Jan. 8, 1929.

1,698,281

R. H. SHADRICK

VALVE ACTUATOR

Original Filed Oct. 5, 1925 2 Sheets-Sheet 1

Fig. 1.

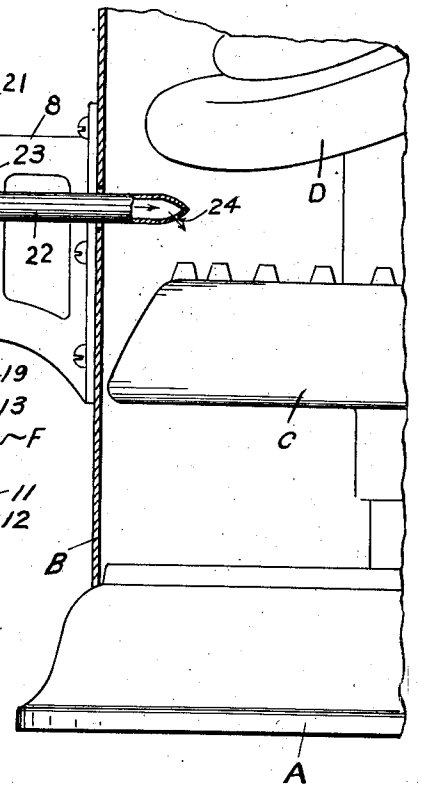


Fig. 2.

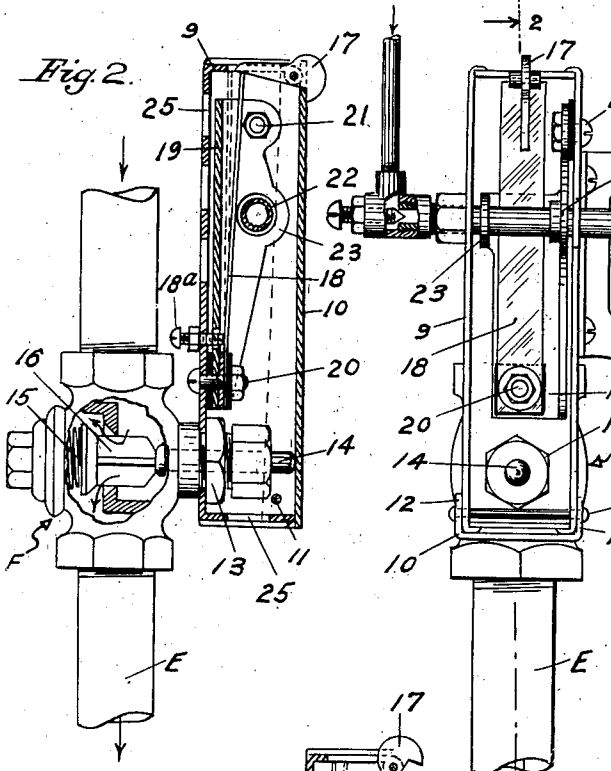
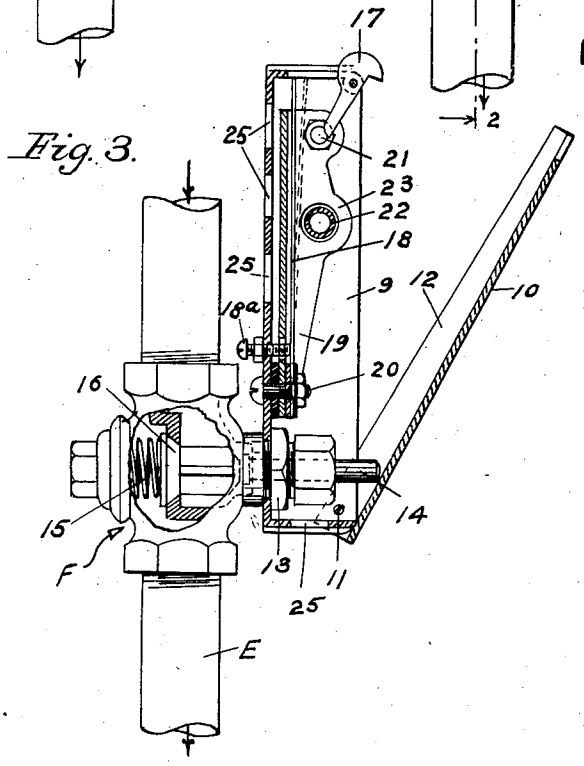


Fig. 3.



