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[Continued on next page]

(54) Title: NEGATIVE PRESSURE WOUND THERAPY APPARATUS AND METHOD OF OPERATING THE APPARATUS

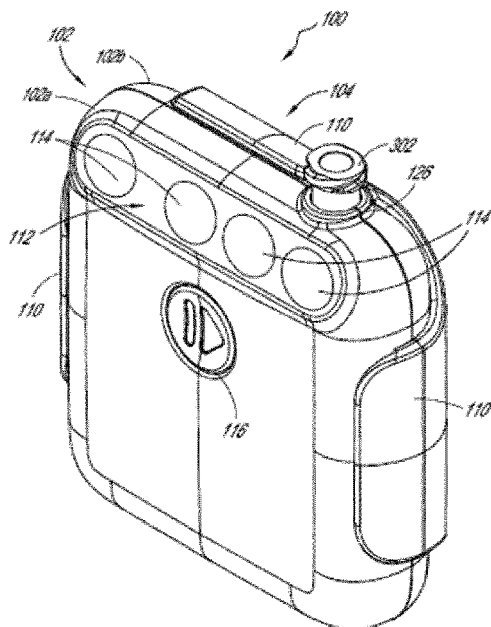


Fig. 1

(57) Abstract: Disclosed embodiments relate to apparatuses and methods for wound treatment. In certain embodiments, a negative pressure wound therapy apparatus includes one or more indicators configured to illuminate in a pattern to communicate at least one of a status of a pump assembly and/or of a dressing. The pattern is configured to enable an electronic device comprising at least one camera to capture the illumination pattern of the one or more indicators and to determine the status corresponding to the pattern of illumination. In some embodiments, a negative pressure wound therapy apparatus is powered by an energy generator that has a first side configured to be in contact with a skin surface of a patient and a second side configured to be exposed to atmosphere, and the energy generator is configured to utilize a temperature differential between the skin surface and the atmosphere to generate electrical energy to power the apparatus. In some embodiments, a negative pressure wound therapy apparatus is powered by an energy harvester that utilizes radio frequency spectrum to power one or more components of negative pressure wound therapy apparatus. In certain embodiments, a negative pressure wound therapy apparatus includes one or more RF energy harvesters to power a pump assembly.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. A61M1/00 A61F13/00 A61F13/02 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) A61M A61F		
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		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/035562 A1 (LOCKE CHRISTOPHER BRIAN [GB] ET AL) 9 February 2012 (2012-02-09) 0025, 0026; figures 5A,B -----	1-10
A	US 2014/236109 A1 (GREENER BRYAN [GB]) 21 August 2014 (2014-08-21) paragraphs 0036, 0052; figure 1 -----	1-18, 20-28
X	US 2013/110058 A1 (ADIE GORDON CAMPBELL [GB] ET AL) 2 May 2013 (2013-05-02) cited in the application paragraphs 0151, 0153, 0157; figures 21, 23 -----	11-18
X	US 2013/144227 A1 (LOCKE CHRISTOPHER BRIAN [GB] ET AL) 6 June 2013 (2013-06-06) paragraphs 0047, 0051; figure 1 ----- -/--	11-18
☒ 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 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 "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 30 June 2016		Date of mailing of the international search report 12/07/2016
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 Martin Amezaga, J

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 2016/018448 A1 (SMITH & NEPHEW INC [US]) 4 February 2016 (2016-02-04) paragraph 0041; figure 2A -----	11-18
X,P	WO 2015/050654 A2 (KCI LICENSING INC [US]) 9 April 2015 (2015-04-09) paragraphs 0074, 0078, 0088; figures 4, 5 -----	11-18
A	US 2014/298928 A1 (DUESTERHOFT PAUL [US] ET AL) 9 October 2014 (2014-10-09) paragraphs 0064, 0093-0095; figure 9 -----	11-18
X	US 2014/005618 A1 (LOCKE CHRISTOPHER BRIAN [GB] ET AL) 2 January 2014 (2014-01-02) paragraphs 0027, 0067, 0068; figure 5 -----	20-28
X	WO 2012/057881 A1 (KCI LICENSING INC [US]; COULTHARD RICHARD DANIEL JOHN [GB]; LOCKE CHRI) 3 May 2012 (2012-05-03) paragraph 0026; figure 1 -----	20-28
A	US 2012/016322 A1 (COULTHARD RICHARD DANIEL JOHN [GB] ET AL) 19 January 2012 (2012-01-19) paragraphs 0058-0060; figure 6 -----	20-28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2015/080740

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.: 19, 29-36
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
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.:

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-10

An apparatus for use in negative pressure wound therapy, comprising: a dressing configured to be placed over a wound; a pump assembly, comprising: a source of negative pressure configured to be fluidically connected to the dressing; and one or more indicators; and a power source comprising an energy generator in electrical communication with the pump assembly, wherein the energy generator has a first side configured to be in contact with a skin surface of a patient and a second side configured to be exposed to atmosphere and the energy harvester is configured to utilize a temperature differential between the skin surface and the atmosphere to generate electrical energy.

2. claims: 11-18

An apparatus for use in negative pressure wound therapy, comprising: a pump assembly, comprising: a source of negative pressure; a port configured to be in communication with a dressing configured to be placed over a wound; and one or more indicators configured to illuminate in a pattern to communicate at least one of a status of the pump assembly and/or of the dressing, thereby enabling an electronic device comprising at least one camera to capture the illumination pattern of the one or more indicators and to determine the status corresponding to the pattern of illumination of the one or more indicators.

3. claims: 20-28

An negative pressure wound therapy apparatus comprising: a pump assembly, the pump assembly comprising a source of negative pressure configured to be fluidically connected to the dressing configured to be placed over a wound; and a power source comprising an energy harvester in electrical communication with the pump assembly, wherein the energy harvester is configured to receive radio frequency (RF) signals and to generate power from at least some of the received RF signals.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 19, 29-36

Claims 19, 29-36 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 39.1(iv) PCT. The methods disclosed in the aforementioned claims comprise the step of providing negative-pressure wound therapy to a patient. Hence they are considered methods for treatment of the human or animal body by therapy/surgery.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/080740

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Information on patent family members

International application No

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