Aug. 9, 1966 S. R. JOHNSON 3,265,305

COMBINED HUMIDIFIER AND HOT WATER RADIATOR

Filed Oct. 9 1964

FIG. 1

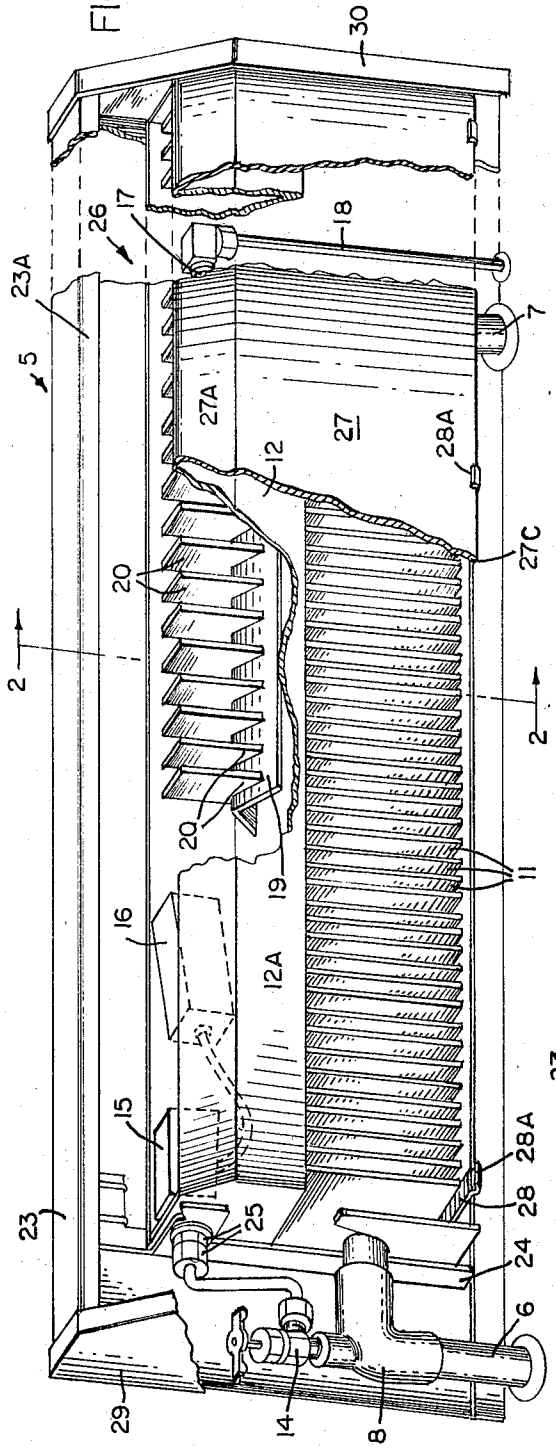


FIG. 3

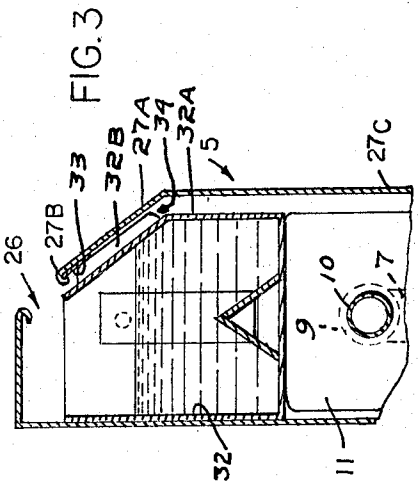
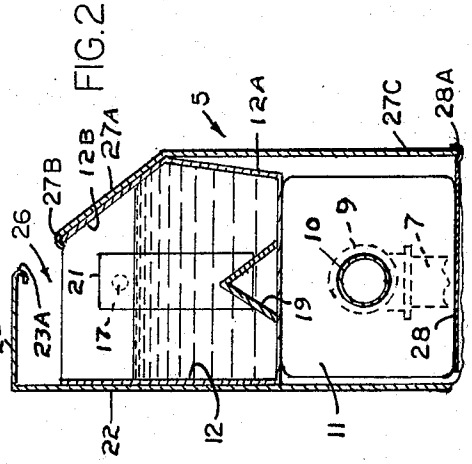


FIG. 2



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COMBINED HUMIDIFIER AND HOT WATER RADIATOR

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5 Claims. (Cl. 237—78)

The present application is a continuation-in-part of my copending application Serial No. 374,334, filed June 11, 1964 and now abandoned.

The present invention relates to combinations of hot water radiators and humidifiers and particularly to such combinations of the simulating base boards type.