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Fig. 4.

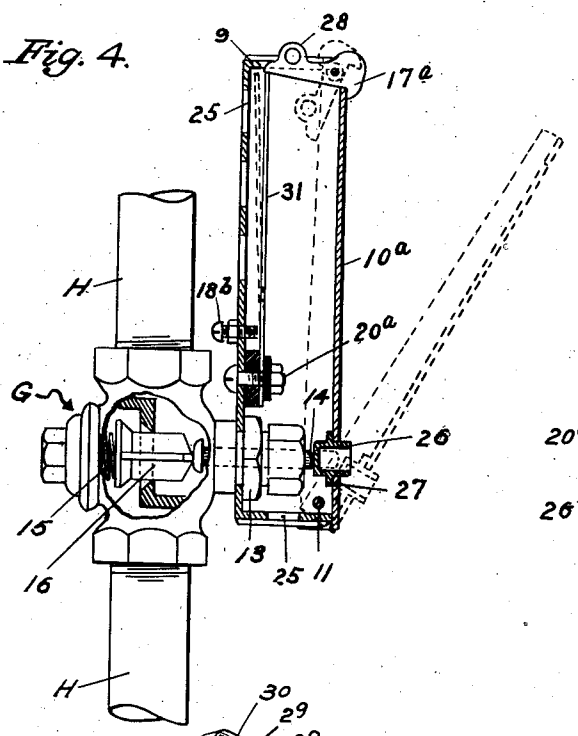


Fig. 5.

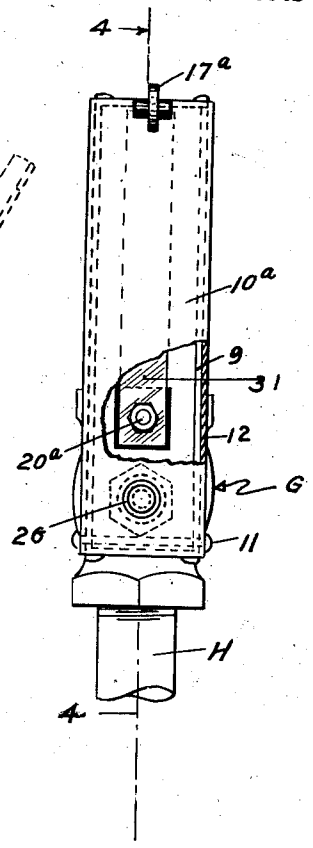
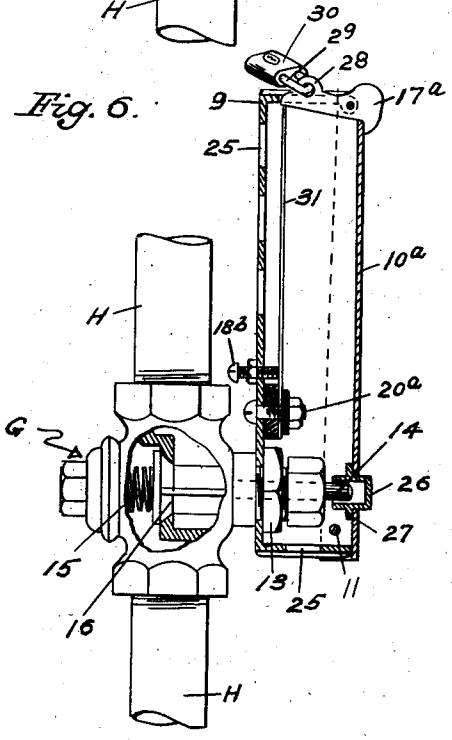


Fig. 6.



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UNITED STATES PATENT OFFICE.

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VALVE ACTUATOR.

Application filed October 5, 1925, Serial No. 60,632. Renewed December 31, 1926.

This invention relates to valve operating devices and the primary object is to provide means of a novel, practical and efficient nature for automatically closing the gas supply pipe to a gas burner, or the like, when the pilot light for such a burner has accidentally become extinguished. The invention is particularly useful in this capacity, when associated either with a so-called automatic burner or with a burner that is manually controlled, as shown in my co-pending patent application Ser. No. 734,180, filed Aug. 26th, 1924, for heater control.

