Oct. 28, 1924. 1,513,461

L. E. JOHNSON

OIL BURNER

Filed March 27 1923 2 Sheets-Sheet 1

Fig. 1.

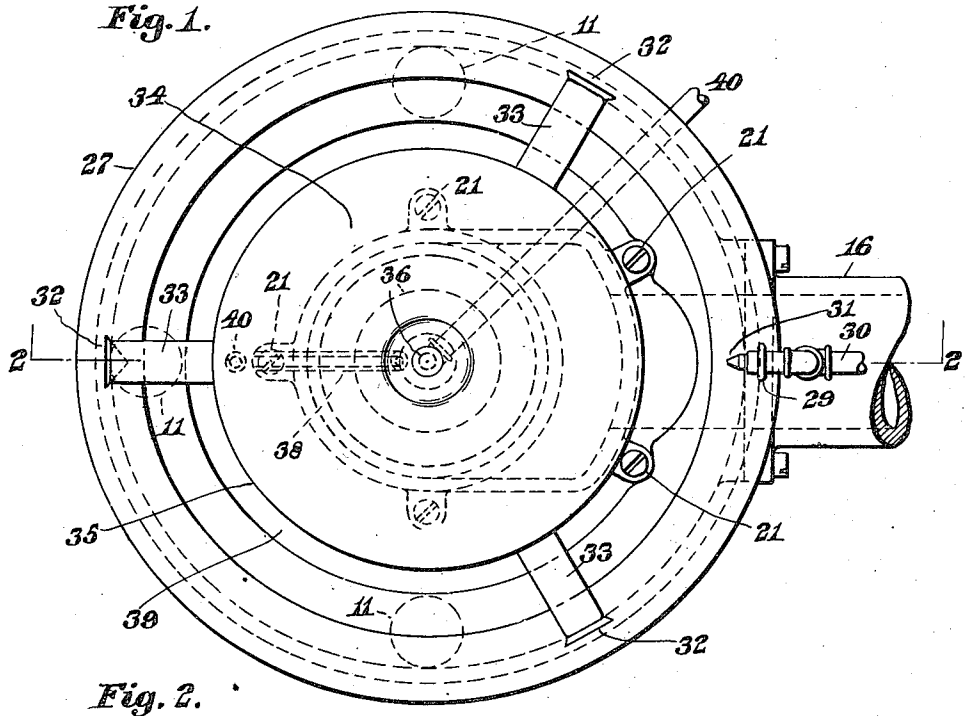
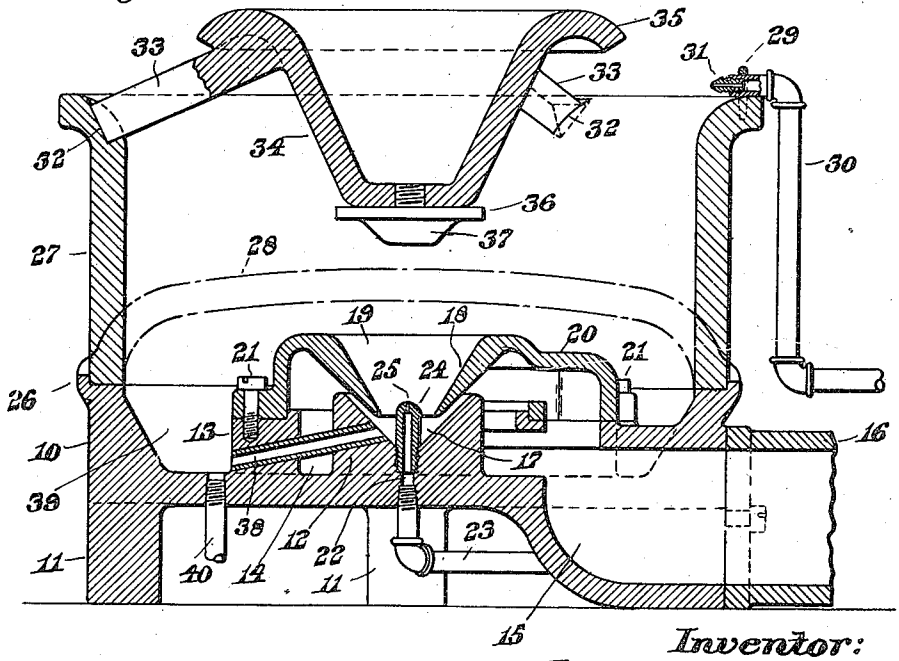


