THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HAL H. OTTESEN
and GORDON J. SMITH

Appeal No. 95-1308
Application 07/999,502[1]

ON BRIEF

Before HAIRSTON, KRASS, and BARRETT, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

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[1] Application for patent filed December 31, 1992, entitled "System And Method For Recording Direct Access Storage Device Operating Statistics."

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 3-5, 9, 11, and 12, all of the claims pending in the application. Claim 1, 2, 6-8, 10, and 13 have been cancelled.

The invention is directed to a method and system to record direct access storage device operating statistics, operating conditions (temperature, vibration, power supply output voltage, and transducer-to-medium clearance), and error occurrences in partitions of a non-volatile, non-moving storage which partitions can be accessed by an external connection port while bypassing the device controller.

Claims 11 and 12 are reproduced below as amended in the Amendment After Final received January 24, 1994 (Paper No. 9). The copy of the claims in the Appendix to the appeal brief does not contain the amendments. Note the two errors in claim 11.

11. A secondary data storage system for a host computer system comprising:

a rotatable data storage medium;

transducer means positionable with respect to the
rotatable data storage medium for physically altering the rotatable data storage medium and for generating a read back signal in response to detection of physical alterations of the rotatable data storage medium;

processing means connected to the transducer means for
filtering data from of [sic] the read back signal and generating indication of error in the data;

a plurality of operating condition monitoring devices
including, [sic, ":"] means for measuring ambient temperature around the secondary data storage system, means for measuring vibration of the secondary data storage system, means for measuring power supply output

voltage, means responsive to the read back signal for determining clearance between the read and write transducer and the recording medium;

a device controller having access to a clock and the plurality of operating condition monitoring devices and receiving indications of error from the processing means for generating a plurality of types of operating records;

a non-volatile, non-moving storage connected to the device controller for receiving the operating records and for storing the operating records sorted by type into partitions of the non-volatile, non-moving storage, the partitions including a main partition for storage of cumulative operating statistics, a secondary partition for logging time stamped operating condition records and a last in last out partition for storing time stamped error occurrence records; and

an external connection port to the non-volatile, non-moving storage allowing read access to the partitions while bypassing the device controller.

12. A method of logging operating statistics for a disk drive unit for use in error analysis, the method comprising the steps of:

clocking power on time of the disk drive unit;

periodically recording power on time in a main partition of a non-volatile, non-moving storage device;

responsive to occurrence of error upon access to a moving media within the disk drive unit, making an error record of such occurrence in a last in last out partition of the non-volatile, non-moving storage including a time stamp, ambient temperature, output voltage for a power supply to the disk drive, mechanical vibration of the disk drive, and clearance between a storage medium and a read and write transducer;

tracking access time periods to locations for data records on the storage medium;

responsive to occurrence of error upon access of the

moving media, determining an error rate; and

responsive to the error rate exceeding a predetermined minimum, recording operating conditions for the disk drive to a secondary partition of the non-volatile storage including a time stamp;

accessing the non-volatile, non-moving storage device over an external connection port.

The examiner relies on the following references:

Chang et al. (Chang)	4,209,809	June 24, 1980
Kaida	4,772,964	September 20, 1988
Sander	4,888,652	December 19, 1989
Sein-o[2]	4,907,109	March 6, 1990
Coale	4,922,491	May 1, 1990
Fukushima et al. (Fukushima)	5,005,088	April 2, 1991
Kimura	5,218,504 (filed June 18, 1991)	June 8, 1993
Smith	5,235,472 (filed October 18, 1991)	August 10, 1993

Gaudet et al. (Gaudet), Head Flight Height Monitoring, IBM Technical Disclosure Bulletin, Vol. 11, No. 12, May 1969, page 1650.

The examiner cites Squires et al. (Squires), U.S. Patent 4,979,055, issued December 18, 1990, as being of interest but it is not relied upon in any of the rejections on appeal. The examiner invites us to consider Squires if we do not find an external port in Coale (Examiner's Answer, page 11). However, the only way this would be possible is by way of a new ground of rejection since Squires is not part of the rejection on appeal and appellants have not had fair opportunity to react to a

[2] A certificate of correction dated March 6, 1990, corrected the inventor's name from "Seni-o" to "Sein-o."

rejection with Squires. Cf. In re Kronig, 539 F.2d 1300, 1302-3, 190 USPQ 425, 426 (CCPA 1976) (whether Board entered new ground of rejection). A rejection must mention the references relied on. In re Hoch, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n.3 (CCPA 1970) ("Where a reference is relied on to support a rejection, whether or not in a 'minor capacity,' there would appear to be no excuse for not positively including the reference in the statement of the rejection."). In any case, since we find an external port, it is not necessary to consider Squires.

