Nov. 11, 1930. J. F. SHELTON 1,780,984

FURNACE

Filed March 28, 1929 2 Sheets-Sheet 1

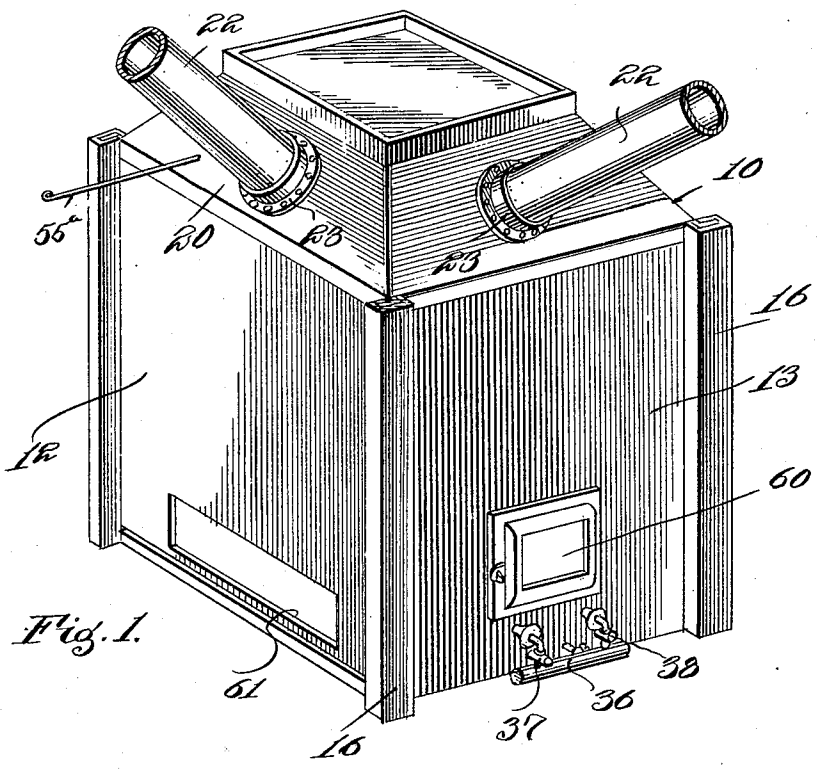


Fig. 1.

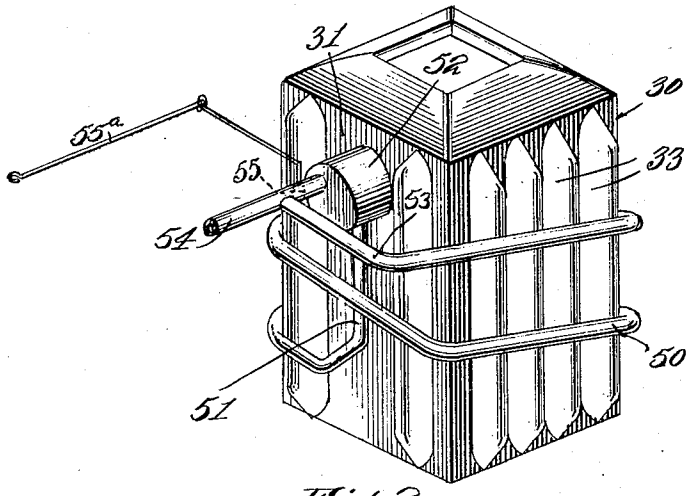


Fig. 2.

