

No. 621,362.

Patented Mar. 21, 1899.

S. McELROY.
AUTOMATIC VALVE.

(Application filed Sept. 4, 1897.)

(No Model.)

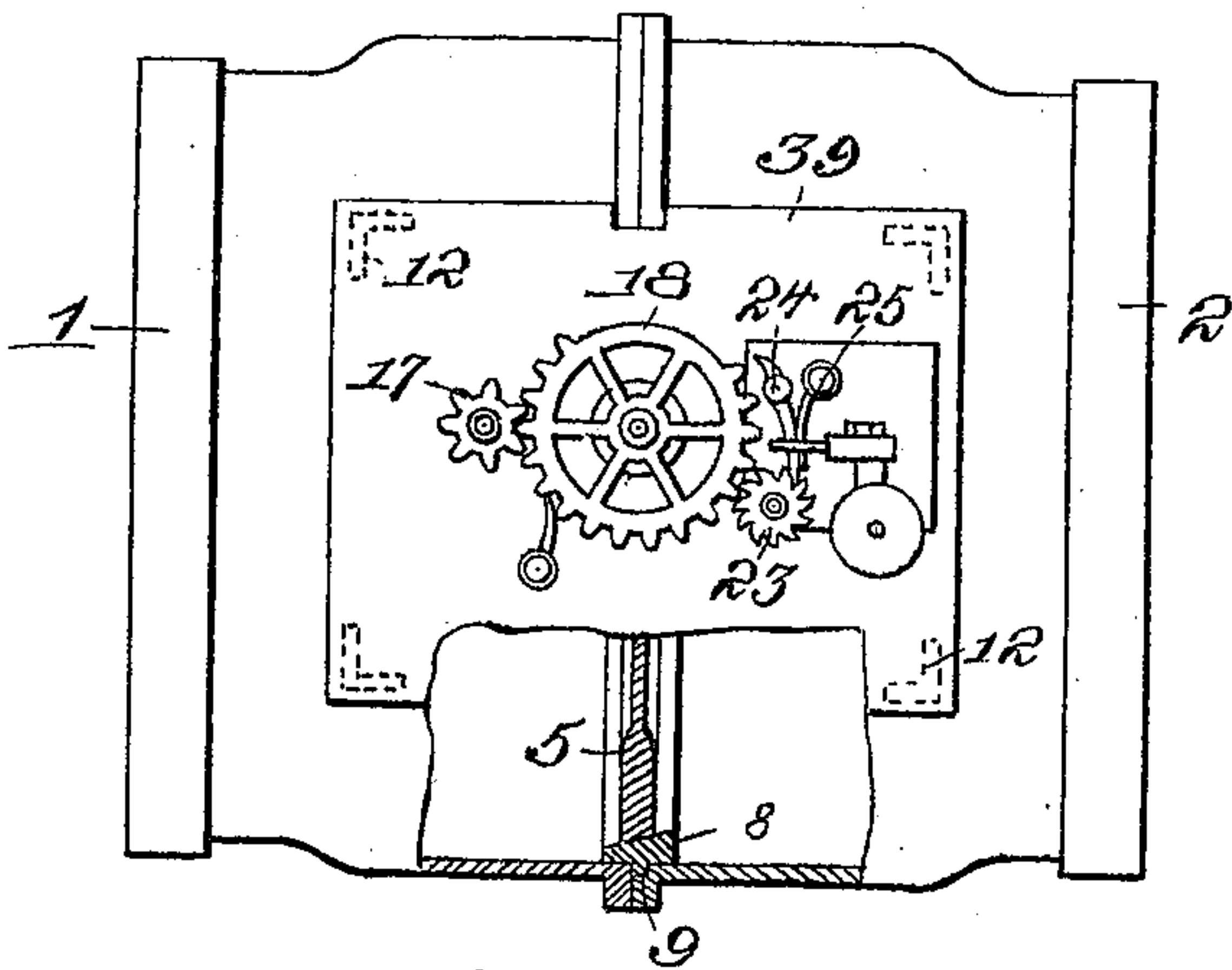


Fig. 1.

