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L. E. JOHNSON

COMBUSTION CHAMBER FOR OIL BURNERS

Filed May 2, 1923

Fig. 1.

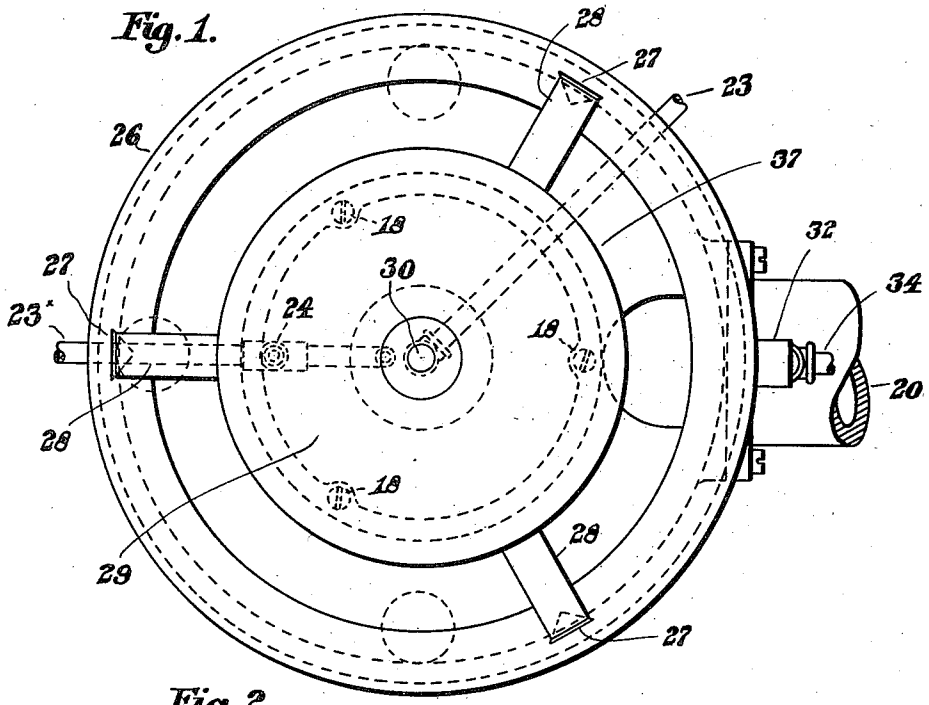
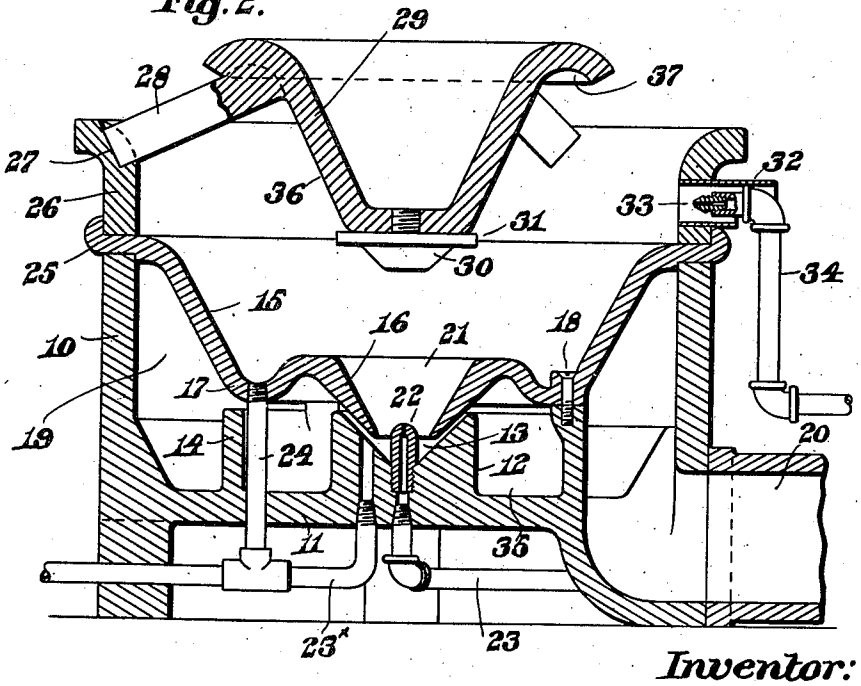


Fig. 2.



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UNITED STATES PATENT OFFICE.

LAWRENCE E. JOHNSON, OF MELROSE, MASSACHUSETTS, ASSIGNOR TO ECONOMY HEATER CO. INC., OF LYNN, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

COMBUSTION CHAMBER FOR OIL BURNERS.

Application filed May 2, 1923. Serial No. 636,086.

To all whom it may concern:

Be it known that I, LAWRENCE E. JOHNSON, a citizen of the United States of America, and a resident of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Combustion Chambers for Oil Burners, of which the following is a specification.

