J. C. GEHRING.

GAS BURNER.

APPLICATION FILED JAN. 22, 1910.

1,047,200.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 1.

Fig. 1

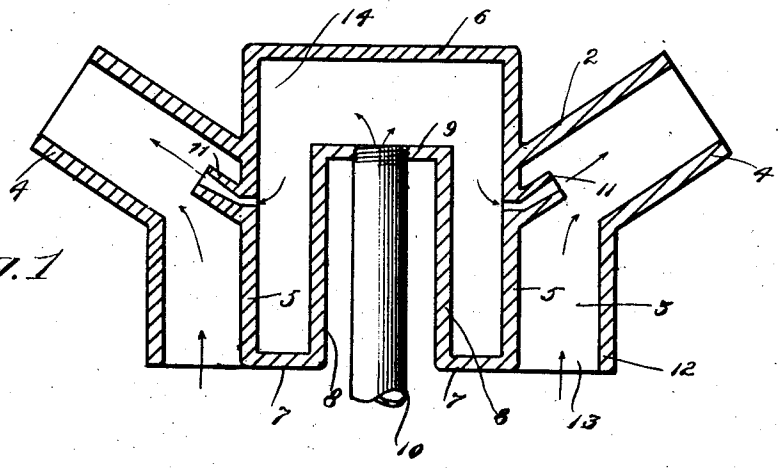
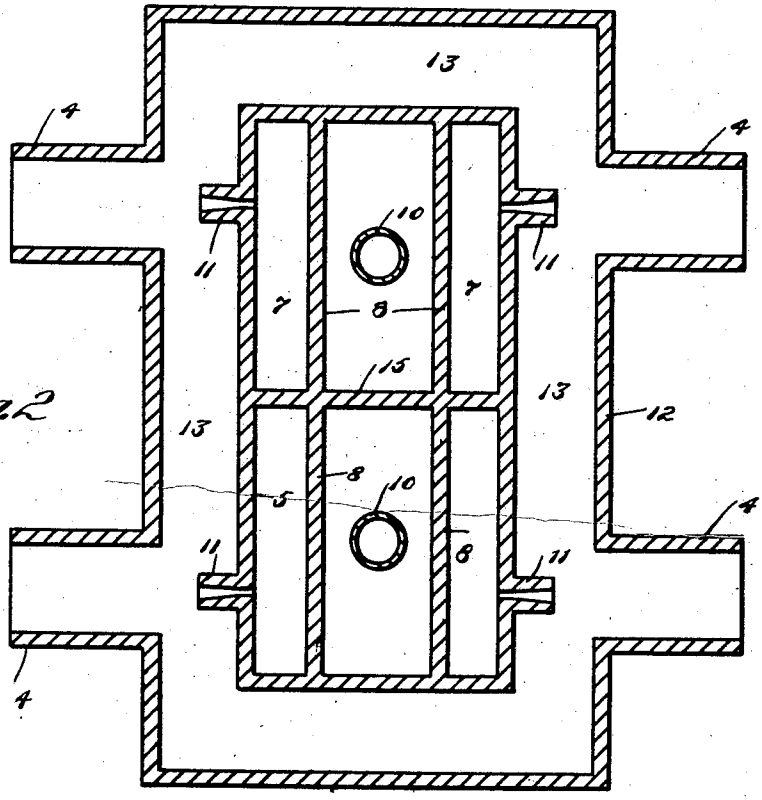


