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**McAuley et al.**

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(54) **BREATHING ASSISTANCE APPARATUS**  
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(56) **References Cited**  
U.S. PATENT DOCUMENTS  
301,111 A 7/1884 Genese  
472,238 A 4/1892 Van Orden  
(Continued)

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FOREIGN PATENT DOCUMENTS  
CA 131 16 62 12/1992  
CN 217 253 8 7/1994  
(Continued)

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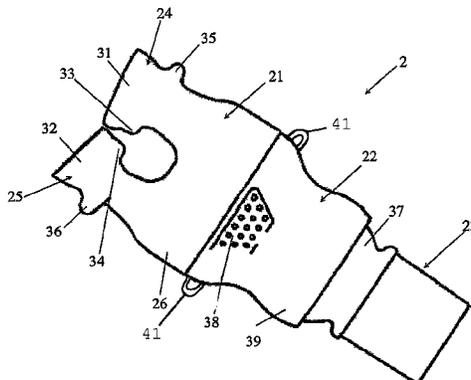
OTHER PUBLICATIONS  
International Preliminary Report on Patentability (IPRP), Interna-  
tional Application No. PCT/NZ2009/000219, mailed Apr. 12, 2011,  
9 pages.  
(Continued)

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(57) **ABSTRACT**  
A nasal cannula can be shaped to fit within a user's nares,  
where the nasal cannula includes at least one prong allowing  
high flow delivery of humidified gases and creates positive  
airway pressure in the patient's airway. The prongs can have  
angled ends such that, in use, gases flowing through the  
prongs are directed to the user's nasal passages. The nasal  
cannula body can be partially swiveling and preferably has a  
ball joint connector. The nasal cannula can have at least one  
flared end prong that preferably seals within a patient's nares.

**19 Claims, 10 Drawing Sheets**



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---	--

(56)

References Cited

U.S. PATENT DOCUMENTS

2007/0089749	A1	4/2007	Ho et al.
2007/0125385	A1	6/2007	Ho et al.
2007/0125387	A1	6/2007	Zollinger et al.
2007/0137653	A1	6/2007	Wood
2007/0163600	A1	7/2007	Hoffman
2007/0295335	A1	12/2007	Nashed
2008/0041388	A1	2/2008	McAuley et al.
2008/0047560	A1	2/2008	Veliss et al.
2008/0060648	A1	3/2008	Thornton et al.
2008/0060657	A1	3/2008	McAuley et al.
2008/0099024	A1	5/2008	Gunaratnam et al.
2008/0196728	A1	8/2008	Ho
2008/0264422	A1	10/2008	Fishman
2009/0044808	A1	2/2009	Guney et al.
2009/0120442	A1	5/2009	Ho
2010/0307502	A1	12/2010	Rummery et al.
2010/0313891	A1	12/2010	Veliss et al.
2011/0308520	A1	12/2011	McAuley et al.
2012/0125339	A1	5/2012	Ho et al.
2012/0132209	A1	5/2012	Rummery et al.
2015/0013678	A1	1/2015	McAuley
2015/0297855	A1	10/2015	McAuley et al.
2016/0038705	A1	2/2016	McAuley et al.
2016/0038706	A1	2/2016	McAuley et al.
2016/0038707	A1	2/2016	Allan et al.

FOREIGN PATENT DOCUMENTS

CN	1784250	6/2006
CN	1901961 A	1/2007
CN	1988930 A	6/2007
CN	101214402	7/2008
CN	101541380	9/2009
EP	0747078	12/1996
EP	2 130 563 A1	12/2009
EP	1646910	8/2015
FR	2658725	8/1991
FR	2749176	12/1997
GB	190 224 431	12/1902
GB	880 824	10/1961
GB	1 467 828	3/1977
JP	H09-010311	1/1997
JP	2005-529687	10/2005
JP	2007-516750	6/2007
JP	2007-527271	9/2007
WO	WO98/18514	5/1998
WO	WO 99/04842 A1	2/1999
WO	WO99/58181	11/1999
WO	WO 00/69497	11/2000
WO	WO 00/74758	12/2000
WO	WO01/41854	6/2001
WO	WO 01/97892 A1	12/2001
WO	WO02/074372	9/2002
WO	WO 2004/041341	5/2004
WO	WO 2004/073778	9/2004
WO	WO 2005/021075	3/2005
WO	WO 2005/051468	6/2005
WO	WO 2005/086946	9/2005
WO	WO 2007/022562 A1	3/2007
WO	WO 2007/041786	4/2007
WO	WO 2007/147088 A2	12/2007
WO	WO 2008/007985 A1	1/2008
WO	WO 2008/070929 A1	6/2008
WO	WO 2008/106716 A1	9/2008
WO	WO2008/148086	12/2008
WO	WO 2009/052560 A1	4/2009

