

Aug. 2, 1927.

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AIR BLAST GAS BURNER

Filed March 22, 1923

3 Sheets-Sheet 1.

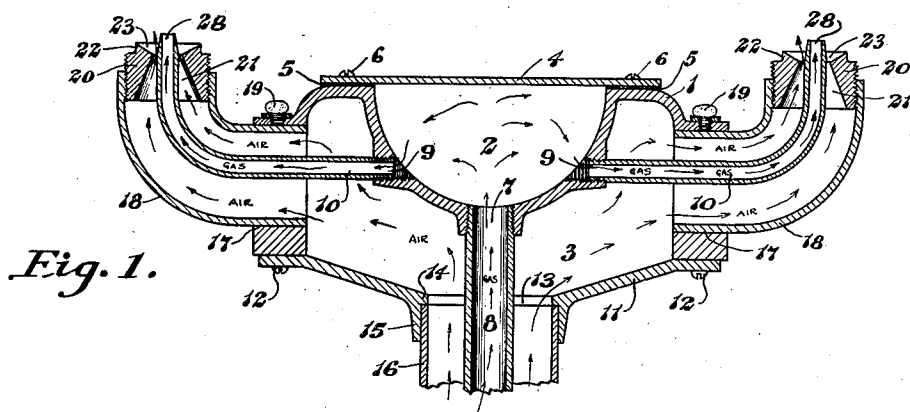


Fig. 1.

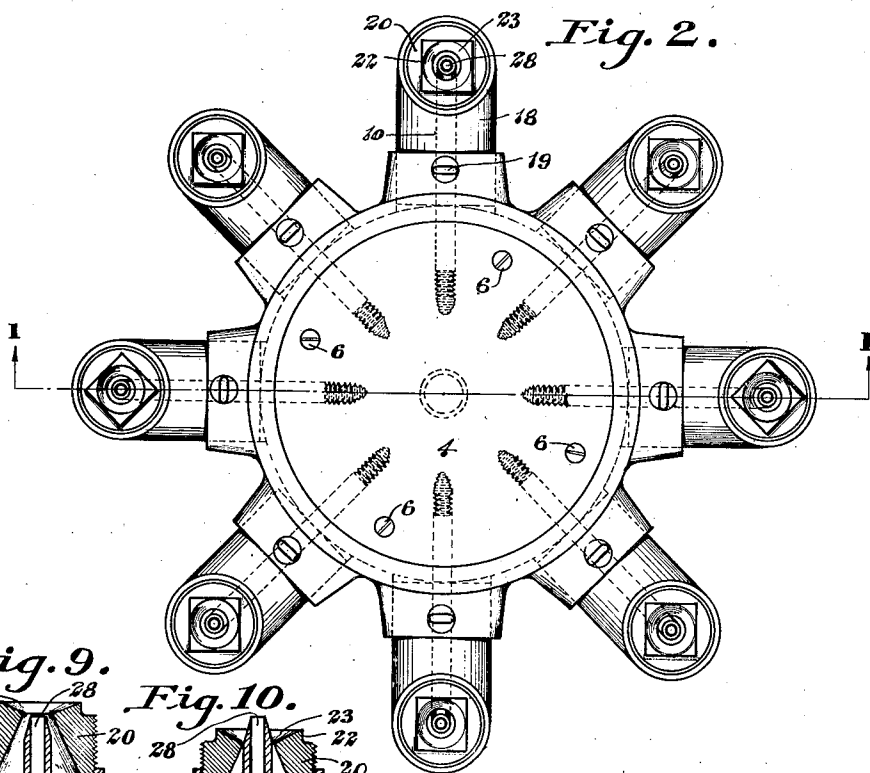


Fig. 2.



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Fig. 3.

