

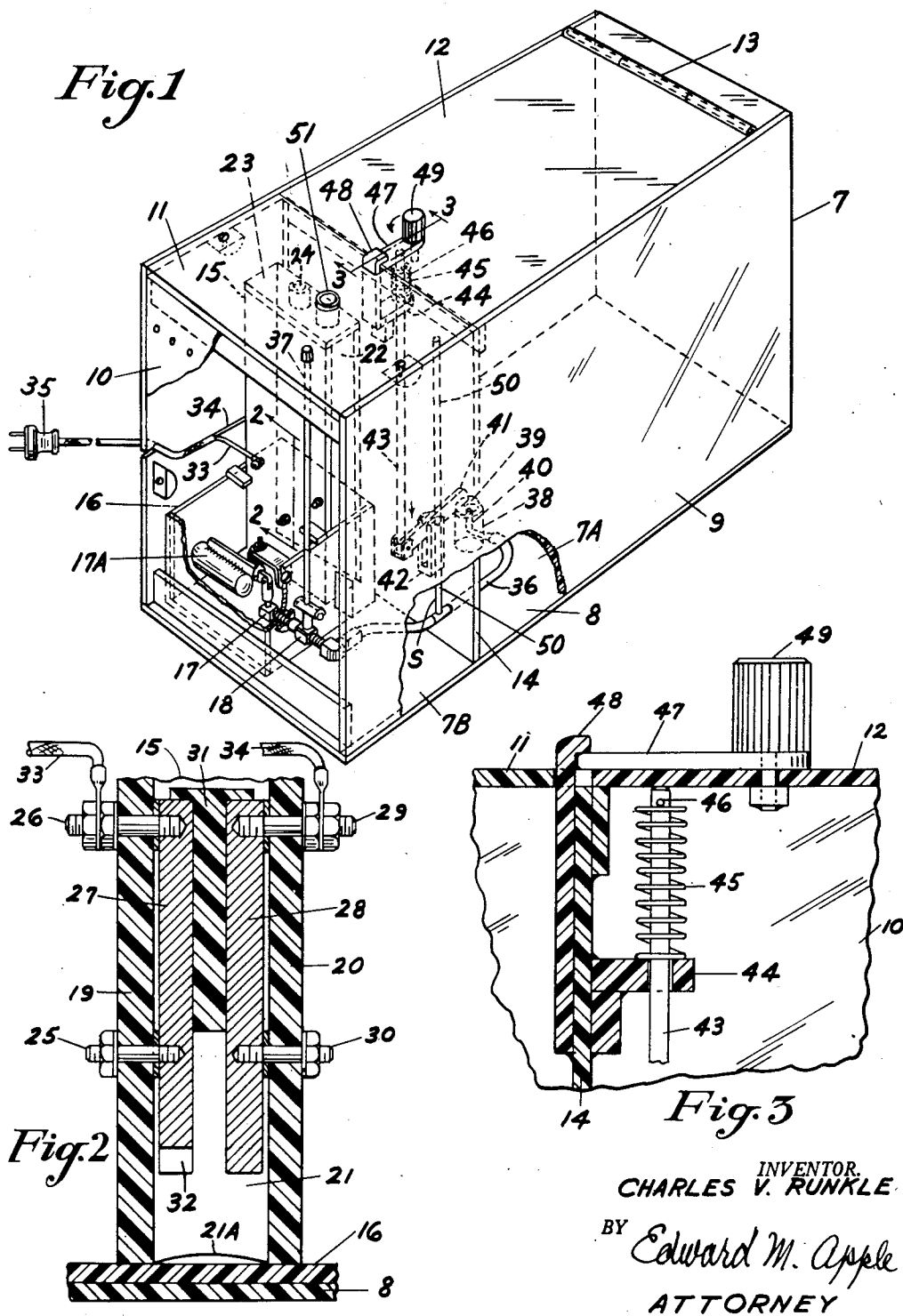
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ELECTRONIC SPACE UNIT HUMIDIFIER

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ELECTRONIC SPACE UNIT HUMIDIFIER

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5 Claims. (Cl. 219-40)

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This invention relates to humidifying devices and has particular reference to a device for adding hot gaseous moisture to the air in a home, office or other place of business, or the like.

