

C. PATOCK.
 PACKLESS AND QUICK ACTING VALVE.
 APPLICATION FILED MAR. 13, 1911.

999,333.

Patented Aug. 1, 1911.

FIG. 1.

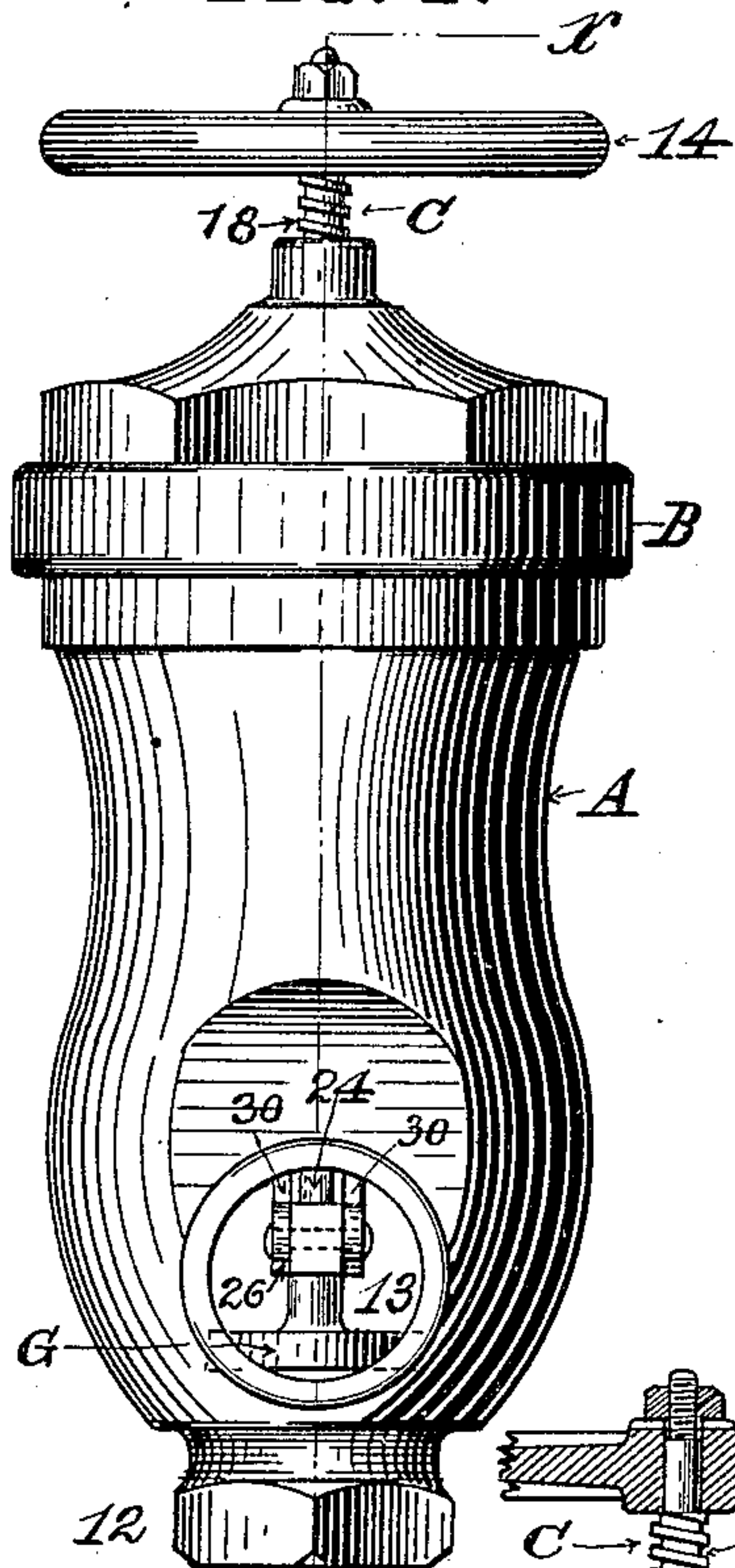


FIG. 2.

