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(54) Title: A SYSTEM AND METHOD FOR CONTROLLING OXYGEN SUPPLY EQUIPMENT

(57) Abstract: Disclosed herein is a system 102 and method for controlling oxygen supply equipment. The system 102 is equipped with pressure sensors 212, 214 coupled to both low-flow and highflow oxygen supply equipments 104, 106. Depending on the oxygen supply selected by a user for the patient, the pressure sensor 212, 214 monitors the current pressure of the preset oxygen supply during an inhalation phase corresponding to the patient. If the current pressure is less than a minima value or if a pressure drop rate is higher than or equal to a threshold rate or both, the system 102 generates an alarm notifying the user to check the preset oxygen supply and in the meanwhile switches the preset oxygen supply from either high-flow oxygen supply equipment 106 to the low-flow oxygen supply equipment 104 or vice-versa.

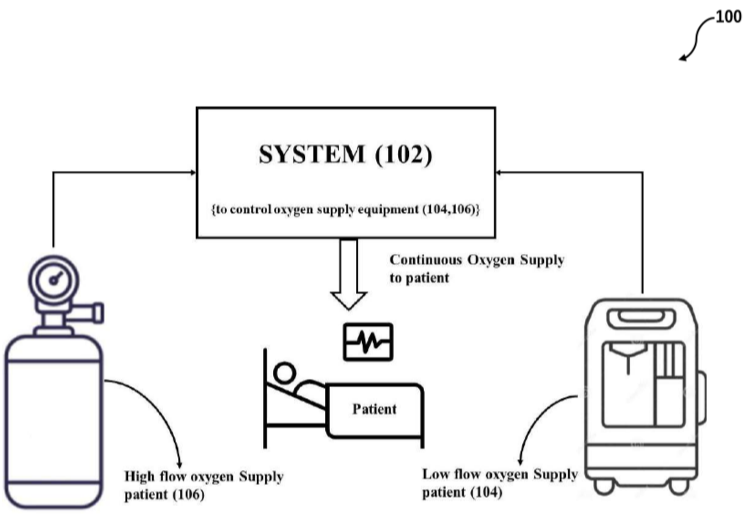

Figure 1

<u>FORM 2</u>

THE PATENTS ACT 1970
(39 OF 1970)
&
The Patent Rules, 2003
Complete Specification
(See Section 10 and Rule 13)

1. TITLE OF THE INVENTION

A SYSTEM AND METHOD FOR CONTROLLING OXYGEN SUPPLY EQUIPMENT

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3. PREAMBLE TO THE DESCRIPTION

COMPLETE

The following specification particularly describes the invention and the manner in which it is to be performed.

DESCRIPTION

TECHNICAL FIELD

[001] The present invention generally relates to ventilator systems and more particularly to providing a system and method for controlling oxygen supply equipments coupled to ventilator systems.

BACKGROUND OF INVENTION

[002] The following description includes information that may be useful in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed invention, or that any publication specifically or implicitly referenced is prior art.

[003] Ventilator systems are very commonly used to deliver a fluid, such as oxygen, air, or other breathing gas or gas mixture, to an airway of patient to augment, supplement, or substitute the patient's own ventilatory effort and/or to treat the patient with a pressure support therapy. In such systems, it is highly important that a continuous flow of the fluid (hereinafter referred to as “oxygen”) at a required pressure is maintained in order to ensure that the patient in need does not suffer due to either disrupt in the flow of oxygen or fluctuating pressure.

[004] Further, there are many types of ventilator systems available in the market based on the type of oxygen supplies they are compatible with. Some ventilator systems only support oxygen cylinders (hereinafter referred to as “high-flow oxygen supply equipment”) while others only support oxygen concentrators (hereinafter referred to as “low-flow oxygen supply equipment”). Also available are those ventilators that can support both high-flow and low-flow oxygen supply equipments. With any of the aforementioned types of ventilator systems, the major objective is to ensure a continuous supply of oxygen to the patient at a required pressure level. However, there can be many issues that can hinder a continuous oxygen supply to the patient, for instance, a fault in the oxygen supply line such as leakage etc that may result in reduced pressure or emptying of the oxygen supply equipments, etc. Therefore, while administering oxygen supply to a patient, a medical professional must cautiously and timely monitor the patient. This is tedious and may often result in situations that may be detrimental to the health of the patients and in worst cases, their survival. Moreover if multiple oxygen supply equipment are being used, it becomes more challenging in managing one vis-à-vis the other.

[005] There is, therefore, a need for a system that overcomes the above-mentioned shortcomings and provides additional advantages such as an alarm system that can notify the medical professional of one or more issues in the oxygen supply line and an automatic switching mechanism that can switch between high-flow supply line and the low-flow supply line on generation of an alarm.

SUMMARY OF INVENTION

[006] The present disclosure overcomes one or more shortcomings of the prior art and provides additional advantages discussed throughout the present disclosure. Additional features and advantages are realized through the techniques of the present disclosure. Other embodiments and aspects of the disclosure are described in detail herein and are considered a part of the claimed disclosure.

