C. D. HAEUSLER.

SUCTION AND COMPRESSION APPARATUS.

APPLICATION FILED FEB. 27, 1913.

1,075,711.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 1.

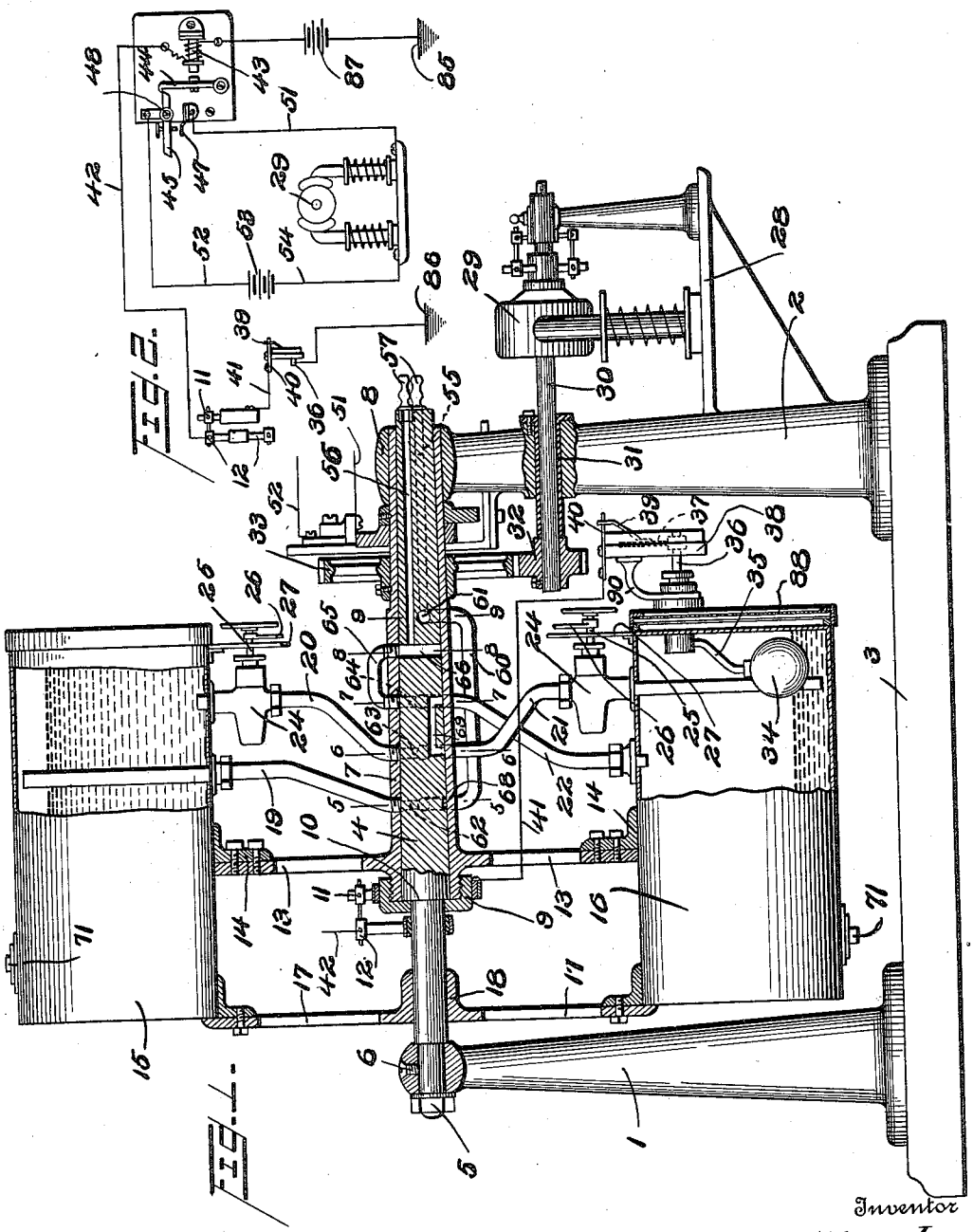


FIG. 2.

FIG. 1.

Inventor

Charles D. Haeusler.

Witnesses

H. S. Strauss

R. A. Kenkel.

By Joshua R. H. Potts.

