Nov. 9, 1926. 1,606,255

L. B. METTLER

COMBINATION GAS BURNER AND COMBUSTION CHAMBER

Filed Nov. 28, 1921 2 Sheets-Sheet 1

Fig. 1.

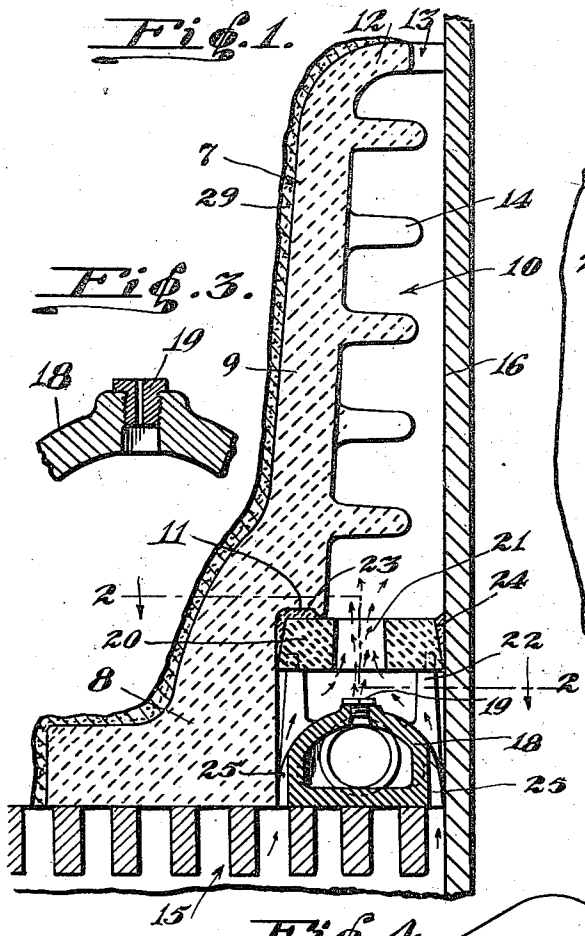


Fig. 2.

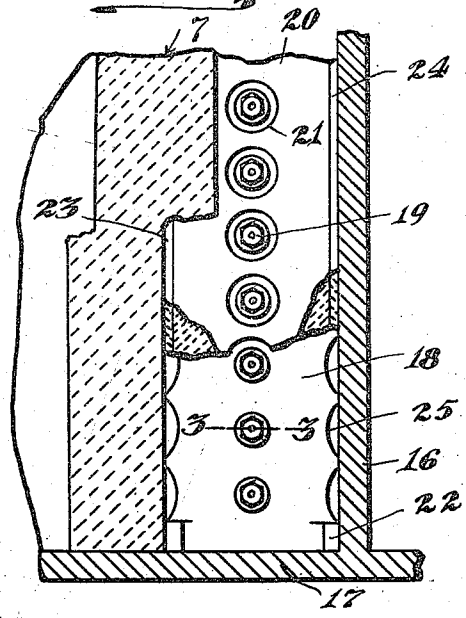


Fig. 3.

Fig. 4.

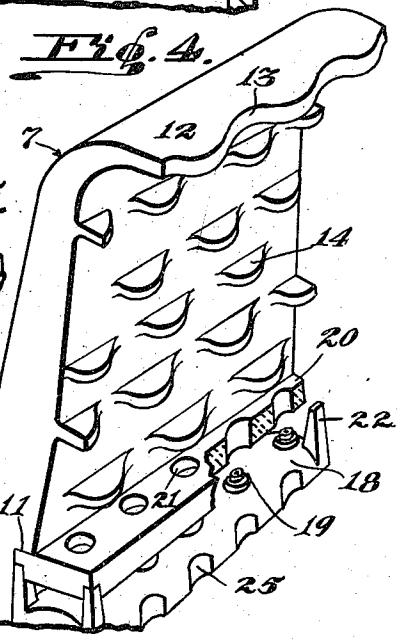
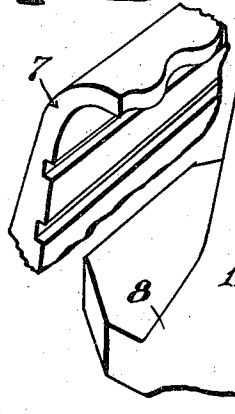


Fig. 5.



