

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DELL TECHNOLOGIES INC. AND DELL INC.,
Petitioners

v.

CLOUD BYTE LLC,
Patent Owner

Case IPR2025-01287
Patent No. 9,629,265

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 9,629,265 (the “’265 Patent”)
1002	Prosecution history of U.S. Application No. 13/780,005, which led to the issuance of the ’265 Patent
1003	Declaration of Himanshu Pokharna, Ph.D. in Support of <i>Inter Partes</i> Review of U.S. Patent No. 9,629,265
1004	<i>Curriculum vitae</i> for Himanshu Pokharna, Ph.D.
1005	U.S. Patent No. 9,332,679 (“Carl”)
1006	Provisional Application No. 61/574,593 (“Carl-Provisional”)
1007	U.S. Patent Application Publication No. US 2008/0218949 (“Hughes”)
1008	U.S. Patent No. 7,042,722 (“Suzuki”)
1009	U.S. Patent No. 5,612,854 (“Wiscombe”)
1010	U.S. Patent No. 7,643,281 (“Okamoto”)
1011	U.S. Patent No. 7,738,253 (“Araujo”)
1012	New Oxford American Dictionary (3rd. ed. 2010) (excerpt)
1013	The American Heritage Dictionary of the English Language (5th ed. 2011) (excerpt)
1014	Collins Dictionary (10th ed. 2009) (excerpt)
1015	Merriam-Webster’s Collegiate Dictionary (11th ed. 2009) (excerpt)
1016	The New Penguin Dictionary of Civil Engineering (2005) (excerpt)
1017	Microsoft Computer Dictionary (5th ed. 2002) (excerpt)

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1018	Random House Webster’s Computer & Internet Dictionary (3d ed. 1999) (excerpt)
1019	Dictionary of Computer and Internet Terms (10th ed. 2009) (excerpt)
1020	Dictionary of Computing (6th ed. 2008) (excerpt)
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1025	U.S. Patent Application Publication No. 2004/0078712
1026	U.S. Patent Application Publication No. 2005/0015632
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1032	Cloud Byte’s Disclosure of Proposed Claim Constructions and Extrinsic Evidence with attached Exhibit A
1033	Declaration of Victoria C. Huang

MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

Real Party-in-Interest (37 C.F.R. § 42.8(b)(1))

The real parties-in-interest are petitioners Dell Technologies Inc. and Dell Inc. (“Petitioners”). No unnamed entity is funding, controlling, or directing this petition or has the ability to control or direct this petition or Petitioners’ participation in any resulting *inter partes* review. Petitioners understand based on public information that the challenged patent, U.S. Patent No. 9,629,265 (the “’265 Patent”), is owned by Cloud Byte LLC (“Patent Owner”).

Related Matters (37 C.F.R. § 42.8(b)(2))

Petitioners are aware of the following district court lawsuit involving the ’265 Patent: *Cloud Byte LLC v. Dell Technologies Inc. and Dell Inc.*, Case No. 2:24-cv-00637-JRG (E.D. Tex.).

Lead and Back-Up Counsel (37 C.F.R. § 42.8(b)(3))

Petitioners appoint James L. Day (Reg. No. 72,681) of Farella Braun + Martel LLP as lead counsel and appoint the following attorneys as back-up counsel: Daniel Callaway (Reg. No. 74,267) and Winston Liaw (Reg. No. 78,766) of Farella Braun + Martel LLP.

Service Information (37 C.F.R. § 42.8(b)(4))

Service of any documents to lead and back-up counsel can be made via hand-delivery to Farella Braun + Martel LLP, One Bush Street, Suite 900, San Francisco, California, 94104. Petitioners consent to electronic service to the

following email addresses: jday@fbm.com, dcallaway@fbm.com,
wliaw@fbm.com, and calendar@fbm.com.

I. INTRODUCTION

Petitioners respectfully request *inter partes* review of claims 1-8 (the “challenged claims”) of U.S. Patent No. 9,629,265 (the “’265 Patent”). Because the petition demonstrates a reasonable likelihood Petitioners will prevail on at least one—and indeed all—of the challenged claims, *inter partes* review should be instituted and the challenged claims of the ’265 Patent should be canceled.

II. GROUNDS FOR STANDING

Petitioners certify pursuant to 37 C.F.R. § 42.104 that the ’265 Patent is available for *inter partes* review and that Petitioners are not barred or estopped from requesting an *inter partes* review challenging the claims of the ’265 Patent on the grounds identified in this petition.

III. IDENTIFICATION OF CHALLENGE

Pursuant to 37 C.F.R. § 42.104(b), Petitioners request *inter partes* review of the challenged claims of the ’265 Patent and further request that the challenged claims be canceled as unpatentable for being obvious under 35 U.S.C. § 103¹ based on the following grounds:

¹ The pre-AIA version of Sections 102, 103, and 112 of the Patent Act apply.

Grounds	Claims	Prior Art
1	1-8	Carl (EX1005) and Hughes (EX1007)
2	1-8	Carl and Suzuki (EX1008)
3	2, 3	Carl, Hughes, and Wiscombe (EX1009)
4	2, 3	Carl, Suzuki, and Wiscombe
5	1, 4, 5, 7, 8	Okamoto (EX1010)
6	2	Okamoto and Hughes
7	2, 6	Okamoto and Suzuki
8	2, 3	Okamoto and Wiscombe

Petitioners’ proposed construction of terms, the evidence relied upon, and the precise reasons why the challenged claims are unpatentable are provided in the following sections of the petition. A List of Exhibits identifying the specific evidence relied upon is provided above.

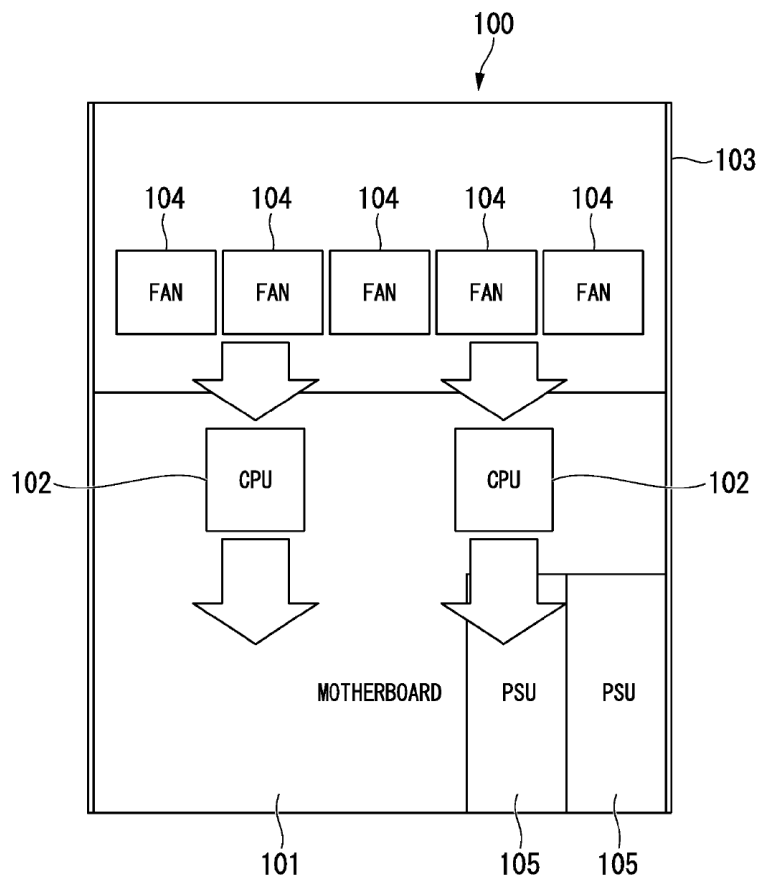
IV. THE CHALLENGED PATENT

A. Patent Specification

The ’265 Patent, entitled “Cooling Structure of Electronic Device,” relates to “[a] cooling structure...designed for an electronic device....” EX1001, 1. The specification acknowledges that “[v]arious technologies regarding cooling structures of electronic devices have been developed....” *Id.*, 1:22-23. However, existing technologies were “disadvantageous” because they did “not demonstrate a

good cooling effect when one power source additionally applie[d] its heat to the other power source, thus totally increasing heat produced by a pair of power sources vertically combined together.” *Id.*, 1:37-39, 1:57-62. This is illustrated in Figure 6, showing a server with “a motherboard 101, a pair of CPUs 102, a housing 103, a plurality of fans 104, and a pair of power source units (or power supply units: PSU) 105.” *Id.*, 1:65-2:1.

FIG. 6



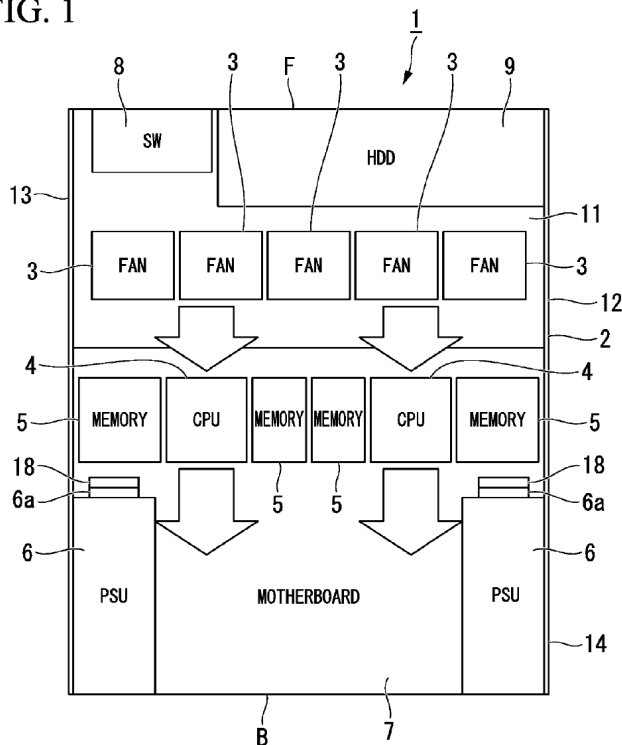
'265 Patent, Fig. 6

The server “is designed to adjacently dispose the two power source units 105 in a further downstream side of a cooling air flow compared to the CPUs 102.” *Id.*, 2:14-19.

The '265 Patent identifies two problems with the configuration in Figure 6. First, “one CPU 102 and one power source unit 105 are positioned linearly along a cooling air flow; hence, a cooling air flow caused by the fan 104 is temporarily warmed by heat caused by the CPU 102 and subsequently flows into the power source unit 105.” EX1001, 2:20-24. Second, “[d]ue to the adjacent arrangement of the power source units 105, one power source unit 105 additionally applies its heat to the other power source unit 105.” *Id.*, 2:27-29. Both “may degrade a cooling effect” for power source units. *Id.*, 2:24-27, 2:29-30.

The '265 Patent addresses these problems by separating the power source units as in Figure 1.

FIG. 1



'265 Patent, Fig. 1

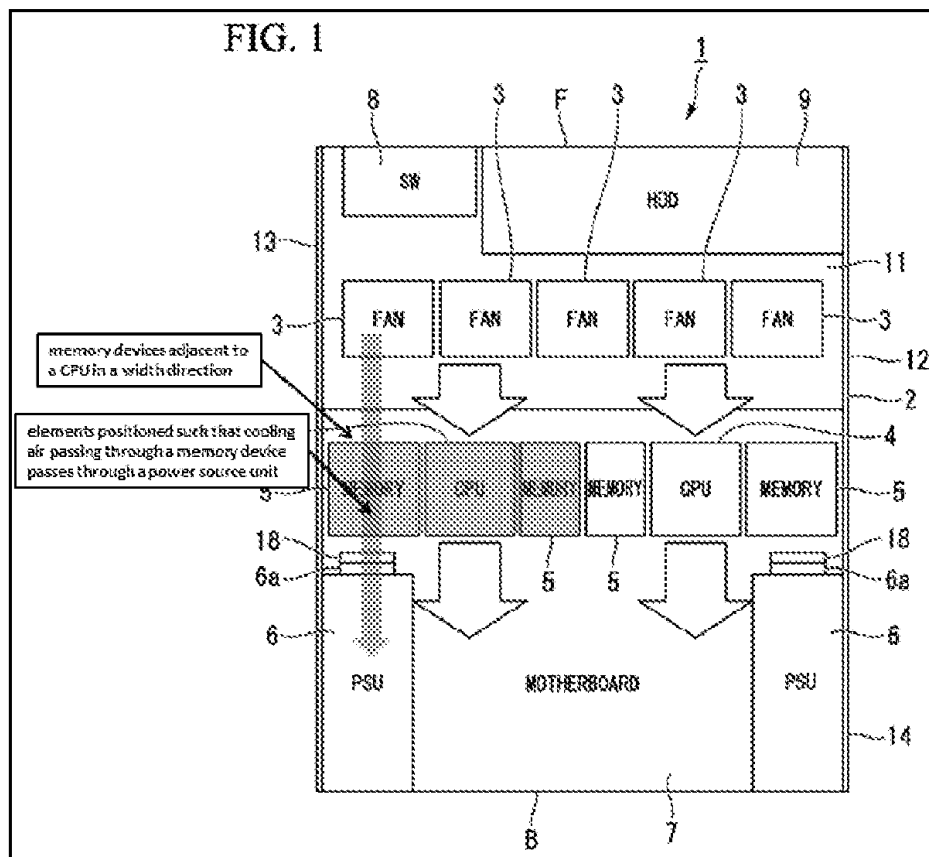
As illustrated, “power source units 6 are not longitudinally aligned to follow the CPUs 4 in a cooling airflow direction....” EX1001, 5:24-29. “Additionally, the power source units 6 are spaced out from each other in the perpendicular direction to the cooling air flow, i.e. the width direction of the housing 2.” *Id.*, 5:30-32.

B. Prosecution History

The '265 Patent issued from an application filed February 28, 2013. EX1002, 2-56. The applicant made multiple amendments to avoid cited art. *Id.*, 213-219, 242-248, 269-276, 296-305. For example, the applicant added the limitation “a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing,” arguing the cited

art did “not disclose or reasonably suggest either arranging memory devices adjacent to a CPU or that such an arrangement is in a ‘width direction’ as described by the claim.” *Id.*, 243, 246-247.

Ultimately, following an examiner interview, the applicant amended the claims to add that “the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units....” EX1002, 297 (emphasis in original). Applicant provided an annotated Figure 1:



Applicant's Fig. 1 (annotated)

Prosecution History, 303

According to the applicant, the claim required arranging the elements “such that cooling air passing through one of memory devices, widthwise adjacent to the CPU, also passes through a power source unit,” which distinguished the cited art. *Id.*, 304.

A Notice of Allowance issued December 12, 2016. EX1002, 312-316.

C. Patent Claims

The '265 Patent contains eight claims, including two independent claims (i.e., claims 1 and 4). Claim 1 reads as follows:

[1pre] An electronic device comprising:

[1a] a housing comprising a front face and a rear face which are distanced from each other in a longitudinal direction;

[1b] a plurality of fans which are arranged inside the housing close to the front face so as to cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing;

[1c] a central processing unit (CPU) which is arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough;

[1d] a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing; and

[1e] a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing,

[1f] wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units, and

[1g] wherein the plurality of power source units are each positioned not to be aligned linearly with the CPU in the longitudinal direction of the housing.

Independent claim 4 recites a “cooling structure of an electronic device.”

Dependent claims 2, 3, 5, 6, and 8 depend from claim 1. Dependent claim 7 depends from claim 4. The claim language for all challenged claims is provided in the attached Claim Appendix.

D. Person of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) would have had (i) an undergraduate degree (or equivalent) in mechanical engineering, electrical engineering, computer engineering, computer science, or a comparable subject and would have had two to three years of work experience in the design and architecture of thermal management systems of electronic devices, or (ii) an advanced degree (or equivalent) in the same or comparable subjects and would have had one year of post-graduate research or work experience in the design and

architecture of thermal management systems of electronic devices. EX1003, ¶66.

A POSITA would have been familiar with the thermal management technology used in electronic devices, such as servers and storage devices. *Id.*

V. CONSTRUCTION OF CLAIM TERMS

The claims should be construed under the *Phillips* standard. 37 C.F.R. § 42.100(b). The Board need only construe claims when necessary to resolve the underlying controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed Cir. 2017). Aside from the following term, no express constructions are necessary to determine the asserted prior art discloses the limitations of the challenged claims.²

A. “the plurality of electronic parts”

Dependent claim 3 recites that “the plurality of power source units are...positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flown downwardly from the plurality of electronic parts.” EX1001, 8:7-13 (emphasis added). The reference to “the plurality of electronic parts” has no antecedent basis. Petitioners interpret the term, for this petition, to mean the “central processing unit (CPU)” of claim 1. When claim 3

² Petitioners may present other claim construction arguments in the related litigation.

was amended during prosecution to refer back to “the plurality of electronic parts” of claim 1, the relevant limitation in claim 1 read: “a plurality of electronic parts, each serving as a central processing unit (CPU), ...” EX1002, 214-215. Claim 1 was later amended to remove reference to “electronic parts” and to recite only “a central processing unit (CPU).” *Id.*, 243-244. Thus, Petitioners interpret claim 3’s “the plurality of electronic parts” to refer back to claim 1’s “central processing unit (CPU).” EX1003, ¶76.

Further, the term does not refer to the “plurality of memory devices” recited in limitation 1d. Reading “the plurality of electronic parts” to include the memory devices would render claim 3 directly inconsistent with claim 1. A POSITA would not understand claim 3 in that way. EX1003, ¶77.

VI. PRIOR ART REFERENCES

The ’265 Patent issued from an application filed February 28, 2013, claiming priority to a Japanese application filed March 5, 2012. *See also* EX1028, 10.

A. Carl (EX1005)

Carl is a U.S. patent entitled “Fan Assembly for Rack Optimized Server Computers” filed August 3, 2012, published February 21, 2013, and issued May 3, 2016. EX1005, 1. Because the application leading to the issuance of the

'265 Patent was filed February 28, 2013, Carl constitutes prior art under at least Section 102(a) and (e) (pre-AIA). Carl was not cited during prosecution.

Under the burden-shifting framework in *Dynamic Drinkware v. National Graphics*, Petitioners have met their “initial burden of production” by showing that Carl is invalidating prior art. 800 F.3d 1375, 1379 (Fed. Cir. 2015). The burden of production is shifted to Patent Owner. *Id.* at 1380. Should Patent Owner meet its burden by showing that the '265 Patent is entitled to an earlier priority date, the burden would then shift back to Petitioners who can—and if necessary will—establish that Carl is entitled to the filing date of its even earlier-filed provisional application (August 5, 2011).

To do so, Petitioners can show the Carl provisional application provides written description support for at least one claim of the Carl patent. *See In re Riggs*, 2025 WL 889905, at *5 (Fed. Cir. Mar. 24, 2025); *Unified Patents v. Longhorn HD*, IPR2020-00879, Paper 35 at 13 (PTAB Nov. 9, 2021); MPEP § 2136.03. The following chart identifies exemplary disclosures in the provisional supporting at least Carl’s claims 1 and 2. EX1003, ¶¶82-85.

Carl (claims 1-2)	Carl-Provisional
1. A fan assembly for an electrical device which comprises a number of heat generating electrical components	EX1006, 3 (1:3-9), 3-4 (1:16-2:8), 4-5 (2:20-3:8), 6 (4:18-20), 6-7 (4:23-5:2), 7 (5:14-16), 14 (12:17-22),

Carl (claims 1-2)	Carl-Provisional
mounted in an enclosure that includes a front wall, a rear wall and two generally parallel sidewalls, the fan assembly comprising:	Figs. 1, 2, 9.
a plurality of vane-axial fans which are arranged in a row that extends generally perpendicularly between the sidewalls, each fan comprising an inlet end, an outlet end and an axis of rotation which is oriented at an angle relative to the sidewalls, the inlet and outlet ends being axially aligned with the axis of rotation and the fan being operable to generate an airflow which enters the inlet end and exits the outlet end;	EX1006, 3 (1:3-9), 4-5 (2:22-3:8), 7 (5:8-10), 7 (5:16-22), 7-8 (5:23-6:5), 8 (6:13-19), 11 (9:14-21), 14-15 (12:22-13:4), Figs. 1-4, 9.
a plurality of inlet plenums, each of which communicates with the inlet end of a corresponding fan;	EX1006, 8 (6:6-10), 8 (6:13-19), 9 (7:7-11), 10 (8:13-16), 15 (13:5-10), Figs. 2, 4, 9.
a plurality of exhaust plenums, each of which communicates with the outlet end of a corresponding fan, each exhaust plenum being configured to turn the airflow in a direction which diverges	EX1006, 8 (6:6-10), 8 (6:13-19), 9 (7:7-15), 15 (13:10-19), Figs. 2, 4, 6, 7, 9.

Carl (claims 1-2)	Carl-Provisional
from the axis of rotation of the fan;	
wherein the airflow is distributed by the inlet and exhaust plenums through the enclosure to thereby cool the electrical components; and	EX1006, 3 (1:10-15), 4 (2:6-8), 6 (4:18-20), 7 (5:10-13), 8 (6:13-19), Figs. 2, 4, 6, 7, 9.
wherein the axis of rotation of each fan is oriented at an angle of between about 20° and 90° relative to the sidewalls. ³	EX1006, 3 (1:5-7), 8 (6:3-5), Fig. 2.
2. The fan assembly of claim 1, wherein the axis of rotation of each fan is orientated at an angle of between about 45° and 90° relative to the sidewalls.	EX1006, 3 (1:5-7), 7-8 (5:23-6:5), 8 (6:16-19).

³ To the extent Patent Owner argues the range for “the axis of rotation of each fan” of “between about 20° and 90° relative to the sidewalls” is not explicitly recited in the provisional, Petitioners identify support for claim 2. The range recited claim 2 (i.e., “an angle of between about 45° and 90°”) is expressly recited in the provisional. EX1006, 7-8 (“As shown most clearly in Figure 2, each fan 124 is oriented such that its axis of rotation A forms an angle α of between about 45° and 90° with the sidewalls 122.”).

Petitioners can also demonstrate that the relevant disclosures in Carl have written description support in Carl’s provisional, which is nearly identical in relevant part. *See Riggs*, 2025 WL 889905, at *5. Petitioner’s arguments rely on Carl’s Figure 1 and its description. *See* Section VII, below. Carl’s provisional includes the same figure and a description with only immaterial differences. EX1003, ¶¶86-90 (comparing disclosures in Carl and provisional). Further, Petitioners provide parallel citations to the Carl provisional application in the analysis of the challenged claims below.

B. Hughes (EX1007)

Hughes is a published U.S. patent application entitled “Enclosure for Containing One or More Electronic Devices and Cooling Module” that was filed January 10, 2008, and published on September 11, 2008. EX1007, 1. Hughes constitutes prior art under Section 102(a), (b), and (e) (pre-AIA). Hughes was not cited during prosecution.

C. Suzuki (EX1008)

Suzuki is a U.S. patent entitled “Electronic Equipment” that was filed February 3, 2004, and issued May 9, 2006. EX1008, 1. Suzuki constitutes prior art under Section 102(a), (b), and (e) (pre-AIA). Suzuki was not cited during prosecution but a Japanese patent application (JP2005011304) related to Suzuki was cited in an IDS. EX1002, 87-89. The application was submitted in Japanese

with only the Abstract in English, and it was not discussed or relied on for any rejection. *Id.*, 93-122, 184-191, 227-235, 255-263, 280-290.