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 3

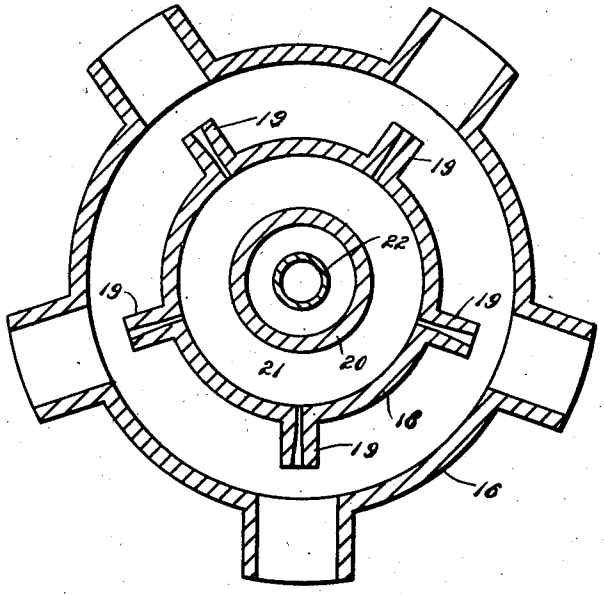
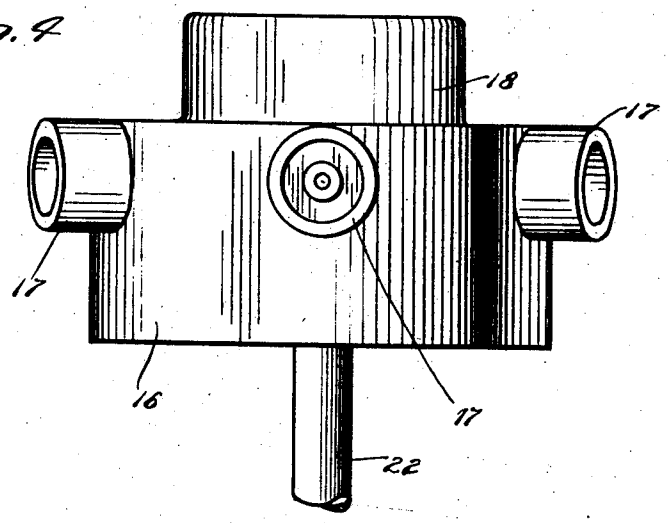


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 5

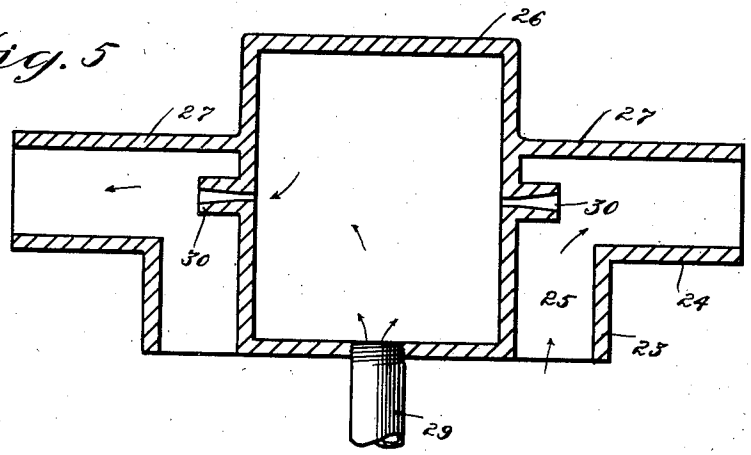
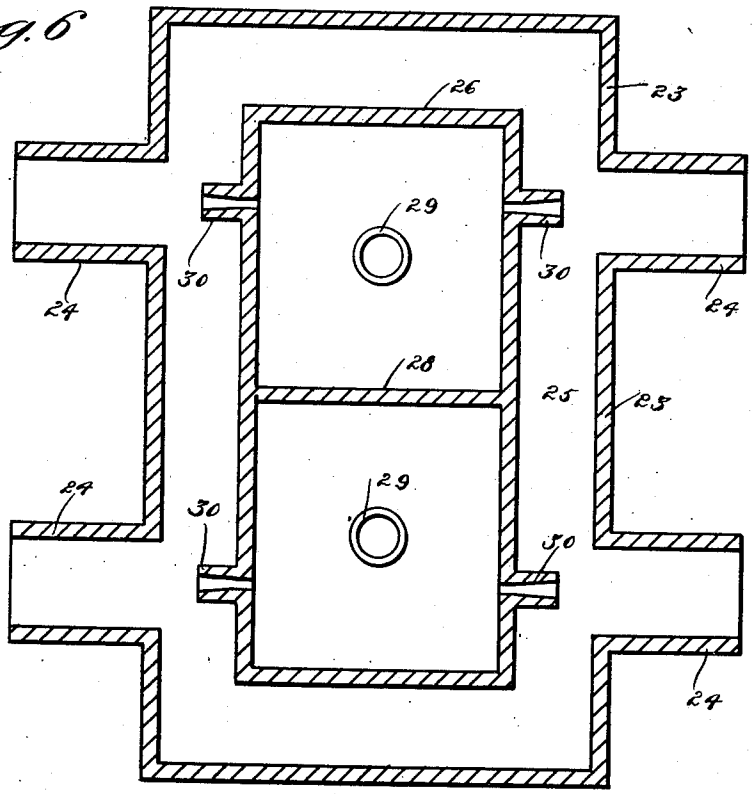


Fig. 6



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UNITED STATES PATENT OFFICE.

