(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
29 December 2016 (29.12.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/209318 A1

(51) International Patent Classification:
A61B 17/221 (2006.01) *A61B 17/00* (2006.01)
A61B 90/00 (2016.01)

(21) International Application Number:
PCT/US2016/013023

(22) International Filing Date:
12 January 2016 (12.01.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/184,623 25 June 2015 (25.06.2015) US

(71) Applicant: **GYRUS ACMI, INC., D.B.A. OLYMPUS SURGICAL TECHNOLOGIES AMERICA** [US/US]; 136 Turnpike Road, Southborough, MA 01772 (US).

(72) Inventors; and
(71) Applicants : **ST. GEORGE, Lawrence, J.** [US/US]; 752 Concord Rd, Sudbury, MA 01776 (US). **GAVALA, Artemie, G.** [US/US]; 39 Old Mill Road, Sutton, MA 01509 (US).

(74) Agent: **CARD, John, M.**; Vivacqua Law, PLLC, 3101 East Eisenhower Parkway, Suite 1, Ann Arbor, MI 48108 (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, IR, IS, JP, KE, KG, KN, KP, KR, 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.

(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,

[Continued on next page]

(54) Title: RETRACTION FORCE SENSING BASKET

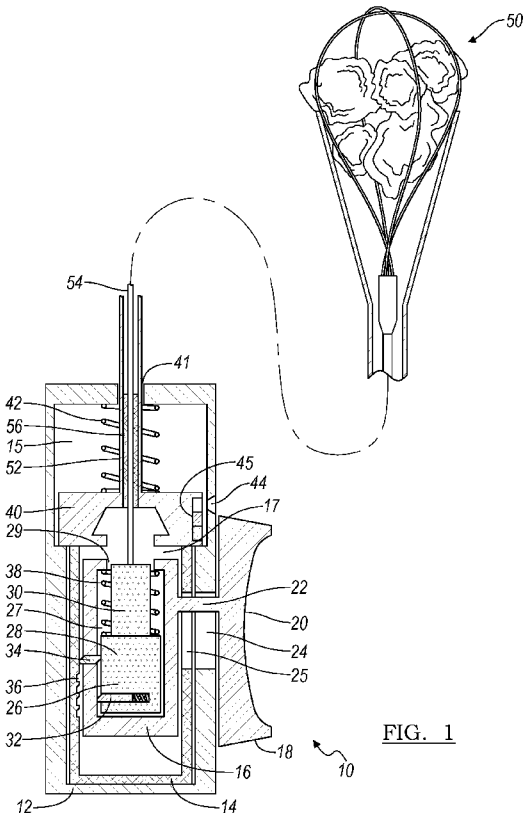

FIG. 1

(57) Abstract: A stone retrieval device includes a sheath and a stone retrieval basket that includes a distal region with a plurality of basket wires and a proximal region with one or more core wires. The stone retrieval basket is contained within the sheath and is movable out a distal opening of the sheath to cause the plurality of basket wires to open into a basket shape. The stone retrieval device further includes a lock mechanism that locks the position of the stone retrieval basket with respect to the position of the sheath and a basket force controller that includes a first control stage and a second control stage. The first control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in an unlocked position, and the second control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in a locked position.

WO 2016/209318 A1

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).

Published:

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

— *with amended claims (Art. 19(1))*

RETRACTION FORCE SENSING BASKET

RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 62/184,623, filed on June 25, 2015, the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to a medical device. More specifically, the present disclosure relates to a medical device for capturing one or more stone fragments.

BACKGROUND

[0003] The statements in this section merely provide background information related to the present disclosure and may or may not constitute prior art.

[0004] During ureteroscopy or percutaneous nephrolithotomy (PCNL) procedures, baskets are often employed to capture and retrieve stone fragments from a patient's anatomy. After the stone fragments have been removed from the patient and released from the basket, the basket is re-inserted one or more times into the patient's anatomy to remove all or most of the remaining stone fragments. In some instances, however, stone fragments that are too large are captured in the basket, which may result in the basket getting stuck in the ureter or access sheath. If the basket can be pushed back, some fragments can be

released and the basket can then be pulled out of the patient. If the basket is completely stuck, the basket can be cut apart from the basket handle and sheath, or a small laser fiber may be inserted into the patient so that laser energy can be utilized to break up the stone fragments. In any case, if the basket is damaged, a new basket has to be employed to complete the medical procedure, which may increase the surgical time and costs.

[0005] Among the literature that can pertain to this technology include the following patent documents and published patent applications: US 7,645,283, US 5,944,728, US 2005/0261705, and DE69828984, the entire contents of which are incorporated herein by reference for all purposes.

[0006] Accordingly, to reduce surgical cost and time, there is a need for a stone retrieval device that prevents the basket from getting stuck in the ureter to minimize trauma to the ureter during retrieval of stone fragments.

SUMMARY

[0007] The present invention provides an improved medical device for capturing one or more stone fragments and a method of using such a device.

[0008] In one aspect, a stone retrieval device includes a sheath and a stone retrieval basket that includes a distal region with a plurality of basket wires and a proximal region with one or more core wires. The stone retrieval basket is contained within the sheath and is movable out a distal opening of the sheath to cause the plurality of basket wires to open into a basket shape. The stone retrieval device further includes a lock mechanism that locks the position of the

stone retrieval basket with respect to the position of the sheath and a basket force controller that includes a first control stage and a second control stage. The first control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in an unlocked position, and the second control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in a locked position.

[0009] The stone retrieval device may be further characterized by one or any combination of the features described herein, such as, for example: the lock mechanism is a ratchet mechanism; the ratchet mechanism includes a first protrusion associated with a first member and a set of notches associated with a second member, the first member being contained in the second member and movable relative to the second member, the first protrusion being engaged with one notch of the set of notches when the lock mechanism is in the locked position; the one or more core wires is attached to a third member contained in the first member, the third member being movable relative to the first member and including a second protrusion, the second protrusion being engaged with the first protrusion when the lock mechanism is in the locked position; movement of the third member relative to the first member pulls the plurality of basket wires into the distal opening of the sheath; the first control stage sensor is a visual indicator with a first color; the second control stage sensor is a visual indicator with a second color that is different than the first color; at least one of the sensors of the first control stage and the second control stage is a pop-up flag; at least one of the sensors of the first control stage and the second control stage is a

tactile sensor; at least one of the sensors of the first control stage and the second control stage is a sonic sensor; the stone retrieval device further includes an automatic release mechanism that releases the stone retrieval basket when the force on the stone retrieval basket exceeds a predetermined maximum force; and the automatic release mechanism is resettable after releasing the stone retrieval basket.

[0010] In another aspect, the present disclosure provides a method of determining a force on a stone retrieval basket including one or more of the following steps: capturing a stone with the stone retrieval basket; and utilizing a sensor to determine if the force on the stone retrieval basket exceeds a predetermined maximum force. The method may be further characterized by one or any combination of the features described herein, such as, for example: the sensor is visual sensor; and the method further includes releasing the stone retrieval basket when the force on the stone retrieval basket exceeds the predetermined maximum force.

[0011] Further features, advantages, and areas of applicability will become apparent from the description provided herein. It should be understood that the description and specific examples are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

DRAWINGS

[0012] The drawings described herein are for illustration purposes only and are not intended to limit the scope of the present disclosure in any way. The

components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the figures, like reference numerals designate corresponding parts throughout the views. In the drawings:

[0013] FIG. 1 is side cross-sectional view of a stone retrieval device in accordance with the principles of the present invention;

[0014] FIG. 2 is a side cross-sectional view of the stone retrieval device shown in FIG. 1 when the device is in a locked position;

[0015] FIG. 3 is a side cross-sectional view of the stone retrieval device shown in FIG. 1 when the device is applying a maximum pull force on one or more stone fragments; and

[0016] FIG. 4 is a partial cross-sectional view of a basket device employed with the stone retrieval device shown in FIG. 1 in accordance with the principles of the present invention.

DETAILED DESCRIPTION

[0017] The following description is merely exemplary in nature and is not intended to limit the present disclosure, application, or uses.

[0018] Referring now to the drawings, a stone retrieval device embodying the principles of the present invention is illustrated in FIGs. 1 through 3 and designated at 10. The stone retrieval device 10 includes a housing 12, a first member 14 contained within a space 15 of the housing 12, a second member 16 contained within a space 17 the first member 14, and a third member

26 contained within a space 27 the second member 16. The third member 26 includes an enlarged portion 28 and a smaller portion 30.

[0019] The third member 26 is able to slide back and forth within the second member 16, and a protrusion 32 embedded in the enlarged portion 28 selectively engages with a protrusion 34 embedded in the second member 16. A biasing member 38, such as, for example, a coiled spring, is positioned about the smaller portion 30. The biasing member 38 is arranged to urge the third member 26 away from an opening 29 of the second member 16.

[0020] The second member 16 is arranged to slide back and forth within the space 17 of the first member 14. The protrusion 34 extends outwardly from the second member 16 such that the protrusion 34 selectively engages with a notch of a set of notches 36 located on an inner surface of the first member 14. Hence, engagement of the protrusion 32 with the protrusion 34 and engagement of the protrusion 34 with one of the notches of the set of notches 36 operates as a ratchet or locking mechanism to lock the position of the third member 26 and the second member 16 relative to the first member 14 in a locked position. When the protrusion 34 is unengaged with any of the notches of the set of notches 36. The second member 16, and consequently, the third member 26, are in an unlocked position relative to the first member 14.

[0021] A positioner 18 includes an extension 22 that extends through an opening 24 of the housing 12 and an opening 25 of the first member 14. The extension 22 is attached to the second member 16. An operator of the stone retrieval device 10, such as a physician, can therefore place, for example, a

thumb on an indentation 20 of the positioner 18 and push or pull on the positioner 18 to move the second member 16 relative to the first member 14 and the housing 12.