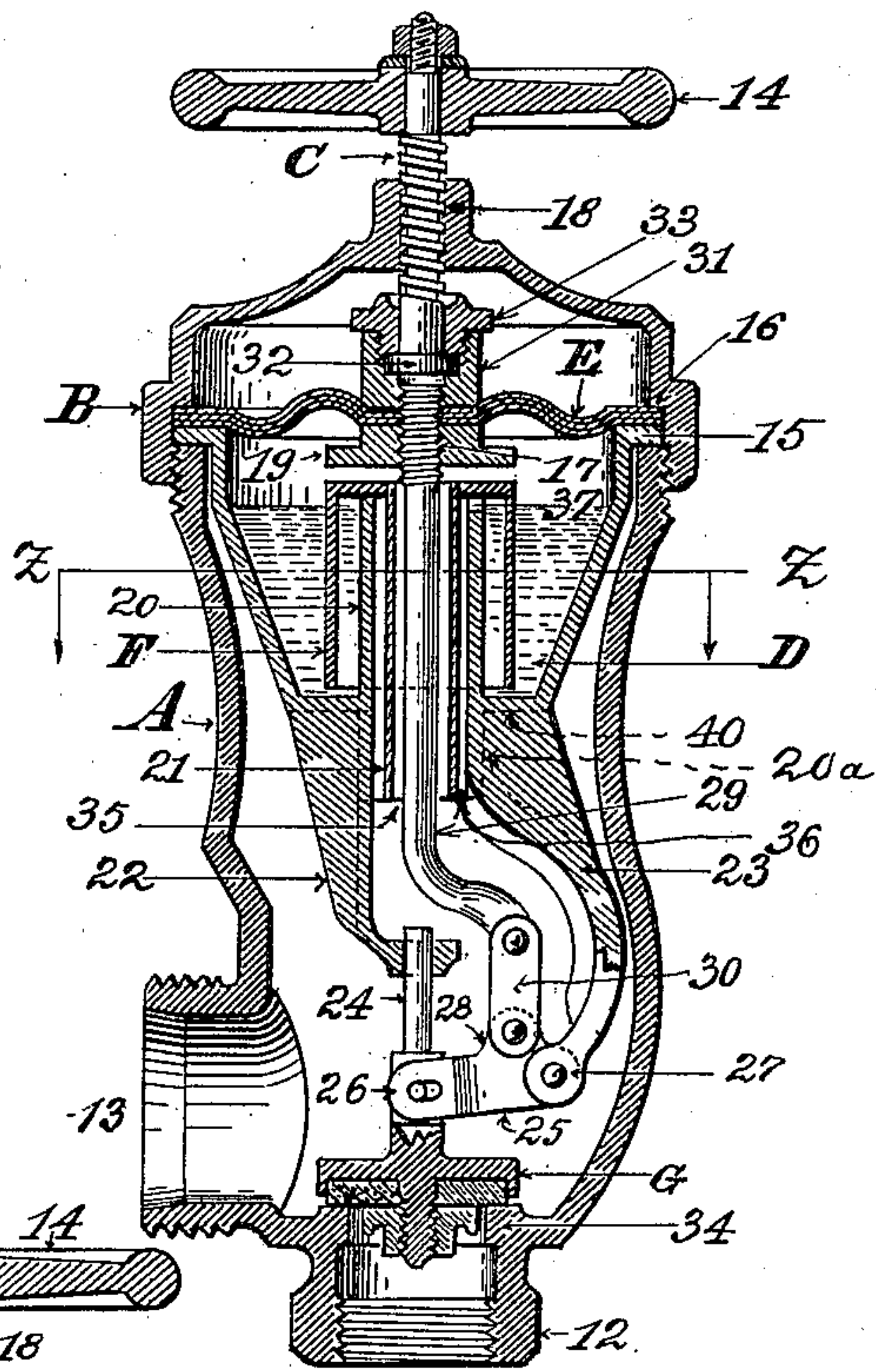


FIG. 3.

