

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
22 January 2009 (22.01.2009)

PCT

(10) International Publication Number  
**WO 2009/012395 A1**

(51) International Patent Classification:  
A61M 39/02 (2006.01)

(21) International Application Number:  
PCT/US2008/070345

(22) International Filing Date: 17 July 2008 (17.07.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/961,160 19 July 2007 (19.07.2007) US

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(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, BR, BW, BY, BZ, CA, CH, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(54) Title: VENOUS ACCESS PORT ASSEMBLY WITH X-RAY DISCERNABLE INDICIA

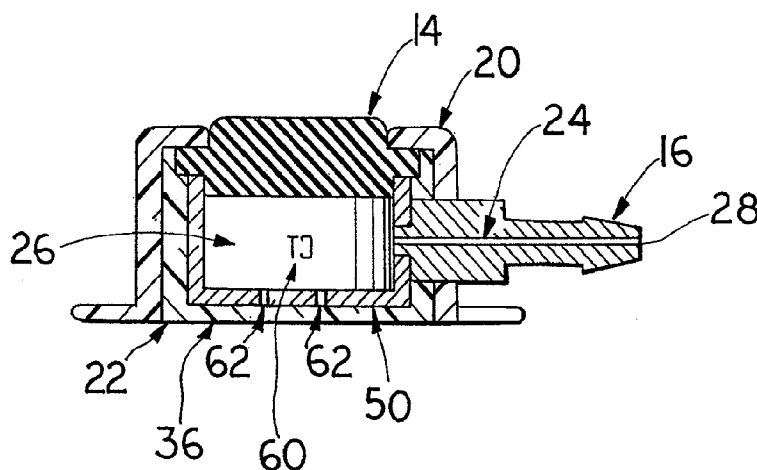


FIG. 6

(57) Abstract: A venous access port assembly (10) having a housing base (22) with a discharge stem (16), a septum (14), a cap (20) and an interior reservoir (26). The port assembly (10) is provided with X-ray discernable indicia (60,62) to identify an attribute of the assembly (10) after its implantation and clearly appear on an X-ray of the patient in a manner informing the radiologist or technologist and the medical practitioner of that particular attribute. The indicia are cutouts (60,62) through a reservoir lining (50) of radiopaque material such as metal where the cutouts have narrow slot width are in the form of one or more sets of alphabetical letters such as "CT" in the lining's side wall (52) or bottom wall (54).

## TITLE

## Venous Access Port Assembly With X-Ray Discernable Indicia

**[0001]** This relates to the field of medical devices and more particularly to venous access ports for the infusion of fluids into the patient and/or withdrawal of fluids from the patient.

**[0002]** Venous access ports for the infusion and/or withdrawal of fluids from a patient are well-known, secured to the proximal end of an implanted catheter. These ports are typically used for drug infusion or for withdrawal of small amounts of blood, where large flows of fluid are not required. The ports are assemblies of a needle-impenetrable housing with a discharge port in fluid communication with the catheter and the reservoir within the port housing, and provide a subcutaneous self-sealing septum that defines an access site for multiple needle sticks through the covering skin tissue of the patient, through the septum and into the reservoir, without the need to continuously search for new access sites. Examples of such ports are disclosed, for example, in U.S. Patents Nos. 4,704,103; 4,762,517; 4,778,452; 5,185,003; 5,213,574; 5,637,102; and 5,833,654. In U.S. Patent No. 5,833,654 is set forth a dual chamber port assembly having a metal casing as a liner in one of the chambers of the port assembly.

**[0003]** It is desired to provide a venous access port assembly that provides for a radiologist, radiology technologist, nurse and ultimately a medical practitioner to be able to discern an important property of the port assembly after the port assembly has been implanted into a patient.