D. Wiscombe (EX1009)

Wiscombe is a U.S. patent entitled “Computer Power Supply Apparatus” that was filed January 24, 1995, and issued March 18, 1997. EX1009, 1. Wiscombe constitutes prior art under Section 102(a), (b), and (e) (pre-AIA). Wiscombe was not cited during prosecution.

E. Okamoto (EX1010)

Okamoto is a U.S. patent entitled “Storage Controller” that was filed September 14, 2007, and issued January 5, 2010. EX1010, 1. Okamoto constitutes prior art under Section 102(a), (b), and (e) (pre-AIA). Okamoto was not cited during prosecution but a Japanese patent application (JP2008171386) related to Okamoto was cited in an IDS. EX1002, 87-89. The application was submitted in Japanese with only the Abstract in English, and it was not discussed or relied on for any rejection. *Id.*, 123-150, 184-191, 227-235, 255-263, 280-290.

VII. THE CHALLENGED CLAIMS ARE INVALID AS OBVIOUS BASED ON CARL AS A PRIMARY REFERENCE

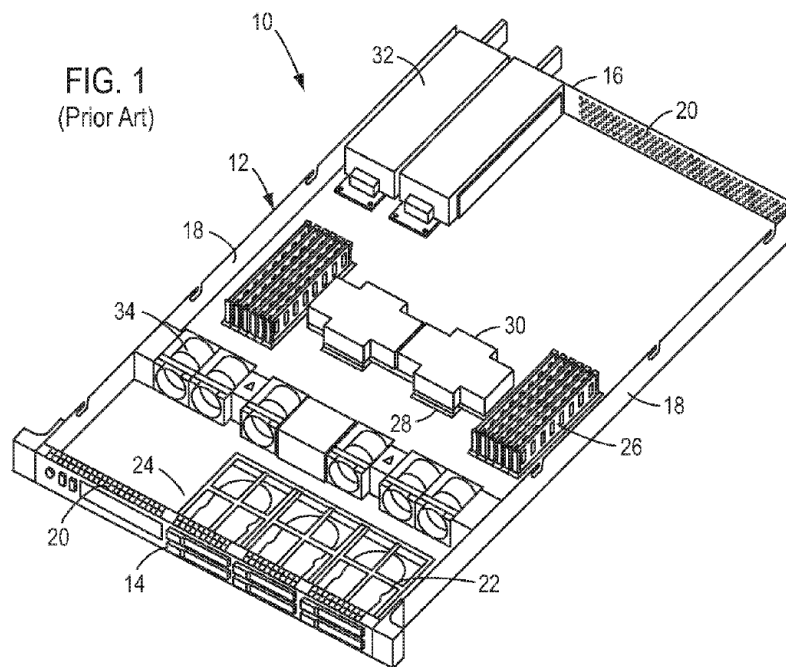
A. Grounds 1 and 2: The Combination of Carl with Hughes or Suzuki Renders Claims 1-8 Obvious

1. Overview of Carl

Carl discloses “[a] fan assembly for an electrical device which comprises a number of heat generating electrical components mounted in an enclosure that

includes a front wall, a rear wall and two generally parallel sidewalls.” EX1005, 1 (Abstract). Carl’s “invention relates to a fan assembly for cooling an electronic device comprising a plurality of heat generating electrical components mounted in an enclosure, such as a server computer.” *Id.*, 1:9-12.

In Figure 1, Carl discloses “[a]n example of a prior art server computer....”
EX1005, 1:29-30. “This server computer, generally 10, includes a number of
electrical components which in this example are housed in a 1u rack enclosure 12.”
Id., 1:30-31.



Carl, Fig. 1

Carl describes an improved fan assembly for electrical devices like the prior art server computer of Figure 1. EX1003, ¶108.

Carl is analogous to the '265 Patent because it is in the same field of endeavor (i.e., electronic devices, including computer servers) and addresses the same problem of cooling components within device enclosures. EX1003, ¶109; EX1005, Abstract, 1:9-20; EX1001, Abstract, 1:6-10; *Sanofi-Aventis, Deutschland GmbH v. Mylan Pharmaceuticals, Inc.*, 66 F.4th 1373, 1377 (Fed. Cir. 2023).

2. The Combination of Carl and Hughes

Carl discloses all of the limitations of the challenged claims except that in Carl's server computer, the two power supplies are positioned side-by-side against one sidewall of the enclosure. The power supplies are not *positioned opposite to each other and spaced out from each other in the width direction of the housing* as recited in limitation 1e.⁴ Hughes discloses a similar electronic device enclosure in which two power supply units are positioned apart with each power supply unit against an opposing sidewall. Thus, the combination of Carl's server computer with the teachings of Hughes discloses, and renders obvious, the challenged claims.

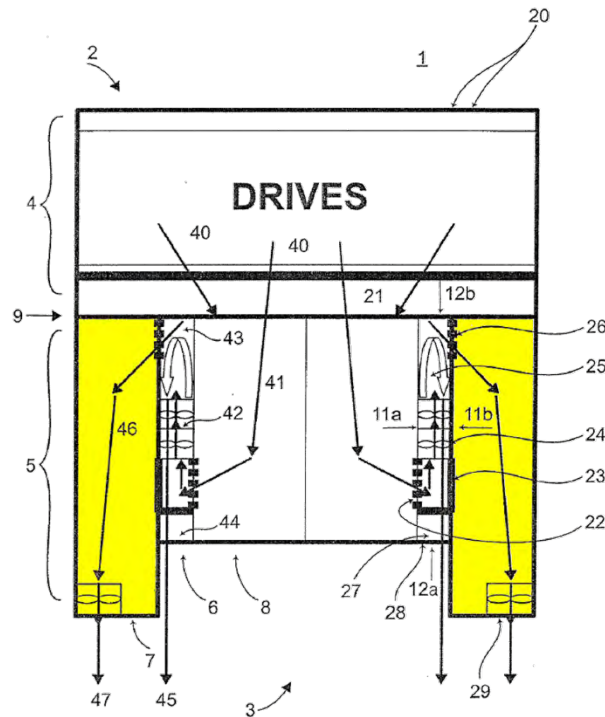
a. Overview of Hughes

Hughes discloses an invention "relat[ing] to an enclosure for containing one or more electronic devices and to a cooling module." EX1007, [0002].

⁴ For ease of review, claim language is italicized.

Embodiments include “storage enclosures for a plurality of disk drives, RAID arrays, SAN or NAS storage, server enclosures and the like....” *Id.* A POSITA would understand Hughes’ “server enclosures” are the type of enclosure described in Carl. EX1003, ¶111.

Figure 1 depicts “an example of a storage enclosure 1” from the top. EX1007, [0028]. Enclosure 1 includes two power supply units 7 “positioned at the sides of the enclosure....” EX1007, [0006].



Hughes, Fig. 1 (highlighted)

Hughes explains that “power supply units 7 are typically the heaviest components in the enclosure 1, and are therefore naturally situated at either side of the enclosure 1, so as to receive support from the rack in which the enclosure 1 is

mounted.” *Id.*, [0029].

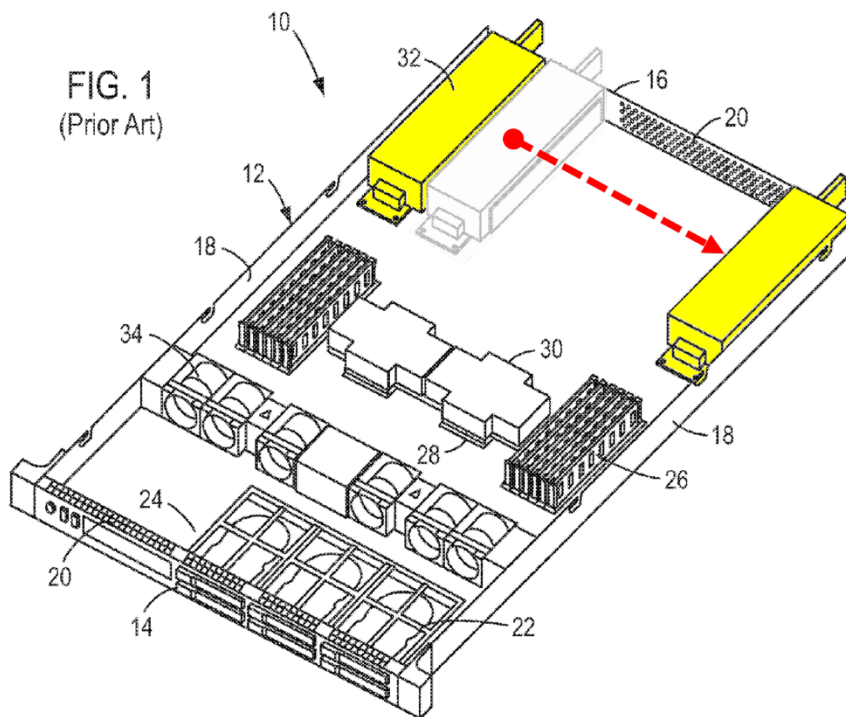
Hughes is analogous to the ’265 Patent because it is in the same field of endeavor (i.e., electronic devices, including computer servers) and addresses the same problem of cooling components within device enclosures. EX1003, ¶113; EX1007, Abstract, [0002]; EX1001, Abstract, 1:6-10; *Sanofi-Aventis*, 66 F.4th at 1377.

b. Motivation to Combine

Carl discloses a server that “includes a number of electrical components...housed in a 1u rack enclosure 12” including two “power supplies 32.” EX1005, 1:30-40, Fig. 1. Carl also recognizes the need to cool heat generating components in the enclosure. *Id.*, 1:21-28. A POSITA would have naturally looked to Hughes, which discloses an invention for “server enclosures” having two “power supply units 7” improving cooling of heat-generating components. EX1007, [0002]; *see also id.*, [0013], Fig. 1; EX1003, ¶114. Like Carl, Hughes recognizes the need for such cooling. As Hughes explains, “components of the enclosure generate heat, which must be removed from the enclosure to keep the operating temperature of the components within acceptable limits....” EX1007, [0004]. Hughes describes an invention directed to cooling such components. *Id.*, [0009]-[0011]. A POSITA implementing Carl’s server

would have considered Hughes because it addresses cooling heat-generating components in just such a device. EX1003, ¶¶114-118.

In light of Hughes, a POSITA would have been motivated to modify Carl’s server to position power supplies 32 on opposite sides of the enclosure against the two sidewalls 18, as illustrated below. EX1003, ¶¶119-123.



Carl, Fig. 1 (modified)

As Hughes teaches, power supplies are relatively heavy and would “naturally” be positioned “at either side of the enclosure” to “receive support from the rack” where the enclosure is mounted. EX1007, [0029]. A POSITA would recognize that this positioning of power supplies 32 would benefit Carl’s “rack enclosure 12” for the reasons identified by Hughes. EX1003, ¶¶120-122. A POSITA would also

recognize that such positioning of power supplies (typically the heaviest components) would better balance Carl's enclosure 12. *Id.*; EX1007, [0029]. Further, separating the power supplies would bring thermal benefits by allowing the flow of cooling air to be more uniform, providing more efficient cooling. *Id.*, ¶123; EX1010, 14:34-40. In addition, a POSITA would have known that this configuration was common. EX1003, ¶121.

Modifying the layout of power supplies in Carl's enclosure would have been well within the skill of a POSITA without undue experimentation and with a reasonable expectation of success. EX1003, ¶124. This was a well-known configuration. EX1008, Fig. 4; EX1022, [0076], Fig. 5; EX1023, 24:44-47, Fig. 50; EX 1024, Figs. 2a, 2b. The modification would have involved simply positioning one of Carl's power supplies in a different location in the enclosure and making minor adjustments to the rear wall. *Id.*, ¶124.

Modifying Carl based on Hughes would have involved no more than use of prior art elements according to known methods yielding predictable results. EX1003, ¶125; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

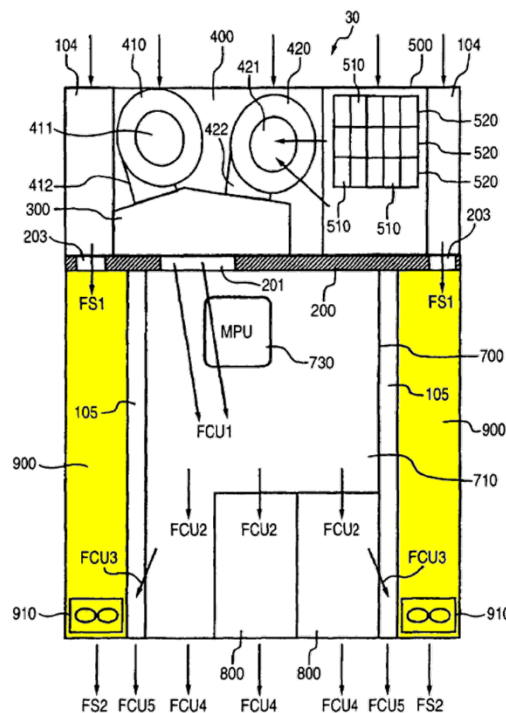
3. The Combination of Carl and Suzuki

Like Hughes, Suzuki discloses an electronic device enclosure in which two power supply units are positioned apart against opposing sidewalls. Thus, the

combination of Carl’s server computer with the teaching of Suzuki discloses, and renders obvious, the challenged claims.

a. Overview of Suzuki

Suzuki relates to cooling “electronic equipment preferably used for disk array control devices or equivalents thereto.” EX1008, 1:13-15. Suzuki’s Figure 4 “is a schematic diagram of the control unit 30,” which includes “two power supply modules 900 being respectively disposed on the both sides of the rear side space of the chassis 100.” *Id.*, 8:22-26, 8:32-35.



Suzuki, Fig. 4 (highlighted)

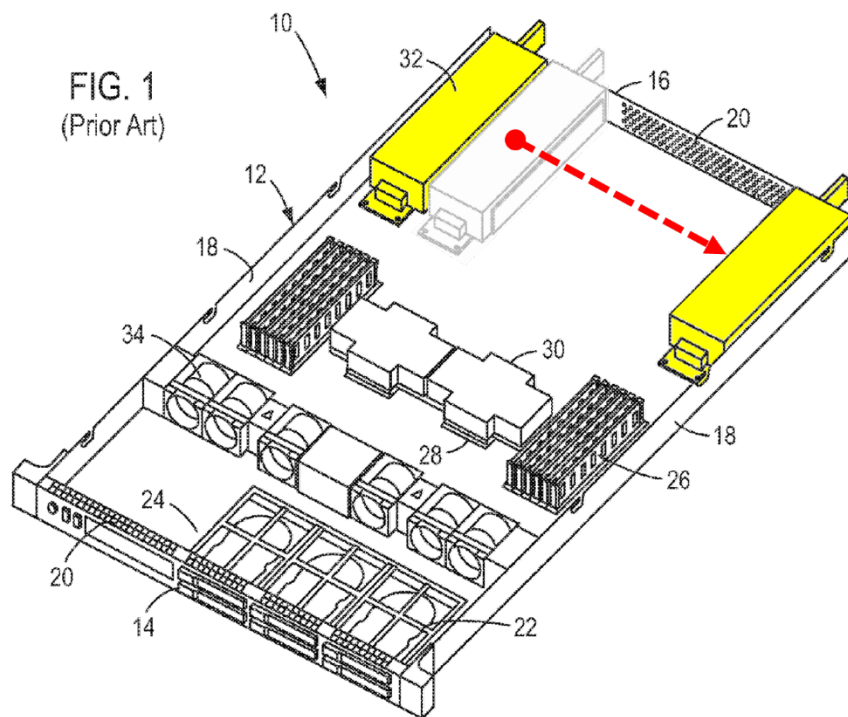
Suzuki is analogous to the ’265 Patent because it is in the same field of endeavor (i.e., electronic devices) and addresses the same problem of cooling

components within electronic device enclosures. EX1003, ¶128; EX1008, Abstract, 1:13-15, 1:29-51; EX1001, Abstract, 1:6-10; *see also Sanofi-Aventis*, 66 F.4th at 1377.

b. Motivation to Combine

A POSITA implementing Carl’s server would have naturally looked to Suzuki, which—like Carl—discloses a rack-mounted electronic device with an enclosure containing heat-generating components needing cooling. EX1008, 1:20-24, 5:4-6. The object of Suzuki “is to provide an electronic equipment capable of performing effective cooling operations to thereby enable performance enhancement while increasing the reliability.” *Id.*, 1:47-51. A POSITA would have considered such prior art because it offers benefits applicable to Carl’s server. EX1003, ¶129.

A POSITA would have been motivated to modify Carl’s server computer based on Suzuki by placing power supplies 32 against opposite sidewalls 18, as illustrated below.



Carl, Fig. 1 (modified)

A POSITA would have been motivated to do so for the same reasons motivating the combination of Carl and Hughes. The power supplies are the heaviest components, making it beneficial to position them against opposing sidewalls for better support from the rack in which Carl's enclosure is mounted. EX1003, ¶131; EX1007, [0029]. The enclosure would also be better balanced. EX1003, ¶131. Separating the two power supplies would have thermal benefits. *Id.*, ¶132; EX1010, 14:34-40. And this configuration was common. EX1003, ¶133.

Modifying Carl based on Suzuki would have been well within the skill of a POSITA without undue experimentation and with a reasonable expectation of success. EX1003, ¶134. The modification would have involved simply

positioning one of Carl’s power supplies 32 in a different location and making minor adjustments to the rear wall. *Id.* It would have involved no more than use of prior art elements according to known methods yielding predictable results. *Id.*, ¶135; *KSR*, 550 U.S. at 416.

4. Claim 1

a. [1pre] An electronic device comprising:

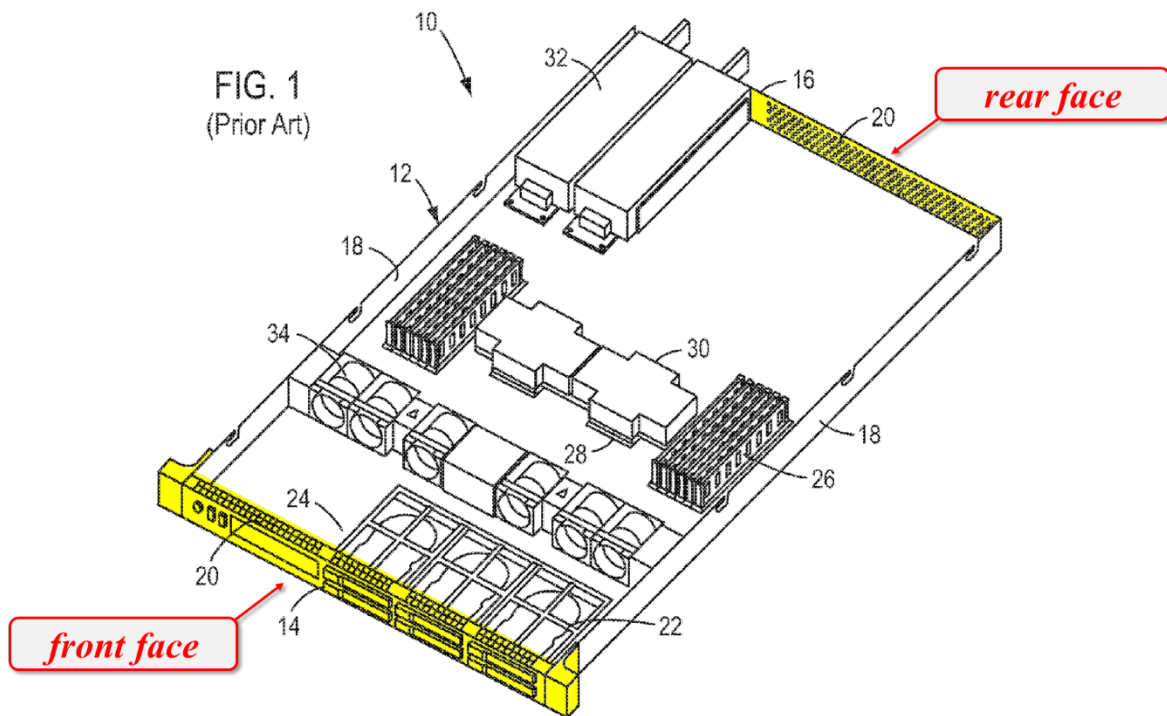
To the extent the preamble is limiting, Carl discloses an *electronic device* as recited in claim 1. Carl discloses, and illustrates in Figure 1, “[a]n example of a prior art server computer....” EX1005, 1:29-30. “This server computer, generally 10, includes a number of electrical components which in this example are housed in a 1u rack enclosure 12.” *Id.*, 1:30-31. The “prior art server computer” illustrated in Figure 1 is an *electronic device* as recited in the preamble. EX1003, ¶¶136-139.⁵

b. [1a] a housing comprising a front face and a rear face which are distanced from each other in a longitudinal direction;

Carl discloses this limitation. EX1003, ¶¶140-144. In particular, Carl discloses *a housing comprising a front face and a rear face* as claimed. Carl’s “server computer, generally 10, includes a number of electrical components which

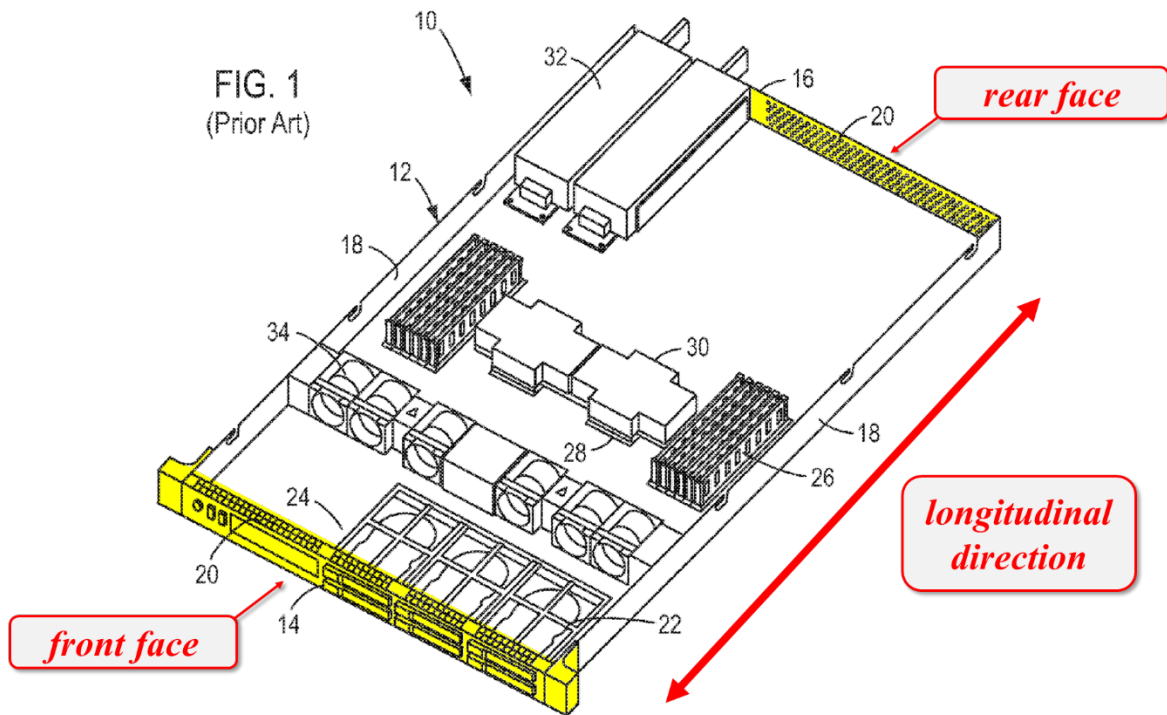
⁵ See also EX1006, 3 (1:16-18), Fig. 1.

in this example are housed in a 1 u rack enclosure 12” (*a housing*) and that “[t]he rack enclosure 12 comprises a front wall 14 [*a front face*], a rear wall 16 [*a rear face*] and two parallel sidewalls 18.” EX1005, 1:30-33.