Fig. 2.



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Fig. 3.

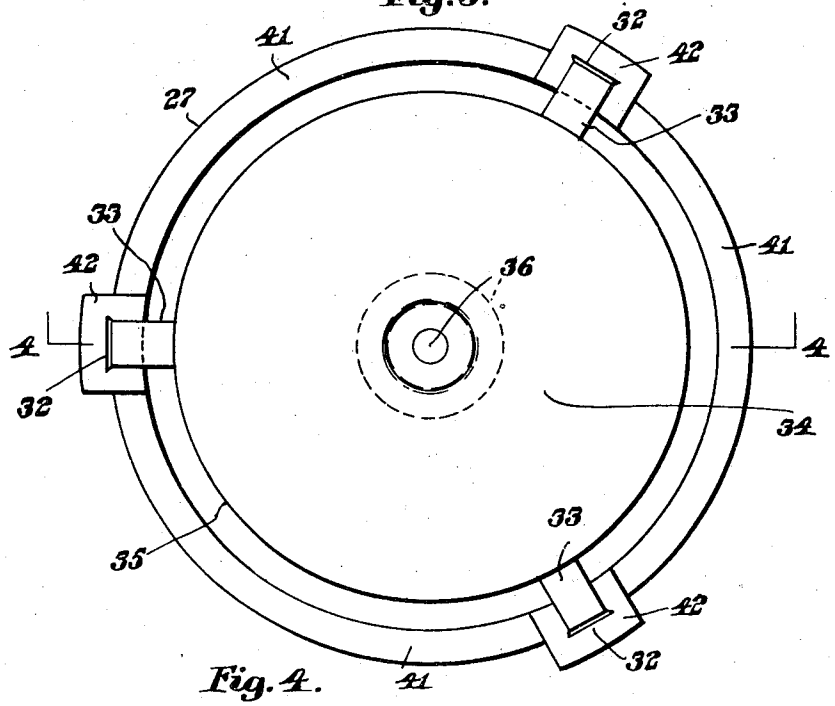


Fig. 4.

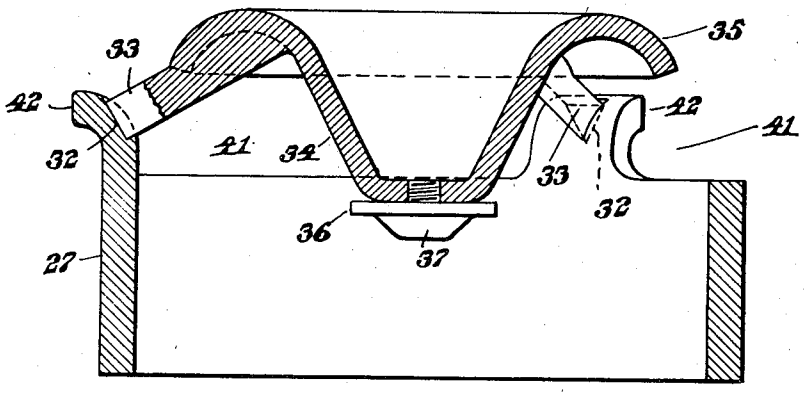
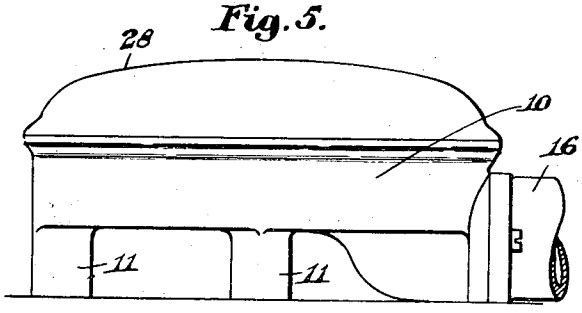


Fig. 5.



