March 1, 1949. H. J. COHN 2,463,246

CLOSURE OPERATED DEODORIZER

Filed July 17, 1946

2 Sheets-Sheet 1

Fig-1

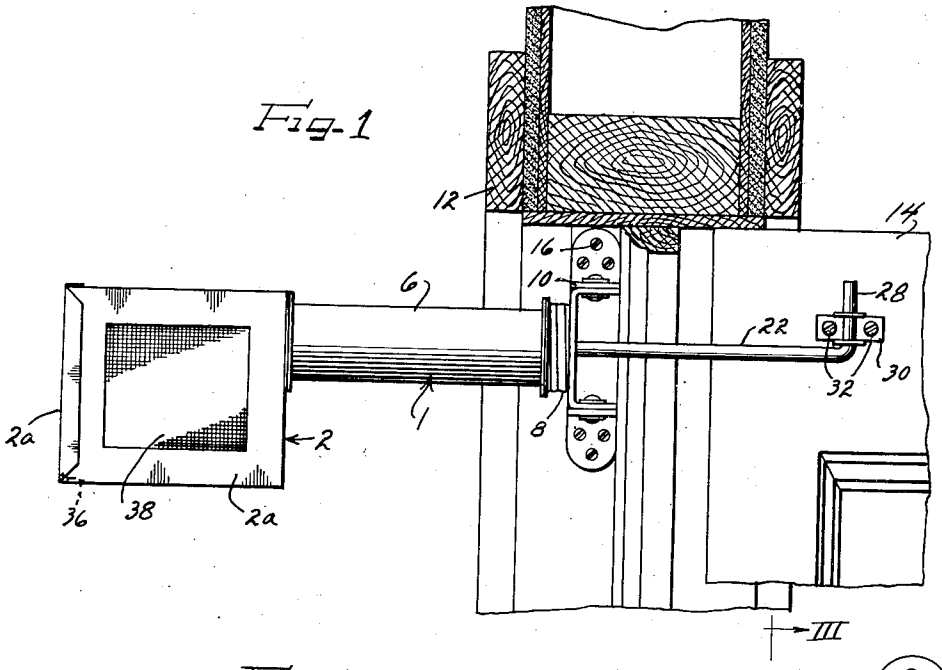


Fig-2

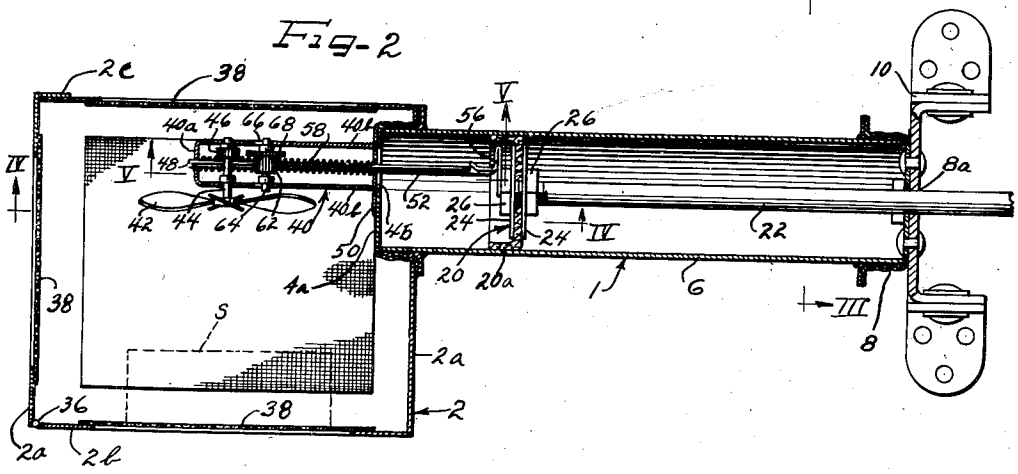
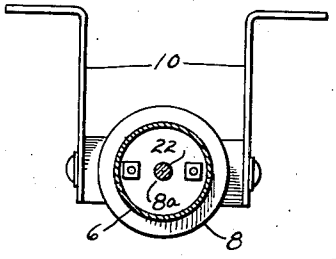


