

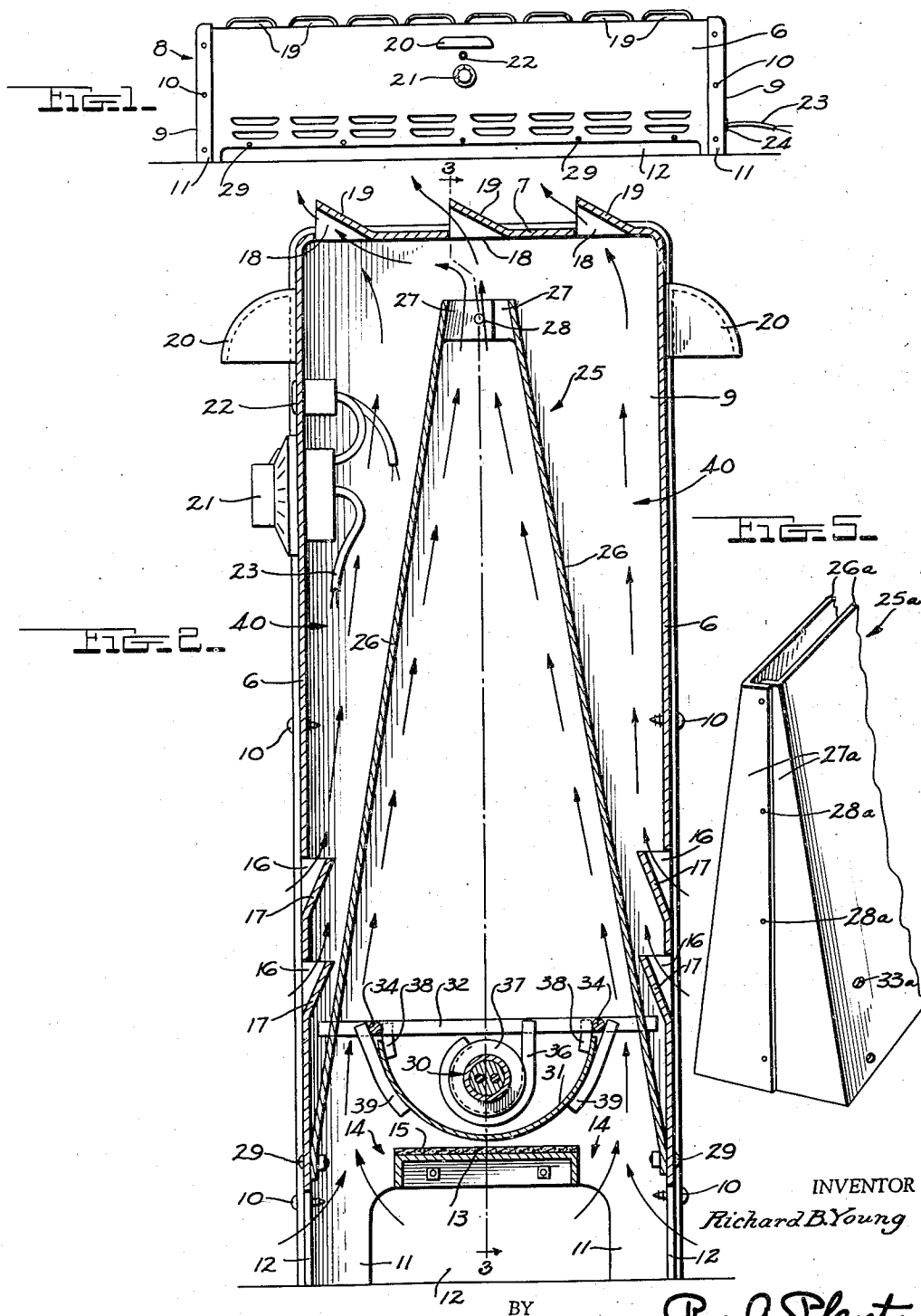
Dec. 9, 1958

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ELECTRICAL SPACE HEATER

2,863,978

Filed Jan. 21, 1955

2 Sheets-Sheet 1



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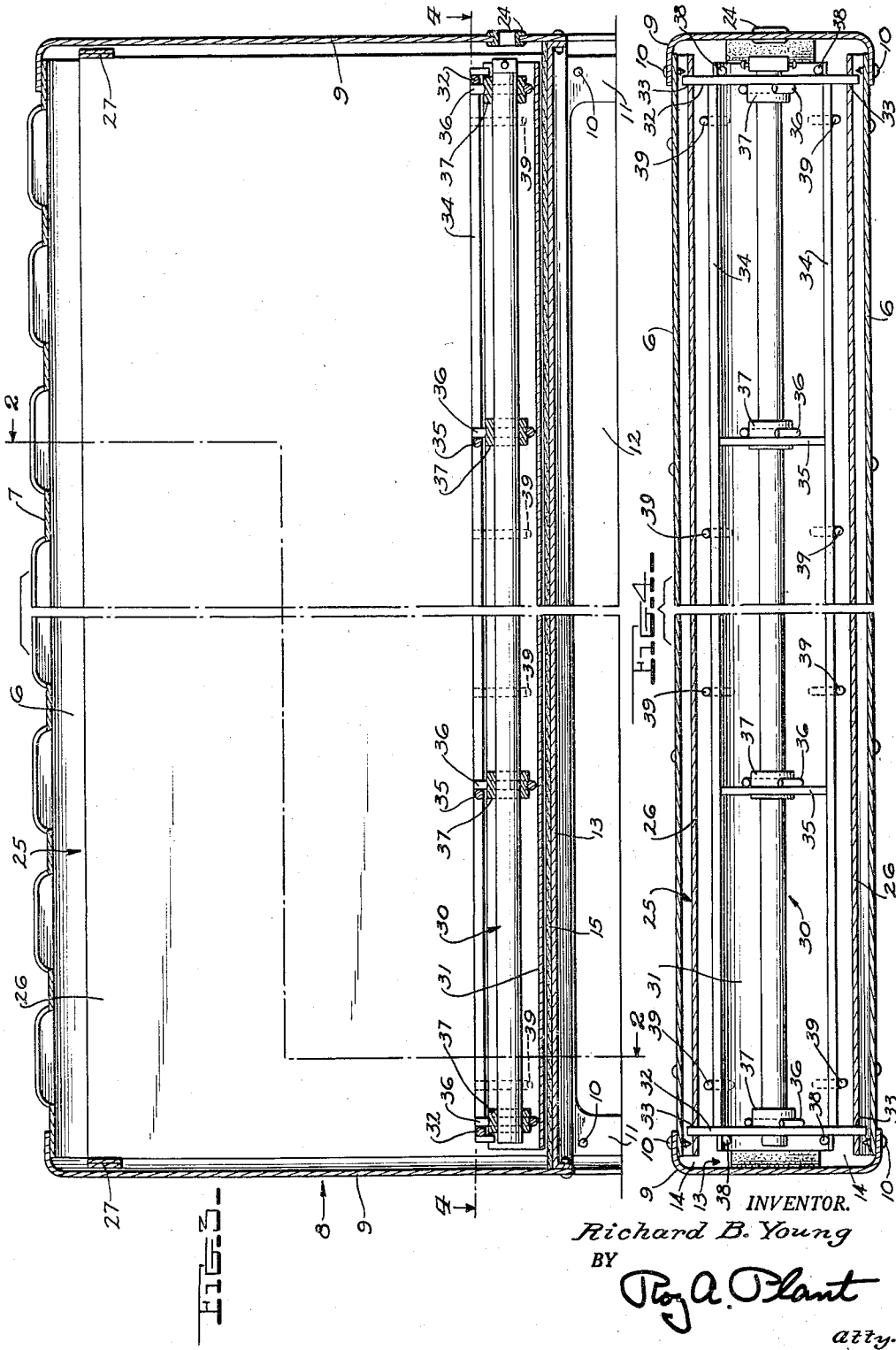
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ELECTRICAL SPACE HEATER

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Application January 21, 1955, Serial No. 483,300

6 Claims. (Cl. 219—34)

The present invention relates broadly to heating equipment, and in its specific phases to an electrically operated heater particularly adapted for room heating.

