

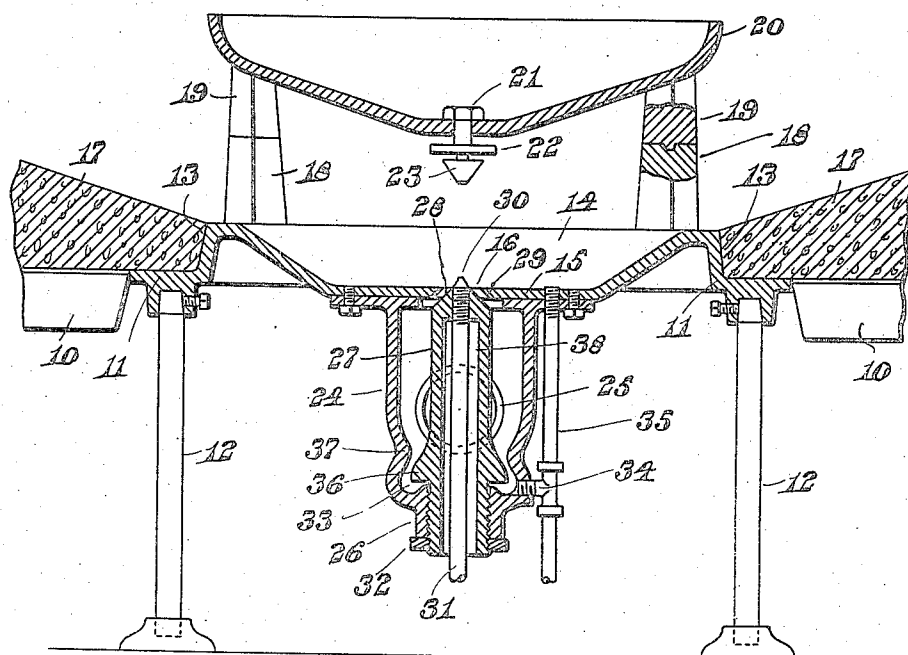
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L. E. JOHNSON

COMBUSTION CHAMBER FOR FUEL BURNERS

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Inventor:
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UNITED STATES PATENT OFFICE.

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COMBUSTION CHAMBER FOR FUEL BURNERS.

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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
5 county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Combustion Chambers for Fuel Burners, of which the following is a specification.

10 This invention relates to combustion chambers for fuel oil burners and has for its object the production of a device of this character which is specially adapted for use in furnaces, and which may be easily installed therein.

15 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.

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

35 The drawing represents a section of a combustion chamber embodying the principles of the present invention.

40 In the drawings, 10 is the grate of an ordinary furnace for heating houses, said grate being annular and having a cylindrical opening in which is positioned the bed plate 11 supported upon the legs 12 resting on the floor of the ash pit.

45 This bed plate 11 has a cylindrical vertical wall 13 and a central depression 14, in the flat bottom 15 of which is a cone-shaped opening 16.

50 The top of the grate 10 to the wall 13 is covered with fire clay 17 closing all openings in said grate, and thereby confining all heat produced to the fire pot of the furnace.

Extending upwardly from the bed plate 11 are a plurality of posts 18 spaced apart, which support legs 19 depending from a cup-shaped basin 20.

In the center of the basin 20 is a stud 21

extending downwardly therefrom and supporting a baffle plate 22, beneath which is positioned a spreader 23 in the form of a truncated cone.

Secured to the under side of the bottom 15 and depending therefrom is a cylindrical casing 24 to which air under pressure is admitted through a pipe 25 from any suitable source of supply.

65 The lower end of this casing 24 has a downwardly extending annular flange 26, to the interior of which is threaded the tubular member 27, the upper end of which is cone-shaped as at 28 and adapted to be positioned in the central cone-shaped opening 16 in the bottom 15 of the bed plate 11 and spaced
70 from the wall 29 thereof.

A nozzle 30 is secured in the upper end of the tubular member 27 and from this nozzle a pipe 31 leads to any suitable supply of fuel oil, which oil is adapted to be forced
75 under pressure through the nozzle 30 and mix with the air passing through the annular space between the inclined walls 28, 29.

80 The inclination of these walls 28, 29 directs the air toward the oil being discharged from the nozzle, thus insuring a perfect mixture in the form of very fine spray or mist.

This mixture when ignited is directed with considerable force against the truncated cone 23 and baffle plate 22, thereby spreading the flame 22 outwardly in every direction, portions of the flame being directed against the inclined bottom wall of
90 the basin 20, along which it is deflected outwardly beyond the edge of said basin 20 against the vertical wall of the fire pot of the furnace.

The tubular member 27 may be adjusted relatively to the casing 24 and secured in adjusted position by means of the lock nut 32.

100 The inner bottom wall of the casing 24 has an annular upwardly extending flange forming an annular gutter 33, in which may collect any unburnt fuel oil, to be drained off through a branch pipe leading to the main drain pipe 35 depending from the bottom 15, and adapted to drain the depression
105 14 in the bed plate 11.

