

April 25, 1944.

E. COHN

2,347,591

VAPOR DIFFUSING DEVICE

Filed Aug. 26, 1943

2 Sheets-Sheet 1

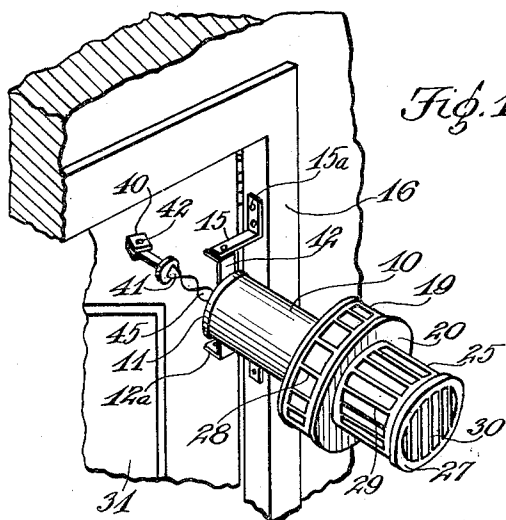


Fig. 1.

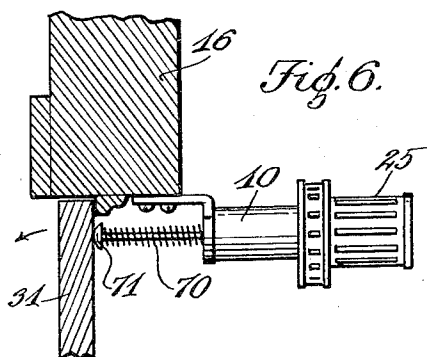


Fig. 6.

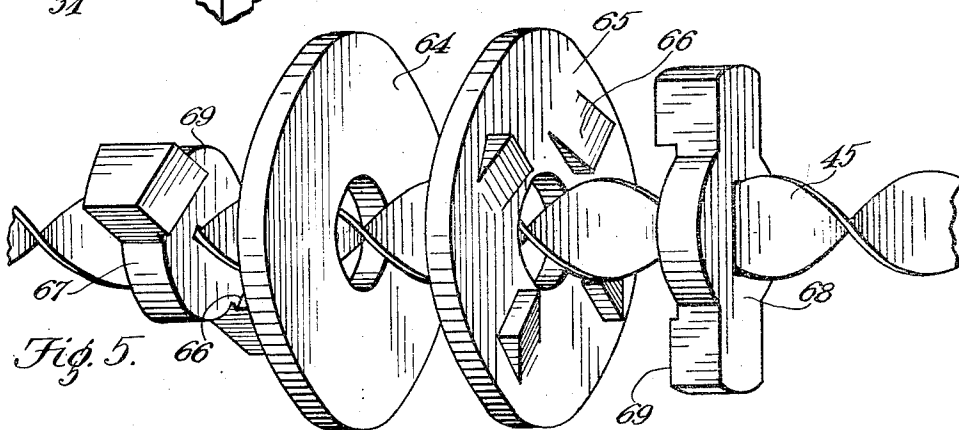


Fig. 5.

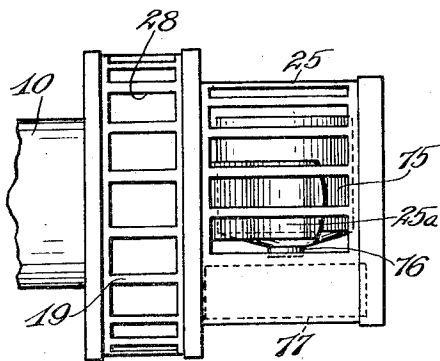


Fig. 7.

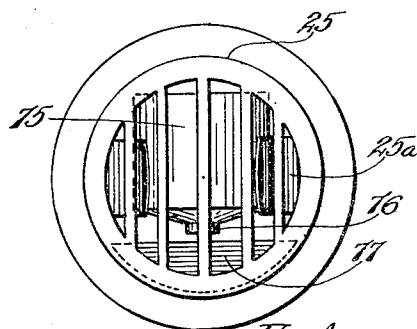


Fig. 8.