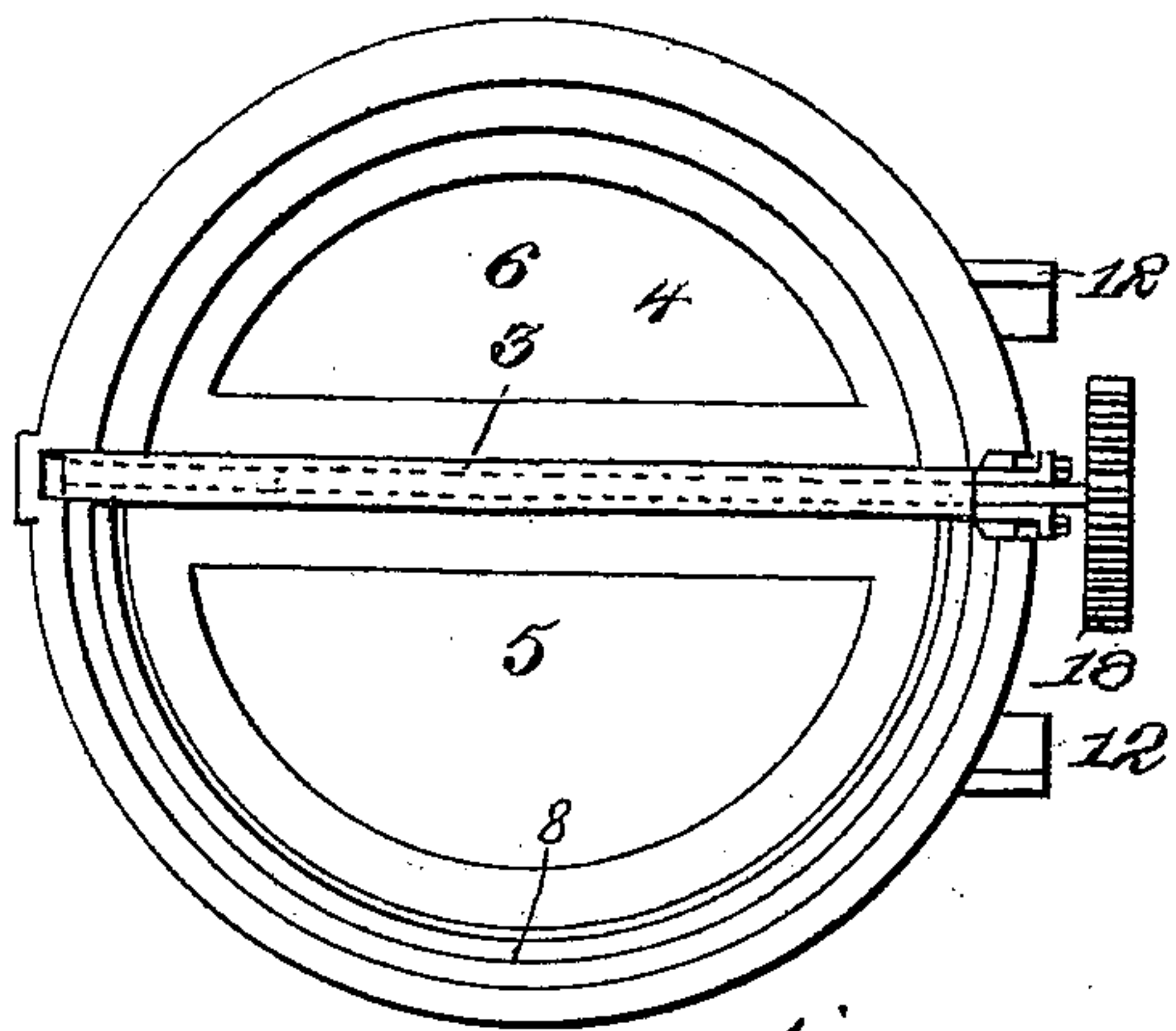


Fig. 2.

Fig. 6.