[007] In one non-limiting embodiment of the present disclosure, a system for controlling oxygen supply equipment is disclosed. The system comprises a processor and a memory. The processor is further coupled to the oxygen supply equipment comprising a high-flow oxygen supply equipment capable of supplying oxygen in a high-pressure range and a low-flow oxygen supply equipment capable of supplying oxygen in a low-pressure range. The processor is further configured to detect current pressure of a preset oxygen supply during each inhalation phase of a patient, wherein the preset oxygen supply is provided by either the high-flow oxygen supply equipment or the low-flow oxygen supply equipment. The processor is further configured to compare the current pressure of the preset oxygen supply with either a low-pressure minima associated with the low-pressure range, or a high-pressure minima associated with the high-pressure range. The processor, based on comparison, is further configured to switch the preset oxygen supply from the low-flow oxygen supply equipment to the high-flow oxygen supply equipment when the current pressure falls below the low-pressure minima or switch the preset oxygen supply from the high-flow oxygen supply equipment to the low-flow oxygen supply equipment when at least one of: the current pressure falls below the high-pressure minima, and a pressure drop rate of the current pressure exceeds or is equal to a pressure drop rate threshold. Both the current pressure falling below the high-pressure minima and the pressure drop rate of the current pressure exceeding the pressure drop rate threshold are indicative of emptying of the high-flow oxygen supply equipment.

[008] In one non-limiting embodiment of the present disclosure, a method for controlling oxygen supply equipment is disclosed. The method comprises detecting current pressure of a preset oxygen supply during each inhalation phase of a patient, wherein the preset oxygen supply is provided by either a high-flow oxygen supply equipment or a low-flow oxygen supply equipment, and wherein the high-flow oxygen supply equipment is capable of supplying oxygen in a high-pressure range, and the low-flow oxygen supply equipment is capable of supplying oxygen in a low-pressure range. The method further comprises comparing the current pressure of the preset oxygen supply with either a low-pressure minima associated with the low-pressure range, or a high-pressure minima associated with the high-pressure range. Based on comparison, the method further comprises switching the preset oxygen supply from the low-flow oxygen supply equipment to the high-flow oxygen supply equipment when the current pressure falls below the low-pressure minima or switching the preset oxygen supply from the high-flow oxygen supply equipment to the low-flow oxygen supply equipment when at least one of: the current pressure falls below the high-pressure minima, and a pressure drop rate of the current pressure exceeds or is equal to a pressure drop rate threshold. Both the current pressure falling below the high-pressure minima and the pressure drop rate of the current pressure exceeding the pressure drop rate threshold are indicative of emptying of the high-flow oxygen supply equipment.

[009] The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF DRAWINGS

[0010] The embodiments of the disclosure itself, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings. One or more embodiments are now described, by way of example only, with reference to the accompanying drawings in which:

[0011] Figure 1 depicts an exemplary environment **100** of a system for controlling oxygen supply equipment, in accordance with an embodiment of the present disclosure;

[0012] Figure 2 depicts a block diagram **200** of a system for controlling oxygen supply equipment, in accordance with an embodiment of the present disclosure; and

[0013] Figure 3 depicts a flowchart **300** of a method for controlling oxygen supply equipment, in accordance with an embodiment of the present disclosure.

[0014] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DETAILED DESCRIPTION

[0015] The foregoing has broadly outlined the features and technical advantages of the present disclosure in order that the detailed description of the disclosure that follows may be better understood. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present disclosure.

[0016] The novel features which are believed to be characteristic of the disclosure, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying Figures. It is to be expressly understood, however, that each of the Figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present disclosure.

[0017] Disclosed herein is a system and method for controlling oxygen supply equipment. Oxygen supply equipments such as oxygen cylinders and concentrators are employed in ventilator systems to augment, supplement, or substitute the patient's own ventilatory effort and/or to treat the patient with a pressure support therapy. A continuous supply of oxygen at a required pressure is highly crucial for the well-being of the patient. Conventional systems employing either a high-flow oxygen supply equipment (e.g., oxygen cylinders) or a low-flow oxygen supply equipment (e.g., oxygen concentrators) or both, face certain shortcomings. For instance, the supply of oxygen has to be monitored regularly by a medical professional to ensure that the patient is receiving continuous supply of oxygen. In such a scenario, a negligence at the end of the medical professional can prove detrimental to the well-being of the patient. Further, even if the medical professional is diligent in monitoring the patient, situations like rapid falling of oxygen pressure due to emptying of the oxygen supply equipment is out of his/her control. Furthermore, there is no way of detecting of a fault or a leakage or emptying of the oxygen supply equipment in conventional systems.

[0018] The present disclosure understands this need and provides a system that is equipped with pressure sensors coupled to both the high-flow and low-flow oxygen supply equipments. Depending on the oxygen supply selected by the medical professional for the patient, the pressure sensor monitors the current pressure of the preset oxygen supply during each inhalation phase of the patient. At any point, if the current pressure goes below a minima value or if a pressure drop rate is higher than a threshold rate or both, the system generates an alarm notifying the medical professional to check the preset oxygen supply and in the meanwhile also switches the preset oxygen supply from either high-flow oxygen supply equipment to the low-flow oxygen supply equipment or vice-versa as per the requirement. This provides a buffer time to the medical professional to check the reason for alarm and take necessary actions while ensuring that the patient receives continuous oxygen supply even while the preset oxygen supply is being checked by the medical professional. The detailed working and explanation of the system is described in the subsequent paragraphs.

[001] **Figure 1** depicts an exemplary environment **100** of a system for controlling oxygen supply equipment, in accordance with an embodiment of the present disclosure. It must be noted by a skilled person that the exemplary environment **100** may also be implemented in various environments, other than as shown in **Figure 1**.

[002] The exemplary environment **100** is explained in conjunction with **Figure 2** that shows a block diagram **200** of a system **102**, in accordance with an embodiment of the present disclosure.

