April 12, 1938. W. H. CRAGUN 2,113,913

OZONATOR

Filed Feb. 1, 1936

FIG. 1

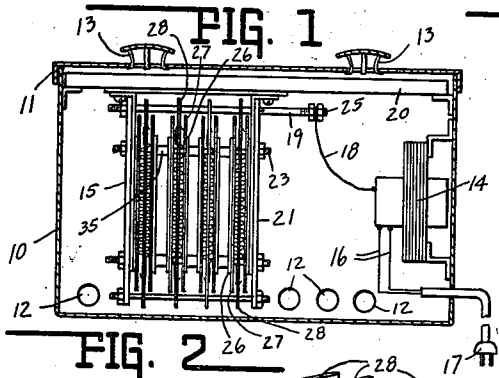


FIG. 3

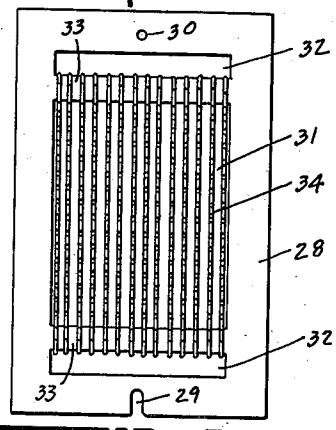


FIG. 4

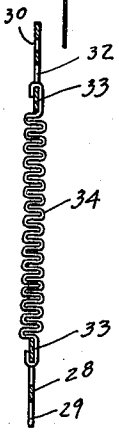


FIG. 2

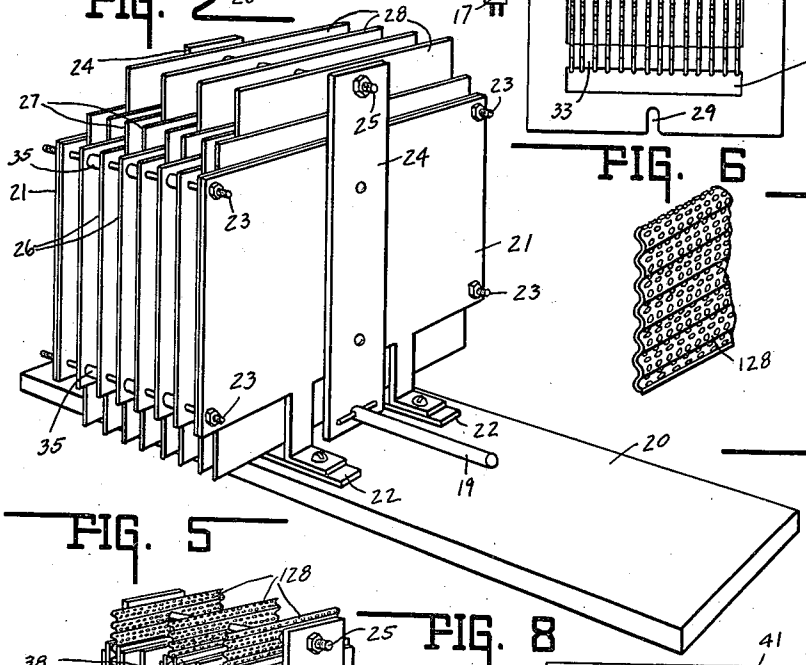


FIG. 6

FIG. 9

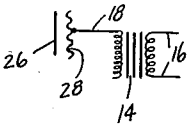


FIG. 5

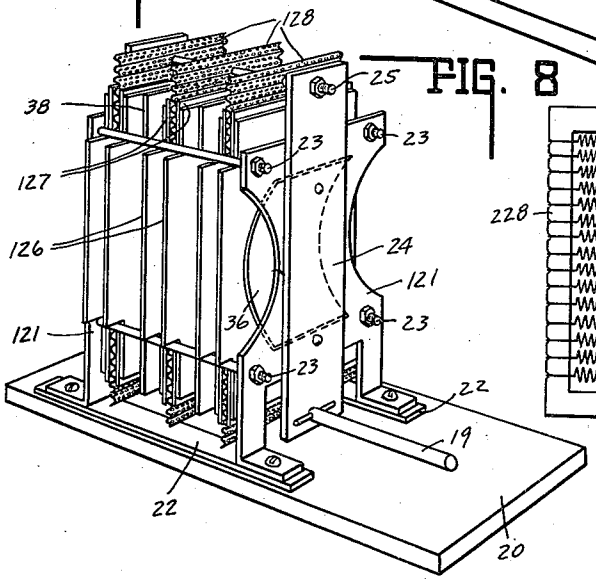


FIG. 8

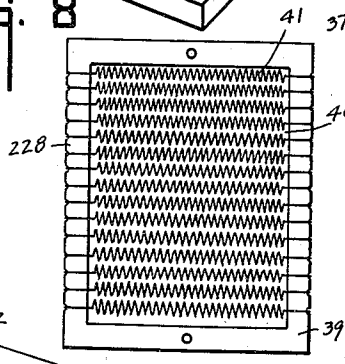
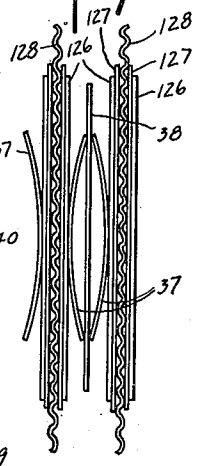


FIG. 7



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2,113,913

OZONATOR

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Application February 1, 1936, Serial No. 61,849

1 Claim. (Cl. 204—32)

This invention relates to an ozonator or device for converting the normal diatomic oxygen of the air into the triatomic form known as ozone. It is well known that ozone is much more active chemically than normal oxygen and that it serves as a much more active oxidizer of carbon monoxide and other deleterious and unpleasant gases as well as bacteria.

One object of the invention is to produce a device of small size capable of ozonizing a large volume of air. The principal use of such a device is in purifying the air in theatres, homes, public conveyances such as buses, street cars and railroad cars, garages and other places where human beings may be assembled.

The device operates on the electric discharge principle by which oxygen may be converted into the ozone form by the passage therethrough of an electric discharge. Another object of the invention is to provide means whereby a multiple spray of electric discharges of relatively low voltage may be produced instead of a single discharge of a higher voltage. To produce any appreciable quantity