Jan. 25, 1938. E. W. KUMMER 2,106,325

PORTABLE AIR CONDITIONER

Filed March 5, 1936 2 Sheets-Sheet 1

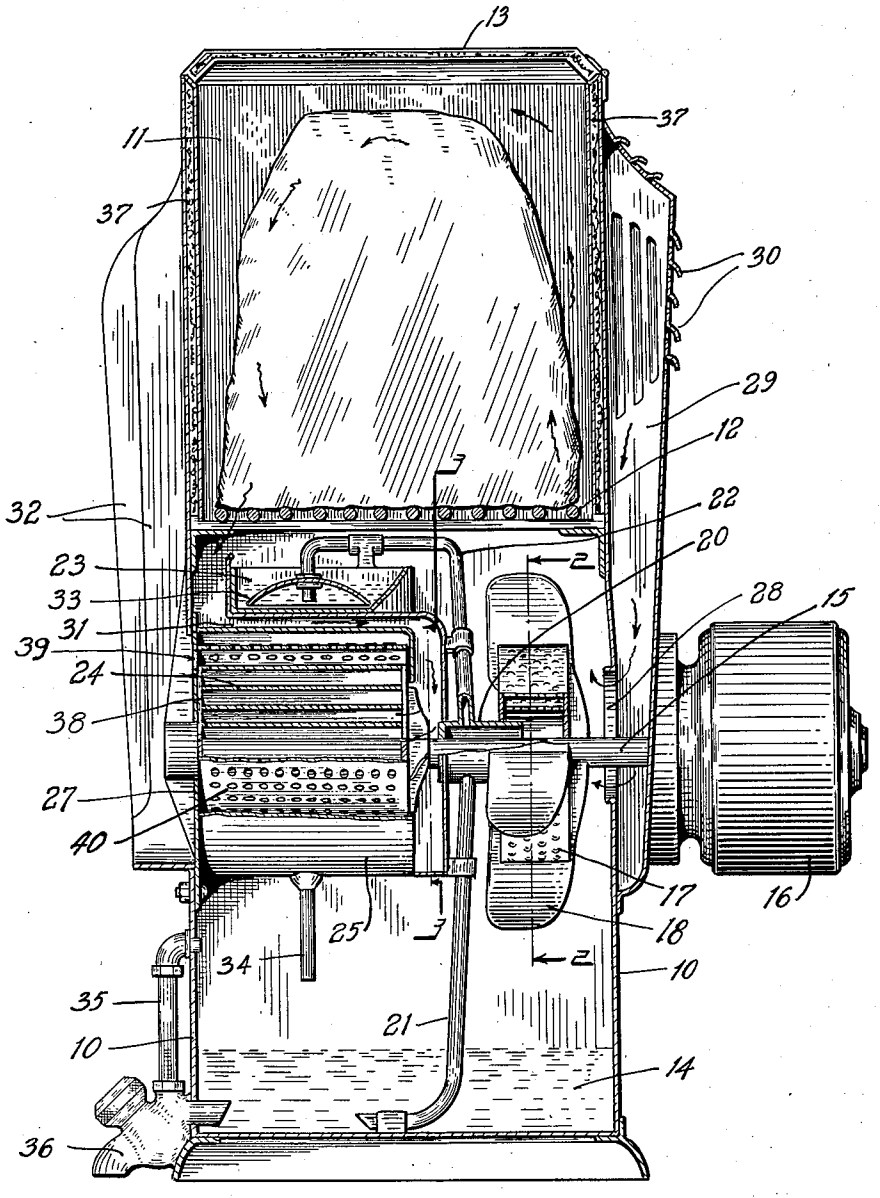


Fig. 1.

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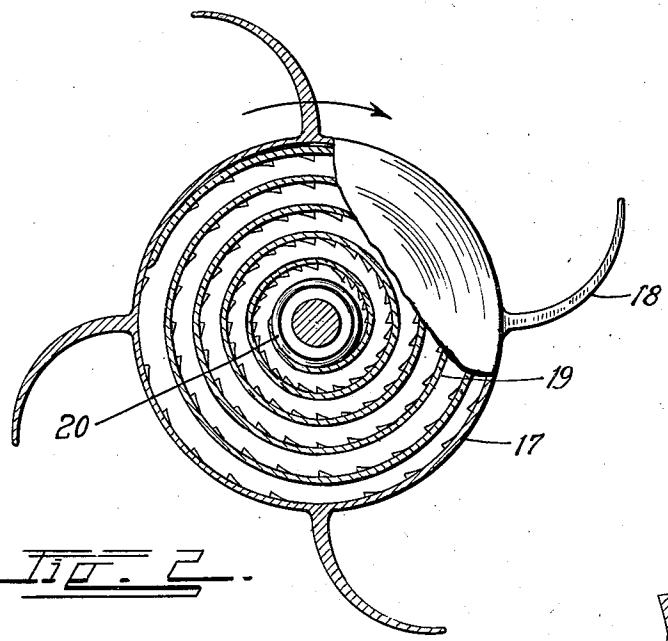


Fig. 2.