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GAS-BURNER.

1,047,200. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed January 22, 1910. Serial No. 539,508.

To all whom it may concern:

Be it known that I, JOSEPH C. GEHRING, citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Burners, of which the following is a specification.

This invention relates to gas burners and comprehends the production of a gas burner wherein improved means is provided for the mixing and combustion of the heating gas.

One of the objects of the invention is the construction of a simple gas burner having a gas superheating chamber in connection with an air and gas mixing chamber so that the gas to be consumed will first be superheated and then thoroughly mixed with the air before being converted into heat.

Another object of the invention is the construction of a gas burner having a gas superheating chamber arranged around a gas supply pipe and connected to a mixing chamber in such a manner that gas entering the superheating chamber from the supply pipe will be superheated so as to enter the mixing chamber under pressure and in such a way as to intimately mix with air drawn in by said gas escaping from the superheating chamber.

With the above and other objects in view the invention consists in certain combinations, constructions and arrangements of parts, clearly described in the following specification and clearly illustrated in the accompanying drawings, in which,

Figure 1 is a detail vertical sectional view showing one part of the improved burner, Fig. 2 is a horizontal sectional view showing the construction of both halves of the burner, each half being like the other, Fig. 3 is a horizontal sectional view of a single burner adapted for use in round furnaces, Fig. 4 is a side elevation thereof, Fig. 5 is a vertical sectional view of another form of the invention, and Fig. 6 is a horizontal sectional view thereof.

Referring to the accompanying drawings illustrating the preferred form of the invention 1 denotes a gas burner, which is provided with mediately disposed discharge tubes 4 which project outwardly, said tubes being formed integral with said burner.

The horizontal partition 2 is connected with a vertical partition 5, the upper end of which projects above the horizontal partition and which carries on its upper end an imperforate integral top 6. The lower end of the vertical partition 5 is brought below the lower sides of the discharge conduits 4 and is connected to a minor horizontal partition 7, from which rises an integral vertical partition 8, which is of considerable less length than the partition or wall 5 and is spaced inwardly thereof by said minor horizontal partition 7. The upper end of the inner vertical partition 8 terminates below the plane of the top 6 and carries thereon a closing wall or partition 9, to which is screw threaded the gas supply pipe 10. The outer or intermediate vertical partition 5 is provided with minor discharge tubes or hollow outlet members 11, the bores of which are flared outwardly, and which are disposed within the plane of the discharge tubes, 4, but above the lower sides of said tubes or hollow members. It will thus be seen that a fluid expansion chamber is formed which is substantially formed with a central inverted U-shaped partition, which extends to a point above said discharge tubes or outlet members 11.

The mixing chamber 3 is surrounded by a wall or shell 12, which is spaced apart from the intermediate wall 5 so as to leave a channel 13 through which air can flow into the mixing chamber 3 and escape with the gas issuing from the minor discharge tubes 11, the bores of which are flared outwardly, and which are disposed within the plane of the discharge tubes 4, but above the lower sides of said tubes.

From the above arrangement it is to be noted that the discharge conduits 4 are integrally formed upon both the expansion chamber 14 and the shell 12, and that the outlet members 11 are integrally formed upon said chamber at central and diametrically-opposite points and project concentrically or between the walls of said conduits, but terminate centrally of the air channel

13, so that the escaping products of combustion may intimately mix with the inrushing air at the corner between the channel 13 and conduits 4.

