E. E. LITTLEFIELD.

APPARATUS FOR AUTOMATIC ACTUATION OF MECHANISMS.

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1,335,380. Patented Mar. 30, 1920.

Fig. 1.

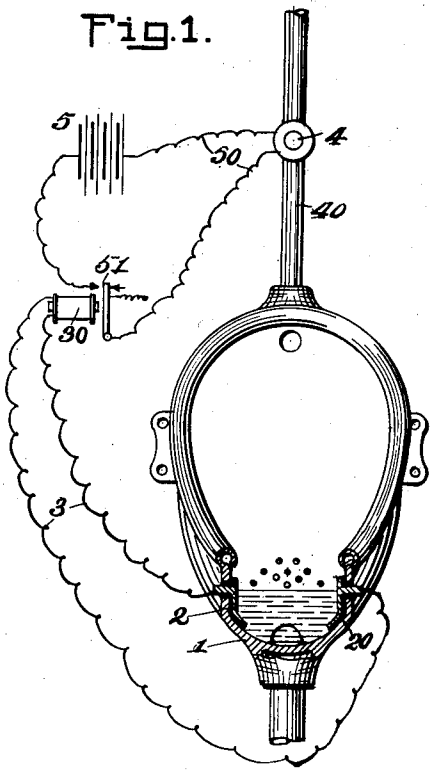


Fig. 2.

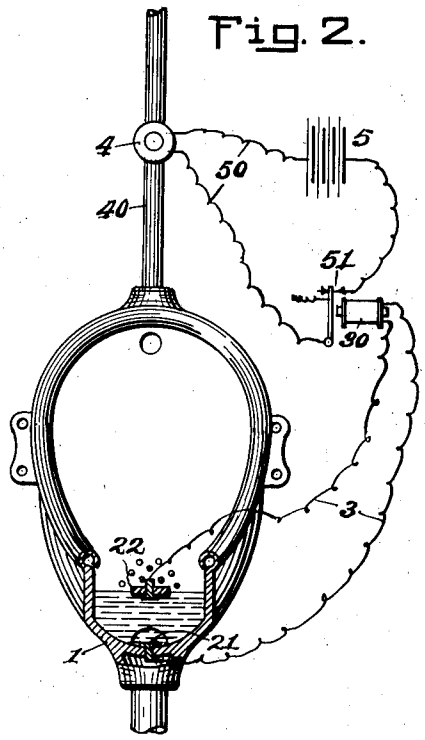
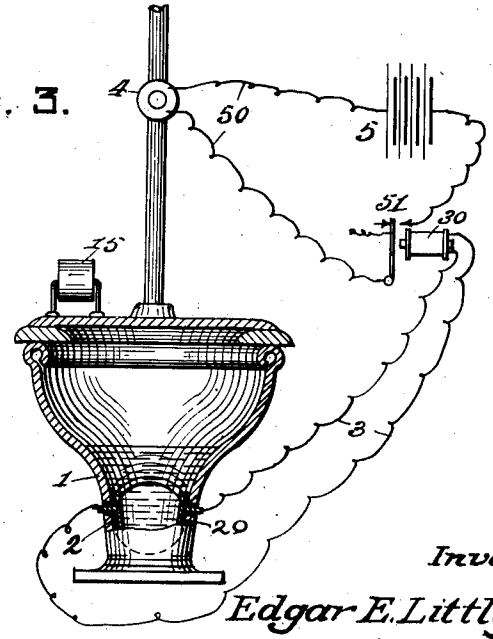


Fig. 3.



Witnesses

George H. Morse.

Nils Johanson.

Inventor:

Edgar E. Littlefield.

By Henry L. Reynolds.

Attorney.

UNITED STATES PATENT OFFICE.

EDGAR E. LITTLEFIELD, OF SEATTLE, WASHINGTON.

APPARATUS FOR AUTOMATIC ACTUATION OF MECHANISMS.

1,335,380. Specification of Letters Patent. Patented Mar. 30, 1920.

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To all whom it may concern:

Be it known that I, EDGAR E. LITTLEFIELD, a citizen of the United States, and resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Apparatus for Automatic Actuation of Mechanisms, of which the following is a specification.

My invention relates to an apparatus for automatic actuation of mechanisms through the medium of changes in the electrical condition of a circuit caused by varying the character or condition of a bath which forms a link in said circuit, and comprises the novel parts and combinations of parts which will be hereinafter described and particularly pointed out in the claims.

The object of my invention is to provide a means whereby an electric-current may be automatically produced or varied in intensity and this produced or modified current applied to actuate other mechanisms.

In the drawings I have shown my invention embodied in forms which are now preferred by me.

Figure 1 is a front elevation, partly in section, showing my invention applied to a urinal and operating to automatically flush it.

Fig. 2 is the same, but showing a slightly different construction of certain parts.

Fig. 3 shows a similar application of my invention for the automatic flushing of a closet bowl.

