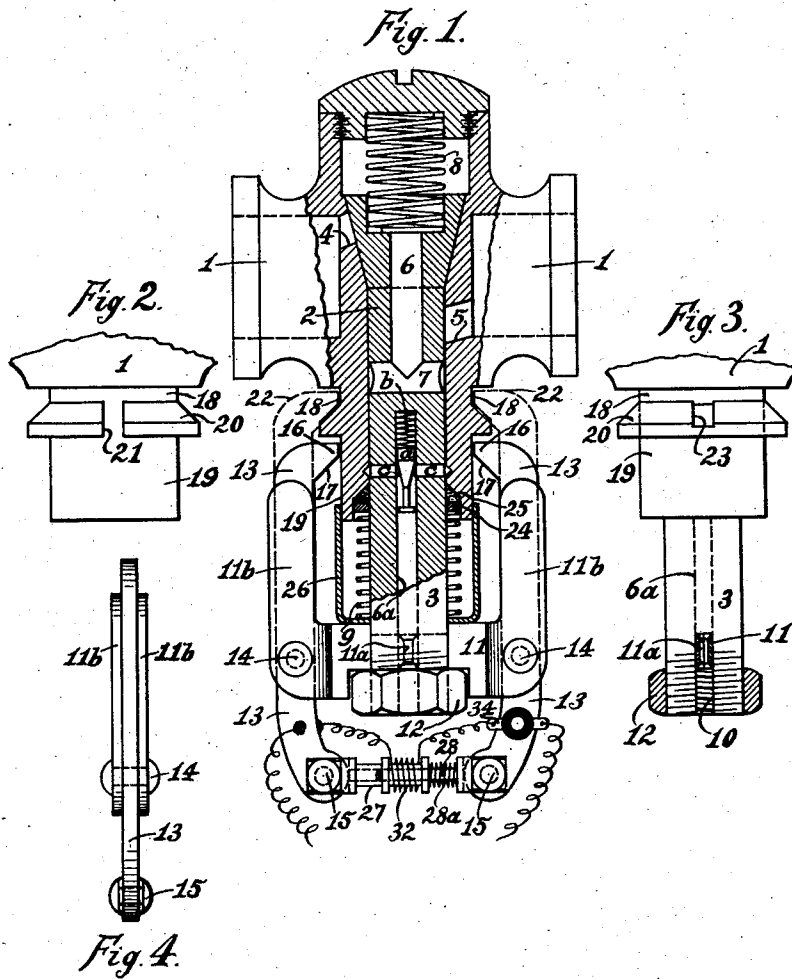


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AUTOMATICALLY OPERABLE VALVE.
APPLICATION FILED DEC. 20, 1909.

1,010,626.

Patented Dec. 5, 1911.



WITNESSES:
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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-OPERABLE VALVE.

1,010,626.

Specification of Letters Patent.

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Original application filed July 22, 1909, Serial No. 508,887. Divided and this application filed December 20, 1909. Serial No. 534,129.

To all whom it may concern:

Be it known that I, CHARLES EDWARD HASTY, a citizen of the United States of America, residing at Elgin, in the county of Kane and State of Illinois, have invented a new and useful Automatically-Operable Valve, of which the following is a specification, reference being had to the accompanying drawings, illustrating same.

This present application is a division of my co-pending United States application Serial No. 508,887, filed July 22, 1909.

My invention relates to valves and also to means for automatically operating such valves under certain conditions.

The principal objects of my invention are, to provide improved means for causing the automatic operation of a valve under certain conditions; to provide improved means for causing the operation of a valve from a distance, by electrical mechanism; to provide improved means for automatically locking the valve in closed position when it is closed; and to provide improved constructions in valves and automatically-operating mechanism therefor as will be hereinafter more fully described.

Other objects will be apparent from the following specification.

In the accompanying drawings Figure 1 is a side view of the preferred form of the improved valve of this invention, with portions shown in cross-section to show the interior construction thereof; Fig. 2 is a side elevation of the lower portion of the valve casing, taken the same as Fig. 1, showing the annular recesses in the casing and one of the passageways connecting the said recesses; Fig. 3 is a side elevation of the lower portion of the valve casing and plug stem, taken at right angles to Fig. 1, showing the annular recesses in the casing around the stem of the plug and also the small depressions for holding the valve-operating mechanism in the position in which the valve is fully opened; and Fig. 4 is an edge elevation of a portion of the operating mechanism of Fig. 1.

