

No. 717,018.

Patented Dec. 30, 1902.

R. M. PAUL.
FLOAT OPERATED COCK.
(Application filed May 5, 1902.)

(No Model.)

Fig. 1

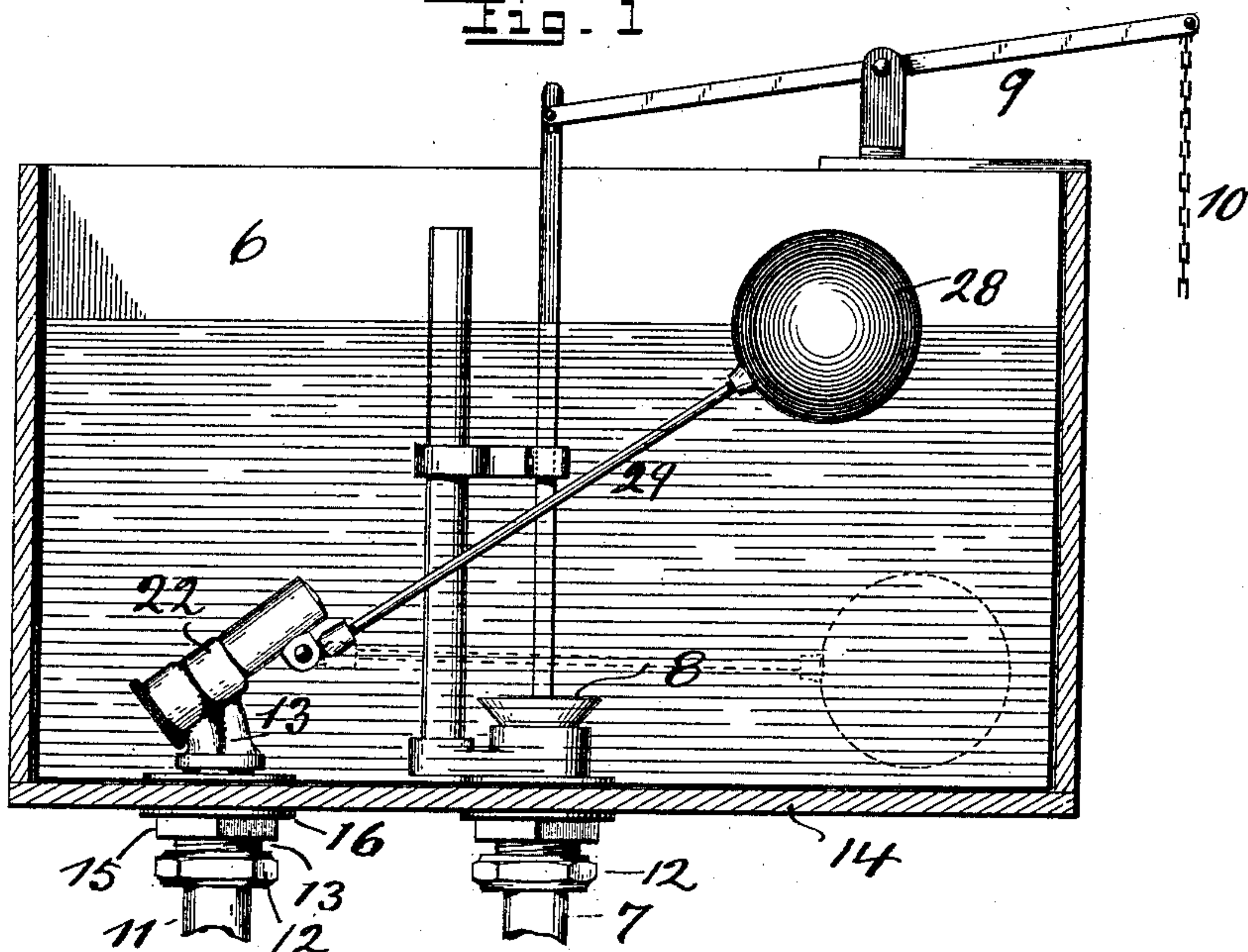


