C. LUDLOW & J. KEOWN.

GAS BURNER.

APPLICATION FILED FEB. 9, 1916.

1,195,047. Patented Aug. 15, 1916.

Fig. 1.

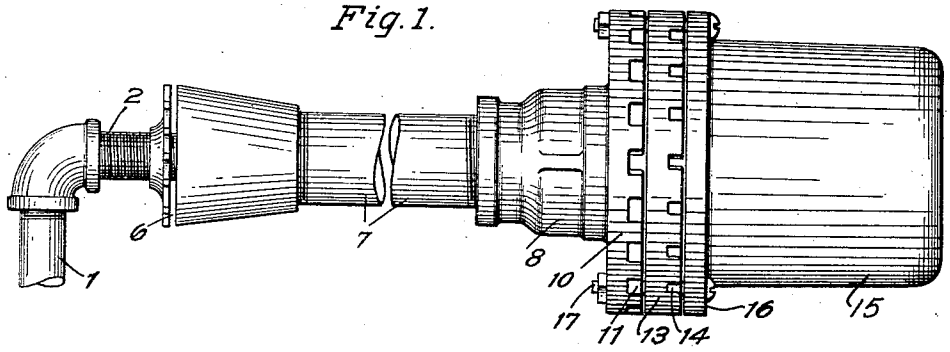


Fig. 2.

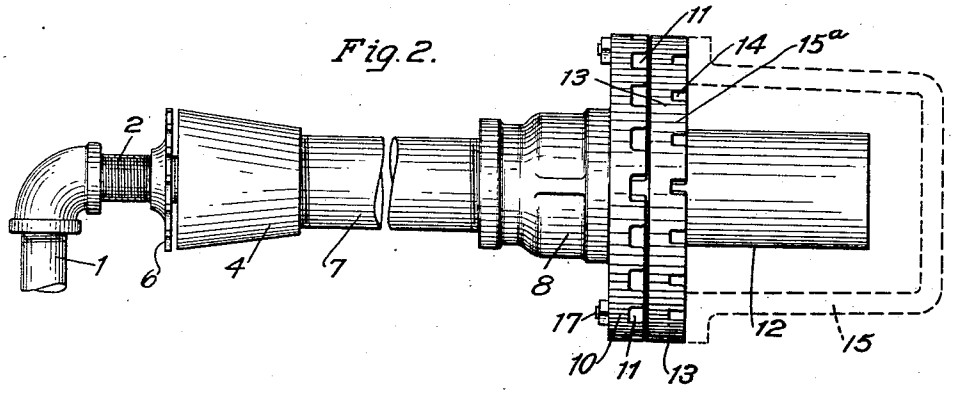
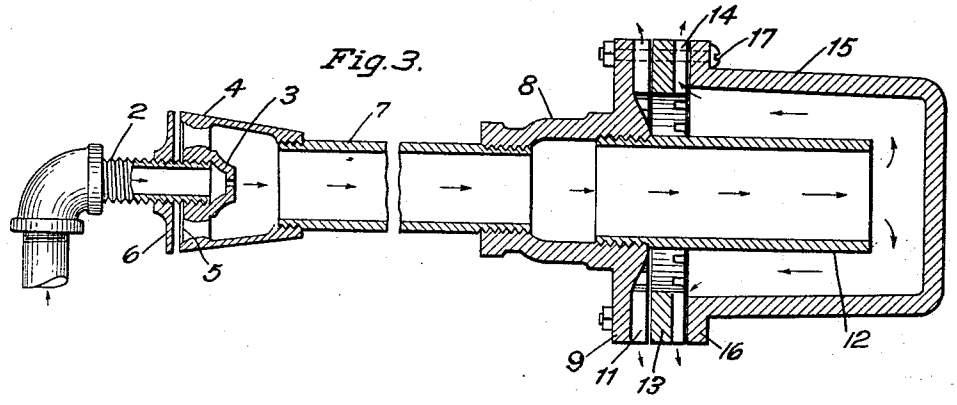


Fig. 3.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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GAS-BURNER.

1,195,047. Specification of Letters Patent. Patented Aug. 15, 1916.

Application filed February 9, 1916. Serial No. 77,249.

To all whom it may concern:

Be it known that we, CHARLES LUDLOW and JOHN KEOWN, citizens of the United States, and residents of Norwood, Hamilton county, Ohio, and of Newport, Campbell county, Kentucky, have invented certain new and useful Improvements in Gas-Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

Our invention relates to burners for fuel gas, particularly for furnace use.

The requirements of a burner are to properly mix air and gas and bring about complete combustion of the mixture. There are a great number of burners on the market which have as their object the provision of a means for heating the gas before it is led to the point of combustion, but for various reasons these burners fall short of the efficiency and inexpensiveness necessary for general use.

It is our object to provide a burner having a proper mixing device for gas and air and a pre-heater for the combustible mixture so formed, all arranged in a simple and economical structure which is adapted for general use. These objects and other advantages to be noted we accomplish by that certain arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawing, Figure 1 is an elevation of the burner turned from its vertical position, so as to show in a horizontal position. Fig. 2 is a like view with the preheater cap removed. Fig. 3 is a longitudinal section thereof.

