Feb. 7, 1956 H. L. GIWOSKY 2,733,704

FORCED AIR FLOW COMBUSTION HEATER FOR SPACE HEATING

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Fig. 1

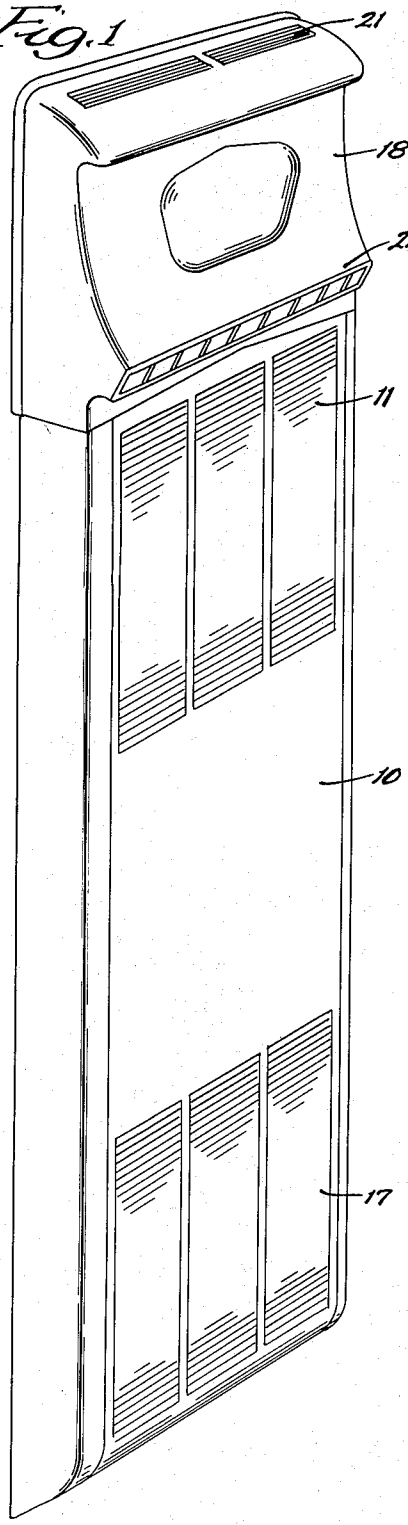
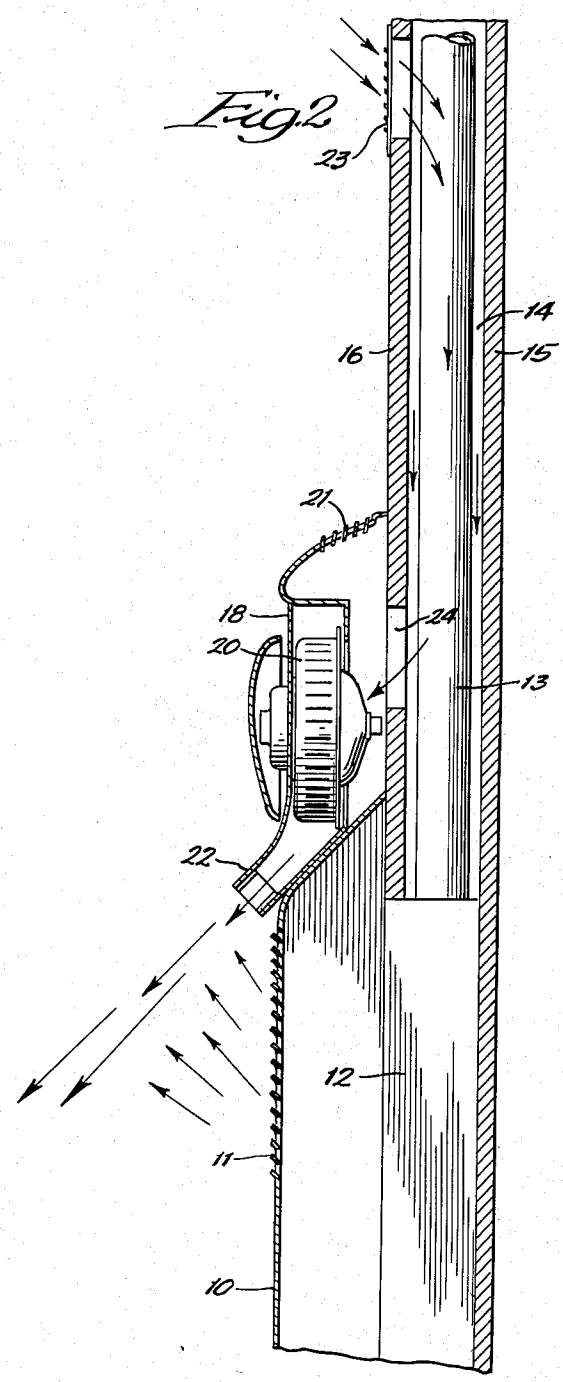


