Feb. 9, 1937. R. S. TAYLOR ET AL 2,069,863

SAFETY DEVICE FOR GAS BURNERS

Filed April 25, 1933

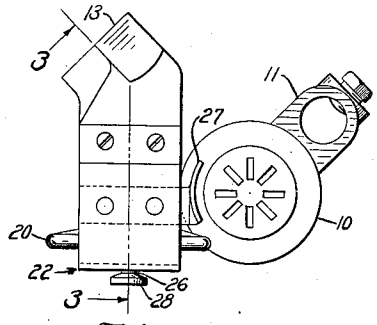


Fig. 2

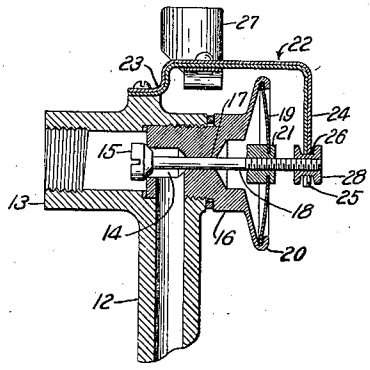


Fig. 3

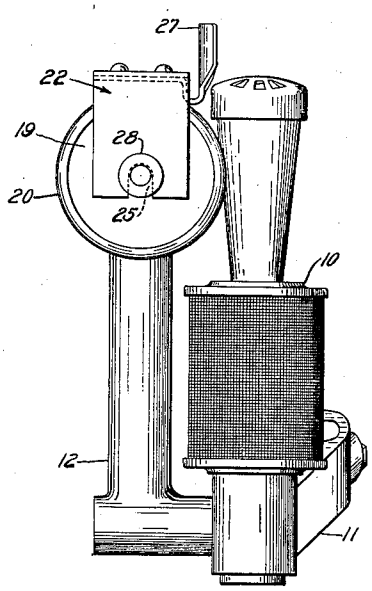


Fig. 1

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Patented Feb. 9, 1937 2,069,863

UNITED STATES PATENT OFFICE

2,069,863

SAFETY DEVICE FOR GAS BURNERS

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Application April 25, 1933, Serial No. 667,785

4 Claims. (Cl. 158—117.1)

This invention relates to fluid fuel burners and more particularly to a safety device for a gas burner automatically operable to cut off the flow of gas to the burner when the flame is extinguished.

There is contemplated such a device comprising a valve, a thermostat operative responsive to heat of the burner flame, and a snap action diaphragm for both sealing the valve and converting the action of the thermostat into snap action of the valve, as set forth in an application Serial No. 478,619 of R. S. Taylor. The present invention resides in the use of a particular type of snap action diaphragm and the connection thereof so that the valve is operated directly by the thermostat in both opening and closing movement, and constitutes an improvement over the device disclosed in said application of Taylor.

The invention will be more fully understood upon reference to the following description taken in connection with the accompanying drawing, in which,

Fig. 1 is an elevation of a gas burner provided with a safety valve contemplated by this invention;

Fig. 2, a plan view of the burner shown in Fig. 1; and

Fig. 3, a detail section of the safety valve taken on line 3—3 in Fig. 2.

Referring to the drawing, a gas burner 10 provided with a mounting bracket 11 is of a type well known in the art and in itself forms no part of the present invention. Gas is conducted to the burner through a conduit 12 which extends alongside of the burner and is adapted for connection to a gas supply line at 13, as shown in Figs. 2 and 3. The conduit 12 is conveniently L-shaped near the burner head where it is provided with a valve passage 14 controlled by a valve member 15. As best shown in Fig. 3, a valve body 16 inserted in conduit 12 is suitably drilled to form the valve passage 14 and communicating guide passage 17 through which extends a valve operating rod or stem 18.

The valve body 16 is outwardly cupped around the valve stem passage 17 and a diaphragm 19 is secured around its edge to the lip 20 of the cupped portion of the valve body forming a seal against the escape of gas through the valve stem passage 17. Through the center of the diaphragm 19 is secured a stud 21 through which extends one end of the valve stem 18. As shown the valve member 15 comprises the head of a screw, the shank of which forms the valve stem 18 and is threaded through the diaphragm stud 21.