Fig. 2

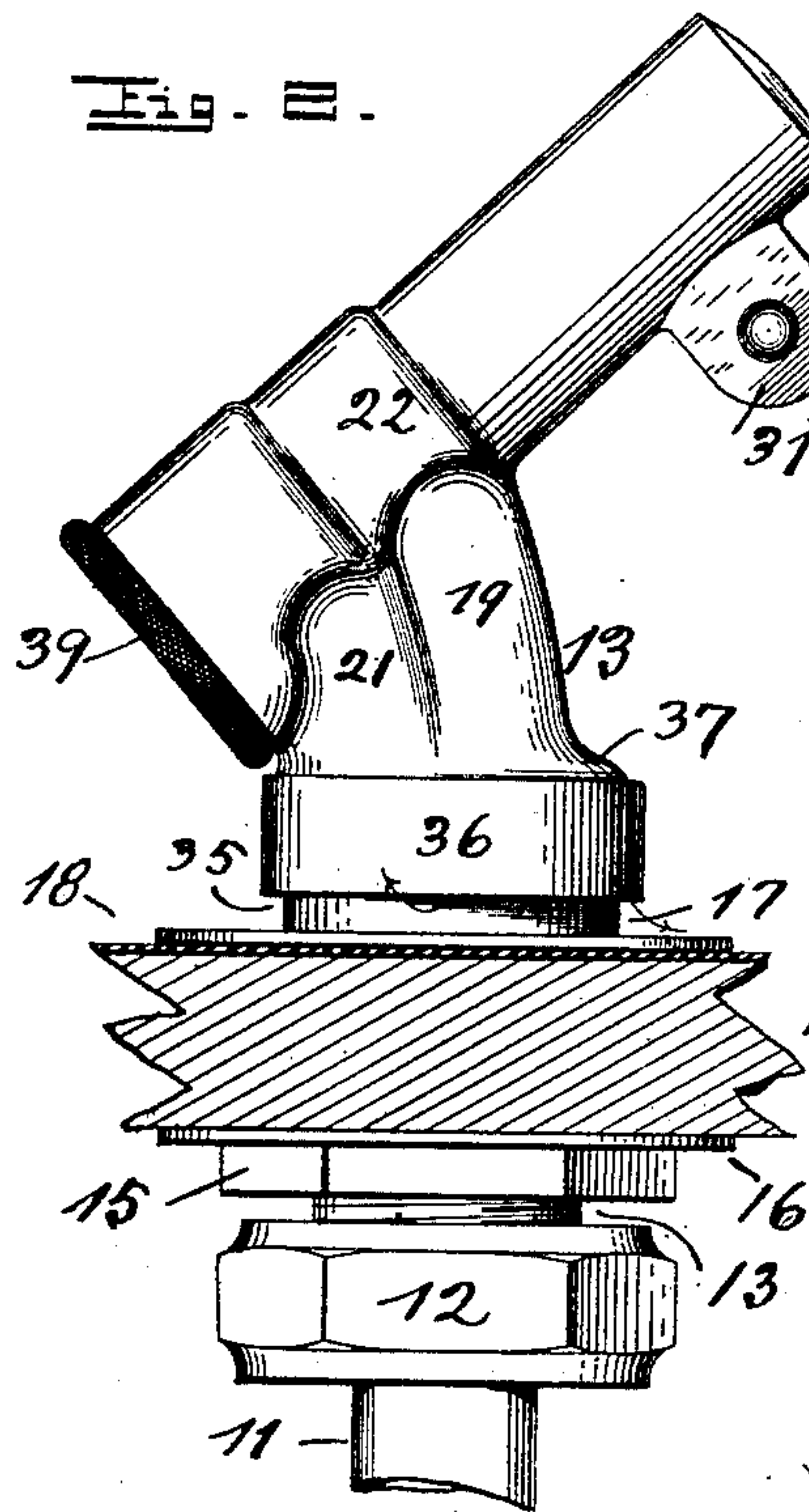


Fig. 3

