Jan. 18, 1966 R. J. STERN 3,229,450

VAPORIZER-HUMIDIFIER

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Fig. 1.

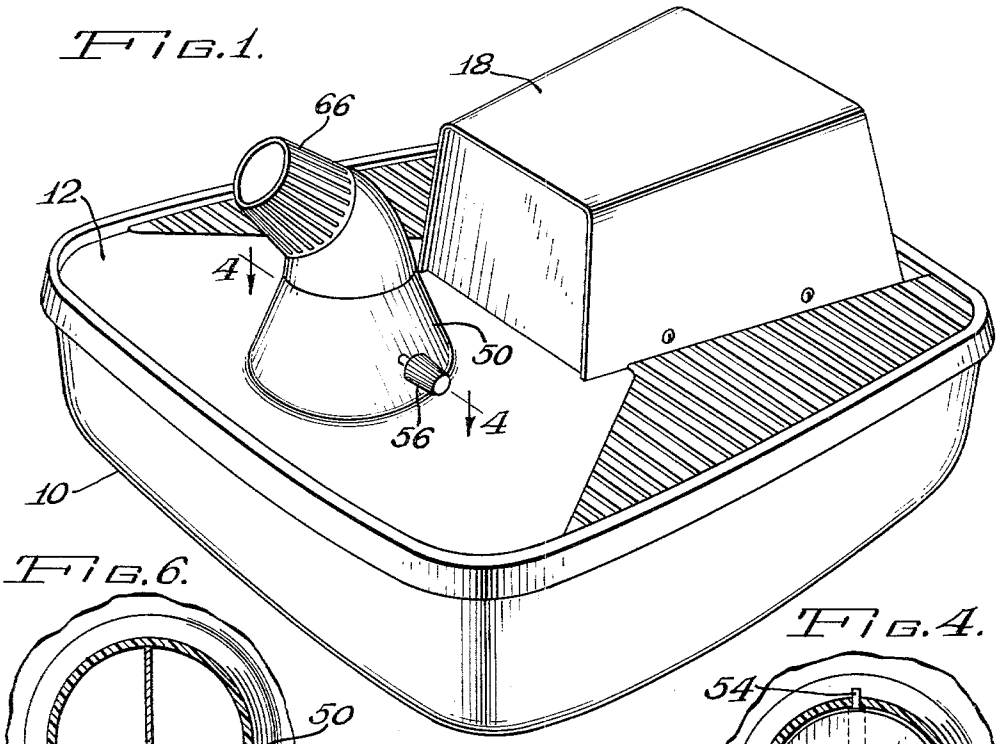


Fig. 6.

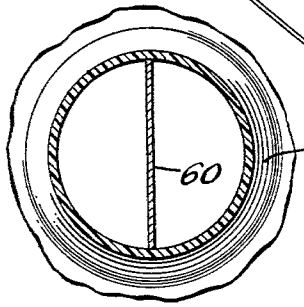


Fig. 7.

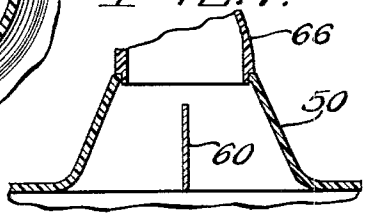


Fig. 4.

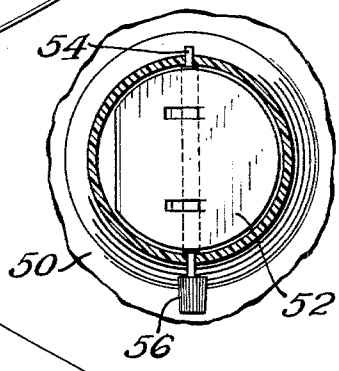
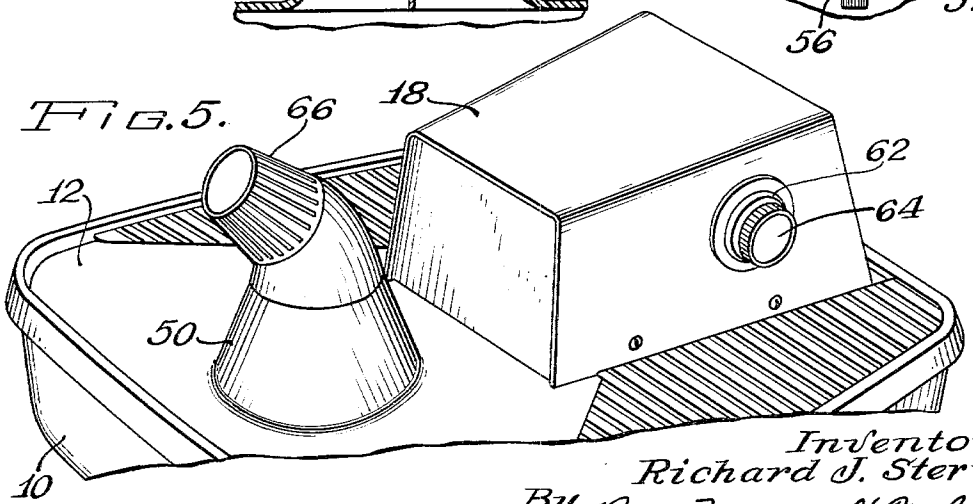


