C. A. JOHNSON.

SELF CLOSING GAS BURNER.

APPLICATION FILED MAR. 9, 1909.

939,263. Patented Nov. 9, 1909.

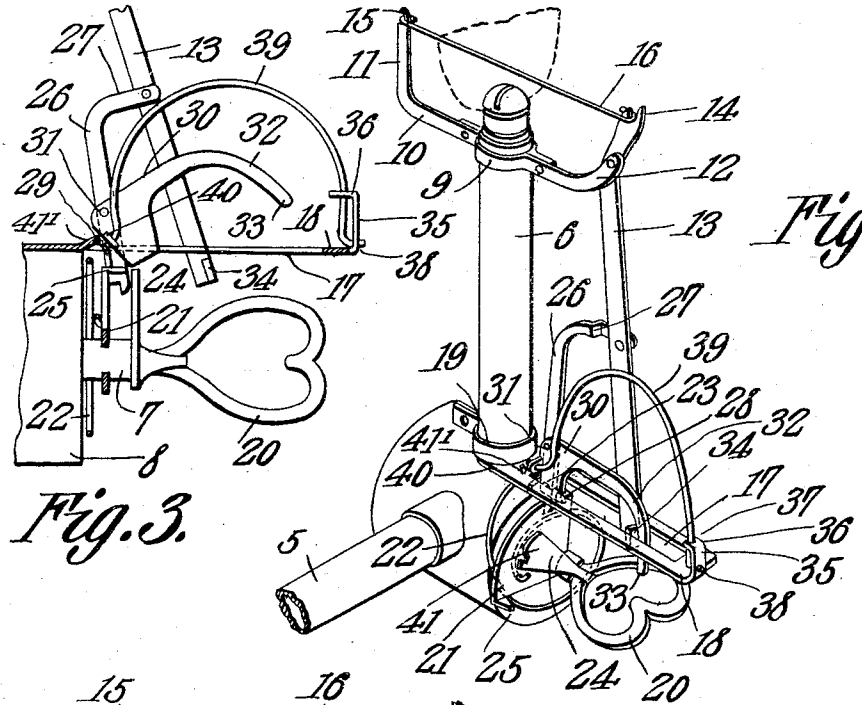

Fig. 1.

Fig. 3.

