(No Model.)

A. KLEINFELDT.

GAS CUT-OFF DEVICE.

No. 522,601. Patented July 10, 1894.

Fig. 1.

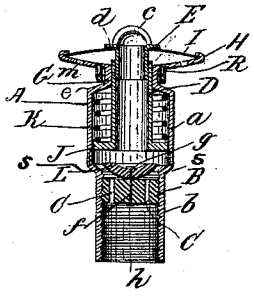


Fig. 2.

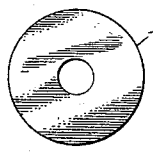


Fig. 3.

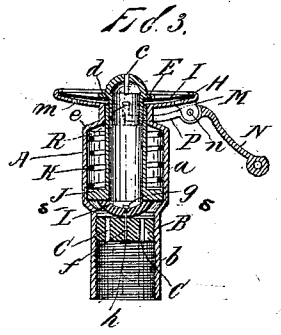


Fig. 4.

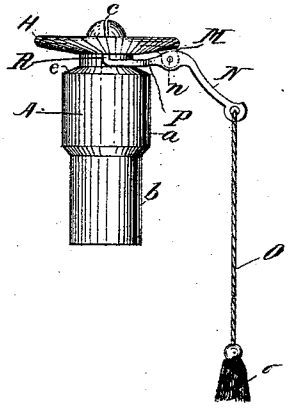


Fig. 5.

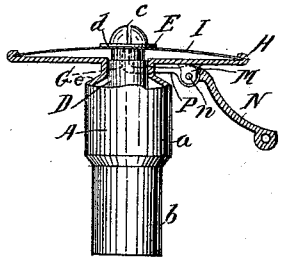
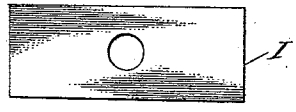


Fig. 6.



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UNITED STATES PATENT OFFICE.

ARTHUR KLEINFELDT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE PERFECTION SAFETY GAS-BURNER COMPANY, OF NEW JERSEY.

GAS CUT-OFF DEVICE.

SPECIFICATION forming part of Letters Patent No. 522,601, dated July 10, 1894.

Application filed June 28, 1893. Serial No. 479,093. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR KLEINFELDT, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas Cut-Off Devices, of which the following is a specification.

The object of my invention is to produce a device which will maintain the valve in a gas-pipe open so long as the gas is being consumed by ignition and which will automatically close the valve and cut off the supply of gas whenever the flame has been extinguished by accident or otherwise and the gas ceases to burn, so as to prevent the escape of non-consumed gas.

The device of my invention is simple in construction, compact in size, can be readily applied to any gas-pipe and is positive in its operation.

In the accompanying drawings forming a part hereof,—Figure 1 illustrates a vertical section of a device embodying my invention showing the position of the parts when the valve is raised and the pipe open. Fig. 2 is a plan view of the expansible spring plate. Fig. 3 is a vertical section similar to Fig. 1 showing the position of the parts of a device embodying my invention when the valve is lowered and the pipe closed. Fig. 4 is a vertical elevation of a device as shown in Figs. 1 and 2. Fig. 5 is a view of a modified form of my invention; and Fig. 6 is a plan view of the expansible spring plate of a different or modified shape from that shown in Fig. 2,—Fig. 5 embodying a plate as shown in Fig. 6.

Like letters refer to corresponding parts in all the views.

A represents a piece of metal tubing or a hollow metal cylinder comprising two sections or portions *a* and *b*, the portion *b* being screw-threaded on its inside, adapted to fit over a corresponding screw-threaded portion of a gas-pipe not shown, leading from a source of gas supply, and in this section is also fitted a block or partition B, having passages or ports C therethrough connecting the lower section or apartment *b* of the cylinder A with the upper portion or section *a*, through which ports or passages C the gas from the gas-pipe passes into the section *a* and thence into the burner or valve D and through the burner-tip E, the burner tip E being screw-threaded on its outside to engage with a corresponding screw-threaded portion on the inside of the upper end of the burner D to unite the two together, as will be readily understood from the drawings, the burner-tip having the usual slot or opening *c* therein from which the gas is omitted to be ignited in the usual manner.

