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F. H. ANDERSON

OIL BURNING FURNACE

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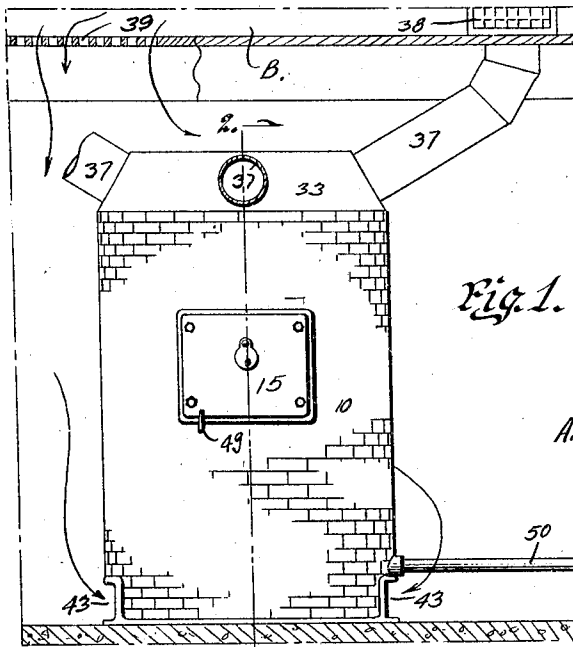


Fig. 1.

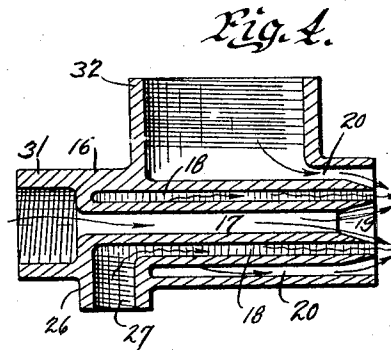


Fig. 4.

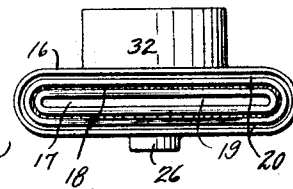


Fig. 5.

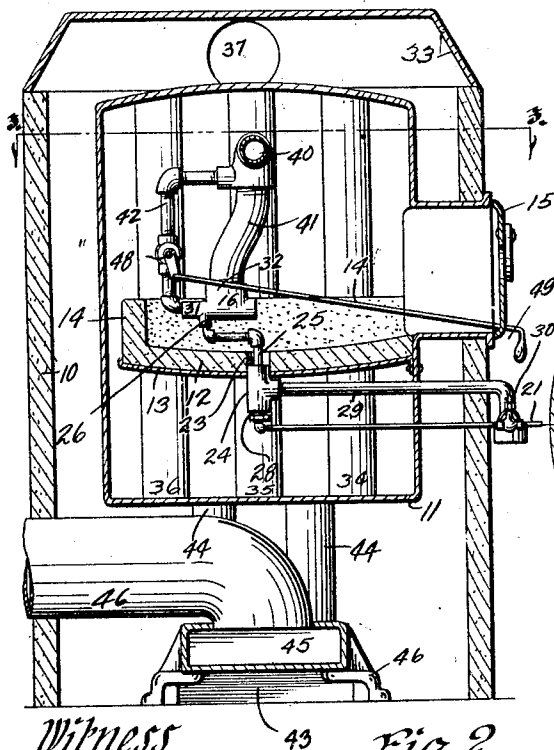


Fig. 2.

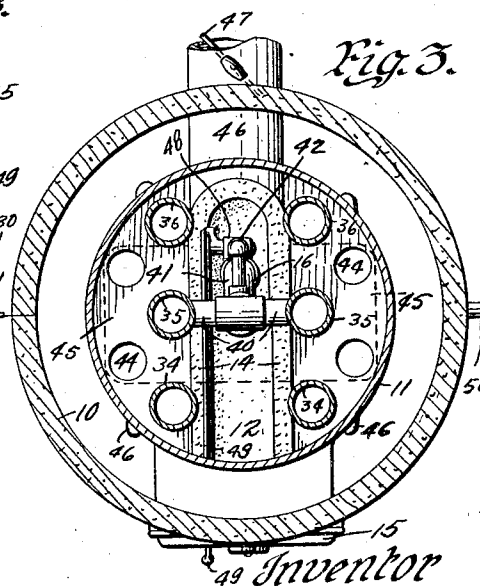


Fig. 3.

