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W. A. CALDWELL, JR.

SAFETY ATTACHMENT FOR BURNERS.

APPLICATION FILED JUNE 28, 1907.

Fig. 1.

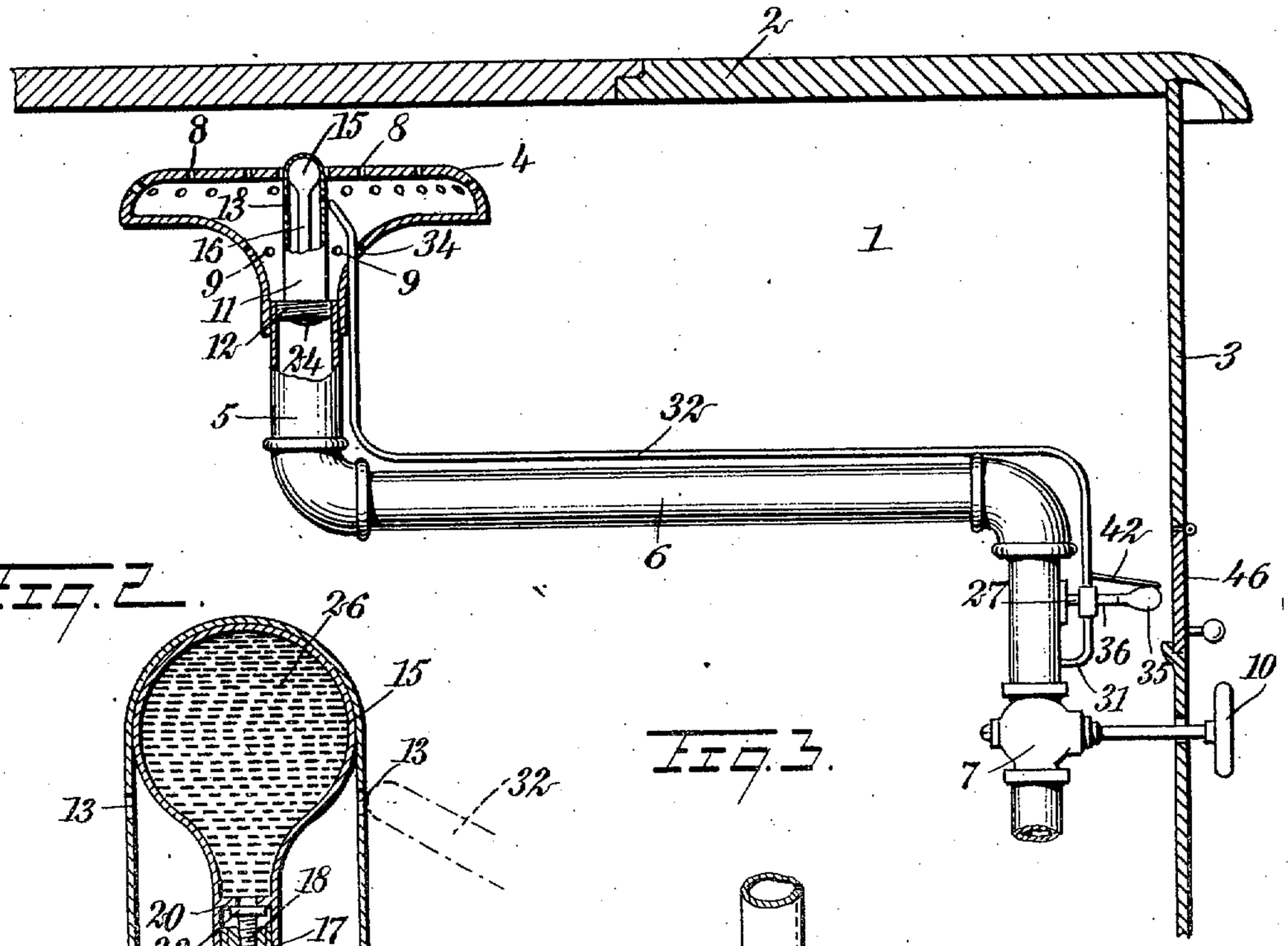


Fig. 2.

