

No. 683,179.

Patented Sept. 24, 1901.

J. KELLY.
VALVE DEVICE.

(Application filed May 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.

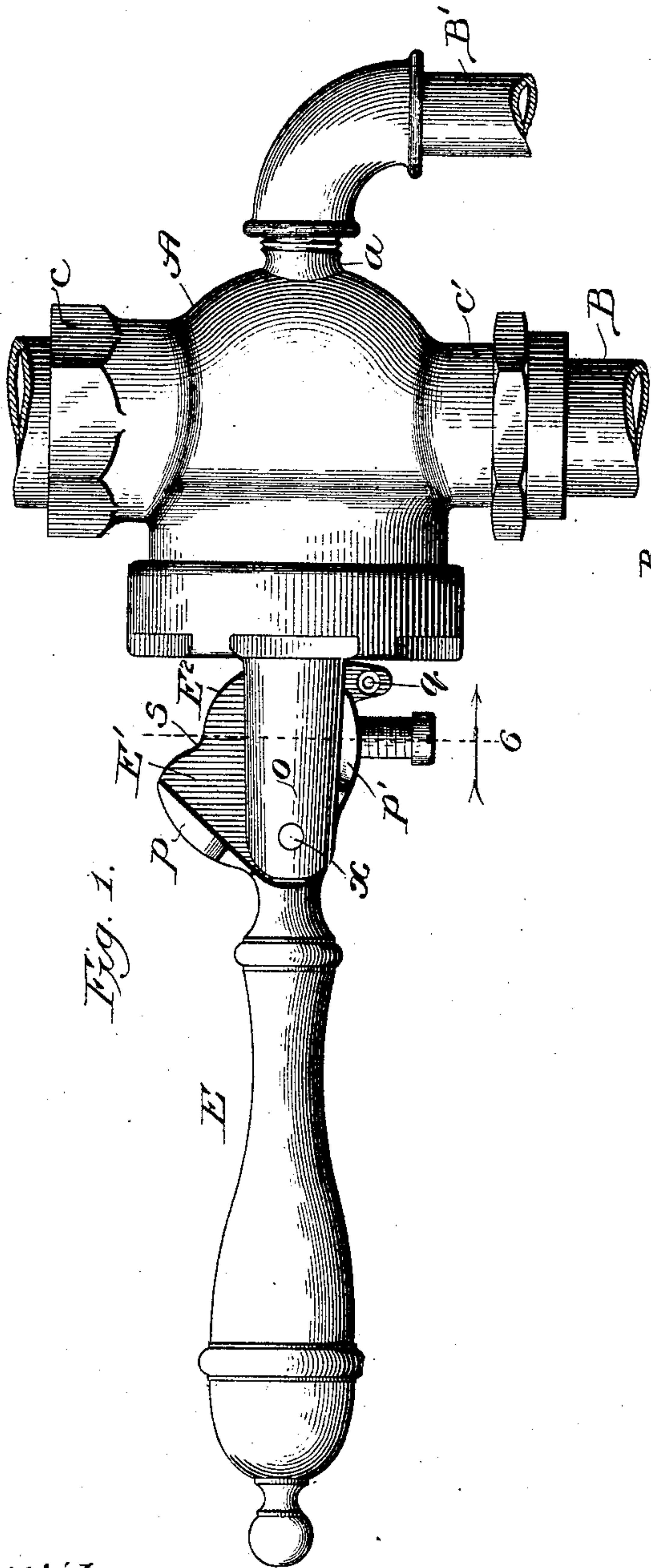


Fig. 1.

