Feb. 28, 1950 K. S. JENSON 2,499,067

COMBINED FORCED DRAFT AND CONVECTION AIR FLOW SPACE HEATER

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Fig. 1.

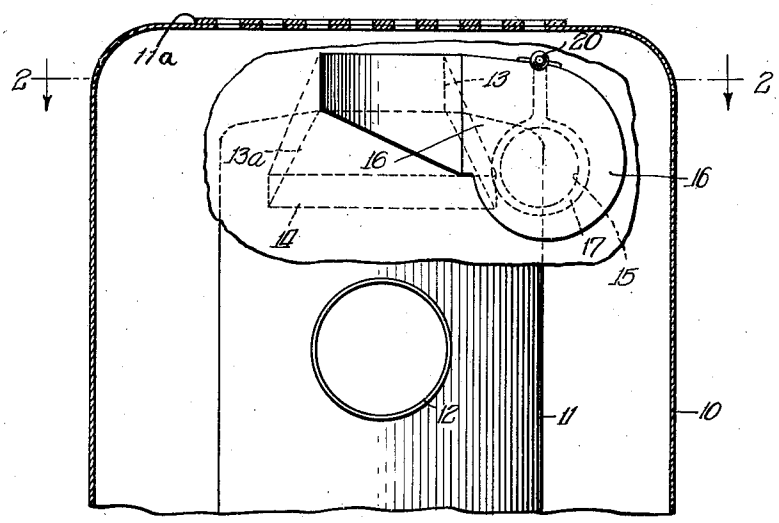
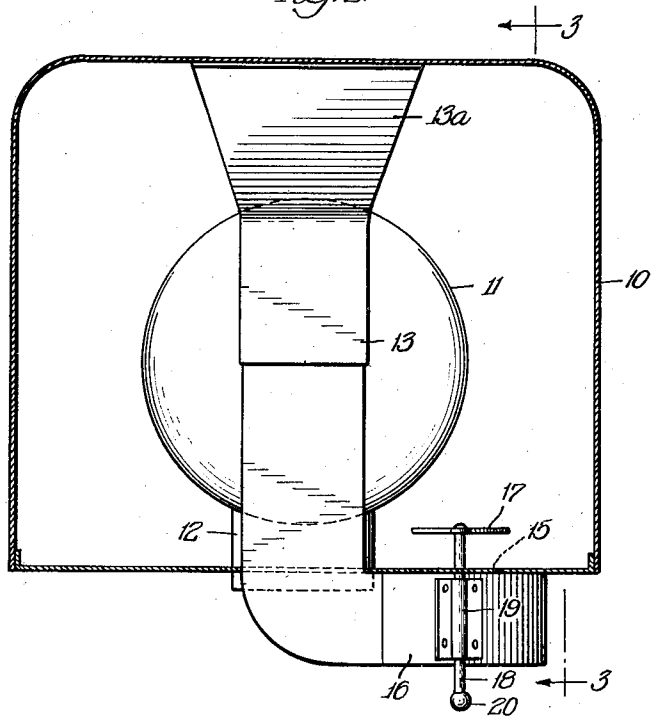


Fig. 2.