Witness
Ray Fisher

Inventor
Frank H. Anderson
by *Bair & Freeman* Attorneys

UNITED STATES PATENT OFFICE.

FRANK H. ANDERSON, OF DES MOINES, IOWA.

OIL-BURNING FURNACE.

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My invention relates to an oil burning furnace.

The purpose of my invention is to provide an oil burning furnace of simple and relatively inexpensive construction.

More particularly, it is my object to provide a furnace structure of the type using oil as a fuel in which there is provided a burner of novel and efficient construction.

A further purpose is to provide such a furnace having a simple and cheap and inexpensive construction and arrangement of the heating chamber.

Still an additional object of my invention is to provide a furnace of the kind just mentioned having a novel construction for carrying the gases of combustion to a chimney or stack.

Another purpose is to provide in such a furnace structure such an arrangement of air conducting tubes as makes it possible to heat a maximum amount of air with the heat afforded by the furnace.

Another purpose is to provide such a structure with parts so arranged as to insure ventilation of the rooms heated from the furnace.

Still an additional purpose is to provide in connection with the air conducting means of the furnace, means for taking off part of the heated air and using it for the burner for thus providing heated air for securing complete combustion.

In this connection, it is part of my purpose to constantly use for the air thus supplied to the burner, some of the air taken from the rooms being heated, for thus drawing off during the operation of the furnace a part of the air, which is being used in the heated rooms and discharging it through the stack and insuring the constant changing of the supply of air sent to the rooms.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my oil burning furnace, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a front elevation of an oil

burning furnace embodying my invention, parts of the building structure being shown in section.

Figure 2 shows a vertical, sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a horizontal, sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a vertical, sectional view through the burner; and

Figure 5 is an elevation of the burner showing the discharge end of the burner nozzle.

For greater convenience, I have shown a compartment indicated by the character A, which may be a basement in which the furnace is placed and have shown a portion of a room B, whereby the operation of the furnace may be better shown.

In the room A is the furnace comprising the casing indicated generally by the reference numeral 10. This casing may be of any suitable structure adapted for the purpose.

Located within the casing 10 is the furnace chamber proper 11, which forms the heating or combustion chamber. The furnace chamber proper 11 is spaced above the bottom of the casing 10, as shown in Figure 2, and contains the burner, which will now be described.

Suitably supported above the bottom of the combustion chamber or furnace casing 11 is a false bottom or the like 12, preferably made of refractory material resting on a steel cross member 13.

It will be understood that the members 12 and 13 extend substantially across the furnace chamber 11 and are all of a width substantially less than the diameter of the chamber 11 as shown in Figure 3.

The false bottom has at each side and at its end a slightly raised wall 14. The casing 10 is provided with a door 15 for providing access to the interior of the casing and to the burner.

My improved burner, which is of novel construction, comprises a casting or member 16 of considerably greater width than vertical thickness having a relatively wide horizontal central passage 17 extending through it from rear to front.

Surrounding the passage 17 is an ellipti-

cal passage 18 closed at its rear end and open at its front end as shown in Figure 4. The front end of the passage 17 is preferably flared somewhat as at 19 in Figure 4.

5 Outside the passage 18 is another elliptical passage 20, also shown in Figures 4 and 5.

Fuel oil is supplied to the burner through a suitable pipe 21 connected with a source of supply and extended through the walls of the casings 10 and 11 as shown in Figure 2.

10 The bottom member 12 has its upper surface slightly concave and inclined toward a central opening 23 extending downwardly through it.

15 Connected with the opening 23 is a downwardly projecting tube 24 extended through the steel bottom 14.

Connected with the pipe 21 is a pipe section 25 forming part of the oil supply pipe extending upwardly through the pipe 24 and the opening 23 and connected as at 26 with an inlet passage 27 (see Figures 2 and 4) communicating with the rear end of the oil nozzle passage 18 already referred to. The lower end of the pipe 24 is closed by a fitting 28.