Carl, Fig. 1 (annotated)

Figure 1 also shows that the *front face* (front wall 14) and the *rear face* (rear wall 16) are *distanced from each other in a longitudinal direction*.



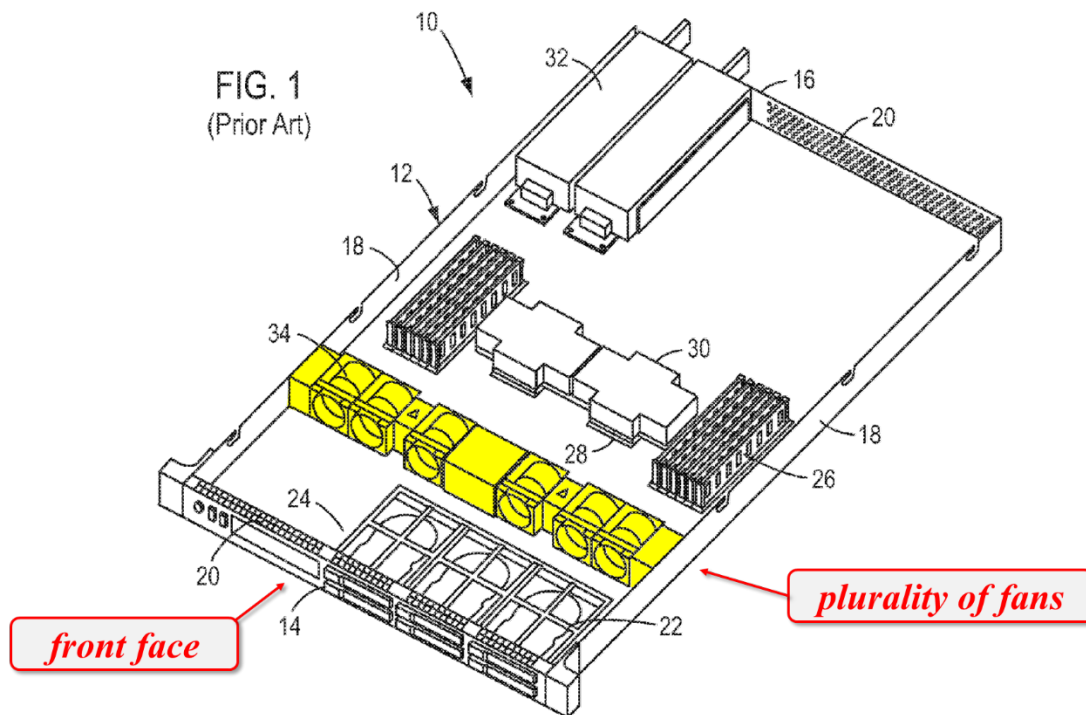
Carl, Fig. 1 (annotated)

The term *longitudinal direction* refers to the lengthwise (i.e., longer) direction in the rectangular rack enclosure 12 (*housing*). EX1003, ¶143; EX1012, 3 (defining “longitudinal” as “running lengthwise rather than across”); EX1013, 3; EX1014, 3; EX1015, 4. The ’265 Patent claim language confirms this; for example, the next limitation in claim 1 states that air flows “downstream in the longitudinal direction from the front face to the rear face of the housing....” EX1001, 7:42-45; *see also id.*, 4:27-29, 5:19-23, Fig. 1 (arrows in longitudinal direction).⁶

⁶ See also EX1006, 3 (1:16-19), Fig. 1.

- c. [1b] a plurality of fans which are arranged inside the housing close to the front face so as to cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing;

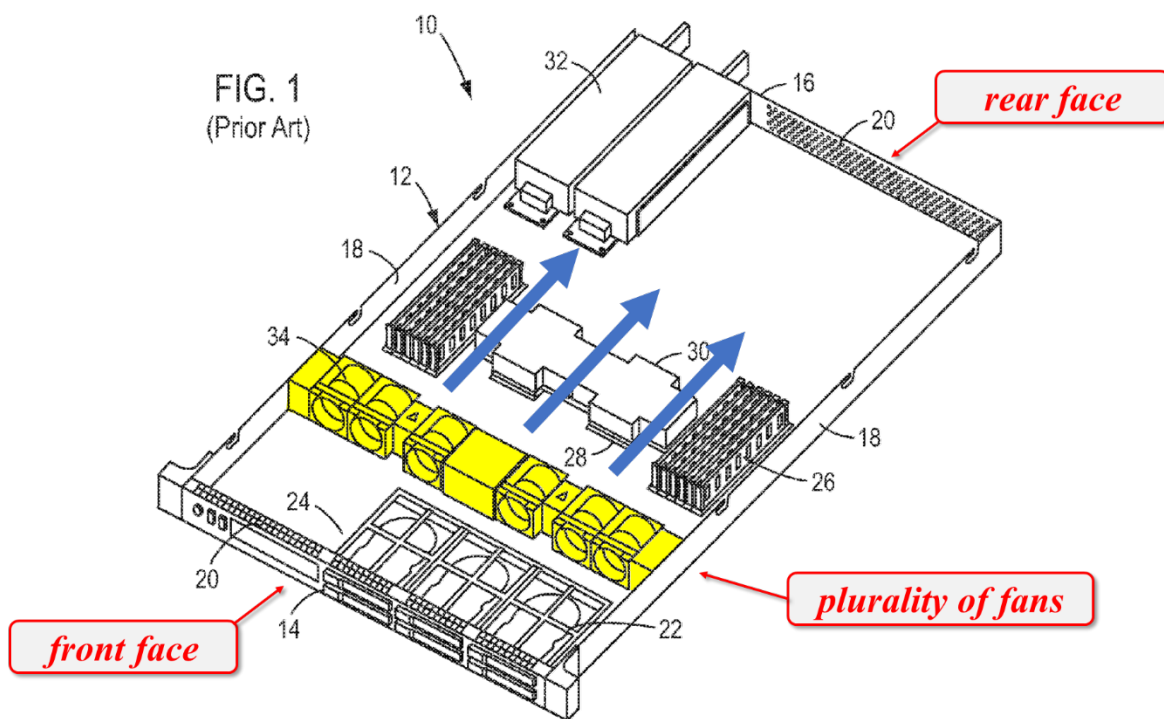
Carl discloses this limitation. EX1003, ¶¶145-149. In particular, Carl’s “server computer 10” includes “a number of fans 34, in this case six, which are oriented with their axes parallel to the sidewalls 18.” EX1005, 1:40-44. Further, Figure 1 shows the *plurality of fans* (fans 34) inside the enclosure and *close to the front face*. EX1003, ¶147.



Carl, Fig. 1 (annotated)

Thus, Carl discloses a *plurality of fans which are arranged inside the housing close to the front face*.

Further, Carl discloses that the *plurality of fans* (fans 34) *cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing*. EX1003, ¶148. Carl’s “fans 34 draw air into the enclosure 12 through the apertures in the front wall 14 and force the air over the heat generating components and through the apertures in the rear wall 16.” EX1005, 1:42-48. The blue arrows annotated in the figure below illustrate air flow *downstream* as claimed.



Carl, Fig. 1 (annotated)

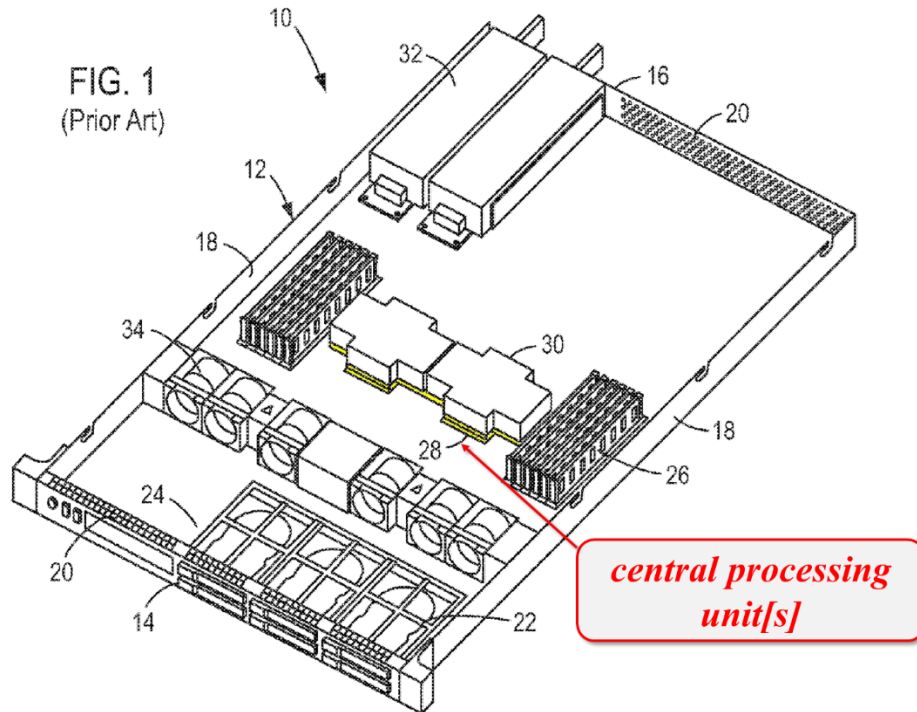
As illustrated, fans cause air to *flow downstream in the longitudinal direction from the front face to the rear face of the housing*.

Carl also states that several of the electronic components in the rack enclosure “generate heat during operation of the server computer 10” and that fans 34 (the *plurality of fans*) “dissipate the heat generated by these components.” EX1005, 1:35-44. “As the air flows over the components, the heat generated by the components is absorbed by the air to thereby cool the components.” *Id.* 1:47-50. Thus, the *plurality of fans* cause *cooling air to flow* as claimed.⁷

- d. [1c] a central processing unit (CPU) which is arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough;**

Carl discloses this limitation. EX1003, ¶¶151-156. Indeed, Carl discloses “two processors 28 (each of which is positioned under a corresponding heat sink 30)....” EX1005, 1:38-40.

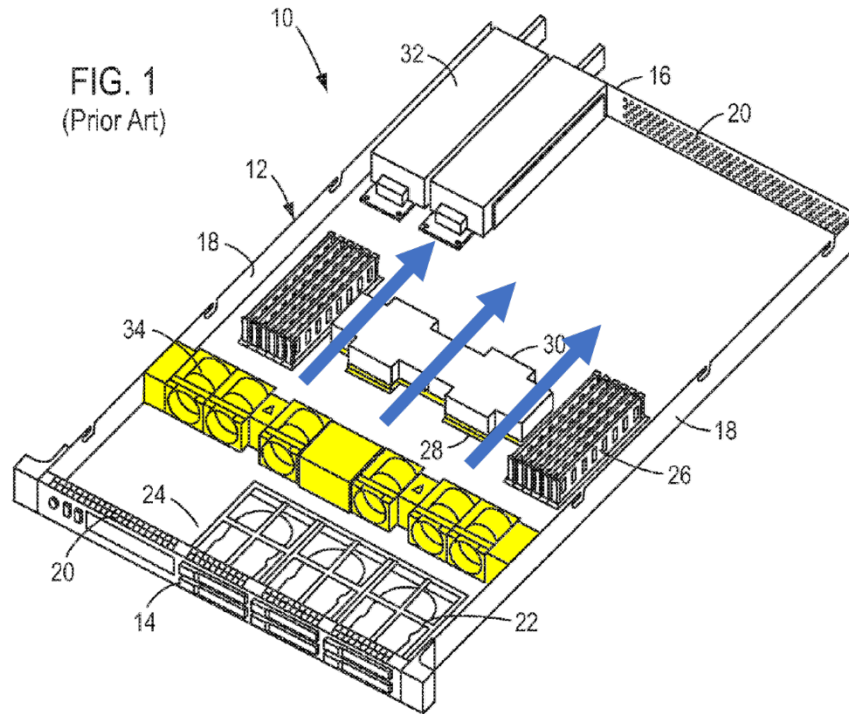
⁷ See also EX1006, 3-4 (1:20-2:8), Fig 1.



Carl, Fig. 1 (annotated)

A POSITA would understand that each of Carl's two processors 28 is a *central processing unit (CPU)*. EX1003, ¶153.

In Carl's server, each *CPU* (processor 28) is *arranged downstream of the plurality of fans* (fans 34) *in the housing*. Each processor 28 is *downstream* because it is in the direction that air flows through the fans toward rear wall 16. EX1003, ¶154.



Carl, Fig. 1 (annotated)

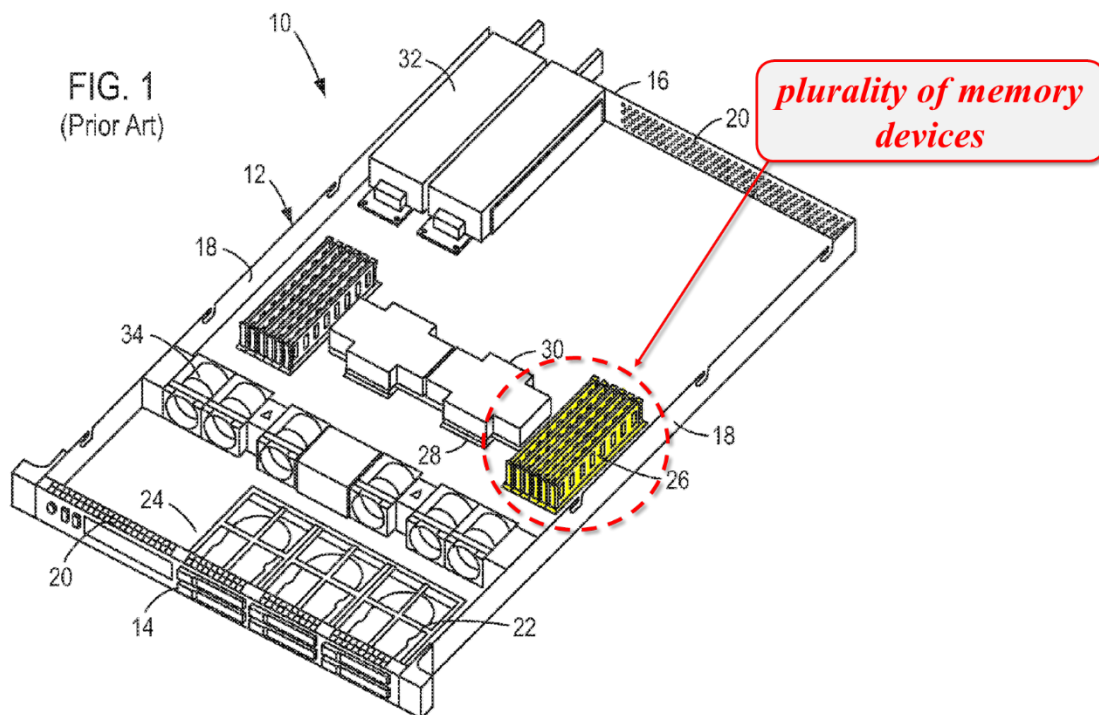
Further, each *CPU* is *positioned to allow the cooling air to directly flow therethrough* because it is located so that air flowing from the fans will directly hit and flow over/around the processor to dissipate heat. EX1003, ¶155; EX1005, 1:40-47. A POSITA would understand that this is what the claim means by reciting the *CPU* is *positioned to allow the cooling air to directly flow therethrough* (i.e., air flows over and around the *CPU*). EX1003, ¶155. A POSITA would not understand the word *therethrough* to suggest that air flows into the *CPU*, because a *CPU* is a solid object. *Id.*⁸

⁸ See also EX1006, 3-4 (1:22-2:6), Fig. 1.

- e. **[1d] a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing; and**

Carl discloses this limitation. EX1003, ¶¶157-161. Carl’s server includes “a plurality of memory modules 26....” EX1005, 1:38. Memory modules 26 constitute the claimed *plurality of memory devices* in two different ways.

First, a POSITA would know that the structure highlighted below is composed of multiple individual memory modules (i.e., dual in line memory modules or DIMMs). EX003, ¶159. It is therefore a *plurality of memory devices*.

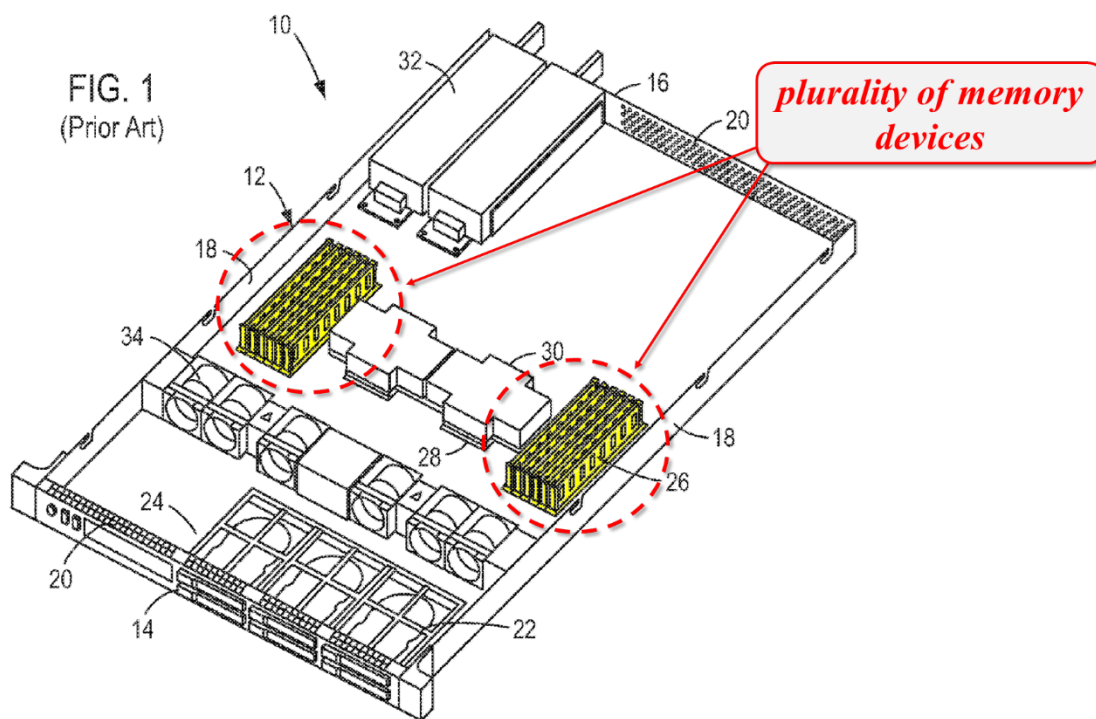


Carl, Fig. 1 (annotated)

Further, as illustrated, the *plurality of memory devices* are located *adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the*

housing. Id. The *width direction* is from side-to-side in Carl’s server and *normal* (i.e., perpendicular) *to the longitudinal direction. Id.*; EX1016, 3 (“normal...Perpendicular, right angled...”). Thus, the highlighted *plurality of memory devices* are shown located *adjacent to* processor 28 in the *width direction* as claimed.

Second, Carl illustrates two similar memory structures (*a plurality of memory devices*) identified below. EX1003, ¶160.



Carl, Fig. 1 (annotated)

Further, as illustrated, the *plurality of memory devices* are located *adjacent to* either CPU 28 in a *width direction*, *substantially normal to the longitudinal direction, of the housing. Id.* To the extent Patent Owner argues (incorrectly) the

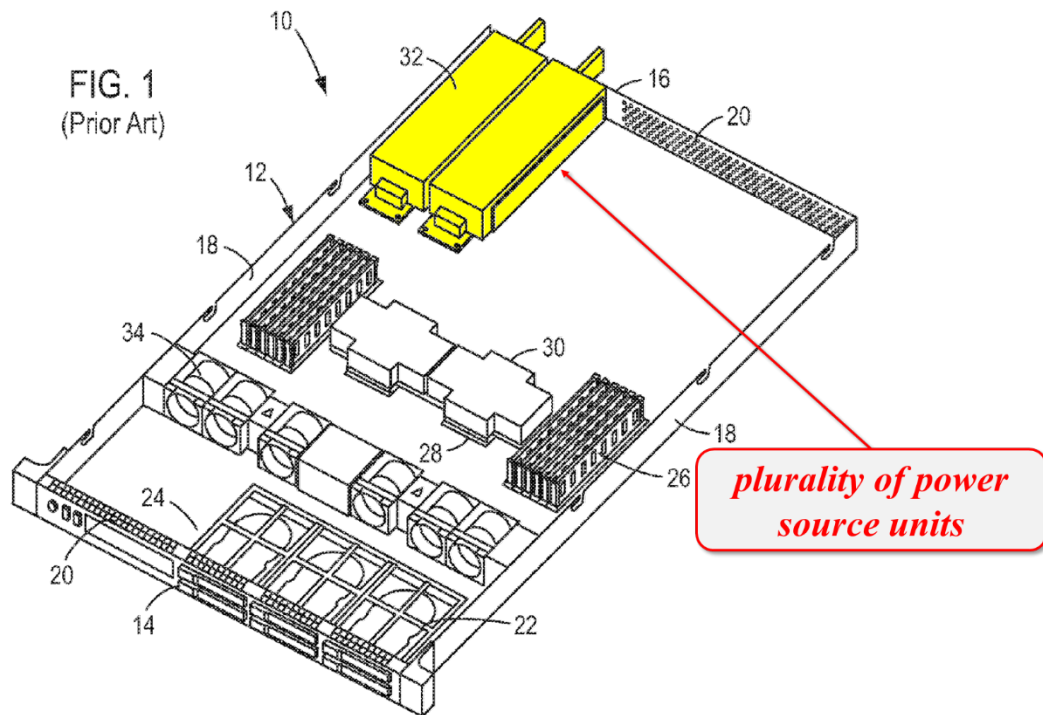
claim requires a memory structure immediately adjacent each side of a CPU in the width direction, it would be an obvious design variation for Carl's server to have one CPU instead of the two depicted in Figure 1, with memory modules 26 on each side, as a POSITA would have known. *Id.* Server computers commonly had one, two, or more CPUs depending on the application and particular design needs. *See, e.g., Id.*; EX1025, [0006]; EX1026, [0019], [0021], Fig. 1.⁹

f. [1e] a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing,

Carl discloses *a plurality of power source units*. EX1003, ¶¶162-167.

Carl's server includes two "power supplies 32" illustrated in Figure 1. EX1005, 1:40.