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2 Sheets-Sheet 2

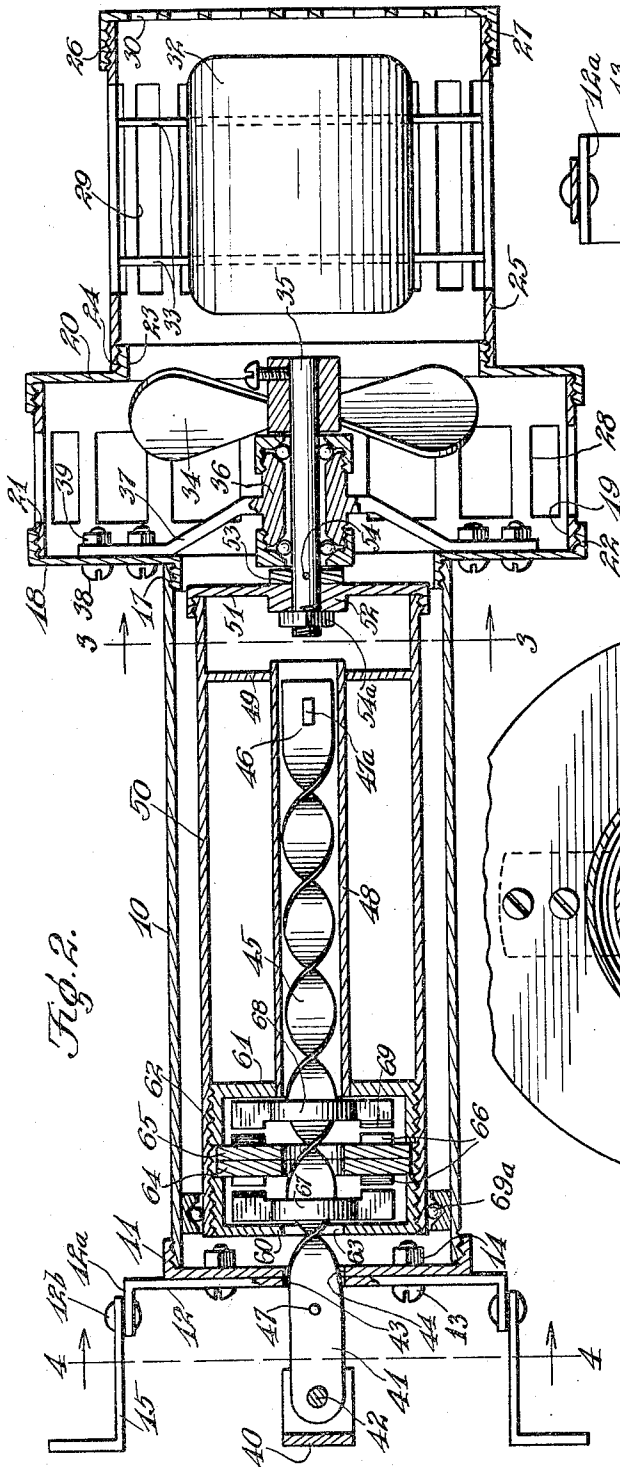


Fig. 2.

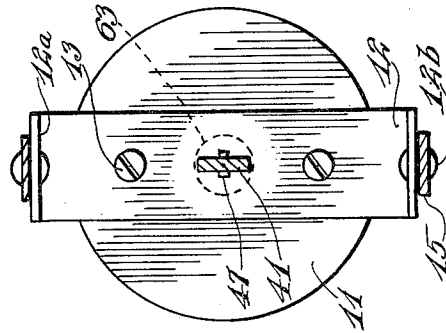


Fig. 4.

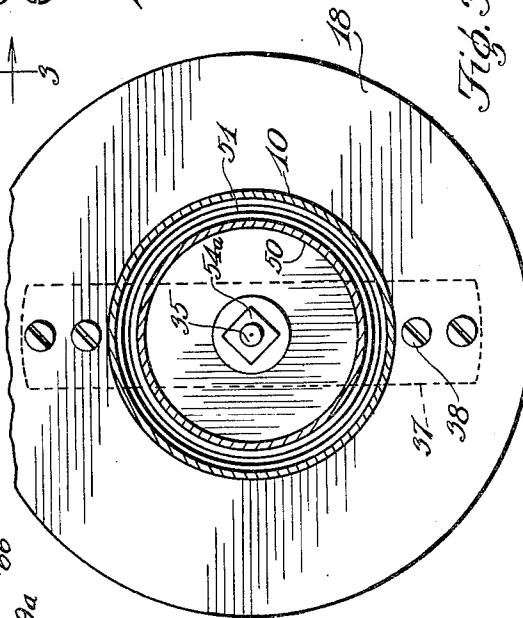


Fig. 3.

