

No. 667,702.

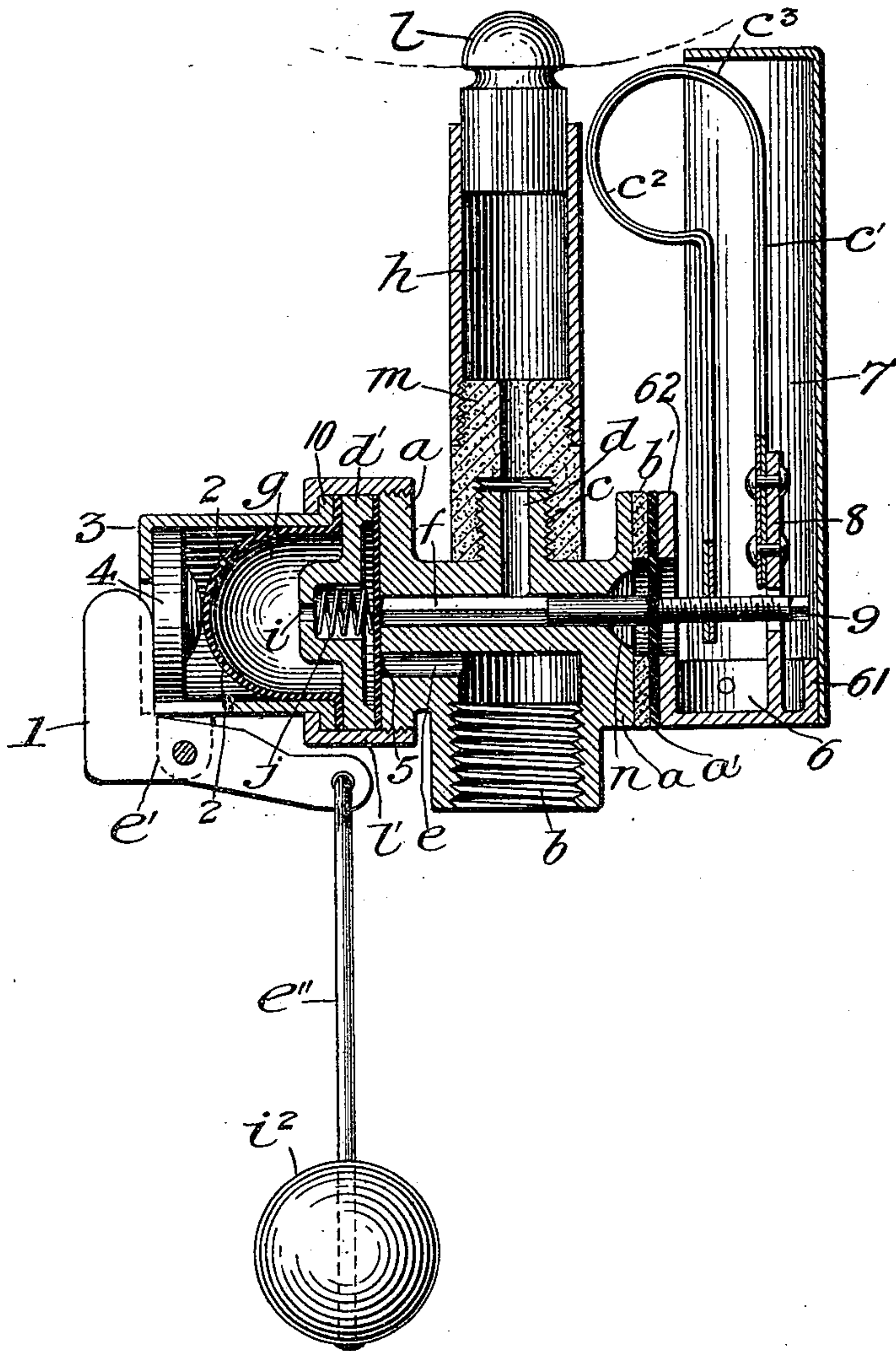
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H. HINCKLEY.

GAS BURNER.

(Application filed Aug. 3, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

HOWARD HINCKLEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 667,702, dated February 12, 1901.

Application filed August 3, 1900. Serial No. 25,734. (No model.)

To all whom it may concern:

Be it known that I, HOWARD HINCKLEY, a citizen of the United States, residing at the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in Gas-Burners; and I do hereby 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.

The object in view is to provide an improved construction of burner which will automatically shut off the flow of gas on the extinguishment of the flame by accident or otherwise. Self-extinguishing burners of this general description are not new; but so far as I am aware they have heretofore been objectionable for many reasons and have never gone into public use. The burner herein described has the advantage that even if the flame is not lighted or should it be blown out before the burner heats up the valve after being opened will close itself, also that there is no necessity for holding the valve open either by hand or locking devices till the flame has heated the burner, because the valve is so arranged as to be held open for a certain time independently of the heating action of the flame.