**[0004]** The present invention is related to a venous access port having a housing and a septum, providing an interior reservoir and a passageway extending from the reservoir through a stem of a discharge port to establish fluid communication with a proximal end of a catheter

lumen to which the port assembly is secured prior to placement of the assembly into a patient. The port may optionally have more than one reservoir and associated septum. The invention is the incorporation of X-ray discernable indicia onto a venous access port that is discernible under X-ray examination to provide information concerning the nature or key attribute of the venous access port, so that the practitioner, subsequent to the date of implantation thereof, can determine that nature or key attribute under X-ray examination. One such key attribute in particular would be, for example, that where the venous access port is rated to be used for power injection, such as used for contrast fluid injection during a contrast enhanced computed tomography, the letters "CT" (for "computed tomography") would be provided on the port assembly in such a manner that they are radiographically visible. The attribute in this example is the property of the port's being adapted to withstand high pressures that are used for injection of contrast fluid into a patient, and the letters "CT" would be understood in medical practice to indicate that the port is suitable for the high pressure injection of contrast fluid.

[0005] In the preferred embodiment, a reservoir lining of radiopaque material such as titanium, includes cutouts such as of letters "CT" (although other indicia may be utilized) through the body of the lining, with the cutouts being radiographically visible. The lining for the reservoir is contained within the port housing and includes an aperture through the side wall for fluid communication with a discharge stem of the port assembly, establishing fluid communication with a catheter sealingly and securely affixed to the discharge stem of the assembly. The reservoir lining of titanium provides protection against penetration by a needle when it is inserted through the septum of the port assembly for injection of fluid into the chamber. The letters "CT" are readable from exterior of the patient in an X-ray. The lining may have several such sets of cutouts located at various locations about the lining's side wall and/or

in the bottom wall thereof. The cutouts preferably are substantially narrow for exposing therethrough only a minimum amount of plastic of the surrounding housing.

[0006] The accompanying drawings, which are incorporated herein and constitute part of this specification, illustrate the presently preferred embodiments of the invention, and, together with the general description given above and the detailed description given below, serve to explain the features of the invention. In the drawings:

[0007] Figs. 1 and 2 are an isometric view and an exploded view, respectively, of the venous access port assembly containing the present invention;

[0008] Fig. 3 is an isometric view of a reservoir lining of the present invention defining X-ray discernable indicia;

[0009] Fig. 4 is an enlarged view of portion of the lining of Fig. 3 illustrating the cutout indicia provided by the lining; and

[0010] Figs. 5 and 6 are cross-section views of the port of Figs. 1 and 2.

[0011] Certain terminology is used herein for convenience only and is not to be taken as a limitation on the present invention. The terms “distal” and “proximal” refer, respectively, to directions closer to and away from the insertion tip of a catheter in an implantable catheter assembly. The terminology includes the words specifically mentioned, derivatives thereof and words of similar import. The embodiments illustrated below are not intended to be exhaustive or to limit the invention to the precise form disclosed. These embodiments are chosen and described to best explain the principle of the invention and its application and practical use and to enable others skilled in the art to best utilize the invention.

[0012] Venous access port assembly 10 of Figures 1, 2, 5 and 6 includes a housing 12 and a septum 14, with a discharge stem 16 extending from a distal end 18 of the port assembly

10 to be attached securely and sealingly to the proximal end of a catheter (not shown). Cap 20 of housing 12 secures to housing base 22 to in turn secure septum 14 in position in the port assembly 10 in a manner that exposes the top surface of the septum for needle insertion. A passageway 24 (see Figs. 5 and 6) extends from an interior reservoir 26 to the distal tip opening 28 of discharge stem 16. A recess 30 is seen to be provided along both sides of discharge stem 16, facilitating insertion of the discharge stem 16 into the catheter lumen and providing a clearance for a locking sleeve or clamp (not shown) utilized to compress the catheter lumen wall against the exterior surface of the discharge port 16 for assured sealed connection of the catheter with the port assembly 10.

