Feb. 14, 1967 J. L. VIECELI ETAL 3,304,066

AIR CONDITIONING DEVICE

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Fig. 1.

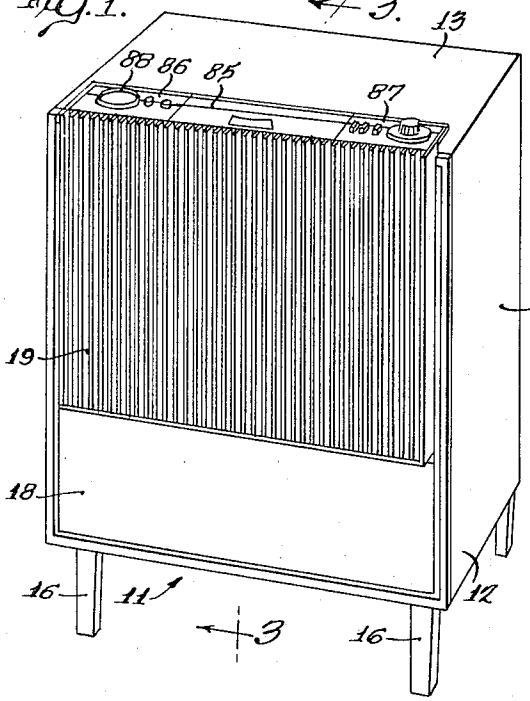


Fig. 5.

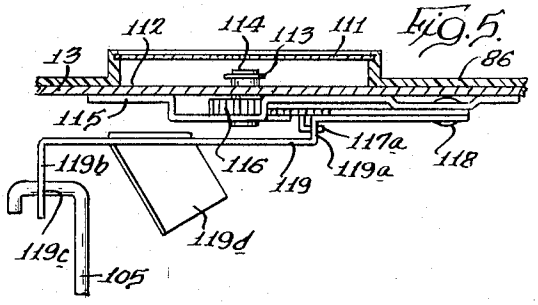
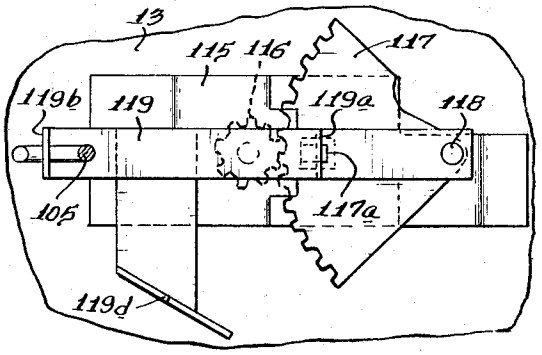


Fig. 6.



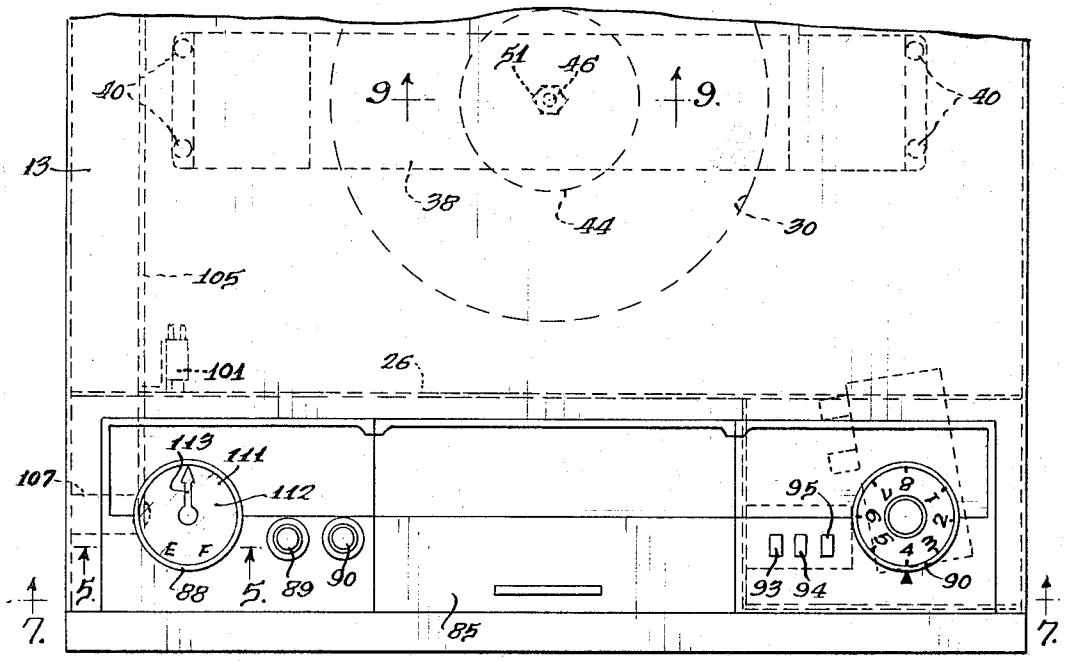


Fig. 2.

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AIR CONDITIONING DEVICE

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Fig. 3.

