

April 9, 1940.

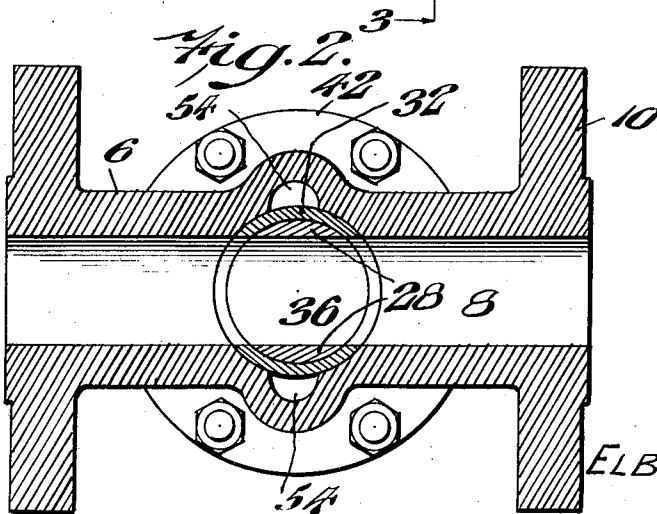
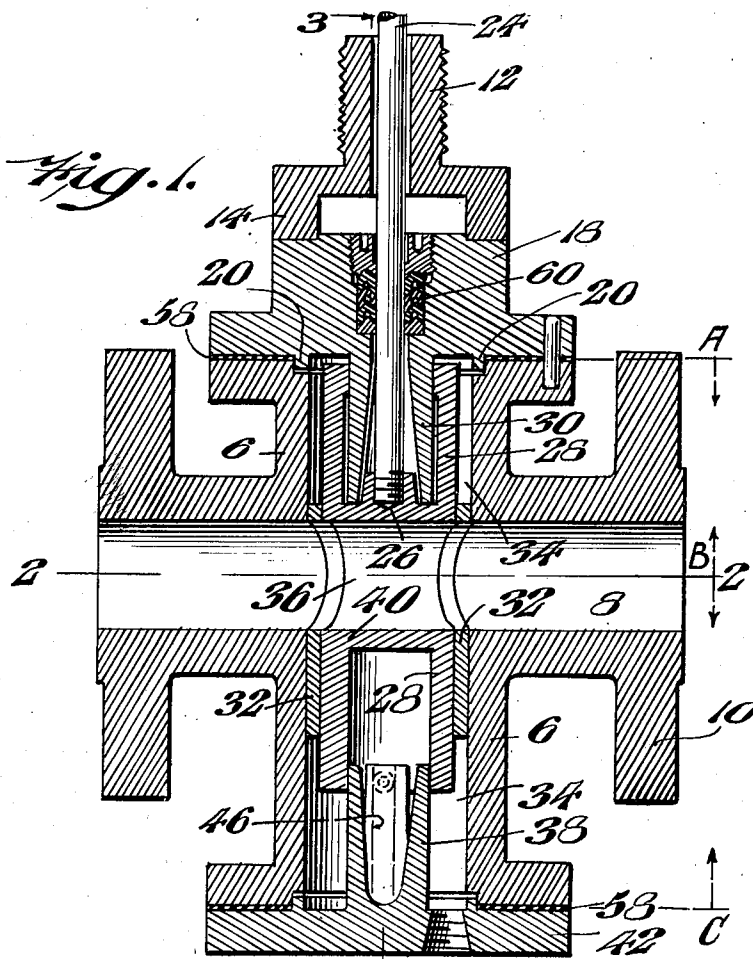
E. A. CORBIN, JR

