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D. R. WALLACE ET AL

3,410,107

OXYGEN TENT APPARATUS AND HOUSING

Filed Aug. 25, 1967

3 Sheets-Sheet 1

FIG. 1

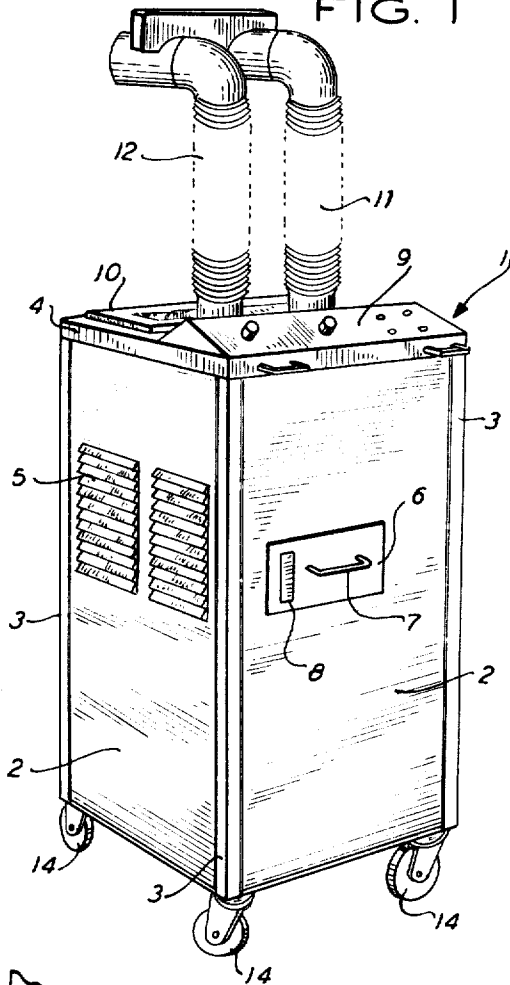


FIG. 3

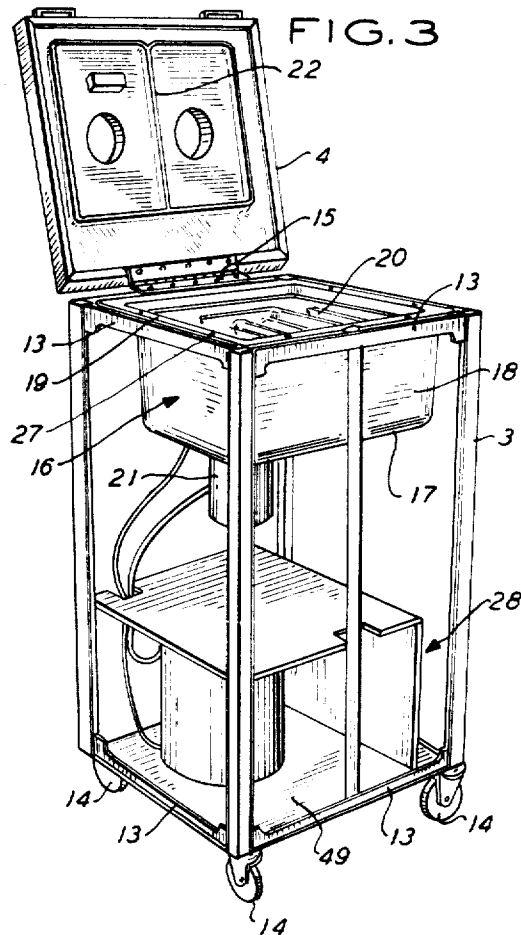
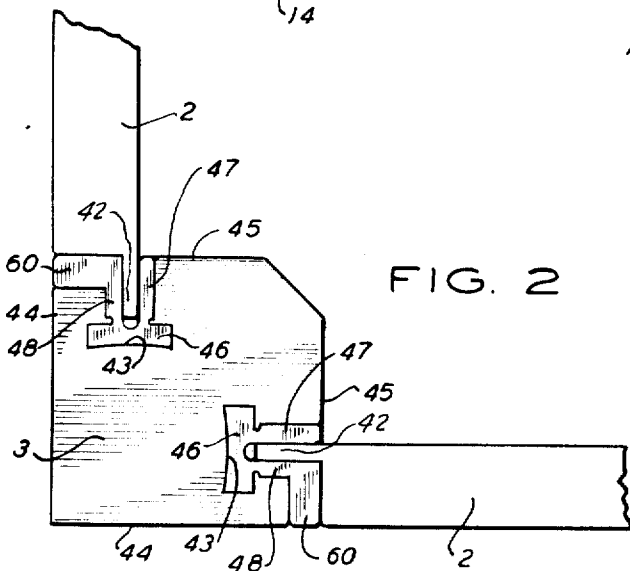