Inventor:
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Patented Oct. 28, 1924. 1,513,461

UNITED STATES PATENT OFFICE.

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

OIL BURNER.

Application filed March 27, 1923. Serial No. 627,982.

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 Oil Burners, of which the following is a specification.

This invention relates to oil burners and has for its object the provision of means whereby the oil and air may be thoroughly mixed in a suitable chamber so that when the mixture is ignited a blue flame will be produced.

Another object of the invention is to provide means whereby parts of the device may be quickly removed and the base covered so that coal or other fuel may be used in the firepot of a furnace without disconnecting or removing the base portion of the device or the connections thereto.

The invention consists of a base portion provided with a central vertical fuel inlet and an air inlet radiating therefrom, said air inlet communicating with an annular space surrounding the fuel nozzle.

The invention further consists in a baffle plate above the fuel nozzle adapted to divert the mixture of oil and air toward the cylindrical wall of the combustion chamber.

The invention further consists in a cone-shaped member disposed in the upper part of the combustion chamber and provided at its upper end with a down-turned flange adapted to divert the mixture downwardly into the bottom of the combustion chamber.

The invention further 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 shown 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 that the invention is not limited to the precise arrangement and organization of the 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 an oil burner embodying the principles of the present invention,

Figure 2 represents a vertical section of same on line 2, 2 on Figure 1.

Figure 3 represents a plan of a modified form of the combustion chamber,

Figure 4 represents a vertical section of same on line 4, 4 on Fig. 3, and

Figure 5 represents an elevation of the base of the device with the combustion chamber removed and said base covered.

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

In the drawings, 10 is a base supported by the legs 11. When in use the base is supported on the grate of the firepot of a furnace, or other heating device. This base is provided with an upwardly extending central boss 12 surrounded by an upwardly extending flange 13, separated from said boss 12 to form an air space 14 open at the top. This air space 14 has a lateral passage 15 extending therefrom, communicating with an air supply pipe 16, through which air is adapted to be forced under pressure to the burner in any well known manner.

The upper end of the boss 12 is provided with a cone-shaped depression 17, into which extends the downwardly extending cone-shaped flange 18, surrounding an opening 19 in a cover plate 20 secured to the upper face of the base 10 by means of bolts 21.

The boss 12 has a passage 22 extending therethrough, the lower end of which communicates with a pipe 23 leading to the oil supply.

The upper end of the passage 22 has mounted therein the nozzle 24, having a discharge orifice 25 in the extreme upper end thereof. This discharge orifice 25 is centrally located in the lower end of the cone-shaped opening 19 in the cover plate 20.

The base 10 is provided with an annular lip 26 which encloses the lower end of the cylindrical combustion chamber 27, adapted to rest normally upon the base 10.

The combustion chamber 27 may be re-

moved from the base 10 and replaced by means of a cover 28, as shown in dotted lines in Fig. 2 and full lines in Fig. 5.

Secured by means of a bale 29 to the upper end of the wall of the combustion chamber 27 is a gas supply pipe 30, provided with a nozzle 31 in the upper end thereof, said nozzle being provided with a small orifice through which illuminating gas may pass, the flame of which when ignited is directed toward the center of said combustion chamber.

In the upper inner wall of the combustion chamber 27 is cut a plurality of notches 32, in which are positioned the outer ends of the radial legs 33 formed integral with a depending cone-shaped baffle member 34. This member 34 may be removed from the combustion chamber 27 when desired.

