Nov. 27, 1934. B. L. HUNTLEY 1,981,916

HUMIDIFIER

Filed Dec. 2, 1932 2 Sheets-Sheet 1

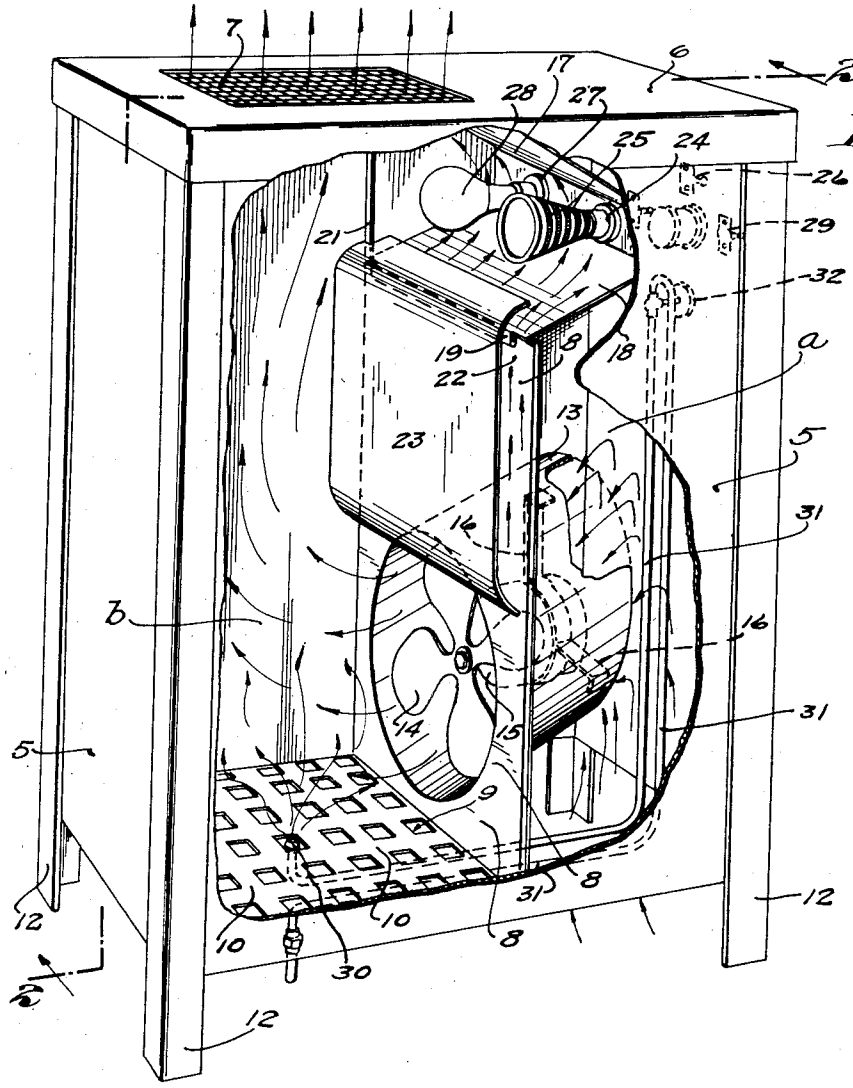


Fig. 1

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Fig. 2

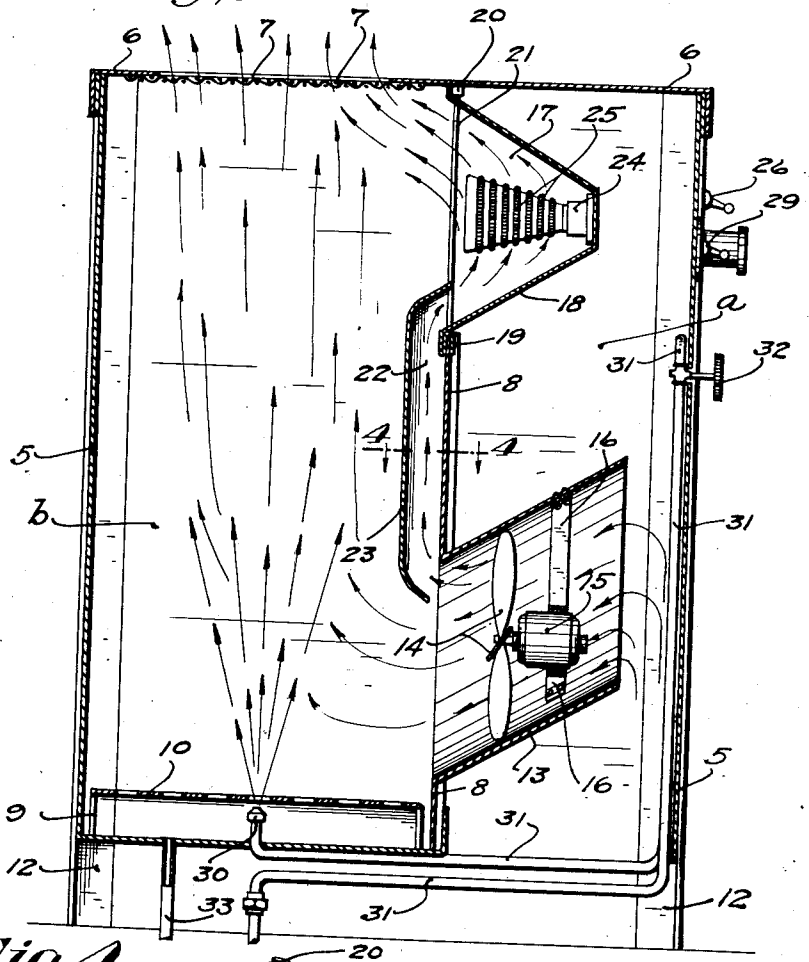


Fig. 4

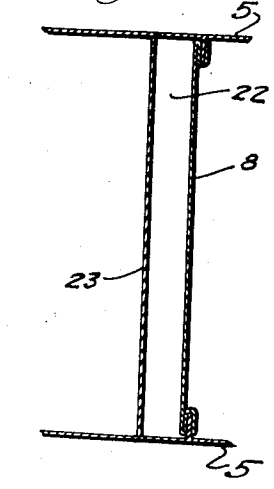
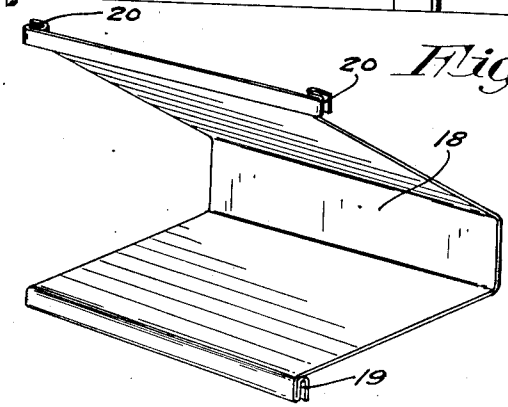


Fig. 3



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UNITED STATES PATENT OFFICE

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HUMIDIFIER

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14 Claims. (Cl. 219—39)

Primarily, my invention is directed to the provision of a simple, comparatively low cost and highly efficient air humidifier, and the preferred embodiment thereof includes secondary but highly important features whereby, under certain conditions, the device may be used as an auxiliary or low service heater when the temperature of a room or dwelling requires a rise in temperature, or as a cooling device in hot weather or when the temperature of a room is normally too high.

Generally stated, the invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

The invention, in its preferred form, is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a perspective with some parts broken away showing the improved humidifier or apparatus;

Fig. 2 is a vertical section taken in the plane of the line 2—2 of Fig. 1;

Fig. 3 is a perspective showing a baffle plate formed to constitute a warming chamber, the same being removed from the cabinet or casing of the apparatus; and

Fig. 4 is a fragmentary view taken on the line 4—4 of Fig. 2.

