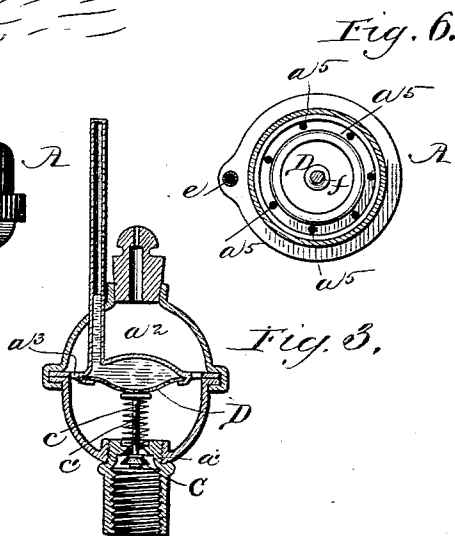
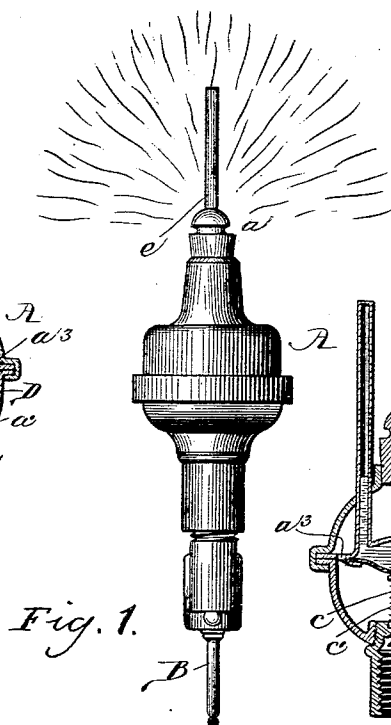
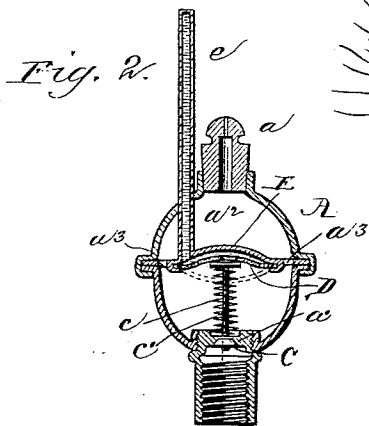
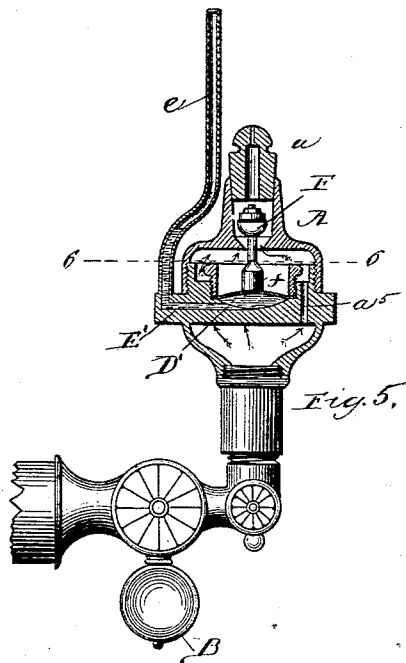
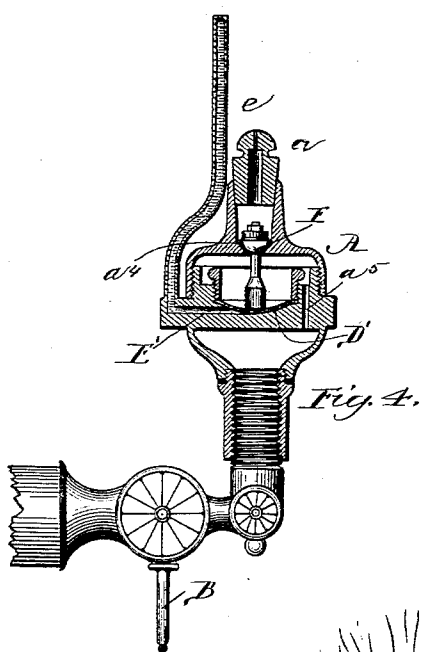


(No Model.)

F. H. ROOT.
AUTOMATIC GAS EXTINGUISHER.

No. 476,412.

Patented June 7, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANCIS H. ROOT, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE H. BLISS,
OF SAME PLACE.

AUTOMATIC GAS-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 476,412, dated June 7, 1892.

Application filed December 16, 1889. Serial No. 333,987. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. ROOT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Gas-Extinguishers, of which the following is a specification.

My invention relates to gas-burners provided with means for automatically cutting off the flow of gas should the burner-flame be blown out or the usual cock be accidentally opened after the flame has been extinguished.

The objects of my invention are to provide highly-sensitive means not only for attaining the result aforesaid, but also for permitting the flow of gas to be automatically established by the simple act of holding a lighted match, taper, or the like in position to light the gas as soon as the same issues from the burner.

