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AUTOMATIC SAFETY GAS VALVE.

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1,090,769. Patented Mar. 17, 1914.

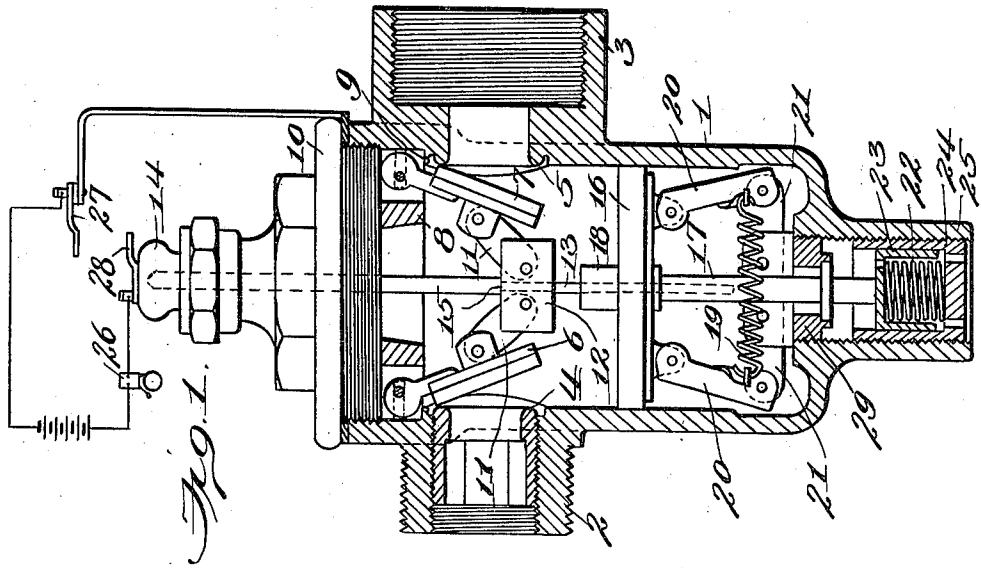


Fig. 1.

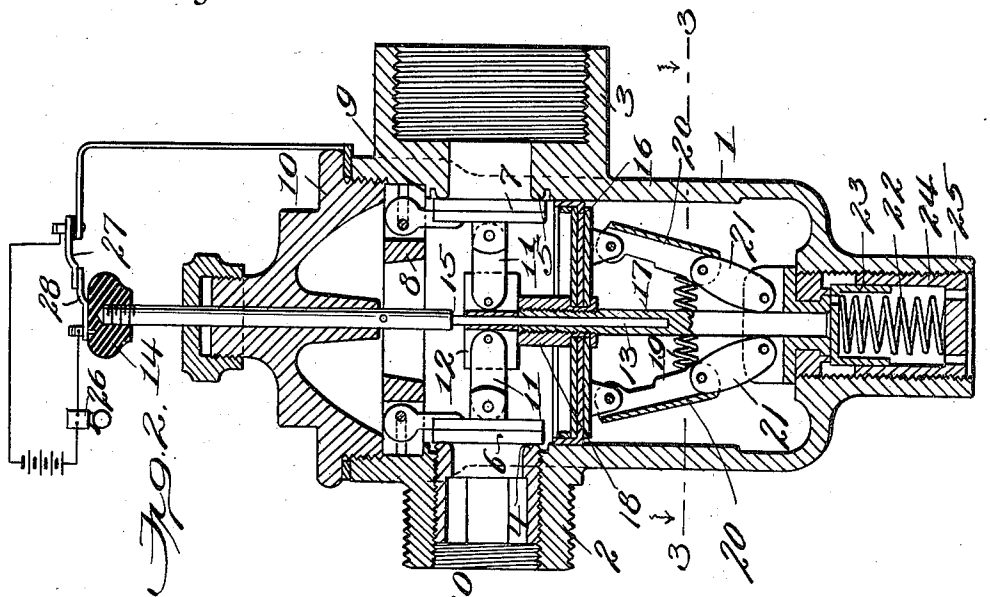


Fig. 2.