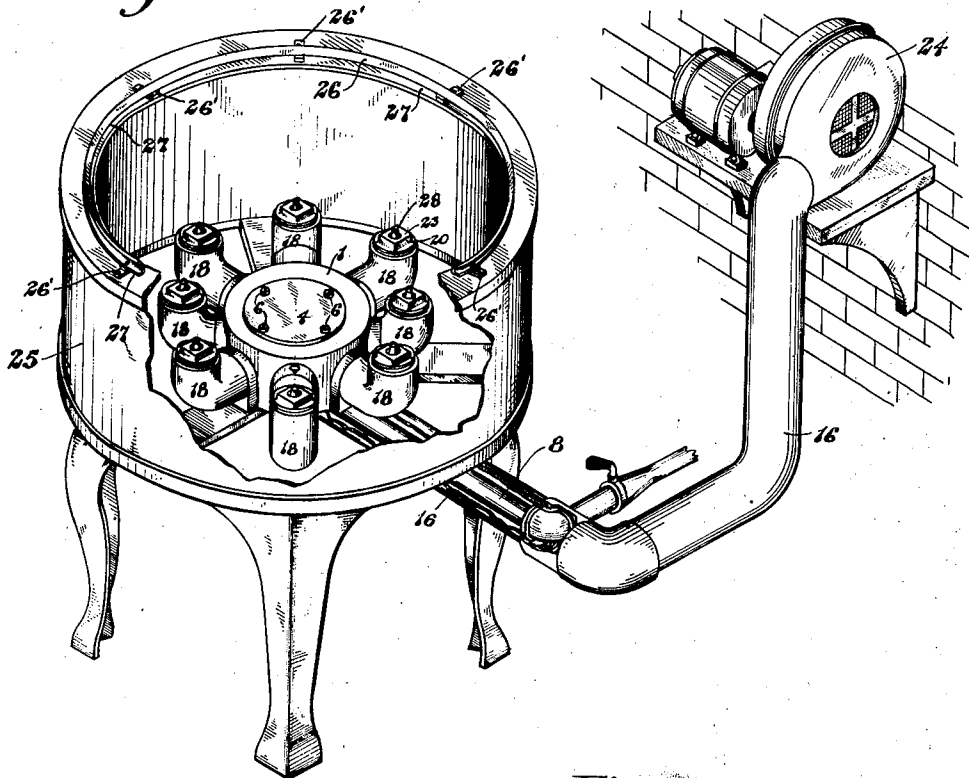
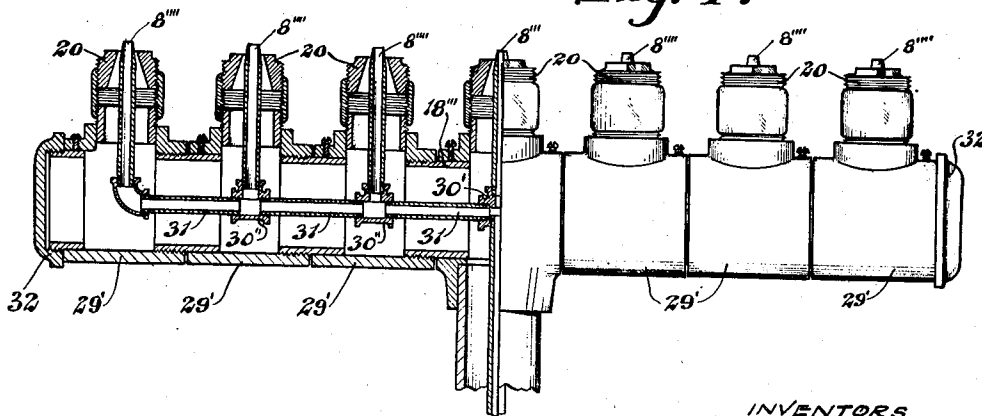


Fig. 4.