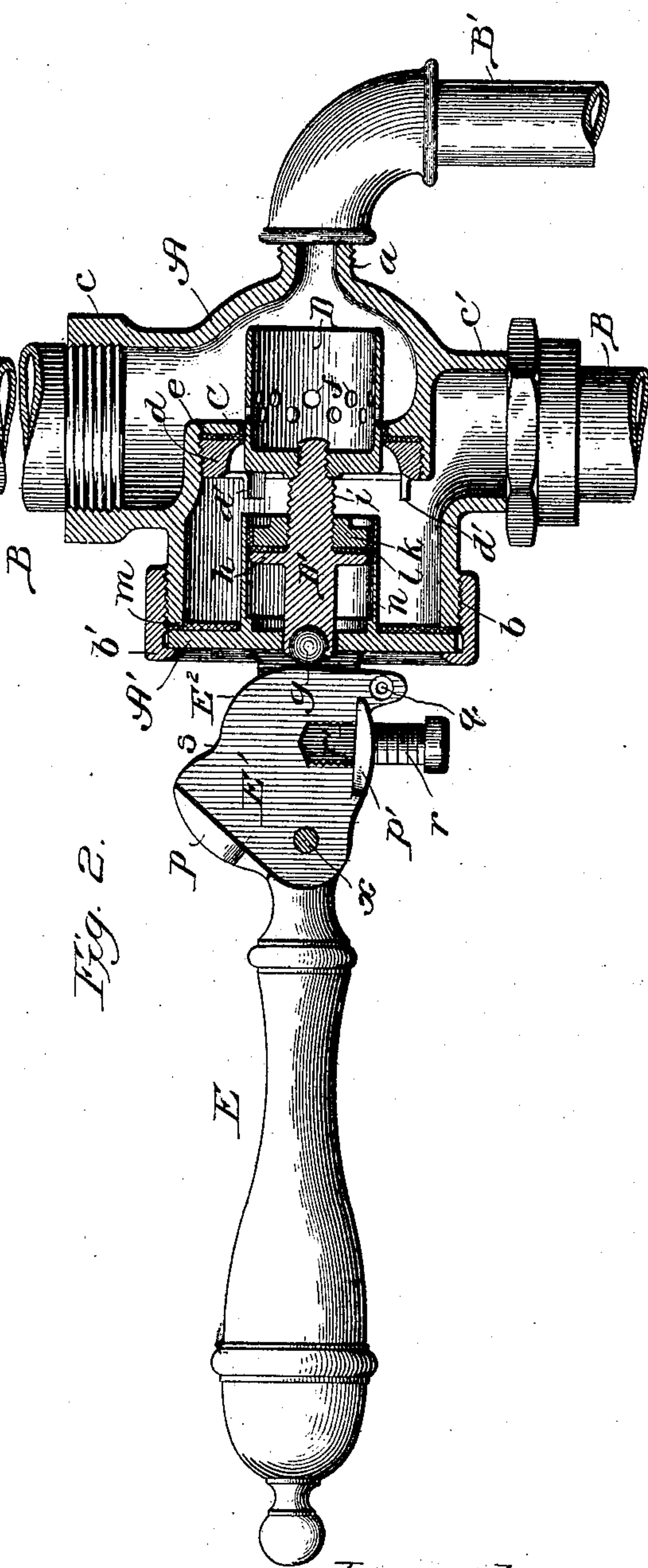


Fig. 2.

