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AUTOMATIC CUT-OFF.

APPLICATION FILED JULY 14, 1905.

Fig. 1.

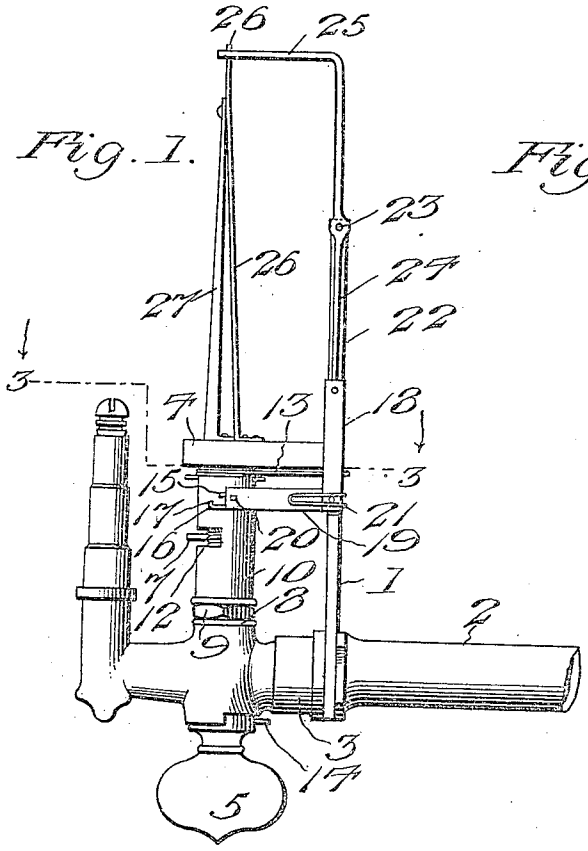


Fig. 2.

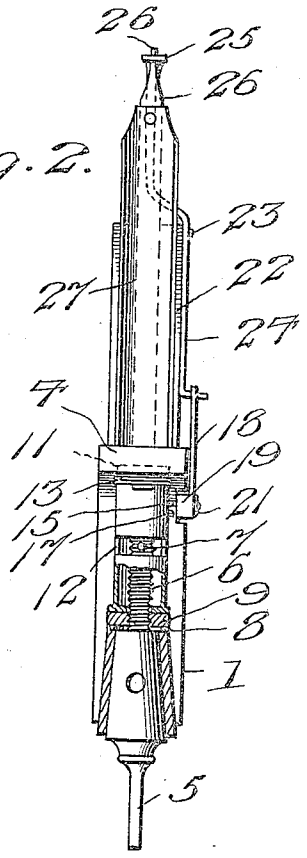


Fig. 3.

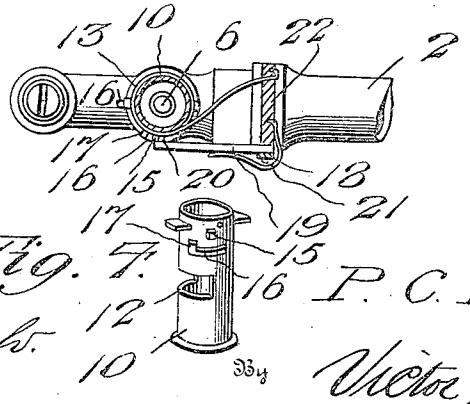


Fig. 4.

Witnesses

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AUTOMATIC CUT-OFF.

No. 817,707. Specification of Letters Patent. Patented April 10, 1906.

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To all whom it may concern:

Be it known that I, PETER C. HANSEN, a citizen of the United States, residing at Fairfield, in the county of Spokane and State of Washington, have invented new and useful Improvements in Automatic Cut-Offs, of which the following is a specification.

The invention relates to automatic cut-offs of that class designed primarily for connection with gas-burners and operative to automatically close the valve and shut off the flow of gas in the event the flame is accidentally or inadvertently extinguished.