Like characters refer to like parts in the several figures.

In certain places and at certain times it is very desirable to be able to cause the operation of a valve, in gas or water systems, at some distance from the valve, and also to

know that the valve has been suitably operated by automatic mechanism when it is impossible to reach the valve to operate it by hand. For instance, in the case of a burning building it is very desirable to shut off the supply of gas to the building, in the main pipe preferably at the meter, to avoid explosions and the possibility of increasing the fire. Oftentimes it is impossible for a person to reach the valve in the main pipe to close it, as when the building or basement of the building is full of fire or smoke, and in this case it is very desirable to have means for automatically closing the valve when the fire produces considerable heat therearound, or means associated with the valve which can be operated at a distance to automatically close the valve as desired. To these ends the valve-operating mechanism of this invention is provided. In such automatically-operable valves it is also very desirable to have means for automatically locking the valve in closed position when it is automatically closed, so that it cannot be again opened until unlocked. This feature is accomplished by the mechanism herein- after described.

In the valve-operating mechanism shown, the valve is automatically closed by the fusing of a joint, upon abnormal heating, which allows spring mechanism to automatically operate the apparatus and thus close the valve. The valve-operating mechanism besides having the fusible joint, also has a heat-producing element for generating heat to cause the fusion of the joint, the said heating element being connected in circuit with a suitable source of electrical supply for heating and fusing the fusible joint.

In the drawings, 1 is a valve casing and 2 is a valve plug, the said plug having a stem 3 extending from the casing. The casing 1 is provided with an inlet 4 leading to the tapered plug seat, and an outlet 5 leading from the opening for the stem 3. The upper end of the plug 2 is provided with a longitudinal hole 6 extending part way down the plug and meeting a transverse hole 7 through the plug, preferably as shown. When the tapered portion of the plug 2 is raised from its seat, against the action of coil springs 8 and 9, the inlet 4 is connected with the hole 6, and then by properly turning the plug 2 the outlet 5 is connected with

the transverse hole 7 which is now raised into alinement with the outlet 5. Thus it will be seen that when the plug 2 is raised from its seat and properly turned, the passage through the valve is opened, and that when the plug is lowered into its seat the passage through the valve is closed.

The lower end of the plug 2 is provided with a longitudinal hole 6^a therein within which is placed a plunger *a* and a coil spring *b* acting thereon. The plug 2 also carries a pair of pins *c c* therein, loosely placed within a transverse hole in the plug 2. The outer ends of the pins *c c* project out past the plug stem 3 into an annular groove within the casing 1, as shown in Fig. 1, when the plug 2 is seated in its seat, so as to lock the plug 2 down until it is desired to release same. When it is desired to raise the plug 2 out of its seat to open the valve, it is necessary to raise the plunger *a* against the action of the coil spring *b*, by thrusting an instrument into the hole 6^a against the plunger *a*. When the plunger *a* is thus raised, the pins *c c* are free to move inwardly, and, therefore, the plug 2 is free to be raised from its seat. Now when the plug 2 is raised from its seat while the plunger *a* is held up, the pins *c c* are pressed inwardly by their contact with the casing 1, until they lie entirely within the plug stem 3, the plug 2 being now free to be raised from its seat as desired. Now when the plug 2 is again seated in its seat, the pins *c c* are lowered with the plug 2 until they are forced out by the plunger *a* into the annular recess in the casing 1, as shown in Fig. 1, thus again locking the valve in closed position. It will be readily understood that when the valve is either open or closed, the plug 2 may be turned around as desired, the pins *c c* in no way limiting such movement.

The lower end of the plug stem 3 carries a cross bar 11, preferably made of two formed metal portions, which extends through a slot 10 in the lower end of the plug stem 3. A nut 12 securely holds the bar 11 in place, by being screwed up tightly against the bar 11 and also squeezing the bifurcated end portions of the plug stem 3 together against the bar 11. The bar 11 is provided with a hole 11^a therethrough through which the instrument for raising the plunger *a* may be inserted as desired.

