

May 11, 1926.

M. JONES

1,584,546

NATURAL GAS BURNER

Filed Sept. 4, 1925

2 Sheets-Sheet 1

Fig. 1.

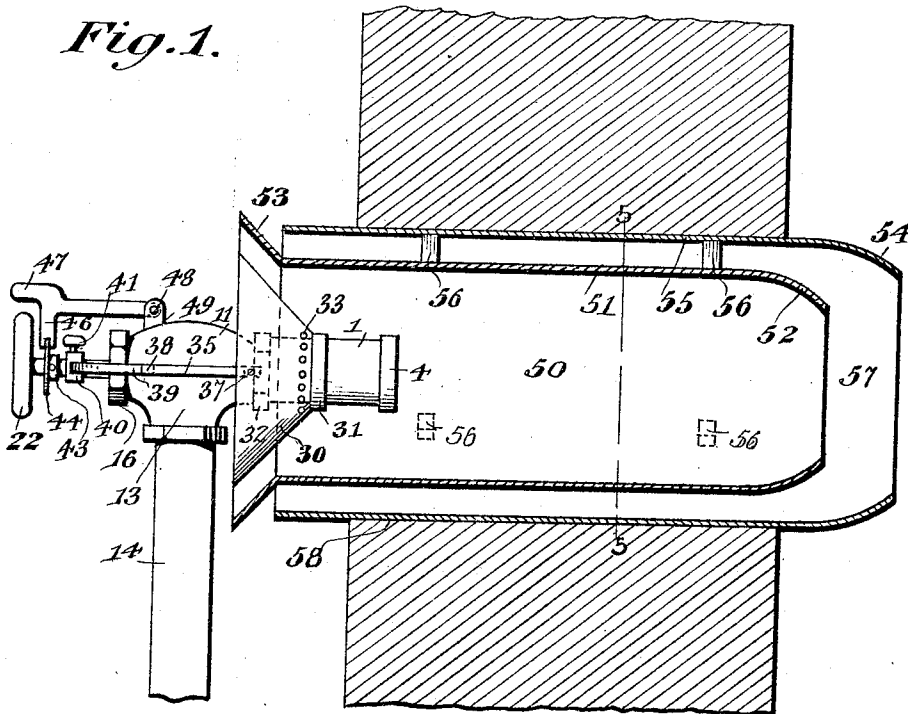
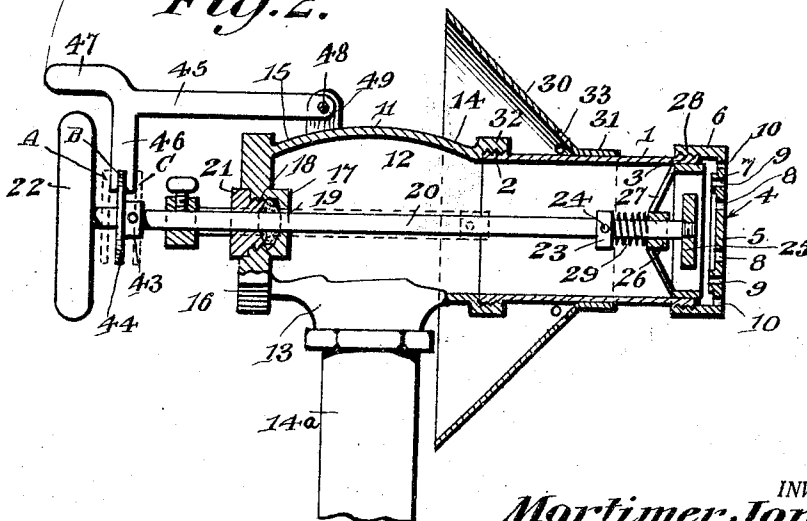


Fig. 2.



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Fig. 3.

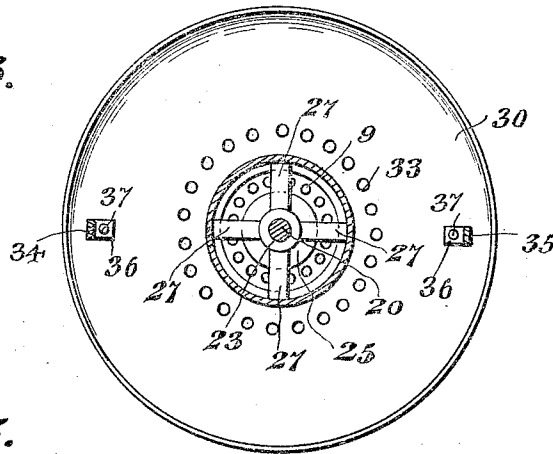


Fig. 5.

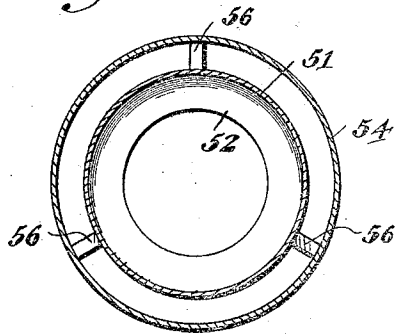


Fig. 6.

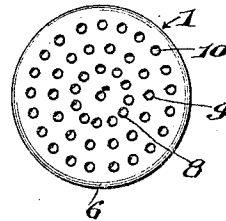
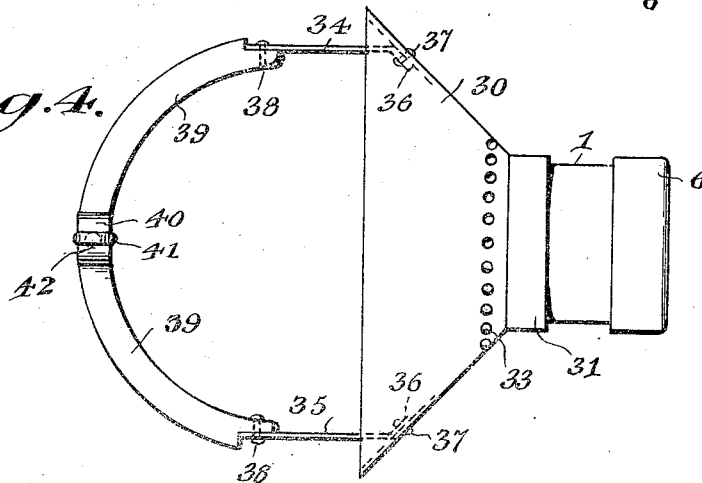


Fig. 4.



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UNITED STATES PATENT OFFICE.

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NATURAL-GAS BURNER.

Application filed September 4, 1925. Serial No. 54,517.

This invention relates to a natural gas burner, and has for its object to provide, in a manner as hereinafter set forth, a burner of such class capable of being accurately adjusted as to air and gas at one operation.

A further object of the invention is to provide, in a manner as hereinafter set forth, a natural gas burner whereby the velocity of the gas is not decreased when the volume thereof entering the mixing chamber of the burner is reduced thereby insuring a satisfactory mixture of gas and air before the mixture reaches the combustion chamber of the burner.

A further object of the invention is to provide, in a manner as hereinafter set forth, a natural gas burner having means to prevent the air and gas from channelling or reaching the point of combustion before the air and gas is properly mixed.

A further object of the invention is to provide, in a manner as hereinafter set forth, a natural gas burner including a mixing chamber and a jacket therefor acting to protect the means forming the mixing chamber and further to provide for additional air when desired, which decreases the flow of the combustible mixture and shortens the flame thereof.

Further objects of the invention, are to provide, in a manner as hereinafter set forth, a natural gas burner which is simple in its construction and arrangement, strong, durable, compact, thoroughly efficient in its use, readily adjusted, and inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described and illustrated in the accompanying drawing, but it is to be understood that although the preferred embodiment of the invention is as illustrated and described, that changes in the details of construction can be had which will fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a sectional elevation of a natural gas burner in accordance with this invention.

