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SAFETY DEVICES FOR GAS SYSTEMS

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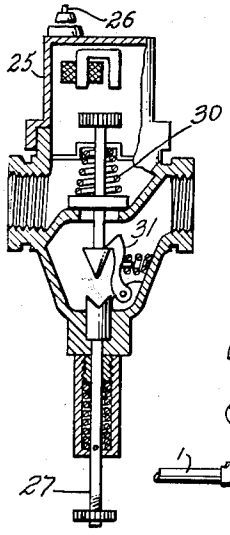


Fig. 4

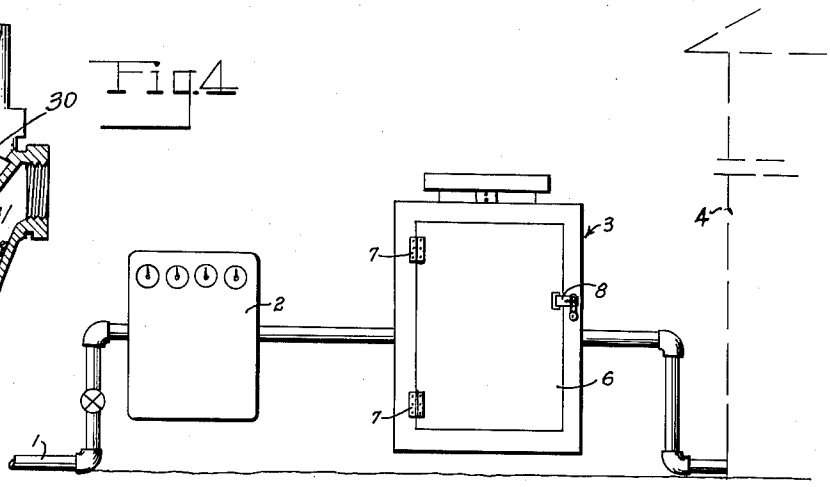


Fig. 1

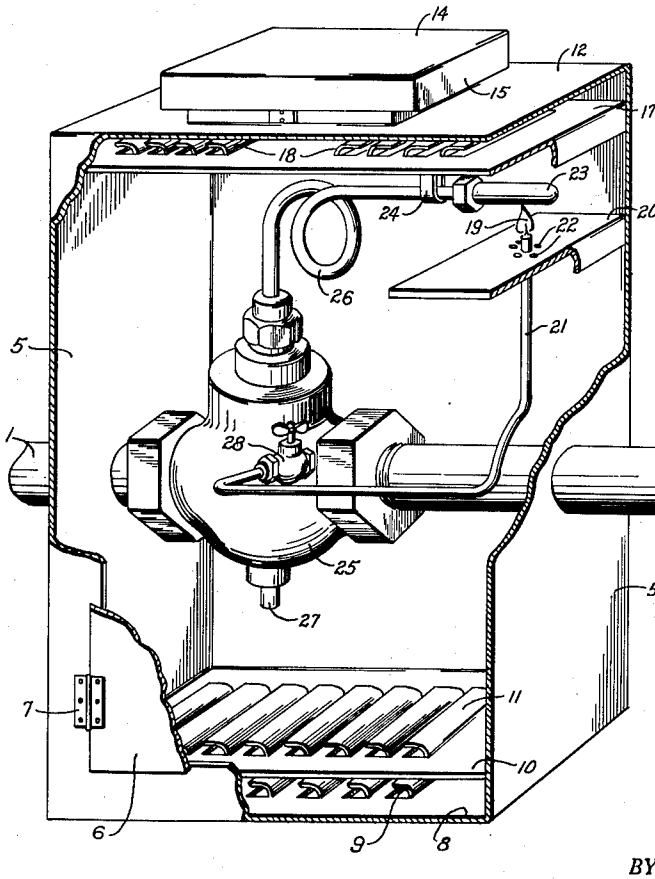


Fig. 2

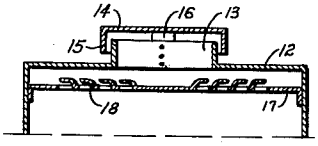


Fig. 3

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SAFETY DEVICES FOR GAS SYSTEMS

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This invention relates to improvements in safety devices for gas systems and more particularly to a safety valve cut-off that may be installed in a gas line exterior of a building and which is held open by the application of heat to a thermo-element and which closes when the heat drops below a predetermined temperature.