The cross bar 11 is provided with a pair of upturned arms 11^b 11^b at each end thereof, between which arms are loosely pivoted a pair of operating arms 13 13 at 14 14. The arms 13 13 are connected together at their lower ends by a fusible link 27 28 which is loosely pivoted to the arms 13 13 at 15 15. The upper ends of the arms 13 13 extend inwardly as at 16 16, and are beveled as at 17 17, to cooperate with the annular passage-ways 18 and 19 and the beveled annular pro-

jection 20 of the casing 1. The annular projection 20 is preferably provided with a pair of diametrically opposite passageways 21 connecting the annular groove 18 and the cylindrical portion 19, and also with a pair of diametrically opposite depressions 23 on the upper beveled surface thereof, located midway between the passageways 21. The ends 16 16 of the arms 13 13 are adapted to slide through the passageways 21 when the arms 13 13 and cross bar 11 are turned around to the proper position and then all raised as a unit with the plug 2 against the action of springs 8 and 9, to the height shown in dotted lines 22 22.

It will be readily seen that the arms 13 13 may be turned clear around in either their lower position or their upper position 22 22, in the latter position the mechanism if so turned opening and closing the outlet passage 5 during a revolution. It will also be seen that when the hole 7 is in alinement with the passage 5 so that the valve is fully open, the ends 16 16 of the arms 13 13 will drop down slightly into the depressions 23 so as to prevent the valve plug 2 from being turned until the operating mechanism is slightly raised. This serves as a latch to hold the valve open against any accidental turning of the operating mechanism.

It will be readily seen that when the arms 13 13 are turned so that the ends 16 16 thereof are directly above the passageways 21 21, in the upper position, the springs 8 and 9 will automatically act to throw the arms 13 13 and the plug 2 to the lower position, thus seating the plug 2 and tightly closing the inlet passage 4. Now if the operating mechanism is turned around in this lower position, the valve will not be opened in the least, because the inlet passage 4 is always tightly closed by the tapered portion of the plug 2. Thus it will be seen that this arrangement provides a safety valve which is also capable of manual operation as desired.

The purpose of the upturned arms 11^b 11^b is to protect the upper portions of the operating arms 13 13 from injury from falling objects, in the case of burning buildings, so as to preserve the usefulness of the valve. If, however, such falling objects strike the lower ends of the arms 13 13 they may in some cases cause the operation of the valve, by breaking the fusible link, even before the fire has heated the said link.

Within the lower end of the portion 19 of the casing 1 is placed a packing ring 24 and suitable packing 25, the ring 24 being held against the packing by spring 9. The spring 9 is preferably inclosed by a cup-shaped portion 26 which is adapted to slide over the portion 19 when the arms 13 13 are raised.

The fusible link shown in Fig. 1, com-

prises a hollow metallic spool 27 and a metallic pin 28 soldered therein by easily-fusible solder and operable endwise through the spool 27. The portion 27 has a heating coil 32 wound thereon for producing heat by means of an electric current to fuse or soften the easily-fusible solder. One terminal of the winding 32 is connected to a terminal member 34 which is suitably insulated from its arm 13 and from the remainder of the valve-operating mechanism, the other terminal of the winding 32 being preferably connected to the valve mechanism. Of course it is to be understood that various forms of heating elements may be used in the apparatus of this invention.

If the fusible link 27 28 is abnormally heated while the valve is open, either by fire or by an electric current, the easily-fusible solder is thus softened or melted, whereupon the spring members 8 and 9 acting on the plug 2 and the valve-operating mechanism, automatically force the upper portions 16 16 of the arms 13 13 apart, due to the beveled surfaces of the depressions 23, and thereby force the valve-operating mechanism and the plug 2 as a whole, to the lower position shown in Fig. 1, the lower ends of the arms 13 13 being forced together. Thus it will be seen that the fusing or weakening of the fusible link 27 28 causes the valve to be automatically closed. If it is desired to reset the apparatus so that the valve can be again held in opened position, it is only necessary to heat the link 27 28 in any suitable manner, such as with a soldering copper or an electric current in the coil 32, and place the parts of the link in normal position, whereupon the cooling of the solder restores the fusible link and the arms 13 13 to normal position and condition.

Of course the device of this invention may be readily made to resolder itself in operative condition, or in other words "self-soldering," by simply equipping same with spring mechanism, such as a coil spring 28^a surrounding the portion 28, adapted to automatically throw the upper ends 16 16 of the arms 13 13 together after they have been spread apart and automatically operated to their lower position by the fusing of the fusible link, before the fusible link cools after operation.

