

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

INVALIDITY CLAIM CHART Invalidity of U.S. Patent No. 9,629,265 in view of Okamoto

U.S. Patent No. 7,643,281 (“Okamoto”) was filed on September 14, 2007, claims priority to December 13, 2006, and was issued on January 5, 2010. Okamoto therefore qualifies as prior art to the '265 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and (b). Okamoto anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) the Asserted Claims of the '265 patent, at least as Dell understands Cloud Byte’s application of the Asserted Claims in an effort to show infringement.

To the extent Cloud Byte argues that any element below is not disclosed by Okamoto, a person of ordinary skill in the art would have found it obvious to combine the teachings of Okamoto with the background knowledge of a person of ordinary skill in the art and/or the additional references, and exemplary teachings, set forth in Dell’s Invalidity Contentions and accompanying charts and/or in Appendix D.

The chart below provides representative examples of where each element of each claim is found within Okamoto. Citations are meant to be exemplary, not exhaustive, and Dell reserves the right to identify and discuss additional portions of the reference in support of its contentions and/or to rebut arguments made by Cloud Byte. Citations to figures, drawings, tables, and the like include reference to any accompanying or related text. All internal cross references are meant to incorporate the cross-referenced material as if fully set forth therein. Where Dell states that Okamoto “discloses” a limitation, that disclosure may be express, implicit, and/or inherent.

It is Dell’s position that Cloud Byte’s Infringement Contentions have not established that any accused product or service infringes any valid claim. Thus, Dell’s statements below should not be treated as an admission, implication, or suggestion that Dell agrees with Cloud Byte regarding either the scope, construction, or interpretation of any of the Asserted Claims or the infringement theories advanced by Cloud Byte in its Infringement Contentions, including whether any Asserted Claim satisfies 35 U.S.C. §§ 101 or 112. Nothing in this chart is intended to suggest that Dell agrees with Cloud Byte’s application of any claim element, suggest a proposed construction at this stage of the case, or suggest that construction is needed, as the parties are not required to exchange terms for construction or propose claim constructions until a later date.

Cloud Byte has yet to identify any limitation of the Asserted Claims that it contends is not anticipated and/or rendered obvious by Okamoto. Dell therefore expressly reserves the right to respond to any such contention, including by identifying additional obviousness combinations, if Cloud Byte makes any such contention. This chart is subject to all reservations, objections, and disclaimers in Dell’s Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

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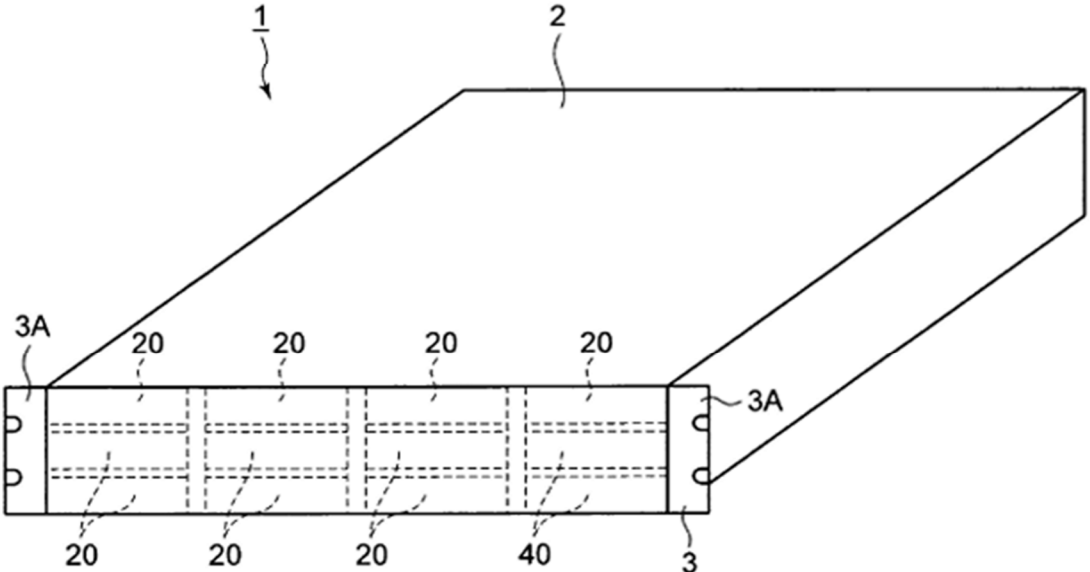
Asserted Claims	Okamoto
[1.pre] 1. An electronic device comprising:	Dell takes no position in these Invalidity Contentions on whether the entirety of the preamble of this claim limitation. To the extent it is a limitation, Okamoto discloses, expressly and/or inherently, an electronic device. <i>See, e.g.:</i> Okamoto at Fig. 1 and accompanying text: FIG. 1  The diagram shows a perspective view of a rectangular electronic device, labeled 1. The top surface is labeled 2. The front face is labeled 3. On the front face, there is a display area 40 and a series of horizontal lines 20. The device is flanked by side panels 3A.

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	Okamoto at Fig. 2 and accompanying text: FIG. 2 Okamoto at 1:13–14: 1. Field of the Invention

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Asserted Claims	Okamoto
	The present invention relates to a storage controller. Okamoto at 1:16–23: A storage controller can provide large capacity storage services to a host computer (hereinafter, “host”). In a storage controller, for example, a storage area based on RAID (Redundant Array of Independent Disks) is constructed using a large number of disk drives. A logical volume (LU: Logical Unit), which is a logical storage area, is configured on the physical storage area of each disk drive. A host can read and write data from and to this logical volume. Okamoto at 2:11-22: With the foregoing in view, an object of the present invention is to provide a storage controller capable of enhancing the ease-of-use of the user. Another object of the present invention is to provide a storage controller that reduces maintenance work for the user, and enhances usability by replacing the entire system when a failure occurs. Yet another object of the present invention is to provide a storage controller that makes it possible to integratively mount a large number of storage devices inside a relatively small enclosure, and to enhance usability and reliability. Other objects of the present invention should become clear from the descriptions of the embodiments, which will be explained hereinbelow. Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when

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	the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 2:45-48: In one aspect of the present invention, at least one storage device of the respective storage devices provided beforehand inside the enclosure can be preconfigured as a reserved storage device. Okamoto at 2:49-53: In one aspect of the present invention, the control board is constituted from a set of two circuit boards having the same configuration, and control structures for controlling the operation of the respective storage devices can be disposed on the respective circuit boards. Okamoto at 2:54-59: In one aspect of the present invention, the control board is constituted from a plurality of circuit boards having a different shape, and the control structure for controlling the operation of the respective storage devices is duplexed in accordance with respective electronic circuits formed on each circuit board. Okamoto at 2:60-65: In one aspect of the present invention, the cooling fan is located in substantially the center part between an inlet provided in one face of the enclosure, and an outlet provided in the other face of the enclosure, and is arranged inside the enclosure so as to be irreplaceable under normal circumstances. Okamoto at 2:66-3:11: In one aspect of the present invention, the respective storage devices are arranged in a matrix in one side of the enclosure by placing a plurality of storage devices in close proximity to one another to form a row, and stacking a plurality of rows one atop the other in close proximity, and the control board is located in the other side of the enclosure, and is provided inside the enclosure so as to be irreplaceable under normal circumstances, and the respective storage

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	devices and control board are connected via a connection board, and inlets are formed between the respective storage devices to take air into the inside of the enclosure, and an outlet is formed in the other side of the enclosure to discharge to the outside of the enclosure a cooling airflow generated by the cooling fan. Okamoto at 3:12-16: In one aspect of the present invention, a connection board is provided perpendicularly on the inside of the enclosure, the respective storage devices are each connected to one side of the connection board, and the control board is connected to the other side of the connection board. Okamoto at 3:17-24: In one aspect of the present invention, a connection board is located in the one side of the enclosure, and disposed horizontally inside the enclosure, the respective storage devices are arranged in the same numbers on the bottom side and on the top side of the connection board, and respectively connected to the connection board, and the control board is disposed horizontally on the inside of the enclosure so as to be connected to the other end of the connection board. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, at least one or more cooling fans 71, 72, 73, which are

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	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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances. Okamoto at 4:35-37: FIG. 1 is an oblique view showing the outside of a storage controller 1. This storage controller 1, for example, can be detachably connected to a rack. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”.

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	Okamoto at 4:60-5:4: More specifically, disk drives 20 are integratively arranged in a matrix by using four disk drives to form a row, and stacking three rows one atop the other. For example, a hard disk drive like a FC (Fibre Channel) disk, SATA (Serial AT Attachment) disk and SAS (Serial Attached SCSI) disk are used as disk drives 20. The present 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, a magneto-optical disk drive, an optical disk drive, a magnetic tape drive, a flexible disk drive, and a holographic memory device can also be utilized. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 5:23-31: Control boards 10 are arranged in the posterior of the enclosure 2 stacked one atop the other. The respective control boards 10 are located rearward of the respective disk drives 20, and are disposed horizontally inside the enclosure 2. As shown in FIG. 4, two control boards 10 are arranged one atop the other in the center of the posterior part of the enclosure 2. The respective control boards 10 control the operations of the respective disk drives 20 in accordance with access requests from a host H as a higher-level device (refer to FIG. 5).

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	Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a “connection board”. The backboard 30, for example, can be constituted from a first board 31, which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 5:58-6:3: A detailed explanation will be provided below, but when a failure occurs in a normal disk drive 20 for storing data utilized by the host H, data recovery work is carried out using a spare disk drive (hereinafter, may be called spare disk) 20, which is built into the enclosure 2, and which has been allocated as a spare beforehand. Spare disk, for example, signifies two of the 12 disk drives 20 mounted in the enclosure beforehand, and the mounting location can be arbitrarily configured. After using up all the spare disks, the user mounts a new disk drive 20 in a repair drive slot 40 when another drive failure occurs. Data recovery can be carried out using this new

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	disk drive 20 (repair disk). Furthermore, in addition to data recovery work, a repair disk can also be used to backup data. Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. 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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:24-40: The number and arrangement of the cooling fans 71, 72, 73 are not limited to the example described above. The constitution can also be such that only one or two cooling fans comprising sufficient cooling capabilities are disposed inside the enclosure 2. However, generally speaking, the cooling capabilities of a cooling fan depend on the external dimensions and number of revolutions of the fan. The bigger the fan and the faster it is made to rotate, the higher the cooling capability, but noise also increases. It is possible to reduce noise while ensuring cooling capabilities to a certain extent by rotating a bigger fan at low speed. When the external dimensions of a fan are increased, the space required to mount the cooling fan also becomes larger, thereby increasing the thickness dimension of the enclosure 2. With the foregoing in view,

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	this embodiment is constituted to achieve the cooling capabilities required for the storage controller 1 by using a plurality of cooling fans 71, 72, 73. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 6:53-59: The flow of the cooling air will be explained. 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. By flowing through the gaps between the respective disk drives 20, the air A1 captures the heat from each disk drive 20, thereby cooling each disk drive 20. Okamoto at 6:60-7:2: The air A1 that flows inside the enclosure 2 via the gaps between the respective disk drives 20 becomes cooling air A2, and flows toward the rear of the enclosure 2 while cooling the respective parts inside the enclosure 2. The cooling air A2, which cools the respective parts, is discharged to the outside of the enclosure 2 via a gap disposed towards the rear of the enclosure 2. This discharged cooling air is shown as A3 in the figure. Furthermore, the flow of the cooling air is shown schematically in FIG. 2, but the actual flow may differ.
[1.a] a housing comprising a front face and a rear face which	Okamoto discloses, expressly and/or inherently, a housing comprising a front face and a rear face which are distanced from each other in a longitudinal direction.

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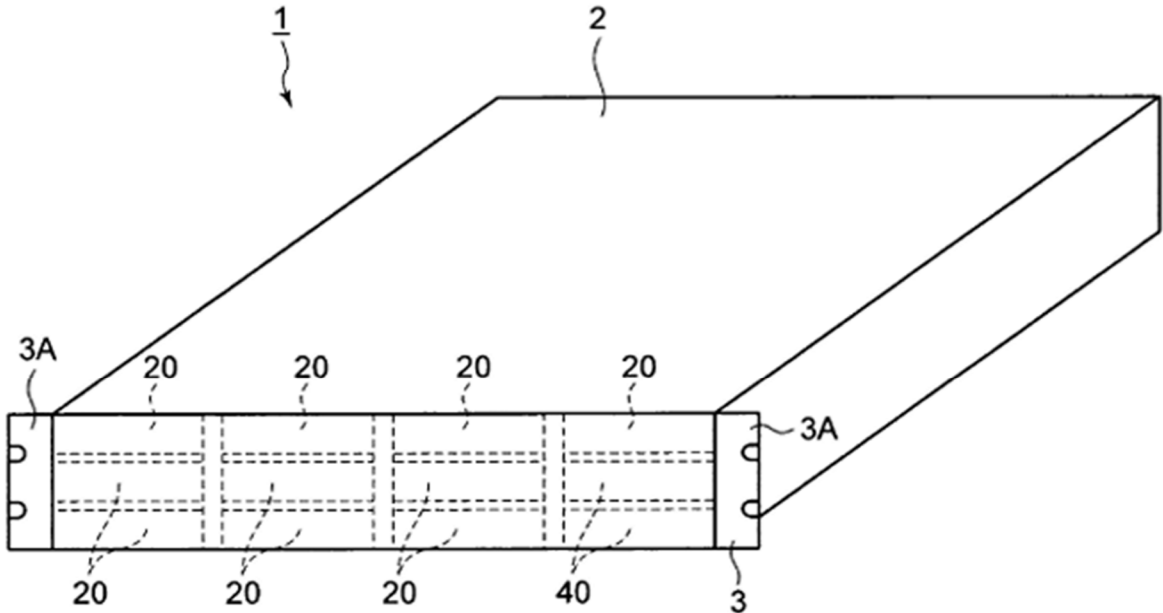
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are distanced from each other in a longitudinal direction;	See, e.g.: Okamoto at Fig. 1 and accompanying text: FIG. 1  Okamoto at Fig. 2 and accompanying text:

