

D. C. SMITH & F. M. HUMMEL.
OZONE PRODUCING MACHINE.
APPLICATION FILED AUG. 14, 1912.

1,063,167.

Patented May 27, 1913.

Fig. 1.

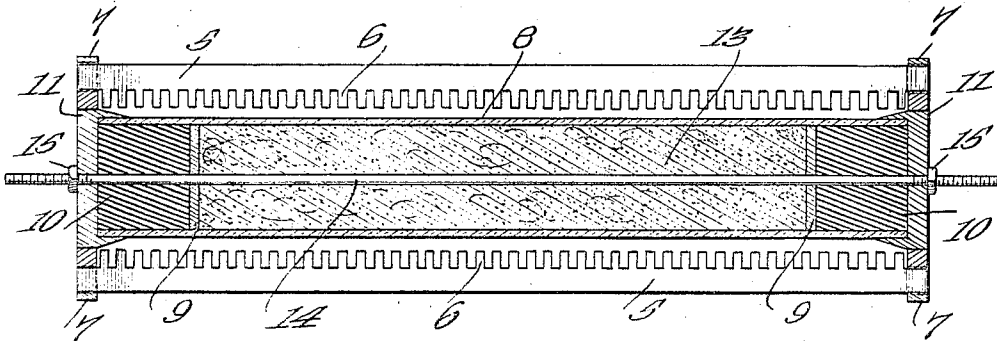


Fig. 2.

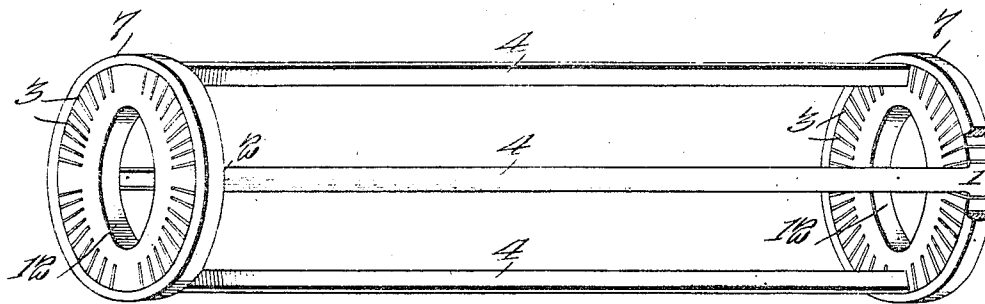


Fig. 3.

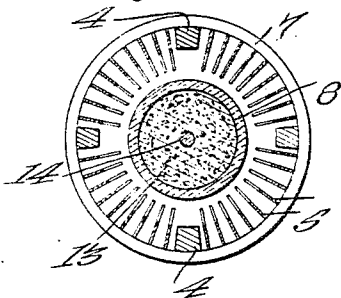


Fig. 4.

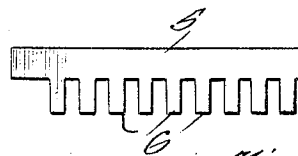


Fig. 5.

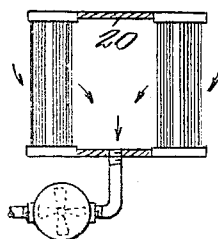
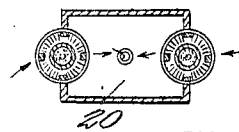


Fig. 6.



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OZONE-PRODUCING MACHINE.

1,063,167.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed August 14, 1912. Serial No. 714,985.

To all whom it may concern:

Be it known that we, DANIEL C. SMITH and FRED M. HUMMEL, citizens of the United States, and residents of Des Moines, in the county of Polk and State of Iowa, have made certain new and useful Improvements in Ozone-Producing Machines, of which the following is a specification.

Our invention relates to improvements in ozone producing machines, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of our invention is to provide a device in which a maximum amount of ozone may be produced with a minimum expenditure of energy.

A further object of our invention is to provide a device which may be readily assembled and taken apart for the purposes of cleaning or inspection.

A further object of our invention is to provide means for centering the discharge terminals, so that the latter may be at once brought into their proper position.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

Our invention is illustrated in the accompanying drawings forming part of this application in which—

Figure 1 is a longitudinal section through the device. Fig. 2 is a perspective view of the frame of the device, showing the manner of holding the electrodes. Fig. 3 is a transverse section through the frame and the electrodes, and Fig. 4 is a face view of one of the removable electrodes. Fig. 5 is a vertical section through the frame of the ozone machine, and Fig. 6 is a horizontal section through the frame.

In carrying out our invention we provide a main frame consisting of metal (preferably aluminum). It comprises the annular end pieces 1 and 2, which are provided with slots 3 extending inwardly from the periphery of the rings toward their centers. These annular end pieces or rings are joined together by longitudinal bars 4 in the manner shown in Fig. 2.

