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T. A. COLEMAN

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GAS BURNER

Filed Sept. 21, 1931

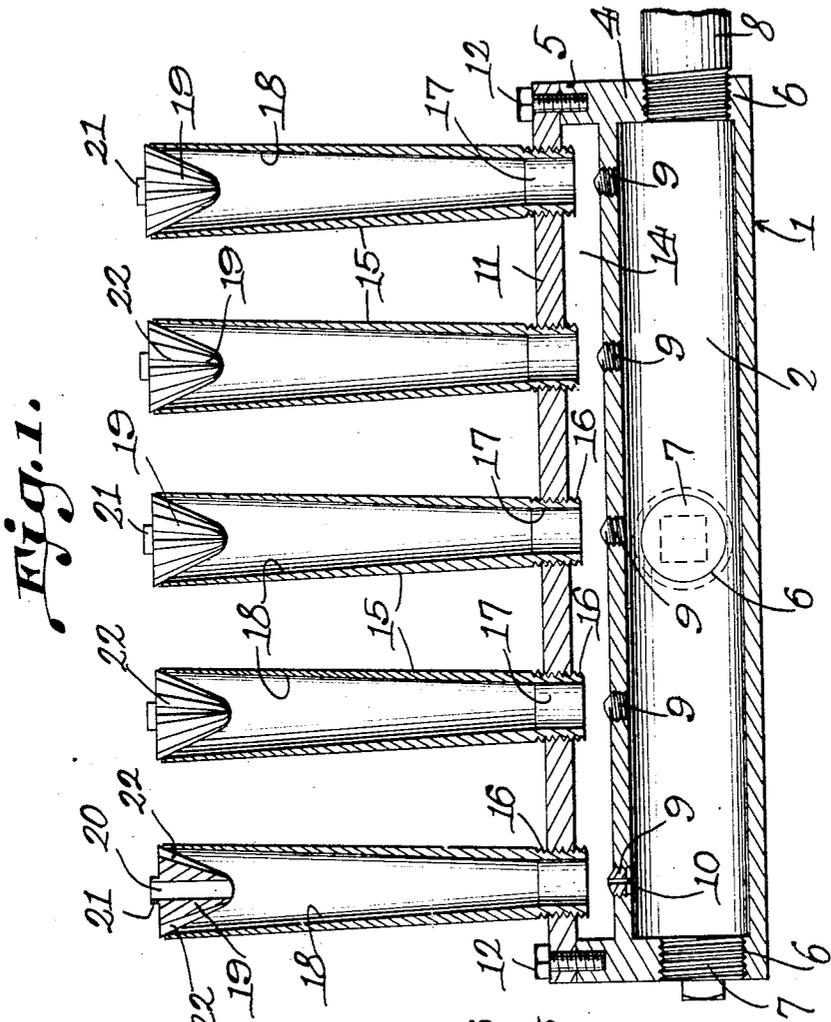


Fig. 1.

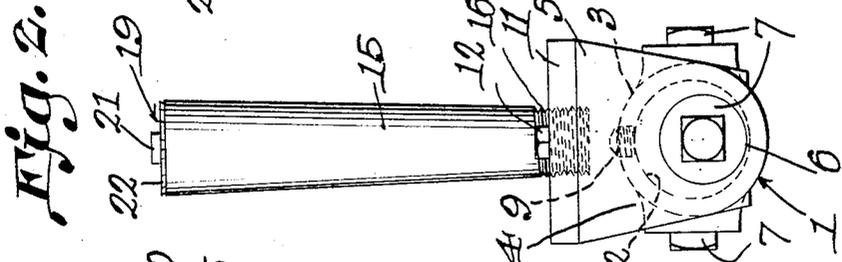


Fig. 2.

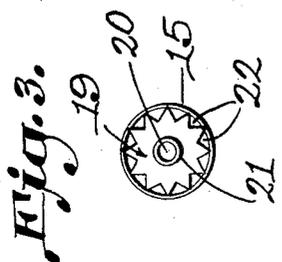


Fig. 3.

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UNITED STATES PATENT OFFICE

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GAS BURNER

Application filed September 21, 1931. Serial No. 564,224.

This invention aims to provide a burner for gas, so constructed that efficient combustion will result, either when the supply of gas is ample, or when the supply is limited. Another object of the invention is to provide a device of the class described, in which an efficient combustible mixture of gas and air will be produced, with the expenditure of a minimum amount of gas, through a wide range of pressure. This invention aims, further, to provide a device of the class described having a gas chamber of such size as to provide a sufficient supply of gas in the event of a sudden drop or lowering of pressure, it being possible to have the gas supplied in a wide variety of range, and so to construct the device that a plurality of the structures shown may be grouped in any desired way, depending upon the taste of the heating engineer.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawing:—

Figure 1 shows in vertical longitudinal section, a device constructed in accordance with the invention, parts being in elevation;

Figure 2 is an end elevation;

Figure 3 is a top plan of one of the burner tubes and its cap.

In carrying out the invention, there is provided a casing, including an elongated hollow body 1, the interior of which forms a gas chamber 2, the body being cylindrical in cross section, as indicated at 3 in Figure 2, although the body may be of any desired cross section. The body 1 includes end walls 4 which are extended above the body 1, to form lugs 5. On its sides and on its ends, the body

1 has openings 6, so that the fuel supply pipe 8, which handles the gas, may be located as desired. The openings 6 which are not occupied by the fuel supply pipe 8 are stopped by closure 7, which may be screw plugs.

