No. 625,376. Patented May 23, 1899.

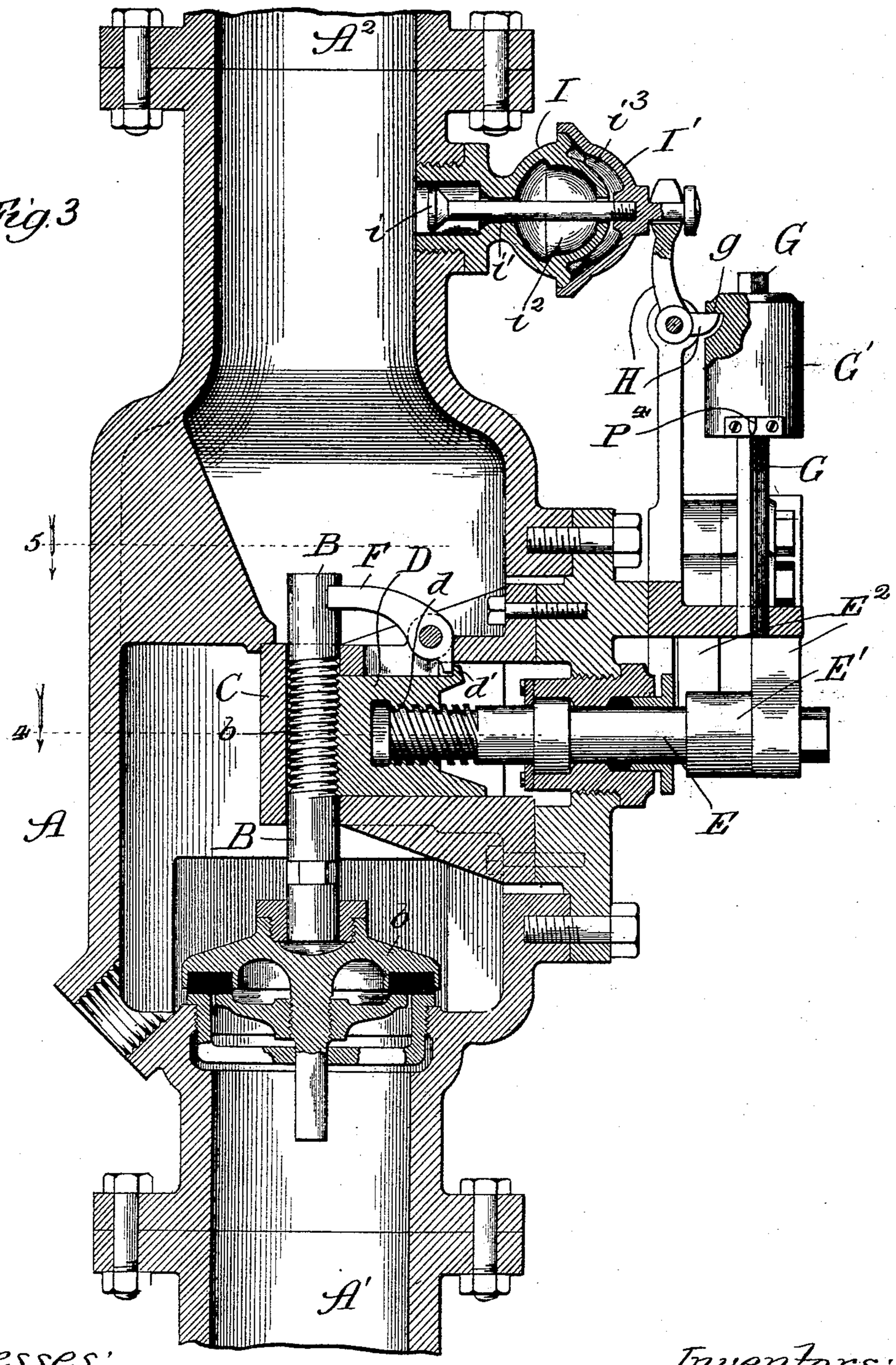
# A. G. ANDERSON & F. MOHN.