[003] In one implementation, the system **102** may comprise an I/O interface **202**, a memory **204,** a processor **210**, a low-pressure sensor **212**, a high-pressure sensor **214** and an alarm device **216**. The memory **204** may be communicatively coupled to the processor **210**. The processor **210** may be communicatively coupled to the low-pressure sensor **212**, the high-pressure sensor **214**, and the alarm device **216.** According to an embodiment, the low-pressure sensor **212**, the high-pressure sensor **214**, and the alarm device **216** may be external to the system **102**. Further, the memory **204** may store patient related data **206** and oxygen supply

equipment data **208**. The significance and use of each of the stored quantities is explained in the subsequent paragraphs. The processor **210** may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. Among other capabilities, the processor **210** is configured to fetch and execute computer-readable instructions stored in the memory **204**. The I/O interface **202** may include a variety of software and hardware interfaces, for example, a web interface, a graphical user interface, and the like. The I/O interface **202** may enable the system **102** to communicate with other computing devices, such as web servers and external data servers (not shown). The I/O interface **202** may facilitate multiple communications within a wide variety of networks and protocol types, including wired networks, for example, LAN, cable, etc., and wireless networks, such as WLAN, cellular, or satellite. The I/O interface **202** may include one or more ports for connecting many devices to one another or to another server.

[0019] In one implementation, the low-pressure sensor **212** is communicatively coupled to a low-flow oxygen supply equipment **104** and the high-pressure sensor **214** is communicatively coupled to a high-flow oxygen supply equipment **106**. The low-flow oxygen supply equipment **104** is capable of supplying oxygen in a low-pressure range while the high-flow oxygen supply equipment **106** is capable of supplying oxygen in the high-pressure range. In accordance with the exemplary embodiment, the low-flow oxygen supply equipment **104** is capable of supplying oxygen in a low-pressure range of 5-7 Psi., while the high-flow oxygen supply equipment **106** in capable of supplying oxygen in a high-pressure range of 5-30 Psi. Such information about the oxygen supply equipment along with other data such as nominal oxygen content, nominal outlet pressure, flow rate and net weight is stored as oxygen supply equipment data **208** in the memory **204**.

[0020] In one implementation, the low-flow oxygen supply equipment **104** and the high-flow oxygen supply equipment **106** are connected to a valve **220** which is further connected to a blower **222** configured to deliver oxygen to the patient. In one embodiment, the valve **220** is a 3/2-type solenoid valve and is configured to actuate in order to allow flow of oxygen from either the low-flow oxygen supply equipment **104** or the high-flow oxygen supply equipment **106** at a given point of time. However, it may be noted by a skilled person that any other suitable type of valve may also be used for the purpose of actuation. Further, in one embodiment, a pressure regulator **218** is provided between the high-pressure sensor **214** and the high-flow oxygen supply equipment **106** in order to regulate the pressure of oxygen supply being released by the high-flow oxygen supply equipment **106**.

[0021] Now, referring to **Figure 1**, the environment **100** shows that the system **102** controls the low-flow oxygen supply equipment **104** and the high-flow oxygen supply equipment **106** in order to ensure a continuous supply of oxygen to the patient. The working of the system **102** begins when a medical professional (hereinafter referred to as "user") selects an oxygen supply to be delivered to the patient based on the patient related data **206** stored in the memory **204**. In one embodiment, the patient related data **206** comprises patient's name, age, address, ailment data and treatment data. In the starting, the oxygen supply to be delivered to the patient may be provided by either the low-flow oxygen supply equipment **104** or the high-flow oxygen supply equipment **106** depending on the user's selection.

[0022] In one embodiment, it is considered that the user selects low-flow oxygen supply equipment **104** based on the patient related data **206**. In this case the preset oxygen supply is provided by the low-flow oxygen supply equipment **104**. The user also sets a low-pressure minima based on the oxygen supply equipment data **208** and patient's requirement. However, it may be noted that the low-pressure minima is always set at a value greater than what is actually required by the patient to be at safer side. For instance, if the patient's requirement is 3 Psi oxygen pressure and the low-flow oxygen supply equipment **104** is capable of providing oxygen within a pressure range of 5-7 Psi, the low-pressure minima may be set as 5 Psi. Once the user selects low-flow oxygen supply equipment **104**, the processor **210** that is communicatively coupled to the valve **220**, actuates the valve **220** so as to allow oxygen supply only from the low-flow oxygen supply equipment **104**. As the preset oxygen supply flows to the patient, the low-pressure sensor **212** detects the current pressure of the preset oxygen supply during each inhalation phase corresponding to the patient. In other words, the current pressure is detected only when the patient inhales oxygen being provided by the low-flow oxygen supply equipment **104**. Upon detecting the current pressure, the processor **210** compares the current pressure with the low-pressure minima. If the current pressure is detected to be below the low-pressure minima, the processor **210** sends a signal to the alarm device **216** to generate an alarm and in the meanwhile also actuates the valve **220** in order to switch the preset oxygen supply to the high-flow oxygen supply equipment **106**. The pressure from the high-flow oxygen supply equipment **106** may be regulated by the pressure regulator **218** in order to meet the required pressure. In this way, while the user checks the reason for alarm, in terms of either a fault in the low-flow oxygen supply equipment **104** or emptying of the low-flow oxygen supply equipment **104**, the patient is continuously supplied with oxygen. This switching mechanism, therefore, provides a buffer time to the user to rectify the situation, that is to replace the low-flow oxygen supply equipment **104** etc., without being worried about the well-being of the patient.

