

937,088.

Patented Oct. 19, 1909.

FIG. 1

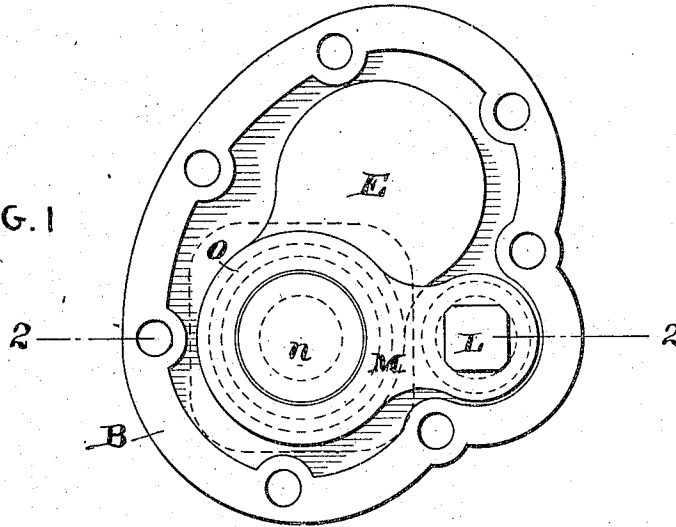


FIG. 2

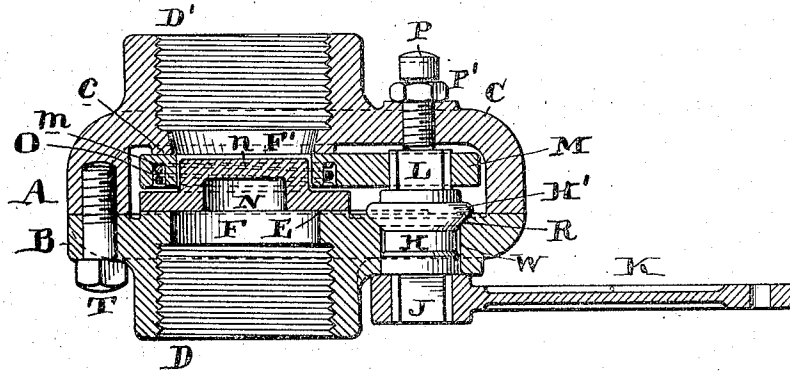
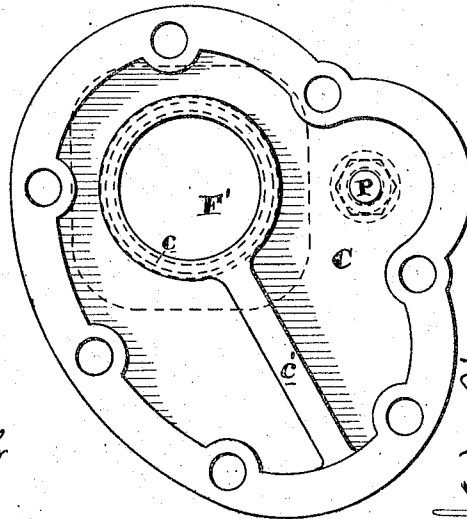


FIG. 3



Witnesses

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UNITED STATES PATENT OFFICE.

FRANKLIN M. PATTERSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO PATTERSON-ALLEN ENGINEERING COMPANY, A CORPORATION OF NEW YORK.

VALVE.

937,088.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed July 30, 1907. Serial No. 386,199.

To all whom it may concern:

Be it known that I, FRANKLIN M. PATTERSON, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Valves, of which the following is a specification.

My invention has reference to valves and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof:—

The object of my invention is to provide a simple and efficient construction of valve which shall maintain itself in perfect operative condition by the normal operation of the valve in its commercial application.

The preferred form of my invention consists of a casing having a through passage-way with which the induction and eduction pipes are connected and provided with a valve-seat and lateral extension thereof, combined with a valve adapted to a sliding cooperation with the seat, a pivoted arm for moving the valve, a spindle for operating the arm extending through the casing and forming therewith a water tight joint, a set screw for holding the spindle in place, means for guiding the pivoted arm, and a spring between the pivoted arm and valve whereby the valve is adapted to take up the wear automatically.