2,196,202

FLOW CONTROL VALVE

Filed June 22, 1938

2 Sheets-Sheet 1



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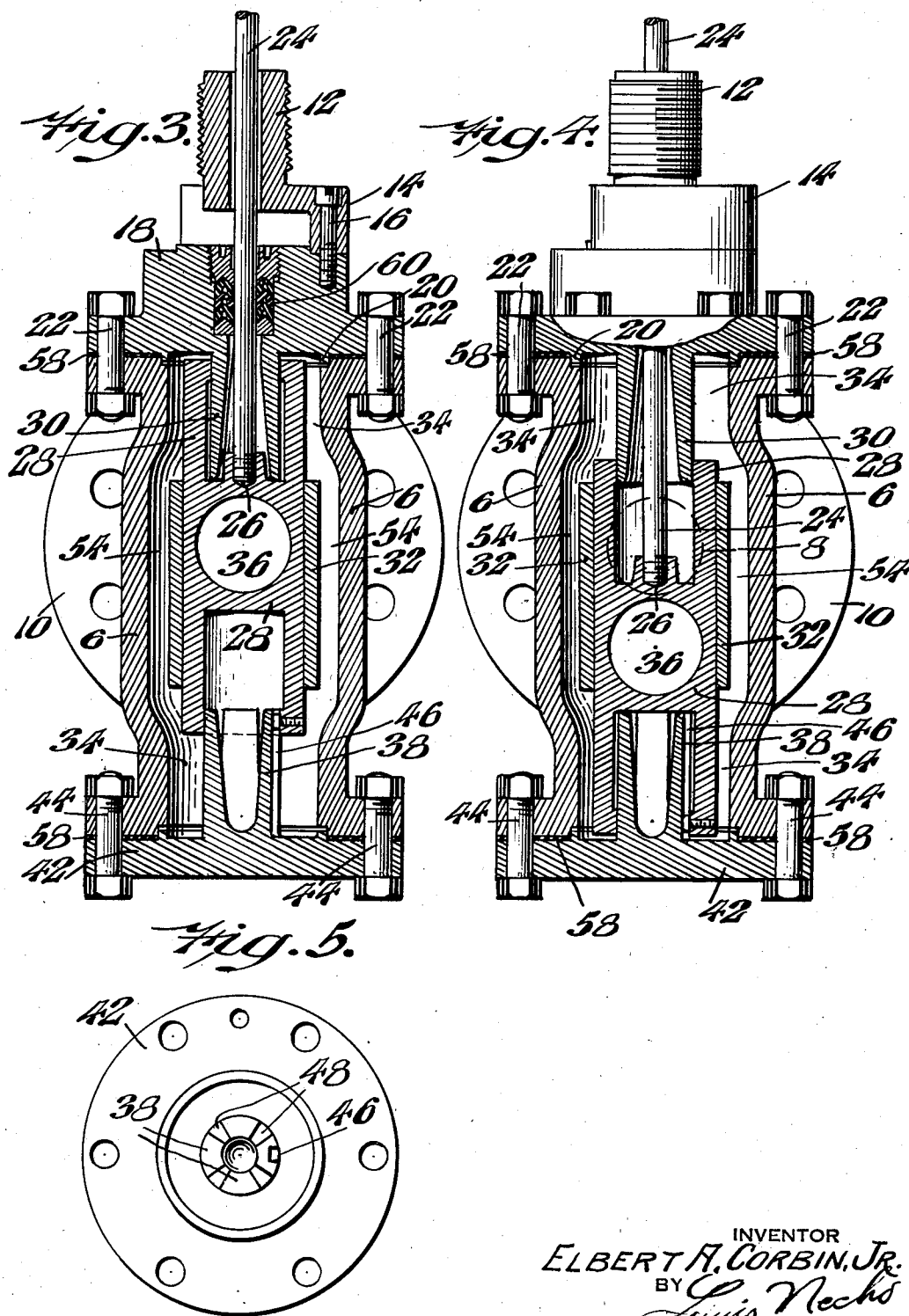
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FLOW CONTROL VALVE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,196,202

## FLOW CONTROL VALVE

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Application June 22, 1938, Serial No. 215,202

3 Claims. (Cl. 251—59)

My invention relates to a new and useful flow control valve of the type particularly adapted for the control of the flow of liquids and also particularly adapted for operation by remote control instruments as is the practice in connection with long extended pipe lines such as those used in the oil industry.

The structure and operation of my novel valve will be more clearly understood from the following specification and the accompanying drawings in which:

Fig. 1 represents a vertical section of a flow control valve embodying my invention.

Fig. 2 represents a section on line 2—2 of Fig. 1.

Fig. 3 represents a section on line 3—3 of Fig. 1.

Fig. 4 represents a view similar to Fig. 3 showing the valve in its closed position.

Fig. 5 represents a plan view of the top and bottom piston supports.

Referring to the drawings in which like reference characters indicate like parts, and more particularly to Fig. 1, my novel valve comprises a housing 6 having the through opening 8 therein which is adapted to register with the pipe lines (not shown), and is also provided with the flanges 10 by which the valve is connected to the said pipe lines, it being understood that other means for connecting the valve to the pipe lines can be used. 12 designates a bushing which is threadedly or otherwise secured to a diaphragm operated remote control mechanism (not shown) and which has the assembly cap 14 which is suitably secured as at 16 to the top cover 18. The top cover 18 is provided with the annular dowel 20 for centralizing or accurately positioning the same with respect to the valve casing 6, it being understood that the top cover 18 is suitably secured as at 22 to the valve casing 6 as best seen in Fig. 3. Through the bushing 12, cap 14 and cover 18 extends the operating stem 24 which is suitably secured as at 26 to the hollow piston 28. The hollow piston 28 and the portion thereof above the opening 8 slides against the pendant guide 30 which is integral with or suitably carried by the top cover 18. 32 designates a sleeve bushing which forms a lining for the inner wall of the piston chamber 34, and against which the upper as well as the lower portions of the piston 28 are adapted to slide. The piston 28 is provided with a through opening 36 of the same size and adapted to register with the opening 8 when the valve is in the full or partially open position as the case

