Sept. 21, 1948. R. WILSON 2,449,681

AIR PURIFIER

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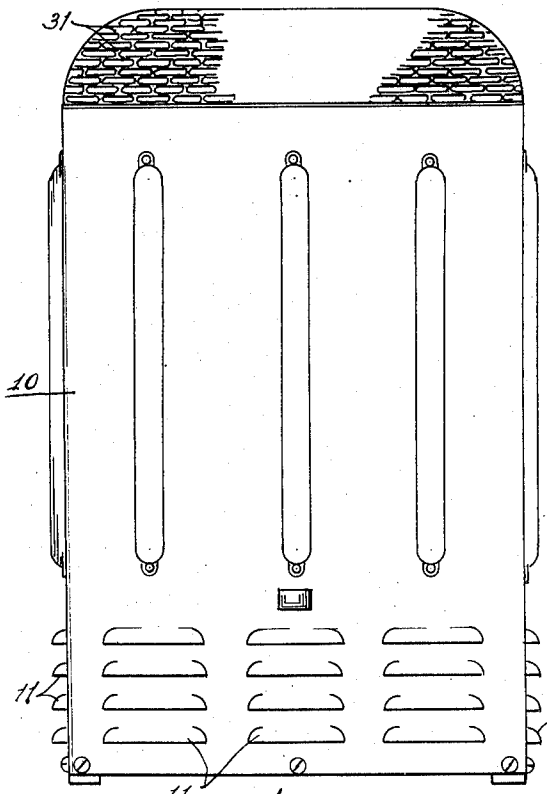


Fig 1.

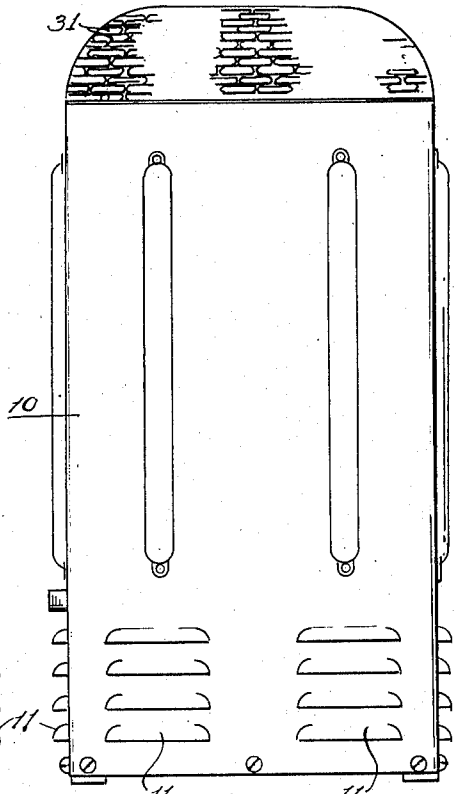


Fig. 2.

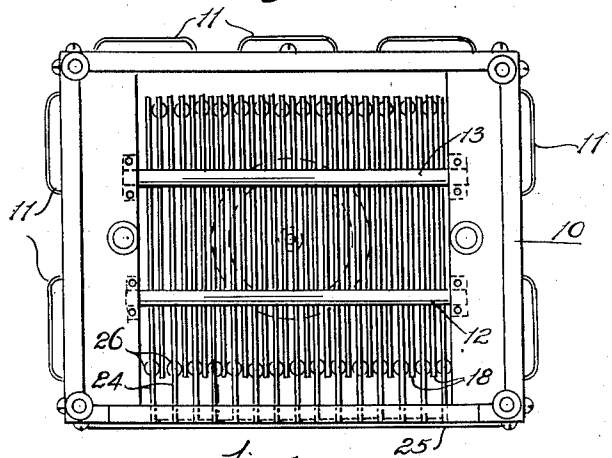


Fig 3.

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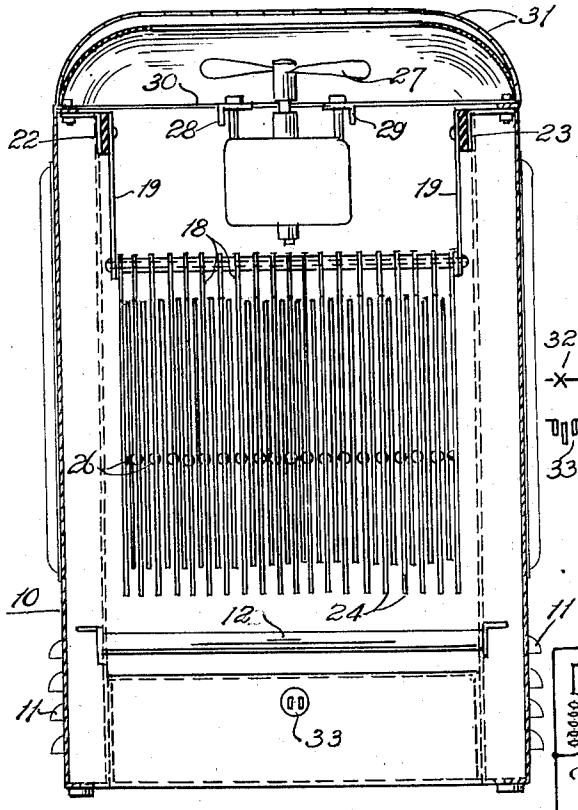