**[0013]** With reference now to Figures 2 to 4, showing reservoir lining 50 of the present invention, lining 50 is cup-shaped and is inserted into well 32 of housing base 22 beneath septum 14, and secured therewithin. Lining 50 is made of needle-impenetrable material such as metal, which may be titanium or stainless steel, and its side wall 52 and bottom wall 54 protects the side walls 34 and bottom wall 36 of housing base 22 defining well 32, from being penetrated by a needle (not shown) inserted into and through septum 14 for injection of fluids into reservoir 26 or withdrawal of blood therefrom. An aperture 56 near or at the bottom of side wall 52, in alignment with a corresponding aperture 38 of housing base 22, establishes fluid communication with passageway 24 of discharge stem 16 for fluid to pass between the reservoir 26 and the catheter and thus the patient. Discharge stem 16 may be a metal component such as titanium or stainless steel which would extend through aperture 38 of the housing base 22, to preferably be welded to lining 50.

**[0014]** In accordance with the present invention, the X-ray discernable indicia are cutouts 60 formed through the body of lining 50, shown as the alphabetical letters "CT". The

letters "CT" are visible when the X-ray of the patient is viewed, readable from outside the lining 50 and are easily discerned by the radiologist or technologist. In lining 50, preferably a plurality of sets of cutout indicia 60,62 are provided equi-angularly spaced about the circumference of the side wall 52 and through bottom wall 54 to assure that the indicia appear in the X-ray irrespective of the angular location at which the X-ray is taken. With particular reference to Fig. 4, it is preferable that the width of each cutout slot 58 of the indicia or letters be as narrow as possible but still be discernable by X-ray; the narrowness of the slots 58 minimizes any possibility that a needle inserted through the septum could penetrate through a slot of a cutout by chance, thus harming the patient and resulting in injection of fluid directly into the tissue surrounding the port. The width of each cutout slot 58 would thus preferably be less wide than the diameter of a needle. The set of cutout indicia 62 through the bottom wall may be dimensionally larger as a set, but still with narrow slot width. Centering of the cutout indicia 62 along the bottom wall 54 positions the indicia directly beneath the reservoir and septum, minimizes any obscuring thereof by the structure of the venous access port assembly, and the indicia may also be easily discernable should the port assembly be at an angle from the horizontal plane of the X-ray.

**[0015]** It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the scope of the present invention as defined by the appended claims.

## CLAIMS

What is claimed is:

1. A venous access port assembly for implantation into a patient, comprising:  
a housing having a discharge port, a needle-penetrable septum and a cap securable to the housing and retaining the septum securely in the assembly, the housing having a housing base defining a bottom wall of at least one reservoir, with the housing base having an outwardly facing bottom surface, and  
the housing base including a reservoir lining of radiopaque material defining X-ray discernable indicia that indicate an attribute of the assembly when an X-ray of the patient is taken so that the practitioner can be advised of the attribute of the assembly after implantation.
2. The assembly of claim 1, wherein the reservoir lining is of needle-impenetrable material.
3. The assembly of claim 2, wherein the reservoir lining is metal.
4. The assembly of claim 3, wherein the reservoir lining is titanium.
5. The assembly of claim 2, wherein the X-ray discernable indicia comprise at least one set of cutouts through a wall of the reservoir lining.
6. The assembly of claim 5, wherein the X-ray discernable indicia are alphabetical letters.

7. The assembly of claim 5, wherein the X-ray discernable indicia comprise a plurality of sets of cutouts through a side wall of the reservoir lining.
8. The assembly of claim 5, wherein the X-ray discernable indicia comprise at least one set of cutouts through a bottom wall of the reservoir lining.
9. The assembly of claim 5, wherein the X-ray discernable indicia comprise a plurality of sets of cutouts through a side wall and a bottom wall of the reservoir lining.
10. The assembly of claim 5, wherein the cutouts are formed as narrow slots having widths only sufficiently wide to be X-ray discernable.