The baffle member 34 is hollow as indicated in Fig. 2 of the drawings, and the upper end thereof is provided with an outwardly and downwardly curved flange 35; and screwed to, or otherwise secured to the bottom of the baffle member 34 is a cylindrical plate 36 having a downwardly extending projection 37 in the form of a truncated cone.

This baffle plate 36, 37 is preferably formed of steel or some metal which is capable of withstanding a most intense heat.

The center of said baffle plate 36, 37 is in axial alinement with the vertical nozzle 24 through which oil is admitted to the combustion chamber.

From the cone-shaped depression 17 extends a downwardly inclined pipe 38, said pipe extending across the air space 14 through the flange 13 and terminating in the space 39 between the flange 13 and the outer wall of the base 10.

In operating the burner, illuminating gas is admitted to the pipe 30; and said gas is ignited as it passes from the nozzle 31, thereby forming a pilot flame directed toward the outer wall of the cone-shaped baffle member 34.

Air is then admitted to the supply pipe 16 and oil is admitted to the pipe 23. The air passing through the pipe 16 is under pressure and the only manner in which it may escape is through the restricted passage between the cone-shaped flange 18 and the wall of the cone-shaped depression 17.

As the air passes downwardly into the bottom of the depression 17 surrounding the nozzle 24, it will be forced upwardly into the opening 19, in which opening it will be mixed with the oil being discharged through the orifice 25.

As the mixture of oil and air is forced upwardly through said opening 19, it will become ignited by the flame being projected by the nozzle 31. When the mixture of fuel has been ignited, the flames circulating upwardly from the opening 19 in the cover plate 20, will be projected against the baffle plate 36, 37 and diverted outwardly in a horizontal direction against the inner walls of the combustion chamber 27.

The flames which are not projected against the baffle plate 36, 37 will be projected against the inclined wall of the cone-shaped baffle member 34, and follow along this surface upwardly until they come into contact with the lower wall of the curved flange 35, when they will be diverted outwardly and downwardly against the inner wall of the combustion chamber and across the path of the flames being diverted horizontally by the baffle plate 36, 37.

As a consequence of the impinging of the combustible mixture against the baffle member 34 and baffle plate 36, 37, and also against the inner wall of the combustion chamber 27, all of the particles of the mixture will be caused to move in intersecting paths within the combustion chamber, thereby causing an intense blue flame within said combustion chamber.

The baffle members 34, 36, and 37 will become intensely heated and a great heat will arise from the combustion chamber, sufficient to fill the firepot of any furnace in which the device may be located.

Should it become necessary at any time to discontinue temporarily the use of oil or other hydro-carbon fuel for heating purposes, the gas pipe 30 may be displaced from the wall of the combustion chamber 27, and this chamber 27, with the baffle members 34, 36, and 37, can be then removed from the firepot and the cover 28 superimposed upon the base 10, so that without displacing the base 10 and the oil and air pipes, a coal fire may be built directly upon top of said cover 28 and around the base 10.

It may be possible that before the proper degree of heat is attained, a portion of the fuel may collect in the bottom of the depression 17, around the nozzle 24, and in such an event this fuel is permitted to pass down the inclined pipe 38 into the space 39, from which it is adapted to pass through the exhaust pipe 40.

In some cases, and under some conditions, it is preferable to have the heat from the flames within the combustion chamber pass therefrom radially rather than upwardly, as would be the case in the device shown in Figs. 1 and 2. Where this is desired, the cylindrical combustion chamber is made as shown in Figs. 3 and 4 of the drawings, the upper portions thereof being cut away at 41, leaving upwardly extending supports 42 for the outer ends of the legs 33.

In this modified form of structure, the flange 35 at the upper end of the baffle member 34 is made of greater diameter and a greater degree of curvature, as shown in

Fig. 4 of the drawings, so that any flame striking the surface of the baffle member 34 will be forced downwardly into the interior of the lower part of the combustion chamber, and in so doing, said flames will intersect the intensely heated products of combustion passing outwardly beneath said flange and through the openings 41.