Fig. 5.



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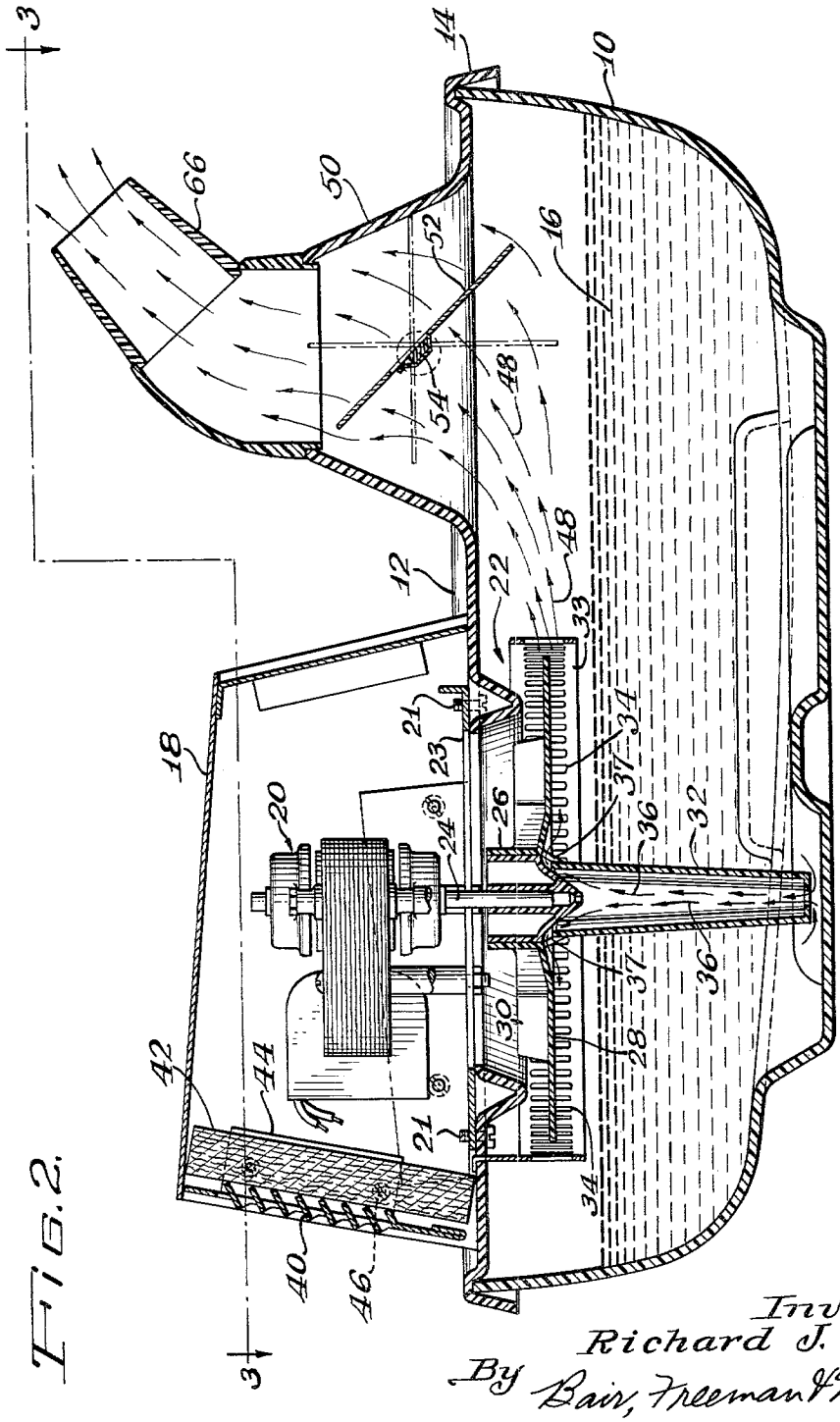


FIG. 2.

