No. 791,698. PATENTED JUNE 6, 1905.

G. C. JETT.

THERMOSTATIC SELF CLOSING GAS BURNER.

APPLICATION FILED OCT. 29, 1904.

4 SHEETS—SHEET 1.

Fig. 1.

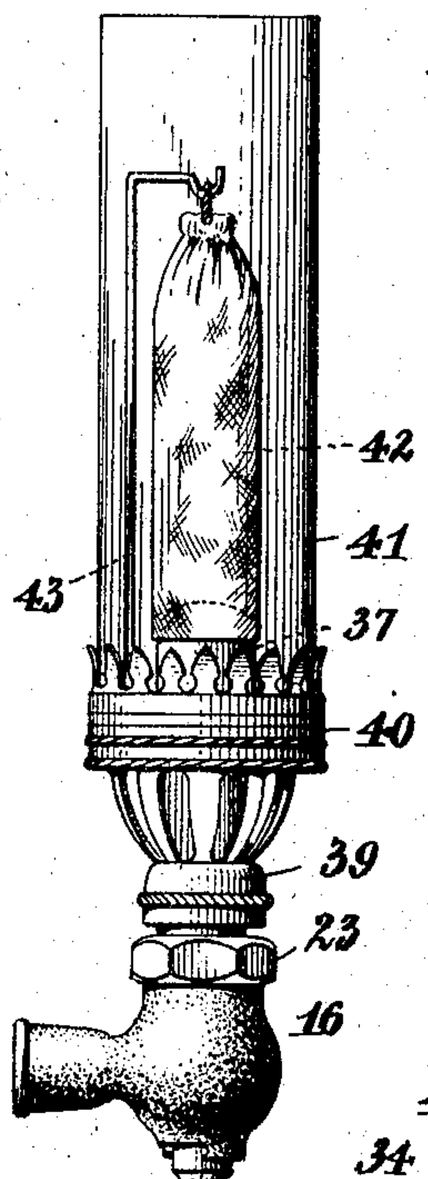


Fig. 2.

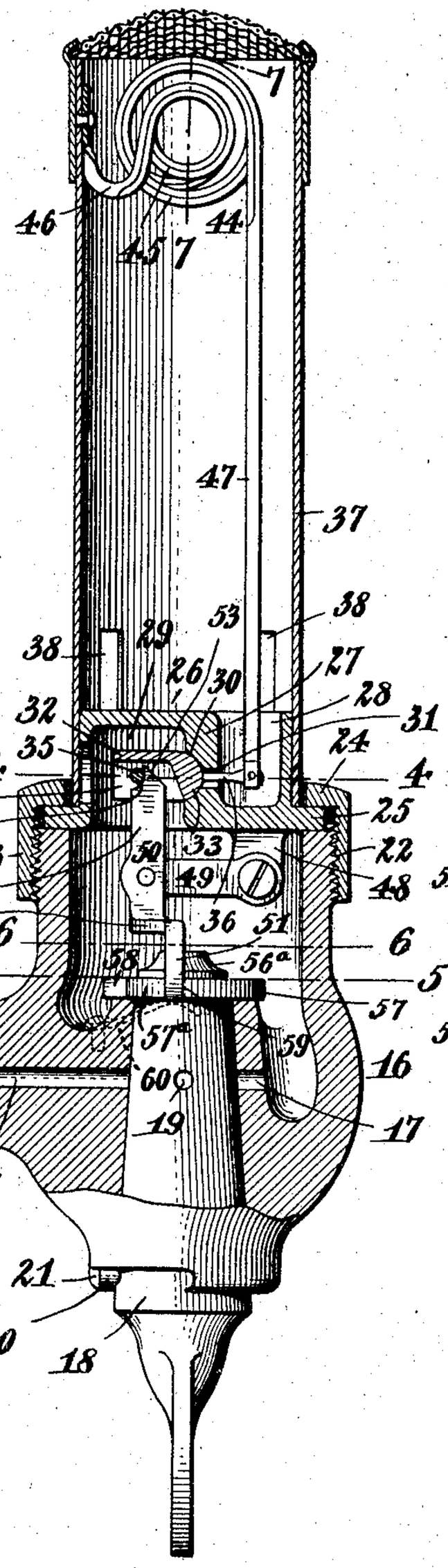
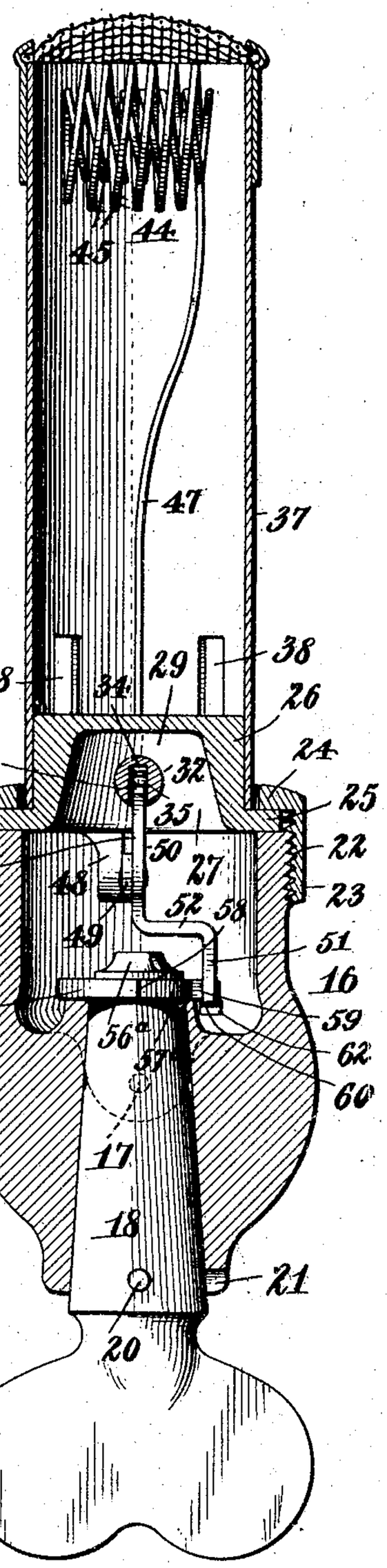


Fig. 3.