Electric heaters for room use have long been available and in the more common forms of same they are of the stationary type such as the "dishpan" or reflector heaters as well as the steam radiator type which merely radiate heat without induced rapid circulation of heated air, or else they are of the more recent type utilizing a fan to circulate electrically heated air. This leaves a need of a heater which induces a more rapid hot air flow than the "dishpan" and steam radiator types, and yet do not require the use of an air circulating fan. It was a recognition of this need and the lack of any adequate solution to same on the open market which led to the conception and development of the present invention.

Accordingly among the objects of the present invention is the provision of a new and improved electric heater designed primarily to rest on a room floor adjacent the baseboard of a side wall and adapted to upwardly discharge a rather rapidly moving blanket of hot air, this being of particular advantage in overcoming the chilling effect of a cold outside wall.

Another object of the invention is to provide an attractive electric heater which is elongated horizontally, is of relatively low height, and is narrow from front to back, to occupy little space and yet heat a large wall and room space.

Another object is to provide an upwardly tapered jet stack within the heater casing through which a main rapidly moving current or jet of electrically heated air is upwardly discharged into the upper portion of the casing and then through openings in the casing top, and to also provide air admission means into the lower portion of the spaces between the stack side walls and the casing side walls, whereby auxiliary upward currents of moving air will be induced in said spaces, by the main hot air current, and such induced air will also become preheated by contact with and radiation of heat from said hot stack side walls as it moves upward for discharge through the openings in the casing top along with the rapidly moving air delivered from said jet stack.

Another object is to provide a heater wherein the stack side walls extend substantially from end to end of the casing, and an elongated electric heating element is centrally mounted between the lower portions of said stack side walls and extends substantially throughout the length thereof to highly heat said walls, as well as radiate heat into space between said side walls thereby providing for heating the air entering the stack by contact with and radiation from said walls and heating element.

A further object is to provide a trough-shaped reflector under the heating element and spaced inwardly from the stack side walls, to upwardly reflect the heat for greater efficiency and to permit upward entrance of air between the edges of the reflector and said stack side walls.

A further object is to provide the casing with a bottom

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means extending from end to end thereof under the reflector and covered with thermal insulation for floor protection, the longitudinal edges of said bottom means being spaced inwardly from the casing side walls to provide inlets for the air to be heated within the stack.

Yet a further object is to provide novel means for mounting the heating element and the reflector.

A still further object is to provide a novel and durable construction which may be expeditiously manufactured and profitably marketed at a reasonable price.

Still further objects and advantages of the present invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the heating apparatus hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain means for carrying out the invention, such disclosed means illustrating, however, but several of various ways in which the principle of the invention may be used.

In the accompanying drawings:

Figure 1 is a side elevation of the heater.

Figure 2 is a vertical transverse sectional view as taken on line 2—2 of Figure 3, looking in the direction of the arrows.

Figure 3 is a vertical longitudinal sectional view as taken on line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a horizontal sectional view as taken on line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a fragmentary perspective view showing a different form of stack construction.

The constructions shown in the drawings will be rather specifically described but it is to be understood that variations to same may well be made within the scope and spirit of the invention. Then, too, while a casing from about three to five feet long, with a height of about nine inches and width of about three inches, is preferred, it is to be understood that other sizes and proportions could well be employed.

The side walls 6 and top 7 of the heater casing 8 are preferably formed from a single metal sheet, while the end walls 9 are separately formed and secured in place by screws 10. Legs 11 are provided for the casing 8 and air inlet spaces 12 are provided between these legs. The casing bottom 13 extends from end to end thereof and has its longitudinal edges spaced inwardly from the side walls 6 to provide air inlet passages 14. This bottom is preferably covered with asbestos or other thermal insulation 15, to better protect the floor, which supports the heater, against excessive heat.

