### (19) World Intellectual Property Organization

International Bureau



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#### (43) International Publication Date 14 June 2001 (14.06.2001)

**PCT** 

# (10) International Publication Number WO 01/41854 A3

(51) International Patent Classification<sup>7</sup>: A61M 16/08.

(21) International Application Number: PCT/US00/33346

(22) International Filing Date: 8 December 2000 (08.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 60/170,213 10 December 1999 (10.12.1999) US

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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM). European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

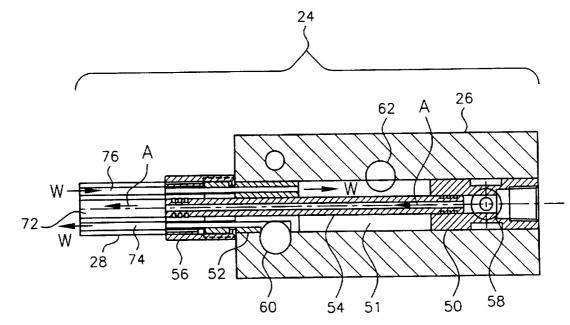
#### **Published:**

with international search report

(88) Date of publication of the international search report: 21 February 2002

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR RESPIRATORY TRACT THERAPY



(57) Abstract: An apparatus is provided for delivering heated and humidified air to the respiratory tract of a human patient for respiratory tract therapy and treatment. The apparatus includes a supply unit (11) and a delivery tube (28) that can be releasably connected to the supply unit (11). Methods of respiratory tract therapy and treatment are also provided.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Ir. \_ational Application No PCT/US 00/33346

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 A61M16/08 A61M16/10

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)

IPC 7 A61M

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 practical, search terms used)

#### EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT			
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
X	US 3 871 373 A (JACKSON RICHARD R)	40-44,51	
	18 March 1975 (1975-03-18)		
Α	column 1, line 66 -column 3, line 3;	1	
	figures 1-3		
v	EP O 009 543 A (JACKSON RICHARD R DR)	40-44,51	
χ	16  April  1980  (1980-04-16)	10 11,02	
Α	page 12, line 2 -page 14, line 5; figure 6	1	
^			
Χ	WO 86 02276 A (OXYGEN ENRICHMENT CO LTD)	40-44,51	
	24 April 1986 (1986-04-24)		
Α	page 8, line 12 -page 11, line 20; figure	1	
	1		
	A (DDAFCEDUEDV AC)	40-44,51	
X	FR 2 311 558 A (DRAEGERWERK AG) 17 December 1976 (1976-12-17)	70 11,51	
۸	page 3, line 22 -page 4, line 23; figure 1	1	
Α			
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	,		

X Further documents are listed in the continuation of box C.	Y Patent family members are listed in 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 document 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	<ul> <li>*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</li> <li>*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</li> <li>*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.</li> <li>*&amp;* document member of the same patent family</li> </ul>		
later than the priority date claimed  Date of the actual completion of the international search	Date of mailing of the international search report		
29 May 2001	1 3. 06. 2001		
Name and mailing address of the ISA	Authorized officer		
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Zeinstra, H		

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ional Application No Int. PCT/US 00/33346

`	ation) DOCUMENTS CONSIDERED TO BE RELEVANT  Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Category °	Criation of document, with indication, where appropriate, of the relevant passages	Ticlevant to stans 140.
X	EP 0 062 913 A (FRESENIUS AG) 20 October 1982 (1982-10-20) page 6, line 10 -page 10, line 12; figures 1,2	26,27, 29,35
Α	page 11, line 29 - line 36	33
X	FR 2 164 873 A (BAXTER LABORATORIES INC) 3 August 1973 (1973-08-03) page 2, line 13 -page 3, line 29; figure 3	26-32,35
А	US 4 324 238 A (GENESE JOSEPH N ET AL) 13 April 1982 (1982-04-13) figure 2	26
X	EP 0 359 531 A (MINNESOTA MINING & MFG) 21 March 1990 (1990-03-21) column 5, line 50 -column 6, line 11; figure 2	26-28, 33,34
Α	US 4 372 306 A (GENESE JOSEPH N ET AL) 8 February 1983 (1983-02-08) figure 2	26
		·

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Information on patent family members

