Sept. 13, 1960 J. PASCALE ET AL 2,952,606

OZONIZER FOR TREATING AIR

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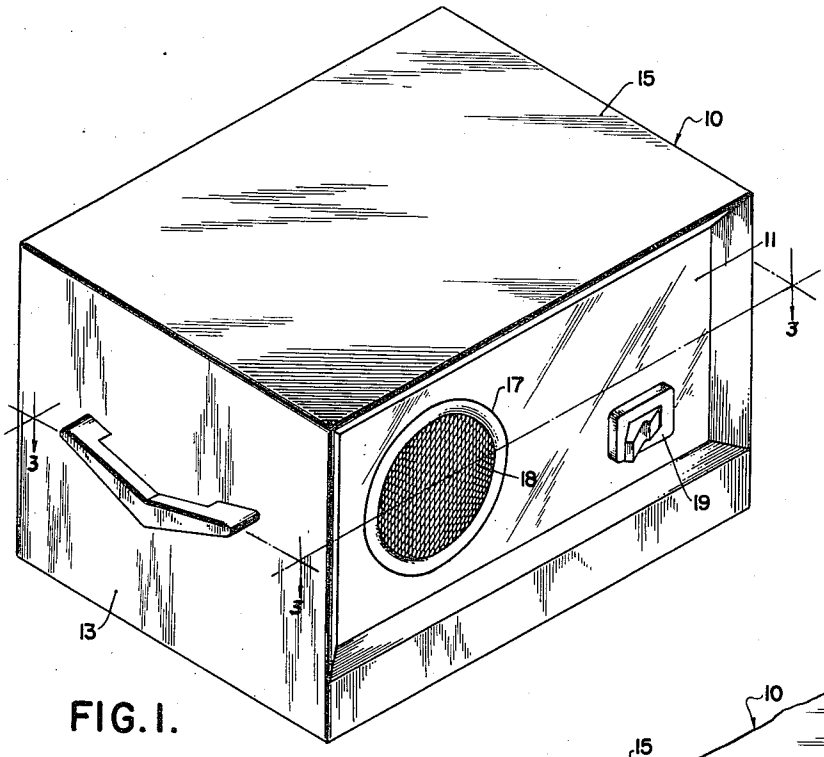

FIG. 1.

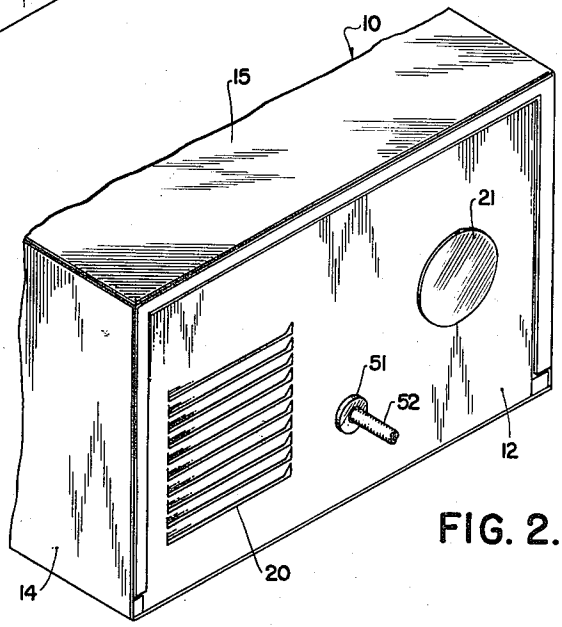

FIG. 2.

