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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BERNARDO RUB

Appeal 2015-006009
Application 12/840,920
Technology Center 2100

Before: JASON V. MORGAN, MICHAEL M. BARRY, and
JOHN R. KENNY, *Administrative Patent Judges*.

KENNY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from rejections of claims 1–5, 7–13, 15, and 25–35, which constitute all pending claims in the application. Final Act. 1; App. Br. 9. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED INVENTION

The claimed invention is directed to methods and systems for managing wear in a solid state non-volatile memory device. Spec. ¶ 1. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method comprising:

performing a first garbage collection on erase units of a flash memory;

establishing at least two groupings for the erase units, wherein the groupings are based at least on a recent write frequency of data targeted for writing to the flash memory;

in response to the first garbage collection, assigning each of the erase units to one of the respective groupings based on wear criteria of the respective erase units corresponding to a wear range assigned to each of the at least two groupings;

determining a recent write frequency of data units targeted for writing to the flash memory, wherein at least one of the data units originate from a garbage collection controller that moves the at least one data unit in response to a second garbage collection;

selecting erase units from the groupings in response to the recent write frequency of the data units corresponding to the groupings; and

writing the data units to the selected erase units.

REFERENCES

Sutardja	US 2009/0138654 A1	May 28, 2009
Hu	US 2011/0029715 A1	Feb. 3, 2011
Araki	US 2011/0191521 A1	Aug. 4, 2011

REJECTIONS

Claims 1–3, 5, 7–11, 13, 15, 25–26, 28–29, and 31–34 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hu. Final Act. 4.

Claims 4, 12, and 27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hu and Araki. Final Act. 11.

Claims 30 and 35 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hu and Sutardja. Final Act. 13.

ANALYSIS

Claims 1–3, 5, 7–11, 13, 15, 25–26, 28–29, and 31–34

Appellant argues that Hu fails to teach or suggest “determining a recent write frequency of data units targeted for writing to the flash memory, wherein at least one of the data units originate from a garbage collection controller” as recited in claim 1. App. Br. 6; Reply Br. 1.

Appellant and the Examiner propose differing constructions for “determining.” Appellant proposes construing “determining” as “the act of finding out or calculating something.” App. Br. 6. The Examiner proposes construing “determining” as deciding or choosing “based on some sort of consideration.” Ans. 13. Appellant provides no support for their proposed construction of “determining,” whereas the Examiner provides a supporting dictionary definition.¹ App. Br. 6; Ans. 13.

¹ The Examiner cites a definition from a Meriam Webster’s dictionary. Although the Examiner does not specifically identify the dictionary, the online version of the Merriam Webster’s Learner’s Dictionary contains the definition (<http://www.merriam-webster.com/dictionary/determining>). Other dictionary definitions accord with this definition. *See, e.g.*, Merriam-Webster’s Collegiate Dictionary (11th ed.), 340 (2008) (“to . . . come to a decision about by investigation, reasoning, or calculation”).

On this record, the Examiner’s proposed construction is more reasonable. We note the Specification does not limit the term “determining” to finding out or calculating something. The Specification even uses the related term “determines” and phrase “determined by,” in other contexts, in a manner more closely related to the Examiner’s interpretation of the term “determining.” *See* Spec. ¶¶ 21, 86. As such, we adopt the Examiner’s proposed construction for “determining.”

With the Examiner’s proposed construction for “determining,” the Examiner finds that Hu teaches or suggests the disputed limitation because Hu decides whether the data to be moved is relocation data or user data pages, and treats the relocation data as more static (less frequently written to) than user data. Ans. 13–14. Appellant argues that Hu is not making a decision regarding whether data is frequently written because Hu is merely assuming that one type of data is more static than another. Reply Br. 6. Appellant argues that, therefore, Hu does not teach or suggest the disputed limitation even with the Examiner’s proposed construction. *Id.*

We agree with the Examiner on this issue. Although Hu does not directly measure the write frequency of the data, Hu decides how to allocate the data based on a qualitative assessment of the write frequency of the data (i.e., on the basis that relocation data is more static than user data.) Ans. 14, citing Hu ¶¶ 19–22, Fig. 1.

Appellant also argues that when selecting units for garbage collection, Hu does not take into account the write frequency of the data targeted for selected units. App Br. 6–7. This argument, however, is premised on the proposition that Hu does not determine a write frequency. *Id.* As discussed above, we do not accept that proposition.

In the Reply Brief, Appellant argues that Hu fails to teach or suggest determining recent write frequency for data units that originate from the garbage collection controller. Reply Br. 6. We will not consider this argument because Appellant fails to present good cause for having waited until the Reply Brief to have raised it, thereby depriving us the benefit of the Examiner's response. App. Br. 6–7; 37 C.F.R. § 41.41(b)(2) (2014).

Accordingly, we sustain the rejection of claim 1 and of claims 2, 3, 5, 7–11, 13, 15, 25, 26, 28, 29, and 31–34, not separately argued. App. Br. 6–7.

Claims 4, 12, and 27

Appellant argues that Araki cannot properly be combined with Hu to reject claims 4, 12, and 27 because Hu teaches only two ways of grouping data, and Hu would have to change its means of allocating data to accommodate a third pool of data (taught by Araki), which would change Hu's principle of operation. App. Br. 7–8; Reply Br. 7. We are not persuaded by this argument because Appellant has not presented any persuasive arguments or evidence demonstrating that adding a third grouping of data would change Hu's principle of operation or be anything more than the exercise within the creativity of an ordinarily skilled artisan, particularly in light of the teachings of Araki. App. Br. 7–8; Reply Br. 7. Based on this record, we agree with the Examiner that such a task is well within the skill and creativity of the ordinarily skilled artisan. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

Claims 30 and 35

Appellant argues that Hu and Sutardja fail to teach or suggest the limitation of “wherein determining the recent write activity associated with the data comprises determining a recent write activity of a different data unit within an address range that encompasses the data” as recited in claim 30. App. Br. 8; Reply Br. 7–8. The Examiner finds Sutardja teaches or suggests this limitation because Sutardja teaches that, in determining a write frequency at each logical address, the write frequency at all addresses are determined at more than one logical address space. Ans. 16–17, citing Sutardja ¶¶ 45, 110. Appellant argues that determining the write frequencies at all addresses fails to determine the write frequency at a different address. App. Br. 8; Reply Br. 7–8. We are not persuaded by that argument, however, because determining the write frequencies at all addresses by necessity determines the write frequency at a different address from the recited data.

Appellant also argues that the claim limitation requires that the write activity of the different address determines the write activity for the recited data. Reply Br. 8. We, however, do not agree with that proposed construction. Given its broadest reasonable interpretation, the limitation merely requires that the actions of determining the recent write activity associated with the recited data, which includes determining the recent write activity of another data unit. By determining the recent write activity of all

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data, Sutardja satisfies this limitation. Ans. 16–17, citing Sutardja ¶¶ 45, 110.

Accordingly, we sustain the rejection of claim 31 and of claim 35, not separately argued. App. Br. 8.

Further, for all of the challenged rejections and all pending claims, we adopt the Examiner’s findings and rationales set forth in the Final Action and the Answer.

DECISION

We affirm the rejections of claims 1–5, 7–13, 15, and 25–35.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED