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(71) Applicant: **COVIDIEN LP** [US/US]; 826 Coal Creek Circle, Louisville, CO 80027 (US).

(72) Inventors: **HAMEL, Gregory**; 357 Athol Ave., Apt. 3, Oakland, CA 94606 (US). **QUINN, Patrick**; 6347 Riverbank Circle, Stockton, CA 95219 (US). **ROSQUETA, Arturo**; 4271 North First St. Space 47, San Jose, CA 95134 (US). **SOSNOWSKI, Stephen**; 9121 Azalea Road, Sherrills Ford, NC 28673 (US). **ANDREWS, Christopher**; 33445 Skylark Drive, Lake Elsinore, CA 92530 (US). **DANG, Hieu**; 8869 Grandville Circle, Westminster, CA 92683 (US). **NGUYEN, Dinh**; 13392 Gilbert Street, Garden Grove, CA 92844 (US). **PECOR, Robert**; 9 Woodcrest Lane, Aliso Viejo, CA 92656 (US). **DINH, Minh, Q.**; 39481 Zacate Avenue, Fremont, CA 94539 (US). **TATAVOOSIAN, Ahramahzd**; 27783 Ruisenor, Mission Viejo, CA 92692 (US).

(74) Agent: **HOHENSHELL, Jeffrey et al.**; Covidien LP, 826 Coal Creek Circle, Louisville, CO 80027 (US).

(54) Title: DEVICES AND SYSTEMS FOR THE TREATMENT OF VASCULAR DEFECTS

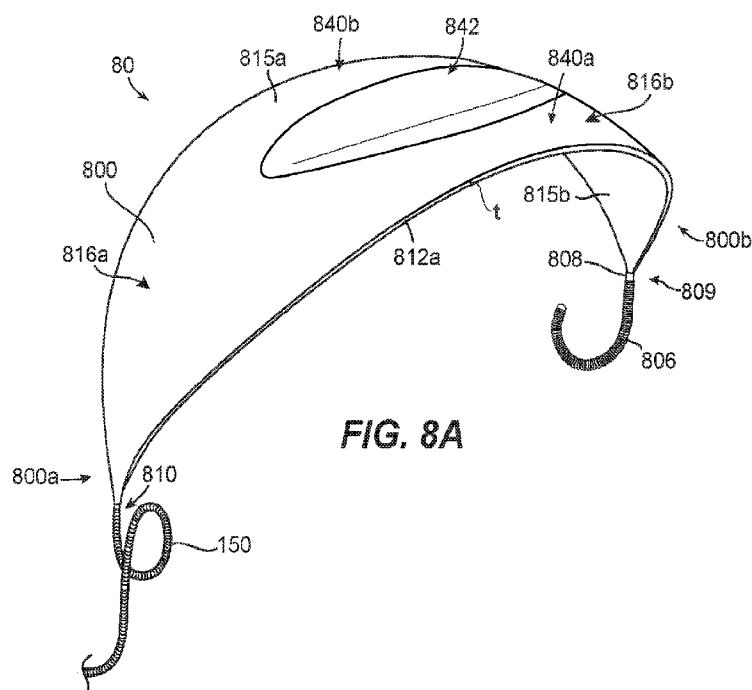


FIG. 8A

(57) **Abstract:** Devices, systems, and methods for treating vascular defects are disclosed herein. One aspect of the present technology, for example, includes an occlusive device comprising a mesh having a low-profile state for intravascular delivery to the aneurysm and a deployed state, the mesh comprising a first end portion, a second end portion, and a length extending between the first and second end portions, and a first lateral edge, a second lateral edge, and a width extending between the first and second lateral edges. The mesh may have a predetermined shape in the deployed state in which (a) the mesh is curved along its width, (b) the mesh is curved along its length, and (c) the mesh has an undulating contour across at least a portion of one or both of its length or its width. The mesh is configured to be positioned within the aneurysm in the deployed state such that the mesh extends over the neck of the aneurysm.





(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, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B17/12
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 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)

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 A	US 2010/094335 A1 (GERBERDING BRENT C [US] ET AL) 15 April 2010 (2010-04-15) figures 1-4B paragraph [0002] paragraph [0021] - paragraph [0022] paragraph [0070] - paragraph [0074] paragraph [0101] -----	1-4,6-9, 12 5,10,11
X A	US 2013/178886 A1 (LIU XIANGDONG [CN] ET AL) 11 July 2013 (2013-07-11) paragraph [0074] paragraph [0079] - paragraph [0080] figure 15 -----	1-9,11, 12 10
X A	US 2017/273691 A1 (RIINA HOWARD [US] ET AL) 28 September 2017 (2017-09-28) figure 56 paragraph [0006] - paragraph [0007] paragraph [0136] - paragraph [0137] -----	1,7-9, 11,12 2-6,10



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

13 March 2020

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25/06/2020

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

Lüddemann, Tobias

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/067002

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.:

1-12, 20

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: 1-12, 20

an occlusive device comprising a mesh with first and second end portions, first and second lateral edges, first and second sides having a first and second surface, further having the special technical features that the mesh is two layered (claim 5 and 11) or comprises a longitudinal divot extending along a length of the mesh (claim 10), solving the technical problem of increased stability of the mesh and redistribution of forces exerted on the mesh.

2. claims: 13-19

an occlusive device comprising a mesh with first and second end portions, first and second lateral edges, first and second sides having a first and second surface, further having the special technical features that an embolic element attached to the mesh is a coil (claim 17) or that a joint connecting the mesh and embolic element comprises a band (claim 18), solving the technical problem of allowing to apply a sustainable force on the mesh by the embolic element.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2019/067002

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