In order to obtain the best results, the air from pipe 16 must enter the air space 14 surrounding the central boss 12, and then pass through the restricted passage beneath the cone-shaped flange 18 until it enters the opening 19 and is forced upwardly therethrough in a vertical plane against the horizontal baffle plate 36, 37, and the orifice 25 in the oil nozzle 24 must be located above the bottom of flange 18 so that the inrush of air entering the opening 19 will break up the oil discharged from said orifice 25 into vapor for combustion.

This makes a very simple form of combustion chamber which is capable of producing an intense heat from hydro-carbon fuel.

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

Having thus described my invention, I claim:

1. In a fuel oil burning device, the combination of a base provided with an annular air space surrounding a cylindrical boss having a cone-shaped depression in its upper end; a cover plate secured to said base and provided with an opening surrounded by a cone-shaped flange extending into said depression; an oil nozzle in said depression; an oil supply pipe communicating therewith; means for supplying air to said annular air space; a cylinder superimposed upon said base; and means positioned in the upper end thereof for diverting the mixture of oil and air toward the wall of said cylinder.

2. In a fuel oil burning device, the combination of a base provided with an air space surrounding a cylindrical boss having a cone-shaped depression in its upper end; a cover plate secured to said base and provided with an opening therethrough surrounded by a cone-shaped flange extending into said depression; an oil nozzle in said depression; an oil supply pipe communicating therewith; means for supplying air to said annular air space; a cylinder superimposed upon said base; and a depending cone-shaped member positioned in the upper end thereof for diverting the mixture of oil and air toward the wall of said cylinder.

3. In a fuel oil burning device, the combination of a base provided with an annular air space surrounding a cylindrical boss having a cone-shaped depression in its upper end; a cover plate secured to said base and provided with an opening therethrough surrounded by a cone-shaped flange extending into said depression; an oil nozzle in said depression; an oil supply pipe communicating therewith; means for supplying air to said annular air space; a cylinder superimposed upon said base; and a depending cone-shaped member positioned in the upper end thereof provided with a downturned flange at its upper end for diverting the mixture of oil and air toward the wall of said cylinder.

4. In a fuel oil burning device, the combination of a base provided with an annular air space surrounding a cylindrical boss having a cone-shaped depression in its upper end; a cover plate secured to said base and provided with an opening therethrough surrounded by a cone-shaped flange extending into said depression; an oil nozzle in said depression; an oil supply pipe communicating therewith; means for supplying air to said annular air space; a cylinder superimposed upon said base; means positioned in the upper end thereof for diverting the mixture of oil and air toward the wall of said cylinder; and a flanged member secured to the bottom of said diverting means and provided with a cone-shaped projection above the oil inlet nozzle.

5. In a fuel oil burning device, the combination of a base provided with a central upwardly extending boss having a cone-shaped depression in its upper end and an annular upwardly extending flange surrounding said boss and separated therefrom to form an air space; a cover secured to said flange and having an opening surrounded by a cone-shaped flange depending into said depression; a nozzle disposed in said boss with its discharge outlet positioned in the center of opening in said cover; means for admitting air to said air space; an oil supply pipe communicating with said nozzle; a cylindrical combustion chamber superimposed on said base; and baffle members in the upper end thereof.

6. In a fuel oil burning device, the combination of a base provided with a central upwardly extending boss having a cone-shaped depression in its upper end and an annular upwardly extending flange surrounding said boss and separated therefrom to form an air space; a cover secured to said flange and having an opening surrounded by a cone-shaped flange depending into said depression; a nozzle disposed in said boss with its discharge outlet positioned in the center of the opening in said cover; means for admitting air to said air space; an oil supply pipe communicating with said nozzle; a cylindrical combustion chamber superimposed on said base; baffle members in the upper end thereof; a drain pipe extending from said depression across said air space and through said annular flange; and

a pipe extending downwardly from the bottom of said base and adapted to drain the oil from the interior of said base.

