

1 591 815

# PATENT SPECIFICATION

(11) 1 591 815

(21) Application No. 38123/77 (22) Filed 13 Sept. 1977  
(44) Complete Specification published 24 June 1981  
(51) INT CL<sup>3</sup> C01B 13/11  
(52) Index at acceptance  
H5H 4A



## (54) OZONE GENERATOR

(71) I, YU PIN, a citizen of the Republic of Singapore, of Block 19 211—C, Corporation Drive, Jurong Town, Singapore 22, Republic of Singapore, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved ozone generator. The use of ozone as a powerful oxidizing sterilizing and purifying agent is well known but its use is not as widespread as it might be, due partly to the hitherto high cost of producing it. The ozone generator of the present invention is a relatively low cost, easily used and installed unit.

According to the present invention I provide an ozone generator comprising a housing provided with a gas flow channel along which oxygen or an oxygen-containing gas is arranged to flow, and a pair of electrodes positioned on opposite sides of said gas flow channel, one of said electrodes being of a multi-finned construction the fins of which extend towards the other of said electrodes.

A preferred embodiment of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic representation of apparatus to be used in the production of ozone.

Figure 2 is a longitudinal cross section of an ozonizer,

Figure 3 is a transverse cross section of the ozonizer shown in Figure 3.

Figure 4 is a perspective view of the electrode used in the ozonizer shown in Figures 2 and 3.

Ozone is produced when oxygen, or a gas such as air containing oxygen, is subjected to an electric discharge which ionizes the O<sub>2</sub> molecules which on recombination form a proportion of O<sub>3</sub> molecules. This procedure is used in the apparatus of the present invention.

As shown in Figure 1, air enters the apparatus 'A' by way of a pump 5 through an inlet 1, passes through a filter 2, a heat exchanger 3 and a moisture removal unit 4. The outlet of the pump 5 passes the pressurized air through an ozonizer 6 where it is subjected to an electric discharge. The ozonizer 6 is supplied with a high voltage from a power supply unit 7, which incorporates a transformer which steps the mains voltage of 110 or 240 volts up to 35,000 to 45,000 volts. The details of the construction of the ozonizer 6 will be described later.

Gas containing the ozone produced in the ozonizer 6 is expanded into an expansion chamber 8 by way of a pressure reduction nozzle 9. The gas now passes through the heat exchanger 3 in which the now cooled ozone containing gas acts to cool the incoming gas. This cooling of the incoming gas acts to condense any moisture contained in the gas which is removed in the unit 4. At the downstream side 10 of the heat exchanger 3, the ozone containing gas is passed to an outlet pipe 11 from where it is collected for use.

As shown in Figures 2 and 3, the ozonizer 6 includes electrodes 12 and 13 mounted on opposite sides of a flow channel 14 along which the air passes. Each electrode is mounted in a insulated support member 15 and 16 respectively, which are interconnected by screws 17. The electrode 13 consists of copper block 18 which is slotted on one face to receive a series of fins 19. The other electrode 12 consists of a flat plate covered by an insulating partition 20. The partition prevents arcing between the electrodes 12 and 13. Springs (not shown) act to hold the partition 20 in place when the two support members are interconnected.

Terminals 21 and 22 are connected to the electrodes 12 and 13 respectively and are connected to opposite terminals of the power supply 7.

The support member 16 is formed with air inlet and outlet nozzles 23 and 24 respectively which are connected by

50

55

60

65

70

75

80

85

90

95

(9)

2

1,591,815

2

appropriate pipes to pump 5 and pressure-reduction nozzle 9 respectively. The sizes of the nozzles 23 and 24 can be adjusted to provide the appropriate gas flow rate.

5 WHAT I CLAIM IS:—

1. An ozone generator comprising a housing provided with a gas flow channel along which oxygen or an-oxygen containing gas is arranged to flow, and a pair of electrodes positioned on opposite sides of said gas flow channel, one of said electrodes being of a multi-finned construction the fins of which extend towards the other of said electrodes.

15 2. An ozone generator as claimed in claim 1 wherein said housing is separable into two parts, each part supporting one of said electrodes.

20 3. An ozone generator as claimed in claim 1 or claim 2 wherein the other electrode of said pair is in the form of a flat plate forming

a wall of said channel, said plate being covered by an insulating partition member extending between the electrodes.

4. An ozone generator as claimed in any of claims 1 to 3 wherein a heat exchanger is provided through opposite sides of which the gas entering and exiting from said flow channel are passed.

5. An ozone generator as claimed in any of claim 1 to 4 wherein means are provided for filtering and removing any moisture from the gas before it enters said housing.

6. An ozone generator substantially as described herein with reference to the accompanying drawings.

For the Applicant  
CARPMAELS & RANSFORD,  
Chartered Patent Agents,  
43 Bloomsbury Square,  
London. WC1A 2RA.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1981  
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

(9)

2

1,591,815

2

appropriate pipes to pump 5 and pressure-reduction nozzle 9 respectively. The sizes of the nozzles 23 and 24 can be adjusted to provide the appropriate gas flow rate.

5 WHAT I CLAIM IS:—

10 1. An ozone generator comprising a housing provided with a gas flow channel along which oxygen or an-oxygen containing gas is arranged to flow, and a pair of electrodes positioned on opposite sides of said gas flow channel, one of said electrodes being of a multi-finned construction the fins of which extend towards the other of said electrodes.

15 2. An ozone generator as claimed in claim 1 wherein said housing is separable into two parts, each part supporting one of said electrodes.

20 3. An ozone generator as claimed in claim 1 or claim 2 wherein the other electrode of said pair is in the form of a flat plate forming

a wall of said channel, said plate being covered by an insulating partition member extending between the electrodes.

4. An ozone generator as claimed in any of claims 1 to 3 wherein a heat exchanger is provided through opposite sides of which the gas entering and exiting from said flow channel are passed. 25

5. An ozone generator as claimed in any of claim 1 to 4 wherein means are provided for filtering and removing any moisture from the gas before it enters said housing. 30

6. An ozone generator substantially as described herein with reference to the accompanying drawings. 35

For the Applicant  
CARPMAELS & RANSFORD,  
Chartered Patent Agents,  
43 Bloomsbury Square,  
London. WC1A 2RA.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1981  
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

