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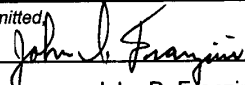
PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
Bernard R.		Berntson		North Muskegon, MI	
☐ Additional inventors are being named on the ___ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
OXYGEN CONCENTRATOR CONSTRUCTION					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
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ENCLOSED APPLICATION PARTS (check all that apply)					
☒ Specification		Number of Pages		☐ CD(s), Number	
		9			
☒ Drawing(s)		Number of Sheets		☒ Other (specify)	
		1		Return Postcard	
☐ Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
☐ Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)	
☐ A check or money order is enclosed to cover the filing fees				\$160.00	
☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number:		17-0055			
☐ Payment by credit card. Form PTO-2038 is attached.					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
☒ No.					
☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

SIGNATURE



TYPED or PRINTED NAME

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Date

07/24/03

REGISTRATION NO.

31,356

(if appropriate)

Docket Number:

900093.00018

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

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GCE - Exhibit 1067, Page 1
GCE Gas Control Equipment Inc. v. VBOX, Inc.

IPR2023-00527

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OXYGEN CONCENTRATOR CONSTRUCTION

CROSS-REFERENCE TO RELATED APPLICATION

[0001] Not applicable.

STATEMENT CONCERNING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

FIELD OF THE INVENTION

[0003] This invention relates to oxygen concentrators, and in particular to medical oxygen concentrators for delivering a flow of oxygen enriched air to a patient.

BACKGROUND OF THE INVENTION

[0004] Medical oxygen concentrators are in widespread usage by patients who require oxygen-rich air as part of their treatment. These oxygen concentrators are sold by a variety of manufacturers and with different models offered by each manufacturer which differ in features and price. Each oxygen concentrator is similar to the next, however, in that each produces oxygen enriched air using certain common components.

[0005] Typically, oxygen concentrator manufacturers have obtained the common components from the manufacturers of these components and assembled them together as part of their oxygen concentrator. The mating of these components to one another to efficiently generate oxygen enriched air has required considerable technical expertise and recurring problems have arisen each time a new medical oxygen concentrator model is introduced. Therefore, a need exists for a different way of making an oxygen concentrator.

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SUMMARY OF THE INVENTION

[0006] The invention provides such a way by providing an oxygen concentrator with a separate oxygen-rich air generator. The oxygen-rich air generator is made as a separate unit that is manufactured upstream in commerce from the oxygen concentrator manufacturer. The oxygen-rich air generator can therefore be optimized for efficient usage in many different oxygen concentrators.

[0007] Many of the complexities of making an efficient oxygen-rich air generator center around the compressor and the proper matching of the other components of the oxygen-rich air generator to the particular compressor utilized. The pump manufacturer is therefore in the best position to solve these issues. Therefore, preferably, the oxygen-rich air generator is manufactured by the pump manufacturer.

[0008] The invention provides a new construction of an oxygen concentrator that includes an oxygen-rich air generator and a new method of making oxygen concentrators, in particular, a method that includes making an oxygen concentrator using an oxygen-rich air generator. The invention also provides a new method of supplying oxygen concentrator manufacturers with components for their products.

[0009] The foregoing and other objects and advantages of the invention will be apparent from the detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Fig. 1 is a perspective schematic view of an oxygen concentrator of the invention; and

[0011] Fig. 2 is a perspective schematic view of an oxygen-rich air generator for the oxygen concentrator of Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Fig. 1 illustrates an oxygen concentrator 10 of the invention. The oxygen concentrator 10 includes a housing or cabinet 12, which may be insulated for sound attenuation or include other elements such as vibration isolators or vibration cancellation components. The housing 12 would be unique to a particular model or brand of oxygen concentrator, and would be provided by an oxygen concentrator manufacturer. The housing 12 may have wheels 14 for easy mobility of the concentrator 10, a power cord 16 for plugging into a wall outlet, switches 18 for operating the concentrator, controls 20 such as a pressure or flow regulator, a pressure or flow meter or other adjustment or monitoring devices or displays for adjusting the concentrator to desired operation levels or monitoring it, a handle 22, and a patient delivery system 24 that may include a humidification bottle 26 and a hose and mask or canula 28 which directly interfaces with the patient. The oxygen concentrator 10 may also have a service access port 30 and would have an oxygen-rich air generator (ORAG) 32 as further described below.