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VAPORIZER-HUMIDIFIER

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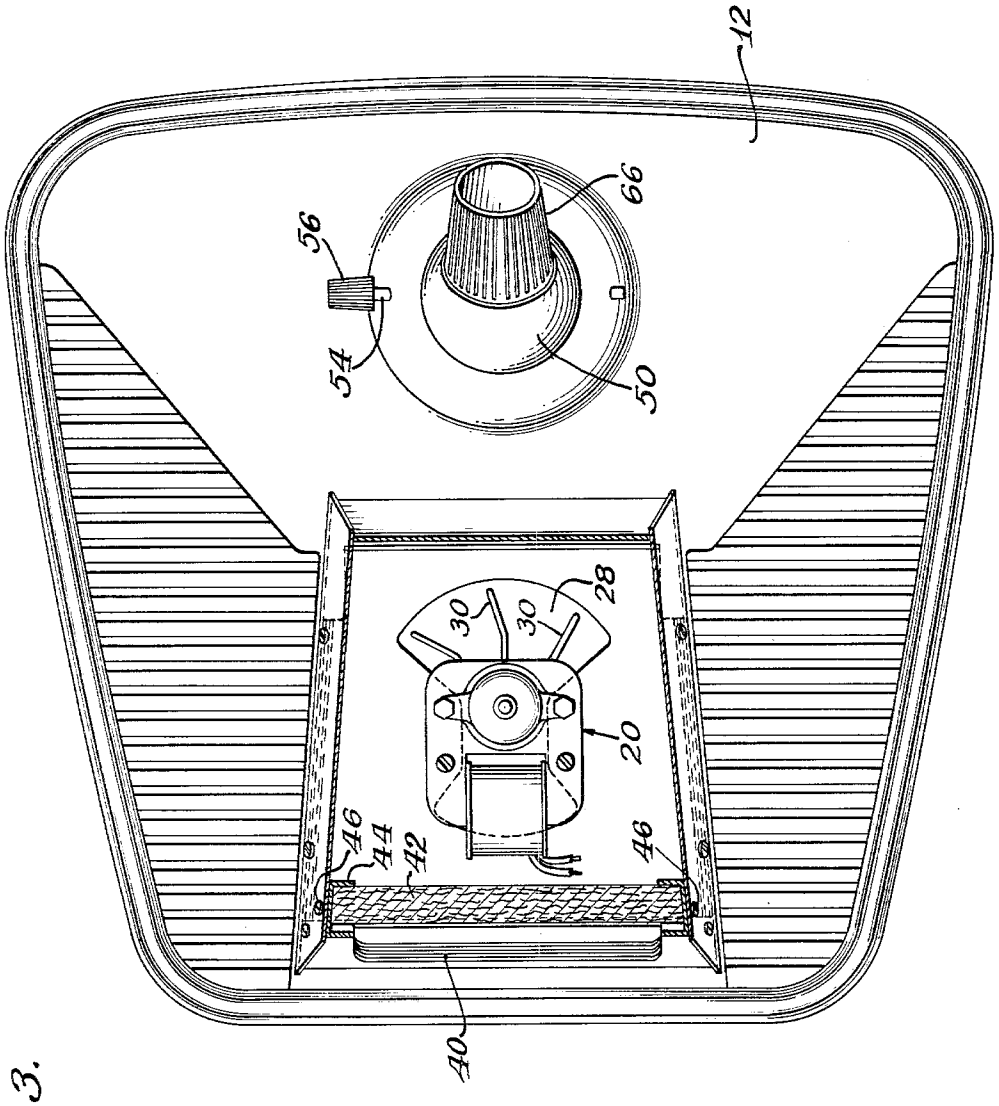


FIG. 3.

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FIG. 8.

