O. LINDER.

OZONIZER.

APPLICATION FILED JAN. 14, 1910.

951,443.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1

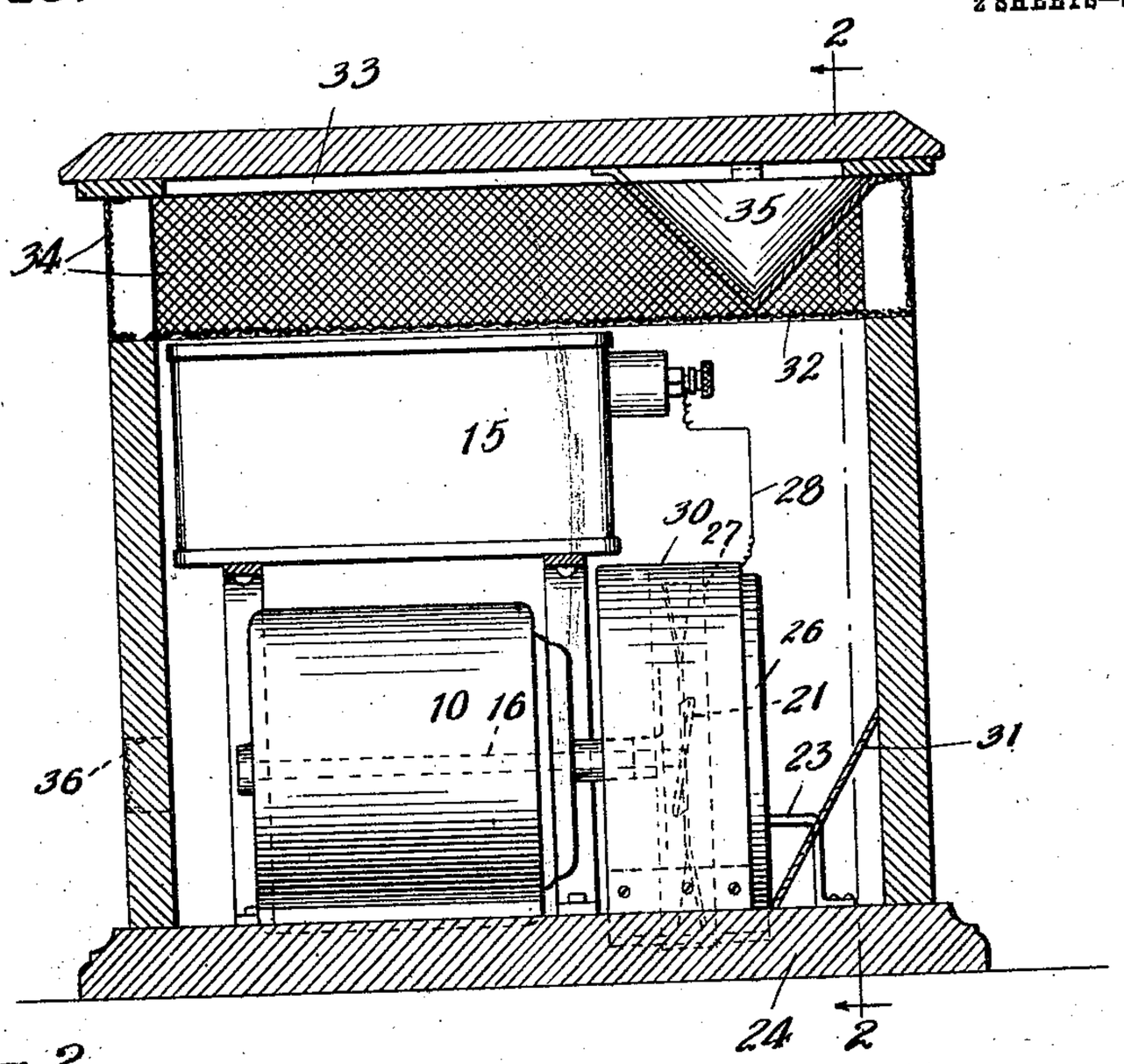
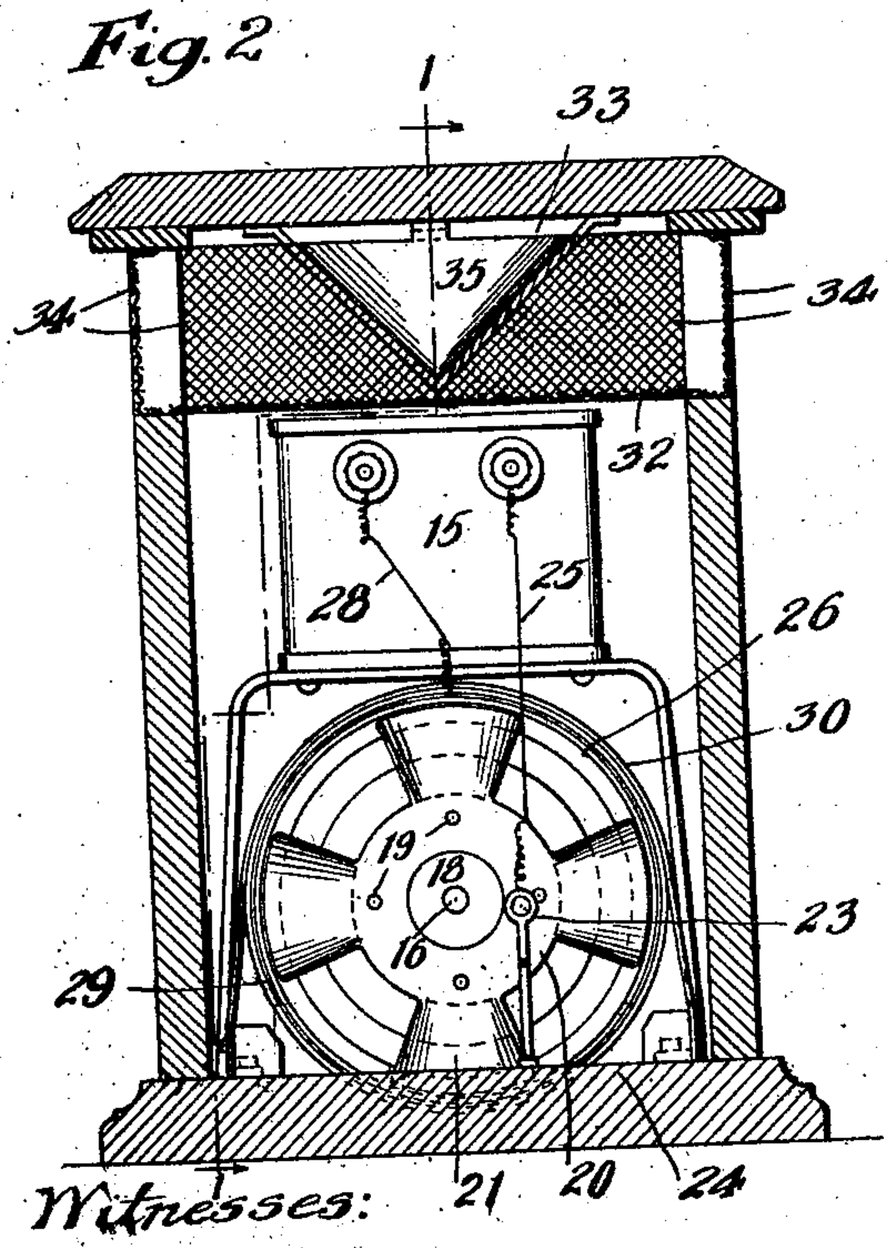


