Nov. 28, 1933. C. J. GRAYSON 1,937,474

GAS BURNER

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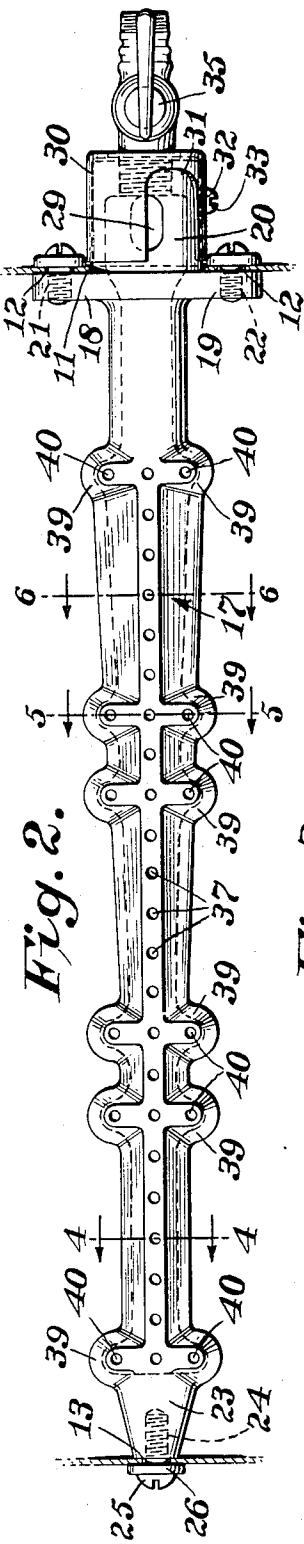


Fig. 2.

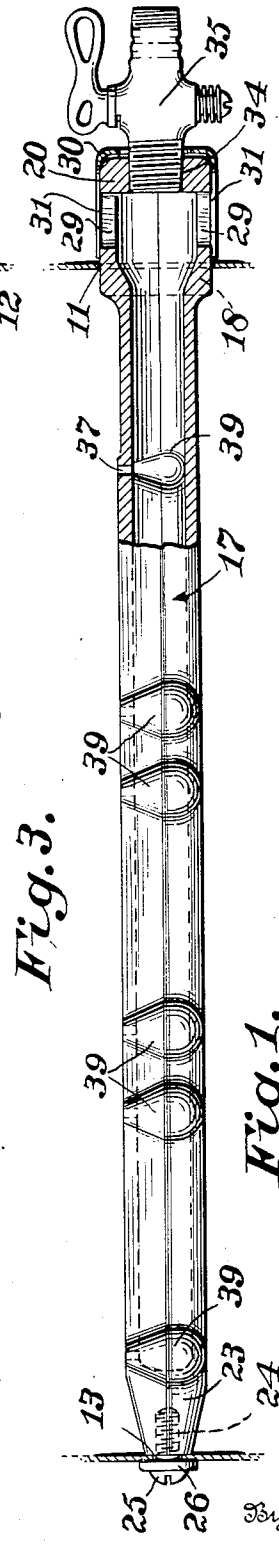


Fig. 3.

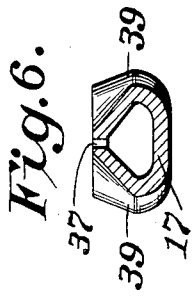


Fig. 6.

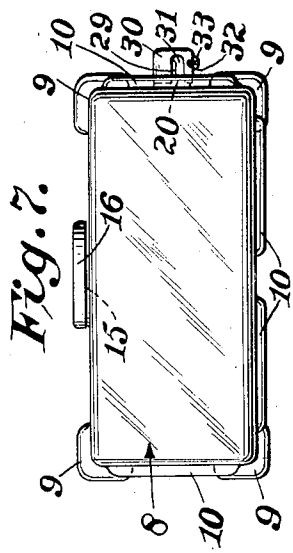


Fig. 7.