The main object of the present invention is the production of means in a cut-off of the class described whereby when the operating parts of the structure are in set or operative position the valve of the fixture is wholly free to be manually controlled without affecting the position of said operating parts.

Another object of the invention is the production of means for initially and partially setting the operating parts on manually opening the gas-valve, the final movement of said parts to full operative position being automatically completed by the heat from the flame.

Another object of the invention is the construction and arrangement of the expansible strip for controlling the operation of the parts to positively insure a complete effective movement of said parts.

With these objects in view the invention consists in the details of structure and arrangement of parts, which will be clearly described in the following specification, with particular reference to the accompanying drawings, in which—

Figure 1 is a view in side elevation, illustrating my improved cut-off in place on a gas-fixture. Fig. 2 is a vertical central section of the same, the parts being shown in elevation. Fig. 3 is a transverse section on the line 3 3 of Fig. 1, and Fig. 4 is a perspective view of the operating-sleeve.

Referring to the drawings, my improved cut-off comprises a supporting-arm 1, bent in the form of a right-angle plate, the free end of the longer arm of which is formed near its lower end with a suitable perforation to fit over the screw-threaded nipple of the supply-pipe 2, being held in place by the end of the barrel 3 of the gas-fixture, which, as is evident, engages the nipple beyond the arm. The shorter arm 4 of the angle-plate projects toward the burner proper, preferably parallel to the barrel of the fixture and of sufficient length to overlie the gas-cock 5 of the fixture. The usual stem of the gas-cock is vertically bored to fixedly receive a threaded rod 6, which extends vertically above the barrel of the fixture, terminating, however, below the arm 4 of the supporting-plate. Near its upper end the rod 6 is provided with a laterally-extending pin 7, designed to coöperate with certain moving parts of the structure to be later described. The barrel-valve of the gas-cock is provided with the usual washer 8, and for vertical adjustment of said valve to prevent leakage I prefer to thread an ordinary nut 9 upon the rod 6, which nut is designed to bear upon the washer and by suitable operation to maintain a gas-tight connection between the valve and casing in the usual manner.

An operating-sleeve 10 is revolubly mounted on the rod 6, being supported at its lower end upon a nut 9 and preferably fitting within a circular recess 11, formed in the lower part of the arm 4, as shown in dotted lines in Fig. 11. The wall of sleeve 10 is formed with a circumferentially and horizontally arranged slot 12, the walls of which loosely embrace the pins 7, projecting from the rod 6, as clearly shown in Fig. 1. A coil-spring 13 is connected at one end to the sleeve 10, near the upper end thereof, and connected at the opposite end to the vertical arm of the supporting-plate, the tension of the spring being sufficient to operate the sleeve and close the gas-valve, as hereinafter described. The slot 12 and pin 7 are so arranged relative to the opening in the gas-valve that when said valve is closed the slot 12 is positioned away from the burner-tip, with one vertical wall in contact with the pin 7. In this arrangement, which is the normal position of the parts, that wall of the slot 12 in contact with the pin 7 is the wall nearest the burner-tip and remote from the stop 14 on the barrel-valve, so that on opening the gas-cock the pin 7 operates to partially revolve the sleeve 10. Immediately above the vertical wall of the slot remote from the pin 7 when the parts are in normal position is provided a stop 15, preferably comprising a radially-projecting nib, and immediately below the stop 15 I arrange an angle-stop 16, comprising an elongated strip secured to the surface of the sleeve and terminating beyond the stop 15 in a vertically-projecting section 17, the latter practically constituting the stop, while the elongated por-

tion of this member forms a guide for the locking-lever, as hereinafter described.

