March 13, 1956 G. W. MEEK 2,738,225

DIFFUSER DEVICE AND ADJUSTABLE CONTROL MEANS THEREFOR

Filed July 10, 1952

Fig. 1.

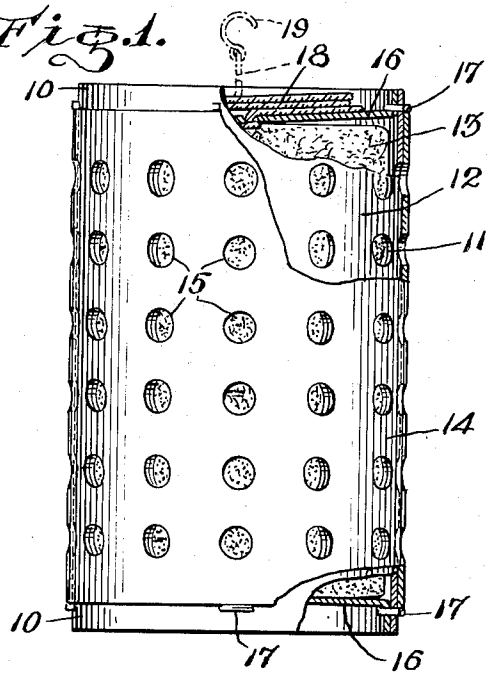


Fig. 2.

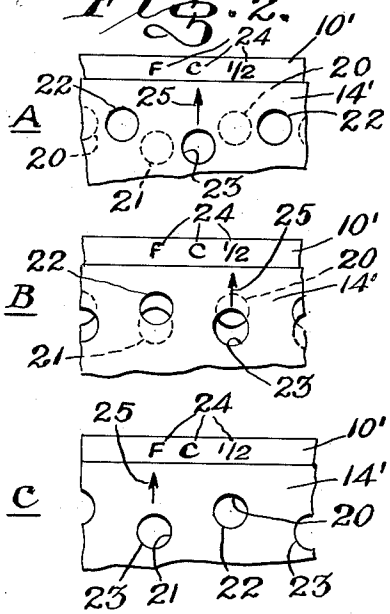


Fig. 3.

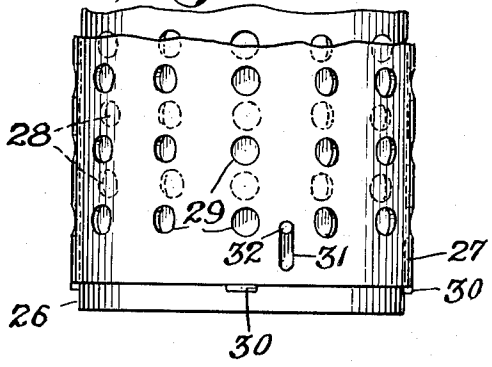


Fig. 4.

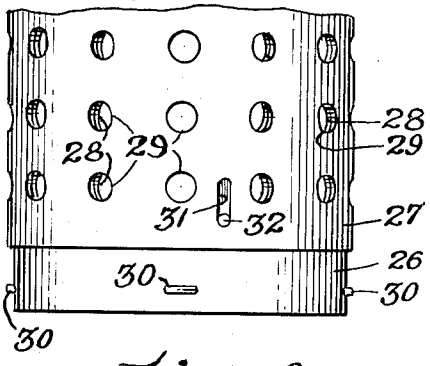


Fig. 5.

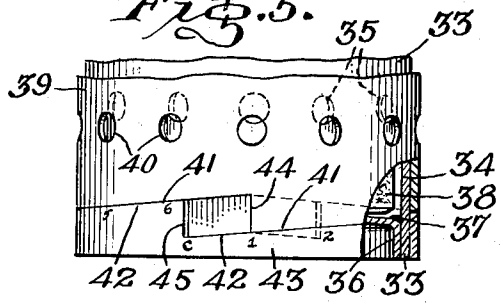
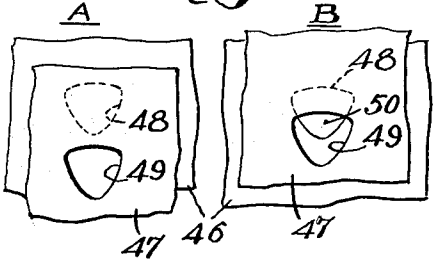


Fig. 6.



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DIFFUSER DEVICE AND ADJUSTABLE CONTROL MEANS THEREFOR

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4 Claims. (Cl. 299—24)

This invention relates to diffuser devices of the type adapted for introducing volatilizable material into air. More particularly, the invention relates to diffuser devices of the character described having means movably supported thereon for adjusting and controlling the rate of discharge of volatilizable material therefrom.