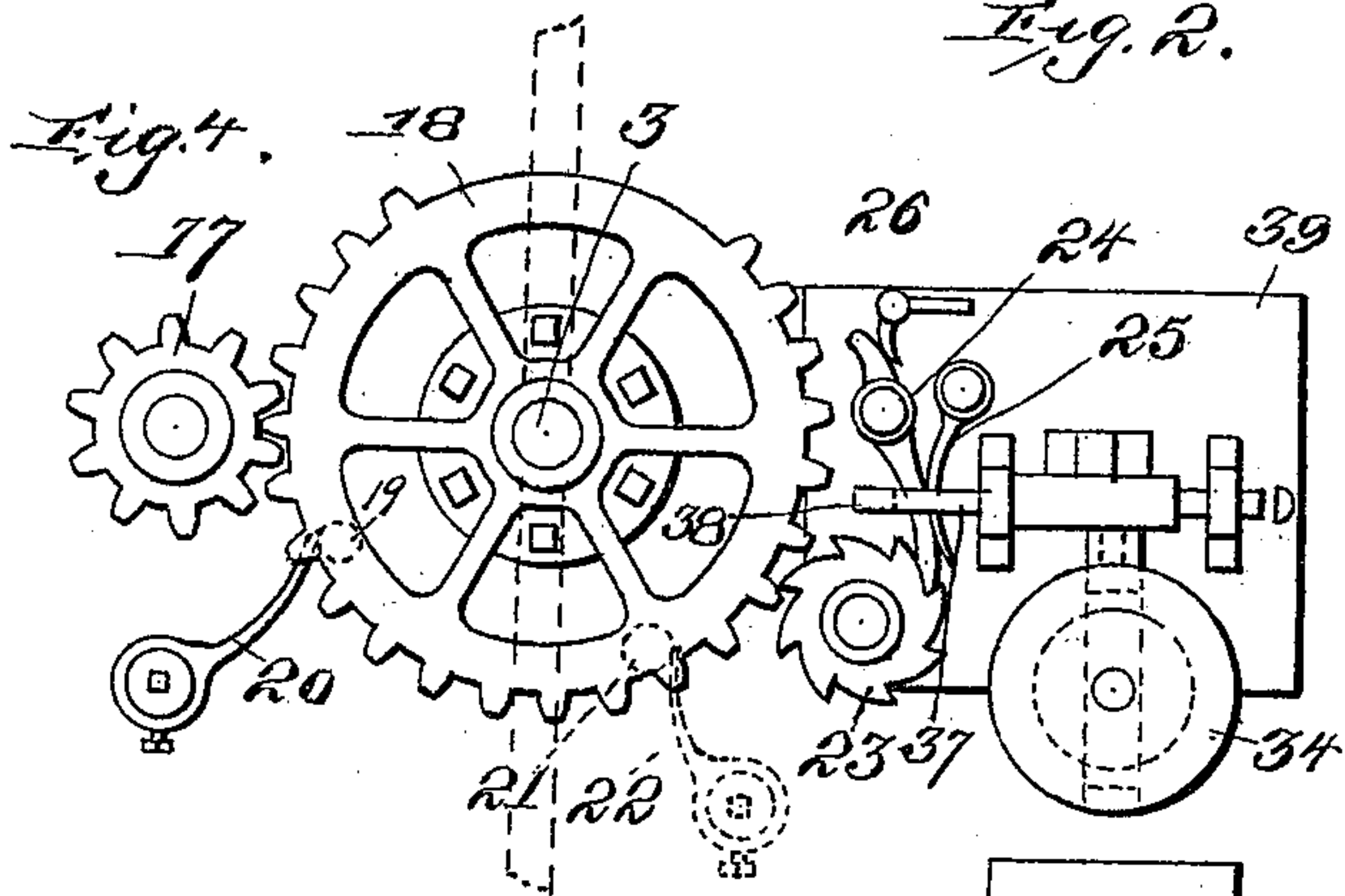