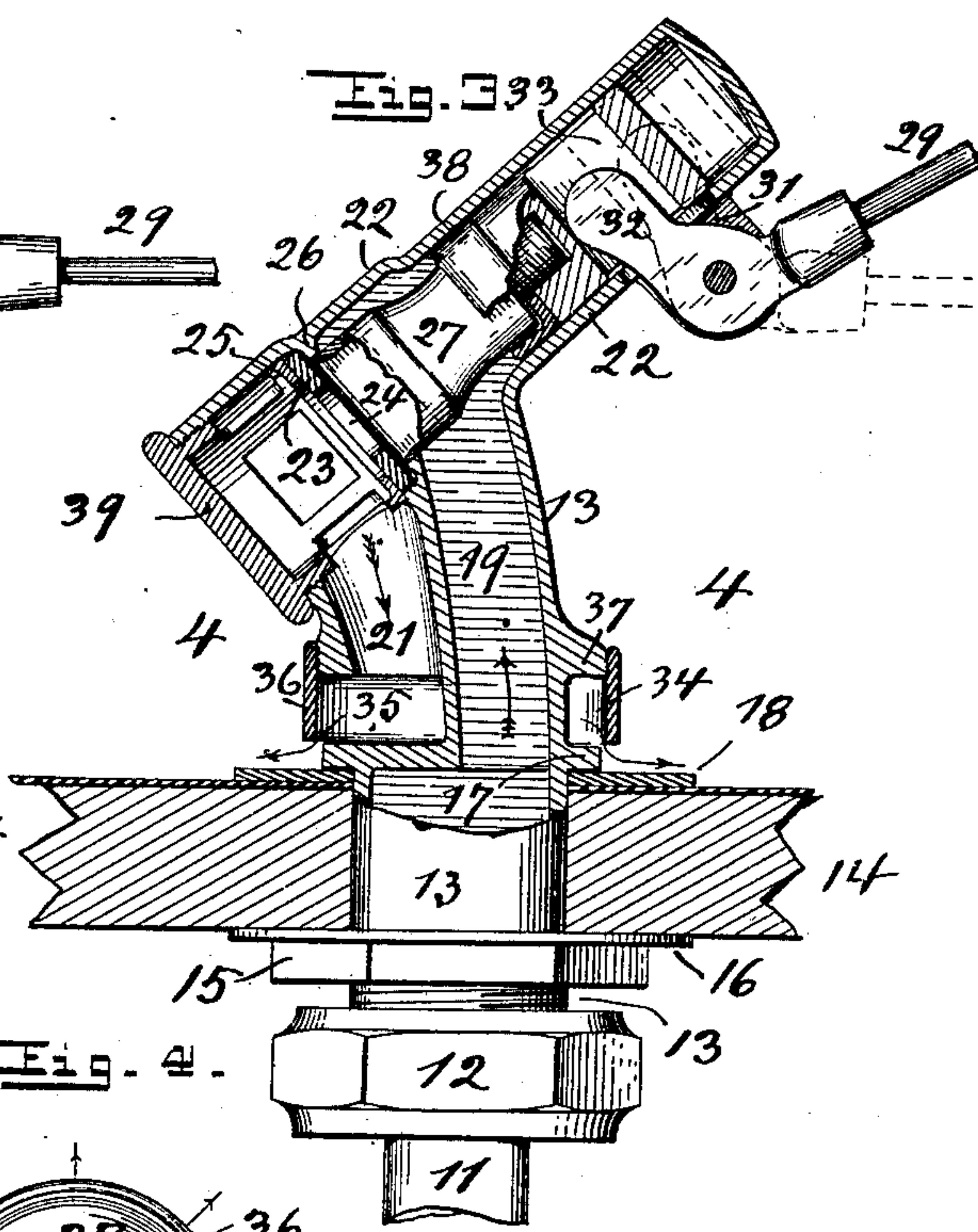
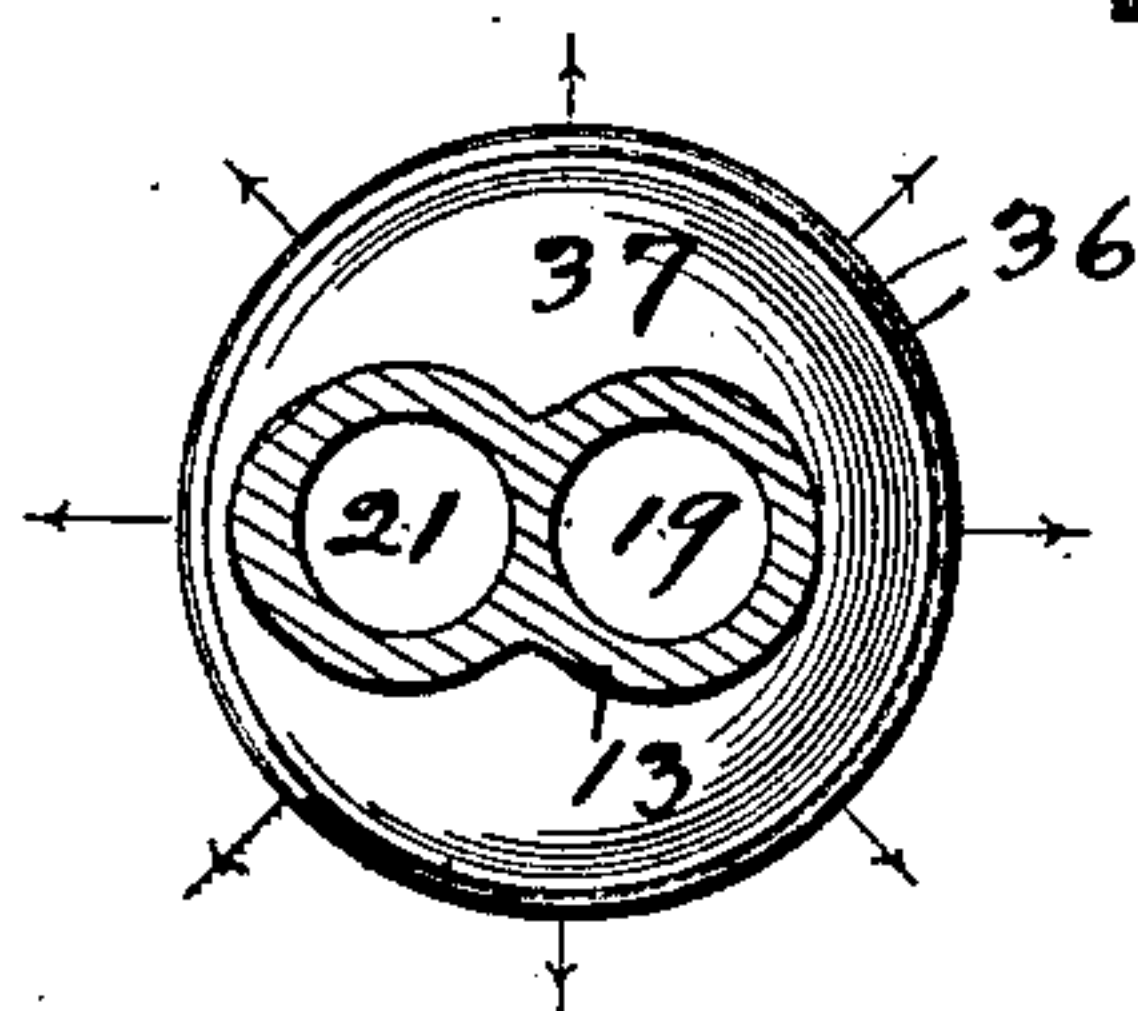