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Fig. 3

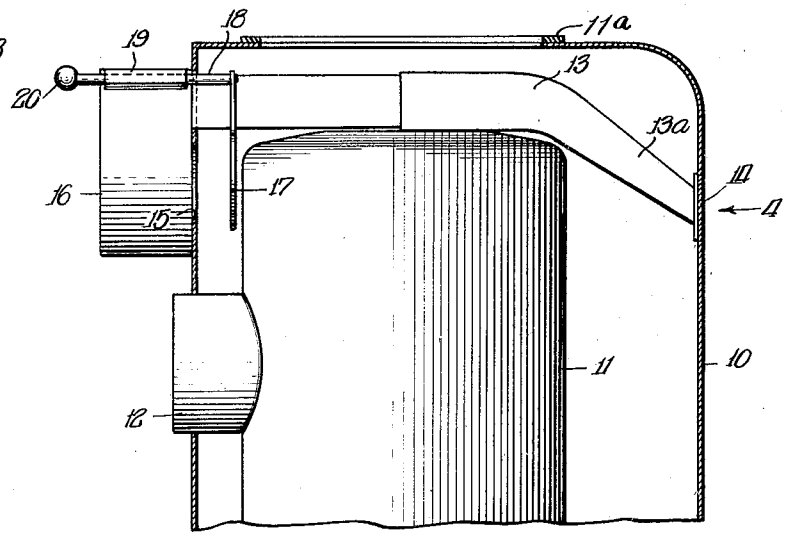


Fig. 4

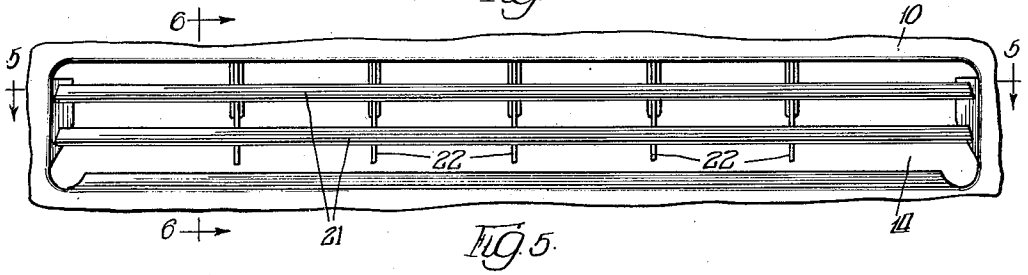


Fig. 5.

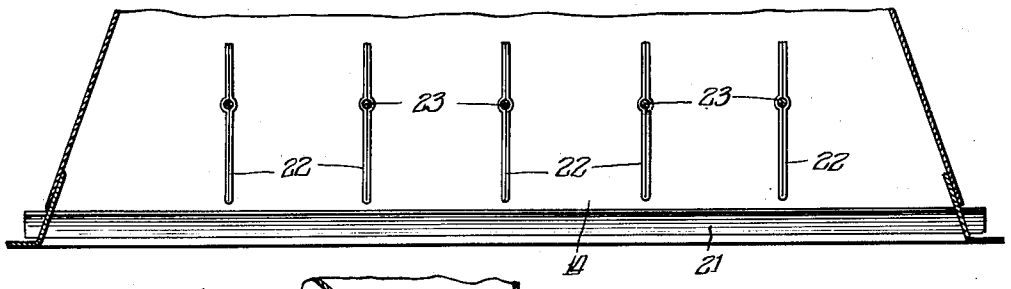
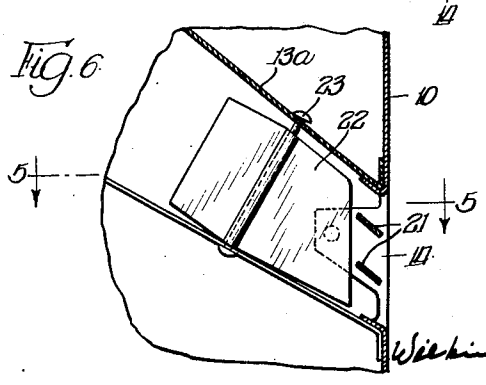


Fig. 6.



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Fig. 8.

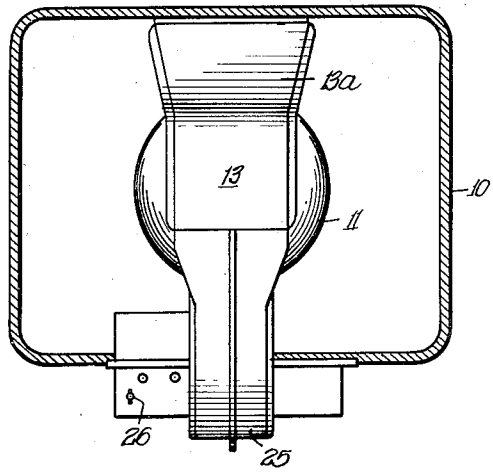


Fig. 7.