I. ational Application No
PCT/US 00/33346

				101700	00/ 55540
Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 3871373	А	18-03-1975	US	3912795 A	14-10-1975
EP 0009543	Α	16-04-1980	AT BR	1931 T 7904407 A	15-12-1982 24-06-1980
			CA	1131524 A	14-09-1982
			DE	2964203 D	13-01-1983
			US	4381267 A	26-04-1983
			JP	1445099 C	30-06-1988
			JP	55038190 A	17-03-1980
			JP	62053193 B	09-11-1987
 WO 8602276		24-04-1986	 AU	4959085 A	02-05-1986
WO 0002270	, ,	21 01 1300	AU	5707790 A	04-10-1990
			BR	85 <b>0</b> 6970 A	23-12-1986
			CA	1266213 A	27-02-1990
			EP	0197114 A	15-10-1986
			JP	62501265 T	21-05-1987
			NZ	213747 A	28-08-1990
			US	4773410 A	27-09-1988
FR 2311558		 17-12-1976	 DE	2522102 A	18-11-1976
11/ 5311330	7	1/ 1/ 15/0	BR	7602804 A	01-02-1977
			CH	589454 A	15-07-1977
			GB	1520836 A	09-08-1978
			JP	51146790 A	16-12-1976
			NL	7604409 A	19-11-1976
			SE	412848 B	24-03-1980
			SE	7605464 A	18-11-1976
EP 0062913		 20-10-1982	 DE	 3115299 A	 04-11-1982
Er 0002913	^	20 10 1902	BR	8202160 A	29-03-1983
			ES	511446 D	16-02-1983
			ES	8303923 A	16-05-1983
			JP	1684791 C	31-07-1992
			JP	3047871 B	22-07-1991
			JP	58010062 A	20-01-1983
FR 2164873	Α	03-08-1973	AR	 194865 A	24-08-1973
1 K 210-0/3	73	55 05 1575	AU	461042 B	15-05-1975
			AU	4952972 A	06-06-1974
			BE	792243 A	30-03-1973
			CA	980695 A	30-12-1975
			CH	544552 A	30-11-1973
			DE	2261127 A	28-06-1973
			ES	186912 Y	01-08-1974
			GB	1408319 A	01-10-1975
			IE	37017 B	13-04-1977
			İT	972661 B	31-05-1974
			JP	48070915 A	26-09-1973
			NL	7217393 A	26-06-1973
			US	3778973 A	18-12-1973
			ZA	7208707 A	29-08-1973
	 A	13-04-1982	US	4256104 A	 17-03-1981
TIC ARRAYS	А	10 04 1702	AU	533587 B	01-12-1983
US 4324238					04-09-1980
US 4324238			ΔΠ	552348U A	(14-(14-140)
US 4324238			AU C.A	5523480 A 1148822 A	
US 4324238			AU CA CA	1148822 A 1149704 A	28-06-1983 12-07-1983

international application No. PCT/US 00/33346

#### **INTERNATIONAL SEARCH REPORT**

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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:	
Claims Nos.: 36-39,45-47,48,49,50 because they relate to subject matter not required to be searched by this Authority, namely:  Rule 39.1(iv) PCT - Method for treatment of the human or animal body by	
therapy	
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)	
This International Searching Authority found multiple inventions in this international application, as follows:	
see additional sheet	
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 fee, this Authority did not invite payment of any additional fee.	
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.:	
Remark on Protest  The additional search fees were accompanied by the applicant's protest.  X  No protest accompanied the payment of additional search fees.	

#### FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-25, 40-44, 51

Tubing assembly for delivering gas to a patient.

(Problem: heating the gas (see the description at page 3, lines 3-5))

2. Claims: 26-35

Bubble trap.

(Problem: removing air from a circulating liquid (see the description at page 3, lines 13-14))

Information on patent family members

In .tional Application No
PCT/US 00/33346

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4324238 A		EP 0024415 A JP 56500007 T WO 8001756 A US 4372306 A	11-03-1981 08-01-1981 04-09-1980 08-02-1983
EP 0359531 A	21-03-1990	US 4883455 A AU 612506 B AU 3891889 A CA 1313986 A DE 68905981 D DE 68905981 T JP 2109576 A JP 3073995 B	28-11-1989 11-07-1991 22-03-1990 02-03-1993 19-05-1993 26-08-1993 23-04-1990 07-08-2000
US 4372306 A	08-02-1983	US 4256104 A AU 533587 B AU 5523480 A CA 1148822 A CA 1149704 A EP 0024415 A JP 56500007 T WO 8001756 A US 4324238 A	17-03-1981 01-12-1983 04-09-1980 28-06-1983 12-07-1983 11-03-1981 08-01-1981 04-09-1980 13-04-1982