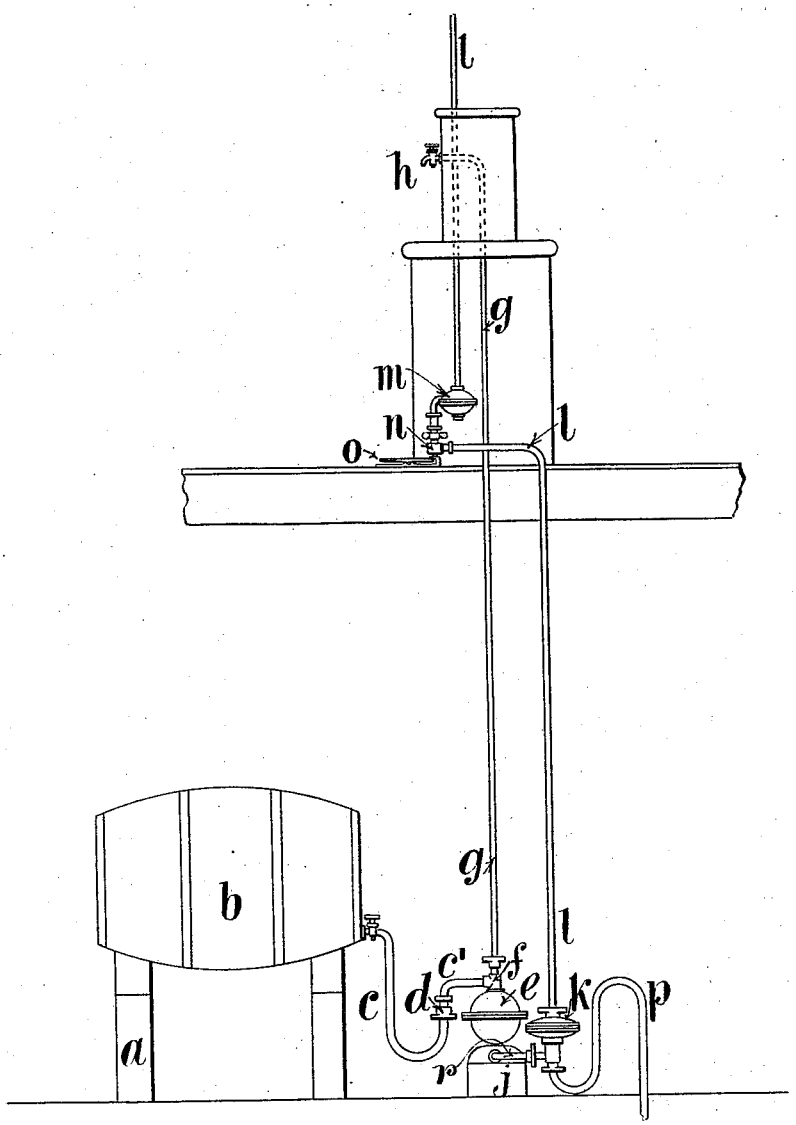
(No Model.) 2 Sheets—Sheet 1.

P. J. CATTERALL & E. BIRCH.

VALVE FOR REGULATING THE SUPPLY OF LIQUIDS.

No. 301,860. Patented July 15, 1884.

FIG. 1.