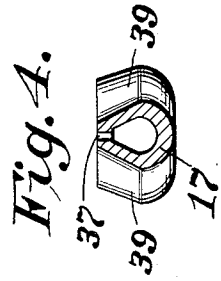


Fig. 4.

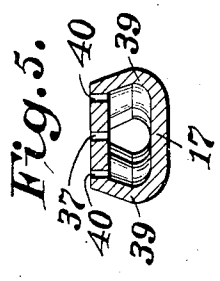


Fig. 5.

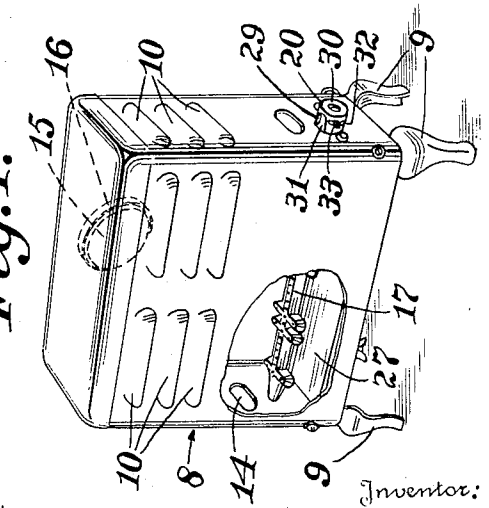


Fig. 1.

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GAS BURNER

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7 Claims. (Cl. 158—116)

This invention relates to heating apparatus and more particularly to a gas heater and its burner construction.

One of the objects of the present invention is to provide a novel gas burner construction which insures an adequate supply of secondary or surrounding air at the outlet ports of the burner to cause complete combustion of the gas.

Another object of the present invention is to provide a novel construction of gas burner which is so shaped as to provide uniformity of gas velocity and pressure of the various burner ports and to convert velocity into pressure at points along its length so that an equal supply of gas is provided at each outlet port of the burner, and an equal height of flame is produced throughout the length of the burner.

Another object is to provide for an increased number of burner openings or ports in a generally tubular burner without increasing the length of the tubular burner and without reducing the space between the ports.

Another object of the present invention is to provide a novel construction of burner and casing for facilitating the assembly and mounting of the parts in position.

Still another object of the present invention is to provide a novel heater and burner construction which is simple, compact, inexpensive to manufacture and efficient for the purpose intended.

These and other objects will become more apparent from the following description and drawing in which like reference characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawing is for purposes of illustration only and not intended as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing

Figure 1 is a perspective view of the heater with the casing partly broken away to show the burner mounted in position.

Fig. 2 is a plan view of the burner construction shown in Figure 1.

Fig. 3 is a side elevational view of the same burner shown in Fig. 2.

Fig. 4 is a cross-sectional view in elevation taken on line 4—4 of Fig. 2.

Fig. 5 is a cross-sectional view in elevation taken on line 5—5 of Fig. 2.

Fig. 6 is a cross-sectional view in elevation taken on line 6—6 of Fig. 2.

Fig. 7 is a plan view of the heater.

Referring to the drawing, the burner 17 comprises a shell of a generally elongated tubular shape having a plurality of outlet ports 37 on one side in a line parallel to the axis of the burner, and in accordance with the present invention is provided with laterally protruding enlargements 39 in its walls at spaced points along its length which enlarge or expand the bore of the tube at these points. At these enlargements a plurality of additional outlet ports 40 are provided for increasing the amount of gas which can be consumed by the burner and increasing the efficiency of the device as a heater without increasing the length of the burner or decreasing the space between the ports. Also these enlargements or expansions of the bore convert velocity into pressure to provide uniformity of pressure throughout the length of the burner and at each of the individual ports, so that the ports adjacent the inlet end of the burner are provided with the desired pressure. Without the enlargements 39 there is a tendency of the gas supplied to the burner with velocity to pass by the ports and the pressure in the tube to gradually increase from the inlet toward the opposite end.