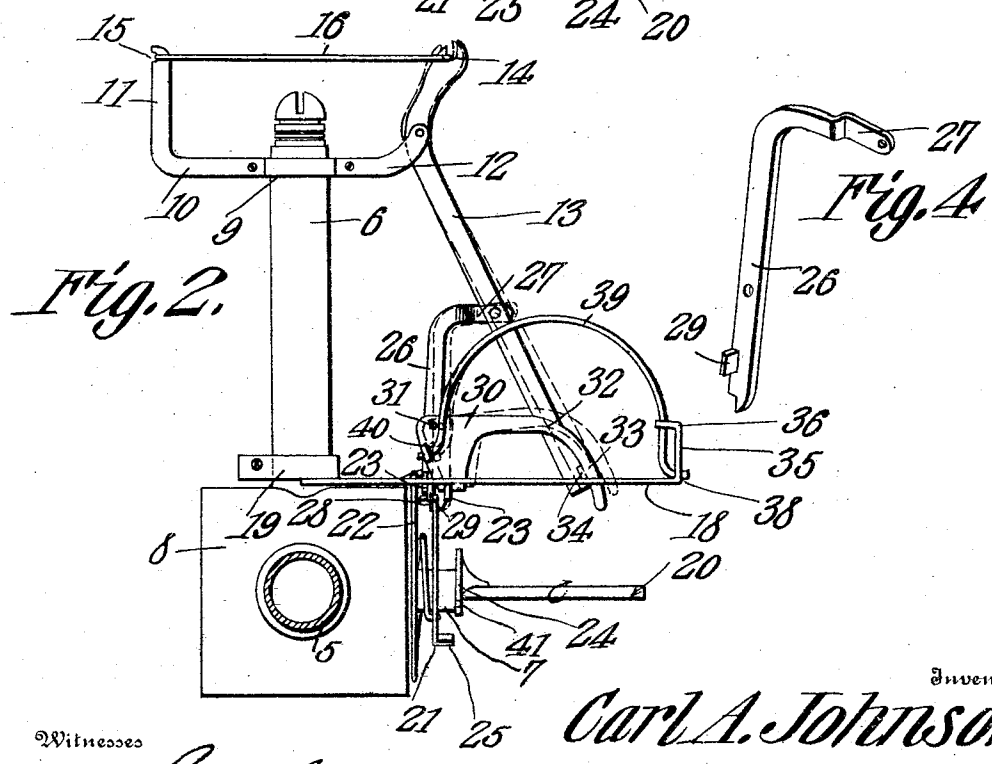

Fig. 2.

Fig. 4.

Witnesses

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SELF-CLOSING GAS-BURNER.

939,263. Specification of Letters Patent. Patented Nov. 9, 1909.

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To all whom it may concern:

Be it known that I, CARL A. JOHNSON, a citizen of the United States, residing at Tolar, in the county of Roosevelt and Territory of New Mexico, have invented a new and useful Self-Closing Gas-Burner, of which the following is a specification.

It is the object of the present invention to improve generally the construction of automatic gas cut-offs such as are applied upon gas jets for the purpose of closing the jet valve should the flame be accidentally extinguished.

One of the novel features of the present invention resides in the fact that not only will the jet valve be automatically and immediately closed upon cooling and consequent contraction of the thermostatic element of the device, but abnormal expansion of this device, due to its becoming stretched, it being in the nature of a length of wire, or the complete destruction of the element will result in the valve being closed as stated. The proper performance by the device, of its function, is further assured by so constructing the device as to automatically compensate for variations in temperature to which the thermostatic element is subjected so that should the flame be but a small one, due to low pressure or other factors, the device will be as sensitive to the slight contraction due to cooling of the thermostatic element upon the flame being extinguished as if the flame area were much larger and affected a greater length of the thermostatic element.

Another feature of the invention lies in the fact that after the device has once been placed in operative condition, by opening the jet valve, the valve may be manually adjusted so as to regulate the flame or more properly speaking, regulate the supply of fuel to the burner. In other words, after the device has been placed in operative condition, the valve itself is capable of flow-controlling movement so as to regulate the supply of fuel to the burner, and this movement of the valve, it may here be stated, is had without in any way affecting the valve operating means, and as a matter of fact the valve may be moved to full cut-off position without affecting the device.

The fact will be appreciated from the above statement that the present invention provides means whereby a person using the device may regulate the jet of flame so as to obtain the desired light and that even should the jet be lowered or dimmed almost until extinguished, the device will still operate as successfully as if the valve of the jet was at full open position, and as a matter of fact the invention aims to provide a device of this class which will require no more attention on the part of the user than does the ordinary gas jet or burner now employed, the gas being turned on by the ordinary form of valve key and being extinguished manually in the same manner and without disturbing the device in any way whatsoever.

In the accompanying drawings, Figure 1 is a perspective view of the device embodying the invention, Fig. 2 is a view in elevation of the device showing in full lines the positions assumed by the various parts when the device is in an operative condition, and in dotted lines the positions assumed by the several parts immediately after the flame is accidentially or otherwise extinguished. Fig. 3 is a view partly in elevation and partly in section showing a portion of the mechanism illustrated in Fig. 2, and showing the elements illustrated in the positions which they would assume immediately after destruction of the thermostatic element of the device, and Fig. 4 is a perspective view of the detent member of the device.

