

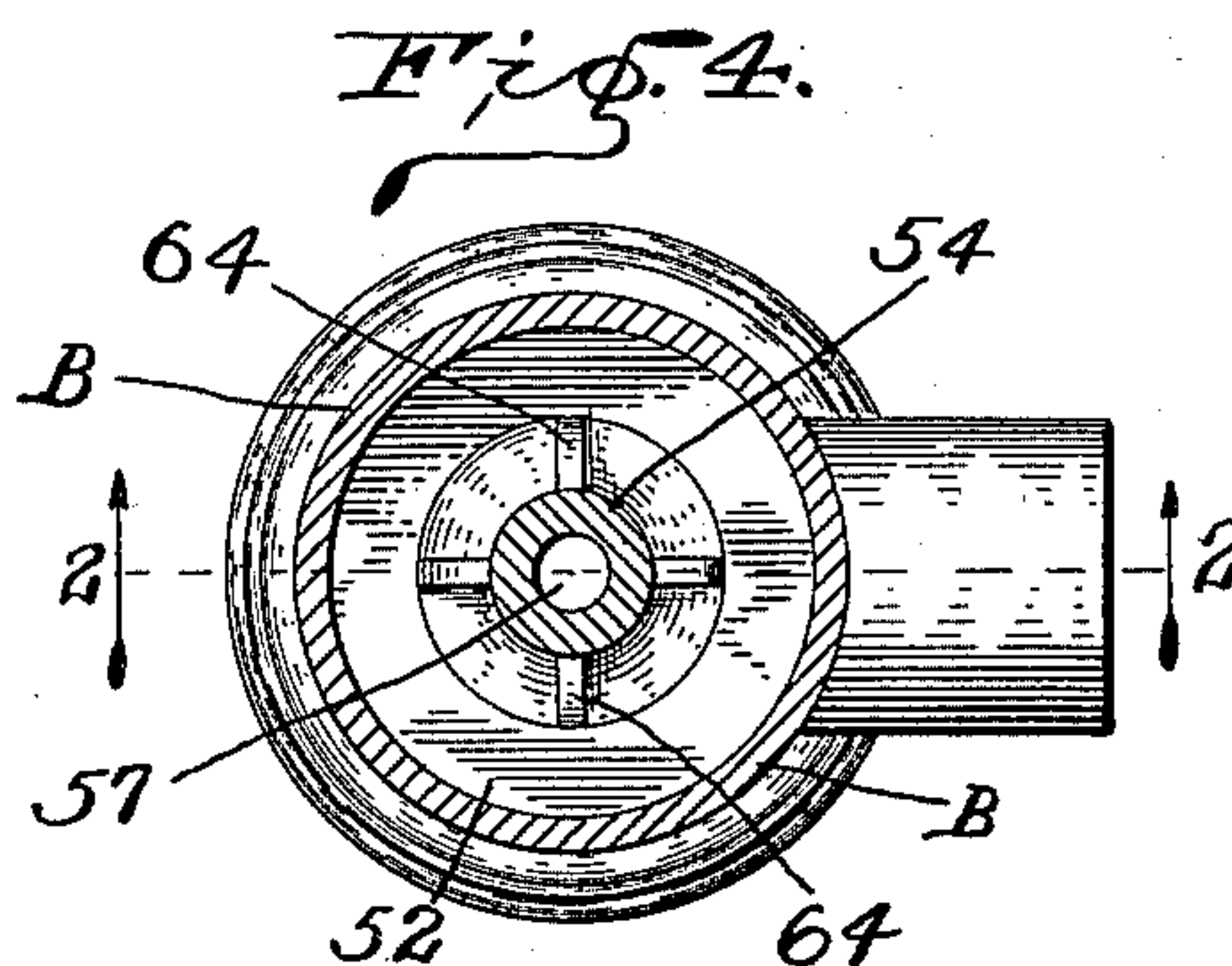