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3

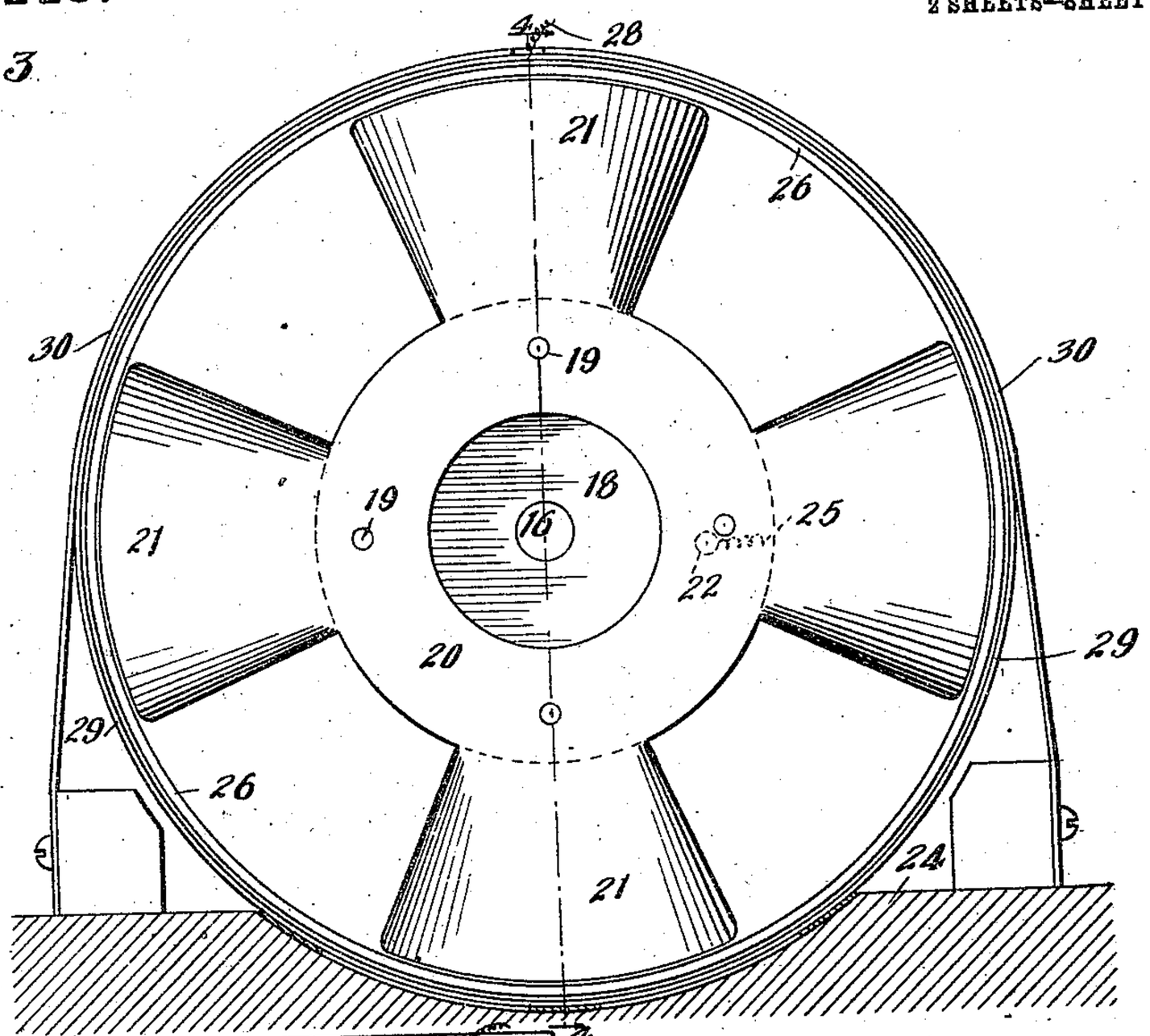


Fig. 4

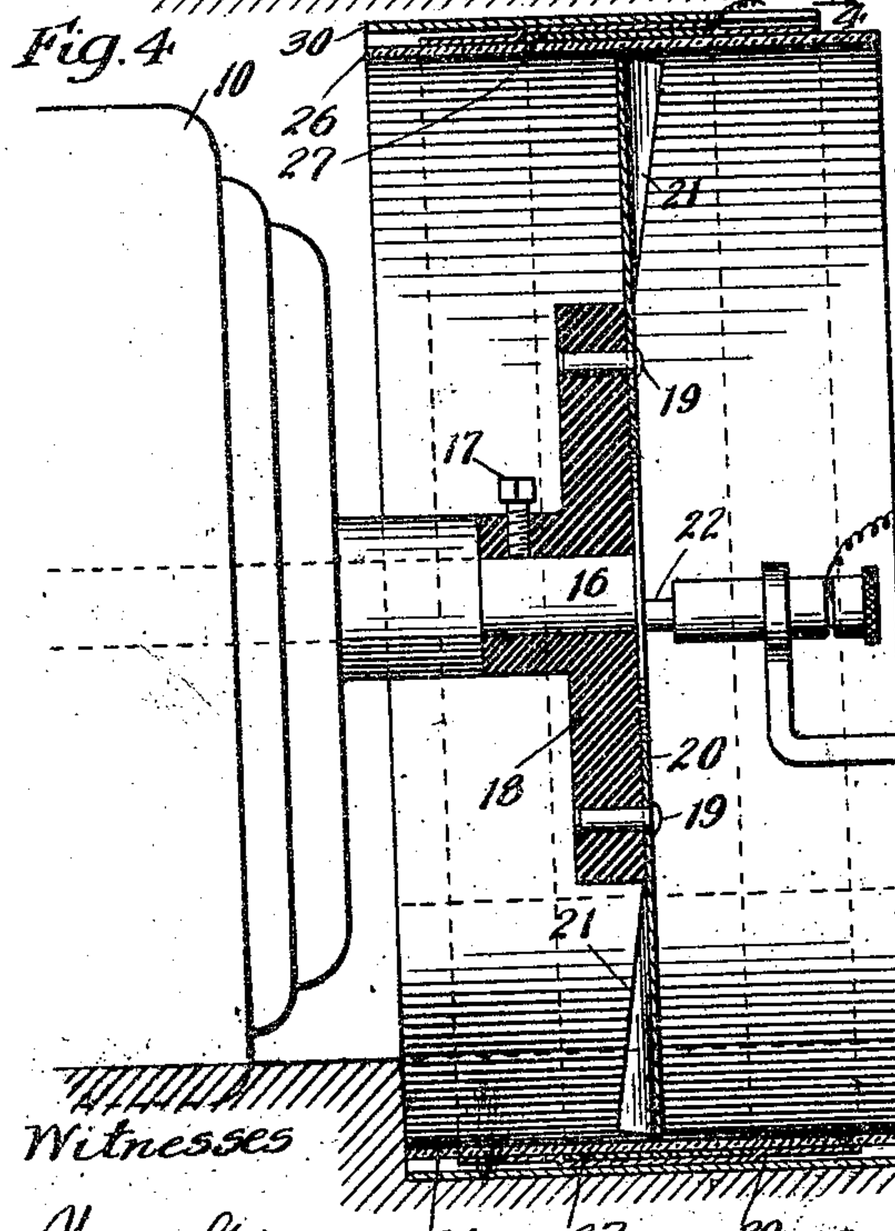
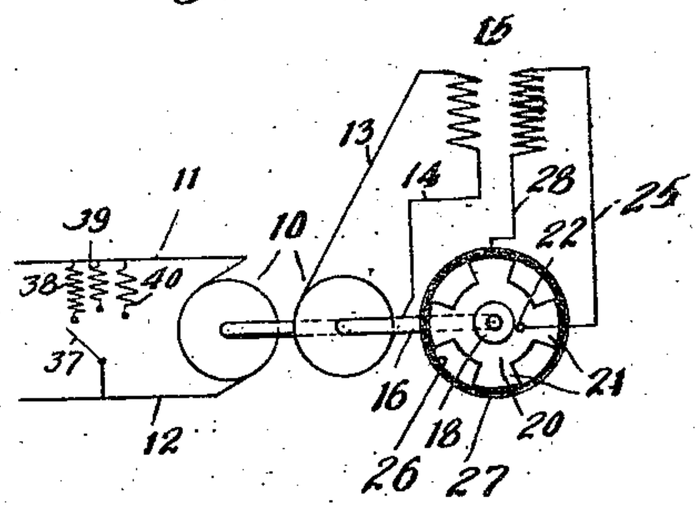


Fig. 5



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UNITED STATES PATENT OFFICE.

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OZONIZER.

951,443. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed January 14, 1910. Serial No. 538,004.

To all whom it may concern:

Be it known that I, OSCAR LINDER, a citizen of the Republic of Switzerland, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Ozonizers, of which the following is a specification.

My invention relates to machines for the producing of ozone for the purification and ozonizing of air in dwelling houses and business establishments, by discharge of an electrical current of high voltage. And the invention has for an object the providing of a machine, of this type, that shall have maximum efficiency of action and simplicity of construction, producing ozone of the highest purity and reducing the mechanism to extreme simplicity of organization and positiveness of operation; and the invention has for further objects such other improvements in structure of function as may be found to obtain in the devices hereinafter described or claimed.

In the accompanying drawings, forming a part of this specification, and in which like reference numerals indicate like parts in all of the figures, Figure 1 is a view of the complete device, with the casing vertically sectioned on the line 1—1 of Fig. 2, to show the ozone-producing mechanism in side elevation; Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1, to show the ozone-producing mechanism in front elevation; Fig. 3 is an enlarged front elevation of the fan-electrode and its associated dielectric and opposed electrode; Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3; and Fig. 5 is a diagram of the electrical circuits.