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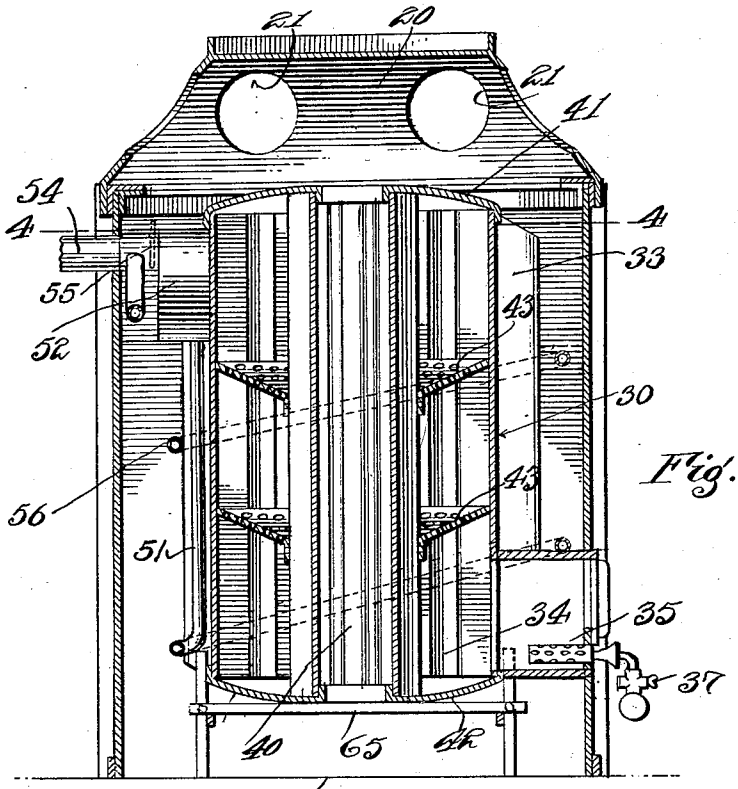


Fig. 3.

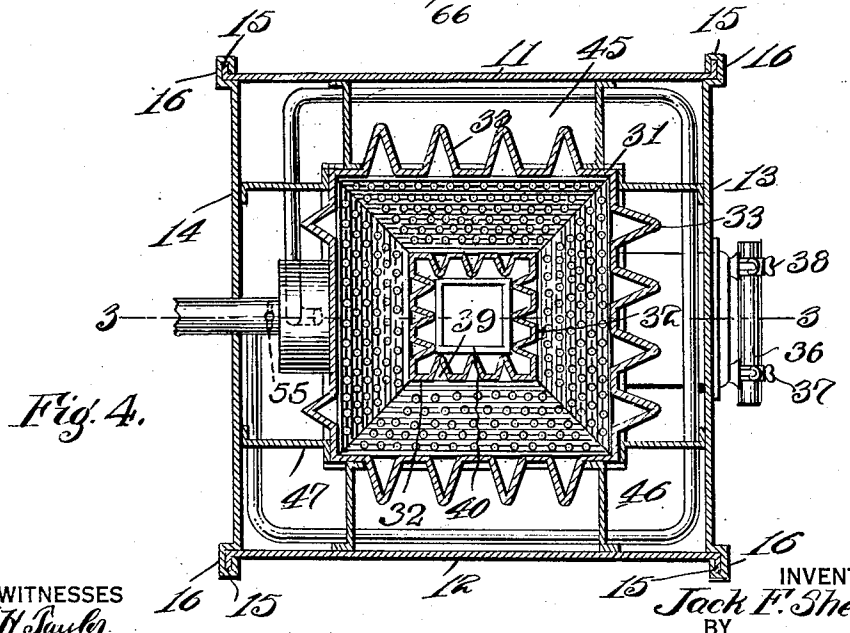


Fig. 4.

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UNITED STATES PATENT OFFICE

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FURNACE

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This invention relates to furnaces.

An object of the invention is the provision of a furnace having a centrally disposed hot air conduit and air passages located in embracing relation with the central conduit with the passages and the central conduit being separated from each other by a heating shell or casing through which hot gases are passed by a tortuous path with the heating shell having angularly disposed heat-radiating fins disposed exteriorly and interiorly of the shell and in open communication with said shell.

Another object of the invention is the provision of a furnace having a plurality of hot air passages which are heated by a hollow shell through which gases evolved from an oil burner or from a coal grate are conducted, said passages being disposed in heat exchange relation with the shell, a spiral tubular passage or conduit being connected with a discharge pipe and with the hollow shell, a valve being employed for controlling the passage of the hot gases from the hollow shell to the usual chimney or to the spiral conduit.

