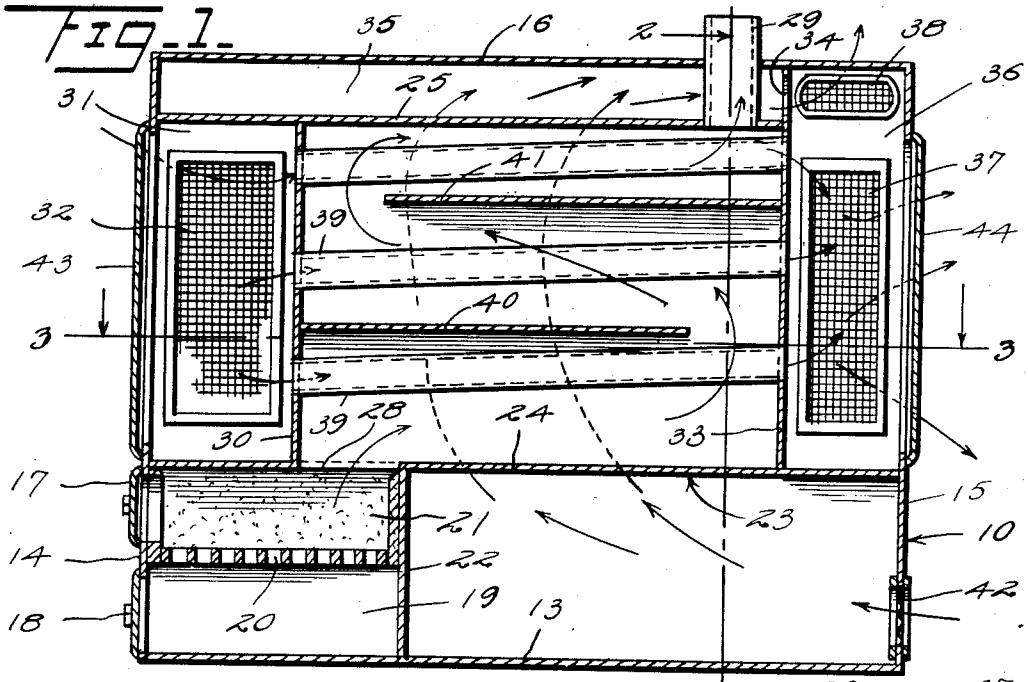
Nov. 21, 1933. J. H. LONG 1,935,852

HEATER

Filed April 21, 1932

Fig. 1.



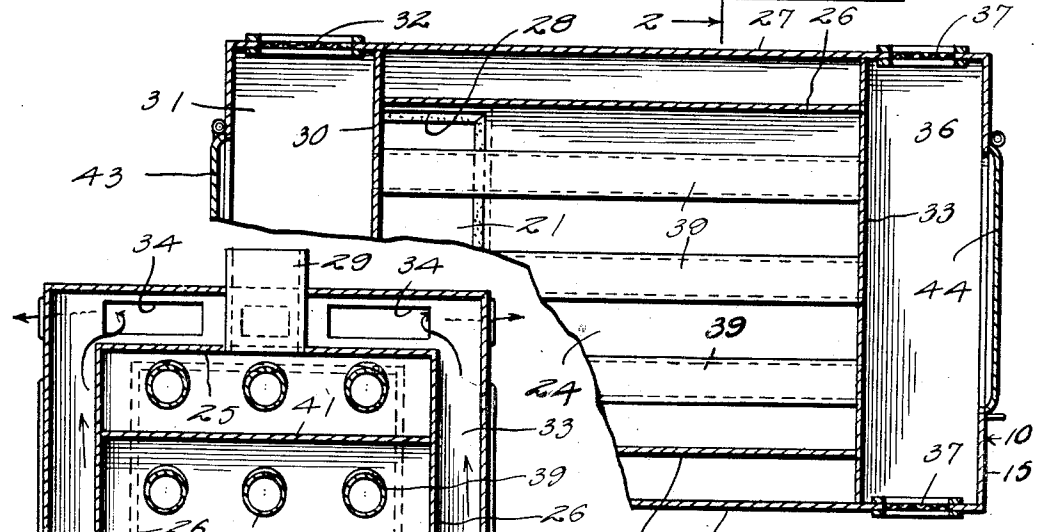
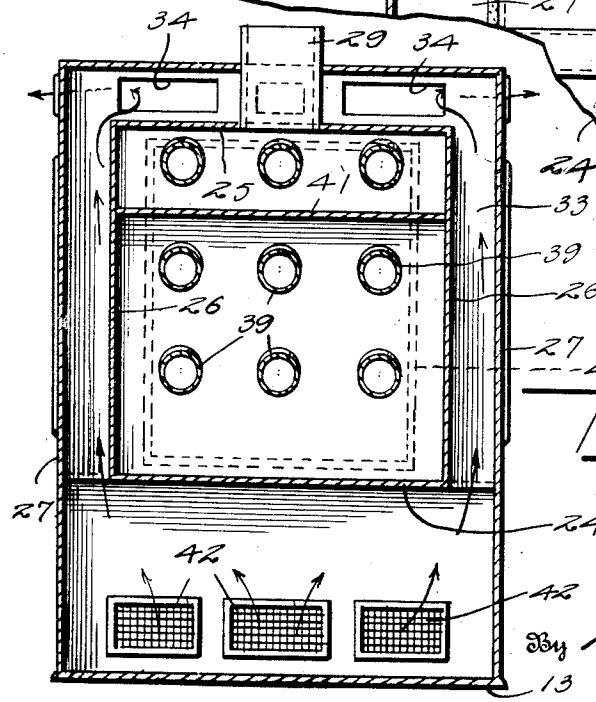