Arranged to fit in the slots 3 is a series of electrodes of the form shown in Fig. 4. These consist of a strip of conducting material 5 of a thickness to correspond with the thickness of the slots 3. The strip 5

has a series of laterally extending teeth 6. When these electrodes are placed in the slots the ends of the teeth will lie at the same distance from the center of the rings as shown in Fig. 3. The electrodes are held in place by means of rings 7, which fit over the annular members 1 and 2.

In Fig. 1, we have shown a dielectric which, in this instance, is a thin glass tube 8. Within the tube at a short distance from each end is an insulating washer 9. Close to the washer is a semi-solid insulating partition 10. This may be made of any suitable insulating substance, such as paraffin wax. On each end of the tube 8 is a cap 11 made of suitable insulating material. The outside diameter of the cap is such that it will fit in the central openings 12 of the annular members 1 and 2, thereby centering the tube 8 with respect to the teeth 6 of the electrodes 5. Between the washers or partitions 9 the tube is filled with finely powdered conducting material 13. A metal conducting rod 14 extends through the tube from end to end, through the washers 9, insulating portions 10, and through the caps 11. The ends of the rod 14 are threaded to receive nuts such as those shown at 15. These hold the caps in place.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The rod 14 forms one terminal to which one pole of high potential machine, such as a transformer or static machine, may be attached, the other pole being connected with the frame which holds the electrodes 5. With an arrangement such as that just described, the dielectric prevents sparking between the teeth 6 and the electrodes 5, and the conducting material 13 within the tube, but it permits a static discharge through the glass in the form of a glow. Now if air be blown through the frame 20 between the teeth 6 and the surface of the glass, ozone will be produced according to the well known effect of a static discharge upon air. One or more of such ozone producing units as that described above may be used. These units are preferably set vertically in the frame 20, and all spaces in the sides of the frame excepting that occupied by the units will be closed up. Air is either drawn through or blown through horizontally, in the direction indicated by the arrows in Figs. 5 and 6, so

that all the air will be compelled to pass through the comb-like electric discharge electrodes and around on the outside of the glass or electric tube. This, as will be readily understood, provides means for operating on a large quantity of air. Moreover, the glow being produced on the outside of a dielectric tube, the device is more easily cleaned than where the glow is produced on the inside, since all that is necessary is to withdraw the tube from the main frame and wipe off the outside surface. It may be immediately replaced, and owing to the use of self centering caps 11 the electrodes themselves may be immediately brought into their proper position. This last feature is very important, since it is necessary that the proper air gap must be provided for the most efficient working of the machine.

20 In our device the air passes either through the slots of the comb-like electrodes 6, or directly through the air gap between these electrodes and the glass dielectric, and in either case the air is brought under the immediate influence of the electric glow. This results in a great efficiency, and the ozone is exceedingly pure.

We claim:

1. In an ozone producing machine, a frame, a series of radially extending plates carried by said frame, each of said plates having teeth extending toward the center of the frame, a hollow dielectric tube carried by the frame, said tube being centered in said frame between said electrode teeth, a conductor disposed within the tube, and means carried by said tube for centering the latter in the frame.

2. In an ozone producing machine, a frame comprising annular end pieces, longitudinal strips connecting said annular end pieces together, a hollow dielectric, end caps for said dielectric arranged to fit within said annular end pieces, a conductor on the inside of said dielectric, and a series of radially extending plates carried by said annular end pieces, each of said plates having teeth arranged to extend toward the outside of said dielectric.

3. In an ozone producing machine, a frame comprising a pair of annular radially slotted end pieces, a series of radially extending plates carried in the slots in said annular end pieces, each of said plates being provided with inwardly extending teeth, a glass tube, conducting material within said glass tube, insulating caps secured to said glass tube, said insulating caps being arranged to enter the annular openings in said slotted end members and to be held in said openings after centering the tube.

4. In an ozone producing machine, a frame comprising end members slotted radially, a series of radially extending plates carried in the slots in said end members, each of said plates having teeth arranged to extend toward the center of the frame, a hollow dielectric tube carried by the frame, and a metal conductor disposed within said tube.

5. In an ozone producing machine, a frame comprising end members slotted radially, a series of radially extending plates carried in the slots in said end members, each of said plates having teeth arranged to extend toward the center of the frame, a hollow dielectric tube carried by the frame, a metal conductor disposed within said tube, and rings for holding said radially extending plates in position.

6. In an ozone producing machine, a frame comprising end members slotted radially, a series of radially extending plates carried in the slots in said end members, each of said plates having teeth arranged to extend toward the center of the frame, a hollow dielectric tube carried by the frame, a metal conductor disposed within said tube, rings for holding said radially extending plates in position, and a powdered conducting material disposed between said metal conductor and the inner surface of said dielectric tube.

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