Fig. 4



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UNITED STATES PATENT OFFICE.

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FLOAT-OPERATED COCK.

SPECIFICATION forming part of Letters Patent No. 717,018, dated December 30, 1902.

Application filed May 5, 1902. Serial No. 105,947. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. PAUL, a citizen of the United States, and a resident of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Float - Operated Cocks; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form also a part of this specification.

This invention relates to improvements in float-operated cocks which are devices automatically controlled by the movements of a float. They are also sometimes called "ball-cocks" and are attached to the inside of a reservoir or tank, which they automatically supply, being operated and controlled for such purpose by a float connected to them, which falls and rises with the level of the water in the tank. Thus the cock is opened when the float drops with the lowering level of the decreasing supply and it is closed when the rising level of the supply lifts the float. One of their uses is in connection with water-closets, where they serve to control the supply to the flushing-tanks thereof, and since this use for such purpose is quite an extensive one I have devised and illustrated my invention as applied in such connection.

The invention consists of certain features of construction, the leading effects of which are a quick operation of the valve in response to the actuation by the float, a perfect seat of it, and a noiseless discharge.

In the following specification, and particularly pointed out in the claims following, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 shows in side view my improved device attached in position within the flushing-tank of a water-closet, the tank being shown in section. Fig. 2 shows an enlarged side view of the device. Fig. 3 is a vertical cross-section of the preceding figure, and Fig. 4 is a horizontal section on line 4-4 of Fig. 3. 6 is the tank which the cock of my invention is intended to supply whenever all or the larger part of the contents thereof have been

discharged through outlet-pipe 7 in consequence of an operation of outlet-valve 8 by means of lever 9 and pull device 10. The supply comes from a pipe 11, which may be the service-pipe from a city waterworks system, and the upper end of which connects by means of a union-coupling 12 to the lower end of the neck 13 of the device, which lower end is threaded for such purpose, as shown. This neck is inserted into an opening in the floor 14 of the tank, and with its lower end projecting out below permits engagement of it by a nut 15, which with an interposed washer 16 holds the device in position within the tank. On the inside of this latter neck 13 has a flange 17, which by means of nut 15 is drawn against the bottom of the tank, so that with a washer 18 interposed and clamped between a water-tight joint is obtained thereat. The upper part of the neck contains two ports, an inlet-port 19 and an outlet-port 21, both substantially parallel with each other and both communicating at their open upper ends with a valve-housing 22. This latter is arranged at an angle to neck and ports, the particular angle selected being one most suited for particular location of ports and connection of the float-lever. Located so as to be intervenient these ports and fitted to fill the area of the valve-housing there is a valve-seat 23 in shape of a disk, with a passage-opening 24, and held in position between shoulders 25 and 26 inside of the valve-housing. It is preferably formed of rubber or a similar slightly-yielding material adapted to furnish a perfect seat. 27 is the valve operating in conjunction with this seat, it being substantially a plug capable of a sliding movement to or from the valve-seat, being guided for such purpose by the valve-housing, into the upper part of which it is fitted. Its lower end is countersunk, so that only a limited annular surface around its edge comes in contact with the valve-seat, thus insuring a more perfect closing contact.

Passage 24 is closed or opened by plug 27 as the same is caused to move to or from the valve-seat, such movements being due to the movement of a float 28, carried at the outer end of a float-lever 29. This latter is pivoted to lugs 31, which project from the side of the valve-housing 22, and its inner end 32 reaches

into the valve-housing through an opening in the wall thereof, engaging the plug-valve within, the engagement being by means of a slot 33 in said plug. The valve is closed and held so when the rising water-level has lifted float 28 to a position sufficiently high and about as shown in Fig. 1. At that time the inner end 32 of the float-lever bears against the valve-plug in a direction toward the valve-seat. When the water-level recedes by reason of discharge of water through outlet-pipe 7, the float commences to drop, but does not immediately affect the valve by reason of the space or play provided between end 32 of the lever and the end of slot 33. The valve is therefore not opened until this space is overcome, whereby the influx of fresh water is deferred and time provided to permit a sufficient quantity of the contents of the tank to discharge. The valve does therefore not open until the float has sunk almost to its lowest position, at which time the short end 32 of the lever finally acts upon the valve and opens this latter quickly. The water now passes out of port 19 into the valve-housing, passes through passage 24 and through port 21 into an annular discharge-chamber 34, provided around neck 13 and above the tank-floor. The final discharge takes place through an annular discharge-orifice, as shown at 35, and is so directed from the lower part of the discharge-chamber as to be precipitated in form of a flat sheet against the floor of the tank, as shown by the arrows in Figs. 3 and 4. The discharge is thereby perfectly noiseless, and also, by reason of being directed across the bottom of the tank, it serves to prevent accumulation of sediment.