Fig-3



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2 Sheets-Sheet 2

Fig. 4

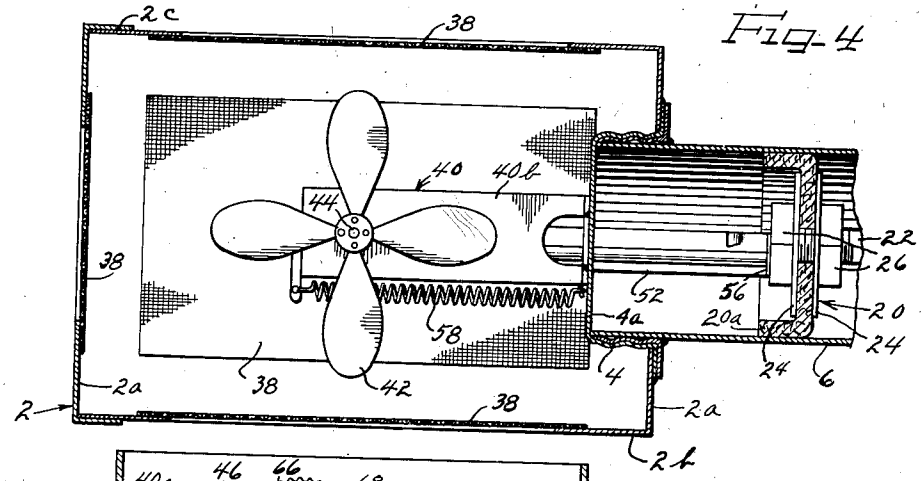


Fig. 5

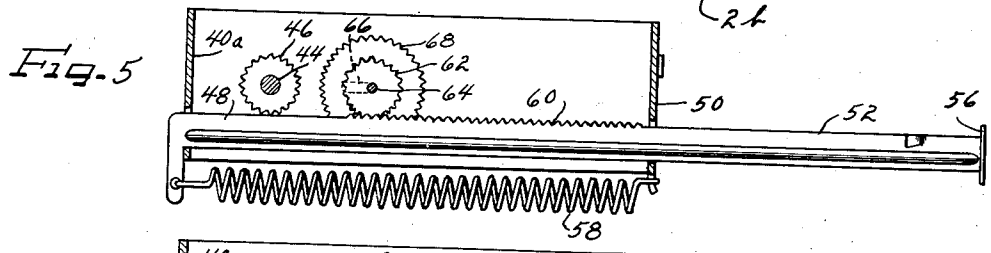


Fig. 6

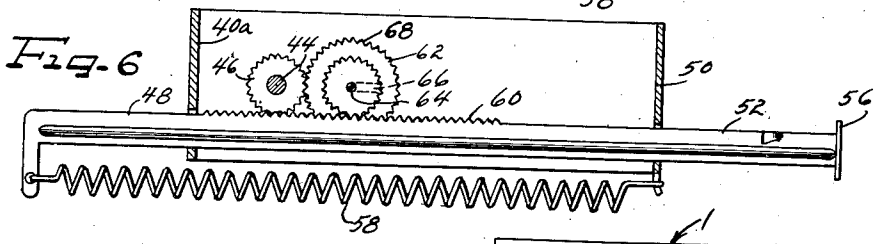
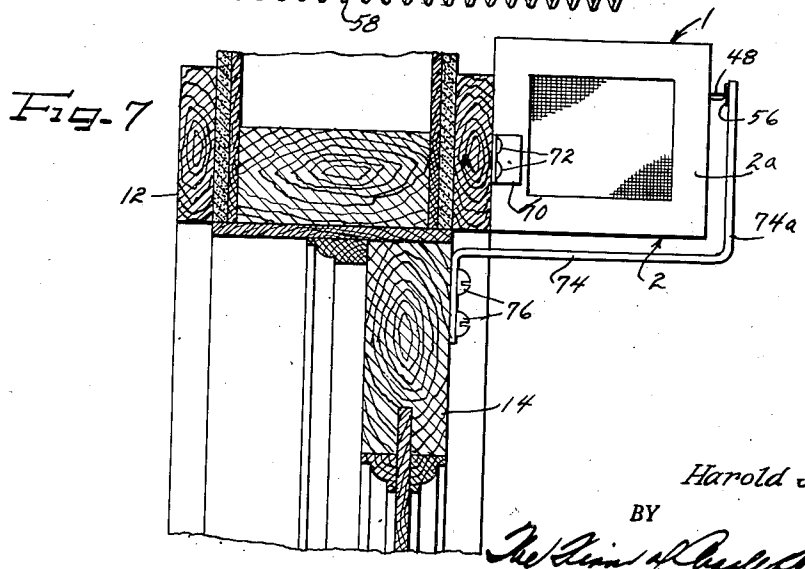