FIG. 2



INVENTORS  
DEAN R. WALLACE  
DOUGLAS D. CARDEN

*Edmund W. Bopp*  
AGENT

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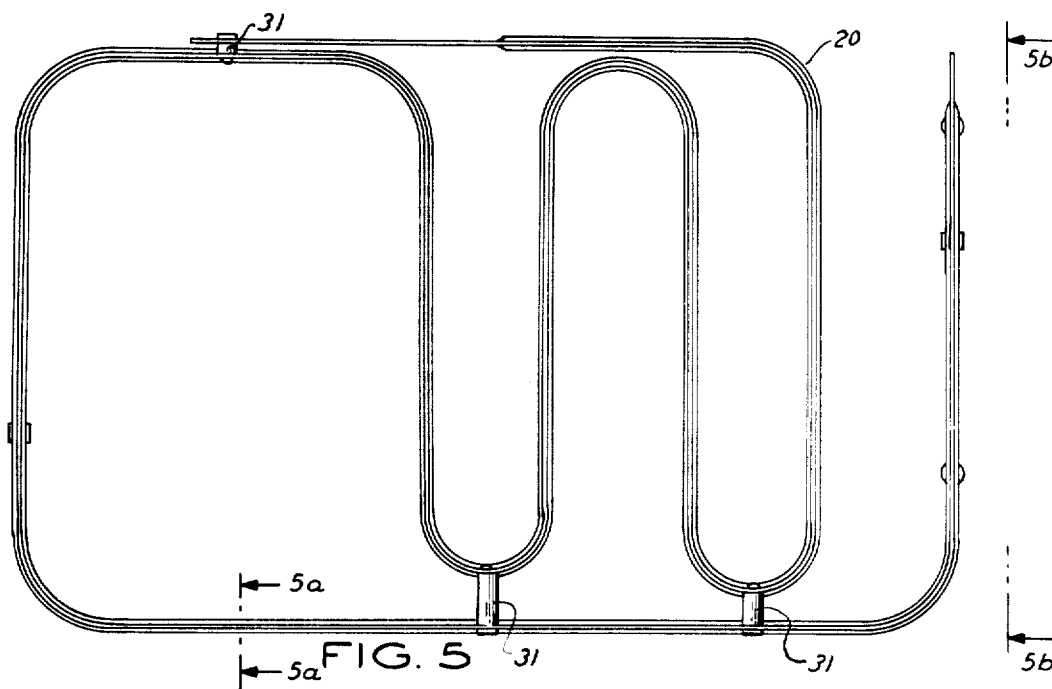
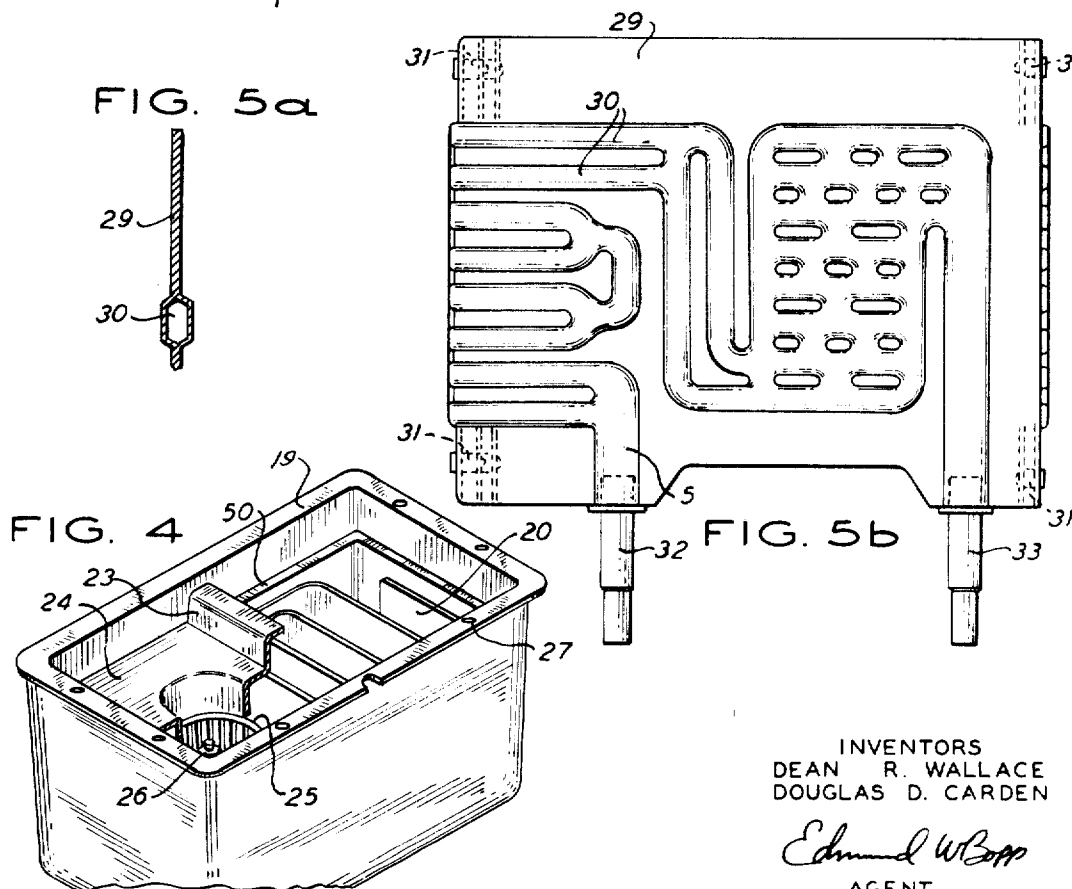
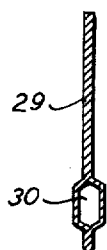


