

July 24, 1951

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2,561,934

FUEL BURNING SPACE HEATER WITH DRAFT CONTROL MEANS

Filed Nov. 26, 1945

2 Sheets-Sheet 1

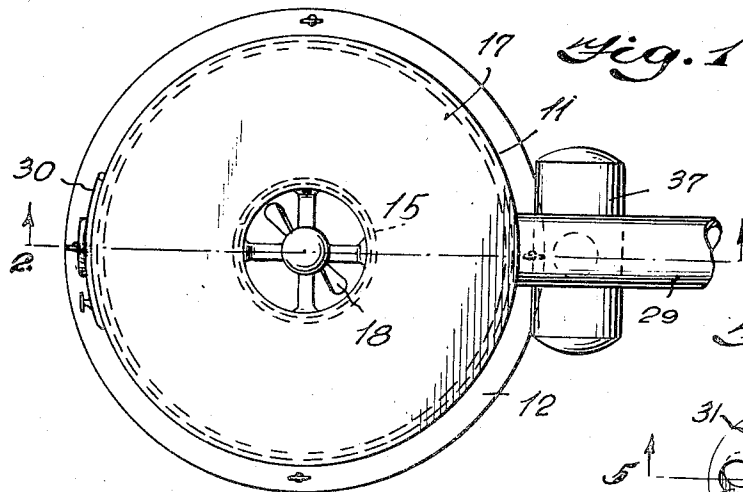


Fig. 1

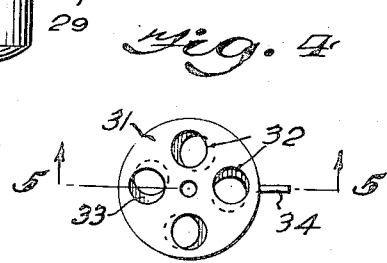


Fig. 4

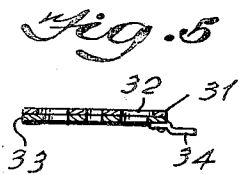


Fig. 5

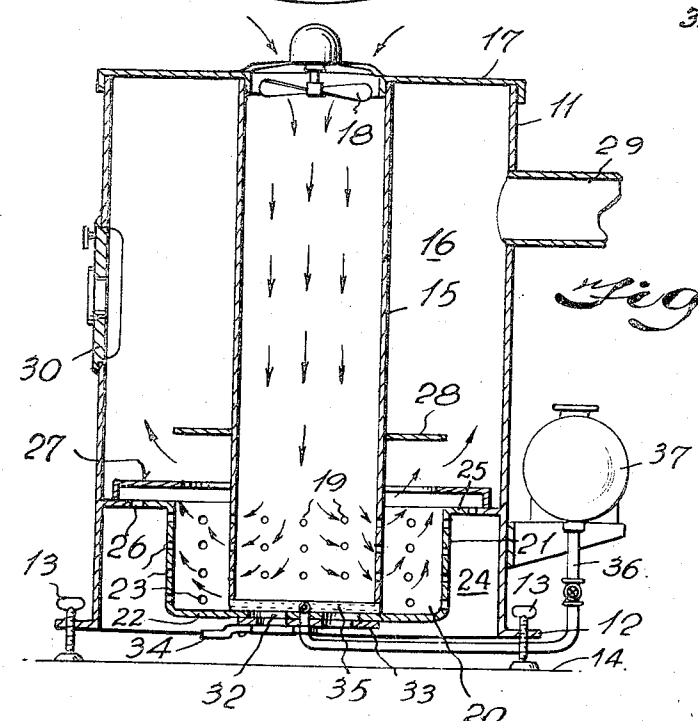


Fig. 2

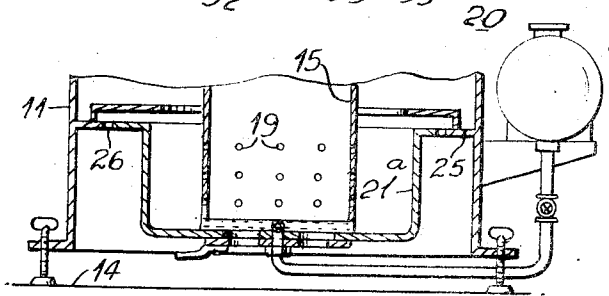


Fig. 3

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2 Sheets-Sheet 2

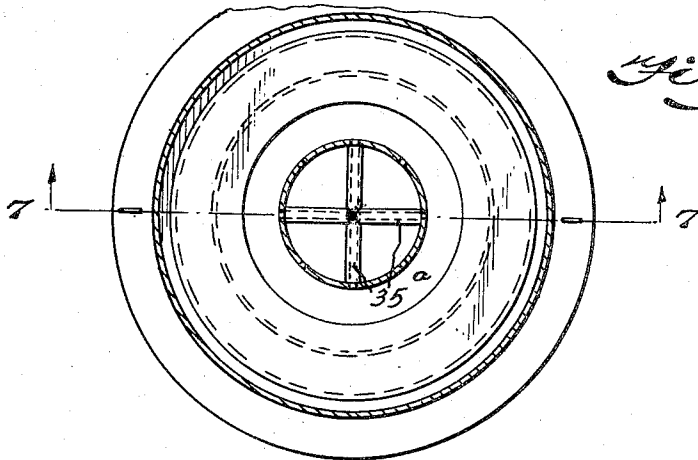


Fig. 6

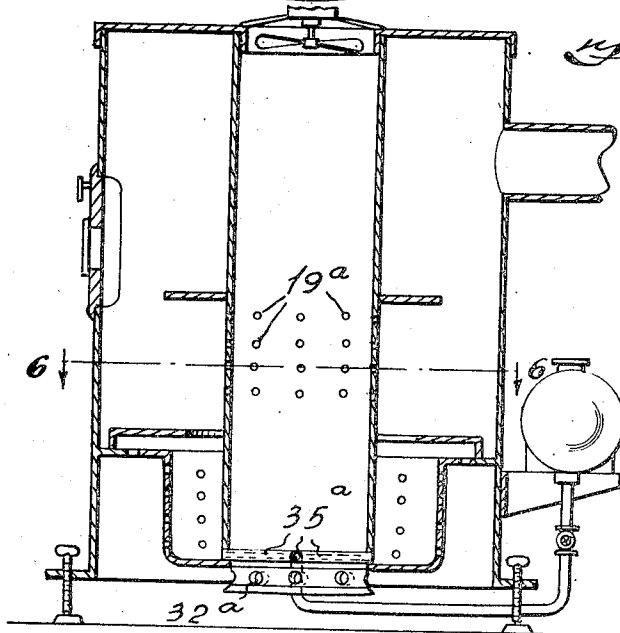


Fig. 7

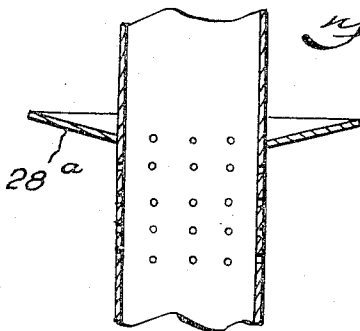


Fig. 8

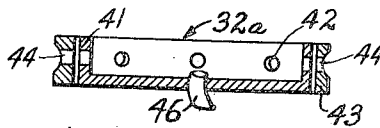


Fig. 9

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FUEL BURNING SPACE HEATER WITH DRAFT CONTROL MEANS

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5 Claims. (Cl. 126-93)

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This invention relates to improvements in space heaters, and more particularly to space heaters of the forced draft type.

One of the objects of the invention is to provide a forced draft space heater provided with controlling means so constructed and arranged that a portion of the forced air, after being heated, and some of the hot products of combustion may be discharged directly into the compartment or compartments to be heated while the other portion thereof is directed to the fuel of burner or burners to be mixed with the fuel for combustion purposes.

With the foregoing object outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a top plan view of one form of a space heater in accordance with the invention.

Fig. 2 is a vertical sectional view taken on the line 2-2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 of the lower portion of a modification.

Fig. 4 is a top plan view of the damper shown in Figs. 2 and 3, partly closed.

Fig. 5 is a sectional view on the line 5-5 of Fig. 4.

Fig. 6 is a top plan view of another modification with the fan or blower removed.

Fig. 7 is a vertical sectional view on the line 7-7 of Fig. 6.

Fig. 8 is a sectional view of a modification of a detail of the structure shown in Fig. 7.