This invention relates to fuel burners and particularly to the combustion chambers thereof, the object of the invention being to provide in a combustion chamber an annular air space in which the air to be used will be preheated before entering the firepot in which the air is to be mixed with the fuel.

Another object of the invention is the construction of a combustion chamber with an air space between the outer casing and the firepot to prevent the outer casing from being subjected to the direct action of the flames within the firepot.

The invention consists in certain novel features of construction and arrangement of parts which will be understood readily by reference to the description of the drawings and to the claims to be hereinafter given.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described, except as required by the scope of the appended claims.

Of the drawings:

Figure 1 represents a plan of a combustion chamber for fuel burners embodying the principles of the present invention, and

Figure 2 represents a vertical section of same.

Similar characters indicate like parts throughout the several figures of the drawings.

In the drawings, 10 is a cylindrical cup-shaped casing open at the top, with the bottom 11 thereof provided with a central boss extending upwardly therefrom, with a cone-shaped depression 13 in its upper end.

This boss 12 is surrounded by an annular flange 14, said flange 14 being spaced from the periphery of the boss 12 as indicated in Fig. 2 of the drawings.

Superimposed upon the flange 14 and the upper end of the cylindrical wall of the casing 10 is a cone-shaped member or firepot 15, the bottom of which is provided with a cone-shaped flange 16 depending into the depression 13.

The top of the flange 14 is separated slightly from the bottom wall of the annular depression 17 in the firepot 15, and the wall of the cone-shaped depression 13 in the boss 12 is slightly separated from the outer wall of the cone-shaped flange 16.

When the cone-shaped member or firepot 15 is positioned within the casing 10 and secured to the flange 14 by the screws 18, an annular air space 19 is formed between the outer wall of the firepot 15 and the inner wall of the casing 10.

Air is admitted to the air space 19 through the air supply pipe 20, as indicated in Fig. 2 of the drawings.

Centrally disposed within the opening 21 in the bottom of the firepot 15 and surrounded by the cone-shaped flange 16 is a nozzle 22 through which fuel oil under pressure is admitted to the firepot 15 from the fuel oil supply pipe 23 leading to any suitable source of supply.

From the depression 13 extends the pipe 23^{x}, which has a branch pipe 24 communicating with the annular depression 17 in the bottom of the firepot 15.

Should any surplus fuel oil collect in the annular depression 17 or in the depression 13, it can be drained therefrom into the pipe 23^{x} and be conveyed to any suitable receptacle.

Superimposed upon the outwardly extending flange 25 of the firepot 15 is a cylindrical member 26, having a plurality of depressions 27 at the upper end of its inner wall, in which are positioned the radial legs 28 forming a part of the cone-shaped member 29 depending into the cylindrical member 26 centrally positioned over the nozzle 22.

On the bottom of the cone-shaped member 29 is secured a baffle plate 30, the body of which is formed in the shape of a truncated cone, and having at its upper end an outwardly extending flange 31.

Through the wall of the cylindrical member 26 extends a cylindrical member 32 in

which is disposed a nozzle 33 mounted in the end of the gas supply pipe 34.

This nozzle 33 has a small passage therethrough, through which illuminating gas is adapted to pass and be ignited to form a pilot flame.

When air is admitted from the supply pipe 20 to the air space 19, this air will be preheated while in said air space and then pass over the top of the annular flange 14 into another air space 35, from which it will pass downwardly into the depression 13 and then upwardly into the opening 21 around the fuel oil nozzle 22.

The air thus admitted into the opening 21 will mix with the fuel oil and pass upwardly in the firepot 15 and become ignited by the pilot flame.

As this mixture of oil and air moves upwardly, a portion thereof will strike the baffle member 30 and its flange 31, and will be forced outwardly against the wall of the firepot 15. Other portions of the mixture of oil and air will strike the inclined wall 35 of the cone-shaped member 29 and will pass upwardly until its strikes the downwardly curved flange 37, thereby causing the mixture to be diverted downwardly in a path intersecting the mixture of oil and air which is projected outwardly in a horizontal direction, by means of the baffle member 30, 31.

While the air in the air space 19 is preheated therein by means of the heat within the firepot 15, and is thereby in better condition to mix with the fuel oil when it is admitted to the firepot through the opening 21, this heat is not so great as to injure the wall of the casing 10. The air within the space 19 is sufficient to prevent injury to the casing 10 by the intense heat within the firepot 15.

This makes it possible to use the casing 10 and the parts connected thereto indefinitely. When the firepot 15, after long use, becomes injured by the intense heat within the same, this firepot may be removed and a new one substituted therefor without replacing the casing 10 and the parts connected thereto.

It is believed that the operation and many advantages of the invention will be readily understood without further description.

