June 27, 1950 G. W. FERREL 2,513,087

GAS BURNER WITH INTERNAL FUEL DISTRIBUTOR

Filed Sept. 6, 1949

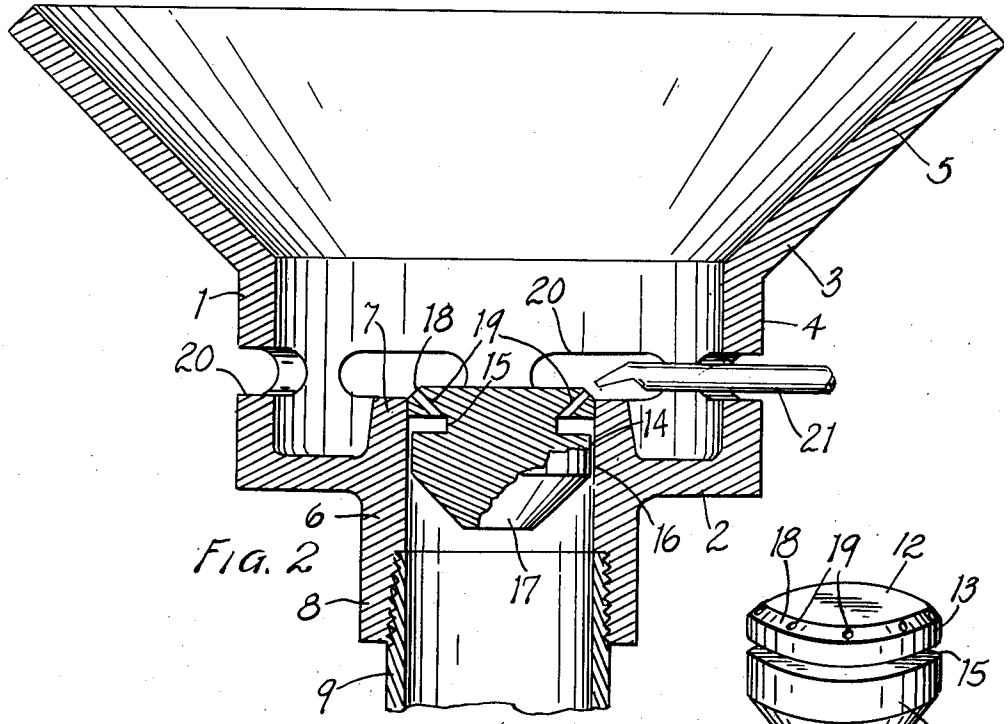


FIG. 2

FIG. 3

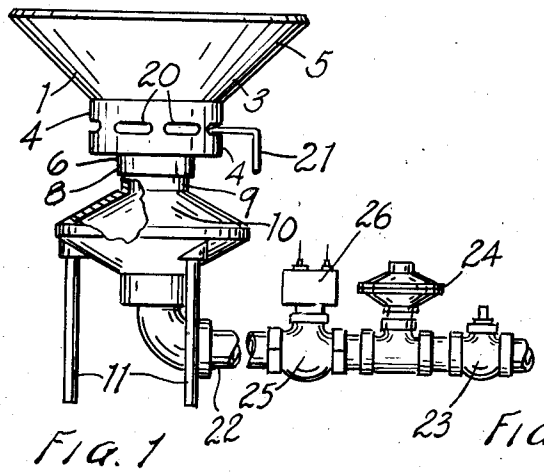


FIG. 1

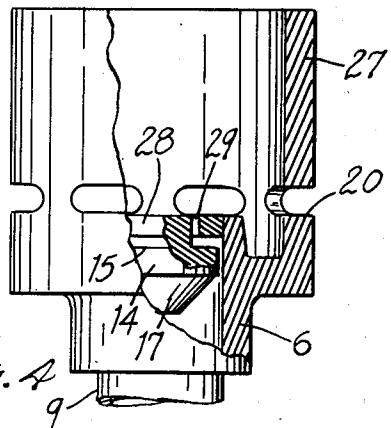


FIG. 4

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Patented June 27, 1950

2,513,087

UNITED STATES PATENT OFFICE

2,513,087

GAS BURNER WITH INTERNAL FUEL DISTRIBUTOR

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Application September 6, 1949, Serial No. 114,213

12 Claims. (Cl. 158—114)

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This invention relates to improvements in gas burners.