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	FIG. 2 The diagram illustrates a system architecture. At the top, a dashed line labeled '1' represents an input or output boundary with three downward arrows labeled 'A1'. Below this is a horizontal bar labeled '20' containing four vertical rectangular blocks, each labeled 'HDD' and '20'. Each 'HDD' block contains a smaller block labeled '21'. Below the 'HDD' blocks is a horizontal bar labeled '30' which contains four blocks labeled '31', '32', '33', and '32A'. Below this is another horizontal bar labeled '11'. Below '11' is a large rectangular area labeled '2' which contains several components: a 'PS' (Power Supply) block with an arrow 'A2' pointing down, a 'CTL' (Control) block with three arrows 'A2' pointing down, an 'HDD' block with an arrow 'A2' pointing down, and a 'BATT' (Battery) block labeled '60'. There are also several cross-hatched boxes labeled '71', '72', and '73'. At the bottom, there are five downward arrows labeled 'A3' with labels '10' and '12' near them. Okamoto at Fig. 14 and accompanying text:

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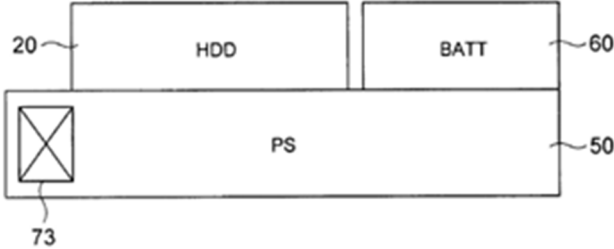
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	FIG. 14  Okamoto at Fig. 16 and accompanying text:

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	FIG. 16 Okamoto at Fig. 24 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 24 Okamoto at 1:13–14: 1. Field of the Invention The present invention relates to a storage controller.

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	Okamoto at 1:24-31: However, a rack-mounted disk array apparatus is also known as a storage controller (Japanese Patent Laid-open No. 2005-327390). In this rack-mounted disk array apparatus, a plurality of hard disk units and interface units are replaceably disposed inside a rack installed in an enclosure. When replacing a hard disk unit, the user pulls out the hard disk unit to be replaced from the front side of the enclosure, and installs a new hard disk unit. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”. Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a

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Asserted Claims	Okamoto
	“connection board”. The backboard 30, for example, can be constituted from a first board 31, which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50.
[1.b] 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	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i>

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direction from the front face to the rear face of the housing;	Okamoto at Fig. 2 and accompanying text: FIG. 2 Okamoto at 1:63-2:7:

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	Further, the above-mentioned respective conventional technologies replaceably provide a relatively small number of hard disk drives, such as two drives, inside an enclosure, without taking into account the installation of greater numbers of hard disk drives. That is, in the case of a constitution that comprises only a small number of hard disk drives, the operating noise from the respective hard disk drives is low, reducing the need for soundproofing measures. However, when a larger number of hard disk drives are mounted in an enclosure, it becomes necessary to increase the cooling capabilities of the cooling fans, and also necessitates that soundproofing measures be taken in line with this. Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 2:60-65: In one aspect of the present invention, the cooling fan is located in substantially the center part between an inlet provided in one face of the enclosure, and an outlet provided in the other face of the enclosure, and is arranged inside the enclosure so as to be irreplaceable under normal circumstances.

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	Okamoto at 2:66-3:11: In one aspect of the present invention, the respective storage devices are arranged in a matrix in one side of the enclosure by placing a plurality of storage devices in close proximity to one another to form a row, and stacking a plurality of rows one atop the other in close proximity, and the control board is located in the other side of the enclosure, and is provided inside the enclosure so as to be irreplaceable under normal circumstances, and the respective storage devices and control board are connected via a connection board, and inlets are formed between the respective storage devices to take air into the inside of the enclosure, and an outlet is formed in the other side of the enclosure to discharge to the outside of the enclosure a cooling airflow generated by the cooling fan. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk

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	drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:24-40: The number and arrangement of the cooling fans 71, 72, 73 are not limited to the example described above. The constitution can also be such that only one or two cooling fans comprising sufficient cooling capabilities are disposed inside the enclosure 2. However, generally speaking, the cooling capabilities of a cooling fan depend on the external dimensions and number of revolutions of the fan. The bigger the fan and the faster it is made to rotate, the higher the cooling capability, but noise also increases. It is possible to reduce noise while ensuring cooling capabilities to a certain extent by rotating a bigger fan at low speed. When the external

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Asserted Claims	Okamoto
	dimensions of a fan are increased, the space required to mount the cooling fan also becomes larger, thereby increasing the thickness dimension of the enclosure 2. With the foregoing in view, this embodiment is constituted to achieve the cooling capabilities required for the storage controller 1 by using a plurality of cooling fans 71, 72, 73. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 6:53-59: The flow of the cooling air will be explained. 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. By flowing through the gaps between the respective disk drives 20, the air A1 captures the heat from each disk drive 20, thereby cooling each disk drive 20. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 7:24-31: Then, outlets 12 are disposed in the rear side of the enclosure 2, and cooling air inside the enclosure 2 is discharged to the outside of the enclosure 2 via these outlets 12. The outlets 12 are constituted as gaps between the respective elements (fans and electronic components) inside the

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Asserted Claims	Okamoto
	enclosure 2. Furthermore, although omitted from the figure, the back face of the enclosure 2 can be covered by a plate having a large number of openings. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 11:52-56: This embodiment is constituted such that the majority of the cooling fans 71, 72, 73 are disposed in the center part of the enclosure 2. Therefore, it is possible to cut down the leakage of noise generated from the cooling fans 71, 72, 73 to the outside of the enclosure 2. Okamoto at 13:63-67: FIG. 12 is a plan view showing a storage controller 1 related to a fourth embodiment with the enclosure 2 and front bezel 3 removed. In this embodiment, all of the cooling fans 71, 72, 73 are arranged approximately in the center part of the enclosure 2. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:9-14: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this embodiment, since all of the cooling fans 71, 72, 73

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Asserted Claims	Okamoto
	are arranged approximately in the center part of the enclosure 2, it is possible to further suppress the leakage of fan noise to the outside of the enclosure 2. Okamoto at 15:3-16: The location of the sub-board 10B is not limited to the example shown in the figures. If a large amount of heat is generated by the electronic circuitry (here, the respective host interfaces 110) mounted on the sub-board 10B, the sub-board 10B can be positioned closer to the cooling fan 71 side. If a small amount of heat is generated by the electronic circuitry mounted on the sub-board 10B, the sub-board 10B can be positioned in a location away from the cooling fan 71 as shown in FIG. 13. Further, when an electronic circuit, like the host interface unit 110, which is connected by cable to a device (here, a host H) outside of the enclosure 2 is mounted to the sub-board 10B, as shown in FIG. 13, connection to the external device becomes easier if the sub-board 10B is positioned close to the outside of the enclosure 2.
[1.c] 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, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 The diagram illustrates a system architecture within a chassis 1. At the top, three input ports A1 are shown. Below them are four vertical bays, each containing an HDD (Hard Disk Drive) labeled 20. Each HDD 20 has a component 21 at its base. These HDDs are connected to a horizontal bus or interface 30, which includes components 31, 32, and 33. Below this, a component 11 is shown. Further down, a power supply unit (PS) 50 and a control unit (CTL) are located. The CTL is connected to four components 71. To the right of the CTL is another HDD 20, which is connected to a component 72. Below the CTL is a battery (BATT) 60. At the bottom left, a component 73 is shown. The system is connected to external ports A2 and A3. Port A2 is connected to the PS and the CTL. Port A3 is connected to the BATT and the CTL. Additional ports 10 and 12 are shown at the bottom. Okamoto at Fig. 5 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 5 Okamoto at Fig. 15 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 15 Okamoto at 7:39-50: The respective control boards 10, for example, are constituted comprising a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Details concerning the respective units 110, 120, 130, 140 will be explained hereinbelow using FIG. 6. Briefly stated, the host interface unit 110 is for exchanging data with the host H. The backend interface unit 120 is for exchanging data with the respective disk drives 20. The processor unit 130 is for controlling the overall operation of the storage controller 1. The data transfer control

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Asserted Claims	Okamoto
	unit 140 is for controlling the transfer of data received from the host H, and data read out from the respective disk drives 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 14:49-54: FIG. 15 is a block diagram of a storage controller 1 according to this embodiment. This storage controller 1 comprises two control structures the same as the above-mentioned first embodiment. The respective control structures are constituted from a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Okamoto at 14:55-62: 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. Two backend interface units 120, two processor units 130, and two data transfer control units 140 are disposed on the main board 10A. Two host interface units 110 are disposed on the sub-board 10B. The main board 10A and the sub-board 10B are electrically connected via a connector.

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Asserted Claims	Okamoto
	Okamoto at 15:22-27: Other circuitry can also be mounted on the sub-board 10B. For example, the constitution can also be such that two backend interface units 120, or two processor units 130 are mounted on the sub-board 10B instead of two host interface units 110. Or, the constitution can also be such that a plurality of types of circuitry are mounted on the sub-board 10B. Okamoto at 15:63-16:2: FIG. 18 is a block diagram of a storage controller 1 according to this embodiment. The one control board, which is shown on the right side of the figure, is constituted from a main board 10A1 and a sub-board 10B1. One backend interface unit 120, one processor unit 130, and one data transfer control unit 140 are disposed on the main board 10A1. One host interface unit 110 is disposed on the sub-board 10B1. Okamoto at 16:3-8: Similarly, the other control board, which is shown on the left side of the figure, is constituted from a main board 10A2, on which are disposed one backend interface unit 120, one processor unit 130, and one data transfer control unit 140, and a sub-board 10B2, on which is disposed one host interface unit 110. Okamoto at 16:44-47: An eighth embodiment will be explained based on FIG. 20. This embodiment gives examples of the arrangement of a microprocessor 131 and the arrangement of a control board 10. Okamoto at 16:48-49 FIG. 20A is a schematic plan view of control boards 10 focusing on the location of the microprocessors 131. Okamoto at 16:50-61: As shown in FIG. 20B, this embodiment is constituted such that the one control board 10 (L) is located on the bottom, and the other control board 10 (U) is located on the top, and these control boards 10 (L), 10 (U) are mounted inside the enclosure 2 in an opposable state so that the

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Asserted Claims	Okamoto
	microprocessors 131 (L), 131 (U) do not interfere with one another. Control board 10 (L) and control board 10 (U) are arranged face-to-face in a horizontally shifted state in the figure so that the microprocessors 131 (L), 131 (U) do not come in contact with one another's boards. Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. Okamoto at 17:4-15: FIG. 21 is a plan view showing a storage controller 1 related to the ninth embodiment with the enclosure 2 and front bezel 3 removed. A backboard 30B is mounted horizontally on the front side of the enclosure 2. A control board 10C is disposed rearward of the backboard 30B so as to partially overlap with the posterior of the backboard 30B. Two each host interface units 110, backend interface units 120, processor units 130, and data transfer control units 140 are disposed on the single circuit board of this control board 10C. Furthermore, as described in another embodiment mentioned hereinabove, a single control board can also be constituted from a main board and a sub-board, which differ in size.
[1.d] 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, expressly and/or inherently, a plurality of memory devices adjacent to the CPU in a width direction, substantially normal to the longitudinal direction, of the housing. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 5 and accompanying text:

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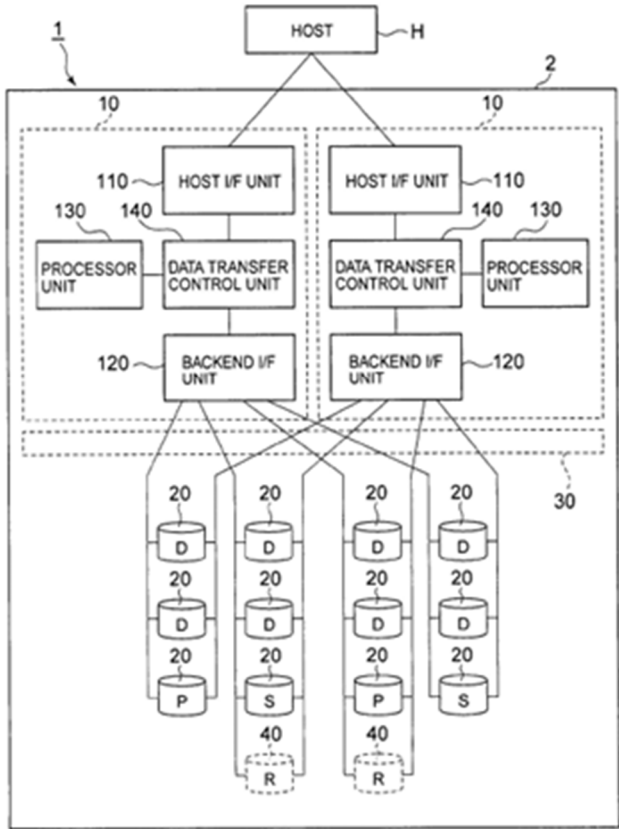
Asserted Claims	Okamoto
	FIG. 5  Okamoto at Fig. 15 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 15 Okamoto at 4:60-5:4: More specifically, disk drives 20 are integratively arranged in a matrix by using four disk drives to form a row, and stacking three rows one atop the other. For example, a hard disk drive like a FC (Fibre Channel) disk, SATA (Serial AT Attachment) disk and SAS (Serial Attached SCSI) disk are used as disk drives 20. The present invention is not limited to hard disk drives, and, for example, various rewritable and nonvolatile storage devices, such as a flash memory or other