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

C. D. HAEUSLER.

SUCTION AND COMPRESSION APPARATUS.

APPLICATION FILED FEB. 27, 1913.

1,075,711.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 2.

FIG. 4.

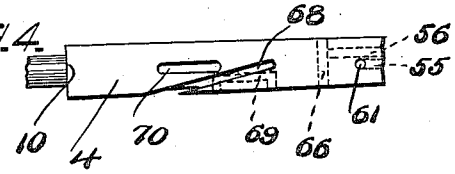


FIG. 5.

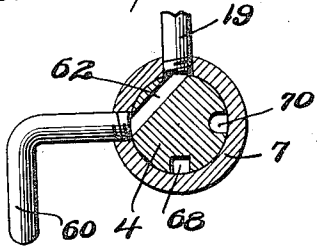


FIG. 3.

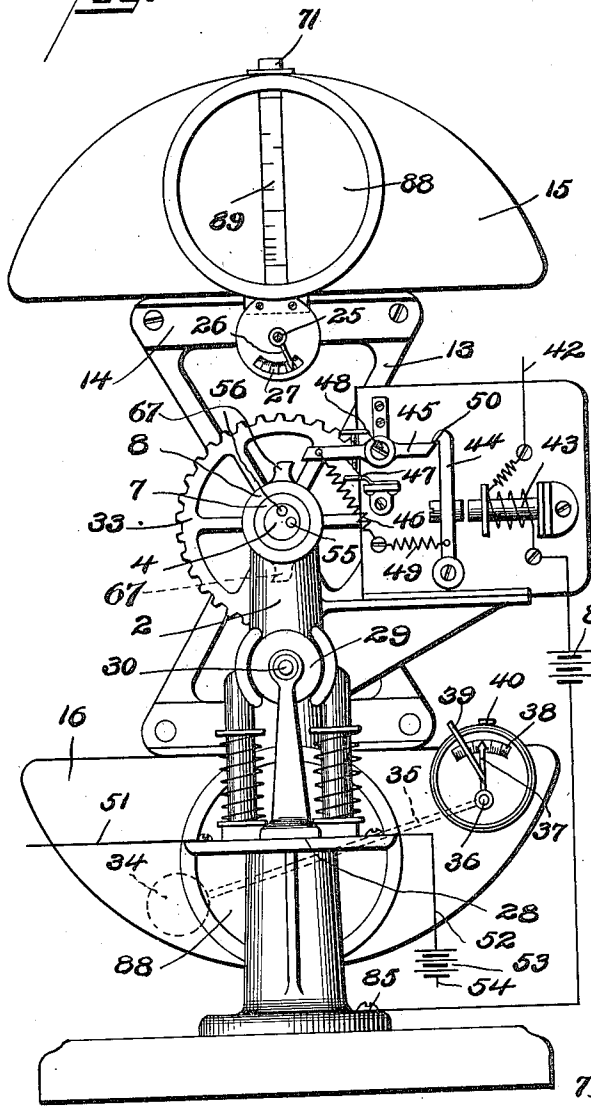


FIG. 6.

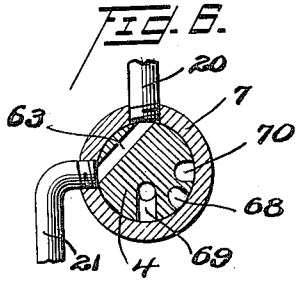


FIG. 7.

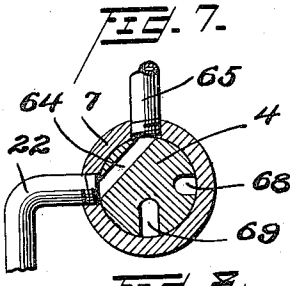


FIG. 8.

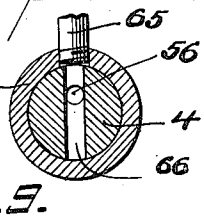
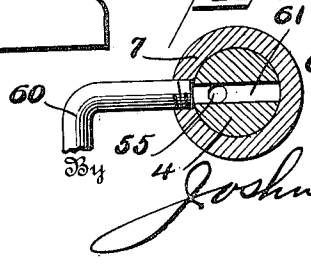


FIG. 9.