I do not wish to limit this invention to all of the exact details herein set forth, as various modifications of same may be made without departing from the scope of the appended claims.

What I claim as my invention is:

1. A valve of the character described having a plug adapted to be placed in a plurality of positions and to be turned in each of the said positions, to control the passage through the valve, means for holding the said plug in each of the said positions, means

for automatically throwing the said plug from one of the said positions to another to close the valve, and mechanism adapted to automatically lock the said plug in the position in which the valve is closed whereby the valve cannot be opened until it is unlocked.

2. A valve of the character set forth having a plug and a seat therefor, means for raising the plug from its seat to open the valve, means for holding the plug in open position, means for seating the plug as desired, and mechanism within the plug adapted to automatically lock the plug in its seat when seated, whereby the valve cannot be opened until it is unlocked.

3. A valve of the character set forth having a plug and a seat therefor, means for raising the plug from its seat to open the valve, and mechanism within the plug adapted to automatically lock the plug in its seat when seated, whereby the valve cannot be opened until it is unlocked.

4. A valve of the character set forth having a plug, means for giving the plug a longitudinal movement to control the valve passage, and mechanism within the plug adapted to automatically lock the plug in closed position whereby the valve cannot be opened until it is unlocked.

5. In a valve having a plug, a longitudinally-arranged plunger within the plug, spring mechanism acting on the said plunger, transverse members carried within the plug, adapted to project therefrom on opposite sides thereof and cooperating with the said plunger, and means exterior of the plug cooperating with the said transverse members, whereby the plug may be automatically locked against operation.

6. In a valve having a plug, a longitudinally-arranged spring-controlled plunger within the plug, transverse locking members within the plug cooperating with the said plunger, and means cooperating with the said locking members, whereby the plug may be locked against operation.

7. A valve having valve-operating mechanism, means for automatically throwing the said mechanism to closing position when the valve is being closed, and mechanism adapted to automatically lock the said valve in closed position whereby it cannot be opened until it is unlocked.

8. In a valve having a plug, a spring-controlled plunger within the plug, a locking member within the plug cooperating with the said plunger, and means cooperating with the said locking member, whereby the plug may be locked against longitudinal movement.

9. A valve of the character set forth having a plug and a seat therefor, means for raising the plug from its seat to open the valve, a spring-controlled plunger within

the plug, locking members within the plug cooperating with the said plunger, and means cooperating with the said locking members, whereby the plug may be locked
5 against operation.

10. A valve of the character set forth having a plug, means for giving the plug a longitudinal movement to control the valve passage, a spring-controlled plunger within
10 the plug, a locking member within the plug cooperating with the said plunger, and means cooperating with the said locking member, whereby the plug may be locked against operation.

15 11. A valve having a plug and operating mechanism therefor, means for automatically throwing the said plug and mechanism to closing position, and mechanism carried within the plug and adapted to automati-
20 cally lock the valve in closed position whereby it cannot be opened until it is unlocked.

12. In a valve having a plug adapted to be moved longitudinally and also rotated to control the valve passage, means for locking
25 the plug against rotation when the valve is open, and means for locking the plug against longitudinal movement when the valve is closed.

13. In a valve having a plug, a longitudi-
30 nally-arranged spring-controlled plunger within the plug, a transverse locking member within the plug cooperating with the said plunger, and means cooperating with the said locking member, whereby the plug
35 may be locked against operation.

14. A valve of the character set forth having a plug and a seat therefor, means for raising the plug from its seat to open the valve, a spring-controlled plunger with-
40 in the plug, a locking member within the plug cooperating with the said plunger, and means cooperating with the said locking member, whereby the plug may be locked against operation.

15. A valve of the character set forth
45 having a plug, means for giving the plug a longitudinal movement to control the valve passage, a spring-controlled plunger within the plug, locking members within the plug cooperating with the said plunger, and
50 means cooperating with the said locking members, whereby the plug may be locked against operation.

16. A valve having a plug and valve-operating mechanism adapted to be moved
55 longitudinally and also rotated to control the valve passage, means for locking the said plug and mechanism against rotation when the valve is open, and means for locking the said plug and mechanism against
60 longitudinal movement when the valve is closed.

As inventor of the foregoing I hereunto subscribe my name, this 7th day of December, 1909.

CHARLES EDWARD HASTY.

Witnesses:

H. L. GIVEN,
WM. WESTON.