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KONRAD, RAYNES, DAVDA & VICTOR LLP		
ATTN: IBMTUC		
350 SOUTH BEVERLY DRIVE, SUITE 360		
BEVERLY HILLS, CA 90212		

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FAYE, HANNAH A

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UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE PATENT TRIAL AND APPEAL BOARD
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Ex parte THERES M. BROWN, NEDLAYA Y. FRANCISCO,
SUGUANG LI, and BETH A. PETERSON
_____

Appeal 2018-008636
Application 13/759,935
Technology Center 2100
_____

Before JOHNNY A. KUMAR, STEVEN M. AMUNDSON, and
JASON M. REPKO, *Administrative Patent Judges*.

KUMAR, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellant[2] seeks our review under 35 U.S.C. § 134(a) from a final
rejection of claims 7, 8, 13, 14, 19, 20, 27–29, and 35–40, i.e., all pending
claims. Claims 1–6, 9–12, 15–18, 21–26, and 30–34 have been cancelled.
We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] Appellant has filed a related Appeal in copending U.S. Patent Application
No. 14/071,529. App. Br. 3.
[2] We use the word "Appellant" to refer to "applicant" as defined in
37 C.F.R. § 1.42 (2017). Appellant identifies the real party in interest as
International Business Machines Corporation. App. Br. 2.

STATEMENT OF THE CASE

The Invention

The invention concerns "performing point in time copy operations from source volumes to space efficient target volumes in two stages via a non-volatile storage." Spec. ¶ 1.[3]

Representative Claims

Independent claims 7, 13, and 19 exemplify the subject matter of the claims under consideration and read as follows:

7. A system, comprising:

> a memory; and

> a processor coupled to the memory, wherein the processor performs operations, the operations comprising:

> in response to receiving a request from a host to perform a point in time copy operation from a source volume to a space efficient target volume, performing a first set of operations, the first set of operations comprising:

> updating a bitmap metadata to indicate tracks to be copied for the point in time copy operation, and in response to updating the bitmap metadata sending an indication to the host that the point in time copy operation is complete even though a corresponding physical point in time copy of data stored in the tracks has not committed;

and

> in response to updating the bitmap metadata, copying, by using the bitmap metadata, data stored in the tracks indicated in

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[3] This decision employs the following abbreviations: "Spec." for the Specification, filed February 5, 2013; "Final Act." for the Final Office Action, mailed July 27, 2017; "App. Br." for the Appeal Brief, filed March 6, 2018; "Ans." for the Examiner's Answer, mailed July 2, 2018; and "Reply Br." for the Reply Brief, filed September 4, 2018.

the bitmap metadata, from the source volume to a non-volatile storage to preserve the point in time copy operation; and

subsequent to completion of the first set of operations, performing a second set operations, comprising asynchronously copying, via a background process, the data copied in the first set of operations to the non-volatile storage, from the non-volatile storage to the space efficient target volume to perform a commit of the physical point in time copy of the data from the source volume to the space efficient target volume, wherein the copying of the data from the source volume to the non-volatile storage takes less time in comparison to directly copying the data from the source volume to the space efficient target volume, and wherein the asynchronous copying of the data via the background process takes more time than the copying of the data from the source volume to the non-volatile storage.

13. A computer program product, the computer program product comprising a non-transitory computer readable storage medium having computer readable program code embodied therewith, the computer readable program code configured to perform operations on a controller, the operations comprising:

in response to receiving, by the controller, a request from a host to perform a point in time copy operation from a source volume to a space efficient target volume, performing a first set of operations, the first set of operations comprising:

updating a bitmap metadata to indicate tracks to be copied for the point in time copy operation, and in response to updating the bitmap metadata sending an indication to the host that the point in time copy operation is complete even though a corresponding physical point in time copy of data stored in the tracks has not committed; and

in response to updating the bitmap metadata, copying, via the controller, by using the bitmap metadata, data stored in the tracks indicated in the bitmap metadata, from the source volume to a non-volatile storage to preserve the point in time copy operation; and

subsequent to completion of the first set of operations, performing a second set operations, comprising asynchronously

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copying, via a background process, the data copied in the first set of operations to the non-volatile storage, from the non-volatile storage to the space efficient target volume to perform a commit of the physical point in time copy of the data from the source volume to the space efficient target volume, wherein the copying of the data from the source volume to the non-volatile storage takes less time in comparison to directly copying the data from the source volume to the space efficient target volume, and wherein the asynchronous copying of the data via the background process takes more time than the copying of the data from the source volume to the non-volatile storage.

