| Amended or New Claim | Explanation of Support |
|---|---|
| is provided in the first connector of the illumination fan, and an electrically conductive contact surface is provided in the second connector of the another illumination fan for being electrically connected with the electrically conductive terminal, such that when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan, the fan and the illumination area of the body of the another illumination fan are respectively driven into rotation and illumination. | |
| 43. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein when the body of the illumination fan is connected with the body of the another illumination fan, the illumination areas of the two bodies form a continuous illumination area. | Column 3, lines 16-17 |
| 44. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block is provided on another side of the body of the another illumination fan to be engaged into the groove of the body of the illumination fan, such that when the groove | Column 2, line 16-30 and column 3, line 7-28 |



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| Amended or New Claim | Explanation of Support |
|---|---|
| of the body of the illumination fan is engaged with the engaging block of the body of the another illumination fan, the body of the illumination fan is connected with the body of the another illumination fan. | |
| 45. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein a groove is provided on each of two sides of the body of the illumination fan and on each of two sides of the body of the another illumination fan, and the body of the illumination fan is connected with the body of the another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the another illumination fan. | Column 2, line 16-30 and column 3, line 7-28 |
| 46. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of the another illumination fan and the second connector of the body of the illumination fan is connected with a first connector of the body of the another illumination fan when the first connector of the body of the | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 3 and 5 (showing the first connector of the body of the illumination fan being electrically connected with the second connector of the body of the another illumination fan and the second connector of the body of the illumination fan being |

| Amended or New Claim | Explanation of Support |
|---|---|
| illumination fan is connected with the second connector of the body of the another illumination fan. | connected with a first connector of the body of the another illumination fan.) |
| 47. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the second connector of the body of the illumination fan is electrically connected with a first connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 (showing the second connector of the body of the illumination fan being electrically connected with a first connector of the body of the another illumination fan.) |
| 48. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 (showing the first connector of the body of the illumination fan being electrically connected with the second connector of the body of the another illumination fan.) |

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The undersigned declares that all statements made herein of his own knowledge are true and that all statements made in information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

David B. Tuckerman

David B. Tuckerman

December 17, 2024

Date



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# APPENDIX A:
# QUALIFICATIONS AND EXPERIENCE

**David B. Tuckerman, Ph.D, P.E., FIEEE**
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Lake Stevens, WA 98258
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EXPERIENCE:

**Tuckerman and Associates, Inc.,** 2009-present: Independent consultant on a variety of technical and IP matters in high-tech industries. Major clients have included CMEA Capital, Tessera, Intellectual Ventures, and Microsoft. Consultant to Microsoft from 2011 through 2020 in the fields of quantum computing and superconducting devices, including management of a 6-year research contract with Auburn University to develop high-density flexible thin-film superconducting interconnection technologies for quantum computing applications.

**Tessera Inc.,** 2003-2009: Senior Vice President and Chief Technical Officer. Member of the executive team that executed a successful IPO in November 2003, with a market capitalization that later exceeded $1 billion. Responsible for managing R&D activities and generating intellectual property in electronic packaging and related technologies, and for formulating a strategy for growth by acquisition. Identified numerous targets that were successfully acquired (North, Shellcase, Digital Optics, Eyesquad, Viewmagic, DBlur, Kronos); these acquisitions established Tessera in two new lines of business: "Imaging and Optics" (ultraminiature camera modules incorporating extended-depth-of-field wafer-scale optics; this 'OptiML WLC' technology was winner of an R&D 100 Award) and "Silent Air Cooling" (fanless, electrostatically driven air cooling, enabling quiet ultra-thin laptop computers).

**CMEA Capital,** 1997 – 2013: Venture Partner at a venture capital firm that has over $1 billion under management. Responsible for sourcing and screening deals, performing due diligence, facilitating syndication, and making ongoing strategic and operational contributions to portfolio companies (including participating in Board meetings), for all deals having to do with physical technologies (electronics, optics, materials, energy, etc.). Primarily investing in technologies related to energy and advanced materials since 2008. Currently on Board of Directors of Reel Solar (electroplated CdTe photovoltaic technology).

**nCHIP, Inc.**, 1989-1997: Founder, Sr. VP, and Chief Technical Officer. Developed advanced multi-chip module technologies enabling ultracompact high-performance digital systems. Responsible for all technical development activities prior to transfer to manufacturing. nCHIP was financed by venture capital from three top-tier venture funds: Kleiner Perkins, Mohr Davidow, and Mayfield. nCHIP grew to approximately $12 million in annualized revenues, and was sold to **Flextronics International Ltd**. in 1995 for $38 million. Venture investors who held their Flextronics stock received up to 40x their initial investment.

**Lawrence Livermore National Laboratory**, 1983-1989: Project Leader, Physics Department. Managed advanced R&D programs in laser processing, electronic packaging and interconnect, X-ray optics, and other national-defense related programs.

**IBM T. J. Watson Research Center**, 1977-1980 (MIT Co-op program): Member of the Josephson junction computer project (superconducting logic circuit design, simulation, and testing). Designed and demonstrated ultrahigh-performance sampling circuitry for on-chip diagnostics of superconducting logic.

EDUCATION:

**M.I.T, B.S.** Electrical Engineering, 1980.
**M.I.T., B.S.** Physics, 1980.
**M.I.T., M.S.** Electrical Engineering & Computer Science, 1980.
**Stanford, Ph.D.** Electrical Engineering, 1984.
**Stanford, MBA,** 1998.

PUBLICATIONS:

See attached list. 10,000+ citations in the professional literature (per Google Scholar)

PATENTS:

181 issued U.S. patents, plus various foreign patents and numerous pending applications. See attached list.

MAJOR HONORS:

Life Fellow of the IEEE
Licensed Professional Engineer (Electrical), California
IEEE Paul Rappaport Award
Fannie and John Hertz Foundation Outstanding Ph.D. Thesis
Consulting Associate Professor of E.E., Stanford University (late 1980's/early 1990's)
(co-supervised two PhD theses on 'laser planarization')
Best Paper Award, VLSI Multilevel Interconnection Conference, 1989
Technical Program Chair, IEEE Multichip Module Conference, 1995
General Chair, IEEE Multichip Module Conference, 1996
Plenary speaker, ASME 9th International Conference on Nanochannels, Microchannels, and Minichannels, 2011.

PRIOR EXPERT WITNESS EXPERIENCE:

***Asetek Danmark A/S v. Coolit Systems Inc.*** **(Northern District of California, 3:19-cv-00410-EMC)**

Expert for Plaintiff Asetek Danmark A/S, engaged by Finnegan Henderson Farabow Garrett & Dunner, LLP

*Asetek Danmark A/S v. Corsair Gaming, Inc. et al* **(Northern District of California, 3:20-cv-06541-EMC)**

Expert for Plaintiff Asetek Danmark A/S, engaged by Finnegan Henderson Farabow Garrett & Dunner, LLP

Selected Publications


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- Tuckerman, D. B., and Pease, R. F. W., 1983, "Microcapillary Thermal Interface Technology for VLSI Packaging", Symposium on VLSI Technology, pp. 60-61.
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- Tuckerman, D. B., and Schmitt, R. L., 1985, "Pulsed Laser Planarization of Metal Films for Multilevel Interconnects", Proc. VLSI Multilevel Interconnection Conference (VMIC).
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- Tuckerman, D. B., and Weisberg, A. H., 1986, "Laser Planarization", Solid State Technology, **29**(4), pp. 129-134.
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- S. E. Peek, V. Gupta, B. Yelamanchili, A. Shah, J. A. Sellers, D. B. Tuckerman and M. C. Hamilton, "Fabrication and Flip-Chip Assembly Processes For Cryogenic Applications Using Indium-Indium and SAC-Indium Bump Connections on Flexible Interconnects," presented at *GOMACTech 2021*, Mar. 29 – Apr. 1, 2021.
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- B. Yelamanchili, A. Shah, S.E. Peek, V. Gupta, J.A. Sellers, D. Tuckerman, M. Hamilton, "Face-to-face cable interconnect scheme for thin flexible superconducting stripline cables", IEEE Trans. Appl. Superconductivity 32(4), 1-5, 2022.
- H. Dai, C. Kegerreis, D. Gamage, J. Egan, M. Nielsen, Y. Chen, D. Tuckerman, S. Peek, B. Yelamanchili, M. Hamilton, A. Herr, Q. Herr, "Isochronous data link across a superconducting Nb Flex Cable with 5 femtojoules per bit", Superconductor Science and Technology 35(4), 045014, 2022.
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# David B. Tuckerman, Ph.D. - List of granted patents

| | | |
|---|---|---|
| 1 | US-4450472-A | Method and means for improved heat removal in compact semiconductor integrated circuits and similar devices utilizing coolant chambers and microscopic channels |
| 2 | US-4567505-A | Heat sink and method of attaching heat sink to a semiconductor integrated circuit and the like |
| 3 | US-4573067-A | Method and means for improved heat removal in compact semiconductor integrated circuits |
| 4 | US-4674176-A | Planarization of metal films for multilevel interconnects by pulsed laser heating |
| 5 | US-4681795-A | Planarization of metal films for multilevel interconnects |
| 6 | US-4814578-A | Planarization of metal films for multilevel interconnects |
| 7 | US-4992847-A | Thin-film chip-to-substrate interconnect and methods for making same |
| 8 | US-5017509-A | Stand-off transmission lines and method for making same |
| 9 | US-5046656-A | Vacuum die attach for integrated circuits |
| 10 | US-5134539-A | Multichip module having integral decoupling capacitor |
| 11 | US-5214844-A | Method of assembling integrated circuits to a silicon board |
| 12 | US-5274270-A | Multichip module having SiO2 insulating layer |
| 13 | US-5397997-A | Burn-in technologies for unpackaged integrated circuits |
| 14 | US-5541524-A | Burn-in technologies for unpackaged integrated circuits |
| 15 | US-5804004-A | Stacked devices for multichip modules |
| 16 | US-7224056-B2 | Back-face and edge interconnects for lidded package |
| 17 | US-7262368-B2 | Connection structures for microelectronic devices and methods for forming such structures |
| 18 | US-7298030-B2 | Structure and method of making sealed capped chips |
| 19 | US-7351641-B2 | Structure and method of forming capped chips |
| 20 | US-7449779-B2 | Wire bonded wafer level cavity package |
| 21 | US-7462936-B2 | Formation of circuitry with modification of feature height |
| 22 | US-7485956-B2 | Microelectronic package optionally having differing cover and device thermal expansivities |
| 23 | US-7566853-B2 | Image sensor employing a plurality of photodetector arrays and/or rear-illuminated architecture |
| 24 | US-7593636-B2 | Pin referenced image sensor to reduce tilt in a camera module |
| 25 | US-7632708-B2 | Microelectronic component with photo-imageable substrate |
| 26 | US-7709968-B2 | Micro pin grid array with pin motion isolation |
| 27 | US-7793414-B2 | Methods for forming connection structures for microelectronic devices |
| 28 | US-7816251-B2 | Formation of circuitry with modification of feature height |
| 29 | US-7858445-B2 | Wire bonded wafer level cavity package |
| 30 | US-8035258-B2 | Systems and methods for assessing standoff capabilities of in-service power line insulators |
| 31 | US-8174270-B2 | Systems and methods for assessing standoff capabilities of in-service power line insulators |
| 32 | US-8248080-B2 | Systems and methods for assessing standoff capabilities of in-service power line insulators |
| 33 | US-8253525-B2 | Smart link coupled to power line |
| 34 | US-8310036-B2 | Chips having rear contacts connected by through vias to front contacts |
| 35 | US-8391934-B1 | Customized hardware selection for a mobile phone |
| 36 | US-8405196-B2 | Chips having rear contacts connected by through vias to front contacts |
| 37 | US-8425965-B2 | Method for heating or sterilizing a liquid stream |
| 38 | US-8426736-B2 | Maintaining insulators in power transmission systems |
| 39 | US-8427800-B2 | Smart link coupled to power line |
| 40 | US-8460814-B2 | Fluid-surfaced electrode |
| 41 | US-8531039-B2 | Micro pin grid array with pin motion isolation |
| 42 | US-8563867-B2 | Smart link coupled to power line |
| 43 | US-8595037-B1 | Systems and methods for insurance based on monitored characteristics of an autonomous drive mode selection system |
| 44 | US-8673219-B2 | Nasal passage insertion device for treatment of ruminant exhalations |
| 45 | US-8692226-B2 | Materials and configurations of a field emission device |

| | | |
|---|---|---|
| 46 | US-8735205-B2 | Chips having rear contacts connected by through vias to front contacts |
| 47 | US-8776145-B2 | In-transit electronic media with location-based content |
| 48 | US-8810131-B2 | Field emission device with AC output |
| 49 | US-8810161-B2 | Addressable array of field emission devices |
| 50 | US-8865361-B2 | Instrumented fluid-surfaced electrode |
| 51 | US-8872022-B2 | Phase-change cooling of subterranean power lines |
| 52 | US-8884813-B2 | Surveillance of stress conditions of persons using micro-impulse radar |
| 53 | US-8889312-B2 | Instrumented fluid-surfaced electrode |
| 54 | US-8897116-B1 | Systems and methods for atomic film data storage |
| 55 | US-8907529-B2 | Smart link coupled to power line |
| 56 | US-8909307-B2 | Customized hardware selection for a mobile phone |
| 57 | US-8928228-B2 | Embodiments of a field emission device |
| 58 | US-8946992-B2 | Anode with suppressor grid |
| 59 | US-8958786-B2 | Mobile device that activates upon removal from storage |
| 60 | US-8965288-B2 | Cost-effective mobile connectivity protocols |
| 61 | US-8968903-B2 | Fluid-surfaced electrode |
| 62 | US-8969848-B2 | Materials and configurations of a field emission device |
| 63 | US-8970113-B2 | Time-varying field emission device |
| 64 | US-8971043-B2 | Management of exterior temperatures encountered by user of a portable electronic device in response to an inferred user contact with the portable electronic device |
| 65 | US-8971868-B2 | Mobile device that activates upon removal from storage |
| 66 | US-8971869-B2 | Mobile device that activates upon removal from storage |
| 67 | US-8971969-B2 | Customized hardware selection for a mobile phone |
| 68 | US-8974939-B2 | Fluid-surfaced electrode |
| 69 | US-9013564-B2 | Controllable lenticular lenslets |
| 70 | US-9019149-B2 | Method and apparatus for measuring the motion of a person |
| 71 | US-9024814-B2 | Tracking identities of persons using micro-impulse radar |
| 72 | US-9055166-B2 | Customized hardware selection for a mobile phone |
| 73 | US-9056556-B1 | System and method for configuration and management of an energy storage system for a vehicle |
| 74 | US-9069067-B2 | Control of an electronic apparatus using micro-impulse radar |
| 75 | US-9077815-B1 | Customized hardware selection for a mobile phone |
| 76 | US-9079505-B1 | System and method for management of a fleet of vehicles having an energy storage system |
| 77 | US-9083819-B2 | Customized hardware selection for a mobile phone |
| 78 | US-9106764-B2 | Customized hardware selection for a mobile phone |
| 79 | US-9140499-B2 | Phase-change cooling of subterranean power lines |
| 80 | US-9143605-B2 | Customized hardware selection for a mobile phone |
| 81 | US-9149010-B2 | Harvesting and grafting of trees |
| 82 | US-9158908-B2 | Power source for in-transit electronic media |
| 83 | US-9171690-B2 | Variable field emission device |
| 84 | US-9177592-B2 | Systems and methods for atomic film data storage |
| 85 | US-9177600-B2 | Systems and methods for atomic film data storage |
| 86 | US-9191489-B2 | Customized hardware selection for a mobile phone |
| 87 | US-9193068-B2 | Structural assessment, maintenance, and repair apparatuses and methods |
| 88 | US-9193402-B2 | Structural assessment, maintenance, and repair apparatuses and methods |
| 89 | US-9199193-B2 | Treatment of ruminant exhalations |
| 90 | US-9207270-B2 | Method and apparatus for measuring negawatt usage of an appliance |
| 91 | US-9216133-B2 | Using a 3D display to train a weak eye |
| 92 | US-9230442-B2 | Systems and methods for adaptive vehicle sensing systems |
| 93 | US-9269268-B2 | Systems and methods for adaptive vehicle sensing systems |
| 94 | US-9270808-B2 | Customized hardware selection for a mobile phone |

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|---|---|---|
| 95 | US-9291297-B2 | Multi-layer phononic crystal thermal insulators |
| 96 | US-9291399-B2 | Management of exterior temperatures encountered by user of a portable electronic device |
| 97 | US-9291400-B2 | Management of exterior temperatures encountered by user of a portable electronic device using multiple heat-rejection elements |
| 98 | US-9305737-B2 | Liquid filament for incandescent lights |
| 99 | US-9320174-B2 | Management of exterior temperatures encountered by user of a portable electronic device in response to an inferred user contact with the portable electronic device |
| 100 | US-9321357-B2 | Method and apparatus for supplying auxiliary electrical power to an electric or hybrid vehicle |
| 101 | US-9341065-B2 | Dual element turbine blade |
| 102 | US-9349562-B2 | Field emission device with AC output |
| 103 | US-9373870-B2 | Battery damage indicator |
| 104 | US-9396810-B2 | Systems and methods for acoustic wave enabled data storage |
| 105 | US-9396814-B2 | Systems and methods for acoustic wave enabled data storage |
| 106 | US-9424893-B2 | Systems and methods for acoustic wave enabled data storage |
| 107 | US-9435320-B2 | Mitigating wind turbine blade noise generation in view of a minimum power generation requirement |
| 108 | US-9437849-B2 | Battery damage indicator |
| 109 | US-9451394-B2 | Cost-effective mobile connectivity protocols |
| 110 | US-9452281-B2 | Tattooing systems and methods |
| 111 | US-9456648-B2 | Systems and methods for helmet liner evaluation |
| 112 | US-9457666-B2 | Method and apparatus for supplying auxiliary electrical power to an electric or hybrid vehicle |
| 113 | US-9486386-B2 | Using a 3D display to train a weak eye |
| 114 | US-9488670-B2 | Systems and methods for detecting overhead line motion |
| 115 | US-9490097-B2 | Liquid filament for incandescent lights |
| 116 | US-9511634-B2 | Systems and methods for anticipatory tire pressure control |
| 117 | US-9512580-B2 | Systems and methods for deicing |
| 118 | US-9514653-B2 | Systems, methods, and devices for providing assistance to an unmanned aerial vehicle |
| 119 | US-9531864-B2 | Customized hardware selection for a mobile phone |
| 120 | US-9548507-B2 | Systems and methods for hydrogen fuel storage and hydrogen powered vehicles |
| 121 | US-9549406-B1 | Automatically adjustable radiofrequency link |
| 122 | US-9553959-B2 | Customized hardware selection for a mobile phone |
| 123 | US-9562704-B2 | Phase-change cooling of subterranean power lines |
| 124 | US-9599407-B2 | System and structure for heating or sterilizing a liquid stream |
| 125 | US-9602650-B2 | Customized hardware selection for a mobile phone |
| 126 | US-9602673-B2 | Systems and methods for monitoring sound during an in-building emergency |
| 127 | US-9648309-B2 | Controllable lenticular lenslets |
| 128 | US-9653128-B2 | Systems and methods for acoustic wave enabled data storage |
| 129 | US-9681557-B2 | Metastable gas heating |
| 130 | US-9688402-B2 | Systems, methods, and devices for unmanned aerial vehicle dispatch and recovery |
| 131 | US-9691500-B2 | Casimir effect memory cell |
| 132 | US-9696119-B2 | Camouflage for transmission towers and lines |
| 133 | US-9714494-B2 | Systems and methods for deicing |
| 134 | US-9719902-B2 | Systems and methods for helmet liner evaluation |
| 135 | US-9723702-B2 | Liquid filament for incandescent lights |
| 136 | US-9751207-B2 | Structural assessment, maintenance, and repair apparatuses and methods |
| 137 | US-9751812-B2 | Taggant for cement authentication |
| 138 | US-9759196-B2 | Mitigating wind turbine blade noise generation in response to an atmospheric variation |
| 139 | US-9772062-B2 | Multi-layer phononic crystal thermal insulators |
| 140 | US-9776632-B2 | Systems and methods for adaptive vehicle sensing systems |
| 141 | US-9781664-B2 | Cost-effective mobile connectivity protocols |