Witnesses:

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4 SHEETS—SHEET 2.

Fig. 4.

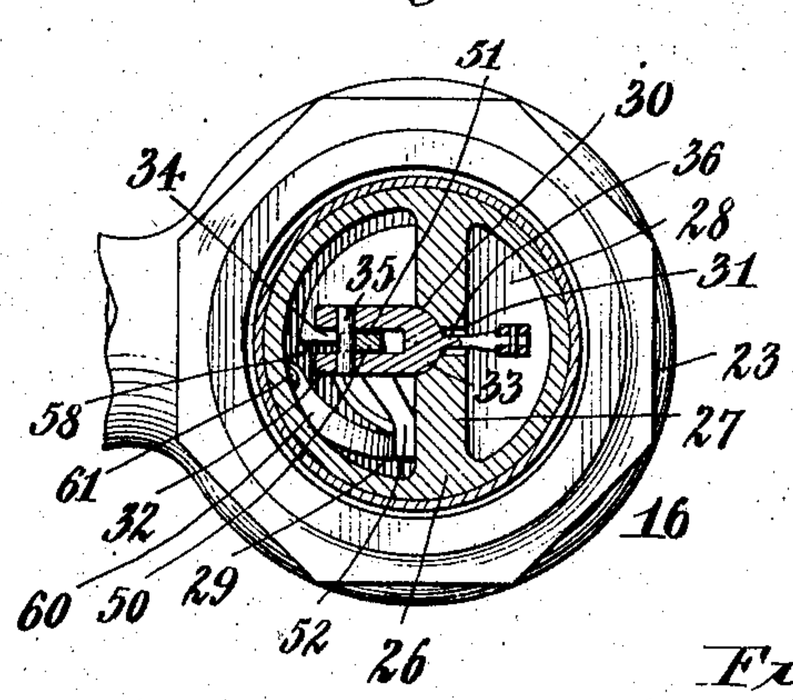


Fig. 5.

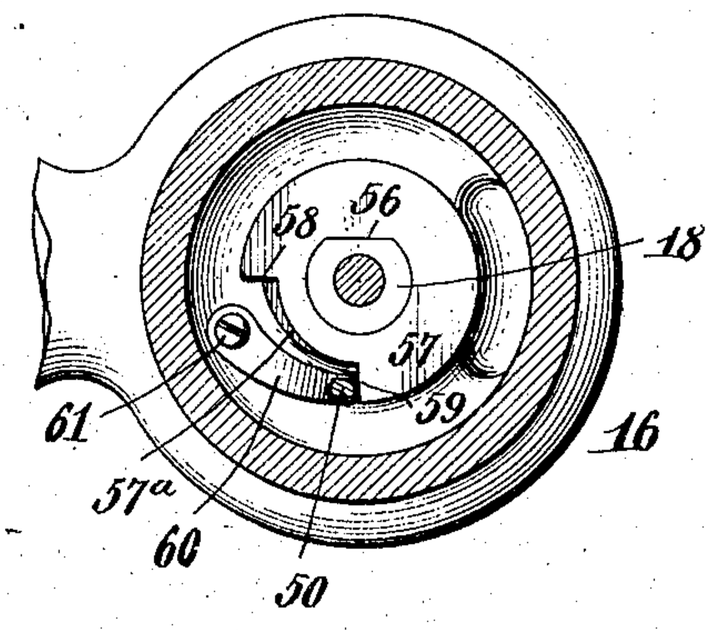


Fig. 6.

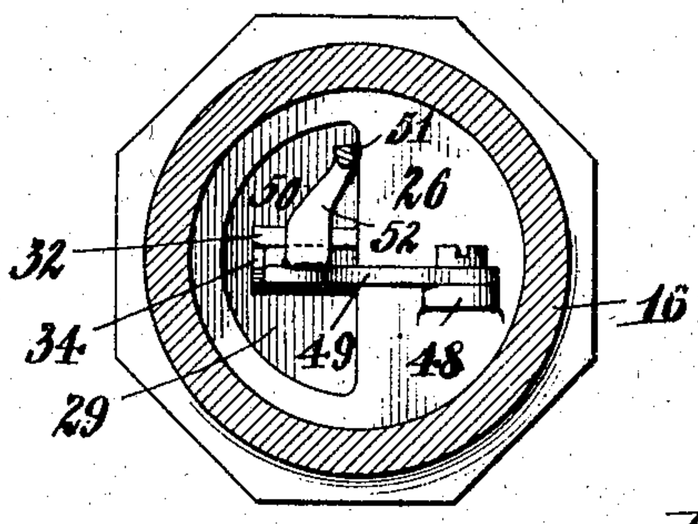


Fig. 7.

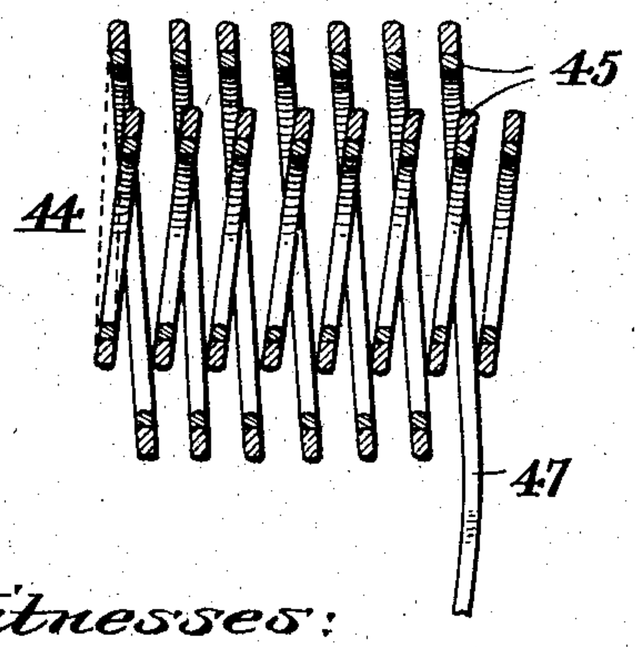


Fig. 8.