The object of the invention is to provide a space unit humidifier which employs a process such as disclosed in U. S. Patent No. 2,451,594, issued to G. W. Watson.

Another object of the invention is to generally improve space unit humidifying devices and to provide a device of that character which is simple in construction, economical to manufacture, and efficient in use.

Another object of the invention is to provide a device which produces a hot gaseous vapor which thoroughly mixes with the air in a room without the necessity of using fans or other mixing apparatus.

Another object of the invention is to provide a device of the character indicated which is constructed and arranged to produce a practically invisible vapor which adds moisture to the air without producing any semblance of free moisture when the room temperature is at 60° F. or above.

Another object of the invention is to provide a device which will humidify the air in a closed space and at the same time add a perceptible amount of B. t. u.'s to the air, while the device is in operation.

The foregoing and other objects and advantages of the invention will become more apparent as the description proceeds, reference being made from time to time to the accompanying drawing forming part of the within disclosure in which drawing:

Fig. 1 is a perspective view of a device embodying the invention.

Fig. 2 is an enlarged sectional view taken on the line 2-2 of Fig. 1.

Fig. 3 is an enlarged sectional view taken on the line 3-3 of Fig. 1.

In Patent No. 2,451,594 issued to Watson he disclosed the process of vaporizing a liquid by inserting a pair of spaced electrodes in the surface of the liquid, applying unlike potentials to the electrodes, and adjusting the spacing between the electrodes to a distance greater than the capillary spacing for the liquid and within the distance that can be bridged by a film of the liquid.

In the device herein disclosed I intend to apply the principle disclosed in that patent but I have improved the structure and arrangement of the apparatus so that the principle can be utilized in a no pressure space unit humidifier.

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Referring now more particularly to the drawings, it will be understood that in the embodiment herein disclosed the reference character 1 indicates the case or housing for the working parts of the device. The case 1 is preferably made of a non-corrosive plastic material and formed with a bottom 8, side walls 9, end walls 10, top 11 and a lid 12 which is hinged as at 13. The case 1 is provided with a water tight partition 14, which divides the case into a large compartment 7-A and a smaller compartment 7-B. The compartment 7-A is water tight and serves as a reservoir for a pre-determined amount of water, which is to be vaporized. The smaller compartment 7-B houses the principal working parts of the device, which are more particularly described hereafter.

The principal working parts of the device include a generator 15, a generator tray 16, a float valve 17 and an adjusting valve 18. The generator 15 comprises a rectangular box-like structure having sidewalls 19 and 20, end walls 21 and 22 and a top cover member 23, all of which are preferably formed of a non-corrosive plastic material similar to the material of which the case 1 is made. The end wall 21 is provided with an opening 21A to permit water to enter the generator 15 from the tray 16. The generator 15 rests on the generator tray 16 and is held to the top member 11 by a spacer 24 which is adapted to bear against the top cover 23 of the generator.

Secured to the front wall 19 by means of threaded brass members 25 and 26 is a copper plate 27 which forms one of the electrodes of the generator. A second copper plate 28 is secured to the rear wall 20 of the generator by means of the threaded elements 29 and 30. The electrodes 27 and 28 are preferably held in predetermined spaced relation by a non-conductive element or spacer 31.

It will be noted that the electrode 27 has one or more cut out portions 32 formed along the lower edge thereof, this reduces the surface area of the electrode 27 and its resulting potential. The electrodes 27 and 28 are respectively connected to the leads 33 and 34 to a 110 volt circuit through the plug 35. Water enters the generator tray 16 from the reservoir 7-A through the filler pipe 36. The flow of water is controlled by the control valve 18, which may be remotely controlled by means of the axially rotatable rod 37. A pre-determined level of water is maintained in the tray 16 by means of a float valve 17, which is controlled by the float 17-A.