The main objects of this invention are:

First, to provide a gas burner of the heating type which is highly efficient in the utilization of the B. t. u.'s of the gas consumed.

Second, to provide a gas burner which may be easily installed in various types of furnaces and boilers and connected to a source of gas supply.

Third, to provide a burner having these advantages in which there is no so-called "primary air" mixed with the gas prior to its discharge from the burner orifices, and at the same time provides for the admission of secondary air or air at the point of discharge of the burner orifices for an effective air mixture with the gas to provide efficient combustion.

Fourth, to provide a gas burner which is of few parts and these parts are readily assembled and do not require adjustment relative to each other for different installations.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary side elevation of a burner assembly embodying my invention, partially in vertical section and partially broken away, certain parts being shown conventionally.

Fig. 2 is an enlarged fragmentary view mainly in vertical section.

Fig. 3 is a perspective view of the burner head.

Fig. 4 is a fragmentary view partially in vertical section of a modified form or embodiment of my invention.

The burner of my invention, illustrated in Figs. 1 to 3 inclusive, comprises a body member designated generally by the numeral 1 and having a bottom 2 and side wall 3. The side wall has a cylindrical lower portion 4 and an outwardly flaring upper portion 5 desirably of inverted conical shape. A tubular burner head holder member 6 is cast integrally with the bottom and walls described and has a portion 7 projecting centrally into the chamber formed by the walls and bottom and also projecting below the bottom to provide a coupling portion 8 internally threaded to receive the gas supply connection 9 which is carried by the equalizing chamber member 10 which constitutes a base provided with supporting legs 11.

The burner head 12 is provided with a cylindrical upper portion 13 fitting within the upper end of the holder in closing engagement with its walls. The head member is provided with a cylindrical inner portion 14 spaced from the upper portion by an annular groove or recess 15. The cylindrical portion 14 is spaced from the wall of the holder to provide an annular gas passage 16. This is desirably quite restricted to insure even distribution of gas to the recess 15.

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Below the portion 14, the head member has a downwardly tapering portion 17 which merges into the portion 14 and acts to uniformly distribute or guide gas to the passage 16. In this preferred embodiment the upper edge of the head member is beveled at 18. The gas delivery ports or jet orifices 19 are disposed at an angle and act to direct the gas outwardly. The burner body is provided with a plurality of angularly spaced elongated air inlet openings 20 desirably arranged in the plane of the discharge ends of the jets. With this arrangement the gas is very uniformly delivered about the burner head and into the burner chamber. A pilot 21 is conventionally illustrated.

The gas supply pipe 22 is provided with a cut-off valve 23, with a pressure regulator 24 at the rear of the valve 23, and with a thermostatically controlled valve 25, the valve control mechanism being conventionally illustrated at 26. It has suitable electrical connections to a thermostat desirably located in space to be heated. The pressure regulator is of importance as it is found practical to deliver the gas to the burner at a relatively low pressure and it is desirable to deliver it at a uniform pressure. The burner is adapted for use in connection with gas supply systems or it may be used in connection with bottled gas. The chamber 10 is disposed at the rear of the regulator and further serves to provide a uniform delivery of the gas to the burner.

One of the features which I wish to particularly point out is that no primary air is admitted in advance of the discharge of the gas into the burner chamber and consequently there are no adjustable parts which can be manipulated by inexperienced persons to decrease the efficiency of the burner. In use the combustion takes place largely at the top and above the burner body. An advantage of this is that the burner head does not become substantially heated and there is no accumulation of carbon on the head or in the jet orifices.