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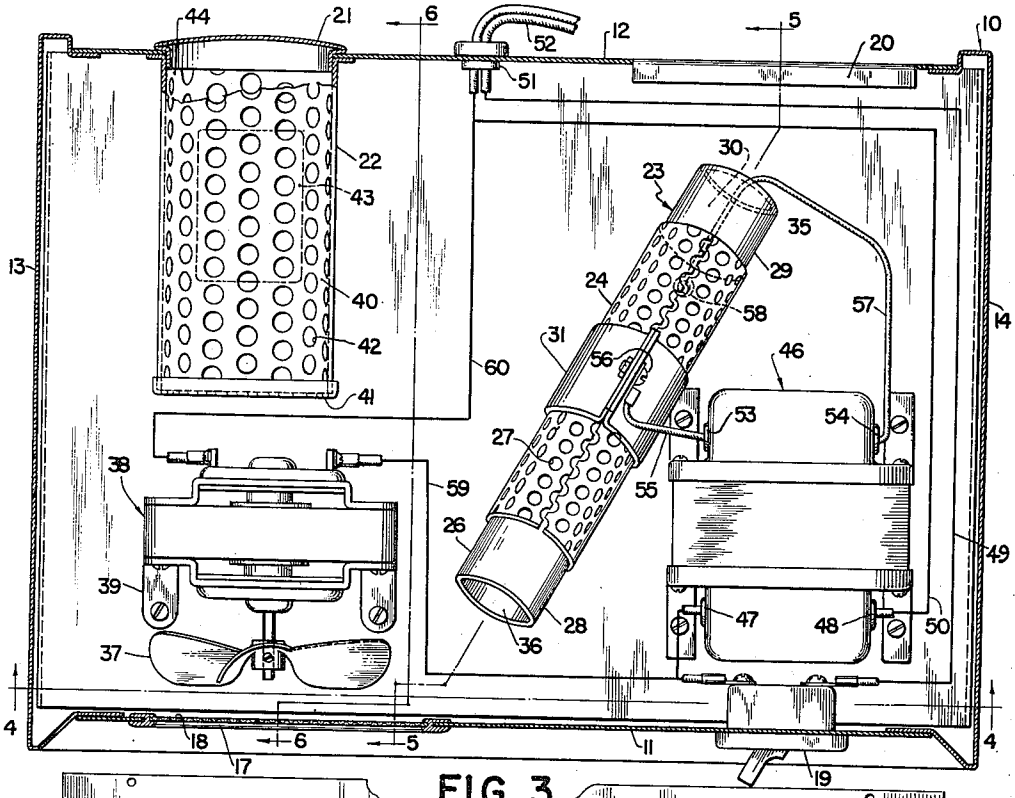

FIG. 3.

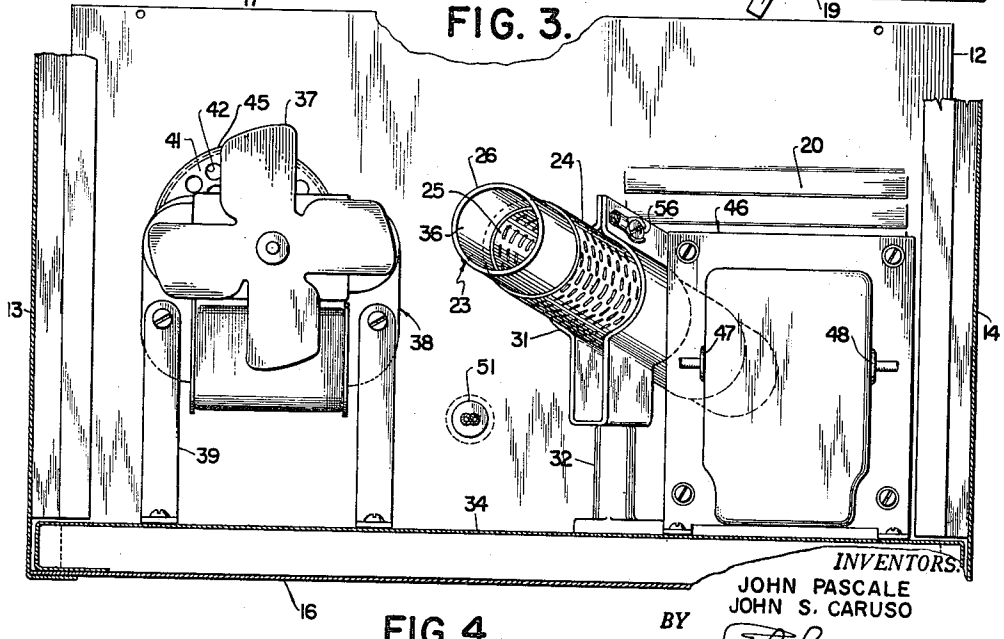

FIG. 4.