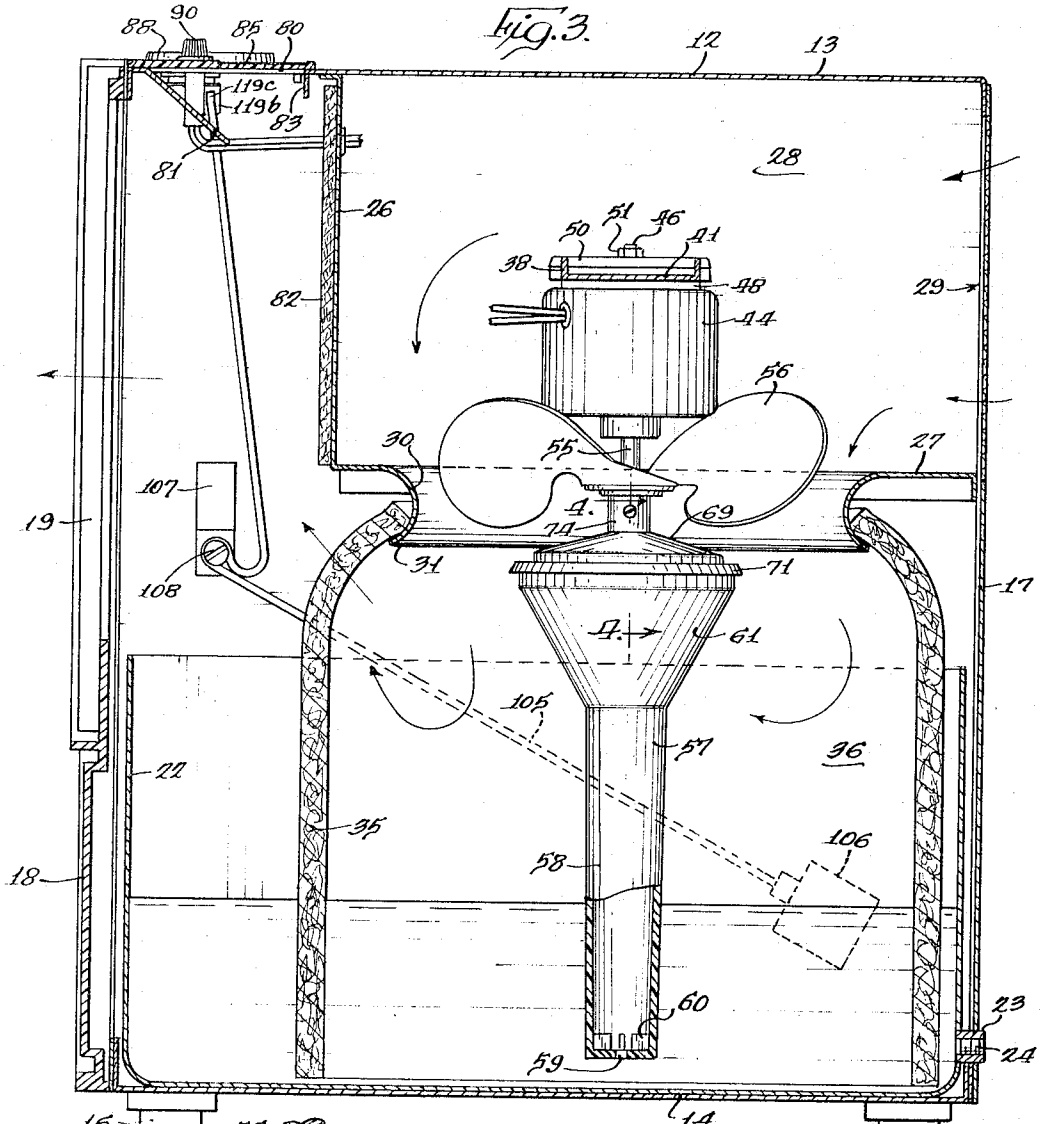
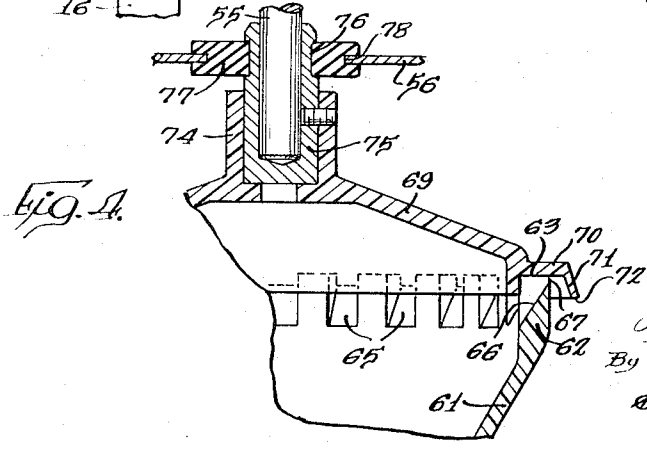


Fig. 4.



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AIR CONDITIONING DEVICE

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Fig. 7.