A further object is to provide the device, in a modified form, whereby it may be employed as a temperature operated safety device to shut off the supply of gas to a house or other building when the same is burning so as to eliminate the possibility of gas escaping into the building.

Other objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, wherein:

Fig. 1 is an elevation of a portion of an ordinary gas heater, partly in section, showing the application thereto of my invention.

Fig. 2 is a sectional elevation, as seen substantially on the line 2—2 in Fig. 1, showing the gas valve as open.

Fig. 3 is a sectional elevation similar to Fig. 2, but showing device with the gas valve closed.

Fig. 4 is a sectional elevation showing a modification of the device shown in Fig. 2, and about as on the line 4—4 in Fig. 5.

Fig. 5 is an elevation of the device, as seen from the right in Fig. 4, a fractional portion of the cover being broken out.

Fig. 6 is a view similar to Fig. 4, but with some alteration and addition.

Referring first to Figs. 1, 2 and 3 of the drawings, and by reference characters, A designates the base of an ordinary heater having a casing or shell B, and a burner C and water coils D inclosed by the casing. The burner is provided with gas by a gas supply pipe E which has a normally open valve F, and a second valve (not shown) which is customarily used to turn the gas on and off either from an adjacent or remote point.

Secured upon the burner shell B, as by a suitable bracket 8, is a box like case 9 having a door 10 which is pivoted at its lower end, to the case, by a pivot member 11; which member passes through the sides of the case and flanges 12 of the cover.

The case 9 is rigidly secured upon the neck of the valve F, as by a nut 13, in such a manner that the stem 14 of the valve head 16 engages the cover and is held in a retracted position by the cover when the latter is closed, as in Fig. 2. A spring 15 tends to close the valve but cannot do so until the cover 10 has been released (as in Fig. 3) so as to allow the stem 14 to be projected.

The cover, which serves and acts as a lever with respect to the valve stem 14, is normally held closed by a dog 17, pivoted in the upper end of the casing 9, and which rests with its inner or rear end upon the end of a strip or bar of thermostatic metal 18, so that when the bar 18 is cooled off to a predetermined temperature it will move or bend back to the dotted line position shown in Fig. 2, and in full lines in Fig. 3, so as to trip or release the dog, and thereby release the cover 10 which will then swing open due to the pressure of the spring 15, and thereby close the valve F. The operative position of the bar 18 is determined and adjusted by a set screw 18^a.

The bar 18 is secured, at its lower end, together with a bent conducting bracket 19, by a bolt 20, to the casing, but both elements 18 and 19 are spaced and insulated from the interior of the case so that the heat will not be conducted thereto any more than necessary. The bracket 19 is also secured to one side of the casing, as by the bolt 21, so as to be rigid therewithin.

The pilot consists of a metallic heat conducting tube 22, which is carried by a pair of ears 23, of the bracket 19, and extends through a hole in the side of the casing 9 as well as through the heater shell B so that it will be in an operative or lighting position with respect to the burner C. The inner end of the tube is preferably closed by being pinched or crimped and is provided with small apertures 24 in its under side through which the gas escapes to keep the pilot burning. The outer end of the tube is provided with a convenient needle valve by means of which the pilot flame may be adjusted as desired.

In addition to serving as a gas conduit the tube 22 also acts as a heat conductor, and, as such, conducts sufficient heat from the pilot flame, which plays about the end of the

tube, to the bracket 19 and thence to the bar 18 to keep the latter under the rear end of the dog 17. Of course when the burner C is burning more heat will be conducted to the bar 18, but without any operative effect. When the pilot flame is extinguished for any reason, however, and when the burner is turned off, then the tube 22 will cool off several degrees, as will also the bracket 19 and the thermally responsive bar 18, with a result that the bar will no longer engage under the dog 17, and the latter will release the door 10, and permit the valve F to close. Now when the main gas valve to the burner C is opened, with the intention of lighting the heater, no gas will flow, and as a result no water will be heated. Thus the operator will be informed that the pilot is out, and upon such notice the various parts can be manually restored to their original positions, at which time the burner may be supplied with gas in the usual manner. It may be noted that the casing 9 is provided with upper and lower ventilating parts 25 which permit a circulation of air through the casing, and thus allow for a quicker and more responsive cooling of the bar 18 when the pilot goes out.