Witnesses

A. Straus

R. H. Krenkel

Inventor

Charles D. Haeusler

By Joshua R. H. Potts.

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

C. D. HAEUSLER.

SUCTION AND COMPRESSION APPARATUS.

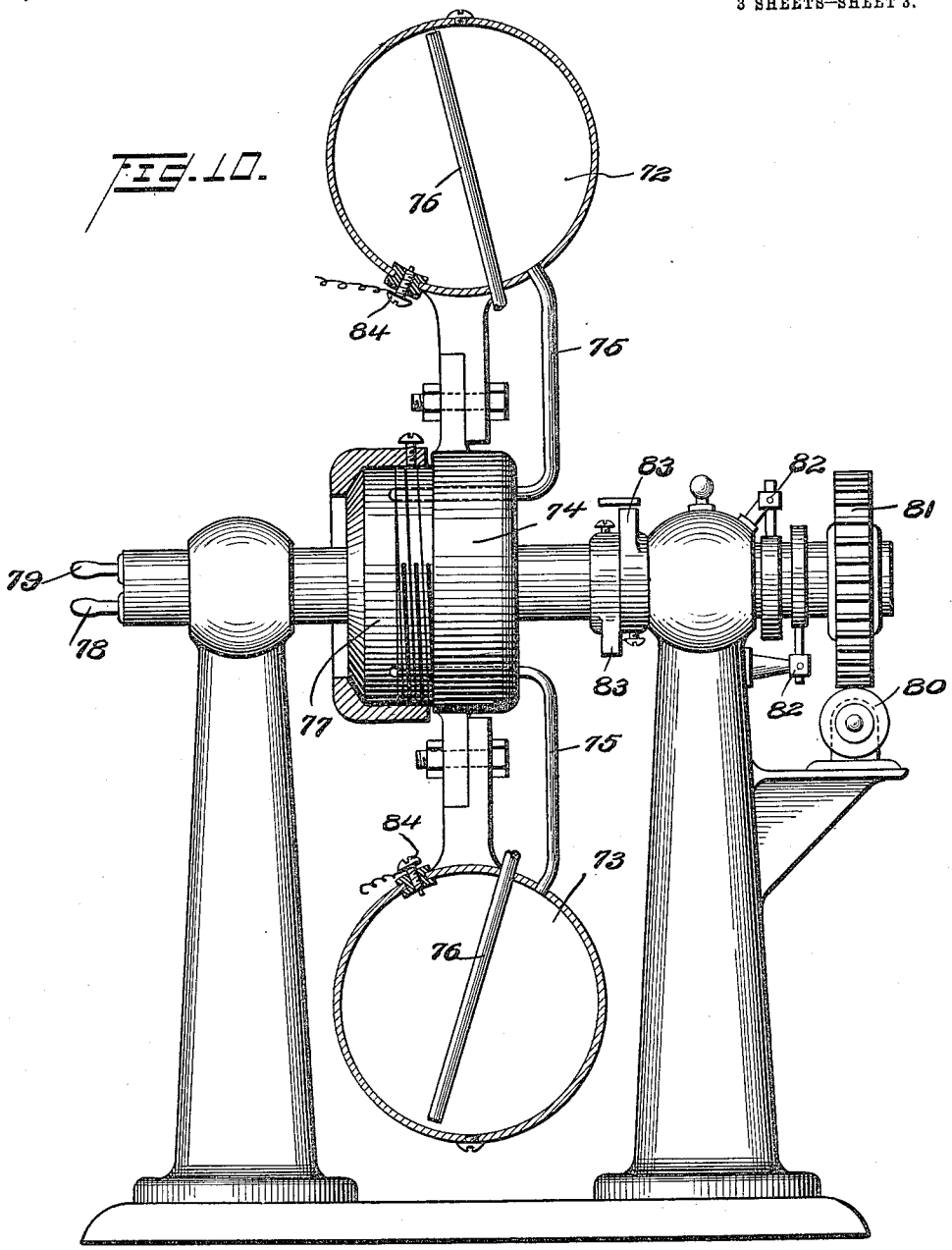
APPLICATION FILED FEB. 27, 1913.

1,075,711.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 3.