[0023] In another embodiment, it is considered that the user selects high-flow oxygen supply equipment **106** based on the patient related data **206**. In this case, the preset oxygen supply is provided by the high-flow oxygen supply equipment **106**. The user also sets a high-pressure minima based on the oxygen supply equipment data **208** and patient's requirement. However, it may be noted that the high-pressure minima is always set at a value greater than what is actually required by the patient. For instance, if the patient's requirement is 15 Psi oxygen pressure and the high-flow oxygen supply equipment **106** is capable of providing oxygen within a pressure range of 5-30 Psi, the high-pressure minima may be set as 20 Psi. Further, the user also sets a pressure drop rate minima. For instance, in one embodiment, the pressure drop rate threshold may be set as 0.5 Psi/min. Once the user selects high-flow oxygen supply equipment **106**, the processor **210** that is communicatively coupled to the valve **220**, actuates the valve **220** so as to allow oxygen supply only from the high-flow oxygen supply equipment **106**. As the preset oxygen supply flows to the patient, the high-pressure sensor **214** detects the current pressure of the preset oxygen supply during each inhalation phase corresponding to the patient. In other words, the current pressure is detected only when the patient inhales oxygen being provided by the high-flow oxygen supply equipment **106**. The high-pressure sensor **214** also detects a pressure drop rate of the preset oxygen supply. Upon detecting the current pressure, the processor **210** compares the current pressure with the high-pressure minima and simultaneously compares the pressure drop rate with the pressure drop rate threshold. If the current pressure goes below the high-pressure minima or the pressure drop rate becomes higher than the pressure drop rate threshold or a combination of both, the processor **210** sends a signal to the alarm device **216** to generate an alarm and in the meanwhile actuates the valve **220** in order to switch the preset oxygen supply to the low-flow oxygen supply equipment **104**. In this way, while the user checks the reason for alarm, in terms of either a leakage/fault in the high-flow oxygen supply equipment **106** or emptying of the high-flow oxygen supply equipment **106**, the patient is continuously supplied with oxygen. This switching mechanism, therefore, provides a buffer time to the user to rectify the situation, that is to replace the high-flow oxygen supply equipment **106** etc., without being worried about the well-being of the patient.

[0024] **Figure 3** depicts a method **300** for controlling oxygen supply equipment, in accordance with an embodiment of the present disclosure.

[0025] As illustrated in **Figure 3**, the method **300** includes one or more blocks illustrating a method for controlling oxygen supply equipment. The method **300** may be described in the general context of computer executable instructions. Generally, computer executable instructions may include routines, programs, objects, components, data structures, procedures, modules, and functions, which perform specific functions or implement specific abstract data types.

[0026] The order in which the method **300** is described is not intended to be construed as a limitation, and any number of the described method blocks may be combined in any order to implement the method. Additionally, individual blocks may be deleted from the methods without departing from the spirit and scope of the subject matter described.

[0027] At block **302**, the method **300** may include detecting current pressure of a preset oxygen supply during each inhalation phase of a patient provided by either a high-flow oxygen supply equipment **106** or a low-flow oxygen supply equipment **104**. If the preset oxygen supply is provided by the low-flow oxygen supply equipment **104**, the method **300** proceeds to block **304** and if the preset oxygen supply is provided by the high-flow oxygen supply equipment **106**, the method **300** proceeds to block **314**.

[0028] At block **304**, the method **300** may include comparing the current pressure (CP) of the preset oxygen supply with a low-pressure minima (LPM).

[0029] At block **306**, the method **300** may include detecting if the current pressure (CP) is less than the low-pressure minima (LPM). If the result of the detection is NO, the method **300** proceeds to block **308** and if the result of the detection is YES, the method **300** proceeds to block **310**.

[0030] At block **308**, the method **300** may include continuing with the preset oxygen supply provided by the low-flow oxygen supply equipment **104** if the current pressure (CP) is not less than the low-pressure minima (LPM).

[0031] At block **310**, the method **300** may include generating an alarm to check the preset oxygen supply provided by the low-flow oxygen supply equipment **104** if the current pressure (CP) is less than the low-pressure minima (LPM).

[0032] At block **312**, the method **300** may include switching the preset oxygen supply from the low-flow oxygen supply equipment **104** to the high-flow oxygen supply equipment **106**.

[0033] At block **314**, the method **300** may include comparing the current pressure (CP) of the preset oxygen supply with a high-pressure minima (HPM).

[0034] At block **316**, the method **300** may include detecting if the current pressure (CP) is at least equal to the high-pressure minima (HPM). If the result of the detection is YES, the method **300** proceeds to block **318** and if the result of the detection is NO, the method **300** proceeds to block **322**.

[0035] At block **318**, the method **300** may include detecting if the pressure drop rate (ΔP) of the preset oxygen supply exceeds or is equal to a pressure drop rate threshold (ΔPT). If the result of the detection is NO, the method **300** proceeds to block **320** and if the result of the detection is YES, the method **300** proceeds to block **322**.

[0036] At block **320**, the method **300** may include continuing with the preset oxygen supply provided by the high-flow oxygen supply equipment **106** if the pressure drop rate (ΔP) of the preset oxygen supply does not exceed the pressure drop rate threshold (ΔPT).

[0037] At block **322**, the method **300** may include generating an alarm to check the preset oxygen supply provided by the high-flow oxygen supply equipment **106** if the current pressure (CP) is less than the high-pressure minima (LPM) or if the pressure drop rate (ΔP) of the preset oxygen supply exceeds the pressure drop rate threshold (ΔPT) or both.

