No. 801,424. PATENTED OCT. 10, 1905.

M. WARREN.

VALVE.

APPLICATION FILED NOV. 11, 1904.

Fig. 1.

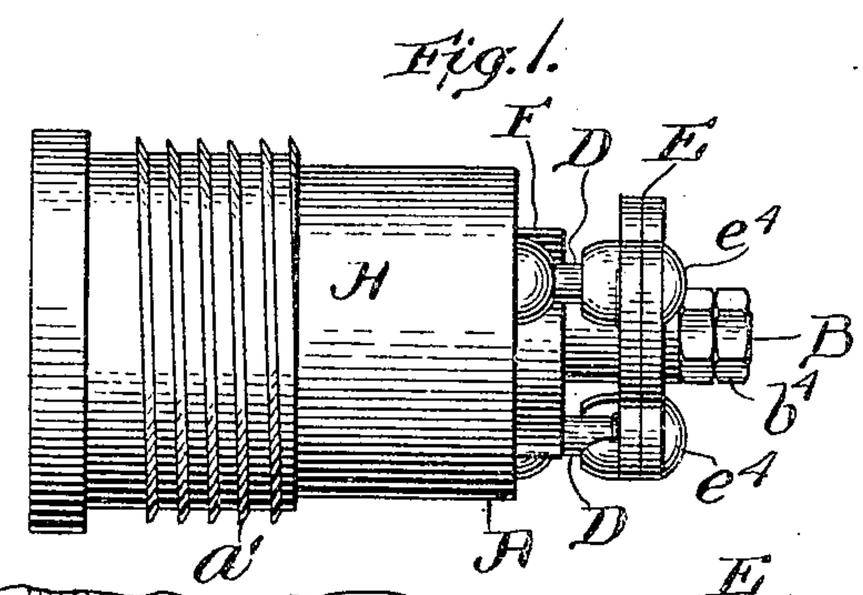
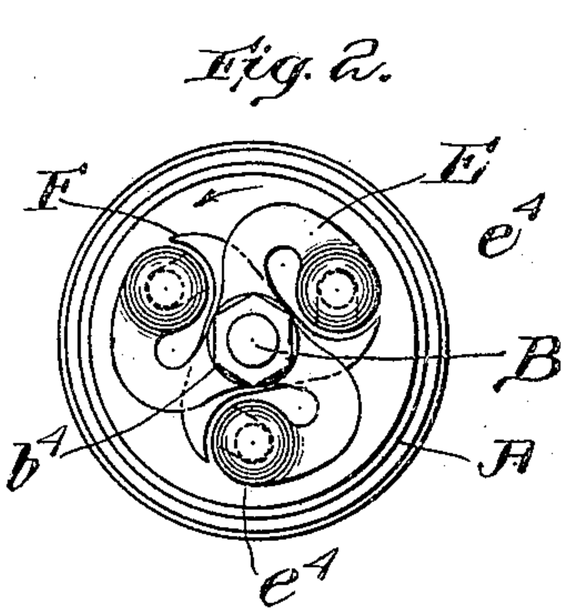


Fig. 2.