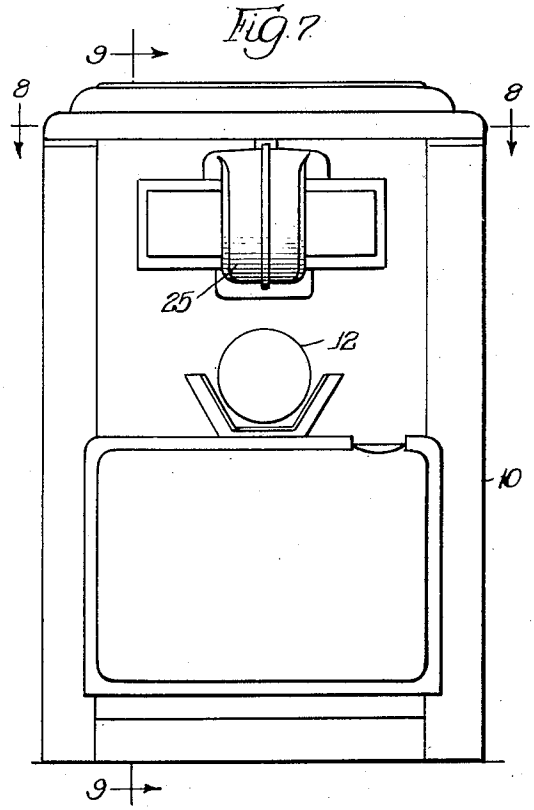
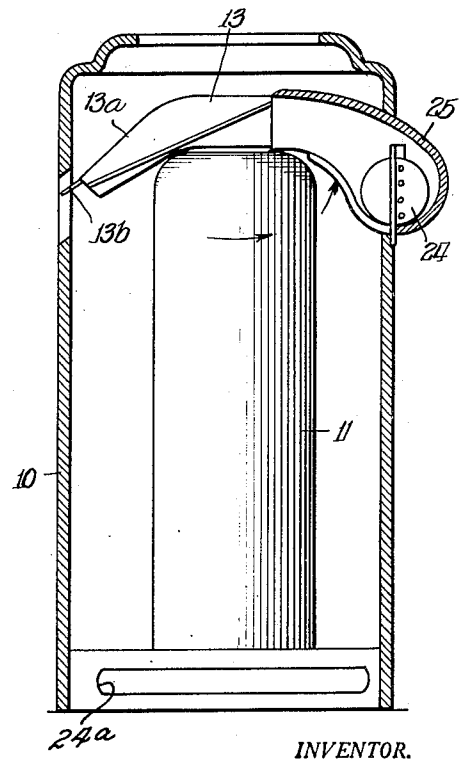


Fig. 9.



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COMBINED FORCED DRAFT AND CONVECTION AIR FLOW SPACE HEATER

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Application October 2, 1944, Serial No. 556,703

3 Claims. (Cl. 126—110)

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The present invention relates to improvements in space heaters.

In the use of ordinary space heaters attempts have been made to circulate the heated air from a burner along the floor with the idea that the heated air will rise and be distributed through the room. According to prior practice it has been common to direct heated air from the lower region of a space heater, and even though this heated air has been blower driven it has not progressed any great distance from the heater before it has tended to rise, so that the distribution of the heated air is rather poor. Moreover, the exit of the heated air from the burner has been through doors which direct the air in more or less narrow streams, which have not been effective.

The present invention contemplates a construction of space heater in which the heated air is circulated through the heater to a duct at the top thereof, whence the heated air is deflected downwardly to the far side of the room in which the heater is located.

An object of the present invention is to provide an improved space heater which will supply heated air to the surrounding space with improved uniformity over prior practice.

A further object is to provide an improved space heater in which the heated air is directed from the upper hotter region of the space heater, said heated air being deflected downwardly into the space surrounding said heater.