The tubular member 27 is provided with a peripheral flange 36 near its lower end,

the outer face of which coacts with an inwardly curved portion 37 of the casing 24, to form a restricted annular passage which may be varied in area by adjusting the tubular member 27 relatively to the casing 24.

The pipe 31 is secured to the upper end of the tubular member 27 and is surrounded by an air space 38 which is open at the bottom.

In the operation of the invention, air under pressure is admitted to the interior of the casing 24, and oil under pressure is forced through the nozzle 30, where it mixes with the air and is finely atomized by the air blast, and is driven against the cone-shaped spreader 23 and baffle plate 22.

The spray of oil against this spreader 23 and baffle plate 22 creates a perfect mixture in the combustion chamber, that causes the burning of all the oxygen delivered thereto, thus generating pure combustion of oil with a combination white and blue flame, and the maximum amount of heat obtainable from the fuel units.

By producing this perfect combustion, no unburnt particles of solid matter remains in the combustion chamber.

This is of considerable consequence, for where these unburnt particles of fuel remain, they finally lodge on the interior of the heater and flues in the form of carbon and mean loss of heat, waste of fuel, and extra cost.

This objection is wholly obviated in the apparatus herein shown and described.

The basin 20 and baffle plate 22 are so constructed that they will continue to deliver radiant heat for at least a half hour after the fire has been shut off; which greatly reduces the cost of operation, especially in hot air furnaces.

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

Having thus described my invention, I claim:

1. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle having a cone-shaped upper end positioned in said opening and spaced from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; a basin superimposed above said nozzle; and means for varying the space between said nozzle and the wall of said opening.

2. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; a basin super-

imposed above said depression on spaced supports extending upwardly from said bed plate and having an outwardly and upwardly flaring bottom wall; and a baffle plate depending from the lowest central portion of said basin above said nozzle.

3. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; a basin superimposed above said depression on spaced supports extending upwardly from said bed plate and having an outwardly and upwardly flaring bottom wall; and a cone-shaped spreader depending from the lowest central portion of said basin above said nozzle.

4. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; a basin superimposed above said depression on spaced supports extending upwardly from said bed plate and having an outwardly and upwardly flaring bottom wall; a cone-shaped spreader depending from the lowest central portion of said basin above said nozzle; and a baffle plate between said spreader and basin.

5. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; a basin superimposed above said depression on spaced supports having its lowest part above said nozzle from which said bottom wall flares upwardly and outwardly; a casing depending from said bed plate and closed at the bottom thereof; a tubular member centrally disposed in said casing and forming a support for said nozzle; and an oil pipe within said tubular member and communicating with said nozzle.

6. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening; a basin superimposed above said depression on spaced supports; a casing depending from said bed plate; a tubular member centrally disposed in said casing and forming a support for said nozzle, said tubular member being threaded to the bottom of said casing and adjustable relatively

thereto; and an oil pipe within said tubular member and communicating with said nozzle.

7. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening; a basin superimposed above said depression on spaced supports; a casing depending from said bed plate, having an annular gutter in the lower end thereof; a tubular member centrally disposed in said casing and forming a support for said nozzle; an oil pipe within said tubular member and communicating with said nozzle; and a drain pipe leading from said gutter.

8. In a device of the class described, a bed plate having a depression with a central opening therein; an oil nozzle positioned in said opening and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening; a basin superimposed above said depression on spaced supports; a casing depending from said bed plate having an annular gutter in the lower end thereof; a tubular member centrally disposed in said casing and forming a support for said nozzle; an oil pipe within said tubular member and communicating with said nozzle; a drain pipe leading from said gutter; and a drain pipe depending from the bottom of said depression.

9. In a device of the class described, a bed plate provided with a depression with a central opening therein having a cone-shaped wall smallest at the top; a cone-shaped nozzle positioned in said opening

and free from the wall thereof; means for supplying oil to said nozzle; means for supplying air to said opening around said nozzle; and a basin superimposed above said cone-shaped wall on spaced supports with the lowest central part of its bottom above said nozzle, from which central portion the bottom wall flares upwardly and outwardly.

10. In a device of the class described, a bed plate having a central cone-shaped opening therein smallest at the top; a tubular member having a cone shaped portion positioned in said opening, the wall of said cone shaped portion being free from contact and parallel with the wall of said opening and the upper end being below the upper face of said bed plate; a pipe for supplying oil the upper end of which extends above said tubular member and is cone-shaped; and means for supplying air to said opening.

11. In a device of the class described, a bed plate having a central cone-shaped opening therein smallest at the top; an imperforate tubular member having a cone-shaped portion positioned in said opening with its wall spaced from the wall of said opening; an oil supply pipe threaded to the upper end of said tubular member with its end projecting above said tubular member and cone-shaped; and means confining the admission of air above said bed plate to the cone-shaped opening therein.

Signed by me at 746 Old South Bldg. Boston, Mass., this 14th day of September 1923.

LAWRENCE E. JOHNSON.

Witnesses:

NATHAN C. LOMBARD.

ROSE STERN.