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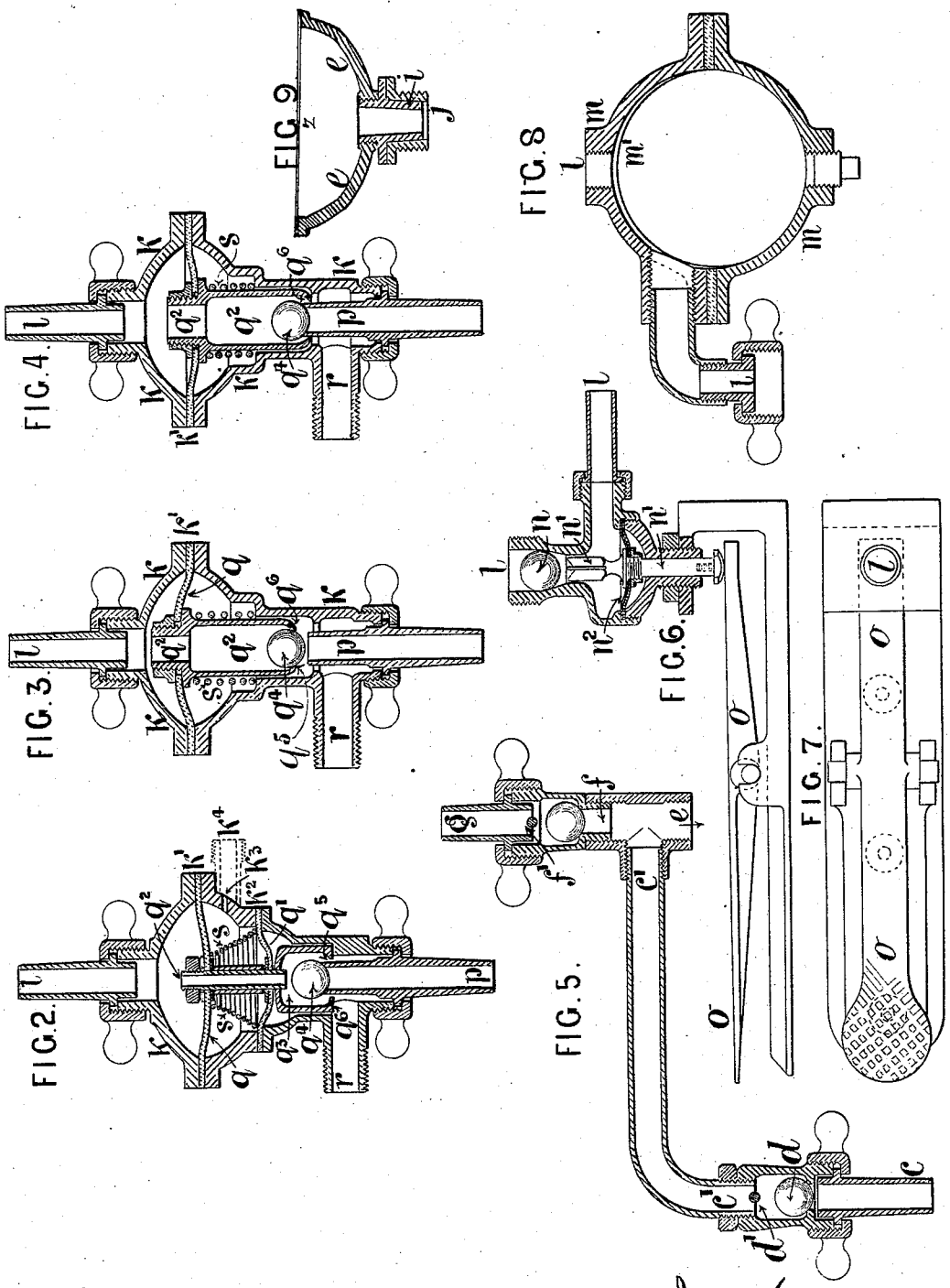

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UNITED STATES PATENT OFFICE.

PETER JAMES CATTERALL AND EDWARD BIRCH, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

VALVE FOR REGULATING THE SUPPLY OF LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 301,860, dated July 15, 1884.

Application filed December 10, 1883. (No model.) Patented in England November 25, 1882, No. 5,611, and in Belgium May 30, 1883, No. 61,537.

To all whom it may concern:

Be it known that we, PETER JAMES CATTERALL and EDWARD BIRCH, both subjects of the Queen of Great Britain, residing at Manchester, in the county of Lancaster, England, have invented a new and useful Improvement in Valves for Regulating the Supply of Water or other Liquids, (for which we have obtained a Patent in Great Britain, No. 5,611, bearing date November 25, 1882, and in Belgium, No. 61,537, bearing date May 30, 1883,) of which the following is a specification.