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| 142 | US-9788195-B2 | Mobile device that activates upon removal from storage |
| 143 | US-9800738-B2 | Systems and methods for monitoring sound during an in-building emergency |
| 144 | US-9801313-B2 | Underwater container cooling via integrated heat exchanger |
| 145 | US-9805763-B2 | Systems and methods for atomic film data storage |
| 146 | US-9810819-B2 | Camouflage for transmission towers and lines |
| 147 | US-9819184-B2 | Balancing power grid parameters using distributed energy control |
| 148 | US-9824845-B2 | Variable field emission device |
| 149 | US-9826534-B2 | Automatically adjustable radiofrequency link |
| 150 | US-9832628-B2 | Cost-effective mobile connectivity protocols |
| 151 | US-9844167-B2 | Underwater container cooling via external heat exchanger |
| 152 | US-9844983-B2 | Systems and methods for anticipatory tire pressure control |
| 153 | US-9876762-B2 | Cost-effective mobile connectivity protocols |
| 154 | US-9878631-B2 | System and method for predictive control of an energy storage system for a vehicle |
| 155 | US-9878786-B2 | System and method for operation and management of reconfigurable unmanned aircraft |
| 156 | US-9878787-B2 | System and method for operating unmanned aircraft |
| 157 | US-9902491-B2 | Reconfigurable unmanned aircraft system |
| 158 | US-9919797-B2 | System and method for operation and management of reconfigurable unmanned aircraft |
| 159 | US-9924642-B2 | Harvesting and grafting of trees |
| 160 | US-9930898-B2 | Pasteurization system and method |
| 161 | US-9989077-B2 | Systems and methods for selective control of fuel tanks |
| 162 | US-10015931-B2 | Production of electricity from plants |
| 163 | US-10015971-B2 | Articles and methods for administering CO2 into plants |
| 164 | US-10017392-B2 | Articles and methods for administering CO2 into plants |
| 165 | US-10052469-B2 | Tattooing systems and methods |
| 166 | US-10072503-B2 | Dual element turbine blade |
| 167 | US-10074879-B2 | Instrumented fluid-surfaced electrode |
| 168 | US-10119592-B2 | Vehicle drivetrain with active magnetic bearings |
| 169 | US-10135302-B2 | Mobile phone having a wireless power module |
| 170 | US-10136437-B2 | Automatically adjustable radiofrequency link |
| 171 | US-10141493-B2 | Thermal management for superconducting interconnects |
| 172 | US-10146222-B2 | Driver training in an autonomous vehicle |
| 173 | US-10171677-B2 | Systems and methods for monitoring sound during an in-building emergency |
| 174 | US-10184867-B2 | Systems and methods for helmet liner evaluation |
| 175 | US-10348884-B2 | Customized hardware selection for a mobile phone |
| 176 | US-10453592-B1 | Reducing losses in superconducting cables |
| 177 | US-10651362-B2 | Method of forming superconducting apparatus including superconducting layers and traces |
| 178 | US-10763013-B2 | Reducing losses in superconducting cables |
| 179 | US-11114602-B2 | Method of forming superconducting layers and traces |
| 180 | US-11211722-B2 | Superconductor interconnect system |
| 181 | US-12027361-B2 | High temperature supercondutor-based interconnect systems with a lowered thermal load for interconnecting cryogenic electronics with non-cryogenic electronics |
| 182 | AU-2011326765-B2 | Treatment of ruminant exhalations |
| 183 | AU-2018341994-B2 | Fabrication of apparatus including superconducting wiring layers and interconnects |
| 184 | AU-2019265449-B2 | Reducing losses in superconducting cables |
| 185 | CA-2057744-C | Multichip module |
| 186 | EP-2638389-B1 | Treatment of ruminant exhalations |
| 187 | EP-2801102-B1 | Anode with suppressor grid |
| 188 | EP-2920548-B1 | Systems and methods for detecting overhead line motion |
| 189 | EP-3210279-B1 | Wireless power receiver in a mobile device |
| 190 | EP-3610519-B1 | Thermal management for superconducting interconnects |

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| 191 | EP-3688796-B1 | Fabrication of apparatus including superconducting wiring layers and interconnects |
| 192 | EP-3745481-B1 | Thermal management for superconducting interconnects |
| 193 | EP-3791432-B1 | Reducing losses in superconducting cables |
| 194 | TW-I317555-B | Image sensor employing a plurality of photodetector arrays and/or rear-illuminated architecture |
| 195 | TW-I333247-B | Method of forming a microelectronic connection component |

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# ELECTRONIC ACKNOWLEDGEMENT RECEIPT

| APPLICATION # | RECEIPT DATE / TIME | ATTORNEY DOCKET # |
|---|---|---|
| **90/019,565** | **12/17/2024 11:02:33 PM Z ET** | **16445.0001-00000** |

## Title of Invention

ILLUMINATION FAN CONNECTABLE WITH AT LEAST ONE ILLUMINATION FAN FOR A COMPUTER

## Application Information

| | | | |
|---|---|---|---|
| APPLICATION TYPE | Utility / ex parte reexam | PATENT # | 10690336 |
| CONFIRMATION # | 5828 | FILED BY | TAMMY BELL |
| PATENT CENTER # | 68415456 | FILING DATE | 07/02/2024 |
| CUSTOMER # | 37705 | FIRST NAMED INVENTOR | - 10690336 |
| CORRESPONDENCE ADDRESS | - | AUTHORIZED BY | Michael Dixon |

## Documents

**TOTAL DOCUMENTS: 2**

| DOCUMENT | PAGES | DESCRIPTION | SIZE (KB) |
|---|---|---|---|
| 01_219491-010200 LIAN LI - Response to NFOA in Ex Parte Reexam of 336 Patent.pdf | 61 | Response after non-final action-owner timely | 6167 KB |
| 002_219491-010200 - LIAN LI INDUSTRIAL - Rule132 - Declaration of David B Tuckerman PhD.pdf | 83 | Reexam - Affidavit/Declaration/Exhibit Filed by 3rd Party | 11007 KB |

## Digest

| DOCUMENT | MESSAGE DIGEST(SHA-512) |
|---|---|
| 01_219491-010200 LIAN LI - | 4D1DC1A66A89DA5342F7E93F28508A79B606DCB1022CBBE3 |

| | |
|---|---|
| Response to NFOA in Ex Parte Reexam of 336 Patent.pdf | A69FA70BD631E36F3B22F92056EC93B86AC752DF56D40D18C05C2C37C80C8CC49C6A059FF9E4551B |
| 002_219491-010200 - LIAN LI INDUSTRIAL - Rule132 - Declaration of David B Tuckerman PhD.pdf | 290B980B72168B46A866092C9941186E503118FF80B41276B31989269CEE7626C5A8373A0721F35B2606FC8249AD0A5EFDFDFAB08538A3CA415E5B5C5B50868B |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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# ELECTRONIC PAYMENT RECEIPT

| APPLICATION # | RECEIPT DATE / TIME | ATTORNEY DOCKET # |
|---|---|---|
| **90/019,565** | **12/17/2024 11:02:33 PM Z ET** | **16445.0001-00000** |

## Title of Invention

ILLUMINATION FAN CONNECTABLE WITH AT LEAST ONE ILLUMINATION FAN FOR A COMPUTER

## Application Information

| | | | |
|---|---|---|---|
| APPLICATION TYPE | Utility / ex parte reexam | PATENT # | 10690336 |
| CONFIRMATION # | 5828 | FILED BY | TAMMY BELL |
| PATENT CENTER # | 68415456 | AUTHORIZED BY | Michael Dixon |
| CUSTOMER # | 37705 | FILING DATE | 07/02/2024 |
| CORRESPONDENCE ADDRESS | - | FIRST NAMED INVENTOR | - 10690336 |

## Payment Information

| PAYMENT METHOD | PAYMENT TRANSACTION ID | PAYMENT AUTHORIZED BY |
|---|---|---|
| **DA / 501792** | **E2024BGN04137541** | **TAMMY BELL** |

| PRE-AUTHORIZED ACCOUNT | PRE-AUTHORIZED CATEGORY |
|---|---|
| **501792** | **37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)** |

| FEE CODE | DESCRIPTION | ITEM PRICE($) | QUANTITY | ITEM TOTAL($) |
|---|---|---|---|---|
| 1822 | EACH REEXAMINATION CLAIM IN EXCESS OF 20 AND ALSO IN EXCESS OF THE NUMBER OF CLAIMS IN THE PATENT UNDER EXAMINATION | 100.00 | 18 | 1800.00 |
| | | | **TOTAL AMOUNT:** | **$1,800.00** |

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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the application of:

10,690,336

Application No.: 90/019,565

Filed: July 2, 2024

Confirmation No.: 5828

Atty. Ref: 219491.010200

For: "Illumination Fan Connectable with at least one Illumination Fan for a Computer"

Group Art Unit: 3993

Examiner: Laura L. Davison

**RESPONSE TO *EX PARTE* REEXAMINATION OFFICE ACTION**

CERTIFICATE OF EFS-WEB TRANSMISSION PURSUANT TO 37 C.F.R. § 1.8 AND CERTIFICATE OF SERVICE PURSUANT TO 37 C.F.R. §§ 1.248, 1.550

I hereby certify that this correspondence is being transmitted via the U.S. Patent and Trademark Office electronic filing system (EFS-Web) to the USPTO on December 17, 2024.

It is further certified that a copy of this paper, in its entirety, was deposited on December 17, 2024, with the U.S. Postal Service, with sufficient First Class Mail postage and addressed to the reexamination requestor: Finnegan, Henderson, Farabow, Garret & Dunner LLP 901 New York Avenue, NW, Washington, DC 20001-4413.

Signed: /Michael K. Dixon/
Name: Michael K. Dixon

Attn: *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sirs:

This correspondence is responsive to the Office Action dated October 17, 2024.

**Amendments to the Claims** begin on page 2 of this paper; and

**Remarks** begin on page 11 of this paper.

## AMENDMENTS TO THE CLAIMS

*This listing will replace all prior versions, and listings, of claims in the application:*

**Listing of the Claims**

1. (Original) An illumination fan connectable with at least one illumination fan for a computer, comprising:

a body, provided with a fan in center of the body,

an illumination area on at least two sides of the fan at top of the body,

a power socket and

a first connector on one side of the body, and

a second connector on another side of the body,

wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area, such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination, and

when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination.

2. (Original) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein an electrically conductive terminal is provided in the first connector, and an electrically conductive contact surface is provided in the second connector for being electrically connected with the electrically conductive terminal, such that when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan, the fan and the illumination area of the body of another illumination fan are respectively driven into rotation and illumination.

3. (Original) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein when the body of the illumination fan is connected with the body



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of another illumination fan, the illumination areas of the two bodies form a continuous illumination area.

4. (Currently Amended) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block of the body of another illumination fan is provided on another side thereof to be engaged into the groove, such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of another illumination fan, the body of the illumination fan is connected with the body of another illumination fan.

5. (Original) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein a groove is provided on two sides of the body of the illumination fan, and the body of the illumination fan is connected with the body of another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of another illumination fan.

6. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

7. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

8. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.



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9. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

10. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

11. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

12. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

13. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

14. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

15. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the top of the body is adjacent to the one side of the body of the illumination fan.



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16. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

17. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

18. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the first connector of the illumination fan is electrically connected with the second connector of the another illumination fan.

19. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the second connector of the illumination fan is connected with a first connector of the another illumination fan.

20. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the second connector of the illumination fan is electrically connected with a first connector of the another illumination fan.

21. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the power socket on the one side of the illumination fan has an opening located on the one side of the illumination fan.

22. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the top of the body is adjacent to the one side of the body of the illumination fan.



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23. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

24. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

25. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein an electrically conductive contact surface is provided in the second connector of the illumination fan and is located on the another side of the illumination fan.

26. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 25, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

27. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 25, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

28. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 25, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

29. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein an electrically conductive terminal is provided in the first connector of the illumination fan and is located on the one side of the body of the illumination fan.



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30. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

31. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

32. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.

33. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the second connector of the body of the illumination fan is connected with a first connector of the body of another illumination fan.

34. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the top of the body is adjacent to the one side of the body of the illumination fan.

35. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the top of the body is adjacent to the another side of the body of the illumination fan.

36. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan.



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37. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan.

38. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 37, wherein the second connector of the illumination fan is connected with a first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan.

39. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 38, wherein the second connector of the illumination fan is electrically connected with the first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan.

40. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 37, wherein the second connector of the illumination fan is electrically connected with the first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan.

41. (New) An illumination fan connectable with at least one other illumination fan for a computer, comprising:

a body, provided with a fan in a center of the body,

an illumination area on at least two sides of the fan at a top of the body,

a power socket and a first connector on one side of the body, and a second connector on another side of the body,

wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area, such that when the power socket on



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the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination, and

when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of the another illumination fan are respectively driven into rotation and illumination.

42. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein an electrically conductive terminal is provided in the first connector of the illumination fan, and an electrically conductive contact surface is provided in the second connector of the another illumination fan for being electrically connected with the electrically conductive terminal, such that when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan, the fan and the illumination area of the body of the another illumination fan are respectively driven into rotation and illumination.

43. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein when the body of the illumination fan is connected with the body of the another illumination fan, the illumination areas of the two bodies form a continuous illumination area.

44. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block is provided on another side of the body of the another illumination fan to be engaged into the groove of the body of the illumination fan, such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of the another illumination fan, the body of the illumination fan is connected with the body of the another illumination fan.

45. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein a groove is provided on each of two sides of the body of the illumination fan and on each of two sides of the body of the another illumination fan, and the



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body of the illumination fan is connected with the body of the another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the another illumination fan.

46. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of the another illumination fan and the second connector of the body of the illumination fan is connected with a first connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan.

47. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the second connector of the body of the illumination fan is electrically connected with a first connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan.

48. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan.



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## REMARKS

This correspondence is responsive to the Non-Final Office Action dated October 17, 2024 ("Action"). Claims 1-5 of the issued claims 1-5 of U.S. Patent No. 10,690,336 (the "'336 patent") were examined within the scope of this reexamination. Claims 1-5 were pending. In this response, claim 4 has been amended and new claims 6-48 have been added. No claims have been canceled. ***Claim 41 is independent.*** A full explanation of support for amended claim 4 and the new claims is provided in Section 8 below. With the addition of the new claims 6-48, claims 1-48 are pending.

The Action states that a July 18, 2024 order found that grounds 1-4 raised a substantial new question of patentability. In the Action, claims 1 and 2 are rejected under 35 U.S.C. 102(a)(1) and 102(a)(2) as being anticipated by United States Published Application Number 2017/0314777 to Lai (hereinafter "Lai") or, in the alternative, under 35 U.S.C. 103 as being obvious over Lai in view of Japanese Patent Number 2018041147 A to Fujitsu (hereinafter "Fujitsu"). Claim 3 is rejected under 35 U.S.C. 103 as being obvious over Lai, or Lai in view of Fujitsu. Claim 4 is rejected under 35 U.S.C. 103 as being obvious over Lai in view of Fujitsu. Claim 5 is rejected under 35 U.S.C. 103 as being obvious over Lai, or Lai in view of Fujitsu, in further view of United States Published Application Number 2008/0279694 to Chou (hereinafter "Chou"). Claims 1-4 are rejected under 35 U.S.C. 103 as being unpatentable over Fujitsu in view of Chinese Patent Number CN 207064277 U to Tsai (hereinafter "Tsai"). Claim 5 is rejected under 35 U.S.C. 103 as being obvious over Fujitsu in view of Tsai, in further view of Chou.

### 1. OVERVIEW OF '336 PATENT

The '336 patent relates to an illumination fan connectable with at least one other illumination fan for a computer. See: Tuckerman 1.132 Declaration at para. 22. Computer fans are generally used for heat dissipation inside the housings of computers. See: Tuckerman 1.132 Declaration at para. 22. To effectively dispel heat accumulated inside a computer housing, multiple cooling fans are often needed. See: Tuckerman 1.132 Declaration at para. 22. Traditionally, each computer fan had to be connected to a power supply through an independent power cable, which creates a lot of wiring inside the housing and makes cable routing and



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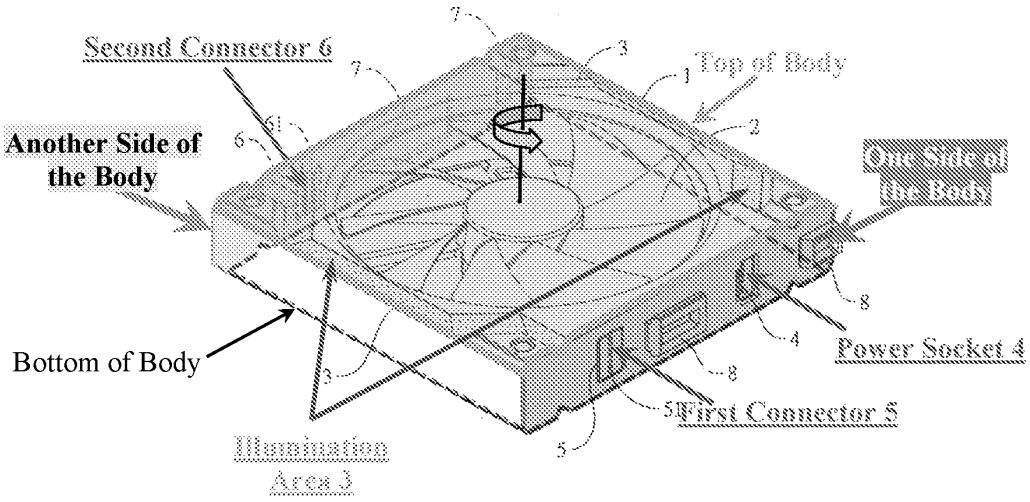
managing cumbersome. See: Tuckerman 1.132 Declaration at para. 22. Additionally, because of the need to connect to power supply with independent power cables, the number of cooling fans that can be assembled is limited by the finite number of connections available on the power supply. See: Tuckerman 1.132 Declaration at para. 22.

Figure 1 of the '336 patent (reproduced and annotated below) shows an embodiment (i.e., an example) of such an illumination fan, which includes a body **1**, a fan **2** disposed in the center of the body **1**, an illumination area **3** disposed on at least two sides of the fan at the top (cyan) of the body **1**, a power socket **4** and a first connector **5** disposed on one side (red) of the body **1**, and a second connector **6** disposed on another side (green) of the body **1**:




See: Tuckerman 1.132 Declaration at para. 23. In this embodiment, the illumination fan's body **1** has a "top" (cyan) facing up and a bottom (with a dashed black perimeter) facing down along the rotational axis of the fan **2**. The body **1** also has *four* sides facing lateral directions perpendicular to the rotational axis of the fan **2**. The power socket **4** and the first connector **5** are both located on one of the four sides, while the second connector **6** is located on another one of the four sides. See: Tuckerman 1.132 Declaration at para. 24. The "top" of the body **1** in this embodiment is adjacent to the four sides, and is where the illumination area **3** (on the at least two sides of the fan **2**) is located. Tuckerman 1.132 Declaration at para. 24.

We understand from our telephonic interview with the Examiner panel that the Examiners have interpreted the claim phrase "side of the body" to mean everything to the right of a centerline of the body was on "one side of the body" and everything to the left of the centerline was on "another side of the body." Below is an annotated version of Figure 1 of the



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'336 patent showing the two sides of the body according to the Examiners' interpretation of "one side of the body" and "another side of the body":

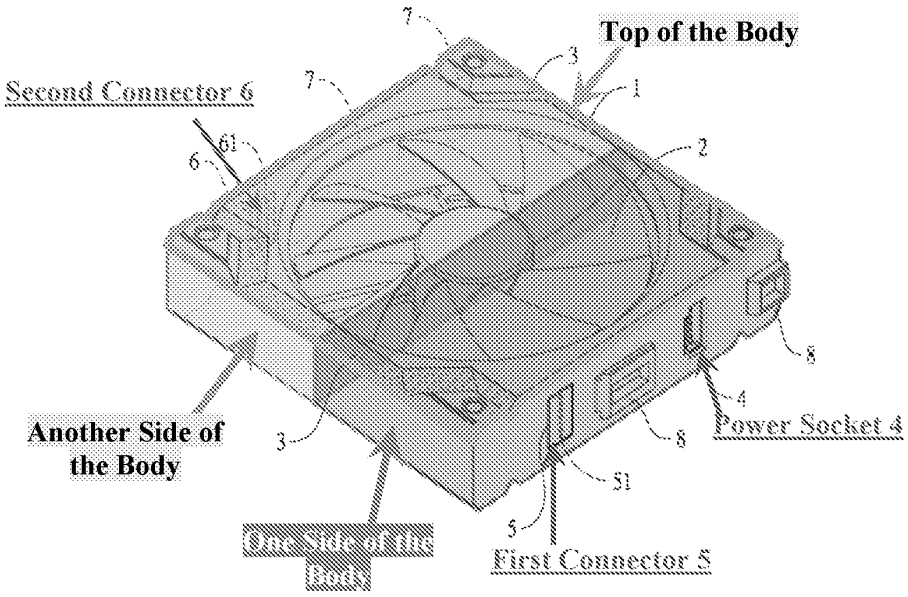


Fig. 1

See: Tuckerman 1.132 Declaration at para. 25. As shown in the annotated Figure 1 immediately above, according to the Examiners' interpretation of "one side of the body" and "another side of the body" in claim 1 of the '336 patent, each side extends outward from a centerline creating two halves. See: Tuckerman 1.132 Declaration at para. 26. The body **1** under such interpretation would only have two sides. See: Tuckerman 1.132 Declaration at para. 26. But the Examiners' interpretation is inconsistent with how a person of ordinary skill in the art ("POSITA") would have understood the term "side of the body" because the "top of the body" will be subsumed and rendered superfluous by the "one side of the body" and the "another side of the body." This is because anything located at the "top of the body" (cyan) will be on *either* the "one side of the body" (red) *or* the "another side of the body" (green), or both, as shown above. See: Tuckerman 1.132 Declaration at para. 26. If something is located right on the centerline at the "top of the body" (cyan), then it will also span over both the "one side of the body" (red) and the "another side of the body" (green), making it simultaneously on three different regions of the body. That is, the "top of the body" will be eviscerated and rendered meaningless. See: Tuckerman 1.132 Declaration at para. 26.

