to this particular purpose.

20 It is my purpose to provide an apparatus of the character described which will embody the desired features of simplicity, accuracy and reliability, and which may be readily installed in position for use.

25 With the above recited objects, and others of a similar nature in view, the invention consists in the construction, arrangement and combination of parts set forth in and falling within the scope of the appended claims.

30 In the accompanying drawings,—Figure 1 is a diagrammatic view of an apparatus embodying my invention. Fig. 2 is a sectional view through the circuit closure. Fig. 3 is a detail view of the magnets for operating the indicator.

40 In the present instance, I have shown my device as adapted for indicating the rise or fall of water at a station or stations which are remote from the body of water itself.

45 In the present embodiment of my invention, I have shown and described a two wire electrical indicating recording device having two wires energized from a source of electricity terminating in two separate contact points, two wires starting from two separate contact points in close proximity to the above mentioned contact points but not contacting therewith, these last mentioned wires terminating in two electromagnets so wired and connected that the adjacent poles are opposite. A pivoted current reversing switch is located between the above men-

tioned pair of contact points so that when the switch is in one position the current will flow in one direction and when in an opposite position the current will flow in the reverse direction thereby reversing the pole to the electromagnets from north to south, and vice versa. For operating the contact switch I employ a transmitting gear operated by power from the outside source either back or forward, continuous, alternately, or intermittently. The circuit closing current reversing switch when not in contact with the teeth is held in a central position between the contact points by means of a suitable tension device. I also employ an electromagnet operating lever having a separate source of current supply and having a projecting arm extending between the poles of the above mentioned electromagnets so that the reversal of the direction of the current flow of the circuit connecting the above mentioned pair of electromagnets will attract and repel the electromagnet operating lever in one direction or the opposite direction, depending upon the direction of rotation of the transmitting gear. When the reversing switch is in contact, the magnet operating arm is attracted to one or the other of the pair of magnets and the indicating gear is moved one tooth in the same direction as the transmitting gear.

While I have shown and described one particular embodiment of my invention, I wish it to be understood that I do not limit myself to all the precise details of construction herein set forth, as modification and variation may be made without departing from the spirit of the invention, or exceeding the scope of the appended claims.

Referring now to the drawings in detail, the numeral 1 indicates a band wheel mounted upon a shaft, journaled above the body of water in the reservoir or the like, said wheel having formed on the periphery thereof teeth 2 which are suitably spaced apart. The back of this wheel is provided with a rim 3 over which passes a frictional engaging driving band 4, one end of which is attached to the float 5 which is adapted to rise and fall with the water W, while the opposite end of the said band is connected to a weight 6.

The numeral 7 designates a pinion meshing with the teeth of the band wheel and adapted to be driven by the latter, said pinion having teeth 8 formed peripherally

thereof and also suitably spaced apart. It will be noted that as the float rises or falls the band wheel will be turned and consequently impart motion to the meshing pinion. In order to indicate the rise or fall of the water I provide at a distant point, such as at a station or substation, an indicator comprising a dial 9 having the usual scale 10, while 11 indicates a pointer arranged at the center of the dial and adapted to be operated by suitable mechanism to move over the dial.

The numeral 11' designates a gear wheel which is connected with the pointer 11, while 12 indicates a toothed pinion meshing with the toothed wheel and adapted to impart motion to the pointer when operated as hereinafter described.

In order to actuate the indicator pointer on the dial and thereby indicate the movement of the band wheel on the rise or fall of the body of water, I employ a two wire electrical equipment and means for making and breaking the circuit and for reversing the current to move the indicator pointer in one direction or in the other direction, depending upon the rise or fall of the water.

The numeral 13 designates a switch lever, pivoted at 14 above the pinion 7, and having a beveled or pointed end 15 adapted to be struck by the pinion in its rotation so that the lever is swung in one direction or the other, depending upon the direction of movement of the said pinion. When the pointed end of the lever occupies a position between two adjacent teeth of the pinion, such switch lever is held in a neutral normally vertical position by means of the oppositely acting tension springs 16 and 17, the springs also serving to restore the lever to its normal position after the same has been engaged by each tooth of the pinion 7 so that the circuit is intermittently made and broken to impart to the indicating gear a step by step movement as will appear later.

The letter B indicates the main battery of the electrical equipment from which leads the line wire 19 terminating at the contact point 20 on the base plate 21 carried by a suitable base board located adjacent to the pinion and switch lever, the lever being designed to swing over the board.

From the second contact pin 22 the line wire 23 leads to the distant station and to the coil 24 of the electromagnet C therein and thence is branched as at 25 to the opposite coil 26 of the electromagnet C, the return 27 leading to the contact pin 28 on the base plate 29, while 30 is a second contact pin on the plate 29 from which the return 31 leads back to the battery. Thus in the circuit just described, if the pinion B is being rotated anti-clockwise or to the left, a tooth striking the end of the switch lever will swing the switch over to the right to

close the circuit at the contact points or pins. When the lever is in such closed position, the circuit will be made through the wire 19 to the contact pin 20, thence through the connecting portion of the switch to the pin 22, thence through the wire 23 to the coil 24, thence through the wire 25 to the coil 26 of the electromagnet, C, thence back through the wire 27 to the contact pin 28, thence through the switch to the contact pin 30, thence through the wire 31 back to the battery. When this circuit is so made the magnet 24 will be energized to attract armature bar 32 which is pivoted as at 33, the said bar having its lower end formed with a yoke 34, the oppositely disposed teeth 35 of which are slightly inclined inwardly and are adapted to engage with the teeth of the pinion 12 to impart a step by step movement to the pinion, consequently imparting motion to the pointer for the indicator dial. The actuating arm 32 of the pinion is provided with a solenoid 36 and a separate battery 37 wired as at 38 and 39 so that the lever will be readily attracted by one coil or the other when the main circuit is closed.