In the drawings, the gas supply tube is indicated by the numeral 5 and the burner by the numeral 6, the valve for controlling the supply of gas from the supply pipe 5 to the burner 6 being indicated by the numeral 7, this valve being mounted for rotative movement, as usual, in a casing 8 which is interposed at the junction of the pipe 5 and the burner 6.

Fitted upon the burner 6 at the upper end thereof, by means of a two-part collar portion 9 is a bracket 10, one of the collar portions being integral with and intermediate of the ends of the said bracket, and this bracket is provided at one end with an upstanding arm 11 and at the other end with an angularly and upwardly extending arm 12 to which is pivoted, adjacent its upper end, an oscillatory arm 13. This arm 13 is formed at its upper end with a notch 14 and the arm 11 is formed, also at its upper end with a notch 15, and engaged in the notches 14 and 15 are the hooked or looped ends of a

wire 16 which constitutes the thermostatic element of the device.

As stated above, the arm 13 is pivoted to the arm 12 at a point adjacent the upper end of the former and inasmuch as the wire 16 extends directly above the upper end of the burner 6 and is exposed to the flame of the burner, the consequent expansion and contraction of this thermostatic element, embodied in the said wire, will result, in the latter instance, in the upper end of the arm 13 being pulled in the direction of the burner, and its lower end being swung in a direction away from the burner, and owing to the fact that the pivot point of the arm 13 is located so much nearer its upper end than its lower end, the lower end will of course have a much wider range of movement than will the upper end, and the reason for this will presently be made clear. The lower end of this arm 13, above referred to, works in a slot 17 formed longitudinally in a bracket plate 18, this plate being provided at one end with an integral collar portion 19 which is clamped, as clearly shown in Figs. 1 and 2 of the drawings, about the lower end of the burner 6, the said bracket plate 18 projecting laterally from the burner or in other words in the same direction as the axis of the valve 7, and also in the same general direction of extent as that of the bracket 10. This bracket 10 extends above the key 20 of the valve 7 as clearly shown in the drawings.

The stem of the valve 7 has loosely mounted upon it a valve actuating member which is in the form of a plate 21 and to which is connected one end of a spring 22 which is wound several times about the said stem of the valve and is connected at its other end to the bracket plate 18, the tendency of this spring being to swing or rotate the plate 21 comprising the valve actuating member, in the direction indicated by the arrow in Fig. 2 of the drawings, the plate being guided in its said movement between a pair of downwardly bent lugs 23 formed at one edge of the slot 17 in the said bracket plate 18, the edge of the plate which is received between these lugs having a line of extent which is the arc of a circle, having as its center the axis of the valve. The stem of the valve 7 is formed with a finger 24 projecting in a direction radially from the stem and in the path of movement of a lug 25 which is formed upon the plate 21 at one radial edge thereof, and at one end of the arcuate edge of the said plate and which projects laterally from the plate, this lug being designed to engage with the finger 24 when the valve actuating member is swung upon its axis through the medium of the spring 22 controlling the same. The conditions under which this movement of the valve actuating member takes place will presently be fully described, and it may be stated here that upon such movement of the valve actuating member, and a consequent rotative movement of the valve, the said valve will be fully closed so as to shut off the supply of gas to the burner 6 from the pipe 5.

It is of course expedient that means be provided for normally holding the valve actuating member 21 against movement to close the valve 7 and such means is embodied in the detent 26 which is pivoted at its upper off-set end 27 to the oscillatory arm 13 at a point substantially midway of the ends thereof and projects downwardly through the slot 17 in the bracket plate 18 with its lower end extending normally in the path of movement of the valve actuating member 21.

