

[54] **DEVICE FOR CLEARING IMPURITIES FROM THE ATMOSPHERE**

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[52] U.S. Cl. **55/128, 55/2, 55/145, 55/146, 55/149, 55/155, 55/DIG. 38**

[51] Int. Cl. **B03c 3/06**

[58] Field of Search.... **55/2, 145, 146, 103, 136, 149, 55/123, 150, 155, 151, DIG. 38, 127, 128**

[56] **References Cited**

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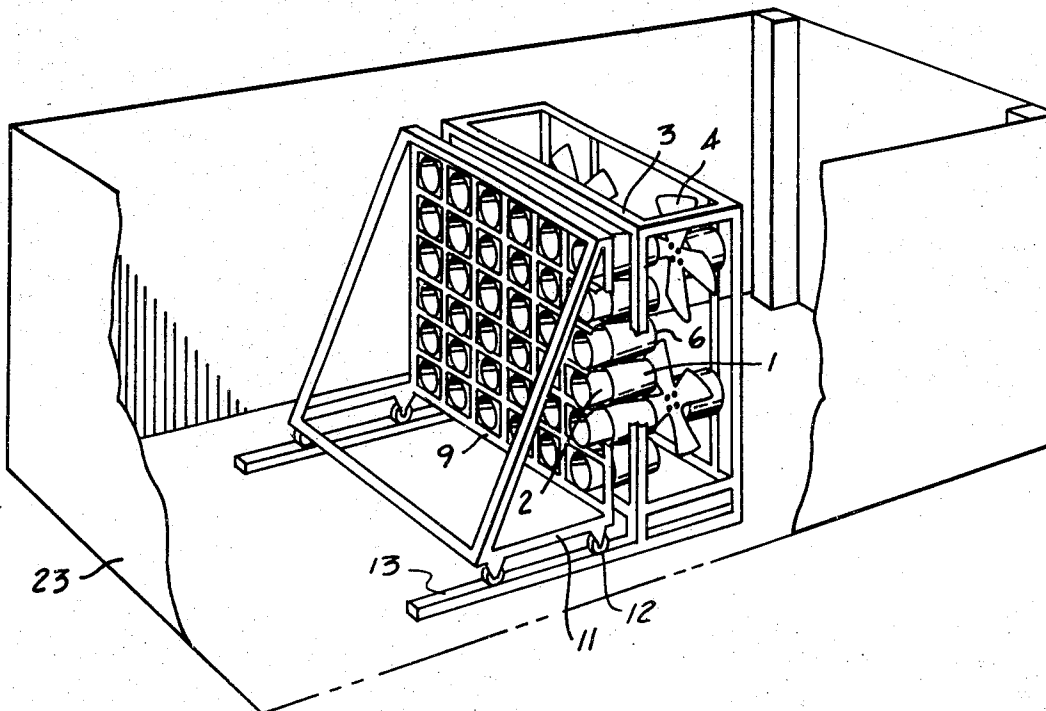
Primary Examiner—Bernard Nozick

Attorney—George B. White

[57] **ABSTRACT**

Oppositely charged electrode cones or electrode cylinders are adjustably supported so that one cone or cylinder is within the other cone or cylinder but spaced therefrom, whereby air currents attracted to and flowing through the electrostatic field have particles of impurity acquire the charge of one of the electrodes and are repelled to be collected on and adhere to the other electrode cone or cylinder. Specifically the cones are made of fiberglass and the adjacent faces of the cones are coated with fiberglass wool. The cylinders may be of larger diameter and may be made of steel.