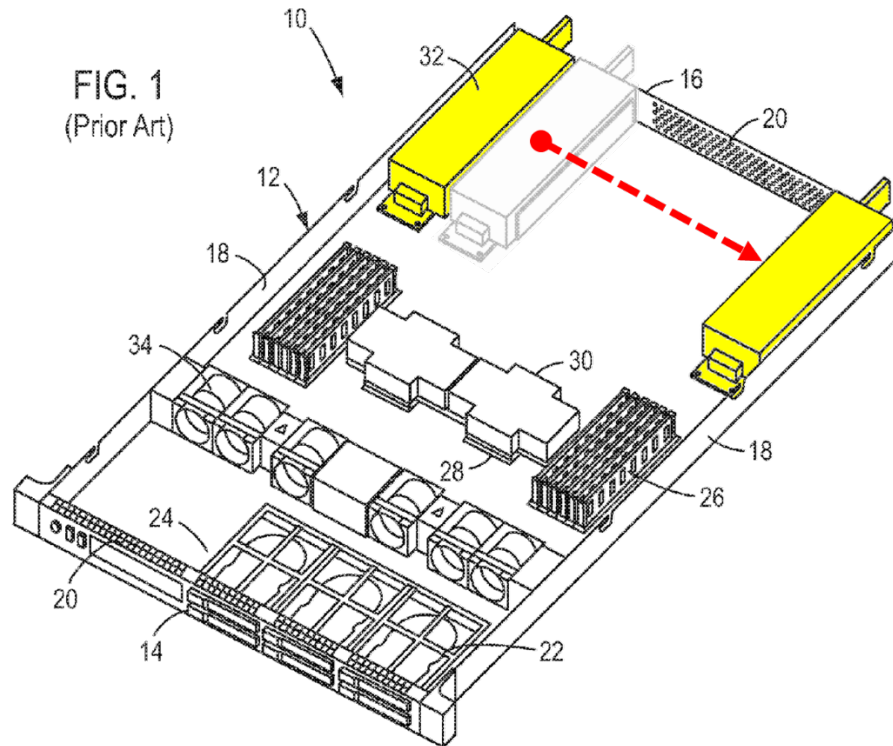
⁹ *See also* EX1006, 3 (1:22-23), Fig. 1.



Carl, Fig. 1 (annotated)

These constitute the claimed *plurality of power source units*.

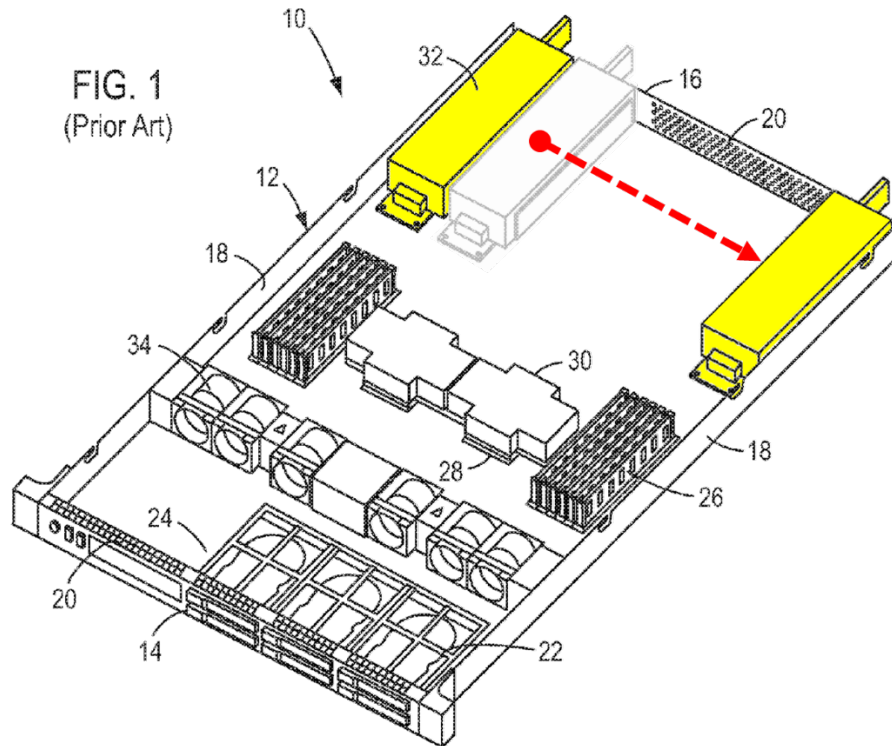
Carl and Hughes: Carl does not disclose *a plurality of power source units* located on opposite sides of the enclosure, but—as discussed above—a POSITA would have been motivated to modify Carl based on Hughes to position Carl’s side-by-side power supplies against each sidewall. EX1003, ¶165.



Carl, Fig. 1 (modified)

Thus, the Carl-Hughes combination discloses *a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing as claimed. Id.*

Carl and Suzuki: A POSITA would have been motivated to modify Carl in the same way based on Suzuki. Instead of locating Carl's two power supplies side-by-side against one sidewall, a POSITA would have been motivated to position them on opposite sides as illustrated. EX1003, ¶166.



Carl, Fig. 1 (modified)

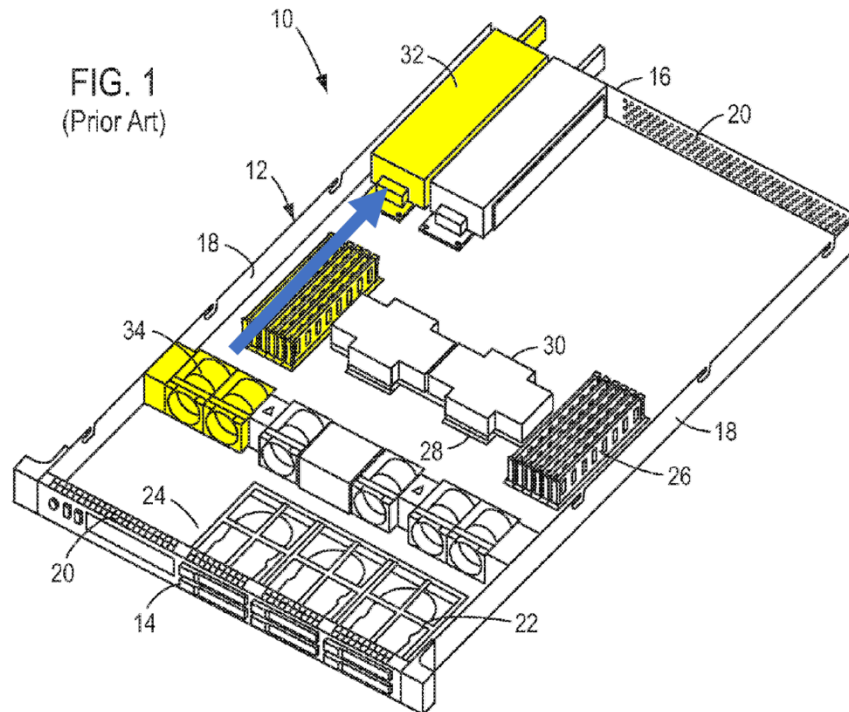
Thus, the Carl-Suzuki combination discloses *a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing as claimed. Id., ¶167.*¹⁰

- g. [1f] wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units, and**

Carl discloses this limitation. EX1003, ¶169. As illustrated in Figure 1, Carl's power supplies 32 are located between memory modules 26 and rear wall 16

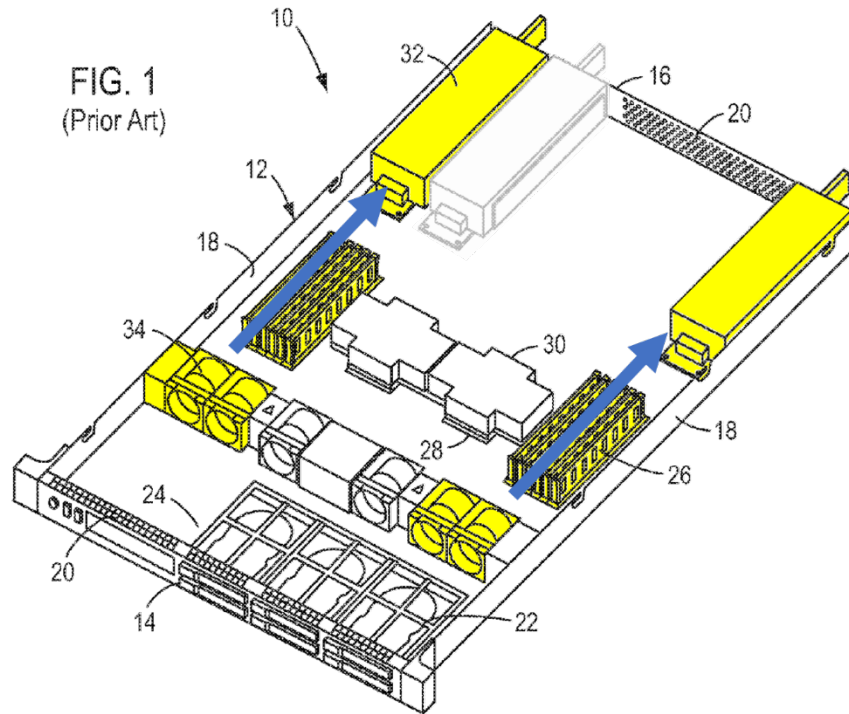
¹⁰ See also EX1006, 4 (2:1), Fig. 1.

such that they are *downstream...from the plurality of memory devices*. Further, power supplies 32 are located so that *the cooling air passing through one of the memory devices passes into one of the power source units* as indicated by the arrow below. *Id.*



Carl, Fig. 1 (annotated)

Additionally, Carl combined with Hughes or with Suzuki also discloses this limitation. EX1003, ¶170. In Carl's server as modified based on Hughes or Suzuki (as illustrated below), power supplies 32 are on opposite sides of enclosure 12 located against the two sidewalls 18.



Carl, Fig. 1 (modified)

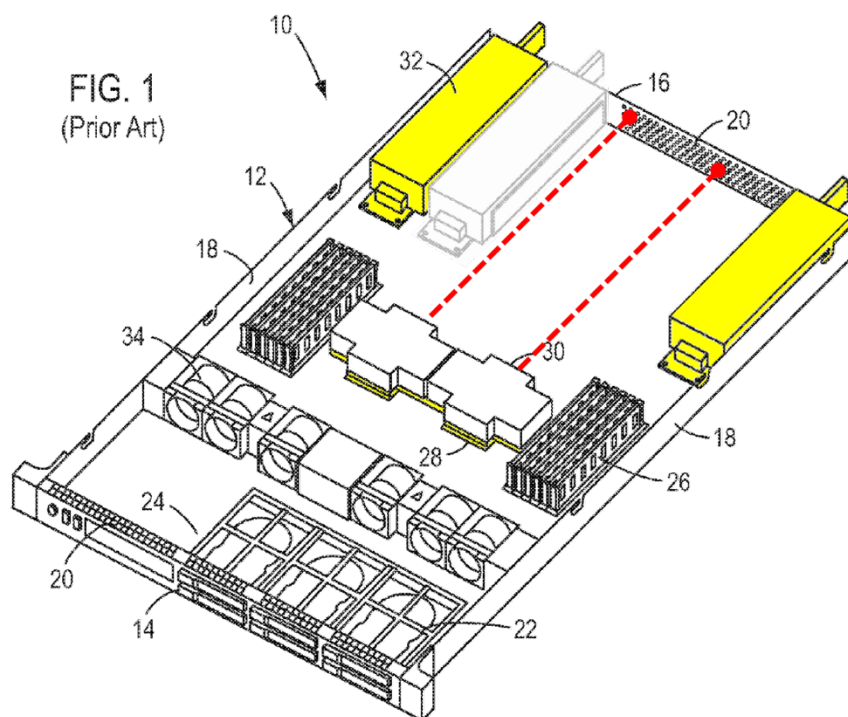
As the arrows above indicate, *the plurality of power source units (power supplies 32) are each positioned further downstream of the cooling air from the plurality of memory devices (memory modules 26) such that the cooling air passing through one of the memory devices passes into one of the power source units.* *Id.*, ¶171.

Thus, Carl alone or combined with Hughes or Suzuki discloses this limitation.¹¹

¹¹ See also EX1006, Fig. 1.

- h. [1g] wherein the plurality of power source units are each positioned not to be aligned linearly with the CPU in the longitudinal direction of the housing.**

Carl combined with Hughes or Suzuki discloses this limitation. EX1003, ¶173-174. In Carl's server, as modified based on Hughes or Suzuki, the power supplies 32 are positioned against opposite sidewalls 18 of enclosure 12. As illustrated below, neither power supply 32 is positioned directly between processors 28 and rear wall 16. *Id.*



Carl, Fig. 1 (modified)

Thus, *the plurality of power source units (power supplies 32) are each positioned not to be aligned linearly with the CPU (processors 28) in the longitudinal*

direction of the housing (enclosure 12).¹²

5. **Claim 2: The electronic device according to claim 1, wherein the plurality of power source units are each arranged to be pulled out from the rear face of the housing.**

Carl-Hughes or Carl-Suzuki discloses claim 1. See Section VII.A.4, above.

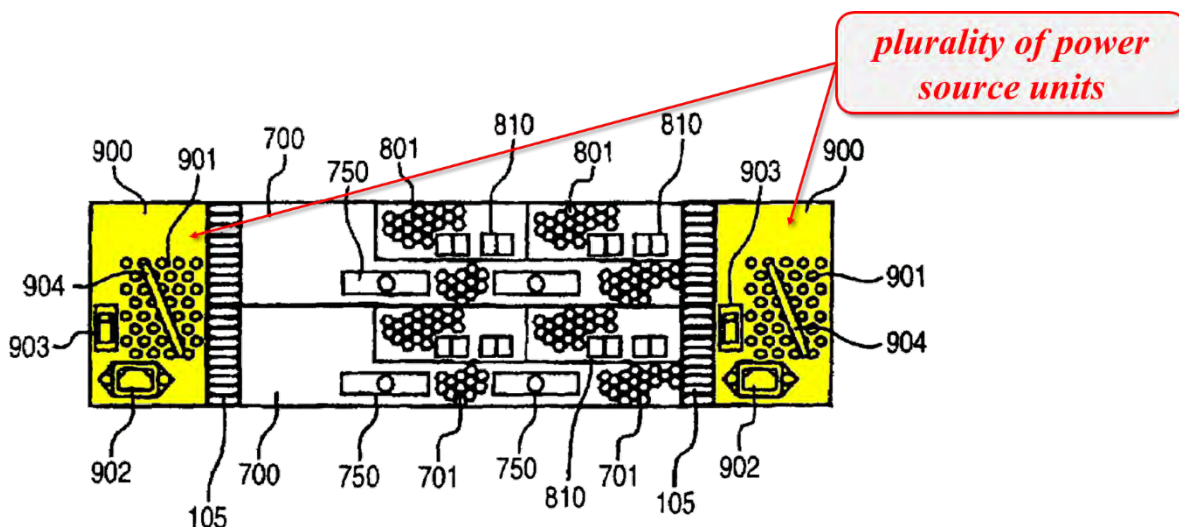
Further, as described for 1e, Carl discloses *a plurality of power source units* (power supplies 32) located against rear wall 16. See Section VII.A.4.f, above.

Carl’s Figure 1 illustrates power supply units 32 with a handle on the back, suggesting they *are each arranged to be pulled out from the rear face of the housing* as claimed. EX1003, ¶¶178-179.

Carl and Hughes: Hughes describes a “form factor that can conveniently be used with common enclosure layouts, where modules may be inserted into/removed from the enclosure through square/rectangular bays in the rear of the enclosure” (EX1007, [0017]), expressly stating that Hughes’ enclosure 1 includes “bays into which can be received...two power supply units 7...” (*id.*, [0028]). A POSITA would understand from Hughes’ disclosures that power supply units 7 are removable through the rear wall of the enclosure. EX1003, ¶180. A POSITA would have been motivated to implement Carl’s server such that the power source

¹² See also EX1006, Fig. 1.

detachably attached to the both sides of each of up/down-stacked control modules 700, respectively.” EX1008, 15:35-38. A handle 904 is “provided on the rear side of each power supply module 900.” *Id.*, 15:49-53. A POSITA would understand from Suzuki’s disclosures that power supply units 7 are removable through the rear wall of the enclosure. EX1003, ¶183.



Suzuki, Fig. 12 (annotated)

A POSITA would have been motivated to implement Carl’s server such that the power supplies are each *arranged to be pulled out from the rear face of the housing*, as taught by Suzuki. *Id.*, ¶184. A POSITA would have recognized the benefit of this design because it would allow easy replacement of defective or damaged power supplies. *Id.* Further, a POSITA could have implemented this design with a reasonable expectation of success because such removable power supplies were well known before 2012. *Id.* Thus, Carl alone or combined with

Suzuki discloses this additional limitation.¹³

- 6. Claim 3: The electronic device according to claim 1, wherein the plurality of power source units are each kept inside a power box, comprising a top board and a pair of side boards, and positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flow downwardly from the plurality of electronic parts.**

Carl-Hughes or Carl-Suzuki discloses claim 1. See Section VII.A.4, above.

Additionally, as described for 1e, Carl discloses a server with two power supplies (*a plurality of power source units*). See Section VII.A.4.f, above. As illustrated in Figure 1, Carl’s power supplies 32 have *a top board and a pair of side boards*.

EX1003, ¶189. A POSITA would understand that the power supply electronics are *kept inside* the box including *top board* and *pair of side boards*. *Id.*; EX1011, 3:13-15, 4:19-20 (describing “a power supply housing 10 [that] is a generally rectangular box that includes end walls 15, side walls 20” and “outer cover 120”), Figs. 7, 8A, 8B.

¹³ See also EX1006, Fig. 1.

EX1007, [0037]. Hughes also explains that air enters the housing through “an aperture” and exits through an “outlet vent 26.” EX1007, [0037]. A POSITA would recognize from this description of air flow into/out of the housing that it is a generally closed structure with at least *a top board and a pair of side boards*. EX1003, ¶192.

A POSITA would have been motivated to implement Hughes’ power supply housing in Carl’s server because it would protect the power supply unit while permitting cooling air to flow through. EX1003, ¶193. A POSITA could have implemented Hughes’ housing with a reasonable expectation of success. *Id.*, ¶193. Thus, the combination of Carl and Hughes discloses that *the plurality of power source units are each kept inside a power box, comprising a top board and a pair of side boards*.

In addition, Carl-Hughes or Carl-Suzuki discloses that *the plurality of power source units are...positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flown downwardly from the plurality of electronic parts* as explained for 1e and 1g. See Sections VII.A.4.f and VII.A.4.h, above; see also Section V.A, above (construction of *the plurality of electronic parts*).

Thus, the combination of Carl and Hughes or Carl and Suzuki also discloses claim 3.¹⁴

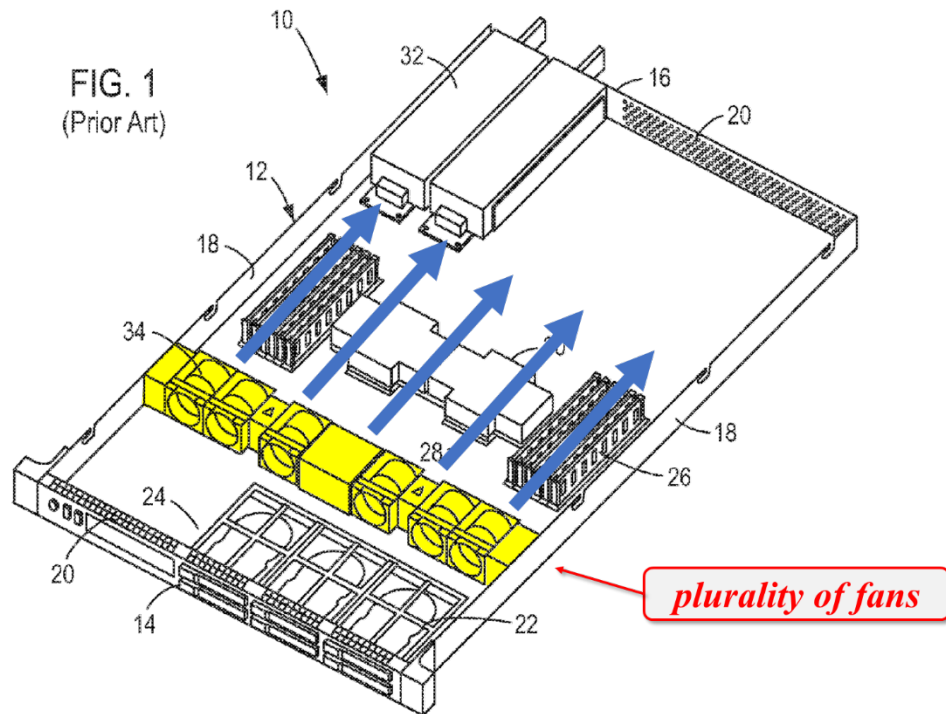
7. Claim 4

- a. A cooling structure of an electronic device comprising a plurality of fans causing cooling air to flow downstream, a central processing unit (CPU), a plurality of memory devices adjacent to the CPU, and a plurality of power source units, all of which are arranged along a flowing direction of the cooling air corresponding to a longitudinal direction in a housing,**

Carl's server includes fans 34, which constitute a *cooling structure of an electronic device* of claim 4. EX1003, ¶¶202-203.¹⁵ The *electronic device* (server computer 10) includes *a plurality of fans causing cooling air to flow downstream* as explained for 1b. See Section VII.A.4.c, above. The *electronic device* includes *a central processing unit (CPU)* as explained for 1c. See Section VII.A.4.d, above. The *electronic device* includes *a plurality of memory devices adjacent to the CPU* as explained for 1d. See Section VII.A.4.e, above. The *electronic device* includes *a plurality of power source units* as explained for 1e. See Section VII.A.4.f, above. As illustrated below and explained for 1a and 1b, all of these components are arranged in the *electronic device* (server computer 10) *along a flowing direction of*

¹⁴ See also EX1006, Fig. 1.

¹⁵ See also EX1006, 3-4 (1:16-2:8), Fig 1.

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Carl, Fig. 1 (annotated)

Thus, to the extent the preamble is limiting, Carl discloses it.

- b. wherein the CPU is arranged downstream of the plurality of fans and positioned to allow the cooling air to directly flow therethrough,**

This limitation is similar to 1c and disclosed for the same reasons. See Section VII.A.4.d, above.

- c. wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling

air passing through one of the memory devices passes into one of the power source units,

This limitation is identical to 1f and disclosed for the same reasons. See Section VII.A.4.e, above.

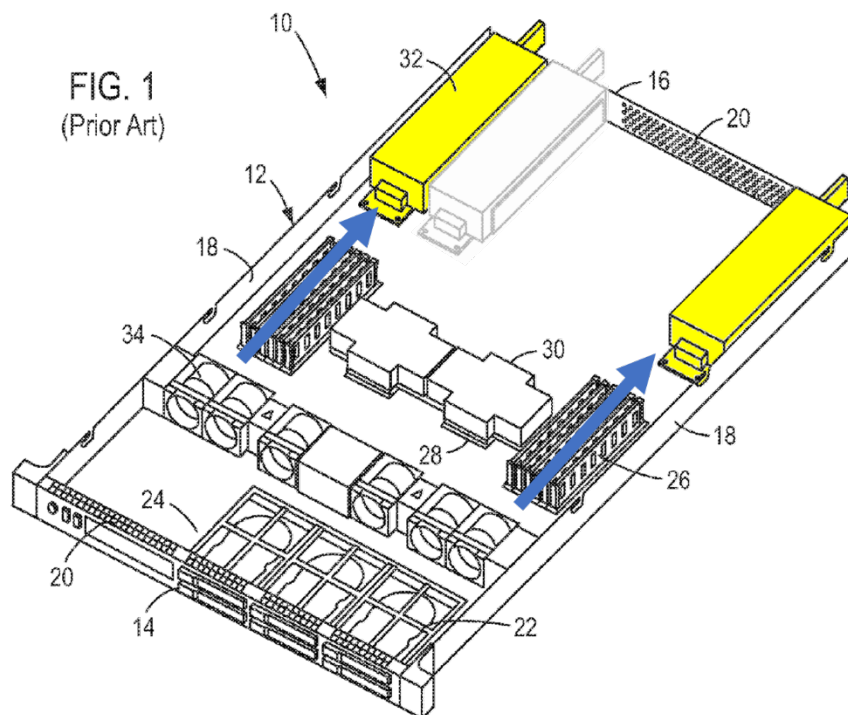
- d. wherein the plurality of power source units are positioned opposite to each other and spaced out from each other in a width direction of the housing such that the plurality of power source units are positioned not to be aligned linearly with the CPU in the longitudinal direction.**

Carl-Hughes or Carl-Suzuki discloses that *the plurality of power source units are positioned opposite to each other and spaced out from each other in a width direction of the housing* for the reasons explained for 1e. See Section VII.A.4.f, above. Carl-Hughes or Carl-Suzuki discloses that *the plurality of power source units are positioned not to be aligned linearly with the CPU in the longitudinal direction* for the reasons explained for 1g. See Section VII.A.4.h, above.

