J. STEYNIS.

APPARATUS FOR PRODUCING OZONE.

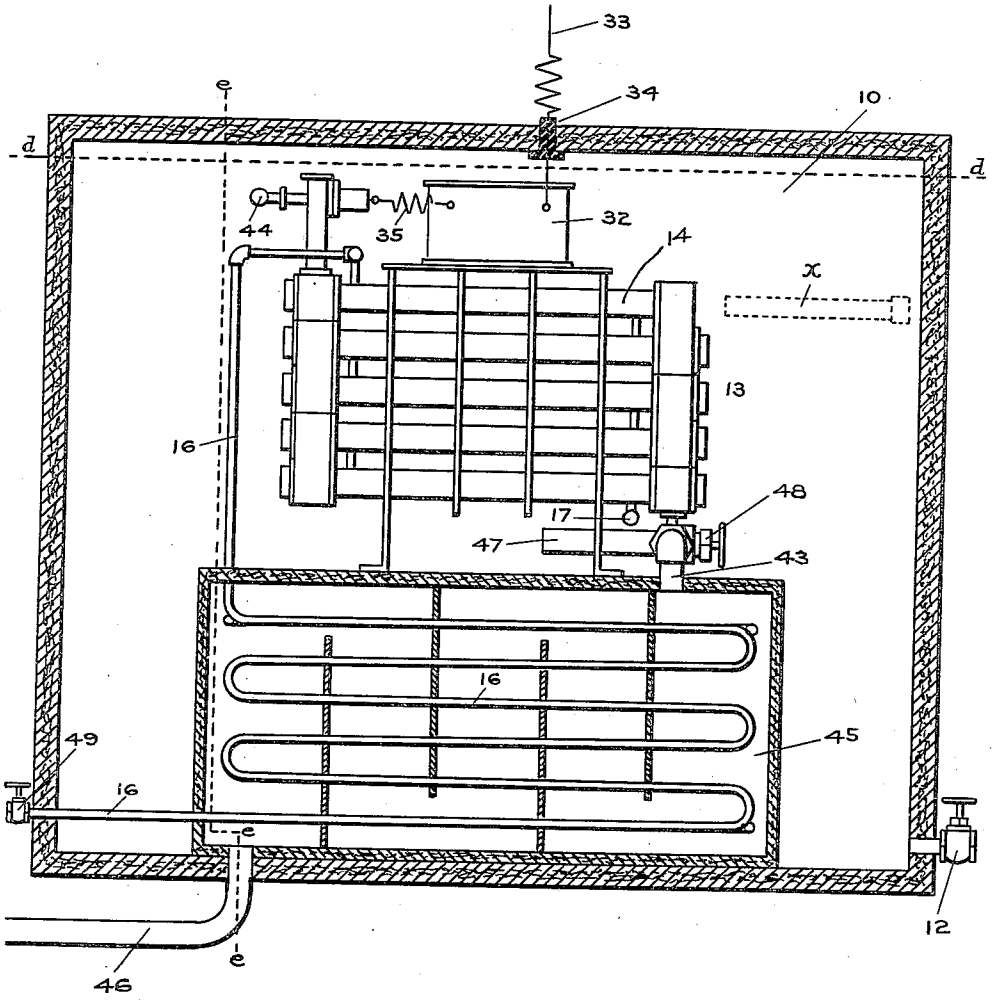
APPLICATION FILED MAR. 11, 1915.

1,201,380.

Patented Oct. 17, 1916.