FIG. 10.



Inventor

Charles D. Haeusler.

Witnesses

A. S. Straus

R. D. Krenkel

By Joshua R. H. Potts

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES D. HAEUSLER, OF KRESSBRONN, BODENSEE, GERMANY.

SUCTION AND COMPRESSION APPARATUS.

1,075,711. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed February 27, 1913. Serial No. 751,088.

To all whom it may concern:

Be it known that I, CHARLES D. HAEUSLER, a citizen of the United States, residing at Kressbronn, Bodensee, Wurttemberg, Germany, have invented certain new and useful Improvements in Suction and Compression Apparatus, of which the following is a specification.

My invention relates to improvements in suction and compression apparatus, and more particularly to an improved apparatus which utilizes a liquid flowing from one receptacle into another and vice versa, and such passage of the liquid causing in one chamber a compression of air and in the other chamber inducing a suction of air.

A further object is to provide an apparatus of this character in which the positions of the receptacle can be reversed so that the flow of liquid is first from one receptacle to the other, and then from the last-mentioned receptacle back into the first-mentioned receptacle, and provide an improved cock controlling the flow of liquid and air by reason of an improved arrangement of passages therein.

A further object is to provide improved automatic mechanism for reversing the receptacles, so that when the liquid reaches a pre-determined level in the lower receptacle, the receptacles are caused to reverse and the flow of liquid changed.

A further object is to provide an apparatus of the character stated which causes a continuous flow of air into the inlet nozzle of the cock and out of the outlet nozzle of the cock, regardless of the positions of the receptacles.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1 is a view partly in elevation and partly in longitudinal section illustrating my improvements. Fig. 2 is a diagram of the electric circuits employed in connection with my improved apparatus. Fig. 3 is a view in front elevation of the apparatus. Fig. 4 is a view in elevation of the cock showing the same partly broken away. Fig. 5 is a view in section on an enlarged scale on the line 5—5 of Fig. 1. Fig. 6 is a view in section on the line 6—6 of Fig. 1. Fig. 7 is a view in section on the line 7—7 of Fig. 1. Fig. 8 is a view in section on the line 8—8 of Fig. 1. Fig. 9 is a view in section on the line 9—9 of Fig. 1, and Fig. 10 is a view partly in section and partly in elevation illustrating a modification.

Referring to my improvements illustrated in Figs. 1 to 9 inclusive, 1 and 2 represent standards located upon a base 3. 4 represents my improved cock which is of general conical form throughout the greater portion of its length, and at one end is reduced in diameter and is secured rigidly in the upper end of standard 1 by means of a nut 5, and a screw 6. The cock 4 fits snugly within a shell 7, and this shell at one end is mounted to turn freely in a bearing 8 provided at the upper end of standard 2 and terminating short of the end of the cock 4. The inner end of the shell 7 is screw-threaded to receive a cap 9 which bears against an annular shoulder 10 on the cock and is provided with an electric contact 11 adapted to engage contacts 12, both of these contacts being insulated from the cock and from the shell as clearly shown in Fig. 1. Integral plates 13 on the shell 7 are secured at their outer ends to brackets 14 on receptacles 15 and 16 respectively. These receptacles are also connected by a bar 17 which has a central bearing 18 turning on the reduced end of cock 4. These receptacles 15 and 16 as shown most clearly in Fig. 3, are of general semi-cylindrical shape with their flat or straight sides substantially in parallelism and opposing each other. Each receptacle 15 and 16 is connected with ports in the shell 7 by means of two pipes, and for convenience of description these several pipes are given separate reference characters as follows: One of these pipes for each receptacle is appreciably longer than the other and extends into the receptacle and almost to the outer wall of the receptacle. The longer pipe of receptacle 15 is given reference numeral 19, and the shorter pipe 20. The longer pipe of receptacle 16 is given reference numeral 21, and the shorter pipe 22. These shorter pipes communicate with openings in the inner walls of the receptacles, and in pipes 20 and 21, cocks 24 are provided. The stems 25 of these cocks have

pointers 26 thereon which register with fixed scales 27, so that they indicate the position of the cock, so that the flow of liquid and air may be controlled as will be hereinafter more fully explained.

