J. A. KLOEB.

GAS BURNER AND MIXER.

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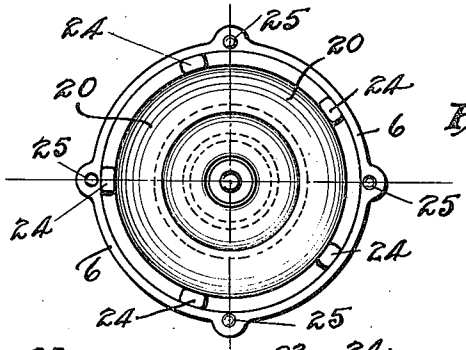


Fig. 1

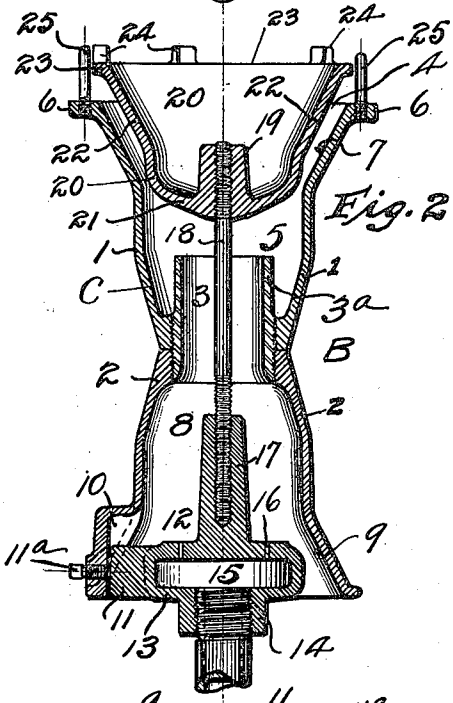


Fig. 2

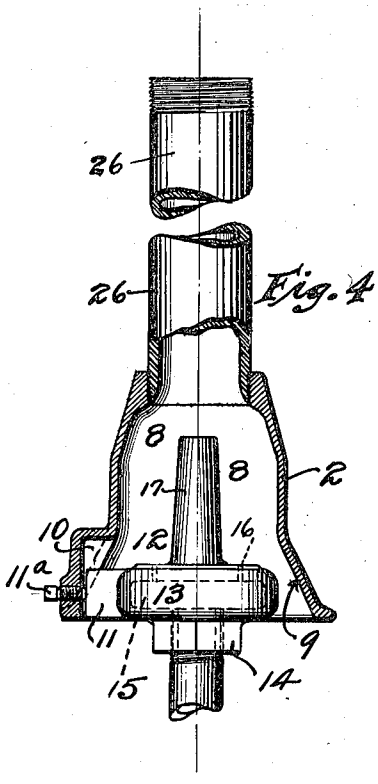


Fig. 4

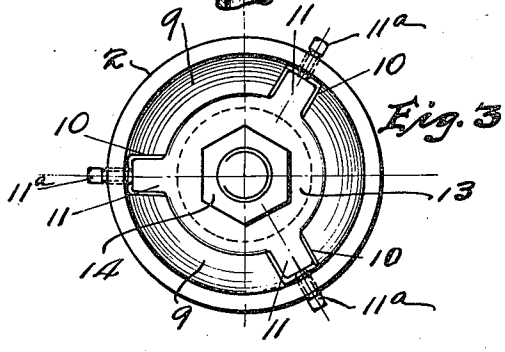


Fig. 3

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GAS BURNER AND MIXER.

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To all whom it may concern:

Be it known that I, JOSEPH A. KLOEB, a citizen of the United States, residing at Piqua, in the county of Miami and State of Ohio, have invented certain new and useful Improvements in Gas Burners and Mixers, of which the following is a specification.

This invention relates in general to the subject of burners, and has particular reference to a novel design of that type which is especially adapted to burn gaseous mixtures.

The main object of the invention is to provide a novel and improved form of burner and mixer that is of simple and durable construction, whose arrangement of parts is such that a maximum heating efficiency is attained with a minimum amount of gaseous fuel. Accordingly, the simple and reliable construction of the present invention renders the same of special utility in connection with hot air, hot water and steam plants wherein gas is the fuel employed as a heating medium.