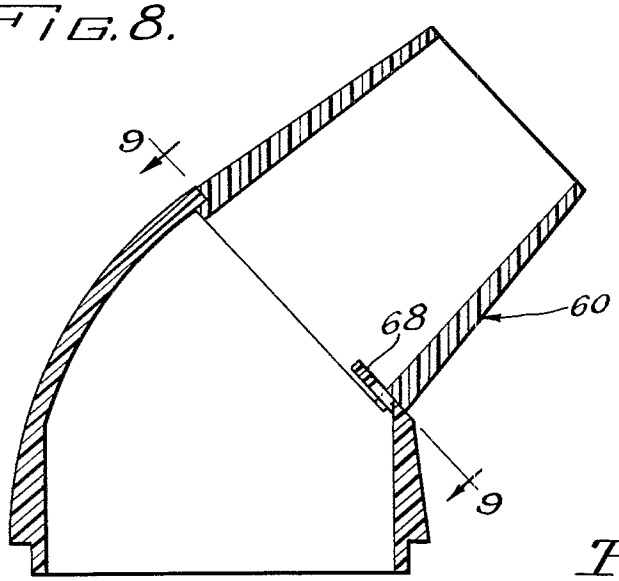


FIG. 9.

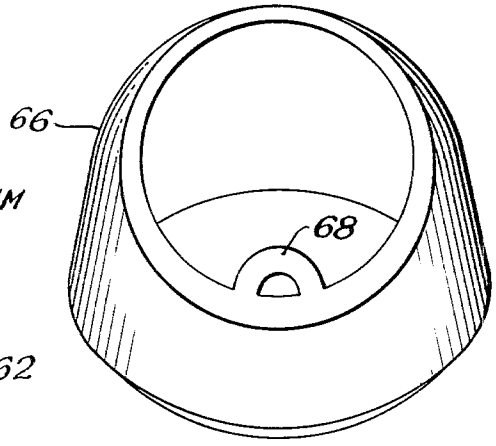
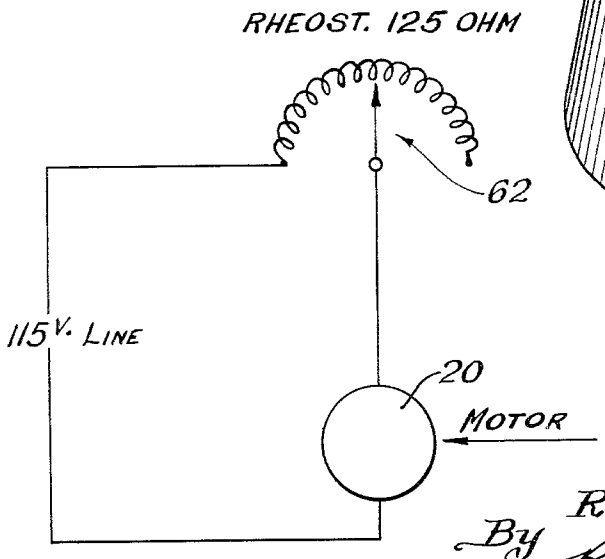


FIG. 10.



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United States Patent Office 3,229,450 Patented Jan. 18, 1966

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VAPORIZER-HUMIDIFIER

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Filed May 13, 1963, Ser. No. 280,056
2 Claims. (Cl. 55—226)

This invention relates generally to air moisturizing apparatus of the type known as vaporizers and humidifiers, and more particularly to new and improved portable vaporizers and humidifiers of the type which add cool and safe water vapor to the air.

It will be appreciated that vaporizers and humidifiers of various types have long been known to provide air with the proper degree of moisture desired for the health and comfort of the user. Such devices have proved particularly useful in the prevention and treatment of respiratory ailments and in the protection of property which would be damaged by air that is too dry.

One type of prior art device is the boiler type which generates steam through heat, while another type is the cool water vapor type which produces cool and safe water vapor without heat so as to eliminate the possibility of burning or scalding. The present invention relates to an improved cool water vapor vaporizer and humidifier which is characterized by a number of novel and highly advantageous features, as explained in greater detail hereinbelow.

Accordingly, it is a general object of this invention to provide an improved vaporizer-humidifier apparatus which comprises selectively adjustable means for controlling the vapor output to be added to the room air.

It is another object of this invention to provide such a cool water vapor vaporizer-humidifier, as above, wherein said selectively adjustable means comprises a manually operable gate valve positioned at the vapor output nozzle of the apparatus.