A bracket 28 fixed to standard 2 supports an electric motor 29, the shaft 30 driven thereby having a bearing 31 in standard 2 and preferably projecting into the space between the standards as indicated in Fig. 1. A pinion 32 fixed to shaft 30 meshes with a gear wheel 33 fixed to shell 7, so that the motor when permitted to operate, causes the shell 7 to revolve on cock 4, and reverse the position of the receptacles 15 and 16. The operation of the motor is however entirely automatic, and regulated by the level of liquid in the receptacle 16. In this receptacle 16, a float 34 is secured to an arm 35 on a shaft 36 which projects through the end of the receptacle 16, and is provided on its outer end with a pointer 37 which registers with a fixed scale 38. On this pointer 37, a contact arm 39 is secured, and is adapted to engage an adjustable contact 40, all of said parts being supported by a bracket 90 secured to the end of receptacle 16. The contact 40 is electrically connected by a wire 41 to the contact 11, and this contact 11 in either of its positions engages a contact 12. The contact 12 is connected by a wire 42 with one side of an electro-magnet 43, the other side of said magnet being connected to a battery 87, and said battery grounded as indicated at 85. The pointer and contact 39 are also grounded as indicated at 86, so that when the contact 39 moves against contact 40, the circuit is closed to energize the magnet 43. This magnet 43 moves a pivoted catch 44 to release a contact arm 45, and when the latter is released, a spring 46 draws the same downwardly into engagement with a stationary contact 47. The contact arm 45 is pivoted between its ends as indicated at 48, and when in normal position is maintained as indicated in Fig. 3 by means of the catch 44. This catch 44 has a coiled spring 49 which holds the upper beveled end 50 of said catch 44 over the end of the contact arm 45, thus maintaining the arm 45 out of contact with the contact 47. The electric motor 29 above referred to is connected at one side by a wire 51 with contact 47. Contact arm 45 is electrically connected by a wire 52 with a battery 53, and the battery 53 is connected to the opposite side of the motor 29 by a wire 54.

The cock 4 as indicated most clearly in Figs. 4 to 9 inclusive is provided with a plurality of passages which control the flow of liquid and air as follows: Substantially parallel longitudinal air inlet and outlet passages 55 and 56 are provided in one end of cock 4, and have pipe nozzles 57 thereon which are adapted to be connected with any desired system or apparatus which requires a continuous flow of air in one direction, and is particularly adapted for use in connection with my improved emanator covered in a pending application. The inlet passage 55 at its inner end is maintained in open communication with a pipe 60 when the shell is in either of its normal positions by means of a transverse passage 61 extending entirely through the cock as indicated in Fig. 9. The other end of this pipe 60, when the parts are in the position shown in Fig. 1, is connected with the pipe 19 by means of a passage 62 in cock 4, so that as the water moves downwardly through pipe 20, the air can flow freely into the upper portion of receptacle 15 through the passage above explained. The water flowing through pipe 20, flows through a passage 63 in cock 4, which in the position shown in Fig. 1, communicates with pipe 21, so that the water flows directly through the pipe 21 into the receptacle 16. The air in the upper portion of receptacle 16 is forced outwardly through pipe 22, and the latter when the parts are in the position shown in Fig. 1, is connected by a passage 64 in cock 4 with a pipe 65 which connects two ports in shell 7, and at one end communicates with a transverse passage 66 which is in direct communication with the outlet passage 56 at all times, because it extends entirely through the cock as indicated in Fig. 8.

When the liquid in the receptacle 16 causes the float 32 to rise to a pre-determined level, the contact 39 will engage contact 40, and the electric circuit including magnet 43 will be closed. The magnet 43 will draw the catch 44 out of the path of arm 45, and spring 46 will move the arm into position to close against contact 47. This will close the motor circuit as above explained, and the motor through the medium of shaft 30, pinion 32, and gear wheel 33 will cause the shell 7 to revolve and bring receptacle 16 to the top, and receptacle 15 to the bottom. As soon as this movement begins, the float 34 will begin to move toward the outer surface of receptacle 16 as its tendency is to rise to the top of the liquid, hence breaking the magnetic circuit 43 and allowing the spring 49 to return the catch to its normal position, and as the shell nears its normal position, a beveled finger 67 will engage the arm 46 and move it into position to be held by catch 44, so that the parts will be exactly reversed. When the parts are reversed, the several pipes above referred to are connected by passages in the cock as will be now explained. The water in the receptacle 16 will flow through pipe 22 and will be connected to pipe 19 by means of a passage 68. The air which is forced out of receptacle 15 through pipe 20, will be directed