Fig. 4.

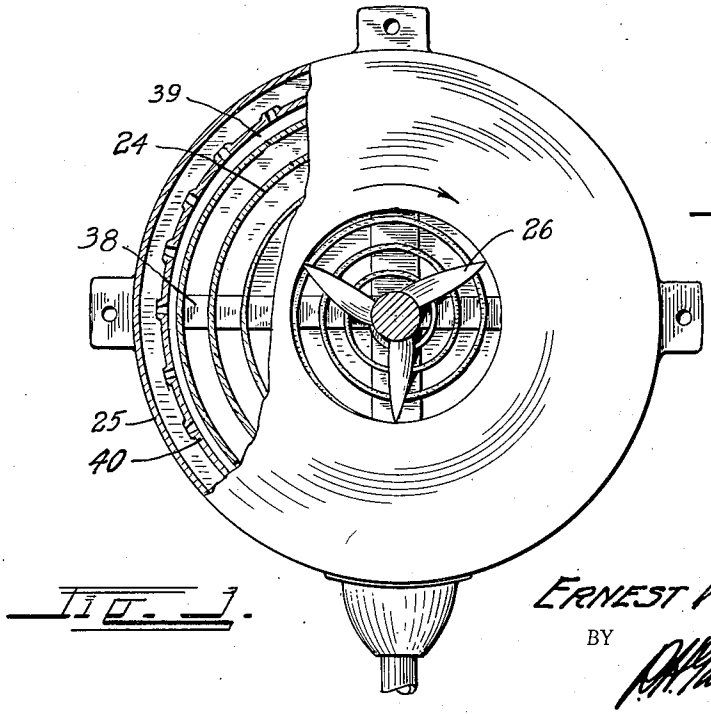


Fig. 3.

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PORTABLE AIR CONDITIONER

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Application March 5, 1936, Serial No. 67,232

3 Claims. (Cl. 261—90)

This invention relates to a portable air conditioner and has for its principal object the provision of a neat, efficient compact unit which can be employed in homes, offices and the like for washing, cooling and properly humidifying the air therein.

Other objects of the invention are: to provide means in an air conditioner for removing all of the suspended water from the air before it is expelled from the machine; to provide efficient means for employing ice as the cooling medium for the air; and to provide a highly efficient mechanical atomizer for diffusing and distributing water in the air for washing and humidifying the same.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:

Fig. 1 is a vertical section through the improved humidifier.

Fig. 2 is a detail section through the combined blower and humidifier employed in the device. The section is taken on the line 2—2, Fig. 1.

Fig. 3 is a detail section showing the moisture extracting or dehydrating portion of the device. The section is taken on the line 3—3, Fig. 1.

Fig. 4 is a detail enlarged section through one of the orifices of the humidifier.

The invention comprises an outer housing 10, in the upper portion of which an ice compartment 11 is formed in which the ice is supported upon a suitable grating 12. Access is had to the ice compartment by means of a hinged lid 13. The bottom of the housing 10 is water tight and forms a water compartment 14. A horizontal shaft 15 extends across the housing 10 below the grating 12. The shaft is rotated from a suitable motor 16 supported on the exterior of the housing.

The shaft 15 carries a combination atomizing and blowing fan consisting of a perforated cylindrical drum 17 from which blower blades 17 radially project. Within the drum 17 is a helical, perforated plate 19 which rotates with the drum. The front and back of the cylindrical drum 17 are completely closed, except for the passage of the shaft 15 at the front and the passage of a water sleeve 20 at the back. Water is fed to the sleeve 20 through a main supply pipe 21, leading from the bottom of the water compartment 14, and from a priming pipe 22 leading from a priming reservoir 23.