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UNITED STATES PATENT OFFICE

2,347,591

VAPOR DIFFUSING DEVICE

Eugene Cohn, Chicago, Ill.

Application August 26, 1943, Serial No. 500,116

14 Claims. (Cl. 21-77)

My invention relates to devices employed in plants, dressing rooms, rest rooms and other premises for the dispersion of a volatile deodorant, perfume, disinfectant or insecticide, and more particularly to devices in which currents of air are directed over or through a solid chemical designed to give off the volatile agent at ordinary temperatures and more rapidly in response to the passage of the air currents, and my main object is to provide an improvement over such devices designed to increase the dispersion of the volatile agent and procure a more rapid and widespread diffusion thereof in the surrounding atmosphere.

A further object of the invention is to provide an apparatus for the above purpose which is operable by the movement of a door or other commonly used part in the premises, and to incorporate means whereby a more rapid and sustained drive of air currents is obtained.

A still further object of the invention is to provide means for controlling or changing the rate at which the volatile agent is dispersed, whereby to supply such agent in amounts suitable for different environments or premises.

Another object of the invention is to provide an apparatus of the character mentioned which utilizes both movements of the swinging door or other actuating part, whereby to double the usual period and effective operation of the dispersing action.

A still further object of the invention is to design a device for the above purpose which is securely supported from the jamb, frame, or other part adjacent to the door, in order that the device may not get out of alinement or balance after it is in operation for an extended period of time.

An important object of the invention is to design the same along lines of compact assembly and for easy dismantling when any attention or repair is required.

An additional object of the invention is to construct the novel device of the fewest number of parts consistent with its efficient operation, and to make these parts largely of sheet material to facilitate their manufacture by stamping operations.

With the above objects in view, and any others which may suggest themselves from the description to follow, a better understanding of the invention may be had by reference to the accompanying drawings in which—

Fig. 1 is a perspective view of the device mounted on the inner side of a door and jamb, suggesting its mode of operation;

Fig. 2 is an enlarged horizontal section, except

for certain parts shown in elevation and partly-vertical section, such parts being later represented by reference numerals 11 to 17;

Figs. 3 and 4 are, respectively, sections on the lines 3-3 and 4-4 of Fig. 2;

Fig. 5 is a perspective view of the main mechanism in the device with parts in separated relation;

Fig. 6 is a horizontal section, partly in elevation, showing a modification of the device illustrated in Fig. 1;

Fig. 7 is an elevation of one end portion of the device, showing a modification; and

Fig. 8 is a right-hand end view of Fig. 7.

Referring specifically to the drawings, 10 denotes a cylinder forming the frame or body portion of the device. The cylinder receives a screw-cap 11 at one end, the screw-cap carrying a cross bar 12 on the outside, and such bar being secured by screws 13 receiving nuts 14. The ends of the cross bar are bent forward as indicated at 12a and attached by loose rivets 12b to companion brackets 15 which are adapted to be secured by screws 15a or other suitable means to the door jamb 16 as indicated in Fig. 1. The cylinder thus becomes vertically pivoted to the said door jamb.

The opposite or outer end of the cylinder 10 is internally threaded as indicated at 17 to receive one end 18 of an enlarged housing 19, the opposite end of the latter being indicated at 20. The housing 19 is a circular band which is externally threaded at its terminals as indicated at 21 to receive inward rims 22 of the ends 18 and 20.

The housing end 20 is formed with a neck 23 which is externally threaded as indicated at 24 to receive the inner end of a cylindrical shell 25, the outer end thereof being externally threaded as indicated at 26 to receive a terminal cap 27. The housing 19 is formed with a circular series of openings 28, while the shell 25 has a similar series of openings 29; and the end cap 27 is made with a series of vertical openings 30.