The cabinet or case of the device is preferably a sheet metal structure and is indicated as an entirety by the numeral 5. This cabinet is preferably provided with a removable cover 6 having a large air passage through a grill 7. The interior of the cabinet is divided into two compartments *a* and *b*, by means of a partition 8 preferably also of sheet metal and which terminates considerably below the top of the casing. The bottom of the compartment *b* is formed to afford a drip pan 9 within which, for a purpose which will hereinafter appear, is preferably placed a raised grid or perforated plate 10. Compartment *a* is open at its bottom for the intake of air and the interior bottom portion of the cabinet is raised above the floor line, by legs, afforded by the lower ends of corner angles 12, so that there will be a free flow of air from the room into the lower portion of said compartment *a*.

A fan casing affords communication between the lower portions of the compartments *a* and *b*. This fan casing is preferably in the form of a large tube 13 that inclines obliquely from the compartment *a* toward the compartment *b*. Within the casing 13 is a small fan 14 driven by a small electric motor 15, shown as supported within the casing by means of a supporting spider 16. Opening into the upper portion of the compartment *b* and as shown, projecting into the upper portion of compartment *a*, is an air warming chamber 17, formed by a sheet metal baffle plate 18, which, as shown, is bent into a sort of V-shaped formation in vertical section. This baffle plate 18 is made removable when the cover 6 has been removed, and at its lower edge is shown as formed with a V-shaped fold 19 that engages the upper edge of the partition plate 8. By reference to Fig. 4 it will be noted that partition plate 8 is made removable by a sliding connection at its edges with the flanges on the side plates 5. The complete partition between the compartments *a* and *b* in the illustration given, is made up of two sections 8 and 18, which carries the light bulb, the air tube 13, and the fan 14 and motor 15.

At the sides of its upper edge, baffle 18 is formed with U-shaped clips 20 that are engageable with flanges 21 on the sides of the cabinet, to thereby hold said baffle in place. As clearly shown, this baffle 18 extends from one wall to the other of the cabinet so as to form the warming chamber 17, above noted. For shunting a part of the air from the fan through the warming chamber 17, a by-pass air conduit 22 extends from the upper portion of the delivery end of the fan housing 13 to the lower portion of said warming chamber 17. This air conduit 22 is formed by the partition plate and a channel-shaped sheet metal spout 23, clearly shown in Figs. 1 and 2.

Within the warming chamber 17 is an electric socket 24 that holds an electrical heating element 25 properly positioned within said warming chamber. The socket 24 will be wired in a well-known manner to a source of current supply, preferably through a switch 26. Also secured to the baffle plate 18 and supported within the warming chamber 17 is another electric socket 27 that supports a light bulb 28. Socket 27 also will be connected to a source of current supply in a well-known way preferably through its own switch 29.

Extended upward through the bottom of the drip pan 9 and positioned to discharge a fine spray of water upward, is a spraying nozzle 30 which, when the grid 10 is used, will be positioned to discharge upwardly through one of the openings thereof, as clearly shown in Fig. 2. This nozzle 30 is connected to a source of water supply, under pressure, through a small water pipe 31, which, as shown, is extended upward within the cabinet and thence downward to the nozzle

30. The purpose of bringing this pipe up within the cabinet is to provide the same with a water-controlled regulating valve 32 that will be within easy reach of a person standing adjacent the cabinet.

From the bottom of the drip pan 9, a drain pipe 33 extends to a suitable place for discharge of surplus water. The fan motor 15 is preferably a variable speed motor so that the fan may be driven at different desired speeds.