I have found that the difference in electrical condition in a voltaic cell caused by slight changes in the electrolyte, either of chemical or of a thermal character, may be used to operate a relay, or analogous instrument, to thereby control or operate other forces or mechanisms. I have shown these facts as utilized to automatically flush urinals and closets by the changes caused in the condition, either chemical or thermal, of the contents of such vessels, by the addition thereto of the body wastes. It is evident that practically any other apparatus might be operated in an analogous manner.

I have discovered that, if the bowl of a urinal or a closet, be considered as an electrolytic cell and electrodes be placed therein, the changes in the chemical contents of the urinal or closet bowl, caused by the addition of a body waste thereto, whether this be the urine or fecal matter, will cause such a change in the chemical action produced as will be sufficient to operate a relay, thereby controlling another and independent source of energy which may be applied through any suitable mechanism to perform any work desired. I have also found that this action may be hastened or intensified by the addition of a suitable chemical thereto, as by the use of a toilet paper, which has had the desired chemical applied thereto or incorporated therein.

In Fig. 1 is shown one manner of installing a device operating under the principles of my invention. The bowl 1, of a urinal, is used as an electrolytic cell, electrodes 2 and 20 being placed therein, and insulated from the bowl, unless, as would often be the case, the materials of the bowl are such as to serve as an insulator. The two electrodes are connected by conductors 3, with a relay 30, which controls the current from an independent source of energy, to apply the same to the operation of any desired mechanism.

I have shown this relay as controlling a circuit 50, which contains an electrically-operated valve 4, placed in the pipe 40, which supplies the flushing water for the urinal. The independent source of energy is represented by the battery 5, for which may be substituted any other suitable source, as a dynamo.

In Fig. 2 is shown a form of apparatus which is essentially the same, but varies in having one electrode, 22 movable to any variation in the water-level, this result being secured by placing it upon a float. The companion electrode 21, is shown at the bottom of the basin and as uninsulated from the basin.

In Fig. 3 the electrodes 2 and 20, are shown as placed to contact with the water forming the seal of a closet bowl, the other parts being as before described. I have also shown a roll of toilet paper 15 which may be charged with some chemical which is innocuous to the user, but which will dissolve in the water and thus strengthen the fluid, thus making of it a better electrolyte and thus increase the current flowing in the relay circuit.

In all of these devices the action is of this character. The normal generation of electricity, when the electrolyte is uncharged water, is small, not sufficient to op-

erate the relay. When the character of the liquid in these basins is changed, by the addition thereto of a body waste, the resistance of the liquid, considered as an electrolyte, is lowered, and the electrolytic action upon the electrodes is increased, resulting in sufficient electric flow to operate the relay, thus bringing into action the stronger energy, represented herein by the battery 5, to operate any apparatus desired.

When the flushing action occurs the electrolyte is again changed in character, the resistance increased and the electromotive force reduced to such a point that the relay contact 51 will be opened, throwing out of action the operating current in circuit 50.

In the form of apparatus shown in Fig. 2, the rise of the electrode 22, caused by the rush of the flushing current, will separate the electrodes to a greater distance, thereby intensifying the difference of resistance. In this form of apparatus the floating electrode may be made so as to act as a screen for foreign bodies, thus serving a double useful purpose.

Urine and other body waste act to greatly strengthen the electrolytic action of a weak or relatively inert liquid, as water. While the liquid in the bowl, tank or whatever the container may be, approaches to the condition of pure water, the current passing will be little or nothing and it will not be effective to operate a motor contained in the circuit. As soon as the water has been charged with the body waste, it becomes a better electrolyte and the passing current becomes sufficient to operate the motor.

There are many uses to which the principles of this invention may be put. It may be used to operate pumping or flushing apparatus; to care for sewerage, factory wastes and like purposes.

What I claim as my invention is:

1. A flushing device for waste receiving receptacles comprising electrodes placed to be contacted by the wastes received by said receptacles, and means for applying the electricity so generated to the operation of a flushing mechanism.

2. A means for automatically stopping a flow of fluid including an electric circuit having actuating mechanism therein and having controlling electrodes in the path of flow of said fluid, a receptacle for said fluid, said electrodes being normally in contact with fluid normally retained in said receptacle.

3. The combination with a waste receptacle, of a flushing device for said receptacle containing a valve normally closed, a source of energy and mechanism adapted for actuation thereby to open and close said valve, an electric relay controlling the application of said source of energy to the actuation of said valve-controlling mechanism, and an electrically energized circuit containing said relay and having electrodes contacted by the wastes received by said receptacle.

4. A means for automatic flushing of urinals and like toilet apparatus comprising an electric circuit and means for employing the body wastes to electrolytically vary the current in said circuit by the alteration of the chemical character of a liquid which forms a part of said circuit.

5. A means for automatic flushing of urinals and like toilet apparatus comprising a closed electric circuit and means for employing the body wastes to automatically vary the strength of the current in said circuit.

6. In a device of the character set forth, a fluid conduit, a receptacle placed to receive the fluid supply of said conduit and containing elements of an electro-motive series, and an electric circuit having actuating mechanism therein and having a path which includes said elements.

