Aug. 19, 1941. P. F. SEIBOLD 2,253,352

HUMIDIFYING DEVICE

Filed Jan. 18, 1941

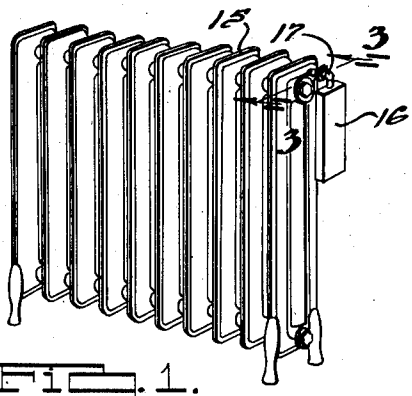


Fig. 1.

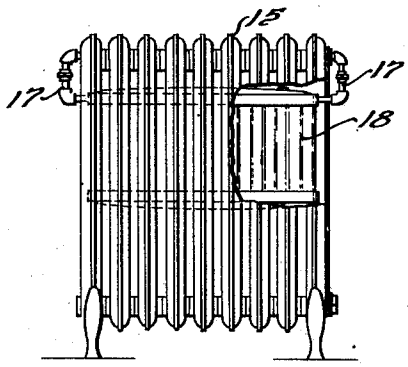


Fig. 2.

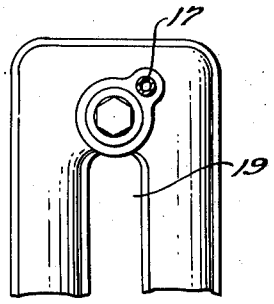


Fig. 3.

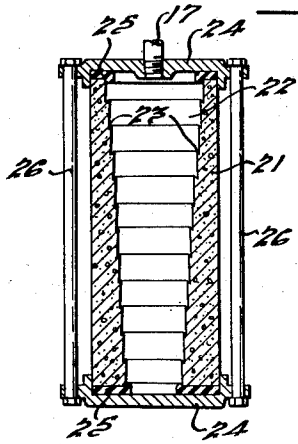


Fig. 4.

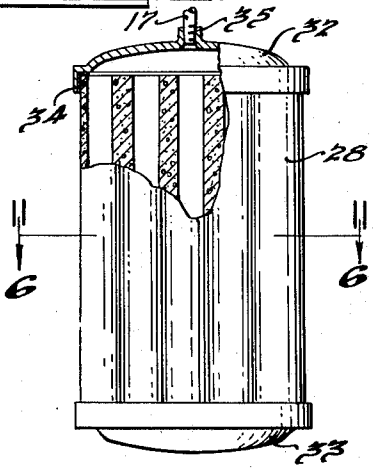


Fig. 5.

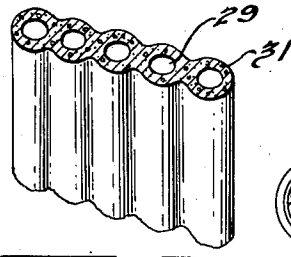


Fig. 8.

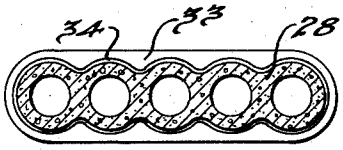


Fig. 6.



Fig. 7.

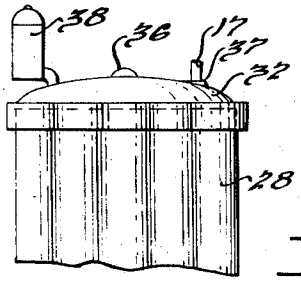


Fig. 9.

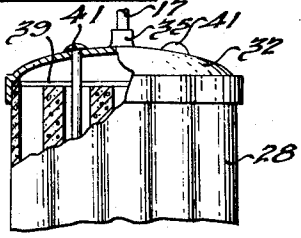


Fig. 10.

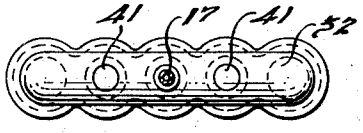


Fig. 11.

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ATTORNEYS

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UNITED STATES PATENT OFFICE

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HUMIDIFYING DEVICE

Paul F. Seibold, Newport, Mich.

Application January 18, 1941, Serial No. 374,995

6 Claims. (Cl. 237—78)

My invention relates to humidifying devices and particularly to a method and means for continuously providing moisture to the air which is being heated by a steam or hot water radiator and is a continuation in part of my application Serial No. 119,460, filed January 7, 1937, and which was renewed on June 29, 1940.