The device shown in Figs. 4, 5, and 6 is primarily intended as a safety device for a gas main leading into a dwelling or other building to cut off the supply of gas throughout the building when the same is on fire. Arrangement is also made whereby said gas supply may be manually shut off and locked so that the occupants cannot obtain gas until the company supplying the same unlocks the device so as to open the gas control valve.

A gas valve G, which is similar to the above described valve F, is cut into the main gas line H, which corresponds to the pipe E. The casing 9 and door 10^a are substantially similar to the corresponding members 9 and 10, except that the door 10^a, instead of acting directly upon the valve stem 14, has a hole in which is reversibly secured a cup shaped member 26 having a flange 27 for holding it in engagement with the door. The door is held shut by a dog 17^a, which is similar to 17, except that it is provided with a perforated ear 28 adapted to receive the bail 29 of a pad lock 30, as shown in Fig. 6. The dog is normally retained in its door locking position by resting on the upper end of a bar of thermostatic metal 31, which like the bar 18, is spaced and insulated from but secured to the case by a bolt 20^a, and may be manually adjusted by a set screw 18^b. The bar 31, however, is affected by temperature, in a reverse manner than that which was described as for the bar 18. Thus, there is nothing, corresponding to the pilot tube 22, to keep the bar 31 warm, and when under normal temperature it retains the position shown by full lines in the drawing. But, when subjected to higher than normal temperature, as when the building is burning, it moves back to the dotted line position shown in Fig. 4, thus tripping or releasing the dog 17^a, and permitting the door 10^a to open and the valve G to close. To reopen the valve G, after all danger has passed, it is only necessary to close the door and move the dog 17^a back to its original position, where it will be retained by the now cooled and restored thermostatic bar 31.

By reversing the member 26, as shown in Fig. 6, so that the door 10^a cannot hold the valve G open, and then applying a pad lock to the dog 17^a, as shown, it will be seen that the device can be effectively utilized as a meter or gas lock, when, for instance, the premises are not occupied. Under such conditions the bar 31 will, when subjected to different temperatures, have no effect on the members 17^a, 10^a or valve G, and obviously there would be no necessity for its doing so. To reinstate the gas supply it is only necessary to remove the lock and again reverse the member 26, when the valve will again be open and the safety cut out feature again restored.

It is understood that suitable modifications may be made in the general design and structural details of the invention as herein disclosed, and I do not limit myself to the particular uses to which I have herein applied my invention, provided, however that such modification and variations in adaptation come within the spirit and scope of the appended claims. Having now therefore fully shown and described my invention what I claim to be new and desire to protect by Letters Patent is:

1. The combination with a valve comprising a valve casing and a valve having a projecting valve stem, the valve having a tendency to close, of a casing rigidly arranged with respect to the valve casing, a normally closed cover for the second mentioned casing, and adapted, when closed, to act against the valve stem to hold the valve open, means for releasably holding the cover closed, and a thermostatic element operatively associated with the holding means.

2. The combination with a valve comprising a valve casing and a valve having a spring projectable valve stem, of a casing rigidly secured with respect to the valve casing, a cover for the second mentioned casing and adapted, when closed, to act against the valve stem to keep the valve open in opposition to the force of the spring, a thermostatic element within said second mentioned casing, and means associated with the thermostatic element for normally holding the cover closed and adapted to release the cover, to permit the valve to close, when said element is subjected to a predetermined temperature.

3. The combination with a valve compris-

ing a valve casing and a valve having a spring projectable valve stem, of a casing rigidly secured with respect to the valve casing, a cover for the second mentioned casing and adapted, when closed, to act against the valve stem to keep the valve open in opposition to the force of the spring, a thermostatic element within said second mentioned casing, and means associated with the thermostatic element for normally holding the cover closed and adapted to release the cover, to permit the valve to close, when said element is subjected to a predetermined temperature, said casing having perforations permitting a circulation therethrough.

4. The combination with a valve comprising a valve casing and a valve having a spring projectable valve stem, of a casing rigidly secured with respect to the valve casing, a cover for the second mentioned casing and adapted, when closed, to act against the valve stem to keep the valve open in opposition to the force of the spring, a thermostatic element within said second mentioned casing, and means associated with the thermostatic element for normally holding the cover closed and adapted to release the cover, to permit the valve to close, when said element is subjected to a predetermined temperature, said casing having upper and lower holes permitting a circulation of air to pass through the casing and about the thermostatic element therewithin.