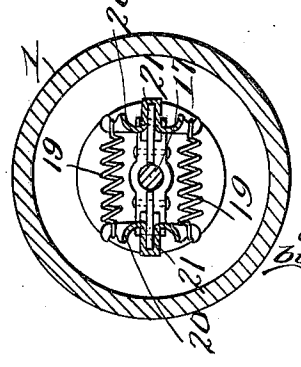


Fig. 3.

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AUTOMATIC SAFETY GAS-VALVE.

1,090,769. Specification of Letters Patent. Patented Mar. 17, 1914.

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To all whom it may concern:

Be it known that we, JAMES M. WESCOTT and CHARLES B. SMITH, citizens of the United States, residing at Hornell, in the county of Steuben, State of New York, and Prattsburg, in the county of Steuben, State of New York, respectively, have invented certain new and useful Improvements in Automatic Safety Gas-Valves, of which the following is a specification.

This invention relates to improvements in automatic safety gas valves of the general type illustrated in our prior U. S. Letters Patent No. 674,289, of May 14, 1901, and No. 692,172, of Jan. 28, 1902, wherein two valve bodies are provided to control, respectively, the main or service pipe and the house distributing pipe, and are connected by an arrangement of toggle links which, in turn, are under the control of a spring actuated element subject to the pressure of gas in the valve casing, and operative when such gas pressure falls below a certain degree to extend the toggle links and thereby effect the secure and positive closure of the valve bodies aforesaid upon their seats.

The principal object of the present invention is to provide a construction of the type stated wherein provision is made for accurately adjusting the parts to operate in shutting off the communication of the gas pipes when the pressure on the valve casing shall have fallen below any degree determined upon as the minimum degree at which the valve bodies may remain open; and wherein provision is made for the certain and instantaneous closure of the valve bodies, immediately that the pressure has fallen, however slightly and momentarily, below said predetermined minimum degree, and without regard to whether the fall of pressure in the valve casing is due to fluctuations in the pressure of gas in the service pipe, or to a too rapid escape of gas through the distributing pipe, occasioned, for example, by the breakage of some fixture, leaving an opening through which the gas would otherwise have unrestricted escape.

A further object of the invention is to provide a construction in which the spring for closing the valve bodies is so related to the other elements of the organization that its efficiency for the purposes in view will not be affected by ordinary deterioration, and in which certainty and reliability of action is secured by the provision of a second relatively weak spring which, while not physically moving the valve bodies to closed position, initiates the physical movement thereof and is extremely sensitive in its action.

The objects stated are obtained by the provision of a spring operated element subject to gas pressure in the valve casing, and normally held in an invariable position without regard to variations in pressure above the aforesaid predetermined minimum degree, in combination with a spring pressed rod or trigger also subject to pressure in the casing and by which the movement of the element aforesaid, which is effective to close the valve bodies, is initiated immediately that the pressure falls below the minimum predetermined degree, the operative movement of said element, when once initiated, being certainly and instantaneously completed by a second spring, the action of which is independent of the pressure in the valve casing. In this way, if the pressure falls, though slightly and momentarily, beyond the predetermined minimum degree, the valve bodies will be certainly and reliably closed even though the pressure should immediately rise to a degree above the predetermined minimum degree.

An embodiment of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a sectional view of a valve in which the features of the invention are incorporated, and in which the valve bodies are in their normal open positions; Fig. 2 is a similar view, but showing the valve bodies closed; Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 2.

Similar characters of reference designate corresponding parts throughout the several views.

The construction shown in the drawings is similar to the constructions illustrated in our prior patents referred to with regard to the construction and relation of the valve casing, the valve bodies, the toggle link connections between the valve bodies, and the pressure restrained element which is operative to act on said connections in effecting the closure of the valve bodies.