My invention also comprehends other features of construction which, together with those above specified, will be better understood by reference to the drawings, in which:—

Figure 1 is an elevation of my improved valve with one-half of the casing removed, showing the interior construction; Fig. 2 is a cross section of the valve on line 2—2 of Fig. 1; and Fig. 3 is an inverted plan view of a portion of the valve-casing.

B and C are two parts constituting the casing A, and these are secured together by means of screws T or in any other suitable manner. The general outline of the valve, especially in the large sizes, is preferably kidney-shaped. The part B consists essentially of a plate having the transverse eduction port F opening through a valve-seat E slightly raised above the inner surface of the plate. The eduction port F communicates with a tubular boss D which is pref-

erably screw-threaded for the reception of a pipe. The valve-seat E, being of cast metal, will wear uniformly under the action of the valve N and may be leveled when desired by a file or otherwise when it becomes worn. The inlet and eduction ports are preferably located to one side of the center of the casing, so that the valve-seat E may extend laterally to one side of the eduction port as indicated in Fig. 1 to permit the valve N to be moved laterally away from the port in opening it and yet at all times to support the said valve N in a proper manner.

The aperture W in the part D, through which a spindle H extends and which it snugly fits, is to one side of the valve-seat, the said spindle being adapted, through means to be described, to slide the valve over the valve-seat. The outer end of the spindle H is formed with a polygonal head J adapted to receive the socket portion of a hand wrench or lever K, and by which the spindle may be rocked in opening or closing the valve. The inner part of the spindle is provided with a conical flange H' and above the flange with the polygonal portion L. The conical flange H' rests in contact with an inner bearing R on the plate B surrounding the spindle and with which it makes a liquid-tight ground joint. A set screw P extends through the body of the part C of the casing and presses upon the end of the spindle H to hold its conical flange H' tightly upon its seat R. A lock-nut P' may lock the set screw when adjusted.

Fitting over the polygonal end L of the spindle H, is an arm M adapted to be moved over the valve-seat E. The free end of this arm M is provided with a large aperture which may be brought into alinement with the induction and eduction ports, as shown in Fig. 2. The valve N has a flat surface which rests upon the valve-seat E, and has an upwardly directed cylindrical hub n which loosely fits the aperture in the free end of the arm M. A coil spring O is interposed between the arm M and the valve N and shielded within an annular recess m in the arm, so that at all times there is a downward pressure from the arm M upon the valve N to cause it to snugly fit to its seat.

The bonnet or part C of the casing forms an inclosing cap over the valve mechanism, and is also provided with the induction port F' and screw-threaded aperture D' for the pipe, by which the medium to be controlled is permitted to pass to the valve. This induction port F' is preferably tapered to a slight extent to cause the water and matter in suspension to converge in passing through the eduction port F, and in this way avoid undue wear upon the valve-seat adjacent to the eduction port. The induction port F' is surrounded by a bearing *c* with a lateral extension *c'* against which the arm M travels and by which it is guided.

With the parts in the position shown in the drawings, the water or other medium entering the induction port F', under pressure, acts upon the exposed surface of the valve N and forces it firmly to its seat E and at the same time operates upon the inner exposed surface of the parts L and H' of the spindle H to force its conical flange H' tightly down upon the bearing surface R. When the wrench or handle portion K is rocked, the spindle H is also rocked, and this swings the arm M which carries the valve N with it. By causing the valve to travel laterally to the solid part of the valve-seat E, the valve-port F is opened and presents a through passageway with all the advantages of a gate valve. When the valve opens the eduction port, the pressure upon it becomes greatly reduced, and excessive friction upon the valve-seat E becomes eliminated. The arm M is at all times spring-pressed against the bearings *c* and *c'*, whereby it not only operates as a means to shift the valve N and spring O, but also as a means constituting an abutment against which the spring O presses to hold the valve N down to its seat. When the medium being controlled is under pressure, the spring O is not necessary to insure the liquid tight joint between the valve and its seat, but when there is no pressure or no material pressure within the bonnet, the spring then performs its function of making a water tight joint to prevent leakage. This would be particularly evident when employing my improved valve as a blow-off valve for a steam boiler, in which there would be no material pressure on the valve when there was no steam pressure.