The present invention comprises a unit that is preferably used exterior of a building within the gas line leading into the building, so that when the fuel supply diminishes, a pilot light in the unit is extinguished thus reducing the temperature on a thermo-controlled valve to close same, and which, when closed will remain closed until manually reopened, thus obviating the danger of escaping gas within the building, should the flame of any gas appliances within the building become extinguished and the gas supply later comes on. In the present construction the pilot light operates the thermostat from a gas supply on the outlet side of the valve, therefore, if the valve is closed because of lack of fuel, it remains closed until manually reopened to permit the lighting of the pilot light to heat the thermo-element so as to maintain the valve in opened condition.

The present valve, together with a particular pilot burner mechanism is a self-contained unit that may be contained within an incoming gas line so as to give protection against gas coming on again to fill the building with a combustible gas mixture or asphyxiate the occupants of the building.

Various safety devices have been proposed heretofore, but these, for the most part, have been dependent on the pressure within a gas line and when the mechanism became worn, the devices were unreliable as safety devices.

An object of this invention is to provide a self-contained safety valve unit which is weatherproof and which requires little or no attention as long as the gas supply and pressure is normal but which will automatically close off the gas supply, should the gas pressure or the fuel supply become inadequate and which will maintain said system in closed condition until manually reset and the pilot relighted.

Still another object of the invention is to provide a housing in a thermo-actuated gas valve that is so constructed as to admit free circulation of air therethrough to supply oxygen to the pilot light but which will prevent drafts of a nature to extinguish the pilot light.

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

Fig. 1 is a diagrammatic elevational view of a gas system showing a gas line, meter, the housing of the present safety device and a building to which the gas line leads being shown in dashed outline;

Fig. 2 is a perspective view of the device with parts broken away and shown in section to show the details of construction of the housing and the positioning of the thermo-valve within the housing, as well as the particular arrangement of the thermo-element and the pilot light; and

Fig. 3 is a fragmentary sectional view through the upper

portion of the housing, showing the manner of ventilation of the housing to prevent undesirable drafts;

Fig. 4 is a vertical sectional view through the control valve.

With more detailed reference to the drawing, the numeral 1 designates a gas line to a gas appliance in the building having the usual meter 2 therein and with the housing generally designated at 3 of the present safety device. The building 4 to which the gas line leads is shown in dashed outline.

The housing 3 is formed with walls 5 which have apertures therethrough for the passage of pipe 1 therethrough. It is preferable to have a door 6 having hinges 7 and a lock type hasp 8, to enable entrance into the housing when desired, but which precludes unauthorized tampering. The housing has a bottom 8 in which louvers 9 are formed so as to deflect air passing therethrough. A similar bottom member 10 is positioned a spaced distance above the bottom 8 and has louvers 11 therein to further deflect and diffuse the air passing therethrough. The housing 3 is provided with a top portion 12 that has an upstanding neck portion 13 forming an outlet vent. A cap 14 having downwardly depending sides 15 is supported on lugs 16 so that the downwardly depending sides 15 will be in overlapping relation with the upstanding neck portion 13 and the cap portion 14 will be a spaced distance above the top of the neck portion 13 so as to allow the circulation of air therethrough without allowing rain or other forms of moisture to pass thereinto.

Spaced downward from the top portion 12 is a baffle 17 having louvers 18 therein to permit circulation of air therethrough, but which are so arranged as to prevent drafts from passing directly through said housing in such force as to extinguish the pilot light 19.

A bracket 20 is secured to one of the walls 5 and has a pipe 21 leading upward therethrough. Spaced vertical holes 22 are provided within the bracket 20 so as to admit air upward around the pipe 21 to give the correct combustion mixture to the pilot light 19. The pipe 21 leads from a control valve in the gas line to supply gas for a pilot light 19 thereabove. Positioned immediately above pipe 21 is a thermo-element 23 that is in close proximity to the flame of the pilot light 19. The thermo-element is suspended by the U-bracket 24 from the baffle 17.