- 8. Claim 5: The electronic device according to claim 1, wherein the plurality of power source units are each positioned along an extension downstream from the plurality of memory devices.**

Carl-Hughes or Carl-Suzuki discloses claim 1. See Section VII.A.4, above. Either combination also discloses claim 5. EX1003, ¶208-212. As illustrated below and discussed for 1f, *the plurality of power source units* (power supplies 32)

are each positioned along an extension downstream from the plurality of memory devices (memory modules 26). See Section VII.A.4.g, above.



Carl, Fig. 1 (modified)

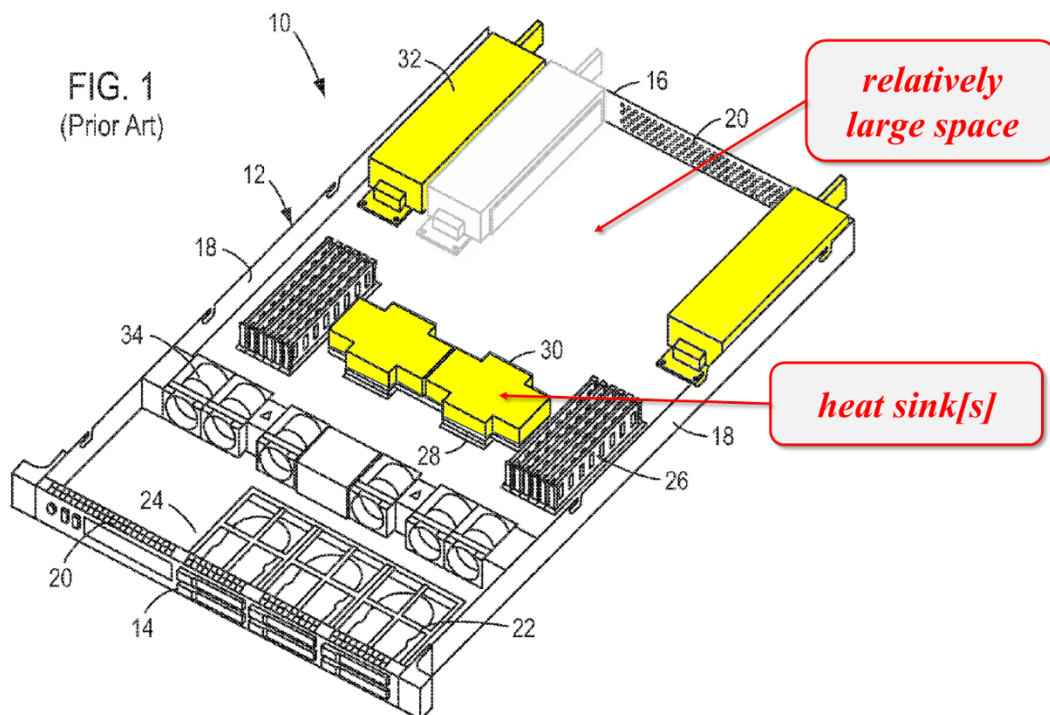
The power supplies are positioned against the sidewalls, *downstream* from memory modules 26 (as indicated by the arrows above) and oriented in a lengthwise direction (i.e., *along an extension*). EX1003, ¶212. Thus, Carl's power supplies, as modified based on Hughes or Suzuki, *are each positioned along an extension downstream from the plurality of memory devices*.¹⁶

¹⁶ See also EX1006, 3-4 (1:16-2:8), Fig 1.

9. **Claim 6: The electronic device according to claim 1, wherein the cooling air flows through a heat sink, attached onto the CPU, and further flows downstream via a relatively large space formed between the plurality of power source units.**

Carl-Hughes or Carl-Suzuki discloses claim 1. See Section VII.A.4, above.

Either combination also discloses claim 6. EX1003, ¶¶215-217. Carl states that processors 28 (each a *CPU*) are “positioned under a corresponding heat sink 30....” EX1005, 1:38-40. In Carl, fans 34 cause *cooling air* to flow *through a heat sink, attached onto the CPU* as claimed. EX1003, ¶215. Further, Carl’s enclosure modified based on either Hughes or Suzuki has *a relatively large space* between the two power sources 32, as illustrated below. *Id.*



Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses that *cooling air...further flows downstream via a relatively large space formed between the plurality of power source units.*¹⁷

10. Claim 7: The cooling structure of an electronic device according to claim 4, wherein the plurality of power source units are each positioned along an extension downstream from the plurality of memory devices.

Carl-Hughes or Carl-Suzuki discloses claim 4. *See* Section VII.A.7, above. The limitation of claim 7 is identical to claim 5 and disclosed for the same reasons. *See* Section VII.A.8, above.

11. Claim 8

a. The electronic device according to claim 1, wherein

Carl-Hughes or Carl-Suzuki discloses claim 1. *See* Section VII.A.4, above. Either combination also discloses claim 8.¹⁸

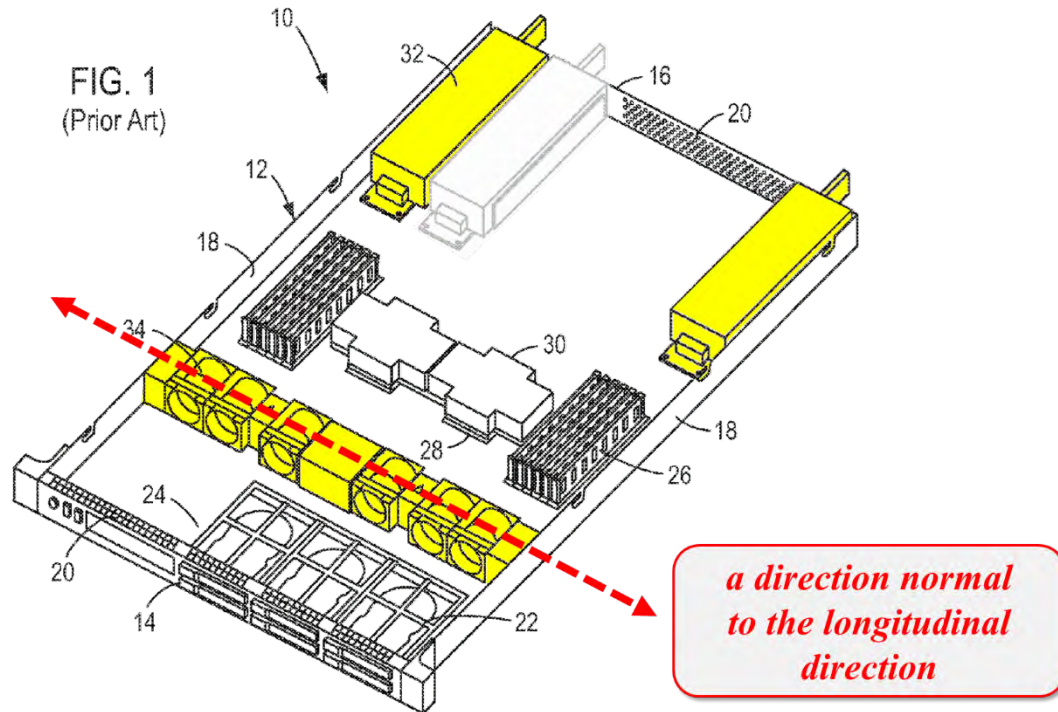
b. the plurality of fans are arranged in a direction normal to the longitudinal direction,

In Carl's server as modified based on Hughes or Suzuki, *the plurality of fans (fans 34) are arranged in a direction normal* (i.e., perpendicular) *to the longitudinal direction*, as illustrated below. EX1003, ¶224; EX1016, 3. This

¹⁷ *See also* EX1006, 3-4 (1:23-2:1), Fig. 1.

¹⁸ *See also* EX1006, 3-4 (1:16-2:8), Fig 1.

limitation defines the term *direction* (which is referred to as *the direction* in later limitations) as the direction indicated by the arrow below. EX1003, ¶224.

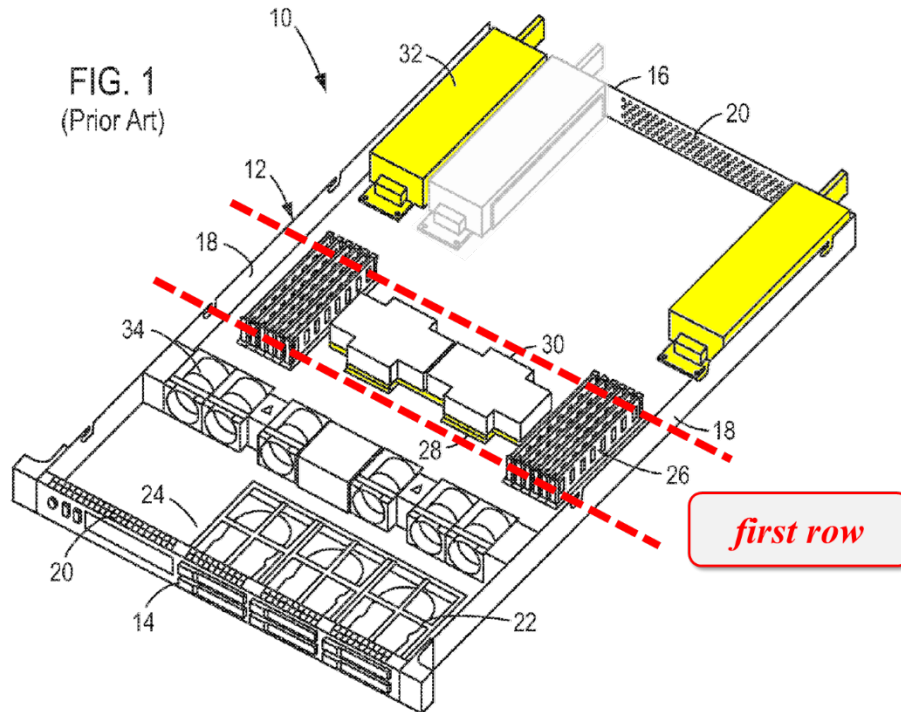


Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

c. the central processing unit is positioned in a first row,

In Carl's server as modified based on Hughes or Suzuki, *the central processing unit* (either of processors 28) *is positioned in a first row*, as illustrated below. EX1003, ¶226.

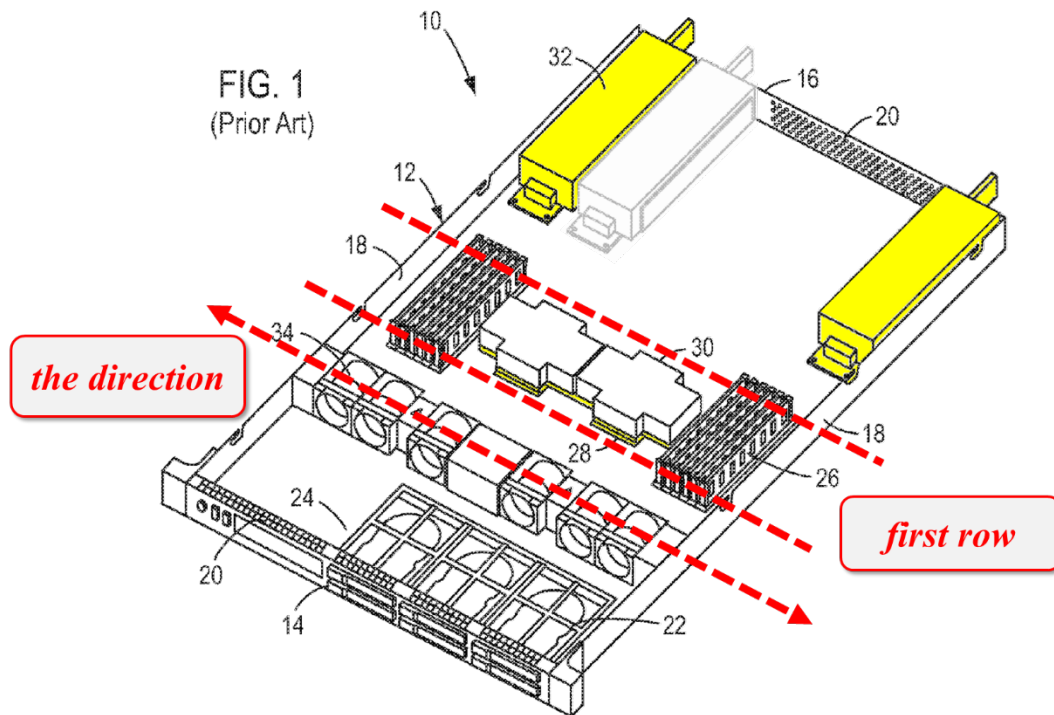


Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

d. the first row extending parallel to the direction,

In Carl's server as modified based on Hughes or Suzuki, *the first row* of processors 28 is *parallel to the direction* (i.e., the direction normal to the longitudinal direction), as illustrated below. EX1003, ¶¶228-229.

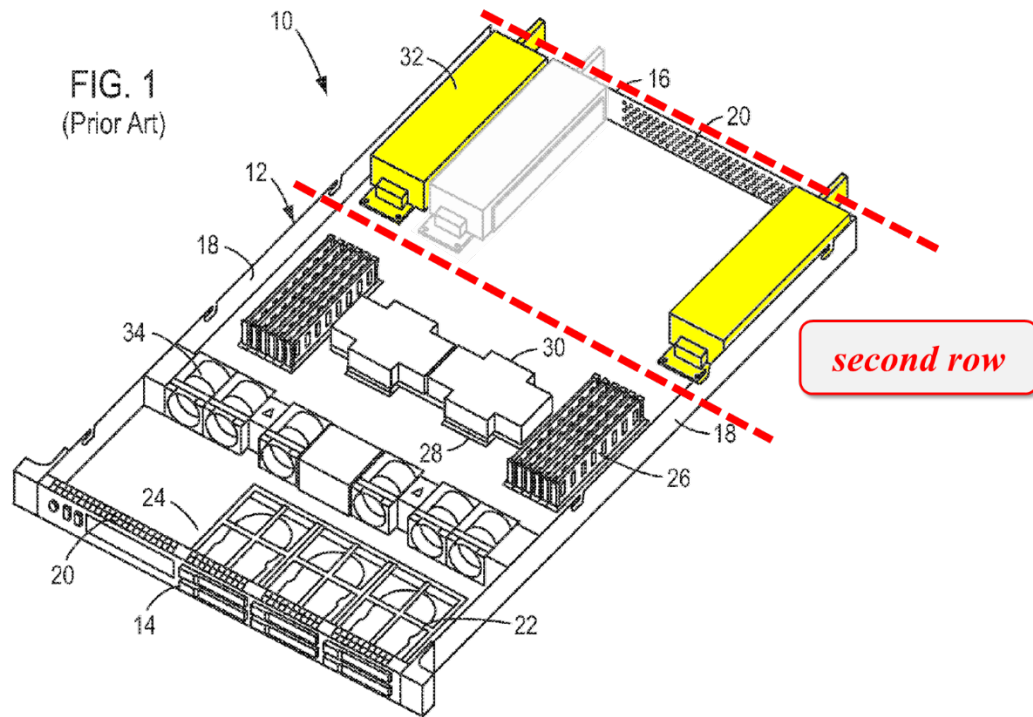


Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

- e. the plurality of power source units are each positioned in a second row,**

In Carl's server as modified based on Hughes or Suzuki, *the plurality of power source units* (power supplies 32) *are each positioned in a second row*, as illustrated below. EX1003, ¶¶231-232.



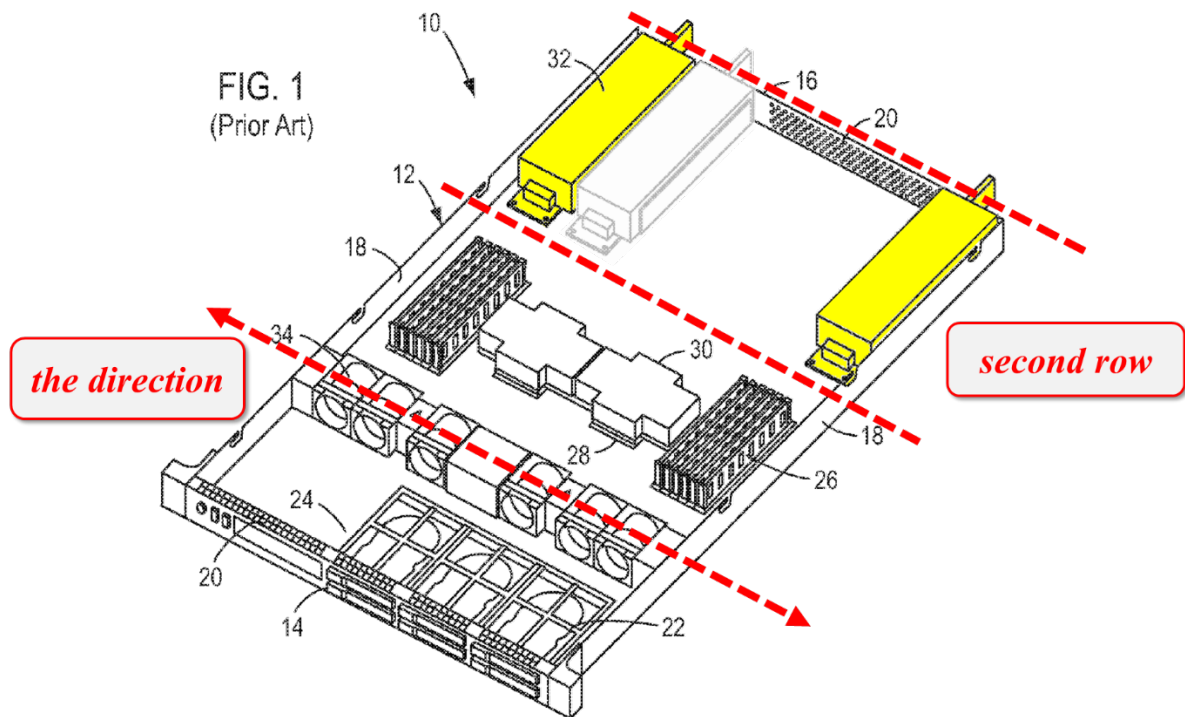
Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

f. the second row extending parallel to the direction,

In Carl's server as modified based on Hughes or Suzuki, *the second row* of power supplies 32 is *extending parallel to the direction*, as illustrated below.

EX1003, ¶¶234-235.

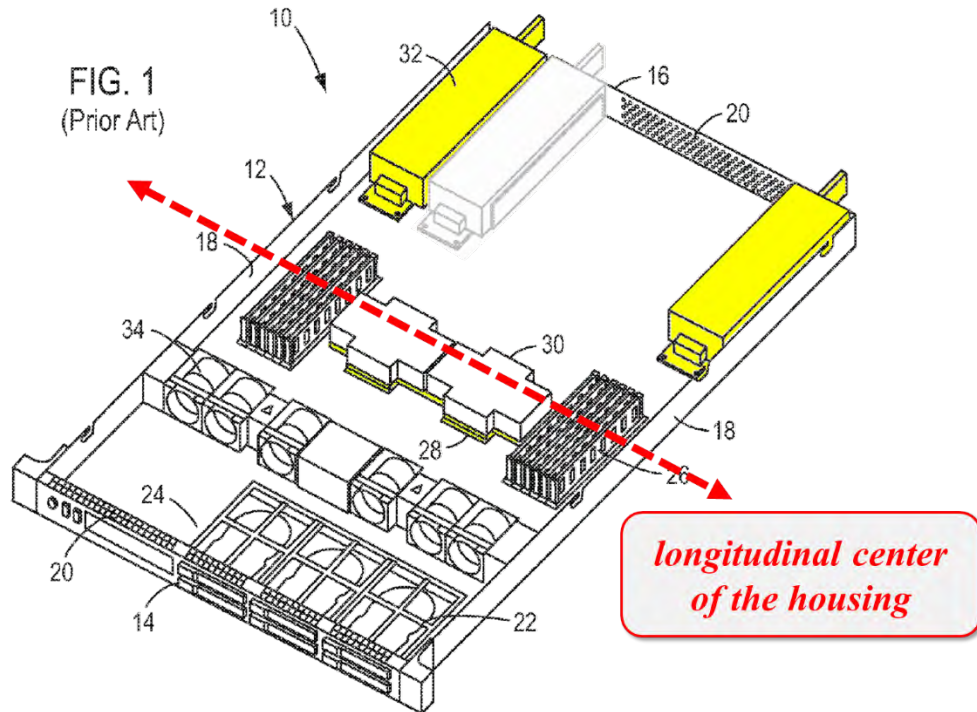


Carl, Fig. 1 (modified)

Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

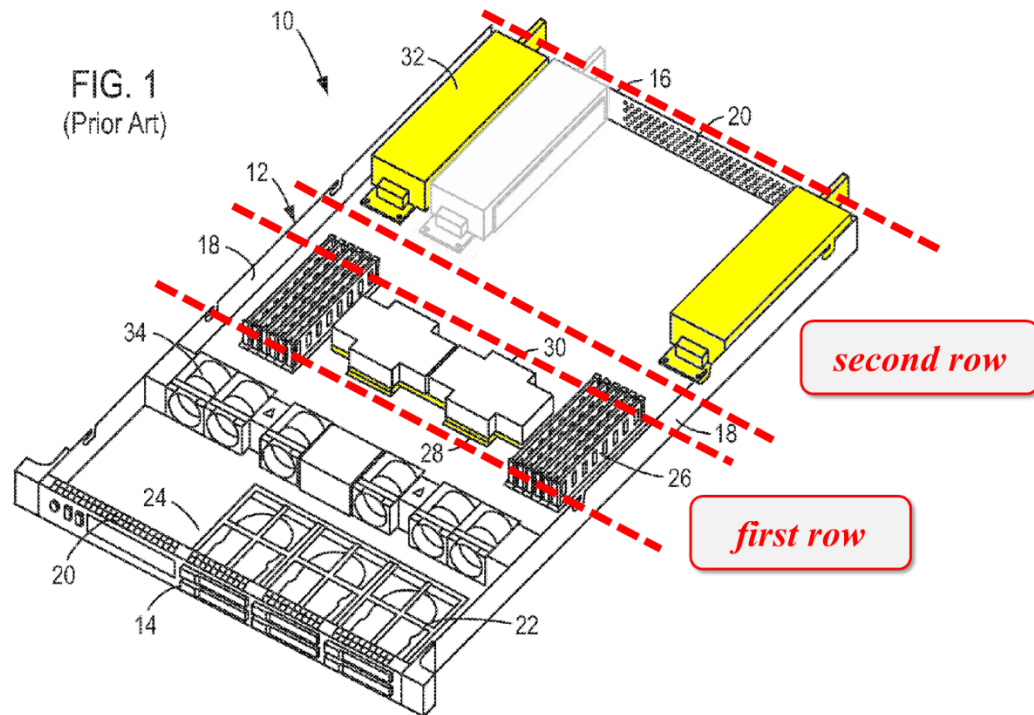
- g. the second row being positioned farther from a longitudinal center of the housing than the first row,**

This limitation refers to the *longitudinal center of the housing* (i.e., midway between front wall 14 and rear wall 16). EX1003, ¶237.