Figure 2 is a fragmentary view, in longitudinal section, illustrating the air supply

controlling means, as well as the jet element and the controlling means for the latter.

Figure 3 is a cross sectional view looking toward the inner end of the jet element and further illustrating the latter, the air controlling means and the controlling device for the jet element.

Figure 4 is an elevation of the air controlling means arranged in operative relation with respect to the jet element.

Figure 5 is a section on line 5—5 Figure 1.

Figure 6 is an end view looking toward the jet element.

Referring to the drawings in detail, a natural gas burner in accordance with this invention, comprises a substantially elongated cylindrical nipple 1 having each of its ends peripherally threaded as at 2, 3. Mounted on the inner end of the nipple 1 and engaging with the thread 3 is a jet element referred to generally by the reference character 4. The jet element 4 is cup shaped in cross section and comprises a circular disc 5, having formed integral therewith an outwardly extending collar 6 having interior threads for engagement with the thread 3 on the nipple 1. The inner face of the collar 6 is not threaded entirely throughout and when the jet element 4 is mounted in position it projects a substantial distance from the inner end edge of the nipple 1. The plate 5 has its inner, or rather that face with which the collar 6 is formed integral, provided with an annular ridge 7 which projects toward the inner end of the nipple 1. The plate 5 is formed with an inner, an intermediate and an outer circular row of openings and which are indicated at 8, 9 and 10 respectively. The openings 9 extend through the plate 5 and ridge 7. The openings 10 are arranged in proximity to the collar 6. The openings are spaced equidistant from the openings 8 and 10.

Arranged exteriorly of the outer end of the nipple 1, is a housing 11, which forms a gas receiving chamber 12. The housing 11 is provided centrally of its bottom with a vertically disposed leg 13 which communicates with and is connected to a gas supply pipe 14. The housing 11 is furthermore provided with a pair of oppositely extending, aligning laterally disposed legs 14, 15.

The leg 14 communicates with and is connected to the threads 2 of the nipple 1 at the outer end of the latter. The outer end

of the leg 15 has formed integral therewith a head-piece 16, which closes the outer end of the said leg 15, and the inner face of the head piece 16 is formed with a protuberance 17 centrally thereof. The head piece 16 is of polygonal contour and of a thickness greater than the thickness of the body of the housing 11. The head piece 16, centrally thereof is formed with a pocket or socket 18 and communicating with the inner end thereof is an opening 19 arranged centrally of the protuberance 17.

The said element 4 is controlled through the medium of a throttle mechanism and which comprises a lengthwise shiftable bar 20 which extends through the socket 18, opening 19, chamber 12 and into the nipple 1. A packing means 21 is mounted in the socket 18 for the rod 20. The outer end of the rod 20 is provided with a hand wheel 22 to facilitate the operation thereof. The inner portion of the rod 20 is provided with an adjustable stop collar 23, which is detachably secured to the rod 20, through the medium of the set screw 24. The inner end of the rod 20 has secured thereto a disc valve 25 for closing the circular row of openings 8. Slidably mounted on the rod 20 between the collar 23 and the disc valve 25 is a spring controlled collar 26 provided with a plurality of radially disposed and downwardly inclined arms 27 which terminate in the rear end of a ring valve 28 which is employed for closing the openings 10. Mounted on the rod 20 and interposed between the collars 23 and 26 is a coiled spring 29 for controlling the valve 28. The function of the spring 29 is to normally maintain the ring valve 28 projected and said valve 28 surrounds the disc valve 25. The length of the body of the ring valve 28, in cross section, is greater than the thickness of the disc valve 25.