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Asserted Claims	Okamoto
	such semiconductor memory device, a magneto-optical disk drive, an optical disk drive, a magnetic tape drive, a flexible disk drive, and a holographic memory device can also be utilized. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. 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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 9:58-10:3: When the respective disk drives 20 are operating normally, the storage controller 1 executes normal operation (S10). Under normal operation, for example, a write process or a read process is carried out. For example, when a write command is issued from the host H, the storage controller 1 writes the write-data received from the host H into the cache memory 142, and notifies the host H to the effect that write command processing has ended. Or, the storage

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Asserted Claims	Okamoto
	controller 1 notifies the host H that write command processing has ended subsequent to computing the parity of the write-data, and respectively writing the data and parity to a prescribed disk drive 20. Okamoto at 10:4-10: When the host H issues a read command, if the requested data exists in the cache memory 142, the storage controller 1 reads this data from the cache memory 142, and sends this data to the host H. When the data requested from the host H does not exist in the cache memory 142, the storage controller 1 reads the data from the prescribed disk drive 20 and sends the data to the host H.
[1.e] 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, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 7 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 7 Okamoto at Fig. 14 and accompanying text:

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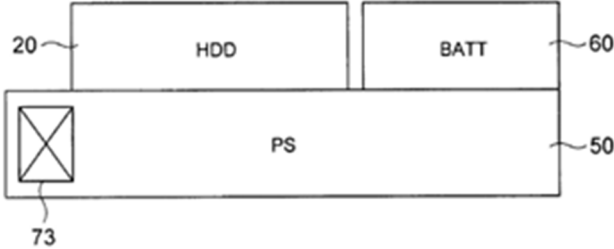
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

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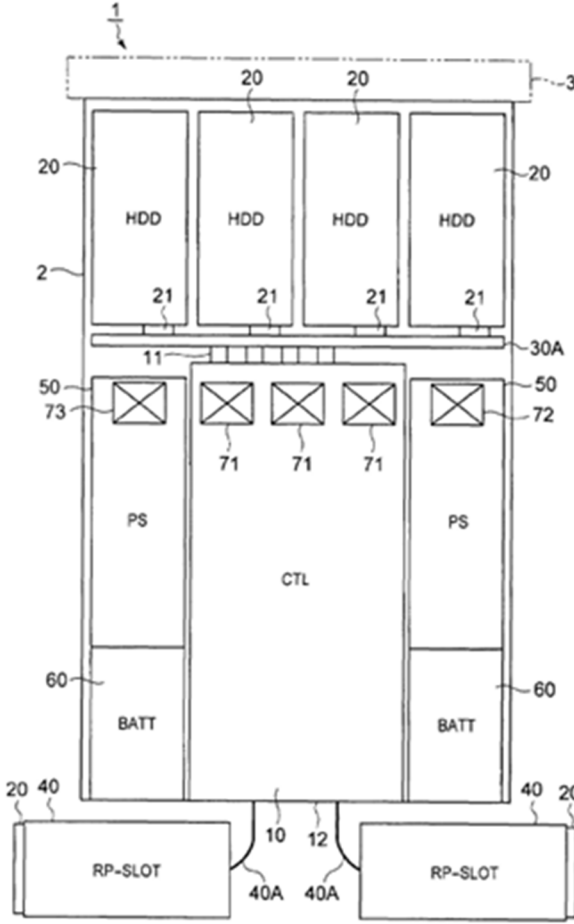
Asserted Claims	Okamoto
	FIG. 24  Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the

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Asserted Claims	Okamoto
	enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances.

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Asserted Claims	Okamoto
	Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. A battery 60

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Asserted Claims	Okamoto
	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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from

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Asserted Claims	Okamoto
	outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 9:20-27: As shown in FIG. 7, the respective power devices 50 are connected to the respective disk drives 20. Therefore, if a failure should occur in either one of the power devices 50, direct current power can be supplied using the other power device 50. Although omitted from the figure, when the storage controller 1 requires a plurality of types of direct current voltage, the respective power devices 50 are constituted so as to output a plurality of types of direct current voltage. Okamoto at 9:28-47: The power capacity of the respective power devices 50 is schematically shown at the bottom of FIG. 7. In this embodiment, the power capacity of the respective power devices 50 is set so as to enable direct current power to be supplied to the largest number of disk drives 20 having a possibility of being simultaneously operated, of the respective disk drives 20. More specifically, the respective power devices 50 comprise the power capacity to ensure that ten disk drives 20 operate simultaneously. In actuality, the maximum number of disk drives capable of being mounted in the storage controller 1 is 14 including repair disks. However, the power capacity of the power devices 50 is configured at 10 units. This is because a spare disk and a repair disk are only used when a failure occurs in either a data disk or a parity disk, and since it is possible to shut off the power to a disk drive 20 in which a failure has occurred, 10 units' worth of power capacity is sufficient. Thus, in this embodiment, configuring the power capacity of the power devices 50 for the lowest value required means that the power devices 50 can be made smaller, and manufacturing costs can be reduced. Okamoto at 10:17-22: When there is a spare disk that is not being used (S12: YES), the storage controller 1 stops the power supply to the failed disk drive 20 (S13), supplies power to the spare disk, and boots the spare disk up (S14). Since power is being supplied to a spare disk instead of the failed disk drive 20, the power capacity of the power device 50 is sufficient.

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Asserted Claims	Okamoto
	Okamoto at 11:45-51: This embodiment is constituted by making the control structure (control boards 10) and power supply structure (power devices 50) of the storage controller 1 redundant. Therefore, even if a failure occurs in any one of the control boards 10 or power devices 50, operation can be continued using the other control board 10 and power device 50, thereby enhancing availability and reliability. Okamoto at 12:15-24: FIG. 9 is a schematic diagram respectively showing the power capacity and power supply status of a power device 50 according to this embodiment. In the first embodiment, it was explained that the respective power devices 50 comprise only enough power capacity to be able to simultaneously supply direct current power to 10 disk drives 20. By contrast, the respective power devices 50 of this embodiment each comprise power capacity that enables direct current power to be simultaneously supplied to 11 disk drives 20 as shown in FIG. 9A. Okamoto at 12:25-29: As shown in FIG. 9B, since only eight data disks and two parity disks are used during normal operation, the capacity of the power outputted from the respective power devices 50 is restricted to a value, which enables direct current power to be supplied to 10 disk drives 20. Okamoto at 12:30-36: As shown in FIG. 9C, when a failed disk is detected, copying is carried out from the failed disk to a spare disk. Therefore, the maximum number of disk drives being driven simultaneously inside the storage controller 1 becomes 11 (=10+1). Accordingly, the capacity of the power outputted from the respective power devices 50 is increased to 11 units' worth of disk drives. Okamoto at 12:37-54: As shown in FIG. 9D, when the data stored in a failed disk can not be restored by a copy process from the failed disk to a spare disk, a correction copy is commenced. In a correction copy, as

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Asserted Claims	Okamoto
	explained hereinabove, data and parity stored in the other disk drives 20 belonging to the same parity group as the failed disk drive 20 are read out, a logical operation is performed, and the data restored by this logical operation is stored in a spare disk. In a correction copy, the maximum number of disk drives being driven simultaneously inside the storage controller 1 is 10 the same as during normal operation. This is because the power supply to the failed disk is stopped, and power is supplied to the spare disk instead. Accordingly, the capacity of the power outputted from the respective power devices 50 is set at 10 units' worth of disk drives. Thus, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1 (normal operating mode, spare disk copy mode, correction copy mode). Okamoto at 13:37-42: Further, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1, and power is supplied at a capacity deemed necessary for each operating mode. Consequently, it is possible to reduce the power consumption of the storage controller 1. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:18-21: A fifth embodiment will be explained based on FIGS. 13 and 14. In this embodiment, the arrangements of the disk drives 20, power devices 50 and batteries 60 are altered from the arrangement described in the first embodiment. Okamoto at 14:22-29:

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Asserted Claims	Okamoto
	FIG. 13 is a plan view showing a storage controller 1 related to the fifth embodiment with the enclosure 2 and front bezel 3 removed. The respective power devices 50 are disposed one each on both sides of the respective control boards (on the right side and left side in FIG. 13). 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: Okamoto at 14:30-32: FIG. 14 is a side view focusing on a power device 50 with the enclosure 2 removed. As described above, a disk drive 20 and battery 60 are located on top of the power device 50. Okamoto at 14:33-40: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this 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. Therefore, the flow of cooling air inside the enclosure 2 can be made relatively uniform, and cooling can be carried out more efficiently.
[1.f] 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, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 7 and accompanying text:

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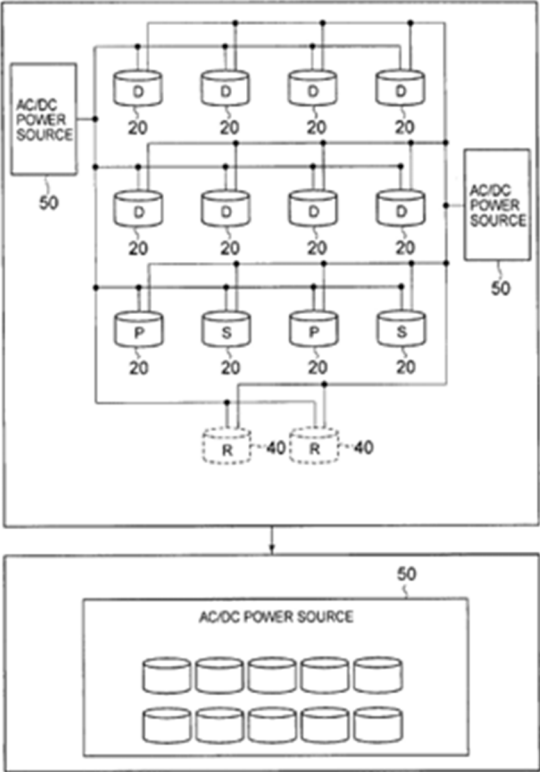
Asserted Claims	Okamoto
	FIG. 7  Okamoto at Fig. 14 and accompanying text:

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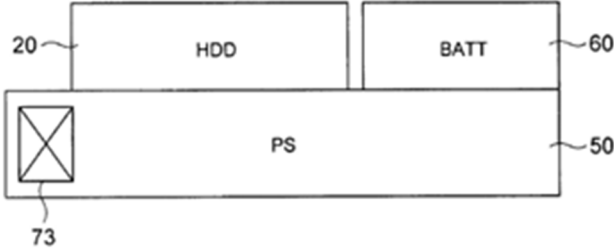
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 24 Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the

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Asserted Claims	Okamoto
	enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances.

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	Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:60-5:4: More specifically, disk drives 20 are integratively arranged in a matrix by using four disk drives to form a row, and stacking three rows one atop the other. For example, a hard disk drive like a FC (Fibre Channel) disk, SATA (Serial AT Attachment) disk and SAS (Serial Attached SCSI) disk are used as disk drives 20. The present 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, a magneto-optical disk drive, an optical disk drive, a magnetic tape drive, a flexible disk drive, and a holographic memory device can also be utilized. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20.

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	Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. 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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 7:17-23:

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	FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 9:20-27: As shown in FIG. 7, the respective power devices 50 are connected to the respective disk drives 20. Therefore, if a failure should occur in either one of the power devices 50, direct current power can be supplied using the other power device 50. Although omitted from the figure, when

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	the storage controller 1 requires a plurality of types of direct current voltage, the respective power devices 50 are constituted so as to output a plurality of types of direct current voltage. Okamoto at 9:28-47: The power capacity of the respective power devices 50 is schematically shown at the bottom of FIG. 7. In this embodiment, the power capacity of the respective power devices 50 is set so as to enable direct current power to be supplied to the largest number of disk drives 20 having a possibility of being simultaneously operated, of the respective disk drives 20. More specifically, the respective power devices 50 comprise the power capacity to ensure that ten disk drives 20 operate simultaneously. In actuality, the maximum number of disk drives capable of being mounted in the storage controller 1 is 14 including repair disks. However, the power capacity of the power devices 50 is configured at 10 units. This is because a spare disk and a repair disk are only used when a failure occurs in either a data disk or a parity disk, and since it is possible to shut off the power to a disk drive 20 in which a failure has occurred, 10 units' worth of power capacity is sufficient. Thus, in this embodiment, configuring the power capacity of the power devices 50 for the lowest value required means that the power devices 50 can be made smaller, and manufacturing costs can be reduced. Okamoto at 9:58-10:3: When the respective disk drives 20 are operating normally, the storage controller 1 executes normal operation (S10). Under normal operation, for example, a write process or a read process is carried out. For example, when a write command is issued from the host H, the storage controller 1 writes the write-data received from the host H into the cache memory 142, and notifies the host H to the effect that write command processing has ended. Or, the storage controller 1 notifies the host H that write command processing has ended subsequent to computing the parity of the write-data, and respectively writing the data and parity to a prescribed disk drive 20. Okamoto at 10:4-10: When the host H issues a read command, if the requested data exists in the cache memory 142, the storage controller 1 reads this data from the cache memory 142, and sends this data to the

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	host H. When the data requested from the host H does not exist in the cache memory 142, the storage controller 1 reads the data from the prescribed disk drive 20 and sends the data to the host H. Okamoto at 10:17-22: When there is a spare disk that is not being used (S12: YES), the storage controller 1 stops the power supply to the failed disk drive 20 (S13), supplies power to the spare disk, and boots the spare disk up (S14). Since power is being supplied to a spare disk instead of the failed disk drive 20, the power capacity of the power device 50 is sufficient. Okamoto at 11:45-51: This embodiment is constituted by making the control structure (control boards 10) and power supply structure (power devices 50) of the storage controller 1 redundant. Therefore, even if a failure occurs in any one of the control boards 10 or power devices 50, operation can be continued using the other control board 10 and power device 50, thereby enhancing availability and reliability. Okamoto at 12:15-24: FIG. 9 is a schematic diagram respectively showing the power capacity and power supply status of a power device 50 according to this embodiment. In the first embodiment, it was explained that the respective power devices 50 comprise only enough power capacity to be able to simultaneously supply direct current power to 10 disk drives 20. By contrast, the respective power devices 50 of this embodiment each comprise power capacity that enables direct current power to be simultaneously supplied to 11 disk drives 20 as shown in FIG. 9A. Okamoto at 12:25-29: As shown in FIG. 9B, since only eight data disks and two parity disks are used during normal operation, the capacity of the power outputted from the respective power devices 50 is restricted to a value, which enables direct current power to be supplied to 10 disk drives 20.