WO	WO 2009/059353 A1	5/2009
WO	WO 2009/092057 A1	7/2009
WO	WO 2009/139647 A1	11/2009

OTHER PUBLICATIONS

International Search Report, International Application No. PCT/NZ2009/000219, mailed Feb. 2, 2010, 3 pages.  
 English Translation of Chinese Examination Report; Application No. 2007800266164; 5 pages.  
 English Translation of First Office Action for Chinese Application No. 201210080441.8 dated Mar. 24, 2014, in 4 pages.  
 Examination Report; Australian Application No. 2007273324; dated May 22, 2012; 3 pages.  
 International Search Report for International Application No. PCT/NZ2007/000185, dated Oct. 31, 2007, in 3 pages.  
 Second Chinese Office Action for Chinese Patent Application No. 201210080441.8 dated Dec. 1, 2014 in 11 pages (with English translation).  
 Australian Examination Report for Patent Application No. 2012265597 dated Dec. 19, 2013, in 5 pages.  
 Canadian Examination Report for Application No. 2655839 dated Oct. 4, 2013, in 2 pages.  
 English Translation of Chinese Examination Report; Chinese Application No. 2007800266164; 5 pages.  
 International Search Report; PCT/NZ2009/000072; dated Jul. 28, 2009; 3 pages.  
 UK Search and Examination Report; Mar. 14, 2013; Application No. GB1210075.6; 2 pages.  
 UK Examination Report; dated May 9, 2013; Application No. GB1119385.1; 4 pages.  
 Australian Examination Report; dated Mar. 4, 2014; Application No. 2010246985; 5 pages.  
 English Translation of JP Examination Report; dated Feb. 10, 2014; Application No. 2012-510418; 4 pages.  
 Chinese Examination Report; dated Mar. 27, 2014; Chinese Application No. 201080028029.0; 16 pages.  
 GB Combined Search and Examination Report; dated May 7, 2014; Application No. GB1406402.6; 6 pages.  
 GB Combined Search and Examination Report; dated May 7, 2014; Application No. GB1406401.8; 4 pages.  
 JP Examination Report, Application No. 2012-538784; 3 pages.  
 Australian Examination Report; dated Aug. 14, 2015; Application No. 2015202814; 8 pages.  
 Chinese Examination Report; dated Jul. 17, 2015; Application No. 201080061122.1; 10 pages.  
 Chinese Examination Report; dated Sep. 14, 2015; Application No. 201080028029.0; 3 pages.  
 European Extended Search Report; dated Sep. 4, 2015; Application No. 10830251.4; 7 pages.  
 European Extended Search Report; dated Sep. 8, 2015; Application No. 10774623.2; 7 pages.  
 Japanese Examination Report; dated Jul. 22, 2015; Application No. 2015-098324; 8 pages.  
 Japanese Examination Report; dated Aug. 5, 2015; Application No. 2012-538784; 8 pages.  
 Australian Examination Report; dated Jan. 9, 2015; Application No. 2010241390; 4 pages.  
 English Translation of Chinese Examination Report; dated Sep. 3, 2014; Application No. 201080061122.1; 9 pages.  
 Second Chinese Office Action; dated Jan. 19, 2015; Application No. 201080028029.0; 16 pages.  
 EPO Search Report; dated Apr. 2, 2014; Application No. 09819444.2; 8 pages.