The gas supply comes from the main in a pipe 1 which is turned to a vertical position before the air is drawn into the gas conduit. In many of the pre-heater burners there is a failure to appreciate the necessity of having a completely mixed gas, or else a failure to appreciate that to properly mix the gas it is requisite that the air be drawn into the gas conduit with the greatest possible amount of suction, and in company with the gas to travel the longest possible path without losing the suction power at the air intake. Accordingly we do not insert our air inlet into the gas supply pipe before it passes the turn for a vertical burner, but prefer to have it in a straight line with the passage of the gas to the burner itself. Accordingly there is inserted in the supply pipe beyond the turn to the vertical, a screwthreaded piece of pipe 2, which has on its upper end a gas nozzle 3. The screw pipe is held in the funnel shaped mixer 4 by means of a cross piece 5, and screwed onto the pipe is the adjustable closure plate 6 for the mouth of the funnel shaped piece. The air passes in the usual manner into the gas pipe 7 from the mixer as is usual in gas burners, the details of the mixer not being a part of this invention, but being the usual type of mixer now in general use.

The gas pipe 7 is preferably three quarters of an inch in diameter, and screwed onto its upper end is a coupling section 8 of over one inch diameter. Preferably integral with this coupling section is a plate 9 which has a flange 10 that is notched at 11, 11. Screwed into the upper end of the section 8 is a conduit pipe section 12 which is of one inch diameter or thereabouts and over this conduit 12 is set an annular plate 13, resting on the plate 9.

The annular plate 13 has notches 14 in a suitable flange 15^a, and is in all substantial points the same as plate 9, except that it has smaller notches and is open in the middle. Over the plate 13 is set the heater cap 15 which is preferably of cylindrical shape, and has a flange 16. The flange 16 and the two notched plates fit together and the three are united by a series of bolts 17, which hold the entire structure of the burner together.

The structure above described, while it is simple and practical is, of course, not the only method by which we can gain the same assemblage of features, and we do not wish to be limited to the above described manner of assembly.

The gas thoroughly mixed with air, and the mixture drawn with undiminished pressure to the burner parts, is led from a narrow pipe 7 into a broader one 8. This brings about an agitation of the mixture before it enters the heater. As the gas enters the heater, which is at a red heat after the burner is started it passes around all sides of the entering pipe or conduit and down along the red hot walls of the cylindrical cap or heater. At the base of the heater the mixture passes out through the notches in the two plates above described. These notches are to be of a total cross sectional area substantially the same or less than the cross sectional area of the one inch conduit leading into the heater. The object of this

is to provide for a discharge of the gas mixture under proper pressure. The mixture is expanded in the heating chamber and care is taken to provide discharge openings of a combined area to maintain a discharge from the burner under pressure. We also find that better results are obtained with the discharge broken up into a large number of openings, and for that reason we prefer to employ a double row of discharge openings, although the number of rows of openings is not of the essence of the invention. For convenience of manufacture, moreover, it may be preferable to dispense with the annular plate 13 and to form the notches or openings 14 in the flange 16 of the heater cap with the parts assembled so that the discharge openings 14 will be out of register with the openings 11. The openings 14 are smaller than the openings 11, so that the gases will not take the same line in rising along the shell or cap 15.

It will be understood that the dimensions given are merely relative, the invention residing therein being in the proportions of the various ones as shown.

The whole structure as described is obviously a simple one, easily made and assembled and easily disassembled for the purpose of cleaning or replacement of parts.

The features of obtaining a proper mixture, giving it the path and agitation now described, and heating it in a hot shell are calculated to give the greatest possible efficiency to the burner.

It will be noted that the burner outlets are located at the base and completely surrounding the cylindrical shell of the heater. This gives the maximum of heat to the heater without losing the full heating efficiency of the burner to any practical extent.

We do not wish to be limited in the claims that follow to the exact structure described in the foregoing specification, as the description refers but to the preferred form of our invention; on the contrary, we wish to be entitled to the full scope of the doctrine of equivalents in the construction of our claims. Also we do not wish to be limited in our claims because of our failure at this time to appreciate the full usefulness of our invention, as we intend it to be used in the future in any manner that may turn out to be economical and convenient, and that mere mechanical changes necessary to adapt it to future uses be fully included in the scope of our invention.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A gas burner having a cylindrical shell, a series of gas outlets around the base of the shell, a pipe extending into said shell and extending substantially to the top thereof, a supply pipe leading into such pipe of less diameter than such pipe, and means for supplying air to said supply pipe, said pipes extending in a straight line into the shell from said air supply point, for the purpose described.

2. In a gas burner, a base piece having notches therein, a pipe affixed to each end of the base piece, a plate having notches in its upper end set on the base piece, a cylindrical shell having a flange to set on the notched plate, one of said pipes from the base piece extending up into the shell, and said shell forming with said notched members a preheating burner with the two series of jet holes around the burner base.

3. In a gas burner, a cylindrical shell, a gas inlet tube extending into said shell, and a double series of separated jet openings about the base of said shell, the upper of said series being of smaller diameter than the lower, whereby the burning gas will form a deep body of flame around the shell.

CHARLES LUDLOW.
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."