3 SHEETS—SHEET 1.

FIG. 1



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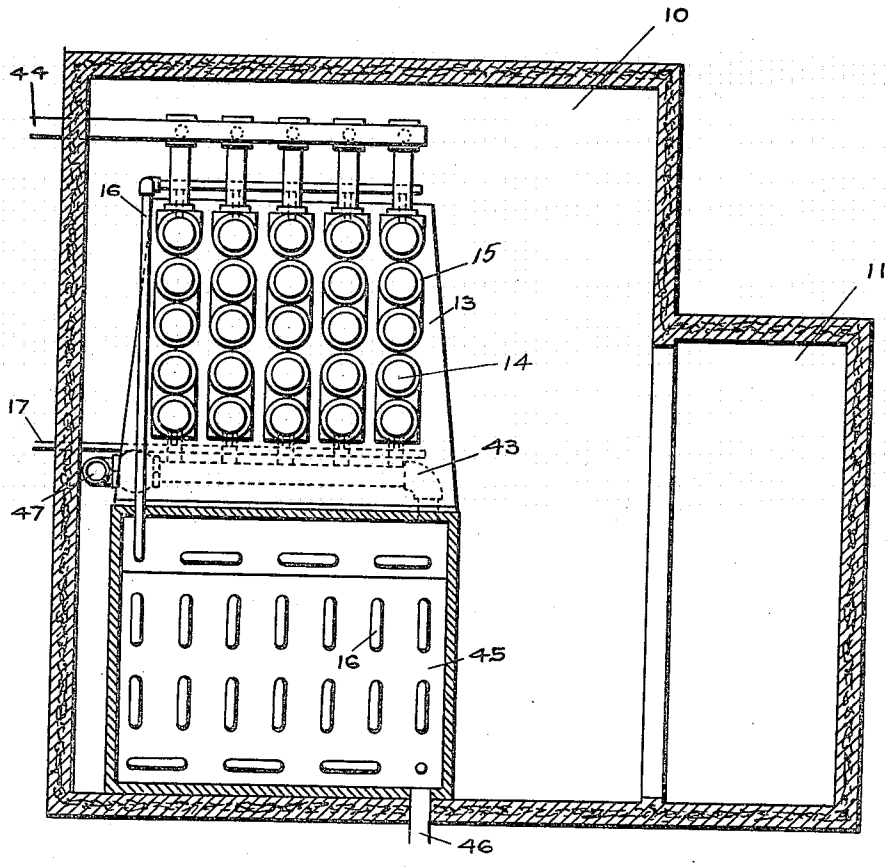
3 SHEETS—SHEET 2.

FIG. 2



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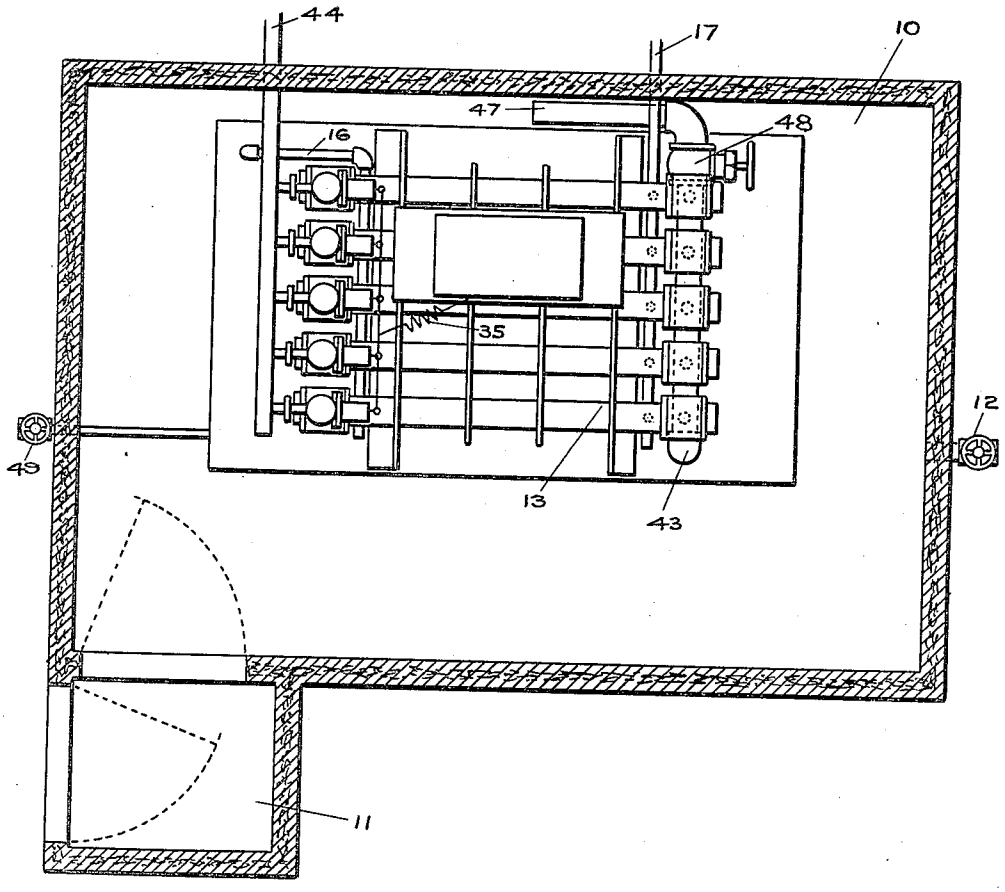
3 SHEETS—SHEET 3.