4 Claims, 11 Drawing Figures



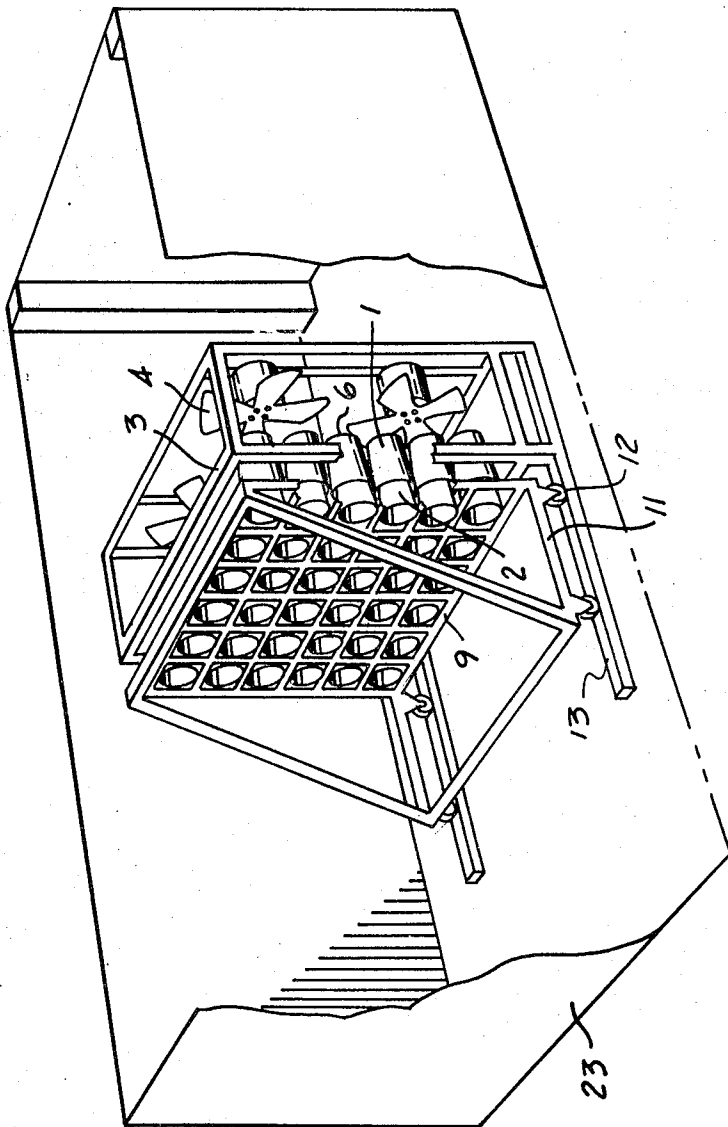


Fig. 1-

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Fig. 3-

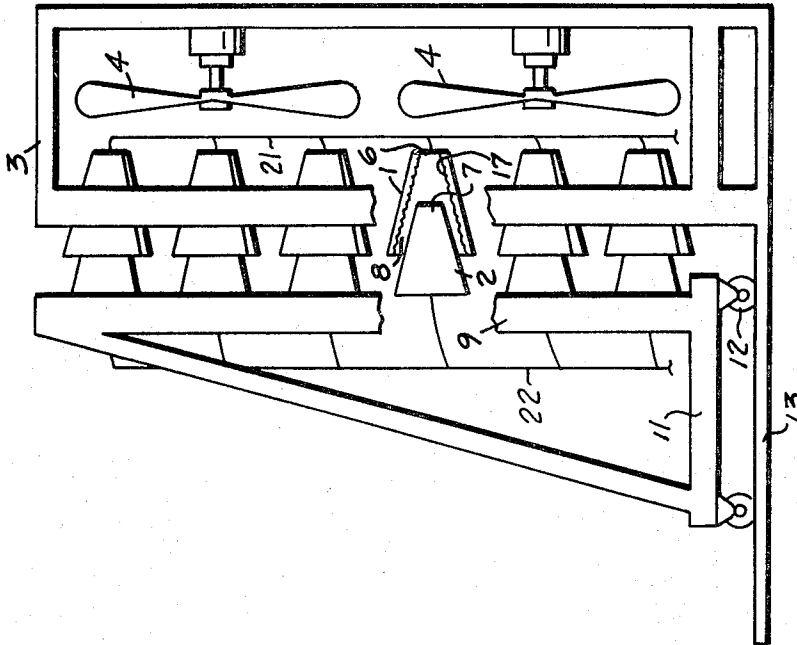