A second problem with this interpretation is that, depending on how the two halves of the "body" are divided, the locations of the power socket **4**, first connect **5**, and second connector **6** become indefinite. See: Tuckerman 1.132 Declaration at para. 27. In the above exemplary division, the power socket **4** and the first connector **5** are on "one side of the body" (red), while the second connector **6** is on "another side of the body" (green). See: Tuckerman 1.132 Declaration at para. 27. But in the below exemplary division, the power socket **4** is on "one side of the body" (red), while the first connector **5** and the second connector **6** are on "another side of the body" (green):

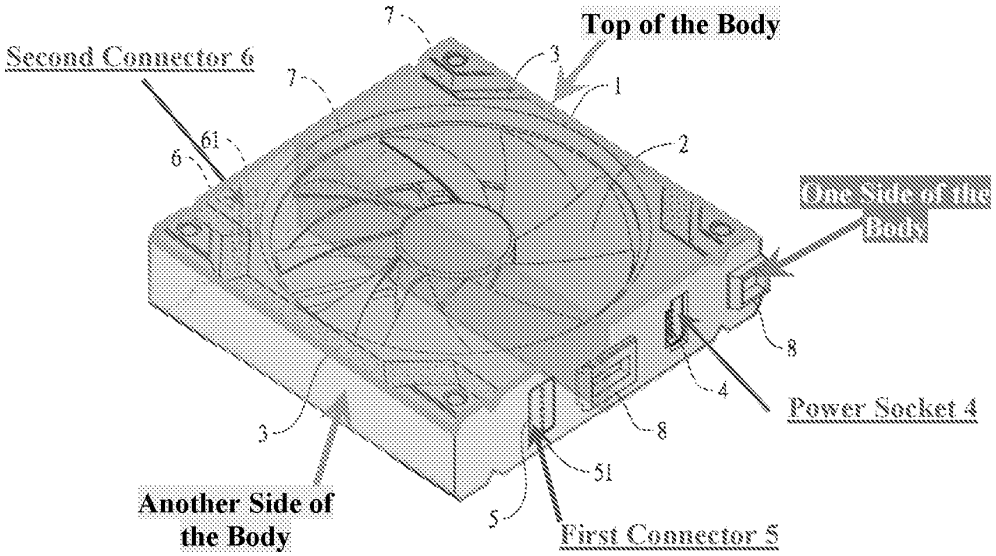


Fig. 1

See: Tuckerman 1.132 Declaration at para. 27. Under this interpretation, the preferred embodiment in Figure 1 will even be excluded from the claim scope because the power socket **4** and the first connector **5** are no longer on the same side, and the first connector **5** and second connector **6** are no longer on two different sides. See: Tuckerman 1.132 Declaration at para. 27. Claim 1 of the '336 patent does not include language on how the two "side[s] of the body," if interpreted as the two halves of the "body," can be divided. See: Tuckerman 1.132 Declaration at para. 28. Thus, in yet another exemplary division below, the two "side[s] of the body" can be the top and bottom halves of the body, respectively. This division causes all the power socket **4**, the first connector **5**, and the second connector **6** to be on both "side[s] of the body," **and the**

**"top of the body" to be completely subsumed and rendered superfluous by the "one side of the body"**:

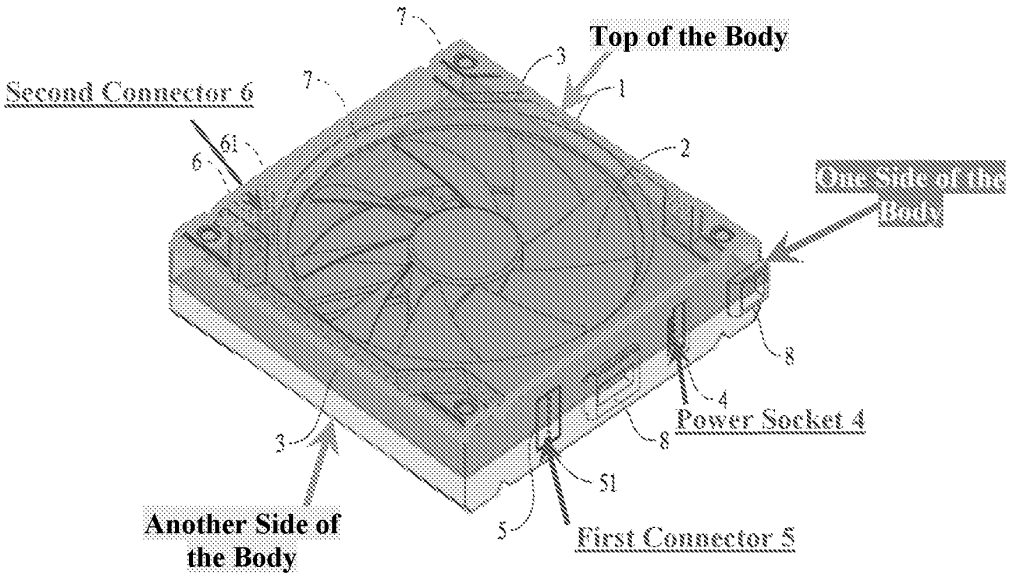


Fig. 1

See: Tuckerman 1.132 Declaration at para. 28 (emphasis added). Thus, the interpretation of the "one side of the body" and the "another side of the body" as two halves of the "body" causes the locations of the power socket **4**, the first connector **5**, and the second connector **6** to become indefinite. As such, this interpretation is not how a POSITA would have understood the phrase "side of the body." See: Tuckerman 1.132 Declaration at para. 29.

A POSITA would not have interpreted "one side of the body" and "another side of the body" as two halves of the "body" because such interpretation causes the previously described nonsensical results. See: Tuckerman 1.132 Declaration at para. 30. The ordinary meanings of "side of the body" and "top of the body," which are distinct from each other as would have been understood by a POSITA, are consistent with the usage of such terms in the claims of the '336 patent. See: Tuckerman 1.132 Declaration at para. 31. The tortured explanation of the two "side[s] of the body" as the two halves of the body creates ambiguity. A POSITA would have known that the "top of the body" means the top and that the body has a bottom opposite the "top." See: Tuckerman 1.132 Declaration at para. 31. And a POSITA would have known that a fan body typically has four sides distinct from and adjacent to the top and the bottom. See:

Tuckerman 1.132 Declaration at para. 32. Thus, a POSITA clearly would not have understood the "side[s] of the body" to mean that the claimed body only has two sides overlapping with the fan body's "top" at which the illumination area is located. See: Tuckerman 1.132 Declaration at para. 33. Rather, a POSITA would have understood Figure 1 of the '336 patent to disclose an illumination fan including a body having four sides, a top, and a bottom, all distinct locations. See: Tuckerman 1.132 Declaration at para. 33.

The '336 patent further discloses that the power socket **4** is electrically connected with the first connector **5**, the second connector **6**, the fan **2**, and the illumination area **3** through, for example, internal wiring:

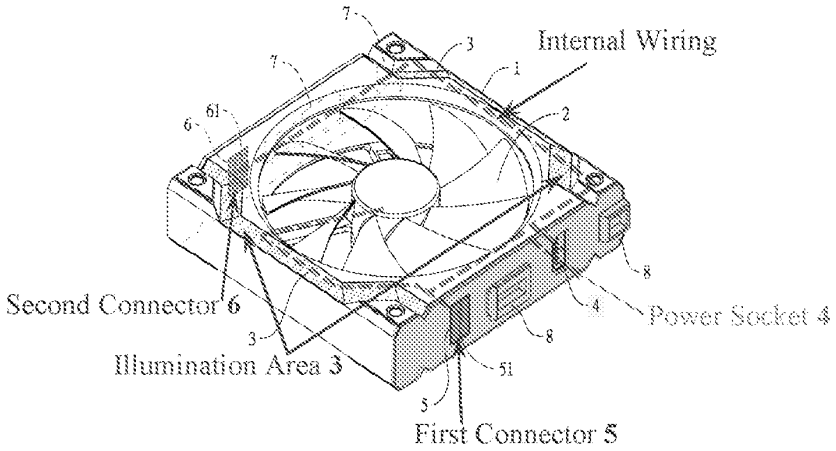


Fig. 1

See: Tuckerman 1.132 Declaration at para. 34 citing '336 pat. at 2:61-3:3, Fig. 1 (exemplary annotations and highlighting added). In a non-limiting configuration, the power socket **4** (highlighted in yellow above) can be supplied with power from behind by the second connector **6**, which can receive power from a prior illumination fan's first connector **5** in the manner as shown in Figure 2 (which illustrates the exemplary connections between any two adjacent illumination fans). See: Tuckerman 1.132 Declaration at para. 35 citing Fig. 2. As such, once the power socket **4** on the same side of the body **1** as the first connector **5** is supplied with power, which is electrically connected with the fan **2** and the illumination area **3**, the fan **2** of the body **1** can be driven into rotation and the illumination area **3** into illumination. See: Tuckerman 1.132 Declaration at para. 35 citing the '336 pat. at 3:4-6, Fig. 1.

Further, the power socket **4**, which is electrically connected with the first connector **5** of a first illumination fan's body **1**, can in turn supply power to the first connector **5** of the first



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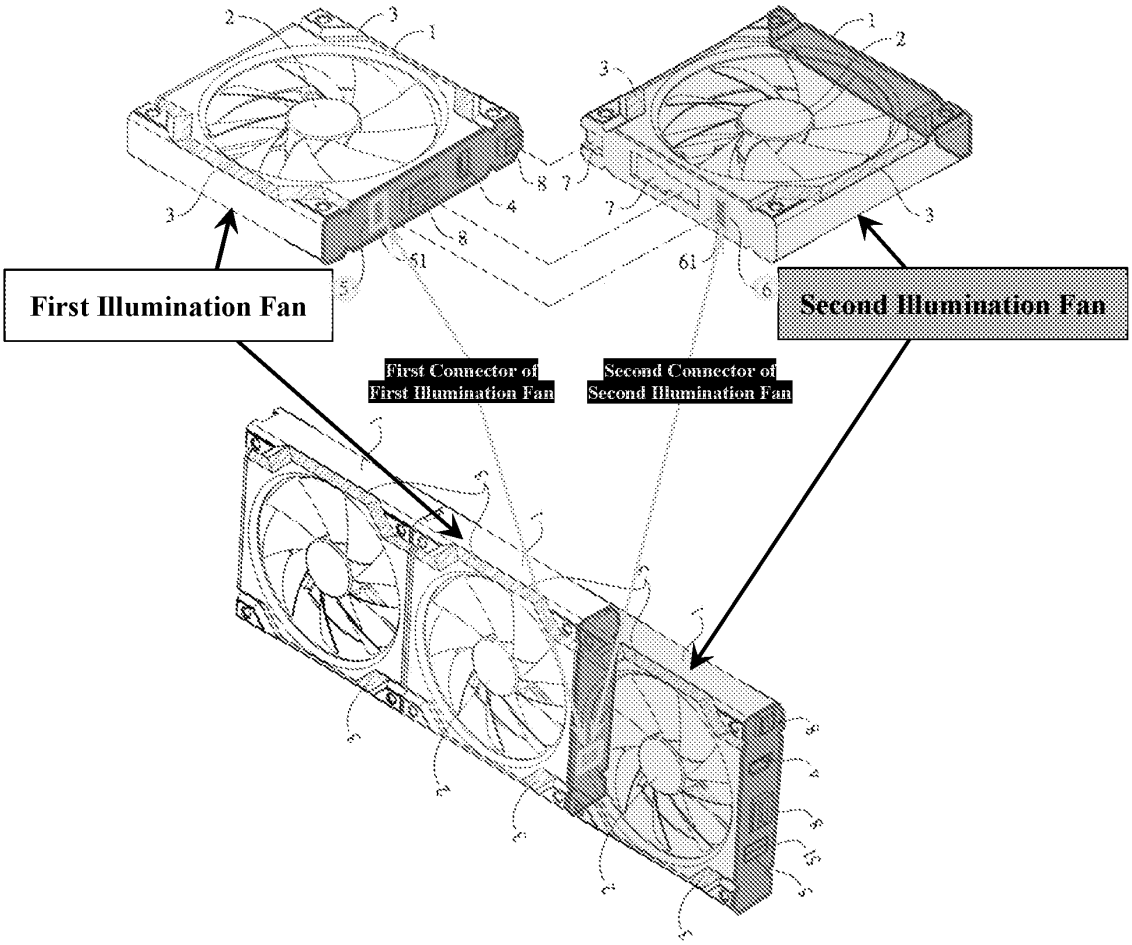
illumination fan's body **1** "so that when the first connector **5** of [the first illumination fan's] body **1** is connected to the second connector **6** of another [or a second illumination fan's] body **1**, the fan **2** of the another [or second illumination fan's] body **1** can be driven into rotation and the illumination area **3** [of the another or second illumination fan's body **1]** can be illuminated." See: Tuckerman 1.132 Declaration at para. 36 citing '336 pat. Figs. 2-3, 3:7-16. A non-limiting configuration of connecting a first illumination fan and a second illumination fan can be illustrated by the annotated Figures 2 and 3 together below:




See: Tuckerman 1.132 Declaration at para. 36 citing '336 pat., Fig. 2 (annotated) and Fig. 3 (rotated and annotated); *see also id.* at 3:7-16. As shown above, a first illumination fan on the

left (labeled in yellow) is connectable to a second illumination fan on the right (labeled in blue). When the first illumination fan is supplied with power, its fan **2** is driven into rotation and the illumination area **3** is illuminated; when the second illumination fan is connected to the first illumination fan through joining the first connector **5** of the first illumination fan and the second connector **6** of the second illumination fan, the fan and illumination area of the second illumination fan are also driven into rotation and illumination, respectively. See: Tuckerman 1.132 Declaration at para. 37.

## 2. LAI DOES NOT ANTICIPATE CLAIMS 1 OR 2 NOR RENDER THEM OBVIOUS IN VIEW OF FUJITSU

The Action rejected claims 1 and 2 under 35 U.S.C. § 102 in view of Lai and, alternatively, under 35 U.S.C. § 103 as being unpatentable over Lai in view of Fujitsu. As explained below, Lai does not disclose at least the following limitations in claim 1:

a. "an illumination area on at least two sides of the fan at top of the body";
b. "a power socket and a first connector on one side of the body, and a second connector on another side of the body";
c. "the power socket is electrically connected with the first connector";
d. "when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination."

Further, Fujitsu does not disclose at least the following limitations in claim 1 and teaches away from a combination with Tsai:

e. "a power socket and a first connector on one side of the body";
f. "an illumination area on at least two sides of the fan at top of the body."

The Action seems to heavily rely on impermissible hindsight by using the disclosure and claims of the '336 patent to suggest non-existent prior-art disclosure of the required elements in the '336 patent. As explained in detail below, Lai does not anticipate claims 1 and 2 nor renders them obvious in view of Fujitsu due to all the missing elements.



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**a. Lai Does Not Disclose Illumination Area at Top of Body**

Claim 1 of the '336 patent states, in relevant part, "an illumination area on at least two sides of the fan ***at top of the body*** . . . ." See '336 pat., Cl. 1 (emphasis added). The Action stated that "Lai discloses . . . an illumination area on at least two sides of the fan at a top of the body (at LEDs 16, Figs. 2 and 4-6; ¶¶ 11 and 13-16) . . . ." See Action at 5. But Lai's purported illumination area, LEDs 16, is not located at the purported "top of the body." Instead, Lai's LEDs are located on an inner circular wall surrounding the fan blades ***beneath*** the top of the purported fan body.

A POSITA would have concluded that Lai does ***not*** disclose or teach "an illumination area . . . at top of the body" as required by claim 1, ***nor*** does the combination of Lai and Fujitsu. See: Tuckerman 1.132 Declaration at para. 45. Here the Action's rejection has a major problem: even if we stipulate that the four discrete LEDs depicted in Lai's Figures 2 and 3 by themselves constitute an "illumination area," there is no evidence that Lai disclosed or intended that these LEDs be located "at top of the body," and in fact a POSITA would have understood that Lai teaches away from locating them at the top, as will be discussed below. See: Tuckerman 1.132 Declaration at para. 45.

Lai discloses the use of multiple RGB LEDs installed in each fan. See: Tuckerman 1.132 Declaration at para. 46 and the annotated Figure 2 immediately below. However, the LEDs of Lai are not "at top of the body," as required by claim 1. The only information about how these LEDs might be positioned is implied in Figure 2, and then expressly provided and confirmed in Figure 3. See: Tuckerman 1.132 Declaration at para. 46. Figure 2 is described as a "schematic view" [Lai 0006] which a POSITA would have understood means a circuit diagram, not a physical depiction. See: Tuckerman 1.132 Declaration at para. 46. Nonetheless, the figure suggests that the preferred embodiment places the four LEDs 16 in roughly four equally spaced locations near the four corners of the fan on an inward-facing circular wall ***beneath*** the "top of the body":

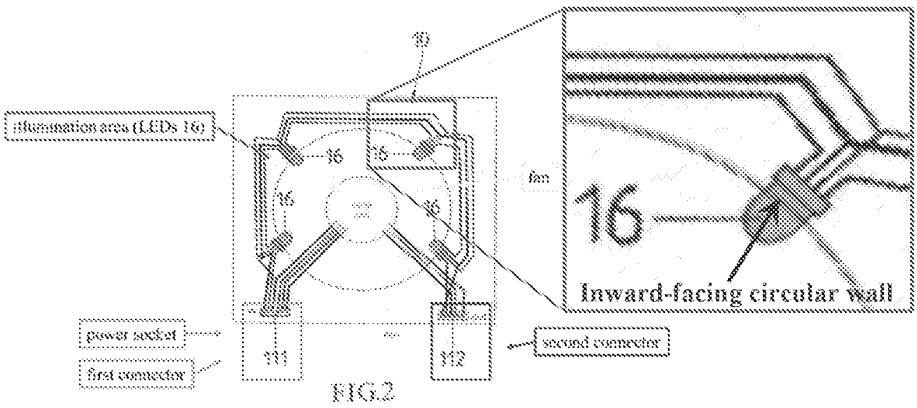


FIG.2

See: Tuckerman 1.132 Declaration at para. 46. As can be seen above, Figure 2 shows a ***solid*** circle going ***across*** the LEDs 16, suggesting that the LEDs 16 are located ***beneath*** the "top of the body." This is because a POSITA would have understood that, were the LEDs 16 located at the "top of the body" (which they are not), the portions of the circle going through the LEDs 16 would be *blocked* by the LEDs 16, not the *other way* around. In other words, the line forming the circle would not extend through the LED but would stop on each side of the LED. That the LEDs 16 are blocked by the ***solid*** circle in Figure 2 suggests that the LEDs 16 are not at, and are instead ***beneath***, the "top of the body," as further confirmed expressly by annotated Figure 3 shown below:

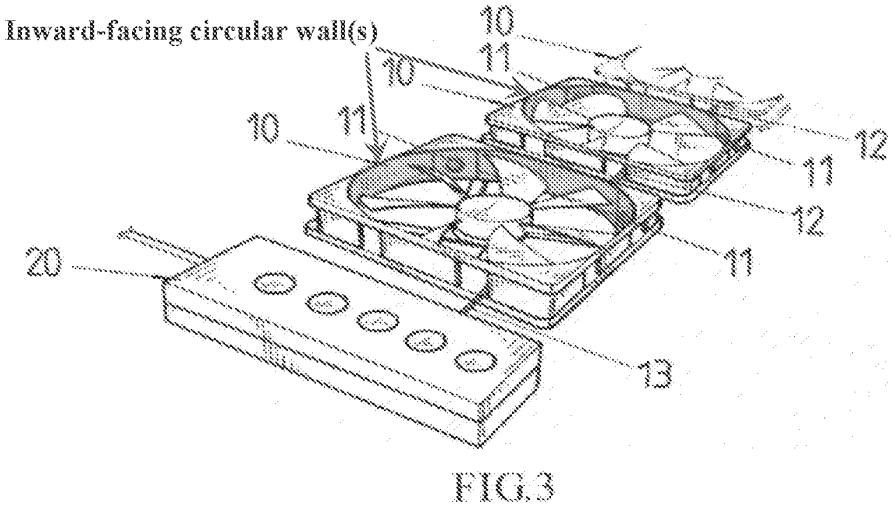


FIG.3

See: Tuckerman 1.132 Declaration at para. 47. As can be seen above, Figure 3 makes it clear that the LEDs (labeled "11" as opposed to "16" in this figure) are indeed attached near the corners of the fan body, and are fixed to the inward-facing circular wall surrounding the large

circular opening within which the fan blades rotate, about mid-height (or mid-depth, if one prefers the term) (as Figure 2 also implies). See: Tuckerman 1.132 Declaration at para. 48.

In other words, the LEDs are not located at the "top of the body" (as this term would be interpreted in the '336 patent, *i.e.*, the front face of the fan body). See: Tuckerman 1.132 Declaration at para. 49. The LEDs are not at the bottom of the body either; they are midway in-between. See: Tuckerman 1.132 Declaration at para. 49. So, Lai's Figure 3 teaches away from the LEDs being "at top of the body," and there is nothing else in Lai's disclosure to contradict this impression. See: Tuckerman 1.132 Declaration at para. 49. This is because a POSITA would have understood Lai to disclose LEDs positioned mid-depth on the inward-facing circular wall surrounding the fan to shine light onto the surfaces of the fan blades, illuminating them as they rotate by, as the primary illumination effect, as opposed to direct viewing of the LEDs located at the "top of the body." See: Tuckerman 1.132 Declaration at para. 49. A POSITA would have concluded that "[p]lacing the LEDs at the top of the body would not have been nearly as effective in accomplishing this visual effect to illuminate the fan blades, so a POSITA would not have been motivated to do so. So again, Lai's design clearly does not disclose and, in contrast, teaches away from having an illumination area at the "top of the body." See: Tuckerman 1.132 Declaration at para. 49.

A POSITA would have understood that Lai's inward-facing, mid-body depth LEDs may not have even been visible at the "top of body" because they may be mostly, if not entirely, blocked by the "top of the body." See: Tuckerman 1.132 Declaration at para. 50. Indeed, a POSITA would have understood that (1) the lenses of the LEDs are directional and normally would not permit much, if any, light going in the lateral directions, and (2) the tips of the LEDs should not extend into the circular space in which the fan blades rotate to avoid inferring with the fan rotation. Further, "it would only be the fan blades that would reflect and/or diffuse the LED light and create visibility of the illumination." See: Tuckerman 1.132 Declaration at para. 50. Even so, the illuminated fan blades are not themselves at the "top of the body." In the terminology of the '336 patent, the fan is not even part of the body; it is a separate component "disposed in the center of the body" ['336 pat., Cl. 1]. Note that an illuminated area being visible in a top view is not the same as an illumination area being physically located at the top of the body, as is required in the '336 patent." See: Tuckerman 1.132 Declaration at para. 50. In sum, Lai does not disclose the claimed "an illumination area on at least two sides of the fan ***at***



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***top of the body***" as claimed in claim 1 of the '336 patent. Thus, it is respectfully requested to withdraw the rejection.

**b. Lai Does Not Disclose Power Socket and First Connector on One Side of Body and Second Connector on Another Side of Body**

The Action states that "Lai discloses . . . a power socket and a first connector (shown as input 111 in schematic view of Fig. 2, the power socket being the input power supply connection of the fan 10, and the first connector being any other of the input connections of the fan 10 for connecting the fan 10 to the controller 20 or to an adjacent fan 10, as shown in Figs. 4-6) on one side of the body (i.e., on the side closest to the controller 20, Fig. 3) . . . ." See Action at 5.