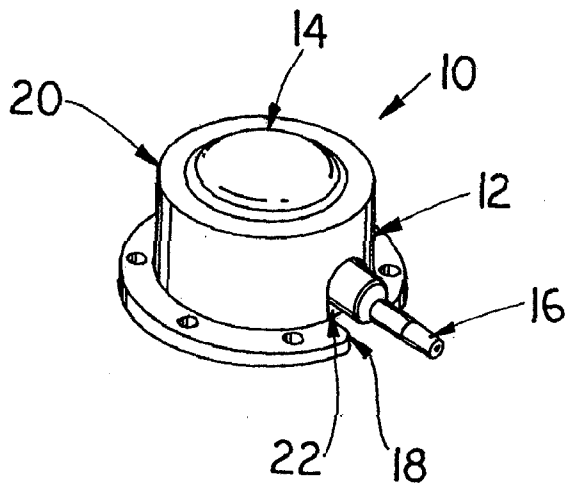


FIG. 1

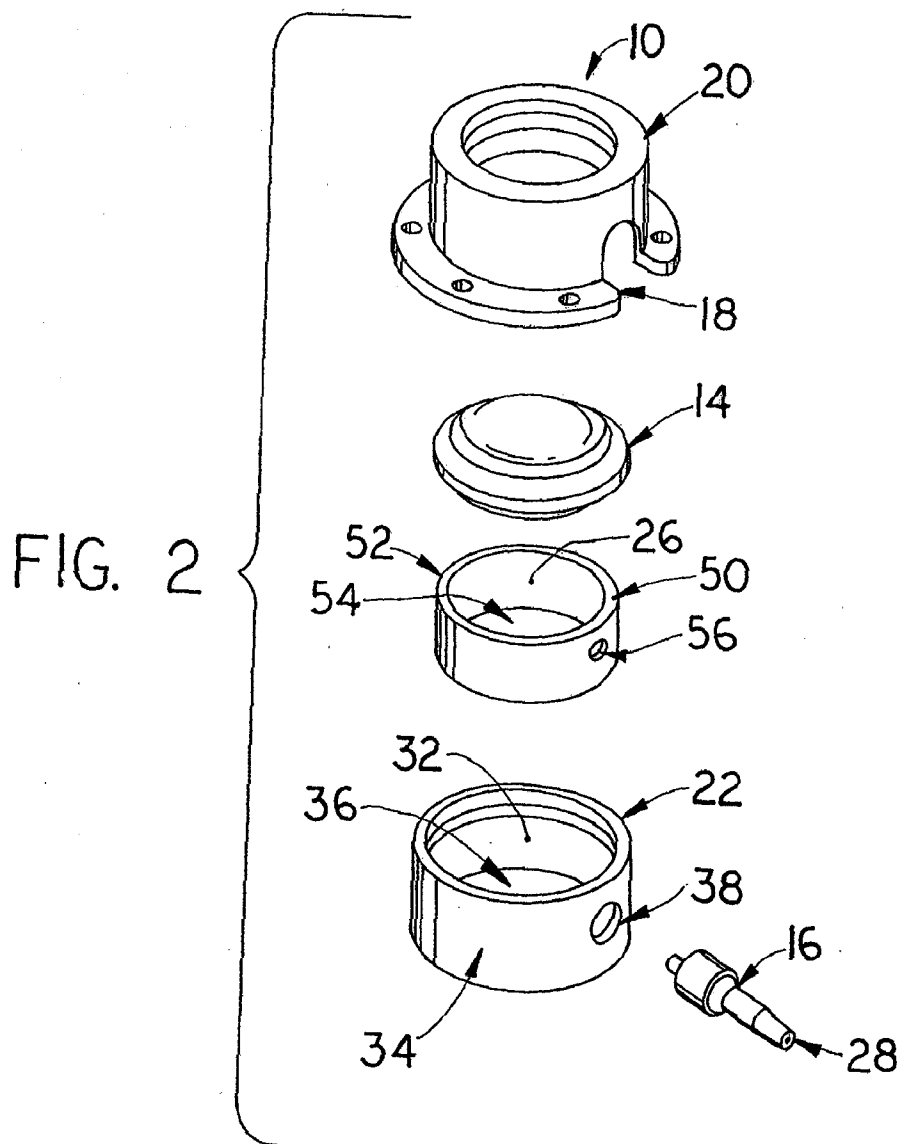


FIG. 2

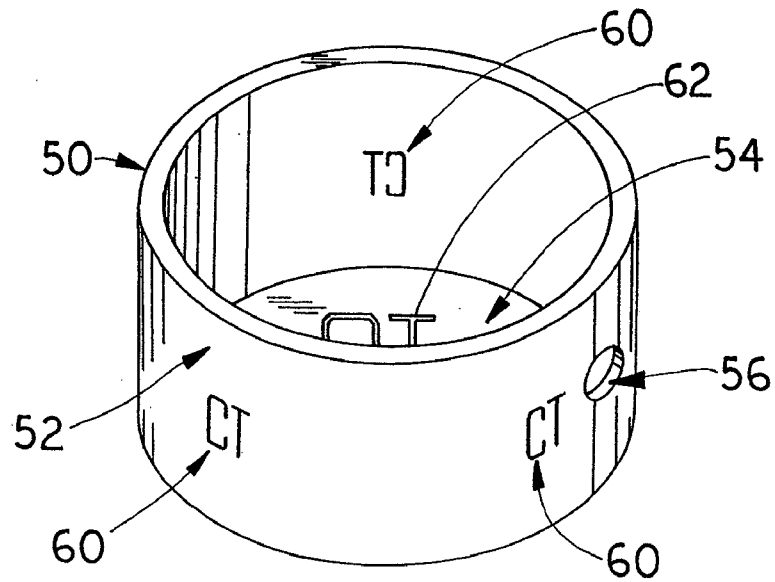


FIG. 3

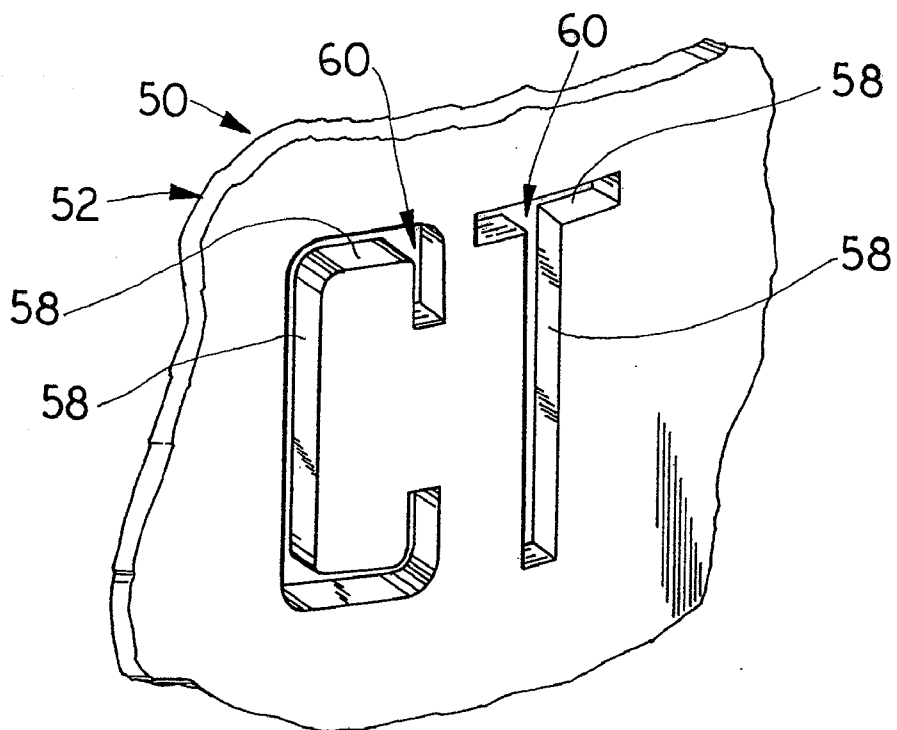


FIG. 4

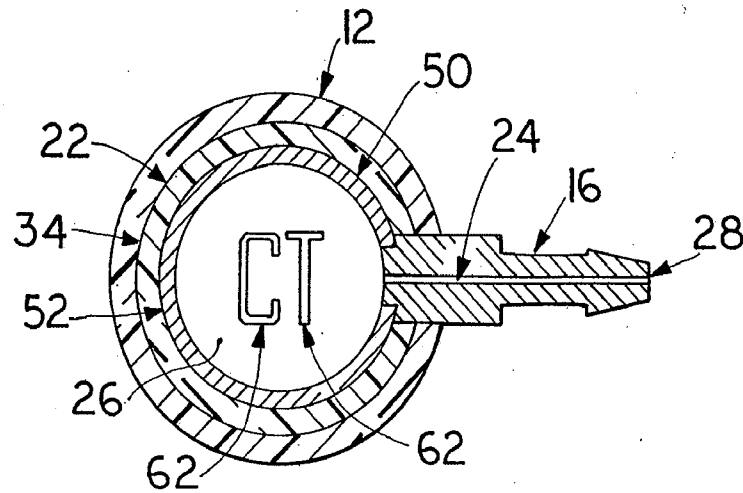


FIG. 5

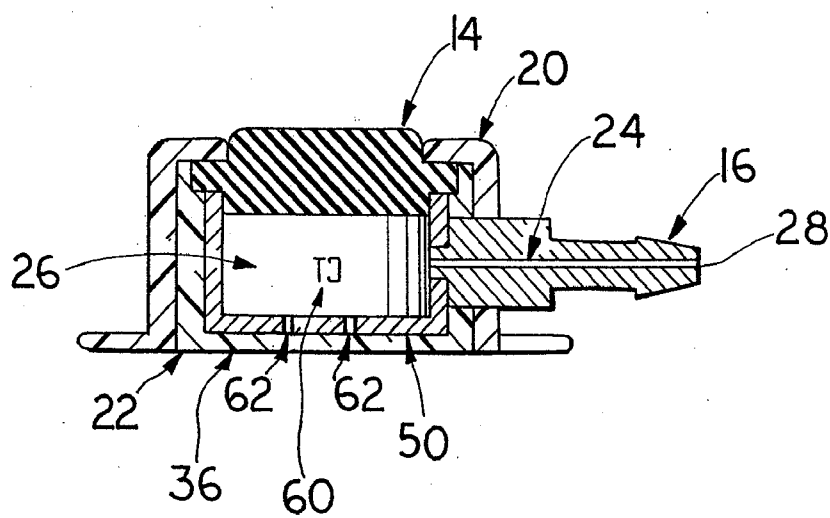


FIG. 6

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2008/070345

## A. CLASSIFICATION OF SUBJECT MATTER

INV. A61M39/02

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

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 practical, search terms used)

EPO-Internal; WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	US 5 213 574 A (TUCKER ELTON M [US]) 25 May 1993 (1993-05-25) cited in the application the whole document	1-4
A	WO 2006/116438 A (BARD INC C R [US]; BEASLEY JAMES C [US]; STATS JASON R [US]; HAMATAKE) 2 November 2006 (2006-11-02) paragraph [0110]; figures 34,35	1-10
A	US 2006/224129 A1 (BEASLEY JIM C [US] ET AL) 5 October 2006 (2006-10-05) paragraph [0076]	1-10
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

14 November 2008

Date of mailing of the international search report

01/12/2008

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/070345

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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