To further equalize the pressure throughout the length of the burner, the burner tube has a generally longitudinal decreasing taper from a point near the inlet end toward the opposite end which, together with the enlargements 39, maintain the pressure and velocity in the proper proportions throughout the tube to produce a flame of equal length at the various ports. The bore at either end of the taper in the embodiment shown is of uniform cross-section for a portion of its length adjacent the extremities.

Besides the features above described, the present invention also provides for the easy flow of secondary air to insure a complete combustion of the gas which consists in making the burner unit, as a whole, of cross-sectional stream line contour toward the burner ports, the cross section decreasing gradually toward the outlet ports. As more clearly shown in the embodiment illustrated with the outlet ports 37 and 40 at the top, the bottom of the burner is blunt with the greatest width of the burner, both in its generally regular contour and at the enlargements, below the center and adjacent the bottom, and with the width gradually decreasing toward the top and the outlet ports. Preferably the top and bottom portions are flat with flat converging sides between the plane of greatest width and the top and with rounded surfaces provided between the flat bottom and this plane. In this manner, when the

heated air and products of combustion rise, due to their temperature, the air flowing in will follow the outside wall or contour of the burner and supply the air directly to the outlet ports avoiding any resistance to the flow of air, and preventing any voids or vacuum adjacent the outlet ports.

To facilitate the mounting, the burner 17 is provided with shoulders 18 and 19 adjacent the inlet end and forming a projecting extension 20 at the inlet end. These shoulders 18 and 19 are bored and tapped as at 21 and 22 for the reception of fastening screws. At the opposite end the burner is provided with a boss 23, bored and tapped at 24, for receiving a supporting and fastening screw.

The casing 8 in which the burner is to be mounted is illustrated as of generally rectangular shape with rounded corners and having legs 9 on which it is supported. At the side and ends of the casing suitable louvers 10 are provided for deflecting heated air from the casing to the ambient atmosphere. The casing is provided at one end with an aperture 11 through which the extension 20 of the burner protrudes and on either side of which smaller apertures 12 are formed for the insertion of the fastening screws into the tapped bores 21 and 22 of the shoulders 18 and 19. At the opposite end the casing is provided with an aperture 13 similar to apertures 12, for the insertion of a screw into the tapped bore 24, all of the screws being like that illustrated at 25 with washers such as 26 between the casing and the head of the screw. The casing is also provided with a small window 14 for purposes of lighting the burner and observing the condition of the flame, and with a flanged opening 15 normally closed by a cover 16, which provides means for attaching a flue or stove pipe when it is desired to conduct the products of combustion from the room.

In assembling the burner in the casing, the end extension 20 is first inserted through the open bottom of the casing and into the aperture 11 until the shoulders 18 and 19 engage the inner side of the casing with the tapped bores 21 and 22 in alignment with the apertures 12. The opposite end of the burner is then raised until the tapped end of 23 is aligned with the aperture 13 after which the screws 25 with the washers are inserted and screwed up tightly to fix the burner in its assembled position. After the parts have been assembled a guard 27 is inserted in the open bottom and held by any suitable fastening means.

When in position, the extension 20 of the burner projects outside of the casing and is formed with a plurality of slots 29 on opopsite sides of the periphery and extending through the wall, preferably made by a core during the casting operation. To provide for adjusting the amount of air supplied to the burner, a sleeve 30 is positioned over the extension 20 which has opposed slots 31 in the direction of the length of the burner for cooperating with the slots 29 and a transverse slot 32 for allowing a rotatable adjustment of the sleeve, a set screw 33 being provided for fastening the sleeve in adjusted position. The outer end of the extension 20 of the burner is axially bored and tapped as at 34 for receiving the nipple of a gas valve 35 adapted to inject gas into the burner with a velocity.

In the embodiment shown, variations in the dimension of the bore of the tubular burner occur only transversely or laterally, the vertical dimension of the bore being substantially uniform.