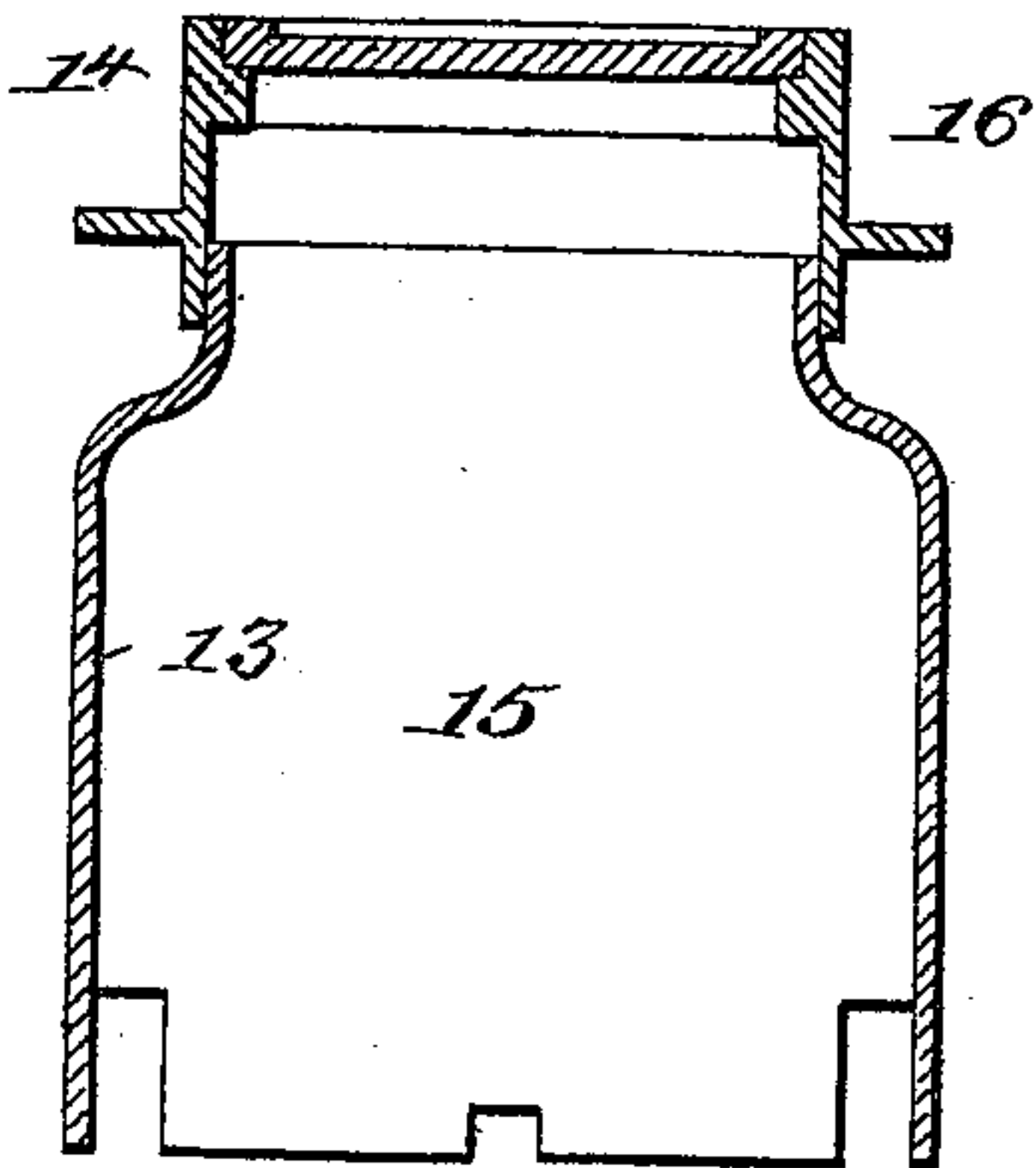