Slidably mounted on the nipple 1 is a controlling element for the air supply to the mixing chamber and said air supply controlling element consists of a conoidal shaped body portion 30 having its smaller end terminating in an annular collar 31, which is slidably mounted on the nipple 1 between the rear end of the jet element 4 and the point of connection 32 between the leg 14 and the outer end of the nipple 1. The body portion 30 in proximity to the collar 31 is formed throughout with a row of spaced air inlet openings 33.

The air supply controlling element is adjusted simultaneously with the controlling of the jet element by the throttle mechanism and for such purpose the body portion 30 at its enlarged end has projecting therefrom a pair of diametrically opposed arms 34, 35, and each of which has an angle shaped inner end 36 which is positioned against the inner face of the body portion 30 and is secured

therewith by the holdfast device 37. The arms 34 and 35 are secured at their outer ends, by the holdfast devices 38, to the end of a bow-shaped member 39 formed centrally with an enlarged portion 40 having an aperture 41 through which extends the rod 20. A set screw 42 is carried by the enlarged portion 40 and which acts as a means for fixedly securing the member 39 to the rod 20, so that when the rod is moved inwardly the air supply controlling element will be carried therewith and said element will be moved outwardly when the rod 20 is withdrawn.

The throttle mechanism, which controls the jet element, as well as the air supply controlling element, has three positions represented at A and C in dotted lines and at B in full line Figure 2. Secured to the rod 20 in proximity to the wheel 22, is a collar 43, provided at one end with a laterally extending annular flange 44. The collar 43 and flange 44 associate with a ratchet lever 45 to provide for the three positions, referred to, of the throttle mechanism. The lever 45 includes a bifurcated arm 46 for receiving the flange 44 to hold the throttle mechanism in position B. Position A is attained by the abutting of the flange 44 against the outer side edge of the arm 46. Position C is obtained by the abutting of the flange 44 against the inner side edge of the arm 46. The lever 45 is furthermore provided with a handle piece 47, and the inner end of said lever 45 is pivotally connected as at 48, to a lug 49, carried by the body portion 11 of the housing.

A mixing chamber which is indicated at 50, is formed by a substantially elongated shell 51, of the desired diameter and length, and said shell 51 has a converging inner terminal portion 52 and a flaring outer portion 53. The shell 51 is arranged concentrically with respect to the nipple 1 and the jet element 4 is positioned at a point between the vertical median of the shell 51 and the outer end thereof. The nipple 1 is of materially less diameter than the diameter of the shell 51.

An air conducting or supply passage 54 surrounds the shell 51, and said passage is provided by an elongated shell 55, in connection with the shell 51. The shell 55 is of greater diameter than the shell 51 as well as of a length to project inwardly with respect to a converging end 52 of the shell 51. The shell 55 has a converging inner end 54. The shells 51 and 55 are maintained in spaced relation by spider elements 56 which are interposed between the said shells and said spider elements or members are spaced from each other. The point of combustion is indicated at 57. The shell 55 is mounted in and extends through an opening 58 formed in a portion of a heater or stove or other device with which the burner is used.

The construction as referred to provides for adjustment relative to air and gas in one operation and such adjustment will be an accurate one. The construction provides
 5 whereby the velocity of the gas is not decreased when the volume thereof entering the mixing chamber is reduced, which is brought about by the controlling of the jet element
 10 and the adjustment of the jet element is had by increasing and decreasing the number of active orifices or openings in the plate 5, rather than decreasing the velocity of the gas, as is done in the usual type of burner.
 15 By setting up the jet element with a large number of small openings, instead of one opening, it is possible to obtain greater velocity of the gas at a lower pressure, which insures better mixture of air and gas before
 20 the same reach the point of combustion. The construction or rather shape of the shell 51 prevents air and gas from channelling or reaching the point of combustion without being properly mixed. The shell 55 which
 25 provides a jacket for the shell 51 serves a double purpose, one of which is to protect the shell 51 and the other of which is to provide additional air when the same is desired, which decreases the flow of the mixture and
 30 shortens the flame.