## AUTOMATIC VALVE FOR FIRE EXTINGUISHING SYSTEMS.

(Application filed June 15, 1898.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 3

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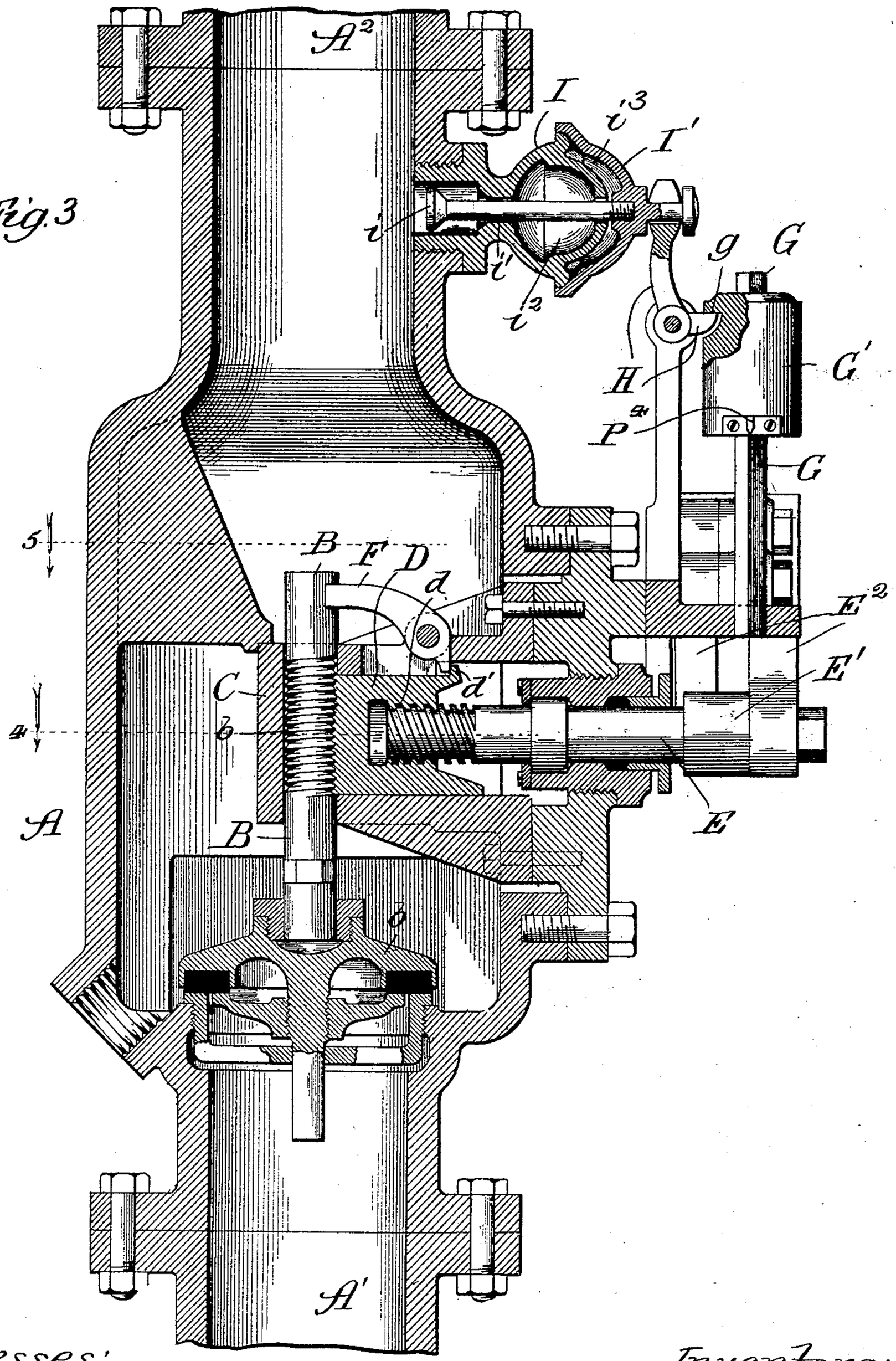


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Fig. 4.