[0013] The ORAG 32 has a chassis 34 that is separate from the housing 12 of the oxygen concentrator 10 and is mounted inside of the housing 12. The chassis 34 mounts the components of the ORAG 32. These components include a pump 36 and adsorbent containers 42 in which sieve beds are contained. The pump 32 may include a compressor, a motor to drive the compressor, and an isolation/vibration and sound attenuation system. Inlet air for the pump 36 is preferably provided through inlet filtration 44 and a valve system 46 for switching the flow of the pump 36 between the adsorbent containers 42 is also mounted to the chassis 34. The adsorbent containers 42 are in selective fluid communication with the inlet and or outlet of the pump 36 via tubing or other connections with the valve system 46, as is well-known. A cooling fan 48 is preferably provided to cool the components of the ORAG 32 and a power and electrical

control connector 50 is provided mounted to the chassis 34 to easily make power and electrical control connections with the controls 20 and switches 18 of the oxygen concentrator 10.

[0014] As different oxygen concentrator manufacturers control the valves 46 differently, the particular algorithm or control system for controlling the valves may be included as part of the oxygen concentrator 10, separate from the ORAG 32. Providing the connection 50 on the ORAG 32 enables each oxygen concentrator manufacturer to use their own control system or control algorithm to control how the adsorbent containers 42 interface with the pump 36.

[0015] The ORAG 32 also preferably includes an oxygen-rich air tank 54 which is connected directly or indirectly to the output of the adsorbent containers 42 and an oxygen-rich air outlet 56 which can be connected to the patient delivery system 24.

[0016] The pump 36 may be a compressor and/or a vacuum pump, depending upon the mode of operation of the ORAG 32. Any suitable mode of operation may be used, and these modes are well-known. The ORAG 32 may also include a motor control system for controlling the pump motor and could also include control systems for controlling the valves which connect the pump inlet and/or outlet to the adsorbent beds, and could also include a control system for the cooling fan.

[0017] The electrical control connections 50 of the ORAG 32 to the other components of oxygen concentrator 10 permit the use of sensors within the ORAG 32 to provide feedback to controls or indicators of the oxygen concentrator 10 outside of the chassis 34, as well as to provide power and control inputs to the ORAG 32. The ORAG 32 may also include an exhaust air cooling system for the pump 36. The adsorbent containers 42 include the sieve beds and a retention and filtration system as are well-known. The oxygen concentrator 10, outside of the ORAG 32, may include electrical switches, flow controls, control panels and displays, flow

indicator displays, and flow regulation controls. Apart from the ORAG 32, the oxygen concentrator 10 would also preferably include sound attenuation insulation or devices, a wiring harness to connect the other components of the oxygen concentrator 10 to the ORAG 32, a power cord, and pneumatic hose connections to the ORAG 32.

[0018] Some components could be provided either as part of the ORAG 32 or not. For example, if an oxygen concentrator manufacturer wanted to use its own control system for controlling the valves that switch the pump outlet/inlet between the adsorbent containers, these controls would be provided as part of the oxygen concentrator 10 outside from the ORAG 32. However, these controls could be provided as a standard part of the ORAG 32, or an oxygen concentrator manufacturer's custom controls could be provided as part of the ORAG 32.

[0019] To make the ORAG 32, many different constructions are possible. For example, any type of pump could be used, i.e., a linear pump, a wobble piston pump, a reciprocating pump, an axial pump, or any other structure capable of producing a gas flow at the required pressures could be used. Also, any number of sieve beds could be used, and any suitable control system could be used to control the adsorption and desorption of them. It may also be desirable to integrate components formerly considered separate. For example, the sieve bed control valves could be integrated into the head or cap of the pump chamber, the sieve beds may be incorporated into the pump housing, the pump cylinder or housing may be the mounting structure or chassis for one or more other components, the pump housing may double as an accumulation tank for oxygen rich gas delivery to a patient and/or as a humidification chamber, etc. Therefore, as used herein, "connected" means integrally connected or connected with fasteners, adhesives, welding, or any other permanent, semi-permanent, or removable means.

[0020] Preferred embodiments of the invention have been described in considerable detail. Many modifications and variations to the preferred embodiments described will be apparent to persons of ordinary skill in the art. Therefore, the invention should not be limited to the embodiments described.

We Claim:

1. An oxygen concentrator, comprising:

an oxygen rich air generator to produce oxygen enriched air from atmospheric air,
including:

a mounting structure;

5 a compressor connected to the mounting structure;

one or more valves in communication with the compressor and
connected to the mounting structure; and

one or more sieve beds in selective communication with the
compressor by way of the valves and connected to the mounting structure;

10 and

a concentrator housing, the housing mounting one or more components selected
from the group consisting of a meter, a regulator, a patient gas delivery device and a
control panel;

wherein the oxygen rich air generator is mounted as a unit to the concentrator
15 housing.