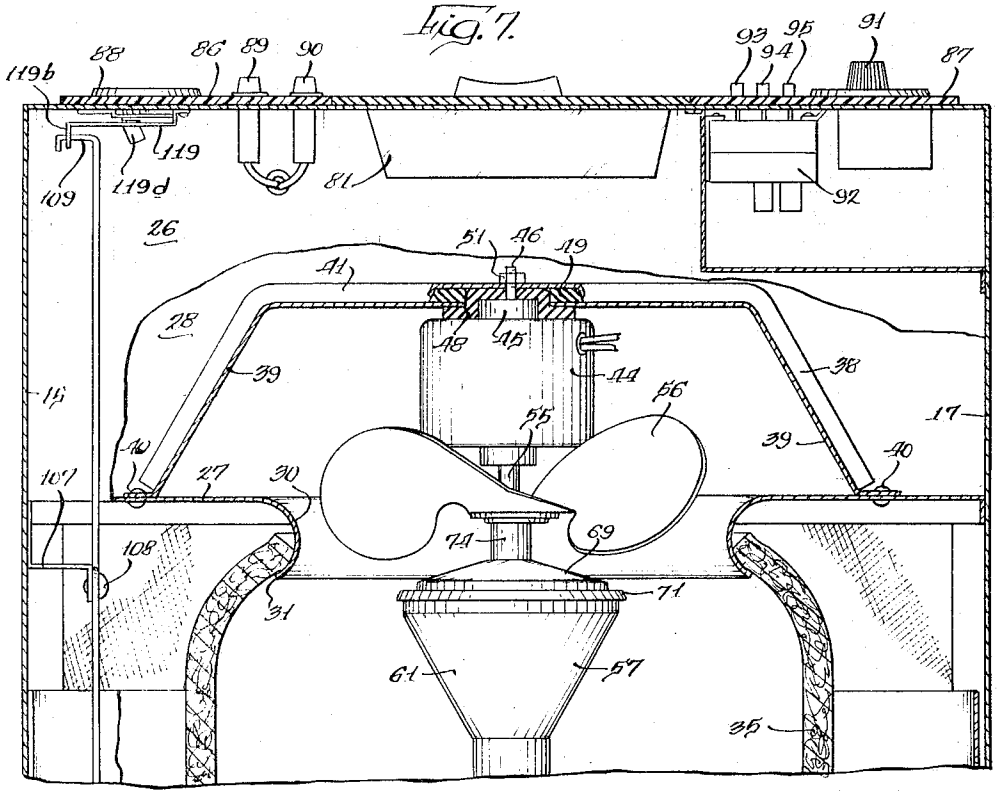


Fig. 8.

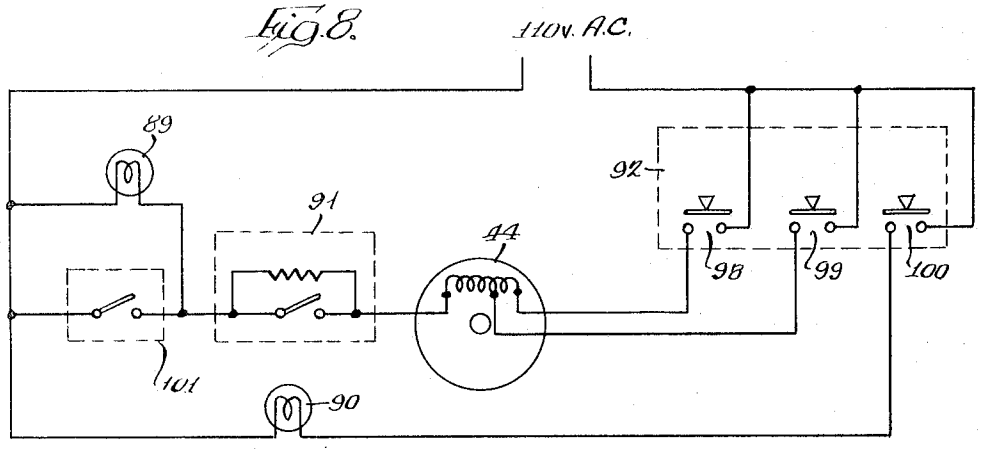
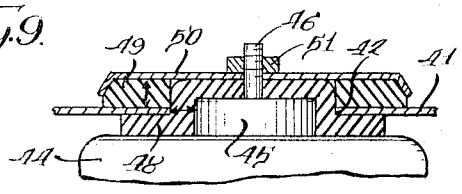


Fig. 9.



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United States Patent Office 3,304,066
Patented Feb. 14, 1967

3,304,066

AIR CONDITIONING DEVICE

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Filed July 6, 1964, Ser. No. 380,573
12 Claims. (Cl. 261—29)

This invention relates to portable air conditioning devices and more particularly to improvements in portable power driven humidifiers for introducing moisture into the ambient air.

Devices for inducing moisture into air have been known and used for many years. The need for a unit to increase the amount of moisture in a home is particularly acute in cold climates where the relative humidity in the home on a cold day may drop to only one or two percent. A number of small room humidifiers have been manufactured to raise the humidity in a single room. Most of these units are noisy in operation and have limited humidifying capacity. Some humidifiers operate on a principle of evaporating water which leaves a heavy deposit of minerals from hard water on the heating chamber thereby decreasing the efficiency of the unit while other humidifiers use a mechanical spray method of hurling minute droplets of water into the air which causes small particles of minerals from the water to be deposited around the room. Thus, there is a need for a large capacity portable humidifier for effectively humidifying a whole home and which would, at the same time, be quiet in operation. Further, the humidifier should not cause mineral deposits in the home but rather should retain the minerals within the humidifier in an area which does not decrease the efficiency of the unit.

It is, therefore, an object of the present invention to provide a portable humidifier having a large capacity for introducing moisture into the ambient air.