A drain pipe 29 leads from the lower part of the tubular pipe 24 outwardly through the walls of the casings 10 and 11 as shown in Figure 2 to an automatic shut-off device 30, which does not in itself form part of my invention, and which is designed to shut off flow of oil through the pipe 20 in case the burner should drain out through the pipe 29.

35 It will be seen from the foregoing that fuel oil is supplied through the pipe 21 and the pipe 25 to the burner nozzle passage 18 of the burner 16.

40 The construction of my furnace and burner is such that the end of the fuel burner passage 18 is elliptical and discharges the combustible gases formed from the fuel in the form of an elliptical tube.

45 It is my purpose to supply air to the passages 17 and 20. The air from the passage 17 discharges inside the elliptical tube of combustible gases and the air discharged from the elliptical passage 20 forms an elliptical column or tube of air around the combustible gases.

50 The manner of supplying the air to the passages 17 and 20 will now be described. At the rear end of the passage 17 is an inlet 31 and at the top of the passage 20 is a larger inlet 32.

60 At the top of the furnace is the usual hood 33. Mounted in the top and bottom of the casing 11 and extending upwardly through that casing is a plurality of air conducting pipes arranged in opposite pairs 34, 35 and 36. The number of such pipes and their sizes may, of course, be varied depending upon the size of the furnace under

consideration and the size, number and location of the rooms to be heated. 65

The manner of supplying air to the lower ends of the pairs of pipes 34, 35 and 36 will be hereafter referred to. These pipes discharge into the hood 33 from which hot air pipes 37 conduct the heated air into rooms, such as the room B, which may be provided with registers 38 or the like and with cold air registers 39. 70

Above the burner 16, the pipes of the pair 35 are connected by short pipe sections 40 with a pipe 41 extending to and connected with the inlet 32 of the air passage 20. The pipe sections 40 are located below the top of the combustion chamber or furnace casing 11 perhaps eight or ten inches, the distance varying somewhat under different circumstances. 75

80 An air by-pass pipe 42 communicates as for instance with the pipe 41 and with the inlet 31 of the air passage 17. At the bottom of the casing 10 are openings 43 to admit air, and it will thus be seen that air will come from the room B through the register 39, thence through openings 43 to the lower interior of the casing 10, and thence upwardly through the pipes 34, 35 and 36 to the hood 33. 85

Air also passes upwardly from the lower part of the casing 10 around the outside of the casing 11 and is thus heated by radiation from the casing 11. 95

This air also passes from the hood 33.

In this connection, it may be mentioned that the casing 11 is spaced from the casing 10 at different distances in different sizes of furnaces depending upon all the circumstances. 100

The gases of combustion after they have been burned in the casing 11 are discharged downwardly through pipes 44 leading from the bottom of the casing 10 to a hollow casing or the like 45, which is located near the bottom of the casing 10, but supported above the bottom by legs 46 or the like to allow free circulation of air around such casing 45. 105

A smoke pipe or the like 46^a leads from the casing 45 to the stack. In the smoke pipe 46 is a control damper 47. 115

In the by-pass 42 is a control valve 48, which is manually operated by means of a rod or the like 49 projecting to the outside of the casing 10.

In the practical use of my improved oil burning furnace, oil is supplied through the pipe 21 to the burner. The first supply of oil may be generated in any ordinary way. Thereafter it gets so hot in the casing 11 that gases form from the oil before it is discharged from the nozzle passage 18. This gas is discharged as has been stated in the form of an elliptical, tubular, horizontal 120 125

column with an air supply on the inside and with an air supply on the outside of the fuel case column. This peculiar arrangement of the burner and the air supply insures complete combustion of the oil gases.

The air supply can be controlled by means of the valve 48. Air passing into the casing 10 through the openings 43 will, of course, pass upwardly around the casing 11 and through the pipes 34, 35 and 36 to the hood 33 and thence through the air pipes 37 to the various rooms to be heated. From the rooms, the air is again drawn into the furnace.

A portion of the air thus circulating is constantly taken off through the pipe 41 for use with the burner.

A like amount of air must be constantly replenished and refurnished and this is easily accomplished on account of the fact that some fresh air gets into the room to be heated.

In order to insure the furnishing of a constant supply of fresh air from out of doors, there is provided a pipe 50 leading from the lower part of the casing 10 through the wall of the room A to some point outside.