In order to provide for the positive engagement of the valve actuating member 21 with the lower end of the detent 26, the said valve actuating member is formed at its other radial edge and at a point corresponding to that at which the lug 25 upon the said member is located, with the laterally turned lug 28 which bears against one side of the detent member 26 at the lower end thereof. The detent 26 is formed at one edge with a laterally turned lug 29 which, together with the thickness of the detent, extends the entire width of the slot 17 in the bracket plate 18, it being understood that the detent 26 is by reason of this lug 29 held against lateral play in the said slot. Pivoted to the detent member 26 is the head 30 of a compensating element which is intended to compensate for variations in the temperature to which the thermostatic element 16 is subjected, the pivot for the said element being indicated by the numeral 31. The head of this element projects downwardly through the slot 17 in the bracket plate 18 with its lower end terminating in a plane below the plane of the said plate and the entire member lies in a vertical plane between that occupied by the detent 26 and that edge of the slot 17 against which the end of the lug 29 bears.

Projecting from the head of the member 30 is a finger 32 which at its end portion is curved downwardly as at 33 and extends over and in contact with a laterally turned lug 34 formed upon the arm 13 at the lower end thereof, this lug, bearing, as in case of the lug 29, against one edge of the slot 17 in the bracket plate 18 so as to hold the said end of the arm against lateral play in the said slot, and also to prevent binding of the compensating element. At its outer extremity, the bracket plate 18 is formed with an upstanding finger 35 having an inwardly turned upper end 36 which is notched as at 37, the finger being provided with an opening 38 and a spring, preferably a wire spring, indicated by the numeral 39 has one of its ends turned at an angle and inserted

in the opening 38 with its portion directly above the said end engaged in the notch 37, the spring being bowed in the form of an inverted U and engaged at its other end in an opening formed in an ear 40 upon the head 30 of the compensating element below the plane of the pivot 31 of the said element. The finger 24 has its outer edge presented in substantially the arc of a circle and is formed with a notch 41 which is of sufficient width to receive the edge or lower end of the head 30 of the compensating element, it being understood, as will presently be fully described that this end or edge of the finger 24 is intended to ride beneath the said edge or end of the member when the valve is turned to cut-off position.

The operation of the device is as follows under conditions where the device is intended to act to cut off the supply of fuel to the burner upon the flame being accidentally extinguished: As heretofore stated, the valve actuating member 21 is loose upon the stem of the valve 7 and immediately after the device has been applied to the burner in connection with which it is to be used, and the gas supply is first turned on by rotating the valve 7 to open position, the finger 24 of this valve stem will engage with the lug 25 and will rock or swing the member 21 in the corresponding direction and to a corresponding degree, this movement of the valve being continued until it is at full open position. When this point is reached, the lower end of the detent 26 is engaged behind the lug 28 on the valve actuating member so as to hold the said member against swinging back to normal position due to the tension of the spring 22. After this has been accomplished, the valve 7 may be turned to any desired point between its open and cut-off position, and should the burner be lighted, the thermostatic member 16 will expand and will consequently lengthen and permit movement of the upper end of the arm 13 in a direction away from the burner 6, the lower end of the said arm moving inwardly in the direction of the burner 6. The degree of this movement of the arm 13 upon its pivot of course varies in ratio to the degree of expansion of the thermostatic element 16, this degree of expansion of the said element being of course in ratio, in turn, to the degree of heat to which the thermostatic element is subjected so that if there is but a small jet of flame, the member 16 will not become heated to such a high degree as if the entire head of the fuel supply was turned into the burner and as a result, the member 16 would only expand to a comparatively slight degree and the lower end of the arm 13 would move inwardly also but to a comparatively slight degree it being understood however, that the degree of angular movement of the lower end of the arm 13 is much greater than that of the upper end owing to the location of the pivot for the said arm substantially at the upper end thereof.

