

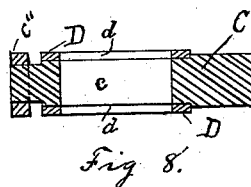
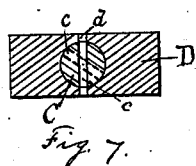
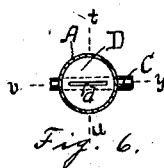
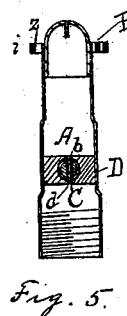
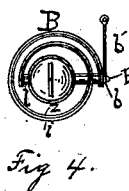
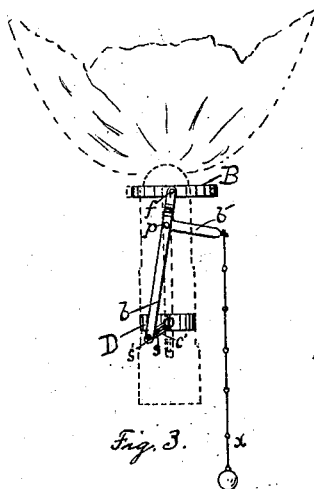
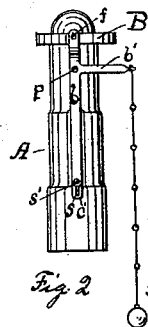
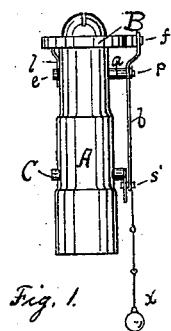
(No Model.)

I. HARRISON & A. M. KILBERG.

AUTOMATIC OPENING OR CLOSING DEVICE FOR GAS BURNERS.

No. 553,238.

Patented Jan. 21, 1896.



Witness:
Wm. Deke.
R. M. Eckman

Inventors:
Isaac Harrison and
Albert M. Kilberg
per D. S. Kiepley atty

UNITED STATES PATENT OFFICE.

ISAAC HARRISON AND ALBERT M. KILBERG, OF SCRANTON, PENNSYLVANIA;
SAID HARRISON ASSIGNOR TO BENNO C. LEVI, OF SAME PLACE.

AUTOMATIC OPENING OR CLOSING DEVICE FOR GAS-BURNERS.

SPECIFICATION forming part of Letters Patent No. 553,238, dated January 21, 1896.

Application filed July 25, 1895. Serial No. 557,076. (No model.)

To all whom it may concern:

Be it known that we, ISAAC HARRISON and ALBERT M. KILBERG, citizens of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Opening and Closing Devices for Gas-Burners; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to that class of automatic opening and closing devices for gas-burners in which a strip or coil of two metals of varying expansibility opens the flow of gas when it becomes heated and cuts off the same when it becomes cooled to ordinary temperature.

The object of the invention is to afford a simpler and more reliable device of the kind than those heretofore in use, as a common gas-jet tube may be made with or fitted out with our device attached at but little extra trouble or expense, and there are no parts which will stick or readily get out of order.

Referring to the drawings, Figures 1 and 2 are each a side elevation of a gas-jet tube having our device attached, the parts of the device being shown in views taken at right angles each to each, the valve being closed in both views. Fig. 3 shows the position of parts when the gas is lighted and the flow is opened, the position of the flame and tube and also the position of the parts of our device when closed being shown by dotted lines. Fig. 4 is a top view of Figs. 1 and 2, and Fig. 5 is a cross-section cut lengthwise of the same. Fig. 6 is a cross-section cut crosswise of the tube above or below the valve and giving a view of the valve which is automatically opened and closed in and by our device. Figs. 7 and 8 show details of the valve in cross-sections thereof, enlarged to a scale of about four times the ordinary size.

Similar letters of reference refer to similar parts throughout the several views.

In the drawings, A designates an ordinary

jet-tube, to the upper end of which is attached the coil B by means of the small rivet or screw *e* and the small lug *l*.

The coil B is properly a flat spiral constructed of an inner strip *z* of brass and an outer strip *i* of steel, the said strips soldered together into a single solid strip and coiled into a flat spiral, as shown, having its inner end fastened to the lug *l* and its other end pivotally connected to the upper end of the lever *b* at *f*. The lever *b* swings on the fixed pin or fulcrum *p* and is provided with a small arm *b'*, to which may be attached the pendant *x*. The post *a*, on which the lever is pivoted, is firmly soldered to the jet-tube A. The lower end of the lever *b* is provided with a pin *s'* extending through and sliding loosely in the slot *s* of the small arm or crank *c'*, which is rigidly attached to the rotary part of the valve in the disk D. The valve is simply constructed of the disk having the slot *d* and the cock or rotary part C having a corresponding slot *c*.

In Fig. 7, which is a cross-section of the valve on the line *t u* of Fig. 6, the dotted lines show the valve fully closed, and the full lines show it fully open. The valve is not liable to be turned beyond the fully-open position, because the parts are so adjusted that the lever *b* has just fully opened the valve when the pin *s'* has reached the outer end of the slot *s* in the crank *c'*.