The upper portion of the cylinder A is constructed so as to form the neck G in which the burner or valve D fits, but which burner is adapted to move up and down easily therein, the neck of the cylinder A comprising a suitable guide for the burner D in its vertical movements, and the upper end of the cylinder A terminates in a circular plate H, made slightly concaved or inclined, the edges of which plate are turned over so as to grasp the outside edges of an expansible circular metal spring plate I, as shown in Fig. 1. This plate I is made slightly larger in diameter than the binding plate H into which it is fitted, the edges being held in the turned-over portion of the metal plate H, as will be seen from the drawings.

The plate I has a central opening therethrough, through which is passed the burner-tip E, which has a flange *d* on its upper end, resting over the plate I when the parts are arranged in their operative position and with which flange the plate I engages to raise the burner D and open the valve in the manner to be presently explained.

The plate H may be continuous with or form part of the cylinder A, or it may be a separate piece secured to the cylinder A in any convenient manner, in the drawings the two parts being shown as constructed in one piece.

The lower end of the burner D is constructed with an annular flange J, the outer edges of which exactly fit the interior or bore of the upper section *a* of the cylinder A, being adapted to move up and down in the section *a* by the vertical movements of the burner D with which it forms a part or with which it is connected, and the downward motion of the burner D is limited by the inclined portion or shoulder *s* of the cylinder A, and by the engagement of the flange *d* on the burner-tip with the plate I, as shown in the drawings

In the compartment or section *a* is located a spiral spring K, placed around the burner D, held in position or situated between the flange J of the burner D and the wall or shoulder *e* of the cylinder A, and the tension of this spring is downward so as to assist in drawing down the burner and holding it down so as to maintain the lower part or flange J of the burner, against its seat L to close the passage of gas from the section *b* into the burner; this valve-seat L is made of metal, or it may be made of any other suitable material, preferably convex on its lower portion and concaved on its upper portion and rests upon the block B in the section *b* and is held centrally thereto by means of a wire or rod *f* which has a nut or head *g* on its upper end engaging with the concaved portion or surface of the valve-seat L and a similar nut or head *h* on its lower end engaging with the under portion of the block B whereby the valve-seat L is securely attached or fastened or held in position so that it cannot be vertically moved therefrom, but by reason of the curved or rounded under surface of the valve-seat L and the spring of the wire or rod F the valve or burner D is enabled to accurately accommodate or seat itself tightly to the valve-seat L so that the engagement of the valve D with its seat will be perfect or gas-tight, the valve-seat L adjusting itself through the curvature of its under side to the position on it of the valve, as in operation after a time the motion of the valve might become slightly irregular in its vertical direction which would be compensated for and taken up by the adjustability or movability, although slight, of the valve-seat.

The upper surface of the valve seat is made slightly concaved, as shown in the drawings, so as to provide a little basin for dirt or dust that may get into the burner through the slot C in the burner tip or otherwise, when instead of accumulating on the upper edges of the valve-seat with which the flange J of the valve D is designed to engage as shown in Fig. 3, thereby preventing a perfect contact and a complete closure of the gas-pipe, the dirt will accumulate in the center of the valve-seat in the basin or recess provided therefor, just explained, and this recess may be made larger or smaller, or rectangular, or otherwise as desired, and the dirt that has accumulated therein may be removed therefrom by taking the burner apart whenever required.

The plate H is provided with a number of openings *m* arranged at any desired points thereof for the free passage of air therethrough so as to enable the air to have free contact with both sides of the plate I; and the plate H is also provided with a lug or projection M to which is pivoted by a pivot *n* a lever N, to one end of which lever is attached a cord O supplied with a tassel *o*, the other end of the lever having two forks or arms P, (only one of said forks being shown in the drawings) and which arms are curved slightly outward away from the pivotal point passing to opposite sides of the cylinder A, the forked arms having upwardly extending arms R, which are adapted to engage with the under surface of the expansible plate I, said arms passing through suitable openings made therefor in the plate H, as will be seen in Fig. 1. This lever N may be attached as well to any other place of the cylinder A instead of being attached to the plate H, as will be readily understood.