19. A storage controller controlling a source volume and a space efficient target volume, wherein the storage controller is coupled to a host, the storage controller, comprising:

a non-volatile storage;

a processor coupled to the non-volatile storage, wherein the processor performs operations, the operations comprising:

in response to receiving a request from a host to perform a point in time copy operation from the source volume to the space efficient target volume, performing a first set of operations, the first set of operations comprising:

updating a bitmap metadata to indicate tracks to be copied for the point in time copy operation, and in response to updating the bitmap metadata sending an indication to the host that the point in time copy operation is complete even though a corresponding physical point in time copy of data stored in the tracks has not committed; and

in response to updating the bitmap metadata, copying by using the bitmap metadata, data stored in the tracks indicated in the bitmap metadata, from the source volume to a non-volatile storage to preserve the point in time copy operation; and

subsequent to completion of the first set of operations, performing a second set operations, comprising asynchronously copying, via a background process, the data copied in the first set of operations to the non-volatile storage, from the non-volatile

storage to the space efficient target volume to perform a commit of the physical point in time copy of the data from the source volume to the space efficient target volume, wherein the copying of the data from the source volume to the non-volatile storage takes less time in comparison to directly copying the data from the source volume to the space efficient target volume, and wherein the asynchronous copying of the data via the background process takes more time than the copying of the data from the source volume to the non-volatile storage.

App. Br. 23–26 (Claims App.).

The Rejections on Appeal

1. Claims 7, 13, 19, 27–29, and 35–40 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Burton et al. (US Patent Application 2005/0251634 A1) and in view of Lorenz et al. (US Patent Application 2008/0077629 A1).

2. Claims 8, 14, and 20 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Burton and Lorenz in view of Kislev (US Patent 8,001,085 B1)

ANALYSIS

We have reviewed the rejection of the pending claims in light of Appellant's arguments that the Examiner erred. In doing so, we have evaluated only the arguments that Appellant actually makes on appeal.

Independent Claims 7, 13, and 19

Claims 7, 13, and 19 recite a two-step method where the first set of operations require, *inter alia*, "copying . . . data stored in the tracks indicated in the bitmap metadata, from the source volume to a non-volatile storage to preserve the point in time copy operation" (step 1); and the second set of operations require, *inter alia*, "asynchronously copying, via a background

process, the data copied in the first set of operations to the non-volatile

storage" (step 2); and "wherein the asynchronous copying of the data via the

background process takes more time than the copying of the data from the

source volume to the non-volatile storage" (disputed limitation). App.

Br. 23–26 (Claims App.).

The Examiner finds that Burton discloses the disputed limitation of

claims 7, 13, and 19. Final Act. 3–4 (citing Burton ¶ 3).

Paragraph 3 of Burton discloses:

> Point in time copying is as of a point in time, unlike synchronous mirroring which is a continuous process of copying data as it updated, but which prevents any updating from occurring by failing to complete the updating storage transaction for the data at a source until after that updating data has also been stored at a target. Asynchronous mirroring also is continuous, but may appear to be quicker, and is a complex process that requires that the updating data is first stored by the source data storage, and requires that safeguards are in place to assure that it will ultimately be stored at the target data storage.

Among other things, Appellant argues that Paragraph 3 of Burton

does not teach the disputed limitation, i.e., "wherein the asynchronous

copying of the data via the background process takes more time than the

copying of the data from the source volume to the non-volatile storage"

Reply Br. 3–4 (emphasis ours). In particular, Appellant argues that

"[p]aragraph 3 of the cited Burton appears to be comparing asynchronous

mirroring to synchronous mirroring, and seems to be indicating that

asynchronous mirroring may appear to be quicker than synchronous

mirroring." *Id.* at 4 (citing Burton, ¶ 3).

We agree with Appellant that the Examiner has not adequately explained how Burton teaches the disputed limitation of claims 7, 13, and 19.

Accordingly, we find that the Examiner has failed to show that Burton teaches that the asynchronous copying of the data via the background process takes more time than the copying of the data from the source volume to the non-volatile storage as required by the claims.

Based on the record before us, we do not sustain the obviousness rejection of claims 7, 13, and 19 based on Burton and Lorenz. Because this determination resolves the appeal with respect to these claims, we need not address Appellant's other arguments regarding Examiner error.

Dependent Claims 8, 14, 20, 27–29, and 35–40

Claims 8, 14, 20, 27–29 and 35–40 depend directly or indirectly from claims 7, 13, and 19. App. Br. 21–23 (Claims App.). For the reasons discussed regarding independent claims 7, 13, and 19, we do not sustain the obviousness rejections of these dependent claims.

CONCLUSION[4]

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
7, 13, 19, 27–29, 35–40	103	Burton, Lorenz		7, 13, 19, 27–29, 35–40
8, 14, 20	103	Burton, Lorenz, and Kislev		8, 14, 20
Overall Outcome				7, 8, 13, 14, 19, 20, 27–29, 35–40

REVERSED

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[4] We note claims 7, 13, and 19 recite wherein the asynchronous copying of the data via the background process (step 2) takes more time than the copying of the data from the source volume to the non-volatile storage (step 1). Our reviewing court guides: where "the problem is known, the possible approaches to solving the problem are known and finite, and the solution is predictable through use of a known option," a solution that is **obvious to try** may indeed be obvious. *Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1351 (Fed. Cir. 2008) (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)). Applying this reasoning here, we note the limited, finite set of three possibilities—the steps may occur such that (1) step 1 takes more time than step 2; (2) step 2 takes more time than step 1; or (3) step 1 and step 2 take the same time. Therefore, in the event of further prosecution the Examiner should ascertain whether modifying Burton (1) would have merely been a predictable result and (2) would have been obvious to try, and thus claims 7, 13, and 19 should be rejected under 35 U.S.C. § 103.