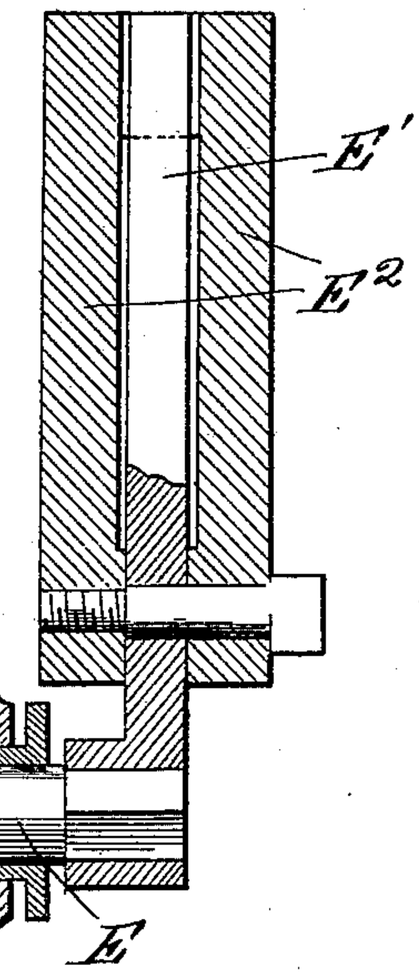
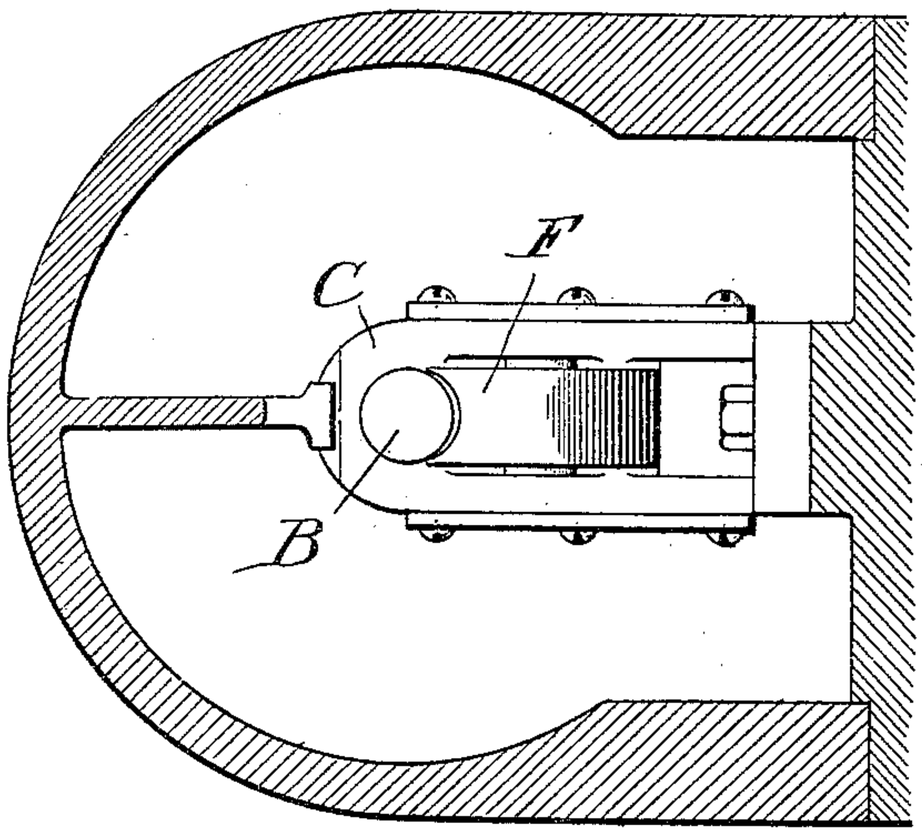



Fig. 5.