In Fig. 8, which is a view of the valve in cross-section on the dotted line *v y* of Fig. 6, the valve is shown in the open position, the tube A is removed, and the small burr or other fastener *c''* which holds the cock C in place is shown. When the valve is placed, by securely fitting the disk D into the lower part of the tube A, the ends of C of course extend out through holes in the sides of the tube.

The operation of our device is now readily explained. The coil B at ordinary temperature holds the lever *b* in a perpendicular and the valve closed. If a lighted match be held under the coil B so as to heat it, its coils enlarge by reason of the inner strip of said coil being made of metal of greater expansibility than that of the outer strip. The expansion of the coil thus causes the lever *b* to take the

position shown in Fig. 3, thus holding the valve open as long as the coil remains heated. As the jet is thus immediately lighted by the same match that heats the coil, the flame of the burning jet keeps the coil heated and the valve open; but should the flame of the jet be in any way extinguished the coil B immediately commences to contract and close the valve. If the adjustment is as it should be the valve will be fully closed in ten to fifteen seconds after the flame is extinguished. The valve may also be opened by pressing downward on the small arm *b'* or pulling downward by the pendant *x*. The jet then being lighted will immediately so heat the coil that when the pressure on *b'* is released the valve will be retained in the open position, as before explained.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The herein described automatic opening and closing device for gas burners, consisting of the spiral coil B constructed of an inner and an outer strip of metal, the said inner strip having a greater expansibility than the said outer strip whereby the coils of the spiral are enlarged by heating; the one end of said spiral being rigidly attached to the tube A and the other end pivotally attached to the upper end of the lever *b*, the said lever being fulcrumed intermediate of its ends, the lower end of said lever being provided with the pin *s'* adapted to slide in the slot *s* of the rigid arm *c'* of the gas cock C and adjusted thereon in such position as is adapted to fully turn on the flow of gas when the pin *s'* of the lever is pressed to the outer end of the slot *s* by means of heating the coil B, and to fully turn off the flow of gas when the cooling of the coil B returns the lever *b* and the arm *c'* to the vertical position, substantially as shown and specified.

2. An opening and closing device for gas burners consisting of a bimetallic coil, in the shape of a flat spiral, encircling the tip of the jet tube, and having one of its ends rigidly attached to the upper part of the said jet tube; a rotary valve having an arm rigidly attached to the rotary part thereof, a slot running lengthwise of the arm, a pin attached to the lower end of the simple lever *b* fulcrumed on the pin *p* attached to the side of the jet tube A, the upper end of said lever being pivotally attached to the outer end of the coil B and the lower end thereof being provided with the pin *s'* adapted to slide in the slot *s* of the arm *c'* of the valve-cock and adapted to open the said valve when the heating of the coil presses the pin to the outer end of the said slot thus turning the cock to the open position, and to close the valve again when the cooling of the

coil B returns the lever *b* and the slotted arm to the vertical position substantially as shown and described.

3. In an automatic opening and closing device for gas burners the combination of the lever *b* having the arm *b'* and the pendant *x* appended thereto, the upper end of the said lever pivotally attached to a bi-metallic expansible coil, adapted to actuate said lever, and the lower end of the lever having a fixed pin adapted to slide in the slot *s* of the arm *c'* which said arm is rigidly attached to the rotary part of the valve controlling the flow of gas, in such relation that when the pin is pushed by the lever *b* to the outer end of the slot *s*, the valve is fully open, and the said slot, adapted to prevent the valve from turning beyond the fully open position, substantially as specified.

4. The combination in a device of the kind described of a rotary valve for controlling the flow of gas, consisting of the cock C seated in the disk D, the slots *d* in the said disk and the corresponding slot *c* in the said cock, and the longitudinally slotted arm *c'*, the pin of an operating lever sliding in the slot thereof and adapted to open and close the said valve, the said arm *c'* being rigidly attached to the cock C, and the parts so adjusted that the slot *c* of the cock is turned in line with the slots *d* of the disk D when the pin *s'* reaches the outer end of the slot in the arm *c'*, substantially as and for the purposes set forth.

5. The combination in a device of the kind described, of the jet tube A having a bimetallic flat spiral coil B of one and one half circumferences, encircling the tip of said tube, and the inner end of said coil attached by means of the lug *l* to the upper part of said jet tube; with the disk D fitted in the lower part of said jet tube and having a rotary valve seated therein, a slotted arm extending from the rotary part of said valve to the outside of the said tube, and a lever having its upper end attached pivotally to the movable end of the aforesaid spiral coil, and a pin on the lower end of said lever sliding in the slot of the valve arm, the lever fulcrumed intermediate of the said coil and the said disk, and the said valve adapted to be turned open by means of the said lever when the said coil is expanded by heat, and adapted to be closed as the coil is contracted again by cooling, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

ISAAC HARRISON.

ALBERT M. KILBERG.

Witnesses:

E. F. MERRIAM,

W. S. NEFF.