[0022] In certain arrangements, the stone retrieval device 10 includes a sensor such as, for example, a pull-force sensor with an opening 44 associated with the housing 12 and a set of color indicators 45 embedded in an enlarged portion 40 of the first member 14 that the operator can view through the opening 44. Accordingly, as the first member 14 slides within the space 15 of the housing 12. Different colored indicators of the set of indicators 45 are observed through the opening 44. Another biasing member such as, for example, a coiled spring 42 is positioned about an extension 56 that extends from the enlarged portion 40 of the first member 14. The biasing member 42 is arranged to urge the first member 14 away from an opening 41 of the housing 12.

[0023] In various arrangements, the stone retrieval device is attached or connected to a capturing device 50, which is shown in greater detail in FIG. 4. The capturing device 50, further a capturing basket 76, is positioned within the sheath 52 and an optional expandable cone 68. The capturing basket 76 includes a rod or wire 54 with a distal end 66 and a proximal end 67 attached to the smaller portion 30 of the first member 26. A pair of wires 58 and 60 are attached to the distal end 66 of the rod or wire 54. Specifically, the ends of each of the wires 58 and 60 are attached to the distal end 66 such that the mid region of the wires 58 and 60 intersect at the distal most end of the capturing basket 76. As shown in FIG. 4, the wires 58 and 60 are generally orthogonal to each other

at the distal point of intersection for this particular arrangement. It is contemplated that various alternative basket wire configurations would work with the retraction force sensing handle portion of the present invention.

[0024] In addition to surrounding the rod or wire 54, the proximal region of the sheath 52 extends through the opening 41 of the housing 12, surrounds the extension 56 and is positioned within the coiled spring 42. The sheath 52 is attached or connected to the enlarged portion 40 of the first member 14. Thus, movement of the third member 26 relative to the first member 14 results in movement of the rod or wire 54 relative to the sheath 52. Different color indicators of the set of color indicators 45 viewed through the opening 44 indicates the pull force on the capturing basket 76. Rather than color indicators, the pull-force sensor can be a sonic sensor, a tactile sensor, a pop-up flag or any other suitable sensor that indicates the pull force on the capturing basket 76.

[0025] When the capturing device 50 includes the optional cone 68, the capturing basket 76 is initially collapsed within the cone 68 as the capturing device 50 is inserted into an anatomical region of a patient. After the capturing basket 76 and the cone 68 have been positioned in the anatomical region containing stone fragments, the operator of the stone retrieval device 10 pushes on the positioner 18 distally such that the wires 58 and 60 exit a distal end 62 of the expandable cone 68. It is contemplated that capturing basket 76 may alternatively extend from a sheath without a cone extending therefrom at a distal end. It is contemplated that a distal end of sheath may have a diameter equal to the diameter of the sheath along its length. After the stone fragments 70 have

been captured by the wires 58 and 60, the operator pulls on the positioner 18 proximally to draw the stone fragments 70 into the cone 68, which causes the cone 68 to expand. The distal end 62 of the cone 68 is configured to expand to a maximum predetermined size.

[0026] As the operator of the stone retrieval device 10 pulls the positioner 18 distally, the second member 16 moves proximally relative to the first member 16 such that the protrusion 34 eventually engages with one of the notches of the set of notches 36 associated the first member 14. Further, the proximal movement of the second member 14 also results in movement of the second member 14 relative to the third member 26. Such movement results in engagement of the protrusion 34 with the protrusion 32 embedded in the third member 26 and compression of the coiled spring 38. As described earlier, engagement of the protrusion 34 with the protrusion 36 and with one of the notches of the set of notches 36 locks the third member 26 and the second member 16 with the first member 14 in a locked position (FIG. 2). To unlock the members, the operator pushes on the positioner 18 such that the protrusion 34 becomes unlocked from the set of notches 36 and the coiled spring 38 pushes the third member 26 proximally relative to the second member 16 to unengage the protrusion 34 from the protrusion 32.

[0027] During the stone removal procedure, the operator can view the color indicators 45 through the opening 44. A first color indicator, such as a light color, can indicate to the operator that the pull force on the stone fragments 70 with not cause trauma or damage to the patient's ureter. As the operator pulls on

the housing 12 when the stone retrieval device is in the locked positions, the operator continues to view the color indicators 45 through the opening 44. Additional pull force moves the first member 14 distally relative to the housing 12, resulting in compression of the coiled spring 42 and movement of the set of color indicators 45 relative to the opening 44. A second color indicator, such as a darker color, may serve as a warning to the operator that the pull force on the stone fragments is approaching a maximum limit. A third color indicator, such as a darkest color of the set of color indicators, may indicate to the operator that the pulls force is at the maximum limit and any additional pull force may damage the patient's ureter. Reducing the pull force results in the coiled spring 42 pushing the first member proximally relative to the housing 12 such that the lighter colored indicators of the set of indicators 45 are viewed through the opening 44 to indicate to the operator that the pull force on the capturing basket 76 has been reduced to a desired level.

[0028] The description of the invention is merely exemplary in nature and variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

CLAIMS

What is claimed is:

1. A stone retrieval device comprising:

a sheath;

a stone retrieval basket including a distal region with a plurality of basket wires and a proximal region with one or more core wires, the stone retrieval basket being contained within the sheath and movable out of a distal opening of the sheath to cause the plurality of basket wires to open into a basket shape;

a lock mechanism for locking the position of the stone retrieval basket with respect to the position of the sheath; and

a basket force controller including a first control stage and a second control stage,

wherein the first control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in an unlocked position and the second control stage includes a sensor for measuring force on the stone retrieval basket when the lock mechanism is in a locked position.