As suggested in Fig. 1, the device projects into a room with which the door 31 has connection; and the shell 25 is designed to contain a cake 32 of the volatile chemical, sufficient space occurring around such cake for the passage or circulation of air currents designed to remove or disperse the volatile agent or vapor from the cake 32, which is preferably supported on a pair of transverse wires 33 suitably secured in the lower part of the shell 25, although any other open or skeleton type of support or retainer may be employed for the purpose.

In the present device the passage of an air

draft is induced in a longitudinal direction over the chemical cake 32 by the rotation of a fan 34. Thus, when the fan is rotated in one direction, the air draft is projected over the cake 32 in an outward direction, whereby to induce a dispersion of the volatile vapor by way of the openings 29 and 30 of the shell 25. On the other hand, when the fan 34 is rotated in the opposite direction, it draws air currents into the shell 25 by way of the same openings to move inwardly over the chemical cake 32, enter the enlarged housing 19 and become dispersed by the centrifugal motion of the fan through the housing openings 28. Thus, the dispersion of the odorant, perfume or other volatile agent is accomplished in an effective manner irrespective of the direction in which the fan 34 is rotated. The fan is carried by a spindle 35 mounted in a ball bearing 36 supported by a bracket 37, the latter being secured by screws 38 and nuts 39 to the end wall 18 of the housing 19.

The rotation of the fan 34 for the purpose described is primarily induced by the swinging motion of the door 31. As shown in Figs. 1 and 2, the inner side of the door carries a swivel receptacle 40 in which the front end of a rod 41 makes a vertically pivoted connection 42. The rod is of flat stock and extends through registering circular openings 43 and 44 in the cross bar 12 and end cap 11 into the cylinder 10 to assume a spiral or threaded formation 45, the remote end of the rod being flat, as indicated at 46. The rod receives a stop pin 47 before entering the cross bar 12 and a similar lug 47a in the end portion 46.

The greater portion of the spiral rod 45 is housed in a central guiding tube 48; and the latter is provided near its outer end with a disc 49 forming part of a cylinder 50 disposed concentrically within the body or outer cylinder 10. The end of the inner cylinder 50 which is proximate to the fan 34 receives an end cap 51 whose hub 52 forms a receptacle for the inner end portion of the fan spindle 35. The latter receives a spacing washer 53 between the ball bearing 36 and the hub 52, such washer being stationed by a pin 54; and the inner end of the spindle 35 is threaded to receive a nut 54a which securely fastens the spindle to the inner cylinder 50.

The cylinder 50 is designed to receive a pair of receptacles 60 and 61 which open on each other in the manner of cups and are peripherally threaded into the inner end of the cylinder as indicated at 62. The receptacle 61 serves as a support for the inner end of the tube 48, having a central opening for this purpose; and the receptacle 60 has a similar opening 63 for the passage of the spiral rod 45.

The receptacles 60 and 61 are designed to serve as clamps to secure between them a pair of rings 64 and 65. These are similar in general, but have oppositely inclined teeth 66 projecting from their outer faces. The spiral rod 45 has threaded on it a pair of impellers 67 and 68, these occurring opposite the rings 64 and 65, respectively, and presenting teeth 69 opposite the teeth 66. The impellers are intended to approach the related rings on the longitudinal motion of the spiral rod 45, with the effect of their teeth 69 engaging the ring teeth 66 with a rotary impulse, resulting in the rotation of the rings. Since these are secured rigidly in the cylinder 50, it follows that the latter will also rotate and operate the fan 34. It is intended that the spiral

rod 45 receive a reciprocatory longitudinal motion. With this considered, the effect on the impellers 67 and 68 will be that one impeller procures engagement with the ring group 64-65 while the rod moves in one direction—the other impeller now remaining idle or turning with the receptacle group 60-61—the action of the impellers becoming reversed both in alternation and rotation when the rod 45 moves in the opposite direction. The inner end of the cylinder 50 is preferably provided with a ball bearing 69a for support and facility of rotation.

It is evident that the spiral rod 45, by its connection with the door 31, will receive the movements just described from the opening and closing actions of the door; and it is understood that the door swivel 42 and the pivot joint at 16 are provided to permit the device to accommodate itself to the arcuate traveling path of the door.