Having now described the invention, what is claimed is:

1. A gas burner comprising a hollow elongated shell of generally tubular form, the bore of the shell being enlarged at spaced points along the shell, a plurality of outlet ports extending through the wall of the shell on one side and including ports laterally disposed with respect to the longitudinal axis of the burner, at the enlarged portions, and a valve nipple in axial alignment with the shell for injecting gas into the shell with velocity, a portion of which is transformed by said spaced bore enlargements along the shell into pressure for insuring a uniform flow of the gas through all of the outlet ports.

2. A gas burner comprising a hollow elongated shell of generally tubular form having one end open and the other end closed, the bore of the shell generally decreasing in horizontal width from a point near the open end toward the closed end, but being enlarged at spaced points along the shell by increases in the horizontal width of the bore, said bore being of uniform vertical height throughout, a plurality of outlet ports extending through the wall of the shell on one side, and a valve nipple extending into the open end of the shell in axial alignment with the shell for injecting gas into the shell, the taper of the shell and the bore enlargements being so constructed and arranged as to produce an equal flow of gas through each of the outlet ports.

3. A gas burner comprising a hollow elongated shell of generally tubular form, the bore of said shell being enlarged at spaced points along its length, a plurality of outlet ports in the wall of the shell parallel to the axis of the shell, a plurality of outlet ports in the shell at the enlarged portions disposed in a line at right angles to the axis of the shell and the first named ports, and a valve nipple in axial alignment with the shell for injecting gas into the shell with velocity, a portion of which is transformed by said spaced bore enlargements along the shell into pressure for insuring a flow of gas through all of the ports at equalized pressure.

4. A gas burner comprising a hollow elongated shell of generally tubular form open at one end and closed at the opposite end and decreasing in cross-sectional area from a point near the open end towards the closed end, the bore of said shell being enlarged at spaced points along its length, a plurality of outlet ports in the wall of the shell parallel to the axis of the shell, a plurality of outlet ports in the shell at the enlarged portions disposed in a line at right angles to the axis of the shell and the first named ports, and a valve nipple extending into the open end of the shell in axial alignment with the shell for injecting gas with velocity, the taper of the shell and the enlargements being so constructed and arranged as to produce an equal flow of gas through each of the outlet ports.

5. A gas burner comprising a hollow elongated shell of generally tubular contour, having a plurality of enlargements at spaced points along its length, extending at right angles to the axis of the shell, said enlargements forming wells on the interior of the shell for converting velocity into pressure, a plurality of outlet ports in the wall of the shell parallel to the axis of the shell, a plurality of outlet ports in the shell at the enlarged portions disposed in a line at right angles to the axis of the shell and the first named ports, the shell having a stream line contour with the greatest width spaced from the center on the

side opposite the outlet ports and of gradually diminishing cross-section toward the outlet ports, and a valve nipple in axial alignment with the shell for injecting gas into the shell with velocity which is in part transformed at the spaced wells along the shell into pressure whereby an equal height of flame is produced throughout the length of the burner due to the enlargements or wells, and complete combustion due to the stream line contour.

6. A gas burner comprising a hollow elongated shell of generally tubular form, the bore of the shell being enlarged at spaced points along the shell, a plurality of outlet ports extending through the wall of the shell on one side, and a valve nipple in axial alignment with the shell for injecting gas into the shell with velocity, a portion of which is transformed by said spaced bore enlargements along the shell into pressure for insuring a uniform flow of the gas through all of the outlet ports, said enlargements at spaced points along the shell being arranged in pairs intermediate the ends with single terminal enlargements.

7. A gas burner comprising a hollow elongated shell of generally tubular form having one end open and the other end closed, the bore of the shell generally decreasing in cross-sectional area from a point near the open end toward the closed end, said bore being enlarged at spaced points along the shell, a plurality of outlet ports extending through the wall of the shell on one side, and a valve nipple extending into the open end of the shell in axial alignment with the shell for injecting gas into the shell, the taper of the shell and the bore enlargements being so constructed and arranged as to produce an equal flow of gas through each of the outlet ports, the enlargements at spaced points along the shell being arranged in pairs intermediate the ends with single terminal enlargements, the bore between the last pair of bore enlargements and the terminal bore enlargement at the smaller end being uniform.

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