2. The stone retrieval device of claim 1 wherein the lock mechanism is a ratchet mechanism.

3. The stone retrieval device of claim 2 wherein the ratchet mechanism includes a first protrusion associated with a first member and a set of notches associated with a second member, the first member being contained in the second member and movable relative to the second member, the first protrusion being engaged with one notch of the set of notches when the lock mechanism is in the locked position.

4. The stone retrieval device of claim 3 wherein the one or more core wires is attached to a third member contained in the first member, the third member being movable relative to the first member and including a second protrusion, the second protrusion being engaged with the first protrusion when the lock mechanism is in the locked position.

5. The stone retrieval device of claim 4 wherein movement of the third member relative to the first member pulls the plurality of basket wires into the distal opening of the sheath.

6. The stone retrieval device of claim 1 wherein the first control stage sensor is a visual indicator with a first color.

7. The stone retrieval device of claim 6 wherein the second control stage sensor is a visual indicator with a second color that is different than the first color.

8. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a pop-up flag.

9. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a tactile sensor.

10. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a sonic sensor.

11. The stone retrieval device of claim 1 further comprising an automatic release mechanism that releases the stone retrieval basket when the force on the stone retrieval basket exceeds a predetermined maximum force.

12. The stone retrieval device of claim 11 wherein the automatic release mechanism is resettable after releasing the stone retrieval basket.

13. A method of determining a force on a stone retrieval basket comprising:

capturing a stone with the stone retrieval basket; and

utilizing a sensor to determine if the force on the stone retrieval basket exceeds a predetermined maximum force.

14. The method of claim 13 wherein the sensor is visual sensor.

15. The method of claim 13 further comprising releasing the stone retrieval basket when the force on the stone retrieval basket exceeds the predetermined maximum force.

AMENDED CLAIMS
received by the International Bureau on 21 July 2016 (21.07.2016)

What is claimed is:

1. A stone retrieval device comprising:

a sheath;

a stone retrieval basket including a distal region with a plurality of basket wires and a proximal region with one or more core wires, the stone retrieval basket being contained within the sheath and movable out of a distal opening of the sheath to cause the plurality of basket wires to open into a basket shape;

a lock mechanism for locking the position of the stone retrieval basket with respect to the position of the sheath;

a basket force controller including a first control stage and a second control stage, the first control stage including a sensor for measuring force on the stone retrieval basket when the lock mechanism is in an unlocked position and the second control stage including a sensor for measuring force on the stone retrieval basket when the lock mechanism is in a locked position; and

an automatic release mechanism that releases the stone retrieval basket when the force on the stone retrieval basket exceeds a predetermined maximum force.

2. The stone retrieval device of claim 1 wherein the lock mechanism is a ratchet mechanism.

3. The stone retrieval device of claim 2 wherein the ratchet mechanism includes a first protrusion associated with a first member and a set of notches associated with a second member, the first member being contained in the second member and movable relative to the second member, the first protrusion being engaged with one notch of the set of notches when the lock mechanism is in the locked position.

4. The stone retrieval device of claim 3 wherein the one or more core wires is attached to a third member contained in the first member, the third member being movable relative to the first member and including a second protrusion, the second protrusion being engaged with the first protrusion when the lock mechanism is in the locked position.

5. The stone retrieval device of claim 4 wherein movement of the third member relative to the first member pulls the plurality of basket wires into the distal opening of the sheath.

6. The stone retrieval device of claim 1 wherein the first control stage sensor is a visual indicator with a first color.

7. The stone retrieval device of claim 6 wherein the second control stage sensor is a visual indicator with a second color that is different than the first color.

8. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a pop-up flag.

9. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a tactile sensor.

10. The stone retrieval device of claim 1 wherein at least one of the sensors of the first control stage and the second control stage is a sonic sensor.

11. The stone retrieval device of claim 1 wherein the automatic release mechanism is resettable after releasing the stone retrieval basket.

12. A method of determining a force on a stone retrieval basket comprising:

capturing a stone with the stone retrieval basket; and

utilizing a sensor to determine if the force on the stone retrieval basket exceeds a predetermined maximum force.

13. The method of claim 12 wherein the sensor is visual sensor.

14. The method of claim 12 further comprising releasing the stone retrieval basket when the force on the stone retrieval basket exceeds the predetermined maximum force.

15. A stone retrieval device comprising:

a sheath;

a stone retrieval basket including a distal region with a plurality of basket wires and a proximal region with one or more core wires, the stone retrieval basket being contained within the sheath and movable out of a distal opening of the sheath to cause the plurality of basket wires to open into a basket shape;

a lock mechanism for locking the position of the stone retrieval basket with respect to the position of the sheath, the lock mechanism including a first protrusion associated with a first member and a set of notches associated with a second member, the first member being contained in the second member and movable relative to the second member, the first protrusion being engaged with one notch of the set of notches when the lock mechanism is in the locked position, the one or more core wires being attached to a third member contained in the first member, the third member being movable relative to the first member and including a second protrusion, the second protrusion being engaged with the first protrusion when the lock mechanism is in the locked position; and

a basket force controller including a first control stage and a second control stage, the first control stage including a sensor for measuring force on the stone retrieval basket when the lock mechanism is in an unlocked

position and the second control stage including a sensor for measuring force on the stone retrieval basket when the lock mechanism is in a locked position.