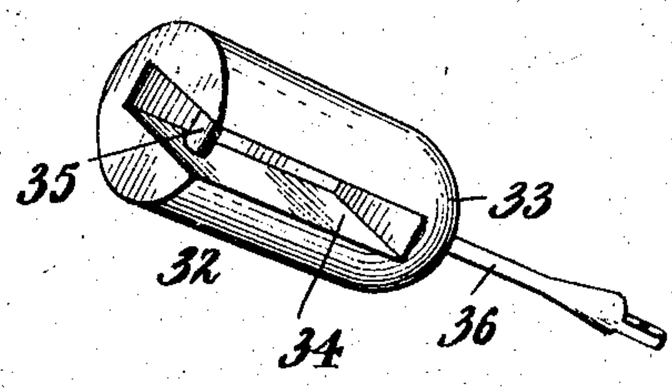
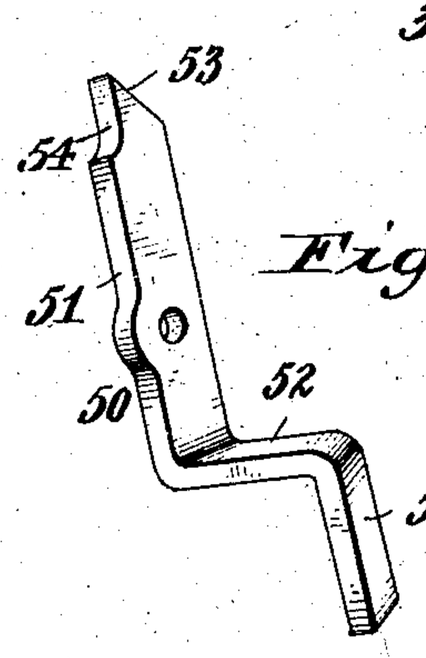


Fig. 9.



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No. 791,698. PATENTED JUNE 6, 1905.

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4 SHEETS—SHEET 3.

Fig. 10.

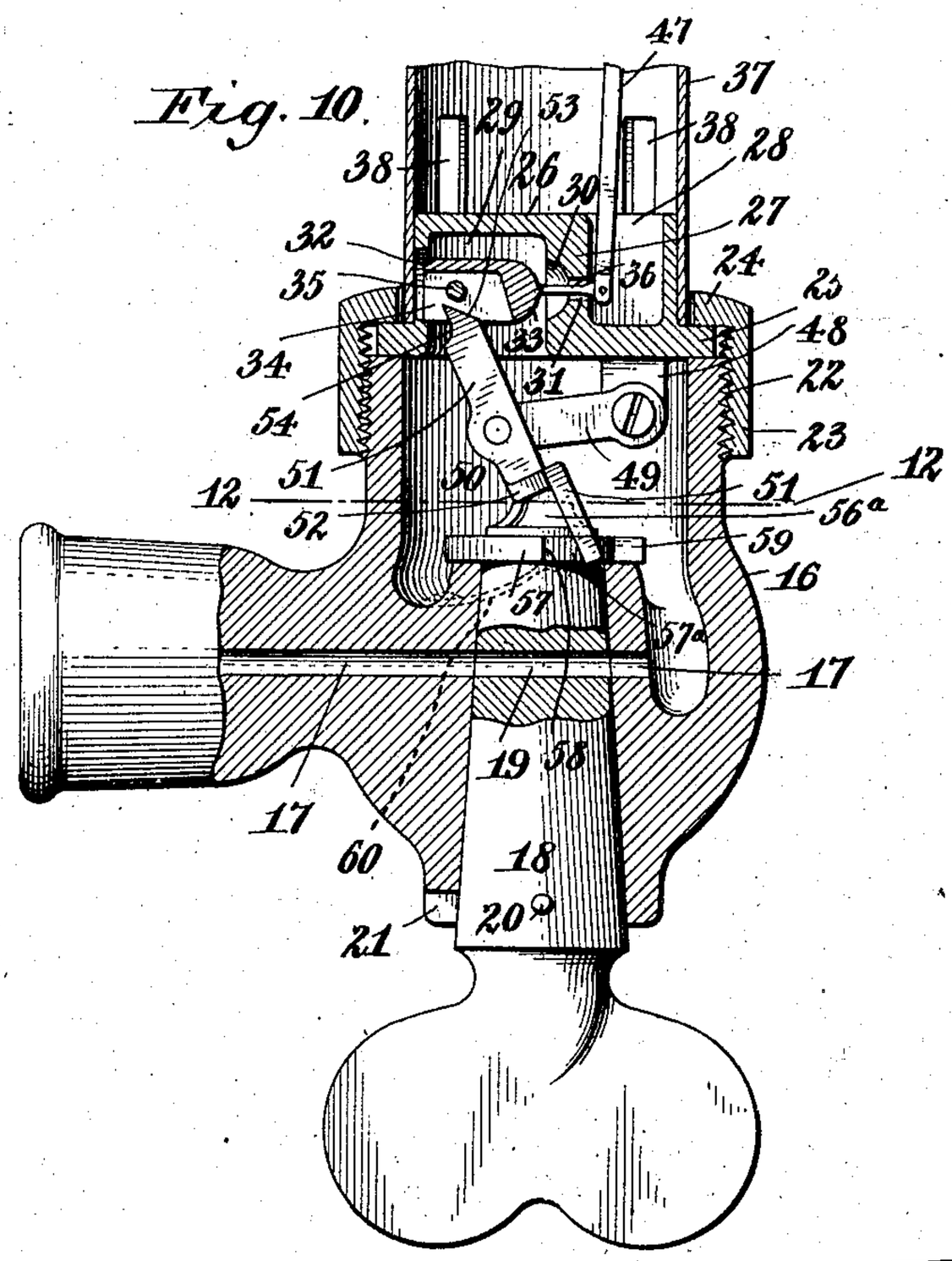


Fig. 11.