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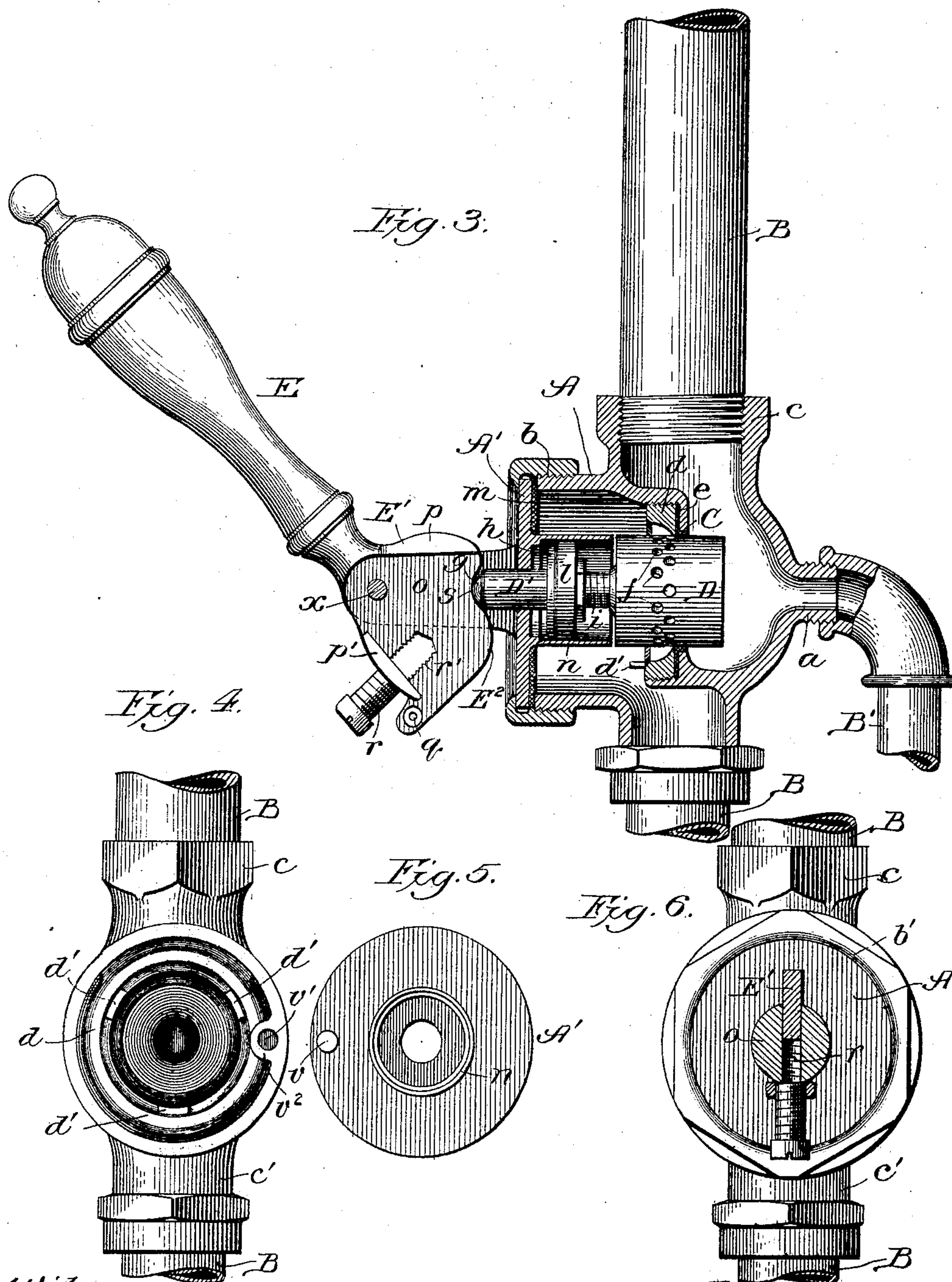
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UNITED STATES PATENT OFFICE.

JOHN KELLY, OF CHICAGO, ILLINOIS.

VALVE DEVICE.

SPECIFICATION forming part of Letters Patent No. 683,179, dated September 24, 1901.

Application filed May 10, 1901. Serial No. 59,621. (No model.)

To all whom it may concern:

Be it known that I, JOHN KELLY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented a new and useful Improvement in Valve Devices, of which the following is a specification.

My invention relates to an improvement in the class of valve devices adapted to be inter-
10 posed in a pipe leading from a supply of liquid under pressure to its point of discharge and in which the valve is of the piston variety, with the passage through it normally main-
15 tained by a weight or spring beyond and closed to the path of the course of water through the pipe, so as to prevent the flow, but which may be retracted at will into such path to permit the flow through the pipe.

I have especially devised my improvement
20 for use in controlling the flushing action of a water-closet, and therefore herein mainly confine the description to its application to that use, in which particular connection my primary object is to provide a valve device of
25 the character described that shall be adapted to be worked by hand and to be conveniently set to produce under any desired degree of pressure from the flush-tank an automatic periodical flush.