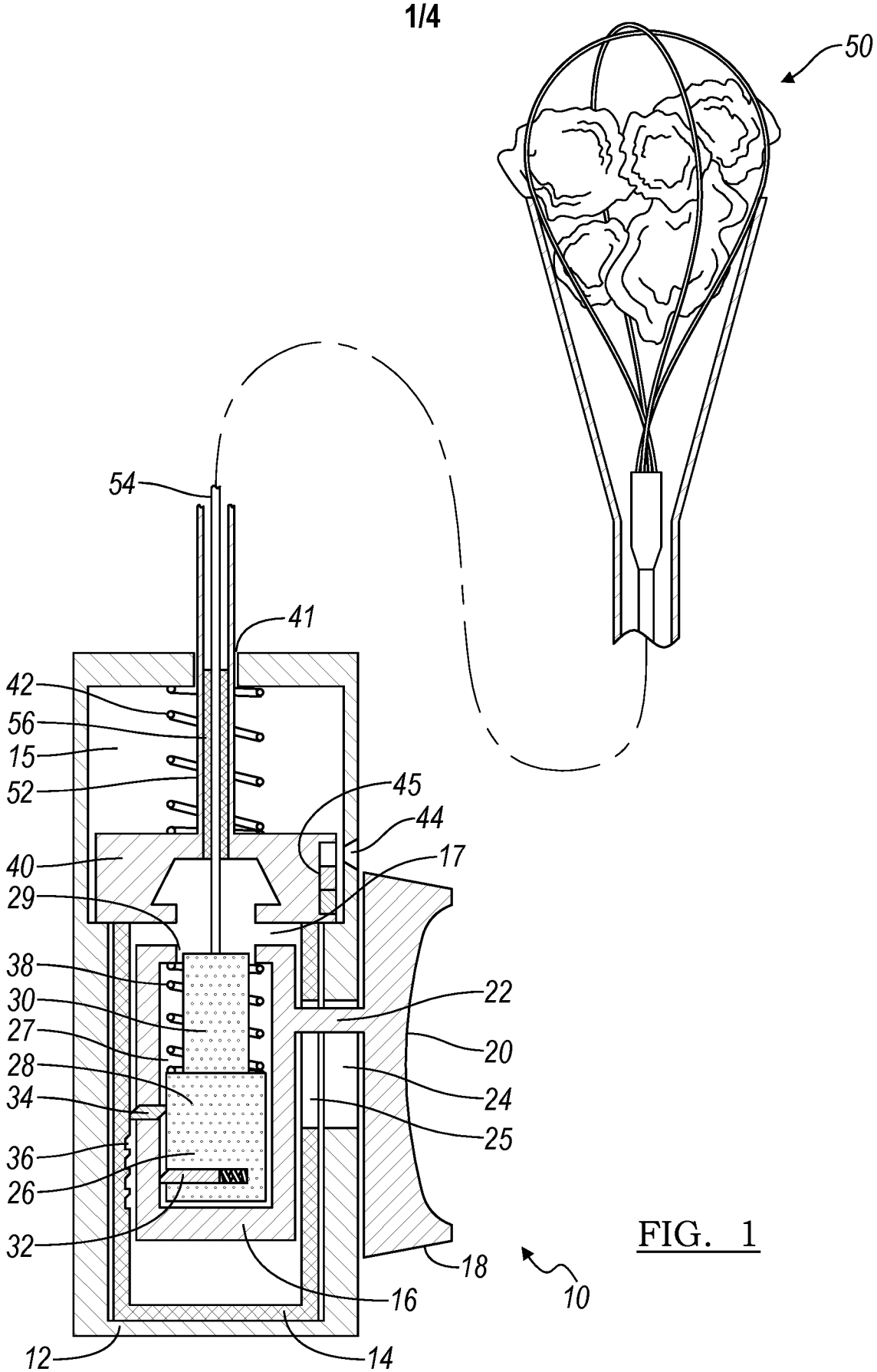
50
54
41
42
56
15
52
45
44
17
40
29
38
30
27
28
34
36
26
32
22
20
24
25
18
16
10
12
14