The Action further states that Lai discloses "second connector (shown as output 112 in schematic view of Fig. 2, from the fan 10 to the next fan 10 in series, connected via transmission line 12 in Fig. 3; see also Figs. 4-6) on another side of the body (i.e., on the side closest to the next fan 10 in the series, Fig. 3 . . . ." See Action at 5. For clarity, these purported mappings are first illustrated below with respect to an annotated Figure 2 of Lai:

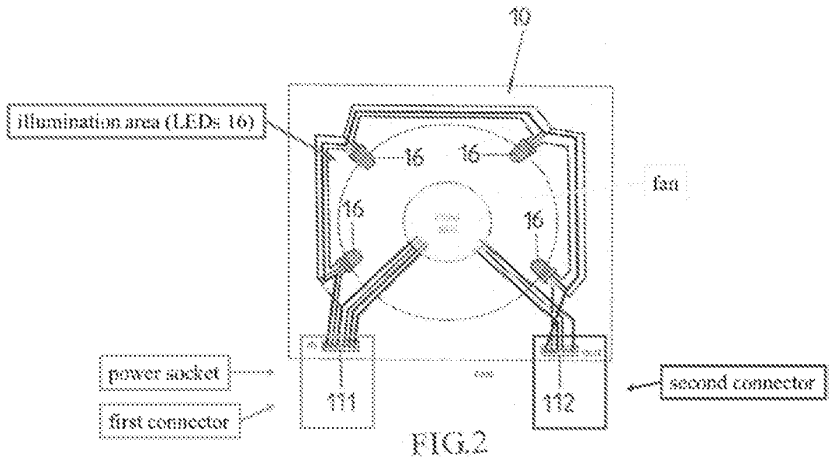

FIG.2

See: Tuckerman 1.132 Declaration at paras. 51-52. As illustrated above, the Action (at 5) maps Lai's single input 111 as the "power socket" and "first connector" and Lai's 112 as the "second connector" in Figure 2. See: Tuckerman 1.132 Declaration at para. 53.

But Lai in fact does not disclose nor otherwise teach any of the "socket" and "connector" limitations in claim 1 of the '336 patent. As an initial matter, no part of Lai discloses or even suggests a "socket" or a "connector," period. See: Tuckerman 1.132 Declaration at para. 54. The entire Lai reference mentions no structure that is even close to a socket or connector. At most,



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Lai refers to element 111 as a "single input," which includes neither a socket nor a connector structure. See: Tuckerman 1.132 Declaration at para. 54. Critically, claim 1 of the '336 patent includes a conditional phrase, "***when*** the first connector of the body [of the illumination fan] is connected with a second connector of a body of another illumination fan." See: Tuckerman 1.132 Declaration at para. 54. This phrasing implicitly requires both a connected state and a disconnected state between the connectors of the two illumination fans, respectively, as demonstrated by Figures 2 (disconnected state) and 3 (connected state) of the '336 patent:

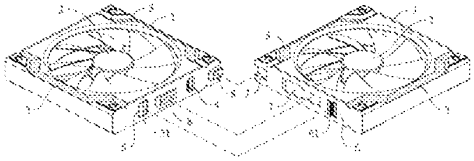

**Fig. 2 (Disconnected State)**

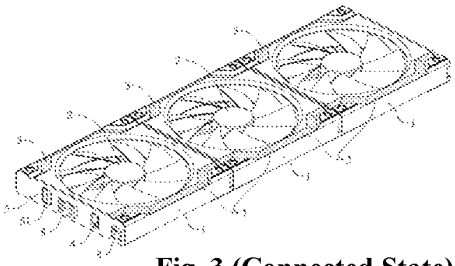

**Fig. 3 (Connected State)**

See: Tuckerman 1.132 Declaration at para. 54. In contrast, Lai has no disclosure nor suggestion of such two states for the alleged "connectors" 111 or 112. Indeed, contrary to the Action's assertion, Lai does not characterize element 111 as, nor suggest it to be, any "socket" nor "connector" at all. See: Tuckerman 1.132 Declaration at para. 55 citing Lai generally. Similarly, Lai does not characterize 112 as any "connector" but a "single output 112." See: Tuckerman 1.132 Declaration at para. 55. Thus, a POSITA ***would not*** have recognized Lai's "single input 111" or "single output 112" as having any "socket" nor "connector" structures. See: Tuckerman 1.132 Declaration at para. 55. In contrast, based on Lai's disclosure, a POSITA would have understood the single input 111 and single output 112 as having nothing more than fixed solder points on printed circuit boards (or PCBs), as shown below:



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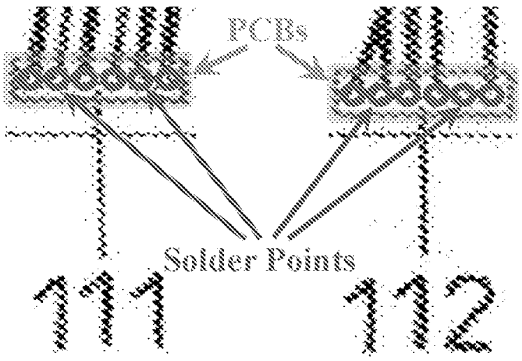


See: Tuckerman 1.132 Declaration at para. 55. Fixed solder points on PCBs in Lai's "single input 111" and "single output 112" are simply not a "power socket" nor a "connector," as would have been understood by a POSITA. This is because Lai's input 111 and output 112 cannot be conveniently divided into separate "socket" and "connector" components at least because of the "single" input 111's and single output 112's ***singular*** structures repeatedly emphasized by Lai. See: Tuckerman 1.132 Declaration at para. 56. Further, to connect to a separate socket and connector, the "***single*** transmission line" in Lai will need to be split in two, which also violates Lai's preference of the transmission line being "single" as well. Thus, Lai's ***single*** input 111, ***single*** output 112, and ***single*** transmission line 12 do not disclose or otherwise teach the claimed "socket" nor "connector" structures. In fact, Lai's repeatedly emphasized ***singular*** structures teach away from splitting the input 111 into a power socket and a first connector, which in Lai's configuration will require ***two*** transmission lines, not a "single" transmission line. Tuckerman 1.132 Declaration at para. 56.

Further, Lai's input 111 and output 112 are both located ***behind*** the ***same*** side of the fan body (upwardly) in Figure 2 and thus together fail to disclose "a power socket and a first connector ***on one side*** of the body, and a second connector ***on another side*** of the body" as required by claim 1 of the '336 patent, as shown below:

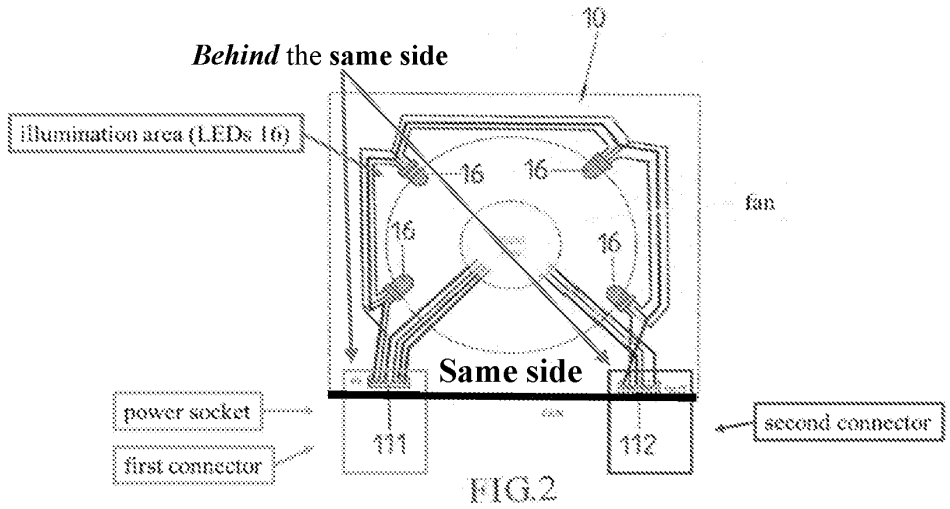


FIG.2

See: Tuckerman 1.132 Declaration at para. 57. Acknowledging as much, the Action argues that, "[a]lthough the schematic view of the fan shown in Fig. 2 of Lai illustrates the input (111) and the output connectors (112) on the same side of the fan body, the fan shown in Fig. 3 of Lai is understood to show the input and output connectors on opposite sides of the fan body, e.g., for connection to a controller (20) on one side via a transmission line (13) and to another fan on another side via another transmission line (12), or for connection to one fan on one side via a first transmission line (12) and to another fan on the other side via a second transmission line (12)." Action at 5-6. But as expressly shown in its Figure 2, Lai's input 111 and output 112 are not even located "on" any side of the fan body. As can be seen clearly above, they are both located ***behind*** the ***same*** side entirely. See: Tuckerman 1.132 Declaration at para. 58. Further, Lai has no such disclosure of "the input and output connectors on opposite sides of the fan body" in Figure 3 because the purported "connectors" are in fact just openings and are not connectors at all, as a POSITA would have understood. Instead, Lai refers to those openings as merely the "windows of a single input 111 and a single output 112" (*i.e.*, golden openings shown below) to allow the transmission lines 12 and 13 to go through, respectively, as opposed to the input 111 and the output 112 ***themselves***. Note that claim 1 of the '336 patent requires the two connectors ***themselves*** to be located on two different sides, not just their "windows" or their connections. Indeed, the ***same*** side of each fan body in Lai's Figure 3, corresponding to the ***same*** side ***behind*** which the alleged input 111 and output 112 are in Figure 2, shows no particular structures ***on*** it at all. See: Tuckerman 1.132 Declaration at para. 58. That is, as shown in Figures 2 and 3 of Lai together, the alleged input 111 and output 112 are both located entirely ***behind*** the ***same*** side



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(and thus entirely ***hidden*** and ***invisible*** in Figure 3). The input 111 and output 112 are thus not ***on*** two ***different*** sides as required by claim 1 of the '336 patent. Instead, they are ***behind*** the ***same*** side and are ***internally*** connected to the single transmission lines 12 and 13 that go through the (gold-colored) "windows" to the outside, as shown below:

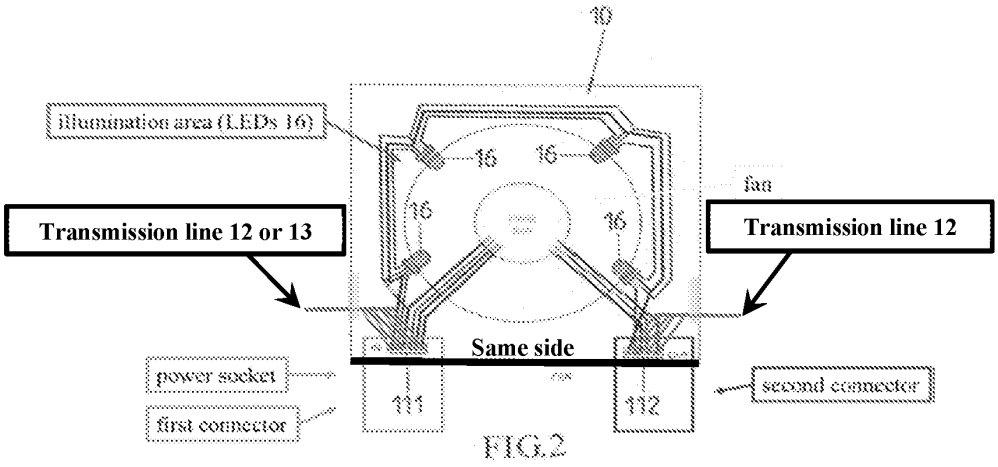


FIG.2

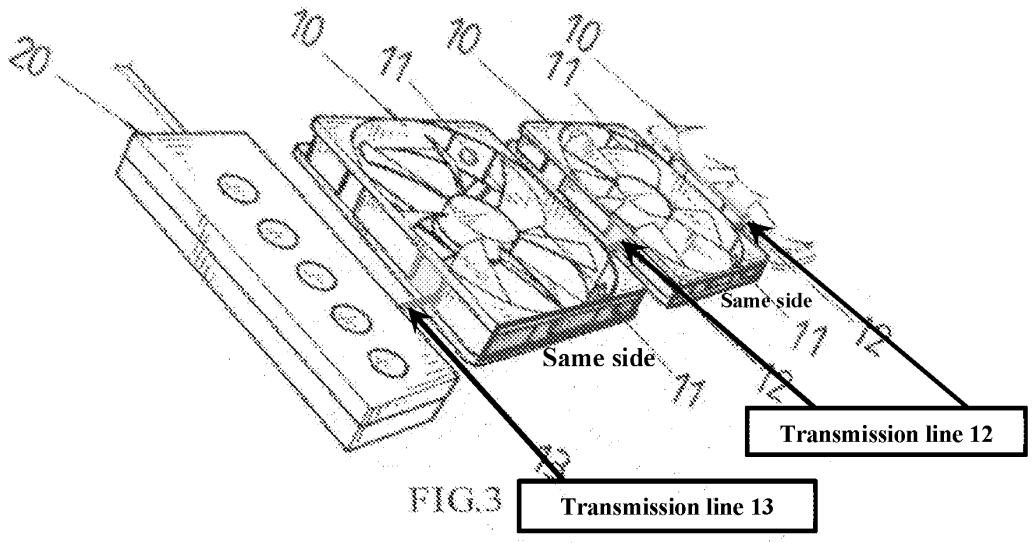


FIG.3

See: Tuckerman 1.132 Declaration at para. 58.

The Action also states "the power socket being the input power supply connection of the fan 10, and the first connector being any other of the input connections of the fan 10 for connecting the fan 10 to the controller 20 or to an adjacent fan 10, as shown in ***Figs. 4-6***) on one



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side of the body (*i.e.*, on the side closest to the controller 20, Fig. 3) . . . ." See Action at 5 (emphasis added). But in fact, a POSITA would have understood that Figures 4-6 of Lai are circuit diagrams that merely show communication pathways and do not teach any spatial positioning whatsoever. See: Tuckerman 1.132 Declaration at para. 59. And critically, they ***do not even include any elements corresponding to Lai's single input 111 nor single output 112 at all***. See: Tuckerman 1.132 Declaration at para. 44. For instance, a POSITA would have understood that the various elements 11 (LEDs), 14 (LED Driver ICs), 15 (Motor Control), 16 (LEDs), and/or 17 (MCU) cannot be physically positioned as shown in Figures 4-6 because they will be interfering with the rotating fan blades, as shown below:

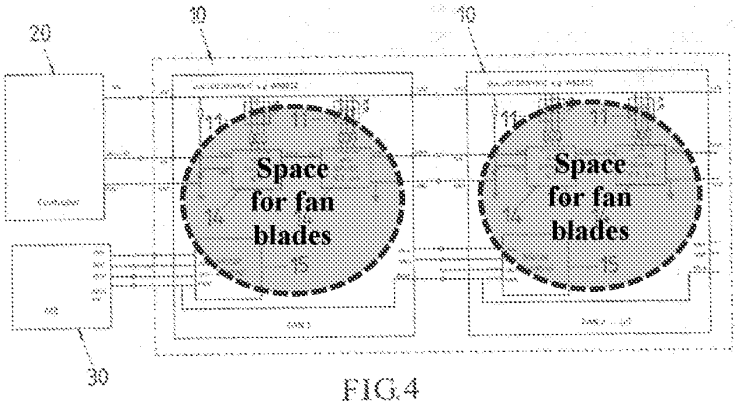


FIG.4

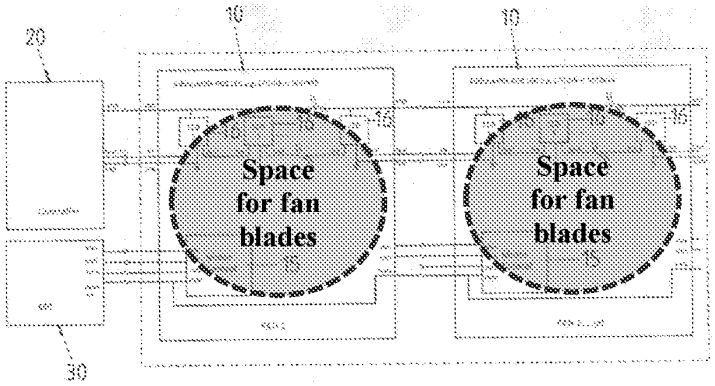


FIG.5



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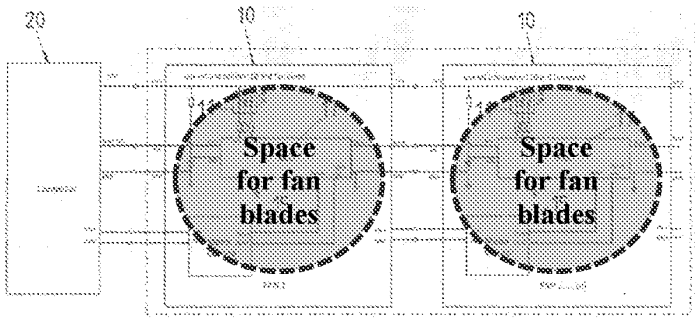


FIG.6

See: Tuckerman 1.132 Declaration at para. 59. Thus, it would have been clear to a POSITA that Figures 4-6 are circuit diagrams that merely show communication and electrical current pathways, ***not*** spatial relationships. See: Tuckerman 1.132 Declaration at para. 60. Critically, neither the single input 111 (the purported "power socket" and "first connector") nor the single output 112 (the purported "second connector") are even included in Figures 4-6 at all, which thus cannot possibly disclose their locations relative to the fan bodies. Consequently, Figures 4-6 of Lai simply do not disclose a first connector together with a power socket on one side of the body, nor a second connector on another side of the body, as required in claim 1 of the '336 patent. See: Tuckerman 1.132 Declaration at para. 60.

In sum, none of Figures 2-6 of Lai nor any other part thereof discloses or otherwise teaches "a power socket and a first connector on one side of the body, and a second connector on another side of the body" as required by claim 1 of the '336 patent. See: Tuckerman 1.132 Declaration at para. 61.

**c. Lai Does Not Disclose that Power Socket Is Electrically Connected with First Connector**

Under the Action's mappings, Lai fails to disclose that "the power socket is electrically connected with the first connector" as required by claim 1 of the '336 patent. This is because, according to the Action, Lai's purported "power socket" and "first connector" are ***separate*** connections in the input 111:

> [A] power socket and a first connector (shown as input 111 in schematic view of Fig. 2, the power socket being the input power supply connection of the fan 10, and the first connector being any ***other*** of the input connections of the fan 10 for connecting the fan 10 to the controller 20 or to an adjacent fan 10, as shown in Figs. 4-6) . . . .

Action at 5 (emphasis added). That is, the Action asserts that Lai's purported "first connector" is any of "the input connections of the fan 10" ***other than*** "the input power supply connection of the fan 10" that is Lai's purported "power socket." See: Tuckerman 1.132 Declaration at paras. 62-63. In other words, the Action asserts that Lai's "power socket being the input power supply connection of the fan 10" is ***different from*** Lai's "first connector being any ***other*** of the input connections of the fan 10 for connecting the fan 10 to the controller 20 or to an adjacent fan 10, as shown in Figs. 4-6)." See: Tuckerman 1.132 Declaration at para. 63. Thus, a POSITA would have therefore understood Lai's purported "power socket" and "first connector" are ***separate*** connections in the input 111 that are ***not*** "electrically connected" with each other. This is because otherwise, Lai's "power socket" and "first connector" in the input 111 will be ***short-circuited out*** with each other and thus will ***not*** be ***different*** from each other, ***contrary to how the Action has mapped them***. Indeed, a POSITA would have understood that any of "the input connections of the fan 10" ***other than*** "the input power supply connection of the fan 10" is a ***signal line*** for, for example, "the addressable RGB LEDs 16 … controlled individually by a controller 20 (as shown in FIG. 3) to result in even more complex and expressive lighting effects through the change in output signals." See: Tuckerman 1.132 Declaration at para. 63 citing Lai ¶ 11. A POSITA would have understood that such signal line in Lai cannot be cross-wired with "the input power supply connection of the fan 10" because the control signals will be short-circuited out by the power and thus lost and unusable. That is, under the Action's mappings, Lai's purported "power socket" is ***not*** "electrically connected with" Lai's "first connector" as required by claim 1 of the '336 patent.