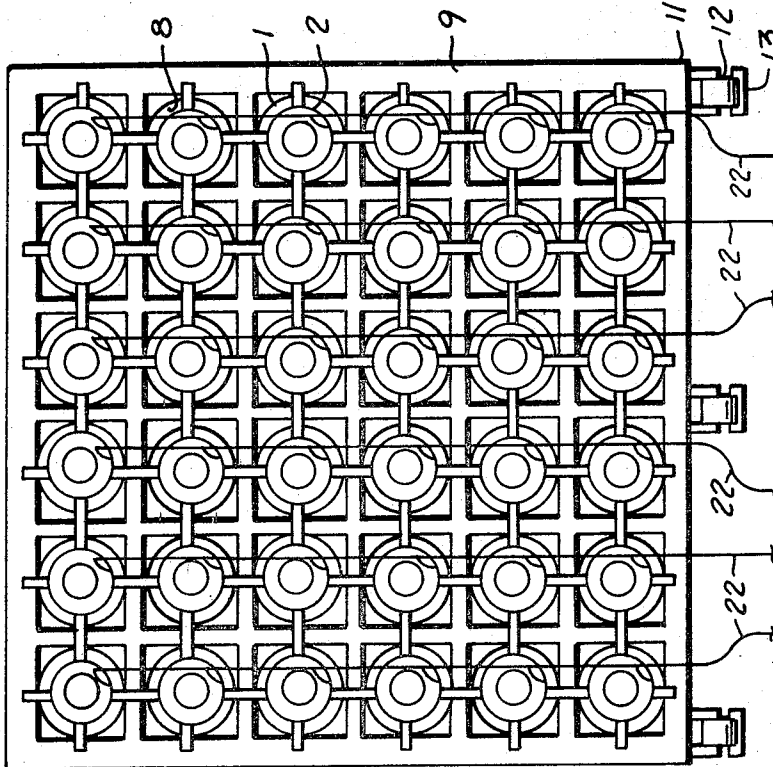


Fig. 2-



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Fig. 4.

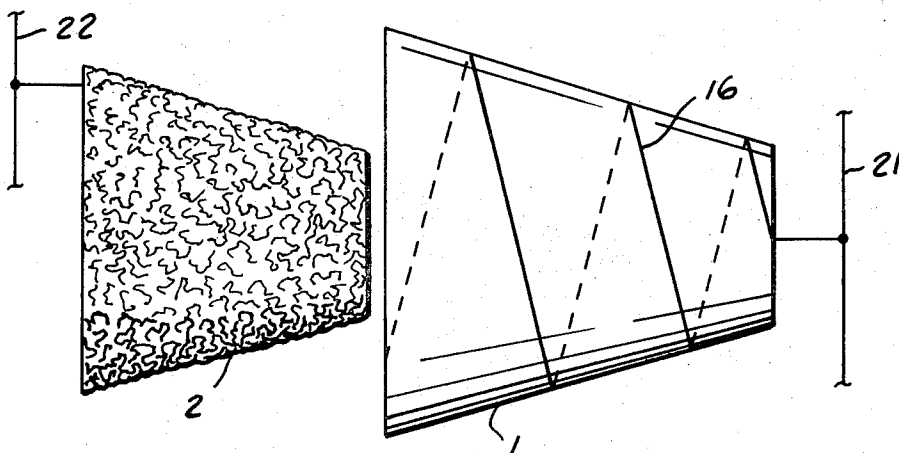
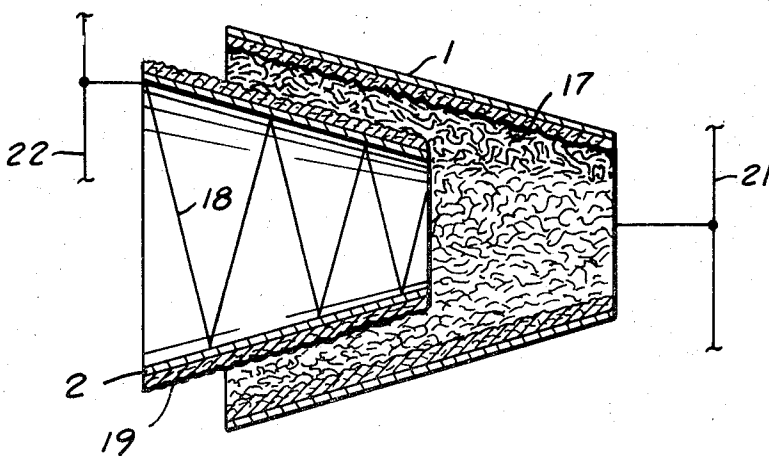