\* cited by examiner

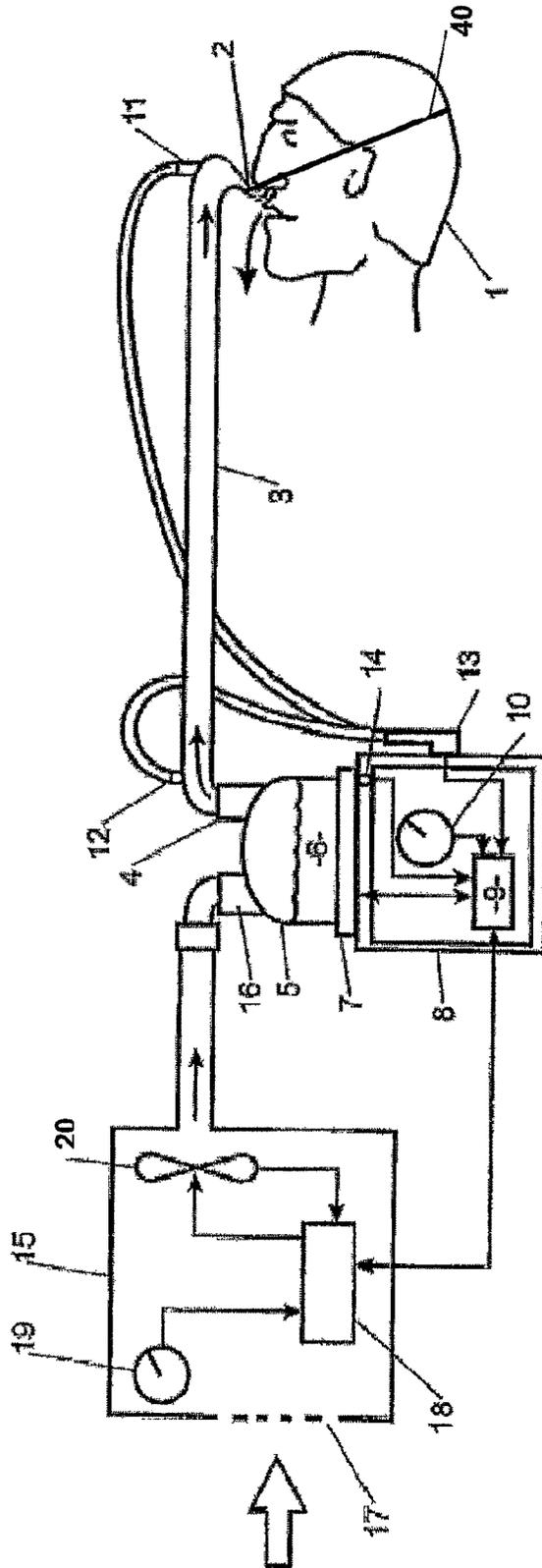


Figure 1

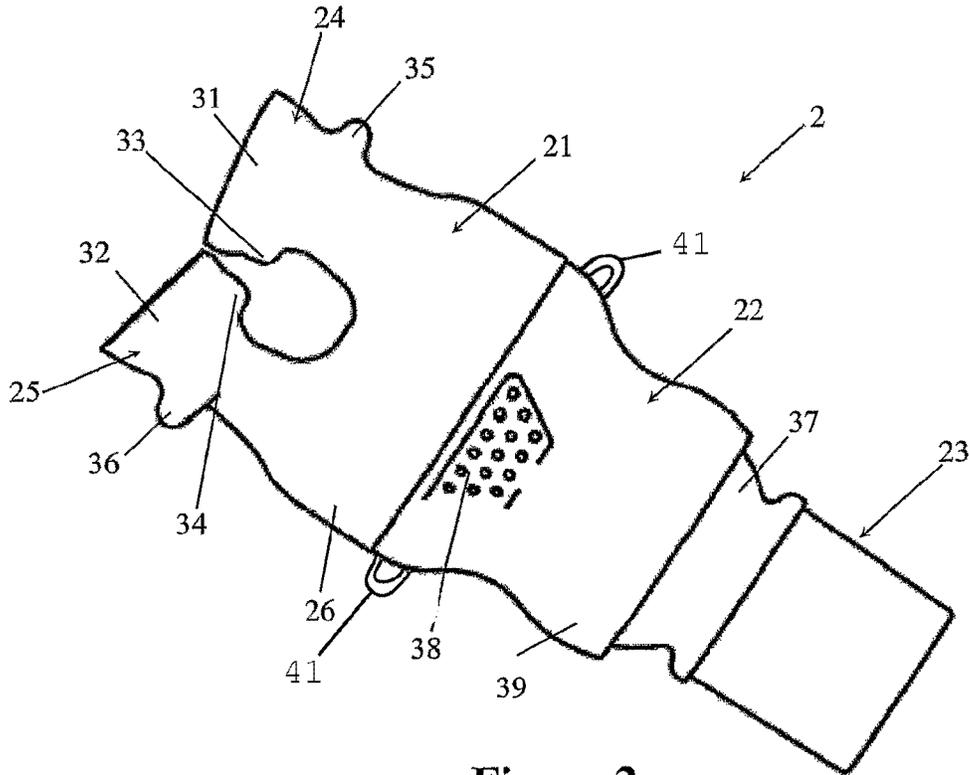


Figure 2

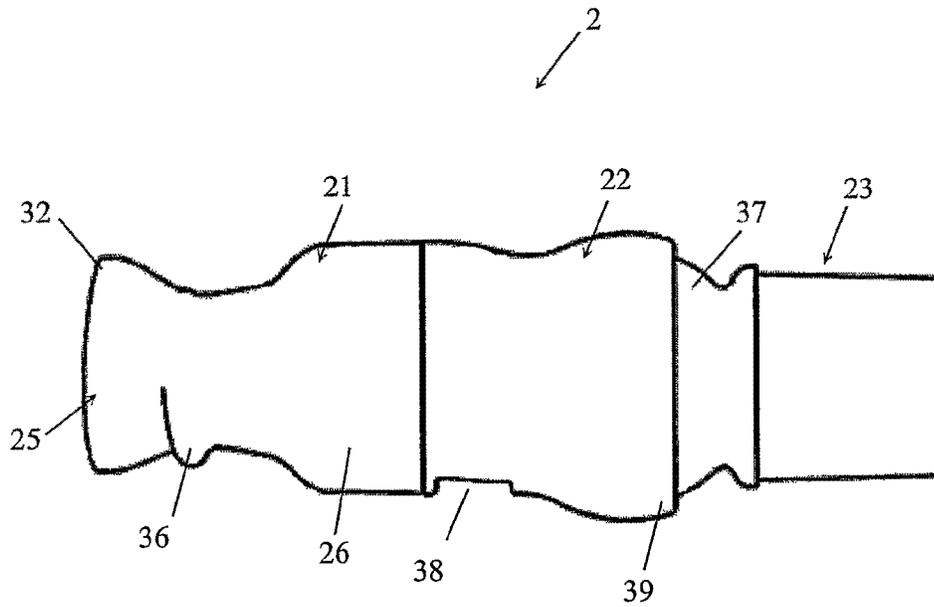


Figure 3

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