In order to prevent the electric current from

flowing from the generator 15, through the water line 36, I provide a novel circuit breaker, or a current breaker. The base of the current breaker is a cylindrical member 38, which is preferably made of a current insulating material such as the case 7 is made of and has a passage way therein. The water feed line 36 is connected to the bottom of the passage way 40 in the cylindrical member 38. The top of the passage way 40 is adapted to be closed by a rubber cup member 39, which is similar in shape to a conventional vacuum cup. The reduced passage way 40 extending through the center of member 38 connects with the water line 36, so that when the rubber cup 39 is forced over the end of the cylindrical member 38, the water in the passage way 40 and the water line 36 is moved leaving an air gap in the upper part of the narrow passage way 40 in the cylindrical member 38. The air gap prevents any current leaking from the water in the line 36, into the water in the main reservoir 7-A, which current might tend to shock anyone who would come in contact with the main body of water in the reservoir 7-A. The rubber cup 39 which closes the end of the current breaker 38 is mounted at the end of a rocker arm 41 which is pivotally mounted in a yoke 42 which is preferably cemented to the partition 14. The rocker arm 41 is connected to a rod 43 which is slidably mounted in a bracket 44 which is also cemented to the partition 14. The upper end of the rod 43 rides against the under face of the hinged lid 12, and is normally urged downwardly thereby. A spring 45 is positioned between the lower leg of the bracket 44 and a pin 46 which extends through the rod 43, and normally urges the rod 43 upwardly. The lid 12 is locked in position by means of a rotatable locking arm 47 which engages a lip 48 comprising part of the bracket 44, which extends through a cut out formed in the upper member 11 of the casing. The locking arm 47 is adapted to be rotated by means of a knurled knob 49. When the hinged lid 12 is closed it urges the rod 43 downwardly, this in turn rocks the arm 41 lifting the rubber cup 39 from the current breaker 38, allowing the water to enter the passage way 40 and the water line 36. On the other hand when the lid 12 is lifted the rod 43 is urged upwardly under the influence of the spring 45, this rocks the arm 41 downwardly causing the rubber cup 39 to close the passage way 40 through the current breaker 38. A water stack 50 is connected to the water line 36 and extends upwardly on the inside of the compartment 7-B, this permits the water to rise in the stack 50 when the rubber cup 39 closes the end of the member 38. This is necessary to accommodate the water backed up in the line 36 by the cup 39 when either of the valves 17 or 18 are closed.

The vapor generated in the generator 15 escapes to atmosphere through the vapor outlet 51.

The device functions as follows:

The water reservoir 7-A is first filled with water, preferably a water free from impurity. The lid 12 is closed and locked in a closed position, and when the lid 12 is closed the rocker arm 41 lifts the rubber cup 39 from the member 38 permitting water to enter the line 36. The control valve 13 is then opened permitting the water to flow through it and through the float valve 17 into the generator tray 16. When the water in the tray 16 reaches the desired depth the float valve 17 shuts off the flow of water under the influence of the float 17-A. The water

level in the generator tray 16 is set so that the electrodes 27 and 28 will be partly submerged. The electrical plug 35 is then connected with a suitable source of 110 volt electricity and the device begins to function. Upon passage of the current across the surface of the liquid, films of the liquid immediately commence to rise in rapid succession. The films bridge the space between the electrodes 27 and 28 and are arched upwardly. The current flows through the films until the latter become vaporized. Both of the electrodes become activated for a distance of several inches above the liquid level. The electrodes are of such low resistance as to be practically unheated by the flow of current through them. As the current flows through the electrodes and the films, the films become vaporized and rise through the interior of the generator 15 and are discharged into the atmosphere through the vapor discharge outlet 51. The body of the liquid in the tray 16 remains cool so that the vaporization does not depend on heating any of the mass of liquid as in the case of the usual water humidifier. The vapor emanating from the discharge outlet 51 is practically invisible and readily mixes with the air in the room.