Referring to the accompanying drawings,
30 Figure 1 shows my improved valve device by a view in side elevation. Fig. 2 is a vertical sectional view of the same, showing the operating-handle in elevation with the valve
35 closed. Fig. 3 is a view like that presented by Fig. 2, but showing the operating-handle raised and the valve open. Fig. 4 shows the valve device by a view in elevation with the operating-handle and parts pivotally connect-
40 ed with it and the screw-ring for fastening it to the valve-shell removed. Fig. 5 is a view in elevation of the inner face of the disk, to the opposite side of which the operating-handle is pivotally connected; and Fig. 6, a sec-
45 tion taken at the line 6 on Fig. 1 viewed in the direction of the arrow and enlarged.

A is the valve-shell, preferably of the shape illustrated, which is approximately hemi-
50 spherical toward one end, from the center of which projects outward a threaded nipple *a*, and cylindrical toward its opposite open end,

about which is provided a circumferential screw-thread *b*. At right angles to the nip-
ple *a*, on the top and bottom of the shell A, respectively, are provided the internally-
55 threaded nipple *c* to receive the lower end of the upper section of a water-closet flush-pipe B and the externally-threaded nipple *c'* to couple the lower section of such flush-pipe with the shell. Within the shell, concentric
60 with the nipple *a*, is formed a vertical annular valve-seat C, provided with an internally-threaded annular flange, projecting toward the straight covered end of the shell to re-
65 ceive an externally-threaded clamping-ring *d* for clamping a leather or other suitable washer *e* against the adjacent face of the seat C to pack it. Lugs *d'* are shown projecting at intervals from the outer face of the ring *d*
70 to afford means for taking hold of it with the fingers to screw and unscrew it, and the inner surface of this ring is shown of conical form.

D is a piston-valve in the form of a cylin-
75 drical cup open at one end and closed at the opposite end, with circumferential series of apertures *f* formed between its ends, and extending from the closed end of the valve is a stem D', carrying an antifriction-ball *g* in a socket formed in its outer extremity and a
80 disk head *h* at one end of its threaded section *i*, on which is screwed a nut *k* for clamping a leather or other suitable washer *l* against the inner face of the disk head.

The cylindrical end of the shell A is closed
85 by a head A' bearing against a packing-washer *m* and removably held in place by a ring *b'*, screwed upon the thread *b*. On the inner face of this head is provided a stud *v* to enter a socket *v'*, provided in a boss *v²* on
90 the end of the shell for guidance in adjusting the head in place. The valve D passes through the seat C, and its stem protrudes through a central opening in the head A', about which opening on the inner side of the head is formed
95 a cylindrical cup *n* to receive the packed disk head *h* and form therewith an outer stuffing-box to prevent leakage. From the center of the outer side of the head A' extends a ver-
100 tically split or bifurcated bearing *o* for the operating-handle E, the inner end of which is formed as a head E', embraced between the

sides of the bearing *o*, on which it is fulcrumed, as represented at *x*. The extremity of the head *E'* where it bears against the ball *g* in the valve-stem forms a cam *E²* and is provided with stop-flanges *p p'* to limit the extent of its movement by engaging at opposite ends of its throw with the upper and lower sides, respectively, of the bearing *o*. A set-screw *r* works in a socket *r'*, extending through a stop-flange *p'* at the base of the handle-head *E'* and continued as an internally-threaded semicylindrical depression in a side of the latter for a purpose hereinafter described, and in the lower extremity of the handle-head is formed an eye *q* for attachment of a pull-chain, also for a purpose hereinafter described.