[0038] At block **324**, the method **300** may include switching the preset oxygen supply from the high-flow oxygen supply equipment **106** to the low-flow oxygen supply equipment **104**.

[0039] A description of an embodiment with several components in communication with each other does not imply that all such components are required. On the contrary, a variety of optional components are described to illustrate the wide variety of possible embodiments of the disclosure.

[0040] When a single device or article is described herein, it will be clear that more than one device/article (whether they cooperate) may be used in place of a single device/article. Similarly, where more than one device or article is described herein (whether they cooperate), it will be clear that a single device/article may be used in place of the more than one device or article or a different number of devices/articles may be used instead of the shown number of devices or programs. The functionality and/or the features of a device may be alternatively embodied by one or more other devices which are not explicitly described as having such functionality/features. Thus, other embodiments of the disclosure need not include the device itself.

[0041] Finally, the language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to delineate or circumscribe the inventive subject matter. It is therefore intended that the scope of the disclosure be limited not by this detailed description, but rather by any claims that issue on an application based here on. Accordingly, the embodiments of the present disclosure are intended to be illustrative, but not limiting, of the scope of the disclosure, which is set forth in the following claims.

[0042] While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

CLAIMS

<u>We claim:</u>

1. A system for controlling oxygen supply equipment, the system comprising:

a processor (210) and a memory (204), wherein the processor (210) is further coupled to the oxygen supply equipment comprising:

a high-flow oxygen supply equipment (106) capable of supplying oxygen in a high-pressure range, and

a low-flow oxygen supply equipment (104) capable of supplying oxygen in a low-pressure range;

and wherein the processor (210) is further configured to:

detect current pressure of a preset oxygen supply during each inhalation phase of a patient, wherein the preset oxygen supply is provided by either the high-flow oxygen supply equipment (106) or the low-flow oxygen supply equipment (104);

compare the current pressure of the preset oxygen supply with either a low-pressure minima associated with the low-pressure range or a high-pressure minima associated with the high-pressure range;

wherein the processor (210), based on comparison, is further configured to:

switch the preset oxygen supply from the low-flow oxygen supply equipment (104) to the high-flow oxygen supply equipment (106) when the current pressure falls below the low-pressure minima;

OR

switch the preset oxygen supply from the high-flow oxygen supply equipment (106) to the low-flow oxygen supply equipment (104) when at least one of:

the current pressure falls below the high-pressure minima, and

a pressure drop rate of the current pressure exceeds or is equal to a pressure drop rate threshold,

wherein both the current pressure falling below the high-pressure minima and the pressure drop rate of the current pressure exceeding the pressure drop rate threshold are indicative of emptying of the high-flow oxygen supply equipment (106).

2. The system as claimed in claim 1, wherein to detect the current pressure, the processor (210) is communicatively coupled to a low-pressure sensor (212) and a high-pressure sensor (214) further coupled with the low-flow oxygen supply equipment (104) and the high-flow oxygen supply equipment (106) respectively, such that if:

the preset oxygen supply is provided by the low-flow oxygen supply equipment (104), the low-pressure sensor (212) detects the current pressure, and

the preset oxygen supply is provided by the high-flow oxygen supply equipment (106), the high-pressure sensor (214) detects the current pressure.

3. The system as claimed in claim 1, wherein the processor (210) is further communicatively coupled to an alarm device (216) configured to generate an alarm when at least one of:

the current pressure falls below the low-pressure minima;

the current pressure falls below the high-pressure minima; and

the pressure drop rate exceeds the pressure drop rate threshold.

4. The system as claimed in claim 1, wherein the processor (210) is further communicatively coupled with a valve (220) connected with both the high-flow oxygen supply equipment (106) and the low-flow oxygen supply equipment (104), and wherein the processor (210) is configured to actuate a valve (220) to switch between the high-flow oxygen supply equipment (106) and the low-flow oxygen supply equipment (104).

5. The system as claimed in claim 1, wherein the memory (204) further stores patient related data (206) and oxygen supply equipment related data (208), wherein:

the patient related data (206) comprises at least one of patient name, patient age, patient address, patient ailment history and patient treatment history; and

the oxygen supply equipment (208) related data comprises at least one of nominal oxygen content, nominal outlet pressure, flow rate and net weight,

and wherein the preset oxygen supply is selected based on the patient related data (206).

6. A method for controlling oxygen supply equipment, the method comprising:

detecting (302) current pressure of a preset oxygen supply during each inhalation phase of a patient, wherein the preset oxygen supply is provided by either a high-flow oxygen supply equipment (106) or a low-flow oxygen supply equipment (104),

wherein the high-flow oxygen supply equipment (106) is capable of supplying oxygen in a high-pressure range, and

the low-flow oxygen supply equipment (104) is capable of supplying oxygen in a low-pressure range;

comparing (304, 314) the current pressure of the preset oxygen supply with either a low-pressure minima associated with the low-pressure range or a high-pressure minima associated with the high-pressure range;

based on comparison,

switching (312) the preset oxygen supply from the low-flow oxygen supply (104) equipment to the high-flow oxygen supply equipment (106) when the current pressure falls below the low-pressure minima; OR

switching (324) the preset oxygen supply from the high-flow oxygen supply equipment (106) to the low-flow oxygen supply equipment (104) when at least one of:

the current pressure falls below the high-pressure minima,

and

a pressure drop rate of the current pressure exceeds or is equal to a pressure drop rate threshold,

wherein both the current pressure falling below the high-pressure minima and the pressure drop rate of the current pressure exceeding the pressure drop rate threshold are indicative of emptying of the high-flow oxygen supply equipment (106).