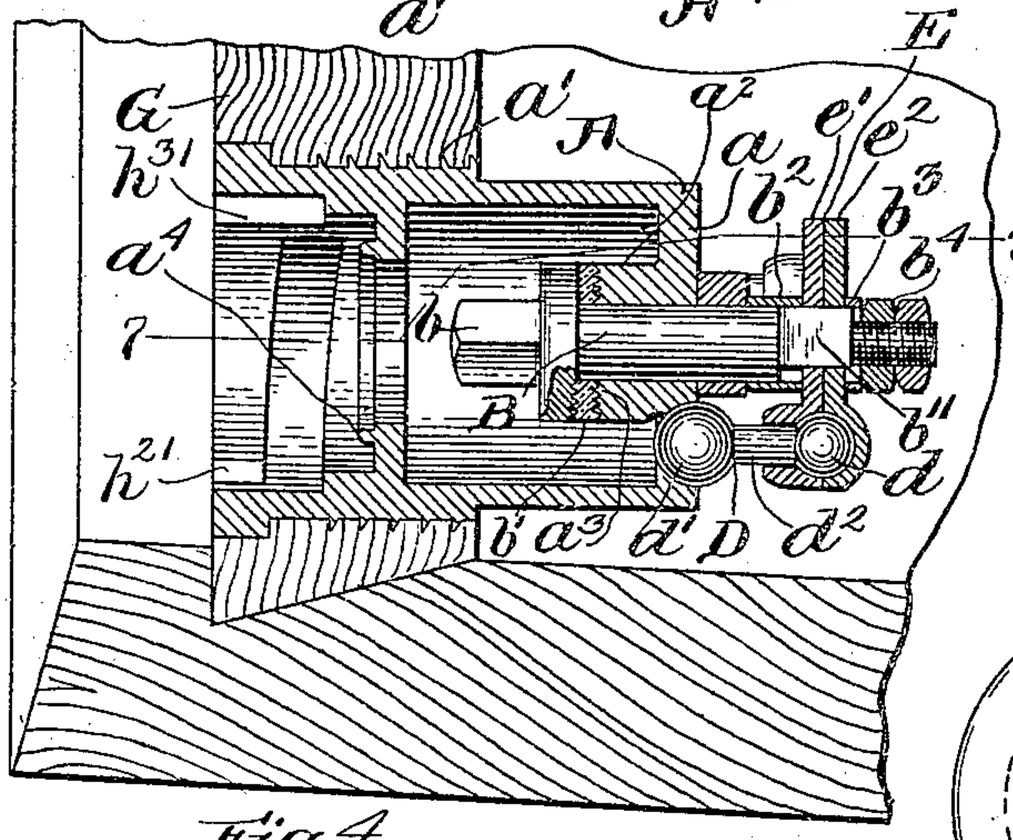


Fig. 4.

Fig. 6.

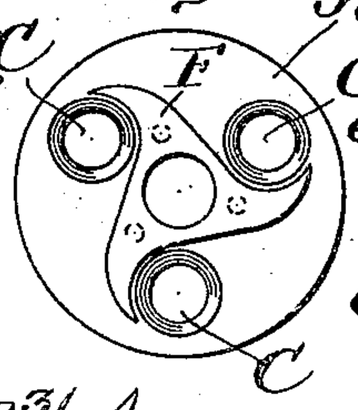
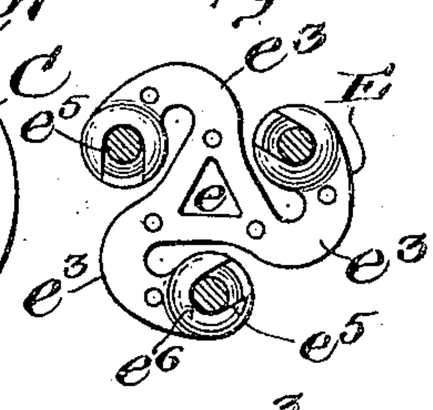


Fig. 5.



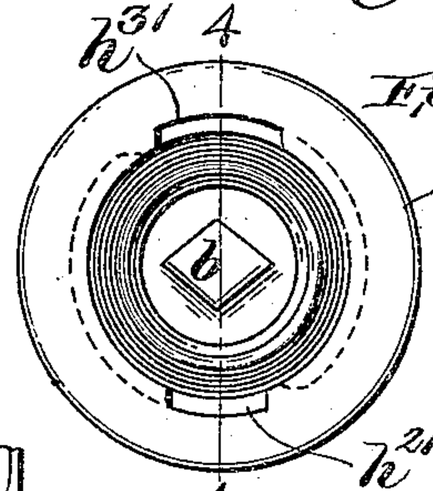


Fig. 3.