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	Okamoto at 12:30-36: As shown in FIG. 9C, when a failed disk is detected, copying is carried out from the failed disk to a spare disk. Therefore, the maximum number of disk drives being driven simultaneously inside the storage controller 1 becomes 11 (=10+1). Accordingly, the capacity of the power outputted from the respective power devices 50 is increased to 11 units' worth of disk drives. Okamoto at 12:37-54: As shown in FIG. 9D, when the data stored in a failed disk can not be restored by a copy process from the failed disk to a spare disk, a correction copy is commenced. In a correction copy, as explained hereinabove, data and parity stored in the other disk drives 20 belonging to the same parity group as the failed disk drive 20 are read out, a logical operation is performed, and the data restored by this logical operation is stored in a spare disk. In a correction copy, the maximum number of disk drives being driven simultaneously inside the storage controller 1 is 10 the same as during normal operation. This is because the power supply to the failed disk is stopped, and power is supplied to the spare disk instead. Accordingly, the capacity of the power outputted from the respective power devices 50 is set at 10 units' worth of disk drives. Thus, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1 (normal operating mode, spare disk copy mode, correction copy mode). Okamoto at 13:37-42: Further, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1, and power is supplied at a capacity deemed necessary for each operating mode. Consequently, it is possible to reduce the power consumption of the storage controller 1. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More

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	accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:18-21: A fifth embodiment will be explained based on FIGS. 13 and 14. In this embodiment, the arrangements of the disk drives 20, power devices 50 and batteries 60 are altered from the arrangement described in the first embodiment. Okamoto at 14:22-29: FIG. 13 is a plan view showing a storage controller 1 related to the fifth embodiment with the enclosure 2 and front bezel 3 removed. The respective power devices 50 are disposed one each on both sides of the respective control boards (on the right side and left side in FIG. 13). 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: Okamoto at 14:30-32: FIG. 14 is a side view focusing on a power device 50 with the enclosure 2 removed. As described above, a disk drive 20 and battery 60 are located on top of the power device 50. Okamoto at 14:33-40: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this 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. Therefore, the flow of cooling air inside the enclosure 2 can be made relatively uniform, and cooling can be carried out more efficiently.
[1.g] wherein the plurality of power source units are each positioned not to be aligned linearly with the CPU in the	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i>

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longitudinal direction of the housing.	Okamoto at Fig. 2 and accompanying text: FIG. 2 Okamoto at Fig. 16 and accompanying text:

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	FIG. 16 Okamoto at Fig. 24 and accompanying text:

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	FIG. 24 Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the

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	enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances.

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	Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. A battery 60

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	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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 7:39-50: The respective control boards 10, for example, are constituted comprising a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Details

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	concerning the respective units 110, 120, 130, 140 will be explained hereinbelow using FIG. 6. Briefly stated, the host interface unit 110 is for exchanging data with the host H. The backend interface unit 120 is for exchanging data with the respective disk drives 20. The processor unit 130 is for controlling the overall operation of the storage controller 1. The data transfer control unit 140 is for controlling the transfer of data received from the host H, and data read out from the respective disk drives 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 9:20-27: As shown in FIG. 7, the respective power devices 50 are connected to the respective disk drives 20. Therefore, if a failure should occur in either one of the power devices 50, direct current

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	power can be supplied using the other power device 50. Although omitted from the figure, when the storage controller 1 requires a plurality of types of direct current voltage, the respective power devices 50 are constituted so as to output a plurality of types of direct current voltage. Okamoto at 9:28-47: The power capacity of the respective power devices 50 is schematically shown at the bottom of FIG. 7. In this embodiment, the power capacity of the respective power devices 50 is set so as to enable direct current power to be supplied to the largest number of disk drives 20 having a possibility of being simultaneously operated, of the respective disk drives 20. More specifically, the respective power devices 50 comprise the power capacity to ensure that ten disk drives 20 operate simultaneously. In actuality, the maximum number of disk drives capable of being mounted in the storage controller 1 is 14 including repair disks. However, the power capacity of the power devices 50 is configured at 10 units. This is because a spare disk and a repair disk are only used when a failure occurs in either a data disk or a parity disk, and since it is possible to shut off the power to a disk drive 20 in which a failure has occurred, 10 units' worth of power capacity is sufficient. Thus, in this embodiment, configuring the power capacity of the power devices 50 for the lowest value required means that the power devices 50 can be made smaller, and manufacturing costs can be reduced. Okamoto at 10:17-22: When there is a spare disk that is not being used (S12: YES), the storage controller 1 stops the power supply to the failed disk drive 20 (S13), supplies power to the spare disk, and boots the spare disk up (S14). Since power is being supplied to a spare disk instead of the failed disk drive 20, the power capacity of the power device 50 is sufficient. Okamoto at 11:45-51: This embodiment is constituted by making the control structure (control boards 10) and power supply structure (power devices 50) of the storage controller 1 redundant. Therefore, even if a failure occurs in any one of the control boards 10 or power devices 50, operation can be continued using the other control board 10 and power device 50, thereby enhancing availability and reliability.

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	Okamoto at 12:15-24: FIG. 9 is a schematic diagram respectively showing the power capacity and power supply status of a power device 50 according to this embodiment. In the first embodiment, it was explained that the respective power devices 50 comprise only enough power capacity to be able to simultaneously supply direct current power to 10 disk drives 20. By contrast, the respective power devices 50 of this embodiment each comprise power capacity that enables direct current power to be simultaneously supplied to 11 disk drives 20 as shown in FIG. 9A. Okamoto at 12:25-29: As shown in FIG. 9B, since only eight data disks and two parity disks are used during normal operation, the capacity of the power outputted from the respective power devices 50 is restricted to a value, which enables direct current power to be supplied to 10 disk drives 20. Okamoto at 12:30-36: As shown in FIG. 9C, when a failed disk is detected, copying is carried out from the failed disk to a spare disk. Therefore, the maximum number of disk drives being driven simultaneously inside the storage controller 1 becomes 11 (=10+1). Accordingly, the capacity of the power outputted from the respective power devices 50 is increased to 11 units' worth of disk drives. Okamoto at 12:37-54: As shown in FIG. 9D, when the data stored in a failed disk can not be restored by a copy process from the failed disk to a spare disk, a correction copy is commenced. In a correction copy, as explained hereinabove, data and parity stored in the other disk drives 20 belonging to the same parity group as the failed disk drive 20 are read out, a logical operation is performed, and the data restored by this logical operation is stored in a spare disk. In a correction copy, the maximum number of disk drives being driven simultaneously inside the storage controller 1 is 10 the same as during normal operation. This is because the power supply to the failed disk is stopped, and power is supplied to the spare disk instead. Accordingly, the capacity of the power outputted from the respective power devices 50 is set at 10 units' worth of disk drives. Thus, in this embodiment, the power capacity of the respective power devices 50 is restricted in

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	accordance with the operating mode of the storage controller 1 (normal operating mode, spare disk copy mode, correction copy mode). Okamoto at 13:37-42: Further, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1, and power is supplied at a capacity deemed necessary for each operating mode. Consequently, it is possible to reduce the power consumption of the storage controller 1. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:18-21: A fifth embodiment will be explained based on FIGS. 13 and 14. In this embodiment, the arrangements of the disk drives 20, power devices 50 and batteries 60 are altered from the arrangement described in the first embodiment. Okamoto at 14:22-29: FIG. 13 is a plan view showing a storage controller 1 related to the fifth embodiment with the enclosure 2 and front bezel 3 removed. The respective power devices 50 are disposed one each on both sides of the respective control boards (on the right side and left side in FIG. 13). 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: Okamoto at 14:30-32:

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	FIG. 14 is a side view focusing on a power device 50 with the enclosure 2 removed. As described above, a disk drive 20 and battery 60 are located on top of the power device 50. Okamoto at 14:33-40: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this 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. Therefore, the flow of cooling air inside the enclosure 2 can be made relatively uniform, and cooling can be carried out more efficiently. Okamoto at 14:49-54: FIG. 15 is a block diagram of a storage controller 1 according to this embodiment. This storage controller 1 comprises two control structures the same as the above-mentioned first embodiment. The respective control structures are constituted from a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Okamoto at 14:55-62: 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. Two backend interface units 120, two processor units 130, and two data transfer control units 140 are disposed on the main board 10A. Two host interface units 110 are disposed on the sub-board 10B. The main board 10A and the sub-board 10B are electrically connected via a connector. Okamoto at 15:22-27: Other circuitry can also be mounted on the sub-board 10B. For example, the constitution can also be such that two backend interface units 120, or two processor units 130 are mounted on the sub-board 10B instead of two host interface units 110. Or, the constitution can also be such that a plurality of types of circuitry are mounted on the sub-board 10B. Okamoto at 15:63-16:2:

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Asserted Claims	Okamoto
	FIG. 18 is a block diagram of a storage controller 1 according to this embodiment. The one control board, which is shown on the right side of the figure, is constituted from a main board 10A1 and a sub-board 10B1. One backend interface unit 120, one processor unit 130, and one data transfer control unit 140 are disposed on the main board 10A1. One host interface unit 110 is disposed on the sub-board 10B1. Okamoto at 16:3-8: Similarly, the other control board, which is shown on the left side of the figure, is constituted from a main board 10A2, on which are disposed one backend interface unit 120, one processor unit 130, and one data transfer control unit 140, and a sub-board 10B2, on which is disposed one host interface unit 110. Okamoto at 16:50-61: As shown in FIG. 20B, this embodiment is constituted such that the one control board 10 (L) is located on the bottom, and the other control board 10 (U) is located on the top, and these control boards 10 (L), 10 (U) are mounted inside the enclosure 2 in an opposable state so that the microprocessors 131 (L), 131 (U) do not interfere with one another. Control board 10 (L) and control board 10 (U) are arranged face-to-face in a horizontally shifted state in the figure so that the microprocessors 131 (L), 131 (U) do not come in contact with one another's boards. Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. Okamoto at 17:4-15: FIG. 21 is a plan view showing a storage controller 1 related to the ninth embodiment with the enclosure 2 and front bezel 3 removed. A backboard 30B is mounted horizontally on the front side of the enclosure 2. A control board 10C is disposed rearward of the backboard 30B so as to partially overlap with the posterior of the backboard 30B. Two each host interface units 110, backend interface units 120, processor units 130, and data transfer control units 140 are disposed on the single circuit board of this control board 10C. Furthermore, as described in another embodiment mentioned hereinabove, a single control board can also be constituted from a main board and a sub-board, which differ in size.

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Asserted Claims	Okamoto
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.	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 14 and accompanying text:

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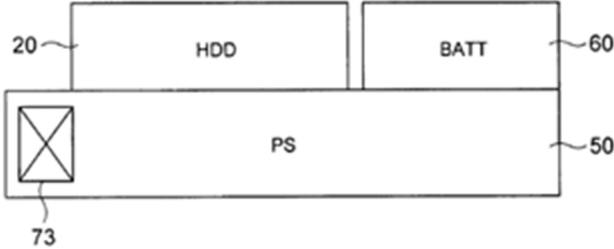
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

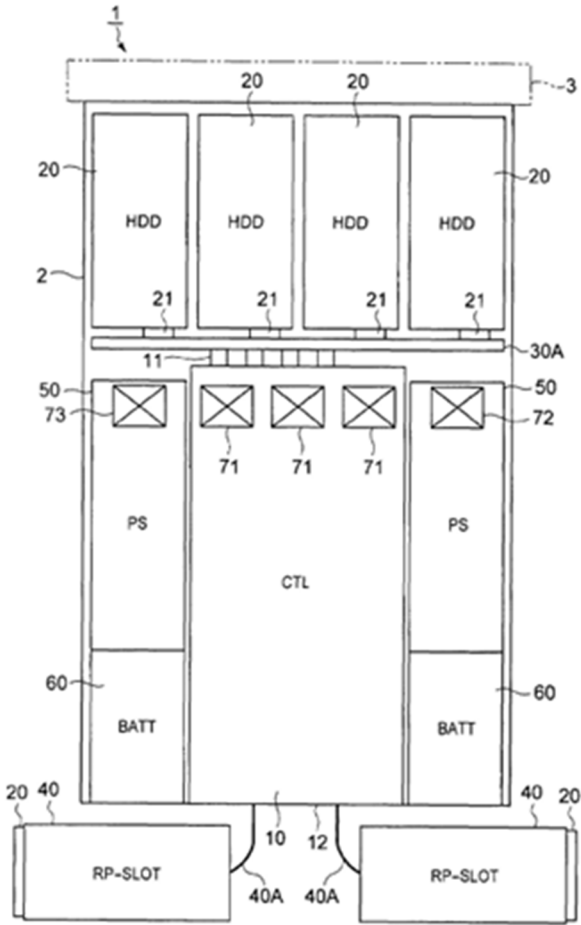
Asserted Claims	Okamoto
	FIG. 24  Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances.