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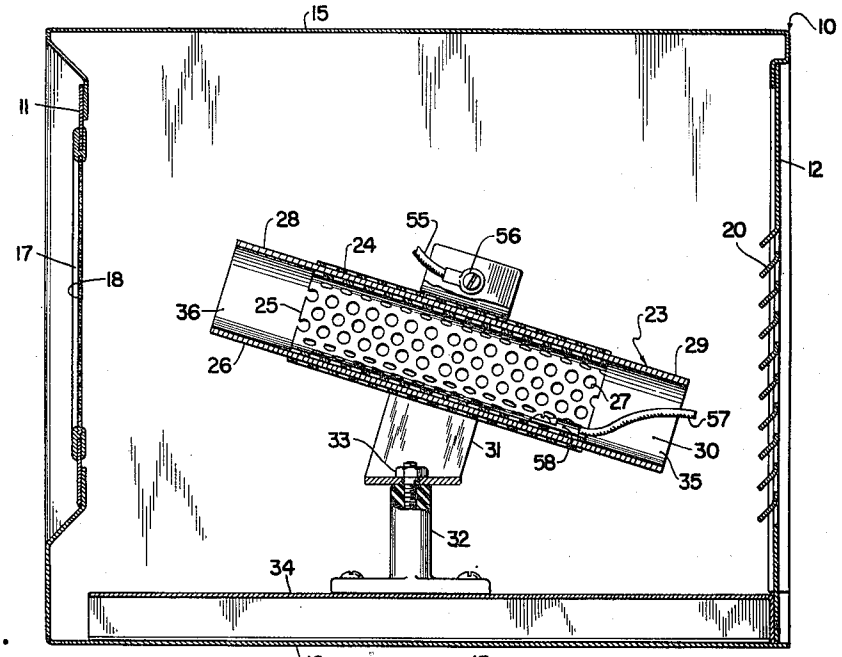

FIG. 5.

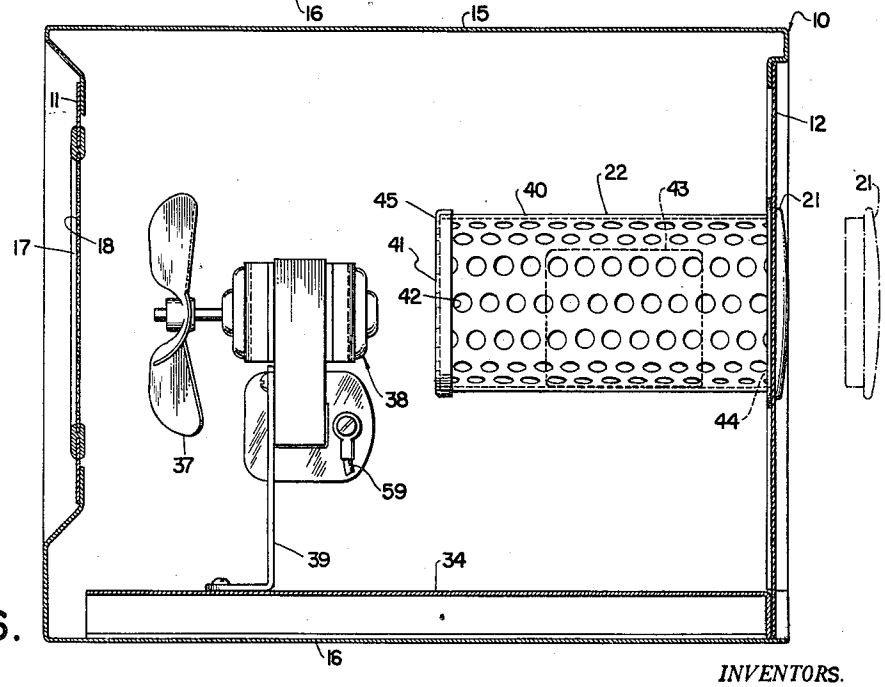

FIG. 6.