The amount of water that will be delivered from the spraying nozzle 30 may, as indicated, be regulated by adjustments of the valve 32. The amount of moisture that will be evaporated with the spray set for any desired delivery of water, will, of course, depend somewhat on the temperature of the room, but to a greater extent upon the speed of the fan and hence the amount of air delivered through the compartment *b*. The spray delivered from the nozzle 30 will be in the form of a mist that will nearly or quite fill the compartment *b*. Water not taken up by the air delivered through the spray or mist within the compartment *b* will be precipitated into the pan 9 and will run off through the drain pipe 33. The main air blast, of course, will be delivered directly through the entire body of the water spray or mist within the compartment *b* and will be discharged directly upward through the grill or opening 7. A relatively small part of the air, however, will be shunted through the air conduit 22 and delivered through the warming compartment 17 where it will be heated to a very considerable extent by the electrical heater 25, and will then be discharged with the main vaporized air upward through the grill opening 7. This warmed or relatively hot air will be caused to join with the cooler humidified air near the place where it is discharged into the room and will insure complete vaporization of any of the mist that may be formed by the air discharged upward under the action of the fan. Moreover, the air warmed by the heating element 25 will be effective to raise the temperature of the room and hence where the temperature of the room requires but a slight raising, will frequently be found efficient as the heating means; but otherwise, it will operate as an auxiliary heater and vaporizer.

Obviously, dust will be washed from the air and carried off with the precipitated surplus water.

It is very desirable to render visible to the eye the amount of moisture or vapor that is being delivered into the room; and this may be done by connecting the light bulb so that the vapor will be illuminated and hence rendered very visible to the eye. In practice, it will increase the efficiency both of the lighting effect and of the heat-reflecting effect to make the interior of the plate 18 highly reflective, as by plating the same with nickel, copper or the like, or by highly polishing the same.

In practice, I have found that it is desirable to make the fan casing 13 in the downwardly inclined oblique form so that the air delivered by the fan will be deflected well downward toward the bottom portion of the vaporizing compartment *b*, so that the air will come into contact with the water spray or vapor through the greatest part of the interior of said compartment.

In hot weather, when it is desirable to lower the temperature of a room, ice may be placed in the compartment *b* on the grid 10. In this case, the vapor supply pipe will, of course, be closed, but the fan may be then used to force air against and around the ice and through the compartment *b* where the cooled or cooler air will be circulated throughout the room.

From the foregoing, it is evident that the device or apparatus illustrated in its preferred form, may be modified within the scope of the invention herein disclosed and claimed. The efficiency of this apparatus has been demonstrated in actual practice.

What I claim is:

1. In a device of the kind described, a casing formed with a vaporizing chamber provided at its bottom with a drip pan, a water-spraying device arranged to deliver a spray above said pan, means for forcing a circulation of air through said vaporizing chamber, an offset warming chamber opening into the upper portion of said vaporizing chamber, and means for shunting a part of the circulated air through said warming compartment.

2. In a device of the kind described, a casing formed with a vaporizing chamber provided at its bottom with a drip pan, a water-spraying device arranged to deliver a spray above said pan, means for forcing a circulation of air through said vaporizing chamber, an offset warming chamber opening into the upper portion of said vaporizing chamber, means for shunting a part of the circulated air through said warming compartment, and an electrical heating element in said warming chamber.

3. In a device of the kind described, a casing formed with a vaporizing chamber provided at its bottom with a drip pan, a water-spraying device arranged to deliver a spray above said pan, means for forcing a circulation of air through said vaporizing chamber, an offset warming chamber opening into the upper portion of said vaporizing chamber, means for shunting a part of the circulated air through said warming compartment, said casing having an air outlet in its top, said warming compartment being located adjacent to said air outlet, and an electric light bulb located in said warming chamber closely adjacent the said air outlet.

4. In a device of the kind described, a casing having two compartments, one being open at its bottom and serving as an air inlet compartment, and the other being open at its top and serving as a vaporizing compartment, a fan casing leading from said air intake compartment into the lower portion of said vaporizing compartment, a water spraying device arranged to deliver an upward spray of water into said vaporizing compartment in front of the delivery end of said fan casing, and a motor-driven fan mounted in said fan casing for producing a forced circulation of air into and upward through said vaporizing compartment.