When the room temperature is above 60° F. there will be no release of free moisture as in the case of most humidifying devices. By the same token the vapor will add an appreciable number of B. t. u.'s to the air in the room and will not reduce the air temperature as in the case of conventional humidifying devices. The device will continue to function in the manner indicated so long as water is maintained in the reservoir and the current is applied to the electrodes of the generator.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. In a device of the character described in combination, a housing of non-conductive material, a partition in said housing dividing said housing into a liquid reservoir compartment and a second smaller compartment, an electric vapor generator in said second compartment having means for passing an electric current through films of liquid formed in said generator, a tray in said second compartment for supplying liquid to said generator, adjustable means for controlling the flow of liquid from said reservoir to said tray, and a current breaker comprising a non-conductive element having a restricted bore, with a movable compressible cap, arranged in the liquid flow line to prevent the passage of current into the liquid in said reservoir.

2. In a device of the character described in combination, a housing of non-conductive material, a partition in said housing dividing said housing into a liquid reservoir compartment and a second smaller compartment, an electric vapor generator in said second compartment, having means for passing an electric current through films of liquid formed in said generator, a tray in said second compartment for supplying liquid to said generator, adjustable means for controlling the flow of liquid from said reservoir to said tray, and a current breaker arranged to prevent the flow of current into the liquid in said reservoir, said current breaker comprising a non-conductive element having a liquid passage way therein, in communication with said tray and a flexible non-conductive member for closing one end of said passage way and dislodging a portion of the liquid therefrom.

3. In a device of the character described in

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combination, a housing of non-conductive material, a partition in said housing dividing said housing into a liquid reservoir compartment and a second smaller compartment, an electric vapor generator in said second compartment, having means for passing an electric current through films of liquid formed in said generator, a tray in said second compartment for supplying liquid to said generator, adjustable means for controlling the flow of liquid from said reservoir to said tray, and a current breaker arranged to prevent the flow of current into the liquid in said reservoir, said current breaker comprising a non-conductive element having a liquid passage way therein, in communication with said tray and a flexible non-conductive member for closing one end of said passage way and dislodging a portion of the liquid therefrom, and means operable from the exterior of said reservoir for opening and closing said current breaker.

4. In a device of the character described in combination, a housing of non-conductive material, a partition in said housing dividing said housing into a liquid reservoir compartment and a second smaller compartment, an electric vapor generator in said second compartment, having means for passing an electric current through films of liquid formed in said generator, a tray in said second compartment for supplying liquid to said generator, adjustable means for controlling the flow of liquid from said reservoir to said tray, and a current breaker arranged to prevent the flow of current into the liquid in said reservoir, said current breaker comprising a non-conductive element having a liquid passage way therein, in communication with said tray and a flexible non-conductive member for closing one

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end of said passage way and dislodging a portion of the liquid therefrom, a cover on said reservoir, and means operated by said cover for opening and closing said current breaker.

5. In a device of the character described in combination, a housing of non-conductive material, a partition in said housing dividing said housing into a liquid reservoir compartment and a second smaller compartment, an electric vapor generator in said second compartment, having means for passing an electric current through films of liquid formed in said generator, a tray in said second compartment for supplying liquid to said generator, adjustable means for controlling the flow of liquid from said reservoir to said tray, and a current breaker arranged to prevent the flow of current into the liquid in said reservoir, said current breaker comprising a non-conductive element having a liquid passage way therein, in communication with said tray, a flexible non-conductive member for closing one end of said passage way and dislodging a portion of the liquid therefrom, a liquid tube connecting said passage way with said tray and a liquid stack connected to said tube between said current breaker and said tray.

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