7. The method as claimed in claim 6, wherein detecting (302) the current pressure further comprises:

detecting the current pressure of the preset oxygen supply by a low-pressure sensor (212) when the preset oxygen supply is provided by the low-flow oxygen supply equipment (104); and detecting the current pressure of the preset oxygen supply by a high-pressure sensor (214) when the preset oxygen supply is provided by the high-flow oxygen supply equipment (106).

8. The method as claimed in claim 6, further comprising generating (310, 322) an alarm when at least one of:

the current pressure falls below a low-pressure minima;

the current pressure falls below a high-pressure minima; and

the pressure drop rate exceeds the pressure drop rate threshold.

9. The method as claimed in claim 6, wherein switching (312, 324) between the high-flow oxygen supply equipment (106) and the low-flow oxygen supply equipment (104) further comprises actuating a valve (220) connected with both the high-flow oxygen supply equipment (106) and the low-flow oxygen supply equipment (104).

10. The method as claimed in claim 6, further comprising selecting the preset oxygen supply based on patient related data (206), and wherein the patient related data (206) comprises at least one of patient name, patient age, patient address, patient ailment history and patient treatment history.

Dated this 14th day of March 2022

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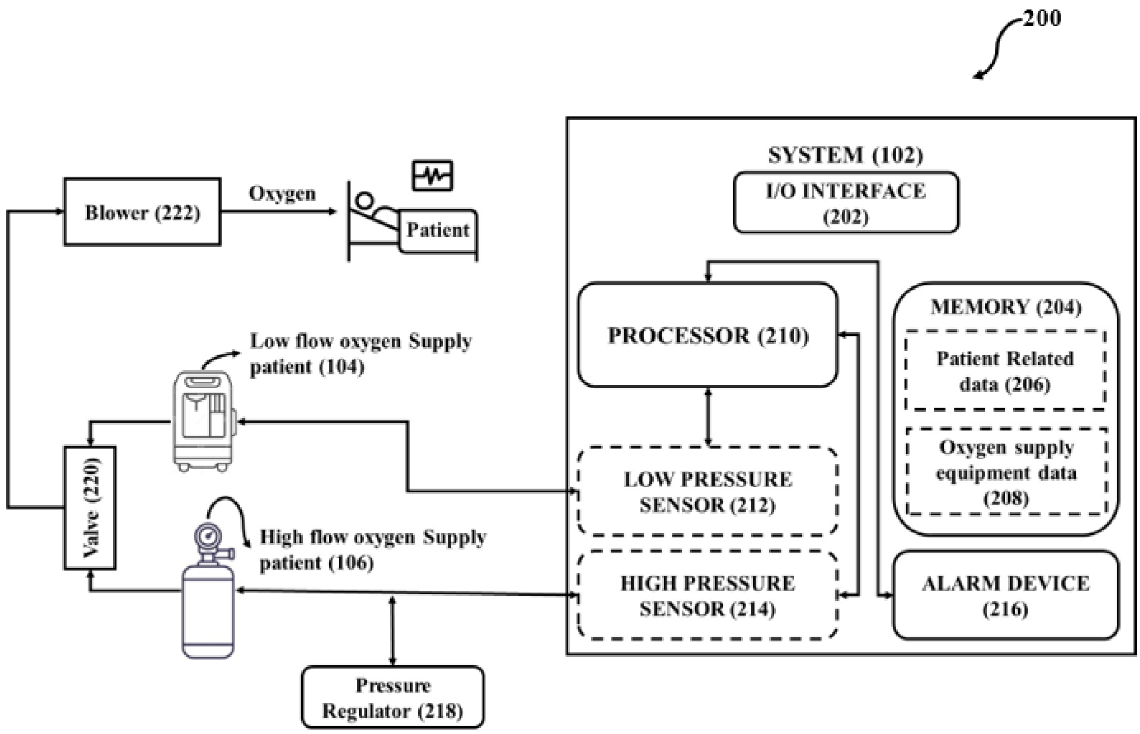
ABSTRACT

A SYSTEM AND METHOD FOR CONTROLLING OXYGEN SUPPLY EQUIPMENT

Disclosed herein is a system **102** and method for controlling oxygen supply equipment. The system **102** is equipped with pressure sensors **212**, **214** coupled to both low-flow and high-flow oxygen supply equipments **104**, **106**. Depending on the oxygen supply selected by a user for the patient, the pressure sensor **212**, **214** monitors the current pressure of the preset oxygen supply during an inhalation phase corresponding to the patient. If the current pressure is less than a minima value or if a pressure drop rate is higher than or equal to a threshold rate or both, the system **102** generates an alarm notifying the user to check the preset oxygen supply and in the meanwhile switches the preset oxygen supply from either high-flow oxygen supply equipment **106** to the low-flow oxygen supply equipment **104** or vice-versa.