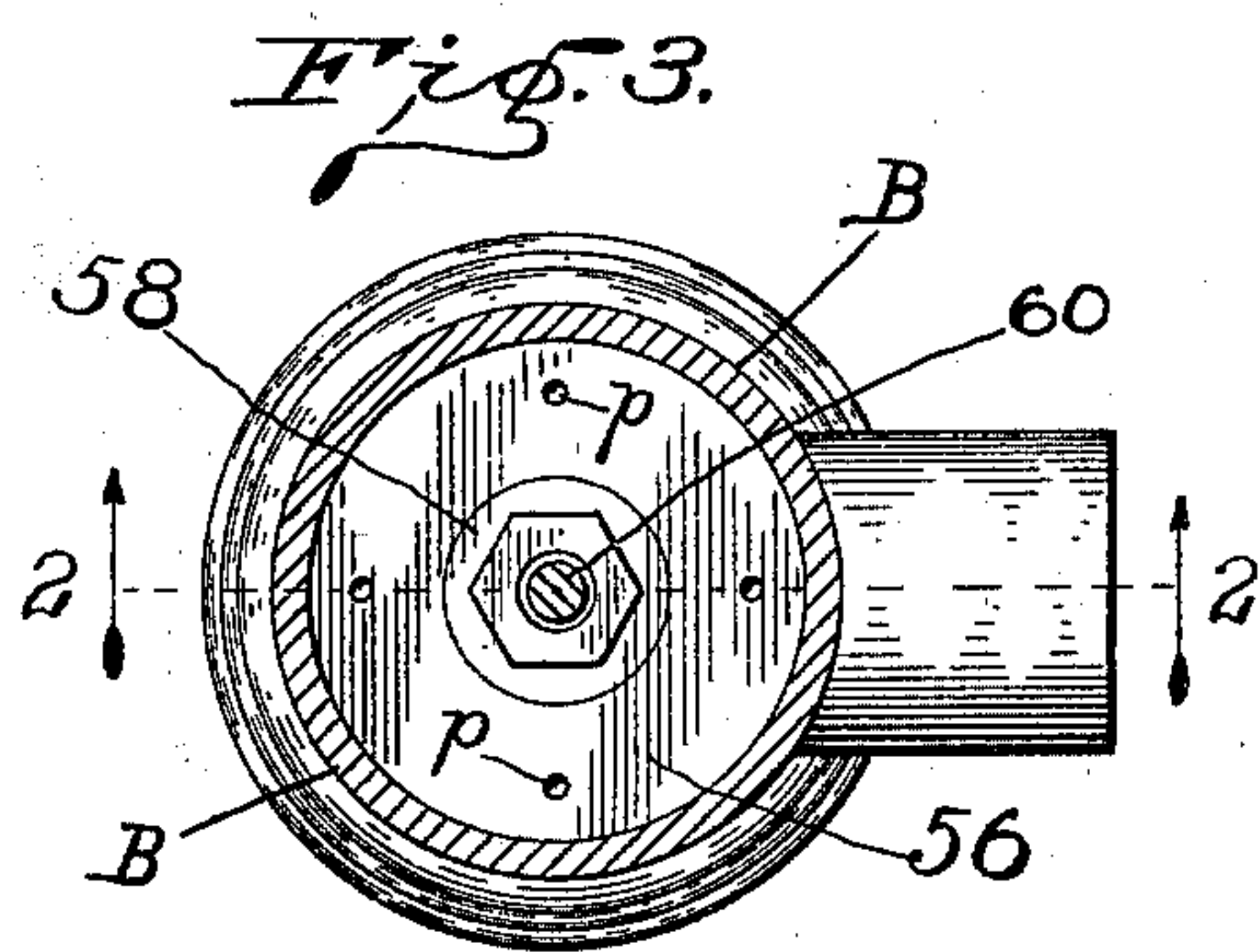
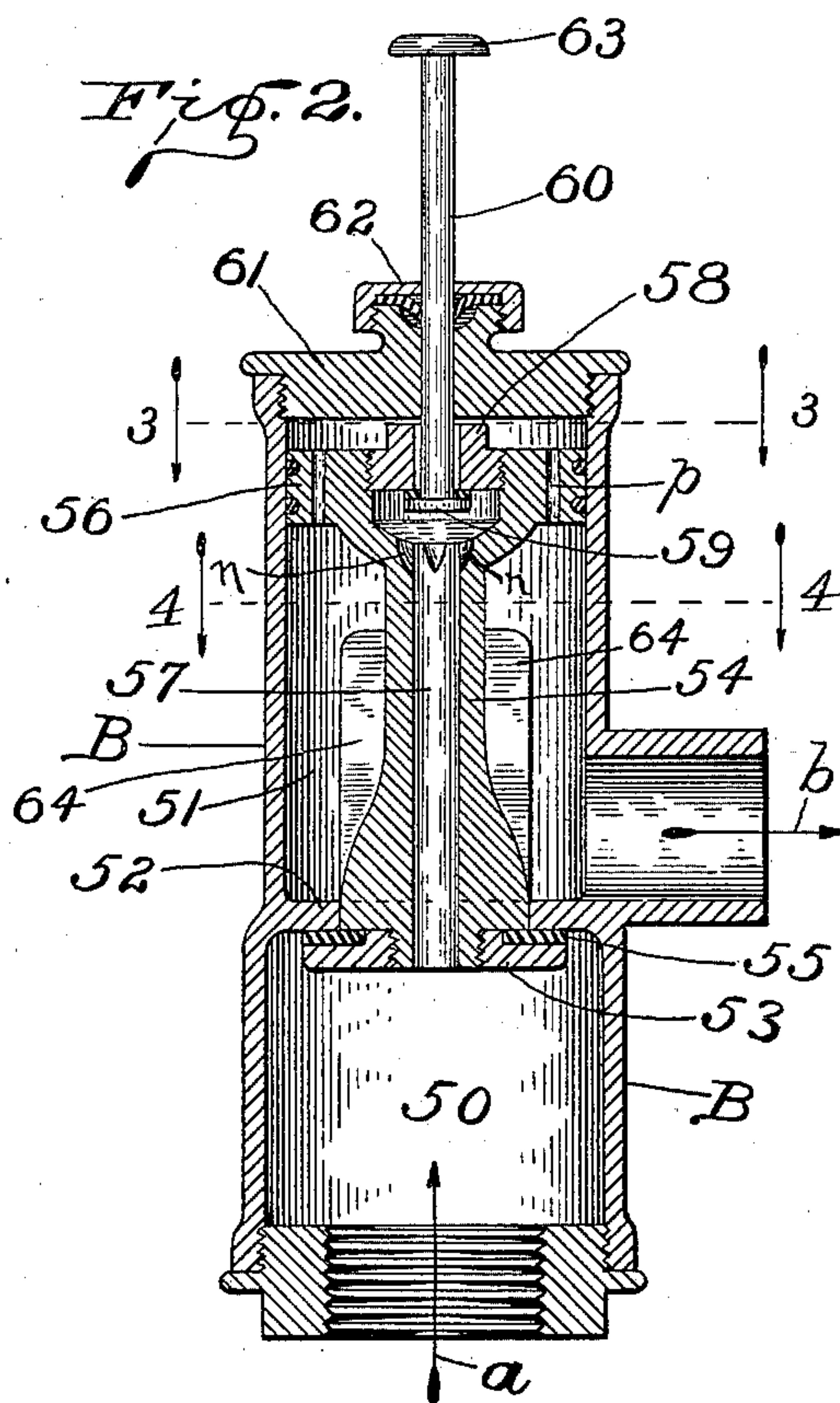