It will be seen from this construction of valve that there is no stuffing-box necessary for the spindle H; and there are no set screws required for adjusting the arm M, and consequently no excessive pressure will come upon the valve N should the seat E become worn on a slight incline, due to the fact that there is more pressure upon the valve when over the eduction port at the time of opening than there is upon the valve when moved laterally with respect to said eduction port. The liquid tight joints are

maintained without excessive wear upon the parts constituting the joints, and no special care is required on the part of the engineer in the practical employment or adjustment of the valve in use.

The valve-seat E is preferably of no greater width than the diameter of the valve N, so that every portion of it is traversed by the said valve N in opening and closing the valve. In this manner, the wear on the valve and on the valve-seat will become uniform, and consequently the valve as a whole will remain in operative condition for a long period. When it is desired to level the valve-seat E or valve N should they become worn, it is only necessary to separate the parts B and C of the casing A and to remove the valve N and smooth it with a file or upon any other flat surface, and also to smooth the flat surface constituting the valve-seat E with a smooth-cut flat file. It is therefore evident that the valve may be repaired when necessary without removing it from the place of use, and obviating the necessity of all expensive machine work, or delays in repairing incident to shipping of the valve to and from a repair shop.

While I prefer the construction shown as being excellently adapted for the purposes of my invention, the details may be modified without departing from the spirit of the invention.

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

1. In a valve, the combination of a case having induction and eduction ports in line, a valve-seat surrounding the eduction port, and a guide adjacent to the induction port and parallel to the valve seat, with a spindle extending through the case to one side of the ports in a line at right angles to the plane of the valve seat and guide and having a conical collar forming a ground joint with the inner surface of the case, a valve-operating arm mechanically connected with the spindle so as to rock with it but adjustable upon the spindle in the direction of its axis and guided continually by the guide, a valve loosely connected to the free end of the valve-operating arm, and a spring surrounding the valve and between it and the arm whereby the valve is pressed upon its seat and the arm is forced against the guide adjacent to the induction port.

2. In a valve, the combination of a case having induction and eduction ports in line, a valve-seat surrounding the eduction port, and a guide adjacent to the induction port, with a spindle extending through the case to one side of the ports and having a conical collar forming a ground joint with the inner surface of the case, a valve-operating arm mechanically connected with the spindle so as to rock with it but adjustable upon the

spindle in the direction of its axis and having its free end provided with an aperture and an annular groove surrounding the aperture, a valve having a stem fitting the aperture so as to be loosely connected to the free end of the valve-operating arm, and a spring surrounding the valve-stem and arranged in the annular groove and between the valve and the arm whereby the valve is pressed upon its seat and the arm is forced against the guide adjacent to the induction port.

3. In a valve, the combination of a case having induction and eduction ports in line, a valve-seat surrounding the eduction port, and a guide adjacent to the induction port and parallel to the valve seat, with a spindle extending through the case to one side of the ports and having a conical collar forming a ground joint continuously with the inner surface of the case, a pivoted valve-operating arm mechanically connected with the spindle so as to be rocked with it but adjustable upon the spindle in the direction of its axis and independent of the valve, a valve loosely connected to the free end of the valve-operating arm, a spring surrounding the valve and between it and the arm whereby the valve is continuously pressed upon its seat and the arm is continuously forced against the guide adjacent to the induction port, and a set screw secured to the case and pressing upon the valve-operating arm to force its conical collar against its bearing to make the joint liquid tight.

4. In a valve, the combination of the case having induction and eduction ports in line and a valve-seat surrounding the eduction port, a valve adapted to slide laterally over the said seat, a spindle having a collar and journaled in the case to one side of the ports with the collar seated upon the inside of the case, a valve-operating arm loosely connected with the spindle so as to be rocked with it and adjustable in the direction of the axis of the spindle and relatively to the valve, and a set screw secured to the case and pressing upon the spindle alone for pressing its collar against its bearing in the case to make a tight joint and take up wear without affecting the valve operating arm.

5. In a valve, the combination of the case having induction and eduction ports in line, a valve-seat around the eduction port, and a guide surface adjacent to the induction port and parallel to the valve seat, a valve for the valve-seat, a spindle journaled in the case to one side of the ports and making a ground joint therewith and rotatable about an axis at right angles to the plane of the valve seat, a valve-operating arm for moving the valve connected with the spindle and continuously guided by the guide adjacent to the induction port, and means carried by the case for forcing the spindle upon its seat in the case.