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OZONIZER FOR TREATING AIR

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6 Claims. (Cl. 204—314)

This invention relates to apparatus for treating air, and is particularly directed to devices for the ozonification, deodorization and purification of air.

The electric ozonification of air has been a commonly employed expedient; but to obtain effective ozonifying results there has been resort to complicated generators with multiple air passageways, often rendering such installations too costly for the average householder. It is accordingly one of our main objectives to present a device of this category in which an extremely simple and inexpensive electric ozonifier unit is employed, a high ozonifying efficiency being provided by the effective placement of certain components so as to obtain an extended path of travel of the air being treated.

It is another object of this invention to provide an ozonifier that permits of a positively induced, continuous and unidirectional passage of air from inlet to outlet, and that obviates the use of complicated insulators at the ends of electrode components for preventing electric arcing.

Still another one of our objectives is the provision of fragrance dispensing or deodorizing means operable simultaneously with the ozonifying process whenever desired.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Fig. 1 is a perspective front view of a device embodying our invention.

Fig. 2 is a fragmentary rear perspective view thereof.

Fig. 3 is a sectional plan view of our invention taken along line 3—3 of Fig. 1, the electrical connections being semi-diagrammatically illustrated.

Fig. 4 is a section of Fig. 3 taken along line 4—4.

Fig. 5 is a section of Fig. 3 taken substantially along line 5—5, showing only the inclined ozone generator.

Fig. 6 is a section of Fig. 3, taken along line 6—6, the dot-dash lines showing the closure for the fragrance dispenser disconnected from the said dispenser.

In the form of our invention illustrated, the boxlike casing 10, containing the components of our invention, comprises a front panel 11, a rear panel 12, side panels 13 and 14, and top and bottom panels 15 and 16, respectively. The said front panel 11 contains a discharge orifice 17 over which is positioned an air permeable fabric filter 18, said front panel also containing the switch 19. The said rear panel 12 contains the louvered intake orifice 20, and laterally disposed with respect thereto the fragrance dispenser cover 21 removably connected to the fragrance dispenser 22, the latter being attached to the inner surface of said rear wall 12, as shown in Figs. 3 and 6. It is important to observe (see Fig. 3) that the respective discharge and inlet orifices 17 and 20 are disposed at laterally opposite sides of the casing 10, discharge orifice 17 being positioned at the left side of the front panel 11, and inlet orifice 20 being disposed at the right side of rear panel 12. The arrangement is such as to provide an extended path of air travel between said orifices, thereby to assure effective treatment

of the air being processed, in a manner to be more clearly hereinafter described.

Disposed obliquely within the interior of casing 10 and positioned substantially along a path extending between said inlet and outlet orifices 20 and 17 is the ionizing unit generally designated 23. This unit comprises the outer metallic cylindrical electrode 24, the inner cylindrical metallic electrode 25, and therebetween the cylindrical dielectric support 26 made of glass or other rigid dielectric material (see Fig. 5). It is preferred that the electrodes be made of a material, such as aluminum, capable of resisting the action of ozone. The said cylindrical electrodes contain perforations, generally designated 27, these serving to dissipate the heat generated within the unit, and being characteristic of cylindrical electrodes frequently used in ozone generators.

The dielectric support 26 extends forwardly and rearwardly beyond the said electrodes 24 and 25, the latter two being preferably of equal length. The extending portions 28 and 29 are sufficiently long to prevent electrical arcing between the terminals of said electrodes 24 and 25, this arrangement eliminating the need for special insulators like those frequently applied to adjacent electrode terminals. The construction is such as to provide a substantially unobstructed inner passageway 30 within the said unit 23.

In embracing engagement with the outer electrode 24 is the cylindrical metallic clamp member 31 the lower portion of which is mounted upon the bracket 32 and secured thereto by the fastener 33, said bracket 32 being mounted upon the floor 34 disposed over the bottom panel 16. It will be noted that the clamp 31 holds the tubular generator 23 in tilted position, so that it slopes upwardly and forwardly, the rear inlet portion 35 of passageway 30 being disposed adjacent the inlet orifice 20 and the outlet portion 36 of said passageway being disposed at a higher level in the region of the fan 37 to be hereinbelow described.