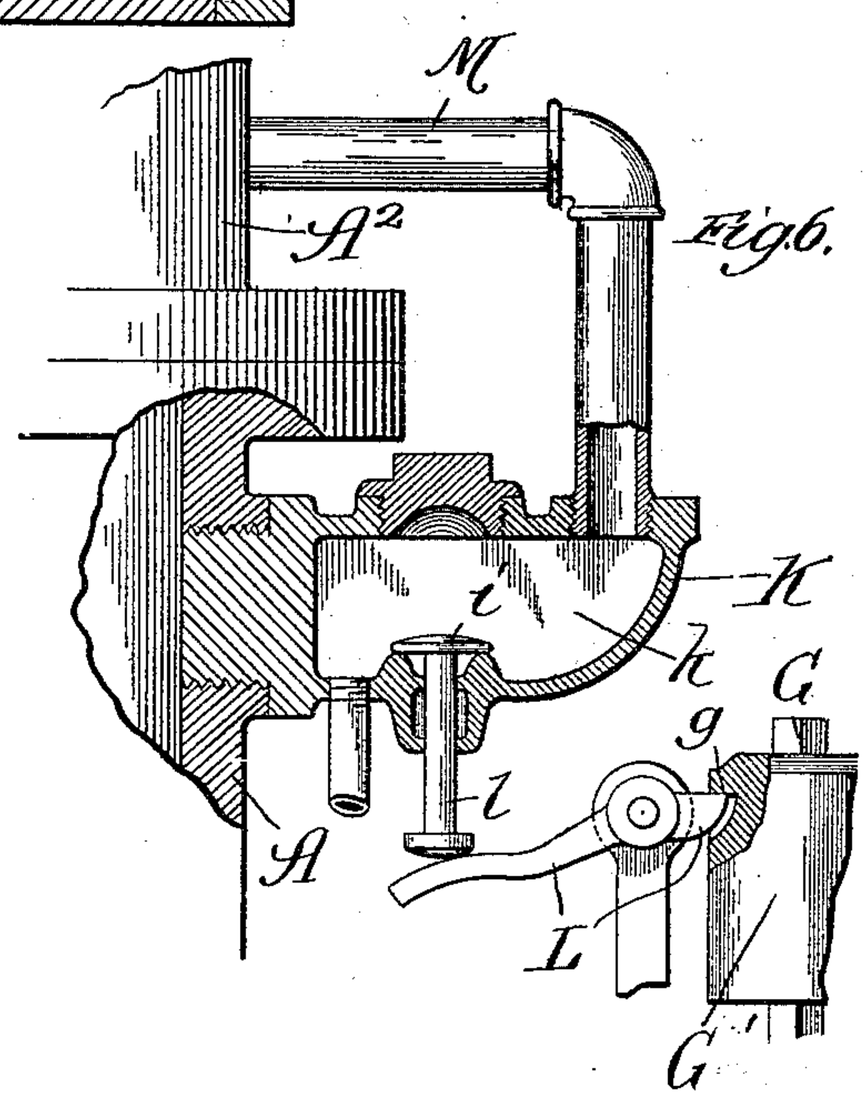




Fig. 6.

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## AUTOMATIC VALVE FOR FIRE-EXTINGUISHING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 625,376, dated May 23, 1899.

Application filed June 15, 1898. Serial No. 683,499. (No model.)

*To all whom it may concern:*

Be it known that we, ANTON G. ANDERSON and FINN MOHN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Valves for Fire-Extinguishing Systems, of which the following is a specification.

Our invention relates to that class of fire-extinguishing systems in which there is a system of pipes arranged in convenient location in a building and provided with sealed sprinklers or nozzles adapted to be unsealed or broken by the presence of heat above a predetermined temperature, so that such pipes when filled with water will sprinkle, inundate, or flood the compartment or room with water and extinguish the fire.