Fig. 4

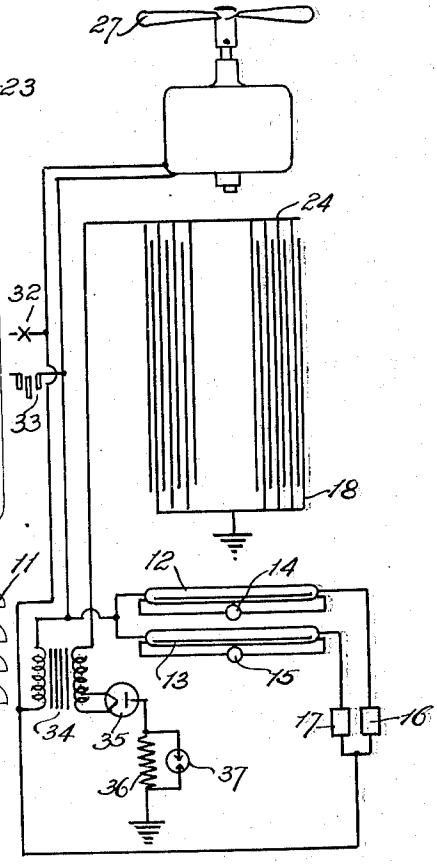


Fig. 5.

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UNITED STATES PATENT OFFICE

2,449,681

AIR PURIFIER

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Application July 23, 1947, Serial No. 762,966

2 Claims. (Cl. 21—74)

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My invention relates to an air purifier which utilizes radiation of light waves of extremely short wave length together with electrostatic attraction to purify air.

Among the objects of my invention is to provide an air purifier in which germs and viruses are killed and in which the maximum number of particles of foreign matter in the air are ionized and collected without the creation of a harmful quantity of ozone or nitrous oxide; to provide an air purifier which purifies and circulates air with a minimum of draft; and to provide an air purifier which is efficient in operation and economical to manufacture.

My invention also contemplates such other objects, advantages and capabilities as will later more fully appear and which are inherently possessed by my invention. While I have shown in the accompanying drawing a preferred form of my invention, yet I wish it understood that the same is susceptible of modification and change without departing from the spirit of my invention.

Referring to the drawing, Fig. 1 is a front elevational view of my air purifier; Fig. 2 is a side elevational view; Fig. 3 is a bottom plan view; Fig. 4 is a detailed rear sectional view and Fig. 5 is a circuit diagram of the same. It should be noted that some electrical apparatus is omitted from Figs. 3 and 4 in order to set forth more clearly the structural details. All electrical parts are clearly set forth in the specification and in Fig. 5, the circuit diagram.

My air purifier comprises a rectangular cabinet 10, constructed of metal or other suitable material. Cabinet 10 has near its bottom on all three sides a group of louvres 11 to permit the passage of air into cabinet 10. Mounted within the bottom portion of cabinet 10 is a pair of germicidal lamps 12 and 13, which are provided with starter devices 14 and 15 and fluorescent ballasts 16 and 17.

Mounted within the center portion of cabinet 10 is a group of flat parallel metallic plates 18. Plates 18 are attached to a cross plate 19 to which is attached a pair of suspension arms 20 and 21. Suspension arms 20 and 21 are attached to cabinet 10 by means of bracket mountings 22 and 23. Plates 18 are electrically connected to cabinet 10 so that they are at ground potential electrically.

Mounted alternately within plates 18 is a second group of flat parallel metallic plates 24. Plates 24 are insulatedly attached to rear panel 25 of cabinet 10. Plates 24 are evenly spaced from plates 18 by means of semi-circular insulators 26,

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composed of solid rubber or other suitable material, which are mounted on each side of plates 18. Plates 24 slide between pairs of said insulators 26 upon the withdrawal of rear panel 25 of cabinet 10. Rear panel 25 is removably attached to cabinet 10 so that plates 24 may be removed from cabinet 10 to facilitate cleaning of all of the plates.

Mounted directly above plates 18 and 24, within cabinet 10, is an electric fan 27. Fan 27 is suspended by brackets 28 and 29 from a cross bar 30. The upper portion of cabinet 10, which comprises all of the portion above cross bar 30 and which encloses the blade of fan 27, is curved and provided with numerous perforations 31 which furnish an air outlet from cabinet 10.

Referring now to the circuit diagram, Fig. 5, electricity from a suitable source of 110 volt 60 cycle alternating current is used. In one side of the line is an on-off switch 32 and in the other side is a safety switch 33. The purpose of the safety switch 33 is to protect the user from harm in case rear panel 25 is removed from cabnet 10 while switch 32 is on. Safety switch 33 comprises a plug attached to the inside of rear panel 25, which plug fits within a socket mounted on the rear of cabinet 10. Removal of the plug from the socket opens one side of the line and prevents the flow of current, thus preventing any injury to the user.