Fig. 4.

Fig. 5.

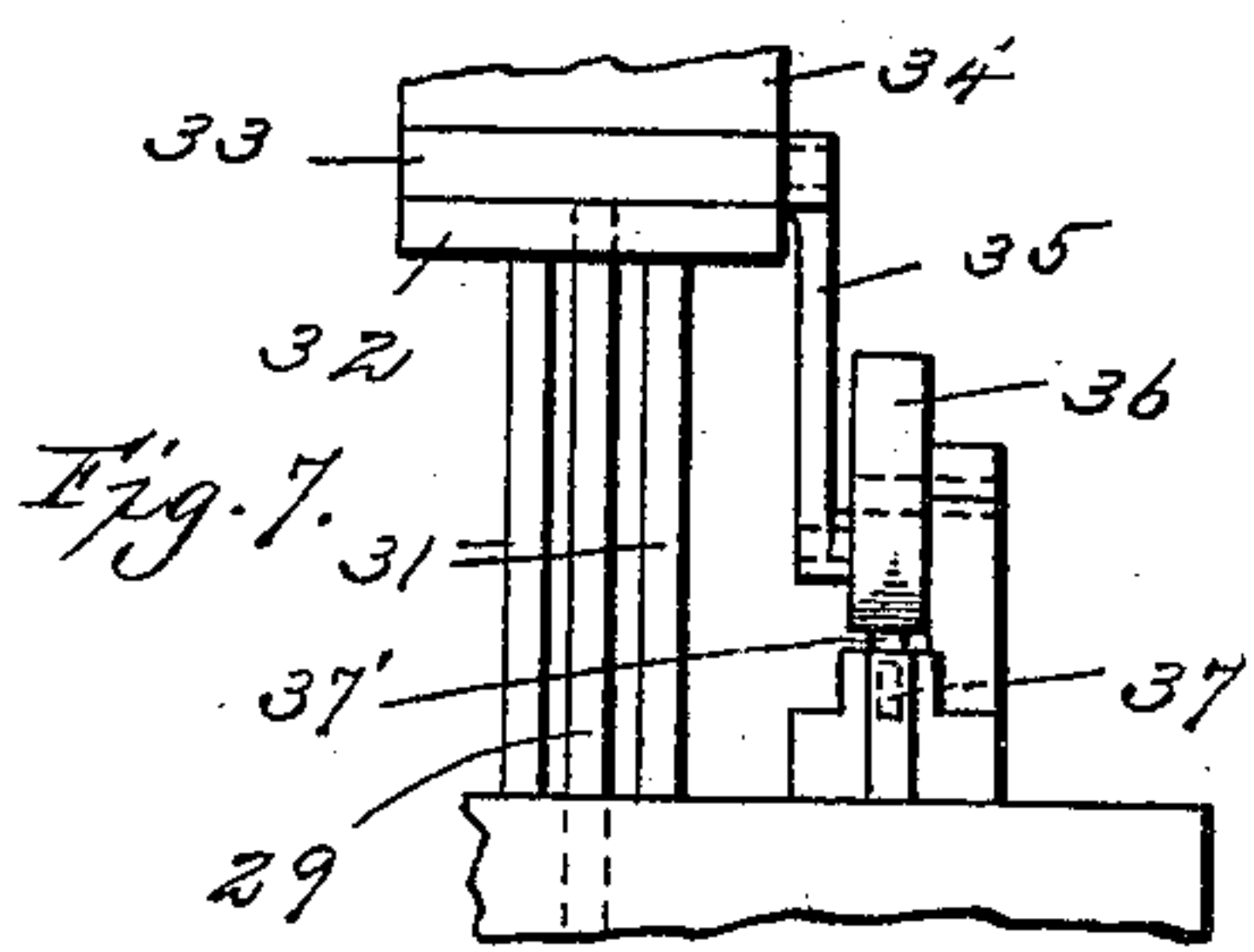
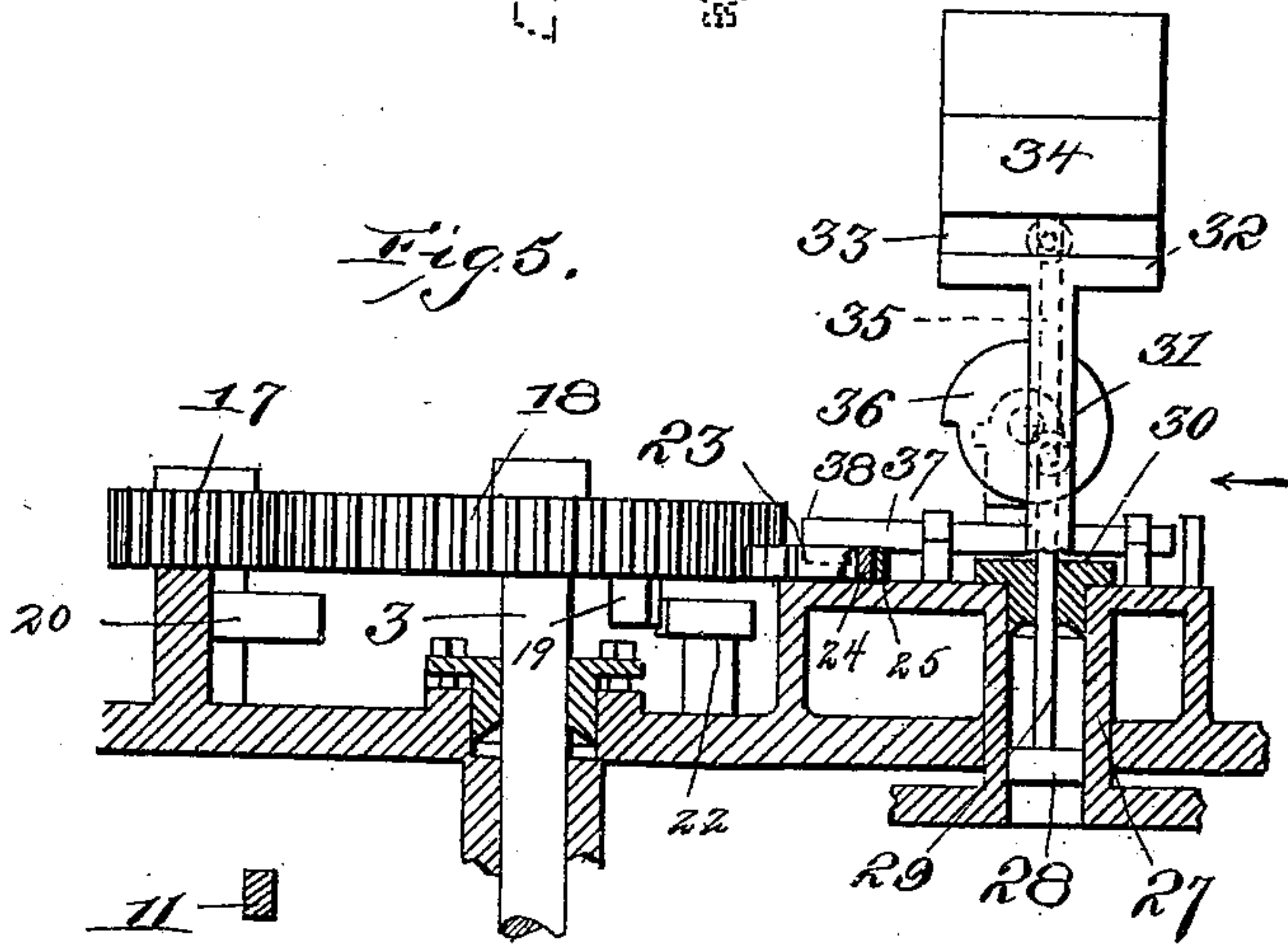