Carl, Fig. 1 (modified)

In Carl's server as modified based on Hughes or Suzuki, *the second row of power supplies is positioned farther from a longitudinal center of the housing than the first row*, as illustrated below. EX1003, ¶238.



Carl, Fig. 1 (modified)

Indeed, the *first row* includes the *longitudinal center*. *Id.* Thus, Carl-Hughes or Carl-Suzuki discloses this limitation.

- h. and the second row being positioned farther from the plurality of fans than the first row.**

In Carl's server as modified based on Hughes or Suzuki, *the second row* of power supplies is *positioned farther from the plurality of fans* (fans 34) *than the first row*, as illustrated below. EX1003, ¶240. In other words, the *first row* is closer to the fans than the *second row* is. *Id.*

section 12...and outwardly removed through the front side opening 26....” *Id.*, 3:23-28.

Wiscombe is analogous to the ’265 Patent because it is in the same field of endeavor (i.e., electronic devices such as computers). EX1009, Abstract, 1:6-8; EX1001, Abstract, 1:6-10; *Sanofi-Aventis*, 66 F.4th at 1377.

2. Motivation to Combine

Carl discloses a server computer that “includes a number of electrical components” including two “power supplies 32.” EX1005, 1:30-40. Wiscombe describes a “specially designed carrier structures on which...power supply boxes are mounted” permitting “drawer-like movement” into and out of a computer enclosure. EX1009, 1:63-67, 2:15-31. As discussed above, Carl’s power supplies are illustrated with external handles indicating that they can be removed through the rear wall of the enclosure. *See* Section VII.A.5, above. To the extent Patent Owner disputes this, Wiscombe expressly discloses removeable power supplies. And a POSITA would have been motivated to implement Carl’s server computer (whether or not modified based on Hughes or Suzuki) with such removeable power supplies to permit easy insertion and removal of Carl’s power supplies through the rear wall of Carl’s server in “drawer-like movement.” EX1003, ¶245; EX1009, 1:63-67, 2:15-31. Further, Wiscombe is intended for use with “conventional, off-the-shelf” power supplies (EX1009, Abstract, 1:59-67), reducing cost and

providing a further motivation for modifying based on Wiscombe. EX1003, ¶¶246.

Wiscombe describes “a representative computer chassis structure” with “three removeable, slide-in power supply assemblies” stacked vertically. EX1009, 2:57-60, Fig. 1. The description of this “representative” structure is “by way of illustration and example only” (*id.*, 6:17-20), and Wiscombe’s patent claims are not limited to any number of power supply assemblies (*id.*, 6:22-47). A POSITA would recognize that Wiscombe can be implemented with a different number of power supplies, including a single power supply, and in different configurations, including as arranged in Carl’s server computer (whether or not modified based on Hughes or Suzuki). EX1003, ¶¶247-248. A POSITA would recognize that even in a different configuration or for a different number of power supplies, Wiscombe provides ease-of-use benefits as well as potential thermal-management advantages and reduced electromagnetic interference. *Id.*

Making minor modifications to Carl’s server computer to implement Wiscombe would have been well within a POSITA’s skill with a reasonable expectation of success. EX1003, ¶249. Wiscombe details the required modifications, which are intended for use with conventional power supplies. *Id.* Modifying Carl based on Wiscombe would have involved no more than use of prior art elements according to known methods yielding predictable results. *Id.*

3. Claim 2

Carl-Hughes or Carl-Suzuki discloses claim 1. *See* Section VII.A.4, above. Wiscombe discloses a “specially designed carrier structure” permitting conventional power supply boxes to be inserted or removed through the rear wall of a computer in a “drawer-like movement.” EX1009, 1:59-67, 2:15-31; *see also id.*, 5:11-21, 5:32-36, Fig. 1; EX1003, ¶¶250-253. Thus, either Carl-Hughes or Carl-Suzuki further combined with Wiscombe discloses claim 2.

4. Claim 3

Carl-Hughes or Carl-Suzuki discloses claim 1. *See* Section VII.A.4, above. Wiscombe discloses a “housing section 12” (*a power box*) having a “top end wall 16” (*a top board*) and “opposite left and right side walls 20 and 22” (*a pair of side boards*) into which “each of the power supply assemblies 14 may be inserted....” EX1009, 3:19-25, Fig. 1; EX1003, ¶260. In addition, Carl-Hughes or Carl-Suzuki discloses that *the plurality of power source units are...positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flown downwardly from the plurality of electronic parts* as explained for 1e and 1g. *See* Sections VII.A.4.f and VII.A.4.h, above; *see also* Section V.A, above. Thus, either Carl-Hughes or Carl-Suzuki further combined with Wiscombe discloses claim 3.

A. Ground 5: Okamoto Renders Claims 1, 4, 5, 7, and 8 Obvious

Okamoto discloses “a storage controller.” EX1010, 1:14. As Okamoto explains, “[a] storage controller can provide large capacity storage services to a host computer....” *Id.*, 1:16-17. “[A] rack-mounted disk array apparatus is also known as a storage controller.” *Id.*, 1:24-25.

FIG. 2

Okamoto, Fig. 2

Each of Okamoto’s embodiments includes “an enclosure 2, a plurality of storage devices 20,...at least one control board 10,...at least one power device 50,...at least one or more cooling fans 71, 72, 73, which are disposed inside the enclosure 2, and which are for taking in air from outside the enclosure 2 and generating a cooling airflow inside the enclosure 2, and at least one device connector 40....” *Id.*, 4:13-31.

2. Claim 1

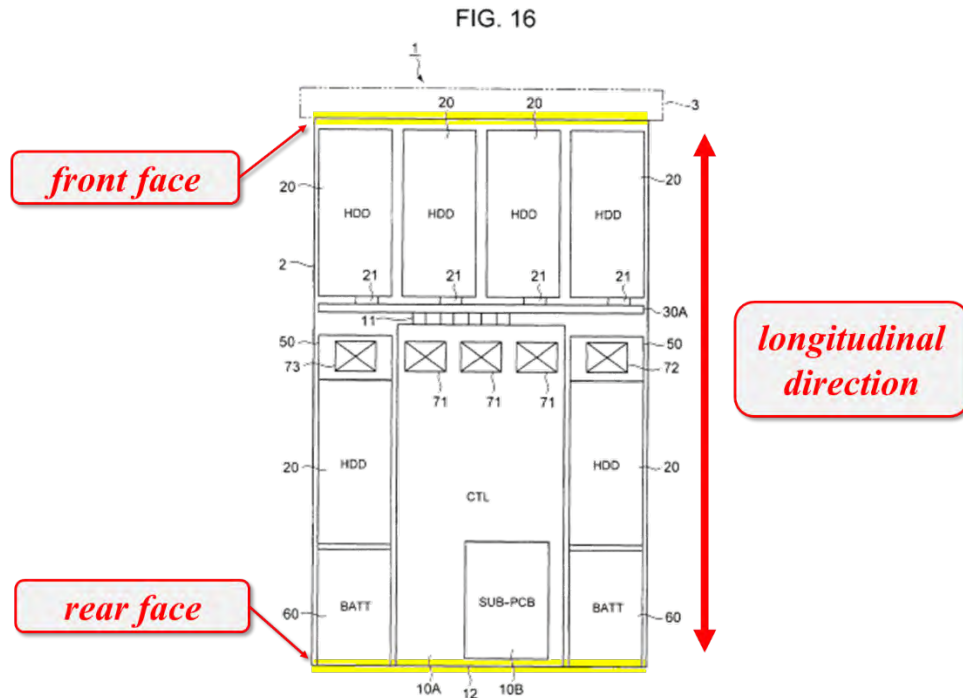
a. [1pre] An electronic device comprising:

To the extent the preamble is limiting, Okamoto discloses it. EX1003, ¶¶265-266. Okamoto discloses multiple embodiments of “a storage controller,” which constitutes an *electronic device*. EX1010, 4:12-31. In particular, Okamoto’s storage controller illustrated in Figure 16 discloses an *electronic device* as claimed.

b. [1a] a housing comprising a front face and a rear face which are distanced from each other in a longitudinal direction;

Okamoto discloses this limitation. EX1003, ¶¶267-270. Okamoto’s server controller 1 includes enclosure 2, which is a *housing*. EX1010, 4:13-15; EX1003, ¶268. Okamoto states that “a front bezel 3...is provided so as to cover the front side of the enclosure 2” and that “a plurality of disk drives 20” are “arranged in a matrix in the front side of the enclosure 2.” EX1010, 4:38-41; *see also id.*, 7:3-31,

Figs. 3 and 4. Thus, Okamoto's enclosure 2 is a *housing comprising a front face and a rear face*, as illustrated below.



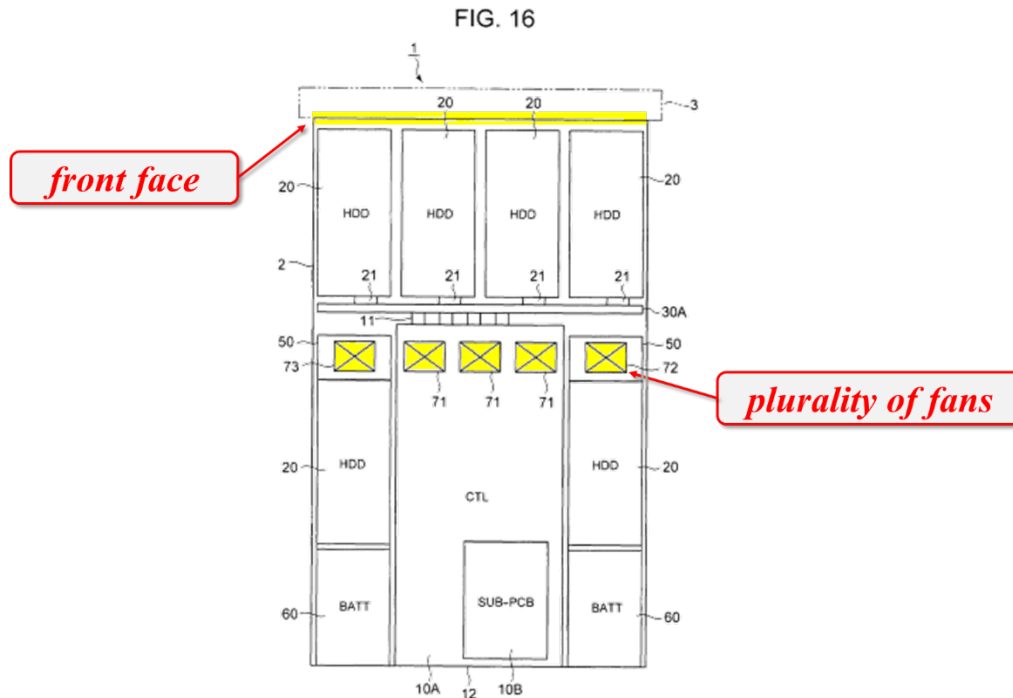
Okamoto, Fig. 16 (annotated)

Further, the *front face* and *rear face* of enclosure 2 are distanced from each other in a *longitudinal direction*, as illustrated. EX1003, ¶269; see also Section VII.A.4.b, above (describing *longitudinal direction*).

- c. **[1b] a plurality of fans which are arranged inside the housing close to the front face so as to cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing;**

Okamoto discloses this limitation. EX1003, ¶¶271-278. Okamoto's storage controller 1 includes "at least one or more cooling fans 71, 72, 73, which are disposed inside the enclosure 2, and which are for taking in air from outside the

enclosure 2 and generating a cooling airflow inside the enclosure 2....” EX1010, 4:13-25. Okamoto’s cooling fans constitute *a plurality of fans*.

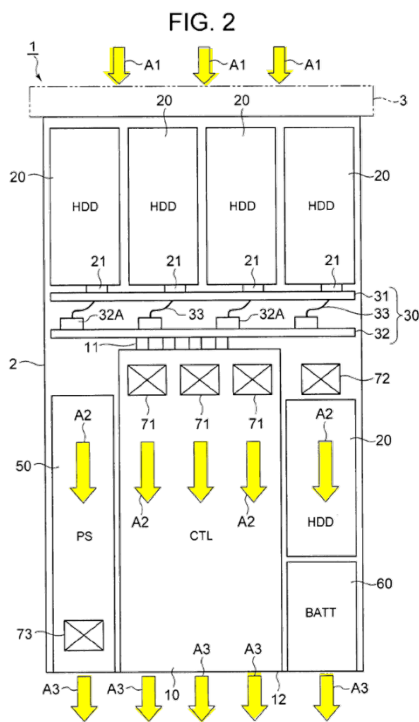


Okamoto, Fig. 16 (annotated)

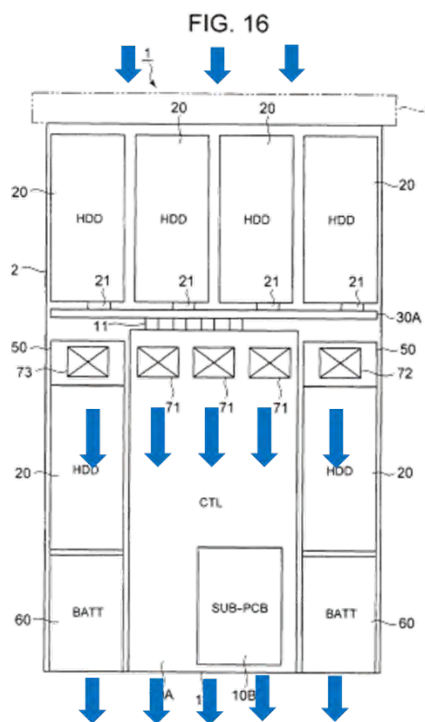
Further, the fans are *arranged inside the housing close to the front face*. EX1003, ¶274. As illustrated, the fans are located in the front part of the enclosure immediately behind backboard 34 and the HDDs 20 against the front face. *Id.* As POSITA would know, in practice the HDDs are smaller than depicted in comparison to the control boards and components in the back part of the enclosure between the fans and rear wall. *Id.*

In addition, Okamoto’s cooling fans *cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing*.

EX1003, ¶¶275-278. In Okamoto’s storage controller, “[a] large number of openings are disposed in the front bezel 3,” which allows “air outside of the enclosure 2 to flow into the inside of the enclosure 2.” EX1010, 4:47-49. “When the respective cooling fans 71, 72, 73 operate, air A1 on the outside of the enclosure 2 is drawn into the inside of the enclosure 2 by way of gaps between the respective disk drives 20.” *Id.*, 6:54-58, Fig. 2. Okamoto’s air A1 “becomes cooling air A2, and flows toward the rear of the enclosure 2 while cooling the respective parts inside the enclosure 2.” *Id.*, 6:62-64.



Okamoto, Fig. 2 (highlighted)



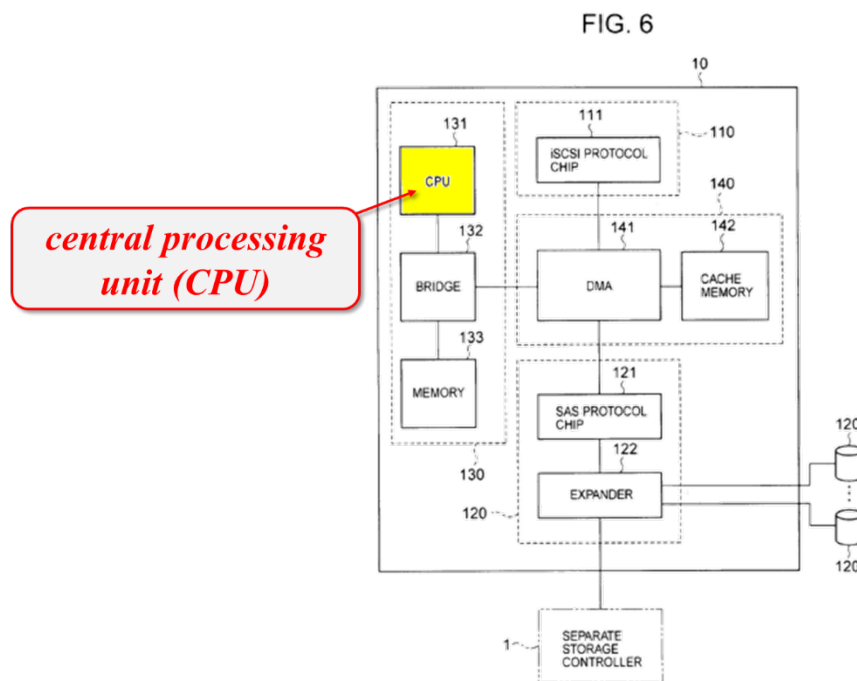
Okamoto, Fig. 16 (annotated)

Okamoto describes the cooling air flow in reference to Figure 2 (above with arrows highlighted in yellow), but a POSITA would understand that the same description

of the cooling air flow would apply to the embodiment illustrated in Figure 16 (above with blue arrows added). EX1003, ¶277.

- d. **[1c] a central processing unit (CPU) which is arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough;**

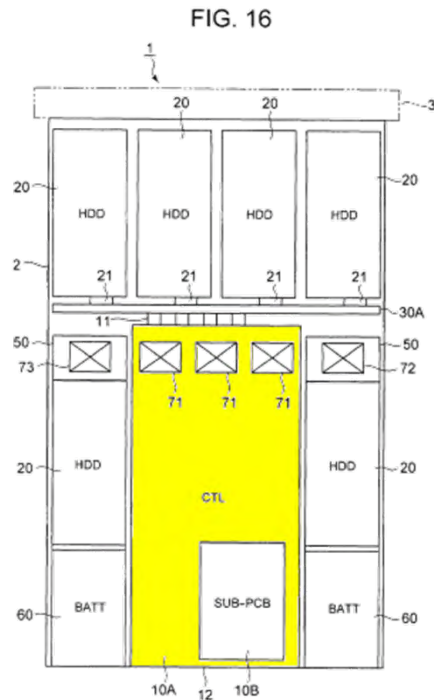
Okamoto discloses this limitation. EX1003, ¶¶279-285. Each embodiment of Okamoto's storage controller includes "at least one control board 10...which is for controlling the operation of the respective storage devices 20...." EX1010, 4:13-19. Figure 6 illustrates "the constitution of the control board 10." *Id.*, 8:35-36. The "processor unit 130" includes "a microprocessor 131, a bridge 132, and a memory 133." *Id.*, 7:52-54. "The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133." *Id.*, 8:56-59. Okamoto's microprocessor 131 is *a central processing unit (CPU)*. EX1003, ¶280.



Okamoto, Fig. 6 (annotated)

Indeed, the figure identifies microprocessor 131 as a “CPU.”

Further, Okamoto’s *CPU* (microprocessor 131) is *arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough*. EX1003, ¶281. Okamoto explains that, in the storage controller illustrated in Figure 16, the “control board is constituted from a main board 10A, which is located on the bottom side of the enclosure 2, and a sub-board 10B, which is mounted on top of the main board 10A.” EX1010, 14:55-58; *see also id.*, 14:44-48, Fig. 17. Control circuit 130, which includes microprocessor 131 (*CPU*), is “disposed on the main board 10A,” which is highlighted in the figure below. *Id.*, 15:17-21.



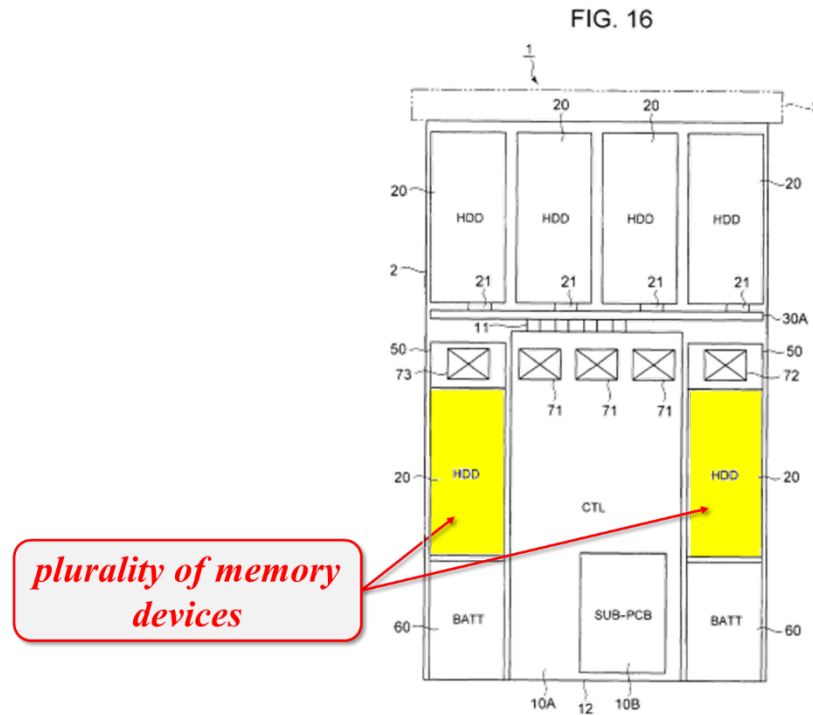
Okamoto, Fig. 16 (highlighted)

A POSITA would know that microprocessor 131 is located on main board 10A behind fans 71 to provide cooling air. EX1003, ¶282. Thus, Okamoto’s CPU (microprocessor 131) is *arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough*. *Id.*, ¶¶282-285; *see also* EX1010, 6:19-20, 6:54-7:2, 15:28-29; Section VII.A.4.d, above (addressing meaning of *therethrough*).

- e. [1d] a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing; and**

Okamoto discloses this limitation. EX1003, ¶¶286-297. All embodiments of Okamoto’s storage controllers include “a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data....” EX1010,

4:13-16. In the embodiment illustrated in Figure 16, two such storage devices 20 are located on either side of the enclosure. EX1003, ¶287; EX1010, 14:34-38 (“disk drives 20...are arranged in bilateral symmetry on the right and left sides”).¹⁹



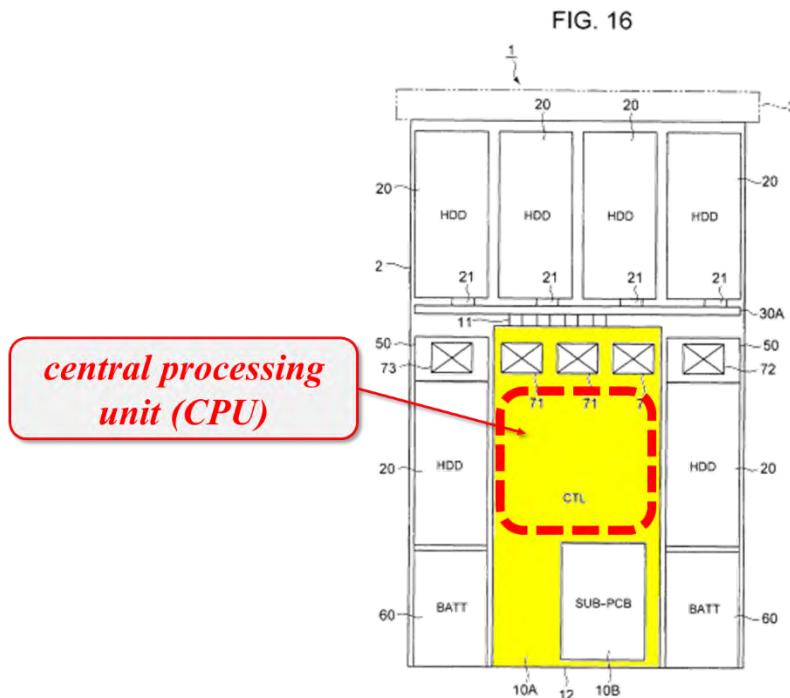
Okamoto, Fig. 16 (annotated)

A POSITA would recognize these two storage devices 20 constitute a *plurality of memory devices*. EX1003, ¶288. Indeed, while the figure above indicates two

¹⁹ A POSITA would understand that Okamoto’s description regarding disk drives 20, power devices 50, and batteries 60 for the embodiment of Figures 13 and 14 (EX1010, 14:18-40) also applies to the Figure 16 embodiment. EX1003, ¶287.

hard disk drives, Okamoto states that the “invention is not limited to hard disk drives, and, for example, various rewritable and nonvolatile storage devices, such as a flash memory or other such semiconductor memory device...can also be utilized.” EX1010, 4:65-5:4. Thus, storage devices 20 are *memory devices*.