It is a further object of the present invention to provide an improved portable humidifier which is quiet in operation.

It is an additional object of the invention to provide an improved portable humidifier having the motor and pump assembly mounted in such a manner as to dampen the vibration transmitted to the housing.

It is still a further object of the present invention to provide a portable humidifier having an improved centrifugal pump to uniformly and accurately disperse liquid therefrom.

It is another object of the present invention to provide an improved portable humidifier which substantially prevents the minerals in the water from being expelled from the humidifier and which is so constructed that the minerals in the water are continually flushed back into the water reservoir.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the present invention reference may be had to the accompanying drawings in which:

FIG. 1 is a front perspective view of a portable humidifier embodying my invention;

FIG. 2 is an enlarged fragmentary top plan view of the humidifier of FIG. 1;

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is an enlarged fragmentary sectional view of the upper portion of the centrifugal pump taken along line 4—4 of FIG. 3;

FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 2;

FIG. 6 is a bottom plan view of the water level gauge illustrated in FIG. 5;

FIG. 7 is a fragmentary sectional view taken along line 7—7 of FIG. 2;

FIG. 8 is a schematic wiring diagram illustrating the electrical circuit; and

FIG. 9 is an enlarged fragmentary sectional view of the motor mounting taken along line 9—9 of FIG. 2.

Referring to the drawings, there is shown a portable humidifier designated generally by the reference numeral **11** which comprises a rectangularly shaped housing **12** having a top **13**, bottom **14**, and sides **15** and which is supported by a plurality of feet **16**. Preferably, the housing is fabricated of galvanized sheet metal and may be attractively styled by placing an imitation wood finish thereon. Enclosing the housing **12** are a rear closure plate **17** and a front **18**. Both the rear closure plate **17** and the front **18** are secured to the housing **12** by a plurality of fastening means, such as sheet metal screws (not shown). Preferably, the front **18** is an integrally molded plastic piece having an outlet grille **19** for permitting moisture laden air to be expelled therethrough.

Positioned within the housing **12** and resting on bottom **14** is a cup-shaped reservoir **22** having an opening facing upwardly in order to receive and store a liquid, such as water, therein. The reservoir **22** may be molded from polyethylene or the like. To drain the reservoir conveniently, there is provided a hollow projection **23** which is integrally molded with the reservoir **22** and positioned in the rear side wall near the bottom. The projection or drain **23** is threaded internally and provided with a threaded plug or closure **24**. Above the reservoir **22** is a vertical wall **26** which depends from the top **13** and extends between the sides **15** of the humidifier housing **12**. A horizontal wall **27** extends between the side walls **15** from the bottom of the vertical wall **26** to the rear closure plate **17**. Walls **26** and **27** may be fabricated from galvanized sheet metal and are secured to housing **12** by welding or other suitable means. It will be appreciated that the walls **26** and **27** in conjunction with the housing **12** and rear plate **17** form a motor chamber **28**, as may be seen in FIG. 3. The horizontally disposed wall **27** is positioned above the reservoir **22**. A plurality of openings **29** in rear plate **17** define an air inlet to the motor chamber **28** and are positioned above the engagement between horizontal wall **27** and rear plate **17**.

For the purpose of permitting air to move from the motor chamber **28** to the space above reservoir **22**, there is provided an opening defined by a circular throat **30** which is formed in the horizontal wall **27** above the reservoir **22** as is best shown in FIGS. 3 and 7. Preferably, the throat **30** has a U-shaped cross-section in order to afford quiet flow of air therethrough. Formed integrally with the U-shaped throat **30** is a bottom edge **31** which is below and turned away from the bight portion of the throat. A cylindrically-shaped skirt or sheet **35** which is fabricated preferably from a porous foam material having a spongy texture, is secured to the throat **30** around the inside of the bight position. Therefore, a spray or soaking chamber **36** is defined between the throat **30**, the resilient sheet **35** and the liquid in reservoir **22**. While the sheet **35** is substantially cylindrical in shape the upper portion is necked down to a smaller diameter in order to securely fit within the U-shaped cross-section of the throat **30**. It should be understood that the sheet **35** might also be attached directly to the horizontal portion of wall **27**. In the present embodiment, the porous sheet **35** extends from the throat **30** to a point adjacent the bottom of the cup-shaped reservoir **22**. When a fluid such as water is placed

in the reservoir 22 as shown in FIG. 3, air entering through inlet openings 29 may readily pass into the motor chamber 28 and subsequently flow into the spray chamber 36.

Straddling the circular throat 30 in the motor chamber 28 is a substantially U-shaped supporting frame member 38 having its legs 39 secured to the wall 27 by fastening means 40 such as rivets. Referring to FIG. 7, the legs 39 are spaced back from the throat 30, and the bight portion 41 of the frame member 38 is positioned above the throat 30 in order to prevent the relatively wide frame member from interfering with the quiet controlled flow of air through the throat. In order to strengthen the U-shaped member 38, the edges thereof are upturned. In the center of the bight portion 41 there is defined an irregularly-shaped motor securing opening 42. In the illustrated embodiment the opening 42 is of a square shape although any irregularly-shaped opening would suffice.