A furnace of this kind has a large number of advantages.

It will be seen that it insures the constant and regular changing of the supply of air in the heated rooms.

It will be noted also that its construction is such as to insure the most effective use of the heat for heating or warming the largest amount of air.

The use of the casing 11 spaced from the wall of the casing 10 affords a large area of surface for heat radiation both inside and outside the casing 11. The provision of the pipes 34, 35 and 36 also affords increased radiating surface.

By taking the air for the burner from the pipes 35 in the manner hereinbefore described, it is seen that the air used for the burner is thoroughly heated before it is mingled with the oil gases. This also serves to insure maximum combustion.

For clearness, it may be said that there is a plurality of pipes 44, four being shown in the present instance, leading from the bottom of the casing 11 downwardly to the hollow casting or casing 45. From the hollow casting or casing 45, the smoke pipe 46 conducts the exhaust gases to the stack.

It will be noted that the cold air passes around the pipes 44, the casing 45, and the pipe 46 within the casing 10 for thus taking from all the exhaust gases almost all their remaining heat.

By using proper connections and fittings, this furnace and burner could be used with steam or hot water. The pipes 34 and 36

could be used for water, if properly connected.

Changes may be made in the details of the construction and arrangement of the various parts of my oil burning furnace without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a furnace structure of the class described, a combustion chamber, a burner therein, a pipe for conducting air vertically through the combustion chamber, and means for taking air from the upper part of said pipe and supplying it to said burner, whereby the air to be thus supplied to the burner may be properly pre-heated.

2. In a furnace structure of the class described, a combustion chamber, a burner therein, a pipe for conducting air vertically through the combustion chamber, and means for taking a part of the air from the upper part of said pipe, and supplying it to said burner, whereby the air to be thus supplied to the burner may be properly pre-heated.

3. In a furnace, an outer casing, a combustion casing therein spaced from the walls of the outer casing and spaced from the bottom thereof, a hood at the top of the outer casing, air pipes passing vertically through the inner casing, a burner in the inner casing, and means for taking air from said air pipes to supply the burner.

4. In a furnace structure of the class described, an outer casing, an inner casing spaced from the bottom and side walls of the outer casing, a hood at the top of the outer casing, air pipes extending vertically through the inner casing, a burner in the inner casing, means for supplying air from the hood to a room to be heated, and an intake opening at the bottom of the outer casing.

5. In a furnace structure of the class described, an outer casing, an inner casing spaced from the bottom and side walls of the outer casing, a hood at the top of the outer casing, air pipes extending vertically through the inner casing, a burner in the inner casing, means for supplying air from the hood to a room to be heated, an intake opening at the bottom of the outer casing, and means for affording communication between the room to be heated and the room in which the furnace is located.

6. In a furnace structure of the class described, an outer casing, an inner casing spaced from the bottom and side walls of the outer casing, a hood at the top of the outer casing, air pipes extending vertically through the inner casing, a burner in the

inner casing, means for supplying air from the hood to a room to be heated, an intake opening at the bottom of the outer casing, a casing spaced below the inner casing, 5 means for providing communication between said third casing and the inner casing, and a discharge pipe leading from the third casing.

7. In a furnace structure of the class described, an outer casing, an inner casing 10 spaced from the bottom and side walls of the outer casing, a hood at the top of the outer casing, air pipes extending vertically through the inner casing, a burner in the inner casing, means for supplying air from 15 the hood to a room to be heated, an intake opening at the bottom of the outer casing, a casing spaced below the inner casing, means for providing communication between said third casing and the inner casing, and a dis- 20 charge pipe leading from the third casing,

said third casing being supported above the bottom of the outer casing.

8. In a furnace of the class described, an outer casing, an inner casing therein comprising a combustion chamber, a burner in 25 the inner casing, a plurality of pipes leading vertically through the inner casing for conducting air therethrough, means for taking air from the upper portion of said pipes within the inner chamber and conducting 30 such air to the burner, a plurality of passages leading from the bottom of the inner casing downwardly, a casing in the lower part of the outer casing having communication with all of said last pipes, and an out- 35 let pipe extending from said last described casing in the lower part of the outer casing outwardly through the wall of the outer casing.

FRANK H. ANDERSON.