Heretofore, steam or hot water radiators were usually provided with a receptacle into which water was added periodically as it was evaporated. Usually, automatic means was not provided for delivering water to the receptacle which was more often dry than provided with water.

The present invention contemplates the use of a ceramic or other porous element into which the steam or water of the radiator is conducted. Water will accumulate within the element through the condensation of the steam or through the direct delivery thereof and will be absorbed by the ceramic or other material which may become saturated, wetting the outer surfaces of the element. The element is disposed in the convection flow or directed path of the air being heated by the radiator so that, as the air becomes heated and more capable of absorbing moisture, water will be taken up from the surfaces of the element and will thereby become humidified. The evaporation of the moisture cools the humidifying element and further condensation of the steam in the element, or a further delivery of the water thereto occurs which will continuously be absorbed and evaporated.

The ceramic element is preferably provided with a hollow interior and may be secured to a suitable conductor which is joined to the interior of the radiator. A small threaded opening on the end of the radiator is employed to support the element and to deliver fluid thereto.

The ceramic element is molded, extruded, or otherwise formed to have a hollow interior with open ends. Suitable caps are provided which are secured to the ends of the ceramic elements by adhesive material or by through-bolts which draw the enclosing caps against a suitable gasket material. One end of the cap is provided with an opening in which a conductor is threaded to form a conducting means as well as a support for the humidifier. The interior wall of the ceramic element may be corrugated to form troughs to receive and retain the water at various heights along the wall to uniformly saturate the entire outer surface. A plurality of vertically extending openings are preferably provided in the ceramic element with the wall thereof of predetermined thickness providing an outer surface which is corrugated in form. The uniform wall thickness provides even distribution of the water from the interior to the outer surface of the element and the corrugated shape provides material strength to the ceramic element.

The element may be supported on one end of the radiator by removing the small plug provided therein and connecting the conductor of the humidifying element thereto. The humidifying element may be made thin so as to be disposed within the central opening in each of the radiator elements to extend along the length thereof. The element may then be supported at each end of the radiator on conductors which complete a circuit through the humidifying element and the radiator.

Accordingly, the main objects of my invention are: to provide a method and means for automatically and continuously humidifying air which is heated by a steam or hot water radiator; to support a humidifying device on a radiator by means of a pipe which conducts steam or hot water thereto; to suspend a moisture absorbing element from a conductor in a radiator for providing a moistened surface in the flow of air about the radiator; to form a humidifying element from a molded, extruded, or otherwise formed ceramic element having one or a plurality of openings therethrough, the ends of which are enclosed by caps which are sealed thereto; and in general, to provide a humidifying device for a radiator which is continuously provided with moisture, which is positive in operation, and economical of manufacture.

Other objects and features of novelty of my invention will be specifically pointed out, or will become apparent when referring, for a better understanding of my invention, to the following description taken in conjunction with the accompanying drawing wherein:

Figure 1 is a perspective view of a radiator having a humidifier secured thereto which embodies features of my invention;

Fig. 2 is a broken plan view of a radiator with a humidifier attached thereto showing a further form of my invention;

Fig. 3 is a sectional view of the structure illustrated in Fig. 1, taken on the line 3—3 thereof;

Fig. 4 is a sectional view of a humidifying element embodying features of my invention;

Fig. 5 is a broken, sectional view of a humidifying element showing a further form which my invention may assume;

Fig. 6 is a sectional view of the structure

illustrated in Fig. 5, taken on the line 6—6 thereof;

Fig. 7 is a top plan view of the structure illustrated in Fig. 5;

Fig. 8 is a perspective view of the ceramic element of the humidifier illustrated in Fig. 5;

Fig. 9 is a broken view in elevation of a humidifier, similar to that illustrated in Fig. 5, and showing a modified form thereof;

Fig. 10 is a broken, sectional view of a humidifier, similar to that illustrated in Fig. 9, showing a still further form which my invention may assume, and

Fig. 11 is a top plan view of the structure illustrated in Fig. 10.

In Fig. 1, I have illustrated a radiator 15 having a humidifier 16 secured to the end thereof by a conductor 17 which is threaded to one end of the radiator.

In Fig. 2, I have illustrated the radiator 15 as having the ceramic element 18 disposed through the central openings 19 through the radiator body so as to be concealed and be disposed directly in the air stream passing upwardly between the radiator elements. Conductors 17 are provided at both ends of the radiator which provide a support for the humidifying element and a circuit through both ends of the radiator and the humidifier.

In Fig. 3, I have illustrated the conductor 17 as being threaded in the tapped opening that is universally provided on the ends of the radiators.