Suspended beneath the member 38 is an electrical motor 44, the rotary axis of which is in vertical alignment and concentric with throat 30. Centrally disposed on top of the motor 44 is a complementary irregularly-shaped projection 45 having a threaded stud 46 extending upwardly therefrom. Preferably, a doughnut-shaped resilient first pad 48 overlies the top of the motor 44 and projection 45 with a central opening to permit the stud 46 to pass therethrough. As seen in FIG. 9, the motor projection 45 is sufficiently smaller than the opening 42 in bight portion 41 so that the resilient pad 48 positioned therebetween prevents contact between the motor and the frame member. Positioned above the bight position 41 is a second doughnut-shaped resilient pad 49 which has an outside diameter greater than the opening 42 and has an inside diameter larger than the combination of projection 45 and the double thickness of first pad 48.

In order that the resilient motor mounting section may be properly sandwiched together, a cup-shaped plate 50 is positioned over the second insulating pad 49 with the outer rim of the plate 50 extending downwardly over the periphery of the pad 49. The plate 50 has a central opening which allows the stud 46 to pass therethrough. Holding this assembly together is a fastener or nut 51 which engages with the threaded stud 46 to lock portion 41 between the two pads. In the assembled state, the resilient connection between the motor 44 and the frame member 38 allows the motor and parts attached thereto to be supported in a pendulous manner. That is to say, the motor is provided with limited pivotal movement with respect to the frame member 38 which greatly lessens vibration caused by the operation of the motor. In addition, the motor 44 is completely separated from the frame 38 by resilient insulating pads which dampen the vibration transmission therebetween to insure quiet operation of the humidifier.

For the purpose of affording air circulation within the housing 12 and means to water the porous sheet 35, motor 44 has a vertically dependent drive shaft 55 which is concentric with throat 30 for supporting and rotating fan 56 and pump 57. As may be conveniently seen in FIGS. 3 and 4, the elongated hollow centrifugal pump 57 of the cone type has a substantially tubular lower portion 58 with an opening at the bottom to define a liquid inlet 59. Preferably, the pump is molded from a nonabsorbent plastic, such as high impact polystyrene. To assist the upward flow of water within the centrifugal pump tubular portion 58, a plurality of spaced radially extending vanes 60 are positioned at the bottom of portion 58 adjacent the inlet 59. In addition to imparting additional impetus to the upward flow of liquid within the portion 58, the vanes 60 provide substantially uniform fluid flow irrespective of the fluid level within the reservoir 22. While the tubular portion 58 may have a constant inside diameter, it is more practical to have a slight taper to facilitate the molding thereof. Integral with the tubular portion 58 and positioned thereabove is conical portion 61 which further accelerates the upward and outward flow of the liquid. Formed near the top of the conical portion 61 is a cylindrical section 62 having a top surface 63 which defines a top opening. A plurality of radially spaced recesses or water discharge openings 65 are formed in the cylindrical section 62 and extend upwardly toward surface 63. The recesses 65 have bottoms 66 which are inclined outwardly from the inside surface of cylindrical section 62 to the outside surface terminating at outside discharging edges 67. According to the present embodiment, the inclined bottom 66 is flat and adapted to propel the fluid forced therealong and discharge the fluid both outwardly and upwardly as it leaves the edges 67 when the pump is rotating.

Closing the top opening in the pump 57 defined by an upper surface 63 of cylindrical section 62 is a cup-shaped cover 69 which is molded of a plastic material and is preferably cemented into rigid engagement with the lower portion of the pump. Integrally formed with the cover 69 is an outwardly extending horizontal flange 70 which is positioned immediately above the discharge openings 65. A depending annular lip 71 is formed around the periphery of flange 70 and is positioned outwardly from the opening 65. The bottom of the lip 71 comes to a point and forms an annular releasing edge 72 which depends below the discharging edges 67. With this construction the liquid which is guided by the inclined bottom 66 is thrown against the bottom of the flange 70 or the inside of lip 71. In either case, the liquid must pass downwardly over the releasing edge 71 before being hurled outwardly therefrom by centrifugal force generated by the rotation of the pump by the drive shaft 55. Thus, the liquid pumped outwardly to the sheet 35 is generally thrown in a horizontal plane with no upward force being exerted thereon. It is important that the liquid emanating from the pump 57 is not directed upwardly in which case the liquid would impinge upon the fan 56. Since the water used in the reservoir 22 may contain minerals which would be deposited on any surface which the water continually impinges, it is important to keep the discharging water from hitting the fan. Further, objectionable noise would be generated if droplets of liquid were to impinge upon the rotating fan. Therefore, it is very important that the water from the pump does not come in contact with the fan 56. The outside surface of lip 71 is sloped with the releasing edge 72 having the largest diameter to prevent the liquid from being released from a point above the edge 72. It will be appreciated by those skilled in the art that the water released from a cylindrical cone pump along a horizontal line of discharge will have only a horizontal component due to centrifugal force.