Fig. 2



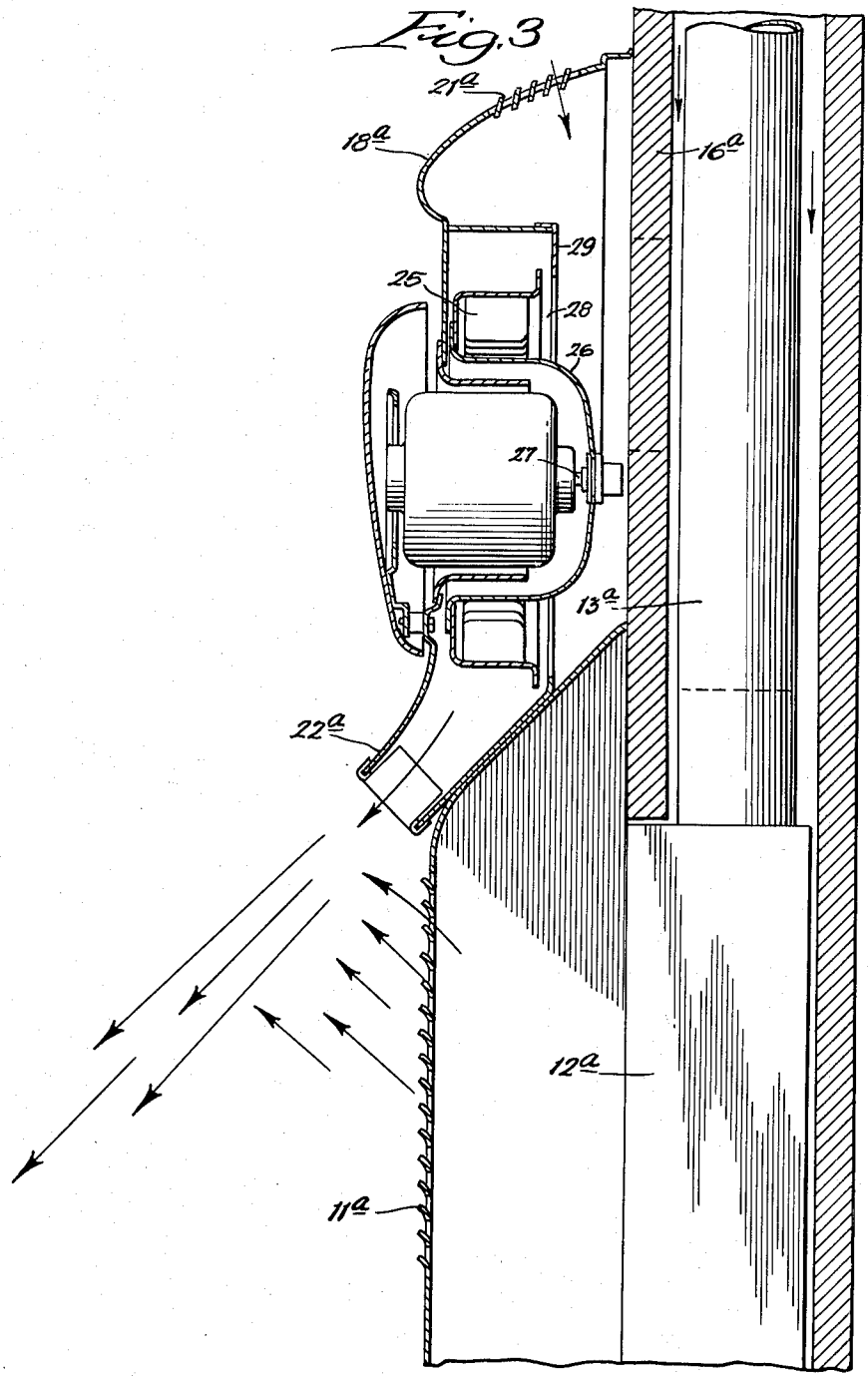
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Fig. 3



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FORCED AIR FLOW COMBUSTION HEATER FOR SPACE HEATING

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3 Claims. (Cl. 126—110)

This invention relates to a forced air heater for heating rooms and other spaces. The invention is particularly useful in connection with a wall heater in which a heater is supported within a wall and the heated air therefrom is discharged under a curtain of forced air into a room, etc.