Further, a POSITA would understand that Okamoto’s *plurality of memory devices* are located *adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing*. EX1003, ¶289. As discussed for 1c, Okamoto’s microprocessor 131 (*CPU*) is on main control board 10A in Figure 16. EX1010, 15:17-21. A POSITA would understand that the *CPU* is located on the portion of main board 10A between fans 71 and sub-board 10B, as shown below. EX1003, ¶289.



Okamoto, Fig. 16 (annotated)

A POSITA would understand that the *CPU* is located in the area indicated above for several reasons. EX1003, ¶¶290-296. There is more room in the indicated area of main board 10A for microprocessor 131 (*CPU*). Also, Okamoto illustrates microprocessor 131 in the front portion of the control board in other figures. For example, Figure 6 is “a block diagram showing the constitution of the control board 10” and illustrates the “CPU” toward the front of the control board opposite the “communication port” located “in the posterior part of the control board 10” for communicating with a separate storage controller. EX1010, 9:5-12, Fig. 6. Similarly, Figure 20A illustrates a “schematic plan view of control boards 10 focusing on the location of the microprocessors 131” (each a *CPU*),

which are located toward the front of the control board in the figure. EX1010, 16:49-50, Fig. 20A. Further, a POSITA would also find it obvious to try locating microprocessor 131 in the area indicated above because it is one of a finite number of options for positioning it on main board 10A. EX1003, ¶296.

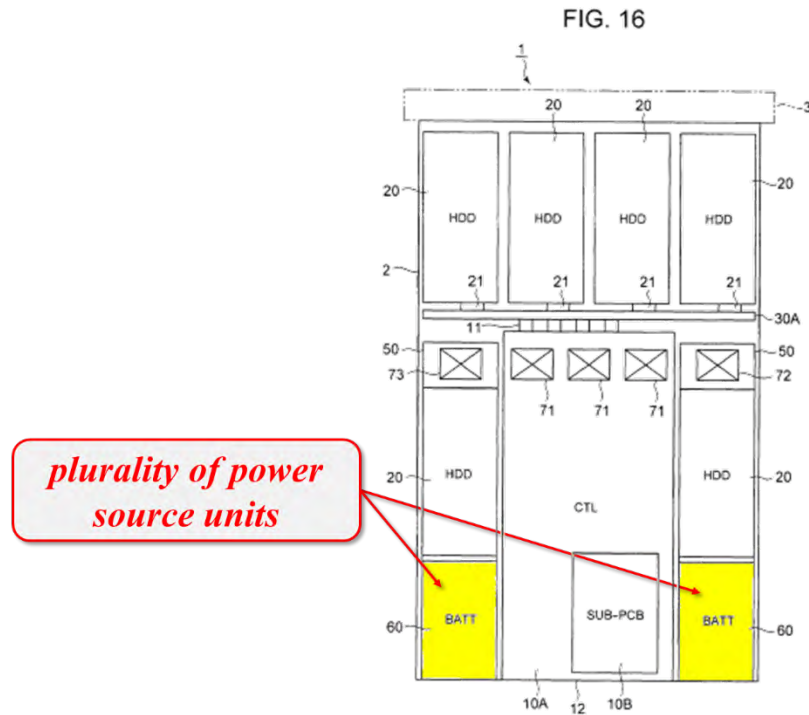
In addition, as illustrated in Figure 16 above, the two storage devices 20 are located *adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing*. EX1003, ¶297. The *width direction* is from side-to-side in Okamoto's storage controller and *normal* (i.e., perpendicular) *to the longitudinal direction*. *Id.*; EX1016, 3. Thus, Okamoto's *plurality of memory devices* are located *adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing*.

f. [1e] a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing,

Okamoto discloses this limitation. EX1003, ¶298-304. A number of Okamoto's storage controller embodiments include one or more batteries 60. EX1010, Figs. 2, 11, 12, 13, 14, 16, 21, 24. Okamoto's batteries 60 are *power source units*. EX1003, ¶¶299-301. Indeed, Okamoto expressly states that “[a] battery 60 supplies power at a prescribed voltage for a short period of time to the respective disk drives 20 and respective control boards 10 when the power output from the power device 50 is interrupted.” EX1010, 6:11-15. In the embodiment

illustrated in Figure 16 (as well as the embodiment in Figure 13), “batteries 60 are arranged in bilateral symmetry on the right and left sides” of the control board.

EX1010, 14:34-38.

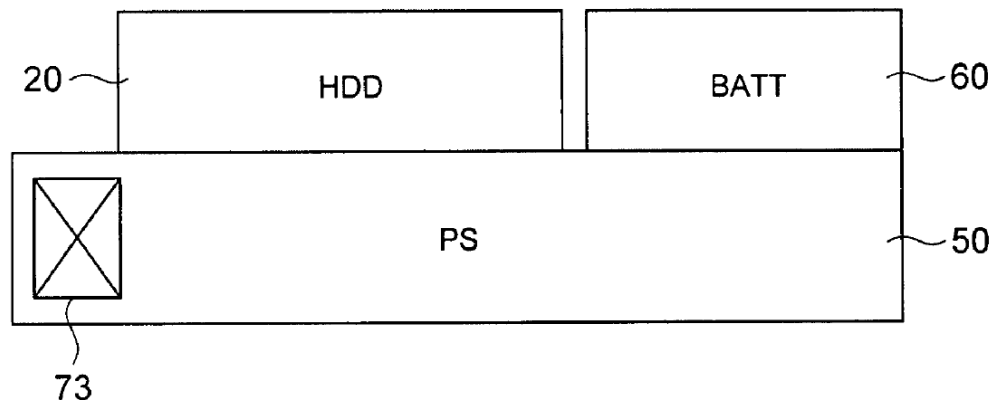


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation because batteries 60 are *a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing.*

In addition, Okamoto also discloses this limitation in a second, independent way. Okamoto’s storage controller embodiment in Figure 16 (as well as the embodiment in Figure 13), includes two “power devices 50” that “are disposed one each on both sides of the respective control boards” on the right and left side.

EX1010, 14:24-26, Fig. 13, Fig. 16. Each power device 50 is positioned below the battery 60 as illustrated in Figure 14. *Id.*, 14:26-29 (“The disk drives 20 are disposed on the front side (the backboard 30A side) and the batteries 60 are disposed rearward on the power devices 50....”), 14:30-32.



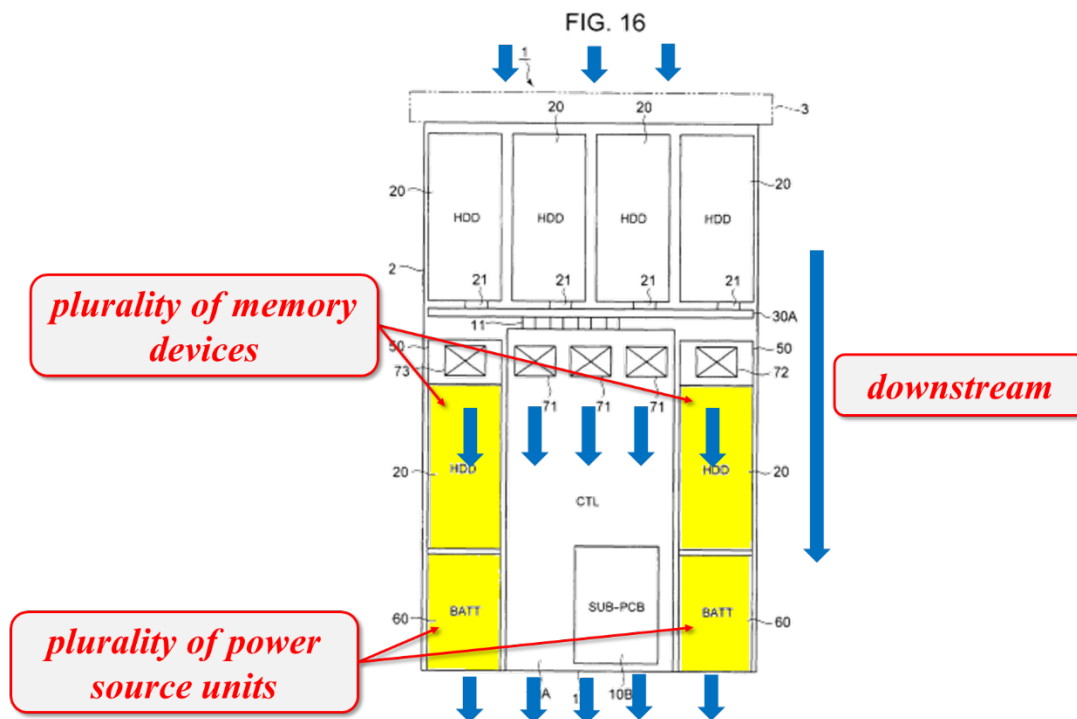
Okamoto, Fig. 14

As a POSITA would recognize, power devices 50 in the Figure 16 embodiment also constitute *a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing*. EX1003, ¶¶302-303.

- g. **[1f] wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units, and**

Okamoto discloses this limitation. EX1003, ¶¶305-315. As discussed for limitations 1d and 1e, Okamoto’s storage controller illustrated in Figure 16 includes a *plurality of power source units* (batteries 60), which are *positioned*

downstream of the cooling air from the plurality of memory devices (storage devices 20). See Sections VIII.A.2.e-VIII.A.2.f, above.



Okamoto, Fig. 16 (annotated)

The batteries 60 are *downstream* from the storage devices 20 because cooling air flows from front to back in Okamoto's storage controller, as discussed for 1b. See Section VIII.A.2.c, above. Thus, *the plurality of power source units* (batteries 60) are each positioned further downstream of the cooling air from the plurality of memory devices (storage devices 20) such that the cooling air passing through one of the memory devices passes into one of the power source units, as claimed.

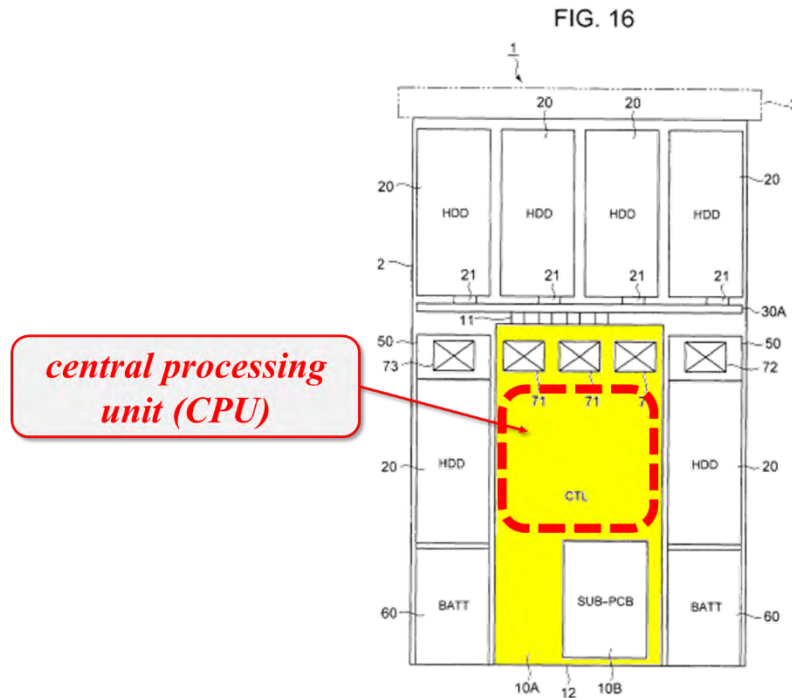
EX1003, ¶¶306-311; EX1010, 6:54-7:2.

In addition, Okamoto discloses this limitation in a second way because the Figure 16 embodiment also has power devices 50 (a *plurality of power source units*) located beneath batteries 60 and at least partially *positioned further downstream of the cooling air from the plurality of memory devices* (storage devices 20) *such that the cooling air passing through one of the memory devices passes into one of the power source units*, as claimed. EX1003, ¶¶312-314; EX1010, 6:54-7:2.

Thus, in two separate and independent ways, Okamoto discloses this limitation.

h. [1g] wherein the plurality of power source units are each positioned not to be aligned linearly with the CPU in the longitudinal direction of the housing.

Okamoto discloses this limitation. EX1003, ¶¶316-320. As discussed for 1c, a POSITA would know that Okamoto's storage controller illustrated in Figure 16 includes a microprocessor 131 (*CPU*) located on the front side of main board 10A. See Section VIII.A.2.d, above.



Okamoto, Fig. 16 (annotated)

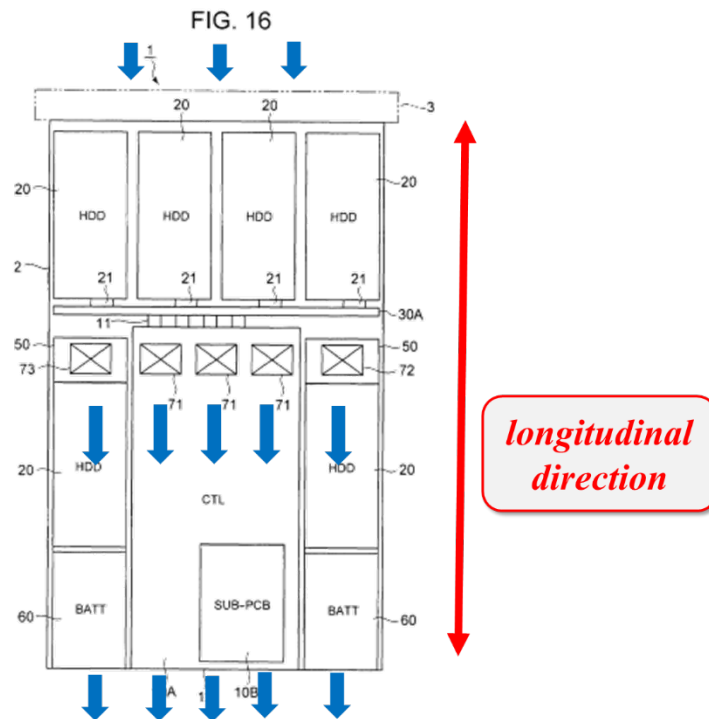
In this embodiment (and Figure 13’s embodiment), “the control boards 10 are arranged in the center, and the power devices 50, disk drives 20 and batteries 60 are arranged in bilateral symmetry on the right and left sides thereof.” EX1010, 14:34-38. In other words, *the plurality of power source units* (whether batteries 60 or power devices 50) *are each positioned not to be aligned linearly with the CPU* (which is located on main board 10A) *in the longitudinal direction of the housing*. EX1003, ¶¶318-320.

3. Claim 4

- a. **A cooling structure of an electronic device comprising a plurality of fans causing cooling air to flow downstream, a central processing unit (CPU), a plurality of memory devices adjacent to the CPU, and a plurality of power source units, all of which are**

arranged along a flowing direction of the cooling air corresponding to a longitudinal direction in a housing,

Okamoto's storage controller includes fans 71, 72, 73, which constitute a *cooling structure of an electronic device*. EX1003, ¶323. The *electronic device* (storage controller) includes *a plurality of fans causing cooling air to flow downstream* as explained for 1b. See Section VIII.A.2.c, above. The *electronic device* includes *a central processing unit (CPU)* as explained for 1c. See Section VIII.A.2.d, above. The *electronic device* includes *a plurality of memory devices adjacent to the CPU* as explained for 1d. See Section VIII.A.2.e, above. The *electronic device* includes *a plurality of power source units* as explained for 1e. See Section VIII.A.2.f, above. As illustrated below and explained for 1a and 1b, all of these components are arranged in the *electronic device* (storage controller) *along a flowing direction of the cooling air corresponding to a longitudinal direction in a housing*. See Sections VIII.A.2.b-VIII.A.2.c, above.



Okamoto, Fig. 16 (annotated)

Thus, if the preamble is limiting, Okamoto discloses it.

- b. wherein the CPU is arranged downstream of the plurality of fans and positioned to allow the cooling air to directly flow therethrough,**

This limitation is similar to 1c and disclosed for the same reasons. See Section VIII.A.2.d, above.

- c. wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units,**

This limitation is identical to 1f and disclosed for the same reasons. See Section VIII.A.2.g, above.

- d. wherein the plurality of power source units are positioned opposite to each other and spaced out from each other in a width direction of the housing such that the plurality of power source units are positioned not to be aligned linearly with the CPU in the longitudinal direction.**

Okamoto discloses *the plurality of power source units are positioned opposite to each other and spaced out from each other in a width direction of the housing* for the reasons explained for 1e. See Section VIII.A.2.f, above. Okamoto discloses that *the plurality of power source units are positioned not to be aligned linearly with the CPU in the longitudinal direction* for the reasons explained for 1g. See Section VIII.A.2.h, above.

4. Claim 5

Okamoto discloses claim 1. See Section VIII.A.2, above. Okamoto also discloses claim 5. EX1003, ¶¶329-334. For reasons discussed for 1f, *the plurality of power source units* (whether batteries 60 or power devices 50) *are each positioned along an extension downstream from the plurality of memory devices* (storage devices 20). See Section VIII.A.2.g, above. Both batteries 60 and power devices 50 are positioned against opposing sidewalls of the enclosure, *downstream* from storage devices 20 and oriented in a lengthwise direction. Thus, batteries 60 and power devices 50 in Okamoto's storage controller *are each positioned along an extension downstream from the plurality of memory devices*. EX1003, ¶¶331-334.

5. Claim 7

Okamoto discloses claim 4. *See* Section VIII.A.3, above. The limitation of claim 7 is identical to claim 5 and disclosed for the same reasons. *See* Section VIII.A.4, above.

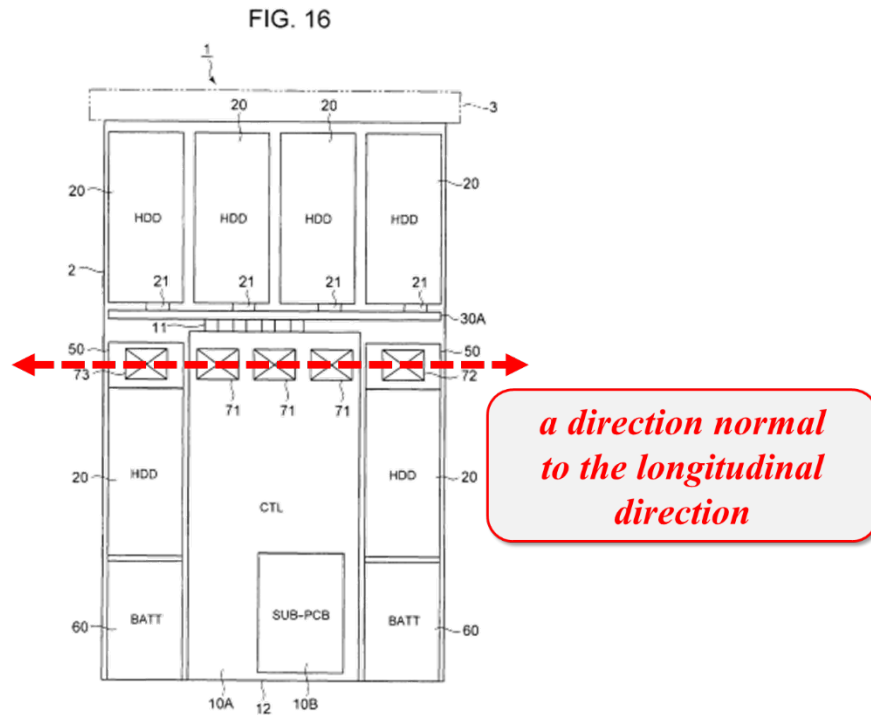
6. Claim 8

a. The electronic device according to claim 1, wherein

Okamoto discloses claim 1. *See* Section VIII.A.2, above.

b. the plurality of fans are arranged in a direction normal to the longitudinal direction,

In Okamoto's storage controller, *the plurality of fans* (fans 71, 72, 73) *are arranged in a direction normal* (i.e., perpendicular) *to the longitudinal direction*, as illustrated below. EX1003, ¶339-340; EX1016, 3. This limitation defines the term *direction* (which is referred to as *the direction* in later limitations) to mean the direction indicated by the arrow in the figure below.

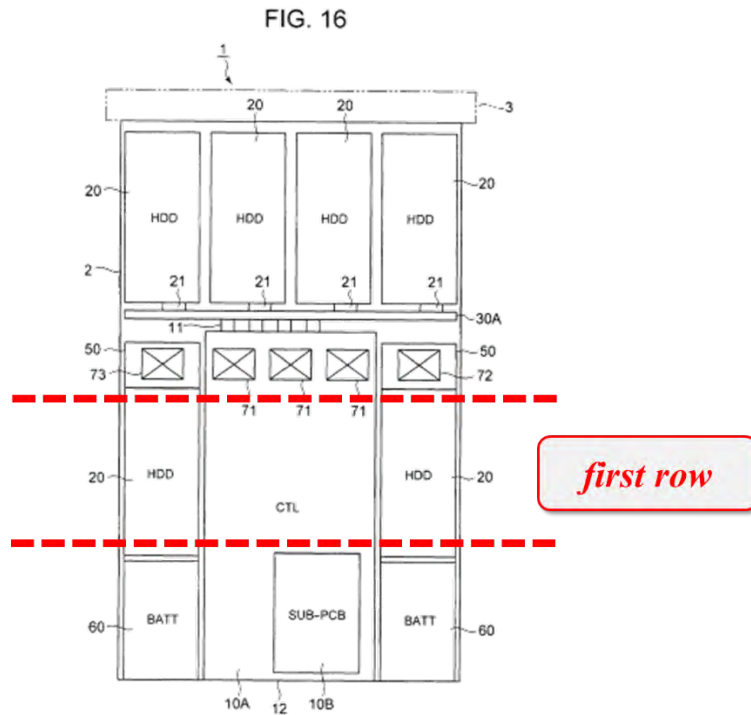


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

c. the central processing unit is positioned in a first row,

As discussed for 1c, a POSITA would understand that in Okamoto's storage controller illustrated in Figure 16 microprocessor 131 is located on main board 10A between fans 71 and sub-board 10B. *See* Section VIII.A.2.d, above. Thus, in Okamoto's storage controller illustrated in Figure 16, *the central processing unit* (microprocessor 131) *is positioned in a first row* as illustrated below. EX1003, ¶¶343-344.