The spring 39, owing to its engagement at one end with the compensating member 30 at a point below the pivot 31 therefor, normally holds the curved extremity 33 of the finger 32 of this member in comparatively firm engagement with the lug 34 at the lower end of the arm 13 so that as the said lower end of the arm swings inwardly toward the burner 6, the said compensating element will swing upon its pivot, through the action of the spring 39, the curved extremity of its said finger 32 riding over the said lug 34. Upon such movement of the arm 13, due to the expansion of the thermostatic element 16, and the pull exerted by the spring 39, the angle between the said arm 13 and the detent member 26 pivoted thereto, is of course changed and becomes more acute and it may be here stated that should the valve 7 be moved to full open position and the flame jet thus increased in area, the further expansion of the thermostatic element 16 would result in the lower end of the arm 13 swinging inwardly toward the burner 6 to a much greater degree and in the angle between this arm and the detent 26 becoming much more acute. Now, should the flame be accidentally extinguished, due to a decrease in pressure in the gas supply, or to being blown out, or in fact any other cause, the cooling of the thermostatic element 16 and its consequent contraction would result in the upper end of the arm 13 moving inwardly toward the burner 16 and the lower end of the said arm moving outwardly from the said burner. This outward movement of the arm will of course exert a pull directly upon the detent 26 at its upper end and indirectly upon the said detent through the medium of the compensating element 30, so that the lower end of the detent will be moved in a direction corresponding to the direction of movement of the said lower end of the arm 13 and out of engagement with the lug 28 on the valve actuating member 21 whereby this member will be released and will be moved rapidly through the action of the spring 22 to engagement of its lug 25 with the finger 24 upon the stem of the valve 7, thereby rotating the said valve to full cut-off position. As the valve practically assumes its full cut-off position, the outer curved or cam edge of the finger 24 rides beneath the lower edge or end of the head 30 of the compensating member and as soon as the valve reaches the position stated and the supply of fuel to the burner has been completely cut off, the said lower end or edge of the compensating member will seat in the notch 41 in the said edge of the finger 24 and the valve will

be locked in this position so that it may not be turned on accidentally. One edge of the notch, however, being curved, admits of manual reopening of the valve.

It will be understood from the foregoing description of operation of the device that the valve has a movement entirely independent of the device after the device has once been set in operative condition, and it will also be understood that the movement of the valve to full cut-off position, provided that the movement is accomplished manually, will in no way affect the device itself since the arcuate edge of the finger 24 is so curved as to ride beneath the member 30 when the valve is being manually closed and lift the said member 30 thereby raising the finger 32 of the said member 30 out of contact with the lug 34 at the lower end of the arm 13 thereby avoiding tripping of the arm 26 when the valve is being moved to closed position as stated.

Should the thermostatic element 16 become unduly stretched or expanded or should it become completely destroyed, or become disengaged at one or both of its ends from its supporting members, the lower end of the arm 13 will swing inwardly toward the burner 6 carrying with it the detent 26 and upon such inward movement of the detent, its edge will engage with an upstanding lug 41′ formed at the inner end of the slot 17 in the bracket plate 18 and the said detent member will rock upon the edge of this lug 41′ as a fulcrum and its lower end will move in a direction outwardly from the burner 6 and out of engagement with the lug 28 upon the valve actuating member 21. It is to be understood of course that the several elements will maintain this position until the fixed arm 11 and the upper end of the arm 13 have been again connected by a suitable thermostatic element 16 or by the original element should the same have merely become disengaged therefrom, and that in consequence of this fact, the valve 17, while it may be momentarily opened, will not remain in such position unless manually held there, owing to the action of the spring 22.

From the foregoing description of the invention, it will be seen that as a matter of fact, the only condition under which the valve 7 may be opened and the supply b burned is when the device itself is in operative condition, and that as soon as the thermostatic element 16 is destroyed or becomes disarranged, or stretched, or the flame becomes extinguished, the device will act immediately to cut off the supply of fuel to the burner.

What is claimed is:—

1. In a device of the class described, a valve-actuating member upon the stem of the valve, a spring operatively connected with the said member for actuating the same, a detent for holding the valve-actuating member in operative position, an arm to which the detent is pivoted, a thermostatic element connected to the arm, and a member engaged by the arm and having connection with the detent, movement of the arm in one direction serving to move said detent out of engagement with said valve-actuating member through the medium of the member connected with said detent.