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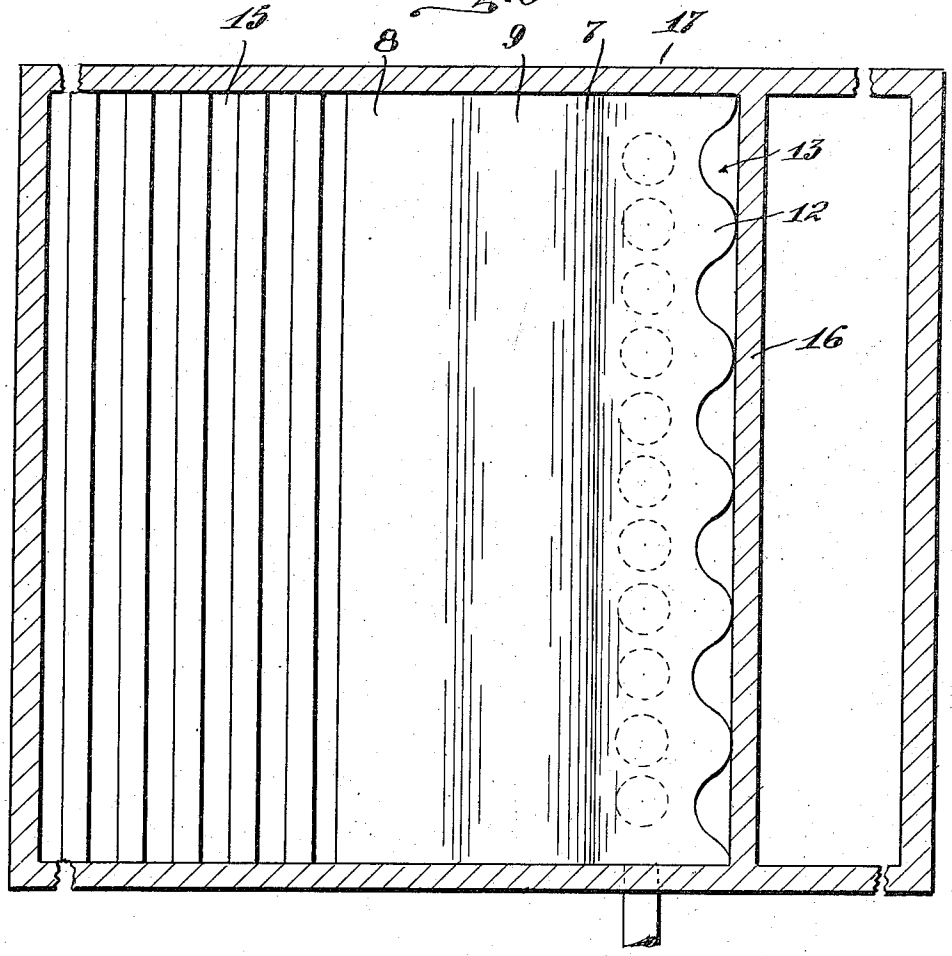
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Fig. 6.



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UNITED STATES PATENT OFFICE.

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COMBINATION GAS BURNER AND COMBUSTION CHAMBER.

Application filed November 28, 1921. Serial No. 518,312.

This invention relates to a combination gas-burner and combustion chamber.

An object of my invention is to provide means whereby heat of combustion generated by the burning of gas in a combustion chamber may be confined and collected by a wall of the combustion chamber and thereafter radiated from the wall to a body to be heated.

Another object is to provide a combustion chamber having a wall formed of heat resisting material provided with a series of protuberances adapted to retard and confine heat, and also adapted to radiate heat to a surface to be heated spaced from the wall.

Another object is to provide a combined combustion chamber and gas burner in which the combustion chamber is so constructed and the burner so arranged as to afford a proper proportion and mixture of gas and primary air to insure complete combustion within the combustion chamber so as to obviate the cooling action incident to the introduction of an excess of primary or secondary air into the combustion chamber, which coupled with the collection and the radiation of the heat of combustion as above referred to produces a heater of high efficiency and economy of gas consumption.

Another object is to provide a combined combustion chamber and gas burner of simple construction in which the parts may be readily assembled and which is adapted to be installed in a fire-box to heat the walls thereof by radiation rather than by convective heat as ordinarily practiced in boiler operations.

With the foregoing objects in view and such other objects and advantages as may subsequently appear my invention resides in the parts and in the combination and construction of the parts hereinafter more fully described and claimed and illustrated in the accompanying drawings in which

Fig. 1 is a view of a combined combustion chamber and gas burner as seen in vertical section;

Fig. 2 is a fragmentary horizontal section and plan view as seen on the line 2—2 of Fig. 1;

Fig. 3 is a detailed vertical section as seen on the line 3—3 of Fig. 2;

Fig. 4 is a detail in perspective of the heater unit with parts removed;

Fig. 5 is a detail in perspective illustrating a modified form of the radiating wall of the combustion chamber;

Figure 6 is a plan view of the structure shown in Figure 1.

Referring to the drawings more specifically 7 indicates a body formed of refractory material comprising a base portion 8 and an upwardly extending wall 9 adapted to constitute the back-wall of a combustion chamber 10; the wall 9 being formed with a shoulder 11 spaced above the plane of the lower face of the base portion 8. The upper end portion of the wall 9 is turned horizontally to form a top wall 12, the outer edge of which is serrated to form a series of vents 13. The inner surface of the wall 9 is provided with a series of projections 14 which serve as baffles and are adapted to be heated to incandescence so as to constitute heat radiating elements. The body 7 is preferably designed to be seated on a grate 15 and arranged with its inner face proximate to a wall or surface 16 to be heated, with the projections 14 extending close to the surface 16 so that when the projections are highly heated they will act to radiate heat to the surface 16. The walls 9 and 16 form two sides of the combustion chamber 10, the ends of which are closed by suitable walls 17, and the top of which is formed by the serrated wall 12 which abuts at its edge against the surface 16 so that the vents 13 will serve as outlets for the discharge of products of combustion from chamber 10.