Fig. 7



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CLOSURE OPERATED DEODORIZER

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9 Claims. (Cl. 21—77)

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This invention relates to a deodorizing or disinfecting device, and particularly to a device of this class operable by the opening or closing movements of a door.

A feature of this invention is the provision of a housing having an apertured wall providing an air discharge opening and the positioning of a source of volatile deodorant or disinfectant within said housing in overlying relationship to the discharge opening and underlying relationship with respect to a fan. Since all of the common volatile deodorants or disinfectants constitute fluids which are heavier than air, the device embodying this invention effectively utilizes this property of the volatile element to obtain maximum vaporization of such volatile element and movement of the resulting vapors into the room area to be treated.

A further feature of this invention is the provision of a piston and cylinder arrangement wherein the piston is operatively connected to a moving door and the cylinder has its bore communicating with a housing containing a source of volatile deodorant or disinfectant. With such an arrangement, the reciprocating movement of the piston accompanying the opening and closing movement of the door produces a reversing direction air current past the source of volatile deodorant or disinfectant and hence permits a substantial quantity of air to be supplied with deodorant or disinfectant vapors for each operation of the door. Furthermore, in accordance with one embodiment of this invention, the piston and cylinder arrangement is utilized in combination with a fan positioned within the deodorant containing housing, and a fan actuating mechanism is provided which initiates rotation of the fan as the piston moves toward the housing. Such an arrangement insures that the housing is filled with vapor carrying air prior to the initiation of rotation of the fan and the subsequent rotation of the fan which, due to a detachable driving connection, continues after cessation of movement of the piston, insures that all of the vapor carrying air is discharged into the room area to be treated.

Accordingly, it is an object of this invention to provide an improved deodorant or disinfecting device of the class that is automatically operable to discharge vapor carrying air into the area to be treated upon movement of a door or similar object.

Another object of this invention is to provide an improved deodorant device wherein a source of heavier-than-air, volatile deodorant is positioned intermediate a vertically aligned fan and an air discharge opening, such that the discharge of the vapor carrying air in the room area to be treated advantageously utilizes the heavier-than-air properties of the deodorant or disinfecting vapors.

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A further object of this invention is to provide an improved deodorant or disinfecting device wherein a cylinder and piston arrangement is provided in cooperation with a housing containing a source of volatile deodorant or disinfectant material in such a manner that reciprocating movement of the piston produced by a door or similarly movable member provides a reversing air current past the source of deodorant in the housing.

A particular object of this invention is to provide an improved automatic, door operated, deodorizer wherein a reversing current of air is produced past a source of volatile deodorant by the opening and closing movement of the door and, in addition, a fan is actuated by the movement of the piston to discharge all of the vapor carrying air from the housing containing the source.

The specific nature of the invention as well as other objects and advantages thereof will become apparent to those skilled in the art from the following detailed description in the annexed sheet of drawings which, by way of preferred example only, illustrate two specific embodiments of the invention.

On the drawings:

Figure 1 is an elevational view, partly in section, showing a deodorizing device embodying this invention in assembled position on a door.

Figure 2 is a longitudinal, vertical sectional view of Figure 1.

Figure 3 is a sectional view taken along the plane III—III of Figure 2.

Figure 4 is an enlarged scale sectional view taken along the plane IV—IV of Figure 2.

Figure 5 is an enlarged scale sectional view taken along the plane V—V of Figure 2. In this view, the fan actuating components are shown in their relative positions occupied when no force is applied to the actuating plunger.

Figure 6 is a view similar to Figure 5 showing the relative positions of the fan actuating components when an actuating force is applied to the actuating plunger.

Figure 7 is an elevational view, partly in section illustrating a further modification of this invention wherein the deodorizing device is utilized without the piston and cylinder attachment.