FIG. 3



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PRODUCING OZONE.

1,201,380. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed March 11, 1915. Serial No. 13,772.

To all whom it may concern:

Be it known that I, JAN STEYNIS, a subject of the Queen of the Netherlands, residing at Bay Shore, county of Suffolk, State of New York, have invented certain new and useful Improvements in Apparatus for Producing Ozone, of which the following is a full and clear description.

My invention relates to apparatus for producing ozone, and particularly to apparatus adapted for use in practising the method described by me in my Patent No. 906,486.

One object of my invention is to provide an apparatus which will produce large quantities of ozone more economically and more efficiently than has been possible heretofore.

A further and more specific object is to provide an apparatus which will be free of troubles arising from moisture condensing on the several parts subjected to high potential currents.

I accomplish these objects by placing the entire ozone generator in an air tight heat insulated dry air casing or chamber, and I make this casing or chamber large enough to accommodate the entire generator and, in addition, provide enough room to accommodate the attendant and to permit any usual repairs or replacements to be made therein.

The arrangement is, therefore, such that the generator, while in operation and while being repaired, is at all times protected from the moist atmosphere and the electrodes and dielectrics may be withdrawn and replaced without danger of moisture depositing and interfering with the operation of the apparatus. I also preferably bring the low tension current used by the apparatus into this dry air compartment and transform it to the desired high potential by a transformer located in the compartment. When this is done there is no trouble in insulating the conductors at the point where they enter the casing.

Other objects and advantages of my invention will appear from the description of the preferred embodiment described in the accompanying specification.

In the drawing—Figure 1 is a vertical sectional view of the casing and generating apparatus. Fig. 2 is a vertical sectional view of the casing taken on line *e—e* of Fig. 1. Fig. 3 is a horizontal sectional view of the casing taken on line *d—d* of Fig. 1.

The chamber 10, which contains practically all of the generating apparatus, is substantially air tight, and is provided with an air lock 11, and a manually controlled valve 12, through which air may be withdrawn from the chamber. The ozone generator proper, 13, is located within this chamber and comprises a plurality of vertical rows of tubes 14, the tubes of each row being connected in series and the several rows being connected in parallel. The number and arrangement of the tubes is, however, not important. Each tube is preferably made up of two sections extending outward from the center to facilitate the assembling of the apparatus. The several rows of tubes are substantially identical. Each tube is provided with a cooling jacket 15, adapted to receive a cooling agent, such as ammonia gas. The jackets of each row may be connected in series, and the several rows of jackets in parallel so that the cooling medium may enter the apparatus by the conduit 16, and after passing through the jackets, be carried away by the conduit 17.