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Asserted Claims	Okamoto
	Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. A battery 60

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Asserted Claims	Okamoto
	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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 9:20-27: As shown in FIG. 7, the respective power devices 50 are connected to the respective disk drives 20. Therefore, if a failure should occur in either one of the power devices 50, direct current power can be supplied using the other power device 50. Although omitted from the figure, when the storage controller 1 requires a plurality of types of direct current voltage, the respective power devices 50 are constituted so as to output a plurality of types of direct current voltage. Okamoto at 9:28-47: The power capacity of the respective power devices 50 is schematically shown at the bottom of FIG. 7. In this embodiment, the power capacity of the respective power devices 50 is set so as to enable direct current power to be supplied to the largest number of disk drives 20 having a possibility of being simultaneously operated, of the respective disk drives 20. More specifically, the respective power devices 50 comprise the power capacity to ensure that ten disk drives 20 operate simultaneously. In actuality, the maximum number of disk drives capable of being mounted in the storage controller 1 is 14 including repair disks. However, the power capacity of the power devices 50 is configured at 10 units. This is because a spare disk and a repair disk are only used when a failure occurs in either a data disk or a parity disk, and since it is possible to shut off the power to a disk drive 20 in which a failure has occurred, 10 units' worth of power capacity is sufficient. Thus, in this embodiment, configuring the power capacity of the power devices 50 for the lowest value required means that the power devices 50 can be made smaller, and manufacturing costs can be reduced. Okamoto at 10:17-22: When there is a spare disk that is not being used (S12: YES), the storage controller 1 stops the power supply to the failed disk drive 20 (S13), supplies power to the spare disk, and boots the spare disk up (S14). Since power is being supplied to a spare disk instead of the failed disk drive 20, the power capacity of the power device 50 is sufficient.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	Okamoto at 11:45-51: This embodiment is constituted by making the control structure (control boards 10) and power supply structure (power devices 50) of the storage controller 1 redundant. Therefore, even if a failure occurs in any one of the control boards 10 or power devices 50, operation can be continued using the other control board 10 and power device 50, thereby enhancing availability and reliability. Okamoto at 12:15-24: FIG. 9 is a schematic diagram respectively showing the power capacity and power supply status of a power device 50 according to this embodiment. In the first embodiment, it was explained that the respective power devices 50 comprise only enough power capacity to be able to simultaneously supply direct current power to 10 disk drives 20. By contrast, the respective power devices 50 of this embodiment each comprise power capacity that enables direct current power to be simultaneously supplied to 11 disk drives 20 as shown in FIG. 9A. Okamoto at 12:25-29: As shown in FIG. 9B, since only eight data disks and two parity disks are used during normal operation, the capacity of the power outputted from the respective power devices 50 is restricted to a value, which enables direct current power to be supplied to 10 disk drives 20. Okamoto at 12:30-36: As shown in FIG. 9C, when a failed disk is detected, copying is carried out from the failed disk to a spare disk. Therefore, the maximum number of disk drives being driven simultaneously inside the storage controller 1 becomes 11 (=10+1). Accordingly, the capacity of the power outputted from the respective power devices 50 is increased to 11 units' worth of disk drives. Okamoto at 12:37-54: As shown in FIG. 9D, when the data stored in a failed disk can not be restored by a copy process from the failed disk to a spare disk, a correction copy is commenced. In a correction copy, as

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Asserted Claims	Okamoto
	explained hereinabove, data and parity stored in the other disk drives 20 belonging to the same parity group as the failed disk drive 20 are read out, a logical operation is performed, and the data restored by this logical operation is stored in a spare disk. In a correction copy, the maximum number of disk drives being driven simultaneously inside the storage controller 1 is 10 the same as during normal operation. This is because the power supply to the failed disk is stopped, and power is supplied to the spare disk instead. Accordingly, the capacity of the power outputted from the respective power devices 50 is set at 10 units' worth of disk drives. Thus, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1 (normal operating mode, spare disk copy mode, correction copy mode). Okamoto at 13:37-42: Further, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1, and power is supplied at a capacity deemed necessary for each operating mode. Consequently, it is possible to reduce the power consumption of the storage controller 1. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:18-21: A fifth embodiment will be explained based on FIGS. 13 and 14. In this embodiment, the arrangements of the disk drives 20, power devices 50 and batteries 60 are altered from the arrangement described in the first embodiment. Okamoto at 14:22-29:

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Asserted Claims	Okamoto
	FIG. 13 is a plan view showing a storage controller 1 related to the fifth embodiment with the enclosure 2 and front bezel 3 removed. The respective power devices 50 are disposed one each on both sides of the respective control boards (on the right side and left side in FIG. 13). 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: Okamoto at 14:30-32: FIG. 14 is a side view focusing on a power device 50 with the enclosure 2 removed. As described above, a disk drive 20 and battery 60 are located on top of the power device 50. Okamoto at 14:33-40: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this 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. Therefore, the flow of cooling air inside the enclosure 2 can be made relatively uniform, and cooling can be carried out more efficiently.
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.	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 7 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

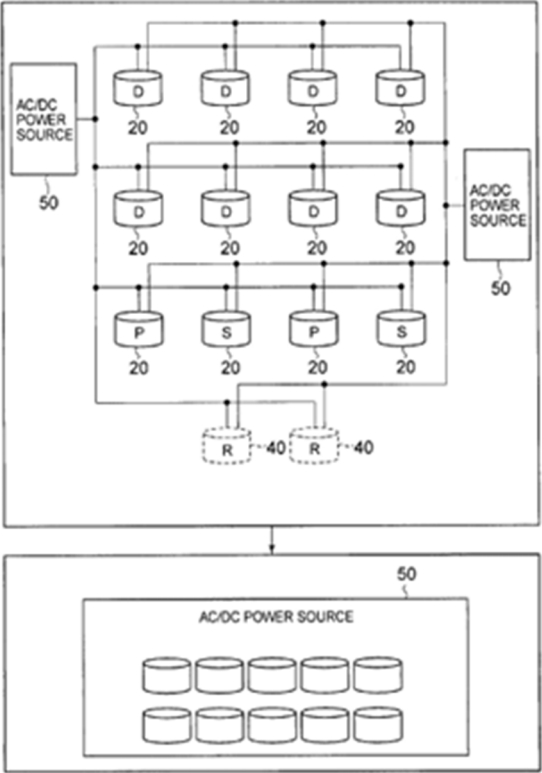
Asserted Claims	Okamoto
	FIG. 7  Okamoto at Fig. 14 and accompanying text:

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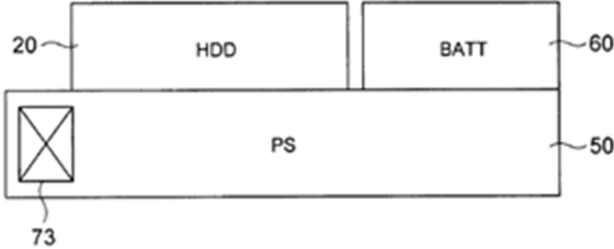
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 24 Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the

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Asserted Claims	Okamoto
	enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 3:25-28: In one aspect of the present invention, the power device comprises power capacity corresponding to the number of storage devices having a possibility of being used simultaneously of the respective storage devices. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances.

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Asserted Claims	Okamoto
	Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:4-8: The respective power devices 50, for example, are located on the other side of the respective control boards 10, and are arranged one atop the other. The power device 50 supplies power of a prescribed voltage to the respective disk drives 20, respective control boards 10 and so forth. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. A battery 60

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Asserted Claims	Okamoto
	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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from

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Asserted Claims	Okamoto
	outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 9:20-27: As shown in FIG. 7, the respective power devices 50 are connected to the respective disk drives 20. Therefore, if a failure should occur in either one of the power devices 50, direct current power can be supplied using the other power device 50. Although omitted from the figure, when the storage controller 1 requires a plurality of types of direct current voltage, the respective power devices 50 are constituted so as to output a plurality of types of direct current voltage. Okamoto at 9:28-47: The power capacity of the respective power devices 50 is schematically shown at the bottom of FIG. 7. In this embodiment, the power capacity of the respective power devices 50 is set so as to enable direct current power to be supplied to the largest number of disk drives 20 having a possibility of being simultaneously operated, of the respective disk drives 20. More specifically, the respective power devices 50 comprise the power capacity to ensure that ten disk drives 20 operate simultaneously. In actuality, the maximum number of disk drives capable of being mounted in the storage controller 1 is 14 including repair disks. However, the power capacity of the power devices 50 is configured at 10 units. This is because a spare disk and a repair disk are only used when a failure occurs in either a data disk or a parity disk, and since it is possible to shut off the power to a disk drive 20 in which a failure has occurred, 10 units' worth of power capacity is sufficient. Thus, in this embodiment, configuring the power capacity of the power devices 50 for the lowest value required means that the power devices 50 can be made smaller, and manufacturing costs can be reduced. Okamoto at 10:17-22: When there is a spare disk that is not being used (S12: YES), the storage controller 1 stops the power supply to the failed disk drive 20 (S13), supplies power to the spare disk, and boots the spare disk up (S14). Since power is being supplied to a spare disk instead of the failed disk drive 20, the power capacity of the power device 50 is sufficient.

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Asserted Claims	Okamoto
	Okamoto at 11:45-51: This embodiment is constituted by making the control structure (control boards 10) and power supply structure (power devices 50) of the storage controller 1 redundant. Therefore, even if a failure occurs in any one of the control boards 10 or power devices 50, operation can be continued using the other control board 10 and power device 50, thereby enhancing availability and reliability. Okamoto at 12:15-24: FIG. 9 is a schematic diagram respectively showing the power capacity and power supply status of a power device 50 according to this embodiment. In the first embodiment, it was explained that the respective power devices 50 comprise only enough power capacity to be able to simultaneously supply direct current power to 10 disk drives 20. By contrast, the respective power devices 50 of this embodiment each comprise power capacity that enables direct current power to be simultaneously supplied to 11 disk drives 20 as shown in FIG. 9A. Okamoto at 12:25-29: As shown in FIG. 9B, since only eight data disks and two parity disks are used during normal operation, the capacity of the power outputted from the respective power devices 50 is restricted to a value, which enables direct current power to be supplied to 10 disk drives 20. Okamoto at 12:30-36: As shown in FIG. 9C, when a failed disk is detected, copying is carried out from the failed disk to a spare disk. Therefore, the maximum number of disk drives being driven simultaneously inside the storage controller 1 becomes 11 (=10+1). Accordingly, the capacity of the power outputted from the respective power devices 50 is increased to 11 units' worth of disk drives. Okamoto at 12:37-54: As shown in FIG. 9D, when the data stored in a failed disk can not be restored by a copy process from the failed disk to a spare disk, a correction copy is commenced. In a correction copy, as

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Asserted Claims	Okamoto
	explained hereinabove, data and parity stored in the other disk drives 20 belonging to the same parity group as the failed disk drive 20 are read out, a logical operation is performed, and the data restored by this logical operation is stored in a spare disk. In a correction copy, the maximum number of disk drives being driven simultaneously inside the storage controller 1 is 10 the same as during normal operation. This is because the power supply to the failed disk is stopped, and power is supplied to the spare disk instead. Accordingly, the capacity of the power outputted from the respective power devices 50 is set at 10 units' worth of disk drives. Thus, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1 (normal operating mode, spare disk copy mode, correction copy mode). Okamoto at 13:37-42: Further, in this embodiment, the power capacity of the respective power devices 50 is restricted in accordance with the operating mode of the storage controller 1, and power is supplied at a capacity deemed necessary for each operating mode. Consequently, it is possible to reduce the power consumption of the storage controller 1. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:18-21: A fifth embodiment will be explained based on FIGS. 13 and 14. In this embodiment, the arrangements of the disk drives 20, power devices 50 and batteries 60 are altered from the arrangement described in the first embodiment. Okamoto at 14:22-29:

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Asserted Claims	Okamoto
	FIG. 13 is a plan view showing a storage controller 1 related to the fifth embodiment with the enclosure 2 and front bezel 3 removed. The respective power devices 50 are disposed one each on both sides of the respective control boards (on the right side and left side in FIG. 13). 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: Okamoto at 14:30-32: FIG. 14 is a side view focusing on a power device 50 with the enclosure 2 removed. As described above, a disk drive 20 and battery 60 are located on top of the power device 50. Okamoto at 14:33-40: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this 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. Therefore, the flow of cooling air inside the enclosure 2 can be made relatively uniform, and cooling can be carried out more efficiently.
[4.a] 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,	Okamoto discloses, expressly and/or inherently, 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. <i>See claims 1.pre, 1.b, 1.c, 1.e.</i>

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Asserted Claims	Okamoto
[4.b] wherein the CPU is arranged downstream of the plurality of fans and positioned to allow the cooling air to directly flow therethrough,	Okamoto discloses, expressly and/or inherently, wherein the CPU is arranged downstream of the plurality of fans and positioned to allow the cooling air to directly flow therethrough. <i>See claim 1.c.</i>
[4.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,	Okamoto discloses, expressly and/or inherently, 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. <i>See claims 1.d, 1.f.</i>
[4.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, expressly and/or inherently, 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. <i>See claims 1.e, 1.g.</i>
5. The electronic device according to claim 1, wherein the plurality of power source units are each positioned along	Okamoto discloses, expressly and/or inherently, 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.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
an extension downstream from the plurality of memory devices.	<i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text: FIG. 2 Okamoto at 4:60-5:4:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	More specifically, disk drives 20 are integratively arranged in a matrix by using four disk drives to form a row, and stacking three rows one atop the other. For example, a hard disk drive like a FC (Fibre Channel) disk, SATA (Serial AT Attachment) disk and SAS (Serial Attached SCSI) disk are used as disk drives 20. The present 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, a magneto-optical disk drive, an optical disk drive, a magnetic tape drive, a flexible disk drive, and a holographic memory device can also be utilized. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. 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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 9:58-10:3:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	When the respective disk drives 20 are operating normally, the storage controller 1 executes normal operation (S10). Under normal operation, for example, a write process or a read process is carried out. For example, when a write command is issued from the host H, the storage controller 1 writes the write-data received from the host H into the cache memory 142, and notifies the host H to the effect that write command processing has ended. Or, the storage controller 1 notifies the host H that write command processing has ended subsequent to computing the parity of the write-data, and respectively writing the data and parity to a prescribed disk drive 20. Okamoto at 10:4-10: When the host H issues a read command, if the requested data exists in the cache memory 142, the storage controller 1 reads this data from the cache memory 142, and sends this data to the host H. When the data requested from the host H does not exist in the cache memory 142, the storage controller 1 reads the data from the prescribed disk drive 20 and sends the data to the host H.
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.	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 5 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