When the burner has been supplied with gas and the same ignited the top 6 and the walls of the discharge tubes will be heated to a high temperature. The vertical wall 5 and the top 6 and the bottom spacing partition 7, with the inner partition 8 inclose a space which constitutes a superheating chamber 14. As the gas leaves the top of the supply pipe 10 it will enter the superheating chamber 14, striking against the heated top 6, and escape under pressure through the minor or gas discharge tubes 11 into the upper part of the mixing chamber 3, and thence directly out through the gas and air discharge tubes 4. As the gas leaves the gas discharge tubes 11 it will be spread outwardly so as to enter the chamber 3 in a spray and intimately mix with the air, which will be drawn by the outflowing gas up through the entrance 13 into the mixing chamber 3 and out with the gas through the discharge pipes 4, which constitute the burner tubes proper. It will be noted that the gas discharge tubes do not project across the entrance 13 but only half way across and that they are adapted to spray gas into the chamber 3 and the discharge tubes 4 so that the gas will evenly enter said tubes, instead of striking against one side or wall of same. A part of the gas striking the top wall 6 will be deflected downward so as to enter the lower part of the chamber 14, thus being heated by the lower part of the vertical walls of this chamber. The entrance 13 for the inflowing air surrounds the entire wall or partition 5 so that an abundance of air can enter the chamber 3.

Should it be desired to connect two supply pipes with the superheating chambers a dividing wall or partition 15 is arranged between the supply pipes, as shown in Fig. 2.

In Figs. 3 and 4 is illustrated a modified form of the improved burner, wherein 16 denotes an annular outer wall, which is provided with burner or discharge tubes 17, five being shown. Within the outer wall 16 a wall 18 is disposed, being provided with gas discharge tubes 19 adapted to discharge gas into the tubes 17 and the space between the partitions or walls 16 and 18. Within the wall 18 a partition or wall 20 is disposed, being spaced apart from the wall 18 by a horizontal partition 21, in a manner like that of the construction shown in Figs. 1 and 2. The partition 18 projects above the top of the outer wall or partition 16 to inclose a superheating chamber, like that shown in Fig. 1, and this chamber is supplied with gas through the supply pipe 22 connected with said chamber. This form of burner is adapted for use in connection with round furnaces and its operation is like that of the construction shown in Figs. 1 and 2.

In Figs. 5 and 6 is shown another form of the improved burner, wherein the outer wall is designated by 23, and is provided with discharge tubes 24, which communicate with a chamber 25, having an open lower end through which air may be drawn thereinto. Within the wall 23 a box like structure 26 is disposed, being connected to the tubes 24 and the wall 25 by a horizontal partition or wall 27. The structure 26 is divided by a central partition 28 into two compartments and supply pipes 29 are connected to each of these compartments or chambers. From the sides of the box like structure 26 gas discharge tubes 30 project so as to spray gas into the chamber 25 and the tubes 24.

As gas leaves the upper ends of the pipes 29, which are located below the tubes 30 it will strike against the upper part or top of the chamber formed by the structure 26, be deflected downwardly at a higher temperature, so as to strike in part the bottom of the structure 26, and then escape through the tube 30, into the air mixing chamber 25 and thence out through the tubes 24.

The outlet or discharge tubes 4 are preferably deflected at an upward angle of the wall 12, so that the flames escaping from said tubes will be inclined upwardly of said wall 12. By this arrangement the flow of air through the mouth 13 will be stimulated, as a greater draft is thereby developed.

Having described my invention, I claim and desire to secure by Letters Patent:—

1. A burner comprising a relatively-large fluid expansion chamber, a shell spaced around said chamber to form an air channel therewith, hollow members communicating with said chamber, conduits formed integrally upon said chamber and shell to discharge the fluid escaping from said hollow members, said hollow members being disposed concentrically of said conduits and terminating short of the mouth thereof, and a fluid inlet member connected to said chamber.

2. In a burner comprising a relatively-large fluid-expansion chamber and an inverted U-shaped partition disposed in and spaced from the walls of said chamber, the combination of a shell spaced around said chamber to form an air-conduit therewith, hollow members communicating with said chamber at points below the top of said U-shaped partition, conduits formed integrally upon said chamber and shell to discharge the fluid escaping from said hollow members, said hollow members disposed substantially concentrically of said last-named conduits and being located between said cham-

ber and shell, and a fluid inlet member connected to the base of said U-shaped partition.

3. A burner comprising a relatively-large fluid expansion chamber, an inverted U-shaped partition, disposed in and spaced from the walls of said chamber, a shell spaced around said chamber to form an air-channel therewith, fluid discharging conduits formed integrally upon said chamber and shell, hollow members in line with said conduits and communicating with said chamber, and a fluid inlet member connected to the base of said U-shaped partition.

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

JOSEPH CHARLES GEHRING.

Witnesses:

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