UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

Ex parte PARESH CHATTERJEE,
VIJAYARANKAN MUTHIRISAVENUGOPAL,
NARAYANASWAMI GANAPATHY, and RAGHAVAN SOWRIRAJAN
_____

Appeal 2019-001195
Application 14/450,855
Technology Center 2400
_____

Before JEREMY J. CURCURI, JAMES B. ARPIN, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

ARPIN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a), the rejection of

claims 2–22. Final Act. 2.[2] Claim 1 is cancelled. Appeal Br. 17 (Claims

App.). We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] "Appellant" here refers to "applicant" as defined in 37 C.F.R. § 1.42.
Appellant identifies the real party-in-interest as American Megatrends, Inc.
Appeal Br. 3.

[2] In this Decision, we refer to Appellant's Appeal Brief ("Appeal Br.," filed
May 29, 2018); the Final Office Action ("Final Act.," mailed August 28,
2017) and the Examiner's Answer ("Ans.," mailed September 20, 2018); and
the originally-filed Specification ("Spec.," filed August 4, 2014). Rather
than repeat the Examiner's findings and determinations and Appellant's
contentions in their entirety, we refer to these documents.

STATEMENT OF THE CASE

Appellant's claimed subject matter "is directed to technologies for consolidating client-specific boot data from multiple storage volumes in a data storage system to a single, high-performance consolidated boot volume." Spec. ¶ 19.

As noted above, claims 2–22 stand rejected. Claims 2, 9, and 16 are independent. Appeal Br. 17 (claim 2), 19 (claim 9), 21 (claim 16) (Claims App.). Claims 3–8 depend directly or indirectly from claim 2, claims 10–15 depend directly or indirectly from claim 9, and claims 17–22 depend directly or indirectly from claim 16. *Id.* at 17–23.

Claim 9 recites "[a] non-transitory computer-readable storage medium having computer-executable instructions stored thereon that, when executed by a storage system computer, cause the storage system computer to" perform functions, substantially as recited in claim 2. *Id.* at 17, 19. Claim 16 recites "[a] data storage system comprising: a storage system computer; a physical storage device operably connected to the storage system computer; a processing unit associated with the storage system computer; and a storage process module executing on the processing unit and configured to" perform functions, substantially as recited in claim 2. *Id.* at 17, 21. The Examiner relies on the same references and substantially similar arguments in rejecting claims 2–22 (Final Act. 2–5), and Appellant does not contest the rejection of claims 3–22 separately from independent claim 2 (*see* Appeal Br. 10, 15). Therefore, we focus our analysis on independent claim 2.

Claim 2, reproduced below with disputed elements emphasized, is representative.

> 2. A computer-implemented method for booting a client device using a consolidated boot volume comprising:
>
> receiving, by a storage process module, an I/O operation for one or more blocks of data of one or more virtual storage volumes;
>
> *checking, by the storage process module, a table for the one or more virtual storage volumes, to determine if the one or more blocks of data have been copied to the consolidated boot volume, wherein the consolidated boot volume comprises client-specific boot data from the one or more virtual storage volumes, and wherein the table comprises a plurality of entries for mapping the client-specific boot data from the one or more virtual storage volumes to respective locations on the consolidated boot volume*; and
>
> determining, by the storage process module, whether to execute the I/O operation against the consolidated boot volume or one of the one or more virtual storage volumes based at least in part on the determination of whether the one or more blocks of data have been copied to the consolidated boot volume.

Id. at 17 (emphasis added).

REFERENCE AND REJECTION

The Examiner relies upon the following reference in rejecting the claims:

Name	Number	Published	Filed
Chang	US 2003/0126242 A1	July 3, 2003	Dec. 28, 2001

Specifically, claims 2–22 stand rejected as unpatentable under 35 U.S.C. § 102 as anticipated by Chang. Final Act. 2–5.

Appellant contests the anticipation rejection of claims 2–22 and relies on alleged deficiencies in the rejection of independent claim 2 to overcome

the rejection of the remaining claims. Appeal Br. 10, 15. Because we determine that reversal of independent claim 2's rejection is dispositive, except for our ultimate decision, we do not discuss the merits of the rejection of claims 3–22 further herein. We review independent claim 2's appealed rejection for error based upon the issues identified by Appellant, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential). We address the rejection of claim 2 below.

ANALYSIS

1. Lack of Anticipation of Claim 2 by Chang

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test. *See In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Moreover, "it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). Nevertheless,

> unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.

Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1371 (Fed. Cir. 2008); *accord In re Arkley*, 455 F.2d 586 (CCPA 1972).

The Examiner rejects independent claim 2 as anticipated by Chang.