In the embodiment shown in Fig. 4, the wall 27 is cylindrical throughout the burner head holder and the air inlet openings are the same as de-

scribed. The burner head 28 is set into the holder with its face flush with the upper edge of the holder and the jet orifices 29 are vertical opening at the flat face of the burner head. The head is otherwise the same as that described. This structure is also efficient although that shown in Figs. 1 to 3 inclusive is preferred by me.

I have illustrated and described my invention in highly practical embodiments thereof. I have not attempted to illustrate or describe other embodiments or adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody and adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, the side wall comprising a lower cylindrical portion and an upper outwardly flaring portion of inverted conical shape, a tubular burner head support integral with and projecting above the bottom centrally of the wall, a block-like burner head disposed within and having an upper cylindrical portion in supported sealing engagement with the wall of the support, and a lower cylindrical portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted annular passage, said head having an annular groove above said lower cylindrical portion, the inner end of the head having a symmetrical downwardly tapered portion merging at its upper end into the said lower cylindrical portion, the upper edge of the head being beveled and projecting above the said support, said head having a plurality of outwardly inclined jet orifices opening at their inner ends to said annular groove and at their outer ends to said beveled edge, said cylindrical portion of the wall having a plurality of angularly spaced horizontally elongated air inlets, the bottom edges of which are in approximately the plane of the upper end of said support.

2. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, the side wall comprising a lower cylindrical portion and an upper outwardly flaring portion of inverted conical shape, a tubular burner head support integral with and projecting above the bottom centrally of the wall, a block-like burner head disposed within and having an upper cylindrical portion in supported sealing engagement with the wall of the support, and a lower cylindrical portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted annular passage, said head having an annular groove above said lower cylindrical portion, said head having a plurality of jet orifices opening at their inner ends to said annular groove and at their outer ends to the space within said body wall, said cylindrical portion of the wall having a plurality of angularly spaced air inlets.

3. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, the side wall comprising a lower cylindrical portion and an upper outwardly flaring portion of inverted conical shape, a tubular burner head support integral with and projecting above the bottom centrally of the wall, a block-like burner head disposed within and having an upper cylindrical portion in supported sealing engagement with the wall of the support, and a lower cylindrical portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted annular passage, said head having an annular groove above said lower cylindrical portion, said head having a plurality of jet orifices opening at their inner ends to said annular groove and at their outer ends to the space within said body wall, said cylindrical portion of the wall having a plurality of angularly spaced air inlets, a chambered base member opening to said support and of a diameter substantially exceeding that of the support, and a gas supply connection opening to the bottom of said base member and provided with a pressure regulating valve, the connections for the gas supply to the burner head being closed against the admission of air.

4. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, the side wall having an upper outwardly flaring upper portion, a central tubular burner head support projecting above the bottom, a burner head disposed within said support and having an upper portion in closing relation to the wall thereof, and a lower portion spaced from the wall of the support and coacting therewith to provide a restricted continuous passage, said head member having a continuous circumferential groove above said lower portion, the head having a downwardly tapered portion merging at its upper end into the said lower portion spaced from the wall of the burner support, the upper edge of the head being beveled and projecting above the said support, said head having a plurality of jet orifices opening at their inner ends to said annular groove and at their outer ends to said beveled edge, said wall having angularly spaced air inlets.

5. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, a central tubular burner head support projecting above the bottom, a burner head disposed within said support and having an upper portion in closing relation to the wall thereof, and a lower portion spaced from the wall of the support and coacting therewith to provide a restricted continuous passage, said head member having a continuous circumferential groove above said lower portion, said head having a plurality of jet orifices opening at their inner ends to said annular groove and at their outer ends to the space within said body wall, said wall having angularly spaced air inlets.