A dehydrator is also carried on the shaft 15. The dehydrator consists of a helical plate 24 supported on spokes 38 about the shaft 15 so as to rotate therewith. The helical sheet is entirely enclosed in an inner perforated cylinder 40 about which is an outer cylindrical shell 25. The cylinder 40 and the shell 25 are closed to each other to form a cylindrical water chamber. At the front end the shell is open about the shaft for the intake of air. In the latter opening impeller blades 26 are provided to draw air into the drum 25. The rear of the shell 25 is closed by means of a circular end plate 27 about which is an annular discharge passage 39 for the discharge of the air from the helical plate 24.

In operation, the blades 18 of the blower create a partial vacuum which draws air through an intake opening 28 into the housing 10. The air is preferably conducted to the intake opening through a vertical intake channel 29 formed upon the exterior of the housing 10 and provided with ornamental louvers 30 through which the air passes.

The air is blown by the blades 18 upwardly into the ice compartment where it circulates about the ice therein and downwardly at the rear into a passage 31 about the dehydrating shell 25. From thence, the air passes into the open end of the dehydrator, assisted by the blades 26. From here, the air discharges about the end plate 27 to the atmosphere. The discharging air is dispersed and directed into a gentle stream by means of suitable baffle plates 32 on the exterior of the housing 10.

The action of the blades 18 in throwing the air outwardly creates a partial vacuum within the atomizing drum 17. This vacuum lifts water upwardly through the pipe 21 and the sleeve 20 and discharges it into the interior of the helical plate 19. The perforations in this plate are formed as shown in Fig. 4 to act as miniature scoops which catch the water, break it up to small particles, and discharge it through the series of perforations in the plate 19 and the drum 17 into the air stream.

When the device is initially started, the perforations in these plates will be dry and open so that the formation of vacuum for lifting the water is impossible or difficult. This is avoided by the priming pipe 22 and the reservoir 23. The melting of the ice in the compartment 11 main-

tains water in the reservoir 23. This water is at a higher elevation than the water sleeve 20 so that the water is readily drawn to the sleeve during the initial rotation of the blades 18.

After sufficient vacuum has been formed to lift the water through the pipe 21, the suction in the pipe 22 will draw a flexible diaphragm valve 33 downwardly against the bottom of the container 23 to prevent further water from being drawn therethrough. Should the vacuum be broken by stopping the machine or by low water in the water compartment 14, the natural elasticity of the valve 33 will allow it to rise to permit water to be drawn from the container 23.

The air upon reaching the dehydrator will be saturated with moisture. This air enters at the axis of the helical plate 24, and is violently whirled so as to create pressure zone against the helical plate 24 at each of its convolutions. This pressure together with centrifugal force causes the water to deposit on the surface of the helical plate from whence it is caused to travel outwardly in the helix until it is thrown against the perforated plate 40. The air pressure against the perforated plate forces the water through the perforations to the space between the inner and outer shells 40 and 25 from whence it drains back through a chain spout 34 to the water reservoir 14.

The water from the melting ice constantly maintains water in the reservoir 14. The lever of the water therein can be noted from the exterior by means of a drain valve 36. The ice compartment is completely insulated from the exterior by means of suitable insulating walls.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:—

1. A combined humidifying, and dehydrating device for use in an air conditioner having a chamber containing a cooling element, comprising a housing having a water compartment, and air inlets and outlets, a shaft rotatably mounted in the housing, a cylindrical drum of foraminated material secured to the shaft, fan blades projecting from the periphery of the drum, a helical plate within the drum, means comprising a pump for elevating water from the water compartment and delivering it to the inside of the drum, a dehydrator carried by the shaft and a partition separating the humidifier and the dehydrator, there being a passageway for air to pass from one side of the partition to the other.

2. In an air conditioning apparatus of the type in which humidified air is passed through a cooling chamber containing a cooling element, a housing whose bottom portion forms a water compartment, a shaft mounted for rotation in the housing, above the water level therein, a centrifugal pump carried by the shaft, an atomizer, also carried by the shaft, a fan associated with the atomizer, the housing having two communicating compartments, in one of which the atomizer and fan are positioned, a dehydrator carried by the shaft and positioned in the other compartment, the dehydrator comprising a foraminated cylinder, and a propeller type fan carried by the shaft and positioned and arranged to produce a flow of air through the cylinder.

3. An air conditioning device comprising a closed housing provided with an inlet and outlet for air, a perforated support extending across the housing, dividing it into an upper and a lower compartment, means for supporting a cake of ice in the upper compartment, the bottom of the lower compartment forming a sump for water accumulating from the melting of the ice in the upper compartment, the lower compartment being separated into two compartments by a partition, a combined blower and atomizer in one of the last named compartments and a rotary dehydrator in the other compartment, and means for raising water from the sump and delivering it to the atomizer.

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