10 is a motor-generator adapted to receive a low-voltage direct current through the connections 11, 12 and to deliver an alternating current, through the connections 13, 14, to the transformer 15, and at the same time to maintain in high speed rotation the horizontal motor-fan-shaft 16. The outer free end of said fan-shaft has mounted upon it, and secured to it by the set screw 17, the insulation-hub 18, made of fiber. The peripheral rim of the vertical front face of this fiber hub 18 has secured upon it, by the rivets 19, the flat annular metallic contact-disk 20 from which, and integral with which, project out radially the four broad fan-vanes 21, the peripheral edge of each such vane being on the arc of a circumference struck from the axis of the motor-shaft as a center, and the face of each vane having the curvature indicated in Fig. 4 and adapted to maintain a flow of air radially outward and forward as the vanes are revolved by the high speed rotation of the motor-shaft on which they are so borne. A spring-pressed contact-point 22, supported on the bracket 23 that is fixed to the base-plate 24 of the machine, presses constantly upon the face of the aforesaid metallic contact-disk from which the fan-vanes radiate, said contact-point being connected, by the connection 25, with one pole of the transformer. Surrounding this constantly rotating fan-electrode, and supported free thereof, is the cylindric glass annulus 26, constituting a cylindric annular dielectric completely surrounding, and in close and uniform radial proximity to, the path of the peripheral edges of the vanes of the said fan-electrode, and extending a considerable distance forward and to the rear of the zone of said path. Completely surrounding and in immediate contact with the outer face of this glass annulus, is the continuous strip or ring of metallic foil 27, of considerably less width than the glass annulus and forming a continuous electrode uniformly opposed to and covering the zone of the path of the peripheral edges of the vanes of the fan-electrode. This metallic-foil electrode is connected, by the connection 28, with the other pole of the transformer, and its outer surface and edges are completely covered by the strip of insulating tape 29 whose overlapping lateral edges are closely applied to the outer face of the glass annulus at either side of the foil strip and continuously around the circumference thereof. The fiber strip 30, having its opposite ends secured to the base-plate of the machine, is passed over the top of the glass annulus, outside the aforesaid insulating tape, and presses firmly down, and steadies in position, the said annulus.

The transformer steps up the alternating current, received from the motor-generator, to a high voltage, of some thousands of volts, and this high-voltage current is continuously discharged across the space between the inner face of the metal-foil electrode and the peripheral edges of the revolving vanes

of the fan-electrode, the discharge passing through the interposed dielectric annulus and jumping the air-space between the inner face of said annulus and the said peripheral edges of the revolving vanes, the glass annulus being thin enough, and of such uniformity and character, as to permit such continuous discharge to pass through it, at the same time preventing all sparking. The electric discharge is thus uniform and continuous and requires no interruption. The ozone is generated in the air that is sucked in from the rear of the fan and driven out into the said air-space across which said continuous discharge is taking place, between the peripheral edges of the revolving vanes and the opposed inner face of the glass annulus; and as fast as the ozone is generated in said air-space, the fan action carries such ozonized air forward out of the range of said electric discharge, thus maintaining a constant flow of cool air and preventing the overheating that would develop noxious gases and deteriorate the ozone if the latter were permitted to dwell in said continuous electric discharge. The ozonized air driven forward by the fan-electrode impinges against the inclined reflector-plate 31 that is secured within the casing in front of the fan, and is thence reflected upward and driven out through the horizontal fine-meshed screen-plate 32 that covers the entire above-described mechanism within the casing. The top chamber 33 of the casing, above said horizontal screen-plate 32, is provided on all four sides with the vertical strips of coarser-meshed screen-plate 34, through which the aforesaid ozonized air flows out into the surrounding room. The inverted conical deflector 35, secured to the under side of the top of the casing and positioned substantially above the front of the fan, facilitates the deflection and distribution of the ozonized air toward the said several side-screens of the upper chamber of the casing. The air to be ozonized may be sucked into the casing through the screened aperturing 36 in the rear casing-wall. A several-point switch 37, and resistances 38, 39, 40, are interposed in the connections through which the direct current passes to the motor-generator, so that several different controlled speeds may be obtained.