Fig. 3.

Fig. 2



Inventor

J. H. Long

By Watson E. Coleman

Attorney

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UNITED STATES PATENT OFFICE

1,935,852

HEATER

Joseph H. Long, Cleveland, Ohio

Application April 21, 1932. Serial No. 606,712

2 Claims. (Cl. 126—109)

This invention relates to heating apparatus and is an improvement over the construction disclosed in my co-pending application filed November 10, 1931, Serial No. 574,196 and my co-pending application filed March 5, 1932, Serial No. 596,991.

An object of this invention is to provide a heater of the horizontal type which is adapted to heat air, the air entering the heater being taken from the room in which the heater is mounted or from a point remote from the heater.

Another object of this invention is to provide a tubular air heater which is so constructed as to make use of substantially all of the heating units so that no heat or the like will be wasted.

A further object of this invention is to provide a construction of this kind which is exceedingly simple in construction so that it can be readily and cheaply manufactured.

The above and various other objects and advantages of this invention will in part be described in and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawing, wherein:—

Figure 1 is a vertical section taken substantially through the center of a device constructed according to the preferred embodiment of this invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary horizontal sectional view taken on the line 3—3 of Figure 1.

Referring to the drawing wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates generally a housing or outer shell comprising a bottom wall 13, a front wall 14, a rear wall 15, and a top wall 16. This casing or jacket is made in substantially rectangular form and the front wall 14 has a fire door 17 hingedly secured thereto above the bottom 13 and an ash door 18 below the fire door 17, so that ashes may be removed from the ash pit 19 disposed below grates 20 interposed between the fire box 21 and the ash pit 19.

While I have disclosed a fire box 21 having an ash pit 19 disposed therebeneath, I do not wish to be limited to this particular construction as, if desired, other heating means such as gas, or electricity may be disposed within the chamber comprising the fire box 21 and the ash pit 19. A vertically disposed rear wall 22 extends across the width of the jacket 10 at the rear end of the fire box 21 and the ash pit 19.

An inner jacket or combustion chamber 23 is mounted within the outer jacket 10 and is of a size such that an air passage is disposed thereabout. This inner jacket or combustion chamber 23 is provided with a bottom wall 24, a top wall 25 and side walls 26 which are disposed in spaced relation to the side walls 27 of the outer jacket 10. The bottom wall 24 is provided adjacent the forward end thereof with an opening 28 which communicates with the fire box 21 so that products of combustion may pass upwardly therethrough and into the combustion chamber 23 and outwardly through a smoke pipe 29. An inner wall 30 is provided for the combustion chamber 23 which is disposed inwardly of the forward wall 14 of the outer jacket 10, thereby providing an intake chamber 31 which communicates with the atmosphere through a grating or intake member 32 disposed on each side of the outer jacket 10.

A vertically disposed rear wall 33 extends from the bottom wall 24 to the top wall 16 of the outer jacket 10 and is provided adjacent the upper end thereof with outlet passages 34 which communicate with the air chamber 35 disposed about the exterior of the inner jacket 23 and within the outer jacket 10. The rear wall 33 of the inner jacket is disposed forwardly of the rear wall 15 of the outer jacket 10 so as to provide a mixing chamber 36 having outlets 37 in each side 27 of the outer jacket 10 through which the heated air passes into the room or the like. Upper outlets 38 are also provided in the side walls 27 adjacent the upper ends thereof so as to permit the passage of all heated air within this mixing chamber 36 outwardly thereof into the atmosphere.