The operation just described takes place when the water is rising and the band wheel is rotating clockwise. When the level of the water is falling the band wheel will turn toward the left and the pinion will be rotated so that the switch lever 13 will be swung to the left and contact with the contact points 40, 41, 42 and 43, respectively, and the points 40 and 41 being upon the base plate 44, while the points 42 and 43 are upon the base plate 45. When the lever is in such position, the current will be reversed and flow through the line 19, wire 46 to the contact point 42, thence through the switch to the branch wire 47, thence through the line 27 to the coil 26, thence through the connecting wire 25 to the coil 24, thence through the wire 23 which now forms a part of the return to the branch wire 48, thence to the contact pin 40, thence through the switch to the pin 41, thence through the branch wire 49 to the line 31 and so back to the battery. It will thus be noted that when the current reversing switch is in one position the current will flow in one direction and when in the opposite position the current will flow in the reverse direction, thereby reversing the poles of the electromagnets from north to south and from south to north, so that the armature will be attracted by one or the other of the coils depending upon the direction of flow of the current, thereby turning the indicator in the desired direction.

Having thus described the invention, what I claim is:—

1. The combination of an indicating device adapted to indicate the rise and fall of a body of fluid, electromagnetic devices ar-

ranged adjacent to the indicating device, a normally open circuit including said electromagnetic devices and having a source of electrical energy therein, means adapted to impart movement to the indicating device upon the energization of the said electromagnetic devices, an operating device adapted to be actuated by the rise and fall of a body of fluid and including a pinion, a switch lever operated from said pinion intermittently, a set of contact points arranged upon each side of the switch lever and adapted to be engaged by the lever in its movement and connected in said circuit in such manner that when the lever is moved in one direction the circuit is closed through one set of contacts and energizes the electromagnetic devices to move the indicator in one direction, and when the lever is moved in the opposite direction, the circuit is closed through the opposite set of contacts and energizes the electromagnetic devices to move the indicator in the opposite direction, and means for normally sustaining the switch out of engagement with the contacts and adapted to restore said switch to its normal position subsequent to the movement of the same under the influence of the pinion.

2. The combination of an indicating device adapted to indicate the rise and fall of a body of fluid, electromagnetic devices arranged adjacent the indicating device, a normally open circuit including said electromagnetic devices, and a source of electrical energy in the circuit, means adapted to impart movement to the indicating device upon the energization of said electromagnetic devices, an operating device including a pinion adapted to be actuated by the rise and fall of a body of fluid, a switch operatively associated with said pinion and pivoted adjacent thereto and designed to be operated intermittently by the teeth of said pinion, a set of contacts arranged upon each side of said lever and connected in said circuit in such manner that when the lever is moved in one direction the circuit is closed through one set of contacts and energizes the electromagnetic devices to move the indicator in one direction, and when the lever is moved in the opposite direction, the circuit is closed through the opposite set of contacts and energizes the electromagnetic devices to move the indicator in the opposite direction, and means for normally sustaining the switch out of engagement with the contacts, said last-named means operating to restore the switch lever to its normal position subsequent to the same being operated by each tooth of the pinion to impart to the indicating device a step by step movement.

3. The combination of an indicating device, electromagnetic devices, a normally open circuit for said electromagnetic devices and a source of electrical energy therein, means adapted to impart movement to the indicating device upon the energization of said electromagnetic devices, an operating device including a pinion, a switch lever operated from said pinion intermittently, a set of contacts arranged upon each side of the switch lever and connected in said circuit in such manner that when the lever is moved in one direction the circuit is closed through one set of contacts and energizes the electromagnetic devices to move the indicator in one direction, and when the lever is moved in the opposite direction, the circuit is closed through the opposite set of contacts and energizes the electromagnetic devices to move the indicator in the opposite direction, and means for normally sustaining the switch out of engagement with the contacts and adapted to restore the same to its normal position subsequent to the movement of the switch under the action of the pinion.

4. In an indicator, an indicating device, electromagnetic devices, a normally open circuit for said electromagnetic devices and a source of electrical energy therein, means adapted to impart movement to the indicating device upon the energization of said electromagnetic devices, an operating device including a pinion, a switch operatively associated with said pinion and pivoted adjacent thereto and adapted to be operated intermittently by the teeth of the pinion, a set of contacts arranged upon each side of the lever and connected in said circuit in such manner that when the lever is moved in one direction the circuit is closed through one set of contacts and energizes the electromagnetic devices to move the indicator in one direction, and when the lever is moved in the opposite direction, the circuit is closed through the opposite set of contacts and energizes the electromagnetic devices to move the indicator in the opposite direction, and means for normally sustaining the switch out of engagement with the contacts, said last-named means operating to restore the switch to its normal position subsequent to the same being acted upon by each tooth of the pinion whereby a step by step movement is imparted to the indicating device.

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

WALTER L. FITZGERALD.

Witnesses:

LOUIS M. FRIDENBERG,
 NORMAN J. SMITH.