Fig. 7.

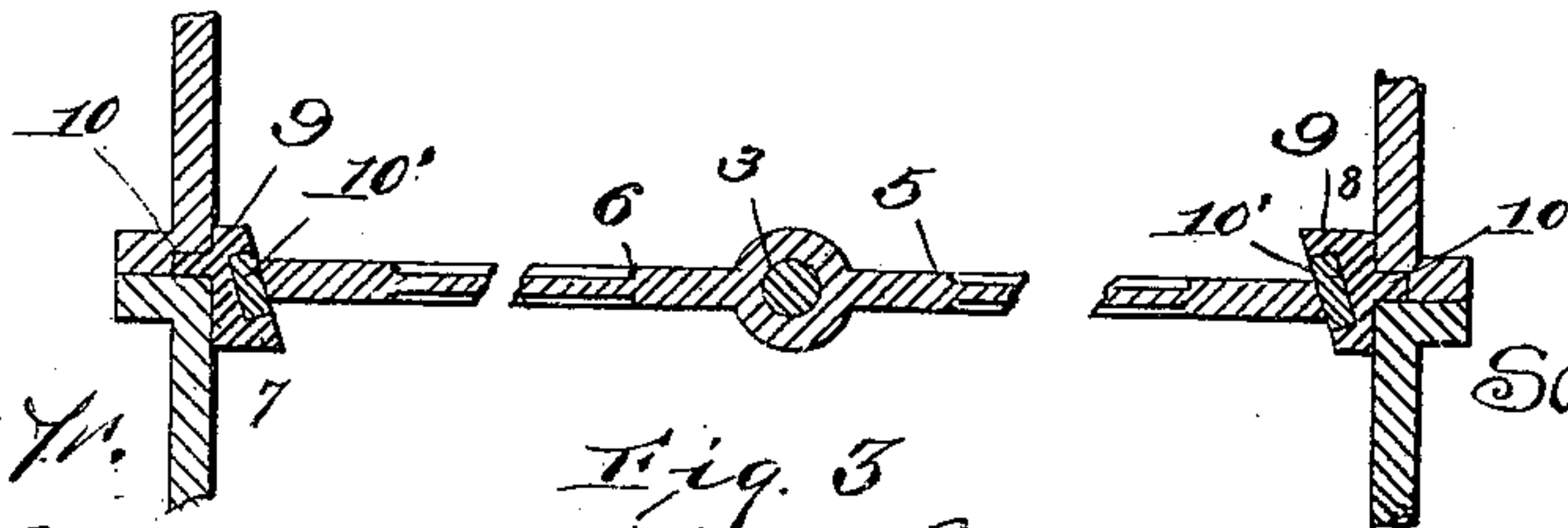


Fig. 3.

Witnesses
Wm. A. Edwards Jr.
Victor J. Evans

Inventor
Samuel McElroy

by John Wedderburn Attorney

UNITED STATES PATENT OFFICE.

SAMUEL MCELROY, OF NEW YORK, N. Y.

AUTOMATIC VALVE.

SPECIFICATION forming part of Letters Patent No. 621,362, dated March 21, 1899.

Application filed September 4, 1897. Serial No. 650,629. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL MCELROY, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Automatic Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automatic turn-valves; and it consists of the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

This invention is intended to provide a valve for water-mains and like uses, which will act as a stop-valve when closed and when its greatest section is opposed to the usual current and as a check-valve when closed, when the relative pressure thereon is reversed.