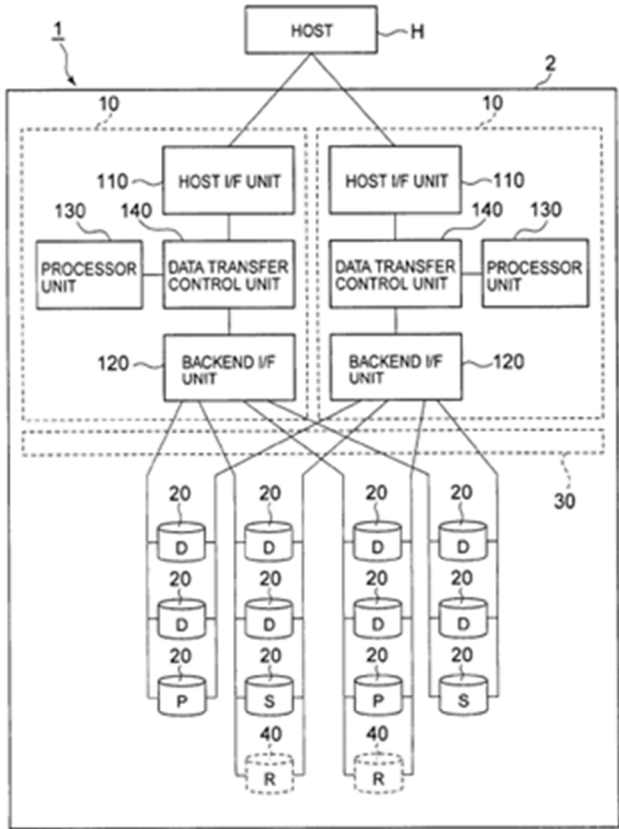
Asserted Claims	Okamoto
	FIG. 5  Okamoto at Fig. 15 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

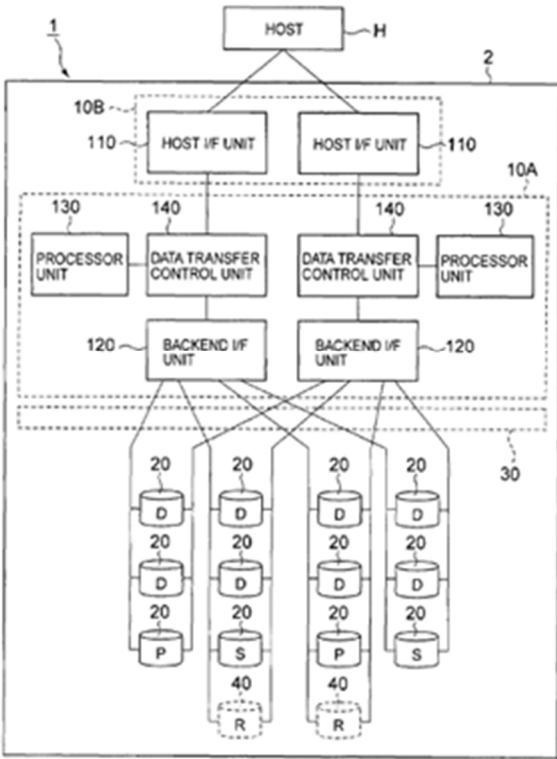
Asserted Claims	Okamoto
	FIG. 15  Okamoto at 7:39-50: The respective control boards 10, for example, are constituted comprising a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Details concerning the respective units 110, 120, 130, 140 will be explained hereinbelow using FIG. 6. Briefly stated, the host interface unit 110 is for exchanging data with the host H. The backend interface unit 120 is for exchanging data with the respective disk drives 20. The processor unit 130 is for controlling the overall operation of the storage controller 1. The data transfer control

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	unit 140 is for controlling the transfer of data received from the host H, and data read out from the respective disk drives 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 14:49-54: FIG. 15 is a block diagram of a storage controller 1 according to this embodiment. This storage controller 1 comprises two control structures the same as the above-mentioned first embodiment. The respective control structures are constituted from a host interface unit 110, backend interface unit 120, processor unit 130, and data transfer control unit 140. Okamoto at 14:55-62: 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. Two backend interface units 120, two processor units 130, and two data transfer control units 140 are disposed on the main board 10A. Two host interface units 110 are disposed on the sub-board 10B. The main board 10A and the sub-board 10B are electrically connected via a connector.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	Okamoto at 15:22-27: Other circuitry can also be mounted on the sub-board 10B. For example, the constitution can also be such that two backend interface units 120, or two processor units 130 are mounted on the sub-board 10B instead of two host interface units 110. Or, the constitution can also be such that a plurality of types of circuitry are mounted on the sub-board 10B. Okamoto at 15:63-16:2: FIG. 18 is a block diagram of a storage controller 1 according to this embodiment. The one control board, which is shown on the right side of the figure, is constituted from a main board 10A1 and a sub-board 10B1. One backend interface unit 120, one processor unit 130, and one data transfer control unit 140 are disposed on the main board 10A1. One host interface unit 110 is disposed on the sub-board 10B1. Okamoto at 16:3-8: Similarly, the other control board, which is shown on the left side of the figure, is constituted from a main board 10A2, on which are disposed one backend interface unit 120, one processor unit 130, and one data transfer control unit 140, and a sub-board 10B2, on which is disposed one host interface unit 110. Okamoto at 16:44-47: An eighth embodiment will be explained based on FIG. 20. This embodiment gives examples of the arrangement of a microprocessor 131 and the arrangement of a control board 10. Okamoto at 16:48-49 FIG. 20A is a schematic plan view of control boards 10 focusing on the location of the microprocessors 131. Okamoto at 16:50-61: As shown in FIG. 20B, this embodiment is constituted such that the one control board 10 (L) is located on the bottom, and the other control board 10 (U) is located on the top, and these control boards 10 (L), 10 (U) are mounted inside the enclosure 2 in an opposable state so that the

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	microprocessors 131 (L), 131 (U) do not interfere with one another. Control board 10 (L) and control board 10 (U) are arranged face-to-face in a horizontally shifted state in the figure so that the microprocessors 131 (L), 131 (U) do not come in contact with one another's boards. Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. Okamoto at 17:4-15: FIG. 21 is a plan view showing a storage controller 1 related to the ninth embodiment with the enclosure 2 and front bezel 3 removed. A backboard 30B is mounted horizontally on the front side of the enclosure 2. A control board 10C is disposed rearward of the backboard 30B so as to partially overlap with the posterior of the backboard 30B. Two each host interface units 110, backend interface units 120, processor units 130, and data transfer control units 140 are disposed on the single circuit board of this control board 10C. Furthermore, as described in another embodiment mentioned hereinabove, a single control board can also be constituted from a main board and a sub-board, which differ in size.
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.	Okamoto discloses, expressly and/or inherently, 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. <i>See, e.g.:</i> Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

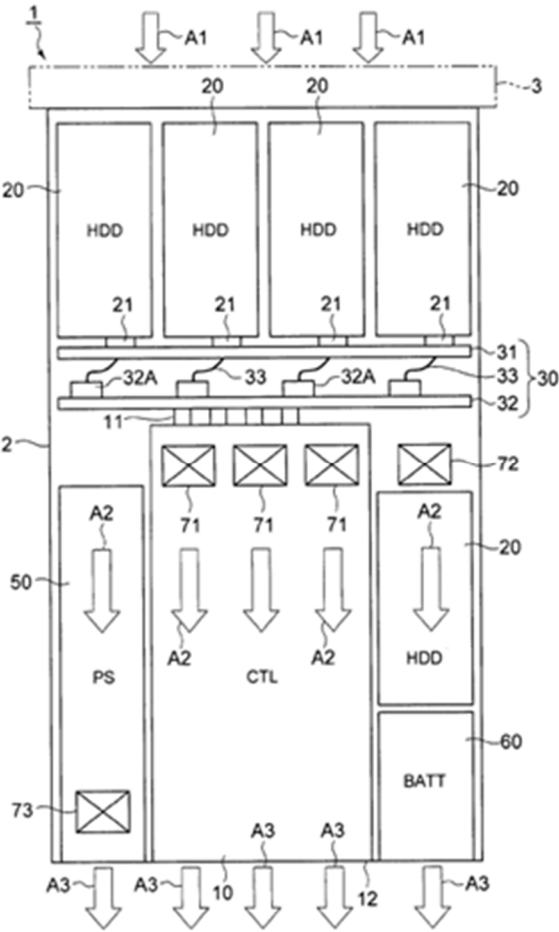
Asserted Claims	Okamoto
	FIG. 2  Okamoto at 4:60-5:4: More specifically, disk drives 20 are integratively arranged in a matrix by using four disk drives to form a row, and stacking three rows one atop the other. For example, a hard disk drive like a FC (Fibre Channel) disk, SATA (Serial AT Attachment) disk and SAS (Serial Attached SCSI)

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	disk are used as disk drives 20. The present 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, a magneto-optical disk drive, an optical disk drive, a magnetic tape drive, a flexible disk drive, and a holographic memory device can also be utilized. Okamoto at 6:9-17: The respective batteries 60 are located on the one side of the respective control boards 10, and are arranged one atop the other rearward of the respective repair drive slots 40. 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. During the period that power is being backed up by battery 60, data stored in cache memory 142 (refer to FIG. 6) can be written to a disk drive 20. Okamoto at 8:50-57: The processor unit 130, for example, is constituted comprising a microprocessor 131, a bridge 132, and a memory 133. The bridge 132 connects the microprocessor 131 and the memory 133. Further, the microprocessor 131 is also connected to a DMA circuit 141 by the bridge 132. The microprocessor 131 processes an access request from the host H by reading in and executing various programs stored beforehand in the memory 133. Okamoto at 8:58-67: The data transfer control unit 140, for example, is constituted comprising a DMA (Direct Memory Access) circuit 141, and a cache memory 142. The DMA circuit 141 is a circuit for enabling the respective protocol chips 111, 121 to access cache memory 142 without going through the microprocessor 131. The cache memory 142 is a memory for temporarily storing data received from the host H, and data that has been read out from a disk drive 20. Okamoto at 9:58-10:3: When the respective disk drives 20 are operating normally, the storage controller 1 executes normal operation (S10). Under normal operation, for example, a write process or a read process is carried out. For example, when a write command is issued from the host H, the storage

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	controller 1 writes the write-data received from the host H into the cache memory 142, and notifies the host H to the effect that write command processing has ended. Or, the storage controller 1 notifies the host H that write command processing has ended subsequent to computing the parity of the write-data, and respectively writing the data and parity to a prescribed disk drive 20. Okamoto at 10:4-10: When the host H issues a read command, if the requested data exists in the cache memory 142, the storage controller 1 reads this data from the cache memory 142, and sends this data to the host H. When the data requested from the host H does not exist in the cache memory 142, the storage controller 1 reads the data from the prescribed disk drive 20 and sends the data to the host H.
[8.pre] 8. The electronic device according to claim 1, wherein	Dell takes no position in these Invalidity Contentions on whether the entirety of the preamble of this claim limitation. Okamoto discloses, expressly and/or inherently, the electronic device according to claim 1. <i>See claim 1.</i>
[8.a] the plurality of fans are arranged in a direction normal to the longitudinal direction,	Okamoto discloses, expressly and/or inherently, the plurality of fans are arranged in a direction normal to the longitudinal direction. <i>See claim 1.b.</i>
[8.b] the central processing unit is positioned in a first row,	Okamoto discloses, expressly and/or inherently, the central processing unit is positioned in a first row. <i>See claim 1.c.</i>