of ozone by a single discharge requires a voltage in the range encountered in the discharge of natural lightning. By means of the present invention a large number of much smaller discharges are produced by a voltage on the order of 5000 volts and such discharges are obtained from a single source of electricity.

Other objects and features of the invention will be understood from the accompanying drawing and the following description and claim:

Fig. 1 is a sectional view through a complete ozonator. Fig. 2 is a perspective view of the ozonizing unit proper removed from the case. Fig. 3 is an elevational view of a grid used with the unit. Fig. 4 is an elevational view of the same taken at right angle to that of Fig. 3. Fig. 5 is a perspective view of a different form of the ozonizing unit. Fig. 6 is a perspective view of a portion of a grid which may be used with either type of unit. Fig. 7 is a side elevation of two of the assemblies used with the unit of Fig. 5. Fig. 8 is an elevational view of a third type of grid. Fig. 9 is a wiring diagram of electrical connections.

The drawing illustrates several preferred forms of the invention. In Fig. 1 there is shown a casing 10 having a cover 11 and openings 12 for the admission of air. In the cover there are provided air outlets 13. Within the casing there are a transformer 14 and the ozonizer unit proper 15. The primary winding of the transformer is connected by suitable conductors 16 to a plug 17 which may be inserted in any socket furnishing alternating electric current at a commercial voltage and frequency,—for example, in a household receptacle supplying 110 volt 60 cycle alternating current. If desired, a switch may be inserted in one of the conductors 16.