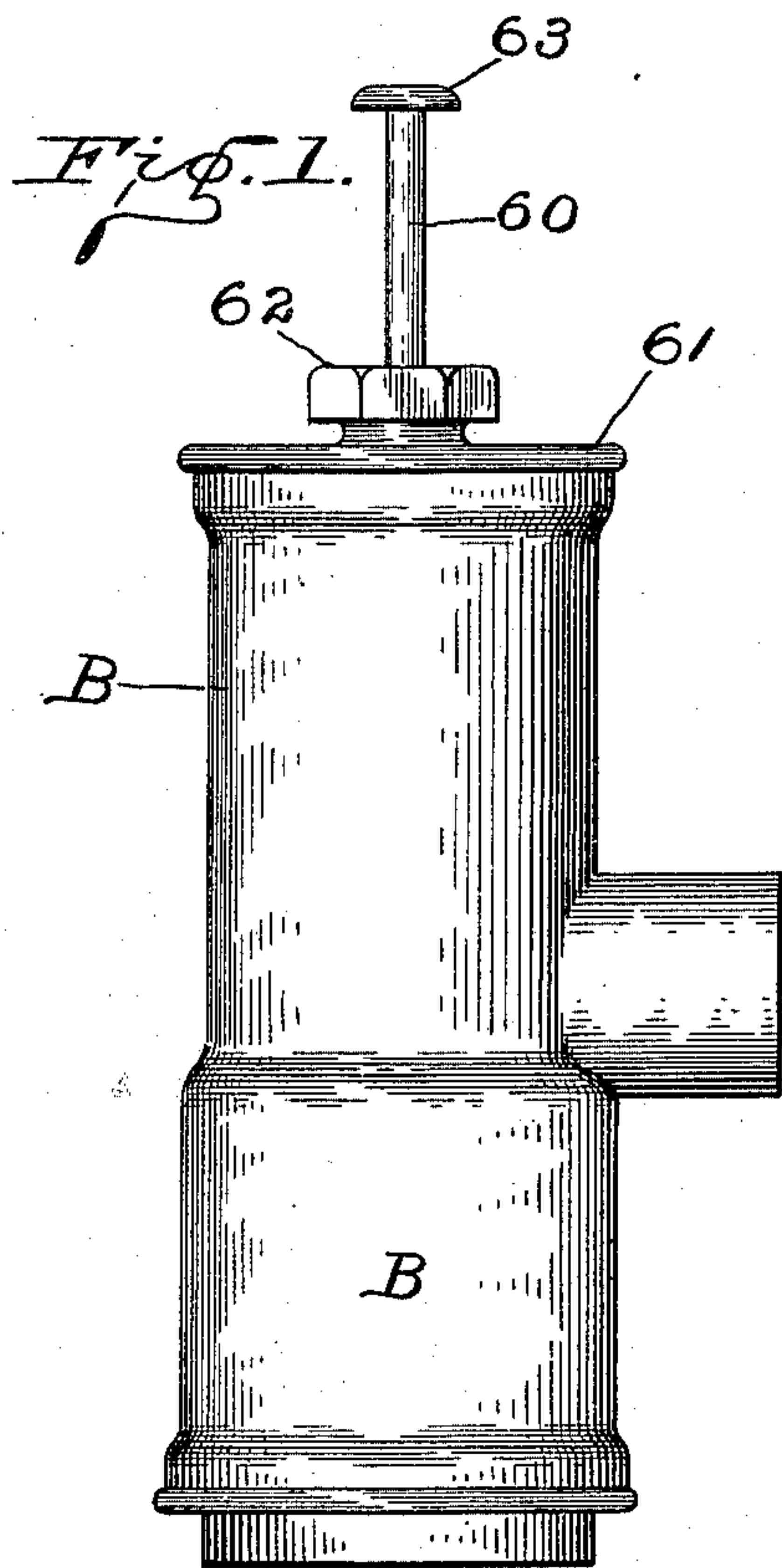
No. 685,931.