In order to secure the fan 56 to the pump 57, the cover 69 has a vertically extending integral projection 74 which contains a metal insert 75 molded therein. The insert 75 has a recessed diameter 76 which is adapted to receive a resilient bushing 77 fabricated of rubber or the like. The bushing 77 has an annular groove formed on the periphery thereof for receiving the fan 56. Thus, the fan is mounted to the pump assembly through an intermediate rubber bushing 77 which dampens the vibration transmitted therebetween and also has the tendency to reduce the amount of dynamic unbalance of the fan. With respect to dynamic balance, it has been noted that the pendulum mounting which allows pivotal movement between the motor, fan and pump combination with respect to the frame member 38, tends to reduce the total unbalance thereof. That is to say, the resilient connection between the motor 44 and the frame member 38 greatly reduces the need for accurate and costly dynamic balancing each of the motor 44, fan 56 and pump 58. Another factor which favorably affects the dampening of the vibration of the rotating components is the liquid in the reservoir 22 which comes into contact with the tubular portion 58 and acts as a dampening means. Tests

run on the present embodiment indicate a surprising lack of overall noise and vibration.

As thusfar disclosed, the rotation of the fan member **56** induces air flow as indicated by arrows in FIG. 3 through inlet openings **29** into the motor chamber **28** and thereafter through throat **30** into the spray chamber **36** where the centrifugal pump **57** lifts the water from the reservoir **22** and throws it uniformly around the top of the porous sheet **35**. The relatively dry air entering the spraying chamber **36** therefore must pass outwardly through the water saturated sheet **35** and thereby picking up an appreciable amount of moisture in so doing. After passing through the sheet **35**, the moisture laden air is expelled from the housing **12** through the air outlet grille **19** in front **18**. It should be appreciated that while the pump is rotating a relatively constant volume of liquid is continually flushing and cleaning the porous sheet **35**. To a great extent this cleaning action reduces the minerals or other substances which are not readily evaporable from hardening in and clogging the sheet to the detriment of performance. Thus, this arrangement flushes the minerals back into the reservoir for deposit on the walls thereof. Naturally minerals deposited on the walls of the reservoir do not reduce the efficiency or output capacity of the humidifier.

Filling the reservoir **22** is easily accomplished by pouring water into a water inlet opening **80** defined in the top **13** of housing **12**. The water inlet **80** is formed at least in part by bending a guide chute **81** from the top **12**. It should be noted that chute **81** is angled downwardly toward vertical wall **26** which is provided with a porous resilient pad **82** extending from the bottom of the wall **26** to near the top thereof. The water inlet **80** is additionally formed by flap **83** which is struck downwardly along the opposite edge from where chute **81** is formed. The top of the pad **82** extends above the lower portion of flap **83**. By this construction, the water entering inlet **80** either strikes chute **81**, which directs it onto resilient pad **82**, or it falls directly on pad **82**. In either case, the resilient pad **82** acts in a similar manner as a sponge to allow the water to flow slowly therethrough onto the sheet **35**. Thus, the reservoir **22** is efficiently filled with water without splashing and consequently with a minimum of noise. In addition, it is impossible for water entering through inlet **80** to splash outwardly through air outlet grille **19**. A door **85** is provided to cover the inlet **80** when filling is not required. The door **85** is hinged between instrument panel sections **86** and **87**.

Since the humidifier herein disclosed is capable of introducing up to 12 gallons of water every 24 hours and the reservoir is of the eight gallon capacity, it is convenient to have a control system for de-energizing the motor circuit when the water level drops below a predetermined level so that the humidifier will not require constant attention and may be used during the evening hours with the knowledge that the unit will turn itself off if the water level drops below the predetermined amount. The system for controlling the operation of the humidifier **11** includes the instrument control panel section **86** which contains a water level gauge **88** to be described hereinafter and two visual indicating lights **89** and **90**. When the reservoir **22** is nearly empty, the visual indicating light **89** is energized and at the same time the motor **44** is prevented from operating until the reservoir is refilled. As a convenience, light **90** comes on whenever the humidifier is turned on. The other instrument panel section **87** contains a control humidistat **91** which turns off the motor whenever a selected humidity level is reached. Also mounted on the panel section **87** is a three button switch **92** containing control buttons **93**, **94** and **95** for selectively turning the motor off, to low speed or to high speed, respectively. Referring now to the schematic electric circuit in FIG. 8, there is illustrated a motor **44** which is controlled by switch **92** whereby the actuating of the off button **93** opens switch contacts **98**, **99** and **100**. Upon actuation of the low speed button **94**, contacts **98** and **100** are closed and lastly, when high speed button **95** is depressed, contacts **99** and **100** are closed. With this arrangement, the depression of either of the motor control buttons **94** and **95** causes contact **100** to close, energizing the light **90** indicating that the humidifier is turned on. The slow speed button **94** closes contact **98** so that the entire widing of the motor is utilized while high speed button **95** closes contact **99** which allows only a portion of the motor winding to be energized. As is understood by those skilled in the art, the humidistat **91** is wired in series with the motor **44** to prevent the operation of the motor when the desired humidity which has been selected is attained. In addition, water level switch **101** is connected in series with the motor **44** and humidistat **91** whereby the motor circuit is opened stopping the humidifier whenever the water level in the reservoir has dropped below a preselected minimum. The liquid level indicating light **89** is connected in parallel with the water level switch **101** so that it will only light when the switch is open. The normally closed water level switch **101** is attached to vertical wall **26**. For the purpose of actuating the switch **101** there is provided a link **105** having a float **106** disposed at one end and adapted to move in response to the liquid level in reservoir **22**. The link **105** which may be made from a circular metal rod is pivotally supported on the side of the housing by a Z-shaped bracket **107** having a pivot screw **108** which serves as a bearing for looped portion of link **105**, as is best shown in FIG. 3. The upper end of link **105** extends toward the housing top **13** and has a hook **109** formed at its end. As hereinbefore mentioned, the water level gauge **88** is positioned on the instrument panel section **86** and comprises a circular crystal **111** which is received in a circular recess formed by the instrument panel section **86**, a circular disc **112** bearing the indicia for the gauge thereon and a pointer **113** to visually indicate the quantity of liquid contained in the reservoir **22**. The pointer **113** is attached to a spindle **114** which is rotatably supported between the top **13** and a bracket **115** attached to the underside of the top **13** in a suitable manner such as by spot welding. Spindle **114** has on the lower end thereof an integral gear **116** positioned between the top **13** and the bracket **115** to engage a segment gear **117** which is pivotally secured to the bracket **115** by pivot member **118**. In order that the pointer **113** which is attached to the spindle **114** may be actuated in response to the movement of the float **106**, a connecting member **119** is also pivotally attached to bracket **115** by pivot member **118** and is secured to the segment gear **117** by means of a finger **117***a* which is struck from the segment gear and which passes through an opening **119***a* defined in the member **119**. In addition, the connecting member **119** has at the end remote the pivot member **118**, a bent portion **119***b* which is formed with an opening **119***c* disposed to receive the hook **109** of link **105**.

