Dec. 15, 1931. L. E. JOHNSON ET AL 1,836,253

ELECTRIC RADIATOR AND HUMIDIFIER

Filed July 13, 1929

Fig. 1

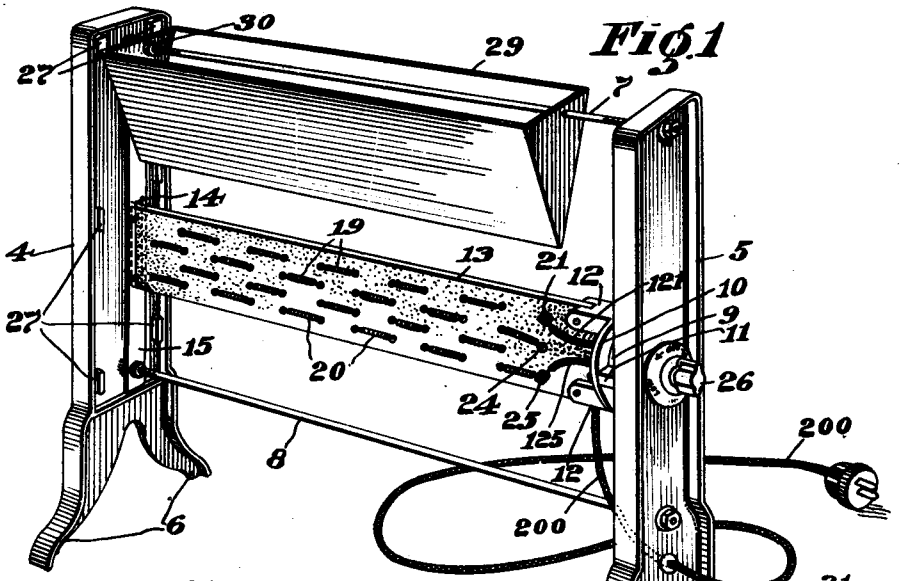


Fig. 2

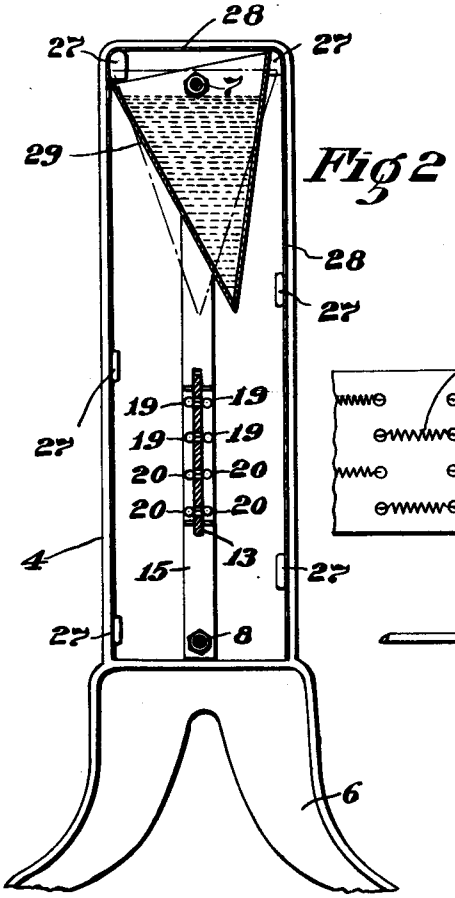
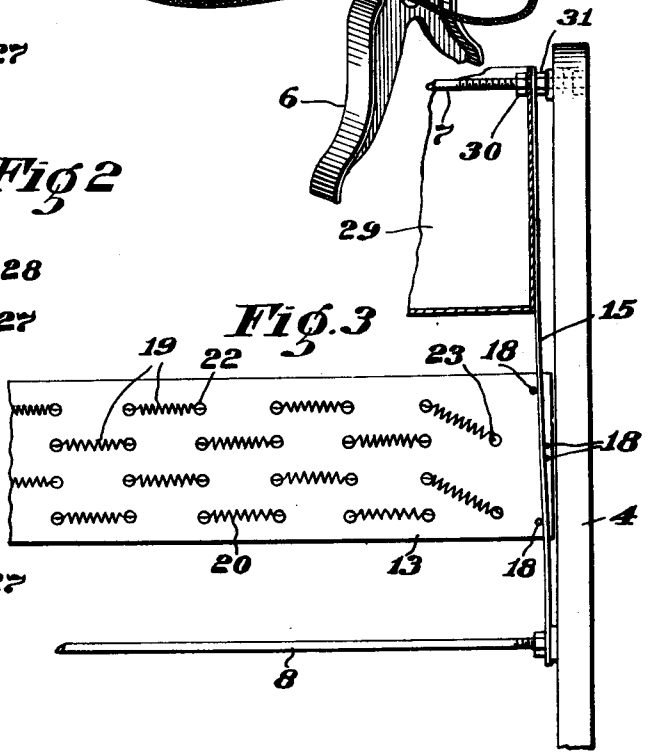