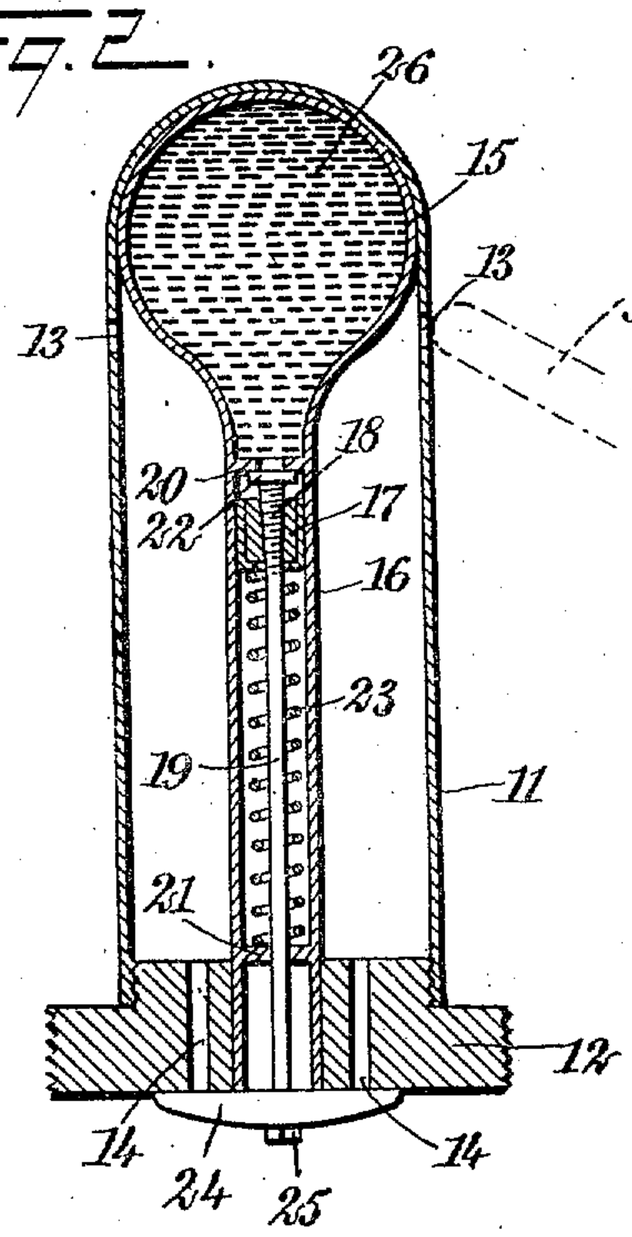
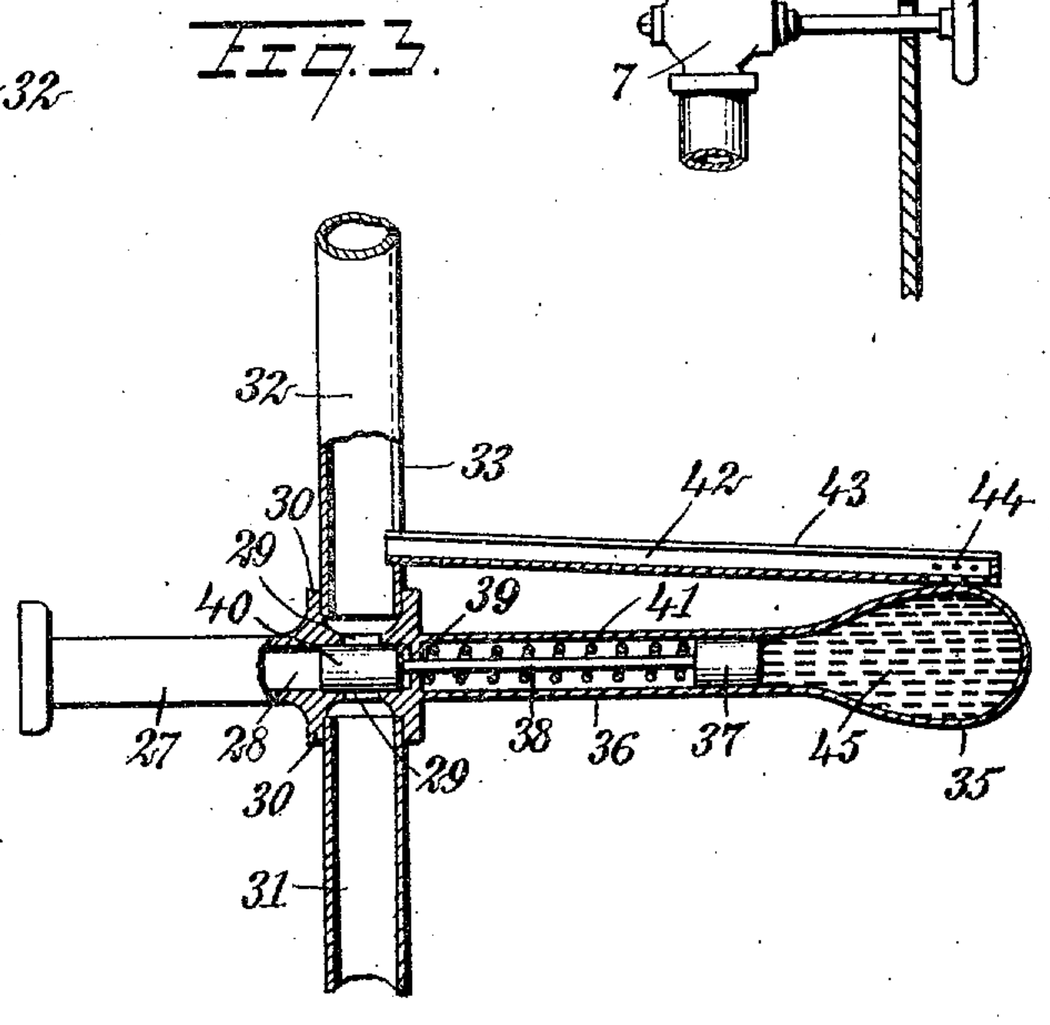