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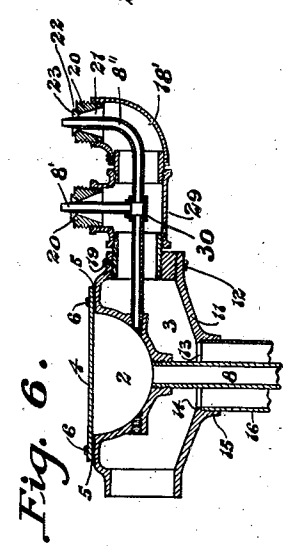
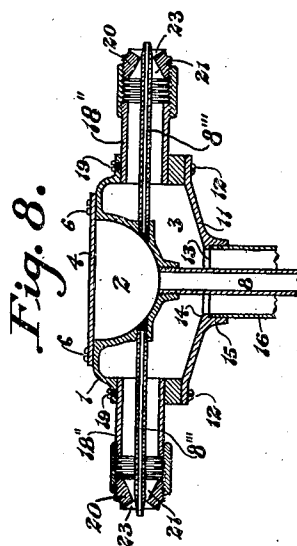
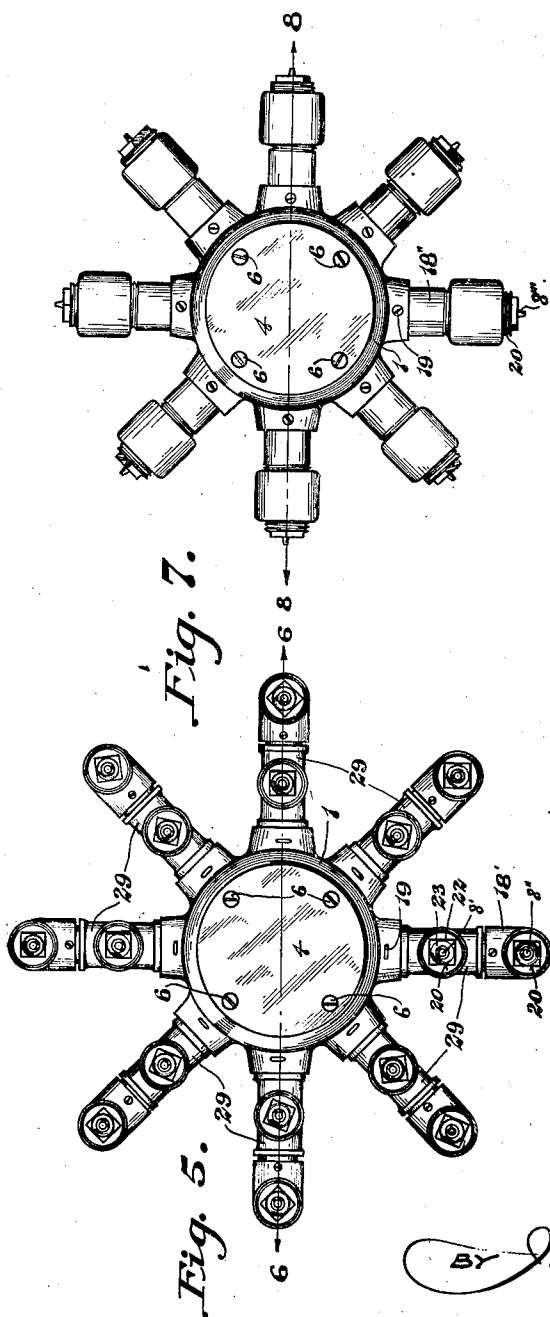
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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AIR-BLAST GAS BURNER.

Application filed March 22, 1923. Serial No. 626,767.

Our invention relates to burners for heating vessels mounted upon a furnace or for heating the furnace itself when it is used as a heater for heating residences or other buildings or for use in a boiler for heating air, water or making steam.

The objects of our invention are to provide a burner which will produce an intense heat with a minimum of gas mixed with air under varying degrees of pressure; to provide convenient regulating means whereby the volume of air may be regulated to correspond with the flow of gas under varying pressures; to provide means whereby the size and shape of the burner may be conveniently varied, depending upon the size of furnace and the purpose for which it is used, and to otherwise simplify and improve the burners as herein set forth.