may be. The lower portion of the piston 28 below the opening 8 slides against the guide 38, the upper edge of which forms a stop to limit the downward movement of the piston 28 when it abuts against the under surface 40 of the hollow portion of the piston 28. Integral with the vertical guide 38 is the bottom cap 42 which is suitably secured to the valve casing 6 as at 44. In order to guard against the turning of the piston 28 about its vertical axis I have keyed the lower portion thereof as at 46. In order to guard against binding of the valve due to suction or compression I have provided the upper guide 30 and the lower guide 38 with vertical through openings 48 (best seen in Fig. 5) through which the fluid that will seep into the hollowed portions 50 and 52 of the opposite portions of the piston may be circulated upwardly and downwardly according to the vertical reciprocation of the piston in the chamber 34. In order to prevent binding of the piston due to accumulation of fluid pressure above or below the bushing 32 I have provided the latter with openings 54 through which the fluid that is contained above or below the bushing 32 may be by-passed to the lower or upper portion of the chamber 34, with the vertical reciprocation of the piston in said chamber.

The operation is as follows:

Referring again to Fig. 1 it is pointed out that my valve is reversible in that the flow through the opening 8 can be in either direction in that it is not restricted to having one end serving as an inlet and the other end serving as an outlet. In order to reverse the operation of the valve it is merely necessary to disconnect the fastening means 22 and then to turn the valve casing 6 about its horizontal axis to bring the lower end thereof (as shown in Fig. 1) to abut against the lower edge of the top cover 18. Due to the fact that the valve is of non-symmetrical dimensions, namely, that the distance from A to B is less than it is from B to C, it follows that when the valve casing 6 is thus reversed the opening 8 is out of registration with the opening 36 through the piston so that the action of the diaphragm and spring-operating mechanism, which is not shown, is reversed. In order further to clarify this point it is pointed out that in conventional diaphragm-spring-remote-control-operated mechanisms it is the practice to utilize the spring to maintain the valve open with the diaphragm being used under pressure to counteract the spring and close the valve, or vice versa. As shown in the drawings, the valve

is illustrated as being adapted to be operated by a diaphragm-spring-remote-control-operated mechanism in which the upward tension of the spring serves to maintain the openings 8 and 36 in alignment and thus retain the valve open, and the downward pressure of the diaphragm serves to bring the openings 8 and 36 out of registration, as shown in Fig. 4, and thus to close the valve. With a construction of this kind it follows that, when the valve casing 6 is turned about its horizontal axis to reverse the position of the parts and bring the larger portion B—C of the valve into contact with the bottom of the cover 18, the opening 36 will normally be below the opening 8 which is the closing position, and the upward tension of the spring in that case will serve to pull the piston 28 up to bring the openings 8 and 36 into registration. Conversely, when the diaphragm, under pressure, pushes the piston 28 downwardly, it will again put the opening 36 out of alignment with the opening 8 and thus close the valve.

It will be noted that the piston proper, as well as the bearing surfaces against which it moves, are free of any packing or gaskets, and that these parts are made with a sufficient clearance to take care of expansion but with the possible seepage reduced to a minimum. However, between the top cover 18 and the bottom cover 42 and the adjacent ends of the valve casing 6 I utilize suitable gaskets 58 and I also provide the stem 24 with suitable packing 60 which prevents leakage about the stem 24 during its movement past the packing 60.

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

1. A valve construction of the character stated comprising a valve casing having a valve chamber formed therein and a through opening intersecting said valve chamber, a piston movable in

said valve chamber and having a through opening therein adapted to register with the through opening in said casing, the body portions of said piston on either side of the through opening therein being hollow, and guides engaging the inner surfaces of the hollowed portions of said piston and constituting stops for limiting the movement of said piston.

2. A valve construction of the character stated comprising a valve casing having a valve chamber formed therein and a through opening intersecting said valve chamber, a piston movable in said valve chamber and having a through opening therein adapted to register with the through opening in said casing, the body portions of said piston on either side of the through opening therein being hollow, and guides engaging the inner surfaces of the hollowed portions of said piston and having apertures formed therein for establishing communication between the respective hollowed portions of said piston and the adjacent portions of said piston chamber.

3. A valve construction of the character stated comprising a valve casing having a valve chamber formed therein and a through opening intersecting said valve chamber, a piston movable in said valve chamber and having a through opening therein adapted to register with the through opening in said casing, the body portions of said piston on either side of the through opening therein being hollow, and the portion of the valve chamber to one side of the through opening in said casing being of the same diameter as but longer than the portion of the valve chamber on the other side of said through opening, whereby said valve casing is rendered reversible with respect to an operating stem engaging actuating means and adapted to engage either end of said piston.

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