7. In a fuel oil burning device, the combination of a base provided with an annular air space surrounding a cylindrical boss having a cone-shaped depression in its upper end; a cover plate secured to said base and provided with an opening therethrough surrounded by a cone-shaped flange extending into said depression; an oil nozzle in said depression; an oil supply pipe communicating therewith; means for supplying air to said annular air space; a cylinder superimposed upon said base; and a depending cone-shaped member positioned in the upper end thereof by means of radiating arms, the ends of which rest in depressions in the wall of said cylinder, said cone-shaped member being adapted to divert the mixture of oil and air toward the wall of said cylinder.

8. In a fuel oil burning device, a combustion chamber; means for admitting air to the center thereof through a central opening; an oil discharge nozzle centrally positioned in said opening; and a cylindrical plate within said chamber and alined with said nozzle, said plate having a depending portion in the form of a truncated cone with a broad flat lower face.

9. In a fuel oil burning device, a combustion chamber; means for admitting air to the center thereof through a central cone-shaped opening flaring outwardly from its lower end; an oil discharge nozzle centrally positioned in said opening; and a cylindrical plate within said chamber and alined with said nozzle, said plate having a depending portion in the form of a truncated cone with a broad flat lower face.

10. In a fuel oil burning device, a combustion chamber; a member centrally positioned in the bottom thereof having a cone-shaped opening therethrough flaring outwardly from the bottom thereof and forming a mixing chamber; an oil nozzle centrally positioned in said opening; and means positioned above said opening for diverting the flame laterally against the inner wall of said combustion chamber.

11. In a fuel oil burning device, a combustion chamber; a member centrally positioned in the bottom thereof having a cone-shaped opening therethrough flaring outwardly from the bottom thereof and forming a mixing chamber; an oil nozzle having its outlet centrally disposed in said opening near the bottom thereof; and means positioned above said opening for diverting portions of the flame upwardly and outwardly and then downwardly against the inner wall of said combustion chamber.

12. In a fuel oil burning device, a combustion chamber; a fuel mixing chamber centrally positioned in the bottom thereof; a cone-shaped depending member in the upper part of said combustion chamber having a flat bottom and an outwardly and downwardly curved flange at its upper end; and a cylindrical plate secured to the lower end of said depending member provided with a depending portion in the form of a truncated cone.

13. In a fuel oil burning device, a combustion chamber; a fuel mixing chamber centrally positioned in the bottom thereof; means positioned above said mixing chamber for diverting portions of the flame upwardly and outwardly and then downwardly against the inner wall of the combustion chamber; and means for diverting another portion of the flame horizontally to intersect the first mentioned portions.

14. In a fuel oil burning device, a combustion chamber; a fuel mixing chamber centrally positioned in the bottom thereof having a wall extending upwardly and outwardly from the bottom thereof; an oil discharge nozzle centrally positioned in the bottom of said mixing chamber; and a depending cone-shaped member above said mixing chamber with its wall substantially parallel with the wall of said mixing chamber.

15. In a fuel oil burning device, a combustion chamber; a fuel mixing chamber centrally positioned in the bottom thereof with its wall flaring upwardly and outwardly; a depending cone-shaped member in said combustion chamber above said mixing chamber; a horizontal baffle plate secured to the lower end of said member; and an oil nozzle centrally positioned in the lower end of said mixing chamber whereby a mixture of oil and air will be projected against said horizontal baffle plate and thereby deflected outwardly toward the inner wall of said combustion chamber.

Signed by me at 746 Old South Bldg., Boston, Mass., this 23d day of March, 1923.

LAWRENCE E. JOHNSON.

Witnesses:
WALTER E. LOMBARD,
NATHAN C. LOMBARD.