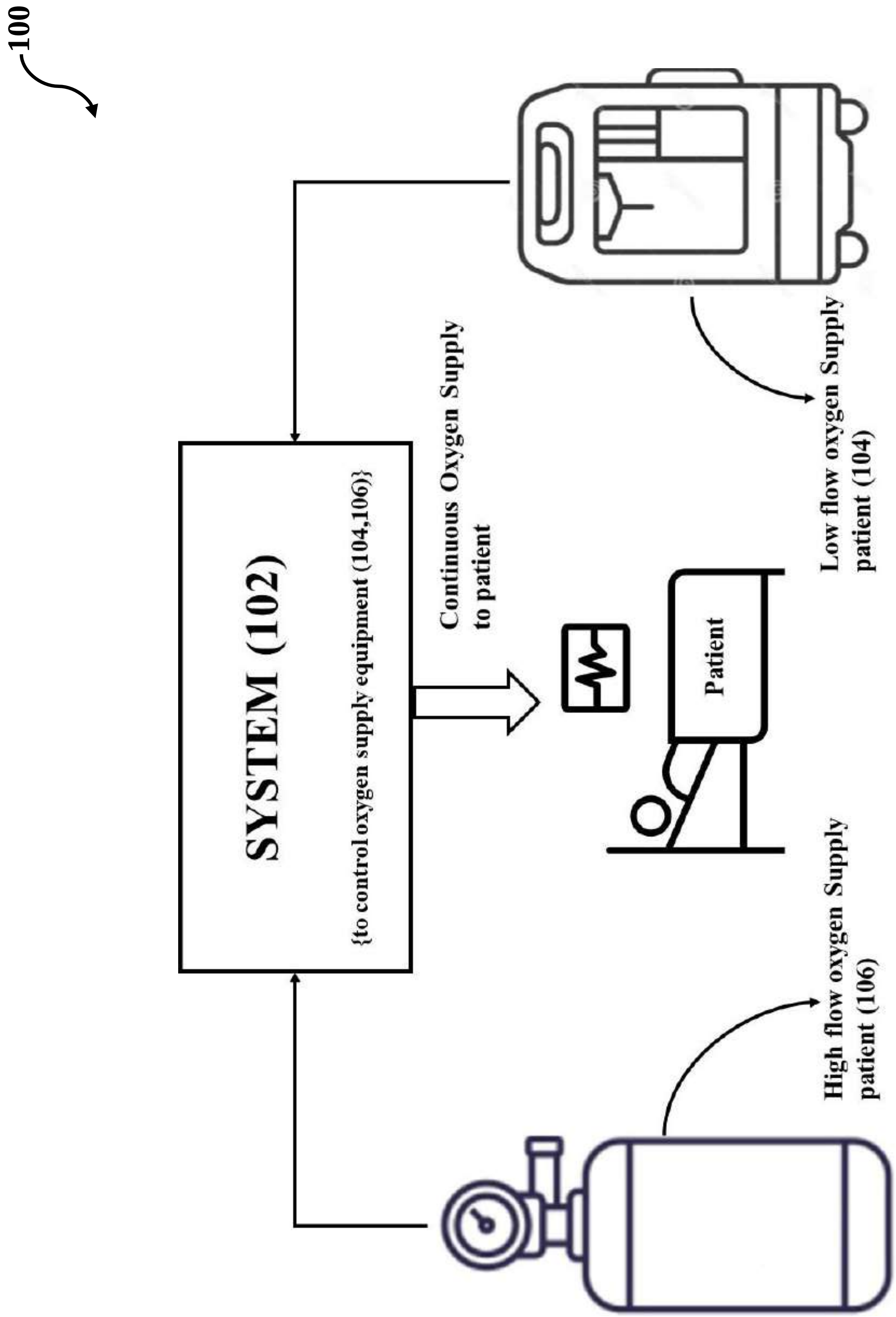


Figure 1

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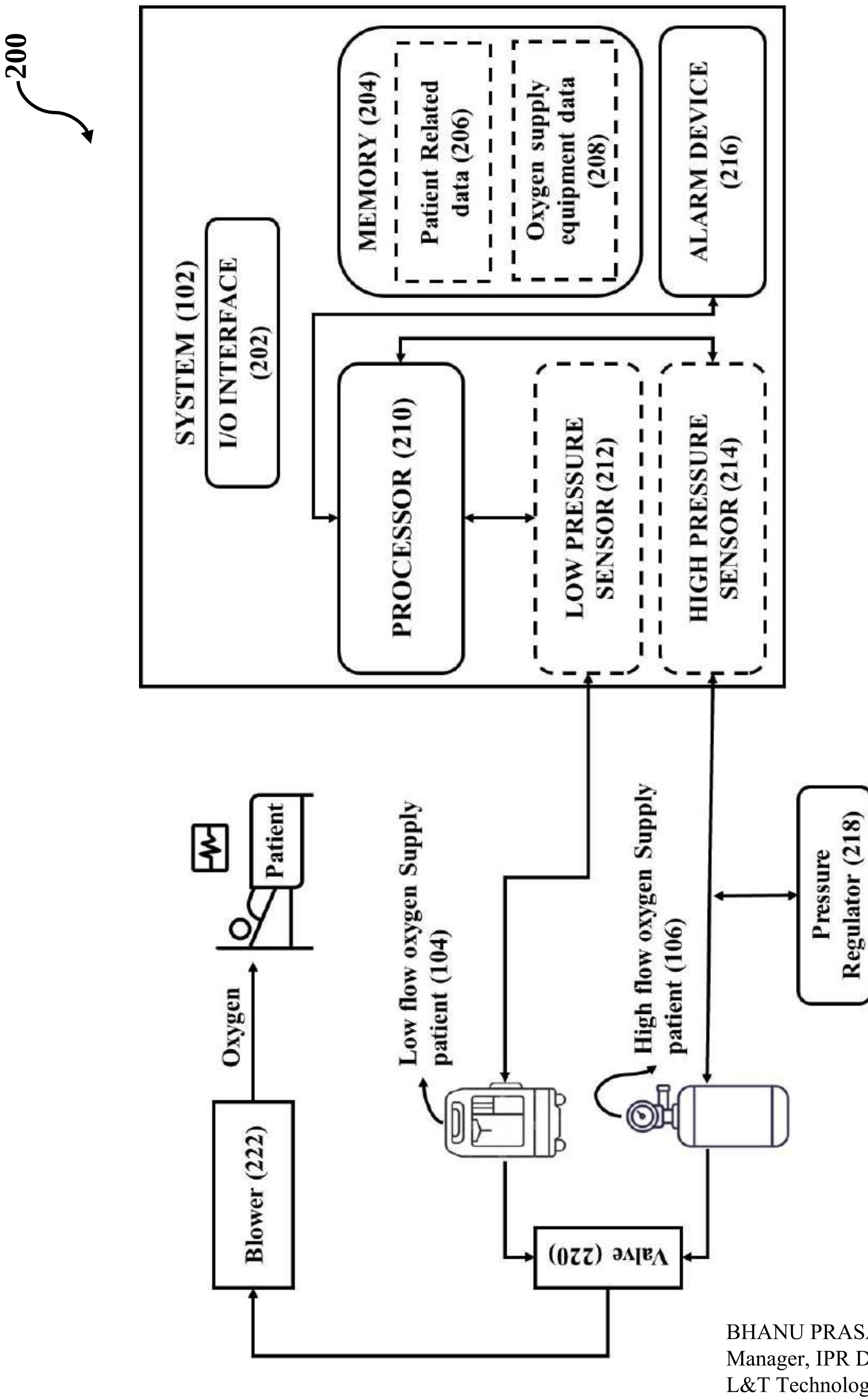