A right-angled locking-lever is pivotally mounted in a suitably-formed recess in the vertical arm of the supporting-plate, the vertical arm 18 of said lever extending normally in alinement with the vertical arm of the supporting-plate and the horizontal arm 19 thereof projecting toward and resting in contact with the surface of the sleeve 10. The free end of the horizontal arm 19 is formed or provided with a laterally-projecting pin 20, shaped and designed in operation to engage either of the stops 15 or 17. A spring 21, secured to the vertical arm and supporting-plate, is adapted to overlie and bear on the face of the horizontal arm 19 of the operating-lever to maintain a yielding contact between the end of said arm and the surface of the sleeve.

A post 22 projects vertically from the plate 4, being in alinement with and practically a continuation of the vertical arm of the supporting-plate, and to the upper end of this arm is pivotally secured at 23 an operating-lever 24, laterally bent at its upper end to provide a horizontally-extending arm 25. The lower end of the operating-lever 24 is movably connected with the free end of the vertical arm 18 of the locking-lever, the connection being such as to permit the operating-lever to set the locking-lever in operation.

A thin metallic strip 26, fixedly secured at one end to the arm 4 of the supporting-plate and at the opposite end to the free end of the arm 25 of the operating-lever, provides the necessary connection between the operating-lever and the supporting-plate, this strip being preferably of spring-steel or other material having a comparatively low degree of expansibility.

A strip 27, secured at one end to the arm 4 and at the opposite end to the strip 26, below the upper terminal thereof, is mounted on the arm 4 forward of the strip 26 and in position to receive the heating effect from the flame at the burner-tip. This strip 27, which serves as a controlling agent in the operation of the structure, is of a material having a comparatively high degree of expansibility, as copper, and it is to be paricularly understood that it is fixedly secured at each end to a permanent part of the structure. In order to render this strip particularly sensitive to the action of the heat, it must be comparatively thin, and to guard against buckling or bending of the strip in operation I form the same of concavo-convex shape in transverse section, as clearly shown in Fig. 2. By this construction I am enabled to use an extremely thin strip and yet insure complete operation of the structure through the expansion of the strip.

In operation, assuming the parts constructed and arranged as described and in normal position, when desiring to light the gas the gas-cock is turned to open the valve. This operation through the medium of the pin 7 will turn the barrel 10 toward the burner-tip until the stop 20 on the arm 19 rides in rear of the stop 15 on the sleeve, this movement of the sleeve being against the tension of the spring 13 and serving to hold the sleeve in what I term the "initially" or "partially" set position. As the heat generated by the flame affects and expands the strip 27, the strip 26, owing to the fixed connection of said strip 27 with the strip 26, will be forced slightly toward the rear or away from the burner-tip. This movement of the upper end of the strip 26 will rock the operating-lever 24 on its pivotal connection with the arm 22 and slightly depress the free end of the arm 19 of the locking-lever. This movement of the arm 19 withdraws the stop 20 from in rear of the stop 15, moving said stop 20 down into contact with the elongated portion of the stop 16. The sleeve is thereby momentarily freed from the stop 20 and revolves toward normal position until the stop 17 contacts with the stop 20, when the movement of the sleeve is again arrested and the parts are in what I term the "fully-set" or "operative" position. With the parts in this position should the flame be accidentally or inadvertently extinguished without shutting off the valve the contraction of the strip 27 will rock the lever 24 in the reverse direction, thereby elevating the free end of the arm 19 of the locking-lever and raising the catch 20 from the stop 17, wholly freeing the sleeve and permitting the sleeve 17 to return to normal position. In this movement of the sleeve the wall of the slot 12 contacts with the pin 7, thereby forcing the valve to closed or normal position.