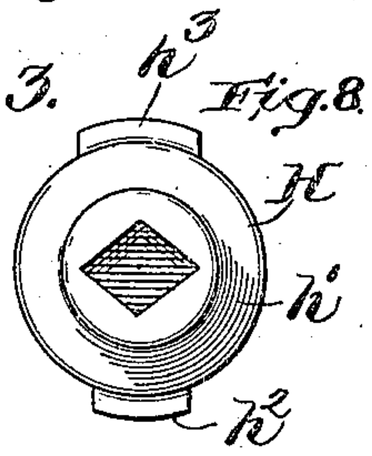
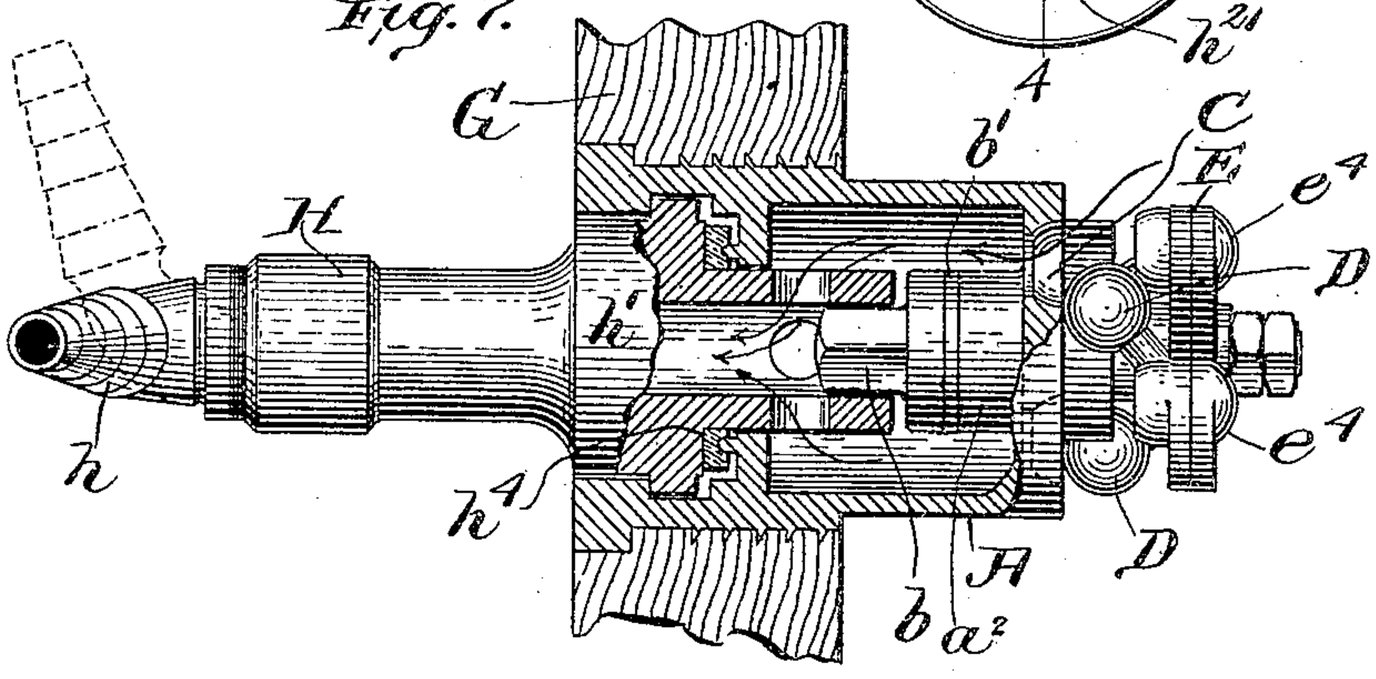


Fig. 8.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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VALVE.

No. 801,424. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed November 11, 1904. Serial No. 232,320.

To all whom it may concern:

Be it known that I, MARION WARREN, a citizen of the United States, and a resident of Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Valves, of which the following is specification.

As is well known, kegs, casks, and the like, such as are used by brewers of ale and beer, are made with a tap-hole in the head and stave, through which the package may be filled by the brewer and through which its contents are drawn off by the consumer. It has been customary to fix a valve in the tap-hole which could be used by the brewer in filling the package and by the consumer to control the discharge of the contents of the package. Ordinarily this valve has been made up of a body exteriorly threaded and screwed into the tap-hole, a rotary slide-valve at the inner end of the body and within the package, and a stem extending from the valve through the valve-body to the exterior of the package, the outer end of which stem was adapted to be engaged by a detachable faucet-wrench, through turning which the stem could be rotated and the valve opened. Such valves have, however, been found not entirely satisfactory, first, because, as it is necessary before use to coat the whole of the interior of the package with pitch, this pitch lodges and hardens upon the relatively movable parts of the valve and often cements the same together so firmly that the stem is broken in attempting to operate the valve, and, second, because as heretofore constructed valves of this class in time became leaky, no adequate provision being usually provided to compensate for wear of the valve and its seat, and because the slide-valves as heretofore made were easily scored and otherwise affected by particles of pitch or other particles lodging between the valve-surfaces, and as the valve must be gas-tight to be practically efficient this was a serious objection.