In carrying the present invention into practical effect, the same contemplates the provision of novel means for mixing and controlling the mixture of gas and air in such a way as to suit the various exacting conditions of service when installed in the different systems above mentioned.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

The essential features of the invention involved in the peculiar construction of burner and mixer, and mode of adjusting the same, are necessarily susceptible to modification without departing from the spirit or scope of the invention, but a preferred and practical embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is a top plan view of the burner. Fig. 2 is a vertical sectional view. Fig. 3 is a bottom plan view, and Fig. 4 is an elevation, partly in section of the modified use of the gas and air mixer forming a part of the present invention.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying out the invention, the burner may be utilized in any convenient or practical way in connection with hot air, hot water, or steam systems, or for other heating purposes with either artificial or natural gas as the fuel.

With particular reference to the construction shown in the accompanying drawings, the numeral 1 designates a burner section, while the numeral 2 designates a mixing section, both of which are preferably of cylindrical form, having frusto-conical end portions which are joined together by a coupling member 3.

The burner section 1 is formed at its upper end with a flared mouth portion 4, and also with a gas receiving chamber 5, while the side wall thereof adjacent the rim 6 is preferably flared as indicated at 7. The mixing section 2 is similar in design to the section 1, and has formed therein a mixing chamber 8 while its tapering side wall 9 is formed with a plurality of cored slots 10 which are adapted to receive therein the radially projecting lugs 11 of a gas feeder member designated in its entirety by the numeral 12. The said lugs 11 are adapted to be engaged by set screws 11^a threaded into the walls of the slots 10 to hold the adjustable parts in position.

With special reference to the coupling member 3, it will be observed that the same is in the form of a tube the lower portion of which is exteriorly threaded to unite the two sections 1 and 2 to establish communication between the combustion chamber 5 and the mixing chamber 8, while the upper portion 3^a which projects into the gas receiving chamber 5 forms a cavity C, the purpose of which will hereinafter more fully appear.

The entire burner designated as an entirety by the reference character B may be adjusted vertically upon the gas feeder member 12 because of the radially projecting lugs 11 being guided in the cored slots 10. Therefore, it will be observed that the body 13 of the said member 12 which includes a tapped hexagonal boss 14 and a gas outlet chamber 15, may be attached to a section of gas pipe in such a manner that the gas will be conveyed into the chamber 15 and

thence into the mixing chamber 8 through a plurality of escape orifices 16. The central portion of the gas feeder member 12 is formed with upwardly projecting standard 17 which is provided with a screw threaded socket adapted to receive one end of a screw threaded supporting rod 18 which extends upwardly through the coupling member 3 into the gas receiving chamber 5. The said rod 18 is also threaded at its upper end as at 19, and receives thereon a flame regulator or spreader 20 which is provided with a rounded head portion 21 and the flared inclined side portion 22 whose pitch corresponds with the flared side 7 of the burner section 1. The top of the flame spreader is provided with a rim portion 23 upon which are arranged in spaced relation a plurality of upstanding studs 24. For the purpose of steadying the flame spreader in its adjustment on the rod 18, the rim portion 6 of the section 1 is provided with a plurality of upwardly projecting pins 25 which are so arranged that they contact with the flame spreader under all service conditions thereby insuring the latter to maintain its normal position.

From the foregoing description, it is believed to be apparent that the quality of gaseous mixture may be easily regulated by adjusting the gas feeder member 12 in the open end of the mixing section 2 so that the circular body 13 of said feeder member may be drawn nearer or farther away from the wall 9 of the section so as to admit more or less air into the chamber 8 as each particular case may require.

The flame spreader 20 is adjustable on the rod 18 so that its wall 22 may be drawn toward and from the flared side 7 to regulate the size of the passage for the escape of the gaseous mixture to produce a small or large flame as desired, and in this connection, it will be noted that studs 24 enable the flame spreader to be adjusted by means of a poker or simiar tool while the flame is burning. Aside from the adjustment of the flame spreader to control the volume of flame obtained by rotating it upon the rod 18 it can also be adjusted, that is, the space between the wall 22 and the flared wall 7 can be varied when the entire body B is adjusted upon the member 12, thus enabling the valve to be originally set so that by slight future adjustments, many varying and exacting conditions of service may be fully complied with.