2. In a device of the class described, a burner valve, a valve-actuating member loose upon the stem of the said valve, a spring operatively connected with the said member for actuating the same, a finger upon the stem of the valve, said valve-actuating member having a lug engaged by the said finger when the valve is moved to open position, a detent holding said valve-actuating member in position when so moved, and an arm to which the detent is pivoted, a thermostatic element connected to the arm, and a member engaged by the arm and having connection with the detent, movement of the arm in one direction serving to move said detent out of engagement with the said valve-actuating member through the medium of the member connected with said detent.

3. In a device of the class described, a burner valve, a valve-actuating member loose upon the stem of said valve, a spring operatively connected with the said member for actuating the same, a finger upon the stem of the valve adapted to engage with the valve-actuating member whereby to move the same to operative position when the valve stem is turned in one direction, a detent holding said valve-actuating member in operative position when so moved, a member to which the detent is pivoted, a thermostatic element connected to the said member, and a compensating member engaged by the member and having connection with the detent, movement of the member in one direction serving to move said detent out of engagement with said valve-actuating member through the medium of the compensating member.

4. In a device of the class described, a burner valve, a valve-actuating member loose upon the stem of said valve, a spring operatively connected with said member for actuating the same, an arm, a thermostatic element connected with the arm, a detent engaging with the valve-actuating member when the same is in one position, whereby to hold the same in operative position, and a member pivoted to the detent and engageable at a number of points with the said arm, movement of the arm in one direction serving to move the detent out of engagement with the valve-actuating member through the medium of the compensating member.

5. In a device of the class described, a burner valve, a valve-actuating member loosely mounted upon the stem of the valve, a finger upon the valve stem engageable with the valve-actuating member, whereby to move the same to operative position when the stem is turned in one direction, a pivoted arm, a thermostatic element connected with the arm, a detent pivoted to the arm and engaging with the valve-actuating member to hold the same in operative position, and a member pivoted to the detent and having frictional engagement with the arm, rocking of the arm in one direction through expansion or contraction of the thermostatic element serving to disengage said detent from said valve-actuating member through the medium of the member pivoted to the detent.

6. In a device of the class described, a burner valve, a valve-actuating member loose upon the stem of the valve, a finger upon the stem of the valve, engageable with the valve-actuating member, whereby to move the same to operative position when the valve is turned in one direction, said valve being capable of flow-controlling movement independently of the valve-actuating member subsequent to the setting into operative position of the said valve-actuating member, a spring having operative connection with the valve-actuating member and arranged to move the same when released to engage with the finger upon the valve stem regardless of the position of the valve, a detent for holding the valve-actuating member in operative position, an arm to which the detent is pivoted, a thermostatic element connected to the arm, and a member engaged by the arm and having connection with the detent, movement of the arm in one direction serving to move said detent out of engagement with said valve-actuating member through the medium of the member connected with the said detent.

7. In a device of the class described, a burner valve, a valve-actuating member loosely mounted upon the stem of said valve, a spring operatively connected with the said member for actuating the same, a finger upon the stem of the valve adapted to engage with the valve-actuating member whereby to move the same to operative position when the valve stem is turned in one direction, a detent holding said valve-actuating member in operative position when so moved, a fixed member, an arm pivoted to the said member, the detent being pivotally supported from the said arm, a thermostatic wire connected to the fixed member and to the arm at one end thereof and normally supporting the arm in a pre-determined position, a compensating element pivoted to the said detent and having frictional engagement with the said arm, and a spring holding the compensating member normally in such engagement, movement of the arm in one direction serving to move the detent out of engagement with said valve-actuating member through the medium of the compensating member.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CARL A. JOHNSON.

Witnesses:

JACOB B. SLAUGHTER,

SAMUEL E. GUILLIANN.