7. A means for automatically starting intermittently operated mechanisms by variations in the chemical composition of a fluid comprising an electric circuit containing a current actuated mechanism which includes a means for automatically supplying fluid to a gap in said circuit.

8. In combination, a source of fluid, a valve, a receptacle normally containing fluid, controlling means for said valve which includes an electric circuit, said circuit having electrodes disposed in said receptacle and adapted to be bridged by fluid supplied by said valve, one of said electrodes being supported by the fluid normally retained in said receptacle.

9. A means for controlling a flow of fluid including a valve, a receptacle for said fluid, said receptacle having an inlet and an outlet, controlling means for said valve which includes an electric circuit, and controlling electrodes in said receptacle between which the fluid supplied by said valve forms a connecting link.

10. A means for controlling a flow of fluid including a valve, controlling means for said valve which includes an electric circuit, said circuit having controlling electrodes which are normally insulated from the valve and adapted to be bridged by fluid supplied by said valve.

11. A regulating apparatus for a fluid supply comprising an electric circuit having actuating mechanism therein and means in the path of the fluid for controlling said actuating mechanism, said means including electrodes which are normally bridged by fluid.

12. A waste receiving trap having electrodes, which form with the waste received thereby, a voltaic cell, the electrodes being permanently separated from each other.

13. A means for controlling a flow of fluid including, a source of fluid, a receptacle normally containing fluid, means for controlling the flow of fluid which includes an electric circuit, and electrodes for said circuit which are normally in contact with the fluid normally contained in said receptacle.

14. A means for controlling a flow of liquid including a source of liquid, a valve therefor normally obstructing the flow of liquid, controlling means for said valve including an electric circuit, and electrodes for said circuit which are adapted to be bridged by liquid supplied by said valve.

15. In a device of the character set forth, a fluid conduit, an acid-resisting receptacle forming a trap which is continuously charged with fluid, and mechanism actuated by an electric circuit having its terminals continuously in contact with the fluid contents of said trap.

16. In combination, a source of fluid, a valve therefor, a receptacle for said fluid, electrical controlling means for said valve, said means including an electric circuit having two electrodes placed to be bridged by fluid supplied by said valve, said electrodes being normally insulated from the devices which retain and conduct said fluid.

17. In combination, a source of water supply, a vessel connected to said source, a valve controlling said connection, electromagnetic means for operating said valve, a normally open circuit for said electromagnetic means, stationary controlling contact in said vessel, said contacts adapted to be electrically connected together by a conducting solution deposited therein.

18. In combination, a source of water supply, a valve therefor, a vessel connected to said source and adapted to be flushed by operation of said valve, electromagnetic means for operating said valve, a normally open circuit for said electromagnetic means, a pair of normally open controlling contacts in said vessel, a body of non-conducting fluid normally retained in said vessel about said contacts, said contacts being adapted to be closed by the deposit of excreta therein, and means associated with said contacts for closing said normally open circuit.

19. In combination, a source of water supply, a valve therefor, a vessel connected to said source and adapted to be flushed by operation of said valve, electromagnetic means for operating said valve, a normally open circuit for said electromagnetic means, a pair of normally open controlling contacts in said vessel, said contacts adapted to be closed by the deposit of excreta therein, the excreta forming part of the circuit for said electromagnetic means, means for delaying the flushing operation for a lapse of time after the deposit of excreta in said vessel.

20. In combination, a source of water supply, a valve, a vessel connected to said source and adapted to be flushed by operation of said valve, electromagnetic means controlling the operation of said valve, said electromagnetic means being controlled automatically by deposit of excreta in said vessel, the excreta forming a part of the circuit for said electromagnetic means.

21. In combination, a source of water supply, a valve therefor, a vessel connected to said source and adapted to be flushed by operation of said valve, electro-magnetic means for operating said valve, a circuit for said electro-magnetic means, a pair of contacts for said circuit in said vessel, a body of liquid normally retained in said vessel about said contacts, the current in said circuit being increased by the deposit of excreta in said liquid to operate said electromagnetic means.

22. In combination, a source of water supply, a valve therefor, a vessel connected to said source and adapted to be flushed by operation of said valve, electro-magnetic means for operating said valve, a circuit for said electro-magnetic means, a pair of electrodes for said circuit in said vessel, said electrodes being in contact with a body of liquid and the current in said circuit being increased by the deposit of excreta therein, there being thus means for delaying the flushing operation for a lapse of time after the deposit of excreta in said vessel.

23. In combination, a vessel adapted to receive excreta, flushing means therefor, electrically operated means for controlling said flushing means, a circuit for said electrically operated means which is energized upon the deposit of excreta in said vessel, and spaced-apart contact terminals in said vessel between which the excreta itself forms an electrical conducting medium to close said circuit and operate said flushing means.

In testimony whereof I have hereunto affixed my signature at Seattle, Washington, this 30th day of January, 1913.

EDGAR E. LITTLEFIELD.

Witnesses:
SYD KING,
HENRY L. REYNOLDS.