



(51) International Patent Classification:

A61B 17/34 (2006.01) A61M 60/839 (2021.01)

A61M 39/06 (2006.01) A61M 60/863 (2021.01)

A61M 60/191 (2021.01) A61M 60/894 (2021.01)

A61M 60/289 (2021.01) A61M 60/90 (2021.01)

(21) International Application Number:

PCT/EP2020/088064

(22) International Filing Date:

30 December 2020 (30.12.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PCT/EP2019/087182

30 December 2019 (30.12.2019) EP

16/990,903 11 August 2020 (11.08.2020) US

(71) Applicant: SYNTACH AG [CH/CH]; Freier Platz 10, 8200 Schaffhausen (CH).

(72) Inventors: SOLEM, Jan Otto; Hulda Rasks Väg 12, 237 42 Bjärred (SE). SOLEM, Kristian; Kraaksgatan 16, SE-231 45 Trelleborg (SE). ENGVALL, Daniel; Kullavägen 20, 302 93 Halmstad (SE). WOLFF, Martin; Körsbärsvägen 10, 223 55 Lund (SE).

(74) Agent: KIPA AB; P.O. Box 1065, 251 10 Helsingborg (SE).

(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, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

(54) Title: AN ACCESS DEVICE FOR A HEART, A REMOVABLE HEMOSTATIC VALVE UNIT, AND A SYSTEM INCLUDING A CARDIAC ASSIST UNIT

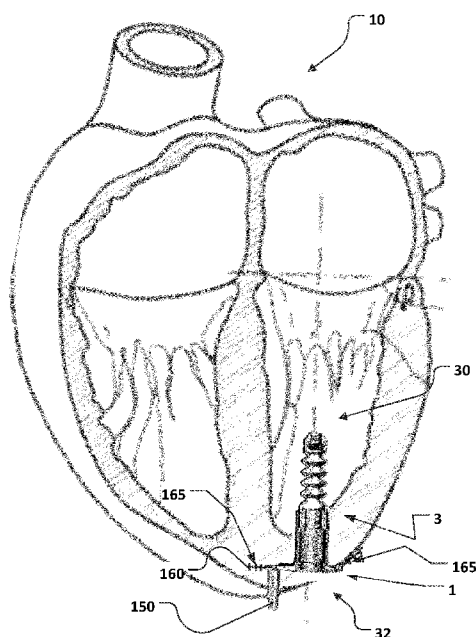


Fig. 11C

(57) Abstract: An access device for a heart chamber, a removable hemostatic valve unit, and a system including a cardiac assist unit are disclosed. In examples, the access device (1) includes an apical base plate (100) and a sealing unit (3) configured to provide a separation of a wet zone from a heart chamber and a dry zone with a gaseous environment outside of said heart chamber inside a patient body at the same time.

Declarations under Rule 4.17:

- *as to the identity of the inventor (Rule 4.17(i))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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

26 August 2021 (26.08.2021)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/088064

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B17/34 A61M39/06 A61M60/191 A61M60/289 A61M60/839
A61M60/863 A61M60/894 A61M60/90

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)

A61B 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 practicable, search terms used)

EP0-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	WO 2018/167059 A1 (ACAD ZIEKENHUIS MAASTRICHT [NL]; UNIV MAASTRICHT [NL]) 20 September 2018 (2018-09-20) cited in the application	1-8,10, 11,19, 20, 31-38, 40,41, 44,52
Y	page 5, line 35 - page 6, line 8 page 6, lines 20-23 page 7, lines 6-13, 17-22 figures 1, 2, 4a-6 ----- -/-	13-18, 21,43, 45,46



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

15 July 2021

Date of mailing of the international search report

28/07/2021

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

Chabus, Hervé

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/088064

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/017440 A2 (MAYO FOUNDATION [US]; SUNDT III THORALF M [US]; PHILLIPS BRENT R [US]) 10 February 2011 (2011-02-10) cited in the application	1,2,31, 47,52
Y	page 9, last paragraph - page 10, paragraph 3 page 21, last paragraph - page 22, paragraph 2 figures 4, 5, 16E	9,21,32, 39,43, 45,46
Y	----- US 2016/081715 A1 (KLEYMAN GENNADY [US]) 24 March 2016 (2016-03-24) cited in the application paragraphs [0049], [0052]; figures 3-4	13-18,43
Y	----- US 5 492 304 A (SMITH ROBERT C [US] ET AL) 20 February 1996 (1996-02-20) cited in the application figures 6, 7	13-18,43
X	----- US 2012/296151 A1 (CURTIS DONALD [US] ET AL) 22 November 2012 (2012-11-22)	22-26
Y	paragraphs [0142], [0146], [0148], [0166], [0189] - [0191]; figures 2a, 2b, 3a, 3b, 16a, 16b	9,32,39
X	----- US 2012/059212 A1 (LAROSE JEFFREY A [US] ET AL) 8 March 2012 (2012-03-08)	1,12,27, 31,45, 47,48,52
Y	paragraphs [0035] - [0046], [0044], [0054]; figures 1, 5, 7, 8	21,45,46
X	----- US 2011/251450 A1 (PAGANI FRANCIS D [US] ET AL) 13 October 2011 (2011-10-13)	1,12,27, 31,42, 45,48,52
Y	paragraphs [0028] - [0049]; figures 1-11, 16-20	21,45,46
X	----- US 2012/165931 A1 (BOURQUE KEVIN [US]) 28 June 2012 (2012-06-28)	1,12,27, 31,42, 45,48,52
Y	paragraphs [0042] - [0045]; figure 7	21,45,46
Y	----- US 2016/151552 A1 (SOLEMAN JAN OTTO [SE]) 2 June 2016 (2016-06-02) paragraph [0108]; figure 11c	21,45,46
X	----- RU 2 696 685 C1 (FEDERALNOE GOSUDARSTVENNOE AVTONOMNOE OBRAZOVATELNOE UCHREZHDIENIE VYSS) 5 August 2019 (2019-08-05) figures 3-5	1,28-31, 49-52
A	----- US 2004/092965 A1 (PARIHAR SHAILENDRA K [US]) 13 May 2004 (2004-05-13) paragraph [0063]; figures 4, 5	28-30, 49-51