To the attainment of the foregoing and other useful ends—such as simplicity, compactness, and the like—my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents in elevation a gas-burner provided with my invention applied thereto. Fig. 2 is a section taken on a vertical central plane through Fig. 1 with the pipe-section for the usual cock omitted. In this figure the valve is shown closed. Fig. 3 is a view similar to Fig. 1 with the valve open. Fig. 4 shows a vertical central section through the burner and represents another of the various arrangements of valves which can be employed. In this view the valve is shown closed. Fig. 5 is a view similar to Fig. 4, but shows the valve open. Fig. 6 is a cross-section on line 6 6 in Fig. 5.

The burner A can be provided with any suitable tip *a* and can be attached as usual or in any suitable way to a supply-pipe provided with an ordinary cock B.

In Figs. 2 and 3 I have provided in connection with the burner a spring-controlled check-valve C, arranged to open against pressure within the gas-supply pipe. Said valve is normally held against its seat *a'* by a spring *c* and is provided with a stem *c'*, which is subject to the movement of a flexible diaphragm

D. This flexible diaphragm is subject to pressure within the pressure-chamber E, which contains a body of some volatile liquid and which is provided with an extension *e*, arranged to stand in such position that it shall be heated from the burner-flame.

To render the device exceedingly neat and compact, I prefer to arrange the diaphragm and lower portion of the fluid-chamber within the body of the burner, which can be chambered, as at *a*², for such purpose, and to extend the fluid-chamber upwardly from chamber *a*² in the form of a small metal tube made of any desired shape in cross-section and arranged to stand within the vicinity of the burner-flame. With such arrangement gas can flow through the burner-chamber *a*² by providing therein any suitable arrangement of passage or ports—as, for example, as at *a*³, Fig. 2.

In the absence of pressure within the pressure-chamber sufficient to overcome the resistance of the valve-spring the valve will remain closed, and hence the flow of gas through the burner will be cut off regardless of the condition of the cock B, which may be either open or closed.

In order to permit the flow of gas through the burner, (assuming cock B to be now open,) it will be necessary to first heat and vaporize the liquid within the pressure-chamber, so as to cause within the latter pressure sufficient to depress the diaphragm or movable abutment, which will in turn depress the valve-stem, and thereby open the valve. As soon as the flow of gas is established it can be lighted by the flame of the match or taper which has been employed in heating the liquid, and by reason of the position of the extension *e* of the pressure-chamber the flame used for heating the liquid therein will while the user is in the act of thus heating the liquid be in position for lighting the gas the moment it issues from the burner-tip. Heat from the burner-flame will keep the fluid heated and vaporized, and thereby maintain within the pressure-chamber sufficient pressure to hold the valve open, and hence the gas continues to burn until either the supply has been cut off by closing cock B or the flame blown out or otherwise extinguished. As soon,

however, as the burner-flame has in any way whatsoever been extinguished the consequent cooling and condensation of the liquid will reduce the pressure within its chamber, and hence permit the valve to close, and thereby absolutely prevent flow of gas through the burner until pressure has again been induced within the pressure-chamber by again heating the liquid.

In Figs. 4, 5, and 6 provision is made for automatically closing the valve by gravity. To such end the check-valve F in said figures is arranged to close upon a seat a^4 in the upper portion of the burner and is provided with a downwardly-projecting stem, which rests upon the diaphragm or movable abutment D. The movable abutment D in this case rises when acted upon by pressure within the pressure-chamber E, which said chamber, like the one in Figs. 2 and 3, is provided with an upwardly-projecting extension e . Passages a^3 are also provided in said last three figures for the flow of gas from the lower to the upper part of the burner. The valve F can be weighted in any suitable way—as, for example, by weighting its stem, which is herein shown made of sufficient size to give the valve all needed weight.

While I prefer the construction shown in Figs. 2 and 3, the foregoing matters are deemed sufficient to demonstrate that various modifications and arrangements of the device can be made without departing from the spirit of my invention.

With regard to the kind of liquid employed, I use alcohol or ether or like liquid, which will not readily freeze and which can be readily vaporized by heat, and with a liquid of such character the device is rendered as sensitive as may be desired. Thus I find by practical test that the flame of a single match will serve both for heating the liquid, so as to cause

the valve to open, and for lighting the gas, which will issue from the burner as soon as the valve has been thus opened. The extension e of the pressure-chamber can be made of thin metal or other suitable substance which will readily heat without burning and is desirably made comparatively small, so that the liquid therein can be quickly heated and vaporized and also so that it will quickly cool and condense after the burner-flame has been extinguished.

What I claim as my invention is—

1. A gas-burner provided with a pressure-chamber arranged to extend alongside the burner-flame, a valve which is normally closed to prevent the flow of gas from the burner, but opened to establish such flow by an increment of pressure within the pressure-chamber, and a body of volatile liquid contained within the pressure-chamber and vaporizable to create sufficient pressure to open the valve by heat from a light held in position to light the gas, the pressure for holding open the valve after the gas has been lighted being maintained by heat from the burner-flame acting direct upon the pressure-chamber alongside the flame, substantially as set forth.

2. The combination, substantially as hereinbefore set forth, with a gas-burner, of a pressure-chamber containing a body of volatile liquid and having an extension e , arranged to stand alongside the burner-flame, a movable abutment subject to pressure within the pressure-chamber, and a valve normally closed to prevent the flow of gas from the burner and opened to establish such flow by an increment of pressure within the pressure-chamber, substantially as described.

FRANCIS H. ROOT.

Witnesses:

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