Figure 2

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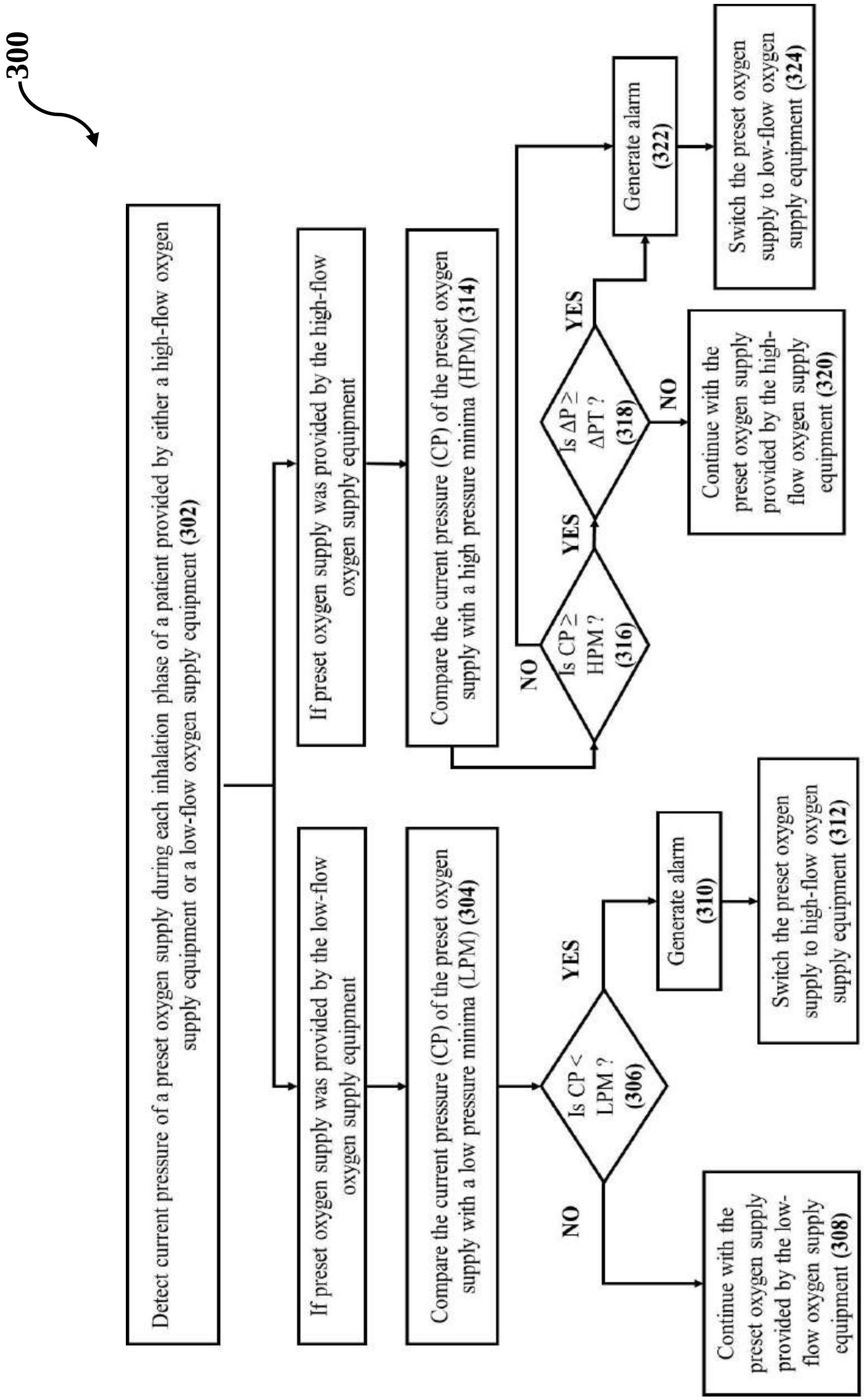

Figure 3

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