It is understood that the stops 47 and 47a on the spiral rod are intended to limit the extent of its reciprocatory movement in order that the rod may not be drawn out of place or jammed by excessive door movements. The rod is however, designed to be produced in an assortment having different numbers of threads—by shortening or lengthening the twists—so that different speeds are obtainable for the fan 34 and more or less of the volatile agent emitted according to the environment or premises in which the device is installed. In order to change one spiral rod for another, it is only necessary to unscrew the housing assembly at 17 from the body 10, withdraw the assembly and unit of the cylinder 50 to enable the latter to be unscrewed from the end cap 51, remove the pins 42 and 47 from the spiral rod, push the latter out through the open end of the tube 48, and replace the rod, etc., by reversing the operation.

The modification of Fig. 6 shows an instance wherein a securing connection is not needed from the spiral rod 45 to the door 31. As noted, the spiral rod is held at the inner end of its travel by the door when in the closed position shown. However, when the door opens in the direction of the arrow, a spring 70 on the spiral rod bears against a head 71 at the inner end thereof to extend the rod as the door opens until the rod has taken the limit of its stroke. It is understood that the rod will again be engaged as the door is about to be closed to reverse its movement.

A further modification is illustrated in Figs. 7 and 8. Here the outer shell 25 is formed with clamping jaws 25a to receive an inverted bottle 75 from whose mouth 76 an occasional drop of a highly volatile agent may issue. The drop falls on a porous or absorbent pad 77, from which the volatile substance may be dispersed as a vapor by the action of the fan 34. This modification is desirable where the value or effect of a liquid volatile agent is preferred.

It will be evident from the above description that I have provided a device or apparatus for the purpose outlined which attains a high degree of efficiency by reason of several factors. First, the fan 34 is centered in a ball bearing, gaining freedom of motion over an ordinary bearing. Second, the cylinder 50 not only serves as a frame or housing for the operative unit within it, but also functions as a fly wheel to add steadiness and momentum to the motion of the fan. Third, the longitudinal movement of the spiral rod 45 quickly advances the affected impeller into en-

engagement with the medial ring group to impart rotation thereto as long as the movement of the rod occurs, when the ring group by reason of its momentum and the fly wheel effect of its frame over-runs the impeller, continuing its rotation for a considerable period. In other words, the device does not only operate during the opening movement of the door, but continues to do so for sometime while the door remains open or before it is again closed, securing a comparatively long period of effective operation. In addition, the device repeats or continues its operation during both movements of the door, between such movements and after the door has been closed. This amounts to a comparatively long period of operation, procuring a wide dispersion of the volatile agent. Further, the device is easily opened for the insertion or replacement of the spiral rod in case more or less of the volatile agent is to be emitted. Thus, no replacement of the entire device or any more than the single spiral rod is necessary for this purpose; and the device need not be manufactured in several sizes or models for different vapor capacities. Also, the device is constructed from light material so assembled as to make its units easily removable for inspection, adjustment or repair; and the manner of assembling the device is by standard screw threads, requiring no undue accuracy for its manufacture or assembly. Finally, the novel device is of a character effective not only to drive or draw the volatile agent from the solid or porous base with a high degree of efficiency, but also to disperse or diffuse the same rapidly by the centrifugal action of the fan. Altogether, the device constitutes a compact, economical and efficient appliance for the purpose outlined.

While I have described the improved vapor diffusing device along specific lines, various minor changes or refinements may be made therein without departing from its principle, and I desire to consider all such changes and refinements as coming within the scope and spirit of the appended claims.

I claim:

1. A device operable by the action of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, and a unit actuated by a movement of the door to produce said air currents, said unit including means permitting the free operation of the unit by momentum when said door movement ceases.

2. A device operable by the opening and closing movements of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, and a unit actuated by either of said movements from the inception thereof to the end to produce said air currents, said unit including means permitting the continued operation of the unit by momentum after either movement attains said end.

3. A device operable by the opening and closing movements of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, and a unit positively actuated by either of said movements from the inception thereof to the end to produce said air currents, said unit including means permitting the continued operation of the unit by momentum after either movement attains said end.