Our invention consists in a burner provided with a central gas chamber having a plurality of gas tubes leading therefrom, an air chamber with a plurality of air tubes leading therefrom and surrounding the respective gas tubes and each having means for regulating the quantity of air, whereby the volume of air relative to the volume of gas will be regulated adjacent the respective gas jet orifices.

Our invention further consists in providing means whereby said burner is made extensible and interchangeable to adapt it to varying sizes of furnaces and to various specific uses for burning gas, oil and gasoline.

Our invention further consists in the peculiar construction, combination and arrangement of parts as herein set forth and claimed.

In the drawings:

Fig. 1 is a vertical section of the burner taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan view of the preferred form of burner used for heating kettles;

Fig. 3 is a perspective view of the burner installed in a furnace with a motor air blower connected thereto;

Fig. 4 is a view partly in elevation and partly in vertical section of a straight

burner adapted to be installed in series for an elongated furnace or boiler;

Fig. 5 is a plan view showing a modified construction of round burner;

Fig. 6 is a vertical section on the line 6—6 of Fig. 5;

Fig. 7 is another modified construction of round burner for heating the walls of furnaces for hot water or steam boilers;

Fig. 8 is a vertical section on the line 8—8 of Fig. 7;

Fig. 9 is a vertical section of one of the gas and air mixtures adjusted to permit a maximum of the air to mix with the gas when the gas pressure is high; and

Fig. 10 is a view thereof adjusted to permit a minimum supply of air when the gas pressure is low.

In the embodiment of our invention as illustrated and which shows preferred constructions we provide a cast housing 1 with a central upper gas chamber 2 and a lower air chamber 3. The gas chamber 1 is closed by plate 4 mounted on an asbestos gasket 5 and secured in position by screws 6. Said chamber is provided with an inlet 7 in the bottom to which gas inlet tube 8 is suitably connected. The side wall of said gas chamber is provided with a plurality of radially disposed outlets 9 having gas outlet tubes 10 removably secured therein. The bottom of air chamber 3 is closed by plate 11 secured thereto by screws 12 and having a central opening 13 with an inwardly extending flange 14 and a downwardly extending flange 15 adapted to receive air inlet pipe 16 surrounding gas inlet tube 8. The side wall of said air chamber is provided with a plurality of openings 17 each adapted to receive air outlet tube 18 each removably held in position by screw 19. The outer end of each air outlet tube 18 is internally screw threaded and is adapted to receive an adjustable plug 20 for regulating the quantity of air which passes outwardly through air outlet tube 18 around gas outlet tube 10 around which said plug is mounted adjacent its outer end. Said plug is provided with a tapering or converging air passage

21 and its top is provided with an angular boss 22 by which said plug may be adjusted with a wrench. Said boss is preferably provided with a central tapering depression 23 in order that the height of the plug may be correspondingly reduced in size. Said air and gas tubes may be curved upwardly, as shown in Figs. 1, 2, 3, 5 and 6 or may extend horizontally, as shown in Figs. 7 and 8 or may extend upwardly, as shown in Fig. 4 depending upon the direction in which it is desired to direct the heat. The air chamber is connected to a motor air blower 24 by air inlet pipe 16. The gas inlet tube 8 enters air inlet pipe 16 as shown in Fig. 3 and is disposed centrally therein thereby permitting the air to pass around it.

The construction of the burner shown in Figs. 1 and 2 is particularly adapted for use in furnaces for heating cooking kettles, as illustrated in Fig. 3 showing the burner mounted in open bottom furnace 25 in which the cooking kettle is supported in spaced apart relation from the furnace wall by circular support 26 having an inner beveled or curved wall adapted to fit the outer wall of kettles of varying shapes and sizes. By thus supporting the kettle on said ring in spaced apart relation from said furnace by feet 26' an air passage 27 is provided between the furnace and the kettle, whereby free circulation of the air through the open bottom of the furnace upwardly between the furnace wall and kettle is obtained. This accomplishes a more accurate adjustment of air and gas by eliminating excessive heat pressure between the furnace and the kettle.