Final Act. 2–3. The Examiner finds, and Appellant does not contest, that

Chang discloses the preamble, and the "receiving" and "determining" steps,

as recited in claim 2. *Id.* (citing Chang, Title, Abstract, ¶¶ 9, 21–35, 37,

Figs. 1, 2). Further, the Examiner finds Chang discloses

> checking, by the storage process module, a table for the one or more virtual storage volumes, to determine if the one or more blocks of data have been copied to the consolidated boot volume, wherein the consolidated boot volume comprises client-specific boot data from the one or more virtual storage volumes, and wherein the table comprises a plurality of entries for mapping the client-specific boot data from the one or more virtual storage volumes to respective locations on the consolidated boot volume,

as recited in claim 2. *Id.* at 3 (citing Chang, Abstract, ¶¶ 22–24, 27, 30–35,

Figs. 1, 3).

In particular, Chang's Figure 2 depicts pooled storage 70 including

client 1 image copy 74 having common operating system (OS) and

application blocks 80 and client 1 specific blocks 82. Chang, Fig. 2; *see id.*,

Abstract ("Each client image copy includes the base boot image and

information specific to the client. . . . The target is determined for the client

device and a boot volume is selected from a set of client image copies.");

cf. Spec., Figs. 2A, 2B (depicting aspects of the consolidation of client-

specific boot data from storage volumes provided within a storage system,

including "common boot data" and "client specific boot data"). Further,

referring to Figure 2, Chang discloses

> new blocks are allocated and created in the "new" image copy 74, 76, 78 and are shown as client-specific blocks 82 in FIG. 2. *This may be achieved by logging new writes to the image copies 74, 76, 78 and allocating new blocks (sectors) in the new image copies 74, 76, 78* or alternatively, by storing the common OS and application blocks 80 to a separate location from the newer and

updateable client-specific blocks 82.

Chang ¶ 33 (emphasis added). The Examiner finds that "'logging' generates a table" (Final Act. 3 (citing Chang ¶ 33)), "wherein the table comprises a plurality of entries *for mapping* the client-specific boot data from the one or more virtual storage volumes to respective locations on the consolidated boot volume" (Appeal Br. 17 (Claims App.) (emphasis added)).

Appellant contends the Examiner erred in rejecting claim 2 as anticipated by Chang because the Examiner allegedly fails to demonstrate that Chang discloses the "checking" step, as recited in claim 2. Appeal Br. 9. In particular, Appellant contends Chang fails to disclose the step of "checking . . . *a table*" (emphasis added), as recited in claim 2. *Id.* at 9–15. For the reasons given below, Appellant persuades us of dispositive Examiner error.

Appellant contends Chang does not disclose a "table" as that term properly is understood in claim 2. Appeal Br. 10–11. The Specification's Figure 8 is reproduced below.

800

STORAGE VOLUME
UNIQUE DATA SLT

SLT ENTRY NUM 802	START BLOCK 804	LENGTH 806	INDEX 808
1	8	2	0
2	27	1	2
3	92	3	3
.		.	
.		.	
.		.	
M-1	298	2	150
M	305	1	152

Figure 8

As reproduced above, "FIGURE 8 is a data structure diagram illustrating a start-length table ('SLT') generated to map client-specific boot data blocks copied to a consolidated boot volume, according to embodiments presented herein." Spec. ¶ 15; *see id.* ¶ 46 (describing the use of STL 800). Thus, the "table" depicted in Figure 8

> *maps* each block of client-specific boot data 206 on the storage volume 202 to the location on the consolidated boot volume 210 where the client-specific boot data was copied in operation 310. The storage volume unique data SL T 800 *may list* the copied blocks in a run length encoding ("RLE") scheme and may be utilized in the boot acceleration mechanism to redirect read I/O operations targeting the storage volume 202 to the consolidated boot volume 210 during boot of the client computer 112 . . . .

Id. ¶ 46 (emphases added).

Appellant contends:

> Although Chang discloses "logging" of new writes, such "logging" does not formulate a table comprising a plurality of entries for mapping client-specific boot data from a virtual storage volume to respective locations on a consolidated boot volume, as recited in Applicant's independent claims. *Chang instead discloses logging of new writes or changes to the client disk as part of a process for updating the client-specific image copies **74, 76, 78**.*

Appeal Br. 14 (emphasis added). Further, Appellant contends,

> Chang does <u>not</u> disclose checking the "table" allegedly formulated by logging of new writes to determine whether a data block has been copied to a consolidated boot volume. Chang describes the remainder of the networking booting operations in paragraph [0035], which include receiving a network boot request (i.e., Chang's Fig. 3, Step 112), identifying the target and logging the client into pooled storage 70 (i.e., Chang's Fig. 3, Steps 114-118), and directly and remotely booting off the client-specific image copies **74**, **76**, or **78** rather than downloading and using the base boot image **72** (i.e., Chang's Fig. 3, Step 120).