Said fan (see Figs. 3, 4 and 6) is operatively associated with the motor 38 supported by bracket 39 which is mounted upon the said floor 34. The said fan is disposed directly behind the discharge orifice 17. Disposed behind said motor 38 is the said fragrance dispenser casing 22, the lateral wall 40 thereof, as well as the front end wall 41, containing perforated portions generally designated 42—said casing being proportioned to receive therein a fragrance emitting or deodorizing member 43. This may be of any material having the desired aromatic or volatile properties, whereby the vapors therefrom could pass outwardly through the said apertured portions 42. Said member 43 could be inserted into casing 22 through the rear opening 44 upon removal of the said closure 21.

In the preferred embodiment illustrated, the upper portion 45 of the fragrance dispenser unit 22 is disposed substantially in alignment with the upper portion of the fan 27 (see Figs. 4 and 6). The arrangement is hence such that upon an operative rotation of the fan, the vapors emanating from casing 22 will be drawn forwardly by the fan 37 and expelled through discharge orifice 17.

The ozone generator 23 is electrically connected to the transformer 46 mounted upon the said floor 34 within casing 10. This is a conventional step-up transformer, the primary terminals 47 and 48 being electrically connected by conductors 49 and 50 to the fitting 51 mounted on the rear panel 12, said conductors 49 and 50 being joined within cable 52 for connection to a suitable source of electrical energy. In the form illustrated, the switch 19 is in series with said primary terminals, as clearly illustrated in Fig. 3. The secondary terminals 53 and 54 of the transformer are electrically connected to the unit 23—the conductor 55 connecting terminal 53 to terminal

56 on said clamp 31 (said terminal being operatively connected to the outer electrode 24), and the conductor 57 connecting terminal 54 to the terminal 58 on said inner electrode 25. The said motor is electrically connected to switch 19 and the electrical wires at fitting 51 through conductors 59 and 60, respectively.

In the operation of this device, the switch 19 is closed, thereby closing the circuit through the transformer 46 and motor 38, causing the fan 37 to rotate and producing a discharge between the electrodes 24 and 25 in known manner. The discharge between the electrodes occurs along the entire surfaces thereof, the tension being sufficiently high to impress upon the surrounding air an electric potential effective to partially convert the oxygen in the air into ozone. Due to the operative action of the fan 37, air is drawn forwardly through and over the unit 23 along the entire extended path thereof. Because of the fact, as aforesaid, that the inlet and outlet orifices 20 and 17, respectively, are at diagonally opposite portions of the casing 10, the path of the air between said orifices is of extended length—the length being further extended by virtue of the fact that the said member 23 is also inclined upwardly in a forwardly direction.

A most effective ozonifying action can thus take place within this unit, such action occurring over a path of travel from the inlet orifice 20 to the region of the blades of the fan 37 in proximate relation to the discharge orifice 17, the air being forced to follow a direct path from the inlet to the discharge region of this device. It has also been found that a slight natural up-draft is created in the tubular member 23 thereby enhancing the forward movement of the air within it.

It is thus evident that this device can serve as an efficient ozonifier for the continuous treatment of air. In a room where it may be desired to impart a pleasing fragrance to the air as it leaves the unit, the use of a suitable fragrance-emitting material within the casing 22 could serve such purpose. It has been found that the direct action of the fan 38 on the air being drawn through the ozonifier 23 and simultaneously upon the vapors emanating from the fragrance dispenser 22 produces an admixture of fragrant ozonified air which adds considerable utility to this device.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except insofar as such limitations are specified in the appended claims.