into pipe 65 and hence into passage 66 by means of a passage 69 in cock 4. The air entering passage 55 will flow through pipe 60, thence through passage 70 into pipe 21, and thence into tank 16. It will thus be noted that when the lower receptacle becomes full, the parts will be automatically shifted so that the full receptacle will be moved to the top and the flow of liquid will pass from the upper receptacle into the lower receptacle and in both of the positions air will be sucked into passage 55 and forced out through the passage 56. The cocks 24 permit a regulation of the flow of liquid, and air, so that the desired pressure and suction may be had.

Plugs 71 normally close inlets to the receptacles 15 and 16, and in starting the upper receptacle is filled with liquid which may be water or any approved liquid, and when the cocks 24 are opened, the operation may be started. In order that the liquid in the receptacles 15 and 16 may be observed at all times, transparent disks 88 are secured in the ends of the receptacles and have graduated scales 89 thereon as clearly shown in Fig. 3.

In Fig. 10 I illustrate a modification which is designed primarily for using mercury as a liquid. The mercury receptacles 72 and 73 are mounted upon a rotary member 74 and the pipes 75 and 76 through which the mercury and air flow are adapted to communicate with a cock 77. In this modification I have not attempted to illustrate in detail the arrangement of ports and passages, but it is to be understood that these ports and passages will control the flow of liquid and air in substantially the same manner as above described in connection with Fig. 1, so that air will enter through nipple 78 and be forced out through nipple 79 when the parts are in either position. A driving worm 80 driven from any source of power, operates a gear 81 to turn the apparatus, and I have illustrated an arrangement of electric contacts 82 and 83 which are adapted to control electrically, the movement of the apparatus. I have not illustrated any particular electric apparatus, but may use any capable of the purpose. In the inner portions of the receptacles 72 and 73, electric contacts 84 are located and when the mercury in the receptacles reaches a level to touch the contacts 84, the electric circuit will be closed to shift the apparatus as will be readily understood.

Various other slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

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

1. An apparatus of the character described, comprising two receptacles normally stationary with one receptacle positioned above the other, means for directing liquid from one receptacle into the other, and means controlled by the level of liquid in one receptacle for reversing the positions of the receptacles, substantially as described.

2. An apparatus of the character described, comprising two liquid receptacles, means for directing liquid from one receptacle into the other, and automatic means for reversing the flow of liquid, substantially as described.

3. An apparatus of the character described, comprising a support, two receptacles secured to the support, automatic means for turning the support, a cock providing rotary mounting for said support, and said cock controlling the flow of liquid from one receptacle to the other, substantially as described.

4. An apparatus of the character described, comprising a support, two receptacles secured to the support, automatic means for turning the support, a cock providing rotary mounting for said support, pipes connecting the inner and outer portions of said receptacles with the cock, and means in certain of said pipes controlling the flow of fluid therethrough, substantially as described.

5. An apparatus of the character described, comprising a support, two receptacles secured to the support, a cock providing rotary mounting for said support, said cock controlling the flow of liquid from one receptacle to the other, and means automatically controlled for reversing the receptacles when the liquid in one receptacle reaches a pre-determined level, substantially as described.

6. An apparatus of the character described, comprising a support, two receptacles secured to the support, a cock providing rotary mounting for said support, pipes connecting the inner and outer portions of said receptacles with the cock, means in certain of said pipes controlling the flow of fluid therethrough, and means automatically controlled for reversing the receptacles when the liquid in one receptacle reaches a pre-determined level, substantially as described.

7. An apparatus of the character described, comprising a support, two receptacles secured to the support, a cock providing rotary mounting for said support, said cock controlling the flow of liquid from one receptacle to the other, electric means for reversing the position of the receptacles,

and a float in one of the receptacles controlling the opening and closing of the circuit controlling the electrical means, substantially as described.

