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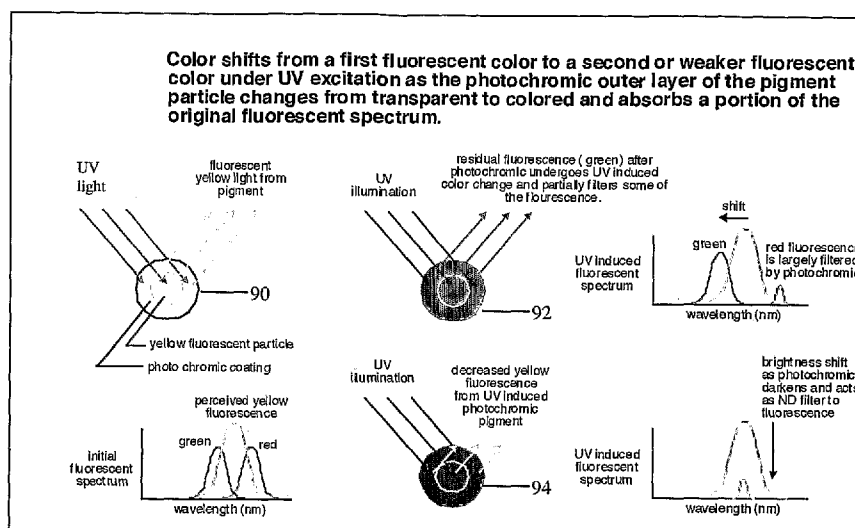
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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

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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.

(54) Title: SYSTEMS AND METHODS FOR CREATING VARIABLE OPTICAL EFFECTS ON MEDIA



(57) Abstract: Methods and systems for optical effects in pigments, inks, and on media. One aspect of this disclosure involves a pigment particle which includes a core, having a fluorescent material and having a spherical shape, and a shell surrounding the core; the shell includes a photochromic material which has a first optical property in a first light source and a second optical property in a second light source which includes a set of wavelengths not sufficiently present in the first light source. The second optical property attenuates an emitted radiation from the fluorescent material. Other aspects are also described.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/024721

A. CLASSIFICATION OF SUBJECT MATTER

INV. C09B67/08 C09D11/00 G07D7/12 G02F1/23

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)

C09B C09D G07D

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 327 788 A2 (SICPA HOLDING SA [CH]) 16 August 1989 (1989-08-16) page 5, line 52 - page 6, line 20; example 18	1-6
A	GB 2 229 189 A (RUE COMPANY P L C DE [GB]) 19 September 1990 (1990-09-19) page 7 page 6, line 9 - line 15	1-6
A	EP 0 728 820 A1 (IMAJE SA [FR]) 28 August 1996 (1996-08-28) example s; table 1	1-6
A	WO 83/00568 A (PLESSEY OVERSEAS [GB]) 17 February 1983 (1983-02-17) the whole document	1-6
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☒ 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 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.

Z document member of the same patent family

Date of the actual completion of the international search

16 July 2007

Date of mailing of the international search report

11/10/2007

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/024721

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 270 213 B1 (SANSONE RONALD P [US] ET AL) 7 August 2001 (2001-08-07) the whole document -----	33
X	US 5 569 317 A (SARADA THYAGARAJ [US] ET AL) 29 October 1996 (1996-10-29) the whole document -----	33

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/024721

Box 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.:
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 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:

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.:

1-6

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: 1-6

pigment particles comprising a core coated with a fluorescent and/or phosphorescent material surrounded by a shell including a photochromic material

2. claims: 7-12

an object comprising a substrate with an indicia comprising a first and a second material wherein the first material changes color upon UV radiation

3. claims: 13,14

an object comprising a substrate with an indicia comprising a first and a second material wherein the first material radiates a color with different intensities upon UV excitation

4. claims: 15-17

a method to authenticate an object based on a color change in response to exposure to a set of wavelength

5. claims: 18-20

method to authenticate an object based on a color change which is caused by a change in an optical property of a photochromic or saturable absorber

6. claims: 21-32

an object comprising a substrate with a pigment coupled to the substrate wherein the pigment is covered with an absorption varying material which in turn is covered by a UV fluorescent material

7. claims: 33-35

an object comprising a substrate and an indicia comprising a fluorescent material and a phosphorescent material

8. claims: 36-38

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

a method to authenticate an object based on a color change
by exposure to an illumination at a first and a second
intensity

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/024721

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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