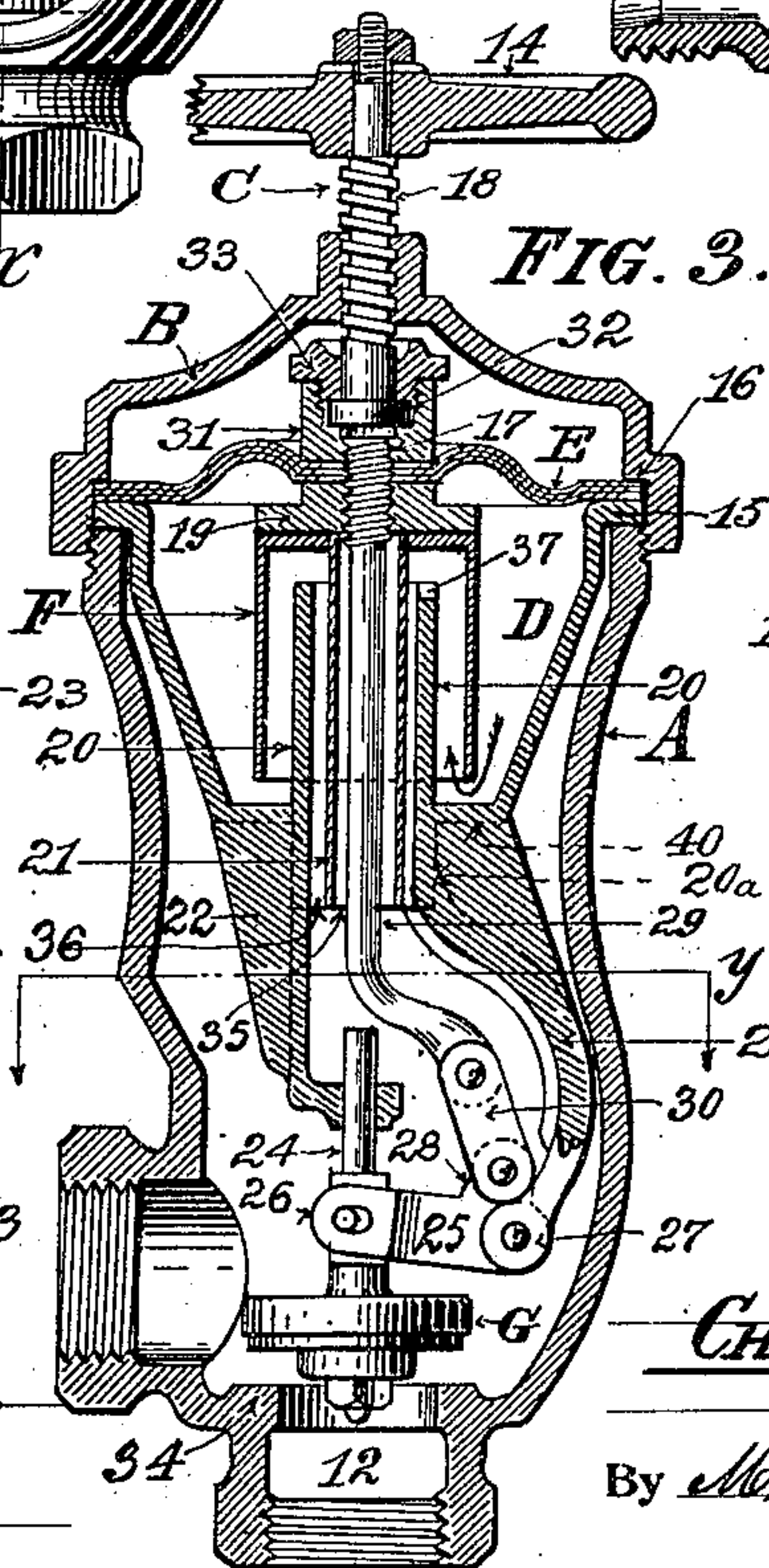


FIG. 5.