It is still another object of this invention to provide such a cool water vapor vaporizer-humidifier, as above, wherein said selectively adjustable means comprises a variable speed vapor flow system for controlling the vapor output of the apparatus.

It is a further object of this invention to provide a portable and compact cool water vapor vaporizer-humidifier wherein the vapor is caused to flow to the outlet nozzle in a path away from the pump motor so as to minimize possible moisture damage to the motor of the apparatus.

It is a still further object of this invention to provide a novel cool water vapor vaporizer-humidifier which comprises replaceable filter means for screening out bacteria and other airborne impurities from the air stream carrying the cool water vapor output of the apparatus.

It is a general object of this invention to provide such a new and improved cool water vaporizer, as above, which is characterized by the relatively high degree of efficiency and economy achieved in a compact and portable unit.

The novel features which are characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following description taken in conjunction with the accompanying drawing in which:

FIGURE 1 is a perspective view of one illustrative embodiment of a vaporizer-humidifier constructed in accordance with the invention;

FIGURE 2 is a side elevational view, in cross-section, of the illustrative embodiment of the invention shown in FIGURE 1;

FIGURE 3 is a top plan view, with the top of the motor housing removed and partly in cross-section, of the illustrative embodiment of FIGURE 1;

FIGURE 4 is a cross-sectional view taken substantially as shown along line 4—4 of FIGURE 1;

FIGURE 5 is a view, partly broken away, of an alternative embodiment of a vaporizer-humidifier constructed in accordance with the present invention;

FIGURE 6 is a top plan view, in cross-section, of the vapor outlet nozzle of the embodiment of FIGURE 5;

FIGURE 7 is an elevational view, in cross-section of the vapor outlet nozzle of the embodiment of FIGURE 5;

FIGURE 8 is a side elevational view, in cross-section, of an alternative embodiment of directional nozzle which is adapted to control spitting of large water droplets from the vaporizer-humidifier;

FIGURE 9 is a view of the alternative directional nozzle, taken substantially as shown along line 9—9 of FIGURE 8; and

FIGURE 10 is an electrical schematic diagram of the variable rheostat motor speed control circuit.

Referring now to the drawing, and more particularly to FIGURES 1, 2, and 3 thereof, there is shown one specific illustrative embodiment of a vaporizer-humidifier constructed in accordance with the present invention. As stated above, the novel vaporizer-humidifier is of the cool water vapor type and does not require any heat or production of steam to provide the desired water vapor output required to moisturize the room air.

As shown in FIGURES 1, 2, and 3, the vaporizer-humidifier comprises the housing formed of a water reservoir base portion **10** and a vapor pump supporting cover portion **12**. The housing may be made relatively compact so as to insure complete portability of the vaporizer-humidifier and advantageously is formed of a suitably rigid and lightweight material to facilitate its portability of use. Towards this end, the housing may be formed of a molded plastic material, such as polystyrene, but it will be appreciated that other materials may be used with equally satisfactory results, and that the specific material utilized for the housing does not form a part of the present invention.

In the illustrative embodiment shown in FIGURES 1, 2 and 3, the housing advantageously is made generally rectangular in shape with the side walls thereof being tapered inwardly from the front nozzle bearing portion of the housing back toward the pump motor portion of the housing. Again, it will be appreciated by those skilled in the art that while this particular shape is shown for purposes of illustration, the outer configuration of the housing is not deemed to be a limiting feature of this invention and that other shapes, such as square, round or oval, also may be used without affecting the principles of the present invention.

As shown in FIGURE 2, the cover portion **12** of the housing is provided with a downwardly extending flange **14** around its periphery so that the housing cover portion **12** may be seated on the peripheral lip formed by the wall edges of the base portion **10**. In this manner, the cover portion **12** of the housing can readily be positioned on the base portion **10** during the operation of the device, or may easily be lifted therefrom in order to enable the base portion **10** of the housing to be filled with water **16**.

Thus, it can be appreciated that the base portion **10** of the housing serves both as a reservoir enclosure for the water **16** and as a support for the cover portion **12**. In accordance with a feature of this invention, all of the operative elements of the vaporizer-humidifier water vapor pump are carried by the cover portion **12**. Thus, the cover portion **12** carries an upstanding motor housing **18** having a plurality of walls which serve as an enclosure for the pump motor **20**, securely mounted on cover por-

tion 12, as by the fasteners 21 and bracket 23. The pump motor 20 may be any suitable fractional horsepower electrical motor, advantageously adapted to be energized from a conventional A.C. voltage outlet for rotatably driving the vapor pump 22.