The valve casing is shown at 1 and is of generally cylindrical form, having near its

upper end connections 2 and 3 for the service pipe and the house distributing pipe respectively. Valve seats 4 and 5 are provided in the casing 1, concentric to these connections, for coöperation with valve bodies 6 and 7. The valve bodies 6 and 7 are pivotally suspended from a plate or frame 8 which is suitably supported in the upper portion of the casing, being preferably held between a shoulder 9 circumscribing the inner face of the casing and the upper casing head 10. Each of the valve bodies 6 and 7 is connected by a link 11 to an intermediate relatively heavy block 12, which also functions as a link and forms a toggle system with the links 11. When the links 11 and 12 are in alinement, the valve bodies 6 and 7 will be closed upon their seats and locked or positively maintained in closed relation, as shown in Fig. 2. When the toggle system is "broken", and the links have an angular relation, the valve bodies 6 and 7 will be in open position, as shown in Fig. 1. The link or block 12 is guided in its movements by a stem 13, located centrally and axially of the casing 1. The stem 13 projects through the head 10 and is provided on its outer end with a knob 14. Within the casing said stem is provided with a shoulder 15 to engage the upper side of the link or block. The stem 13 is manually operated to "break" the toggle system and restore the valve bodies 6 and 7 to open position after each automatic closure of said valve bodies consequent to a fall in the pressure in the casing below the predetermined minimum degree. For this purpose, the stem 13 is pushed inwardly or depressed, its shoulder 15 engaging the upper side of the link or block 11 and moving said block inwardly, *i. e.* away from the head 10, thereby moving the valve bodies 6 and 7 to open position, as is obvious.

For the purpose of closing the valve bodies 6 and 7, a suitably packed disk-like element 16, which, for convenience, may be termed a "plunger" is employed. The plunger 16 is mounted upon a rod 17 which is located centrally and axially of the casing 1, and projects beyond the upper face of said plunger, the projecting portion of said rod being suitably formed, *e. g.* provided with a sleeve 18 for engagement with the under face of the link or block 12. Obviously, when the plunger 16 is moved toward the head 10, the sleeve 18 will engage the link or block 12 and will move said block toward the head 10, thereby establishing the closed relation of the valve bodies 6 and 7.

For effecting the aforesaid movement of the plunger 16, it is preferred to employ a pair of springs 19 which are disposed transversely of the casing 1 and have their ends connected to links 20 which are pivoted to the under face of the plunger at opposite sides thereof. The links 20 are also pivoted to links 21 which, at their lower ends, are pivoted to brackets mounted adjacent the bottom of the casing. The plunger 16 is normally held in its lower-most position, as shown in Fig. 1, without regard to fluctuations in the pressure of the casing. This result is achieved by reason of the fact that in such lower-most position of the plunger, all the pivots of the links 21 are in a common horizontal line, parallel to the springs 19 and hence the pull of said springs on the links 20 is ineffective to produce any variation of the relation of the links and consequent upward movement of the plunger. It will thus be seen that when the plunger is in its lower-most position, the parts are virtually locked against operation and hence the position of the plunger is not affected by any variations in pressure.

In order that the springs 19 may act to produce an upward movement of the plunger, means is provided for initiating such movement and hence disestablishing the locked relation of the parts, as just explained, immediately that the pressure in the casing falls below the predetermined minimum degree. Such means preferably comprises a spring 22 which engages the lower end of the stem 17, said stem having its lower end in the form of an inverted cup 23 to fit over said spring. The spring 22 is directly supported upon the base of an adjustable cup 24, which is threaded into a cylindrical extension 25 projecting from the bottom of the casing 1. The tension of the spring 22 may be regulated by moving the cup 24 relatively to the extension 25, and adjustment of the cup inwardly of said extension increasing the tension of the spring 22 and a movement of the cup outwardly of said extension lessening the tension of said spring. The minimum pressure at which the valve bodies 6 and 7 may remain open depends, of course, upon the tension of the spring 22, and is predetermined by a regulation of such tension in the manner explained. The spring 22 simply initiates the upward movement of the plunger. In other words, it merely disestablishes the locked relation of the parts which obtains when the plunger is in its lowermost position, but does not actually effect the closure of the valve bodies. For this reason the spring 22 may be relatively weak, while the springs 19, which actually effect the closed relation of the valve bodies, once the upward movement of the plunger has been initiated, are relatively strong and certainly and reliably perform their function without regard to the pressure in the casing 1. It will thus be apparent that the rod 17, in coaction with the spring 22, functions as a sort of a trigger and inasmuch as the power required to move said rod sufficiently to render the springs

19 operative, is very slight, it will be apparent that the construction is very sensitive and certain in its operation.