My invention has for its object to provide an improved valve, and I have shown it as applied for use with brewer's kegs, casks, or the like; but, as will be clear, its use is not necessarily so limited.

In the accompanying drawings, Figure 1 is a side elevation of my improved valve closed. Fig. 2 is an elevation of the inner end of the valve shown in Fig. 1. Fig. 3 is an elevation of the outer end of the valve shown in Fig. 1. Fig. 4 is a section on line 4 4 of Fig. 3, but showing the valve mounted in the head of a cask. Fig. 5 shows separately the yielding valve-carrier hereinafter described. Fig. 6 is a view of the inner end of the valve-body, showing the deflector, herein after described, which guides the free ends of the valve-plugs onto their seats. Fig. 7 is a section on line 7 7 of Fig. 4, but showing the valve in its open position and showing also a faucet-wrench of usual construction by which valves of this class are operated. Fig. 8 is a view of the socket end of the faucet-wrench shown in Fig. 7.

In the best form of my invention now known to me the valve-body is a hollow shell, exteriorly threaded, as usual, and closed at its inner end by a wall through which extends the valve-stem. As herein shown, three ports are provided through this end wall, spaced around the valve-stem, and the inner end of the valve-stem—*i. e.*, that end of the stem which is within the package when the valve is in use—projects beyond the end wall and is provided with a yielding carrier, to which are pivotally connected the ends of three valve-plugs, so that when the stem is turned the plugs are carried around the axis of said stem toward or from their seats at the inner ends of the ports, said seats being adapted to receive and fit the free ends of the plugs, which are preferably spherical.

Having reference to the drawings, which represent the preferred form of my new valve, A represents the body of my improved valve; B, the rotatable valve-stem journaled in the inner end wall *a* of said body; C, the ports through the body; D, the toggle-like valve-plugs; E, the spring valve-carrier through which the valve-plugs D are connected with stem B, and F the deflector described later.

The body A is a hollow shell exteriorly threaded, as at *a'*, to adapt it to be screwed into the usual opening provided in the head and stave of the cask G. The inner end wall *a* of this body A is made with a central boss a^2, in which the stem B is journaled, and the face of boss a^2 is made with sharp annular serrations a^3. Corresponding serrations are formed upon the face of the head *b*, and between these two faces a washer *b'*, of soft metal, is carried, in which the serrations are embedded so as to form a gas-tight joint.

Stem B near its inner end is made for a part of its length triangular in cross-section, as at b'' in Fig. 4, to receive upon it the valve-carrier E, which has a correspondingly-shaped opening e near its middle. To the end wall a is fixed the deflector F, and between deflector F and carrier E is a sleeve b^2, and between sleeve b^2 and a second sleeve b^3 carrier E is held by two nuts b^4, mounted upon the threaded inner end of stem B.

The carrier E is made from two spider-like plates e' and e^2, each complementary to the other, and these two plates are riveted or otherwise fastened together. These plates when placed together provide three curved spring-arms e^3, terminating at their outer ends in spherical sockets e^4, which inclose balls d, formed on the ends of plug D.

Each plug D is preferably made from a single piece of metal and comprises, besides its ball d, a valve member d', having, preferably, a valve-face slightly more than hemispherical in form, this valve member d' being connected with ball d by a shank d^2, extending from valve d' to ball d through one of the slots e^5, provided in plate e' of carrier E, each of said slots opening into one of the sockets e^4. These slots e^5 are arranged tangentially with respect to the axis of stem B, so that when the latter is turned in the direction indicated by the arrow in Fig. 2 the plugs D are first rocked sidewise on valves d' and balls d and then carried bodily into the position shown in Fig. 7, with valves d' entirely clear of the ports C—that is to say, when the valve is being opened the first part of the rotary movement of stem B merely rocks each plug on its ball d and valve d', and the rest of the movement of the stem carries the plug bodily away from its port C. It is therefore true that in the preferred form of my valve each plug D constitutes one member of a toggle, the other member of which is its spring-arm e^3, and therefore great power can be applied to the valve-plugs while being seated or starting to open by the rocking or twisting motion imparted to them before they are moved bodily. This great power can be applied with the utmost ease, since the toggle action enormously multiplies the actuating power, and this is of importance, since it seats the valve so closely that no foreign substance can remain between the valve and its seat, and the valve and its seat, although of hardened metal, wear and renew an absolute fit between the valves and seats, the motion of the valves presenting continuously new surfaces in opposition to the seat. Also the initial part of the opening movement of each valve acts to break up the hardened pitch before the valve is moved bodily, thereby obviating the objectionable sticking and breakage of the valve-stem noted above. It will be apparent also that the leverage is so great at this initial part of the movement of the valves that but comparatively slight power is required to be applied to the stem to operate them, and the stem is therefore not in danger of breakage.