The statement of the rejections in the Examiner's Answer uses the wrong claim numbers in the rejections. For example, the Examiner's Answer recites a rejection for cancelled claim 2 (Examiner's Answer, page 4), which is apparently intended to refer to claim 11, and cancelled claim 8 (Examiner's Answer, page 7), which is apparently intended to refer to claim 12. We believe the intended rejections are accurately summarized by appellants (Brief, page 4) as follows:

Claim 11 stands rejected under 35 U.S.C. § 103 as being unpatentable over Coale, Chang, Kaida, Smith, Fukushima, and Gaudet. The reasons are stated in the Examiner's Answer, pages 4-6, referring to claim 2.

Claims 3-5 and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Coale, Chang, Kaida, Smith, Fukushima, Gaudet as applied in the rejection of claim 11 further in view of Sein-o. The reasons are stated in the Examiner's Answer, pages 7-10, where the rejection of claim 8, pages 7-9, is apparently meant to refer to claim 12.

Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Coale, Chang, Kaida, Smith, Fukushima, Gaudet, Sein-o, and Sander. The reasons are stated in the Examiner's Answer, page 10.

OPINION

We reverse.

Appellants argue that the claims stand or fall together as a single group (Brief, page 4) but also argue the groups separately. It is appellants' position that method claim 12 is "substantially equivalent to the system claim set forth within Claim 11 as described above" (Brief, page 7) and should be patentable for the same reasons. It is also appellants' position that dependent claim 9 is patentable because it depends on claim 12 (Brief, page 8). Accordingly, the claims will be considered to stand or fall together with representative claim 1.

Coale is directed to a method of detecting and analyzing exception events occurring in a computer peripheral subsystem connected to a host computer. The method includes maintaining a Subsystem Environment database comprising information relating to the current configuration of the computer peripheral subsystem, and usage and error information relating to the peripheral subsystem. The peripheral subsystem 21 (figure 2) includes four parts: (1) "one or more input/output (I/O) devices 23 for receiving operation commands and data from the host computer system" (column 3, lines 57-59) which may be a computer disk file subsystem referred to as a Direct Access Storage (DAS) subsystem (column 1, lines 13-16); (2) "I/O device internal error detection, determination, and recovery mechanism 25" (column 3, lines 65-67) which "is typically common for all devices in the

subsystem" (column 3, lines 67 to column 4, line 1); (3) a "subsystem memory 29 stores data representing the subsystem physical configuration, a subsystem usage log, an exception event log, fault criteria, problem procedures, and a Problem Profile (record) data base" (column 4, lines 17-21); and (4) "service alert function 27 is a programmed facility that interfaces with I/O devices in the subsystem to receive detailed input data from the subsystem" (column 4, lines 28-30).

Although Coale does not describe the DAS, since the DAS is a computer disk file subsystem for data storage (column 1, line 14) and since such disk files conventionally comprise a "rotatable data storage medium" and a "transducer means positionable with respect to the rotatable data storage medium," as recited in claim 1, we find that Coale suggests a rotatable data storage and transducer means. Appellants do not contest that Coale discloses these limitations. The error detection and recovery mechanism 25 in Coale necessarily implies the existence of a "processing means . . . generating indication of error in the data." Coale discloses "analyzing data relating to exception event reports, or error reports, that may be received from various parts of the storage subsystem, such as the device, the channel, or the path from the channel to the device" (column 6, lines 13-17) and combining a new exception event report with a time stamp for recording in the current exception event portion of the exceptions log in the Subsystem Environment database (column 6, lines 22-26) which implies the existence of a "device controller having access to a clock . . . and receiving indications of error from the processing means for generating a plurality of types of operating records."

Appellants argue that neither Coale nor any of the other references disclose: (1) monitoring and storing the claimed operating conditions (temperature, vibration, power supply output voltage, and transducer-to-medium clearance); (2) a non-volatile, non-moving storage for storing specific operating records sorted by type into main, secondary, and last in last-out partitions; (3) an external connection port to the non-volatile, non-moving storage allowing read access to the partitions thereof while bypassing the device controller.

Coale shows a block diagram of the computer peripheral subsystem but does not describe the physical structure, which makes it difficult to establish a prima facie case of obviousness. It is improper to resort to speculation or unfounded assumptions to supply deficiencies in the factual basis for a rejection. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967).

As to the alleged difference (1), it is clear that Coale does not disclose or suggest monitoring and storing the claimed operating conditions. Coale maintains a log of usage, which corresponds to the broadly claimed "cumulative operating statistics," and a log of time stamped error exceptions, which corresponds to the broadly claimed "time stamped error occurrence records." However, Coale does not monitor the claimed physical operating conditions or log "time stamped operating condition records." As discussed, infra, this limitation is considered determinative of the obviousness question.