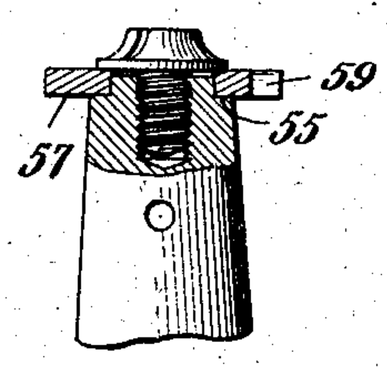
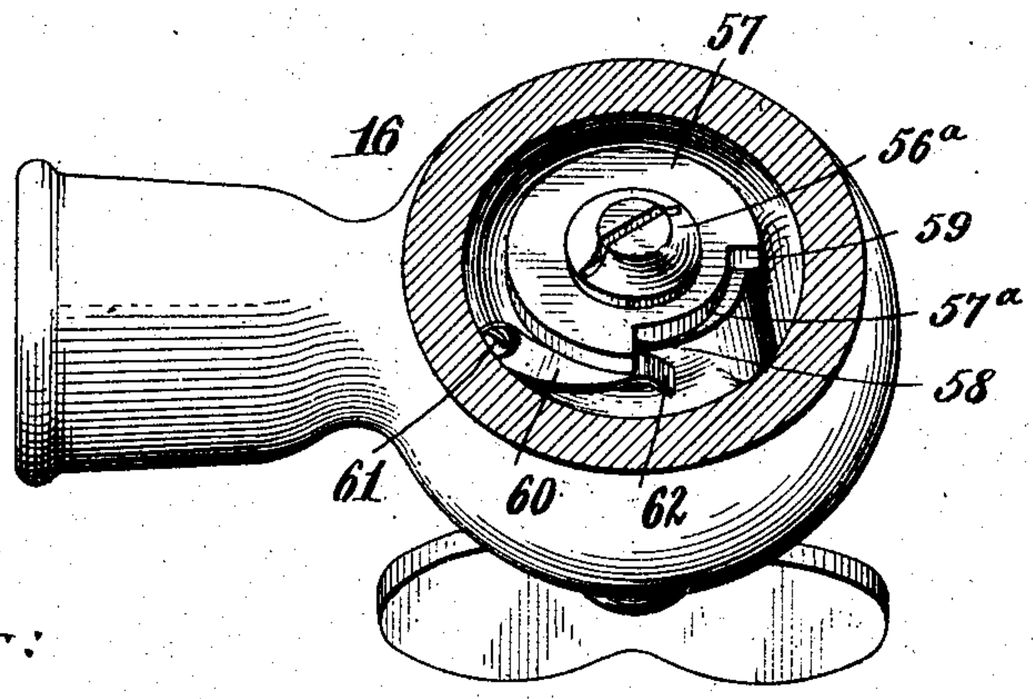


Fig. 12.



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4 SHEETS—SHEET 4.

Fig. 13.