Fig. 5.



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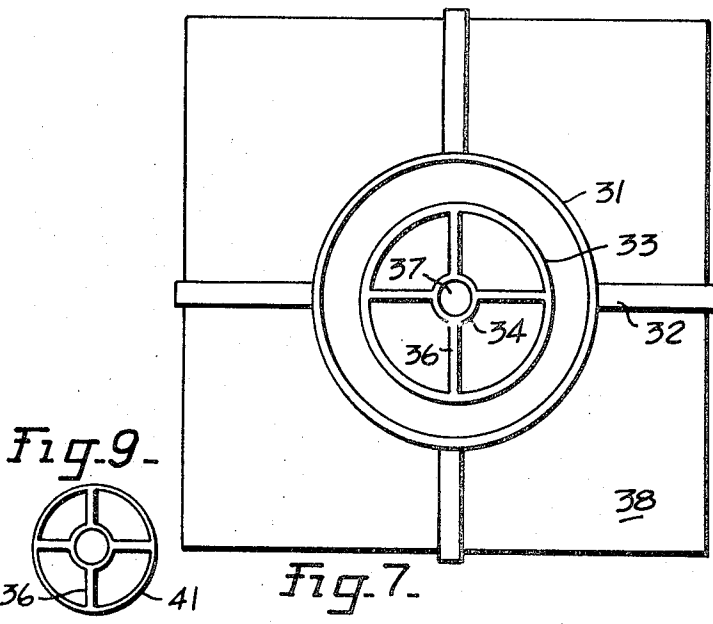


Fig. 9.

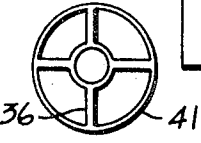


Fig. 7.

Fig. 11.

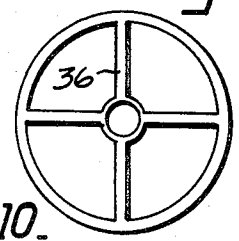


Fig. 8.

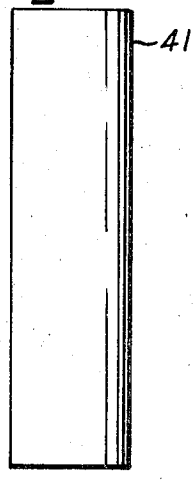


Fig. 10.

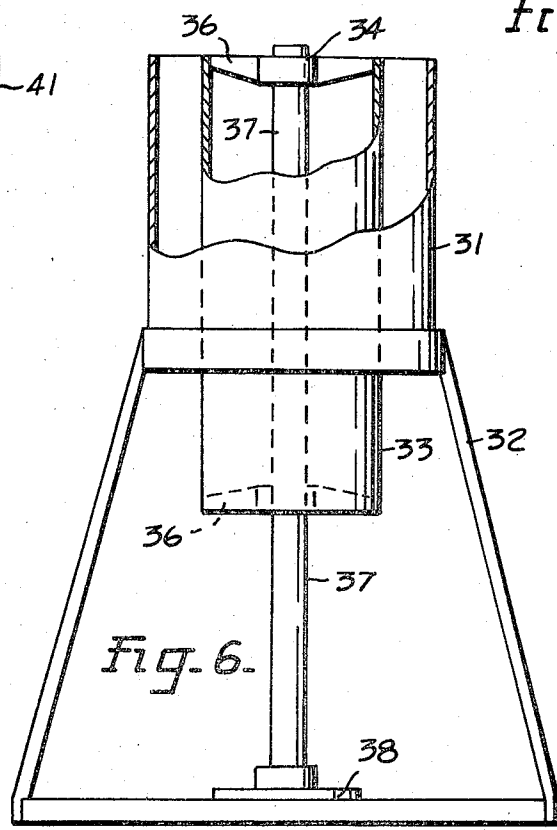
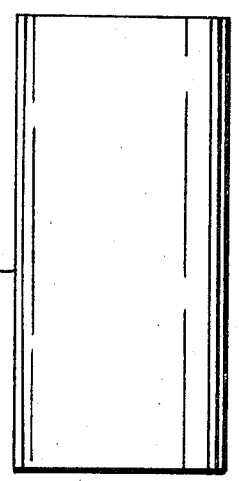