In the counteraction of odors and in other treatments of air involving the addition of volatilizable materials to the air, it has been found that there is distinct advantage in using volatilizable material which is in an essentially solidified or solid form. Thus for example, volatilizable components in a liquid medium can be solidified by means of a gelling agent or can be absorbed on a porous solid carrier such as pumis or the like. In the past, however, it has been difficult with solid or solidified air treating materials of the type described, to achieve the degree of control that has heretofore been achieved with air treating compositions dispensed by means of wick devices or by spraying.

An object of my invention is to provide a diffuser device for essentially solidified or solid air treating agents comprising a container part having a plurality of discharge apertures and adjustable means enveloping said container part for selectively sealing and incrementally exposing the apertures in said container part. A further object of the invention is to provide as the adjustable means for said diffuser device a sleeve member movable with respect to the container part and having apertures therein adapted to register with the apertures in said container part.

These and other objects of my invention will be readily understood from a consideration of the following specification and accompanying drawing showing certain adaptations of my invention wherein the various parts of the device are identified by suitable reference characters in each of the views wherein:

Fig. 1 is a side elevation of one form of my device with part of the structure broken away and in section;

Fig. 2 is a series of fragmentary views of the upper portion of a device similar to that shown in Fig. 1 showing a modified arrangement of apertures and indicating the various operative positions thereof;

Fig. 3 is a view of the lower end portion of a device similar to that shown in Fig. 1 but indicating a modified form of construction and showing the device in the closed or inoperative position;

Fig. 4 is a view similar to Fig. 3 showing the device in the open or operative position;

Fig. 5 is a view similar to Fig. 3 showing a further modification and with part of the structure broken away and in section.

Fig. 6 is a fractionary view of a portion of the device as shown in any of the Figs. 1 to 5 indicating a modified form of discharge aperture in the closed or inoperative position (A), and the partially open or operative position (B).

The diffuser device as shown in Fig. 1 of the drawing comprises a container part **10** having apertures **11** in the

side walls **12** thereof through which air is adapted to pass in contacting essentially solidified or solid air treating material **13** arranged within the container. For purpose of illustration the air treating material **13** has been indicated as an essentially cylindrical body of air treating gel, but it will be understood that granular pumis or other absorbent carrying volatilizable components can be employed as the air treating material.

Arranged circumferentially of the container **10** is a sleeve **14** having apertures **15** adapted to register with the apertures **11** in said container in the manner shown in Fig. 1 of the drawing. It will be noted, however, that the apertures **15** and the corresponding apertures **11** are spaced apart a distance slightly greater than the diameter thereof so that rotation of the sleeve **14** on the container **10** an amount sufficient to bring apertures **15** in alinement with the spaces between the apertures **11** will effect a substantial closure of all of the apertures. In this closed position which I shall refer to as the inoperative position, the free circulation of air through the container is substantially eliminated and the escape of volatilizable material from within the container is seriously retarded, depending of course upon the closeness of the slidable engagement between the sleeve **14** and the container wall **12**.

It is not intended that the seal or closure afforded by the adjustable sleeve **14** be such as to prevent the escape of volatilizable material during long periods of storage and the diffuser device as shown in the drawing is intended to be initially packed, shipped and stored in a suitable outer container of air-tight construction. This outer container can assume any of the forms available such for example as, a glass or plastic receptacle having a screw cap or other air-tight closure. On the other hand the diffuser device can also be packaged by inserting in a pliable plastic bag of the type which can be rendered vapor-tight by cementing or heat sealing. The latter type of packaging is particularly advantageous when the diffuser device is produced as a single use or dispensable device.

The container **10** can be fashioned from many types and kinds of material such as plastic, treated cardboards or papers and the like, and can be fashioned by various procedures depending upon the material embodied. For purpose of illustration I have indicated the container **10** as comprising a cylindrical part forming the side walls **12** which is closed at the upper and lower ends thereof with cup-shaped caps **16** which may be cemented, stapled or otherwise secured in place. As shown in the drawing the caps **16** are retained in position by the staples **17** which serve the further purpose of positioning the sleeve **14** on the container and preventing sliding movement of the sleeve longitudinally of the container.

The cap **16** at the upper end of the device is provided with a suspending member **18** which for the purpose of illustration has been indicated as a cord having a hook **19** at the end thereof to facilitate hanging the device from suitable supports. It will be understood, however, that any suitable means may be provided for suspending the device in either the vertical position indicated in the drawing or, if desired in a horizontal position. The device can, of course, also be used by simply resting the lower end thereof on a suitable horizontal supporting surface.