The object of the invention is to overcome the disadvantages and inconveniences incident to valves for similar purposes now in common use by dispensing with the recesses below and above the valve when closed, with the tapering and sliding faces, which are apt to jam or to be otherwise injured and also having a tendency to gather sand or other material on the lower seats or recesses, the expensive and cumbersome screw-shaft and other gear needed to move them, as well as lengthened lug-faced joints needed, the uncertainty as to the position of the valves, in large valves the risk of freezing in the upper chamber or the objectionable space occupied if they are laid horizontally, and to particularly overcome the greatest disadvantage in valves of this character now commonly used that arises when they are closed or, being moved the entire exposed surface, takes the full pressure of the current in the main and the valve must be moved a greater distance than the bottom or section height of the connecting-main.

The present invention substitutes a quarter-turn for more than twice the motion. By an eccentric center it largely balances the pressure at starting opposed to the opening of the valve. It uses the unbalanced pres-

sure to assist tightness and stability when closed. It permits the convenient use of devices to cushion and fix the opening, to cushion the seat, to lock the valve, and relieve it, as large surfaces may require. Its beveled valve-seats are at once self cleansing and tightening, while adapted at the same time to the use of the main-valve packing-rings. The largest mains can be laid side by side near a street-grade, and the present cumbrous and costly chambers and guard-cases used to render the operating mechanism accessible are materially modified or entirely superseded by other simpler construction.

In the accompanying drawings, Figure 1 is a plan view of the valve-case, showing a portion thereof removed and broken away at one side. Fig. 2 is an end elevation of the valve-case, looking toward the joint portion thereof. Fig. 3 is a diametric view showing the mode of moving the valve proper and its opposite seats. Fig. 4 is a top plan view, on an enlarged scale, of the operating-gear. Fig. 5 is an elevation, partially in section, of the device shown by Fig. 4. Fig. 6 is a sectional elevation of a guard-case. Fig. 7 is a detail end elevation looking in the direction indicated by the arrow, Fig. 5.

Referring to the drawings, wherein similar numerals of reference are employed to indicate corresponding parts in the several views, the numerals 1 and 2 designate the opposite sections of the valve-case, which are bolted together in the usual manner and have face-joint lugs and expanded in sections for a proper distance between the ends, which, as shown, are the usual hub-and-spigot form, to provide a section through the valve-opening which will fully equal that of the main to which it is connected. A valve-stem 3 extends through the said valve-case, and thereon is mounted a valve 4, which is eccentric to the case-center, as shown, one side, 5, having more surface than the other side, 6. On the inner side of the valve-case are valve-seat arms 7 and 8, which are adapted to the opposite valve-seat faces and located on opposite sides of the stem. The valve-seat frames are secured in place on each side by means of lugs 9, taking into recesses 10 in the valve-case at the face-joint of the latter. The seats 7 and 8 are recessed on their beveled

faces to receive packing-rings 10', which may be of any suitable material, but are specially and preferably constructed of fine-grain hard wood, which experience has indicated to be the best. The angle of the bevel-faces is regulated to the size and use of the valve and also to guide and self-tighten the valve-seats. In an opposite position an internal lug 11 is provided on the valve-case and forms a permanent stop to guard the valve in opening and prevent the same from turning past its central line. Extending outwardly or upwardly over the valve-case sections are angular lugs 12, which surround the location of the operating-gearing and are adapted to receive and hold in proper position a removable guard-case 13, which is adapted to protect and also provide means of access to the said mechanism. This case slides over and is held by the said lugs and is preferably made in two sections—an upper one 14 and a lower one 15. The upper section 14 has a manhole and cover therefor of the usual form and is provided at or near its lower end with a wide bearing ledge or flange 16, intended to be embedded in the ground below the surface of the roadway and to take the pressure of street-vehicles or other loads on the cover without transmitting it to the lower section of the valve-case inclosing the actuating-gearing. To accommodate this intended use, the upper section is made larger than the lower section and slides freely over the latter, and the said lower section is expanded below the joints of the two sections, so as to properly rest on the valve-case, as set forth.