In the operation of a wall heater or a heater located adjacent the wall of a room, there is a tendency for the heated air to rise toward the ceiling of the room and along one side of the room while leaving a substantial portion of the room imperfectly heated. The stratification of the heated air above the less heated air represents a substantial loss in heating and a loss in comfort to the occupants of the room. However, efforts to use circulating fans, etc. with such structures have proven unsatisfactory because of the heat to which the circulating motor is subjected. Further, even when the heated air is discharged under pressure from the casing of the wall heater or other heater, there remains a strong tendency for the heated air to rise before it has progressed deeply into the room, so that effective heating of the lower living space of the room is not accomplished.

An object of the present invention is to provide a structure which overcomes the above disadvantages and causes the heated air from the wall heater or other heater to be carried effectively and in motion through the lower part of the room so as to supply fairly uniform temperature in the living area of the room. A further object is to provide a structure in which a curtain of relatively cool air such as room air is formed over the discharge ports of the wall heater so as to direct and partially carry the heated air downwardly toward the floor area of the room so that the warm air mixed with the room air rolls across the lower portion of the room area to substantially fill it. Another object is to provide means for drawing air from a room about the exhaust pipe of the wall heater and diverting this, together with other portions of air, over the discharged heated air from the wall heater and in a stream mixed therewith toward the bottom portion of the room. A still further object is to provide a novel combination of a blower and heater for the mixing of room air with heated air in a free space outside of the heater and maintaining the same in admixture and motion within the lower portion of the room. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown, in an illustrative embodiment, by the accompanying drawings, in which—

Figure 1 is a perspective view of a wall heater and blower combination embodying my invention; Fig. 2, a vertical sectional view showing the wall heater installed within the wall of the room and circulating blower means combined therewith; and Fig. 3, an enlarged vertical sectional view of a blower and heater structure constituting a modification of the invention.

In the structure shown in Figs. 1 and 2, 10 designates the outer casing of a wall heater having discharge apertures 11 in the upper portion of the casing. The heater

proper is indicated by the numeral 12, and the stack for the heater is indicated by the numeral 13. The stack extends upwardly through the stud space 14 between the wall panels 15 and 16. As shown more clearly in Fig. 1, the heater casing 10 is provided at its lower end with air intake ports 17. The air passes the heater 12 and rises and passes out of the discharge or outlet ports 11. Since a wall heater of this type is well known in structure, a detailed description herein is believed unnecessary. It is sufficient to point out that the air is drawn inwardly through port 17 in the lower portion of the casing and is heated by the heater 12 and then is discharged upwardly at about an angle of 30° from the discharge outlet 11, as shown more clearly in Fig. 2.

Above the cabinet 10 is mounted a blower casing 18 in which is mounted a motor-driven blower 20. The upper portion of the casing 18 is provided with air intake passages 21, and the lower portion of the casing is provided with a discharge nozzle 22 extending downwardly at an angle so as to direct a curtain of room air over the rising stream of air from the heater outlet 11, as indicated by arrows in Fig. 2. As a result of the impingement of the curtain of air from the nozzle 22, the heated air from the outlet 11 is forced downward at an angle of about 45° toward the floor of the room. The elongated nozzle 22, as shown more clearly in Fig. 2, directs a flat curtain of relatively cool or room air downwardly toward the floor so as to provide a blanket or curtain over the stream of air issuing outwardly and upwardly from the heater outlet 11.

While a fan mounted within the heater casing 10 will direct heated air outwardly, it is difficult to project the heated air for any great distance because of the tendency of the heated air to rise toward the ceiling. Thus an imperfect heating of the lower portion of the room results. I have discovered, however, that if a blanket or curtain of relatively cool air, such as room air, is directed over the rising column of heated air from the outlet 11, the cooler or heavier air can readily be forced to the bottom of the room and then tends to move across the room. At the same time, the heated air from the outlet 11 is not only hemmed in by the curtain of room air, but is drawn by it downwardly toward the bottom of the room so that it may roll across the bottom of the room while at the same time mixing with the room air. By this means, it is found that there is a substantial uniform heating of the lower or living space of the room while at the same time the admixed room air and heated air are kept in motion so as to supply uniform heating with a high degree of efficiency. The mixing of the heated air and current of room air is accomplished at a point away from both the heater and the blower, thus enabling the mixed gases to expand freely and with a rolling movement through the lower portion of the room.