**d. Lai Does Not Disclose That When First Connector of Body of Illumination Fan Is Connected with Second Connector of Body of Another Illumination Fan, Fan and Illumination Area of Body of Another Illumination Fan Are Respectively Driven Into Rotation and Illumination**

Under the Action's mappings, Lai fails to disclose that, "***when*** the first connector of the body [of the illumination fan] is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of the other illumination fan are respectively driven into rotation and illumination." '336 pat., Cl. 1 (emphasis added). This is at least because, as explained in the previous section, Lai's purported "first connector" is a ***signal line*** not electrically connected with Lai's purported "power socket." See: Tuckerman 1.132



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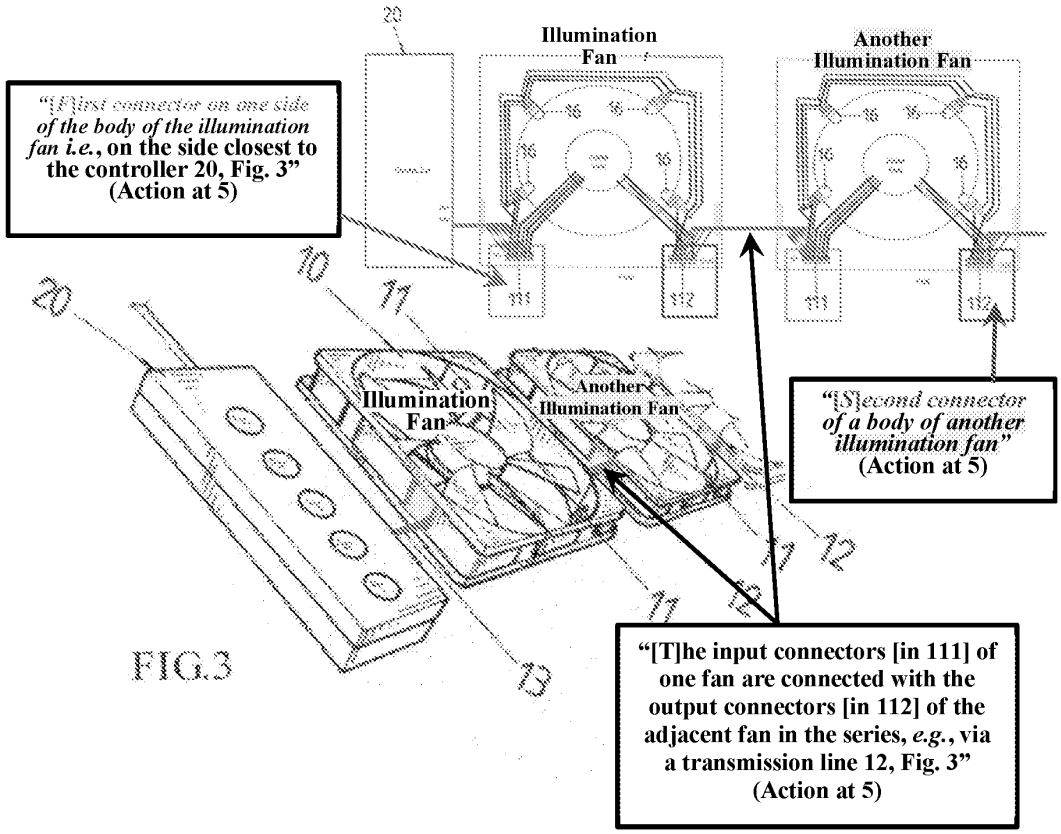
Declaration at para. 64. Thus, Lai's "first connector" is ***not*** supplied with power by Lai's "power socket" even "when the power socket on the one side of the body is supplied with power," as recited by claim 1 of the '336 patent. In turn, under the Action's mappings, Lai's purported "first connector" cannot be connected to ***another illumination fan*** for its fan and illumination area to be driven into action. That is, Lai fails to disclose that, "when the first connector of the body [which is merely a signal line] is connected with a second connector of a body of ***another illumination fan***, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination."

Further, the Action's mappings do not explain how Lai's purported "*first connector on one side* ***of the body*** (i.e., on the side closest to the controller 20, Fig. 3)" of the ***"illumination fan***" (located on the ***far-left***) can be conditionally connected with a "**second connector of a body of another illumination fan**" (located on the ***far-right***) "when the input connectors [in 111] of one fan are connected with the output connectors [in 112] of the adjacent fan in the series, *e.g.*, via a transmission line 12, Fig. 3)" (Action at 5):



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See: Tuckerman 1.132 Declaration at para. 65. As can be seen above, Lai's purported "*first connector on one side* ***of the body*** (i.e., on the side closest to the controller 20, Fig. 3)" of the "***illumination fan***" (located on the ***far-left***) and Lai's purported "**second connector of a body of another illumination fan**" (located on the ***far-right***) are respectively located on the opposite two sides of the two adjacent illumination fans and are far apart from each other. Action at 5. The Action does not explain how the two connectors so far apart are connected "when the input connectors [in 111] of one fan are connected with the output connectors [in 112] of the adjacent fan in the series, e.g., via a transmission line 12, Fig. 3." Thus, a POSITA would not have understood that Lai discloses this limitation under the Action's mappings. See: Tuckerman 1.132 Declaration at para. 66.

Furthermore, as discussed previously, claim 1's conditional phrasing, "***when*** the first connector of the body [of the illumination fan] is connected with a second connector of a body of another illumination fan," implicitly requires both a connected state and a disconnected state between the connectors of the two illumination fans, as shown in Figures 2 (disconnected state) and 3 (connected state) of the '336 patent:

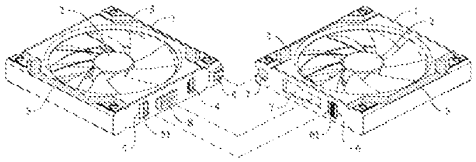

**Fig. 2 (Disconnected State)**

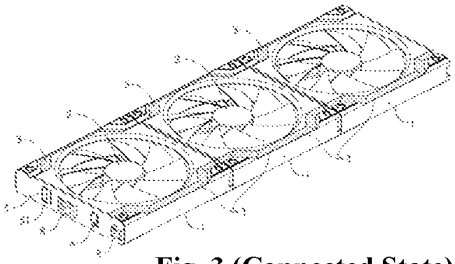

**Fig. 3 (Connected State)**

See: Tuckerman 1.132 Declaration at para. 67.

But a POSITA would have understood that the (first) illumination fan adjacent the controller 20 and the (second or) another illumination fan adjacent the (first) illumination fan in Lai are ***permanently*** connected via the "single transmission line 12." See: Tuckerman 1.132 Declaration at para. 68. That is, under the Action's mappings, a POSITA would have understood that the ***far-left*** first connector (which is merely a signal line) on the one side of the illumination fan's body "closest to the controller 20, Fig. 3" cannot be ***conditionally*** connected to the ***far-right*** "second connector of a body of another illumination fan" to allow the fan and illumination area of the another illumination fan to be driven into action, as implicitly required by claim 1 of the '336 patent. See: Tuckerman 1.132 Declaration at para. 68.



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In sum, under the Action's mappings, Lai fails to disclose that, "***when*** the first connector of the body [of the illumination fan] is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of the other illumination fan are respectively driven into rotation and illumination." See: Tuckerman 1.132 Declaration at para. 69.

**e. Fujitsu Does Not Disclose Power Socket and First Connector on Same Side of Body of Illumination Fan**

The Action recognizes the weakness of the rejection of claim 1 over Lai in its interpretation of Lai as disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body. See Action at 6. The Action further rejected claim 1 over Lai in view of Fujitsu arguing that Fujitsu discloses a power socket and a first connector on one side of the body and a second connector on another side of the body. See Action at 6. In particular, the Action states that Fujitsu discloses "a power socket (female power connector CNA and/or CNB, see ¶ 31 and 39) and a first connector (inter-fan connector CNC, ¶ 31) on one side of the board, and a second connector (inter-fan connector CND) on another side of the body." See Action at 6. The Action concluded that it would have been obvious to a POSITA "to provide the body of Lai with a power socket and a first connector on one side of the body and a second connector on another side of the body, as taught by Fujitsu, in order to facilitate a serial arrangement of fans (as shown in Fig. 3 of Lai and Figs. 5-6 of Fujitsu). See Action at 6.

The Action identifies connectors CNA and CNB in each fan unit of Fujitsu as being the "power sockets." See: Tuckerman 1.132 Declaration at para. 85 citing Action at 6. But neither CNA nor CNB is on a "side of the body," as a POSITA would have interpreted the '336 patent. See: Tuckerman 1.132 Declaration at para. 85. As discussed previously, a POSITA would have understood that in the '336 patent, it is clear from the specification and associated figures that each fan body has an approximately square profile when viewed from the top/front (i.e., viewing along the axis of fan rotation, so that the viewer is facing the illumination areas). The body also has four sides, as well as a "top of the body" (containing the illumination area) and an opposite face which we might call the rear or "bottom" of the body (the '336 patent does not name this bottom face, but its existence is apparent). See: Tuckerman 1.132 Declaration at para. 86.



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In one or more of the '336 patent's embodiments, the power socket and first connector are located on one side of the body, and a second connector is located on another side of the body. See: Tuckerman 1.132 Declaration at para. 92. This configuration supports claim 1 of the '336 patent, which recites, *inter alia*, "a power socket and a first connector on one side of the body" and "the power socket on the one side of the body." These two claim phrases together confirm that the "power socket" and the "first connector" must be on the ***same side*** of the illumination fan's body. This required configuration of the power socket **4** and the first connector **5** being located on the ***same side*** of the body of the illumination fan (red) is depicted in Figure 1 of the '336 patent, as shown below:

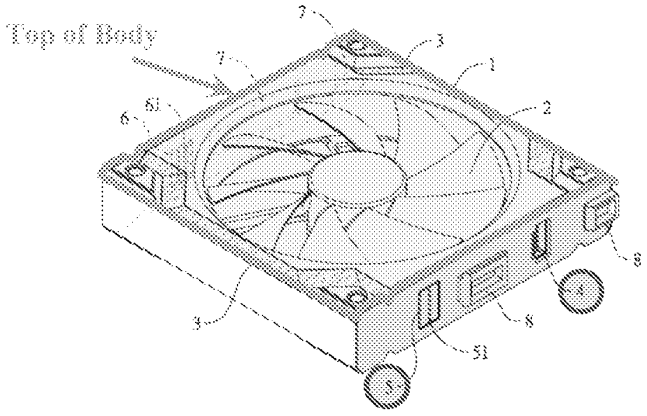


Fig. 1

See: Tuckerman 1.132 Declaration at para. 92. In contrast to the illumination area **3** located at the top of the body, the power socket **4** and the first connector **5** are ***not*** located at the top of the body (cyan) because they are located on the side of the body (red).

Applying the same interpretation of "side of the body" and "top of the body" to the Fujitsu publication, it is apparent that connector CNA is located on the top (i.e., the front) of the fan body, not on a side of the fan body as required by claim 1 of the '336 patent. See: Tuckerman 1.132 Declaration at para. 87. This is evident from Figures 6 and 7 in Fujitsu, and is also evident from a close reading of paragraph [0039] in Fujitsu, which states that "[t]he connector CNA on one side is arranged on a lower part of the ***front*** surface of each fan," and furthermore that "[t]he connector CNB on the other side is arranged on an upper part of the ***rear*** surface of each fan unit" (emphasis added). See: Tuckerman 1.132 Declaration at para. 87. Note that Fujitsu is using the phrases "one side" and "other side" to refer to the front and rear surfaces



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of the fan unit. See: Tuckerman 1.132 Declaration at para. 87. This is different from the '336 patent's use of the word "side" in each embodiment's "side of the body" of the illumination fan, wherein the "side of the body" in the embodiments means one of the major faces or surfaces (there are four such faces in the preferred embodiments shown) bounding the fan body that are perpendicular to the front and rear faces of the fan body. See: Tuckerman 1.132 Declaration at para. 87. Fujitsu's "front surface" is equivalent to "top of the body" in the claim language of the '336 patent. See: Tuckerman 1.132 Declaration at para. 87. Yet, the Action incorrectly claims that Fujitsu teaches a power socket and a first connector on one side of the body. See: Tuckerman 1.132 Declaration at para. 87 citing Action at 6. This appears to incorrectly interpret the translation of Fujitsu using the word "side" as describing the location of connectors CNA and CNB, but without including Fujitsu's additional explanatory language which makes it clear that the "front side" or "front surface" in this context is referring to the front or rear surfaces, ***not*** an equivalent "side of the body" in the '336 patent context, which is in fact perpendicular to the front and rear surfaces in the embodiments. See: Tuckerman 1.132 Declaration at para. 87.

A POSITA would have understood that a foundational purpose of Fujitsu's invention is to "enable hot swapping of one fan unit," a goal Fujitsu reiterates numerous times. See: Tuckerman 1.132 Declaration at para. 88 citing Fujitsu Cl. 3 ("[T]he plurality of fan units is configured so as to enable hot swapping of one fan unit among the plurality of fan units …"); para. [0002] ("[A]n ability to perform hot maintenance and swapping while maintaining a system operational state (energized state) is desirable."); paras. [0008]-[0009]. ("[Summary of the Invention] … An object of the present invention is to provide an electronic device capable of assigning to each fan unit an address associated with a position of each fan unit even when the fan unit is swapped".); para. [0041]. ("Therefore, fan unit 10 can be hot-swapped without having to stop the system …"). Indeed, Fujitsu's emphasis on "hot swap"—mentioned no fewer than 55 times throughout the patent—underscores its central importance to the invention. See: Tuckerman 1.132 Declaration at para. 88.

For Fujitsu's hot-swapping to work, each fan unit must maintain at least two power sockets to ensure continuous power during a swap. See: Tuckerman 1.132 Declaration at para. 89. This dual-socket configuration is crucial: when one power cable is disconnected from one power socket during maintenance, the second power cable connected to the second power socket maintains uninterrupted power. See: Tuckerman 1.132 Declaration at para. 89.



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A POSITA would conclude that Lai alone or in view of Fujitsu does not render any '336 claims obvious. See: Tuckerman 1.132 Declaration at para. 90. The Action maps a connector CNC in the Fujitsu patent as the "first connector" in the '336 claim language. See: Tuckerman 1.132 Declaration at para. 90. Fujitsu explains that "connector CNC (male) . . . is provided by protruding on the right side surface when viewed from a front surface of each fan unit 10." See: Tuckerman 1.132 Declaration at para. 90 citing Fujitsu para. [0038]. In the language of the '336 patent, connector CNC would indeed be considered as being "on one side of the body." See: Tuckerman 1.132 Declaration at para. 90. However, by glossing over the fact that Fujitsu and the '336 patent used the word "side" in two entirely different meanings (as recently explained above), the Action incorrectly concludes that Fujitsu embodies the claim limitation "a power socket and a first connector on one side of the body." See: Tuckerman 1.132 Declaration at para. 90. For this to be true, the power socket and first connector would both need to be on the same side of the body. But a POSITA would have concluded that they are obviously ***not*** on the same sides, as clearly shown in the colored annotations of Fujitsu's Figures 6 and 7:

FIGURE 6
(Excerpt)

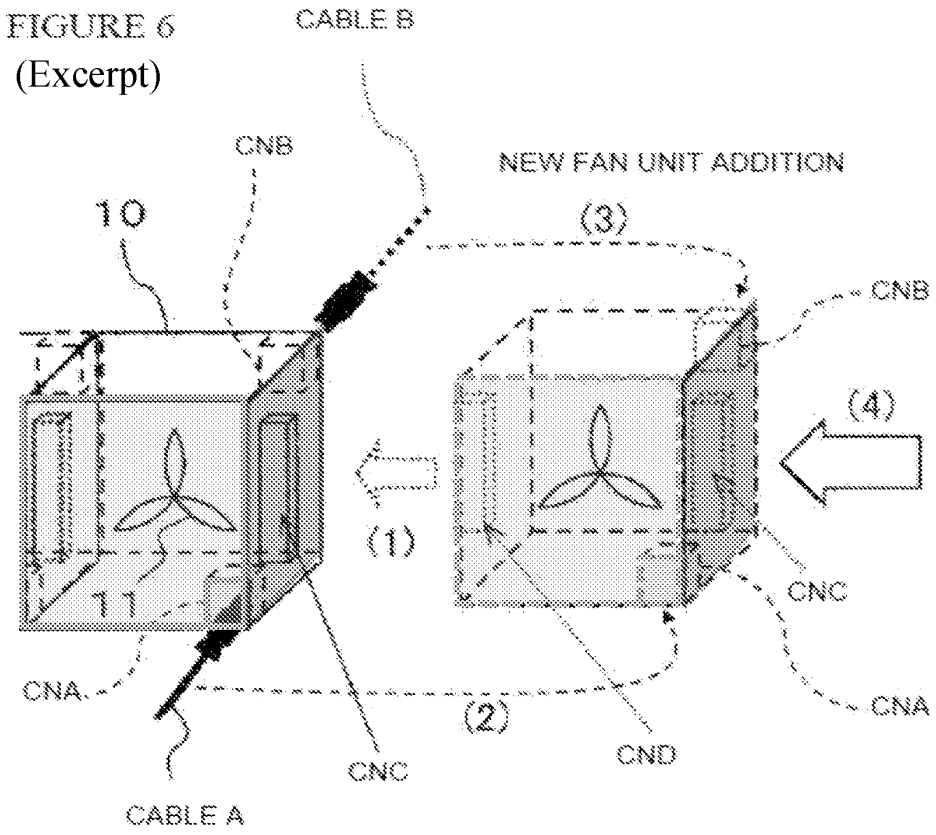
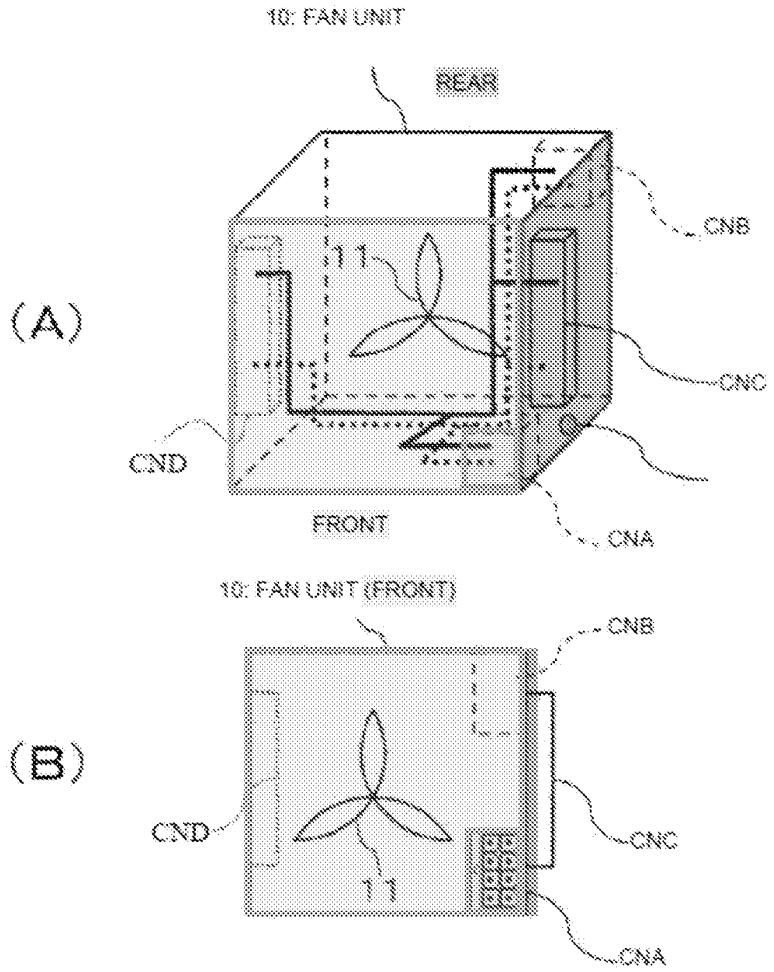


FIGURE 7

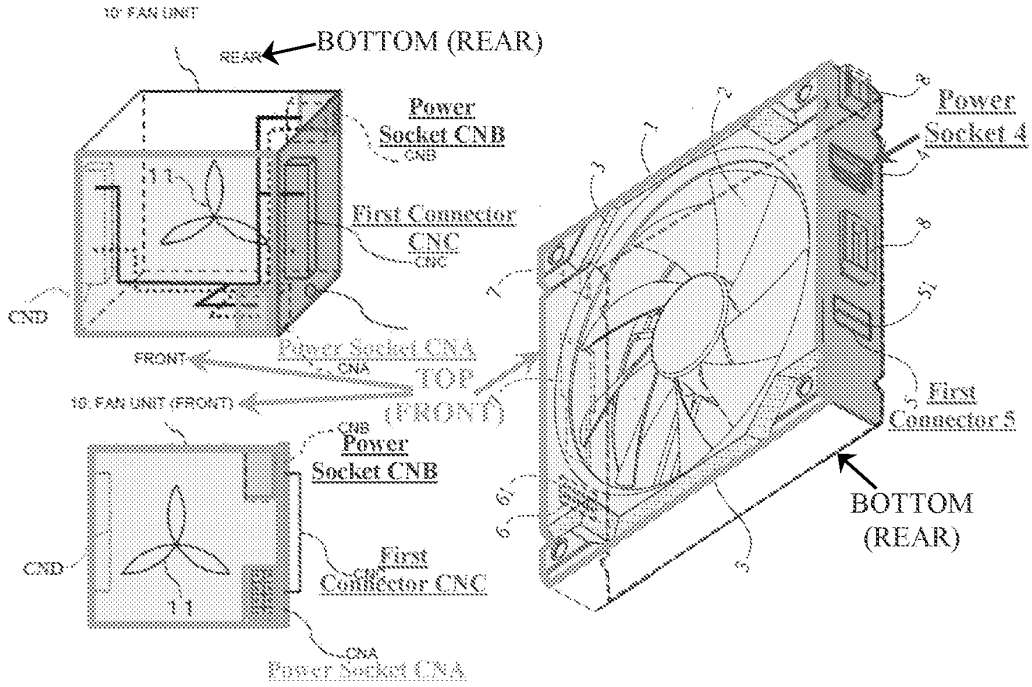



See: Tuckerman 1.132 Declaration at para. 90.

The Action identifies connector CNC as being the "first connector," and connectors CNA and CNB are each identified as a "power socket." See: Tuckerman 1.132 Declaration at para. 91 citing Action at 6. But it is unequivocal from the Figures 6 and 7 (reproduced and annotated above) that connector CNA is mounted on a (cyan) surface facing the reader (Fujitsu's "front surface," which is equivalent to the '336 patent's "top of the body"), connector CNC is mounted on a (red) surface facing to the right (Fujitsu's "right side surface" or "end side," and the '336 patent's "side of the body"), and connector CNB is mounted on a surface facing away from the reader (Fujitsu's "rear surface" and what would be considered the "bottom of the body" in the

'336 patent, though that term is not specifically used). See: Tuckerman 1.132 Declaration at para. 91. So, in both figures and text, Fujitsu does not teach having a power connector/socket and another connector being on the same side of the fan unit. See: Tuckerman 1.132 Declaration at para. 91.