A further object of the invention is the provision of a furnace having a burner for producing hot gases which are conducted into a heating shell located centrally of the furnace by means of a spirally arranged conduit, a header being in communication with the hollow shell and with one end of the conduit, a valve being employed for controlling the admission of the gases directly to the header or to the usual chimney, said shell having hollow fins in close association with the spirally arranged conduit.

A still further object of the invention is the provision of a furnace formed of an outer shell or casing composed of a plurality of walls, a pair of opposed walls having right angularly disposed flanges adapted to be received within longitudinally disposed grooves formed at the opposite edges of the other side walls, whereby the first-mentioned side walls may be readily removed from the last-mentioned side walls.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a view in perspective constructed in accordance with the present invention,

Figure 2 is a view in perspective of the inner heating shell of the furnace,

Figure 3 is a vertical section taken along the line 3—3 of Figure 4, and

Figure 4 is a horizontal section taken along the line 4—4 of Figure 3.

Referring more particularly to the drawings, 10 generally designates an outer shell of a furnace which is composed of a pair of side walls 11 and 12, a front wall 13 and a rear wall 14. The side walls have their vertical edges turned laterally at an angle to provide flanges 15 which are adapted to be received within sockets formed by bending the side edges of the front and rear walls into a U-shaped member 16. By this construction the side walls 11 and 12 may be readily and removably connected to the edges of the front and rear wall by causing the flanges 15 to slide into the sockets formed by the U-shaped member 16.

Resting upon the upper edges of the side walls, the front and rear walls, is a top or closure 20, having openings 21 which are adapted to receive air pipes 22 secured to the outer surfaces of the top 20 by means of flanged rings or collars 23. The space formed by the top 20 is adapted to provide a hot air chamber from which the air is conducted by means of the pipes 22 to the various rooms of a building which is adapted to be heated by the furnace.

A centrally disposed heating shell, generally designated by the numeral 30 and shown more particularly in Figure 2 as a unit, consists of an outer casing 31 and an inner casing 32. The outer casing is provided with a plurality of vertically disposed ribs 33 which are V-shaped in cross section and in open communication with the chamber

34 into which hot gases are conducted from an oil burner, generally designated by the numeral 35, or from a coal grate which may be substituted or utilized instead of the oil burner. The oil burner is applied by means of a pipe 36 and the flow of the oil to the burner is controlled by means of valves 37 and 38.

The inner partition or casing 32 has its side walls vertically corrugated to provide ribs 39 which are in communication with the chamber 34 of the hollow shell 30. The ribs 39 are triangular in cross section. These corrugations or ribs 33 and 39 form additional radiating surfaces for the hollow shell and around which and through which the hot air travels when being heated before it enters the chamber 20 in the top of the furnace. An air flue 40 is located centrally of the shell 30 and is formed by the ribbed walls of the inner casing 32.

The bottom and top of the shell 30 are closed as indicated at 41 and 42. The perforated baffles 43 are located in spaced relation within the chamber 34 of the shell 30 and further aid in providing a tortuous path for the hot gases entering the chamber 34 for aiding in radiating the heat to the ribs or corrugations 33 and 39. The top and bottom members 41 and 42, respectively, are securely sealed to the top and bottom edges of the partitions 31 and 32 in order to prevent the escape of the gases from the heating apparatus to the hot air passing through the flue 40 and through the space 45 in the outer shell or casing 10.

A plurality of partitions 46 and 47 are located within the space 45 and extend vertically of the furnace and are connected with the outer walls of the shell 10 and with the outer partition 31 of the inner shell 30. These partitions provide channels for the passage of air from the bottom of the furnace to the storage chamber 20.

A spiral conduit, generally designated by the numeral 50, is connected through its lower end by means of a conduit 51 to a header 52 which is in open communication with the chamber 34 of the central shell 30. The opposite or upper end 53 of the spirally arranged conduit is connected with an outlet pipe 54 whereby the exhaust gases from the burner are conducted to the usual chimney. A valve 55 is located in the conduit 54 between the upper terminous of the spiral conduit 50 and the header 52 so that when the valve 55 is closed the exhaust gases from the chamber 34 which have entered the header 52 are passed downwardly through the vertical portion 51 of the conduit 50 and then around the spiral conduit and will be discharged into the exhaust conduit 54. However, when the valve 55 is open the greater portion of the exhaust gases from the chamber 34 will pass directly through the header and through the discharge conduit 54 to the chimney.