The thermo-element 23 connects with a valve 25 by means of a tube 26, which tube may be filled with a non-compressible fluid, such as mercury, an expansible metallic element to close an electrical contact to operate an electro-magnetic mechanism to hold the valve in open position, or by a metallic element to mechanically hold the valve in open position when the thermo-element 23 is heated, all of which valves are well known in the art, and no claim is being made to the internal construction of any particular valve. The patents to Ross-Watt 1,850,646 and Alfery 2,321,119 show valves of the general type used. Figure 4 shows in section one form of valve which may be used. As shown in this figure the valve is urged to closed position by a spring 30 and is held closed by a latch 31. When the valve is opened by the re-set button 27 and the thermo-element is heated the valve is held opened against the tension of the spring 30 by means of the solenoid shown at the top of the housing 25 of Fig. 4. When the thermo-element cools the valve is released by the solenoid and closed by the spring 30 and held closed until the re-set button 27 is manipulated to release the latch and open the valve. When the valve element is in open position, gas is allowed to escape through pilot control valve 28 and pipe 21 to enable the lighting of the pilot light 19. Whereupon, the thermo-element 23 is heated so that the valve is held in open position.

It is to be understood that the valve **25** having thermo-element **23**, tubing **26**, re-set button **27**, as well as pilot control valve **28** and pilot gas pipe **21** are known in the field of valves in connection with such items as hot water heaters, but the present invention is considered new as herein set forth as an adjunct to a gas system.

Operation

Upon installation of the safety device within a gas line **1**, the door **6** may be opened to expose to view the safety valve mechanism. The valve **28** may be opened the desired amount but no gas will pass therethrough until push button **27** is moved to raise valve element latch mechanism and valve, which will permit gas to flow through pipe **21** to pilot **19** which may now be lighted as indicated at **19**, so that the flame or the heat from the flame will heat the thermo-element to hold valve **25** open, whereupon push button **27** may be released and the valve **28** regulated to such extent that the flame of the pilot light **19** will give sufficient heat to heat the thermo-element **23** to maintain the valve element in open position as long as gas is flowing through the outlet end of pipe **1**.

When there is no longer sufficient gas flowing through pipe **1** or upon the combustible mixture or the gas pressure dropping below a point sufficient to produce combustion of gas to maintain the pilot light **19** lighted or if for any reason that the pilot fails to be maintained in a lighted condition, the valve element within valve **25** will close and will remain latched closed until it is possible to investigate the reasons for such failure and to remedy same before the gas is turned on thereby obviating danger of an explosive mixture escaping into the building or of persons within the building becoming asphyxiated due to an accumulation of gas therein.

It is to be pointed out that the present device is responsive to the combustibility of the gas and not solely dependent on the pressure and will operate as long as the mixture remains combustible independent of the pressure.

While the invention has been described in some detail in one embodiment thereof, it is to be understood that changes may be made in the minor details of construction and adaptations made for particular installations without departing from the spirit of the appended claims.

Having thus described the invention, what is claimed is:

1. A safety device for installation within a primary pipe system for conducting inflammable gas to an appliance in a building comprising a thermally actuated valve within said primary system which valve has an inlet and an outlet, a secondary gas outlet formed in said primary pipe system on the outlet side of said valve, a conduit leading from said secondary outlet, a gas fed burner connected to said conduit, a thermal actuated element within the heat range of said burner, means responsive to said thermal element for holding said valve open as long as gas is flowing through said outlet to said burner to heat said thermal element, means for closing the valve when the flow of gas ceases, means for holding said valve closed when closed by said last named means, manual means for opening said valve to permit gas to flow through said valve to said burner so that said burner by means of said thermal element will maintain said valve in open position and a housing surrounding said burner on said secondary conduit so as to define a heating chamber for maintaining said burner in lighted condition, said housing insulating said burner from heat from any appliance in said primary pipe system.

2. The invention according to claim 1 in which said housing has an upstanding neck on the upper end thereof surrounding an opening in the upper end of said housing and a cover telescoped over said upstanding neck and spaced therefrom to form an air passage therearound and therebetween.

3. The invention according to claim 1 in which said housing is provided with a transverse baffle secured within said housing and spaced below the upper end of said housing, which transverse baffle is provided with a plurality of inversely arranged louvers, the housing having also louvers formed in the bottom thereof for passage of air therethrough, a transverse baffle formed intermediate said bottom louvers and said first named baffle, said transverse baffle having louvers formed therein for passage of air therethrough, said louvers in the bottom and transverse baffles being so arranged as to prevent said burner from becoming extinguished by outside air currents.

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