

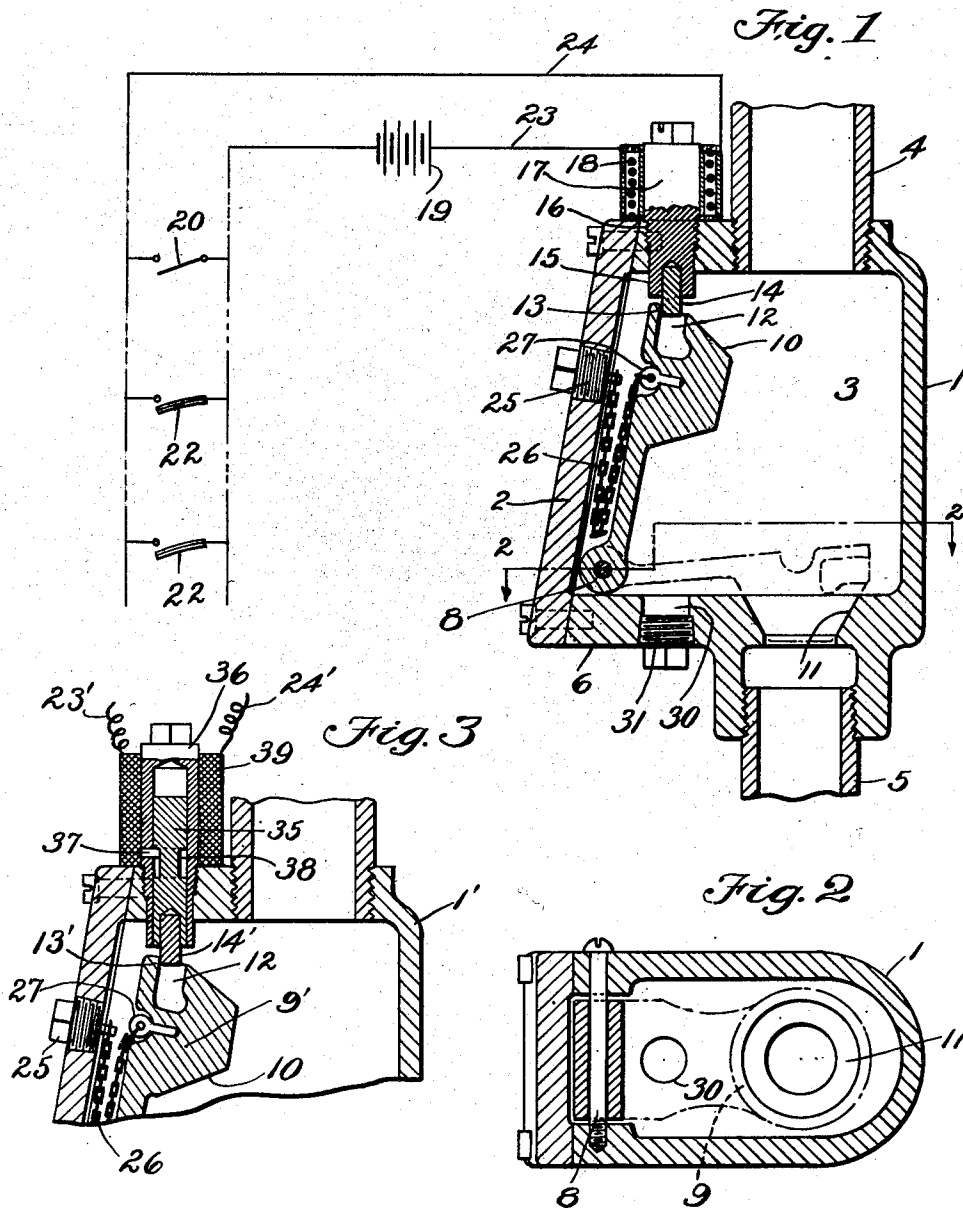
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AUTOMATIC CUT-OFF VALVE

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AUTOMATIC CUT-OFF VALVE.

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This invention relates to safety valves adapted to be placed in the supply lines for illuminating gas, preferably adjacent the points of entry of such lines through the foundation walls of a house or building, and adapted to interrupt the flow of gas from such supply lines to the distribution lines in the building in case of fire or other emergency.

10 The object of the present invention is the provision of an improved safety device of the character mentioned, wherein the device may operate either due to the presence of excessive temperature near by or at remote
15 points, wherein the device may be readily reset, in which the valve casing housing the valve may be provided with walls wholly composed of metal, and wherein all possibility of the breaking of electric circuits
20 within the gas system may be eliminated.

