Title: PORTABLE OXYGEN CONCENTRATOR

Abstract: This invention relates to powered medical devices such as portable oxygen generators. A powered portable oxygen concentrator (POC) is described comprising an oxygen concentrator and a heat engine coupled to the oxygen concentrator to power the oxygen concentrator. The oxygen concentrator comprises an inlet port for receiving air, a gas separator configured to separate waste gas from the received air and provide an oxygen enriched gas, an oxygen outlet port for venting the oxygen enriched gas, and an exhaust port for venting the waste gas.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01D53/047 F02G1/043
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B01D F02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td></td>
<td>paragraphs [0080] - [0084], [0186], [0187], [0291]; figures 1-5; examples 1-5</td>
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<td>paragraph [0002]; claims 1,2,8; figure 1</td>
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<td>JP 6 218216 A (SAN DEN CORP) 9 August 1994 (1994-08-09) cited in the application</td>
<td>1-4</td>
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<tr>
<td></td>
<td>abstract</td>
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* Special categories of cited documents :
* "A" document defining the general state of the art which is not considered to be of particular relevance
* "E" earlier application or patent but published on or after the international filing date
* "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
* "O" document referring to an oral disclosure, use, exhibition or other means
* "P" document published prior to the international filing date but later than the priority date claimed

Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search
2 April 2012

Date of mailing of the international search report
18/07/2012

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016

Authorized officer
de Biasio, Arnaldo
INTERNATIONAL SEARCH REPORT

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. □ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Incompletely; 24(partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/21 0 (continuation of first sheet (2)) (April 2005)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4 (completely); 24 (partially)  
the powered oxygen concentrator of claim 1 further comprising a gas pressuriser (cf. claim 2) coupled to the inlet port for pressurising the received air

2. claims: 1, 5-19 (completely); 24 (partially)  
the powered oxygen concentrator of claim 1 wherein the heat engine is a closed cycle gas engine, and wherein the closed cycle gas engine comprises a chamber and a chamber inlet port coupled to the chamber, the chamber inlet port in fluid communication with the exhaust port for delivering the vented waste gas to the chamber (cf. claim 5)

3. claims: 20-23, 38-45 (completely); 24 (partially)  
a closed cycle engine with integrated pump (cf. claim 38) and the powered oxygen concentrator of claim 5 further comprising an integrated pump (cf. claim 20)

4. claims: 25-37  
a self-pressurising closed cycle gas engine, comprising a gas pressuriser; and wherein the gas pressuriser is coupled to the inlet port to pressurise the received gas and provide the pressurised gas; and wherein the gas pressuriser is in fluid communication with the chamber inlet port for delivering the pressurised gas to the chamber; and wherein the gas pressuriser is powered by the closed cycle gas engine
<table>
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