In Fig. 4, I have illustrated a ceramic element 21 which is molded to have an opening 22 through the center thereof which varies in diameter to provide shouldered portions 23 upon which the moisture may collect so as to saturate the ceramic material from the top to the bottom thereof. End plates 24 are drawn against gaskets 25 at the ends of the ceramic element 21 by bolts 26 to form a unit seal construction. A conduit 17 extends from the top of the plate through which steam or hot water is admitted to the interior of the ceramic element 21 and which forms a support for the entire humidifying unit.

Referring to Figs. 5 to 8, inclusive, I have illustrated a further form which my humidifier may assume. The humidifying element 28 is provided with a series of openings 29, the wall 31 of which is of uniform thickness providing a corrugated appearance to the outside of the element. The uniform thickness of wall provides an even distribution of the moisture through the ceramic material while the corrugated form provides strength to prevent the rupturing of the material under pressure. The element is extruded in dies from ceramic material and cut to predetermined length and thereafter dried and baked in a conventional manner. The clay, such as is employed in bricks, flower pots, and the like, readily absorbs moisture so that the water within the openings 29, delivered from a hot water radiator or from the steam which condenses within the openings, readily passes through the material to be absorbed by the air which is heated by the radiator.

A head cap 32, similar to the bottom cap 33, which may be cast, molded and preferably pressed from a sheet of metal, is secured to the ends of the ceramic element preferably by suitable sealing material 34. A threaded opening 35 is provided in the cap 32 in which the threaded conductor 17 is secured.

In Fig. 9, I have illustrated the ceramic element 28 as being provided with caps 32 and 33 which are secured together by a through-bolt 36. A conductor 17 is threaded into an opening 37 at one side of the cap 32 while a valve 38 is threaded to the opposite side thereof. Where a valve 38 is employed on the radiator, the conduit 17 is threaded into the radiator in place of the valve and the valve 38 is attached to the humidifier cap as illustrated.

Figs. 10 and 11 illustrate the humidifying element 28 as being provided with end caps 32 and 33 which are drawn against a gasket 39 by a pair of through-bolts 41. A centrally threaded opening 35 has the conduit 17 attached thereto by which the humidifier is secured to the radiator.

It will thus be seen that I have provided a humidifier of new and novel construction which is attached or conductively joined to the radiator. The ceramic portion of the humidifier is extruded from a die to provide a commercial method of production, with lengths being severed as the extruding operation continues. Openings through the element provide uniform wall thickness and a corrugated appearance to the resulting element which embodies material strength. The end caps may be molded from metal or a ceramic material but are preferably stamped from sheet metal and secured in position by a suitable sealing material or by through-bolts which draw the caps against sealing gaskets. The resulting humidifier is supported directly on the radiator by the conductor which admits a flow of steam or water thereto.

While I have described and illustrated several embodiments of my invention, it will be apparent to those skilled in the art that various changes, omissions, and substitutions may be made therein without departing from the spirit and scope of my invention as set forth in the accompanying claims.

What I claim is:

1. A humidifier including, in combination, a ceramic element having a plurality of central openings, caps enclosing the ends of said element with the openings in communication with each other, means for sealing said caps to the ends of said element, and a conductor extending from at least one of said caps.

2. A humidifier including, in combination, a ceramic element having a plurality of central openings and walls of like thickness forming a corrugated outer surface, caps enclosing the ends of said elements with the openings in communication with each other, means for sealing said caps to the ends of said element, and a conductor extending from at least one of said caps.

3. A humidifier including, in combination, a ceramic element having a plurality of central openings and walls of like thickness forming a corrugated outer surface, caps having flanges shaped to conform to said corrugations enclosing the ends of said element, means for sealing said caps to the ends of said element, and a conductor extending from one of said caps forming a support for said humidifier.

4. A humidifier including, in combination, a ceramic element having a plurality of central openings, caps on the ends of said element with the openings in communication with each other, gaskets between said caps and elements, and at least one through bolt for drawing said caps against said gasket and element to form a unit construction.

5. A humidifier including, in combination, a ceramic element having a plurality of central openings, caps on the ends of said element with

the openings in communication with each other, gaskets between said caps and element, at least one through bolt for drawing said caps against said gasket and element to form a unit construction, and a conduit conductively joining the humidifier to a radiator and supporting the humidifier thereon.

6. A humidifier for a radiator having a central opening through the elements thereof, a ceramic element provided with a plurality of openings, caps for sealing the ends of the element with the openings in communication with each other, the element and caps being of such thickness as to fit within the openings of the radiator, and conductors projecting from the radiator and joined to both ends of the humidifier.

PAUL F. SEIBOLD.