FIG. 1

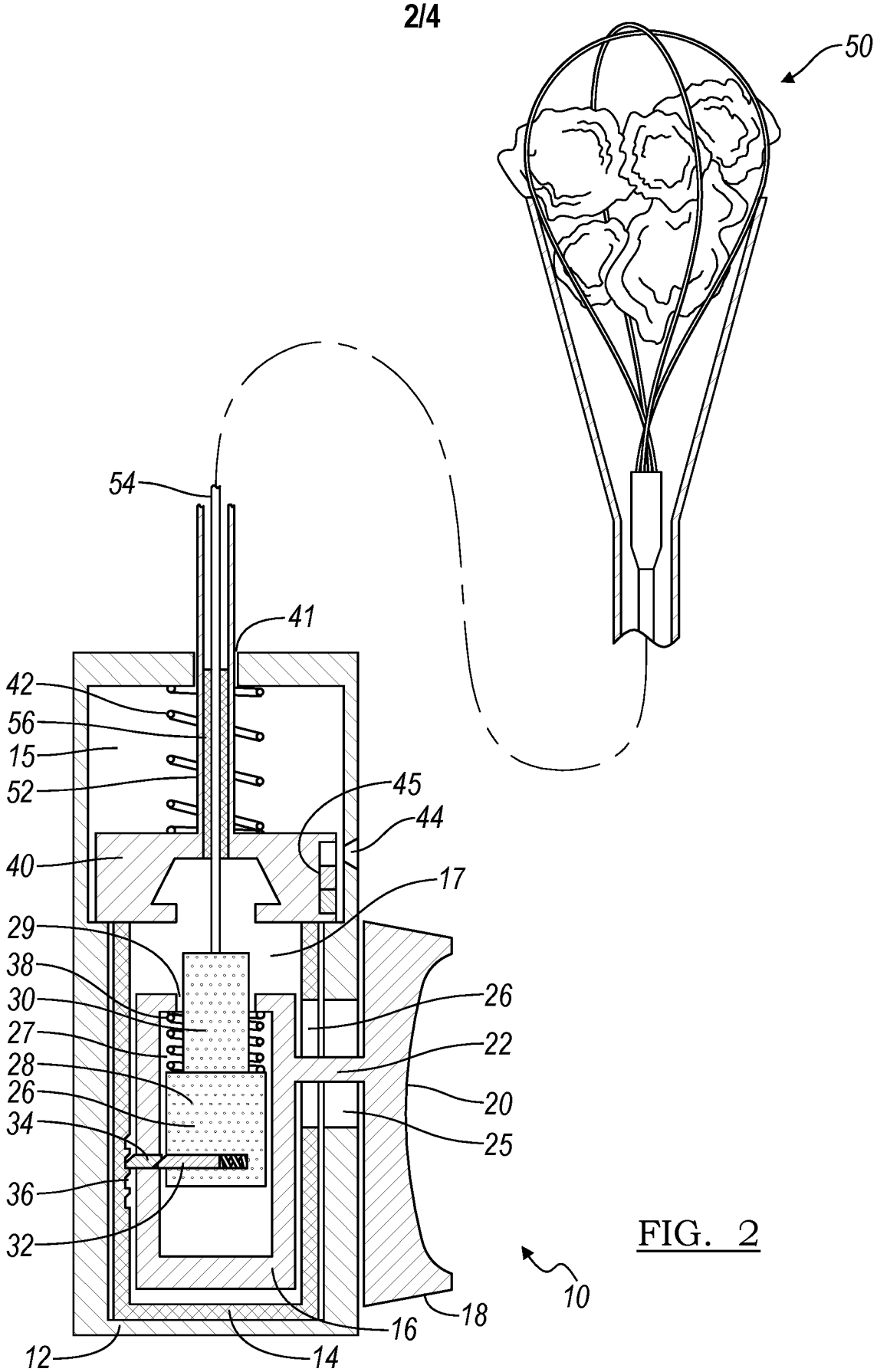
50
54
41
42
56
15
52
45
44
40
17
29
38
30
27
28
26
34
36
32
26
22
20
25
10
18
16
12
14