Specifically, Fujitsu illustrates the alleged power socket (CNA or CNB) on the "front" (equivalent to the "top" of the illumination fan body in '336 patent's Fig. 1 embodiment) or the "rear" (equivalent to the bottom of the illumination fan body in '336 patent's Fig. 1 embodiment), while the alleged first connector (CNC) is positioned on a separate "side." See: Tuckerman 1.132 Declaration at para. 94. This arrangement in Fujitsu does not read on the structure required by claim 1, as shown below:



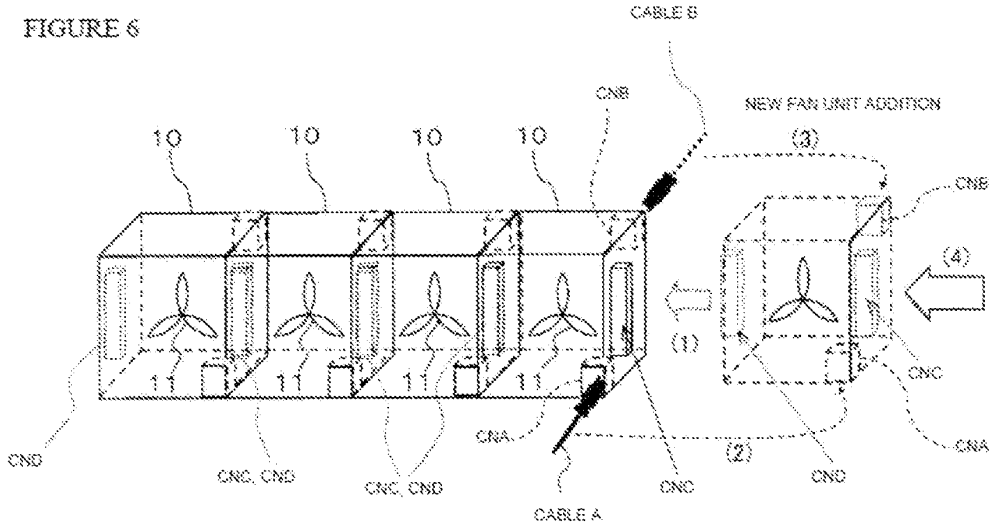

Tuckerman 1.132 Declaration at para. 94 *comparing* Fig. 7 of Fujitsu, alleged "Power Socket CNA/CNB" *with* '336 pat. Fig. 1 (rotated), "Power Socket 4") (annotated). The diagram above depicts a comparison between (1) on the left, a portion of Figure 7 from Fujitsu showing the front and rear locations of the connectors that the Action maps to the claimed "**power socket**" (*i.e.* CNA(cyan)/CNB(grey)) and (2) on the right, Figure 1 of the '336 patent depicting the

location of the claimed power socket (red) on the same side of the body (red) as that the first connector is on. See: Tuckerman 1.132 Declaration at para. 95. As can be seen further above in annotated Figures 6 and 7 of Fujitsu, the connectors that the Action has mapped to the claimed "**power socket**" (CNA/CNB) are not located on the same side of the body as the connector that the Examiner mapped to the claimed "**first connector**" (CNC). Instead, as shown, the CNA structure is located on the equivalent "top" (front) whereas the CNB structure is located on the equivalent bottom (rear) of the fan unit. See: Tuckerman 1.132 Declaration at para. 95. Because neither CNA nor CNB is located on the same side of the fan unit as where CNC is, Fujitsu fails to disclose "a power socket ***and*** a first connector ***on one side of the body***" and "the power socket ***on the one side of the body***" as recited in claim 1. See: Tuckerman 1.132 Declaration at para. 95.

Furthermore, it would not have been obvious to a POSITA to move CNA and CNB onto the same side as CNC as a matter of design choice because to do so would be in direct contradiction of the teachings of Fujitsu. See: Tuckerman 1.132 Declaration at para. 89. In fact, Fujitsu teaches away from such movements, as explained below. As discussed, Fujitsu discloses a system that is configured to enable hot-swapping of fans. See: Tuckerman 1.132 Declaration at para. 89. The way the hot-swap process works, one must first connect a new fan unit to the right of the rightmost existing fan unit (mating connector CND of the new fan unit to connector CNC of the existing fan unit):

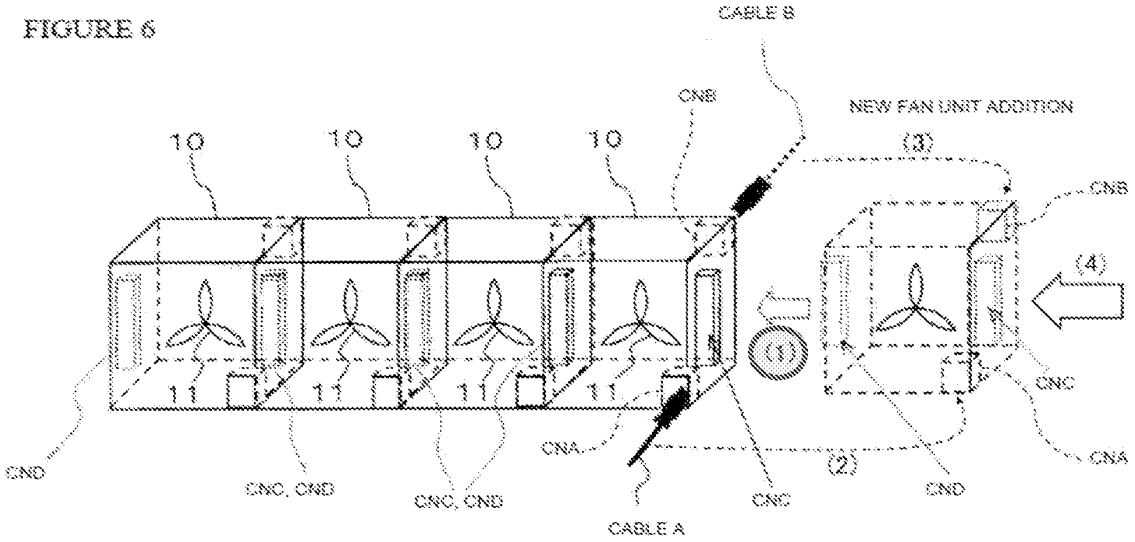
> [0042] [T]he hot-swapping procedure of fan unit 10 according to the present embodiment will be explained while referring to FIG. 6 [reproduced below]. …

FIGURE 6



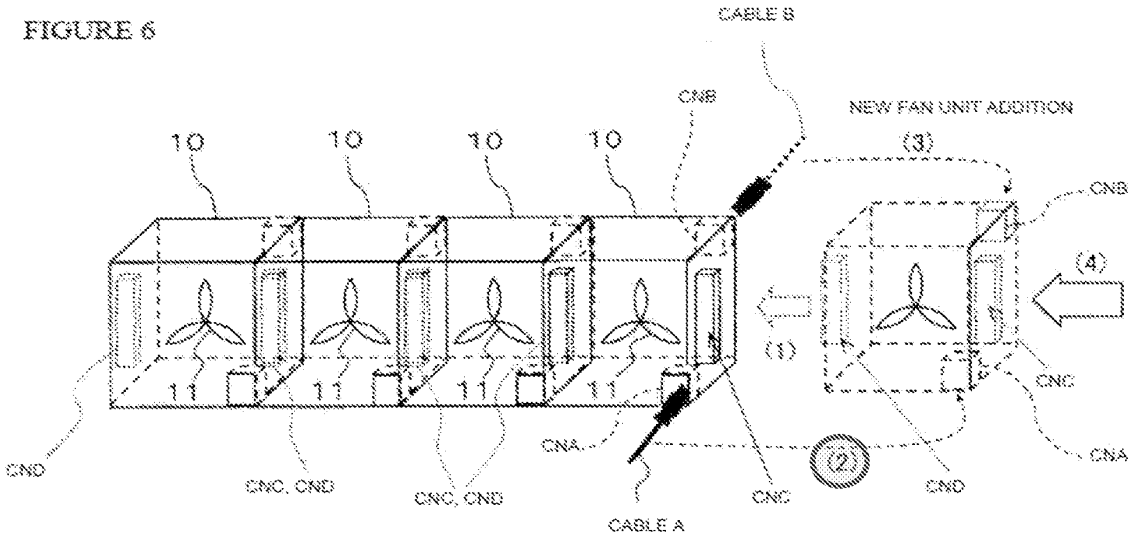
[0044] [T]he maintenance person engages the connector CNC (male) of fan unit 10 on the right-most side with the connector CND of the new fan unit 10 (refer to *Arrow (1)* shown in FIG. 6). Accordingly, the new unit 10 is connected to fan unit 10 on the right-most side as a fifth fan unit 10.

FIGURE 6




[0045] Subsequently, the maintenance person removes the cable A that is connected to the connector CNA of fan unit 10 on the right-most side, and connects the same to the connector CNA of the additionally- linked new fan unit 10, as shown by *Arrow (2)* of FIG. 6. …

FIGURE 6




[0046] Furthermore, the maintenance person removes the cable B that is connected to the connector CNB of fan unit 10 on the right-most side, and connects the same to the connector CNB of the additionally- linked new fan unit 10, as shown by *Arrow (3)* of FIG. 6. …



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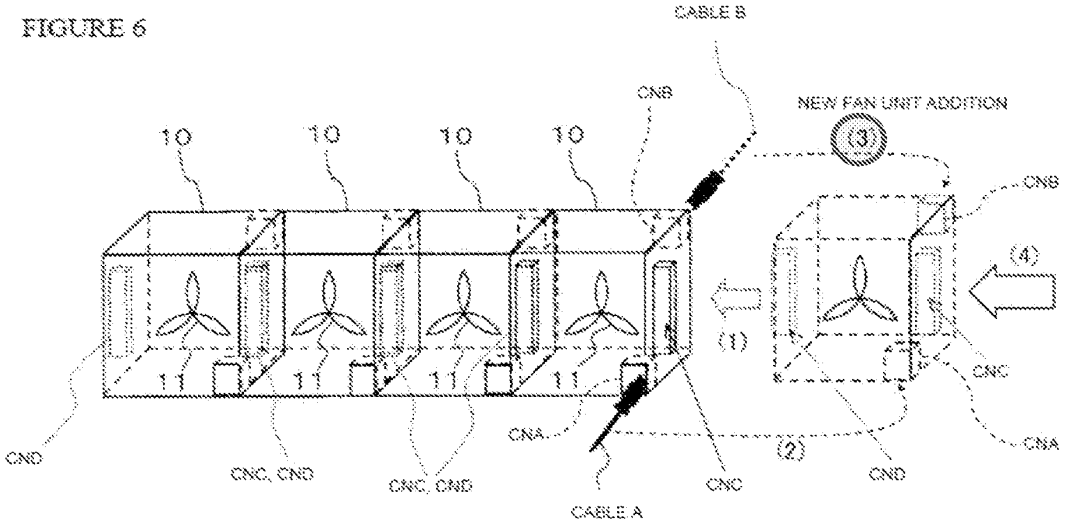
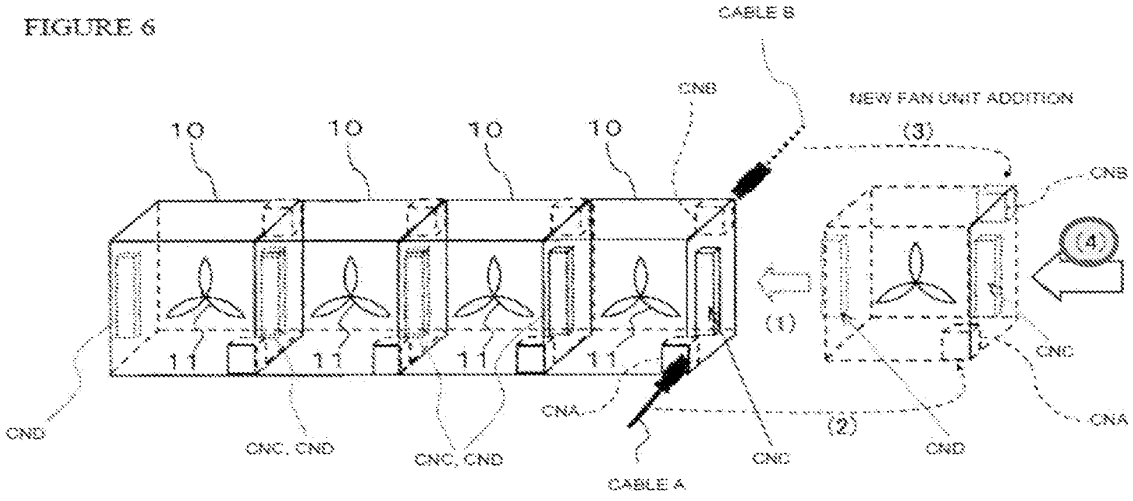
FIGURE 6




[0047] Subsequently, the maintenance person performs the sliding operation to move all five fan units 10 in which the new fan unit 10 is added on the right-most side in a direction of the *Arrow (4)* (left side) shown in FIG. 6. Accordingly, the new fan unit 10 is pushed inside server 1, and a fifth fan unit 10 from the right (left-most side) is pushed outside from server 1.

FIGURE 6




[0048] At this time, when the pushed-out fan unit 10 is a faulty fan unit to be swapped (target fan unit), the pushed out fan unit 10 is removed, and the swapping operation is completed. When the pushed-out fan unit 10 is not the target fan unit, the maintenance person adds and connects that pushed-out fan unit 10 on the right-



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> most side and pushes thereof inside server 1 as the new fan unit 10 as explained above. The maintenance person repeats such an operation till the target fan unit is pushed out.
>
> [0049] In such a way, a specific fan unit among the serially-connected four fan units 10 (faulty fan unit) can be swapped with a new fan unit 10 without stopping the power supply to fan unit 10. Accordingly, swapping of fan unit 10 in a state in which rotation of the cooling fan 11 provided in each fan unit 10 is maintained as is, that is, swapping of fan unit 10 in the hot state can be performed.

See: Tuckerman 1.132 Declaration at para. 89 citing Fujitsu at [0043]-[0049] (emphasis added).

As shown above, the hot-swapping is done while "connectors CNA and CNB of the fan unit on the right-most side are connected to the cables A and B, respectively." See: Tuckerman 1.132 Declaration at para. 89 citing Fujitsu ¶ 0042. In other words, the power cables A and B initially remain plugged into the pre-existing right-most fan while the new fan is attached; if both cables were removed, then all the fans would shut down, which could overheat the server. See: Tuckerman 1.132 Declaration at para. 89. Leaving the cables attached would not be possible if either CNA or CNB was on the same side as connector CNC because the cable would be squashed when the two fans are plugged together. See: Tuckerman 1.132 Declaration at para. 97. Indeed, the hot-swap procedure requires that one remove the two cables, one at a time, on the fan that is now in second position after a new fan has been attached on the right, so that they can be re-connected one at a time to the new right-most fan. See: Tuckerman 1.132 Declaration at para. 89. As such, if the CNA and CNB are located on the same "side" as that CNC is located on, cables A and B will be jammed between the fans, making the serial removal of them, and hence the required "hot-swapping", rendered impossible. See: Tuckerman 1.132 Declaration at paras. 97-99. In short, it is a physical impossibility in Fujitsu's hot-swapping scheme to have the power socket located on the same "side of the body" as that the first connector is located on as required by claim 1 of the '336 patent. See: Tuckerman 1.132 Declaration at para. 100. Thus, Fujitsu teaches way from positioning CNA and CNB on the same side as CNC.

For at least these reasons, it would not have been obvious to a POSITA to combine Lai and Fujitsu. Further, even if a POSITA would have combined Lai with Fujitsu, the combination still does not teach the claimed illumination fan of claim 1 of the '336 patent. Furthermore, it would not have been obvious to a POSITA to modify Lai nor Fujitsu for the reasons set forth



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herein. Thus, it is respectfully requested that the rejection of claim 1 and those claims depending therefrom be withdrawn.

**f. Fujitsu Does Not Disclose Illumination Area on at Least Two Sides of Fan at Top of Body of Illumination Fan and Teaches Away from Combination with Tsai To Disclose This Element**

The Action recognizes the weakness of the rejection of claim 1 over Lai in its interpretation of Lai. See Action at 6. But the Action further rejected claim 1 stating that Fujitsu discloses an illumination area (12, *see* Fig. 14). See Action at 6. But the Action also expressly recognizes that "Fujitsu does ***not*** disclose that the illumination area is on at least two sides of the fan at the top of the body." See Action at 12 (emphasis added).

As discussed above, Fujitsu is directed to solving a very specific market need, specifically, cooling fans used in large-scale backbone servers and configured to undergo hot maintenance and hot-swap defective fans out of a series of fans. See: Tuckerman 1.132 Declaration at paras. 71-72 citing Fujitsu ¶ 0002. A POSITA would have therefore understood Fujitsu to address this specific market need by providing the ability to "hot-swap" a defective fan in a "large-scale backbone server," such as would exist as part of a server farm in a large data center. See: Tuckerman 1.132 Declaration at para. 51. This is an ultrahigh reliability environment where downtime is viewed as intolerable. See: Tuckerman 1.132 Declaration at para. 73. A large-scale server will be designed with multiple fans to provide cooling redundancy, and it is desirable to be able to swap out a defective fan without shutting down the server nor any of its operating fans. See: Tuckerman 1.132 Declaration at para. 73. Fujitsu offers just such a method in his patent application. See: Tuckerman 1.132 Declaration at para. 73. In Fujitsu's preferred embodiments, each fan also has a pair of redundant connectors CNA and CNB that can be connected to a pair of power supply cables (only the right-most fan is intended to be connected to these cables in normal operation). See: Tuckerman 1.132 Declaration at para. 74. This feature permits a hot-swapping procedure whereby a new fan can be attached at the end of the row, powered up, slid into the server, and a fan at the opposite (left) end of the row can then be removed. See: Tuckerman 1.132 Declaration at para. 74. The power cables A and B are transferred one at a time from the original right-most fan to the newly attached right-most fan, so that all the fans are continuously supplied with power. See:



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Tuckerman 1.132 Declaration at para. 74. This procedure can be repeated until the defective fan has been removed from the row." See: Tuckerman 1.132 Declaration at para. 74.

A POSITA would most definitely **not** view the Fujitsu reference as having any bearing on the subject of "illumination fans," such as are a subject of the '336 patent. See: Tuckerman 1.132 Declaration at para. 75. A POSITA would have understood that the purpose of an illumination fan is to provide widely viewable lighting (usually with full-color RGB capability that can be dynamically varied) having some cosmetic or entertainment value to the user or his guests. See: Tuckerman 1.132 Declaration at para. 75. Illumination fans are typically marketed to users of desktop personal computers or gamers, where the casing has been specifically designed to make the fans visible. See: Tuckerman 1.132 Declaration at para. 75. They would not be designed into backbone servers (Fujitsu's target market), which are generally installed in rack-mounted cabinets in highly secure restricted-access facilities that are normally only viewed by maintenance engineers or technicians. See: Tuckerman 1.132 Declaration at para. 75. To add illumination would increase fan cost, add to the power consumption and hence electricity cost, increase the heat load on the server which would reduce reliability (or require additional cooling fan capability to dispose of the heat), and increase the air conditioning load on the data center which further adds to electricity cost. See: Tuckerman 1.132 Declaration at para. 75. All these effects are detrimental to the goals of a data center operator, so the use of illumination fans would not be considered in that market. See: Tuckerman 1.132 Declaration at para. 75. Fujitsu [¶ 0005] specifically states "lower power consumption is desirable in the servers in recent years." See: Tuckerman 1.132 Declaration at para. 75. The addition of illumination to Fujitsu's fan units would be contrary to this desire to minimize power consumption, would provide no benefit, and would in fact increase costs and particularly heat generation, thereby causing significant detrimental effects to the heat dissipation and the economic operation of a data center. See: Tuckerman 1.132 Declaration at para. 75. A POSITA would therefore consider that cooling fans for high-reliability high-end servers are in a different "field of endeavor" from illumination fans for personal computers, which is the subject of the '336 patent. See: Tuckerman 1.132 Declaration at para. 76. For these reasons, Fujitsu teaches away from a combination with Tsai to add any more illumination area.

The sole purpose of the indicator lamp on the right side of a fan unit of Fujitsu is to assist in the hot-swapping of a failed fan unit by verifying the powered-up status of a new fan that is



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being inserted. See: Tuckerman 1.132 Declaration at para. 79. There is no advantage to the maintenance technician in making this lamp larger or with more uniform illumination than a standard LED indicator lamp normally provides. See: Tuckerman 1.132 Declaration at para. 79. To do so would require adding extra circuitry and/or light diffusers, which increases fan unit cost, power consumption, and heat dissipation, all undesirable properties in a large-scale backbone server. See: Tuckerman 1.132 Declaration at para. 79.

The limitation of "an illumination area on at least two sides of the fan at top of the body" is not met by either Fujitsu nor the combination of Fujitsu and Tsai. See: Tuckerman 1.132 Declaration at para. 80. As an initial matter, "Fujitsu does not disclose that the illumination area is on at least two sides of the fan at the top of the body" as expressly recognized by the Action (at 12). In all of Fujitsu's preferred embodiments, the only illumination comes from a single "insertable / removable indicator lamp" on the "right side surface when viewed from the front surface" of each fan unit body [Fujitsu 0040]. See: Tuckerman 1.132 Declaration at para. 80. To a POSITA reading the '336 patent, "top of the body" clearly means that frontal portion of the body when viewing along the fan's axis of rotation. See: Tuckerman 1.132 Declaration at para. 80. The '336 illumination areas are clearly shown and labeled as "3" in all the preferred embodiments ('336 patent Figures 1-5), and they are located on two different sides of the fan, both at "top of the body". See: Tuckerman 1.132 Declaration at para. 80. In stark contrast, Fujitsu teaches that the single indicator lamp is located on the "***right*** side surface when viewed from the front surface." See: Tuckerman 1.132 Declaration at para. 80. This location is clearly not at "top of the body"; rather, using the claim language of the '336 patent, such an indicator lamp would be described as being on the right "side of the body," which is where Fujitsu requires the lamp to be located. See: Tuckerman 1.132 Declaration at para. 80. The only figure in Fujitsu depicting the indicator lamp is Fig. 7(A), and the lamp's position is depicted as low on the right side of the fan unit between the front and rear faces, hence nowhere near the "top of the body" (i.e., nowhere near the front face), and certainly not providing illumination for the front of the body. See: Tuckerman 1.132 Declaration at para. 80.