FIG. 5a



INVENTORS  
DEAN R. WALLACE  
DOUGLAS D. CARDEN

*Edmund W. Bopp*  
AGENT

Nov. 12, 1968

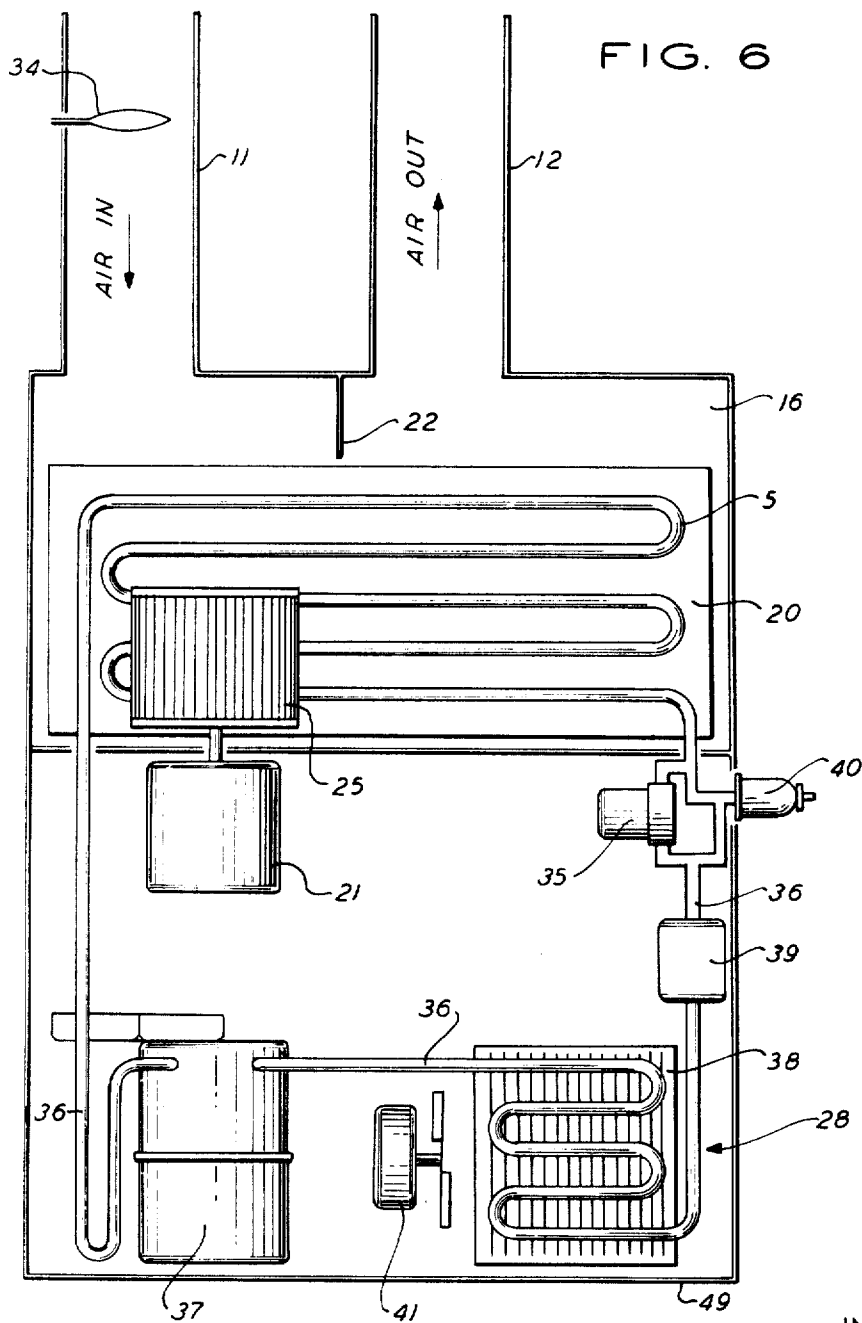
D. R. WALLACE ET AL

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OXYGEN TENT APPARATUS AND HOUSING

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INVENTORS  
DEAN R. WALLACE  
DOUGLAS D. CARDEN

*Edmund W. Bopp*  
AGENT

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**OXYGEN TENT APPARATUS AND HOUSING**  
Dean R. Wallace, Madison, and Douglas D. Carden,  
Barneveld, Wis., assignors to Air Reduction Company,  
Incorporated, New York, N.Y., a corporation of New  
York

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## ABSTRACT OF THE DISCLOSURE

Apparatus including a housing and equipment therein for providing a conditioned environment to an oxygen tent, said housing comprising four side panels and posts, a base and a cover assembly, said equipment comprising a central "cold box" chamber and a refrigeration system therefor.

### Background of the invention

The purpose or function of an oxygen tent is to provide a conditioned, oxygen enriched atmosphere for treatment of various illnesses.

Apparatus of the prior art employed to accomplish this purpose has encountered problems in ease of access to internal components for servicing, maintenance or replacement of parts and for cleaning the operating components to provide maximum efficiency and prevent clogging and cross contamination.

Not only have the housings of the prior art required the use of tools for time consuming removal of parts to get to the internal components, but the internal components used in many instances are not conducive to cleaning and their arrangement within the housing prevents or hinders adequate servicing, maintenance or replacement of parts as well as their cleaning. Furthermore, it is desirable to have a condensate receptacle with visible means to show the condensate level rather than have to remove parts of the housing for inspection.

### Summary of the invention

It is the primary object of this invention to provide a novel housing arrangement wherein no tools are required to provide access to the interior.

It is a further object of this invention to provide an arrangement of components within the housing to provide ease of access to each component individually for proper servicing, maintenance, replacement and cleaning.

It is also an object of this invention to utilize an evaporator plate free of fins rather than difficult to clean and service evaporator coils, and a removable blower wheel wherein no tools are required for removal.

It is also an object of this invention to provide the housing with a visible indication of the condensate level in the condensate receptacle.

With the above and other objects in view, the invention resides in the novel features of form, construction, arrangement, and combination of parts hereinafter described and claimed.

