



(51) International Patent Classification:

A61M 31/00 (2006.01) A61M 3700 (2006.01)
A61M 25/10 (2013.01) A61B 5/01 (2006.01)
A61M 16/04 (2006.01) A61H 39/06 (2006.01)
A61M 5/168 (2006.01)

(21) International Application Number:

PCT/US20 12/048 160

(22) International Filing Date:

25 July 2012 (25.07.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/5 11,409 25 July 2011 (25.07.2011) US

(71) Applicant (for all designated States except US):
NEUROSAVE, INC. [US/US]; 760 Market Street, Suite
718, San Francisco, CA 94102 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KRECK, Thomas**
[US/US]; C/o Neurosave, Inc., 760 Market Street, Suite
718, San Francisco, CA 94102 (US). **RODGERS, Seth**
[—/US]; C/o Neurosave, Inc., 760 Market Street, Suite
718, San Francisco, CA 94102 (US). **SAS, Ian** [—/CA];
C/o Neurosave, Inc., 760 Market Street, Suite 718, San
Francisco, CA 94102 (US).

(74) Agent: **WILSON, Mark, B.**; Fulbrigh & Jaworski,
L.L.P., 98 San Jacinto Boulevard, Suite 1100, Austin, TX
78701 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(88) Date of publication of the international search report:

11 July 2013

(54) Title: NON-INVASIVE SYSTEMS, DEVICES, AND METHODS FOR SELECTIVE BRAIN COOLING

(57) Abstract: Methods, systems, and devices are disclosed for providing selective and non-selective cooling and warming of a patient. Multiple embodiments of devices are disclosed for performing rapid induction and maintenance of therapeutic hypothermia either in a hospital setting or in the field so that hypothermic treatment can be quickly instituted before significant tissue damage occurs. Methods are also disclosed for targeting brain cooling by irrigating the upper airway, aerodigestive tract, and/or more generalized cooling by irrigating the esophagus and/or stomach.



A. CLASSIFICATION OF SUBJECT MATTER

A61M 31/00(2006.01)i, A61M 25/10(2006.01)1, A61M 16/04(2006.01)1, A61M 5/168(2006.01)1, A61M 37/00(2006.01)1, A61B 5/01(2006.01)i, A61H 39/06(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 31/00; A61N 1/39; A61F 7/12; A61K 31/02

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:brain cooling, aerodigestive tract, tracheal,esophageal.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010-0324635 A1 (THOMAS, KRECK) 23 December 2010 See abstract, paragraphs [0076], [0228]-[00235] .	1-3
A	See claims 24,32,33, paragraphs [0056],[0073],[0074],[0075],[0076],[0124], fig. 3 .	130-164,295-303
A	US 2009-0177258 A1 (YOSHIMASA, TAKEDA et al.) 09 July 2009 See paragraphs [0052],[0073],[0077],[0081], figs. 2,5A,5B.	1-3,130-164 ,295-303
A	US 2006-0276552 A1 (BARBUT, DENISE et al.) 07 December 2006 See claim 14, paragraphs [0160],[0161], figs. 33,36.	1-3,130-164 ,295-303
A	US 2010-0292765 A1 (ALEX, ETWIL) 18 November 2010 See paragraphs [0068],[0080], figs. 1,3B.	1-3,130-164 ,295-303
A	US 06149624A A (MCSHANE, RICHARD HOUSTON) 21 November 2000 See claim 1, column 5, lines 43-53, fig. 1 .	1-3,130-164 ,295-303

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

27 FEBRUARY 2013 (27.02.2013)

Date of mailing of the international search report

28 FEBRUARY 2013 (28.02.2013)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-70 1, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KANG, Sung Hyun

Telephone No. 82-42-481-8160



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/048160

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0324635 A1	23 . 12 . 20 10	AU 2009-20627 1 A1	30 . 07 . 2009
		CA 27 122 18 A1	30 . 07 . 2009
		EP 2240 104 A2	20 . 10 . 2010
		US 8308787 B2	13 . 11 . 2012
		Wo 2009-09460 1 A2	30 . 07 . 2009
		Wo 2009-09460 1 A3	15 . 10 . 2009
		wo 2009-09460 1 A3	30 . 07 . 2009
US 2009-0 177258 A1	09 . 07 . 2009	CN 10 1267786 AO	17 . 09 . 2008
		CN 10 1267786 B	10 . 11 . 2010
		EP 1935382 A1	25 . 06 . 2008
		JP 04-658758 B2	07 . 01 . 201 1
		JP 2007-075505 A	29 . 03 . 2007
		JP 4658758 B2	23 . 03 . 201 1
		US 822 1481 B2	17 . 07 . 2012
		wo 2007-032397 A1	22 . 03 . 2007
US 2006-0276552 A1	07 . 12 . 2006	EP 1888 156 A2	20 . 02 . 2008
		US 2007-01238 13 A1	31 . 05 . 2007
		US 2008-00046 13 A1	03 . 01 . 2008
		US 2008-0249 188 A1	09 . 10 . 2008
		US 2010-02 11 140 A1	19 . 08 . 2010
		US 2011-0028938 A1	03 . 02 . 201 1
		us 7824436 B2	02 . 11 . 2010
		us 7837722 B2	23 . 11 . 2010
		us 8075605 B2	13 . 12 . 201 1
		wo 2006- 124702 A2	23 . 11 . 2006
US 2010-0292765 A1	18 . 11 . 20 10	EP 2117486 A1	18 . 11 . 2009
		wo 2008-094509 A1	07 . 08 . 2008
US 06149624A A	21 . 11 . 2000	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.: **47-129, 165-294, 304-312.**
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 47- 129, 165 - 294, 304- 312 pertain to methods for treatment of the human body by therapy and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.
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.: **4-46, 50-129.**
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. 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 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.