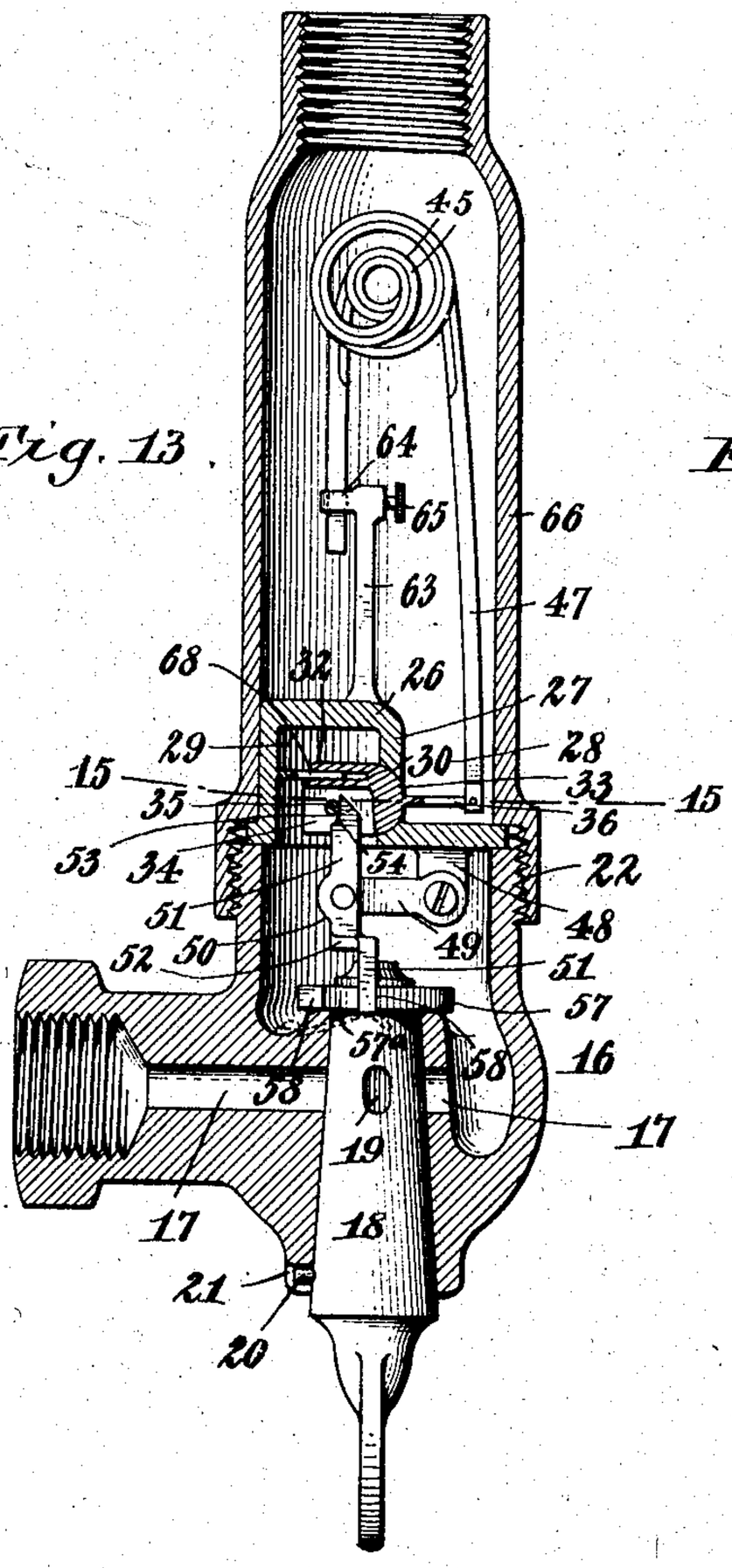


Fig. 14.

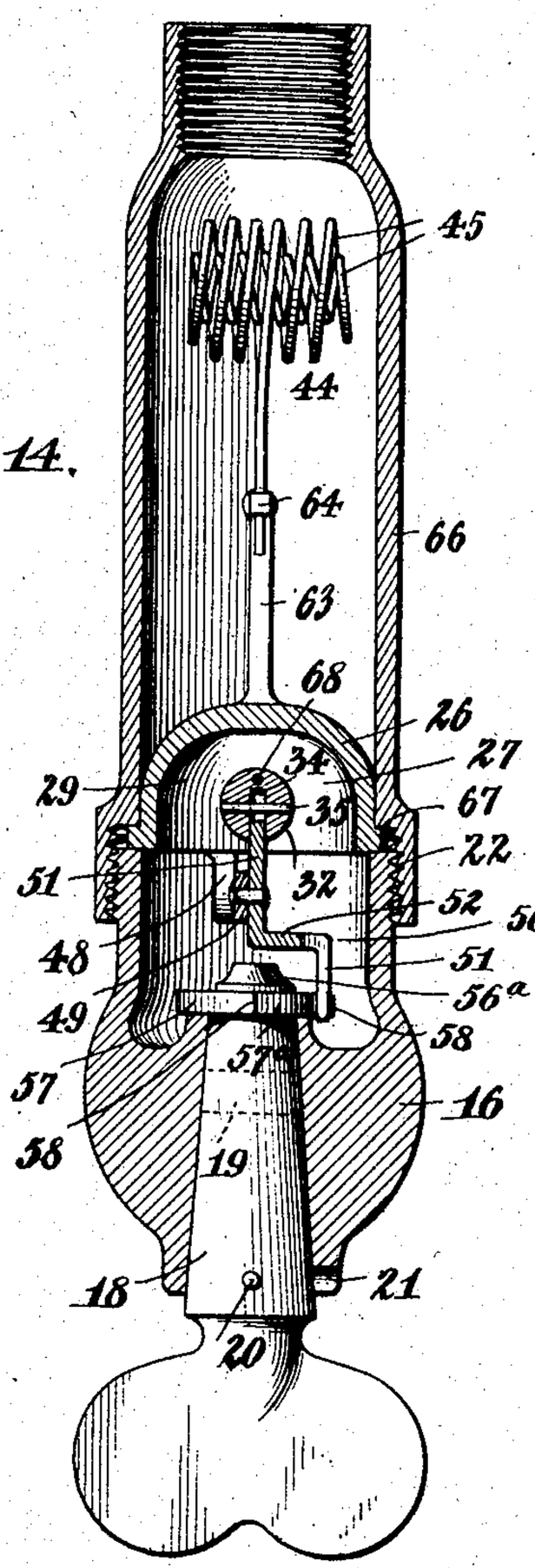
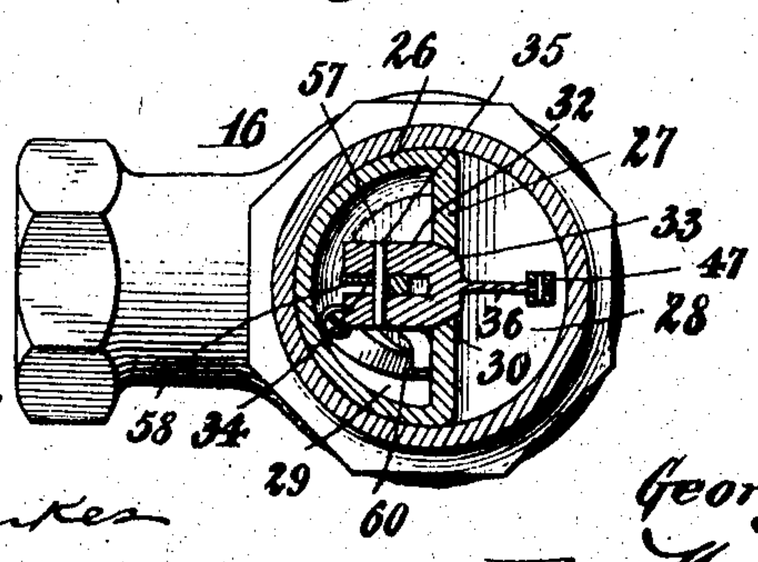


Fig. 15.



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No. 791,698. Patented June 6, 1905.

UNITED STATES PATENT OFFICE.

GEORGE C. JETT, OF BUFFALO, NEW YORK.

THERMOSTATIC SELF-CLOSING GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 791,698, dated June 6, 1905.

Application filed October 29, 1904. Serial No. 230,593.

To all whom it may concern:

Be it known that I, GEORGE C. JETT, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Thermostatic Self-Closing Gas-Burners, of which the following is a specification.

My invention relates to thermostatic self-closing gas-burners; and it has for its object the production of a burner of this character which is positive in action, simple in construction, and which is so constructed that every part thereof is rendered accessible for cleaning, repairing, and adjusting, thus assuring perfect operation with the least attention.