It will be appreciated by those skilled in the art that the float **106** moves in response to the level of the liquid in reservoir **22**. The link **105** pivots about screw **108** which causes the hook **109** at the opposite end of the link to rotate the connecting member **119** which correspondingly rotates the segment gear **117** and spindle **114** to position the pointer **113** at the proper indicia on the disc **112**.

In order for the water level gauge to provide a control function as well as an indicating function, the member **119** is formed with a struck out projection **119***d* which is disposed between the bent portion **119***b* and the opening **119***a*. The projection **119***d* is provided to contact and actuate the water level switch **101** which is disposed on the wall **26**. By this means the normally closed water level switch is opened by the contact of projection **119***d* when the liquid level in reservoir **22** is near the bottom thereof. Thus, as the float member **106** follows the liquid

level to near the bottom of reservoir **22**, the connecting member **119** is rotated by the action of link **105** to a position where the projection **119***d* will contact the normally closed switch **101** and open it thereby de-energizing the motor **44**, fan **56** and pump **58**. This feature is advantageous since the water level in the reservoir **22** may drop below the bottom of pump **58** while the user of the humidifier is not present. As previously mentioned, upon the opening of water level switch **101**, light **89** is energized to indicate that the reservoir is empty and that the pump is no longer operating.

Tests conducted upon the humidifier described herein have indicated that the unit has a large capacity to disperse moisture into a relatively large area and at the same time is very quiet in operation. The large reservoir and refined control circuit allows the humidifier to be operated for long periods of time without attention.

While there has been shown and described one embodiment of the invention, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention and that it is intended by the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A humidifier comprising a housing, a cup-shaped reservoir with the opening facing upwardly disposed within said housing, wall means forming a chamber within said housing above said reservoir, an air inlet opening defined by said housing into said chamber and a circular throat formed in said wall means above said reservoir, a frame member in said chamber supporting a motor above said circular throat so that a rotatable motor shaft depends downwardly toward said throat and is concentric therewith, means on said frame member resiliently supporting said motor only at the center of the end remote from said shaft, fan means attached to said shaft slightly above said throat, a porous sheet attached to said wall means surrounding said throat and extending downwardly into said reservoir, a centrifugal pump enclosed by said sheet and secured coaxially to said shaft and extending into said reservoir for dispersing liquid from said reservoir onto said sheet, and said housing defining a discharge opening remote from said chamber for allowing the moisture laden air which is forced through the sheet by said fan means to egress therefrom.

2. The humidifier of claim **1** wherein said housing defines a liquid inlet opening for allowing the reservoir to be filled, a resilient pad attached to said wall means, a chute member integral with said housing at the edge of said opening and angled downwardly therefrom to guide liquid against said resilient pad, and said pad being disposed over said sheet whereby liquid impinging thereon falls onto said porous sheet and flows down said sheet to said reservoir.

3. The humidifier of claim **1** wherein said hollow centrifugal pump comprises a lower substantially tubular portion being provided with a liquid inlet opening at the bottom, a conical portion being disposed above said tubular portion and having a relatively short cylindrical section at the top thereof, a plurality of spaced recesses in said cylindrical section each having an outwardly inclined bottom which terminates at the outer edge of said recess, and a pump cover enclosing said conical portion and having an annular lip extending downwardly past said outer edges and spaced outwardly therefrom.

4. The humidifier of claim **1** wherein a normally closed switch is positioned in the electrical circuit with said electrically powered motor, said switch being associated with said housing, a float gauge comprising a link with a float member at one end adapted to move in response to the liquid level in said reservoir and pivotally attached to said housing, a dial member exposed and carried on said housing, said dial member activated to visually indicate the liquid level in said reservoir by the rotation of a spindle gear, a segment gear pivotally attached to said housing at a point spaced from said link and in power transmitting engagement with said spindle gear, means interconnecting said link and segment gear to rotate said spindle gear in response to movement of said link, and an integral flange formed on said segment gear and positioned to engage said switch and open it when said reservoir is nearly empty.