FIG. 2

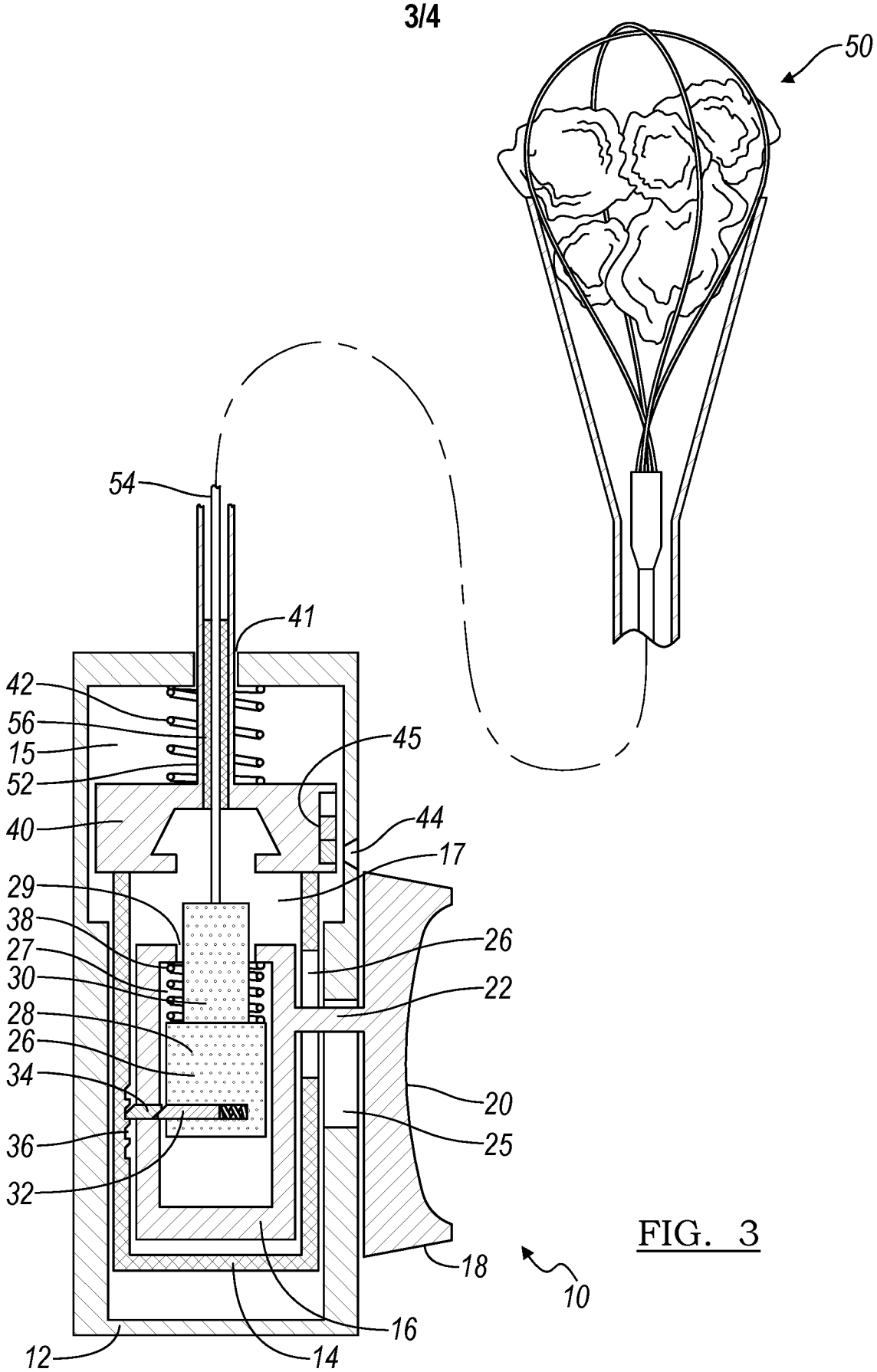
50
54
41
42
56
15
52
40
45
44
17
29
38
27
30
28
26
34
36
32
26
22
20
25
18
10
16
12
14

FIG. 3

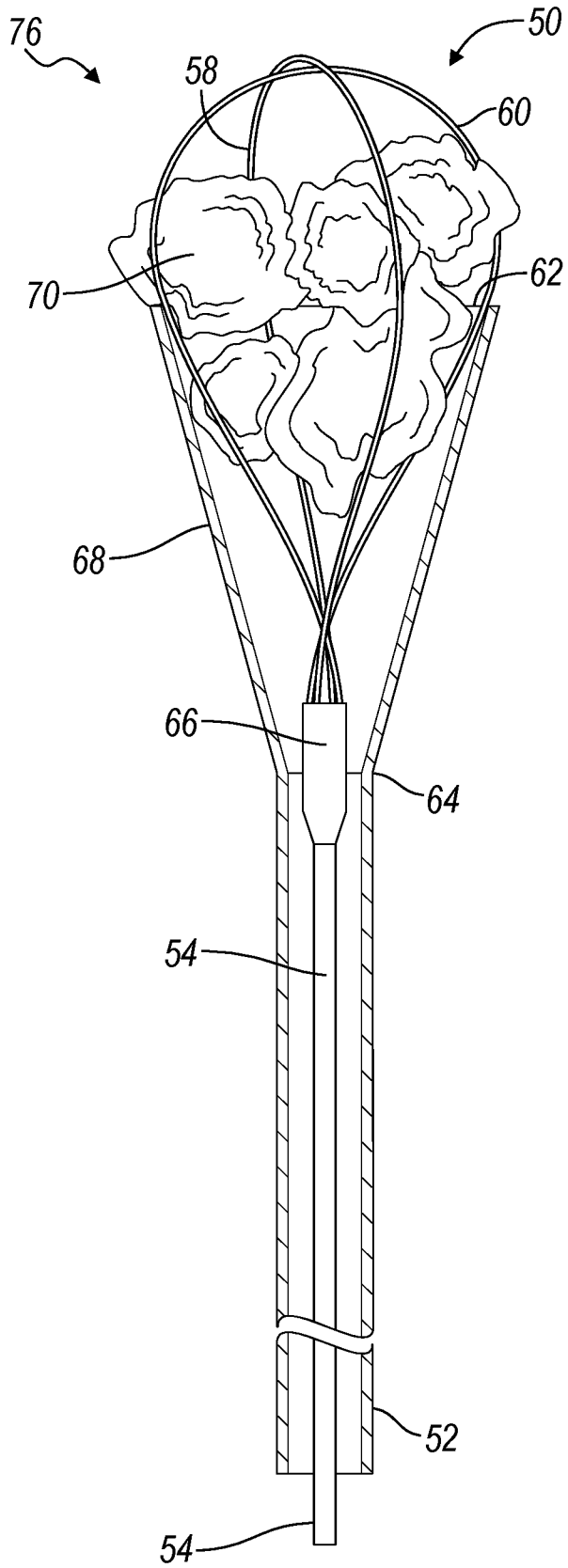

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/013023

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B17/221 A61B90/00 A61B17/00
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