It is to be understood that the details of the end closures of the device as shown in Fig. 1 does not limit or restrict my invention but are merely given for purpose of illustration. If the container part were to be molded from plastic material, at least one end would be molded integrally with the adjacent side walls; and it is within the scope of my invention to fashion the container part by molding two plastic cups each having apertured side walls and a closed end and then joining the two open ends after

arranging volatilizable material therein to provide the assembled container part. In such an instance it might be advisable to provide a slight taper in the side walls of the separate parts of the container to facilitate forming operations and similarly to provide two tapered sleeves engaging the respective parts but otherwise corresponding to the sleeve 14 as shown in Fig. 1.

With the apertures arranged as shown in Fig. 1 of the drawing, partial opening or full opening can easily be obtained by the degree to which the sleeve 14 is rotated to orient the apertures 15 with respect to the apertures 11. In the modified showing in Fig. 2 of the drawing I have indicated a portion of a container 10' and a sleeve 14' generally similar to the container and sleeve as shown in Fig. 1 but having the apertures therein arranged in a staggered fashion. The container part has alternate vertical lines of apertures 20 arranged slightly above the intermediate lines of apertures 21, the degree of offset being such as to provide a substantially one-half overlap if the two types of apertures are superimposed. In the sleeve 14' the alternate rows of apertures 22 and intermediate rows of apertures 23 are staggered or offset in a similar manner so that in a closed position as indicated in Fig. 2A the apertures of the container 10' fall between the apertures of the sleeve 14'. By rotating the sleeve to the right as indicated in Fig. 2B the apertures 22 and 23 of the sleeve are brought into registering alinement with the apertures 21 and 20 respectively of the container, thus providing a pre-determined size opening through the container wall. This adjustment is facilitated by indicia 24 in the container and an arrow 25 on the sleeve. For purpose of illustration this has been indicated as a one-half open position.

By rotating the sleeve 14' to the left as shown in Fig. 2C, the apertures 22 and 23 are brought into registering engagement with the apertures 20 and 21 respectively in the container 10', thus providing the maximum size opening through the wall of the container. With the modification as shown in Fig. 2, it is of course possible to get any desired degree of opening by varying the extent to which the sleeve 14' is rotated from the closed position shown in Fig. 2A to the position shown in Fig. 2C. The adjustment to the position shown in Fig. 2B however, provides a means for quickly and easily setting the device to function at a predetermined fraction i. e., one-half, of its full capacity.

In Figs. 3 and 4 of the drawing I have indicated a container 26 and sleeve 27 generally similar to the container 10 and the sleeve 14 I have shown in Fig. 1 of the drawing. In this modification, however, the sleeve 27 is adapted for slidable movement longitudinally of the container from a position as shown in Fig. 3 where the apertures 28 in the container, and the apertures 29 in the sleeve are respectively covered by intermediate wall positions of the other part, to a position as shown in Fig. 4 where the apertures in the container and sleeve are in superimposed or alined arrangement. The position as shown in Fig. 4 represents the fully open position in which the maximum circulation of air through the device is possible. By varying the degree of vertical movement of the sleeve 23, the amount of overlap of the apertures 28 and 29 and the corresponding size of the openings into the container can be varied at will.

Suitable stop members 30 are provided for preventing displacement of the sleeve 27 and for alining the same in the closed position. These stop members may be staples similar to the staples 17 shown in Fig. 1 or any suitable protruding members. Similar stop members would also be provided at the upper end of the container 26 to limit upward movement of the sleeve 27 into the operative position.

With the device as shown in Figs. 3 and 4, it will be noted that a cylindrical container is not essential and any desired elliptical or even essentially rectangular contour in the cross section of the container and sleeve could

be provided. When an essentially cylindrical container and sleeve are employed, however, it is desirable to provide means as indicated by the elongated slot 31 in the sleeve and pin 32 protruding from the container 26 and engaging the slot 31 for alining the sleeve 27 circumferentially with respect to the container 26 and preventing relative rotation therebetween.

In Fig. 5 of the drawing I have shown a modification wherein regulation of the degree of opening provided through the walls of the device is effected by a combination of horizontal and vertical sliding movement. In this modified construction, I have indicated a container 33 generally similar to the container 10 as shown in Fig. 1. The container 33 is provided with a cylindrical wall 34 having apertures 35 therein and the ends of the cylindrical wall 34 are closed by means of cup shaped caps 35, which for purpose of illustration have been indicated as cemented to the side wall 34 as seen at 37. Arranged within the container 33 is a body of volatilizable material 38 which may be a body of air treating gel or other solid or solidified material carrying volatilizable components.