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2020/088064

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.:
because they relate to subject matter not required to be searched by this Authority, namely:
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.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ EP2020/ 088064

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-8, 10, 11, 13-20, 31-38, 40, 41, 43, 44, 47, 52

Access device for a heart chamber including a sealing unit

2. claims: 9, 22-26, 39

Removable hemostatic valve unit including a pneumatic valve in a through port

3. claims: 12, 21, 27, 42, 45, 46, 48

Cardiac assist unit configured to be transapically implanted wherein said cardiac assist unit is attachable to a sealed access device

4. claims: 28-30, 49-51

Sealed access device configured to matingly engage with multiple medical devices having mating connection interfaces, respectively

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/088064

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2018167059 A1	20-09-2018	NONE	
WO 2011017440 A2	10-02-2011	US 2012130391 A1 US 2014378772 A1 WO 2011017440 A2	24-05-2012 25-12-2014 10-02-2011
US 2016081715 A1	24-03-2016	EP 2958502 A1 US 2016081715 A1 US 2018243005 A1 US 2019216501 A1 WO 2014130636 A1	30-12-2015 24-03-2016 30-08-2018 18-07-2019 28-08-2014
US 5492304 A	20-02-1996	CA 2123956 A1 DE 69414471 T2 EP 0630660 A1 ES 2123684 T3 US 5492304 A	17-12-1994 20-05-1999 28-12-1994 16-01-1999 20-02-1996
US 2012296151 A1	22-11-2012	US 2012296151 A1 US 2015011819 A1 WO 2012158968 A2	22-11-2012 08-01-2015 22-11-2012
US 2012059212 A1	08-03-2012	EP 2600918 A1 US 2012059212 A1 WO 2012019126 A1	12-06-2013 08-03-2012 09-02-2012
US 2011251450 A1	13-10-2011	EP 2558141 A1 JP 5781597 B2 JP 2013523388 A US 2011251450 A1 WO 2011130010 A1	20-02-2013 24-09-2015 17-06-2013 13-10-2011 20-10-2011
US 2012165931 A1	28-06-2012	US 2011160850 A1 US 2012165931 A1	30-06-2011 28-06-2012
US 2016151552 A1	02-06-2016	AU 2011229996 A1 AU 2015200522 A1 BR 112012024268 A2 CA 2793912 A1 CN 102939059 A CN 104941016 A EP 2549956 A1 EP 2868296 A1 EP 3360515 A1 ES 2527732 T3 ES 2734003 T3 HK 1180936 A1 HK 1211248 A1 IL 222194 A JP 5449615 B2 JP 5833623 B2 JP 2013523208 A JP 2014128660 A KR 20130079370 A RU 2012145276 A RU 2015113140 A SE 1050283 A1 SG 184382 A1	18-10-2012 26-02-2015 19-12-2017 29-09-2011 20-02-2013 30-09-2015 30-01-2013 06-05-2015 15-08-2018 29-01-2015 03-12-2019 01-11-2013 20-05-2016 31-01-2017 19-03-2014 16-12-2015 17-06-2013 10-07-2014 10-07-2013 27-04-2014 20-09-2015 26-09-2011 30-10-2012

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/088064

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2012245678 A1	27-09-2012
		US 2013289717 A1	31-10-2013
		US 2016151552 A1	02-06-2016
		US 2018207336 A1	26-07-2018
		US 2021106809 A1	15-04-2021
		WO 2011119101 A1	29-09-2011

RU 2696685	C1	05-08-2019	-----
US 2004092965	A1	13-05-2004	-----
		AU 2003272572 A1	23-04-2004
		CA 2500054 A1	15-04-2004
		EP 1562486 A2	17-08-2005
		ES 2398383 T3	15-03-2013
		JP 2006501023 A	12-01-2006
		US 2004092965 A1	13-05-2004
		WO 2004030515 A2	15-04-2004