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

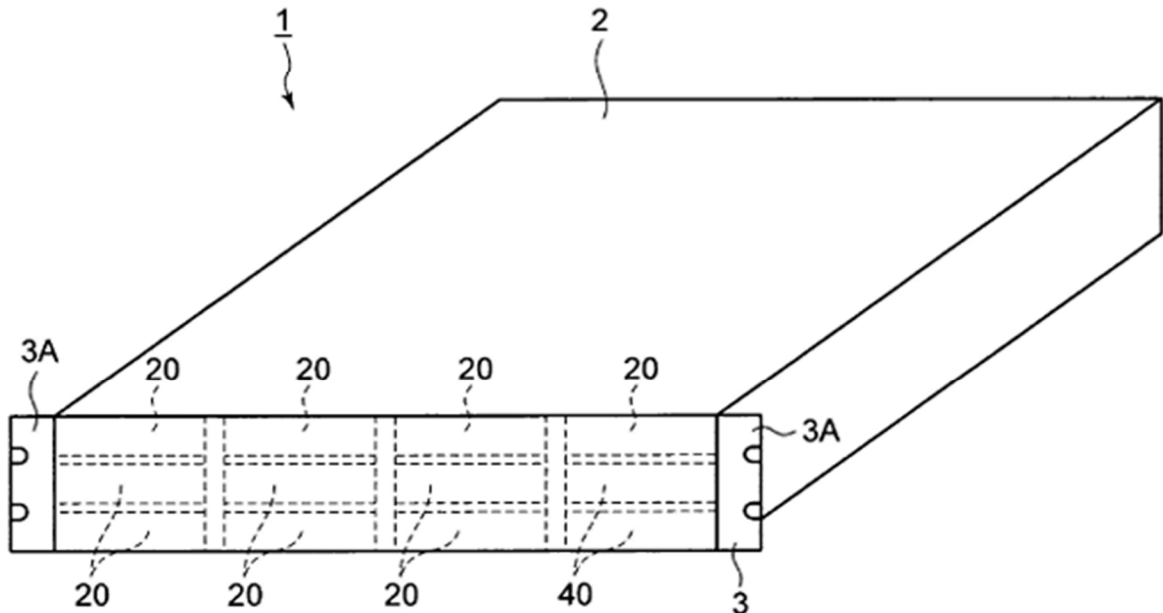
Asserted Claims	Okamoto
	Okamoto at Fig. 1 and accompanying text: FIG. 1  Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 5 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 5 Okamoto at Fig. 15 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 15 Okamoto at Fig. 7 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 7 Okamoto at Fig. 14 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

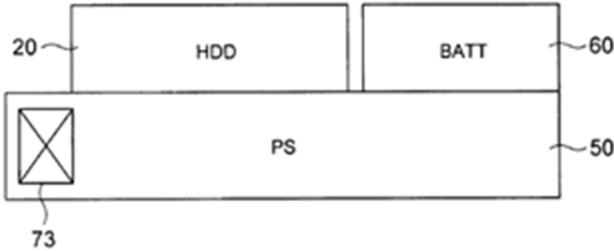
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 24 Okamoto at 1:13–14: 1. Field of the Invention The present invention relates to a storage controller.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	Okamoto at 1:24-31: However, a rack-mounted disk array apparatus is also known as a storage controller (Japanese Patent Laid-open No. 2005-327390). In this rack-mounted disk array apparatus, a plurality of hard disk units and interface units are replaceably disposed inside a rack installed in an enclosure. When replacing a hard disk unit, the user pulls out the hard disk unit to be replaced from the front side of the enclosure, and installs a new hard disk unit. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”. Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	“connection board”. The backboard 30, for example, can be constituted from a first board 31, which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50.
[8.c] the first row extending parallel to the direction,	Okamoto discloses, expressly and/or inherently, the first row extending parallel to the direction. <i>See, e.g.:</i>

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

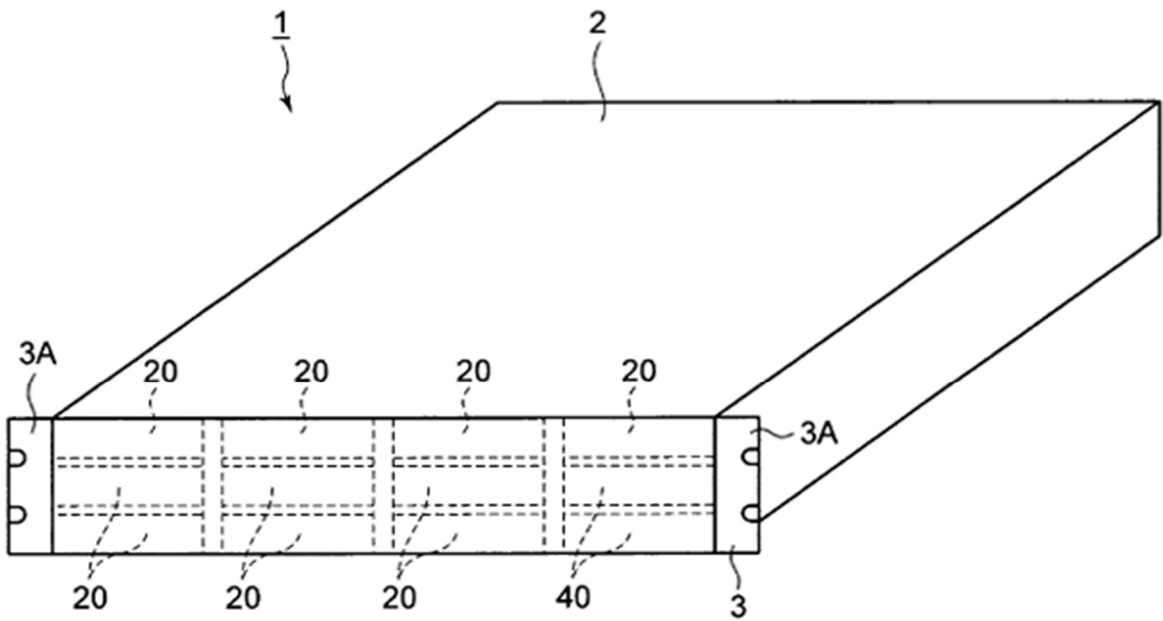
Asserted Claims	Okamoto
	Okamoto at Fig. 1 and accompanying text: FIG. 1  Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 14 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

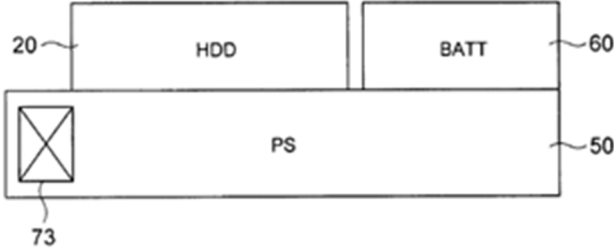
Asserted Claims	Okamoto
	FIG. 14  Okamoto at Fig. 16 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 24 Okamoto at 1:13–14: 1. Field of the Invention The present invention relates to a storage controller.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	Okamoto at 1:24-31: However, a rack-mounted disk array apparatus is also known as a storage controller (Japanese Patent Laid-open No. 2005-327390). In this rack-mounted disk array apparatus, a plurality of hard disk units and interface units are replaceably disposed inside a rack installed in an enclosure. When replacing a hard disk unit, the user pulls out the hard disk unit to be replaced from the front side of the enclosure, and installs a new hard disk unit. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”. Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	“connection board”. The backboard 30, for example, can be constituted from a first board 31, which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50.
[8.d] the plurality of power source units are each positioned in a second row.	Okamoto discloses, expressly and/or inherently, the plurality of power source units are each positioned in a second row. <i>See claim 1.e.</i>

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
[8.e] the second row extending parallel to the direction,	Okamoto discloses, expressly and/or inherently, the second row extending parallel to the direction. <i>See, e.g.:</i> Okamoto at Fig. 1 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 1 Okamoto at Fig. 2 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 2 The diagram illustrates a system architecture. At the top, a dashed line labeled '1' represents a boundary. Below it, four vertical rectangular blocks labeled 'HDD' (20) are arranged horizontally. Each HDD block contains a smaller block labeled '21'. Above the HDDs, three arrows labeled 'A1' point downwards. Below the HDDs, a horizontal line labeled '30' contains three blocks labeled '32A' and '33'. Below this, a horizontal line labeled '11' is shown. In the center, four vertical rectangular blocks are arranged horizontally. The leftmost block is labeled 'PS' (50) and contains a block labeled 'A2'. The next three blocks are labeled 'CTL' (71) and each contains a block labeled 'A2'. To the right of these is a block labeled 'HDD' (20) containing a block labeled 'A2'. Below these blocks, a horizontal line labeled '10' is shown. At the bottom, five arrows labeled 'A3' point downwards. On the right side, a block labeled 'BATT' (60) is shown. A block labeled '73' is located at the bottom left. A block labeled '72' is located at the top right. A block labeled '12' is located at the bottom right. Okamoto at Fig. 16 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

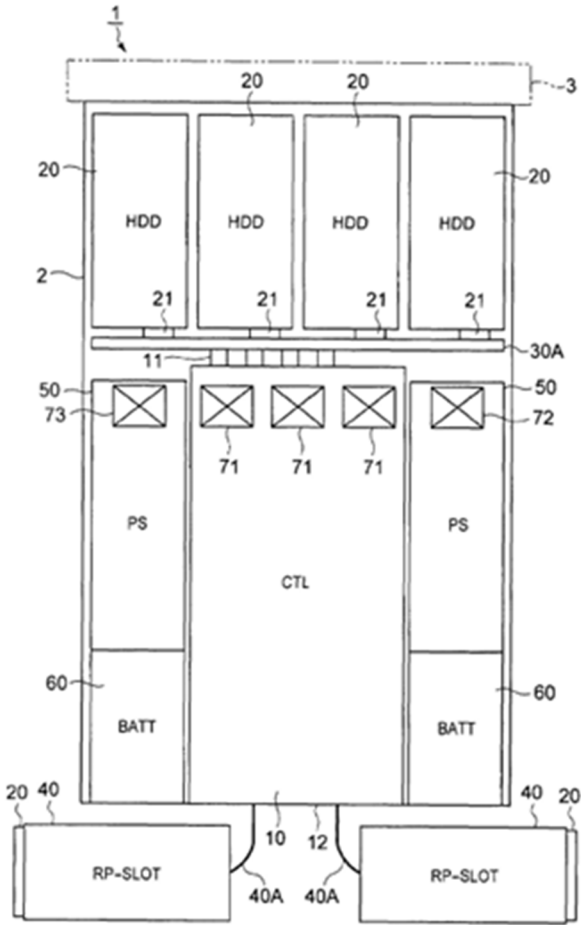
Asserted Claims	Okamoto
	FIG. 24  Okamoto at 1:13–14: 1. Field of the Invention The present invention relates to a storage controller.

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	Okamoto at 1:24-31: However, a rack-mounted disk array apparatus is also known as a storage controller (Japanese Patent Laid-open No. 2005-327390). In this rack-mounted disk array apparatus, a plurality of hard disk units and interface units are replaceably disposed inside a rack installed in an enclosure. When replacing a hard disk unit, the user pulls out the hard disk unit to be replaced from the front side of the enclosure, and installs a new hard disk unit. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”. Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a “connection board”. The backboard 30, for example, can be constituted from a first board 31,

Exhibit D3 – Okamoto Invalidity Claim Chart for the '265 Patent

Asserted Claims	Okamoto
	which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50.
[8.f] the second row being positioned farther from a longitudinal center of the housing than the first row,	Okamoto discloses, expressly and/or inherently, the second row being positioned farther from a longitudinal center of the housing than the first row. <i>See, e.g.:</i>

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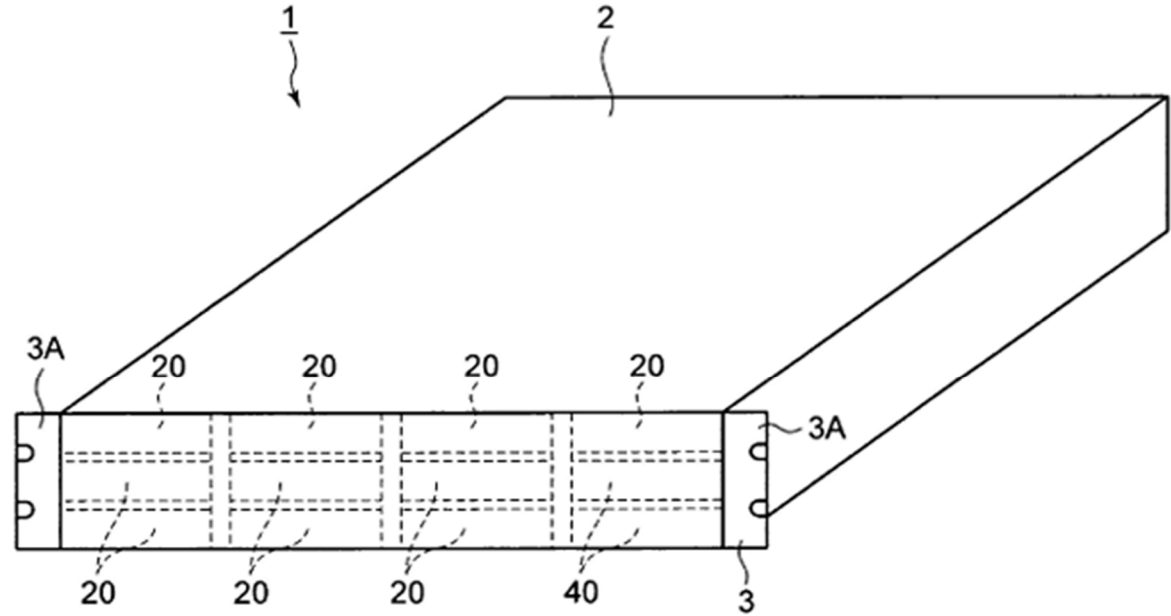
Asserted Claims	Okamoto
	Okamoto at Fig. 1 and accompanying text: FIG. 1  Okamoto at Fig. 2 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 2 Okamoto at Fig. 16 and accompanying text:

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Asserted Claims	Okamoto
	FIG. 16 Okamoto at Fig. 24 and accompanying text:

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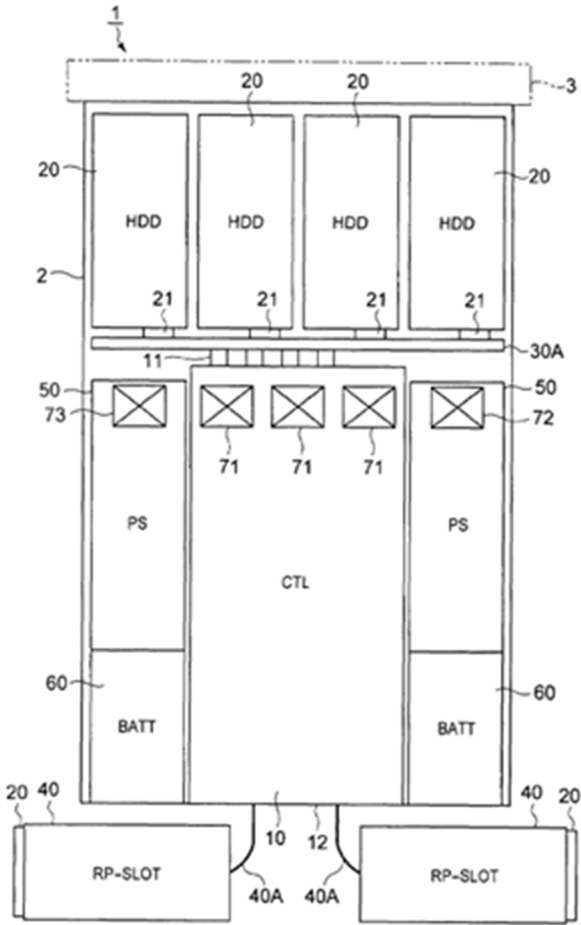
Asserted Claims	Okamoto
	FIG. 24  Okamoto at 1:13–14: 1. Field of the Invention The present invention relates to a storage controller.