The best form of the invention at present known to me is represented in the accompanying drawing, which illustrates a burner having my improvements applied thereto in vertical cross-section.

Referring to the view, *a* denotes the burner-casting, which may be of any preferred shape, size, and material. It is interiorly threaded at *b* for attachment to any ordinary gas-fitting, and is provided with an exteriorly-threaded projection *c* for the attachment thereto of a burner of any approved construction. The tip of the burner is denoted by *l* in the drawing, and *h* indicates the usual metallic shell, into which the tip is secured in the ordinary manner. The shell *h* is secured to the threaded projection *c* of the burner-casting *a* by means of insulating material *m*.

The burner-casting, which also forms the valve-casing, is provided with the gas-passage *e*, leading from the pipe, and with a similar passage *d* leading to the tip. The flow of gas through these passages is controlled by

means of a valve 5, which is a thin disk of rubber, leather, or other flexible material. This disk is held tightly against the square end of the casting *a* over the outlet of the gas-passage *e* by means of a metallic cup *d'*, which is hollowed out, as shown in the drawing, and has its flanged edge clamped against the disk by means of the cap or union *l'*, which is screwed onto the end of the casting, as indicated in the drawing. The interior of the cup *d'* constitutes a valve-chamber, and it has a coiled spring *j*, seated in a central depression therein and bearing against the center of the valve 5 in order to hold it normally tightly against the gas-passages.

A metallic cap 3 is clamped against the burner-casting by means of the same union *l'* which clamps the cup *d'* in place, and between the flanged end 10 of this cap and edges of the cup *d'* are secured the edges of a rubber cup *g*, forming a vacuum-chamber. The interior of this cup is in communication with the valve-chamber, already described, through an opening *i* in the depressed center of the disk *d'*, and the walls of the rubber cup are provided with one or more minute orifices or pin-holes 2 2 for a purpose presently to be described.

Fitting in the bore of the cap 3 is a wooden disk 4, and a bell-crank lever 1 is pivoted in ears *e'*, projecting downward from the cup, and has its upper end bearing centrally against the disk, its opposite end being provided with a link or chain *e''*, having at its lower end a ball or hanger *i*².

As hereinbefore described, the spring *j* holds the valve 5 closely against the end of the gas-passage *e* and keeps the flow of gas shut off. In order to light the burner, this valve must first be opened, and it can only be done in the present invention by exhausting the air from the vacuum-chamber *g*. This is done by pressing the disk 4 against the end of the rubber cup and causing the air to be expelled therefrom through the pin-holes 2 2. The expulsion of the air causes a vacuum in the chamber *g*, which overcomes the tension of the spring *j* and pulls the valve 5 away from the gas-passage *e*, thereby permitting the flow of gas into the passage *c* and to the burner-tip, where it may be ignited.

One of the objects of the invention, as be-

fore noted, is to hold the valve 5 open for a predetermined period, and this is effected and regulated by the vacuum-chamber *g* and the pin-holes 2 2 in its wall. It is characteristic of the present construction that no valves are employed other than the valve which controls the flow of gas through the burner, and in order to regulate the return of the air into the vacuum-chamber *g* after it has been expelled in the manner before described I provide the aforesaid pin-holes in the walls of the chamber. In the drawing these holes are shown considerably exaggerated in size for the purpose of illustration, but in actual practice they will be so small as to be hardly visible. When the wooden disk 4 is pressed inward, the air is forced out of the chamber *g* through these pin-holes, with the result of opening the valve, as before described. Immediately on releasing the disk 4 the resilience of the rubber cup, out of which the vacuum-chamber is formed, causes it to immediately begin to resume its normal distended shape, as shown in the drawing, and the openings or pin-holes 2 2 permit the external air to leak through into the chamber and destroy the vacuum. The size and number of these openings control the rate at which the air will return into the chamber, and this rate may be regulated by varying the openings as experience may show to be necessary.

With the burner constructed as thus far described after the valve has been opened it must remain open until the vacuum in the chamber *g* has been destroyed by the leakage thereinto of the air through the pin-holes. Should the flame not therefore be lighted, or should it be immediately extinguished after lighting, the leakage of gas through the burner can only continue while a vacuum or partial vacuum exists in the chamber *g*, and as the air immediately begins to reënter the chamber on releasing the pull on the link *e'* this period is determinable in advance by regulating the number and size of the orifices 2. Provision is thus made for automatically closing the burner after a predetermined period, and were no means provided for holding the valve open after the vacuum-chamber has ceased to act the burner-flame would be extinguished by the closing of the valve 5.