The invention relates particularly to the automatic valve, the construction and arrangement thereof, and the means for locking and unlocking such valve, so that water may be fed to or released from the pipes forming the system.

The object of our invention is to provide a simple, economical, and efficient automatic valve to be used in connection with a fire-extinguishing or sprinkling system.

A further object is to provide an automatic valve with means for locking and unlocking it.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation of an automatic valve constructed in accordance with our improvements; Fig. 2, a diagrammatic view of the electrically-actuated alarm and circuit which is used in connection with our valve; Fig. 3, a vertical longitudinal sectional elevation taken on the line 3 of Fig. 1; Figs. 4 and 5, transverse sectional views taken on the lines 4 and 5 of Figs. 1 and 3, and Fig. 6 a modified form of release-valve hereinafter described.

In the art to which this invention relates it is well known that there are three systems for sprinkling fires, known as, first, the "fluid" or "wet" system, in which the pipes which form the system are constantly filled with water under pressure, so that when the nozzles or sprinklers are unsealed by heat or otherwise the water immediately floods the rooms or apartments. The next (second) system is known as the "air" system, in which the pipes are filled with air under pressure and serve to counterbalance the water-pressure on the supply or throttle valve and hold it down on its seat, and thus prevent the water from entering the system. In this system when the sprinklers or nozzles which are on the delivery-pipes are unsealed the air under pressure escapes and liberates the throttle-valve to allow the fluid to sprinkle the apartment and extinguish the fire. The next (third) system is known as the "vacuum" system and the pipes which form this system are exhausted, so that there is a partial vacuum in the pipes, and the valve in such case is kept on its seat against the water by mechanical means. In this system when the sprinklers or nozzles which are on the delivery-pipes are unsealed atmospheric pressure rushes into the pipes, liberates the releasing means, and permits the water-pressure to operate the supply-valve and permit the delivery-pipes to be filled with water and sprinkle the apartments to extinguish the fire.

Our invention relates particularly to the last two systems, though with slight modifications it may be applied to all of the systems and is intended to provide a simple, economical, and efficient supply-valve having mechanism arranged to hold it firmly on its seat and against the superior pressure of the water, so that when air is either exhausted from or admitted into the pipes forming the system the release mechanism is operated to permit the supply-valve to open, all of which will more fully hereinafter appear.

In constructing a valve in accordance with our improvements we make a casing A of the desired size, shape, and strength to hold the operative and other parts in their respective positions. This valve is provided with a supply-pipe A′, which is connected with some suitable source of water-supply, and a delivery-pipe $A^2$, which is connected with the pipes of a sprinkler-system, (not shown,) though it may be of any of the usual forms and arrangements and provided with the ordinary hermetically-sealed nozzles or sprinklers, so that when heat above a predetermined point is reached in any room in which they may be arranged the nozzles will be unsealed

and the fluid therein allowed to escape or atmospheric air allowed to enter, all of which will be more fully hereinafter described.

In order to check the flow of water under pressure in the valve, the valve-casing is preferably provided with a vertical movable valve-stem B, having a valve-disk *b* seated therein and which, as shown in the drawings, is of the Jenkins type, though it will be understood that any form of valve may be used in place thereof.

In order to hold the valve on its seat and check the supply of water, the valve-stem is arranged in a guide C, having a perforation or opening extending vertically therethrough, and the valve-stem is provided with threaded portions *b'*, against which a sliding block or nut D may be impinged and engage with the threaded portion, as shown in Fig. 3 of the drawings, and thus hold the valve-stem, with its valve, on the seat. The valve-stem and nut instead of being threaded may be recessed, notched, or provided with other interlocking mechanism. In order to operate this sliding nut and hold the valve on its seat or permit it to rise therefrom, we provide the sliding nut with a threaded opening or recess *d* and an operating-screw E, having threaded engagement therewith. This operating-screw has a portion which extends out from a suitable position on the valve-body and is provided with a lever E', having a weight $E^2$ loosely or pivotally mounted thereon, so as to hold the lever normally at its lower limit of motion and permit the valve to remain in a normal open position.

