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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN D. DAVIS,
JOHN HAYES, ZHANGXI TAN, HARI KANNAN, and
NENAD MILADINOVIC

Appeal 2019-003585
Application 14/454,537
Technology Center 2100

Before BRADLEY W. BAUMEISTER, DAVID J. CUTITTA II, and
MICHAEL J. ENGLE, *Administrative Patent Judges*.

ENGLE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–20, which are all of the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Pure Storage as the real party in interest. Appeal Br. 1.

TECHNOLOGY

The application relates to “adjustable error correction in a storage cluster.” Spec. Abstract.

ILLUSTRATIVE CLAIM

Claim 1 is illustrative and reproduced below with certain limitations at issue emphasized:

1. A method for adjustable error correction, comprising:

determining health of a plurality of storage nodes in a storage cluster, wherein a plurality of authorities is located within the plurality of storage nodes, *each authority owning a range of user data*, and wherein *two authorities of the plurality of authorities are located within a first storage node of the plurality of storage nodes*;

adjusting a variable read time supported by one or more flash dies in nonvolatile memory of the storage cluster to increase read reliability, based on the health of the plurality of storage nodes; and

adjusting, by one or more authorities of the two authorities, erasure coding based on the health of the plurality of storage nodes.

REFERENCES

The Examiner relies on the following prior art references:

Name	Number / Title	Date
Colgrove	US 2012/0079318 A1	Mar. 29, 2012
Smith	US 2003/0037299 A1	Feb. 20, 2003
Solaris	<i>Solaris Volume Manager Administration Guide</i> , Chapter 4, “Multi-Owner Disk Set Concepts”	2010
Suzuki	US 2013/0238836 A1	Sept. 12, 2013
Yoon	US 2009/0144598 A1	June 4, 2009

REJECTIONS

The Examiner makes the following rejections:

Claims	Statute	Basis	Final Act.
1–20	§ 112(a)	Written description	2
1, 3–7, 9, 10, 12, 13, 15–17, 19, 20	§ 103	Colgrove, Solaris, Suzuki	4
2, 11, 18	§ 103	Colgrove, Solaris, Suzuki, Yoon	10
8, 14	§ 103	Colgrove, Solaris, Suzuki, Smith	11

ISSUES

1. Did the Examiner err in finding the limitation “adjusting, by one or more authorities of the two authorities, erasure coding,” as recited in claim 1, lacks sufficient written description support?

2. Did the Examiner err in finding Solaris teaches or suggests “each authority owning a range of user data” and “two authorities of the plurality of authorities are located within a first storage node of the plurality of storage nodes,” as recited in claim 1?

ANALYSIS

§ 112(a): Written Description

Claim 1 recites “adjusting, *by one or more authorities* of the two authorities, erasure coding.” The issue is whether the Specification supports adjusting *by* authorities or whether it merely discloses authorities “assist” in the process.

In particular, the Specification discloses:

Authorities 168 control how and where data is stored in the non-volatile solid-state storages 152 in some embodiments. This control *assists* in determining which type of erasure coding scheme is applied to the data

Spec. ¶ 25 (emphasis added).

Based on this disclosure, Appellant argues that “the authorities play a causative role in controlling, setting and adjusting erasure coding.” Appeal Br. 5. “The premise that one operator performs an action with the assistance of another operator does not deny the other operator a causative role in performing the action, but instead reinforces the causative role each operator has in performing the action.” *Id.* at 6.

However, we agree with the Examiner that the Specification discloses “[a]uthorities 168 . . . are implemented . . . for example as lists or other data structures stored in memory.” Spec. ¶ 25. “In other words, ‘authorities’ are just a format for a collection of data” and “[d]ata, in general, cannot ‘adjust’ anything by itself let alone ‘adjust erasure coding’ as claimed.” Ans. 4.

Contrary to Appellant’s analogy, this is not an instance where a team of operators “adjusts” such that each member of the team can be said to “adjust.” Here, a “list” or “other data structure” is not itself an operator but rather merely a tool that “assists” the operator (e.g., a list that the operator refers to). *Id.*; *see also* Spec. ¶ 50 (“Fig. 7 is a flow diagram Actions of the method can be performed by a processor, such as the CPU of a storage node or the controller of a non-volatile solid-state storage. . . . Erasure coding is set based on the health of the flash memory, in an action 704.”).

Thus, we agree with the Examiner that the application’s disclosure fails to reasonably convey that the inventor had possession of the claims as presently written as of the effective filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

Accordingly, we sustain the Examiner’s § 112(a) rejection of claim 1, and claims 2–20, which Appellant argues are patentable for similar reasons. *See* Appeal Br. 9; 37 C.F.R. § 41.37(c)(1)(iv).

§ 103: Obviousness

Claim 1 recites “each authority owning a range of user data” and “two authorities of the plurality of authorities are located within a first storage node of the plurality of storage nodes.”

The Examiner states, “the Examiner was not attempting to assert Official Notice but rather make a general statement ‘authorities’, i.e. lists or other data structures . . . are well-known. As proof of this, the Solaris art was implemented as a secondary reference . . .” Ans. 4 (emphasis omitted). In Solaris, “the multiple boxes of programming code” “represent[] ‘authorities’, i.e. data structures, (e.g. ‘multi-owner’ seen in the code boxes) that ‘own’ ranges of data (represented by ‘nodeone’ or ‘nodetwo’, for example, in the code boxes[]).” *Id.*

We are not persuaded by Appellant’s argument that “[o]wnership of a disk set is not the same as ownership of a range of data.” Appeal Br. 11. Although the Specification may give *examples* of a “range of user data” being measured in smaller units (e.g., “inode numbers” or “segment numbers”), the broadest reasonable interpretation of “a range of user data” is not limited to such examples. *E.g., Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (“[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.”).

Nevertheless, we are persuaded by Appellant’s argument that the Examiner fails to sufficiently explain how authorities are taught or suggested by Solaris’ nodes or owners of multi-owner disk sets. Appeal Br. 11. Solaris discloses that “[e]ach multi-owner disk set is associated with a list of nodes” and “[t]hese nodes share ownership of the disk set.” Solaris 1.

Solaris further discloses, “*Nodes* are the physical machines that are part of a Sun Cluster system.” *Id.* Solaris’ nodes cannot be the claimed “authorities” because that would fail to meet the limitation “two authorities [i.e., Solaris’ nodes] . . . are located within a first storage node.” The Examiner states that “the code represents ‘authorities,’” but the Examiner fails to explain sufficiently how there are “two authorities [i.e., codes]” or whether those two codes “are located within a first storage node.”

The Examiner does not rely upon the additional references Yoon or Smith to cure the deficiencies discussed above.

Accordingly, given the record before use, we are constrained to reverse the Examiner’s § 103 rejections of claims 1–20.

OUTCOME

The following table summarizes the outcome of each rejection:

Claims Rejected	35 U.S.C. §	Reference(s) / Basis	Affirmed	Reversed
1–20	112(a)	Written description	1–20	
1, 3–7, 9, 10, 12, 13, 15–17, 19, 20	103	Colgrove, Solaris, Suzuki		1, 3–7, 9, 10, 12, 13, 15–17, 19, 20
2, 11, 18	103	Colgrove, Solaris, Suzuki, Yoon		2, 11, 18
8, 14	103	Colgrove, Solaris, Suzuki, Smith		8, 14
OVERALL			1–20	

TIME TO RESPOND

No time for taking subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.36(a)(1)(iv).

AFFIRMED