The lower portions of the side walls 6 are formed with air admission openings 16 having air directing louvers 17, and the top 7 has air discharge openings 18 for which air directing louvers 19 are provided. By placing one side of the casing 8 toward a room wall, the discharging hot air will be directed against said wall as it ascends, whereas the casing may be reversed if it be desired to direct the hot air somewhat away from the wall.

Suitable carrying handles 20 are shown on both side walls 6, and one of these walls may carry the thermostat 21 and tell-tale light 22, if the heater is to be so equipped. The service cord 23 may enter through an insulator 24 in one of the casing ends and its wires may be connected with the thermostat 21 or directly to the heating element, as may be required.

A metal jet stack 25, which preferably has a dark inner face for heat absorption, is mounted in the casing 8 and extends from end to end thereof, said stack being

being open at both its upper and lower ends and being upwardly tapered transversely. In most views, the stack 25 is shown as formed from two upwardly converging sheet metal side walls 26 having overlapped lugs 27 at their upper corners, said lugs being welded or otherwise secured together at 28. The lower edges of the side walls 26 are secured by bolts 29, or otherwise, to the casing side walls 6, below the openings 16.

In Figure 5, the side walls 26a of the stack 25a have triangular end flanges 27a welded or otherwise secured together at 28a. This construction, as well as that of Figure 2, are exceptionally satisfactory for the purpose at hand.

A rod-like electric heating element 30 is mounted centrally between the lower portions of the side walls of the stack, in the present instance, between the side walls 26 of the stack 25. This heating element 30 extends substantially from end to end of the casing 8 and is spaced upwardly from the casing bottom 13. A trough-like reflector 31 extends under the full length of the heating element 30 to upwardly reflect the heat, and novel means are provided for mounting said reflector and heating element.

Two transverse rods 32 extend between and are supported by the stack side walls 26 or 26a, a short distance above the element 30. These rods are shown extending through openings 33 in the stack side walls 26 and are thus supported by the latter. Openings 33a for the same purpose are shown in the stack side walls 26a of Figure 5.

Two longitudinal rods 34 extend between the two transverse rods 32 adjacent the edges of the reflector 31, said rods 32 and 34 being welded together. Additional transverse rods 35 extend between and are welded to the longitudinal rods 34 at suitable intervals. A horizontal frame is thus provided from which to suspend the heating element 30 and reflector 31.

J-shaped hangers 36 are welded at their upper ends to the transverse rods 32 and 35. The lower ends of these hangers embrace and hold insulators 37 through which the heating element 30 extends. Thus, the element 30 is effectively suspended and held against sagging.

Short suspenders 38 are welded to the corners of the reflector 31 and to the transverse rods 32, and reflector-supporting fingers 39 are welded to the longitudinal rods 34 at suitable intervals. These fingers 39 are curved to conform to the transverse curvature of the reflector 31 and they partially underlie the latter to hold it against sagging.

In the operation of the heater, the element 30, when connected to a suitable source of electricity (not shown), radiates intense heat and this heat is reflected upwardly and intensified by the reflector 31, causing said reflector and the side walls 26 or 26a of the jet stack to become highly heated. The air entering this jet stack through the spaces 12 and passages 14 is thus highly heated, ascends and discharges in a rapidly moving main current or jet into the upper portion of the casing 8 from which it discharges through the openings 18. This upwardly moving main current or jet of hot air induces air to enter through the openings 16 into the chambers 40 between the stack side walls and the casing side walls, in which chambers the air is heated by contact with and radiation from said stack side walls. Auxiliary upward currents of relatively rapidly moving hot air are thus created and these currents also discharge through the openings 18. Space heating is thus rapidly and efficiently accomplished.