According to the present invention the safety valve preferably comprises a casing whose walls are entirely metallic and which houses a valve biased towards, or having a
25 constant tendency to assume, a closed position but maintained in open position by means including a fusible element. The valve may be pivotally supported and swing upon release to a closed position in a direction such that the gas tending to enter the
30 distribution piping in the building will maintain the valve tightly closed. Again, the mechanism is preferably constructed in such manner that it may be automatically rendered operative either by excessive heat
35 at the point where it is disposed or by the existence of an excessive temperature at various points throughout the building, or may be manually controlled if desired. For
40 the purpose of effecting a control of the valve to permit its closure, destruction of a fusible or heat destructible element is preferably relied on; and such fusible element is preferably arranged to have the heat necessary
45 for its destruction transmitted to it either when the walls of the casing of the valve mechanism are exposed to heat, or upon a localized heating of the supporting means for the fusible element which may
50 preferably be accomplished by an electrically heated coil arranged outside the casing of the valve mechanism. If desired the release of the valve mechanism may be accomplished under certain conditions by the direct
55 effect of excessive heat and under other conditions by electro-magnetic means. In

either case, however, it is designed that mechanism shall be rendered operative automatically by the existence of too high a temperature at the casing proper or at a point remote from the casing. It is further
60 designed that the device shall be readily reset after being caused to operate and that in its destruction the fusible element shall not have an opportunity to form an excrescence upon the valve which may interfere
65 with its closing.

In the accompanying drawings in which there are shown for purposes of illustration two forms which the invention may assume
70 in practice,

Fig. 1 is a central vertical section through one illustrative form of the safety device together with a diagrammatic showing of certain circuits:
75

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary sectional view corresponding to a portion of Fig. 1 showing a modified form of construction.
80

In the form of the invention shown for purposes of illustration in Figs. 1 and 2, a casing 1 having a closure member 2 provides a chamber 3 which is arranged between and serves to connect a gas supply line 4 with the distribution line 5 in a building, the casing
85 1 being preferably connected to the line 4 at a point just inside the usual manual shut off valve. Within the casing 1 and above the bottom wall 6 of the latter there is mounted loosely as at 8 a valve member 9
90 which has a conical portion 10 adapted when the valve assumes the dotted line position shown in Fig. 1 to cooperate with the valve seat 11 and to interrupt the flow of gas in the supply line 4 to the distribution line 5,
95 the valve seating as will be obvious in a direction such that the pressure of the gas in the line 4 will aid in rendering it more effective in its action. The casing 1 obviously
100 need not be made in two parts but may be cast integral, and when this is done the valve 9 may be inserted through the opening for the pipe 4 and held in position with the finger while the pin 8 is inserted. For
105 the purpose of normally maintaining the valve 9, which is biased towards closed position by gravity, in open position means are provided including an opening 12 in the valve member which provides an edge 13
110 which cooperates with an abutment member 14 composed of some material which bends

readily, fuses, or is destroyed by the application of heat. The abutment 14 is supported in a metallic plug 15 which is threaded as at 16 into the wall of the casing through which the pipe 4 opens into the latter. At its outer end plug 15 comprises a cylindrical portion 17 which is surrounded by a heating coil 18 constructed in a familiar manner and adapted to be supplied with electric current from any suitable source 19 upon the closure of a manually controllable switch mechanism 20 or upon the closure of any one of a series of thermostatic switches 22, the closure of the manual switch or the thermostatic switches connecting the leads 23 and 24 from the coil 18 in a closed circuit with the source of current 19.

For the purpose of enabling the movement of the valve 9 to open position after it has once been closed a threaded removable plug 25 is connected by a chain 26 and hook or eye 27 with the rear side of the valve 9 so that upon unscrewing the plug 25 the chain 26 may be drawn to open the valve and move the latter into the full line position shown in Fig. 1. A second opening 30 having a closure plug 31 is arranged adjacent the distribution line 5, through which opening a rod or other implement may be inserted upon removal of the plug 31 to force the valve to the position shown in full lines in Fig. 1. It will be observed that the recess 12 will collect the molten material from the element 14 and prevent possibility of the latter adhering to the surface of the valve 10 and causing an excrescence which would prevent closure of the valve.

The mode of operation of this illustrative form of the invention is as follows: Let it be assumed that a fire breaks out near the casing 1. In this event the walls of the casing will become hot and the heat will be conducted and radiated to the abutment member 14. As a result the latter will be melted and cease to hold the valve 9 in open position. Thereupon the valve 9 will close by gravity and the conical surface 10 seating within the surface 11 will effectively interrupt the flow of gas into the house piping. Owing to the fact that the fused metal drops into the recess 12 the valve will seat surely and can not have its closing movement interfered with by the possible adherence of the metal to the surface 10. In the event that the fire breaks out at a point remote from the casing 1, but adjacent one of the thermostats 22, which may be arranged in any desired number about the house or building, the heat will cause the affected thermostat to close a circuit including the source of current 19, the coil 18 and the wires 23 and 24. As a result the resistance coil 18 will be heated and will heat the element 15 and this heat, conducted longitudinally of the latter, will melt the fusible material 14 and permit the

valve to close. It will also be obvious that in the event of the discovery of fire by a person in the house the switch 20 may be closed, immediately effecting the heating of the coil 18 without waiting until a temperature sufficient to effect operation of one of the thermostats 22 is produced.