As shown on the drawings:

A deodorizing or disinfecting device embodying this invention is indicated generally by the numeral 1. Such device comprises a box-like housing 2 which may be conveniently formed by welding or otherwise securing together of side walls 2a, bottom wall 2b and top wall 2c. In a suitable aperture in one of the side walls an internally threaded socket member 4 is suitably mounted as by welding or brazing and such socket member receives the externally threaded end of a cylinder casing 6. Socket 4 has a base portion 4a which defines an opening 4b.

A cap 8 is threadably secured to the other end of the cylinder casing 6 and a pair of brackets 10 are suitably pivotally secured to cap 8 in spaced relation by pins 10a. The deodorizing device 1 may be conveniently attached to the frame 12 of a door or similar swinging member 14 by means of screws 16 which pass through suitable apertures in the bent over end portions of brackets 10.

A piston 20 is provided which cooperates with the bore of cylinder casing 6. While piston 20 may comprise any one of several well known forms, such piston may be conveniently formed by a cup-shaped piece 20a of leather, rubber or similar material, which is secured on an end of a piston rod 22 between a pair of disks 24. The piston end of piston rod 22 is threaded and the disks 24 are held in assembly with cup-shaped member 20a by nuts 26. The end of piston rod 22 remote from housing 2 projects outward out of cylinder casing 6 through a suitable aperture 8a provided in end cap 8. The aperture 8a is sufficiently large to permit ready air flow therethrough in response to movement of piston 20. The other end portion of piston rod 22 extends out of cylinder 6 thru a suitable aperture in cap 8 and is bent at right angles as indicated at 28 and the bent portion 28 is pivotally engaged in suitable apertures provided in a bracket member 30 which is secured to the movable door 14 by screws 32. It is therefore apparent that as the door 14 moves in its normal swinging movement relative to the frame 12, that the piston 20 will be reciprocated within the cylinder casing 6.

One side wall 2a of the housing 2 is pivotally mounted on the housing as by hinges 36 and the pivoted side wall may be opened to provide convenient access to the interior of housing 2 and thus permit the convenient insertion in such housing of a source S of suitable deodorizing or disinfectant material. Such material may comprise any one of several forms and may be conveniently utilized in cake form and be mounted on the bottom wall 2b of the casing 2. The bottom wall 2b of casing 2, and preferably the side walls 2a and top wall 2c as well, are provided with a plurality of perforations 38 to provide air inlet and discharge openings.

An elongated, U-shaped support member 40 is provided having the free ends of the arms 40b thereof secured to the base portion of the socket 4 and projects inwardly into the housing 2, disposed in overlying relationship to the position occupied by the source of deodorant (not shown). Near the inner end of the support member 40, a fan 42 is journalled on a vertical shaft 44 which is in turn supported in suitable aligned apertures in the arms of support member 40. A pinion 46 is secured to shaft 44.

The actuating mechanism for unidirectionally rotating the fan 42 comprises a slide 48 which is a flat strip of metal which is journalled for sliding movement in suitable apertures provided respectively in a plate 50 secured to the bottom of socket 4 and the base 40a of the U-shaped support member 40. One end 52 of slide 48 projects through the aperture 4b provided in the base of socket member 4 and thus extends into the interior of cylinder casing 6. The end portion 52 of slide 48 is bent to provide an engaging surface 56 which is substantially perpendicular to the axis of cylinder casing 6. The engaging surface 56 of slide 48 is normally disposed a sufficient distance within the cylinder casing 6 so as to be engaged by piston 20 as the piston nears the end of its stroke in the direction approaching the housing 2. A tension spring 58 is provided which operates between the interior end of slide 48 and plate 50 and thus urges the slide 48 to its extreme right hand position as illustrated in Figures 2 and 5 of the drawing. Hence, as the piston 20 reciprocates due to swinging movement of the door, the slide 48 will likewise have a reciprocating movement imparted thereto.

One edge of slide 48 is provided with rack-like gear teeth 60 and the teeth 60 cooperate with a pinion 62 which is mounted upon the vertical shaft 64 journalled in the arms 40b of support member 40. Shaft 64 is journalled in longitudinal slots 66 provided in support member 40 and hence the shaft 64 is longitudinally movable to the extent permitted by the slots 64. A driving gear 68 is also mounted on shaft 66 and is secured to pinion 62 for co-rotation. Driving gear 68 is located so as to mesh with the fan pinion 46 when the shaft 64 is moved to its extreme left hand position in the slot 66, as shown in Figure 6.