8. An apparatus of the character described, comprising a support, two receptacles secured to the support, a cock providing rotary mounting for said support, pipes connecting the inner and outer portions of said receptacles with the cock, means in certain of said pipes controlling the flow of fluid therethrough, electric means for reversing the position of the receptacles, and a float in one of the receptacles controlling the opening and closing of the circuit controlling the electrical means, substantially as described.

9. An apparatus of the character described, comprising a stationary cock, a shell mounted to turn on the cock, receptacles having a fixed relation to the shell and movable therewith, a pair of pipes connecting each receptacle with the shell, one pipe of each pair extending into the receptacle and terminating close to the outer wall of the receptacle, automatic means for turning the shell, cocks in one of each pair of said pipes, fixed scales, and pointers on the stems of said cocks registering with the scales, whereby the flow of fluid through the pipes is controlled, and said cock having passages therein controlling the direction of the flow of liquid through said pipes, substantially as described.

10. An apparatus of the character described, comprising a stationary cock, a shell mounted to turn on the cock, receptacles having a fixed relation to the shell and movable therewith, a pair of pipes connecting each receptacle with the shell, one pipe of each pair extending into the receptacle and terminating close to the outer wall of the receptacle, automatic means for turning the shell, cocks in one of each pair of said pipes, fixed scales, and pointers on the stems of said cocks registering with the scales, whereby the flow of fluid through the pipes is controlled, and said cock having passages therein controlling the direction of the flow of liquid through said pipes, said cock also having air passages therein communicating with certain of said pipes, whereby a continuous flow of air is caused by the flow of liquid from one receptacle to the other, substantially as described.

11. An apparatus of the character described, comprising standards, a horizontal cock secured in a stationary position in the standards, a shell fitting the cock and mounted to turn thereon, said cock at one end having air inlet and exhaust passages, two receptacles located above and below the shell and having rigid connection therewith, said receptacles adapted to contain liquid, pipes connecting both of said receptacles with the shell, automatic means for turning the shell, said cock having passages therein connecting the respective pipes whereby the water is permitted to flow from the upper receptacle into the lower, and air from the lower receptacle into the exhaust passage, and air from the inlet passage into the upper portion of the upper receptacle, and said cock having other passages connecting the pipes when the receptacles are reversed, whereby the flow of liquid and air into and from the receptacles are reversed, substantially as described.

12. An apparatus of the character described, comprising a normally horizontal stationary cock, a shell mounted to turn on the cock, liquid receptacles located above and below the shell and having a fixed relation therewith, pipes connecting the receptacles with the shell, said cock having passages therein controlling the flow of liquid and air to and from the said receptacles when the said receptacles are in either of their normal positions, and means for automatically turning the shell to reverse the positions of the receptacles at pre-determined intervals, substantially as described.

13. An apparatus of the character described, comprising a normally horizontal stationary cock, a shell mounted to turn on the cock, liquid receptacles located above and below the shell and having a fixed relation therewith, pipes connecting the receptacles with the shell, said cock having passages therein controlling the flow of liquid and air to and from the said receptacles when the said receptacles are in either of their normal positions, means for automatically turning the shell to reverse the positions of the receptacles at pre-determined intervals, an electric motor constituting said last-mentioned operating means, a normally open electric circuit including a source of electricity supply controlling the operation of the motor, and means operated by the level of liquid in one of the receptacles for controlling the closing of said circuit, substantially as described.

14. An apparatus of the character described, comprising a normally horizontal stationary cock, a shell mounted to turn on the cock, liquid receptacles located above and below the shell and having a fixed relation therewith, pipes connecting the receptacles with the shell, said cock having passages therein controlling the flow of liquid and air to and from the said receptacles when the said receptacles are in either of their normal positions, means for automatically turning the shell to reverse the positions of the receptacles at pre-determined intervals, an electric motor constituting said last-mentioned operating means, a normally open electric circuit including a source of electricity supply controlling the operation of

the motor, a float in one of said receptacles, an electro-magnet controlling the closing of said first-mentioned circuit, said magnet included in a normally open circuit with a source of electricity supply, and said last-mentioned circuit closed by the said float, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES D. HAEUSLER.

Witnesses:

CHARLES BRASHEARS BEYLARD,

FERNAND GORILIANJ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."