The diaphragm 19 is a resilient cupped disc of a type well known in the art which is stable in a flexed position on either side of its flat or center position and may be referred to as an over-center snap action spring. A thermostatic element comprising a bimetallic strip 22 is mounted with one end 23 fixed and its other end free, the free end being provided with a slot 25 adapted to engage a grooved portion 26 of an adjustable member 28 threaded on the end of the valve stem 18. A member 27 of good thermal conductive material is secured at one end to the thermostatic element 22 with its other end extending with respect to the burner in such a position as to be heated by the flame when the burner is operating.

The parts mentioned above are so designed and arranged that when the burner is not in operation the valve 15 is closed and the snap action diaphragm is bowed in its outward stable position. The burner may be lighted in two ways. Heat may be applied for a time to the thermal conductor 27 until, due to the increase in temperature, the bimetallic strip 22 exerts sufficient pressure inwardly through the member 28 to snap the diaphragm 19 to its opposite stable position carrying therewith through valve stem 18 the valve member 15 to its open position, thus allowing flow of gas to the burner which may then be lighted.

When the burner is lighted the flame maintains the thermal conductor 27 at its increased temperature and the safety valve remains open. If, in any manner, the flame should go out or the burner be turned off, the thermal conductor 27 and bimetallic element 22 cool off until the latter, due to the decrease in temperature, exerts sufficient pressure on the member 28 to snap the diaphragm 19 to its outward stable position carrying therewith through valve stem 18 the valve member 15 to its closed position thereby cutting off further flow of gas to the burner.

Since the bimetallic element is resilient, the burner may also be lighted by pressing inwardly on the member 28 to hold valve 15 open until the burner flame heats the bimetallic element through the conductor 27 sufficiently that opening pressure is not exerted, after which, operation occurs in the manner previously described.

The same results could be obtained by providing in place of the snap action diaphragm 19 an ordinary flexible diaphragm and a separate snap action device. However, with the arrangement

above described the diaphragm and snap action device are combined into a single element thus greatly simplifying the arrangement.

It will be obvious to those skilled in the art that various changes may be made in the construction and arrangement without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawing and described in the specification but only as indicated in the following claims.

We claim:

1. Fluid fuel burner apparatus comprising a burner, a structure including a gas supply conduit connected to the burner, a valve member in said conduit, a stem connected to said valve member, a snap-action diaphragm mounted on said structure and connected to said stem and adapted to buckle to either side of a plane to move the valve member to open and closed positions respectively, said diaphragm being sealed with respect to said structure and said stem to prevent leakage, and a resilient thermostatic member mounted on said structure and connected to said stem, said resilient member being in heat transfer relation with the gas flame of the burner, said resilient member being automatically distortable under variation of temperature to move said diaphragm to center position from either buckled position.

2. Fluid fuel burner apparatus in accordance with claim 1 characterized by said resilient member being accessible for manual operation.

3. Fluid fuel burner apparatus comprising a burner, a structure incuding a gas supply conduit connected to the burner, a valve member, a stem connected to said valve member, a snap-action diaphragm mounted on said structure and connected to said stem and adapted to buckle to either side of a plane to move the valve member to open and closed positions respectively, said diaphragm being sealed with respect to said structure and said stem to prevent leakage, and a resilient thermostatic member mounted on said structure including means operatively connecting the same to said stem, said resilient member being in heat transfer relation with the gas flame of the burner, said resilient member being automatically distortable under variation of temperature to move said diaphragm to center position from either buckled position.

4. Fluid fuel burner apparatus comprising a burner, a structure including a gas supply conduit connected to the burner, a valve member, a stem connected to said valve member, a snap-action diaphragm mounted on said structure and connected to said stem and adapted to buckle to either side of a plane to move the valve member to open and closed positions respectively, said diaphragm being sealed with respect to said structure and said stem to prevent leakage, and a resilient thermostatic member mounted on said structure including means operatively connecting the same to said stem, said resilient member being in heat transfer relation with the gas flame of the burner, said resilient member being accessible for manual operation and automatically distortable under variation of temperature to move said diaphragm to center position from either buckled position.

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