6. The combination in a gas burner, of a body member comprising a bottom and side wall integral therewith and extending upwardly therefrom, a central tubular burner head support projecting above the bottom, a burner head disposed within said support and having an upper portion in closing relation to the wall thereof, and a lower portion spaced from the wall of the support and coacting therewith to provide a restricted continuous passage, said head member having a continuous circumferential groove above said lower portion, said head having a plurality of jet orifices opening at their inner ends to said annular groove and at their outer ends to the space within said body wall, said wall having angularly spaced air inlets, a chambered base member opening to said support and of a diameter substantially exceeding that of the support, and a gas supply

connection opening to the bottom of said base member and provided with a pressure regulating valve, the connections for the gas supply to the burner head being closed against the admission of air.

7. The combination in a gas burner, of a body member comprising a bottom and side wall extending upwardly therefrom and having a lower cylindrical portion and an upwardly outwardly flaring upper portion, a tubular burner head support member, a burner head disposed within said support and having an upper portion coacting with the wall of the support to close the support, said head having an annular recess and having a portion below the recess spaced from the wall of the support to provide a passage opening to the recess, a plurality of angularly spaced jet orifices opening to said recess and within said body member wall, the body member having air inlet openings in a plane adjacent the plane of the discharge of the jet orifices, and a gas supply connection to said burner including a chamber and a pressure regulating valve arranged in advance of said chamber.

8. The combination in a gas burner, of a body member comprising a bottom and side wall extending upwardly therefrom, a tubular burner head support member, a burner head disposed within said support and having an upper portion coacting with the wall of the support to close the support, said head having an annular recess and having a portion below the recess spaced from the wall of the support to provide a passage opening to the recess, a plurality of angularly spaced jet orifices opening to said recess and within said body member wall, the body member having air inlet openings, and a gas supply connection to said burner.

9. The combination in a gas burner, of a body member comprising a bottom and side wall extending therefrom, a central hollow burner head support projecting above the bottom, a burner head member disposed within and having an upper portion in closing relation to the wall of the support, and a lower portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted passage, said head member having an annular recess between said upper and lower portions, the inner end of the head having a downwardly tapered portion merging at its upper end into the said lower portion spaced from the wall of the burner support, said head having a plurality of jet orifices opening at their inner ends to said recess, the side wall having a plurality of angularly spaced air inlets in surrounding relation to the burner head support, and a gas supply connection for said burner, the connections for the gas supply to the burner head support being closed against the admission of air.

10. The combination in a gas burner, of a body member comprising a bottom and side wall extending therefrom, a central hollow burner head support projecting above the bottom, a burner head member disposed within and having an upper portion in closing relation to the wall of the support, and a lower portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted passage, said head member having an annular recess between said upper and lower portions, said head having a plurality of jet orifices opening at their inner ends to said recess and within said body member wall, the side wall having air inlets in surrounding relation to the burner head support, and a gas supply connection for said burner, the connections for the gas supply to the burner head support being closed against the admission of air.

11. The combination in a gas burner, of a body member comprising a bottom and side wall extending therefrom, a central hollow burner head support projecting above the bottom, a burner head member disposed within and having an upper portion in closing relation to the wall of the support, and a lower portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted passage, said head member having an annular recess between said upper and lower portions, said head having a plurality of jet orifices opening at their inner ends to said recess and within said body member wall, the side wall having air inlets in surrounding relation to the burner head support, and a gas supply connection for said burner provided with a pressure regulating valve, the connections for the gas supply to the burner head support being closed against the admission of air.

12. The combination in a gas burner, of a body member comprising a bottom and side wall extending therefrom, a central hollow burner head support projecting above the bottom, a burner head member disposed within and having an upper portion in closing relation to the wall of the support, and a lower portion concentric with and spaced from the wall of the support and coacting therewith to provide a restricted passage, said head member having an annular recess between said upper and lower portions, said head having a plurality of jet orifices opening at their inner ends to said recess and within said body member wall, the side wall having air inlets in surrounding relation to the burner head support.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,387,565	Thorp	Aug. 16, 1921
1,596,667	Levey et al.	Aug. 17, 1926
1,600,712	Buttner	Sept. 21, 1926

FOREIGN PATENTS

Number	Country	Date
428,878	Great Britain	May 21, 1935