### Brief description of the drawing

FIG. 1 is a perspective view of the apparatus housing;  
FIG. 2 is a plan view of the sliding panel and corner post construction;

FIG. 3 is a perspective view of the housing frame;

FIG. 4 is a perspective view of the "cold box" chamber with the blower housing seal cut away;

FIG. 5 is a plan view of the evaporator plate;

FIG. 5a is a cross-sectional view showing a refrigerant channel along line 5a—5a of FIG. 5;

FIG. 5b is an end view of FIG. 5 along line 5b—5b; and

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FIG. 6 is a schematic view of the internal components of the housing.

### Description of the preferred embodiments

Referring now more specifically and with reference characters to the drawing, in FIG. 1, the housing 1 comprises side panels 2, corner posts 3, horizontal frame members 13, base 49 and cover assembly 4. Louvers 5 are placed near the top of a pair of opposed panels to lessen the possibility of the entrance of dirt and dust to the interior of the housing while ventilating same. One side panel has an opening therein receiving condensate tray 6 provided with a handle 7 for removal and sight glass 8 for viewing the level of condensate in the tray. The cover assembly includes, on its external surface, control panel 9, air inlet 10, intake duct 11 and discharge duct 12.

As seen in FIG. 3, the corner posts are held together at their upper and lower ends by horizontal frame members 13 to form the housing frame. Casters 14 are fastened to the members 13 near the corner posts. Cover assembly 4 is hinged to a horizontal member at 15. The interior of the housing includes "cold box" chamber 16 comprising bottom wall 17, side walls 18, and horizontal peripheral flange 19 which is fastened to upper horizontal members 13 at 27 to support the chamber in position within easy access once the cover assembly is lifted as shown. Within the chamber is evaporator plate 20 to be described in more detail hereinafter and a blower fan including wheel 25 shown in FIG. 4. Extending below and connected to the blower wheel through the chamber bottom wall is motor 21 which turns the blower wheel to provide a negative pressure at the intake duct and air inlet.

It should be noted that the hollow interior of chamber 16 is divided into a negative pressure side at the intake duct and a positive pressure side at the discharge duct by means of rib separator 22 on the cover assembly which contacts rib 23 on blower housing seal 24 as shown in FIG. 4. The blower housing seal 23 rests on shoulder 50 of the chamber. Blower wheel 25 is readily removable merely by removing nut 26. In the lower part of the housing interior is the refrigeration system generally designated at 28.

Referring now more particularly to FIGS. 5, 5a and 5b, the evaporator plate 20, preferably of aluminum, is formed by the bonding together of two imperforate complementary plates in which have been formed desired continuous groove patterns. After bonding, the imperforate plate formed thereby has, as shown in FIG. 5a, a common wall 29 and closed continuous channels 30. The channels run substantially the entire plate length in its rebent configuration as shown in FIG. 5 with spaced succeeding levels along the vertical dimension of the plate. The configured plate in FIG. 5 uses round aluminum spacers 31 which retain the final configuration of the plate and extend therethrough at walls 29 between channels 30. As shown in FIG. 5b, the initial entry of the refrigerant from the refrigeration system is through an aluminum copper tube 32 into the continuous channels 30 and the exit of the refrigerant in its return cycle through the refrigeration system is by way of a similar tube 33.

Referring now more specifically to FIG. 6, the internal components of the housing also include a liquid filled sensing element 34 in the intake duct 11 which monitors the air coming in from the tent canopy and acts on a combination bellows and microswitch to control directional flow of refrigerant. If the incoming air is too low in temperature as compared with a set point, the microswitch closes and energizes the solenoid bypass valve 35 which allows hot gas from the compressor to flow through it into the evaporator plate 20, thus imposing an artificial load on the system. When the temperature reaches the set point, the microswitch opens and causes a de-ener-

gization of the solenoid at the bypass valve 35 and a return to a cooling cycle.

The refrigeration system comprises the evaporator plate 20 in the upper part of the housing in chamber 16 with the refrigerant on a cooling cycle running through tubing 36 connecting the evaporator plate to compressor 37 and condenser 38 in the lower part of the housing, through dryer 39, expansion valve 40 and back to the evaporator plate. Fan 41 is provided in the lower part of the housing to maintain air brought in through louvers 5 circulating in the housing to dissipate the heat generated during the cooling cycle.