A further object is to provide an improved space heater for delivering air which is comfortable to persons located in the room in which the space heater is located.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a rear elevational view of one embodiment of the present invention;

Figure 2 is a plan section taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is an elevational section taken along the plane indicated by the arrows 3—3 of Figure 2;

Figure 4 illustrates, on an enlarged scale, a detail of construction of the preceding figures, said view being taken in the direction of the arrow 4 in Figure 3;

Figure 5 is a sectional view taken along the plane indicated by the arrows 5—5 of Figure 4 and the arrows 5—5 of Figure 6;

Figure 6 is a sectional view taken along the plane indicated by the arrows 6—6 of Figure 4;

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Figure 7 is a rear view in elevation of a modified construction;

Figure 8 is a plan section taken along the plane indicated by the arrows 8—8 of Figure 7; and

Figure 9 is an elevational section taken along the plane indicated by the arrows 9—9 of Figure 7.

Referring first to Figures 1, 2 and 3, the numeral 10 indicates a casing adapted for the circulation of air. Located within said casing is the heat drum 11, which is illustrated as being of generally cylindrical contour. Located adjacent to the bottom of said heat drum 11 is a burner (not illustrated), and located at the side of said heat drum is the outlet flue 12 for the discharge of products of combustion from said burner. The heat drum 11 may have an imperforate top, but the top of the casing 10 will preferably be provided with apertures preferably controllable in extent for permitting the escape of a portion of the air which has circulated up through the casing 10 exteriorly of the heat drum 11. Figures 1 and 3 illustrate a conventional sliding shutter 11a for controlling such apertures.

Located above the heat drum 11 is the heat conduit means or duct 13, a preferred contour of which is illustrated in Figures 1, 2 and 3. The forward end of said duct 13 is downwardly inclined, as indicated by the numeral 13a. Said downwardly inclined end 13a leads to the outlet or nozzle 14. Said duct 13 provides a passageway for heated air from the vicinity of the top of the heat drum 11 through an opening 15 to the blower 16, which blower communicates with the inlet end of the duct 13. The blower 16 is driven by a motor (not illustrated) located outside of the casing 10 and therefore protected from the radiant heat from the heat drum 11. The opening 15 is controlled by the damper 17, which is suspended from the rod 18 slidably mounted in a sleeve 19 mounted at the top of the blower 16. A handle 20 is provided for moving the rod 18 and consequently the damper 17 to control access of air from the region adjacent to the top portion of the heat drum 11 through the opening 15 to the blower 16 and duct 13 and out through the nozzle 14.

Figures 4, 5 and 6 illustrate a direction control which may be used for distributing the air from the downwardly directed end 13a of the duct 13. Figure 6 illustrates how the outer extremity of the portion 13a of the duct 13 may be disposed in overlapping relationship with the metal of the casing 10 bounding the nozzle 14. Disposed crosswise of the nozzle 14 in a horizontal direction are the relatively stationary vanes 21—21, having

their flat sides generally parallel with the flow of air through said portion 13*a*. The numerals 22—22 indicate adjustable vanes mounted to swing about the pins 23—23, which pins are carried by the upper and lower walls of the portion 13*a* of the duct 13. Said adjustable vanes 22 may be individually adjusted to send air at any desired angle in a crosswise direction within the limits of the discharge nozzle 14. As illustrated in Figure 2, the downwardly directed portion 13*a* of the duct 13 is flared horizontally to deliver the heated air with a fan-shaped distribution.

Figures 7, 8 and 9 illustrate a slight modification of the structure illustrated in Figures 1, 2 and 3. In Figures 7, 8 and 9 an enclosed motor 24 is disposed within the blower housing 25, which takes air in the direction of the arrows from the region adjacent to the top of the heat drum 11 and delivers said air to the duct 13 having the downwardly directed outlet portion 13*a*. The motor 24 may be controlled by a multiple-speed switch of the usual type. Such a switch is indicated by the numeral 26. The construction illustrated in Figures 7, 8 and 9 differs from the construction illustrated in the preceding figures in that the upper wall of the portion 13*a* of the duct 13 is provided with a downwardly directed lip 13*b* to aid in deflecting the heated air from the top of the heat drum 11 downwardly to the space in front of the casing 10. The enclosed motor 24, as well as the motor (not illustrated) located on the outside of the blower 16, is protected against radiant heat from the heat drum 11 in order to protect the motor windings. The casing 10 is illustrated in Figure 9 with a conventional inlet opening 24*a* for the admission of air to the space between the casing 10 and the drum 11.