Arranged on the grate 15 below the shoulder 11 is a tubular gas burner 18 provided with a series of upwardly opening burner nozzles 19 and spaced above the burner 18 is a horizontal wall 20 formed with openings 21 arranged above and spaced from the burner nozzles 19 which openings constitute mixing throats. The wall 20 is formed of refractory material and sets against the shoulder 11 to project horizontally from the inner face of the upwardly extending wall 9 with the openings 21 arranged adjacent to the inner surface of the wall 9; the horizontal wall 20 being here shown as supported on standards 22 formed on the burner 18. It is intended that the only inlets to the combustion chamber 10 comprise the openings 21 and accordingly the wall 20 is designed to extend between the wall 9 and the surface 16 throughout the length of the wall 9 and between the

end walls 17 with the joints between the wall 20 and the wall 9 and surface 16 sealed by a suitable packing composition as indicated at 23 and 24. As a means for permitting the flow of air into the space between the burner and the wall 20 the sides of the burner are recessed as indicated at 25 to provide air passages along each side of the burner.

In the application of the invention the body 7 together with the wall 20 and burner 18 is arranged adjacent to a wall or surface 16 to be heated as shown in Fig. 1. An important feature of the invention resides in providing a combustion chamber 10 having a wall 9 formed with a series of heat radiating elements 14 of any suitable shape and arrangement adapted to be heated to incandescence and radiate heat to a wall 16 located in close proximity thereto.

In the operation of the invention gas is delivered to the burner from any suitable source and discharged through nozzles 19 and caused to pass upwardly through the openings 21 into the combustion chamber 10 where it is ignited; the flow of gas through the openings 21 acting to draw air from beneath the burner upwardly around the sides thereof and into the openings 21 where the gas and air are mixed to provide the proper mixture to support combustion of the gas which is designed to take place adjacent the wall 20 and form an intense heat in the lower portion of the combustion chamber. The convective heat rising in the combustion chamber will be baffled and retarded by the projections 14 so that the latter will be highly heated preferably to incandescence so that the major portion of the heat generated in the combustion chamber will be absorbed by the refractory material forming the body 9 and projections 14 so as to reduce the waste heat passing through the vents 13 in the products of combustion to a minimum. The heat collected by the projections 14 and wall 9 is largely radiated to the wall 16. In order to inhibit the loss of heat through the body 9 the latter may be covered with a suitable heat insulation 29 as shown in Fig. 1 which may comprise a covering of asbestos or other suitable material.

By means of my invention a high efficiency in heating effect relative to gas consumption is obtained as the heat of combustion will be confined in the combustion chamber 10 until the largest portion possible is absorbed by the surface to be heated.

I claim:

1. In a combination gas burner and combustion chamber, an upwardly extending wall of heat resisting material, a horizontal wall extending from the lower portion of said wall and formed with a series of spaced inlet openings constituting mixing throats, a surface to be heated extending upwardly from said horizontal wall adjacent to said upwardly extending wall, said surface and wall forming a combustion chamber; and a gas burner located below said horizontal wall and having a series of gas orifices, spaced beneath and discharging into said throats whereby the flow of gas from said orifices will be directed through said throats to effect a flow of gas and air into said throats and means projecting from the upwardly extending wall for obstructing the flow of convective heat adapted to radiate heat to the surface to be heated and to assist combustion in the combustion chamber.

2. In a combination gas burner and combustion chamber, a wall formed of heat resisting material, a wall constituting a surface to be heated arranged in close proximity to said first named wall and forming with the latter a mixing and combustion chamber, a horizontal wall extending between said walls and formed with mixing openings, a gas burner below the horizontal wall and between the other two walls whereby an air receiving chamber is provided between the burner and the horizontal wall, said burner having nozzles spaced below and opening to said mixing openings, and heat radiating elements located in the chamber adjacent to the surface to be heated adapted to be heated to incandescence and arranged to impede the upward flow of convective heat and also radiate heat throughout the surface to be heated.

3. In a combined gas burner and combustion chamber, the combination of a wall to be heated, a second wall formed of heat resisting material having a wall portion disposed in close proximity to but spaced from said first named wall and formed with a horizontally extending upper end portion having a serrated edge which terminates contiguous to the first named wall, walls closing the ends of the space between said first and second named walls, a bottom wall extending between said walls and having openings; said walls forming collectively a combustion chamber which is closed at its sides and ends, a gas burner located to direct gas through the openings in the bottom wall, and a plurality of heat radiating elements projecting from the face of said second wall and terminating close to the wall to be heated.

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