

C. F. FERNALD.

VALVE.

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942,492.

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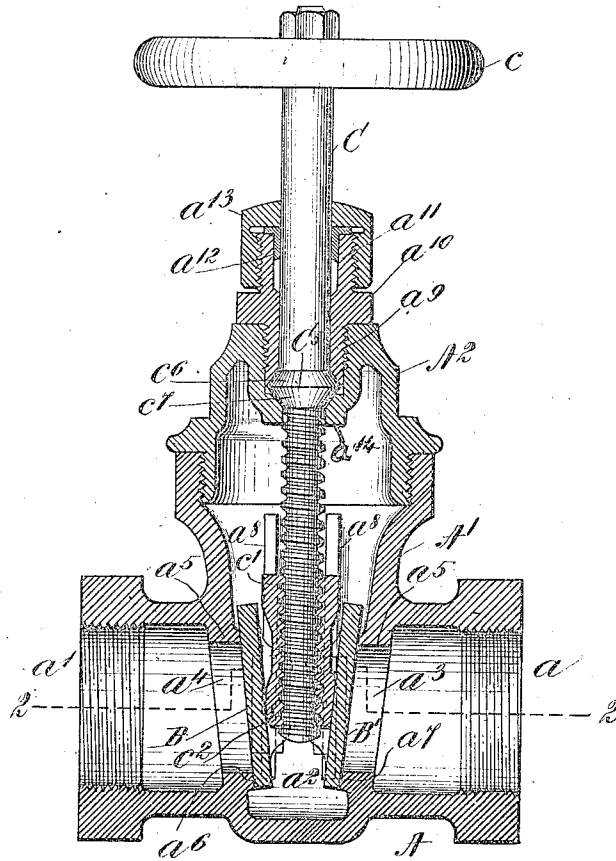


Fig. 1 - b

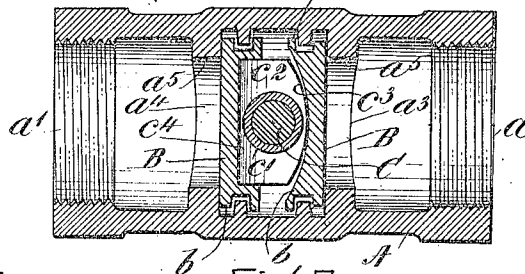


Fig. 2.

WITNESSES.

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VALVE.

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To all whom it may concern:

Be it known that I, CHARLES F. FERNALD, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

My invention relates especially to an improved means for evenly seating the valves upon their valve seats.

My invention relates also to further improvements in detail of construction all of which can best be seen and understood by reference to the drawings, in which—

Figure 1 shows my valve in cross vertical section. Fig. 2 shows the same on the line 2—2 of Fig. 1.

In the drawings:—A represents the hollow body of the valve from which there projects laterally a neck A¹ on which is threaded the bonnet A². Through the body of the valve there extends a straightaway passage of which *a* represents the inlet passage of the valve and *a*¹ the outlet passage thereof. Intermediate these passages is the valve chamber *a*² communication between which and said respective inlet and outlet passages is by way of the ports *a*³, *a*⁴. These ports are formed by inward contractions *a*⁵, *a*⁵ formed in the body of the valve and on the internal faces of which contractions are formed the valve seats *a*⁶, *a*⁷, respectively. These valve seats are constructed to occupy an inwardly inclined position by which the valve chamber interposed between said seats is wedge-shaped in form.

B, B¹ represent the respective valves or disks which are adapted to be contained in the valve chamber *a*² and assume an operative seating position upon their respective valve seats (as shown in the drawings where they close the ports in the passage through the body of the valve), or be drawn away into the neck of the valve and assume an inoperative position with respect to the valve seats, leaving the passage-way open through the body of the valve.

The valves or disks are guided onto or

off their seats in the following manner: Arranged upon the respective sides of the body of the valve and extending up into its neck A¹ are what may be termed guides or ways *a*⁸. These ways project inwardly from the shell of the valve and in a direction cross-wise the passage through the body of the valve. Their disposition is such, also, that the valves or disks sliding upon these guides or ways, when moved in one plane of direction, will become seated upon their respective valve seats and will at all times, or when moved into a disengaging position, hold and maintain an angular position corresponding with that of their respective seats with respect to said guides. The disks or valves are arranged to slide upon these guides by forming grooved projections *b* on the backs of the respective disks or valves and in which grooves of the projections the guides are adapted to be contained. The effect is that the valves or disks are so maintained that by moving the same in one plane of direction they may be guided or brought to contact with their respective valve seats without drawing across the face of said seats. Besides this and even more essential, the valves or disks are maintained in an operative position at all times whatever their position or the position of the valve may be, which prevents them from becoming disarranged so as to bind. In other words, these disks or valves always occupy a normal position to move freely in either direction.