The stem 13, as above explained, is used to restore the valve bodies 6 and 7 to open position, and in connection with this operation, said stem is also utilized to reset the plunger 16 and the parts connected therewith, the lower portion of the stem for this purpose fitting in an axial recess in the rod 17, so that when the stem is moved inwardly or depressed, it will not only effect the opening movement of the valve bodies 6 and 7, but will also move the plunger 16 to its lower-most position, and reset the parts which effect the upward movement of said plunger.

It is preferred to employ an alarm to indicate a fall in the pressure of the gas sufficient to result in the closure of the valve bodies 6 and 7 upon their seats. Such an alarm may conveniently comprise an electric bell 26, the circuit for which has a fixed contact 27 and a movable contact 28 which is preferably mounted on the knob 14 of the stem 13, the knob 14 being constructed of rubber or other suitable insulating material.

It will be understood that the upward movement of the plunger 16 by the springs 19 is limited by the engagement of the cup-shaped lower end 23 of the rod 17 against an annular collar 29, which is arranged at the upper end of the extension 25. Or any other suitable means for limiting the upward movement of the plunger 16 may be provided.

Having fully described our invention, we claim:

1. An automatic safety gas valve comprising a casing having an inlet and an outlet, a pair of valve bodies controlling said inlet and outlet, connections between said valve bodies and operative to effect simultaneously opening or closing movements thereof, a plunger movable axially of the casing and subject to the pressure of the gas therein, means associated with the plunger to operate said connections in closing the valve bodies, spring means for moving the plunger to engage said connections, operative connections between said plunger and spring means and having a locked relation in the lower-most position of the plunger, and a second spring means operative to initiate the operative movement of the plunger and to disestablish the normal locked relation of said operative connections when the pressure in the casing falls below a determined degree.

2. An automatic safety gas valve comprising a casing having an inlet and an outlet, a pair of valve bodies controlling said inlet and outlet, connections between said valve bodies and operative to effect simultaneously opening or closing movements thereof, a plunger movable axially of the casing and subject to the pressure of the gas therein, means associated with the plunger to operate said connections in closing the valve bodies, links pivoted to the under face of the plunger at opposite sides thereof, links pivoted to said first named links and to the base of the casing, coil springs extending transversely of the casing and connecting said first named links, the pivots of said second named links being in a common line parallel to said springs when the plunger is in its lower-most position, a road depending from the plunger and upon which the plunger is mounted, and a spring engaging the lower end of said rod and effective to initiate the operative movement of the plunger when the pressure in the casing falls below a determined degree.

3. An automatic safety gas valve comprising a casing having an inlet and an outlet, a pair of valve bodies controlling said inlet and outlet, connections between said valve bodies and operative to effect simultaneously opening or closing movements thereof, a plunger movable axially of the casing and subject to the pressure of the gas therein, means associated with the plunger to operate said connections in closing the valve bodies, links pivoted to the under face of the plunger at opposite sides thereof, links pivoted to said first named links and to the base of the casing, coil springs extending transversely of the casing and connecting said first named links, the pivots of said second named links being in a common line parallel to said springs when the plunger is in its lower-most position, a rod depending from the plunger and upon which the plunger is mounted, a spring engaging the lower end of said rod and effective to initiate the operative movement of the plunger when the pressure in the casing falls below a determined degree, and a cup carrying said last named spring and adjustable in the direction of the axis of the casing whereby to regulate the tension of said spring.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JAMES M. WESCOTT.
CHARLES B. SMITH.

Witnesses:
MAURICE J. TRANT,
JAMES B. MERRITT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."