When it is desired to close the valve and prevent water from entering the system, the supply of water is shut off by means of a "main" valve, (not shown,) which should be interposed between the automatic valve and the source of water-supply. The raising of the weight and lever on the operating-screw operates the sliding nut or block, so as to force it inwardly and permit a lug *d'*, which is arranged thereon, to contact a holding-dog F and force it out of engagement with the valve-stem, thus permitting the valve to fall back on its seat. The further operation of the weight and lever on the operating-screw forces the sliding nut into engagement with the threaded portion of the valve-stem, and thus locks the parts against opening by the water-pressure or until the weight is released.

In order to hold the weight and lever of the operating-screw in their up position—the position to lock the valve against opening—the weight is provided with a hook *e*, adapted to be engaged by means of a latch-lever *e'*, which in turn has its opposite extending arm engaged by means of a locking or holding dog $e^2$, thus locking the parts, as shown in Fig. 1, against the pressure of the water in the supply-pipe. The parts are now arranged so that the main valve between the automatic valve and the source of supply may be opened for action. In order to release the parts by the action of heat, the valve-casing is provided with a rod G, which is arranged adjacent to the dog of the operating-screw, and is provided with a sliding weight G', so arranged that when this weight is allowed to drop it contacts the arm $e^3$ on the weight-holding dog, releases the parts, and permits the main weight to rotate the operating-screw and its sliding nut, so as to allow the valve to be opened by fluid-pressure. To hold this second weight in an upper position and away from contact with the weight-holding dog, it is preferably notched, as at *g*, and arranged in such position as to be engaged by means of a pivoted dog H, one arm of which, as hereinafter described, is connected with or contacted by a vacuum or air-pressure valve. In Fig. 3 we have shown this second holding-dog as connected with a vacuum-valve formed in two parts, a spherical body portion I and a cover I', which is connected with the holding-dog and provided with a valve-disk *i* at its inner end. This vacuum-valve has connection, by means of a passage *i'*, with the sprinkler system, so that when the parts are in the position shown in Fig. 3 and all fluid exhausted from the sprinkler system the outside or external atmospheric pressure keeps the cover I' in the position shown; but when air is admitted to the system, due to the unsealing of the sprinklers, nozzles, or otherwise, it rushes into the chamber $e^2$ of the vacuum-valve, and from thence into the chamber $i^3$, so that the weight G' operates the holding-dog to that position which will release the weight and allow it to drop and contact the main weight-holding dog, and thus release the parts, as has been hereinbefore described.

When it is desired to use our improved valve in connection with a system having air under pressure therein, we provide a release-valve in which there is a valve casing or body K and secure it in any desirable position to the automatic valve-body, as shown in Fig. 6. The holding-dog L in this figure is of a slightly-different shape from that shown in Fig. 3, and is arranged to contact the stem *l* of the release-valve K. The air under pressure fills the system and by means of the pipe M fills the chamber *k* of the release-valve and keeps the valve-disk *l'* on its seat and against the action of the weight G'. When the nozzles or sprinklers become unsealed or the pipe broken in any way, so that the air under pressure is liberated, a supply of water rushes into the system, forces the air out, and lowers the pressure in the chamber *k*. The weight G' operates the primary holding-dog L into such a position that the weight is allowed to drop and contact the secondary weight-holding dog and release the parts, as has been hereinbefore described.

It is oftentimes desirable, and, in fact, absolutely necessary, that some person in the building should be notified of the fact that the sprinkler system is in operation, due to a

probable fire, and in order to accomplish this result we prefer to use electromechanical means, as is shown in Figs. 1 and 2. On the valve-casing we secure two terminals P and P′, insulated from the casing. Each of such terminals is connected by means of the wires $p$, $p'$, and $p^2$ with a source of electricity, preferably in the form of a battery $P^2$ and an electric bell $P^3$. The releasing or second weight G′ is provided with a plug $P^4$, which is preferably insulated therefrom and so arranged that when the weight drops this plug enters the space between the electric terminals and closes the circuit, so that the current flows from the battery through the wires $p'$, the terminals and the wires $p$, through the electric bell $P^3$ to sound the alarm, and thence back through the wire $p^2$ to the battery, notifying the person in charge that the sprinkler system is in operation. Instead of using this specific form of alarm system other well-known alarm systems may be used in connection with our automatic valve, merely illustrating this as one form which is simple to understand, economical to construct, and efficient in operation.