In order to provide for holding the valve open while the flame is burning, I arrange a rod *f* in a passage in the burner-casting between the passages *e* and *c*, and at the opposite end of the casting I provide the following means, which is controllable by the heat of the flame, for the purpose of acting on the rod to hold the valve open so long as the flame is lighted. As illustrated in the drawings, that portion of this rod which lies in the passage between the passages *c* and *e* is rectangular in cross-section, so as to permit the flow of gas through the passage, but the other portion of the rod is circular and fills

that part of the passage beyond the passage *c*.

At the end of the burner-casting opposite the valve 5 I provide a small depression or chamber *n*, which is closed by means of a flexible diaphragm *a'*, secured to the burner-casting in any suitable way and insulated therefrom by means of the disc *b'*, made of any suitable insulating material. The diaphragm *a'* is preferably made of leather, but may be made of rubber or other suitable flexible material. The rod *f* is of a length just equal to the distance between the diaphragm *a'* and the valve 5, so that any pressure upon the outer side of the diaphragm will cause the opposite end of the rod to press against the inner side of the valve and hold it open. For the purpose of providing an automatic means for thus pressing the rod against the valve I provide the burner-casting with a supplemental casting 6, having a circular flange 61 around its base, and a vertical flange 62, by means of which it is secured to the burner-casting. To a post or projection 8 rising vertically from the bottom of the casting 6 there is secured one end of a thermostatic strip *c'*, or "lamina," as it is called, this name being derived from the fact that it is composed of two layers of metal—an inner layer *c²* of brass and an outer layer *c³* of steel or iron. This strip is rigidly secured to the post 8 by rivets or in any other suitable manner and is extended up and bent over inwardly toward the burner-tip, as shown in the drawing, whence it is continued downwardly again to a point opposite the exposed part of the diaphragm *a'*. Into this end of the thermostatic strip is secured a screw 9, which is adjusted so as normally to bear lightly against the diaphragm *a'* in line with the rod *f*, the outer end of the screw being squared, as shown in the drawing, so as to permit it to be adjusted as desired.

Around the flange 61 of the casting 6 is secured by rivets or otherwise the lower end of a thin metallic shell 7, which incloses the thermostatic strip on all sides except that toward the burner. This shell extends above the strip, as shown in the drawings, and is closed at its upper end, so as to protect and conceal the strip.

When the valve 5 is open and the flame lighted, as already described, the thermostatic strip is immediately heated and expands in a manner well understood, thereby causing the screw 9 to press against the diaphragm *a'* and cause the latter to push the rod *f* through the opening in the burner-casting. The formation of a vacuum in the chamber *g* having caused the valve to open, as already explained, projection of the rod *f* through the burner in this way forms an abutment and prevents the valve 5 from returning and closing the passage *e* as long as the flame is lighted. When the flame is extinguished by accident or otherwise, the ther-

mostatic strip cools off and contracts, thus releasing the pressure on the diaphragm *a'* and permitting the spring *j'* to reclose the valve 5 and shut off the flow of gas.

5 Having thus described my invention, what I claim is—

10 1. In a burner for automatically shutting off the flow of gas, the combination of a normally-closed valve, means for opening and automatically closing the valve gradually when the flame is not burning, and mechanism actuated by the heat of the flame for holding the valve open.

15 2. In a burner for automatically shutting off the flow of gas, the combination of a normally-closed valve, mechanism actuated by the heat of the flame for holding the valve open, and means whereby said valve is opened and held open for a predetermined period independently of the mechanism for holding it open by the heat of the flame.

20 3. In a burner for automatically shutting off the flow of gas, the combination of a valve-casing having gas-passages therethrough, a valve closing said passages, a vacuum-chamber communicating with the valve-chamber for exhausting the air from the outer side of said valve, and opening the same, and means for allowing the air to gradually return to the
30 vacuum-chamber and permitting the valve to close.

4. In a burner for automatically shutting off the flow of gas, the combination of a valve-casing, having gas-passages therethrough, a valve closing said passages, a vacuum-chamber for exhausting the air from the outer side of the valve and permitting it to open, a valve-operating rod contained within the casing; and means actuated by the heat of the flame for pressing the rod against the valve and holding it open. 35 40

5. In a burner for automatically shutting off the flow of gas, the combination of a valve-casing having gas-passages therethrough, a valve in said casing normally closing the passages, a vacuum-chamber for exhausting the air from the outer side of the valve, and thereby opening the passages, a burner shell and tip communicating with said passages, a valve-operating rod inclosed within the casing normally in contact with the inner side of the valve, a diaphragm bearing against the outer end of the rod, and means actuated by the heat of the flame for causing the diaphragm to press the rod against the valve and hold it open. 45 50 55

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

HOWARD HINCKLEY.

Witnesses:

EMMA COOK,
LAURISTON BUNKER.