Fig. 3.



WITNESSES

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SAFETY ATTACHMENT FOR BURNERS.

No. 883,784. Specification of Letters Patent. Patented April 7, 1908.

Application filed June 28, 1907. Serial No. 381,242.

To all whom it may concern:

Be it known that I, WILLIAM A. CALDWELL, Jr., a citizen of the United States, and a resident of Roswell, in the county of Chaves and Territory of New Mexico, have invented a new and Improved Safety Attachment for Burners, of which the following is a full, clear, and exact description.

This invention relates to safety attachments for burners, and more particularly gas burners for stoves, lamps and the like.

The object of the invention is to provide a simple, inexpensive and efficient safety attachment for burners, which prevents the escape of gas or other fuel to the burner unless the fuel is ignited.

A further object of the invention is to provide a device of the class described, having means controlled by the heat of the burner for operating a fuel inlet valve, and further, having means for igniting the fuel burner from a point remote from the burner.

A still further object of the invention is to provide a safety attachment for burners, having a fuel inlet valve controlled by the expansion and contraction of a thermally sensitive substance, whereby the escape of the fuel to the burner is prevented when the fuel is not ignited, and having means similarly controlled by the expansion and contraction of a thermally sensitive substance, for igniting the fuel at the burner from a point remote from the burner.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which

Figure 1 is a side elevation of a burner having my invention applied thereto and showing parts in vertical section; Fig. 2 is an enlarged vertical section of a detail; and Fig. 3 is an enlarged partially vertical section of a further detail.

Before proceeding to a more detailed explanation of my invention it should be understood that gas burners, for instance, those in connection with stoves and lamps, are often a source of danger in that the flame at the burner is accidentally extinguished and subsequently the gas fuel escapes from the burner, unignited, to fill the room with its poisonous vapors, which are, as well known, dangerous to animal organism. To obviate this danger I provide a safety attachment for gas burners which prevents the escape of the gaseous fuel from the burner if the latter is unignited. For the purpose I employ a thermally sensitive substance which controls a movable member located in a casing, the movable member in turn serving to operate an inlet valve controlling the flow of the fuel into the burner. As long as the fuel is ignited at the burner the valve will be open, as the heat of the flames expands the substance in the chamber, forcing the movable member into an operative position and thereby opening the valve and holding the same open against the tension of a spring as long as the substance remains expanded.