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	DE 10 2009 022867 A1 (ENDOSMART GES FUER MEDIZINTECH [DE]) 2 December 2010 (2010-12-02)	1,6-10
A	paragraph [0014] - paragraph [0026] paragraph [0034] - paragraph [0040] paragraph [0043] - paragraph [0046]; figures 1-5	11,12

X,P	WO 2015/134846 A1 (UNIV AKRON [US]; MAHAJAN AJAY [US]; NAJAFI ZAHRA [US]) 11 September 2015 (2015-09-11) paragraph [0034] - paragraph [0047] paragraph [0050] - paragraph [0052]; figures 1-3	1,6-10

	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
26 February 2016	04/03/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Ioanovici, T

5

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/199200 A1 (TEAGUE JAMES A [US] ET AL) 7 October 2004 (2004-10-07) paragraph [0004] - paragraph [0009] paragraph [0036] - paragraph [0043] paragraph [0050] - paragraph [0058]; figures 1-3, 7, 8	1
Y	DE 32 16 178 A1 (OEHRLEIN LEO; KOCH HELMUT PROF DR MED) 3 November 1983 (1983-11-03)	1-3
A	page 4, line 5 - page 5, line 31; claim 1; figures 1-2	6
Y	US 5 957 932 A (BATES JAMES S [US] ET AL) 28 September 1999 (1999-09-28)	1-3
A	column 1, line 28 - column 3, line 10 column 4, line 1 - column 5, line 8 column 6, line 18 - line 20; figures 1-5	4,5
A	EP 0 324 641 A2 (BAXTER INT [US]) 19 July 1989 (1989-07-19) column 1, line 45 - column 2, line 30 column 3, line 45 - column 4, line 9; figures 1-5	1,6,7
A	WO 2009/042451 A2 (WILSON COOK MEDICAL INC [US]; LU WENFENG [US]; RUCKER BRIAN K [US]) 2 April 2009 (2009-04-02) paragraph [0007] - paragraph [0008] paragraph [0017] - paragraph [0022] paragraph [0028]; figures 1-6	1,6,7
A	US 5 573 530 A (FLEURY MICHAEL T [US] ET AL) 12 November 1996 (1996-11-12) column 2, line 12 - line 26 column 7, line 19 - line 53; figures 1-10	1-5
A	WO 01/60235 A2 (FOGARTY THOMAS J M D [US]; WILLIS DAVID B [US]; HOWELL THOMAS A [US];) 23 August 2001 (2001-08-23) page 59, line 17 - line 23; figure 8	1,6,7,9, 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/013023

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. [X] Claims Nos.: 13-15
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:

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.

Continuation of Box II.1

Claims Nos.: 13-15

Claims 13-15 relate to subject-matter considered by this Authority to be covered by the provisions of Rules 39.1(iv) PCT and 67.1 (iv) PCT, because their subject-matter relates to a method for treatment of the human body by surgery. Consequently, no opinion will be formulated with respect to the subject-matter of these claims (Article 34(4)(a)(i) and (b) or 17(2) PCT). It is only disclosed that the device is used inside the human body and that the method is performed inside the human body for capturing stone fragments, and it is not disclosed that the device is intended for another purpose outside of a surgical procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2016/013023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102009022867 A1	02-12-2010	NONE	
WO 2015134846 A1	11-09-2015	NONE	
US 2004199200 A1	07-10-2004	AU 2004231494 A1	04-11-2004
		CA 2520884 A1	04-11-2004
		EP 1613221 A1	11-01-2006
		US 2004199200 A1	07-10-2004
		WO 2004093697 A1	04-11-2004
DE 3216178 A1	03-11-1983	NONE	
US 5957932 A	28-09-1999	US 5788710 A	04-08-1998
		US 5957932 A	28-09-1999
		US 6319262 B1	20-11-2001
EP 0324641 A2	19-07-1989	CA 1310557 C	24-11-1992
		DE 68911696 D1	10-02-1994
		DE 68911696 T2	04-08-1994
		EP 0324641 A2	19-07-1989
		JP H025977 A	10-01-1990
		JP 2810075 B2	15-10-1998
		US 4820283 A	11-04-1989
WO 2009042451 A2	02-04-2009	US 2009082780 A1	26-03-2009
		WO 2009042451 A2	02-04-2009
US 5573530 A	12-11-1996	NONE	
WO 0160235 A2	23-08-2001	AU 3838201 A	27-08-2001
		EP 1259155 A2	27-11-2002
		JP 5090600 B2	05-12-2012
		JP 2004504865 A	19-02-2004
		US 2002059938 A1	23-05-2002
		US 2004168692 A1	02-09-2004
		WO 0160235 A2	23-08-2001