Of course it is to be understood that the expansible spring-plate I may be of various shapes instead of circular as shown in Figs. 2, 3 and 4, and in Figs. 5 and 6 I have shown the plate as rectangular having the central opening therethrough, said plate I being slightly longer than the distance between the inside surfaces of the turned-over portions of the plate H, as will be seen in Fig. 5. The turned-up portions of the plate H, however it is shaped or arranged constitute holding devices or means for holding or binding the ends of the expansible metal plate I; and instead of employing a plate H, *per se* by which to hold the edges of the plate I, this device I may be otherwise held at its edges by separate holding devices attached to the cylinder, frame or gas-pipe, in any case the dimension of the plate or device between its edges or the points where it is held being greater than the distance between the holding devices for the purposes set forth, within the spirit of my invention.

The operation of the hereinabove described device is as follows: The position of the parts being as shown in Fig. 3 with the valve D resting on the valve-seat L, the main cock in the gas-pipe being opened (not shown however) but the gas being prevented from entering the burner by the seating of the valve or burner onto its seat, the gas although it may pass through the ports C in the block B cannot pass between the under or lower surface of the flange J of the burner D by reason of the contact of such flange with the upper edge of the valve-seat L, as before explained; and the spring K is in its normal position resting between its seats or housings, and the plate I is down in its curved or sprung position in engagement with the arms P of the lever N. The cord is now taken by the hand and pulled down when the arms P engaging with the plate I will force the plate I to its upper position positively as shown in Fig. 1 and this plate I being of greater diameter than the plate H will be in the one or the other position either in its extreme downward position or in its extreme upward position, and by raising the plate I or forcing it upward or causing it to belly or spring upward by the engagement therewith of the arms P, the burner D will be positively raised from off its seat enabling a free passage of the gas into the burner and out through the burner-tip where it may be ignited, the upward move-

ment of the burner compressing the spring K between its seats; as soon as the gas has been ignited the heat of the gas flame will heat the plate I, causing it to expand and curve farther upward in addition to the power of the plate to maintain itself curved or sprung in its upwardly curved position, and this expansion will continue, or the plate will be maintained in its expanded and upwardly curved condition so long as the gas is burning, and the expansion will be sufficient to overcome the resistance or power of the spring K and maintain the burner D in its raised position off the valve-seat; therefore so long as the gas is burning the valve will remain raised and the pipe open, but should for any reason whatever the flame go out, the plate I will become cooled by the air surrounding its upper and lower surfaces, and the spring D will restore the plate I to its normal position, or to its farthermost downward curved position, as shown in Fig. 3, at the same time forcing down with it the burner D which will engage with its seat L, thereby closing the gas-passage until the lever N is again operated to again raise the plate I and raise the burner D from its seat by the engagement of the plate I with the flange E on the burner tip as before explained.

From the above description of the operation it will be evident that the expansible metal plate engages with the burner to raise it from its seat, it being only necessary to suitably impart an upward movement to the plate to effect this end; and also that said expansible metal plate maintains the burner raised by its expansion due to the heat of the gas-flame, and that it permits the burner to be lowered by contracting when the flame goes out. So long as the gas is ignited the heat of the flame maintains the expansible metal plate in upper position and resists the effort to lower the valve or burner, but when the flame goes out the plate contracts and permits the valve or burner to be lowered to its seat.

It will also be noted that after the expansible metal plate has been moved sufficiently in either direction to overcome its tendency to lie in the initial position, this metal plate will tend itself to buckle or move in the direction of pressure and thus itself act to raise or lower the burner.

As before stated the foregoing describes a device shown in the drawings which embodies my invention, but my invention may no doubt be effectually embodied in other constructions or combination of parts making up an operative device, therefore I do not limit my invention to the precise construction of parts or their relative size or arrangement comprising the device shown in the drawings, but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a gas cut-off device the combination with a cylinder having a self-adjusting valve-seat, a burner or valve adapted to move vertically in said cylinder and to rest on said valve-seat in its lower position, an expansible metal plate adapted to engage with said burner and means whereby it may be actuated to raise said burner from its seat, said expansible metal plate being adapted to maintain the burner raised by the expansion of said plate through the heat of the gas-flame, and to permit the burner to be lowered by the contraction of said plate when the flame goes out, substantially as set forth.