I use a similar device for igniting the fuel at the burner from a point remote from the burner, a bulb filled with the thermally sensitive substance controlling a valve admitting fuel to an ignition tube adjacent to the bulb. From the ignition chamber a flame conveyer leads to the burner; thus, when a burning match or other source of heat is applied to the ignition bulb, the expansion of the substance in the latter permits the flow of fuel to the ignition tube, the fuel being there ignited and the flame running along the flame conveyer to the chamber of the burner, heating the latter. The expansion of the thermally sensitive substance therewithin, opens the valve and permits fuel to flow into the burner, and the flame, heating the chamber, immediately ignites the fuel. When the match or other source of heat is withdrawn from the ignition bulb, the substance therewithin cools and the flow of fuel to the ignition tube ceases. As soon as the burning fuel at the burner is extinguished, the chamber and the thermally sensitive substance therewithin cool and the flow of fuel to the burner is thereupon immediately stopped.

Referring more particularly to the drawings, 1 represents a stove, having the usual top 2 and sides 3. A burner 4 which may be of any preferred or common type, is arranged within the stove and is mounted at the end of an upwardly disposed arm 5 of the fuel supply pipe 6. A hand valve 7 of the usual kind is provided at the fuel pipe 6, and can be manually operated to control the flow of the gaseous fuel through the pipe. The

burner 4 has openings 8 to permit the flame from the burning fuel to escape, and has further openings 9 through which air can be drawn in by the inrush of the gas to make a suitable burning mixture of air and gas. The valve 7 has the usual hand-wheel 10 at the side of the stove.

Arranged centrally within the burner is a sleeve 11, preferably rounded and closed at the end adjacent to the top of the burner. The sleeve 11 is carried by a threaded disk or plug 12, located in the correspondingly threaded end of the arm 5 of the fuel pipe. The sleeve 11, near the upper end has openings 13 at the sides, and the plug 12 has openings 14 therethrough, effecting communication between the fuel pipe and the interior of the sleeve, to permit the flow of fuel from the pipe through the openings 14, thence into the sleeve 11, and thence through the openings 13 to the burner. Within the sleeve 11 is a bulb 15 preferably fitting snugly within the rounded end of the sleeve. At the lower end, the bulb 15 has an elongated integral casing 16 the lower end of which fits in a suitable opening near the middle of the plug 12. A movable member 17 is slidably arranged within the casing 16 and consists of a sleeve and therewithin a member having a conical threaded opening therethrough. The correspondingly formed end 18 of a rod 19 is located in the conical threaded opening of the member and extends longitudinally of the casing 16, projecting from the lower end. Near the ends, the casing 16 has transverse integral partitions 20 and 21, the partitions having openings therethrough. The rod 19 passes through the opening in the lower partition 21 and has at the opposite end, beyond the movable member 17, a laterally extended head 22 normally closing the opening through the partition 20. A helical spring 23 is mounted upon the rod 19 between the partitions 21 and the movable member, normally holding the latter in the normal position with the head of the rod 19 closing the opening through the partition 20. The projecting end of the rod 19 has a valve disk 24, held in position by a nut 25. The valve disk 24 is laterally extended, and closes the openings 14 when the member 17 and rod 19 are in the normal position, when the fuel is prevented from flowing into the burner. Within the bulb 15 is a thermally sensitive substance 26 such as mercury, completely filling the bulb at ordinary temperatures. When the bulb is heated the substance expands, and passing through the opening in the partition 20 forces the movable member longitudinally of the casing 16 against the tension of the spring 23, thereby opening the valve and permitting the fuel to flow through the openings 14 and 13 to the burner. Thus as long as the fuel is ignited at the burner, the expanded liquid within the bulb holds the valve open and permits the continued flow of the fuel.