Having thus described my invention, I claim:

1. In a fuel oil burning device, the combination of a cup-shaped casing closed at the bottom, and said bottom having an inner cylindrical flange extending upwardly therefrom; a firepot consisting of a deep cone-shaped member depending into said casing and forming an air space between its outer wall and the inner wall of the casing, said member having a central opening in the bottom thereof and said bottom being spaced from the upper end of said inner flange; means for supplying air to said space; a nozzle adapted to project fuel oil upwardly into the center of said cone-shaped member; and an annular passage surrounding said nozzle and through which the air in said air space is adapted to pass into said cone-shaped member.

2. In a fuel oil burning device, the combination of a cup-shaped casing closed at the bottom and side, and said bottom having an inner cylindrical flange extending upwardly therefrom; a removable firepot consisting of a deep cone-shaped member depending into said casing and forming an air space between its outer wall and the inner wall of the casing, said member having a central opening in the bottom thereof and said bottom being spaced from the upper end of said inner flange; means for supplying air to said space; a nozzle having its outlet in the bottom of said opening and adapted to project fuel upwardly into the center of said cone-shaped member; and an annular passage surrounding said nozzle and through which the air in said air space is adapted to pass into said cone-shaped member.

3. In a fuel oil burning device, the combination of a cup-shaped casing closed at the bottom and side, and said bottom having an inner cylindrical flange extending upwardly therefrom; a deep cone-shaped member depending into said casing and forming an air space between its outer wall and the inner wall of the casing, said member having a central opening in the bottom thereof and said bottom being spaced from the upper end of said inner flange; means for supplying air to said space; a nozzle having its outlet in the bottom of said opening and adapted to project fuel oil directly into said cone-shaped member; an annular passage surrounding said nozzle and through which the air in said air space is adapted to pass into said cone-shaped member and mix with said oil above the outlet of said nozzle: and baffle members depending into said cone-shaped member and positioned in front of said fuel oil nozzle.

4. In a fuel oil burning device, the combination of a cup-shaped casing closed at the bottom and side, and said bottom having an inner cylindrical flange extending upwardly therefrom; a deep cone-shaped member depending into said casing and forming an air space between its outer wall and the inner wall of the casing, said member having a central opening in the bottom thereof and said bottom being spaced from the upper end of said inner flange; means for supplying air to said space; a nozzle adapted to project fuel oil directly into said cone-shaped member; an annular passage surrounding said nozzle and through

which the air in said air space is adapted to pass into said cone-shaped member and mix with said oil above the outlet of said nozzle; and removable baffle members depending into said cone-shaped member and positioned above said fuel oil nozzle.

5. In a fuel oil burning device, the combination of a cup-shaped casing closed at the bottom and side; a cone-shaped member depending into said casing and forming an air space between its outer wall and the inner wall of the casing; means for supplying air to said space; a nozzle centrally disposed in an opening in the bottom of said cone-shaped member and adapted to project fuel oil directly into said cone-shaped member; and an annular passage surrounding said nozzle and through which the air in said space is adapted to pass into said cone-shaped member around said nozzle and mix with the oil at a point above the nozzle outlet.

6. In a fuel oil burning device, the combination of a cup-shaped casing having a centrally disposed cylindrical boss extending upwardly from the bottom thereof and provided with a cone-shaped depression in its upper end; a cone-shaped member depending into said casing and forming, with the wall of said casing, an annular air space closed at the top by the wall of said cone-shaped member; means for admitting air into said space; means for admitting fuel oil under pressure through the bottom of said cone-shaped member; and means for admitting air from said space through the bottom of said cone-shaped member around the fuel oil inlet.

7. In a fuel oil burning device, the combination of a cup-shaped casing having a centrally disposed cylindrical boss extending upwardly from the bottom thereof and provided with a cone-shaped depression in its upper end; a cone-shaped member depending into said casing and forming, with the wall of said casing, an annular closed air space extending to the top of said casing; a cone-shaped flange depending from the bottom of said cone-shaped member into said depression; means for admitting air into said space; means for admitting fuel oil under pressure through the bottom of said cone-shaped member; and means for admitting air from said space through the bottom of said cone-shaped member around the fuel oil inlet.

8. In a fuel oil burning device, the combination of a casing closed at the bottom; a member having a flange at the top resting on the upper end of the wall of said casing with the body portion thereof depending into said casing and spaced from the vertical wall of said casing thereby forming an air space entirely surrounding said depending body portion, which has a central opening in the bottom thereof; means for supplying air to said space; a nozzle adapted to project fuel oil upwardly through said opening into the center of said member; and an annular passage surrounding said nozzle and through which the air in said air space is adapted to pass into said depending member.

Signed by me at 746 Old South Bldg., Boston, Mass., this 30th day of April, 1923.

LAWRENCE E. JOHNSON.

Witnesses:

WALTER E. LOMBARD,

NATHAN C. LOMBARD.