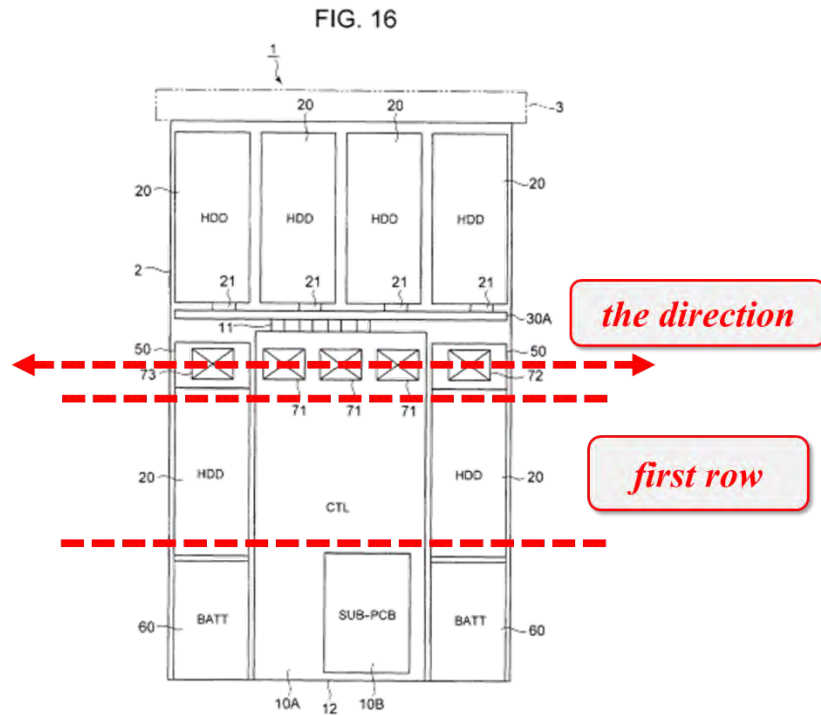


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

d. the first row extending parallel to the direction,

In Okamoto's storage controller illustrated in Figure 16, *the first row* including microprocessor 131 is *parallel to the direction* (i.e., the direction normal to the longitudinal direction) as illustrated below. EX1003, ¶346.



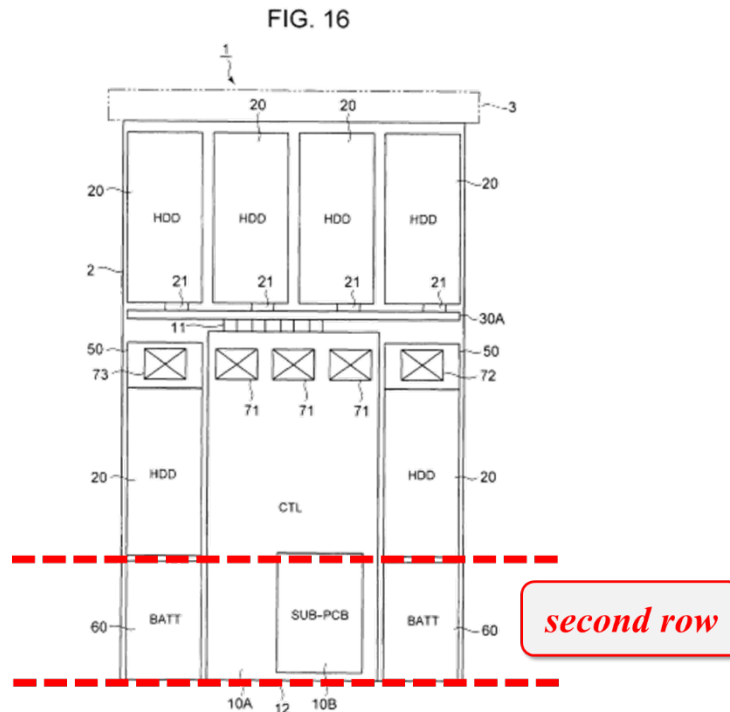
Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

- e. the plurality of power source units are each positioned in a second row,**

In Okamoto's storage controller of Figure 16, *the plurality of power source units (batteries 60) are each positioned in a second row* as illustrated below.

EX1003, ¶348.

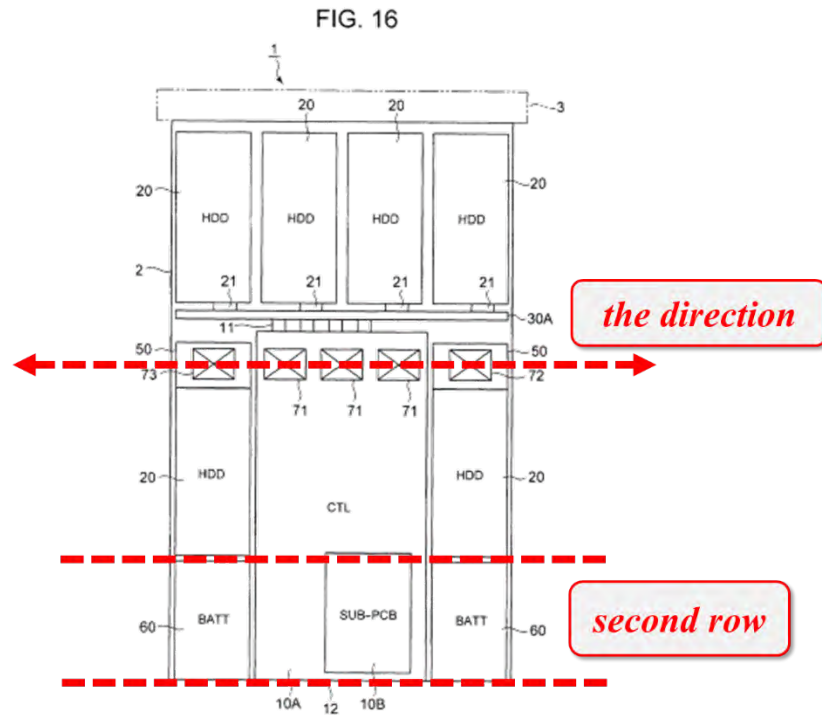


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

f. the second row extending parallel to the direction,

In Okamoto's storage controller illustrated in Figure 16, *the second row* of batteries 60 is *extending parallel to the direction* (i.e., the direction normal to the longitudinal direction) as illustrated below. EX1003, ¶350.

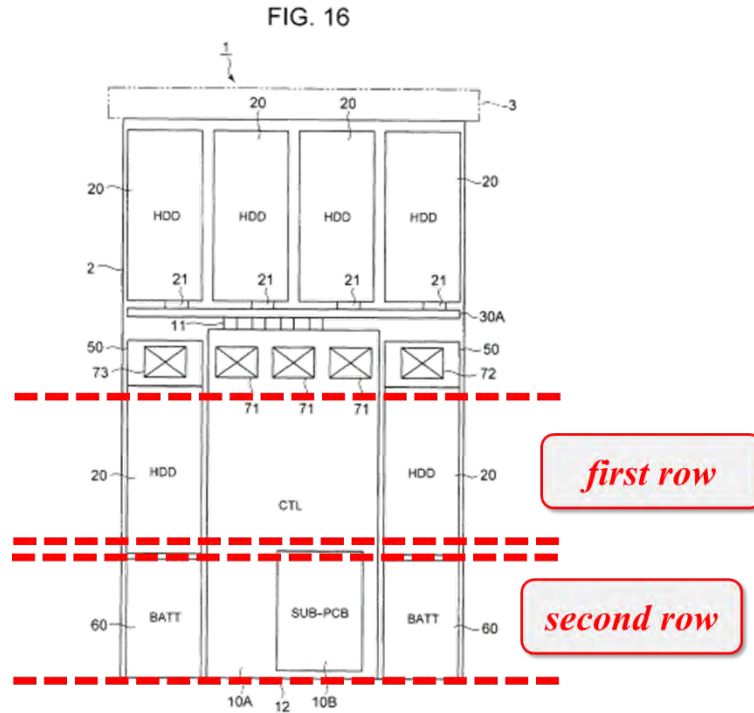


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

- g. the second row being positioned farther from a longitudinal center of the housing than the first row,**

In Okamoto's storage controller of Figure 16, *the second row* of batteries 60 is *positioned farther from a longitudinal center of the housing* (i.e., midway between the front wall and rear wall of enclosure 2) *than the first row* as illustrated below. EX1003, ¶¶352-353.

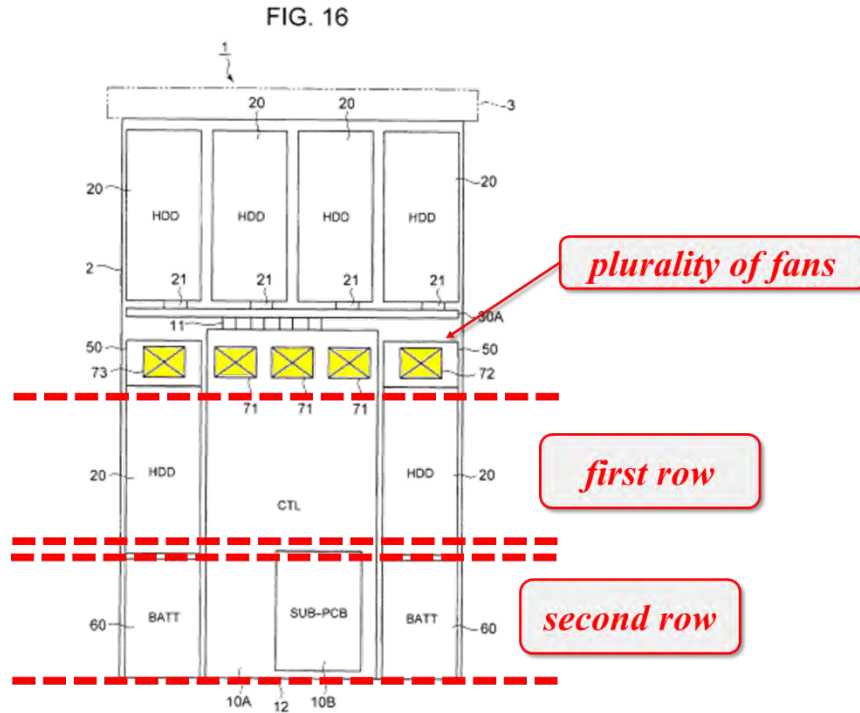


Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

- h. and the second row being positioned farther from the plurality of fans that the first row.**

In Okamoto's storage controller illustrated in Figure 16, *the second row* of batteries 60 is *positioned farther from the plurality of fans* (fans 71, 72, 73) *than the first row* as illustrated below (i.e., the first row is closer to the fans than the second row is). EX1003, ¶355.



Okamoto, Fig. 16 (annotated)

Thus, Okamoto discloses this limitation.

B. Ground 6: Okamoto-Hughes Renders Claim 2 Obvious

1. Motivation to Combine

Hughes describes a “form factor that can conveniently be used with common enclosure layouts, where modules may be inserted into/removed from the enclosure through square/rectangular bays in the rear of the enclosure” (EX1007, [0017]), and Hughes’ enclosure includes “bays into which can be received...two power supply units 7...” (*id.*, [0028]). A POSITA would understand Hughes’ power supply units are removable through the enclosure’s rear wall. EX1003, ¶358. A POSITA would have been motivated to implement Okamoto’s storage

controller such that the plurality of power source units are each *arranged to be pulled out from the rear face of the housing*, as Hughes teaches. *Id.*

A POSITA would have recognized the benefit of allowing a user to replace a defective or damaged power device 50 or battery 60 in Okamoto’s storage controller. EX1003, ¶359. While Okamoto describes making many of the components “irreplaceable under normal circumstances” (EX1010, 4:30-31), one embodiment includes “at least one replaceable-type storage device” (*id.*, 18:19-23). The replaceable storage device is for use if other irreplaceable storage devices “become unusable.” *Id.*, 2:40-44. Similarly, a POSITA would have been motivated to make at least one *power supply unit* in Okamoto replaceable should any “become unusable.” EX1003, ¶359. A POSITA could have implemented this design with a reasonable expectation of success as such removable power supplies were well known. *Id.* This modifications would have involved no more than use of prior art elements according to known methods yielding predictable results. *Id.*, ¶360.

2. Claim 2

Okamoto discloses claim 1. *See* Section VIII.A.2, above. Hughes discloses that *the plurality of power source units are each arranged to be pulled out from the rear face of the housing*. *See* Section VII.A.5, above. Thus, Okamoto-Hughes discloses claim 2. EX1003, ¶¶362-370.

C. Ground 7: Okamoto-Suzuki Renders Claims 2 and 6 Obvious

1. Motivation to Combine

Suzuki discloses a control unit including power supply units 7 that are removable through the rear wall of the enclosure. *See* Section VII.A.5, above. A POSITA would have been motivated to modify Okamoto to provide removable power supplies per Suzuki. EX1003, ¶374. A POSITA would have recognized the benefit of allowing easy replacement of a defective/damaged power device 50 or battery 60 in Okamoto. *Id.*; *see also* Section VII.A.5, above. Further, a POSITA could have implemented this design with a reasonable expectation of success as such removable power supplies were well known. EX1003, ¶374.

Further, Suzuki discloses attaching a *heat sink* to a *CPU* as recited in claim 6. EX1008, 14:49-55, Fig. 11C. A POSITA would have been motivated to implement Suzuki's heat sink on Okamoto's CPU as it would provide more effective cooling. EX1003, ¶375. Further, a POSITA could have done so with at least a reasonable expectation of success. *Id.* The modifications would have involved no more than the use of prior art elements according to known methods yielding predictable results. *Id.*

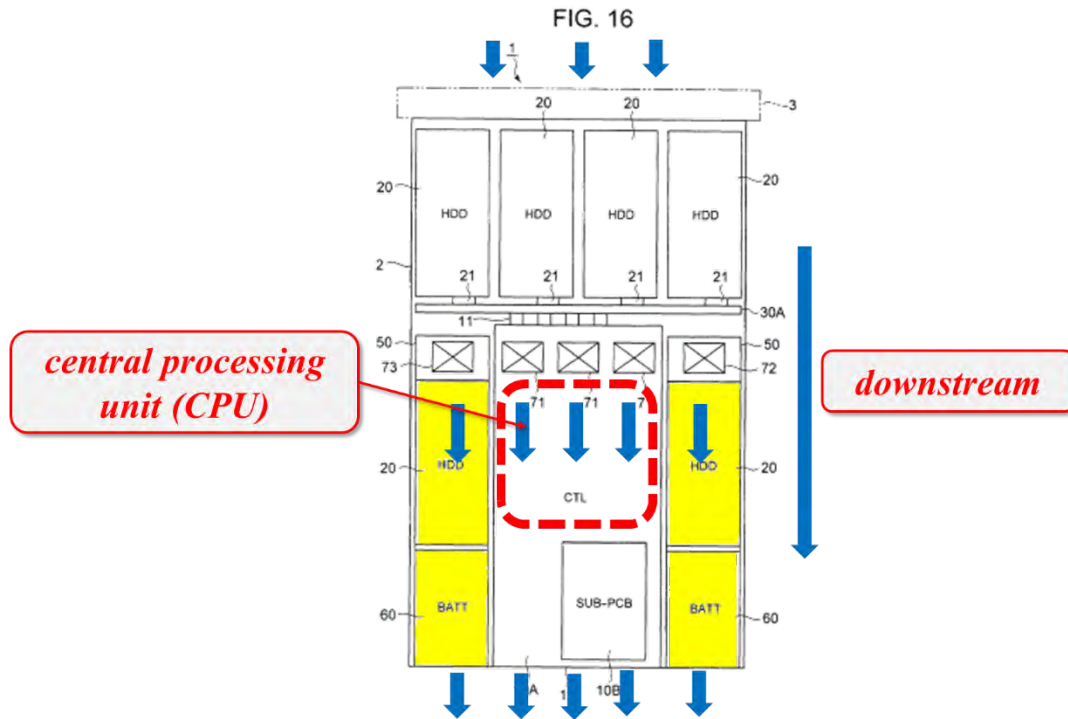
2. Claim 2

Okamoto discloses claim 1. *See* Section VIII.A.2, above. Suzuki discloses that *the plurality of power source units are each arranged to be pulled out from the*

rear face of the housing. See Section VII.A.5, above. Thus, Okamoto-Suzuki discloses claim 2. EX1003, ¶¶376-385.

3. Claim 6

Okamoto discloses claim 1. *See Section VIII.A.2, above. Suzuki discloses attaching a heat sink to the CPU and that the cooling air flows through a heat sink, attached onto the CPU as recited in claim 6. EX1008, 14:23-24 (“[A] heat sink 731...for cool down of the MPU 730 and other electronic parts...are laid out in a longitudinal direction, along the direction of a cooling wind....”), Fig. 11C. Okamoto discloses that the cooling air flows over the CPU and further flows downstream via a relatively large space formed between the plurality of power source units as illustrated below.*



Okamoto, Fig. 16 (modified)

Thus, Okamoto-Suzuki discloses claim 6. EX1003, ¶¶388-397.

D. Ground 8: Okamoto-Wiscombe Renders Claims 2 and 3 Obvious

1. Motivation to Combine

Okamoto discloses a storage controller with power devices and batteries. Wiscombe describes “specially designed carrier structures on which...power supply boxes are mounted” permitting “drawer-like movement” into/out of the computer. EX1009, 1:63-67, 2:15-31. As discussion above, a POSITA would recognize Wiscombe is not limited to specific numbers or configurations of power supplies. See Section VII.B.2, above. Wiscombe could be implemented in Okamoto and would provide benefits similar to those discussed above. *Id.*

A POSITA would be motivated to modify Okamoto’s storage controller based on Wiscombe permitting easy insertion/removal of at least one power device 50 or battery 60 through the rear wall. EX1003, ¶¶399-401. A POSITA would recognize benefits of allowing a user to replace a defective/damaged power device or battery without disassembling Okamoto’s storage controller. *Id.* Further, Wiscombe is intended for use with “conventional, off-the-shelf” power supplies (EX1009, Abstract, 1:59-67), limiting cost and providing a further motivation for the modification. EX1009, 3:33-38, 3:55-63.

Modifying Okamoto based on Wiscombe would have been within a POSITA’s skill with a reasonable expectation of success. EX1003, ¶402. Wiscombe details the required modifications, which are intended for use with conventional power supplies. *Id.* The modifications would have involved no more than use of prior art elements according to known methods yielding predictable results. *Id.*

2. Claim 2

Okamoto discloses claim 1. *See* Section VIII.A.2, above. Wiscombe discloses “specially designed carrier structures” permitting conventional power supply boxes to be inserted/removed through the rear wall of a computer in a “drawer-like movement.” EX1009, 1:59-67, 2:15-31; *see also id.*, 5:11-21, 5:32-36, Fig. 1. Thus, Okamoto-Wiscombe discloses claim 2. EX1003, ¶¶404-412.

3. Claim 3

Okamoto discloses claim 1. *See* Section VIII.A.2, above. Wiscombe discloses a “housing section 12” (*a power box*) having a “top end wall 16” (*a top board*) and “opposite left and right side walls 20 and 22” (*a pair of side boards*) into which “each of the power supply assemblies 14 may be inserted....” EX1009, 3:15-25; EX1003, ¶421. Okamoto discloses that *the plurality of power source units are...positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flown downwardly from the plurality of electronic parts*, as explained for 1e and 1g. *See* Sections VIII.A.2.f and VIII.A.2.h, above; *see also* Section V.A, above. Thus, Okamoto-Wiscombe discloses claim 3. EX1003, ¶¶413-423.

IX. DISCRETIONARY DENIAL IS NOT WARRANTED

Pursuant to the Interim Processes for PTAB Workload Management Memorandum (March 26, 2025), discretionary denial issues (if any) will be raised in a separate brief by Patent Owner. If Patent Owner files such a brief, Petitioners will respond in an opposition brief as provided in the Interim Processes for PTAB Workload Management Memorandum.

X. CONCLUSION

The Board should institute review and cancel the challenged claims of the '265 Patent.

Respectfully submitted,

/James L. Day/

James L. Day
Registration No. 72,681
FARELLA BRAUN + MARTEL LLP
One Bush Street, Suite 900
San Francisco, California 94104
jday@fbm.com

CLAIM APPENDIX

[1pre] An electronic device comprising:

[1a] a housing comprising a front face and a rear face which are distanced from each other in a longitudinal direction;

[1b] a plurality of fans which are arranged inside the housing close to the front face so as to cause cooling air to flow downstream in the longitudinal direction from the front face to the rear face of the housing;

[1c] a central processing unit (CPU) which is arranged downstream of the plurality of fans in the housing and positioned to allow the cooling air to directly flow therethrough;

[1d] a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing; and

[1e] a plurality of power source units which are positioned opposite to each other and spaced out from each other in the width direction of the housing,

[1f] wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units, and

[1g] wherein the plurality of power source units are each positioned not to be aligned linearly with the CPU in the longitudinal direction of the housing.

2. The electronic device according to claim 1, wherein the plurality of power source units are each arranged to be pulled out from the rear face of the housing.

3. The electronic device according to claim 1, wherein the plurality of power source units are each kept inside a power box, comprising a top board and a pair of side boards, and positioned close to each of side faces of the housing so as not to directly interfere with the cooling air flown downwardly from the plurality of electronic parts.

4. A cooling structure of an electronic device comprising a plurality of fans causing cooling air to flow downstream, a central processing unit (CPU), a plurality of memory devices adjacent to the CPU, and a plurality of power source units, all of which are arranged along a flowing direction of the cooling air corresponding to a longitudinal direction in a housing,

wherein the CPU is arranged downstream of the plurality of fans and positioned to allow the cooling air to directly flow therethrough,

wherein the plurality of power source units are each positioned further downstream of the cooling air from the plurality of memory devices such that the cooling air passing through one of the memory devices passes into one of the power source units,

wherein the plurality of power source units are positioned opposite to each other and spaced out from each other in a width direction of the housing such that the plurality of power source units are positioned not to be aligned linearly with the CPU in the longitudinal direction.

5. The electronic device according to claim 1, wherein the plurality of power source units are each positioned along an extension downstream from the plurality of memory devices.

6. The electronic device according to claim 1, wherein the cooling air flows through a heat sink, attached onto the CPU, and further flows downstream via a relatively large space formed between the plurality of power source units.

7. The cooling structure of an electronic device according to claim 4, wherein the plurality of power source units are each positioned along an extension downstream from the plurality of memory devices.

8. The electronic device according to claim 1, wherein
the plurality of fans are arranged in a direction normal to the longitudinal direction,
the central processing unit is positioned in a first row,
the first row extending parallel to the direction,
the plurality of power source units are each positioned in a second row,
the second row extending parallel to the direction,
the second row being positioned farther from a longitudinal center of the housing than the first row,
and the second row being positioned farther from the plurality of fans than the first row.

CERTIFICATE OF COMPLIANCE

This petition complies with the 14,000 word-count limit under 37 C.F.R. § 42.24(a)(1)(i). The petition contains 13,305 words, excluding the parts exempted by 37 C.F.R. § 42.24(a)(1) (i.e., table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, word count certificate, and appendix of exhibits), as determined by the word count feature of Microsoft Word, which was used to prepare this petition.

/James L. Day/

James L. Day
Registration No. 72,681
Farella Braun + Martel LLP

CERTIFICATE OF SERVICE

I hereby certify that on July 14, 2025, I caused a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits to be served by express mail, or means at least as fast and reliable as express mail, on the following correspondence address identified using the USPTO Patent Center:

71799-NEC-IPC (Sughrue Mion PLLC)
c/o Alan Kasper, William Mandir, or Mark Boland
2000 Pennsylvania Ave. NW, Suite 9000
Washington, DC 20006

In addition, courtesy copies were sent by electronic means to the Patent Owner's litigation counsel at the following addresses:

yurykapgan@quinnemanuel.com
brianmack@quinnemanuel.com
claire@millerfairhenry.com
jonathantse@quinnemanuel.com
melissaneri@quinnemanuel.com
ryangoldstein@quinnemanuel.com
andrea@millerfairhenry.com

/James L. Day/

James L. Day
Registration No. 72,681
Farella Braun + Martel LLP