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(54) **Method and apparatus for photographing fluorescent and reflected-light images**

(57) A photographing method and apparatus for photographing a fluorescent image, composed of fluorescent light emitted by a living tissue that has been illuminated by a stimulating light, as an image having a higher S/N ratio. Fluorescent light emitted by a living tissue that has been illuminated by a stimulating light emitted from a light source and propagated along an endoscope enters an image fiber. The fluorescent light entering the image fiber is propagated along the image fib-

er to the output face of the image fiber and focused on the light-receiving zone of a photographing element, under photographing conditions set so that the relation between the pixels of aforementioned output face, upon which the fluorescent image is formed, to the pixels receiving the light of the fluorescent image within aforementioned light-receiving zone satisfies the condition expressed by the formula: $N_f \times 4 > N_d$.



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 10 9613

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
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| Y | US 4 762 391 A (MARGOLIN GEORGE) 9 August 1988 (1988-08-09) * column 2, line 9 - line 30 * * column 3, line 12 - column 4, line 10 * * column 7, line 1 - line 33 * * claim 2 * * figure 1 * | 1,4,11, 14 | |
| X | FR 2 548 497 A (THOMSON CSF) 4 January 1985 (1985-01-04) * the whole document * | 24,26, 28,30 | |
| X | EP 0 792 062 A (CANON KK) 27 August 1997 (1997-08-27) * abstract * * page 1, line 1 - page 4, line 41 * * page 12, line 5 - page 13, line 47 * * page 21, line 6 - line 54 * * figure 9 * | 24,25, 27,28, 32,33 | TECHNICAL FIELDS SEARCHED (Int.Cl.7) H04N A61B |
| A | US 4 951 135 A (SASAGAWA KATSUYOSHI ET AL) 21 August 1990 (1990-08-21) * column 6, line 14 - line 26 * * figures 2,5 * --- -/- | 4,5,14 | |
| The present search report has been drawn up for all claims | | | |
| Place of search | Date of completion of the search | Examiner | |
| THE HAGUE | 9 January 2002 | Didierlaurent, P | |
| CATEGORY OF CITED DOCUMENTS | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document | |
| X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | | |

EPO FORM 1503 03/82 (P04/C01)



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Application Number

EP 01 10 9613

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 10 9613

| DOCUMENTS CONSIDERED TO BE RELEVANT | | |
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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim |
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| The present search report has been drawn up for all claims | | |
| Place of search | Date of completion of the search | Examiner |
| THE HAGUE | 9 January 2002 | Didierlaurent, P |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document |

EPO FORM 1603 03 92 (P04CC1)



European Patent
Office

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 01 10 9613

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-23,39,41

Photographing method and apparatus using fluorescent light and image fiber with the pixel number of the image sensor being strictly less than 4 times the number of pixels (strands) of the image fiber.

2. Claims: 24-38,40,42

Photographing methods and apparatuses where the light-image is focused on a readout zone smaller than the total light-receiving zone of the photographing element

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 10 9613

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-01-2002

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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| 专利名称(译) | 用于拍摄荧光和反射光图像的方法和设备 | | |
| 公开(公告)号 | EP1148717A3 | 公开(公告)日 | 2002-03-20 |
| 申请号 | EP2001109613 | 申请日 | 2001-04-18 |
| [标]申请(专利权)人(译) | 富士摄影胶片公司 | | |
| 申请(专利权)人(译) | 富士胶片有限公司. | | |
| 当前申请(专利权)人(译) | 富士胶片株式会社 | | |
| [标]发明人 | HAKAMATA KAZUO FUJI PHOTO FILM CO LTD | | |
| 发明人 | HAKAMATA, KAZUO, FUJI PHOTO FILM CO., LTD. | | |
| IPC分类号 | A61B1/04 A61B1/05 A61B5/00 H04N5/225 H04N5/347 H04N5/361 H04N5/369 A61B1/00 | | |
| CPC分类号 | A61B1/043 A61B1/00009 A61B1/05 A61B5/0071 A61B5/0084 H04N5/3454 H04N5/3725 H04N2005/2255 | | |
| 优先权 | 2000174165 2000-06-09 JP 2000117439 2000-04-19 JP | | |
| 其他公开文献 | EP1148717A2 | | |
| 外部链接 | Espacenet | | |

摘要(译)

一种用于拍摄荧光图像的拍摄方法和设备，其由由刺激光照射的活组织发射的荧光组成，作为具有较高S/N比的图像。由从光源发出并沿内窥镜传播的刺激光照射的活组织发出的荧光进入图像光纤。进入图像光纤的荧光沿着图像光纤传播到图像光纤的输出面并聚焦在拍摄元件的光接收区上，在设定的拍摄条件下，使得上述输出面的像素之间的关系，在上述光接收区内接收荧光图像的光的像素形成荧光图像满足由下式表示的条件：Nf×4> Nd。

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC/CPC) |
|----------|---|--|---|
| Y A | US 5 833 617 A (HAYASHI KATSUMI) 10 November 1998 (1998-11-10) + column 21, line 19 - line 60 + + figure 6 + | 1, 4, 11, 14 2, 3, 5-10, 12, 13, 15-23, 39-42 | H04N5/225 A61B1/00 |
| Y | US 4 762 391 A (MARGOLIN GEORGE) 9 August 1988 (1988-08-09) + column 2, line 9 - line 30 + + column 3, line 12 - column 4, line 10 + + column 7, line 1 - line 33 + + claim 2 + + figure 1 + | 1, 4, 11, 14 | |
| X | FR 2 548 497 A (THOMSON CSF) 4 January 1985 (1985-01-04) + the whole document + | 24, 26, 28, 30 | TECHNICAL FIELD SEARCHED (IPC/CPC) |
| X | EP 0 792 062 A (CANON KK) 27 August 1997 (1997-08-27) + abstract + + page 1, line 1 - page 4, line 41 + + page 12, line 5 - page 13, line 47 + + page 21, line 6 - line 54 + + figure 9 + | 24, 25, 27, 28, 32, 33 | H04N A61B |
| A | US 4 951 135 A (SASAGAWA KATSUYOSHI ET AL) 23 August 1990 (1990-08-21) + column 6 line 14 - line 26 + + figures 2, 5 + | 4, 5, 14 | |

The present search report has been drawn up for all claims.

THE HAGUE 9 January 2002 Didier Laurent, P

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| 1. Category of cited documents | 2. Priority or patent law underlying the invention |
| 3. Category of cited documents | 4. Document cited as prior art |
| 5. Document cited as prior art | 6. Document cited as prior art |
| 7. Document cited as prior art | 8. Document cited as prior art |