Within the chamber 10 is the transformer 32, supported in any suitable manner, as shown in Fig. 1. The primary leads 33 of the transformer pass through one of the walls, or ceiling of the chamber as shown at 34. The primary circuit may be supplied with measuring instruments, such as a volt meter and a wattmeter, not shown, which are placed outside of the room. One terminal of the secondary circuit is grounded and the other is connected to the customary inner electrodes by means of the lead 35.

The high tension current from the transformer will, therefore, cause silent or streaming discharges to take place between the inner electrodes and the outer grounded electrodes, contained in the tubes 14, and air passing through these tubes will accordingly be ozonized. Such air enters the generator through the conduit 43, and passes out in the form of ozone, or ozonized air through the conduit 44.

Located within the chamber 10, and below the ozone generator 13, as illustrated, is the cooling or drying device 45, which, by reason of the cooling medium flowing through the coiled conduit 16 contained therein, cools and dries the air admitted through the inlet 46. The air thus cooled is admitted to the ozone generator through the conduit 43, heretofore referred to. This conduit 43 has an extension 47, which, when the valve 48 is

opened, supplies cool, dry air to the chamber 10. When the valve 48 is closed the extension 47 is inoperative, and all of the cooled and dried air is supplied to the ozone generating tubes.

The mode of operation of the device is as follows: Cooling fluid is made to flow through the conduit 16 by manipulation of the valve 49 and air is supplied to the drying device through the conduit 46. The valves 48 and 12 are now open allowing the air which has been dried to pass into the chamber 10, through the extension 47, thus displacing the moist atmospheric air which passes out through the open valve 12. When the chamber 10 has been filled with dry air, the valves 48 and 12 are closed, and high tension electric current is applied to the electrodes through the transformer 32. All of the air which passes through the drying device is now supplied to the ozone generating tubes, whereby it is converted into ozone which is discharged at 44.

It will be observed that the transformer and the entire high tension circuit are located within the chamber which is supplied with dried air and in this way all danger of the deposit of moisture from the air on the high tension circuit, and the consequent grounding of the circuit, is eliminated. Also, when it is necessary to remove the electrodes and dielectrics they are taken into the dry air of the chamber, as shown at x in Fig. 1, instead of into the moist atmospheric air as has been necessary heretofore. Thus no moisture can collect on them or the exposed parts of the generator and they can be repaired or replaced without danger of short circuiting or grounding the machine.

The particular construction by reason of which it is possible to remove the electrodes and dielectrics in sections from the tubes, forms no part of my present invention and accordingly is not described herein. Reference is, however, made to my copending application, Serial No. 13,269, filed March 9, 1915, for a description of a construction which may be used in this connection.

What I claim is:

1. In an apparatus of the character described, a substantially air tight chamber, means for supplying dried air to said chamber, and an ozone generator located within said chamber and provided with removable electrodes, whereby said electrodes may be removed from the generator without being removed from the chamber.

2. In an apparatus of the character described, a substantially air tight chamber, means for supplying dried air to said chamber, an ozone generator located within said chamber, and means through which air may be removed from said chamber.

3. In an apparatus of the character described, a substantially air tight chamber provided with an air lock, means for supplying dried air to said chamber and an ozone generator located within said chamber.

4. In an apparatus of the character described, a substantially air tight chamber provided with an air lock, means through which air may be removed from said chamber, means for supplying dried air to said chamber, and an ozone generator located within said chamber.

5. In an apparatus of the character described, a substantially air tight chamber, an ozone generator within said chamber, and means also within said chamber for supplying dried air to said chamber and to said generator.

6. In an apparatus of the character described, a substantially air tight chamber, a plurality of generator tubes, a transformer for supplying current to said tubes, and means for supplying dried air to said chamber and to said tubes, said tubes, transformer, and air supplying means being located within said chamber.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAN STEYNIS.

Witnesses:
MERRELL E. CLARK,
WALTER S. JONES.