As to the alleged difference (2), the examiner finds "that Coale uses a partitioned, non-volatile, non-moving storage subsystem data base to store error information" (Examiner's Answer, page 11). However, the examiner does not cite to the record to support this finding. We do not find any description in Coale of the physical structure in which the Subsystem Environment

database is stored and so must conclude that the examiner erred in finding a "non-volatile, non-moving storage." Coale suggests that the Subsystem Environment database is a separate memory from the DAS subsystem (the rotatable data storage medium) because the prior art describes data checks being "recorded in ordinary bookkeeping associated with the DAS subsystem" (emphasis added) (column 2, lines 24-25), rather than in the DAS subsystem, and because subsystem memory 29 is described separately from the DAS subsystem. One skilled in the art would have appreciated that any memory for storing the kind of configuration, usage, and exception information in the Subsystem Environment database would have to be stored in a non-volatile memory so the information is not lost when the power is turned off and thus a non-volatile storage would have been obvious. However, the database could be stored on a moving, non-volatile memory such as a hard disk, floppy disk, or tape. "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The examiner has not explained why such limitation would have been obvious. While the examiner has not addressed the "non-volatile" or "non-moving" storage limitations, we do not base our decision to reverse on these limitations alone.

As to the alleged difference (3), the examiner finds the service alert message output (4) in figure 2 to be "an external connection port to the non-volatile, non-moving storage allowing read access to the partitions thereof while bypassing the device controller" (Examiner's Answer, page 5). Coale shows the I/O operation commands and data input to the I/O devices 23 separate from the output (4); thus, output (4) bypasses the device controllers. While the analysis structure in figures

3-5 of Coale is present between the Subsystem Environment database and the service alert output (4), claim 1 does not preclude the presence of this additional structure. Accordingly, we agree with the examiner that there is an external connection port (4) to the Subsystem Environment database memory.

In our opinion, the problem with the rejection is that there is no evident motivation for modifying Coale to store operating condition records of the types claimed, i.e., temperature, vibration, power supply output voltage, and transducer-to-medium clearance. "It is well established that before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion, or motivation to lead an inventor to combine those references." Pro-Mold and Tool Co. v. Great Lakes Plastics Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996). A suggestion to combine "may come expressly from the references themselves. It may come from knowledge of those skilled in the art that certain references, or disclosures in the references, are known to be of special interest or importance in the particular field. It may also come from the nature of a problem to be solved, leading inventors to look to references relating to possible solutions to that problem." Id. at 1573, 37 USPQ2d at 1630 (citations omitted). We look at more than just the express teachings of the references, but the references are the logical place to start.

We find no suggestion in Coale, express or implied, to store anything other than the types of usage and error records associated with reading and writing to a disk. The examiner has done a thorough job in finding references which individually teach detecting one of the claimed operating conditions. However, none of these references suggest that the physical operating conditions be

stored in a record for later analysis. The references deal with real time monitoring and control, e.g., Gaudet triggers control circuitry to stop the disk drive operation whenever head crash conditions are detected and Smith generates a write fault signal to stop writing of the read/write heads when the external force is in excess of a predetermined threshold. The examiner points to no suggestion in the references of storing the claimed physical operation conditions. If there was any suggestion of storing one of the operating conditions for error analysis, it would be possible to analogize this to other operating conditions; however, we find no such suggestion, nor has the examiner pointed to any in the record.

The examiner concludes (Examiner's Answer, page 6):

> It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the combination system of Coale and Chang et al. with each of parameters the art has recognized to be indicative of the physical configuration of the disk file; including temperature (Kaida), vibration (Smith), power supply (Fukushima et al.), and flying height (Gaudet et al.); in order to provide a reliable, composite indication to the combination system to provide one with all the information concerning the physical configuration of a disk file in order to diagnose the system to find a way to correct for an error.

It is not sufficient to be able to make up a plausible reason for the combination. While the admitted prior art driver may be capable of being modified to work the way appellants' apparatus is claimed, there must be a suggestion or motivation in (or from) the references to do so. See In re Mills, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990) ("While Mathis' apparatus may be capable of being modified to run the way Mills' apparatus is claimed, there must be a suggestion or motivation in the reference to do so."); In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) ("The mere fact that the prior art could be so modified would not have made the modification

obvious unless the prior art suggested the desirability of the modification."). The examiner has not shown how one skilled in the art would have been led from the references and his or her own knowledge of the art to monitor and record the physical operating conditions of a disk drive. Accordingly, we conclude that the examiner has failed to demonstrate the necessary motivation to establish a prima facie case of obviousness with respect to claim 1 and independent claim 12 which contains

analogous physical operating limitations. The rejection of claims 3-5, 9, 11, and 12 is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
ERROL A. KRASS Administrative Patent Judge	)	APPEALS AND INTERFERENCES
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT

Appeal No. 95-1308
Application 07/999,502

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