Fig. 3



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UNITED STATES PATENT OFFICE

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ELECTRIC RADIATOR AND HUMIDIFIER

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This invention relates, generically, to electric radiators, and more particularly to a combined electric radiator and humidifier.

Accordingly there are two principal objects of the present invention: first, to provide novel and improved means for mounting the resistance element and its support whereby the resistance element is free to expand or contract, sagging of the resistance element and its support under heat is overcome, uniform distribution of heat on opposite sides of the support is assured, and free expansion longitudinally of the support under heat is permitted; and second, to provide novel and improved means for humidifying the air heated by the radiator and/or for controlling the direction of flow of the heated air from the radiator.

To the accomplishment of these objects and such others as may hereinafter appear the various features of the invention relate to certain devices, combinations and arrangements of parts hereinafter described and then set forth broadly and in detail in the appended claims, which possess advantages readily apparent to those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawings illustrating the best form of the invention at present known to the inventors, in which:

Figure 1 is a view, in perspective, of the electric radiator and humidifier with its foraminous hood removed;

Fig. 2 is a view, in transverse sectional elevation; and

Fig. 3 is an enlarged detail, in rear elevation, partly in section.

In the illustrated embodiment of the invention the electric radiator and humidifier comprises standards 4 and 5 which constitute the closed ends of the radiator and which are provided with legs 6 for supporting the radiator upon the floor. The standards 4 and 5 are connected together in a fixed spaced relation by tie-rods 7 and 8.

Secured centrally to the standard 5 and passing therethrough is a cylindrical switch shell 9 upon which is mounted an annulus 10. The annulus 10 is secured to two lugs 11 (only one of which is shown in Fig. 1) which extend inwardly from the standard 5.

The annulus is provided with a pair of yoked arms 12 which embrace the opposite faces of a transit board 13 at one end thereof. The board is constructed of dried asbestos and constitutes the support for the electric heating means of the radiator. The board is supported in a vertical plane in order to keep it from sagging.

The free end of the transit board 13 fits loosely in a slot 14 formed in a flexible steel strap 15 provided with openings through which pass, respectively, the tie-rods 7 and 8. The ends of the strap 15 are held in position on the tie-rods by lock nuts (Fig. 3). The openings in the strap 15 for receiving the tie-rods are spaced apart a distance somewhat greater than the vertical distance between the tie-rods so that the strap 15 is bowed away from the standard 4 towards the standard 5. The free end of the board 13 is engaged with the strap 15 through three cotter pins 18 passed through the board and arranged at opposite sides of the strap.

With this construction the board is supported rigidly at one end and is supported yieldingly at its other end. The board is thus permitted to expand freely longitudinally when heated by the resistance element it carries. If the board was supported rigidly at both ends it would bow laterally under heat. This would result in cracking the dried asbestos of which the board is composed and injury to the resistance element thereon.

The resistance element comprises two separately mounted pieces of coiled wire 19 and 20. Preferably nichrome or chromel wire is used. One end of the coil 19 is connected on the rear face of the board to an upper terminal 21 (Fig. 1), and it is then threaded in and out of the upper course of openings 22 formed in the board, being stretched at each passage through the board, to form a series of short coils extending between said openings alternately on opposite sides of the board. When the last opening in the upper course of the openings 22 is reached the coil 19 is threaded through the opening 23 (Fig. 3) in the next to the upper course, then it is threaded, as

above described, through the openings 22 in the next to the upper course, and finally its free end is connected on the front face of the board to a central terminal 24 (Fig. 1) which extends through the board.

The coil 20 is connected at the front face of the board to a lower terminal 25 (Fig. 1) and is threaded into and out of the lower course of openings 22 and then back again through the openings in the next to the lower course, its free end being connected at the rear face of the board to the central terminal 24 to which the coil 19 also is connected.