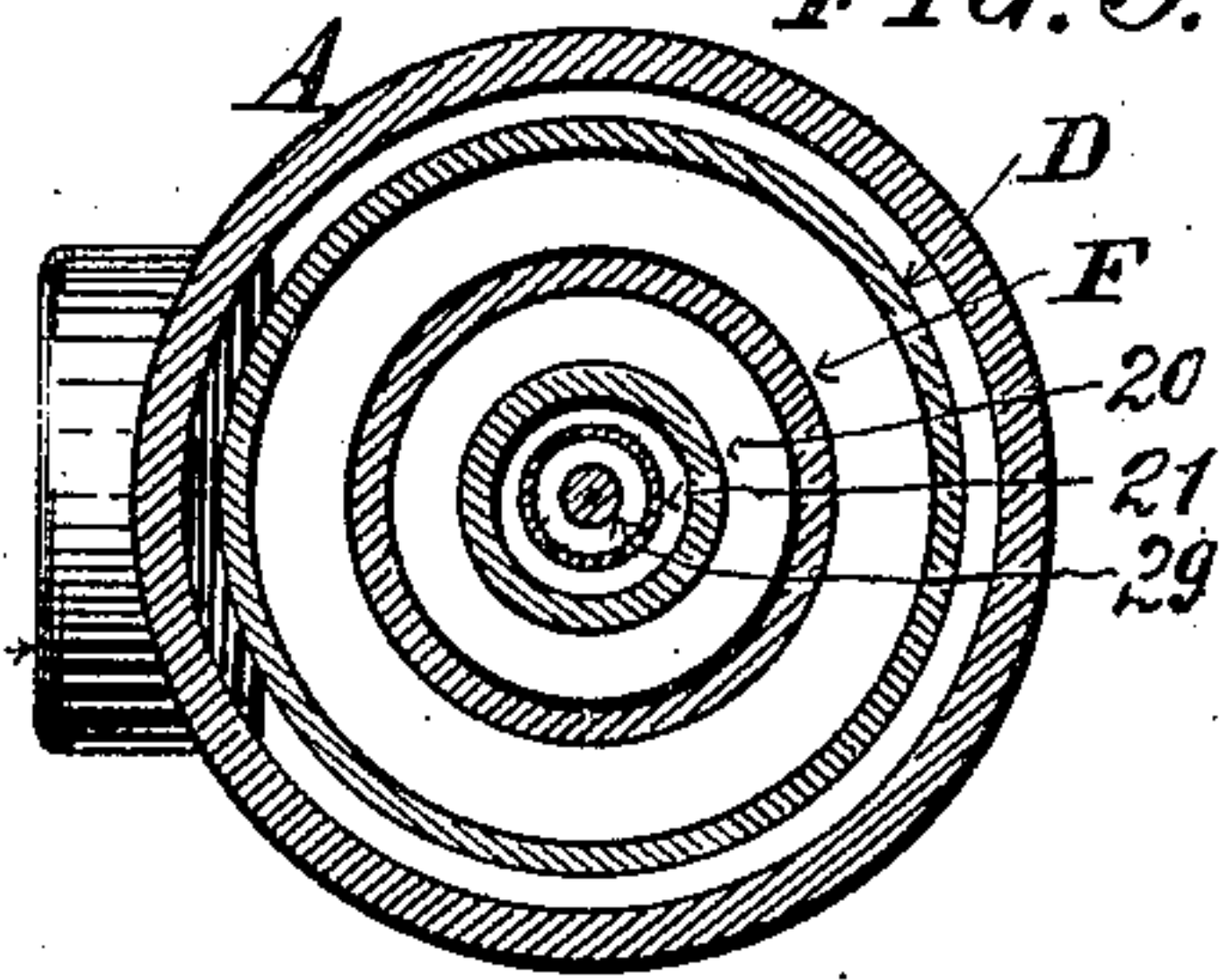
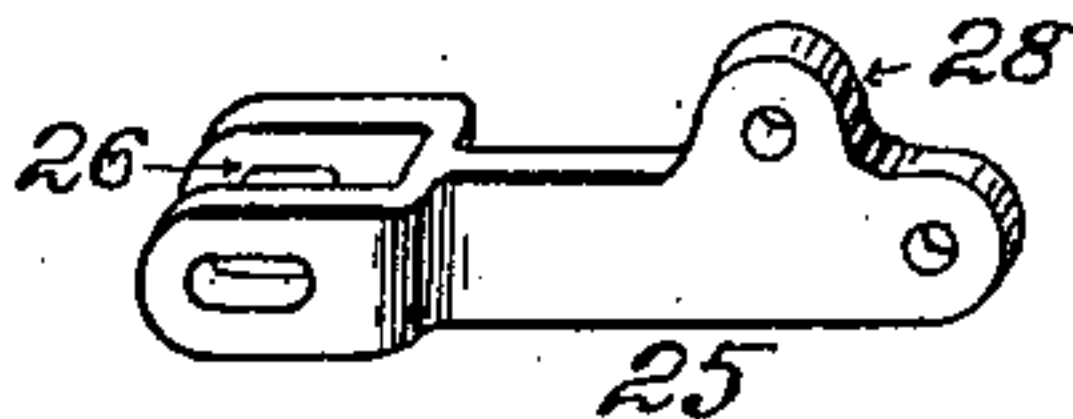


FIG. 6.



Witnesses:

C. B. Knudsen,
A. S. Peterson,

Inventor:

CHARLES PATOCK.

By *Michael Stark & Sons,*
 Attorneys

UNITED STATES PATENT OFFICE.

CHARLES PATOCK, OF CHICAGO, ILLINOIS.

PACKLESS AND QUICK-ACTING VALVE.

999,333.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed March 13, 1911. Serial No. 614,176.

To all whom it may concern:

Be it known that I, CHARLES PATOCK, a citizen of the United States, and resident of Chicago, Illinois, have invented certain new and useful Improvements in Packless and Quick-Acting Valves; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to steam valves; and it is especially directed to that class of valves in which there is no packing employed or necessary to prevent the escape of fluid past the valve stem, and in which a condensing chamber is used to prevent the steam from injuring the metallic diaphragm employed therein. It shall also be of the quick-acting type.