6. In a valve, the combination of the case

having induction and eduction ports in line, a valve-seat around the eduction port, and a guide adjacent to the induction port parallel to the valve seat, a valve for the valve-seat, a spindle journaled in the case to one side of the ports in a line at right angles to the valve seat and making a ground joint therewith, a valve-operating arm for moving the valve connected with the spindle and continuously guided by the guide adjacent to the induction port, a spring carried by the arm for pressing it against the guide adjacent to the induction port and the valve against the valve-seat around the eduction port, and means carried by the case independent of the valve for forcing the spindle upon its seat in the case.

7. In a valve, the combination of the case having parallel induction and eduction ports and a fixed cylindrical spindle bearing provided with an integral conical seat upon the inside of the case, a spindle extending through the cylindrical bearing in the side of the case and having an annular conical bearing surface adapted to the conical seat of the case, an arm loosely connected with the spindle and guided by the case, and a spring actuated valve operatively connected with the arm to control the eduction port.

8. In a valve, the combination of the case having induction and eduction ports and a fixed cylindrical spindle bearing provided with an integral conical seat, a spindle extending through a cylindrical bearing in the side of the case and having an annular conical bearing surface adapted to the conical seat of the case, an arm loosely connected with the spindle and guided by the case, a valve operatively connected with the arm to control the eduction port, and a set screw in the case for pressing the annular conical bearing of the spindle upon the conical seat in the case without affecting the valve.

9. In a valve, the combination of a case with means for operating the valve consisting of a rocking spindle, an arm rocked by the spindle and movable relatively to the spindle in the direction of its axis, a valve loosely sustained in the free end of the arm, a spring between the arm and valve, and a guiding means upon the inside of the case for guiding the arm and taking the thrust of the spring, the several parts being inclosed within the case so as to be supported and guided between the two walls thereof.

10. In a valve, the combination of the casing having induction and eduction ports, a valve-seat and a guide parallel to the valve seat, with a rocking arm guided against the guide of the case, a valve guided against the valve-seat and moved by the rocking arm, spring devices for pressing the rocking arm against the case and away from the valve-seat, a rocking spindle extending through the case for operating the rocking arm, and

means independent of the rocking arm for holding the spindle in liquid tight operative position.

11. In a valve, the combination of the case having induction and eduction ports a fixed guide and a valve-seat opposite the fixed guide, a valve for the valve-seat, a rocking arm having a loose connection with the valve and guided against a fixed guide in the case, a spring carried with the rocking arm for pressing the valve upon its seat, and a spindle for rocking the rocking arm journaled in the case and positively held against longitudinal movement therein.

12. In a valve, the combination of a case having induction and eduction ports and a flat valve-seat for the eduction port and extending laterally therefrom and also a guide around and extending laterally with respect to the induction port, a valve having a flat surface arranged to slide over and in continuous contact with the valve-seat, a constantly acting spring to press the valve upon its valve-seat, and pivoted means interposed between the spring and the guide for simultaneously moving the valve and spring in an arc.

13. In a valve, the casing having induction and eduction ports in line and in which the induction port is slightly conical and terminating in an orifice of less area than the smallest area of the eduction port to cause the liquid to converge in passing

through the eduction port, a valve for the eduction port, and means for shifting the valve laterally.

14. A valve comprising a sectional casing with inlet and outlet openings and a journal opening embodying a beveled ground seat, a journal fitted in said opening in the casing and provided with a beveled shoulder which bears against the ground seat, means whereby said journal may be turned, a valve carrying arm on said journal, a self-adjusting valve carried by said arm and movable in a plane at right angles to a line passing through the inlet and outlet openings and a tension screw bearing terminally against the inner end of the journal and acting with a pushing force to press the beveled shoulder of the journal against the ground seat therefor in the casing.

15. In a valve, the casing having induction and eduction ports in line and in which the induction port terminates in an orifice of less area than the smallest area of the eduction port to cause the liquid to converge in passing through the eduction port, a valve for the eduction port, and means for shifting the valve laterally.

In testimony of which invention, I have hereunto set my hand.

FRANKLIN M. PATTERSON.

Witnesses:

R. M. HUNTER,

R. M. KELLY.