With this construction the separate coils forming the circuits 19 and 20 are perfectly free to expand or contract, and by forming the circuits of short coils upon opposite sides, and in staggered relation on both sides, of the transit board they are heated uniformly with no danger that one of the coils will sag and contact with another coil as would be the case with single coils extending from end to end horizontally of the transit board.

The terminals 21, 24 and 25 are connected, respectively, to cables (only two of which, 121 and 125, are shown in Fig. 1) which are connected in the shell 9 to a standard three-way switch 26 by means of which the flow of electricity through the coils is controlled to produce high, low and medium heat in a manner well understood in this art. Electrical connection between the switch and a wall socket is made through the cable 200.

The standards 4 and 5 are provided on their internal faces with lugs 27 which form guides for a hood 28 (Fig. 2) which encloses the top and sides of the radiator. The bottom of the radiator is unenclosed so that the air outside the radiator may flow freely through the open bottom and displace the air within the radiator after it has been heated by the resistance element. The hood is perforated to allow the heated air to escape therethrough.

In order to humidify and/or medicate the heated air before it flows out of the radiator the tie-rod 7 carries a container 29 for the humidifying and/or medicating liquid. The container comprises an elongated wedge-shaped vessel having its open top adjacent the top of the hood which is provided with an opening (not shown) through which the humidifying and/or medicating liquid may be poured into the container. The container is loosely mounted on the tie-rod 7 so that it may be swung laterally thereon. The container is held in the position to which it may be swung by frictional contact with the strap 15. Nuts 30 and 31 (Fig. 3) threaded on the tie-rod 7 maintain one end face of the container in contact with the strap 15. As shown in Fig. 2 angular adjustment of the container is limited by the top portion of the hood 28.

With this construction the container may be positioned with its bottom edge in the vertical plane of the transit board 13 and it then acts as a baffle to divide the upwardly rising current of heated air and split it into two streams one of which flows out of the radiator substantially through the front of the hood 28 and the other one of which flows out of the radiator substantially through the back of the hood. Substantially all the heated air may be diverted and caused to flow out of the radiator through the front of the hood by swinging the container 27 into the full line position of Fig. 2. If the container is swung into a position opposite to that shown in the full line position of Fig. 2 substantially all the heated air is diverted and caused to flow out of the radiator through the back of the hood.

While the primary object of the present invention is directed to a specific field in the art of heating air it is not to be understood as limiting the scope of the claims, where the context otherwise permits, to an electric radiator and humidifier as it will be apparent to those skilled in the art that certain features and combinations of parts hereinbefore described are well adapted for general use in heating air independent of the humidifying feature.

In the appended claims the term "humidifying liquid" is used in an inclusive sense for either water or a medicated liquid.

It will be clear also to those skilled in this art and with the general objects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment thereof being intended as an exploitation of its underlying essentials, the features whereof are definitely stated in their true scope in the claims herewith.

What is claimed as new, is:—

1. In an electric radiator and humidifier the combination with electric means for heating the air within the radiator and inducing a flow of air therethrough and a foraminous hood, of a wedge-shaped container for the humidifying liquid within the hood, edge down, in the path of flow of the heated air, and means for mounting the container in a manner for shifting said edge laterally to control the direction of flow of the heated air out of the radiator.

2. In an electric heater and humidifier the combination with a pair of standards, horizontal tie-rods connecting the standards, a strap having a vertical slot therein supported from the tie-rods, said strap having two holes therein through which the tie-rods pass, respectively, said holes being spaced apart vertically a distance somewhat greater than the distance between the tie-rods to cause the strap to bow away from the adjacent standard, a support secured to the other standard, and a transit board having one end secured to the support and the other end

mounted in the slot in the strap, of a wedge-shaped container for the humidifying liquid pivotally mounted upon one of the tie-rods.

3. In an electric radiator a pair of standards, tie-rods connecting the standards, a strap having a slot therein supported by the tie-rods adjacent one of the standards so that the strap bows toward the other standard, a support secured to the last named standard, and a resistance element board having one end secured to the support and having its other end mounted in the slot in the strap.

4. In an electric radiator and humidifier a pair of standards, upper and lower tie-rods connecting the standards, electric heating means between the standards and between the tie-rods, a container for the humidifying liquid mounted for swinging movement upon the upper tie-rod and above the heating means, and friction means for holding the container in different angular positions.

5. An electric radiator having, in combination, rigid end supports, a transit board in a vertical plane between said supports, an inwardly bowed strap secured to one of said supports having a vertical slot in which one end of the board is seated, and a member fixed to the other support to which the board is rigidly connected.

In testimony whereof, we affix our signatures.

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