Our improvement relates to the invention for which we obtained Letters Patent of the United States No. 253,683, dated February 14, 1882, and is partly or wholly applicable for other purposes; and the object of our invention is to form an improved valve for regulating the supply of water or other liquid. We attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation showing the valve applied to apparatus for raising beer or other liquid. Fig. 2 is a sectional elevation upon a larger scale of the valve. Figs. 3 and 4 are sectional elevations of a modified form of the valve. Fig. 5 is a sectional elevation of the back-pressure valves. Fig. 6 is an elevation, partly in section, of the ball-valve in the water-supply pipe, and of the treadle for actuating the same. Fig. 7 is a plan of Fig. 6. Fig. 8 is a sectional elevation of an air-vessel for the prevention of concussion in the water-supply pipe; and Fig. 9 is a detached view in section, showing our arrangement for connecting the chamber to the water-chest.

Similar letters refer to similar parts throughout the several views.

In Fig. 1, *a* is the stillage, and *b* is the barrel containing the beer or other liquid to be raised. To the tap of this barrel is connected one end of the flexible tube *c*, the other end of which is connected to a back-pressure valve, *d*, (shown on an enlarged scale in Fig. 5,) communicating by the pipe *c'* with the upper part of the chamber *e*. This chamber is made in halves, and a diaphragm, Z, Fig. 9, of india-rubber or other pliant or flexible material, is fitted in the chamber, the periphery of the diaphragm being even with the periphery of the flanges of the halves of the chamber, which are then bolted together. This diaphragm effectually prevents any liquid admitted to the upper part of the chamber *e* from mingling with the water or other liquid admitted to the lower part of the chamber *e*. The upper part of the chamber *e* communicates through the back-pressure valve *f* (shown on an enlarged scale in Fig. 5) and pipe *g* with the delivery-tap *h*. The lower part of the chamber *e* is connected to the water-chest *j* by the taper-socket *i* in the manner shown in Fig. 9, and may be easily removed, if desired. Water is admitted to the water-chest *j* through the valve *k* (shown on an enlarged scale in Figs. 2, 3, and 4) and supply-pipe *l*, connected to the cistern. To the supply-pipe *l* are fitted the air-chamber *m* (shown in Fig. 8) and ball-valve *n*, actuated by the spindle *n'* and treadle *o*, as shown in Figs. 6 and 7. A waste-pipe, *p*, is connected to the lower part of the valve *k*. The bend in the waste-pipe is level with the top of the chamber *e*, and is for the purpose of keeping the chamber charged with water when the beer in the barrel is run off.

In the valve *k*, as shown in Fig. 2, *q* is the upper and larger diaphragm, and *q'* is the lower diaphragm, both of which are fixed to a tube, q^2. The periphery of each diaphragm is secured between the flanges of the shell or case *k*, as shown at *k'* and k^2. A chamber, q^3, is fixed to the lower end of the tube q^2. The chamber q^3 contains a ball, q^4, which rests on and closes a seating, q^5, and thus forms a valve. In the lowest part of the shell *k* is fixed the waste-pipe *p*, that may enter the chamber q^3 and be closed by the ball q^4, as shown in the drawings. To the top of the shell *k* is connected the water-supply pipe *l*, provided with the treadle-valve *n*. From the side of the lowest part of the shell projects a pipe, *i*, connected to the water-chest *j*, to which water is to be supplied. When it is desired to admit water to the water-chest *j*, the treadle-valve *n* of the water-supply pipe *l* is opened and water admitted to the valve *k*, the pressure of water forces down the upper diaphragm, *q*, and with it the lower diaphragm, *q'*, and tube q^2. Water flows through the tube q^2 around

the ball q^4 (which then rests on and closes the waste-pipe p) and through the side pipe, r, into the water-chest j. When the treadle-valve n of the water-supply pipe l is closed, a spring, s, lifts the diaphragms, tube q^2, and chamber q^3. The ball q^4 is thus raised from the waste-pipe p and rests on and closes the seating q^5 at the bottom of the chamber q^3, and allows the waste water to escape through the waste-pipe p. As the spring s raises the diaphragms, water passes through the vent-hole q^6, (formed in the bottom of the chamber q^3,) and thus allows the diaphragms to be raised. A hole, k^3, is made in the shell k, and when it is desired to raise the diaphragms, tube q^2, and chamber q^3 by water, instead of the spring s, a pipe, k^4, is attached, which is connected to the main water-supply, the pressure of which is continuous. This pressure of water raises the diaphragms and tube whenever the treadle-valve n is closed, and the supply of water through the pipe l is shut off from the upper diaphragm, q.