A conventional vapor pump 22 is connected to the motor shaft 24, as by means of the friction fitting hub 26, so as to depend downwardly from the motor 20 into the housing base portion 10. The hub 26 of the vapor pump is secured to a relatively planar disk member 28 and a plurality of vertically upstanding blades 30 are positioned on disk member 28 around the hub 26. The blades 30 are shown in FIGURES 2 and 3, respectively, and may be straight, arcuate or angled, as desired. An elongated tapered tube 32 is secured to the hub 26 below the disk member 28, and is of sufficient length to be immersed within the water 16 stored in the reservoir formed by the housing base portion 12. A vapor screen 33 having a plurality of slots 34 formed therein is positioned around the outer peripheral edge of the disk member 28, and at right angles to the plane of the disk member 28, so as to cause the water particles to be broken into a fine vapor upon operation of the pump in a well understood manner.

Towards this end, the elongated tapered tube 32 is formed with a fluid passageway at its center and is open at its lower edge such that upon rotation of the pump 22 by the motor 20, the water 16 in the housing base portion 12 is sucked upwardly through the center passageway of the tube to the disk member 28. This water flow is indicated in FIGURE 2 by the arrows 36. When the water flowing upwardly through the elongated tube 32 reaches the top of the tube, it flows through suitable openings 37 and along the lower surface of the disk member 28 to be thrown against the water vapor screen 34 by the centrifugal action of the pump. This causes the water particles to be broken into water vapor which is carried to the outlet nozzle 50 of the apparatus as explained hereinbelow.

The operation of the pump motor to rotate the disk 28 also causes the fan blades 30 positioned on the disk 28 to rotate. This serves to draw air into the vaporizer-humidifier from the outside through the air openings provided in the grill member 40 located on the back wall of the motor housing 18. The air drawn in through the louvered openings of grill 40 advantageously is caused to pass through a filter member 42 which is positioned in a bracket 44 directly adjacent to the openings of grill 40. In accordance with a feature of this invention, the filter member 42 serves to screen out bacteria and other airborne impurities from the air drawn into the vaporizer-humidifier so as to add a healthful filtering action to the water vaporizing operation.

In accordance with a still further feature of this invention, the filter bracket 44 is pivotally mounted on the motor housing 18, as by means of the pivot members 46, so that the filter bracket may be tilted outwardly by fingertip action to permit ready replacement of the filter member 42 in its supporting bracket 44.

The air thus drawn in from the outside and passed through the filter member 42 flows downwardly as a result of the rotation of the blades 30 to carry the water vapor away from the motor 28 within the housing 18 and thereby protect the motor from the adverse effects of water vapor. As indicated by the arrows 48, the water vapor is carried in a path towards the outlet nozzle 50 which is provided on the remote end of the housing cover portion 12. Advantageously, in one embodiment of the invention, the outlet nozzle 50 may be integrally formed with the housing cover portion 12 and provided with inwardly tapered walls so as to concentrate the cool water vapor flow issuing from the apparatus.

In accordance with a further feature of this invention, the degree of cool water vapor flow output from the apparatus may be controlled, as desired, by selectively adjusting the size of the outlet opening of the nozzle. Towards this end, a pivoted gate valve 52 may be mounted on a pivot pin 54 positioned across the outlet nozzle 50, as illustrated in FIGURES 2 and 4. The end of the pivot pin 54 advantageously is connected to a suitable, manually operable knob 56 so that upon rotation of the knob 56, the gate valve 52 may be pivotally rotated from one position to another, as indicated by the solid and dotted lines in FIGURE 2, to enlarge or decrease the size of the nozzle opening. In this manner, the manual operation of the gate valve serves as a readily operable control means for adjusting the cool water vapor output to the level desired to moisturize the room air.

An alternative embodiment of the invention is shown in FIGURES 5, 6, and 7 of the drawing. In this alternative embodiment, the construction of the novel vaporizer-humidifier is substantially the same as the construction of the first described embodiment, and therefore, similar parts have been identified with the same reference numerals. The alternative embodiment of FIGURES 5, 6, and 7, however, differs from the first described embodiment in that the means for controlling the amount of cool water vapor output to the air does not include the manually operable gate valve which is included in the outlet nozzle 50 of the first embodiment. Rather, in the alternative embodiment, the outlet nozzle 50 is formed with the fixed vertical partition member 60 such that there is no selectively adjustable barrier to the vapor output of the nozzle 50.