Nozzles 9 are threaded or mounted otherwise in the top of the body 1, and have reduced vertical bores 10. Above the body 1 is located a flat horizontal table 11, which is considerably wider than the body 1, as shown in Figure 2. The ends of the table 11 are attached by securing elements 12 to the upper ends of the lugs 5. The space 14 between the table 11 and the top of the body 1 is open, thereby forming an air inlet which extends entirely across the casing from side to side.

Mixing tubes 15 are located immediately above the nozzles 9. A means is provided for mounting the mixing tubes 15 for vertical adjustment, toward and away from the nozzles 9, and with this end in view, the lower ends of the mixing tubes are threaded at 16 into the table 11. The lower portions of the bores of the mixing tubes 15 may be cylindrical, as shown at 17, although, throughout practically the entire length of the mixing tubes 15, the bores flare, as they extend upwardly, as shown at 18.

Conical caps 19 are seated in the upper ends of the mixing tubes 15. The caps 19 have central longitudinal passages 20, and the caps are provided on their outer surfaces with longitudinal grooves 22, located immediately adjacent to each other, and increasing in width from their lower ends to their upper ends. On their upper surfaces, the caps 19 may be provided with upstanding nipples 21, disposed about the passage 20.

In practical operation, the gas enters through the pipe 8, into the chamber 2. This chamber 2 is of sufficient size so that it will hold a large quantity of gas, and make up for any irregularities (within reasonable limits) which may occur in the pressure of the gas supply. The gas passes at high speed through the reduced bores 10 of the nozzles 9. The air enters the sides of the casing, through the space 14, and mixes with the gas, as the gas passes into the mixing tubes 15, where a thorough mixture of gas and air is

brought about. A regulation in the amount of air supplied, relative to the amount of gas supplied, may be brought about by threading the tubes 15 upwardly and downwardly, at 16, in the table 11, the space between the lower end of the tubes 15 and the nozzles 9 thus being adjusted. Because the tubes 15 have the flared bores 18, the mixture expands as it moves upwardly, but the mixture moves upwardly with great rapidity, toward the caps 19. A part of the mixture goes upwardly through the central passages 20, and burns at the upper end of the passages 20, that is, at the nipple 21, in the form of a jet. A part of the gas or mixture moves upwardly through the longitudinal grooves 22 of the caps 19, and the gas expands laterally, owing to the fact that the grooves 22 widen as they extend upwardly. There is formed, therefore, around the jet burning at the nipple 20, an annulus of flame, at the upper ends of the grooves 22. It is clear that air can find its way between this annulus of flame and the central jet at the nipple 21. Ample air, therefore, is supplied to the jet burning at the nipple 21, and the annulus of flame has air both inside of it and outside of it, thereby promoting combustion, and keeping down carbon.

The device forming the subject matter of this application is intended primarily for use in connection with boilers and furnaces, and it is characterized by simplicity of construction, the number of parts being cut down, and economy in the consumption of gas being brought about, regardless of whether the device is used with natural gas, or with manufactured gas, under all pressures. The device provides an efficient combustion of gas when burning with a full supply of gas or when the supply of gas is limited. It provides an efficient combustible mixture of gas and air, by using a minimum amount of gas with a maximum amount of air, through a wide range of pressure. It is to be observed that the gas chamber 2 is of large size, and affords a supply of gas in the event of a sudden lowering of gas pressure. The connections for the pipe 8 may be made in a number of different places owing to the provision of a plurality of the openings 6. The tubes 15 may be adjusted vertically with respect to the nozzles 9, and the device may be used either with natural gas or with manufactured gas, a single adjustment, generally, being necessary, and that adjustment being made when the device is installed. The large chamber at 2 provides for any fluctuations which may thereafter occur.

60 What is claimed is:—

1. A device of the class described, comprising an elongated hollow body having a fuel inlet, the body comprising end walls that extend above the body, nozzles in the top of the body, a table mounted on the upper ends of

the end walls and spaced from the top of the body to form an air inlet extended entirely across the device from side to side, mixing tubes located directly above the nozzles, means for mounting the mixing tubes in the table for longitudinal adjustment, toward and away from the nozzles, the mixing tubes having bores that flare as they extend upwardly, and conical caps seated in the upper ends of the mixing tubes, the caps having central longitudinal passages, and being provided on their outer surfaces with longitudinal grooves disposed immediately adjacent to each other and increasing in width from their lower ends to their upper ends.

2. A device of the class described comprising a casing including a body having a fuel inlet, the casing having an air inlet located above the body, nozzles in the top of the body, mixing tubes located directly above the nozzles, means for mounting the mixing tubes in the top of the casing for longitudinal adjustment, toward and away from the nozzles, the mixing tubes having bores that flare as they extend upwardly, and conical caps seated in the upper ends of the mixing tubes, the caps having central longitudinal passages, and being provided on their outer surfaces with longitudinal grooves disposed immediately adjacent to each other and increasing in width from their lower ends to their upper ends.

3. In a device of the class described, a mixing tube having a bore which flares as it extends upwardly, a conical cap seated in the upper end of the mixing tube, the cap having a central longitudinal passage, and being provided on its outer surface with longitudinal grooves disposed immediately adjacent to each other and increasing in width from their lower ends to their upper ends, and means for supplying a fuel mixture to the tube.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.
THOMAS A. COLEMAN.

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