The blower and heater combination also provides a means for utilizing or saving heat from the exhaust pipe 13 leading from the heater 12 upwardly through the stud space 14. An opening is formed within the inner wall 16 at a point above the blower and a room air inlet 23 is installed therein so that under the suction of the blower 20 air is drawn downwardly through the inlet 23 and the stud space 14 and thence through the opening 24 in the wall 16 adjacent the blower to permit the air thus warmed by contact with the stack 13 to be passed through the blower. At the same time, sufficient room air is drawn inwardly through the inlet 21 so that the discharged curtain of air is still heavy enough to carry to the bottom of the floor under the force of the blower.

In the modification shown in Fig. 3, the structure is substantially the same as shown in Figs. 1 and 2, except that the wall 16*a* is imperforate and all of the air drawn into the blower comes from the room and through the

upper inlet 21*a* of the lower casing 18*a*. The blower structure and motor structure are the same as shown in Figs. 1 and 2, the blower means 25 being driven by member 26 fixed to the motor shaft 27, and air to the blower being supplied through the port 28 in the rear portion 29 of the blower casing. Since such blowers are well-known in construction, a detailed description is herein believed unnecessary. In the operation of the structure shown in Fig. 3, the air rising past the heater 12*a* is discharged upwardly through the ports 11*a* where it meets a downwardly-directed curtain of air from the elongated discharge nozzle 22*a* of the blower casing 18*a*. The discharged curtain of air consists of room air received into the blower through the ports 21*a* and thence discharged downwardly through the inclined nozzle 22*a*.

In the structure shown in all of the modifications, it will be noted that the blower itself is supported at a spaced distance from the wall heater and is not subjected to heat from the heater. It is, in fact, insulated therefrom by a stream of room air, which stream is relatively heavy and is carried in a blanket or curtain to the lower portion of the room, directing and drawing with it the rising column of heated air from the discharge ports of the heater casing. The force of the discharged stream not only carries the heated air downwardly into the bottom of the room, but mixes with it so that the resulting mixture rolls across the room and fills the living space of the room with a uniform mixture of air, supplying relatively uniform heat at high efficiency.

The invention has been described in connection with a wall heater, but it will be understood that the invention is applicable to similar heaters maintained along the wall and where a blanket of air can be discharged above the stream of heated air so as to meet it in mid-air and effect a directional control and mixing thereof to fill the lower portion of the room.

While in the foregoing specification I have shown specific structures in considerable detail for the purpose of illustrating embodiments of the invention, it will be understood that such details of structure may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In combination with a wall heater having a stack adapted to extend upwardly between the panels of a room wall, said heater having a casing providing a heated air discharge outlet adjacent the upper end thereof, a blower unit having a motor-driven impeller spaced from said heater and being equipped with a discharge nozzle adjacent said outlet and directed downwardly and outwardly relative thereto for discharging a curtain of air thereacross, said blower unit being provided with an inlet spaced from said impeller and being adapted to communicate directly with a room interior, said inlet and said impeller being arranged with respect to each other so that air drawn through the inlet by the impeller flows through the space between the impeller and said heater.

2. In combination with a room wall having spaced-apart panels, a wall heater having a casing providing a recessed portion received within the room wall and being provided with a stack extending upwardly therefrom between said panels, said casing having a forward portion extending outwardly beyond the wall and providing adjacent the upper end thereof a discharge outlet for heated air communicating with the room, a blower unit mounted above said casing adjacent the forwardly extending portion thereof and being equipped with a nozzle extending downwardly and outwardly above said discharge outlet for directing a curtain of air thereacross, said blower unit being provided with an inlet spaced from said nozzle and having a motor-driven impeller interposed between said nozzle and said inlet and being spaced forwardly of said wall whereby air drawn through said inlet and into said impeller flows between the impeller and room wall, and said room wall being provided with an air inlet opening spaced from said blower unit and an air outlet opening communicating with said blower unit for drawing air from between said panels and about said stack.

3. In combination with a wall heater having a casing and a stack extending upwardly therefrom, said casing having adjacent the upper end thereof a discharge outlet for heated air, a blower unit mounted above said casing and having a motor-driven impeller spaced from said stack and spaced also from the casing of said wall heater, said impeller being equipped with a discharge nozzle extending downwardly and outwardly through said space between said impeller and said wall heater casing to discharge a curtain of air downwardly and outwardly across said outlet, said blower unit having an air inlet spaced from said impeller and being arranged with respect thereto so that air drawn through the inlet by said impeller flows through the space between the motor-driven impeller and said stack and through the space between the impeller and said wall heater casing.

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