5. The structure defined in claim 4 in further combination with a warming compartment offset from but opening into the upper portion of said vaporizing compartment and projected into the upper portion of said air intake compartment, an air-shunting conduit leading from the upper portion of the delivery end of said fan casing and directing a part of the air into said warming compartment, and a heating element located in said warming compartment.

6. The structure defined in claim 4 in further combination with a warming compartment offset from but opening into the upper portion of said vaporizing compartment and projected into the upper portion of said air intake compartment, an air-shunting conduit leading from the upper

portion of the delivery end of said fan casing and directing a part of the air into said warming compartment, and a heating element located in said warming compartment, said warming compartment being afforded by a removable baffle plate bent to form the outline thereof, and said casing having a removable cover formed with an air outlet passage adjacent to the open side of said warming compartment.

7. In a device of the kind described, a casing formed with a vaporizing chamber provided at its bottom with a drip pan having a drain passage, a grid spaced from the bottom of said pan, water-spraying means including a nozzle located below said grid but positioned to discharge an upward spray of water through one of the openings of said grid, and means for producing a forced circulation of air through said vaporizing chamber.

8. In a device of the kind described, a casing, a partition dividing said casing into an air intake compartment and a vaporizing chamber, said air intake compartment being open for the intake of air, a tubular fan casing secured to and opening into the lower portion of said partition, but terminating short of the outer wall of said air intake compartment, said vaporizing chamber having a drip pan in its bottom and an air discharge at its top, a motor-driven fan in said fan casing, and water-spraying means including a nozzle projected through the bottom of said drip pan and arranged to produce an upward spray of water in front of the delivery end of said fan casing.

9. The structure defined in claim 8 in which said partition is offset into the upper portion of said air intake chamber to afford a warming chamber, an electrical heater in said warming chamber, and a baffle plate spaced from said partition to afford an air by-pass leading from the upper portion of the delivery end of said fan casing and directing a portion of the air into said warming chamber, the latter being located adjacent to the air outlet passage in the top of said vaporizing chamber.

10. In a humidifier, a casing having an air outlet at its upper portion and an air inlet in its lower portion, arranged for the flow of air through said casing, means for commingling water vapor with air while the air is being passed through said casing, an electrical light font located in said casing immediately adjacent to said outlet and arranged to project light through the vapor-laden air and to illuminate the latter at the place where it is discharged through said air outlet and illuminate the vapor of the air as it is discharged from said casing.

11. In a humidifier, a casing having an air outlet at its upper portion and an air inlet at its lower portion, a partition separating said casing into two compartments, one of which is a vaporizing compartment, said partition being removable through the top of said casing, means for commingling water vapor with the air while it is being passed through one of the vaporizing compartments, an air tube applied to and opening through the lower portion of said partition, a fan and a motor mounted in said air tube and arranged to force a blast of air into said vaporizing compartment, and an electrical light font applied to the upper portion of said partition and arranged to illuminate vapor discharged through the top of said casing, said fan, motor and light font being removable with said partition.

12. In a humidifier, a casing having an air outlet at its upper portion and an air inlet in its lower portion, arranged for the flow of air through said casing, means for commingling water vapor with air while the air is being passed through said casing, an electrical light font located in said casing and arranged to project light through the vapor-laden air and to illuminate the latter at the place where it is discharged through said air outlet and illuminate the vapor of the air as it is discharged from said casing.

13. A vaporizer comprising a casing having a partition dividing the same into two compartments, the one being open at its lower portion and affording an air intake compartment, and the other being open at its top and affording a vaporizing compartment, a fan casing applied to and opening through said partition and affording communication between the said compartments, a water spray device arranged to deliver a spray of water into said vaporizing compartment, and a motor-driven fan mounted in said casing and arranged to force a circulation of air from said air intake compartment into said vaporizing compartment, and through the spray of water produced in the latter.

14. The structure defined in claim 13 in which said partition with said fan casing and motor-driven fan are together removable from said casing.

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