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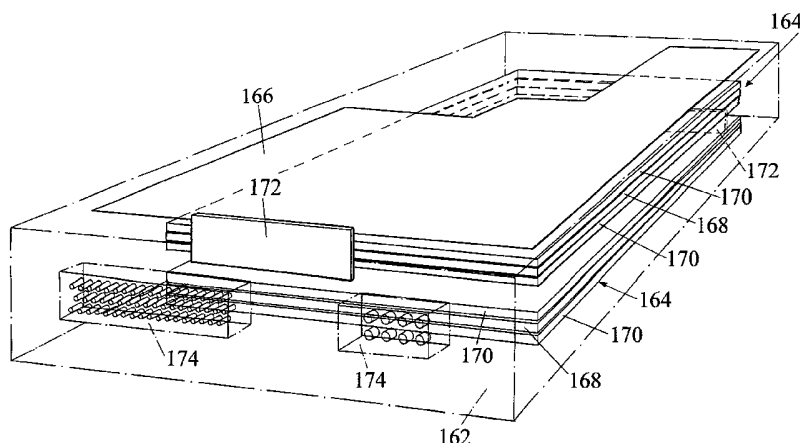
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(54) Title: INFORMATION STORAGE SYSTEMS



(57) **Abstract:** An information storage apparatus comprises a one or more storage media (168), which include a plurality of informa-
tion tracks. Each storage medium (168) has a head assembly (170) having a substantially planar surface and a plurality of read/write
heads positioned in registry with said information tracks. The read/write heads are arranged substantially in the plane of the planar
surface. The information storage medium (168) and the head assembly (170) are arranged in mutually sliding abutment such that
the read/write heads are substantially in sliding contact with the outer surface of the information storage medium in use. In another
aspect an information storage and retrieval apparatus comprises an information storage medium (168) comprising an information
storage area, and an array (170) of information read and/or write heads. The information storage medium (168) and array of heads
(170) are arranged to be oscillated with respect to each other in use such that each region of the information storage area is aligned
with at least one of the read/write heads during the oscillation.

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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

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B5/00 G11B5/48 G11B5/49 G11B21/00

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 G11B

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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 212 680 A (TOUPIN RICHARD A) 18 May 1993 (1993-05-18) column 2, line 13 - column 3, line 57	1,2,6,7, 9,10,12, 17,19, 21-23,25
Y	abstract ----- -/--	3,4

☒ 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

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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 5 739 975 A (ALDRICH WILLIAM N ET AL) 14 April 1998 (1998-04-14) column 1, line 28 - column 3, line 41 column 4, line 13 - column 4, line 59 column 7, line 51 - column 7, line 61 column 17, line 65 - column 18, line 29 column 19, line 66 - column 20, line 18 column 23, line 66 - column 24, line 25 abstract -----	1-3,6-8, 10,12, 13, 19-21,25
X	US 4 903 151 A (MITAMURA AKIO ET AL) 20 February 1990 (1990-02-20) abstract column 1, line 60 - column 2, line 24 column 6, line 38 - column 6, line 44 -----	1,19, 21-23
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A	EP 0 463 908 A (THOMSON CSF) 2 January 1992 (1992-01-02) abstract; claim 1 -----	1,2,7, 10,11,19
Y	US 5 227 211 A (ELTOUKHY ATEF H ET AL) 13 July 1993 (1993-07-13) column 1, line 15 - column 1, line 19 column 2, line 36 - column 3, line 27 -----	3,4
A	EP 1 156 479 A (MITSUBISHI CHEM CORP) 21 November 2001 (2001-11-21) page 2, paragraph 5 page 20, paragraph 248 -----	1,3,4
E	EP 1 381 031 A (MASS AS O) 14 January 2004 (2004-01-14) column 3, line 18 - column 5, line 17 abstract; figures 6-9 -----	1-7,10, 11,19,21

INTERNATIONAL SEARCH REPORT

PCT/ GB 03/04595

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.:

1-25

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: 1-25

An information storage apparatus comprising a storage medium with information tracks, and a plurality of read/write heads arranged in a plane, the medium and the heads being arranged in mutually sliding abutment such that the heads are in sliding contact with the outer surface of the medium.

2. claims: 26-35 and 47

An information storage and retrieval apparatus comprising a head array and an information storage medium, the heads and the medium being arranged to be oscillated with respect to each other, so that each region of the storage area is aligned with at least one head during oscillation.

3. claims: 36-41

Information storage apparatus comprising a plurality of heads, the heads being arranged such that in use each track of an information storage disk can be accessed by more than one head.

4. claim: 42

An information storage apparatus comprising a plurality of heads being arranged in an arc formation so that the heads are positioned along an arcuate line extending across the tracks.

5. claim: 43

Information storage apparatus comprising an information storage disk and at least one head, wherein said disk is arranged to revolve relative to said head at a speed less than 600 revolutions per minute.

6. claims: 45-46

An information storage apparatus with a plurality of heads arranged to read/write information from an information storage medium, the position of the heads in relation to the tracks being adjustable by one or more piezoelectric elements.

7. claim: 48

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Method of retrieving data from a non-volatile storage medium
comprising passing an array of heads over the storage medium
such that each head traverses only a minor portion of the
medium in the direction of their relative movement.

INTERNATIONAL SEARCH REPORT

International Application No
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