The casting for this device cannot very well be prepared in a manner to provide for the discharge-chamber by integral parts, for which purpose it is formed by means of a ring 36, forming the outer wall of said chamber, and being secured, preferably, by a screw connection to a shoulder 37, projecting from the outside of the neck.

The closing of the valve takes place by analogous operation, but in reverse order, and by reason of the play in slot 33, before mentioned, the short end 32 of the float-lever, actuated by the rising float, does not immediately act upon the valve for the purpose of closing the same.

Any inclination of the valve to close freely is further counteracted by creating a back pressure in the discharging water, which is done by having the area of the discharge-orifice 35 somewhat smaller than the area of passage 24. The water is thus caused to choke in port 21 and crowds against the under side of the valve. When the buoyancy of the float finally does overcome these opposing effects, the valve moves quickly, closing passage 24 at once, and thereby preventing the whizzing and singing noise produced in all devices where the water is shut off gradually by a slow movement.

To prevent leakage into the upper part of the valve-housing, I provide a packing 38, suitably held in place. It is done by having the plug-valve in two parts secured to each other by a screw connection and with the packing clamped between these two parts. Below this packing there is a space between the valve and its housing to permit free access of water all around, which may thus quickly reach passage 24 as soon as the valve is opened. By pressing equally against said valve the same becomes practically a balanced valve as far as any counter effects, due to the water-pressure and interfering with its operation, are concerned.

To permit introduction of the interior parts into the valve-housing, parts of this latter must necessarily be separable to permit access for such purpose. I provide for such access at the lower end by means of a cap 39, inserted endwise and held in place by a screw connection. The side of this cap is extended inwardly sufficiently, so as to enable its inner end to form shoulder 25, which, as already explained, serves as one of the means for holding valve-seat 23 in place. This side is also sufficiently open by perforations therein to prevent closing of access to port 21 and interference with the passage of water there-through.

While a float has been shown to operate this valve automatically, it is clear that it may also be positively operated by manual operation, and in which case a suitable handle would be provided in place of the float and its lever. It might be a lever like the float-lever, only shorter. There being no pressure against the valve tending to move it, no means would have to be provided to hold it in either its open or closed position, since it will remain in any position to which it has been moved.

Having described my invention, I claim as new—

1. In a device to control passage of liquid matter, the combination of a cylindrical valve-housing closed at both ends, an attaching-neck for it, the same connected to the side of the valve-housing between the ends thereof, two ports in this neck communicating with the valve-housing through two corresponding openings in the side thereof, a valve-seat formed in the valve-housing and between the two port-openings in the side thereof, a valve fitted for guidance into this valve-housing and means to move it to and from its seat.

2. In a device to control passage of liquid matter, the combination of a cylindrical valve-housing closed at both ends, an attaching-neck for it, the same connected to the side of the valve-housing between the ends thereof, an annular discharge-chamber formed around this neck and provided with an annular discharge-orifice of limited width in its outer wall, two ports in this neck communicating with the valve-housing through two corresponding openings in the side thereof and

one of them also communicating with the discharge-chamber mentioned, a valve-seat formed in the valve-housing and between the two openings in the side thereof a valve fitted for guidance into this valve-housing and means to move it to and from its seat.

3. In a device to control passage of liquid matter, the combination of a cylindrical valve-housing closed at one end and provided with an annular shoulder 26 between its ends, a cap 39 closing the other end and extending inwardly toward shoulder 26, a perforated disk held in position between shoulder 26 and the inner end 25 of cap 39, an attaching-neck having two ports in it, one of them communicating with one part of the valve-housing

on one side of the perforated disk, the other port with the other part on the other side of the disk, the communication being in each case through a corresponding opening in the side of the valve-housing and between the closed ends thereof, a valve fitted for guidance in one part of the valve-housing and means to move it to and from the perforated seat therein.

In testimony whereof I hereunto set my signature in the presence of two witnesses.

ROBERT M. PAUL.

Witnesses:

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ARTHUR KLINE.