In Fujitsu's words: "[b]ecause the right side surface is exposed to the outside when fan unit 10 is arranged on the right-most side of the plurality of fan units 10 (when fan unit 10 is added), the maintenance person can check a lighting state of the insertable / removable indicator lamp 12." See: Tuckerman 1.132 Declaration at para. 81 citing Fujitsu ¶ 0040. Thus Fujitsu



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locates the indicator lamp on the "right side surface" of the fan unit, because the rest of the fan body is expected to be mostly if not entirely concealed by the server's case, as a POSITA would have understood. See: Tuckerman 1.132 Declaration at para. 81. Therefore, Fujitsu teaches away from placing any type of illumination at the "top of the body" (as this term would be construed by a POSITA in the '336 patent), and instead teaches that the sole illumination (an indicator lamp) shall be placed on a "side of the body" (as this term is understood in the '336 patent). See: Tuckerman 1.132 Declaration at para. 82.

Furthermore, there would be no motivation for a POSITA to take the single indicator lamp of Fujitsu and locate it on "two sides of the fan" because to do this would increase cost and generate more heat for no benefit. See: Tuckerman 1.132 Declaration at para. 83. That is, Fujitsu teaches away from this modification which also would not cure the fundamental defect that the proposed lamps would still be placed on the sides of the body, as taught by Fujitsu to facilitate maintenance from the side(s). See: Tuckerman 1.132 Declaration at para. 83. Hence, neither lamp would be located at "top of the body," as required in the '336 claim language, and there would be no motivation to add illumination at top of the body. See: Tuckerman 1.132 Declaration at para. 83. Thus, for at least these reasons, Fujitsu does not disclose the claimed "illumination area on two sides of the fan at the top of the body" nor would a POSITA be motivated to modify Fujitsu to create an illumination area "on at least two sides at top of the body" in combination with Tsai, something that would add cost, complexity, power consumption, and heat, for no apparent benefit. See: Tuckerman 1.132 Declaration at para. 84.

### 3. NEITHER FUJITSU NOR TSAI DISCLOSES A POWER SOCKET AND FIRST CONNECTOR ON ONE SIDE OF A BODY OF CLAIM 1

The Action rejected claims 1-4 under 35 U.S.C. 103 as being unpatentable over Fujitsu in view of Chinese Patent Number CN 207064277 U to Tsai (hereinafter "Tsai"). The Action asserted that Fujitsu discloses the claimed invention but admitted that Fujitsu does not disclose an illumination area on two sides of the fan at the top of the body as claimed. The Action stated that Tsai discloses such element and concluded that it would have been obvious to a POSITA to have modified the invention of Fujitsu with the illumination are disclosed in Tsai.

Fujitsu does not disclose a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1 and as set forth in Section 2



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above. The arguments in Section 2 regarding Fujitsu not disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body are incorporated herein and applied to the rejection of claim 1. The Action does not cite any portion of Tsai as disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1. Thus, for at least those reasons, claim 1 and those claims 2-4 depending therefrom are allowable, and it is respectfully requested that the rejection be withdrawn.

## 4. LAI DOES NOT DISCLOSE THE CONNECTORS NOR ELECTRICALLY CONDUCTIVE TERMINALS IN THE CLAIMED CONNECTORS OF CLAIM 2

The Action rejected claim 2 under 35 U.S.C. 102(a)(1) and 102(a)(2) as being anticipated by United States Published Application Number 2017/0314777 to Lai (hereinafter "Lai") or, in the alternative, under 35 U.S.C. 103 as being obvious over Lai in view of Japanese Patent Number 2018041147 A to Fujitsu (hereinafter "Fujitsu"). Neither Lai nor Fujitsu discloses a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1, from which claim 2 depends, and as set forth in Section 2 above. The arguments set forth in Section 2 above regarding Lai and Fujitsu not disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body are incorporated herein and applied to the rejection of claim 2. Furthermore, because neither Lai nor Fujitsu discloses first and second connectors, neither reference discloses the claimed "electrically conductive terminal . . . in the first connector, and an electrically conducted contact surface . . . in the second connector . . . ." See claim 2 of the '336 patent. In addition, claim 2 depends from independent claim 1, which is allowable, as set forth herein. Thus, for at least those reasons, claim 2 is allowable, and it is respectfully requested that the rejection be withdrawn.

## 5. NEITHER LAI NOR FUJITSU DISCLOSES THE CONTINUOUS ILLUMINATION AREAS OF CLAIM 3

The Action rejected claim 3 under 35 U.S.C. 103 as being obvious over Lai, or Lai in view of Fujitsu. Neither Lai nor Fujitsu discloses a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1, from



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which claim 3 depends, and as set forth in Section 2 above. The arguments set forth in Section 2 above regarding Lai and Fujitsu not disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body are incorporated herein and applied to the rejection of claim 3. In addition, claim 3 depends from independent claim 1, which is allowable, as set forth herein. Thus, for at least those reasons, claim 3 is allowable, and it is respectfully requested that the rejection be withdrawn.

## 6. FUJITSU DOES NOT DISCLOSE A GROOVE AND AN ENGAGING BLOCK OF CLAIM 4

The Action rejected claim 4 under 35 U.S.C. 103 as being obvious over Lai in view of Fujitsu. Fujitsu does not disclose a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1, from which claim 4 depends, and as set forth in Section 2 above. The arguments set forth in Section 2 above regarding Fujitsu not disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body are incorporated herein and applied to the rejection of claim 4. In addition, claim 4 depends from independent claim 1, which is allowable, as set forth herein. Thus, for at least those reasons, claim 4 is allowable, and the it is respectfully requested that the rejection be withdrawn.

## 7. CHOU DOES NOT DISCLOSE A GROOVE ON TWO SIDES AND AN ENGAGING BLOCK OF CLAIM 5

The Action rejected claim 5 under 35 U.S.C. 103 as being obvious over Lai, or Lai in view of Fujitsu, in further view of United States Published Application Number 2008/0279694 to Chou (hereinafter "Chou"). Neither Lai nor Fujitsu discloses a power socket and a first connector on one side of the body and a second connector on another side of the body as claimed in claim 1, from which claim 5 depends, and as set forth in Section 2 above. The arguments set forth in Section 2 above regarding Lai and Fujitsu not disclosing a power socket and a first connector on one side of the body and a second connector on another side of the body are incorporated herein and applied to the rejection of claim 5. Chou is not cited as disclosing a power socket, first and second connectors. In addition, claim 5 depends from independent claim



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1, which is allowable, as set forth herein. Thus, for at least those reasons, claim 5 is allowable, and it is respectfully requested that the rejection be withdrawn.

## 8. AMENDED AND NEW CLAIMS

The present application includes pending claims 1-48. Claims 1, 2, 3, and 5 were issued in the original '336 patent. Claim 4 is being amended. Claims 6-48 have been added to the application in this Response. Claims 6-40 depend from independent claim 1, as set forth herein. Claim 41 is independent. Claims 42-48 depend from independent claim 41.

Explanation of support for each of the amended and new claims is provided as follows:

| Amended or New Claim | Explanation of Support |
|---|---|
| 4. (Currently Amended) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block <u>of the body of another illumination fan</u> is provided on another side thereof to be engaged into the groove, such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of another illumination fan, the body of the illumination fan is connected with the body of another illumination fan. | The underlined added text in "an engaging block <u>of the body of another illumination fan</u> is provided on another side thereof to be engaged into the groove" provides proper antecedent basis for the later statement in the same claim 4 of "such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of another illumination fan". This added text is supported at Column 2, lines 24-30 and Column 3, lines 18-28 and Figures 4 and 5 showing the grooves and engaging block. |
| <u>6. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the top of the body is adjacent to the one side of the body of the illumination fan.</u> | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of body as being adjacent to one side of the body of the illumination fan.) |
| <u>7. (New) The illumination fan connectable with at least one illumination</u> | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. |



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| Amended or New Claim | Explanation of Support |
|---|---|
| fan for a computer of claim 1, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | 1-5 (showing the top of body as being adjacent to another side of the body of the illumination fan.) |
| 8. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side of the body of the illumination fan and the another side of the body of the illumination fan as being adjacent to a bottom of the body of the illumination fan.) |
| 9. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the top of the body is adjacent to the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the one side of the body of the illumination fan.) |
| 10. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan |
| 11. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 2, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side and the another side of the body of the illumination fan as adjacent to a bottom of the body of the illumination fan.) |
| 12. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being |



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|---|---|
| top of the body is adjacent to the one side of the body of the illumination fan. | adjacent to the one side of the body of the illumination fan.) |
| 13. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 14. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 3, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side and the another side of the body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 15. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the top of the body is adjacent to the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the one side of the body of the illumination fan.) |
| 16. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 17. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 4, wherein the one side of the body of the illumination fan and the another side of the body of the | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side of the body of the illumination fan and the another side of the |



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| Amended or New Claim | Explanation of Support |
|---|---|
| illumination fan are adjacent to a bottom of the body of the illumination fan. | body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 18. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the first connector of the illumination fan is electrically connected with the second connector of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 |
| 19. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the second connector of the illumination fan is connected with a first connector of the another illumination fan. | Column 3, lines 7-22 and Figs. 2 and 4 (showing the second connector of the illumination fan being connected with a first connector of the another illumination fan.) |
| 20. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 5, wherein the second connector of the illumination fan is electrically connected with a first connector of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 |
| 21. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the power socket on the one side of the illumination fan has an opening located on the one side of the illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 6 and Column 3, lines 29-29 and Figs. 1, 2 and 4 (showing the power socket on the one side of the illumination fan having an opening located on the one side of the illumination fan.) |
| 22. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being |



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| Amended or New Claim | Explanation of Support |
|---|---|
| top of the body is adjacent to the one side of the body of the illumination fan. | adjacent to the one side of the body of the illumination fan.) |
| 23. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 24. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 21, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side and the another side of the body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 25. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein an electrically conductive contact surface is provided in the second connector of the illumination fan and is located on the another side of the illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1, 2, 4 and 5 (showing an electrically conductive contact surface being provided in the second connector of the illumination fan and being located on the another side of the illumination fan.) |
| 26. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 25, wherein the top of the body is adjacent to the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing top of the body being adjacent to the one side of the body of the illumination fan.) |
| 27. (New) The illumination fan connectable with at least one illumination | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. |



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| Amended or New Claim | Explanation of Support |
|---|---|
| fan for a computer of claim 25, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 28. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 25, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side and the another side of the body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 29. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein an electrically conductive terminal is provided in the first connector of the illumination fan and is located on the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 (showing an electrically conductive terminal in the first connector of the illumination fan and being located on the one side of the body of the illumination fan.) |
| 30. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the top of the body is adjacent to the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the one side of the body of the illumination fan.) |
| 31. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 32. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 29, wherein the | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing one side and the another side of |



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| Amended or New Claim | Explanation of Support |
|---|---|
| one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | the body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 33. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein the second connector of the body of the illumination fan is connected with a first connector of the body of another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 2-5 (showing the second connector of the body of the illumination fan being connected with a first connector of the body of another illumination fan.) |
| 34. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the top of the body is adjacent to the one side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the one side of the body of the illumination fan.) |
| 35. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the top of the body is adjacent to the another side of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the top of the body being adjacent to the another side of the body of the illumination fan.) |
| 36. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 33, wherein the one side of the body of the illumination fan and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 1-5 (showing the one side and the another side of the body of the illumination fan being adjacent to a bottom of the body of the illumination fan.) |
| 37. (New) The illumination fan connectable with at least one illumination | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, |



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| Amended or New Claim | Explanation of Support |
|---|---|
| fan for a computer of claim 2, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan. | line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 3 and 5 (showing the first connector of the body of the illumination fan being electrically connected with the second connector of the body of another illumination fan.) |
| 38. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 37, wherein the second connector of the illumination fan is connected with a first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 |
| 39. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 38, wherein the second connector of the illumination fan is electrically connected with the first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan. | Column 1, line 53 – Column 2, line 2 and Column 2, line 61 – Column 3, line 3 and Figs. 3 and 5 (showing the second connector of the illumination fan being electrically connected with the first connector of the another illumination fan.) |
| 40. (New) The illumination fan connectable with at least one illumination fan for a computer of claim 37, wherein the | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs 3 and |



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| Amended or New Claim | Explanation of Support |
|---|---|
| second connector of the illumination fan is electrically connected with the first connector of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan. | 5 (showing the second connector of the illumination fan being electrically connected with a first connector of the another illumination fan.) |
| 41. (New) An illumination fan connectable with at least one other illumination fan for a computer, comprising:<br>a body, provided with a fan in a center of the body,<br>an illumination area on at least two sides of the fan at a top of the body,<br>a power socket and a first connector on one side of the body, and a second connector on another side of the body,<br>wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area, such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination, and<br>when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an | Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 22 and Column 3, lines 29-39 and Figs. 1-5. |



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| Amended or New Claim | Explanation of Support |
|---|---|
| illumination area of the body of the another illumination fan are respectively driven into rotation and illumination. | |
| 42. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein an electrically conductive terminal is provided in the first connector of the illumination fan, and an electrically conductive contact surface is provided in the second connector of the another illumination fan for being electrically connected with the electrically conductive terminal, such that when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan, the fan and the illumination area of the body of the another illumination fan are respectively driven into rotation and illumination. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 |
| 43. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein when the body of the illumination fan is connected with the body of the another illumination fan, the illumination areas of the two bodies form a continuous illumination area. | Column 3, lines 16-17 |
| 44. (New) The illumination fan connectable with at least one other | Column 2, line 16-30 and column 3, line 7-28 |



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| Amended or New Claim | Explanation of Support |
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| illumination fan for a computer of claim 41, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block is provided on another side of the body of the another illumination fan to be engaged into the groove of the body of the illumination fan, such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of the another illumination fan, the body of the illumination fan is connected with the body of the another illumination fan. | |
| 45. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein a groove is provided on each of two sides of the body of the illumination fan and on each of two sides of the body of the another illumination fan, and the body of the illumination fan is connected with the body of the another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the another illumination fan. | Column 2, line 16-30 and column 3, line 7-28 |
| 46. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 |



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| Amended or New Claim | Explanation of Support |
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| illumination fan is electrically connected with the second connector of the body of the another illumination fan and the second connector of the body of the illumination fan is connected with a first connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan. | – Column 3, line 3 and Column 3, lines 6-22 and Figs. 3 and 5 (showing the first connector of the body of the illumination fan being electrically connected with the second connector of the body of the another illumination fan and the second connector of the body of the illumination fan being connected with a first connector of the body of the another illumination fan.) |
| 47. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the second connector of the body of the illumination fan is electrically connected with a first connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 (showing the second connector of the body of the illumination fan being electrically connected with a first connector of the body of the another illumination fan.) |
| 48. (New) The illumination fan connectable with at least one other illumination fan for a computer of claim 41, wherein the first connector of the body of the illumination fan is electrically connected with the second connector of the body of the another illumination fan when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan. | Column 1, line 53 – Column 2, line 2; Column 2, lines 3-11; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22; Column 1, line 53 – Column 2, line 2; Column 2, line 61 – Column 3, line 3 and Column 3, lines 6-22 and Figs. 1-5 (showing the first connector of the body of the illumination fan being electrically connected with the second connector of the body of the another illumination fan.) |



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Thus, it is respectfully requested that new claims 6-48 be allowed. See: Tuckerman 1.132 Declaration at para. 103.

## 9. INTERVIEW SUMMARY

The Undersigned Representative participated in a telephonic interview on November 22, 2024 with Examiner Laura Davison, Reexamination Specialist Joshua Kading and Supervisory Primary Examiner Patricia L. Engle. The Undersigned Representative thanks the Examiners for participating in the telephonic interview. The rejection of claim 1 over Lai in view of Fujitsu was discussed. In particular, the Undersigned Representative argued that the power socket (CNA and CNB, Fig. 7) are not on the same side as the CNC connector in Fujitsu. Examiner Davison stated that she interpreted CNA and CNB of Fujitsu as being on the same side of the fan. The Undersigned Representative also stated that Lai differs from the claimed invention in the '336 patent because Lai's fans are connected together with transmission lines (13, Figure 3) not with first and second connectors as claimed. Examiner Davison stated that the connectors of claim 1 of the '336 patent are disclosed in Lai. No agreement was reached.

## 10. CONCLUSION

The Action's rejections of claims 1-5 were supported with very strained interpretations of ordinary terms. As set forth herein and in the accompanying 1.132 declaration from expert David Tuckerman, it is clear that a POSITA would have understood the claimed terms "one side" and "another side" according to their commonly understood definitions, which is fully aligned with their usage in the '336 patent and claims 1-5. As such, we believe that it is clear that a POSITA would not have understood the cited references to disclose the claimed invention. Thus, claims 1-5 are allowable. Furthermore, new claims 6-40 depend from allowable claim 1. Independent claim 41 and its dependent claims include elements similar to allowable claim 1 and are thus allowable. Thus, it is respectfully requested that all rejections be withdrawn and claims 1-48 allowed.



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Respectfully submitted,

GREENBERG TRAURIG, LLP

Date: December 17, 2024

/Michael K. Dixon/

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# United States Patent and Trademark Office

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| I2024BH043498235 | 1822 | REEXAMINATION CLAIMS IN EXCESS OF 20 | $1,000.00 | Deposit Account |

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the application of:

10,690,336

Application No.: 90/019,565

Filed: July 2, 2024

Confirmation No.: 5828

Atty. Ref: 219491.010200

For: "Illumination Fan Connectable with at least one Illumination Fan for a Computer"

Group Art Unit: 3993

Examiner: Laura L. Davison

**NOTICE OF PRIOR AND CONCURRENT PROCEEDINGS AND DECISIONS PURSUANT TO 37 CFR 1.565**

CERTIFICATE OF EFS-WEB TRANSMISSION PURSUANT TO 37 C.F.R. § 1.8 AND CERTIFICATE OF SERVICE PURSUANT TO 37 C.F.R. §§ 1.248, 1.550

I hereby certify that this correspondence is being transmitted via the U.S. Patent and Trademark Office electronic filing system (EFS-Web) to the USPTO on December 18, 2024.

It is further certified that a copy of this paper, in its entirety, was deposited on December 18, 2024, with the U.S. Postal Service, with sufficient First Class Mail postage and addressed to the reexamination requestor: Finnegan, Henderson, Farabow, Garret & Dunner LLP 901 New York Avenue, NW, Washington, DC 20001-4413.

Signed: /Michael K. Dixon/
Name: Michael K. Dixon

Attn: *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sirs:

The patent owner is informing the Office of concurrent litigation in which the referenced patent under reexamination, U.S. Patent Number 10,690,336, is involved. U.S. Patent Number 10,690,336 has been asserted in the following matters:

| PARTIES (PLAINTIFF V. DEFENDANT) OR CASE TITLE | COURT OR AGENCY | CASE NUMBER | CASE FILING DATE |
|---|---|---|---|
| Thermaltake Technology Co., Ltd. et al v. Chien-Hao Chen et al | Patent Trial and Appeal Board | IPR2024-01230 | July 26, 2024 |
| Lian Li Industrial Co., Ltd. et al v. Thermaltake Technology, Co., Ltd. et al | Central District Court of California | 2-23-cv-07470 | September 8, 2023 |
| Lian Li Industrial Co., Ltd. et al v. Phanteks Europe et al | Central District Court of California | 2-23-cv-07471 | September 8, 2023 |

The Examiner is requested to contact the Undersigned Representative with any questions.