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	Okamoto at 1:24-31: However, a rack-mounted disk array apparatus is also known as a storage controller (Japanese Patent Laid-open No. 2005-327390). In this rack-mounted disk array apparatus, a plurality of hard disk units and interface units are replaceably disposed inside a rack installed in an enclosure. When replacing a hard disk unit, the user pulls out the hard disk unit to be replaced from the front side of the enclosure, and installs a new hard disk unit. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 4:47-55: A large number of openings are disposed in the front bezel 3. This is to allow air outside of the enclosure 2 to flow into the inside of the enclosure 2. Mounting parts 3A are disposed at both ends of the front bezel 3. The storage controller 1 can be detachably mounted to another enclosure, such as a rack, using these mounting parts 3A. Further, details will be described using FIG. 3, but inlets are formed between the respective disk drives 20 for guiding air from outside of the enclosure 2 to the inside of the enclosure 2. Okamoto at 4:56-59: FIG. 2 is a plan view of the storage controller 1 with the enclosure 2 and front bezel 3 removed. In the front side of the enclosure 2, disk drives 20 are arranged in a matrix as “storage devices”. Okamoto at 5:32-39: Between the rear side of the respective disk drives 20 and the front side of the respective control boards 10, a backboard 30 is disposed orthogonal to the respective control boards 10 as a

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Asserted Claims	Okamoto
	“connection board”. The backboard 30, for example, can be constituted from a first board 31, which connects to the disk drives 20, a second board 32, which is connected to the connectors 11 of the respective control boards 10, and a cable 33, which connects the first board 31 and the second board 32. Okamoto at 5:40-50: The front side of the first board 31 is electrically connected to the connectors 21 disposed on the rear sides of the respective disk drives 20. The rear side of the second board 32 is electrically connected to the respective connectors 11 disposed on the front sides of the respective control boards 10. Then, the first board 31 and the second board 32 are electrically connected by connectors 32A, which are disposed on the front side of the second board 32, and cables 33. Furthermore, the above constitution is merely an example, and the backboard 30 can also be constituted from a single board as described hereinbelow. Okamoto at 5:51-57: The respective repair drive slots 40, for example, are located on the right side of the front face of the enclosure 2, and are arranged one atop the other. A repair drive slot 40 is a slot for a user to mount a disk drive 20 for repair use. A repair disk drive (hereinafter, may be called a repair disk) 20 is a disk drive used for data recovery after using a spare disk drive 20, which is built into the enclosure 2 at the outset. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50.
[8.g] and the second row being positioned farther from the plurality of fans than the first row.	Okamoto discloses, expressly and/or inherently, and the second row being positioned farther from the plurality of fans than the first row. <i>See, e.g.:</i>

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Asserted Claims	Okamoto
	Okamoto at Fig. 2 and accompanying text: FIG. 2 Okamoto at 1:63-2:7: Further, the above-mentioned respective conventional technologies replaceably provide a relatively small number of hard disk drives, such as two drives, inside an enclosure, without

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Asserted Claims	Okamoto
	taking into account the installation of greater numbers of hard disk drives. That is, in the case of a constitution that comprises only a small number of hard disk drives, the operating noise from the respective hard disk drives is low, reducing the need for soundproofing measures. However, when a larger number of hard disk drives are mounted in an enclosure, it becomes necessary to increase the cooling capabilities of the cooling fans, and also necessitates that soundproofing measures be taken in line with this. Okamoto at 2:23-44: To solve for the above problems, a storage controller according to one aspect of the present invention comprises an enclosure, a plurality of storage devices, which are disposed inside this enclosure, and which are for storing data, at least one control board, which is disposed inside the enclosure, and which is for controlling the operation of the respective storage devices, at least one power device, which is disposed inside the enclosure, and which is for supplying power to the respective storage devices and control board, at least one cooling fan, which is disposed inside the enclosure, and which is for taking in air from outside the enclosure and generating a cooling airflow inside the enclosure, and at least one device connector for connecting a new storage device other than the respective storage devices inside the enclosure to the control board, and at least the respective storage devices, a control board, power device and cooling fan are provided inside the enclosure so as to be irreplaceable under normal circumstances. Even when the respective storage devices, which were irreplaceably mounted in the enclosure beforehand, become unusable, a new storage device can be replaceably attached to the device connector in order to make data storage possible. Okamoto at 2:60-65: In one aspect of the present invention, the cooling fan is located in substantially the center part between an inlet provided in one face of the enclosure, and an outlet provided in the other face of the enclosure, and is arranged inside the enclosure so as to be irreplaceable under normal circumstances. Okamoto at 2:66-3:11:

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	In one aspect of the present invention, the respective storage devices are arranged in a matrix in one side of the enclosure by placing a plurality of storage devices in close proximity to one another to form a row, and stacking a plurality of rows one atop the other in close proximity, and the control board is located in the other side of the enclosure, and is provided inside the enclosure so as to be irreplaceable under normal circumstances, and the respective storage devices and control board are connected via a connection board, and inlets are formed between the respective storage devices to take air into the inside of the enclosure, and an outlet is formed in the other side of the enclosure to discharge to the outside of the enclosure a cooling airflow generated by the cooling fan. Okamoto at 4:12-31: The embodiments of the present invention will be explained below on the basis of the figures. These embodiments, as will be explained hereinbelow, comprise an enclosure 2, a plurality of storage devices 20, which are disposed inside this enclosure 2, and which are for storing data, at least one control board 10, which is disposed inside the enclosure 2, and which is for controlling the operation of the respective storage devices 20, at least one power device 50, which is disposed inside the enclosure 2, and which is for supplying power to the respective storage devices 20 and the control board 10, 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 for connecting a new storage device other than the respective storage devices 20 inside the enclosure 2 to the control board 10, and at least the respective storage devices 20, control board 10, power device 50 and cooling fans 71, 72, 73 are provided inside the enclosure 2 so as to be irreplaceable under normal circumstances. Okamoto at 4:38-46: The storage controller 1, for example, comprises an enclosure 2, a front bezel 3, which is provided so as to cover the front side of the enclosure 2, and a plurality of disk drives 20 arranged in a matrix in the front side of the enclosure 2. Furthermore, as will be explained hereinbelow, a control board 10, a backboard 30, a repair drive slot 40 for adding a new disk

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Asserted Claims	Okamoto
	drive when a disk drive 20 installed beforehand fails, a power device 50, a battery 60, and cooling fans 71, 72, 73 are respectively provided inside the enclosure 2. Okamoto at 5:5-22: It should be noted here that the respective disk drives 20 are mounted in the enclosure 2 so as to be irreplaceable under normal circumstances. Mounted in the enclosure 2 so as to be irreplaceable under normal circumstances means that the respective disk drives 20 cannot be replaced by a user. Even if the front bezel 3 is removed, a user cannot pull a disk drive 20 out of the enclosure 2, and insert a new disk drive 20 into the open space. That is, in this embodiment, the respective components 10, 20, 30, 40, 50, 60, 71, 72, 73 inside the enclosure 2 are respectively fastened to the inside of the enclosure 2, and cannot be replaced manually. The fact that there is absolutely no intention to have replacement work performed by a user makes the storage controller 1 of this embodiment substantially different from a storage controller of the prior art. The other components, that is, the control board 10, backboard 30, power device 50, battery 60, and cooling fan 71 are also mounted so as to be irreplaceable under normal circumstances the same as the disk drives 20. Okamoto at 6:18-23: A plurality of cooling fans 71, 72, 73 can be disposed inside the enclosure 2. For example, three cooling fans 71 are disposed in the front side of the respective control boards 10. One cooling fan 72 is disposed in the space on front side of the repair drive slots 40. One cooling fan 73 is built into the rearward side of each of the power devices 50. Okamoto at 6:24-40: The number and arrangement of the cooling fans 71, 72, 73 are not limited to the example described above. The constitution can also be such that only one or two cooling fans comprising sufficient cooling capabilities are disposed inside the enclosure 2. However, generally speaking, the cooling capabilities of a cooling fan depend on the external dimensions and number of revolutions of the fan. The bigger the fan and the faster it is made to rotate, the higher the cooling capability, but noise also increases. It is possible to reduce noise while ensuring cooling capabilities to a certain extent by rotating a bigger fan at low speed. When the external

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	dimensions of a fan are increased, the space required to mount the cooling fan also becomes larger, thereby increasing the thickness dimension of the enclosure 2. With the foregoing in view, this embodiment is constituted to achieve the cooling capabilities required for the storage controller 1 by using a plurality of cooling fans 71, 72, 73. Okamoto at 6:41-52: It should be noted here that the majority of the cooling fans 71, 72, 73 are arranged substantially in the center part of the enclosure 2. That is, the cooling fans 71 for cooling the respective control boards 10, and the cooling fan 72 for cooling the respective repair drive slots 40 and respective batteries 60 are disposed on the rear side of the backboard 30. Therefore, it is possible to hold down the leakage of noise generated from these cooling fans 71, 72 outside the enclosure 2. As will be clear from the embodiments explained hereinbelow, the cooling fan 73 for cooling a power device 50 can also be disposed so as to be located in the center part of the enclosure 2. Okamoto at 6:53-59: The flow of the cooling air will be explained. 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. By flowing through the gaps between the respective disk drives 20, the air A1 captures the heat from each disk drive 20, thereby cooling each disk drive 20. Okamoto at 7:17-23: FIG. 4 is a schematic diagram showing the rear view of the enclosure 2. As shown in FIG. 4, the respective control boards 10 each comprise three cooling fans 71, and are stacked one atop the other. That is, two control boards 10 are stacked in the thickness direction of the enclosure 2. Similarly, the respective power devices 50, batteries 60 and disk drives 20 are all stacked vertically one atop the other. Okamoto at 7:24-31: Then, outlets 12 are disposed in the rear side of the enclosure 2, and cooling air inside the enclosure 2 is discharged to the outside of the enclosure 2 via these outlets 12. The outlets 12 are constituted as gaps between the respective elements (fans and electronic components) inside the

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Asserted Claims	Okamoto
	enclosure 2. Furthermore, although omitted from the figure, the back face of the enclosure 2 can be covered by a plate having a large number of openings. Okamoto at 9:12-19: FIG. 7 is a schematic diagram showing the power supply structure of the storage controller 1. The respective power devices 50, for example, convert alternating current power inputted from outside to direct current power of a prescribed voltage, and supply same to the respective disk drives 20, respective control boards 10, and respective cooling fans 71, 72, 73. For convenience sake, only the power devices 50 and disk drives 20 are shown in FIG. 7. Okamoto at 11:52-56: This embodiment is constituted such that the majority of the cooling fans 71, 72, 73 are disposed in the center part of the enclosure 2. Therefore, it is possible to cut down the leakage of noise generated from the cooling fans 71, 72, 73 to the outside of the enclosure 2. Okamoto at 13:63-67: FIG. 12 is a plan view showing a storage controller 1 related to a fourth embodiment with the enclosure 2 and front bezel 3 removed. In this embodiment, all of the cooling fans 71, 72, 73 are arranged approximately in the center part of the enclosure 2. Okamoto at 14:1-8: In the above-mentioned first embodiment, the cooling fan 73 for cooling the respective power devices 50 is arranged toward the rear of the enclosure 2. By contrast, in this embodiment, cooling fan 73 is also arranged approximately in the center part of the enclosure 2. More accurately, all of the cooling fans 71, 72, 73 are arranged at the rear side of the backboard 30A, which is disposed rearward of the respective disk drives 20. Okamoto at 14:9-14: Being constituted like this, this embodiment also exhibits the same effect as the above-mentioned first embodiment. In addition to this, in this embodiment, since all of the cooling fans 71, 72, 73

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Asserted Claims	Okamoto
	are arranged approximately in the center part of the enclosure 2, it is possible to further suppress the leakage of fan noise to the outside of the enclosure 2. Okamoto at 15:3-16: The location of the sub-board 10B is not limited to the example shown in the figures. If a large amount of heat is generated by the electronic circuitry (here, the respective host interfaces 110) mounted on the sub-board 10B, the sub-board 10B can be positioned closer to the cooling fan 71 side. If a small amount of heat is generated by the electronic circuitry mounted on the sub-board 10B, the sub-board 10B can be positioned in a location away from the cooling fan 71 as shown in FIG. 13. Further, when an electronic circuit, like the host interface unit 110, which is connected by cable to a device (here, a host H) outside of the enclosure 2 is mounted to the sub-board 10B, as shown in FIG. 13, connection to the external device becomes easier if the sub-board 10B is positioned close to the outside of the enclosure 2.