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(54) Title: AUTOMATIC CONTROL SYSTEM FOR MECHANICAL VENTILATION FOR ACTIVE OR PASSIVE SUBJECTS

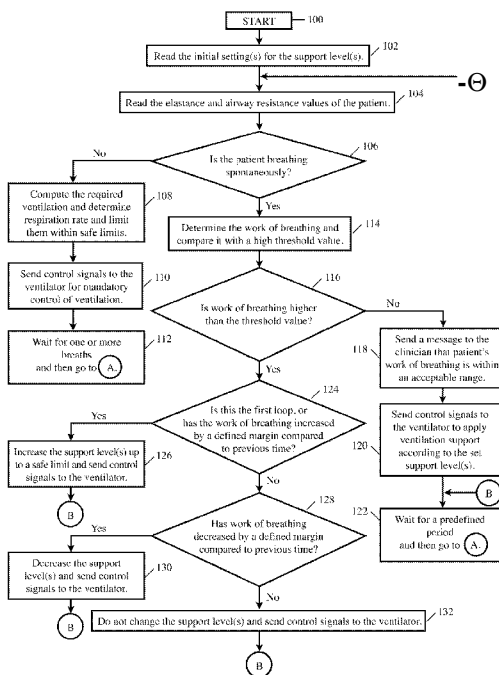


FIG. 2

(57) Abstract: A method and an apparatus for controlling a ventilator to automatically adjust ventilation assistance to an active or passive subject. The method includes determining volume and flow rate of gas to the patient during inspiration on an ongoing basis, and generating control signals in proportion to the volume and flow rate of gas to the patient wherein proportionality factors, and support levels for the elastic and resistive components of pressure are automatically adjusted by the ventilator. The ongoing pressure applied by the ventilator is a sum of elastic and resistive pressures that are automatically controlled by the system. When the patient breathes spontaneously, the support levels are automatically adjusted based on the patient's requirements. If the patient does not breathe spontaneously, the ventilator provides ventilation at an optimal level and rate. The method may be used in weaning or in a management phase of ventilation.

WO 2011/017033 A3

A. CLASSIFICATION OF SUBJECT MATTER*A61M 16/00(2006.01)i, G06F 17/10(2006.01)1, G05B 19/18(2006.01)1, G06Q 50/00(2006.01)1*

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)

A61M 16/00; A62B 7/02

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: ventilation,control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008-0236582 A1 (TEHRAN I) 02 October 2008 See abstract, claims 33 and 37-41, paragraphs 38-39, and fig. 2	20-35
Y	US 2003-0010339 A1 (BANNER et al.) 16 January 2003 See abstract, claim 12, paragraphs 62-63, and figs. 2 and 10-12	20-35
A	US 2005-0109340 A1 (TEHRANI) 26 May 2005 See abstract, claims 1-2, paragraphs 24-26 and 33-35, and figs. 1-2c	20-35
A	US 04986268 A (TEHRANI) 22 January 1991 See abstract, claims 1-4, and figs. 1-3c	20-35

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

* 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 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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/043170

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008-0236582 A1	02.10.2008	None	
US 2003-00 10339 A1	16.01.2003	AU 2000-2979 1 A1 CA 2362 164 A1 EP 1 156846 A1 GB 01 169 10 DO GB 2362 108 A NZ 513865 A US 68206 18 B2 Wo 00-4588 1 A1 Wo 00-4588 1 A9	25.08.2000 10.08.2000 28.11.2001 05.09.2001 14.11.2001 28.09.2001 23.11.2004 10.08.2000 07.09.2001
US 2005-0 109340 A1	26.05.2005	AU 2004-292955 A1 AU 2004-292955 B2 CA 2545570 A1 GB 06 1 1065 DO GB 2423721 A GB 2423721 B NZ 546941 A US 7802571 B2 wo 2005-05 1280 A2 wo 2005-05 1280 A3	09.06.2005 18.02.2010 09.06.2005 12.07.2006 06.09.2006 12.11.2008 31.01.2009 28.09.2010 09.06.2005 09.06.2005
US 04986268 A	22.01.1991	None	

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.: **1-19**
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 1-19 pertain to methods for treatment of human by therapy or surgery, thus relate to a subject matter which this international Searching Authority is not required to search under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT.
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:

1. IAs all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. IAs all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. IAs 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. INo 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.:

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.
- I No protest accompanied the payment of additional search fees.