I will now refer to the mode of operating the valves. Upon the neck A¹ is arranged as before described the bonnet A² of the valve. Through this bonnet and arranged to turn therein is a non-rising stem C, fitted with a hand-wheel *c* by which the stem may be turned. The stem extends down into the interior of the valve and in the construction shown even into the valve chamber *a*². The portion of the stem which is contained within the valve is made threaded and upon it is arranged to slide up and down as the valve is turned a sleeve *c*¹. On the end of this sleeve is arranged a nut *c*² made preferably elongated and contained in sockets formed by the projections extending as before explained from the backs of the respective

- valves or disks. By means of these projections acting as flanges the nut on the end of the sleeve arranged on the valve stem is adapted to connect with the valves or disks and move them from and into a seating position depending as the valve stem is turned in one direction or the other, the valves of course being guided during this operation as was before described.
- 10 While I have described means by which the valves or disks may be guided to become properly seated upon their valve seats, yet owing to some slight irregularity in the positioning of the valve seats or relative position of the guides, I prefer that the valves or disks may have a slightly loose fit upon their respective guides, not so loose that it will in any way detract from the purposes of my invention above described, but just so loose that the disks or valves may have a chance to accommodate themselves to any slight variation or irregularity in the positions of their respective seats in order that such positioning of the valves or disks may be easily obtained with relation to the nut c^2 .
- 20 I have so formed the nut that the disks or valves may readily vary or adjust their positions thereon to accommodate themselves to their seats. Such construction of the nut consists in making the opposite sides of the nut, facing the respective disks and sockets formed therein, cylindrically convexed to fit loosely within said respective sockets and so forming the nut also that the lines of curvature presented by the opposite sides thereof will lie in planes positioned at substantially right angles to each other, the sockets of course being correspondingly concaved to receive the convexed sides of the nut. The convexed sides of the nut being thus disposed from axes on which the respective disks will turn easily with sufficient movement to accommodate themselves to their respective seats but with no such excess of movement as would tend to their displacement or wear, the aforedescribed convexed formation of the nut tending also to hold the disks or valves very securely on their respective seats.
- 50 Reference has already been made to the fact that the valve stem C turns within the bonnet A² surmounting the neck of the valve. In this connection it is to be noted that the valve stem is provided with a collar c^5 which is contained within a depression formed in the bonnet of the valve into which is threaded a screw a^9 , the collar upon the valve stem being interposed in a socket formed between the end of this screw and the adjacent side of the bonnet. The collar c^5 is provided with beveled faces c^6 , c^7 which are adapted to bear against seats correspondingly beveled, formed in the end of said screw and the bottom of the depression formed in the bonnet. The screw a^9 is provided with an annular shoulder a^{10} resting upon the top of the bonnet and attached to this is a stuffing-box a^{11} in which is contained a gland a^{12} encircling the valve stem and held in place by a packing-nut a^{13} . By means of the collar c^5 on the valve stem it is held from sliding in a longitudinal direction but permitted to turn. The especial point to be noted in this construction is the beveling of the sides of the collar which permits them to fit evenly upon their adjacent seats by reason of the fact that a beveled side of the collar will adjust itself to irregularities in the seat and accordingly make a tight fit. Now this is of material importance for the following reason: When the valve is closed by operating the stem to force the valvular disks down upon the valve seats, as soon as these disks are fairly seated, upon a slight further turning of the stem the beveled face c^6 will be forced up against its seat formed on the end of the screw a^9 . Now if this face fits tight against its valve seat the valve will not leak when closed. When the valve stem is turned in a reverse direction for opening the valve the sleeve c^1 on the valve stem will rise on said stem until the end of the sleeve contacts with the inside of the bonnet at the point a^{14} . Upon a slight further turning of the valve stem the sleeve will be made to hug tight against the side of the bonnet. This acts to draw the beveled face c^7 of the collar on the stem hard against its seat and prevents the valve from leaking when open. In case there is a slight leakage this is provided for by the gland or packing further up on the valve stem. Moreover, by obtaining a tight joint at the point of the collar I am enabled to remove the packing-nut and repack the valve with absolute safety whether the valve is open or shut.
- Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—
1. A valve having inclined seats, disks adapted to become seated thereon which disks are provided with sockets formed in the backs thereof, a valve stem by which said disks are controlled, and a nut threaded on said stem the opposite sides of which nut facing the respective disks and sockets formed therein are cylindrically convexed to fit loosely within said respective sockets and which nut is so formed also that the lines of curvature presented by the opposite convexed sides thereof will lie in planes positioned at substantially right angles to each other.
 2. A valve having inclined seats, disks adapted to become seated thereon, said disks having sockets formed in the backs thereof, means for guiding said disks to move onto and off their respective seats, a valve stem

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formed also that the lines of curvature pre-

sented by the opposite convexed sides there-
of will lie in planes positioned at sub-
stantially right angles to each other.

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Witnesses:

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