From the foregoing description, it will be apparent that when the slide 48 is moved to the left as viewed in Figure 2, the shaft 64 will be likewise moved to the extreme left hand position permitted by the slot 66 and the driving gear 68 will be in engagement with fan pinion 46 and hence produce rotation of fan 42. However as soon as the axial movement of the slide 48 to the left, as viewed in Figure 2, ceases, or the slide 48 actually reverses its movement and moves to the right, the driving conection between the fan pinion 42 and the driving gear 68 is interrupted and the fan continues to rotate in the same direction due to its own inertia. Therefore, each time that the slide 48 receives an actuating force to the left, as viewed in Figure 2, from piston 20, the fan 42 will be rotated in one direction. Such rotation of the fan is utilized to produce a downwardly directed air stream which passes over the source of deodorant or disinfecting material (not shown) and is then discharged into the room area to be treated through the perforations 38.

It is to be particularly noted that the downward direction of discharge of deodorizing or disinfecting vapors utilizes a physical property of such vapors to improve the efficiency of the discharge of the vapors to the room area to be treated. All of the commonly known deodorants and disinfectants produce vapors which are heavier than air and the afore-described arrangement embodying this invention takes advantage of such property to promote the discharge of vapor bearing air from the housing 2.

In the operation of a deodorizer embodying this invention, the piston 20 is of course reciprocated each time that the door 14 is opened and closed. Such reciprocating movement of piston 20 produces a reversing air current past the source of deodorant material (not shown); i. e., as the piston proceeds to the right as viewed in

Figure 2, a suction current of air is produced which draws air into the housing 2 and hence into intimate contact with the source of the deodorant material. As the movement of the piston 20 is reversed, the air contained within cylinder casing 6 is discharged into the housing 2 through the aperture in socket 4 and such air is also forced past the source of deodorant material. As a result, as the piston 20 nears the end of its thrust, the housing 2 is substantially filled with relatively concentrated, vapor containing air which is then discharged from the housing 2 by the actuation of the fan 42 at the end of the thrust of piston 20.

Referring now to Figure 7, there is disclosed a modification of this invention wherein the housing 2 is utilized alone, without the cylinder casing 6 and piston 20 being connected thereto. In such modification, a housing 2 is secured to the door frame by bracket 70 and screws 72. A Z-shaped arm member 74 is secured to the movable door by suitable screws 76 and has one arm portion 74a thereof disposed so as to abuttingly engage the projecting end of slide 48. The dimensions of arm member 74 are, of course, selected so as to insure that such arm member will always contact the end portion 56 of the slide 48 as the door 14 is returned to its closed position. Accordingly, when the door 14 is opened and then closed, the arm 74 will impart an actuating impulse to the slide 48 to produce rotation of the fan 42 and hence discharge a current of air past the source of deodorant or disinfectant and outwardly through the apertures 38 in the housing 2. It is to be understood that the arrangement of the fan and discharge opening with respect to the source of deodorant vapors is the same in the modification in Figure 7 as that previously described, namely, the fan is positioned in overlying relationship with respect to the source of deodorant vapors so that the heavier than air properties of such vapors may be utilized to secure more efficient discharge of the deodorizing vapors from the housing 2.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A deodorizing device comprising a housing, said housing being constructed to provide a zone for receiving a source of heavier than air volatile deodorant, said housing having at least the bottom wall thereof apertured to provide an air discharge opening, a fan, means rotatably supporting said fan in said housing in overlying relationship to said zone, said fan being constructed and arranged to produce an air current downwardly through said zone and through said opening, and means for unidirectionally actuating said fan.

2. A deodorizing device comprising a housing, said housing being constructed to support a source of volatile deodorant therein, said housing having an air discharge opening in the wall thereof, a fan rotatably mounted in said housing and arranged to produce an air current past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced within said housing past said source, and means responsive to movement of said piston for unidirectionally rotating said fan to produce an air current past said source through said discharge opening.