It is widely recognized that human comfort is affected by the relative humidity and that during cold weather, the air in a heated building is far too dry with the average sized room in a house requiring the addition of a gallon of water a day thereto. While relative humidity below 35% or above 50% is attended by some degree of discomfort to most people, there are many whose health is adversely affected when the relative humidity is too low. In addition, low relative humidity within a house results in separation of joints and cracks in floors, moldings, and furniture. These factors have lead to the wide use of humidifiers, some of the automatic type that are either incorporated in hot air heating systems or connected to the water supply and others that are independent of the heating systems, sometimes referred to as portatble and usually requiring filling by hand.

For those having hot water heating systems, the type that is otherwise usually regarded as the most satisfactory, there is no way to incorporate humidifying means therein so that, prior to the present invention, portable humidifiers or those connected to the water supply have had to be used. Neither choice is a satisfactory solution of the problem, even for a single room, due to the cost of both types of equipment and the space they require and the attention needed when they are in service, particularly the portable type.

The principal objective of the present invention is to provide a combined hot water radiator and humidifier, particularly one that can be used as a baseboard radiator or as a part thereof or, by itself, as a humidifier, particularly one that can be incorporated in existing baseboard radiators or other suitable housings. In accordance with the invention, this objective is attained with a housing having a lengthwise opening in its upper portion. Within the lower portion of the casing there is a heating unit including a lengthwise hot water conduit of stock having good heat conductivity perforations and having an inlet and an outlet for use in connecting it with the hot water system. A plurality of spaced fins of heat conductive stock are supported by the conduit in thermal contact therewith, the fins having an upper edge providing a supporting surface. An elongated, open tank of heat conductive stock is supported by the fins below the lengthwise opening and it divides the portion of the housing which it occupies into a lower, heating chamber and an upper humidifying chamber. The container has a float controlled inlet connectable to the hot water system and, when a safeguard against the malfunctioning thereof is desired, the container also has an overflow. Within the container and projecting upwardly above the water level, as determined by the float, are a series of water absorbent plates.

In the accompanying drawings, there are shown illlustrative embodiments of the invention from which these and other of its objectives, novel features, and advantages will be readily apparent.

In the drawings:

FIGURE 1 is a perspective view of a combined hot water radiator and humidifier in accordance with the invention with certain parts broken away to show interior details,

FIGURE 2 is a section taken approximately along the indicated lines 2—2 of FIGURE 1, and

FIGURE 3 is a similar sectional view illustrating a modification of the invention.

A combined hot water radiator and humidifier is shown as having a generally indicated housing **5** of the type simultaing a baseboard. The length of the housing depends on the heating requirements of the room and the structural features thereof which may permit several lengths to be combined or which may require that each length be spaced from and entirely independent of the others. In any event, the total length of the housing is such as to include between its ends, the hot water supply pipe **6** and a return pipe **7** of the hot water heating system and having elbows **8** and **9**, respectively, interconnected by the conduit **10**, typically a length of copper tubing. The conduit **10** is provided with a plurality of axially spaced, rectangular fins **11**, typically of copper, attached to the conduit **10** in a manner ensuring a good thermal contact therewith.

Seated on the fins **11** usually adjacent one end of the housing **5** is a tank **12** of stock that is a good heat conductor and provided with an inlet **13** shown as connected to the elbow **8** by a valve **14** and having a valve **15** within the tank **12** controlled by the float **16** to maintain a desired water level therein. At its other end, the tank **12** has an overflow **17** conneced to a drain **18** as a safeguard against any chance of water damage in the event of any malfunctioning of the float-controlled valve **15**. Within the tank **12**, there is a lengthwise support **19** in the form of an inverted V having a series of spaced, transverse slots **20**, each receiving and providing support for an appropriate one of the plates **21** which are of water absorbent material and which are dimensioned to extend an appropriate distance above the water level.

The housing **5** is shown as having a back wall **22** with which one side of the tank **12** is in contact and which is provided with an inturned flange **23**. The back wall **22** has end braces **24** caught under the conduit **10** and also serving as a backer against which the fittings of the inlet **13** and the overflow **17** may be clamped as by nuts **25** with only the nuts **25** threaded on the inlet fitting **13A** being shown. It will be noted that the lower part **12A** of the front wall of the tank is inclined upwardly and outwardly, see FIGURE 2, and that the upper part **12B** thereof is inclined upwardly and inwardly towards the free edge of the flange **23** but terminating short thereof to provide a lengthwise slot **26**. The housing **5** also includes a front wall **27** having an upwardly and inwardly inclined portion **27A** terminating in a rolled edge **27B** hooked over and supported by the edge of the upper front wall part **12B** of the tank **14**. The lower part of the housing back wall **22** is also provided with transverse members **28** each having a bead **28A** at its end releasably catching the rolled edge **27C** at the bottom edge of the housing front wall **27** both supporting it above the floor and holding its portion **27A** in thermal contact with the portion **12B** of the front tank wall.