Fig. 6.

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DEVICE FOR CLEARING IMPURITIES FROM THE ATMOSPHERE

BACKGROUND OF THE INVENTION

The use of electrostatic field in a manner to use oppositely charged elements spaced apart so as to charge particles which acquire the same charge as one of the electrodes or plates and then are attracted to the other electrode or plate is well known as particularly described in the book entitled "Basic Electricity" by Abraham Marcus (2nd Edition — 1964, pages 19, 20 and 21).

The closest prior art of which applicant is aware is the U.S. Pat. No. 895,729 to F. G. Cutrell, granted Aug. 11, 1908.

The object of the invention is to improve the apparatus in such a manner as to facilitate the adjustment of the spacing between the electrodes in accordance with the atmospheric conditions, and to enable the arrangement of the size and number of electrodes in such a manner as to accomplish the purification of large masses of air, particularly to provide a device whereby air could be treated and purified in sufficiently large masses to free the atmosphere of so-called smog.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an arrangement of a battery of fiberglass electrodes in operating assembly.

FIG. 2 is a face view of a battery of electrodes on the adjustable frame.

FIG. 3 is a side view partly in section of the battery of said electrodes.

FIG. 4 is a detail view of the electrode cones indicating the electrowiring on the exterior cone.

FIG. 5 is a detailed view partly in section indicating the electric wiring on the inner electrode cone.

FIG. 6 is a detailed view of cylindrical electrodes partly in section.

FIG. 7 is a top plan view of the cylindrical electrodes.

FIG. 8 is a side view of a smaller inner cylindrical electrode.

FIG. 9 is a plan view of FIG. 8.

FIGS. 10 and 11 are respectively side view and plan view of a cylindrical inner electrode of a different size.

DETAILED DESCRIPTION

In the illustrative embodiment of the invention shown in FIGS. 1 to 5 inclusive, a plurality of outer dielectric cones 1 are supported in registry with matching dielectric inner cones 2. On the frame 3 which supports the outer dielectric cones 1 in a predetermined pattern, are also supported a plurality of fans or blowers 4 electrically operated for the purpose of circulating air and blowing the air through the smaller end 6 of the outer cone 1 and then through the smaller end 7 of the inner cone 2 and through the space 8 between the cones 1 and 2.

The frame 9 on which the inner cones 2 are suitably mounted is supported on a carriage base 11 provided with wheels 12 which ride in suitable tracks 13 as shown in FIGS. 2 and 3. In this manner the relative position of the cones 2 in the respective outer cone 1 can be adjusted to suit the atmospheric condition.

As shown in FIG. 4, a conductor wire 16 is wound around or imbedded into the outer cone 1. The outer

cone 1 is made of dielectric material, preferably fiberglass, and the inner surface thereof is coated with fiberglass wool 17 as indicated in FIG. 5. The inner cone 2 has a conductor wire 18 cemented to its inner periphery as shown in FIG. 5 and the outer periphery of the inner cone 2 has a coating of fiberglass wool 19. Experimentally the following proportions were found most effective: the larger end of the outer cone 1, about 32 inches in diameter, and the smaller end thereof, about 12 inches, the length of the outer cone being about 32 inches; the cone is made of fiberglass about one-quarter of an inch thick. The conductor 16 is preferably cemented to the outside periphery. The larger end of the inner cone is about 24 inches, the smaller end thereof being 12 inches, and the length thereof about 24 inches; the fiberglass cone being about one-quarter of an inch thick.