To use the valve device for controlling the flush in a water-closet, the shell *A* is interposed, as represented, in the flush-pipe *B*, leading from an overhead flush-tank (not shown) to the closet-bowl, (also not shown,) and the pipe *B'*, which leads from the water-supply system, is coupled to the nipple *a* to enable the tank to fill from that pipe through the valve-shell and through the upper section of the pipe *B*. With the cam-head *E'* bearing against the valve-stem *D'* in the position of the operating-handle illustrated in Figs. 1 and 2 the valve-openings *f* are all beyond the valve-seat *C* in the closed portion of the valve-shell, and the valve being effectually packed by the washer *e* communication is cut off from the nipple *c* to the nipple *c'*, whereby the valve is closed, and however great the pressure may be of the water in the flush-tank it cannot overcome the dead-center of the horizontally-disposed operating-handle *E* by the force it exerts in the valve-shell against the valve. Then to produce the flush the handle, which should be located in position relative to the closet-seat to be readily accessible, is raised to the position in which it is illustrated in Fig. 3, wherein the concaved section *s* of the cam-head *E²* is opposed to the valve-stem, permitting the water-pressure to force out the valve far enough to bring its openings *f* beyond the opposite side of the valve-seat *C* in the cylindrical part of the shell, whereby the water from the flush-tank may flow through the shell by way of the valve and out at the nipple *c'*. To thus produce the flush, it is only necessary to start the rise of the operating-handle, since as soon as it is raised off the dead-center the force of the water-pressure against the valve will complete the upward throw. The weight of the handle *E* when the water-pressure is released will return it to its position of again closing the valve. If it be desired to produce the flushing operation by a pull-chain, (not shown,) the latter may be attached to the cam-head *E'* at the eye *q* to enable the operating-handle to be raised to the position shown in Fig. 3 by pulling the chain; but

then the valve device should be placed higher up in the flush-pipe than when the handle *E* is intended to be operated by hand.

By providing the set-screw *r* or some analogous means suitable for the purpose the operating-handle may be set off the dead-center at any angle to the valve-stem to enable its resistance to be overcome automatically by the water-pressure against the valve, the angle to which the handle is set being determined by the amount of water-pressure in the flush-tank. Thus a periodical flush may be automatically produced, since whenever the pressure in the flush-tank becomes sufficient to overcome the resistance of the operating-handle the pressure will open the valve. It will be observed that the set-screw *r* of the illustrated adjusting device for this purpose protrudes as to about half of its diameter beyond the semicylindrical depression in a side of the head *E'*, so that the exposed section of the end of the screw may abut against the lower edge of a bearing member *o*, thus to stop the handle *E* at any angle to which it may be adjusted.

With the flush-tank closed air-tight, as it should be by preference, it acts as an air-chamber and will prevent water-hammer on all the fixtures of an ordinary-sized house.

While the details shown and thus quite minutely described produce the best construction now known to me of valve device for the embodiment of my improvement, they may be variously modified by those skilled in the art without departure from my invention, which consists in the general as well as in the more specific construction of the device and, in the broadest conception, in the gravity (or a spring-controlled) action of the operating-handle with the cam-head bearing against the valve to maintain it normally closed.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a valve device, the combination with the shell having an inlet and an outlet, at which it is adapted to be coupled into a flush-pipe, a water-supply opening communicating with said inlet and a closing-head at one end, of a packed annular valve-seat interposed in the shell between said inlet and outlet, a piston-valve comprising a cup confined in said seat and provided with openings and with a stem protruding through said head, a stuffing-box comprising a cup on the inner side of said head and a packed disk head on the stem fitting within said cup, and a pivotal gravity-handle having a cam-head bearing against the protruding end of said stem, substantially as and for the purpose set forth.

2. In a valve device, the combination with the shell having an inlet and an outlet, at which it is adapted to be coupled into a flush-pipe, a water-supply opening communicating with said inlet and a closing-head at one end, of a packed valve-seat interposed in the shell

between said inlet and outlet, a piston-valve
confined in said seat and provided with a stem
protruding through said head, a gravity-han-
dle pivotally supported on a bearing on said
5 head and having a cam-head bearing against
the protruding end of said stem, and a set-
screw working in said cam-head against said

bearing for setting the handle at any desired
angle to said stem, substantially as and for
the purpose set forth.

JOHN KELLY.

In presence of—

D. W. LEE,

ALBERT D. BACCI.