Electric fan 27 is connected across the line voltage, as is the primary of transformer 34. Transformer 34 is a 5000 volt transformer which provides a peak secondary voltage of 7000 volts. One side of the secondary of transformer 34 is connected to plates 24, while the other side is connected to the cathode of a rectifier tube 35.

Between the plate of rectifier tube 35 and ground are a one megohm resistor 36 and neon bulb 37 connected in parallel. The purpose of this circuit is to serve as a warning when the plates 18 and 24 have become dirty and need to be cleaned. A capacity of .001 microfarad normally exists between plates 18 and 24. If the plates become covered with foreign matter, more current flows between them, thus increasing the voltage drop across resistor 36. When the voltage drop reaches 65 volts, neon bulb 37 glows to indicate that the plates must be cleaned.

Also connected across the 110 volt line are a pair of germicidal lamps 12 and 13. In parallel with lamps 12 and 13 are starters 14 and 15. In series with the lamps and starters are fluorescent ballasts 16 and 17. Lamps 12 and 13 are 8 watt ultraviolet short wave lamps with radiation cen-

tering around 2537 angstroms. All air which passes through cabinet 10 must come within the rays of this pair of lamps and usually remains within them during substantially all of the time it is passing through cabinet 10. Disease producing germs and viruses are killed and mold spores are destroyed by the ultraviolet radiation from these lamps, thus making the air more healthful and pure.

At the same time that the air is being purified by germicidal radiation, dust particles and other foreign matter suspended in the air are ionized by the radiation of lamps 12 and 13. This radiation causes the dust particles and foreign matter to take on a positive electrical charge. After the particles have become ionized, they pass between parallel plates 18 and 24. Plates 24 are charged to a potential of approximately 7000 volts negative with respect to plates 18, which are at ground potential. The dust particles, which have acquired a positive charge while passing through the rays of lamps 12 and 13, are attracted to negative plates 24 by electrostatic attraction and adhere to them.

In operation, my air purifier draws air into cabinet 10 through louvres 11 by means of the suction created by electric fan 27. The air passes by germicidal lamps 12 and 13, which kill germs and destroy spores by means of ultraviolet radiation. Dust particles and any other substances which are suspended in the air are ionized by the radiation of lamps 12 and 13 and take on a positive charge. As the air passes between plates 18 and 24, the positively charged particles are deposited on negative plates by electrostatic attraction and the air which passes out of cabinet 10 through perforations 31 is pure.

It should be noted that the creation of harmful quantities of nitrous oxides or ozone is eliminated by the absence of any corona or arc discharge. Sufficient ozone is created to remove odors from the air and restore its freshness.

Perforations 31 of cabinet 10 cover the entire upper portion of cabinet 10 in all directions from the blade of electric fan 27 so that air moves in all directions from the top of cabinet 10. This prevents any movement of air sufficiently directional to cause a harmful draft.

It should be noted that germicidal lamps 12 and 13 are preferably positioned transversely to plates 18 and 24 so that their rays extend between said plates for substantially the full length of cabinet 10. Keeping the air within the rays of lamps 12 and 13 increases the length of time during which the germicidal action and ionization take place.

My air purifier is simple to clean because negative plates 24, which accumulate almost all of the dirt and impurities, may be easily removed from cabinet 10 and cleaned.

Having thus described my invention, I claim:

1. An air purifier comprising a closed cabinet, a plurality of openings adjacent the base of said cabinet adapted to permit the entry of air into said cabinet, a pair of ultraviolet lamps mounted within said cabinet above said openings, a plurality of flat metallic parallel plates mounted within said cabinet above said lamps and positioned transversely thereto, said plates electrically connected to said cabinet, a plurality of flat metallic parallel plates slidably and insulatedly mounted within said first plates, said second plates connected to an electrical source of supply adapted to maintain a high negative charge on said second plates with respect to said first plates, an electric fan mounted within said cabinet above said plates, said electric fan and said ultraviolet lamps connected to a suitable electrical source of supply, and a plurality of openings adjacent the top of said cabinet adapted to permit the exit of air from said cabinet, said electric fan adapted to draw air through said plurality of openings adjacent the base of said cabinet, into said cabinet past said ultraviolet lamps, through said parallel plates and out said plurality of openings adjacent the top of said cabinet for purification of said air.

2. An air purifier comprising a closed cabinet having a plurality of openings adjacent the top and bottom for the entry and exit of air, a pair of lamps mounted within the lower portion of said cabinet, said lamps having a radiation centering around 2537 angstroms, a plurality of flat metallic parallel plates mounted within said cabinet above said lamps and positioned transversely with respect to said lamps, said plates electrically connected to said cabinet, a plurality of flat metallic plates removably and insulatedly mounted alternately between said first plates, said second plates connected to a source of electrical supply adapted to furnish a constant charge of substantially 7000 volts negative with respect to said cabinet, and an electric fan mounted within the upper portion of said cabinet, adapted to cause air to pass through said cabinet, said lamps and electric fan connected to a suitable source of electrical supply.

RAY WILSON.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,129,783	Penney	Sept. 13, 1938