From the foregoing, it will be seen that a novel and efficient electric heater has been provided utilizing radiation, conduction and convection. Heating is thus accomplished directly with no heating of water; there is no hot blast in one spot but a gentle and active discharge of hot air throughout the length of the heater; and there is no exposed element to burn by accidental touch. More-

over, the heater is sufficiently compact to permit storage in small space when not needed.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the heating apparatus herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. An electric heater comprising a horizontally elongated casing of much greater height than width, said casing having side walls, end walls and a top, a jet stack mounted within said casing and extending substantially from end to end thereof, said jet stack being open at its upper and lower ends and having the former spaced downwardly from the casing top, said jet stack having upwardly converging side walls mounted by and cooperating with the casing side walls to form air heating chambers therebetween, said casing having air inlet openings below the lower end of said stack and air inlet openings into the lower ends of said chambers, the casing top being provided with hot air outlet openings, an elongated heating element mounted centrally in the lower portion of said jet stack and extending substantially from end to end of said casing, and a trough-like reflector, having a cross-section of substantially less than 180° curvature, suspended under said heating element and extending substantially from end to end thereof, the longitudinal edges of said reflector being inwardly spaced from the side walls of said jet stack and the bottom of the reflector trough being spaced not more than half the radius of curvature of said cross section.

2. An electric heater comprising a horizontally elongated casing of much greater height than width, said casing having side walls, end walls and a top, a jet stack mounted within said casing and extending substantially from end to end of said casing, said jet stack being open at its upper and lower ends and having the former spaced downwardly from the casing top, said jet stack having upwardly converging side walls mounted by and cooperating with the casing side walls to form air heating chambers therebetween, said casing having air inlet openings below the lower end of said stack and air inlet openings into the lower ends of said chambers, the casing top being provided with hot air outlet openings, an elongated heating element mounted centrally in the lower portion of said jet stack and extending substantially from end to end of said casing, and a trough-like reflector suspended under said heating element and extending substantially from end to end thereof, the longitudinal edges of said reflector being inwardly spaced from the side walls of said jet stack, said casing having a narrow thermally insulated bottom the longitudinal edges of which are inwardly spaced from the casing side walls, said bottom being disposed under said reflector and extending from end to end thereof, said casing having supporting legs at its corners, the spaces between said legs and the spaces between said bottom and the casing side walls constituting said inlet openings into the lower end of said stack.

3. A structure as specified in claim 1; together with an elongated horizontal frame provided with portions loosely mounted in the lower portion of said jet stack over said heating element and reflector, suspending means for said heating element connected with said frame, and suspending means for said reflector connected with said frame.

4. In a heater having a jet stack open at its upper and lower ends, said jet stack having opposed side walls, a horizontally elongated heating element disposed centrally in the lower portion of said stack, an elongated trough-like reflector disposed under said heating element and extending from end to end thereof, the longitudinal edges of said reflector being inwardly spaced

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from said side walls of said stack and curved upwardly substantially parabolically around said heating element, placing the latter no farther from the bottom of said reflector trough than its parabolic focus, so as to reflect all the heat rays divergently back into said stack, and mounting means loosely supported by said stack for said heating element and reflector.

5. A structure as specified in claim 4; said mounting means comprising a horizontal frame disposed over said heating element and trough, suspending means for said heating element connected with said frame, and suspending means for said reflector also connected with said frame.

6. In a heater having a jet stack open at its upper and lower ends, said jet stack having opposed side walls, a horizontally elongated heating element disposed centrally in the lower portion of said stack, an elongated trough-like reflector disposed under said heating element and extending from end to end thereof, the longitudinal edges of said reflector being inwardly spaced from said side walls of said stack and curved upwardly to reflect all the heat rays from said heating element back into

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said stack, and mounting means loosely supported by said stack for said heating element, said mounting means comprising a frame having transverse rods loosely supported in the stack over the ends of said heating element and reflector, and longitudinal rods secured to said transverse rods and disposed adjacent to longitudinal edges of said reflector, suspending means for said heating element connected with said transverse rods, and supporting fingers for said reflector, said fingers being secured to said longitudinal rods and at least partially underlying said reflector.

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