

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number
WO 2005/002425 A3

(51) International Patent Classification⁷: **A61B 6/00**

(21) International Application Number:
PCT/US2004/021654

(22) International Filing Date: 2 July 2004 (02.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/484,784 2 July 2003 (02.07.2003) US

(71) Applicant (for all designated States except US): **U.S. GOVERNMENT AS REPRESENTED BY THE SECRETARY OF THE ARMY** [US/US]; U.S. Army Medical Research Institute of Chemical Defense, Office of the Staff Judge Advocate, Attn: MRMCA-JA (Ms. Elizabeth Arwine), 504 Scott Street, Fort Detrick, MD 21702-5012 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GRAHAM, John S** [US/US]; 3100 Ricketts Point Road, Aberdeen Proving Ground, MD 21010 (US). **BUA, Dominic P** [US/US]; 4 Ivanhoe Drive, Lynnfield, MA 01940 (US). **SCHOMACKER, Kevin T** [US/US]; 6 George Road, Maynard, MA 01754 (US).

(74) Agent: **ARWINE, Elizabeth**; Office of the Staff Judge Advocate, Department of the Army, Attn: MCMR-JA (Ms. Elizabeth Arwine), 504 Scott Street, Fort Detrick, MD 21702-5012 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

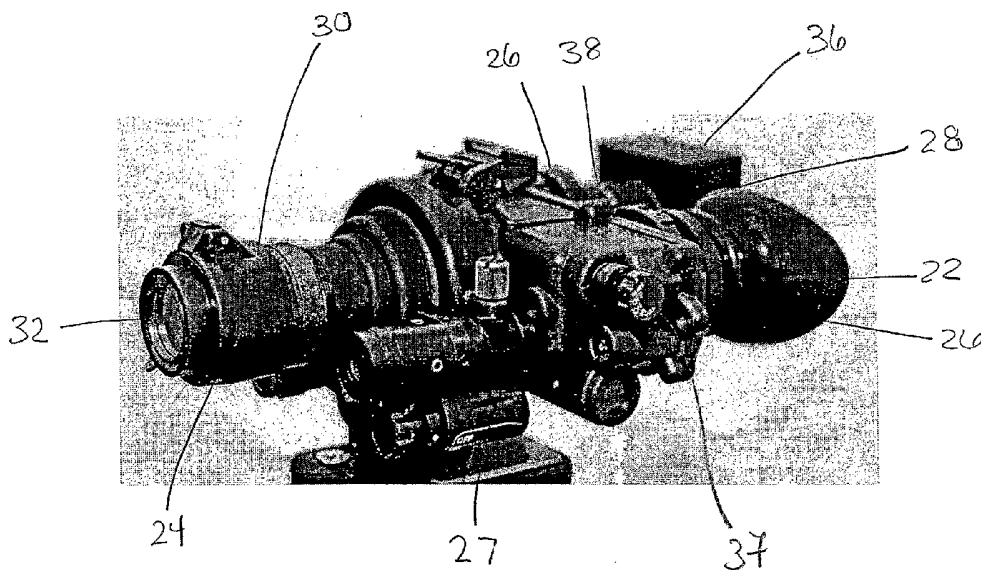
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, 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

[Continued on next page]

(54) Title: WEARABLE TISSUE VIABILITY DIAGNOSTIC UNIT



(57) Abstract: A device for gathering image information about a region of tissue that has been exposed to a contrast agent and methods of use thereof. The device preferably includes night vision goggles, and an excitation source that generates light of a wavelength to activate the contrast agent. The excitation source preferably is attached to the night vision goggles and is capable of directing light to a target. A filter preferably is attached to the night vision goggles, wherein the filter passes light sufficient to form an image of the region of tissue, and wherein the image may be assessed to determine the viability of the region of tissue.

WO 2005/002425 A3



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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

15 December 2005

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/21654

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61B 6/00

US CL : 600/473

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)

U.S. : 600/473,431

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,865,754 A (SEVICK-MURACA ET AL.) 02 February 1999 (02.02.1999), See Figure 1.	1-3, 10-13, 19-23, 29-34, 37-43, and 51-53
Y	US 6,032,070 A (FLOCK ET AL.) 29 February 2000 (29.02.2000), See Figure 5.	1-3, 10-13, 19-23, 29-34, 37-43, and 51-53

☐ 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 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

31 August 2005 (31.08.2005)

Date of mailing of the international search report

17 OCT 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Brian L. Casler

Telephone No. (571) 272-8685

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/21654

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.: 56 and 57
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:
Please See Continuation Sheet
3. ☒ Claims Nos.: 4-9, 14-18, 24-28, 35, 36, 44-50, 54 and 55
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 additional fees, this Authority did not invite payment of any 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/US04/21654

Continuation of Box II Reason 2:

Claims 4-9, 14-18, 24-28, 35, 36, 44-50, 54 and 55 were not search because they are improperly multiply dependent, In reference to claims 56 and 57 were not search because they are indefinite in that it fails to point out what is included or excluded by the claim language.