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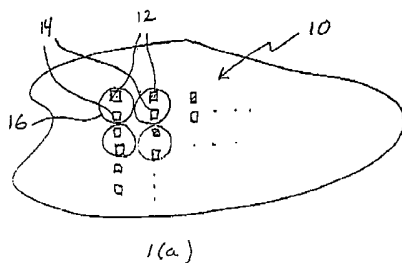
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

(72) Inventors; and

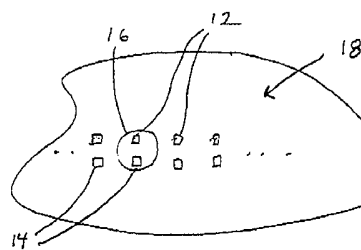
(75) Inventors/Applicants (*for US only*): **OLSZAK, Artur,**

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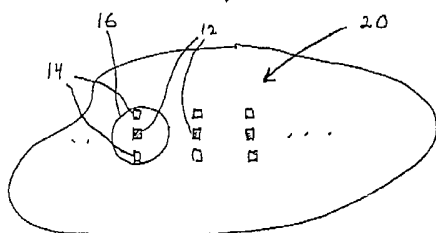
(54) Title: AN IMAGING SYSTEM WITH AN INTEGRATED SOURCE AND DETECTOR ARRAY



1(a)



1(b)



1(c)

(57) Abstract: An imaging system with an integrated source and detector array. A plurality of light detectors are arranged in a detector array and a plurality of light sources corresponding to detectors in the detector array are arranged in a source array in an epi-illumination system so that light radiated from a point on the object illuminated by a given source is detected by a corresponding detector. An optical system is disposed with respect to the source array and the detector array so as to illuminate an object with light from the source array and image the object on the detector array. Ordinarily, the sources and detectors are coplanar and, preferably, are fabricated or at least mounted on the same substrate. One or more sources in the source array may have a corresponding plurality of detectors, and one or more detectors in the detector array may have a corresponding plurality of sources. In one embodiment the Airy pattern of the point response of the optical system encompasses both a detector and its corresponding light sources. In another embodiment, the optical pathway is split by a diffractive element to produce conjugate points corresponding to light sources and their respective detectors. In a further embodiment, the pathway is split by a Wollaston prism. In yet another embodiment where the illumination and image light have different wavelengths, the pathway is split by dispersion. The system is particularly suited for fluorescence imaging, confocal microscopy and array microscopes.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
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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.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/17155

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02B21/00

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)

IPC 7 G02B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 407 008 A (SCHMIDT WERNER ET AL) 27 September 1983 (1983-09-27)	1,3,6, 10-12, 16,34
Y	column 12, line 35 - line 62 -----	2
Y	WO 00/25165 A (BOUCHON DOMINIQUE ; SPAJER MICHEL (FR); CENTRE NAT RECH SCIENT (FR)) 4 May 2000 (2000-05-04) claim 1 -----	2
A	US 5 239 178 A (DERNDINGER EBERHARD ET AL) 24 August 1993 (1993-08-24) column 6, line 41 - line 59 -----	1

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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 document 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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/17155

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 fee, this Authority did not invite payment of any additional fee.
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.:

1-3,6,10-12,16,34

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ 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: 1-3,6,10-12,16,34

Imaging system with coplanar detector and source arrays

2. claims: 4,5

Imaging system with detector and source arrays whose numbers of elements differ from each other

3. claims: 7,13,23

Imaging system with diffractive element

4. claims: 8,14

Imaging system with Wollaston prism and circular polarizer

5. claims: 9,15

Imaging system with direct view prism

6. claims: 17-22

Imaging system with confocal microscope

7. claims: 24-33

Imaging system with array of optical elements

8. claims: 35-66

Method of providing epi-illumination with interspersed sources and detectors

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/17155

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