Control of water vapor output in the alternative embodiment is provided by means of a variable rheostat 62 which is mounted in a wall of the motor housing 18. Those skilled in the art will appreciate that the variable rheostat 62 may be electrically connected to the circuit of the motor 20, as shown in FIGURE 10, such that the speed of the motor 20 may be controlled as desired by selective rotation of the variable rheostat 62. This selective rotation may be facilitated by means of the manual control knob 64 coupled to the variable rheostat 62 and accessible from the outside of the motor housing 18. Accordingly, selective rotation of the control knob 64 will cause the speed of the pump motor 20 to be varied in a desired manner to vary the speed of the pump rotation in a corresponding fashion. This operation, therefore, controls the amount of cool water vapor output at the outlet nozzle 50.

If desired, the cool water vapor output from the outlet nozzle 50 may be given a directional characteristic by means of the directional nozzle 66 adapted to be positioned upon the outlet nozzle 50. As shown in FIGURE 7, for example, the inner end of the directional nozzle 66 may be provided with a suitable shoulder flange adapted to be frictionally fitted within the outer peripheral edges of the outlet nozzle 50 for a snug fit which allows selective rotation therewithin. In this manner, the directional nozzle 66 may be rotated in any desired direction upon the outlet nozzle 50 to cause the cool water vapor output of the vaporizer-humidifier to be concentrated in a desired direction. As shown in FIGURES 1, 2, 5 and 7, this directional nozzle 66 may be used with either illustrative embodiment of the invention.

Those skilled in the art will appreciate that the vaporizer-humidifier may have an undesirable tendency to eject or spit relatively large droplets of water in the water vapor output from the nozzle. In accordance with a feature of this invention, as illustrated in FIGURES 8 and 9, this tendency is controlled by means of an upstanding member 68 which is positioned on the lower peripheral outlet rim of the arcuate directional nozzle member 60. The projecting member 68 projects into the path of the vapor stream and serves to minimize spitting of large water droplets therefrom such that the outlet stream primarily comprises the desired cool water vapor. Advantageously, the projecting member 68 may be integrally molded as a part of the nozzle 60, or if desired, it may

be separately formed and assembled into the nozzle member.

While there has been shown and described a specific embodiment of the present invention, it will, of course, be understood that various modifications and alternative constructions may be made without departing from the true spirit and scope of the invention. Therefore, it is intended by the appended claims to cover all such modifications and alternative constructions as fall within their true spirit and scope.

What is claimed as the invention is:

1. The improvement of a cool water vapor vaporizer-humidifier comprising the combination of a compact portable housing formed of a lower base portion and an upper cover portion, said lower base portion comprising a plurality of walls defining a reservoir enclosure for storing water therein, said upper cover portion being formed with a pump motor housing and an upwardly extending vapor outlet nozzle spaced from said pump motor housing, said upper cover portion having air inlet means therein; an electrically energizable pump motor supported on said cover portion within said pump motor housing; a vapor pump coupled to said motor for rotation therewith, said vapor pump comprising a disk member, a vapor screen located radially outwardly from said disk member, and an elongated tube extending from said disk member into the water stored within said base portion, such that rotation of said vapor pump causes water to be drawn upwardly through said tube and to be thrown by centrifugal force against said vapor screen to break the water particles into water vapor; a plurality of fan blades on said disk member for causing air to be drawn into said portable housing through said air inlet means for carrying the water vapor from the vapor pump to the vapor outlet nozzle in a path away from the pump motor; an

upstanding member positioned within the vapor outlet nozzle and extending into the path of said water vapor to control the spitting of large droplets of water from said vapor outlet nozzle; said pump motor housing including a pivotally mounted wall, said air inlet means being formed in said pivotally mounted wall of said pump motor housing; and an air filter supported on said pivotally mounted wall within said pump motor housing and adjacent said air inlet means, the pivotally mounted wall being pivotable to enable said wall to be moved outwardly to facilitate replacement of said air filter.

2. A cool water vapor vaporizer-humidifier as in claim 1 including a selectively operable gate valve in said vapor outlet nozzle for varying the outlet opening to thereby vary the vapor output from said vapor outlet nozzle to moisturize the room air, as desired.

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