It will be noted that in the movement of the sleeve in the partial setting of the parts the slot 12 is moved to such position as to permit a free manual movement of the gas-cock, if desired, without affecting the sleeve, and this is also true when the parts are in the fully-set or operative position. This function and result of the structure is important in that I am thereby enabled to use the burner and fixture provided with my improved cut-off exactly as if the cut-off were absent, so far as the manual control in turning on or off or lowering the gas-flame is concerned. The concavo-convex formation of the strip 27 is also material in that I am enabled thereby to use an extremely thin strip, readily influenced by the heat, and yet prevent buckling or binding of the strip in use. In connection with this feature of the structure it will be noted that the strips 26 and 27 are fixedly secured together at their upper ends and are spaced apart and fixedly secured to the arm 4 at their lower ends. By this arrangement the effect of the strip

27 in its expansion or contraction is readily communicated to the strip 6, owing to their separation at the bottom and connection at the top. In the use of my cut-off I am enabled to readily apply the same to the gas-cocks of the usual construction, as no change whatever is necessary in the same beyond the slight boring in the valve to receive the rod 6.

Having thus described the invention, what is claimed as new is—

1. The combination with a gas-fixture, of an expansible strip arranged adjacent thereto, a valve closing the sleeve connected with the valve and with the strip, said sleeve being moved to operative position by the successive operation of manually opening the valve, and an initial expansion of the strip, and means intermediate the strip and sleeve to release the sleeve on a contraction of the strip.

2. The combination with a gas-fixture, of a stem projecting vertically from the valve thereof, a spring-operated sleeve encircling the stem, said sleeve being formed with a horizontally-arranged slot, a pin projecting from the stem and entering said slot, one wall of the slot contacting with the pin when the parts are in normal position, said pin moving the sleeve to operative position in the opening movement of the valve, and an expansible strip arranged adjacent the flame from the fixture, and a connection between said strip and sleeve.

3. The combination with a gas-fixture, and a valve therefor, of a rod projecting vertically from the valve and provided with a laterally-extending pin, a spring-controlled sleeve encircling the rod and formed with a slot to receive the pin, a plurality of stops formed on the sleeve, a locking-lever adapted for operative connection with either of said stops, said sleeve being turned to engage said lever and one of said stops on the opening movement of the valve, an expansible strip arranged adjacent the flame from the fixture, means between said strip and locking-lever adapted on the initial expansion of the strip to cause the locking-lever to engage the other of said stops on the sleeve, and means intermediate said strip and the locking-lever to wholly release the sleeve from said lever on the contraction of the strip.

4. The combination with a gas-fixture having a valve, of a rod projecting vertically from said valve, a pin projecting laterally from the rod, a spring-controlled sleeve encircling the rod and formed with a slot to receive the pin, said pin engaging one wall of the slot to move the sleeve in the opening movement of the valve, means for locking the sleeve in set position, and means to release the lock upon extinguishment of the flame from the fixture, the slot in the sleeve being of a length to permit manual movement of the valve without affecting the sleeve when the parts are in operative position.

5. The combination with a gas-fixture having a valve, of a valve-controlling sleeve having a partially-set position and a completely-set position, means for locking said valve-controlling sleeve in each of said positions, a connection between said valve-controlling sleeve and the valve whereby said sleeve is moved to the first position in the initial operation of the valve, and an expansible strip arranged adjacent the flame from the fixture and adapted on expansion to move the valve-controlling sleeve to the second or operative position.

6. The combination with a gas-fixture having a valve, of a valve-controlling sleeve having a partially-set position and a completely-set position, means for locking said valve-controlling sleeve in each of said positions, a connection between said valve-controlling sleeve and the valve whereby said sleeve is moved to the first position in the initial operation of the valve, and an expansible strip arranged adjacent the flame from the fixture and adapted on expansion to move the valve-controlling sleeve to the second or operative position, the said valve being free for manual operation in both positions of the valve-controlling sleeve.

7. An automatic cut-off comprising a valve-controlling means, an expansible strip, and a second strip arranged between the valve-controlling means and the expansible strip, said second strip being of a less degree of expansibility than the expansible strip and secured directly to said expansible strip at the upper end, the lower end of the strips being fixed with relation to each other and spaced apart.

In testimony whereof I affix my signature in presence of two witnesses.

PETER C. HANSEN.

Witnesses:
DAVID W. GOULD,
JOHN L. FLETCHER.