It will be noted that the free edge of the flange **23** is rolled in as at **23A** enabling back walls to be fitted together when more than one length is to be combined in which case the other length would not usually require a humidifier. If additional humidifying means were required, the tank **12** could be replaced by one of greater length. Caps **29** and **30** are fitted over the ends of the walls to complete the housing.

From the foregoing, it will be appreciated that the humidifier tank **12** is supported by and in good thermal contact with the fins of the heater and with the front and

back housing walls, and also it is a barrier dividing, throughout its length, that part of the housing **5** that it occupies into upper and lower portions. The lower portion under the tank **12** is a heating chamber and the upper portion a humidifier with the heating chamber including the space between the front wall part **12A** of the tank and the front wall **27** of the housing.

The lower part of the tank wall **32A** extends vertically in spaced relation to the housing **5** and its upper part extends upwardly and inwardly and is corrugated as at **32B**. A strip **33** is secured to the outer crests at their upper ends for engagement by the rolled edge **27B** of the housing wall portion **27A** with the corrugations providing generally indicated air passages **34** opening into the space above the tank **32** and between it and the slot **26**.

In operation, the float-controlled valve maintains the humidifier tank **12** filled to the desired extent as determined by its float. The water introduced into the tank may or may not be hot depending on heat requirements, and the rate of water evaporation is a function of its temperature so that the tank **12** must be heated to the maximum extent and for the maximum length of time. This objective is attained because of the good thermal contact of the humidifier tank **12** with the heating fins **11** and because the heating chamber retains the heat for the maximum time. It will be appreciated that the humidifier also serves to vent air from the heating system and that access to the humidifying means can be readily had simply by removing the front wall **27**.

I claim:

1. A combined humidifier and radiator for hot water heating systems comprising a housing of heat conductive material, having an upwardly opening, lengthwise slot in the upper portion of its outer wall, a heating unit in the lower portion of said housing including a lengthwise water conduit of heat conductive stock for connection with an inlet and an outlet of the system, and a plurality of approximately rectangular fins of heat conductive stock through which the conduit extends and with which said conduit is in thermal contact, and an elongated, open tank of heat conductive stock within said housing below said slot, said tank being supported by and in thermal contact with said fins, said outer housing wall and the proximate wall of said tank being spaced and arranged to establish an air conduit effecting communication between the heating chamber and the space between said tank and said slot, and said tank including a float controlled inlet for connection with the inlet of said system.

2. A combined humidifier and radiator for hot water heating systems comprising a housing of heat conductive material, having an upwardly opening, lengthwise slot in the upper portion of its outer wall, a heating unit in the lower portion of said housing including a lengthwise water conduit of heat conductive stock for connection with an inlet and an outlet of the system, and a plurality of approximately rectangular fins of heat conductive stock through which the conduit extends and with which said conduit is in thermal contact, and an elongated, open tank of heat conductive stock within said housing below said slot, said tank including a flat bottom and being supported by and

in thermal contact with said fins and being of a size and shape to constitute a horizontal partition substantially dividing said housing into a lower heating chamber and an upper humidifying chamber, the upper part of the outer tank wall and the upper part of the outer housing wall being upwardly and inwardly inclined, the upper edges of said upper parts including detachable, interengageable portions, and said tank including a float controlled inlet for connection with the inlet of said system.

3. A combined humidifier and radiator for hot water heating systems comprising a housing of heat conductive material, having an upwardly opening, lengthwise slot in the upper portion of its outer wall, a heating unit in the lower portion of said housing including a lengthwise water conduit of heat conductive stock for connection with an inlet and an outlet of the system, and a plurality of approximately rectangular fins of heat conductive stock through which the conduit extends and with which said conduit is in thermal contact, and an elongated, open tank of heat conductive stock within said housing below said slot, said tank including a flat bottom and being supported by and in thermal contact with said fins, said outer housing wall and the proximate wall of said tank being spaced and arranged to establish an air conduit effecting communication between the heating chamber and the space between said tank and said slot, and said tank including a float controlled inlet for connection with the inlet of said system, a support in the form of an inverted channel seated on and extending lengthwise of the tank bottom and a plurality of vertically disposed, water absorbent plates spaced lengthwise of said tank and supported on said support.

4. The combined heater and radiator of claim **2** in which the lower part of the front wall of the tank is inclined upwardly and outwardly, the lower edge of the outer wall of the housing being spaced from the lower part of the outer tank wall to provide a longitudinal air chamber opening into the lower chamber.

5. The combined heater and radiator of claim **1** in which the front wall of the tank includes a part having vertical corrugations whose crests engage the outer wall of the housing and which divide the air conduit into a plurality of air passages effecting communication between the heating chamber and the space between the tank and the slot.

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