Fig. 9 is a sectional view of a sleeve type damper shown in Fig. 7.

Referring first to Figs. 1 and 2, 11 designates a vertically disposed casing, open at its lower end and provided with an external flange 12 or the like for attachment of threaded legs 13 having threaded engagement with the flange for adjusting the position of the casing relatively to the surface 14 on which the heater is supported.

Centrally arranged in the casing is a down-draft tube 15 spaced from the inner surface thereof to provide an annular chamber 16 which is closed at its upper end by an annular roof 17, adjoining the upper edges of the casing and tube.

Any suitable air blower, such as an electric motor-driven fan 18, is suitably supported at the top of the tube 15 for forcing air from the space

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in which the heater is arranged, down the tube, from which it may be discharged through apertures 19, at the lower end portion of the tube into an auxiliary annular chamber or fire pot 20 having an upstanding annular wall 21 projecting from an annular bottom 22 rigidly united with the tube 15. The bottom 22 is preferably imperforate while the wall 21 is provided with apertures 23 to allow heated air to pass through the fire pot into an annular chamber 24 from which the heated air and some of the hot products of combustion may be discharged below the bottom edge of the casing 11 into the room or space to be heated.

15 An annular internal roof 25 of the chamber 24, connects the upper end of the wall 21 to the casing 11 and the roof is apertured as indicated at 26 to allow hot products of combustion entering the chamber 24 to be discharged into the chamber 20 16, or, when the blower is inoperative, to permit air to flow upwardly through the chamber 24 into the chamber 16. An annular baffle 27 is mounted on the roof above the apertures 26 to direct gases toward the center of the structure, and another 25 baffle 28 is mounted on the tube 15, above the baffle 27, to cause hot products of combustion to be directed toward the wall of the casing 11 for heating the latter.

The casing is preferably provided near its upper end with a discharge flue 29 for delivering products of combustion to a chimney or the like, and if desired, the casing can be provided with a door 30.

At the bottom of the tube 15, there is arranged a stationary plate 31 provided with relatively large apertures 32 designed to cooperate with a similar rotatable plate 33 to form a regulating damper having a handle 34. The plate 31 is arranged below a plurality of fuel radiating tubes 35, the outer ends of which form burners discharging into the fire pot 20, and these burners may be supplied with fuel by any suitable means. For example, the tubes 35 may be connected to a pipe 36 receiving fuel oil from a tank 37 or the like.

In operation it will be noted that oil discharged from the burners will mix in the fire pot 20 with air entering the same either through apertures 23 by natural draft or apertures 19 by forced draft. When natural draft is used, the heated air will travel upwardly past the baffles 27, 28, to heat the wall of the casing, and then be discharged through the flue 29. When forced draft is used, the air forced through the tube 15 will be pre-

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heated and some of it will travel through the holes in the damper at the bottom of the tube while the remainder will enter the fire pot through apertures 19. The air entering through 19 will mix with the fuel to form a combustible mixture. The products of combustion, in this instance, will pass upwardly past the baffles 27, 28 and be discharged through the flue 29, and in doing so, will heat the tube and the casing. A part of the heated air and some of the products of combustion are discharged through the open lower end of the casing 11 during forced draft resulting from the operation of the fan 18.

The modification shown in Fig. 3 is similar to that in Fig. 1, with the exception that the wall 21a is imperforate so that no gas will pass there-through.

In the modifications shown in Figs. 6 and 7, the structure is similar to that shown in Figs. 2 and 5, with the exception that the apertures 19a are positioned above the fire-box and the damper 32a is of the sleeved type instead of the ported plate variety. The damper 32a is shown more clearly in Fig. 9 and includes a sleeve 41 having radially disposed openings 42. A ring 43 embraces the sleeve 41 and may be rotated thereon. The ring 43 is provided with openings 44 which are adapted to register with the openings 42. In this modification the fuel is fed to the firepot through a pipe 46 which communicates with the radially disposed tubes 35a.

Instead of arranging the baffle 28 horizontally, as in Figs. 2, 3 and 7, it may be of dish-shape as indicated at 28a in Fig. 8, with the periphery thereof arranged uppermost.

From the foregoing, it is believed that the construction, operation and advantages of the heaters disclosed may be readily understood by those skilled in the art, and it is apparent that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the following claims.