The conductor wire 16 is connected by suitable wires 21 to one terminal of suitable source of electricity and the inner wire 18 is connected by suitable wires 22 to the opposite terminal of suitable source of electricity whereby an electrostatic field is created between the cones.

The intensity of the electrostatic field is determined by the potential difference between the opposite electrodes formed by the inner and outer cones and it also can be varied by the relative position of the adjustable inner cones 18. The unit is surrounded by a suitable wall, such as tent walls 23, shown in FIG. 1 so as to form a windbreak at about the ground level.

Thus the air from the atmosphere is drawn into the area by the fans or blowers 4 and it is forced to flow through the open ends of the cone electrodes 1 and 2. As the air travels from the smaller end of the outer cone 1 toward the smaller end of the inner cone 2, the particles acquire the same charge as that of the outer electrode 1 and are repelled from the outer cone and fly against the surfaces of the inner cones 2 and adhere thereto and are collected thereon. Such of the particles which may acquire the charge of the inner cone 2 fly against and adhere to and are collected on the inner surface of the outer cone 1.

In practice the spacing between the inner periphery of the outer cone 1 and the outer periphery of the inner cone 2 is normally about four inches depending on weather conditions and other atmospheric conditions and may be separated even as far as shown in FIG. 4.

The connector wires 21 and 22 which supply opposite charges to the dielectric cones 1 and 2 respectively, are connected to a generator of current supply of about 45,000 volts to each set of outer and inner cones. The cones will capture practically all particles, even finest molecular particles and also gases. As the air passes through and around the cones these particles and material deposits itself on the cones and on all surfaces thereof. The suction fans or blowers draw in and circulate the air in and around the cones.

In the form shown in FIGS. 6 to 11 an outer dielectric drum 31 is permanently supported on a stand 32. A replaceable inner drum 33 is supported by means of a hub 34 on spokes 36 on a central shaft 37 on a base 38. The inner drum 33 can be thus replaced by a larger drum 39 shown in FIGS. 10 and 11 or by a drum 41 of smaller circumference shown in FIGS. 8 or 9 thereby respectively to reduce or increase the gap, and the cor-

responding field between the outer and inner drums. These drums are also charged through suitable wiring with current of about 45,000 volts and they are effective to greater distances. Batteries of such sets of drums can be arranged pointing upwardly.

I claim:

1. In an apparatus for depositing and collecting impurities from the atmosphere, a hollow outer electrode, a hollow inner electrode insertable into the outer electrode, said electrodes being adapted to be charged to opposite electric potentials thereby to create an electrically charged field between and within said hollow electrodes, and means to support said electrodes in the path of air flow from the atmosphere, said hollow electrodes being substantially frusto-conical, and the smaller end of said inner electrode being longitudinally spaced inwardly from the smaller end of the outer electrode, means to direct flow of air into the space within and

between said electrodes through the smaller ends of said electrodes,

a frame to support a plurality of outer electrodes, another frame to support a plurality of inner electrodes,

and means for adjusting the relative longitudinal spacing between the inner and outer electrodes.

2. In the apparatus specified in claim 1, said frusto-conical electrodes being made of dielectric material and each having electrical conductors in the respective walls thereof,

said conductors being connected to opposite terminals of an electrical charge source for opposite charges of the respective conductors.

3. In an apparatus as specified in claim 1, each of said electrodes being made of fiberglass, and fiberglass wool coating on the inner surface of the outer electrode and on the outer surface of said inner electrode.

4. In the apparatus specified in claim 1, air circulating means to create a forced flow inwardly of the smaller ends of said electrodes.

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