In operation a portion of the heat circulated about the heat drum 11 will be discharged through the top of the casing 10. When the blower 16 (Figs. 1 to 6) or the blower 25 (Figs. 7 to 9) is running, part of the heated air is directed through the duct 13 and is discharged outwardly and downwardly into the room through the nozzle 14. The heated air leaves the nozzle 14 at high velocity and can be forced completely across a room of ordinary size. If it is desired to reduce the velocity of the air leaving the nozzle 14, the damper 17 (Figs. 1 and 2) may be moved closer to the opening 15, thus restricting the air entering the blower. In the construction illustrated in Figures 7 to 9 the air flow may be controlled by operation of the multiple-speed switch 26.

The blower 16 (Figs. 1 to 6) and the blower 25 (Figs. 7 to 9) are so located that they draw the heated air near the top of the heating drum 11, directing said heated air over the top of said heating drum in the hottest zone of the heater. Accordingly, air heated to the greatest extent in the heater is delivered by the blower regardless of the rate of firing of the burner.

During tests, temperatures of the delivered air have ranged from 110° F. to 190° F. when operating the heater throughout the full range of fuel control. Heaters of other types have delivered air at a maximum temperature of 150° F. and a minimum temperature of 70° F. Air at 70° F. or colder moved rapidly across a room produces a cold, clammy feeling. According to the present invention, no such feeling is encountered even at low firing rates. Considering conditions at high firing rates, air that leaves the blower nozzle at 190° F. is too warm for a person located directly in its path near the heater, but as such air mixes with the colder room air the resulting temperature is comfortable.

Though certain preferred embodiments of the present invention have been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. In a space heater, in combination, a casing, a heating drum disposed within said casing in position to provide a space between said drum and said casing for heated air, conduit means extending across said casing in the region closely adjacent to the top of said drum, blower means for forcing air through said conduit means, said blower means having an intake communicating with the upper region of said space for heated air and having an outlet communicating with one end of said conduit means, said conduit means having its other end downwardly directed for directing heated air from said blower means in a downward direction from the upper portion of said casing to the exterior of said casing, said casing being provided with an opening to admit air to the space between said casing and said drum, the top of said casing being apertured to permit the escape of heated air from said casing, and means for controlling the amount of heated air delivered by said blower means to said conduit means.

2. In a space heater, in combination, a casing, a heating drum disposed within said casing in position to provide a space between said drum and said casing for heated air, conduit means extending across said casing in the region closely adjacent to the top of said drum, blower means for forcing air through said conduit means, said blower means having an intake communicating with the upper region of said space for heated air and having an outlet communicating with one end of said conduit means, said conduit means having its other end downwardly directed for directing heated air from said blower means in a downward direction from the upper portion of said casing to the exterior of said casing, said casing being provided with an opening to admit air to the space between said casing and said drum, the top of said casing being provided with apertures controllable in extent for permitting the escape of a portion of the air from said casing.

3. In a space heater, in combination, a casing, a heating drum disposed within said casing in position to provide a space between said drum and said casing for heated air, conduit means extending across said casing in the region closely adjacent to the top of said drum, blower means for forcing air through said conduit means, said blower means having an intake communicating with the upper region of said space for heated air and having an outlet communicating with one end of said conduit means, said conduit means having its other end downwardly directed for directing heated air from said blower means in a downward direction from the upper portion of said casing to the exterior of said casing, said casing being provided with an opening to admit air to the space between said casing and said drum, the top of said casing being provided with apertures controllable in extent and means for controlling the amount of heated air delivered by said blower means to said conduit means.

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