An important feature of the invention consists in the adjustable plug 20 mounted in the end of air outlet tube 18 and surrounding the outer end of gas outlet tube 10 which permits said plug to be adjusted outwardly or inwardly toward or from the jet orifice 28 of the gas outlet tube 10 whereby when the gas pressure is high a corresponding amount of air to be mixed therewith can be obtained by adjusting said plug outwardly over the outwardly tapering end of gas outlet tube 10 as shown in Fig. 9 thereby permitting a larger discharge of air there-through, and when the gas pressure is less the plug may be adjusted inwardly as shown in Fig. 10 thereby correspondingly reducing the size of the air outlet 18 and consequently reducing the volume of air which may be discharged therethrough to mix with the gas.

Another important feature of the invention consists in provision for extending and increasing the number of burners as illustrated in Figs. 5 and 6 to adapt it to varying sizes of furnaces; also in the provision whereby the individual burners may be changed from those extending uprightly as in Figs. 1 and 2 to those extending hori-

zontally as in Figs. 7 and 8. It is thus seen that various combinations and arrangements of burners may be obtained, as for instance, part of the individual burners may extend upwardly while others may extend outwardly toward the walls of the furnace thereby providing a furnace which is adapted to heat kettles as well as to heat the radiating walls of the furnace at the same time.

In the modified construction illustrated in Figs. 5 and 6 outlet tubes 18' are each provided with a T-coupling 29, in which an adjustable plug 20 is mounted and gas outlet tube 8' is provided with T-coupling 30 on which the outer end 8'' of said gas outlet tube is mounted.

In the construction shown in Figs. 7 and 8 the adjustable plug is inserted in the end of a straight air outlet tube 18'' and over the outer end of straight gas outlet tube 8''' whereby the heat is directed laterally from each individual burner against the furnace wall instead of upwardly.

In the modified construction illustrated in Fig. 4, outlet tubes 18''' are each provided with a plurality of T-couplings 29' in which adjustable plugs 20 are mounted and gas outlet tube 8''' is provided with T-coupling 30' into which tubes 31 and T's 30'' are screwed. By this construction the burner can be extended or built out to considerable length if desired by adding T-couplings 29' and gas outlet tubes 8'''. When the burner is built up to the desired length the ends are closed by closure caps 32.

The tapered end of each gas outlet tube and the reverse tapering wall of the adjustable plug forms an inwardly converging circular passage for the air outwardly there-through, whereby it is caused to thoroughly penetrate and mix with the gas being discharged from the gas tube.

By providing a gas chamber in close proximity the individual burners connected thereto by radiating gas outlet tubes an even and uniform and full volume of gas flow is obtained thereby giving a pre-heated gas or oil of more inflammable nature preparatory to mixing a likewise pre-heated air.

While we have illustrated preferred embodiments of our invention it will be understood that other modifications than those illustrated may be made without departure from the scope or spirit of the invention as defined in the claims.

What we claim as new and desire to secure by Letters Patent is:

1. In combination with a gas furnace and contained therein, a gas chamber with means for admitting gas thereto, an air chamber surrounding said gas chamber and means for admitting air thereto, a plurality of gas outlets leading and radiating from said gas

chamber, a plurality of air outlets leading from said air chamber and encircling said gas outlets, respectively, in spaced apart relation thereto, and adjustable means in the outer end of said air outlets with means thereon by which the air flow and pressure may be regulated, substantially as set forth and for the purposes specified.

2. In combination with a gas furnace and contained therein, a gas chamber with means for admitting gas thereto and so located that the gas will be pre-heated before it reaches the gas burners, an air chamber surrounding said gas chamber and means for admitting air thereto and so located that the air therein will be pre-heated before it reaches the burners, a plurality of gas outlets leading and radiating from said gas chamber, a plurality of air outlets leading from said air chamber and encircling said gas outlets, respectively, and means in the outer end of each air outlet with means thereon by which the air flow and pressure may be regulated, substantially as set forth and for the purposes specified.