Mounted upon the fuel pipe 6 at a point adjacent to a wall of the stove is a bracket 27, constituting at one end a casing 28 having opposite lateral openings 29. Around the openings 29 the bracket 27 has annular flanges 30, at one of which is mounted a tube 31 effecting communication between the fuel pipe and the casing 28 through said opening 29. At the opposite opening 29 the flange 30 carries a flame-conveying tube 32, having a longitudinal slot 33. The flame-conveying tube 32 runs to the burner and passes through a suitable opening 34 in the side of the latter, and has the end disposed adjacent to an opening near the bulb 15.

A bulb 35 having an elongated neck 36, is carried at the end of the bracket 27 and has a movable member 37 slidably arranged within the neck. A rod 38 is secured to the movable member 37, and extends through a suitable opening in a partition 39 into the casing 28, within which it is secured to a valve plunger 40. A helical spring 41 is arranged upon the rod 38 and holds the movable member, the rod and the valve plunger in a normal position, the latter closing the openings 29 and preventing the flow of fuel to the flame conveyer. An ignition tube 42, having a slot 43 and at the end a plurality of openings 44, is arranged adjacent to the bulb 35 and communicates at the inner end with the flame-conveyer 32. The bulb 35 is filled with a thermally sensitive substance 45, such as mercury. When the bulb is heated by the application of a burning match or other source of heat, the expansion of the substance therewithin forces the movable member 37 longitudinally of the neck, against the tension of the spring, thereby displacing the valve plunger 40 and uncovering the openings 29, to permit the flow of fuel from the pipe 6 through the tube 31 into the flame-conveyer and the ignition tube. The source of heat ignites the gas within the ignition tube, and the flame passes through the latter into the flame-conveyer running along the latter to the end thereof, the air being supplied for the combustion through the slots 43 and 33. The flame burning at the end of the flame-conveyer heats the bulb 15, and as explained before, opens the valve to permit the flow of the fuel from the pipe 6 into the burner, where it is ignited by the flame at the end of the flame-conveyer. When the source of heat is withdrawn from the bulb 45, the cooling thereof permits the substance to contract and the spring 41 thereupon closes the openings 29. A door 46 at the side of the stove gives access to the ignition device.

It will be understood that my attachment may be constructed of any suitable material,

for instance, cast-iron. I prefer to fashion the bulbs of suitable nickeled metal, the valve-disk of rubber, leather or the like, and the springs of steel. The device is applicable not only to gas burners, but to all burners using a gaseous mixture, for instance, mixtures of gasolene vapor and air.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. In a device of the class described, a hollow body having at the end a chamber, said chamber containing a thermally sensitive substance, a movable member within said chamber and operable by the expansion and contraction of said substance, a fuel inlet, said member having a valve controlling said fuel inlet, said body having a partition adjacent to said chamber, and resilient means arranged between said member and said partition for resisting the movement of said member in a direction to open said fuel inlet.

2. In a device of the class described, a hollow, elongated body forming a cylinder and having at the end a laterally extended part forming a chamber, said chamber containing a thermally sensitive substance, a movable member within said cylinder and operable by the expansion and contraction of said substance, a fuel inlet, said member having a valve disk controlling said fuel inlet, said body having a partition adjacent to said chamber, and a spring arranged between said member and said partition and resisting the movement of said member in a direction to open said fuel inlet.

3. In a device of the class described, a burner, a fuel inlet pipe, a plug between said burner and said inlet pipe and having a sleeve presenting openings, a bulb within said sleeve and containing a thermally sensitive substance, said bulb having a casing, a movable member within said casing, a rod rigid with said movable member, openings through said plug effecting communication between said inlet and said sleeve, said rod having a valve disk for closing said openings of said plug, and a spring within said casing holding said member in a normal position to close said openings by means of said valve disk, said member being operable by the expansion and contraction of said substance.

4. In a device of the class described, a chamber containing a thermally sensitive substance and having a neck, a movable member in said neck controlled by the expansion and contraction of said substance, an ignition tube adjacent to said chamber, a flame-conveying tube communicating with said ignition tube, a fuel inlet valve to said ignition tube controlled by said member, and means for normally holding said fuel inlet valve closed.

