J. G. GOODHUE.

ROTARY VALVE.

APPLICATION FILED MAY 15, 1912. RENEWED JULY 11, 1918.

1,326,046. Patented Dec. 23, 1919.

Fig. 1.

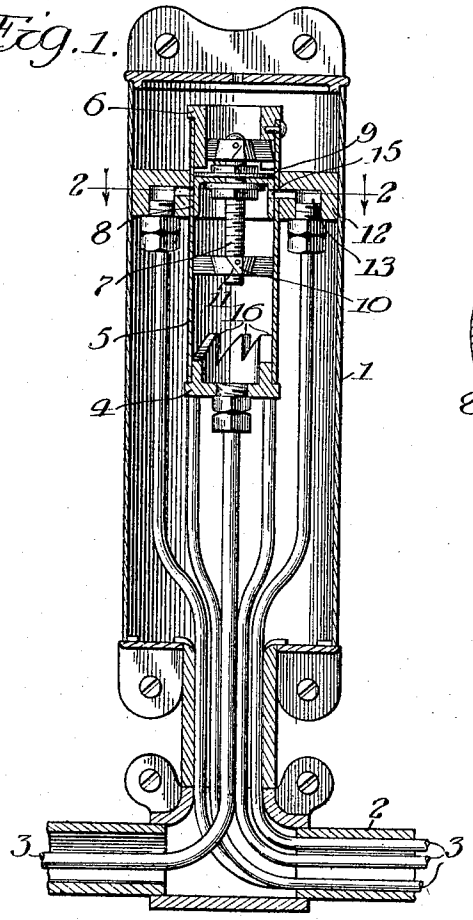


Fig. 2.

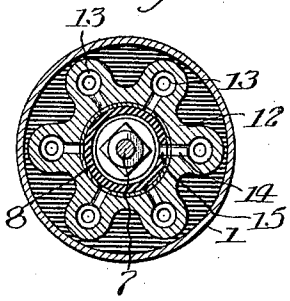


Fig. 3.

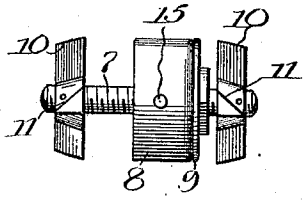


Fig. 4.

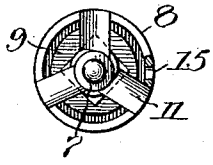
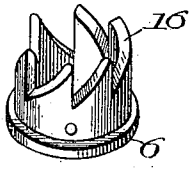


Fig. 5.



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ROTARY VALVE.

1,326,046. Specification of Letters Patent. **Patented Dec. 23, 1919.**

Original application filed December 1, 1911, Serial No. 663,322. Divided and this application filed May 15, 1912, Serial No. 697,553. Renewed July 11, 1918. Serial No. 244,488.

To all whom it may concern:

Be it known that I, JULIAN G. GOODHUE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rotary Valves, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improvement in rotary valves, this application being a division of my copending application No. 663,322 for disinfecting apparatus and the like, filed December 1, 1911. That part of my invention described and claimed herein has as its principal object the provision of automatic means whereby one pipe may be connected with any one of a plurality of other pipes.

A further object of my invention resides in the particular arrangement and combination of parts hereinafter described.

In the accompanying drawings Figure 1 is a vertical central section of my improved valve device;

Fig. 2 is a horizontal cross section on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Figs. 3, 4 and 5 are detail views of portions of my device.

Referring more particularly to the drawings, 1 is a cylindrical casing surrounding the valve device proper which may or may not be used as desired. The casing 1 is shown as attached to a wall by suitable screws and provided at its lower end with fittings connecting with conduits such as 2—2. In the conduits 2—2 are pipes 3—3 which connect directly with my valve device. One of these pipes, which I will call the inlet pipe, enters the lower end of the valve casing through the center of a casting such as 4. Above the casting 4 is a cylinder 5, at the upper end of which is a second casting 6. Certain details of castings 4 and 6 are similar, but the upper casting 6 is open at the top for purpose to be mentioned later. Within the cylinder 5 is a valve structure shown in detail in Fig. 3 comprising a central bolt 7 which carries intermediate of its ends a cup leather 8, the cup leather 8 being clamped between suitable nuts such as 9—9. At the ends of the bolts 7 are nuts or hubs provided with a plurality of projecting arms such as 10. Each of these arms 10 is provided with an inclined face 11. Surrounding the valve cylinder 5 is a casting 12, which is provided with a plurality of openings 13 in its lower face for connection with the pipes 3—3. This casting is also provided with a series of horizontal passages such as 14 connecting said openings with apertures in the casing 5. As is clearly illustrated in Fig. 1, the cup leather 8 is provided with an aperture 15 by which the interior of the casing 5 may be connected with the passages 14 through the apertures in the casing and thence with the pipes 3. As plainly shown in Figs. 1 and 5 the castings 4 and 6 are provided with indentations or serrations 16 along their inner edges.