Slidably and rotatably mounted on the container 33 is a sleeve 39 having apertures 40 therein adapted to register with the apertures 35 in the wall 34. The lower end of the sleeve 39 is provided with a plurality of spirally arranged bearing segments 41 which engage corresponding bearing segments 42 of an end or stop ring 43 secured to the container 33. The cooperating bearing surfaces 41 and 42 impart a predetermined vertical sliding movement to the sleeve 39 as it is rotated on the container 33. For purpose of illustration I have indicated in the drawing a construction wherein two of the bearing segments, 41 and two bearing segments 42 are employed circumferentially of the device. In the lowermost position of the sleeve 39 the end 44 of the bearing segment 41 is in engagement with the end 45 of the bearing segment 42, and the apertures 40 in the sleeve are lowered to a sufficient extent to be out of alinement with the apertures 35, thereby effecting a substantial seal or closure of the container 33. When the sleeve is rotated from this closed position to any of the positions in which the apertures 40 are vertically alined with apertures 35 i. e., the operative positions 1 to 6, as indicated in the drawing the effective overlap of the apertures 40 and 35 is progressively increased until in position 6 the apertures 40 and 35 will exactly coincide to provide the maximum size opening for circulation of air through the container. It will also be apparent that a quick closing of the apertures can be effected in any of the positions of adjustment by merely rotating the sleeve to aline the apertures 40 thereof in positions between the rows of apertures 35 in the container. Thus the construction as shown in Fig. 5 provides great flexibility in use while at the same time facilitating accurate fractional adjustment of the size of the openings for circulation of air through the container.

In Figs. 1 to 5 of the drawing I have indicated in each instance containers and sleeves having cooperating circular holes or apertures therein. It will be noted, however, that in some modifications the ability to adjust the apertures to predetermined partially open positions can be facilitated by providing apertures having predetermined contours other than circular. By way of illustration I have shown in Fig. 6 small fragments of a container 46 and sleeve 47 containing apertures 48 and 49 respectively which are of an essentially triangular shape but have rounded corners. The apertures are shown in the closed or inoperative position at A, while at B they are shown in a partially open or operative position, and it will be noted that the essentially triangular hole 50 provided by the overlap of the apertures 48 and 49 is of a contour which permits greater accuracy and control particularly when it is desired that the hole 50 be substantially smaller than the full apertures 48 and 49.

In any of the modifications of the device the movable

sleeve members can be fashioned from various materials such as plastics, treated paper or cardboard, or the like. When a plastic sleeve is employed, it may be of a transparent or semi-transparent nature to permit adjustment of the size of the openings by direct viewing of the relative positions of apertures in the sleeve and container. On the other hand, when opaque plastic materials or other opaque materials such as treated paper or cardboard are employed, it is preferable to provide supplemental indicating means of the type shown in Figs. 2 and 5 to facilitate quick and accurate adjustment of the movable sleeve.

Various changes or modifications in the vapor diffuser device herein disclosed will occur to those skilled in the art, and to the extent that such changes and modifications are embraced by the appended claims, it is understood that they constitute part of my invention.

I claim:

1. A diffuser device comprising a cylindrical container part forming a storage chamber for volatilizable material, said container having longitudinally of the side walls thereof and uniformly spaced throughout the circumference thereof a plurality of rows of apertures for passage of air and volatilizable material therethrough, a sleeve member closely and slidably engaging outer surfaces of said side walls, said sleeve member having longitudinal rows of apertures corresponding in number and circumferential spacing with the rows of apertures in said container, cooperating guide means circumferentially of said container and sleeve, and the spacing between said guide means and apertures differing from row to row circumferentially of the device to such an extent as to provide different overlapping registration

of apertures in said sleeve and container on circumferential alignment of different rows of apertures.

2. A diffuser device as defined in claim 1 wherein the cooperating guide means restrict said container and sleeve to relative rotary movement, the apertures in said container and sleeve being arranged in correspondingly staggered rows, and the apertures in adjacent rows being so spaced from said guide means that movement of the sleeve in one direction will provide a predetermined fractional overlap of said apertures and movement of the sleeve in the other direction will provide a full overlap of said apertures.

3. A diffuser device as defined in claim 1 wherein the cooperating guide means are spirally arranged on the device whereby relative rotation of the container and sleeve also imparts relative longitudinal movement therebetween.

4. A diffuser device as defined in claim 3 wherein the apertures in said container and sleeve are arranged in corresponding longitudinal rows and circumferential rings, and the longitudinal movement provided in the full relative rotary movement of said container and sleeve is slightly greater than the size of said apertures, thereby providing for incremental adjustment of said apertures from a fully closed to fully open position as different rows of apertures are aligned in the rotation of said sleeve.

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