While we have described our invention with more or less minuteness as regards details and as being embodied in certain precise forms, we do not desire to be limited thereto unduly or any more than is pointed out in the claims. On the contrary, we contemplate all proper changes in form, construction, and arrangement, the omission of immaterial elements and the substitution of equivalents as circumstances may suggest or necessity render expedient.

We claim—

1. In an automatic valve for fire-extinguishing systems, the combination of a valve-casing, a valve vertically movably mounted therein and provided with a valve-stem having a threaded portion, a guide for such valve-stem, a sliding block or nut arranged to engage the threaded portion of the valve-stem and hold the valve on its seat, an operating-screw for such block to reciprocate the same, a lever and weight for moving the operating-screw, dog mechanism for holding the weight of the operating-screw in its inoperative position, and release mechanism adapted to be operated by fluid-pressure and move the holding-dog mechanism so as to release the weight and operate the other parts, substantially as described.

2. In an automatic valve for fire-extinguishing systems, the combination of a valve-casing, a valve vertically movably mounted therein and provided with a stem having a threaded portion, a guide in which such stem moves, a sliding nut arranged at one limit of its motion to hold the stem with its valve on the seat and at its other limit of motion to permit the stem to be operated, an operating-screw engaging with the sliding nut to operate the same, a lever and weight for moving such operating-screw, holding or dog mechanism for holding the weight in its inoperative position and cause the nut to hold the valve in its locked position, a second weight arranged to contact the holding-dog mechanism, a dog for holding this second weight in its inoperative position, and a valve arranged to be operated by fluid-pressure and operate the last-named holding-dog and liberate the secondary weight to operate the parts, substantially as described.

3. In an automatic valve for fire-extinguishing systems, the combination of a valve-casing, a valve vertically movably mounted therein and provided with a stem having a threaded portion, a guide in which the valve-stem moves, a sliding nut arranged to hold the stem with its valve on the seat at one limit of its motion and permit the stem to be operated when at its other limit of motion, an operating-screw engaging with the sliding nut to operate the same, a lever and weight for moving such operating-screw, dog mechanism for holding the weight in its inoperative position and permitting the sliding nut to hold the valve in its locked position, a second weight arranged to contact the holding-dogs, a dog for holding this second weight in its inoperative position, and a vacuum-valve made in two parts one of which is a cover portion in contact with the second holding-dog and arranged to be held in position by atmospheric pressure and adapted to operate the second holding-dog when fluid under pressure enters the valve-casing and permit the other parts to be operated, substantially as described.

4. In an automatic valve for fire-extinguishing systems, the combination of a valve-casing, a valve vertically movably mounted therein and provided with a stem having a threaded portion, a guide for such stem portion, a sliding nut arranged to contact the stem portion and hold the valve on its seat when at one limit of its motion and permit the valve to be released when at its other limit of motion, an operating-screw engaged with the sliding nut arranged by its rotations to reciprocate the same, a lever on such operating-screw, a weight loosely pivoted on the lever of the operating-screw, compound latch-and-dog mechanism for holding the weight in its inoperative position, a secondary weight arranged to move vertically or substantially so and liberate the weight-holding latch-and-dog mechanism, a pivoted dog for holding the secondary weight in its inoperative position, a vacuum-valve made in two parts connected with the chamber of the automatic valve-casing one part of which forms a cover and is provided with a valve-stem arranged to be operated when fluid-pressure enters such valve and contact the holding-dog to release the parts, substantially as described.

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