3. A deodorizing device comprising a housing, said housing having an air discharge opening in the bottom wall thereof, said bottom wall being constructed and arranged to support a source of heavier than air volatile deodorant therein, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, and means for reciprocating said piston, whereby a reversing direction air current is produced within said housing, and means in said housing cooperative with said piston to produce a downward flow of air past said source to discharge through said opening during one direction of movement of said piston.

4. A deodorizing device comprising a housing, said housing being constructed and arranged to support a source of volatile deodorant therein, said housing having an air discharge opening in the wall thereof, a fan rotatably mounted in said housing and arranged to produce an air current past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced past said source, and means including a reciprocable plunger for unidirectionally rotating said fan, said plunger being engageable by said piston only as said piston moves toward said housing, whereby the air stream produced by said piston is substantially discharged into said housing prior to initiation of rotation of said fan.

5. A deodorizing device comprising a housing constructed to contain a source of deodorant therein, said housing having an air discharge opening in the wall thereof, a fan rotatably mounted in said housing and arranged to produce an air current past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced within said housing past said source, and means responsive to movement of said piston for unidirectionally rotating said fan, said last mentioned means including a detachable driving connection with said fan, whereby said fan continues to rotate by inertia irrespective of cessation of movement of said piston.

6. A deodorizing device comprising a housing constructed to contain a source of deodorant, said housing having an air discharge opening in the wall thereof, a fan rotatably mounted in said housing and arranged to produce an air current past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced past said source, and means including a reciprocable plunger for rotating said fan, said plunger being engageable by said piston only as said piston moves toward said housing, where-

by the air stream produced by said piston is substantially discharged into said housing prior to initiation of rotation of said fan, said fan rotating means including a detachable driving connection with said fan, whereby said fan continues to rotate by inertia irrespective of cessation of movement of said piston.

7. A deodorizing device comprising a housing, said housing having at least the bottom wall thereof apertured to provide an air discharge opening and constructed to support a source of heavier than air, volatile deodorant in overlying relation to said opening, a fan, means rotatably supporting said fan in said housing in overlying relationship to said source, whereby said fan produces an air current downwardly past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing at a point relatively above said source, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced within said housing past said source, and means responsive to movement of said piston for unidirectionally rotating said fan.

8. A deodorizing device comprising a housing, said housing having at least the bottom wall thereof apertured to provide an air discharge opening and constructed to support a source of heavier than air, volatile deodorant in overlying relationship to said opening, a fan, means rotatably supporting said fan within said housing in overlying relationship to said source, whereby said fan produces an air current downwardly past said source and through said opening, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing at a point relatively above said source, a piston reciprocable in said cylinder, means for reciprocating said piston, whereby a reversing direction air current is produced within said housing past said source, and means including a reciprocable plunger for unidirectionally rotating said fan, said plunger being engageable by said piston only as said piston moves toward said housing, whereby the air stream produced by said piston is substantially discharged into said housing prior to initiation of rotation of said fan, said fan rotating means including a detachable driving connection with said fan, whereby said fan continues to rotate by inertia irrespective of cessation of movement of said piston.

9. A deodorizing device comprising a box like housing adapted for fixed mounting adjacent a door, said housing having the walls thereof apertured to provide substantially unimpeded passage of air into and out of said housing, the bottom wall of said housing being constructed to support a source of heavier than air, volatile deodorant in overlying relationship to the bottom wall aperture, a fan, means rotatably supporting said fan within said housing in overlying relationship to said source, whereby said fan produces an air current downwardly past said source and through said apertured walls of said housing, a hollow cylinder mounted on said housing and having the bore thereof communicating with the interior of said housing, a piston reciprocable in said cylinder, said piston having a rod portion adapted for connection to the door, whereby swinging movement of the door produces reciprocation of said piston to in turn produce a reversing direction air current past said source, and means including a reciprocating plunger for unidirectionally rotating said fan, said plunger being engageable by said piston only as said piston moves toward said housing, whereby the air stream produced by said piston is substantially discharged into said housing prior to initiation of rotation of said fan, said fan rotating means including a detachable driving connection with said fan, whereby said fan continues to rotate by inertia irrespective of cessation of movement of said door.

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The following references are of record in the file of this patent:

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