2. In a gas cut-off device the combination with a cylinder having a self-adjusting valve-seat, a burner or valve adapted to move vertically in said cylinder and to rest on said valve-seat in its lower position, an expansible metal plate adapted to engage with said burner and means whereby it may be actuated to raise said burner from its seat, said expansible metal plate being adapted to maintain the burner raised by its expansion through the heat of the gas-flame and a spring located within the cylinder to lower the burner to its seat when the flame goes out.

3. In a gas cut-off device the combination with a cylinder having a self-adjusting valve-seat, a burner or valve adapted to move vertically in said cylinder and to rest on said valve-seat in its lower position, an expansible metal plate adapted to engage with said burner and means whereby it may be actuated to raise said burner from its seat, said expansible metal plate being adapted to maintain the burner raised by its expansion through the heat of the gas-flame and means located within the cylinder to lower the burner to its seat when the flame goes out.

4. In a gas cut-off device, a burner or valve adapted to move vertically in an inclosing cylinder and an expansible metal plate adapted to engage with said burner and means whereby it may be actuated to raise said burner from its seat, said plate also adapted to maintain the burner raised by its expansion through the heat of the gas-flame, said plate being held on its edges the dimension of said plate between the points where it is held being greater than the distance between the holding devices, substantially as and for the purpose set forth.

5. In a gas cut-off device a burner or valve adapted to move vertically, a spring metal plate adapted to be sprung or curved upward and downward by suitable means to raise and lower said valve or burner to open and close the gas passage, said plate being held at its edges, the dimension of the plate between the points where it is held being greater than the distance between the holding devices, substantially as and for the purpose set forth.

6. In a gas cut-off device an expansible metal plate adapted to operate by expansion and contraction through the heat of the gas-flame, and connected so as to operate a valve controlling the gas passage, said plate being held at its edges the dimension of the plate between the points where it is held being greater than the distance between the holding

devices substantially as and for the purpose set forth.

7. In a gas cut-off device the combination of a cylinder, a burner or valve adapted to move vertically in said cylinder, an expansible metal spring device adapted to operate by expansion and contraction through the heat of the gas-flame to maintain the gas passage opened or closed, said spring device being held on its edges the dimension thereof between the points where it is held being greater than the distance between the holding devices substantially as and for the purpose set forth.

8. In a gas cut-off device the combination of a valve controlling the gas passage, an expansible metal spring plate adapted to move said valve, said plate being held on its edges, the dimension of the plate between the points where it is held being greater than the distance between the holding devices, means adapted to operate said plate to move said valve to open the gas passage and means adapted to operate said plate to move said valve to close the gas-passage.

9. In a gas cut-off device the combination of a valve controlling the gas passage, an expansible metal spring plate adapted to engage with said valve, said plate being held on its edges the dimension of the plate between the points where it is held being greater than the distance between the holding devices, a lever adapted to operate said plate to move said valve to open the gas passage and a spring adapted to operate said plate to move said valve to close the gas-passage.

10. In a gas cut-off device the combination of a metal cylinder, a burner or valve adapted to move vertically in said cylinder an expansible metal spring plate held on its edges the dimension of the plate between the points where it is held being greater than the distance between the holding devices, a lever adapted to operate said plate to raise the valve to open the gas passage said plate being adapted to maintain the gas passage open by its expansion through the heat of the gas flame and a spring located in said cylinder adapted to operate said plate to lower said valve to close the gas passage.

11. In a gas cut-off device the combination of a cylinder, an expansible metal circular plate adapted to be held on its edges, the diameter of the plate being greater than the distance between the holding devices and a valve engaging with said plate adapted to move vertically upward or downward in said cylinder by the curving upward or downward of said plate, substantially as and for the purpose set forth.

12. In a gas cut-off device the combination of the cylinder A constructed substantially as shown and described, block B having gas-ports or passages C therein, self-adjusting valve-seat L attached to said block B, burner or valve D, burner-tip E secured thereto, spring K, expansible spring plate I and lever N all arranged and adapted to operate substantially as and for the purpose set forth.

This specification signed and witnessed this 13th day of June, A. D. 1893.

ARTHUR KLEINFELDT.

In presence of—
ALFRED W. KIDDLE,
E. M. TAYLOR.