When the valve is to be closed, stem B is turned in a direction opposite to that indicated by the arrow in Fig. 2, and by this movement plugs D are first swung bodily around stem B until valves d' strike the deflector F, which guides them into the ports C onto their seats, and then the remainder of the rotary movement of the stem rocks each plug on its ball d and valve d' from a more or less inclined position into and slightly beyond the perpendicular position shown in Fig. 4. The arms e^3 are constructed so as to yield slightly as the plugs approach their fully-closed positions, which allows each valve to be seated independently of the others and makes it unnecessary to have all of the plugs of exactly the same length to a nicety, as would be required with a rigid carrier. I do not mean to say, however, that it is essential that the carrier be resilient, since a practical valve could be made without this feature, and, furthermore, the particular means shown for securing resiliency are not essential, as other ways of securing a yielding pressure on the plugs as they are closed will, from the construction described, occur to those skilled in this art and are intended to be included within the scope of my invention. Also it will be apparent that it is within the scope of my invention to depart from the relative arrangement between the valve-stem and the ports herein shown so long as the substance of what I have desribed is maintained.

The slots e^5 of the carrier E are closed at one end, as at e^6, and this end e^6, by engagement with the shank d^2 of its valve-plug D, serves as a stop to limit the closing movement of stem B and prevent the plug D passing beyond the position which it is to occupy when the valve is closed. By this means the tension on the arms e^3 when the valve is in its closed position is not exerted torsionally on the valve-stem, but axially or lengthwise, so that there is no tendency for the valve to open of itself, while at the same time washer b^2 is held snugly between the end of boss a^2 and and head b, and valves d' are held tightly against their seats.

It will now be clear that my improved valve comprises a body made with a port therethrough and a stem rotatably mounted in said body, to which is pivotally connected one end of a plug, whose opposite end is free and adapted to coöperate with the seat to control said port, said plug being rocked sidewise when shifted to and from said seat by the turning of the stem.

A feature of my device is the organization of parts and the shape thereof, so that the opening and closing of the valves cause the valve-surfaces to grind together as the valve is closed, and thus each valve fits and continu-

ally renews its seat by this grinding action, and the free and universal connection of the plug with the socket-carrier causes the valve to continually present fresh surfaces in opposition to the valve-seat.

Another feature of my invention consists in providing means to guide the free end of the plug onto its seat when it is being moved by the stem toward its closed position.

Another feature of my invention consists in the construction whereby the plug is yieldingly forced and held onto the valve-seat.

Another feature of my invention consists in providing a stop to limit the rotary valve-closing movement of the stem, so that when the plug is in its closed position it has been carried slightly beyond the perpendicular or "dead-center," so to speak, and there is therefore no torsional strain on the stem, which would tend to open the valve.

It is customary to operate valves of this class by a removal faucet-wrench, and herein I have shown such a faucet-wrench at H, Fig. 7, which is of ordinary construction—that is, it is made at one end with a spout h and at its other end with a socket h', which can be passed into body A to engage with head b of stem B. Socket h' is made with two wings or lugs h^2 and h^3, lug h^2 being narrower than lug h^3. The body A at its open outer end is made upon opposite sides of its interior with two cam-grooves h^{21} and h^{31}, into the open ends of which the lugs h^2 h^3, respectively, are passed in order to engage socket h' with the head b of stem B. The entrances to these two grooves are each of about the same width as its respective lug, and the purpose of this is to make it impossible for socket h' to be inserted in body A wrong side up, which would bring spout h in the wrong position when the faucet is turned to open the valve. When faucet H is turned to rotate stem B and open the valve, lugs h^2 and h^3 travel along these cam-grooves, which act to force the socket h' into body A against an interior seat a^4, so as to prevent leakage around the faucet and also to clamp the faucet in place. To make a tight joint at seat a^4, the socket h' is provided with a gasket h^4, of rubber or the like, into which said seat is embedded to some extent when faucet H is turned to open the valve.