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> Chang describes "logging" of new writes (which the Final Office
> Action alleges results in formulation of a "table") as part of the
> copy-on-write process (i.e., Chang's Fig. 3, Steps 106-108) to
> handle new writes to client disks. Chang, however, does not
> disclose using (e.g., checking) this information in latter steps of
> the network booting process (i.e., Chang's Fig. 3, steps 112-120).
> *Thus, Chang's alleged "table" is at most used when applying
> copy-on-writes but is not used to make a determination of
> whether a data block has been copied to a consolidated boot
> volume.*

Appeal Br. 14–15 (emphasis added). We agree.

Initially, we note the Examiner acknowledges that Chang does not
expressly disclose a "table." Final Act. 5 ("While Chang did not specifically
implement the word 'table', logging [copied] information formulates a
table."). Nor does the Examiner find that Chang inherently discloses a
"table," as recited in claim 2. *See* Final Act. 2–5; Ans. 6–7; *see also
Verdegaal Bros.*, 814 F.2d at 631 (To anticipate, a single reference must
disclose "expressly or inherently" each and every element as set forth in the
claim.).

Instead, the Examiner finds:

> Per Chang's paragraph [0035] the I/O server performs target
> discovery and identifies the pooled storage devices, the client
> image copy or volume and path to such boot image (Thus
> creating a table of information). Based on client address, which
> is identified from network registry (e.g., see paragraph [0032]),
> the external storage controller can determine/check based on or
> from the discovered/identified information (i.e. a table which
> comprises information from the discovery) to find the proper
> client image copy to boot the client device and the path. The
> boot reply then provided the path to the client for use in remote
> booting (e.g., see paragraph [0029]).

Ans. 6. At most, this shows that Chang discloses assembling information
about a client in a client image copy, including common and client specific

blocks, and that a path to these may be identified. *See* Chang, Abstract, ¶ 35, Fig. 2. This description does not disclose expressly or inherently a "table," as understood in view of the Specification's disclosure and as recited in claim 2. *See In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997) ("[T]he PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification.").

Further, the Examiner interprets the recitation that the "the table comprises a plurality of entries *for mapping* the client-specific boot data from the one or more virtual storage volumes to respective locations on the consolidated boot volume" (emphasis added) as a mere statement of intended use. Ans. 7. We disagree.

The claim recites, "checking . . . a table for the one or more virtual storage volumes, *to determine if* the one or more blocks of data have been copied to the consolidated boot volume." Appeal Br. 17 (Claims App.) (emphasis added). The claim further recites two elements facilitating this determination, one of which is that the table contains a plurality of entries "for mapping" client-specific boot data to respective locations on the consolidated boot volume. *Id.* Thus, we are persuaded that this element is not a mere statement of intended use, but, rather, a description of *how* the "checking" step makes the recited determination that the data has been copied to the consolidated boot volume. Therefore, the Examiner does not persuade us that Chang expressly or inherently discloses "checking . . . a table," as recited in claim 2.

To show anticipation, the Examiner must demonstrate that Chang discloses each and every element of the claimed method, as recited in the claim. The Examiner fails to do so here, and Appellant persuades us that the Examiner erred in rejecting claim 2, as anticipated by Chang. Consequently, we do not sustain the anticipation rejection of claim 2.

2. *The Remaining Claims*

Each of claims 9 and 16 includes substantially similar elements to the relevant elements of claim 2 discussed above. Appeal Br. 10; *see id.* at 17, 19, 21 (Claims App.). Each of claims 3–8, 10–15, and 17–22 depends directly or indirectly from one of independent claims 2, 9, or 16. *Id.* at 17–23. As noted above, Appellant challenges the rejection of independent claims 9 and 16 for the same reasons as claim 2 and of the dependent claims for the same reasons as their base claims. *See* Appeal Br. 10, 15. Because we are persuaded the Examiner erred in the anticipation rejection of claim 2, we also are persuaded the Examiner erred in the anticipation rejection of claims 3–22. For this reason, we do not sustain the rejection of those claims.

DECISIONS

1. The Examiner erred in rejecting claims 2–22 as anticipated by Chang.
2. Thus, on this record, claims 2–22 are not shown to be unpatentable.

CONCLUSION

For the above reasons, we reverse the Examiner's decision rejecting claims 2–22.

In summary:

Claims Rejected	35 U.S.C. §	Reference	Affirmed	Reversed
2–22	102	Chang		2–22

REVERSED