Thus, air is brought into the housing "cold box" chamber from the canopy by means of the negative pressure created by the blower fan. The air is conditioned on its way to the positive side of the chamber and exits through the discharge duct into the canopy.

The panel and corner post arrangement for the housing is shown in FIG. 2. Each panel 2, preferably made of steel, is provided with opposed tongues 42 substantially coplanar with the interior surface of the panel. The corner posts 3 are aluminum extrusions of substantially square cross-section having tongue receiving T-shaped grooves 43 extending inwardly from the post interior surfaces 45 and spaced from the external surfaces 44 of the post a distance sufficient to provide a flush, coplanar relationship between the exterior surfaces of panel and post. The internal surfaces 45 are recessed between each groove and its external surface 44, and each groove is constructed of substantially larger width and length than the tongue received therein to provide a space for T-shaped vinyl extrusion 46 having split legs 47 and 48 with a diverging bias for secure attachment of the vinyl extrusion to the post. Leg 48 has a spacer bulb 60 at its free end for positioning each panel side edge adjacent its tongue in spaced relation to post interior surface 45 at the recess. The vinyl extrusion not only prevents vibration rattling which would result from metal to metal contact of panel and post due to the refrigeration system but it acts to facilitate movement of the panels relative to the posts. Thus, the panels can be easily slid upwardly and removed, once the cover assembly is lifted, to provide access to the interior of the housing. The panels are supported by the housing base 49 as are posts 3.

It is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. Oxygen tent apparatus in combination with a housing therefor, said housing comprising a frame, a plurality of panels, a cover assembly and a base, said frame including a plurality of vertical posts and horizontal members adjacent the upper and lower ends of said posts connecting said posts together, each post having a plurality of vertical grooves running substantially the length thereof and being supported on said base, each panel having a tongue at each side edge slidably received within a corresponding groove of an adjacent post and being supported by said base, a cold box chamber extending within said housing and supported by said upper horizontal members, said cover assembly being supported by said upper horizontal members and, along with said base,

adapted to prevent sliding movement of said panels, and a refrigeration system supported by said base so that upon lifting said cover assembly, said panels may be slidably removed to expose the cold box chamber and refrigeration system for cleaning and servicing.

2. The combination set forth in claim 1 wherein an evaporator plate is positioned within said chamber, said plate having a plurality of rebent portions, said plate being imperforate and said plate having at least one integral continuous channel running substantially the entire length thereof, said at least one channel being positioned at spaced levels along the height of said plate.

3. The combination set forth in claim 2 wherein said cover assembly has a downwardly extending continuous intermediate rib, said chamber has a blower wheel positioned therein in fixed relation to said evaporator plate and a blower housing seal positioned over said blower wheel and resting on a shoulder in said chamber adjacent the upper edge of said evaporator plate, said seal including an opening therethrough above said wheel and a continuous upstanding rib vertically aligned with the cover assembly rib to divide said chamber into a negative pressure side at the blower wheel and a positive pressure side.

4. The combination set forth in claim 1 wherein said grooves are larger than said tongues forming thereby an internal space, and a plastic member in said internal space to preclude contact of said panels and posts.

5. The combination set forth in claim 1 wherein at least one panel has louvers adjacent the top edge thereof to permit ventilation of the housing interior, and one panel has an opening therein, a condensate tray received within said opening, said condensate tray having a sight glass for inspection of the condensate level.

6. Oxygen tent apparatus in combination with a housing therefor, said apparatus including a cold box chamber positioned within said housing and secured thereto, and an evaporator plate positioned within said chamber, said evaporator plate comprising an imperforate plate in a fixed configuration having formed therein at least one continuous refrigerant-receiving channel, refrigeration apparatus within said housing and secured thereto below said chamber, and means connecting said refrigeration apparatus to said evaporator plate through said chamber to allow refrigerant to cycle within said at least one channel of said evaporator plate.

7. The combination set forth in claim 6 wherein said housing includes a cover assembly, said cover assembly having a downwardly extending rib, said chamber including a blower wheel positioned therein in fixed relation to said evaporator plate and a seal positioned over said wheel and adjacent the upper edge of said evaporator plate, said seal including an upstanding rib vertically aligned with said cover assembly rib to divide said chamber into negative and positive pressure sides.

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WILLIAM J. WYE, *Primary Examiner.*