Patented Nov. 5, 1901.

J. W. NETHERY.  
VALVE.

(Application filed May 31, 1901.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOSEPH W. NETHERY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE NETHERY HYDRAULIC VALVE COMPANY, OF INDIANAPOLIS, INDIANA; NEW YORK, N. Y., AND JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 685,931, dated November 5, 1901.

Application filed May 31, 1901. Serial No. 62,596. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH W. NETHERY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to that class or variety of valves wherein the main valve is opened and closed by a piston-head on the opposite end of the valve-stem, which in turn is operated to open the valve by the pressure of the fluid when admitted to the portion of the chamber behind said piston-head through a by-pass, which by-pass is opened and closed by means of a small auxiliary valve. A valve embodying said invention will be first fully described and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a valve of the variety in question; Fig. 2, a central vertical sectional view of the same as seen when looking upwardly from the dotted lines 2 2 in Figs. 3 and 4; and Figs. 3 and 4, horizontal sectional views thereof as seen when looking downwardly from the dotted lines 3 3 and 4 4, respectively, in Fig. 2.

The main shell or body B of the valve contains two chambers 50 and 51, which are divided by a diaphragm 52, which constitutes the main-valve seat. The ingress-opening for the valve leads into the chamber 50, and the egress-opening leads out from the chamber 51, the direction of flow being indicated by arrows *a* and *b* at said openings, respectively. The main valve 53 is secured to the lower end of the valve-stem 54 and is provided with a suitable washer 55, which when the valve is closed rests against the under side of the diaphragm 52, which thus forms the main-valve seat, as shown. On the opposite end of the valve-stem 54 is the piston-head 56, which fits in the cylinder or chamber 51 above the egress-opening. A longitudinal perforation 57 extends through the valve 52, its stem 54, and the piston-head 56

and forms a by-pass. This is enlarged at the upper end, thus forming a small chamber at this point, and into this enlarged opening a bushing 58 is inserted, which forms a head to said small chamber and also a valve-seat for the small auxiliary valve 59. Said valve 59 has a stem 60, which extends up through the head 61 of the chamber 51 and through a stuffing-box 62, formed in or upon said head, and terminates in a push-button 63, by means of which it may be pushed downwardly, and the auxiliary valve thus opened. Immediately said auxiliary valve is opened the fluid flows through the by-pass 57 into that portion of the chamber 51 which is above the piston-head 56, and as said piston-head has a greater area than the valve 52 the latter is forced down and opened, permitting the fluid to flow through, as will be readily understood. With this arrangement of the auxiliary valve the amount of flow can be governed by the operator at the time of using the valve. If the auxiliary valve is pushed down only slightly and held in this position, the main valve will open but a trifle and only a small flow will result. If the small valve is pressed farther, the main valve will open farther. As the main valve moves farther down a larger flow will result, and if pressure is continued on the small auxiliary valve the main valve will continue to open until the full flow is obtained. In any event the auxiliary valve will close instantly pressure on its stem is released, as it is always subject to pressure from the main supply through the by-pass. In closing, the main valve is retarded in its movement by the quantity of fluid which has passed to above the piston-head and which as the valve and said piston-head rise escapes to below said head through the small perforations *p* in said head and thence out through the egress-opening. The main valve in its movement is guided by wings 64. The portion of the valve-stem 54 between said wings swells out gradually, as shown in Fig. 2, and this provides for a gradual (rather than a sudden) opening and closing of the main-valve orifice. Notches *n* are formed at the bottom of the small chamber in the piston-head, so that