The ratio of the transformer is such as to provide a voltage on the order of 5000 volts at the secondary terminals, one of which is connected by a conductor 18 to a stem 19 of the unit proper. The second of the secondary terminals is left isolated or may be grounded or connected to one of the primary lines 16.

The ozonizer unit shown in Fig. 2 is mounted upon a cross piece 20 which may be removably supported with the casing 10 and includes a pair of end plates 21 fixed to the cross piece 20 and insulated therefrom by insulation 22. The end plates 21 are secured together by bolts 23. Secured to the end plates are upright insulation strips 24 between which there extend a bolt 25 and the stem 19.

Between the end plates there are located a number of assemblies each consisting of a pair of plates 26, a pair of dielectric sheets 27 and a grid 28. The plates 26 are formed of a material capable of carrying an electric charge and are electrically connected by the bolts 23 but are otherwise electrically isolated by the dielectric sheets and the insulation 22. The dielectric sheets are of mica, glass or other suitable material of substantially uniform thickness. The grids are electrically connected by means of the stem 19 which passes through a slot 29 in each grid and by the bolts 25 which pass through openings 30 therein.

The grids 28, as shown in Figs. 3 and 4, consist of metal plates having a central opening 31 and two openings 32 at the upper and lower ends, cross bars 33 being formed in the plates between said opening. Secured to the cross bars 33 and extending across the central opening 31 there are a plurality of relatively heavy corrugated wires 34, the corrugations of which extend beyond the surfaces of the plate and engage the dielectric sheets in the assembly. The wires are preferably sufficiently stout to prevent any appreciable yielding of the individual corrugations when the assembly is clamped together.

The several assemblies are clamped together between the end plates 21 by tightening the bolts 23. Spacers 35 are placed upon said bolts between the plates 26 of adjacent assemblies to

transmit the clamping force from one assembly to the next and to maintain the assemblies in spaced relation.

In the operation of the device alternating potential is impressed upon the grids 28 by the transformer. This potential is sufficiently high to cause an electric discharge through the dielectric sheets to charge the plates 26 at one extremity of the cycle and to cause a similar discharge from plates to grids to discharge the plates at the other extremity of the cycle. Due to the fact that the dielectric sheets are of substantially uniform thickness, each corrugation of the wires 34 is uniformly spaced from its adjacent plate and an individual discharge takes place from each corrugation. Thus a large number of relatively small discharges are produced and said discharges are so distributed that they may ozonize as large a volume of air as may be passed through the case 10.

In Figs. 5, 6, and 7, a modified form of unit is shown. In these figures like numbered parts have the same construction and function as in Figs. 1 and 2. Parts numbered in the 100 series have the same function but different construction than parts correspondingly numbered in the unit series of Figs. 1 and 2. Plates 126 are supported on the bolts 23 and grids 128 are supported upon stem 19 and bolt 25. The grids 128 are formed of a single sheet of corrugated and perforated sheet metal (Fig. 6) which engages the dielectric sheets 127 at a large number of points from which electric discharges may take place.

For securing the desired pressure upon the various assemblies there are provided leaf springs 36 interposed between the end plates 121 and the adjacent plates 126 and leaf springs 37 interposed between the plates 126 of adjacent assemblies. Additional plates 38 are provided for abutment purposes between the springs 37.

A third alternative form of grid 228 is shown in Fig. 8. This consists of a rectangular frame 39 having a central opening 40 across which there is stretched coiled springs 41 which are of larger diameter than the thickness of the frame and so engage the dielectric sheets at a larger number of points from which electric discharges may take place.

The invention has been described in a number of preferred forms but the scope thereof is not to be limited by such descriptions. Variations in the details thereof may be made without departing from the scope of the invention as defined in the appended claim.

The invention claimed is:

An ozonator assembly including a pair of parallel plates of material capable of receiving an electric charge, a pair of dielectric sheets each engaging the inner surface of one of said plates, a grid frame, and a plurality of helically coiled wires carried by said frame with their axes parallel to said plates, said wires extending between said sheets and engaging said sheets at a plurality of points and means for pressing said plates together.

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