2. An oxygen concentrator as claimed in claim 1, wherein the oxygen rich air
generator is enclosed in the concentrator housing.

3. An oxygen concentrator as claimed in claim 1, wherein the oxygen rich air
generator is in communication with one or more of the components

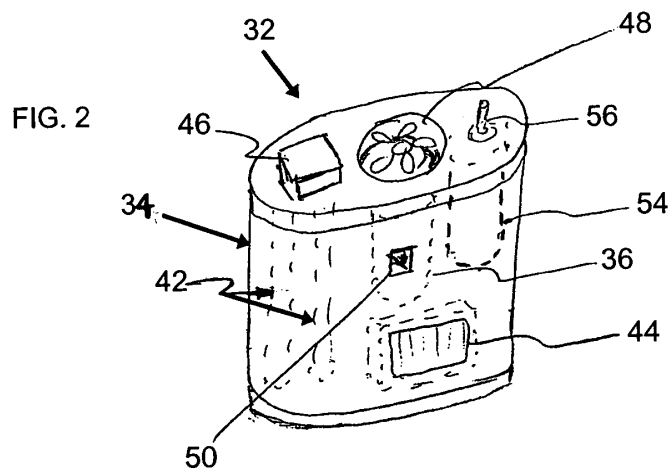
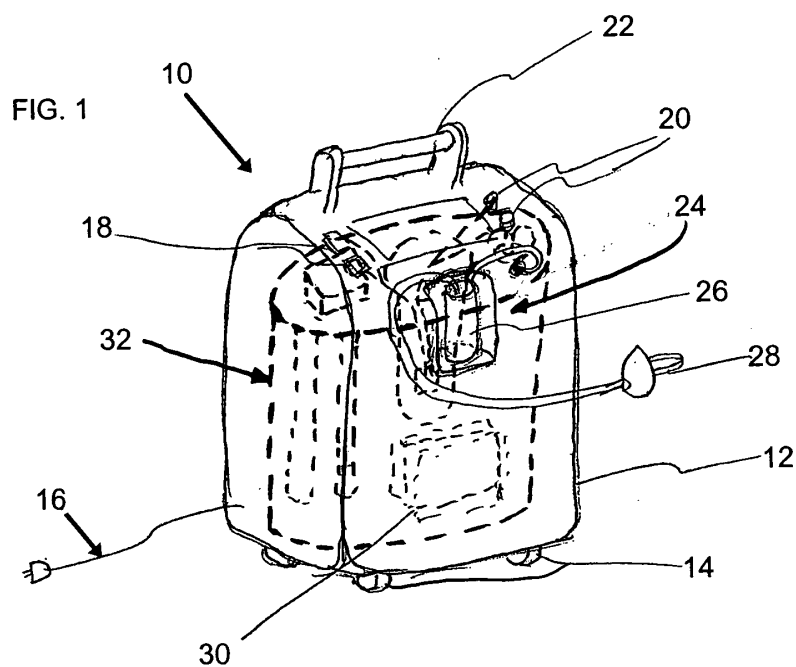
4. A method of making an oxygen concentrator, comprising the steps of:
making an oxygen rich air generator to produce oxygen enriched air from
atmospheric air having a chassis that mounts a compressor, one or more valves and one
or more sieve beds for producing oxygen enriched air; and

5 assembling the chassis to a concentrator housing.

5. A method of making an oxygen concentrator as claimed in claim 4,
wherein the concentrator housing includes at least one component selected from the
group consisting of a meter, a regulator, a patient gas delivery device and a control panel
and the oxygen rich air generator is affixed to at least one of said components.

6. A method of doing business in the field of supplying oxygen concentrator
manufacturers with components for making oxygen concentrators, comprising the steps
of offering an oxygen concentrator manufacturer an option of having two or more oxygen
concentrator components selected from the group consisting of a compressor, one or
5 more sieve beds, one or more valves, an exhaust cooling system and a compressor
cooling system preassembled into an oxygen rich air generator having a chassis which is
separate from a housing of the concentrator, the oxygen rich air generator to be received
by the oxygen concentrator manufacturer as a unit and to be mounted by the oxygen
concentrator manufacturer to a housing of the oxygen concentrator manufacturer.

7. A method of doing business as claimed in claim 5, wherein the oxygen rich air generator is affixed by the oxygen concentrator manufacturer to one or more other components selected from the group consisting of a meter, a regulator, a patient gas delivery device and a control panel.



PATENT APPLICATION SERIAL NO. _____

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