In Figs. 4 and 5 the enlarged views of the operating mechanism are shown, as well as the lock and relief devices. Preferably, a pinion 17 is mounted on the valve-case and engages a spur-wheel 18 on the projecting end of the valve-stem. This form of arrangement of mechanism is particularly adapted to large valves requiring multiplied power. The mechanism for operating the present form of valve has the special advantage of an adaptability to be worked by a key-rod with a socket fitting over the head of the pinion or, if no pinion is used, of the valve-stem, the latter carrying a hand-wheel or removable lever-arm of any desired power, which when not in use can be disconnected and placed within the guard-case and is economical in cost and space and always in convenient position for use.

The spur-wheel 18 has a portion thereof on its inoperative side formed without teeth, none being needed at that point, as but a quarter-turn, more or less, is given to the wheel, and on its under face said wheel is provided with a post 19, which when the valve is opened comes in contact with the end of a spring-arm 20 to stop the valve a short distance from its full opening and use the spring-pressure in coöperation with the balance of pressure in a reacting current to insure prompt closure when the device serves as a check-

valve. When the valve is used as a stop-valve, the mechanism may be employed to close the same. To cushion any violent closure of the valve, the post 19, as indicated at 21, Fig. 4, is adapted to engage with a spring-arm 22, also located on the valve-case and engaging the said post before the valve closes, it being understood that the tension of said spring-arms is to be regulated by suitable set-screws. To control the valve-seating in case the spur-wheel is not used, the same construction is arranged in connection with a ratchet-wheel which may be applied to the valve-stem head or on the arm attached to the valve-stem head if no ratchet-wheel is used. To lock the valve when closed, the spur-wheel 18 is employed to actuate a ratchet-wheel 23, with which it meshes, the latter being engaged by a pawl 24, with a spring 25 bearing thereagainst in the usual manner. To throw and hold the pawl out of gear, a wiper 26 is used.

To provide, as circumstances sometimes require, an automatic relief for a check-valve if closed and locked, a small cylinder 27 is employed, which is cast or bolted to the valve-case and is provided with a piston 28 and a piston-rod 29, as well as a stuffing-box 30 and two posts 31, to which is secured a perforated bearing-plate 32. The piston-rod 29 passes through the said plate and is secured to a head-plate 33, having weights 34 resting thereon to hold the piston in place when not acting as a relief to the valve. The bearing-plate 33 carries a connecting-link 35, pivoted on a proper journal-bearing at its head and connected with a second journal-bearing at its lower end on a cam 36, which is also properly fitted with journal-bearings and having a projection which, when it is turned by lifting the bearing-plate 33, comes in contact with a boss or projection 37' on a rectangular bar 37, having a clasp-hook 38 at its end, and when the said projection of the cam engages the said boss or bar the latter, being connected to the pawl 24, operates it out of engagement with the ratchet-wheel 23, overcoming the tension of the spring 25, and thereby leave the remaining mechanism free to be actuated by the valve.

Assuming that the valve is closed, acting as a stop-valve, firmly held in its seat by the pressure of the water-main and by the ratchet-wheel and pawl; but a severe reacting blow comes upon the other face of the valve, which may rupture the main if not relieved. This is caused over and over again in a water-main by starting an engine without opening the stop-valve. The increased pressure thus brought to bear lifts the loaded piston, with its rod 28 and circular plate or head 33, and the latter, being connected with the cam 36, rocks the latter to engage the catch on the bar 37, which is connected with the pawl 34, and thus draws it clear of the ratchet-wheel 23, freeing the valve and allowing the latter to fly open under such increased pressure.

The mechanism set forth is all supported by and fastened to a table 39, cast or bolted to the valve-case.

Having thus described the invention, what is claimed as new is—

1. In a valve of the character set forth, the combination of a circular valve, having a shaft eccentric to the center of its circle, and having beveled seats, and a circular seat-frame carrying beveled packing-rings, with which said beveled seats engage, substantially as described.

2. In a valve of the character set forth, the combination of a pivoted circular valve, mechanism for controlling the same, a stop on one of the wheels of said mechanism, and springs engaging said stop near each end of its throw for cushioning the valve at or near its point of full opening and at or near its point of closing.

3. In a valve mechanism of the character set forth, the combination of a circular valve,

mechanism for controlling the same, an automatic locking device, coacting with said mechanism, and an automatic relief mechanism to unlock the valve under unusual pressure, substantially as described.

4. In a valve of the character set forth, the combination of a pivoted circular valve, external mechanism for controlling the same, a guard-case for said mechanism, and a telescoping head-section for said guard-case provided near its lower end with a bearing flange or ledge adapted to be embedded in the ground below the surface thereof, for the purpose and substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL MCELROY.

Witnesses:

SAMUEL H. MCELROY,
HARRY C. WINGATE.