Another object is to provide a thermostatic controller which is very sensitive and quickly responds to the change of temperature due to the light being accidentally extinguished or to the increased heat of the burner-flame.

With these and other objects in view the invention consists in the construction of the thermostatic controller and in the construction, arrangement, and combination of the various parts, as will be hereinafter described, and particularly pointed out in the subjoined claims.

In the drawings, Figure 1 is a side elevation of a burner constructed according to my invention. Fig. 2 is an enlarged central vertical section of the same with the lower end of the gas-cock in elevation. Fig. 3 is a similar section on a plane at a right angle to that shown in Fig. 2. Fig. 4 is a horizontal section taken on line 4 4, Fig. 2. Fig. 5 is a horizontal section taken on line 5 5, Fig. 2. Fig. 6 is a horizontal section taken on line 6 6, Fig. 2, looking up. Fig. 7 is a sectional view through the coil of the thermostatic controller, taken on line 7 7, Fig. 2, looking to the right. Fig. 8 is a further enlarged detached perspective view of the auxiliary valve whereby the flow of gas is shut off through the efforts of the thermostatic controller when the gas is accidentally extinguished. Fig. 9 is a further enlarged detached perspective view of the manually-actuated lever whereby the auxiliary valve is opened. Fig. 10 is a central vertical section of the lower end of the burner, showing the position of the various parts after the thermostatic controller has come into full action. Fig. 11 is a sectional elevation of the main gas-cock, with its attached cam for actuating the lever, whereby the auxiliary valve is opened. Fig. 12 is a sectional perspective view of the lower part of the gas-cock, taken on line 12 12, Fig. 10, the lever for opening the auxiliary valve being omitted. Fig. 13 is a vertical section of a regulating device, showing my invention in modified form. Fig. 14 is a vertical section taken at a right angle to Fig. 13. Fig. 15 is a horizontal section taken on line 15 15, Fig. 13.

Referring to the drawings in detail, corresponding numerals of reference refer to corresponding parts in the several figures.

The reference-numeral 16 designates a gas-cock having the usual inlet-passage 17, intersected by a tapering valve or plug 18, provided with a transverse passage 19, adapted on turning the valve to be brought into or out of registration with the inlet-passage 17 to respectively open and close the supply of gas to the burner. As is common in valves of this type, a stop-pin 20 is provided, which limits the extent of movement of the valve, said pin striking against stops 21 on the casing arranged to limit the movement of the valve through ninety degrees of a circle. The upper end of said casing is open and provided with an external screw-thread 22, adapted to receive an internally-threaded collar 23, having an inwardly-extending annular flange 24. Between said flange and the upper end of the valve-casing I clamp the peripheral flange 25 of a valve-housing 26, the latter being cast with a transverse wall 27, which divides the housing into an upwardly-opening chamber 28 and a downwardly-opening chamber 29. Formed in the transverse wall 27 of said valve-housing is a curved valve-seat 30, extending partly through the wall and communicating with the upwardly-opening chamber 28 by a restricted gas-passage 31.

32 designates an auxiliary valve of cylindrical form in cross-section and having a semispherical closure end 33, adapted to be seated against the correspondingly-shaped valve-seat 30, thus assuring perfect closure

without being in exact alinement. This valve is provided with a downwardly-opening longitudinal groove 34 and with a transverse pin 35 in said groove. The auxiliary valve is also provided with a valve-stem 36, which extends from the closure end thereof through the gas-passage 31 and into the upwardly-opening chamber 28 of the valve-housing.

As this invention is particularly adapted for incandescent gas-burners, I have illustrated the same in preferred form on burners of this type, in which a tube 37 is slipped over the auxiliary-valve housing 26 and has its upper end provided with the usual wire-gauze diffuser. The lower end of said tube is provided with air-apertures 38, through which air passes to mingle with the gas passing through said tube. An air-regulator 39, Fig. 1, of the usual form surrounds the bottom of said tube, and by means of the same the apertures 38 may be partly closed to provide the proper amount of air to the gas. The usual stamped chimney-support 40 is provided for holding the chimney 41. A mantle 42 is suspended over the tube 37 by means of a support 43.

Within the tube 37, but in the heat zone, I confine the thermostatic controller 44, which consists of a double coil 45, formed of two strips of unequally-expansible metals, as copper and untempered steel, brazed together and located directly beneath the wire-gauze diffuser. The double coil is arranged with one coil within the other, one end of the inner coil being directed outwardly, as at 46, and riveted to the tube 37, and the opposite end of the inner coil is continued in a larger surrounding coil, which terminates in a depending arm 47, extending into the upwardly-opening chamber of the auxiliary-valve housing 26, said depending arm being pivotally connected to the stem of the auxiliary valve. Throughout the coiled portion of the thermostatic controller two strips of metal are used, the outer strip being copper and extended to form the terminals of the controller.

Formed on the auxiliary-valve housing is a depending lug 48, to which one end of a link 49 is pivotally secured. The other end of said link has pivotal connection with a lever 50, having vertical end portions 51 and an intermediate horizontal portion 52, the latter serving to offset the end portions. The upper end of said lever enters the grooves 34 in the auxiliary valve and is beveled, as at 53, toward the closure end of said valve. Said lever is also provided on that edge thereof nearer the free end of the valve with a curved notch 54, forming a lock edge for engagement with the pin 35 in the groove 34 of said valve.

The upper end of the main valve is reduced in diameter to form a shoulder 55, said reduced portion having a straight side 56. A cam 57, having an aperture corresponding to the form of the reduced upper end of the valve, is seated against said shoulder 55 and is thus held against turning independent of said valve. A securing-screw 56[a] enters a threaded central bore in the upper end of the main valve and is provided with an enlarged head having its marginal portion bearing against said cam, thus preventing disconnection of the latter from the valve. Said cam is notched, as at 57, to form two acting shoulders 58 59, arranged ninety degrees from each other. The lower end of the lever 50 lies normally within the notched portion of the cam, so as to be actuated by the stops on said cam as it is turned.