5. A humidifier comprising a rectangular housing including a top, bottom and two sides and open at the front and rear, a vertical wall depending from said top of the housing and a horizontal wall extending from the bottom of said vertical wall to the rear of said housing to define a motor chamber, a cup-shaped reservoir facing upwardly and supported on said bottom, said horizontal wall defining a circular throat having a U-shaped cross-section, a porous sheet attached to said horizontal wall around said throat to form a continuous sheet which depends into said reservoir, a frame member disposed within said housing and secured to said horizontal wall, an electric motor positioned above said throat in said chamber and supported only at the center of its upper portion by said frame member, said motor having a downwardly depending shaft which carries a fan and pump means, said pump means extending into said reservoir, a plate secured to said housing covering the rear opening and in sealing engagement with said horizontal wall, and an air inlet opening defined in said plate above the engagement with said horizontal wall affording air access to said motor chamber whereby rotation of said fan and said pump means forces a flow of air through said inlet, said throat, said sheet and the front of said housing.

6. In a humidifier comprising a housing, a cup-shaped reservoir disposed within said housing for receiving and storing a liquid therein, a frame member positioned over said reservoir, a motor having a drive shaft depending toward said reservoir resiliently supported only at the center of the end remote from said shaft by said member in a pendulous manner permitting limited pivotal movement, and a pump means attached to said shaft in coaxial relationship and extending into said reservoir.

7. In a humidifier having a cup-shaped reservoir with the opening facing upwardly and adapted to receive liquid therein, a motor vertically disposed over said reservoir with a shaft extending downwardly, an elongated hollow centrifugal pump connected to said shaft and the longitudinal axis of said pump being coaxial with said shaft, said pump comprising a lower tubular portion defining a liquid opening at the bottom thereof, a plurality of ribs radially spaced along the inside of said tubular portion near the bottom for assisting the upward flow of liquid when said pump is rotated by said shaft, a conical portion disposed above said tubular portion for acceleration of the flow of liquid, a relatively short cylindrical section positioned immediately above said conical portion, a plurality of spaced discharge recesses defined in said cylindrical section with the bottoms thereof inclined outwardly and upwardly to form discharge edges along the outside of said cylindrical section, and a cover for said pump provided with an outwardly extending flange having an annular depending lip positioned below and spaced outwardly from said discharge edges to receive the liquid egressing from said discharge edges and to release the liquid uniformly in a horizontal plane.

8. In a humidifier including a vertical disposed electric motor having a downwardly extending rotatable shaft, a centrifugal pump secured to and coaxial with said shaft comprising a hollow tubular portion having a liquid inlet opening near the bottom thereof, an integral upright conical portion above said tubular portion to increase the velocity of the liquid forced through said tubular portion, a cylindrical section integral with said

conical portion at the top thereof and being provided with a plurality of spaced recesses having outwardly and upwardly inclined bottoms which terminate at discharging edges spaced below the top of said cylindrical section, and a cover for said pump enclosing the top of said cylindrical section and being provided with an outwardly extending integral flange which terminates at a downwardly depending annular lip having a bottom releasing edge which is positioned below said discharging edges and spaced outwardly therefrom.

9. The humidifier of claim 8 wherein said cover has an upwardly extending projection for attaching said pump and shaft together, and a resilient bushing connected to said projection and carrying a fan.

10. In a humidifier comprising a vertically aligned electric motor being provided with a downwardly extending drive shaft, a reservoir positioned below said motor, a fan and pump means connected to said shaft and depending into said reservoir, a frame member supporting said motor only near the top thereof by a resilient connection including an irregularly-shaped projection on the top of said motor with an upwardly extending stud, a first resilient pad having an opening in which said projection is disposed with said stud extending therethrough, said frame member defining a complementary irregularly-shaped opening adapted to receive from the bottom a correspondingly irregularly-shaped portion of said first pad and projection so that said motor is prevented from rotating and said motor is separated from said frame member by said first pad, a ring-shaped resilient pad disposed above said frame member having an internal aperture greater than said projection so that a portion of said first pad and projection are received therein, a plate positioned over said ring-shaped pad, and fastener means positioned over said plate to cooperate with said stud for sandwiching said resilient connection together whereby said motor and frame are resiliently connected with said motor permitted limited pivotal movement.

11. In a humidifier comprising a housing containing a reservoir for holding liquid; a frame member horizontally positioned over said reservoir and defining an opening therein; an electric motor suspended below said member by a resilient connection including, a projection extending upwardly from said motor through said opening, a resilient means positioned between said projection and member and extending above said member, said projection being smaller than said opening, the portion of said resilient means extending above said member being larger than said opening, a plate disposed above said means having an aperture to receive said projection therethrough, a fastener above said plate for retaining said motor vertically, said resilient means keeping said plate, projection and motor spaced from said member whereby said motor is pendulously supported; a shaft extending downward from said motor; and a pump means connected to said shaft and extending into said liquid holding reservoir.

12. In a humidifier comprising a housing containing a liquid holding reservoir, a horizontally disposed frame member connected to said housing and positioned above said reservoir, a motor pendulously suspended beneath said member by a first resilient connection positioned therebetween at the center of said motor, said motor having a downwardly extending drive shaft, a rotary pump coaxially attached to said shaft and extending into said reservoir, and a fan coaxially attached to the upper portion of said pump by an interposed second resilient connection whereby said connections dampen the vibration transmitted to said member.

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