In practical operation this mechanism maintains a constant large outflow of air highly charged with ozone of the greatest possible purity, practically free of any measurable trace of noxious gases. The air-flow maintained by the fan-electrode acts to automatically keep the discharging edges of the vanes and the opposed face of the glass annulus free of dust that would otherwise accumulate and interrupt the continuity of the electric discharge.

The positioning of the entire mechanism in the lower chamber of the casing, below the horizontal screen-plate and the laterally screened-in upper chamber, precludes the possibility of the user meddling with the mechanism or suffering a dangerous shock by thrusting any metallic instrument into contact with the high-voltage contacts; and this is a consideration of some importance because such danger has not been adequately guarded against in other machines of this character that have been devised for commercial use.

My invention is hereinabove set forth as embodied in one particular form of construction, but I do not limit it thereto or to less than all the possible forms in which the invention as hereinafter claimed may be embodied and distinguished from any prior devices for like purpose.

I claim:—

1. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an opposed continuous electrode having its face in continuously uniform proximity to the path of the vanes of said fan-electrode; and a continuous and uniformly thin dielectric in immediate contact with said face of the continuous electrode and extending over the entire zone of the discharge; substantially as specified.

2. In an ozonizer; in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an opposed continuous and stationary electrode having its face in continuously uniform proximity to the path of the vanes of said fan-electrode; and a continuous and uniformly thin dielectric in immediate contact with said face of the continuous electrode and extending over the entire zone of the discharge; substantially as specified.

3. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of dielectric concentric with and slightly spaced from said fan; and an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; substantially as specified.

4. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the elec-

trical discharge that ozonizes said air; a cylindric annulus of dielectric concentric with and slightly spaced from said fan; and an electrode on the outer side of said dielectric and opposed to the peripheral path of the vanes of said fan-electrode; substantially as specified.

5. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of dielectric concentric with and slightly spaced from said fan; and an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; the said outer electrode having its active face in contact with the dielectric and having its other surface covered with insulation; substantially as specified.

6. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of glass concentric with and slightly spaced from said fan; and an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; substantially as specified.

7. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of dielectric concentric with and slightly spaced from said fan; and a metallic-foil electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; substantially as specified.

8. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electric discharge that ozonizes said air; a motor having a motor-shaft bearing an insulating hub to which said fan-electrode is secured; an opposed electrode; and a dielectric through which the electric discharge between the two aforesaid electrodes passes; substantially as specified.

9. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air, the said vanes having a curvature adapting them to force the air-flow radially outward and forward; an annulus of dielectric concentric with and slightly spaced from said fan, and adapted to direct the fan-impelled air-flow forward in a direction perpendicular to the plane of rotation of the fan; and an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; substantially as specified.

10. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air, the said vanes having a curvature adapting them to force the air-flow radially outward and forward; an annulus of dielectric concentric with and slightly spaced from said fan, and adapted to direct the fan-impelled air flow forward in a direction perpendicular to the plane of rotation of the fan; an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; and an oblique reflector forward of said fan and adapted to reflect the flow of ozonized air to a place of outlet remote from the front of the rotating fan; substantially as specified.

11. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air, the said vanes having a curvature adapting them to force the air-flow radially outward and forward; an annulus of dielectric concentric with and slightly spaced from said fan, and adapted to direct the fan-impelled air-flow forward in a direction perpendicular to the plane of rotation of the fan; an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; and a conical deflector adapted to distribute the flow of ozonized air to several outlets that are laterally disposed with respect to said deflector; substantially as specified.

12. In an ozonizer, in combination: a source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of glass concentric with and slightly spaced from said fan; an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; and a casing having a chamber containing the operating electrodes and a distributing chamber screened from the first chamber and provided with screen-protected aperturing through which the ozonized air received from the first chamber is distributed to the room outside the machine; substantially as specified.

13. In an ozonizer, in combination: a

source of high-voltage electric current; a rotary fan operating to maintain a continuous flow of air and having its vanes adapted to constitute one of the electrodes for the electrical discharge that ozonizes said air; an annulus of glass concentric with and slightly spaced from said fan; an electrode on the outer side of said dielectric and opposed to the path of the vanes of said fan-electrode; and an insulating supporting member adapted to hold said dielectric annulus steadily concentric to the rotating-fan; substantially as specified.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses.

OSCAR LINDER.

Witnesses:
PEARL ABRAMS,
HENRY LOVE CLARKE.