In connection with the coupling tube 3, and its upper portion 3^a which extends into the gas receiving chamber 5, it may be said that the same is of great practical value. This tube which in the arrangement shown constitutes a Venturi tube is especially embodied in this construction to prevent back fire explosions. That is to say, through experiment it has ben found that in firing back into the mixing chamber of a burner, the back fire or ignited mixture always follows the wall of the chamber in which it originates and is contained. Therefore, if in the present construction the back fire starts at the mouth of the burner section 1, the same will follow the walls of the chamber 5 and be prevented from entering the mixing chamber 8 by coming in contact with the upstanding upper portion 3^a which will tend to reverse the direction of travel of the back fire and cause it to again pass out with the gases coming through the tube 3 from the chamber 8. The provision of this type of coupling 3 which forms the cavity or pocket C lessens to almost a certainty the possibility of the burner flashing back or back firing into the mixing chamber.

In the construction shown in Fig. 4, the parts are identical with those shown in Fig. 2 except for the tube extension 26 which takes the place of the tube 3 shown in Fig. 2. The construction embodied in this figure merely illustrates another use to which the invention may be put, using either the burner section 1 as disclosed in Fig. 2 or a burner section of different type.

With reference to the particular form of mixing section 2 shown in both Figs. 2 and 4, it may be said that this shape of mixer produces an increased area for air supply, while the tapering down of the chamber at its outlet end tends to increase the velocity of the mixture to the burner. Another feature of this form of mixing section is that the number of gas outlet orifices 16 may be increased to suit the different service conditions while at the same time obtaining the best possible mixing of gas and air.

From the foregoing description it is thought that the many features and advantages of the present invention will be readily apparent, and that the method of assembling and disassembling the same is obvious. By making the parts detachable and adjustable, the burner may be made to suit a wide variety of conditions, thereby enhancing its commercial value.

I claim:

1. A gas burner including a burner section constituting a burner element, a mixing section, means for coupling said sections and establishing communication therebetween, gas feeder means adjustable within the mouth of the mixing section to regulate the air intake, and flame regulating means in the burner section.

2. A gas burner including a mixing section having a mixing chamber and also having cored slots in one end, a chambered gas feeder device having radially projecting lugs slidable in the said slots to render the feeder member adjustable within the mixing chamber to regulate the quality of gaseous

mixture, and means carried by the mixing section to engage the said lugs to hold the mixing section in adjusted position on the chambered gas feeder device.

3. A gas burner including a burner section constituting the burner element, a mixing section, a Venturi coupling member connecting said sections and projecting into the burner section, gas feeder means adjustable within the mouth of the mixing section to regulate the air intake, and flame regulating means in the burner section.

4. A gas burner including a burner section constituting the burner element, a mixing section, a Venturi coupling member connecting said sections and projecting into the burner section, gas feeder means adjustable within the mouth of the mixing section to regulate the intake of air, and flame regulating means supported by and adjustable with the gas feeder means and also adjustable independently thereof.

5. A gas burner including a burner section constituting the burner element, a mixing section, means for coupling said sections and establishing communication therebetween, gas feeder means adjustable within the mixing section, a support detachably connected with the gas feeder means, and flame spreader means carried by the support and arranged within the burner section, said flame spreader means adjustable independently of the gas feeder means.

6. A gas burner including a burner section, a mixing section, coupling means detachably connecting said sections, gas feeder means adapted to be connected with the gas supply, said gas feeder means adjustably receiving the mixing section thereon to regulate the intake of air, a rod carried by said gas feeder means, and a flame spreader adjustable on the end of said rod and located within the burner section.

7. A gas burner including a burner section, a mixing section, coupling means for detachably connecting said sections, a chambered gas feeder member adjustable in the mouth of said mixing section to regulate the quality of the gaseous mixture, a flame regulator, and a supporting rod connection between the gas feeder member and flame regulator, said flame regulator adapted to be adjusted on said rod in the mouth of said burner section.

8. A gas burner including a burner section having a flared mouth portion and a gas receiving chamber, a mixing section formed with a mixing chamber and provided with a flared mouth portion having cored slots therein, a coupling for detachably connecting said sections and extending into the chamber of the burner section, a chambered gas feeder member adapted to be connected with a gas supply, radially projecting lugs carried by said member and adjustable in the slots of the mixing section to regulate the size of the air intake passage to control the quality of gaseous mixture, a flame spreader arranged in the burner section and having flared sides to match the flared mouth of said section, and a supporting connection between the gas inlet member and flame spreader, the said flame spreader being rotatably adjustable on the supporting connection.

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

JOSEPH A. KLOEB.

Witnesses:
CHAS. LAURENCE,
MARIE F. ATTENWEILER.