Within the casing of the valve is a flat spring 60, having one end secured with a screw 61 entering the metal of the casing, from which point the spring gradually rises and at its free end is inclined downward, as at 62. The position of the spring with relation to the cam is such that when the gas is turned off the free end of the spring lies beneath the notched portion of the cam and bears with said end against the lower end of the lever 50, tending to hold said lever in its normal position, also serving to elevate said lever and force the upper end of the same in rear of the pin 35 in the auxiliary valve when the main valve is being turned off.

The stem 36 of the auxiliary valve has its outer end gradually enlarged, and when the said valve approaches the end of its outward movement said gradually-enlarged portion of the stem enters the gas-passage 31 and closes the latter in proportion to the extent the valve is opened beyond a certain point.

The operation of the device is as follows: To light the gas, the main valve 18 is turned to the right a quarter of a revolution, which action turns the cam 57, causing the stop 58 thereon to engage the lower end of the lever 50, and thus actuate the same to unseat the auxiliary valve 32, which in turn places the coil of the thermostatic controller under tension. In this condition the upper end of the lever 50 is held in rear of the pin 35 in the auxiliary valve, and the stop 58 bears against the lower end of said lever, thus holding the same against lowering by force of gravitation. In this position of the parts the gas has a free passage from the feed-pipe to the burner. Therefore when the gas is first ignited the coil of the thermostatic controller is left under tension, and as said coil becomes heated by the action of the burning gas it tends to curl up, thus taking the strain off the depending arm 47 and carrying the same inward to a greater extent, which carries the auxiliary valve still farther from its seat and allows the lever 50 to gravitate below the grasp of the pin 35, as shown in Fig. 10. It will be noticed in this figure that the outer end of the link 49 is carried with the lever 50 and that the lower end of the latter has swung

away from the stop 58 on the cam. When the parts assume this position, the auxiliary valve is free to move by action of the thermostatic controller only. If by reason of increased pressure in the gas-main the flow of gas should be above normal, the temperature would immediately rise, which would cause the enlarged portion of the valve-stem to enter the gas-passage, thus making the area of the same smaller and raising the resistance at that point to momentarily check the undue flow of gas. When the temperature falls, the reverse action will take place, thereby giving a constant quantity of gas even with a variable pressure. By this means a perfect gas-regulating device is obtained, whereby the flow of gas will be constant at all times. If for any reason, accidental or otherwise, the light should become extinguished, the temperature within the heat zone containing the coil of the thermostatic controller would immediately fall, which would cause the coil to reverse its compensating motion, and consequently draw on the valve-stem of the auxiliary valve to close the latter, thus entirely cutting off the escape of gas and providing against loss of life from asphyxia and also preventing waste of gas. On discovering the gas extinguished and the main valve open a quarter-turn of the latter to the left will bring the stop 59 of the cam against the lower end of the lever 50, forcing the said end in contact with the free inclined end of the spring 60, whereby said lever is elevated while being swung to its normal position, during which action the inclined upper end of said lever strikes the pin in the auxiliary valve, thereby slightly elevating said valve while the lower end of said lever depresses the spring 60 until the said lever clears the said pin and assumes its normal position with its upper end between said pin and the closure end of said valve, said lever being held elevated by the spring 60. In this the normal position the stop 59 of the cam is held against the lower end of the lever 50.

In the modification shown in Figs. 13 to 15 the auxiliary-valve housing is provided with an upwardly-projecting arm 63, having a socket 64 at its upper end for the reception of one terminal of the thermostatic controller, which is held therein by a set-screw 65. In this instance the drawings show the invention adapted more particularly for stove connection, and in lieu of the collar 23 and tube 37, previously described, I screw a pipe-section 66 onto the upper end of the valve-casing, said pipe-section having an internal shoulder 67, which bears against the peripheral flange 25 of the valve-housing, thereby locking the same securely in place. The thermostatic controller differs from that described hereinbefore in that the fixed terminal is directed downward and held in the socket 64, formed at the upper end of the upwardly-projecting arm 63. In this instance I have shown the auxiliary valve 32, guided for movement on a pin 65, extending into the downwardly-opening chamber in the auxiliary-valve housing.

Having thus described my invention, what I claim is—

1. The combination with a gas-burner and a valve therefor, of an auxiliary valve between the point of consumption of the gas and the first-mentioned valve and being connected with the latter, and a thermostatic controller comprising two spiral coils arranged one within the other and formed of two strips of unequally-expansible metals, one terminal of said controller being secured to a fixed point and the other terminal thereof having connection with the auxiliary valve.

2. The combination with the gas-burner and a valve therefor, of an auxiliary valve between the point of consumption of the gas and the first-mentioned valve and being connected with the latter, a thermostatic controller comprising two spiral coils arranged one within the other and formed of an outer strip of metal and an inner strip of metal, each of different expanding capacity, one of said terminals being secured to a fixed point and the other terminal having connection with the auxiliary valve.

3. The combination with the gas-burner and a valve therefor, of an auxiliary valve between the point of consumption of the gas and the first-mentioned valve, operative connection between said auxiliary valve and the first-mentioned valve to cause the auxiliary valve to move with the first-mentioned valve only when opening the latter, and a thermostatic controller in the heat zone having connection with the auxiliary valve.

4. The combination with the gas-burner and a valve therefor, of a cam secured to said valve, an auxiliary valve between said cam and the point of consumption of the gas, a lever pivoted between its ends and having its ends held in operative relation to said cam and the auxiliary valve respectively, and a thermostatic controller in the heat zone having connection with said auxiliary valve.

5. The combination with a gas-burner and a valve, of a valve-housing having a valve-seat and a gas-passage, an auxiliary valve for said valve-seat adapted to open or close said gas-passage, a link pivotally attached to the valve-housing, a lever pivotally attached between its ends to said link and having its ends held in operative relation to both valves to cause the auxiliary valve to open on opening the first-mentioned valve, and a thermostatic controller in the heat zone having connection with the auxiliary valve.