5. The combination with a valve comprising a valve casing and a valve having a spring projectable valve stem, of a casing rigidly secured with respect to the valve casing, a cover for the second mentioned casing and adapted, when closed, to act against the valve stem to keep the valve open in opposition to the force of the spring, a thermostatic element within said second mentioned casing, and means associated with the thermostatic element for normally holding the cover closed and adapted to release the cover, to permit the valve to close, when said element is subjected to a predetermined temperature, said thermostatic element being spaced and insulated from and secured to the casing.

6. The combination with a valve having a tendency to close, of a casing rigidly secured with respect to and adjacent to the valve, a cover for the casing adapted, when closed, to open the valve, and when open, to permit the valve to close, and a thermostatically controlled device contained in the casing for releasably securing the cover in closed position.

7. The combination including a spring closable valve having a projecting valve stem adapted, when depressed, to open the valve, a casing carried by the valve, a cover hinged at one end to the casing and adapted near said end, to depress the valve stem to hold the valve open when the cover is closed, a latch device for releasably engaging the other end of the cover to hold it closed, and means normally holding the latch device in engagement with the cover and adapted to be actuated so as to release the latch device.

8. The combination including a valve comprising a valve casing and a valve having a spring projectable valve stem for opening the valve, a casing arranged adjacent to the valve casing, a cover hinged at one end to the second mentioned casing and adapted near said end, to engage the valve stem to hold the valve open when the cover is closed, a latch device for releasably engaging the other end of the cover to hold it closed, and means normally holding the latch device in engagement with the cover and adapted to be actuated so as to release the latch device, said means including a thermally responsive element, and means for adjusting the operative position thereof.

9. A device of the character described consisting of a spring closable valve having a projecting valve stem for opening the same, a casing arranged to house the projecting end of the valve stem, a cover hingedly secured to the casing, and operatively associated with the projecting end of the valve stem so as to hold the valve open when the cover is closed, and means for releasably holding said cover in closed position.

10. The combination with a main burner, of a spring closable valve for controlling fuel to a main burner, a thermostatically releasable device, removed from direct influence of the main burner, for normally holding said valve open, and a heat conducting pilot tube associated with said device for releasing said releasable device at a predetermined temperature.

11. The combination including a main burner, a spring closable valve for controlling fuel to the main burner, a lever member for opening the valve, a temperature controlled device removed from direct influence of the flame of the main burner for releasably engaging the lever member to hold the valve open, and a heat conducting pilot tube associated with said device whereby when the pilot flame is extinguished said lever member will be released to permit the valve to close.

12. The combination including a yieldingly closable valve, a casing rigidly associated with the valve and having a door for opening the valve when the door is closed, a thermally controlled device contained in the casing for releasably holding the door closed, and a heat conducting pilot tube extending out of the casing for conducting heat to the said device.

13. The combination with a burner of a gas heater, of a valve having a tendency to close for controlling the supply of gas to the burner, thermally responsive means, positioned so that it will not be directly influenced by the flame of the burner, for releasably

holding the valve open, and a pilot for said burner, said pilot including a heat conducting tube associated with the thermally responsive means and furnishing the sole means for conducting heat thereto.

14. The combination of a valve, means for yieldingly holding the same closed, releasable means for holding the valve open against the closing tendency of the first mentioned means, a thermally responsive element of the type wherein distortion thereof is effected by variations in temperature, said element being operatively associated with the second mentioned means whereby the latter will be released, to permit the valve to close, when the thermally responsive element has been distorted by a predetermined change in temperature, and means for adjusting the element whereby to regulate its operative sensitiveness to changes in temperature.

15. The combination including a valve for controlling the supply of fuel to a main burner, a heat conducting pilot tube for lighting the main burner, said pilot tube being arranged to receive fuel irrespective of the open or closed position of the valve, means for releasably holding the valve open, and thermostatically controlled means associated with the pilot tube for releasing the holding means, when the pilot is extinguished, to permit the valve to close.

16. The combination including a valve, for controlling the supply of fuel to a main burner, a heat conducting pilot tube having a pilot burner at one end, for lighting the main burner, and thermally responsive means connected with the other end of the tube, and influenced by the temperature of the tube, to effect a closing of the valve when the tube is cooled by the extinguishment of the pilot burner, to thereby prevent a flow of fuel to the main burner.

In testimony whereof I affix my signature.

RICHARD H. SHADRICK.