What I claim and desire to secure by Letters Patent is:

1. A space heater comprising, a vertically disposed tubular casing having an open lower end, means adapted to support the casing with the lower end spaced from a supporting surface, a cup-shaped fire pot having an impervious annular bottom wall and a generally cylindrical side wall, an annular flange joining the top of the cylindrical wall to said casing and supporting the fire pot within the lower end of the casing, said flange having spaced apertures there-through, a vertically disposed tube within said casing extending into the fire pot providing an annular space between the periphery of the tube and the cylindrical wall of the fire pot, said tube being joined to the bottom wall of the fire pot, a fan within said tube for forcing air downwardly therethrough, a damper mechanism at the lower end of said tube adjacent the bottom wall of the fire pot for controlling the passage of air downwardly from said tube, means closing the top of the casing around said tube, said tube having a plurality of apertures through the wall thereof in the region of the fire pot, and a plurality of tubes arranged radially within the lower end of the first tube for discharging fuel into the fire pot.

2. A space heater comprising, a vertically disposed tubular casing having an open lower end, means adapted to support the casing with the lower end spaced from a supporting surface, a

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cup-shaped fire pot having an impervious annular bottom wall and a generally cylindrical side wall provided with a plurality of spaced apertures, an annular flange joining the top of the cylindrical wall to said casing and supporting the fire pot within the lower end of the casing, a vertically disposed tube in said casing extending into the fire pot providing an annular space between the periphery of the tube and the cylindrical wall of the fire pot, said tube being secured to the bottom wall of the fire pot, a fan within said tube for forcing air downwardly therein, a plate across the lower end of said tube having ports there-through, a damper mechanism for controlling the passage of air through said ports, means closing the top of the casing around said tube, said tube having a plurality of apertures through the wall thereof in the region of the fire pot, and means for supplying fuel into the fire pot adjacent the bottom wall thereof.

3. In a space heater, a vertically disposed tubular casing having an open lower end, means adapted to support the casing with the lower end above a supporting surface, a fire pot having an impervious annular bottom wall and a generally cylindrical side wall provided with a plurality of apertures, a flange joining the top of the cylindrical wall to said casing and supporting the fire pot within the lower end of the casing, a vertically disposed tube in said casing extending into the fire pot, said tube being rigidly joined to the bottom wall of the fire pot, a fan within said tube for forcing air downwardly therethrough, an adjustable damper mechanism adjacent the lower end of said tube for controlling the volume of air moving downwardly from said tube, means closing the top of the casing around said tube, and said tube having a plurality of apertures through the wall thereof in the region of the fire pot.

4. In a space heater, vertically disposed tubular casing having an open lower end, means adapted to support the casing with the lower end above a supporting surface, a fire pot having an impervious annular bottom wall and a generally cylindrical side wall provided with a plurality of apertures, means joining the top of the cylindrical wall to said casing and supporting the fire pot within the lower end of the casing, a vertically disposed tube in said casing extending into the fire pot rigidly joined to the bottom wall of the fire pot, means for forcing air downwardly in said tube, a damper mechanism adjacent the lower end of said tube controlling the flow of air downwardly from said tube, means closing the top of the casing around said tube, and said tube having a plurality of apertures through the wall thereof adjacent the fire pot.

5. A space heater comprising, a vertically disposed tubular casing having an open lower end, means adapted to support the casing with the lower end spaced from a supporting surface, a cup-shaped fire pot having an impervious annular bottom wall and a generally cylindrical side wall provided with a plurality of spaced apertures, an annular flange joining the top of the cylindrical wall to said casing and supporting the fire pot within the lower end of the casing, said flange having spaced apertures therethrough, a vertically disposed tube within said casing extending into the fire pot providing an annular space between the periphery of the tube and the cylindrical wall of the fire pot, said tube being joined to the bottom wall of the fire pot, a fan within said tube for forcing air downwardly therein, a damper mechanism at the lower end

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of said tube adjacent the bottom wall of the fire pot for controlling the passage of air downwardly from the tube, means closing the top of the casing around said tube, said tube having a plurality of apertures through the wall thereof within the fire pot, a plurality of tubes arranged radially within the lower end of the first tube for discharging fuel into the fire pot, and an annular baffle supported on said flange and surrounding the tube in spaced relationship.

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