6. The combination with a gas-burner and a valve, of a valve-housing located between said valve and the point of consumption of the gas, an auxiliary valve in said valve-housing and having a groove therein, a lever connecting both valves to cause the auxiliary valve

to be opened on opening the first-mentioned valve, said lever entering the groove in the auxiliary valve, and a thermostatic controller located in the heat zone and having connection with the auxiliary valve.

7. The combination with a gas-burner and a valve therefor, a valve-housing located between said valve and the point of consumption of the gas and having a valve-seat and gas-passage therein, an auxiliary valve adapted to close said gas-passage and having a valve-stem extending through the latter, operative connection between the auxiliary valve and the first-mentioned valve, and a thermostatic controller having connection with the stem of the auxiliary valve.

8. The combination with a gas-burner and a valve therefor, of a valve-housing between said valve and the point of consumption of the gas having oppositely-opening chambers separated by an intervening wall, said wall having a valve-seat and a gas-passage, an auxiliary valve adapted to open and close said gas-passage, suitable connection between both valves whereby the auxiliary valve is opened on opening the first-mentioned valve, and a thermostatic controller having connection with the auxiliary valve to open the latter still farther and to close the same when the light is extinguished.

9. The combination with a gas-burner, and a valve therefor, of a valve-housing between said valve and the point of consumption of the gas having oppositely-opening chambers separated by an intervening wall, said wall having a gas-passage therein, an auxiliary valve in one of said chambers to close said gas-passage and having a valve-stem projecting through the gas-passage into the other of said chambers, said valve-stem being tapered at its outer end to check the flow of gas through said gas-passage when the auxiliary valve approaches the end of its opening movement, a suitable connection between both valves to cause the auxiliary valve to open on opening the first-mentioned valve, and a thermostatic controller arranged in the heat zone and having an arm connected to the free end of the auxiliary-valve stem.

10. A thermostatic controller comprising two spiral coils arranged one within the other and formed of two strips of unequally-expansible metals.

11. A thermostatic controller comprising two spiral coils arranged one within the other and formed of two strips of unequally-expansible metals, one of said strips being continued beyond the other, one end of said continued strip being secured to a fixed point and the other end thereof being free to move on change of temperature within certain limits.

12. A thermostatic controller comprising two spiral coils arranged one within the other and formed of two strips of unequally-expansible metals, the outer strip having greater expanding capacity than the inner strip and being continued beyond the ends of the inner strip and extending outward to form arms, one of said arms being secured to a fixed point and the other arm being free to move on change of temperature within certain limits.

13. The combination with a gas-burner and a valve, of a cam secured to said valve and having a cut-away portion forming two shoulders, an auxiliary valve located between said cam and the point of consumption of the gas, a thermostatic controller in the heat zone and having connection with the auxiliary valve, and a lever pivoted between its ends and having one end operatively engaging the auxiliary valve and its other end lying between the shoulders on said cam.

14. The combination with a gas-burner and a rotary valve, of a cam secured to the end of said valve so as to revolve therewith, said cam having its edge cut away to form two shoulders, an auxiliary valve located between said cam and the point of consumption of the gas, a thermostatic controller having connection with said auxiliary valve, and a lever pivoted between its ends and having said ends offset for engagement with the auxiliary valve and to lie between the shoulders of the cam, respectively.

15. The combination with a gas-burner and a valve, of a valve-housing between said valve and the point of consumption of the gas, said housing having a gas-passage and a curved valve-seat coincident with said gas-passage, an auxiliary valve having a rounded end fitting said curved valve-seat, a lever having loose connections with both valves to cause the auxiliary valve to open on opening the first-mentioned valve, and a thermostatic controller in the heat zone having connection with said auxiliary valve to close the same when the light becomes extinguished.

16. The combination with the gas-burner and a valve within a valve-casing, of a cam secured to the upper end of said valve and having a portion of its edge cut away to form two shoulders, a spring secured to the valve-casing and having its free end lying beneath said cut-away portion, an auxiliary valve, a thermostatic controller in the heat zone connected to said auxiliary valve, a link pivoted at one end to a fixed point, and a lever pivotally connected to the free end of said link and having its upper end loosely connected with the auxiliary valve and its lower end extending into the cut-away portion and bearing against the said spring, the latter serving to hold said lever elevated until actuated by the cam and until the auxiliary valve is moved free of the upper end of said lever.

17. The combination with the gas-burner and a valve, of an auxiliary valve between the first-mentioned valve and the point of consumption of the gas, a pivoted lever having its upper end in engagement with said auxiliary

valve and serving to actuate the same only on opening the first-mentioned valve, means for normally retaining said lever in engagement with said auxiliary valve, means for actuating said lever on opening and closing the first-mentioned valve, and a thermostatic controller in the heat zone having connection with the auxiliary valve.

18. The combination with the gas-burner and a valve, of a valve-housing having a gas-passage, an auxiliary valve in said valve-housing having a groove therein and a pin arranged transversely in said groove, said auxiliary valve being adapted to close said gas-passage, a thermostatic controller in the heat zone having connection with said auxiliary valve, a link having one of its ends pivotally connected to the valve-housing, a lever pivoted between its ends to said link and having one end engaging said pin, said end of the lever being inclined, means for actuating the opposite end of the lever, and means for normally holding said lever elevated for engagement with said pin.

19. The combination with the gas-burner and a gas-cock comprising a casing having its outlet end open and a valve in said casing, of a valve-housing secured to the open end of said casing and having a gas-passage therein, an auxiliary valve adapted to close said passage, a thermostatic controller in the heat zone having connection with said auxiliary valve, and operative connection between both valves whereby said auxiliary valve is opened on opening the first-mentioned valve and whereby the auxiliary valve is allowed to close without closing the first-mentioned valve.

In testimony whereof I have affixed my signature in the presence of two subscribing witnesses.

GEORGE C. JETT.

Witnesses:
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CHAS. F. BURKHART.