In the operation of my device it is expected that the inlet pipe will be connected to a source of fluid pressure capable of producing alternate periods of pressure and vacuum or pulsations of pressure. In my original application, of which this is a division, the inlet pipe is shown as connected with a door check, but it is obvious that the principal source of pressure or pulsation is immaterial.

Referring now to Fig. 1, the valve member is shown at the upper end of the casing 5. If now the pressure in the lower part of the casing falls below atmospheric, the valve will be forced down so that the inclined faces 11 of the arms 10 will strike against the inclined surfaces of the indentations 16 on the member 4. The valve member will consequently be rotated to some extent. If now the partial vacuum of the valve casing is succeeded by a pressure impulse coming from the inlet pipe the valve member will be forced to the top of the casing again, whereupon the upper arms 10 will engage in the indentations on the member 6 to further rotate the valve. By suitably designing the members 4 and 6 one complete reciprocation of the valve will serve to turn the aperture 15 from its position in register with one of the passages 14 to register with the next succeeding one. It will be understood, and is apparent by inspection of Figs. 1 and 5 that members 4 and 6 have the inclined faces of their respective indentations oppositely inclined

when looked at from the same direction. Consequently when the members 4 and 6 are placed opposite to each other, the impulses given the bolt are in the same direction. As appears in Fig. 3 the inclination of the faces 11 on the arms at the opposite ends of the bolt 7 is in the opposite direction when viewed from the side of the bolt 7 in order to properly coöperate with the indentations on the members 4 and 6. By the means described and in response to the pulsations mentioned the port 15 will be connected with each of the passages 14 in turn.

As is well known the door check produces alternate periods of pressure and partial vacuum. Consequently I have shown my device as operated by atmospheric pressure on the down stroke. This is not essential, however, since the down stroke might be accomplished by means of a spring or weight, the device thus being adapted for use in connection with systems in which the pressure would never fall below atmospheric, but would merely have periods of alternately high and low pressure.

It will be obvious also that while I have shown and described herein a rotating valve having only one port therein surrounded by a casting having six corresponding passages any convenient number of ports may be used in the valve to coöperate with a suitable number of passages in the surrounding casting. Certain other possible combinations of ports and passages are shown and described in my original application.

Having thus described my invention, what I claim is:

1. An automatic valve comprising in combination, a cylindrical casing provided with an inlet and a plurality of outlets, a head carried in said casing having a flange projecting within the casing, said flange being provided with notches, a valve carried in said casing having a port for specifically connecting said inlet with each of said outlets, and arms carried by said valve having beveled faces for contacting with the walls of said notches.

2. An automatic valve comprising in combination, a cylindrical casing provided with an inlet and a plurality of outlets, a head for said casing provided with notches having inclined faces, a rotary reciprocating valve mounted in said casing, said valve comprising a longitudinal member, a cup leather mounted on said member and provided with a port for connecting said inlet with each of said outlets in turn, and arms carried on said longitudinal member having beveled faces for coöperating with the inclined faces of said notches.

3. An automatic valve comprising in combination, a cylindrical casing having an inlet and a plurality of outlets, heads for said casing having projections provided with beveled faces extending into said casing, a rotary reciprocating valve mounted within said casing comprising a longitudinal member to which is attached a cup leather provided with a port for connecting said inlet with each of said outlets in turn, arms carried at each end of said longitudinal member and having beveled faces adapted to coöperate with the beveled faces of said heads, the projections on one of said heads acting to turn said valve a part of the angular distance between one outlet and the next, and the projections on the opposite one of said heads serving to hold said valve in position so that said port shall register with one of said outlets.

4. An automatic valve provided with an inlet and a plurality of outlets, said valve comprising a member operable by variations in pressure of the fluid governed by said valve for placing said inlet in connection with each of said outlets in turn.

5. A valve provided with an inlet and a plurality of outlets and comprising means whereby changes in pressure in the fluid controlled by the valve operate to connect said inlet with each of said outlets in succession.

6. The combination of a valve chamber having a plurality of outlets, a valve working within said chamber and having a port adapted to come into communication with said outlets, said valve having two movements, one of which will bring said valve into position to register with said outlets and the other of which will enable the port in said valve to come into communication with said outlets one after another.

7. The combination of a cylindric valve chamber having an annular series of side apertures, a valve arranged for longitudinal and rotary movement within said cylinder and having a port adapted to come into register with said apertures, whereby the longitudinal movement of said valve will bring the port thereof into and out of position to register with said apertures and the rotary movement of said valve will bring said port into register with different apertures.