the small valve 59 may not when pushed down forcibly interfere with the flow of fluid through the by-pass 57, said notches forming a path for the fluid around said valve 59 when said valve is pushed down into contact with the structure below:

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

10 1. The combination of a valve-body containing two chambers divided by a diaphragm constituting the main-valve seat, a main valve in a lower chamber, a valve-stem extending up through the valve-seat into the  
15 upper chamber, a piston-head upon the upper end of the valve-stem containing a small chamber formed therein, a longitudinal perforation through the main valve and valve-stem from the lower valve-chamber to said  
20 small chamber, a perforation from said small chamber to the portion of the main valve-chamber above the piston-head, a small auxiliary or starting valve contained within the small chamber in the piston-head, and a  
25 valve-stem thereto extending up through the perforation leading to above said piston-head and thence on up through the head to the main upper valve-chamber to the outside, substantially as and for the purposes set  
30 forth.

2. The combination, in an automatically-acting valve, with the main valve and its actuating piston-head, of a small auxiliary starting-valve mounted to slide loosely within a  
35 chamber formed in the main-valve-and-piston-head structure, wherein it is permitted a free limited movement, whereby, by manipulation of said starting-valve from the outside, the main valve may be caused to open to any  
40 desired point and there caused to remain, thus providing for any desired flow through the main valve.

3. The combination of a valve-body having a diaphragm whereby it is divided into two  
45 main chambers and which constitutes the main-valve seat, a main valve positioned in the lower chamber below said valve-seat, a valve-stem extending up through into the upper chamber and provided with guiding-  
50 wings whereby it is held centrally to the valve-seat and increasing gradually in size between the wings as it approaches the main valve, a piston-head upon the upper end of the valve-stem having small passages from  
55 above to below the same, a small central chamber within said piston-head, a bushing forming the upper wall to said chamber, a small auxiliary valve positioned within said

chamber, a stem to said valve extending up through said bushing and out through the  
60 upper end of the valve-body, and a by-pass leading through the main-valve structure of which said small chamber forms a part, said several parts being constructed arranged and operating substantially as set forth. 65

4. The combination of the main-valve body provided with a diaphragm dividing the same into two chambers and constituting the main-valve seat, a main valve the valve-stem  
70 whereof passes through said valve-seat, said valve-stem being perforated longitudinally and provided with a loosely-mounted auxiliary valve in the upper end of the perforation for closing the same, said main valve being  
75 also formed substantially of the same size as the opening next to the valve and decreasing gradually in size as the distance from the valve increases whereby the effective valve-opening gradually increases as the valve re-  
80 ceedes from its seat and gradually decreases as the valve approaches its seat, substantially as shown and described.

5. The combination of a valve-body containing a valve-seat, a main valve having a by-pass extending through the stem thereof  
85 which at a certain point develops into a small chamber, a piston-head upon the upper end of said valve-stem operating to open said valve by the pressure on said piston, an auxiliary or starting valve mounted to slide  
90 freely within said small chamber in the by-pass, and a stem to said small valve extending through a suitable stuffing-box to the outside, substantially as shown and described.

6. The combination of a valve-body con- 95 taining a diaphragm dividing the same into two chambers and containing a valve-seat, a main valve positioned in one of said chambers, a piston-head positioned in the other of said chambers, a valve-stem passing through  
100 the valve-seat and connecting the valve and the piston-head, said valve-stem being largest next to the valve and decreasing gradually in size whereby the effective opening of the valve is smallest when the valve is nearest  
105 its seat, and guiding-wings on said valve-stem whereby the valve is held centrally to position at all times throughout its movement, substantially as shown and described.

In witness whereof I have hereunto set my  
110 hand and seal, at Indianapolis, Indiana, this 27th day of May, A. D. 1901.

JOSEPH W. NETHERY. [L. S.]

Witnesses:

CHESTER BRADFORD,  
L. H. COLVIN.