In the modified form of the valve k, as shown in Figs. 3 and 4, only one diaphragm is used, the lower diaphragm being dispensed with. The shell is made in two instead of three pieces, and the chamber and tube q^2 are formed in one piece. Fig. 3 shows the diaphragm q and tube q^2 raised, the treadle-valve n being closed and the pressure of water in the supply-pipe l being shut off. The ball q^4 rests in the seating q^5 at the bottom of the chamber q^2 and closes the valve. Fig. 4 shows the diaphragm q and tube q^2 in the position they would occupy when the treadle-valve n is opened and the pressure of water through the supply-pipe l is admitted to the valve k. The ball q^4 rests upon and closes the waste-pipe p, and water flows through the tube q^2 and pipe r into the water-chest j.

Fig. 5 shows the back-pressure valves d and f connected by the pipe c'. Each of these valves d and f is formed of a ball resting upon a seating. Pieces of wire d' and f' are fitted to prevent the balls from closing the pipes c' and g, respectively.

In Figs. 6 and 7, n is the ball-valve, and o is the treadle which actuates the valve-spindle n', secured to a flexible diaphragm, n^2, held at its periphery between the flanges of the body of the valve. The ball n rests in a conical seating near the foot of the water-supply pipe l.

In Fig. 8, m is the air-vessel placed between the treadle-valve n and the water-supply cistern, to prevent concussion in the pipes. m' is the india-rubber air-ball placed within and nearly filling the interior of the shell. l is the pipe which carries the water-supply from the cistern into and out of the air-vessel m to the treadle-valve n, and thence to the valve k. To regulate the flow of water in the pipe l, a screw-down tap is placed between the cistern and the air-vessel m. (This tap is not shown in the drawings.)

Fig. 9 shows the lower part of the chamber e connected by the taper socket i to the water-chest j.

The mode of operation of the whole apparatus is as follows: The beer or other liquid flows from the barrel b through the tube c, valve d, and tube c' and fills the chamber e. When it is wished to draw beer, the tap h is opened, and the treadle o is operated so as to raise the ball in the valve n and admit water or other liquid through the supply-pipe l, valve k, pipe r, and chest j into the lower part of the chamber e. The pressure of the water forces up the diaphragm in the chamber e, raises the beer through the pipe g, and delivers it through the tap h. The back-pressure valve d prevents any beer from being forced back into the barrel b. When sufficient beer has been drawn, the treadle o is released, and the ball allowed to fall and close the valve n and shut off the supply of water through the pipe l. The diaphragms and tube q^2 then rise in the valve k and allow some of the water to escape from the chamber e and chest j through the waste-pipe p, and the beer from the barrel b again fills the chamber e. The back-pressure valve f prevents any beer from returning from the pipe g to the chamber e.

Having stated the nature of our invention and described the manner of performing the same, we declare that what we claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of a spring-pressed diaphragm having an inlet, allowing the flow of liquid in the direction opposite to the pressure of said spring, with a tube extending through said diaphragm and movable therewith, two outlets arranged below said tube, and a valve which closes one of said outlets when the liquid flows as aforesaid, but leaves it open when the liquid ceases to flow in that direction, substantially as set forth.

2. In combination with the beer-vessel, pipes, backflow-valves, and diaphragm-chamber e, arranged substantially as described, devices for letting on or cutting off the supply of water at any time, and a valve provided with a spring-pressed diaphragm, a tube extending through said diaphragm and movable therewith, two outlets—one extending to the diaphragm-chamber e, the other allowing escape of water—and a ball which automatically closes the latter when the flow of water is let on to force out the beer, substantially as described.

The foregoing specification of our improvement in valves for regulating the supply of water or other liquid signed by us this 30th day of October, 1883.

PETER JAMES CATTERALL.
EDWARD BIRCH.

Witnesses:
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