In the modified illustrative form of the invention shown in Fig. 3 the entire system is the same except that instead of resorting to destruction of the fusible element in the event of a fire at a point remote from the mechanism, electro-magnetic means is relied on to move the fusible element to a position to release the valve. In this illustrative form a fusible abutment 14' cooperates with a shoulder 13' upon a valve 9' and in the event of heating of the casing 1' the fusible element 14' will be destroyed and the valve 9' allowed to close just as in the first illustrative mechanism disclosed. The member 14' is mounted at the lower end to an armature 35 which is reciprocable in a dielectric tube 36 and which is prevented from dropping downwardly to an excessive distance by a pin 37 extending into an annular groove 38. A solenoid 39, having leads 23' and 24' is connected in circuit just as was the coil 18 in the form shown in Fig. 1. It will be evident that in the event of the closure of a circuit between a source of current and leads 23' and 24' the solenoid 39 will be energized and the core 35 drawn into the latter and that the bodily upward movement of the element 14' will release the valve 9' and permit it to close.

In the event that the abutment element of either illustrative form of the invention is rendered inoperative by the action of heat, so that it no longer retains the valve in open position, it may obviously readily be replaced by removing its associated mechanism and replacing the element. From the foregoing description it will also be evident that whether the fire occurs adjacent the safety device proper or at a point remote therefrom the admission of gas to the building may be surely interrupted.

While the forms of mechanism here shown and described are well adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the forms or embodiments herein disclosed, for it is susceptible of embodiment in various forms all coming within the scope of the claims which follow.

I claim:

1. A safety valve for gas pipes including a valve casing, a valve therein biased towards closed position, an abutment element readily deformable by the action of heat normally maintaining said valve in open position, supporting means for said abutment member relative to which said valve is movable during closing and means carried by but

exterior to said casing for rendering said abutment element inoperative to hold said valve open.

2. A safety valve for gas pipes including
5 a valve casing, a valve therein biased towards closed position, an abutment element readily deformable by heat normally maintaining said valve in open position, supporting means for said abutment member relative
10 to which said valve is movable during closing and means including a coil carried by but exterior to said casing and means for causing a flow of current therethrough for rendering said abutment element inoperative
15 to hold said valve open.

3. A safety valve for gas pipes including a valve casing, a valve therein biased towards closed position, an element readily deformable by heat normally maintaining said
20 valve in open position, and electric heating means carried by but exterior to said casing for effecting destruction of said element whereby said valve may close.

4. A safety valve for gas pipes including
25 a valve casing, a valve therein biased towards closed position, an element normally operative to hold said valve in open position, said element becoming inoperative to hold the valve open when subjected to excessive
30 heat and means arranged outside said casing for generating heat to effect destruction of said element.

5. A safety valve for gas pipes including
35 a valve casing, a valve therein biased towards closed position, a fusible element in said casing normally operative to hold said valve in open position, but deformable on excessive heating of said casing, means arranged outside said casing for generating heat to
40 effect destruction of said element, and means at a distance from said casing for rendering said last mentioned means operative.

6. A device of the class described comprising a casing arranged between a supply line and a distributing line and affording a chamber,
45 a valve in said chamber biased towards closed position, means including a heat deformable device for holding said valve in open position, and means including an element forming a removable portion of said
50 casing, and a flexible connection between said element and said valve for moving said valve to open position.

7. A device of the class described comprising a casing having wholly metallic walls
55 arranged between a supply line and a distributing line and affording a chamber, a valve in said chamber biased towards closed position, means including a heat destructible device supported by a wall of said casing
60 for holding said valve in open position, and means for applying a localized heat to a portion of the wall of said casing to effect deformation of said heat deformable element whereby said valve may close.
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8. A device of the class described comprising a casing forming a connection between a supply line and a distributing line,
a valve in said casing biased towards closed position, and a fusible element cooperating
70 with said valve to hold the latter open, said mechanism providing a recess to receive said fusible element on fusion of the latter.

9. A device of the class described comprising a casing forming a connection between a supply line and a distributing line,
75 a valve in said casing biased towards closed position, and a fusible element engaging said valve to hold the latter open, said valve having a recess to receive said fusible element on
80 fusion of the latter.

Signed by me at Boston, Massachusetts,
this 24th day of October, 1924.

JOHN F. CURRIVAN.