The burner casing 35 is in direct communication at its inner end with the chamber 34 so that the gases of combustion of either an oil burner or of a coal grate will pass directly into the chamber 34 at its lower end and through the perforated baffles 43, thence through the header 52, after which it will be conducted around through the spiral conduit 52 or directly through the discharge conduit 54, depending upon the position of the valve 55.

A door 60 is adapted to normally close an opening or passage leading into the burner chamber 25. An opening 61 formed in one side wall or in both side walls is adapted to permit air to enter the chamber 45 of the outer casing or shell 10 whence it will be conducted through the said chamber and through the central conduit 40 where it is hid during its passage through the said chamber and flue before it enters the storage chamber 20. A metal bracket 65 resting upon the floor 66 is adapted to support the lower end of the inner shell 30.

The operation of my device is as follows: The heat is produced either by means of a coal grate or preferably by an oil or gas burner located within the casing 35. Since this casing is in direct contact with the chamber 34 in the inner shell 30 the gases of combustion will enter said chamber and pass upwardly against the baffles 43 and through the hollow ribs 33 and 39 while heating said surfaces. Air which has entered the opening 61 will pass upwardly and in close association with the side walls of the inner shell 30 and particularly in close association with the hollow ribs 33 and the ribs 39. The air also passes through the central flue or conduit 40 and in this connection it will be noted that the partitions 46 and 47 co-operate with the hollow ribs 33 and 39 for radiating the heat to the air which passes through the furnace.

When it is desired to increase the heating capacity of the furnace the valve 55 is closed, whence the hot exhaust gases from the chamber 34 will pass downwardly through the pipe 51 and thence be conducted through the spiral member 50 before said gases are discharged into the discharge pipe 54. In this manner heat not only from the inner shell 30 but the heated spiral conduit 50 will act to raise the temperature of the air passing through the furnace.

I claim:

1. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, spiral tubing having one end in communication with the outer shell and the other end connected to the discharge pipe.

2. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, spiral tubing having one end in communication with the outer shell and the other end connected to the discharge pipe, and a valve for controlling the circulation of gases through the spiral tubing.

3. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, spiral tubing having one end in communication with the outer shell and the other end connected to the discharge pipe, and a valve in the discharge pipe for causing circulation of combustion gases through the spiral tubing.

4. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, a header in open communication with the outer shell, the discharge pipe being connected with the header, a spiral tubing having the lower end thereof connected to the header and encircling the outer shell, the other end of the tubing being in communication with the discharge pipe.

5. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, a header in open communication with the outer shell, the discharge pipe being connected with the header, a spiral tubing having the lower end thereof connected to the header and encircling the outer shell, the other end of the tubing being in communication with the discharge pipe, and a valve in the discharge pipe for causing circulation of the exhaust gases through the spiral tubing.

6. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the outer shell, a discharge pipe connected with the outer shell, a header in open communication with the outer shell, the discharge pipe being connected with the header, a spiral tubing having the lower end thereof connected to the header and encircling the outer shell, the other end of the tubing being in communication with the discharge pipe, the header being connected to the upper end of the outer shell.

7. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the hollow shell, a discharge pipe connected with the hollow shell, spiral tubing having one end in communication with the outer shell and the other end connected to the discharge pipe, and a valve in the discharge pipe for causing circulation of exhaust gases through the spiral tubing, hollow ribs projecting from and in communication with the outer shell, said ribs acting to space the spiral tubing from the outer walls of said shell.

8. A furnace comprising an outer shell, an inner hollow shell having a passage therethrough for hot air, a combustion chamber in communication with the hollow shell, a discharge pipe connected with the hollow shell, spiral tubing having one end in communication with the outer shell and the other end connected to the discharge pipe, and a valve for causing circulation of exhaust gases through the spiral tubing, partitions connected betwen the outer and inner shells and provided with passages to receive and support the spiral tubing.

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