A plurality of heater tubes 39 are secured at one end to the forward wall 30 and at the opposite end to the rear wall 33, and these tubes 39 extend through the combustion chamber 23, and are disposed in an upward inclination so that the heated air disposed therein will readily flow upwardly therethrough through the intake chamber 31 to the mixing chamber 36.

In order to provide a tortuous passage for the products of combustion within the combustion chamber 23, I have provided a plurality of baffles or plate members, one of which is secured to the forward wall 30 and is designated 40, and another designated 41 is secured to the rear wall 33 in a position above the lower baffle 40. Preferably, these baffles are disposed intermediate pairs of series of heater tubes 39 so as to deflect the heat within the combustion chamber

23 and cause this heat to be exhausted to a substantial degree within this combustion chamber 23, thereby heating the walls of the combustion chamber 23 and the surface of the heater tubes 39. In this manner, not only the air in the tubes 39 will become heated, but the air disposed about the inner casing 23 will be heated, and this air will flow upwardly from an intake port 42 in the forward wall 15 adjacent the bottom 13 and about the outer surface of the jacket 23 and through the outlets 34 into the mixing chamber 36, from which point the heated air passes outwardly through the outlet ports 37 and 38 in the side walls 27.

Through the provision of a heater as disclosed, it is not necessary, in order to obtain a flow of air through the horizontal heater, to use a forcing means in the form of a fan or the like within the intake chamber 31.

A front door 43 is hingedly secured to the forward wall 14 above the fire box 21 so as to permit access to the inner jacket 23 for cleaning out the intake chamber 31 and the tubes 39. A rear door 44 is secured to the rear wall 15 in the same manner as the front door 43, permitting access to the mixing chamber 36 and to clean out the rear end of the tubes 39.

In the use and operation of this device, the jacket 10 may be disposed in a room or portion of a building to be heated and the desired medium, either coal or other heating medium, placed in the forward and lower portion of the outer casing 10 beneath the chamber 23 so that hot air will pass upwardly through the outlet 28 and into the chamber 23.

If desired, pipes or conduits may be connected to the outlets 37 and 38 and in like manner, the cold air entering the intake ports 32 may be conducted thereto by means of suitable conduits or the like communicating with the atmosphere at a point remote from the heater. In this manner, the heater may be mounted in the cellar or lower portion of a building and the hot air conducted to the desired portions of the building through conventional hot air conduits. The hot gases passing out through the opening 28 will enter the combustion chamber 23 and strike the lower baffle or partition 40 and pass about the rear end of this baffle, which rear end is disposed forwardly of the rear wall 33. Rising upwardly, as shown by arrows, the hot gases will pass between the baffles 40 and 41, and be directed forwardly and about the forward end of the upper baffle 41, the upper baffle 41 having the forward end thereof disposed rearwardly of the front wall 30. From this point, the hot gases will pass upwardly, as shown by arrows, and out through the smoke pipe 29. In the passage of the products of combustion through the combustion chamber 23, the heater tubes 39 will be thoroughly heated as will the jacket 23, and the air will be drawn upwardly through the heater tubes 39 and in like manner, the air about the innet jacket 23 will be heated and this air will rise within the outer jacket 10 and pass out through the ports 34 and 38, the air first entering the chamber between the two jackets through the intake ports 42.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. A heater as set forth comprising an outer jacket, a fuel burning means in the jacket adjacent one end, a horizontally disposed combustion chamber within the jacket, said chamber having the walls thereof spaced from the walls of the jacket to provide an air heating chamber, the forward end wall of the combustion chamber being spaced inwardly from the forward wall of the jacket to provide an intake chamber, the bottom wall of which constitutes the top of the fuel burning means, a plurality of longitudinally extending upwardly inclined heater tubes extending through the combustion chamber and communicating at one end with the intake chamber, and an outlet chamber within the outer jacket communicating with the rear end of said heater tubes, said outer jacket having outlet ports in the side walls thereof communicating with the outlet chamber to permit the heated air to pass outwardly into the atmosphere.

2. A heater as set forth comprising an outer jacket, a horizontally disposed combustion chamber within the jacket, a fuel burning means within the outer jacket and communicating with the combustion chamber, a plurality of staggered baffle plates mounted within the combustion chamber to provide a tortuous passage for the products of combustion, a smoke pipe connected to the combustion chamber and extending through the outer jacket, a plurality of heater tubes extending longitudinally through the combustion chamber and inclined upwardly from the forward to the rear end of the combustion chamber, said combustion chamber having the forward and rear ends thereof disposed inwardly of the adjacent ends of the outer jacket whereby to provide an intake chamber and an outlet chamber respectively, the bottom wall of the intake chamber extending entirely across the fuel burning means, and doors carried by the outer jacket to permit entrance into said latter chambers.

JOSEPH H. LONG.