3. In a multiple gas burner having a gas chamber and an air chamber surrounding said gas chamber, a plurality of interchangeable gas outlet tubes leading from said gas chamber, a plurality of interchangeable air outlet tubes leading from said air chamber and each spaced apart from and surrounding one of said gas outlet tubes, and means for regulating the volume of air discharged through said air tubes, respectively, substantially as set forth and for the purposes specified.

4. In a multiple gas burner having a gas chamber and an air chamber, a plurality of interchangeable gas outlet tubes leading from said gas chamber, a jet orifice connected to each of said gas outlet tubes, a plurality of interchangeable air outlet tubes leading from said air chamber and each having a plurality of air outlets and means for regulating the volume of air discharged through each air outlet around its gas jet orifice, substantially as set forth and for the purposes specified.

5. In a multiple gas burner having a gas chamber and an air chamber, a plurality of gas outlet tubes leading from said gas chamber, a plurality of air outlet tubes leading from said air chamber and surrounding said gas outlet tubes, respectively, and each air outlet tube internally threaded adjacent to its outer end, an adjustable hollow externally threaded plug interposed between the outlet end of each gas outlet tube and the surrounding air outlet tube and having its inner wall converging toward the outer end, substantially as set forth and for the purposes specified.

6. In a gas burner, an air outlet tube, a gas outlet tube projecting through said air

outlet tube, an adjustable externally threaded plug screwed into the outer end of said air tube, said plug having an angular boss on its outer end whereby the flow of air from said air outlet tube may be regulated and having a depression in the outer end of said plug whereby the height of said plug may be greatly reduced in size, substantially as set forth and for the purposes specified.

7. In a multiple gas burner having an air chamber and a plurality of air outlets with means to supply air to said air chamber, a gas chamber with means to supply gas thereto, a gas outlet therefrom through each of said air outlets, and adjustable means for regulating the volume of air from each air outlet, substantially as set forth and for the purposes specified.

8. In a multiple gas burner, a gas chamber and means to supply gas thereto, a plurality of detachable sectional gas outlets, an air chamber, and means to supply air thereto, a detachable sectional air outlet surrounding each gas outlet and means for regulating the volume of air from each air outlet, substantially as set forth and for the purposes specified.

9. In a multiple gas burner, a gas chamber and means for supplying gas thereto, a plurality of detachable sectional gas outlets arranged in series and leading from said gas chamber, an air chamber and means for supplying air thereto, a plurality of detachable sectional air outlets arranged in series, each gas outlet being surrounded by one of said air outlets and means for regulating the volume of air from each air outlet, substantially as set forth and for the purposes specified.

10. In a multiple gas burner, a gas chamber, a plurality of sectional interchangeable detachable gas outlets leading therefrom, an air chamber, and means for supplying air thereto, a plurality of sectional interchangeable detachable air outlets, each air outlet surrounding a corresponding gas outlet whereby anyone of said cooperating gas and air sections may be interchanged according to the desired use for which the burner may be used, as herein illustrated, described and claimed.

11. In a multiple gas burner, a plurality of sectional gas tubes connected to a source of gas supply, a three-way coupling interposed between the adjacent sections of the gas tube, a gas tube for each burner leading upwardly from each of said couplings and a gas tube extending upwardly from the outer end of said gas tube for the outer burner, a sectional air tube and means to supply air thereto, couplings adapted to detachably connect the respective sections of said air tube, means to close the outer end of said air tube, a plug in the outer end of each air outlet and means for adjusting said

plugs to increase or diminish the flow and volume of air therethrough, substantially as set forth and for the purposes specified.

12. In a multiple gas burner, a cast housing, a plate mounted on the top thereof to form a gas chamber, a plate at the bottom of said casting adapted to form an air chamber partly surrounding said gas chamber, an air inlet to said air chamber, a gas inlet ex-

tending through said air inlet and air chamber to said gas chamber, a plurality of air outlets from said air chamber, a plurality of gas outlets from said gas chamber through said air chamber and air outlets, and means for regulating the flow of air through said air outlets.

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