4. A device operable by the action of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, and a unit rotated by a movement of the door to produce said air currents, said unit including means permitting the continued free rotation of the unit by momentum when said door movement ceases.

5. A device operable by the action of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, and a unit actuated by either movement of the door to produce said air currents, said unit including means permitting the free operation of the unit by momentum when said door movement ceases, and said means comprising an overrunning clutch effective on either of said door movements.

6. The structure of claim 1, said means comprising a screw extending from the door, a driven element productive of said air currents, and a driving element threaded on the screw and carried into engagement with the driven element to operate the same on the longitudinal travel of the screw by virtue of said door movement.

7. The structure of claim 1, said means comprising a screw extending from the door, a driven element productive of said air currents and presenting ratchet teeth, and an impeller threaded on the screw and presenting ratchet teeth in juxtaposition to those of the driven element, said impeller being carried into operative engagement with the driven element to rotate with the same on the longitudinal travel of the screw by virtue of said door movement, and said continued rotation being effected by the overrunning of the teeth of the driven element in respect to those of the impeller.

8. A device operable by the action of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, a rotary fan carried by the support opposite said substance and designed to create such currents by pressure or suction according to the direction in which the fan rotates, and a mechanism from the door to the fan to operate the same in one or the other direction according to the movements of the door, said mechanism including an overrunning clutch and weighted means peripherally thereof causing said fan to continue its rotation by momentum when the movements of the door cease.

9. A device operable by the action of a swinging door or the like comprising a support, a substance carried by the latter from which a volatile agent may be drawn by the contacting passage of air currents, a rotary fan carried by the support opposite said substance and designed to create such currents by pressure or suction according to the direction in which the fan rotates, and a mechanism from the door to the fan to operate the same in one or the other direction according to the movements of the door, said mechanism comprising a screw extending from the door in axial alignment with said rotary fan, an extension of the latter along the screw, a ring-like member carried by the extension around the screw and presenting oppositely-directed ratchet teeth series from its end faces, and a pair of impellers threaded on the screw and presenting ratchet teeth in meshing juxtaposition to the teeth of the respective series, said impellers be-

ing carried into operative engagement with said member and consequent rotation with the same on the longitudinal travel of the screw in one or the other direction according to the movements of the door.

10. A device operable by the action of a swinging door or the like comprising a support, a substance on the latter from which a volatile agent may be drawn by the contacting passage of air currents, a rotary driven element to produce the latter, an actuating twist-screw operated longitudinally by the movements of the door, and a driving element mounted as a nut on said screw for operative engagement with said driven element on the movement of the screw, said driving element being suitable to operate from screws having twists of different lengths.

11. A device operable by the action of a swinging door or the like comprising a support, a substance on the latter from which a volatile agent may be drawn by the contacting passage of air currents, a rotary driven element to produce the latter, an actuating twist-screw operated longitudinally by the movements of the door, and a driving element mounted as a nut on said screw for operative engagement with said driven element on the movement of the screw, said driving element being suitable to operate at speeds in inverse proportion to the length of the screw twists.

12. A device operable by the action of a swinging door or the like comprising a support, a substance on the latter from which a volatile agent

may be drawn by the contacting passage of air currents, a rotary driven element to produce the latter, an actuating twist-screw made from flat rod material and operated longitudinally by the movements of the door, and a driving element formed with a center slot having the cross-section of said material to serve as a nut for said screw and engage said driven element on the movement of the screw.

13. The structure of claim 4, said device including a screw extending from the door in axial alinement with the unit and movable longitudinally according to the movements of the door, the unit including an element receiving the screw as a nut to be driven thereby, and a tubular continuation of the unit serving as a guide for the screw.

14. A vapor diffusing device comprising a cylindrical housing a rotary fan centered therein, means communicating with one end of the housing to operate the fan in either direction, a chamber extended from the opposite end of the housing, and a substance in the chamber from which a volatile agent may be drawn by the contacting passage of air pressure or suction air currents from the fan according to the direction of its rotation, the outer end of the chamber having outlets for the discharge of vapor induced by the pressure currents and the rim of the housing having outlets for the centrifugal dispersion of vapor drawn by the suction currents.

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