To this end, the invention consists in the novel and peculiar combination of parts and details of construction as hereinafter first fully set forth and described and then pointed out in the claims.

In the drawings already referred to, which serve to illustrate this invention more fully, Figure 1 is an elevation of my packless, quick-acting valve. Fig. 2 is a longitudinal sectional elevation on line *x x* of Fig. 1, showing the valve in closed condition. Fig. 3 is a similar view, illustrating the valve in open position. Fig. 4 is a sectional plan on line *y y* of Fig. 3. Fig. 5 is a like view on line *z z* of Fig. 2 except that the branch 13 on the valve casing is not shown externally screw-threaded, this construction being a modification of that shown in Fig. 4. Fig. 6 is a perspective view of the operating lever by which the valve proper is opened and closed.

Like parts are designated by the same characters and symbols of reference in all the figures.

A, in these drawings denotes the casing of this valve, which in the present showing is of the so-called angle valve type, it having at its lower end an internally screw-threaded inlet 12, and near its lower end and sidewise projecting therefrom a branch 13, which may be an internally screw-threaded member the same as the member 12, or fitted to receive a coupling nut, (not shown), as illustrated in Figs. 1 and 2.

The upper end of the casing A is exter-

nally screw-threaded to receive a bonnet B, which bonnet is centrally bored and tapped to receive the correspondingly screw-threaded part 18, of the operating spindle C, said spindle carrying at its upper end a hand wheel or similar manipulating member 14, by means of which the spindle is rotated.

The interior of the casing A is adapted to receive a tapering water pot D, which pot has at its upper end a laterally-projecting flange 15, resting upon the upper edge of the casing A, and held thereto by the shoulder 16, in the bonnet B. Between the flange 15 and the shoulder 16 there is located diaphragm E, which is centrally punctured for the passage of the upper, screw-threaded end of a rod 29, as will hereinafter more fully appear.

Centrally in the water pot D there is, preferably formed integral with the bottom of the pot, a tube 20, and over this tube is inverted a cup F, which normally reaches from the bottom of the water pot to within a short distance of a member or collar 19, located on the upper screw-threaded part 17, of the rod 29, and serving as an abutment for the cup F. In the center of this cup F there is a downwardly pending tube 21, which tube is smaller in diameter than the tube 20, and which is securely fastened to the bottom of the cup F.

From the bottom of the water pot D project downwardly a bracket 22, and also an arm 23, both these parts being preferably formed integral with the water pot, the bracket 22 being designed to serve as a guide for the guiding stem 24, of the valve proper G, and the arm 23 is planned to afford a pivot member for a lever 25, shown in detail in Fig. 6, said lever having at one end a fork 26, engaging the valve-stem 24, its opposite end being pivotally connected to the bifurcated lower end 27, of said arm 23, there being near this end of the lever 25 an upwardly projecting punctured lug 28, wherewith connects the lower end of the bent rod 29, by two links 30, said bent rod 29 forming, as it were, a disconnected continuation of the screw-spindle C.

Above the diaphragm E there is located a connecting member 31, being a cylindrical body bored and internally screw-threaded to receive a collar 32 at the lower end of the spindle C, and a follower or retaining sleeve 33 above said collar to rotatably connect said

spindle C to said connecting member, said latter member being also internally screw-threaded below the collar 32, to receive the upper, screw-threaded end 17 of the bent rod 29.

The diaphragm E comprises preferably a number of superposed metallic, corrugated, disks, whereby said diaphragm is made of sufficient strength to resist high pressure, but at the same time very flexible to offer but slight resistance to the bending thereof, and also to avoid breakage caused by the frequent bending or deflecting of said diaphragm. These several layers of the diaphragm are held together and to the connecting member 31 by the collar 19 which acts as a clamping nut for the parts mentioned. In the lower part of the casing A there is located the usual valve seat 34, upon which the valve proper G seats, said valve proper being of any efficient and desirable construction.