We claim:

1. In an apparatus for treating air, an outer casing having two opposite panels, an air inlet orifice at one end of one of said panels, an air outlet orifice above said inlet orifice and at the opposite end of the other panel, whereby a diagonal air pathway is provided within said casing, an ozonifying unit within said casing and disposed between said inlet and outlet orifices, and a motorized fan disposed adjacent said outlet orifice; said ozonifying unit comprising a tubular dielectric member with a continuous passageway extending therethrough, and outer and inner cylindrical electrodes operatively mounted upon and within said dielectric member, respectively, said tubular dielectric member being inclined with respect to said panels and extending diagonally in the direction of said pathway, said dielectric member having an air intake portion adjacent said inlet orifice and an air discharge portion adjacent said fan; and electric means for actuating said ozonifying unit, whereby ozonified air drawn through said dielectric member will be discharged through said outlet orifice.

2. In an apparatus for treating air, an outer casing having two opposite panels, an air inlet orifice at one end of one of said panels, an air outlet orifice above said inlet orifice and at the opposite end of the other panel, whereby a diagonal air pathway is provided within said casing, an ozonifying unit within said casing and disposed between said inlet and outlet orifices, and a motorized fan disposed adjacent said outlet orifice, said ozonifying unit comprising a tubular dielectric member with a continuous passageway extending therethrough, and outer and inner cylindrical electrodes operatively mounted upon and within said dielectric member, respectively, said tubular dielectric member extending diagonally in the direction of said pathway and being tilted upwardly from said inlet orifice, said dielectric member having an air intake portion adjacent said inlet orifice and an air discharge portion adjacent said fan; and electric means for actuating said ozonifying unit whereby ozonified air drawn through said dielectric member will be discharged through said outlet orifice.

3. In an apparatus for treating air, an outer casing having two opposite panels, an air inlet orifice at one end of one of said panels, an air outlet orifice above said inlet orifice and at the opposite end of the other panel, whereby a diagonal air pathway is provided within said casing, an ozonifying unit within said casing and disposed between said inlet and outlet orifices, a motorized fan disposed adjacent said outlet orifice, and a vapor dispenser positioned behind said fan and laterally with respect to said ozonifying unit; said ozonifying unit comprising a tubular dielectric member with a continuous passageway extending therethrough, and outer and inner cylindrical electrodes operatively mounted upon and within said dielectric member, respectively, said tubular dielectric member being inclined with respect to said panels and extending diagonally in the direction of said pathway, said dielectric member having an air intake portion adjacent said inlet orifice and an air discharge portion adjacent said fan; and electric means for actuating said ozonifying unit and said fan, whereby ozonified air drawn through said dielectric member and vapor from said dispenser will be simultaneously discharged through said outlet orifice.

4. In an apparatus for treating air, the combination according to claim 3, said vapor dispenser being mounted on the said panel containing said intake orifice, said last-mentioned panel having an apertured portion in communication with said vapor dispenser, and a closure member in releasable engagement with said apertured portion.

5. In an apparatus for treating air, the combination according to claim 3, said vapor dispenser having at least a portion thereof disposed in line with said fan and said outlet orifice.

6. In an apparatus for treating air, an outer casing having two opposite panels, an air inlet orifice at one end of one of said panels, an air outlet orifice above said air inlet orifice and at the opposite end of the other panel, whereby a diagonal air pathway is provided within said casing, an ozonifying unit within said casing and disposed between said inlet and outlet orifices, a motorized fan disposed adjacent said outlet orifice, and a vapor dispenser positioned behind said fan and having at least a portion thereof disposed in line with said fan and said outlet orifice, said vapor dispenser being mounted on the said panel containing said intake orifice, said last-mentioned panel having an apertured portion in communication with said vapor dispenser, and a closure member in releasable engagement with said apertured portion; said ozonifying unit comprising a tubular dielectric member with a continuous passageway extending therethrough, and outer and inner cylindrical electrodes operatively mounted upon and within said dielectric member, respectively, said dielectric member extending forwardly and rearwardly beyond said electrodes, thereby constituting terminal barriers against arcing, said tubular dielectric member extending in a direction defining a path between said inlet and outlet orifices and having an air intake portion adjacent said inlet orifice and an air dis-

charge portion adjacent said fan, said tubular dielectric member being tilted forwardly and upwardly; and electric means for actuating said ozonifying unit and said fan, whereby ozonified air drawn through said dielectric member and vapor from said dispenser will be simultaneously discharged through said outlet orifice.

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