It is thought that the many advantages of a natural gas burner, in accordance with this invention, can be readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet
 35 it is to be understood that changes, variations and modifications can be had with respect to the details of construction which fall within the scope of the invention as claimed.

40 What I claim is:—

1. A natural gas burner comprising a nipple adapted to communicate with a gas supply, a jet element secured to the inner end of
 45 said nipple and formed with concentric rows of openings, a conoidal shaped air supply controlling element slidably mounted on said nipple and formed with a row of openings, a throttle valve mechanism connected with
 50 said air supply controlling mechanism and operating in said nipple and provided with means to simultaneously control said jet element and supply element, and a shell surrounding said supply element, nipple and
 55 jet element, spaced therefrom and projecting inwardly from said jet element and providing a mixing chamber with which the openings in the air supply and jet elements communicate.

2. A natural gas burner comprising a nipple adapted to communicate with a gas supply, a jet element secured to the inner end
 60 of said nipple and formed with concentric rows of openings, a conoidal shaped air supply controlling element slidably mounted
 65 on said nipple and formed with a row of

openings, a throttle valve mechanism connected with said air supply controlling mechanism and operating in said nipple and provided with means to simultaneously control
 70 said jet element and supply element, and a shell surrounding said supply element, nipple and jet element, spaced therefrom and projecting inwardly from said jet element and providing a mixing chamber with which
 75 the openings in the air supply and jet elements communicate, said shell having a flaring outer end and a converging inner end.

3. A natural gas burner comprising a nipple adapted to communicate with a gas supply, a jet element secured to the inner end
 80 of said nipple and formed with concentric rows of openings, a conoidal shaped air supply controlling element slidably mounted on said nipple and formed with a row of openings, a throttle valve mechanism connected
 85 with said air supply controlling mechanism and operating in said nipple and provided with means to simultaneously control said jet element and supply element, and a shell surrounding said supply element, nipple and
 90 jet element, spaced therefrom and projecting inwardly from said jet element and providing a mixing chamber with which the openings in the air supply and jet elements communicate, said shell having a flaring
 95 outer end and a converging inner end, said converging inner end spaced a greater distance from said jet element than the distance between the latter and said flaring
 100 outer end.

4. In a natural gas burner, a mixing chamber, a jet element positioned therein and spaced from the inner end thereof and provided with concentric rows of openings communicating with said chamber, a shiftable
 105 throttle valve mechanism provided with a pair of spaced valves for simultaneously closing and openings the outer and inner row of said openings, and a shiftable air supply controlling element arranged within said
 110 chamber and slidably movable simultaneously with said mechanism when said valves are shifted to and from closed position with respect to said outer and inner row of openings.
 115

5. A natural gas burner comprising a nipple adapted to communicate with the gas supply, a jet element secured to the inner end of said nipple and formed with concentric
 120 rows of openings, a conoidal shaped air supply controlling element slidably mounted on said nipple and formed with a row of openings, a throttle valve mechanism connected with said air supply controlling mechanism and operating in said nipple and
 125 provided with means to simultaneously control said jet element and supply element, a shell surrounding said supply element, nipple and jet element, spaced therefrom and projecting inwardly from said jet element
 130

and providing a mixing chamber with which the openings in the air supply and jet elements communicate, and a protecting element surrounding and spaced from said shell
5 and further extended inwardly from the inner end of the shell and forming in connection with the latter an air passage.

6. In a natural gas burner, a mixing chamber, a jet element positioned therein and
10 spaced from the inner end thereof and provided with concentric rows of openings communicating with said chamber, a shiftable throttle valve mechanism provided with a pair of spaced valves for simultaneously

closing and opening the outer and inner row 15 of said openings, and a shiftable air supply controlling element arranged within said chamber and slidably movable simultaneously with said mechanism when said valves are shifted to and from closed position with 20 respect to said outer and inner row of openings, said air supply controlling element being conoidal in contour and formed with a row of openings in proximity to its lower
25 end.

In testimony whereof, I affix my signature hereto.

MORTIMER JONES.