The operation of this valve is substantially as follows: The valve is connected to a line of steam pipe, a radiator, or other object where steam is to be turned on and off. The hand wheel 14 is turned in the proper direction to open the valve proper G, by pulling the diaphragm, and with it the bent rod and the lever upwardly. Steam will enter the casing and pass out through the branch 13. Steam will also pass through the space 35 between the bent rod 29 and tube 21, and also through the space 36 between the latter tube and the wall of the cup F and lift the latter until arrested by the collar 19, and enter the space below the diaphragm where the steam will be condensed and collect as water in the water pot, from which it will overflow back through the space 36 so that the diaphragm will be comparatively cool and no steam able to pass from the chamber or casing past the valve-spindle. As soon as the pressure is released, the inverted cup F will drop back to its normal position with its inner bottom surface resting upon the upper edge of the inner tube or stand pipe 20, thereby leaving a small space below the lower edge of the cup through which the water of condensation may pass upwardly through a notch 37, at the upper end of said standpipe 20. This stand pipe 20 has below the bottom 40, of the water pot an extension 20^a, approximately of the same length as the inner tube 21 which extends for some distance below said bottom 40, whereby said extension 20^a, in conjunction with the inner tube 21, acts as a siphon and causes the water in the pot to be discharged through the space 36 while the space in the tube 21, (35) serves as a vent to the space below the diaphragm E.

It will now be observed that this steam valve is packless, and that the valve proper G, is operated by the lever 25 at the long

arm thereof, while the rod 29 is pivoted to said lever at the short arm 28, the proportions of the arms being as 1:4, and that the valve proper can be fully opened by approximately one revolution of the hand wheel 14. It will also be noticed that this steam valve is anti-freezing, that is to say that the water of condensation in the water pot is immediately siphoned out as soon as the valve proper is closed, or pressure in the valve casing released. This steam valve is especially well adapted for use on steam radiators of heating systems, but it is evident that it is also applicable to all uses and purposes where so-called globe valves and gate valves are now employed. While for the smaller sizes of this steam valve the upper portion of the valve casing would seem rather large in proportion to the remainder thereof, which has been thus planned to afford ample space for a diaphragm of sufficient diameter and flexibility, and to permit of the entry of the entire interior valve mechanism through the upper end of the casing, these differences in the dimensions will become less apparent as the sizes of the valve increase. In cases where this valve is to be used in hot-water heating systems, or for cold water and other cooled fluids, where the necessity of keeping the diaphragm cool to prevent its being injured by heat is not prevalent, I shall dispense with the condensed water pot and the float cup in the casing, thereby cheapening the valve to a considerable extent without detracting from its usefulness as a stop valve of the quick-acting and packless type.

Having thus fully described this invention, I claim as new and desire to secure to me by Letters Patent of the United States:—

1. A packless and quick opening valve, comprising, in combination, a casing, a valve proper in said casing, a bonnet on said casing, a lifting screw tapped in said bonnet, a diaphragm in said casing located between the upper end of said casing and the bonnet, means constructed to connect said lifting screw rotatably to said diaphragm, a rod connected at one end to said diaphragm, a lever in said casing having a long, and a short arm, said rod being connected at its other end to the short arm of said lever, a pivot member in said casing and removable therefrom, said lever being connected to said pivot member at one end and to said valve proper at its other end, as specified.

2. In a packless and quick opening valve, the combination of a casing, a valve proper in said casing, a bonnet at the upper end of said casing, a lifting screw tapped in said bonnet, a diaphragm in said casing, said diaphragm comprising a multiplicity of superposed layers, a connection on said diaphragm constructed to swivelly engage the

lower end of said lifting screw, a bent rod in said casing connected at one end to said diaphragm, a lever in said casing said lever having a short and a long arm, the short arm being connected to the other end of said rod, the long arm of said lever being connected to said valve proper, a bracket in said casing to which said lever is pivotally connected, and a water pot in the upper part of said casing below said diaphragm, said water pot having ingress and escape passages leading from and to the interior of said casing below said diaphragm.

3. A packless and quick opening valve comprising, in combination, a casing, a valve proper in said casing, a bonnet on said casing, an operating screw tapped in said bonnet, a diaphragm in said casing, said diaphragm being connected to the lower end of said operating screw, means connected to said diaphragm and said valve proper constructed to raise and lower the valve proper

by rotating said screw, a removable water pot in said casing below said diaphragm, a stand pipe in said water pot, an inverted cup over said stand pipe of approximately the same length as the stand pipe, said stand pipe having an extension below said water pot, a tube centrally in said cup and within said stand pipe and reaching approximately to the end of the extension, there being a notch in the upper end of said stand pipe, said cup being adapted to be raised when fluid is admitted to said casing and to drop by gravity as soon as pressure in the casing is released.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES PATOCK.

Witnesses:

MICHAEL J. STARK,
JOSEPH KAHN.

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