What I claim is—

1. A valve, comprising a body made with a port therethrough; a stem mounted in said body; a plug held between the stem and body and having a toggle action when actuated by relative movement of the stem and body to control said port.

2. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body and a plug for controlling said port, pivotally connected at one end to said stem and actuated by said stem.

3. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body and a plug having a curved face, for controlling said port, pivotally connected at one end to said stem and actuated by said stem.

4. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body; a plug pivotally connected at one end to said stem and actuated by said stem and having a hemispherical valve-face to control said port, the port having a valve-seat of hollow hemispherical form corresponding to the valve-face.

5. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body; and a plug for controlling said port pivotally connected at one end to said stem, and means to guide the free end of the plug to its seat when shifted toward its closed position.

6. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body; a plug for controlling said port, pivotally connected at one end to said stem; and a stop to limit the closing movement of the stem so as to hold the plug member beyond the dead-center.

7. A valve, comprising a body made with a port therethrough; a stem rotatably mounted in said body; a yielding carrier fixed to said stem, and a plug for controlling said port pivotally connected at one end to said carrier.

8. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced; and a plurality of plugs for controlling said ports, each pivotally connected at one end to said stem.

9. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced; a yielding carrier fixed to said stem, and a plurality of plugs for controlling said ports, each pivotally connected at one end to said carrier.

10. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced; a yielding carrier fixed to said stem, and a plurality of plugs for controlling said ports, each pivotally connected at one end to said carrier, and a stop for limiting the closing movement of the stem so as to hold the plugs beyond the dead-center.

11. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided at one side of the body with a head and at the opposite side of said body with a yielding carrier; a plurality of valve-plugs between the carrier and body for controlling said ports each pivotally connected at one end to said carrier, and a stop for limiting the closing movement of the stem so as to hold the plug members beyond dead-centers, with the yielding carrier exerting endwise pressure

on the plug in one direction to hold the head thereof against the valve-seat.

12. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided with a plurality of spring-arms, and a plurality of plugs between said arms and the body for controlling said ports, each plug pivotally connected at one end to the extremity of one of said arms.

13. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided with a plurality of spring-arms, each made at its outer end with a socket; and a plurality of plugs between said arms and the body for controlling said ports, each plug made at one end with a ball pivotally mounted within the socket of one of the arms.

14. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided with a plurality of spring-arms, each made at its outer end with a socket; and a plurality of plugs between said arms and the body for controlling said ports, each plug made at one end with a ball pivotally mounted within the socket of one of the arms and at its opposite end with a hemispherical valve-face adapted to seat in its respective port.

15. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided with a plurality of spring-arms, each made at its outer end with a socket; and a plurality of plugs between said arms and the body for controlling said ports, each plug made at one end with a ball pivotally mounted within the socket of one of the arms and at its opposite end with a hemispherical valve-face adapted to seat in its respective port, and a deflector for guiding each valve into its port when the stem is turned to close the valve.

16. A valve, comprising a body having a plurality of ports therethrough; a rotatable stem extending through said body around which said ports are spaced, said stem being provided with a plurality of spring-arms, each made at its outer end with a socket; and a plurality of plugs between said arms and the body for controlling said ports, each plug made at one end with a ball pivotally mounted within the socket of one of the arms and at its other end with a hemispherical valve-face adapted to seat in its respective port; a deflector for guiding each valve into its port when the stem is turned to close the valve, and a stop to limit the closing movement of the plugs and hold them beyond dead-centers.

17. A valve, comprising a body having a port therethrough; a rotatable stem extending through said body; a slotted socket fast to the stem; a plug, one end of which is a ball pivotally mounted in the socket and with its stem traveling in the slot; all organized and arranged to cause the plug to be guided in a circular path to the valve-seat, by the action of the slot.

18. A valve, comprising a hollow body; a port connecting the hollow and the outer side of the body; a stem mounted in the body; a plug held between the stem and body and having a toggle action when actuated by relative movement of the stem and body to control said port.

19. A valve, comprising a hollow body; a port connecting the hollow and the outer side of the body; a carrier; a plug held between the carrier and the body and having a toggle action when actuated by relative movement of the carrier and body to control said port and means to relatively actuate the body and carrier.

Signed by me at Boston, Massachusetts, this 3d day of November, 1904.

MARION WARREN.

Witnesses:
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