5. In a device of the class described, a bulb having an elongated neck and containing a thermally sensitive substance, a movable member in said neck and controlled by the expansion and contraction of said substance, an ignition tube adjacent to said bulb, a flame-conveying tube communicating with said ignition tube, a fuel inlet valve communicating with said ignition tube through said flame-conveying tube, a plunger for closing said valve, said plunger being controlled by said member, and means for normally holding said plunger in position to close said valve.

6. In a device of the class described, a bulb having an elongated neck and containing a thermally sensitive substance, an ignition tube adjacent to said bulb and having a longitudinal slit, a flame-conveying tube communicating with said ignition tube and having a longitudinal slit, a fuel inlet valve communicating with said ignition tube through said flame-conveying tube, said flame-conveying tube extending from said ignition tube to a burner, a plunger for closing said valve, a rod connecting said member and said plunger, and a spring within said neck and engaging said member to hold said plunger in position, closing said valve.

7. In a device of the class described, a chamber containing a thermally sensitive substance, a valve for controlling fuel, said valve being controlled by said substance, a second chamber containing a thermally sensitive substance, an ignition tube, a flame-conveying tube, and a valve for controlling the fuel inlet to said ignition tube, said fuel inlet valve to said ignition tube being controlled by said substance within said second chamber.

8. In a device of the class described, a chamber containing a thermally sensitive substance, a movable member, a fuel inlet valve controlled by said member, said member being operable by the expansion and contraction of said substance, a second chamber containing a thermally sensitive substance, an ignition tube adapted to coact with said second chamber, a flame-conveying tube leading from said ignition tube to said first chamber, and a second valve for controlling the fuel inlet to said ignition tube, said second valve being controlled by said substance within said second chamber.

9. In a device of the class described, a chamber containing a thermally sensitive substance, a valve for controlling a fuel inlet, said valve being controlled by said substance, a second chamber containing a thermally sensitive substance, a movable member controlled by the expansion and contraction of said substance within said second chamber, an ignition tube adjacent to said second chamber, a flame-conveying tube communicating with said ignition tube and leading to said first chamber, a fuel inlet valve

to said ignition tube controlled by said member, and means for normally holding said valve closed.

10. In a device of the class described, a chamber containing a thermally sensitive substance, a movable member, a fuel inlet valve controlled by said member, said member being operable by the expansion and contraction of said substance, a second chamber containing a thermally sensitive substance and having a neck, a second movable member in said neck and controlled by the expansion and contraction of said substance within said second chamber, an ignition tube adjacent to said second chamber, a flame-conveying tube communicating with said ignition tube and leading to said first chamber, a fuel inlet valve to said ignition tube and controlled by said member, and means for normally holding said fuel inlet valve to said ignition tube, closed.

11. In a device of the class described, a chamber containing a thermally sensitive substance, a casing communicating with said chamber, a movable member within said casing, an inlet valve controlled by said member, means for normally holding said valve closed, said member being operable by the expansion and contraction of said substance, a second chamber containing a thermally sensitive substance and having a neck, a second movable member in said neck and operable by the expansion and contraction of said substance within said second chamber, an ignition tube adjacent to said second chamber, a flame-conveying tube communicating with said ignition tube and leading to said first chamber, a fuel inlet valve to said ignition tube and controlled by said second member, and means for normally holding said fuel inlet valve to said ignition tube, closed.

12. In a device of the class described, a chamber containing a thermally sensitive substance, a casing communicating with said chamber, a movable member within the said casing and operable by the expansion and contraction of said substance, a fuel inlet, said member having a valve disk controlling said fuel inlet, said casing having a partition, a spring arranged between said member and said partition and resisting the movement of said member in a direction to open said fuel inlet, a bulb having an elongated neck and containing a thermally sensitive substance, a movable member in said neck and controlled by the expansion and contraction of said substance within said bulb, an ignition tube adjacent to said bulb, a flame-conveying tube communicating with said ignition tube and leading to said chamber, a fuel inlet valve communicating with said ignition tube, through said flame-conveying tube, a plunger for closing said valve to said ignition tube, said plunger being controlled by said member within said neck, and means for normally holding said plunger in position to close said valve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. CALDWELL, JR.

Witnesses:
C. A. HAMILTON,
C. C. CALDWELL.