8. The combination of a valve chamber having a plurality of ports, a valve arranged within said chamber and having a port adapted to come into communication with said chamber ports, means whereby fluid pressure will move said valve so as to bring it into and out of position to communicate with said ports, and means whereby said movement of said valve will cause the port thereof to come into position to register with different chamber ports.

9. The combination of a vertically disposed cylindric valve casing having side openings, a valve having a port, and arranged for longitudinal and rotary move-

ment within said casing, a fluid inlet near the lower end of said valve casing whereby said valve may be raised and lowered by fluid pressure, and means whereby said raising and lowering of said valve will cause a rotation thereof to bring the port of said valve into communication with different ports in said valve casing.

10. The combination of a vertically arranged valve casing, a fluid actuated valve arranged for vertical and rotary movement in said casing, a fluid inlet near the lower end of said casing and means whereby longitudinal movement of said valve in said casing will rotate the same, said casing and valve having ports to be brought into and out of register by the movement of said valve.

11. The combination of a cylindric valve casing having circumferentially arranged side ports, a valve arranged for reciprocation and rotary movemnt within said casing and having a port adapted to coöperate with said casing ports, a series of pipes connected with said casing so as to communicate with the various side ports thereof, and a fluid inlet near the lower end of said casing.

12. The combination with a vertically arranged cylindric valve casing having side ports near its upper end, of a valve arranged for vertical and rotary movements within said valve casing, said valve having a side port adapted to coöperate with the side ports in said cylindric casing, a fluid inlet near the lower end of said valve casing, and means whereby the vertical reciprocation of said valve turns the same to cause the port thereof to come into position to coöperate with different ports in said casing.

13. The combination with a cylindric valve casing having side ports, of a valve arranged for longitudinal and rotary motion within said casing, and having a port arranged to coöperate with the ports in said casing, of a series of pipes connected with said valve casing for communication with the ports thereof, another pipe connected with the lower end of said valve casing, and an outer casing inclosing said valve casing and the ends of said pipes associated therewith.

14. The combination of a vertically arranged valve casing, a valve arranged for vertical and rotary motion within said valve casing, a fluid pipe communicating with said valve casing near one end thereof, and ports in said valve casing adapted to be opened by the longitudinal movement of said valve, said ports being arranged to be opened when the valve is at or near the upper end of its stroke.

15. The combination with a vertically arranged valve casing of a valve arranged for longitudinal and rotary movement therein, a fluid pipe communicating with said valve casing near one end thereof, means whereby the longitudinal movement of said valve causes a turning movement also thereof, said casing having a plurality of ports arranged to be opened successively by said valve when the same is at or near one end of its stroke.

16. The combination with a vertically arranged valve casing, of a valve arranged for longitudinal and rotary movement therein, a fluid pipe communicating with said valve casing near the lower end thereof, means whereby the longitudinal movement of said valve causes a turning movement also thereof, said casing having a plurality of ports arranged to be opened successively by said valve when the same is at or near the upper end of its stroke.

17. The combination of a valve chamber, provided with a plurality of side ports, a valve in said chamber having a port adapted to coöperate with said valve chamber ports, said valve being arranged for both longitudinal and rotary movement within said chamber, said valve chamber having an inlet aperture for fluid supply and said valve port being arranged to communicate with said inlet so as to distribute the fluid entering through the same to the side ports of said cylinder.

18. The combination of a valve chamber having a plurality of outlet ports, a fluid actuated valve in said chamber having a port adapted to communicate with said valve chamber ports, means for moving said valve so as to bring its port into communication with different valve chamber ports, and a fluid inlet communicating with the interior of said valve chamber and with said valve port whereby fluid from said inlet may be distributed by said valve through said valve chamber outlet ports.

19. The combination of a valve casing having a plurality of side ports, a fluid actuated valve arranged to work in said casing and fitting against the inner surface thereof, said valve having a port arranged to register with one or another of the ports in said casing, and a fluid inlet opening into the interior of said casing, the port in said valve communicating with the portion of the interior of the valve casing with which said fluid inlet communicates.

20. The combination of a valve chamber having a plurality of outlet ports, and a fluid actuated valve having a longitudinal and rotatable movement and a port constructed for connection with each of said plurality of outlet ports in said chamber.

21. The combination of a valve chamber having a plurality of outlet ports and being open at an end, a fluid inlet provided in said chamber, and a valve operable longitudinally of said chamber and having a port constructed to be operably connected to the

ports in said chamber, said valve being actuated along said chamber by fluid entering therein.

22. The combination of a valve chamber, a valve mounted for longitudinal and rotatable movement therein, the chamber and valve each being provided with ports constructed to be operably connected together, a fluid inlet provided in said chamber, and said fluid actuating said valve along said chamber and means provided at each end of said chamber for rotating said valve.

In witness whereof I hereunto subscribe my name this 18th day of April, A. D. 1912.

JULIAN G. GOODHUE.

Witnesses:

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A. MILLER BELFIELD.