Respectfully submitted,

GREENBERG TRAURIG, LLP

Date: December 18, 2024

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PATENT AND TRADEMARK OFFICE

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# ELECTRONIC ACKNOWLEDGEMENT RECEIPT

| APPLICATION # | RECEIPT DATE / TIME | ATTORNEY DOCKET # |
|---|---|---|
| **90/019,565** | **12/18/2024 01:41:03 PM Z ET** | **16445.0001-00000** |

## Title of Invention

ILLUMINATION FAN CONNECTABLE WITH AT LEAST ONE ILLUMINATION FAN FOR A COMPUTER

## Application Information

| | | | |
|---|---|---|---|
| APPLICATION TYPE | Utility / ex parte reexam | PATENT # | 10690336 |
| CONFIRMATION # | 5828 | FILED BY | TAMMY BELL |
| PATENT CENTER # | 68402868 | FILING DATE | 07/02/2024 |
| CUSTOMER # | 37705 | FIRST NAMED INVENTOR | - 10690336 |
| CORRESPONDENCE ADDRESS | - | AUTHORIZED BY | Michael Dixon |

## Documents

**TOTAL DOCUMENTS: 1**

| DOCUMENT | PAGES | DESCRIPTION | SIZE (KB) |
|---|---|---|---|
| 219491-010200 Notice of Prior and Concurrent Proceedings in Ex Parte Reexam of 336 Patent.pdf | 2 | Notice of concurrent proceeding(s) | 105 KB |

## Digest

| DOCUMENT | MESSAGE DIGEST(SHA-512) |
|---|---|
| 219491-010200 Notice of Prior and Concurrent Proceedings in Ex Parte Reexam of 336 Patent.pdf | 3261A9C06BD08A51BC98580F9B7578A94D8603C4FAE30E0BD855D78EB459873F408DA3BDC1DDC9092A641B529DC33136C1946BB2164D4D66E8186FCA166BFDAB |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

| *Office Action in Ex Parte Reexamination* | **Control No.** 90/019,565 | **Patent Under Reexamination** 10690336 | |
|---|---|---|---|
| | **Examiner** Laura L Davison | **Art Unit** 3993 | **AIA (First Inventor to File) Status** Yes |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

a. ☑ Responsive to the communication(s) filed on 17 December 2024.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☑ This action is made FINAL.

c. ☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☑ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☑ Claims 1-48 are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☑ Claims 1-48 are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☐ been filed in Application No. _____.
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

| Notice of References Cited | Application/Control No. 90/019,565 | Applicant(s)/Patent Under Reexamination 10690336 | |
|---|---|---|---|
| | Examiner Laura L Davison | Art Unit 3993 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date YYYY-MM-DD | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
| * | A | US-10082286-B1 | 2018-09-25 | Huang; Taichi | G02B6/0008 | 1/1 |
| * | B | US-20080124234-A1 | 2008-05-29 | Echazarreta; Jaime | F04D25/08 | 361/695 |
| * | C | US-20150233391-A1 | 2015-08-20 | Liu; Wen-Hao | F04D29/601 | 415/68 |
| | D | | | | | |
| | E | | | | | |
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| | I | | | | | |
| | J | | | | | |
| | K | | | | | |
| | L | | | | | |
| | M | | | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date YYYY-MM-DD | Country | Name | CPC Classification |
|---|---|---|---|---|---|---|
| | N | TW M528403 U | 2016-09-11 | TW | LAI W | |
| | O | JP-2005051085-A | 2005-02-24 | JP | HASEGAWA Y | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | English translation of Hasegawa (JP-2005051085-A) (Year: 2005) |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

| Reexamination | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 90/019,565 | 10690336 |
| | Certificate Date | Certificate Number |

| Requester Correspondence Address: ☐ Patent Owner ☑ Third Party |
|---|
| FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP<br>901 NEW YORK AVENUE, NW<br>WASHINGTON, DC 20001-4413 |

| LITIGATION REVIEW ☑ | LLD<br>(examiner initials) | 17 July 2024<br>(date) |
|---|---|---|
| Case Name | | Director Initials |
| Lian Li Industrial Co., Ltd. ET AL v. Thermaltake Technology Co., Ltd. ET AL, 2:23cv7470, US District Court for the Central District of California | | /rds/ for DPR |
| Lian Li Industrial Co., Ltd. ET AL v. Phanteks Europe ET AL, 2:23cv7471, US District Court for the Central District of California | | PLE for DPR |

| COPENDING OFFICE PROCEEDINGS | |
|---|---|
| **TYPE OF PROCEEDING** | **NUMBER** |
| Inter Partes Review, filed 26 July 2024 (PENDING) | IPR2024-01230 |

| /Laura Davison/<br>Reexamination Specialist, Art Unit 3993 | |
|---|---|

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 90/019,565 | 10690336 |
| | Examiner | Art Unit |
| | Laura L Davison | 3993 |

| CPC - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| none | | |

| CPC Combination Sets - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US Classification - Searched* | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Reviewed patent file wrapper for US 10,690,336 (SN 16/403,867) | 07/15/2024 | LLD |
| Searched P-TACTS for post-grant proceedings (none found) | 07/15/2024 | LLD |
| Searched Patent Data Portal (PDP) for continuity data | 07/15/2024 | LLD |
| Litigation search (litigation found) | 07/17/2024 | LLD |
| Updated P-TACTS search (IPR2024-01230 found) | 01/15/2025 | LLD |
| Reviewed prior art cited in IPR2024-01230 | 01/27/2025 | LLD |

| Interference Search | | | |
|---|---|---|---|
| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
| | | | |

| /Laura Davison/<br>Reexamination Specialist, Art Unit 3993 | |
|---|---|



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M528403

(19)中華民國智慧財產局

(12)新型說明書公告本 **(11)證書號數：TW M528403 U**

**(45)公告日： 中華民國 105 (2016) 年 09 月 11 日**

(21)申請案號：105206065 (22)申請日： 中華民國 105 (2016) 年 04 月 28 日

(51)Int. Cl.： ***F21V33/00 (2006.01)***

(71)申請人：迎廣科技股份有限公司(中華民國) (TW)

桃園市龜山區南上路 350 巷 57 號

(72)新型創作人：賴文賢 (TW)

(74)代理人：黃榮謨

申請專利範圍項數：4 項 圖式數：6 共 15 頁

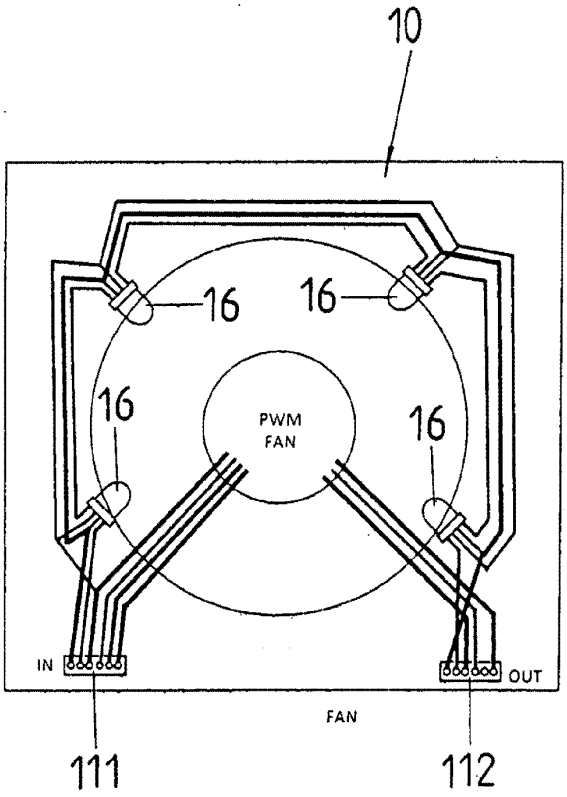
(54)名稱

使用串列控制風扇上ＬＥＤ燈光與轉速之裝置

(57)摘要

本創作係提供一種使用串列控制風扇上 LED 燈光與轉速之裝置，其中該裝置上之 LED 風扇係採用可定址的三原色 LED(ADDRESSABLE RGB LED)，該可定址的三原色 LED(ADDRESSABLE RGB LED)內置 IC 控制芯片，具有單總線控制功能，且具有可任意串聯之特性，該 LED 風扇具單一 I/O(輸入/輸出)窗口控制所有的可定址的三原色 LED(ADDRESSABLE RGB LED)，每個可定址的三原色 LED(ADDRESSABLE RGB LED)由控制器單獨控制，並透過輸出訊號的不同，讓三原色(RGB LED)產生不同的燈光效果，該燈效變化可運用控制器來調整，LED 風扇係利用單一傳輸線相互電性連接，而近控制器之一 LED 風扇係利用另一傳輸線與控制器電性連接。

指定代表圖：




第二圖

符號簡單說明：

(10)・・・LED 風扇

(111)・・・輸入端

(112)・・・輸出端

(16)・・・可定址的三原色 LED (ADDRESSABLE RGB LED)

M528403

公告本

105. 6. 16 修正

# 新型摘要

※ 申請案號：105206065

※ 申請日：105. 4. 28　　※IPC 分類：F21V 33/00 (2006.01)

【新型名稱】(中文/英文)

使用串列控制風扇上 LED 燈光與轉速之裝置

【中文】

本創作係提供一種使用串列控制風扇上 LED 燈光與轉速之裝置，其中該裝置上之 LED 風扇係採用可定址的三原色 LED(ADDRESSABLE RGB LED)，該可定址的三原色 LED(ADDRESSABLE RGB LED)內置 IC 控制芯片，具有單總線控制功能，且具有可任意串聯之特性，該 LED 風扇具單一 I/O(輸入/輸出)窗口控制所有的可定址的三原色 LED(ADDRESSABLE RGB LED)，每個可定址的三原色 LED(ADDRESSABLE RGB LED) 由控制器單獨控制，並透過輸出訊號的不同，讓三原色(RGB LED) 產生不同的燈光效果，該燈效變化可運用控制器來調整，LED 風扇係利用單一傳輸線相互電性連接，而近控制器之一 LED 風扇係利用另一傳輸線與控制器電性連接。



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【英文】

【代表圖】

【本案指定代表圖】：第（二）圖。

【本代表圖之符號簡單說明】：

(10) LED 風扇

(111)輸入端

(112)輸出端

(16) 可定址的三原色 LED(ADDRESSABLE RGB LED)



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# 新型專利說明書

（本說明書格式、順序，請勿任意更動）

【新型名稱】（中文/英文）

使用串列控制風扇上 LED 燈光與轉速之裝置

【技術領域】

【0001】本創作係有關於一種使用串列控制風扇上 LED 燈光與轉速之裝置，尤指一種 LED 風扇控制裝置串接多組風扇，透過單一控制裝置便能控制個別風扇的 LED 燈光變化及風扇轉速。

【先前技術】

【0002】按，一般傳統式的 LED 風扇，係具有單一風扇控制及單一燈光調整功能，故僅能在單一風扇上調整燈光，無法將整個風扇統籌控制，無法數個風扇具有數種設定功能。　參閱圖一所示，習用的數個 LED 風扇 100 必需利用獨立的傳輸線 101、102、103 分別與控制器 200 電性連接，該 LED 風扇 100 僅具有單一調整燈光功能，而且繞接的傳輸線 101、102、103 會影響整體外觀，因而有待改進者。

【0003】本創作人有鑑於此，累積從事此行業多年之經驗，乃精心研究並再三測試改良，如今終於創作出一種新型之使用串列控制風扇上 LED 燈光與轉速之裝置，可以摒除習用產品缺點，以增進功效者。

【新型內容】

【0004】緣是，本創作之主要目的在於提供一種使用串列控制風扇上 LED 燈光與轉速之裝置，其中 LED 風扇



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控制裝置串接多組風扇，透過單一控制裝置便能控制個別風扇的 LED 燈光變化及風扇轉速。

【0005】為達上述目的，本創作採用如下的技術手段：

一種使用串列控制風扇上 LED 燈光與轉速之裝置，其中該裝置上之 LED 風扇係採用數顆可定址的三原色 LED(ADDRESSABLE RGB LED)，該可定址的三原色 LED(ADDRESSABLE RGB LED)內置 IC 控制芯片，具有單總線控制功能，且具有可任意串聯之特性，該 LED 風扇具單一輸入端及輸出端窗口來控制所有的可定址的三原色 LED(ADDRESSABLE RGB LED)，每個可定址的三原色 LED(ADDRESSABLE RGB LED)由控制器單獨控制，並透過輸出訊號的不同，讓可定址的三原色 LED(ADDRESSABLE RGB LED)產生不同的燈光效果，該燈效變化可運用控制器來調整，而 LED 風扇係利用單一傳輸線相互電性連接，近控制器之一 LED 風扇係利用另一傳輸線與控制器電性連接。

【0006】為了讓 貴審查委員對本創作有更進一步的了解，茲佐以圖式詳細說明本創作如下：

【圖式簡單說明】

【0007】

第一圖：係習用 LED 風扇控制裝置串接之外觀示意圖。

第二圖：係本創作 LED 風扇控制裝置串接之外觀示意圖。

第三圖：係本創作 LED 風扇之平面結構圖。

第四圖：係本創作利用內建 LED 驅動 IC 串列控制多顆 LED 風扇之電路圖。



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第五圖：係本創作利用 LED 驅動 IC 串列控制多顆 LED 風扇之電路圖。

第六圖：係本創作利用微控制器串列控制多顆 LED 風扇之電路圖。

【實施方式】

【0008】參閱第二圖所示，本創作使用串列控制風扇上 LED 燈光與轉速之裝置，其中該裝置上之每一 LED 風扇 10 係採用數顆可定址的三原色 LED(ADDRESSABLE RGB LED) 16，該可定址的三原色 LED(ADDRESSABLE RGB LED) 16 內置 IC 控制芯片，具有單總線控制功能，且具有可任意串聯之特性，該 LED 風扇 10 僅具有單一輸入端(INPUT)111、單一輸出端(OUTPUT)112 窗口，便可控制所有的可定址的三原色 LED(ADDRESSABLE RGB LED) 16，而每個可定址的三原色 LED(ADDRESSABLE RGB LED) 16 皆由控制器 20 單獨控制(如第三圖)，並透過輸出訊號的不同，讓可定址的三原色 LED(ADDRESSABLE RGB LED) 16 產生不同的燈光效果，該燈效變化可運用控制器 20 利用來遙控調整，亦可進入作業系統中以專用程式來調整。

【0009】配合第三圖所示，本創作 LED 風扇 10 係利用單一傳輸線 12 相互電性連接，而近控制器 20 之一 LED 風扇 10 係利用另一傳輸線 13 與控制器 20 電性連接。

【0010】參閱第四圖所示，本創作使用串列控制風扇上 LED 燈光與轉速之裝置的第一種實施例，其中數組 LED 風扇 10 上係分別具數顆內建 LED 驅動 IC 的可定址的三原色 LED(ADDRESSABLE RGB LED) 16，該數顆可定



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址的三原色 LED(ADDRESSABLE RGB LED) 16 係成串列排列，近控制器 20 之一可定址的三原色 LED(ADDRESSABLE RGB LED) 16 則與控制器 20 電性連接。每一顆 LED 風扇 10 上係分別具有一控制馬達 15，該控制馬達 15 係分別與主機板(MB)30 電性連接。

【0011】參閱第五圖所示，本創作使用串列控制風扇上 LED 燈光與轉速之裝置的第二種實施例，其中數組 LED 風扇 10 上係分別具多組三原色(RGB LED) 11，每一組三原色(RGB LED) 11 係分別採用 LED 驅動 IC 14 來驅動其燈光顏色，相鄰的 LED 風扇 10 係相互電性連接，近控制器 20 之一 LED 驅動 IC 14 則與控制器 20 電性連接。另，每一組 LED 風扇 10 上係分別具有一控制馬達 15，該控制馬達 15 分別與主機板(MB)30 電性連接。

【0012】參閱第六圖所示，本創作使用串列控制風扇上 LED 燈光與轉速之裝置的第三種實施例，其中數組 LED 風扇 10 上係分別具有一微控制器(MCU)17，每一微控制器(MCU)17 係分別採用 MCU 驅動三原色(RGB LED) 11 與調整 LED 風扇 10 之 PWM(Pulse Width Modulation) 轉速控制，相鄰的微控制器(MCU)17 係電性連接，近控制器 20 之微控制器(MCU)17 則與控制器 20 電性連接。每一 LED 風扇 10 上係分別具有一控制馬達 15，每一控制馬達 15 一端分別與微控制器(MCU)17 電性連接，近控制器 20 之一控制馬達 15 則與控制器 20 電性連接。

【0013】綜上所述，本創作使用串列控制風扇上 LED 燈光與轉速之裝置，其中 LED 風扇控制裝置串接多組風扇，透過單一控制裝置便能控制個別風扇的 LED 燈光變



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化及風扇轉速。其實用功效當無庸置疑，而本創作又從未公諸於市或已見於其他刊物，實已符合專利法之規定，爰依法提出專利申請之。

【符號說明】

【0014】

(10) LED 風扇

(11) 三原色(RGB LED)

(111)輸入端

(112)輸出端

(12) 傳輸線

(13) 傳輸線

(14) LED 驅動 IC

(15) 控制馬達

(16) 可定址的三原色 LED(ADDRESSABLE RGB LED)

(17) 微控制器(MCU)

(20) 控制器

(30) 主機板(MB)

(100) LED 風扇

(101、102、103) 傳輸線

(200) 控制器



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# 申請專利範圍

1、一種使用串列控制風扇上LED燈光與轉速之裝置，其中該裝置上之LED風扇係採用數顆可定址的三原色LED(ADDRESSABLE RGB LED)，該可定址的三原色LED(ADDRESSABLE RGB LED)內置IC控制芯片，具有單總線控制功能，且具有可任意串聯之特性，該LED風扇具單一輸入端及輸出端窗口來控制所有的可定址的三原色LED(ADDRESSABLE RGB LED)，每個可定址的三原色LED(ADDRESSABLE RGB LED)由控制器單獨控制，並透過輸出訊號的不同，讓可定址的三原色LED(ADDRESSABLE RGB LED)產生不同的燈光效果，該燈效變化可運用控制器來調整，而LED風扇係利用單一傳輸線相互電性連接，近控制器之一LED風扇係利用另一傳輸線與控制器電性連接。

2、如申請專利範圍第1項所述之使用串列控制風扇上LED燈光與轉速之裝置，其中數組LED風扇上分別具數顆內建LED驅動IC的可定址的三原色LED(ADDRESSABLE RGB LED)，該數顆可定址的三原色LED(ADDRESSABLE RGB LED)係成串列排列，近控制器之一可定址的三原色LED(ADDRESSABLE RGB LED)則與控制器電性連接，每一LED風扇上係分別具有一控制馬達，該控制馬達係分別與主機板(MB)電性連接。

3、如申請專利範圍第1項所述之使用串列控制風扇上LED燈光與轉速之裝置，其中數組LED風扇上分別具多組三原色(RGB LED)，每一組三原色(RGB LED)係



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105. 6. 16 年/月/日 修正

採用 LED 驅動 IC 來驅動其燈光顏色，相鄰的 LED 風扇相互電性連接，近控制器之一 LED 驅動 IC 則與控制器電性連接，每一 LED 風扇上係分別具有一控制馬達，該控制馬達係分別與主機板(MB)電性連接。

4、如申請專利範圍第 1 項所述之使用串列控制風扇上 LED 燈光與轉速之裝置，其中數組 LED 風扇上分別具一微控制器(MCU)，每一微控制器(MCU)係分別採用 MCU 驅動 RGB LED 與調整 LED 風扇之 PWM 轉速控制，相鄰的微控制器(MCU)係電性連接，近控制器之微控制器(MCU)則與控制器電性連接；每一 LED 風扇上係分別具有一控制馬達，該控制馬達係分別與主機板(MB)電性連接，該控制馬達一端分別與微控制器(MCU)電性連接，近控制器之控制馬達則與控制器電性連接。



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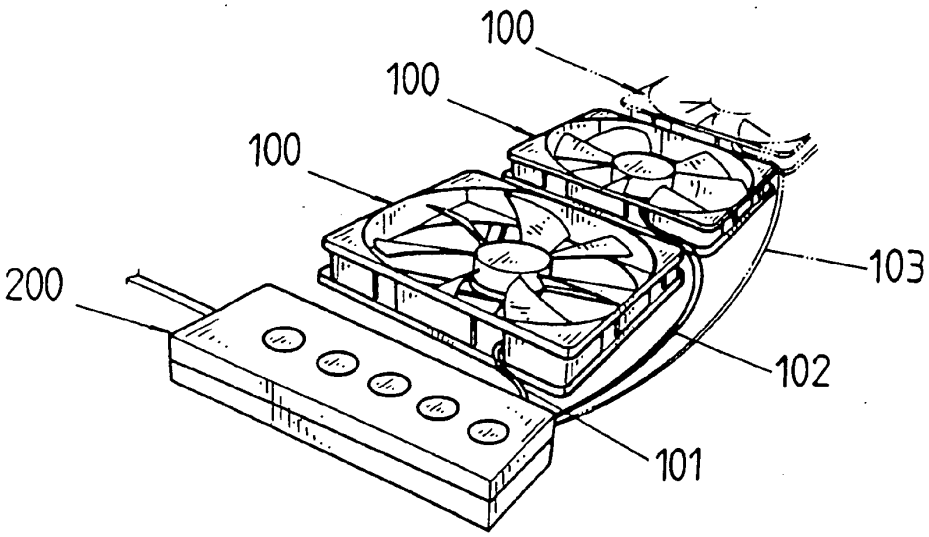
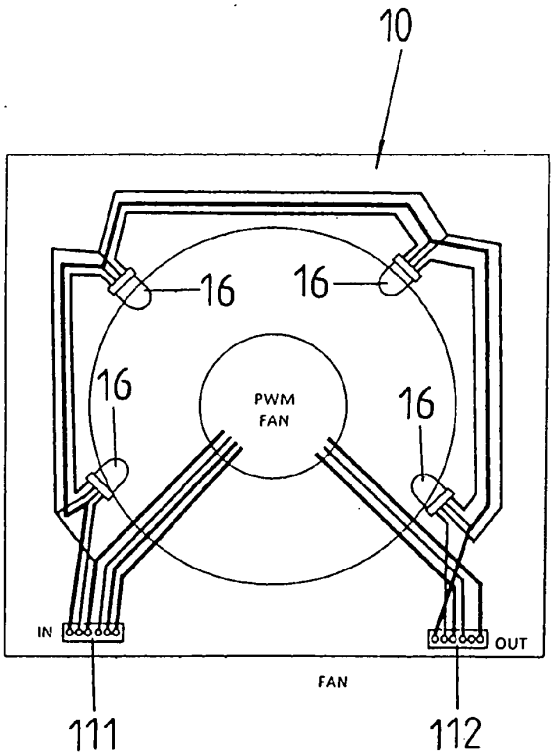
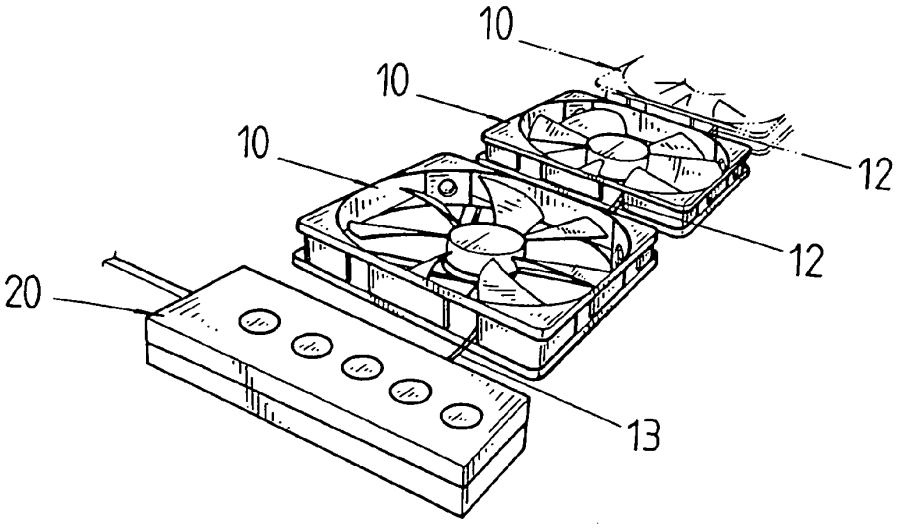

100
100
100
200
103
102
101

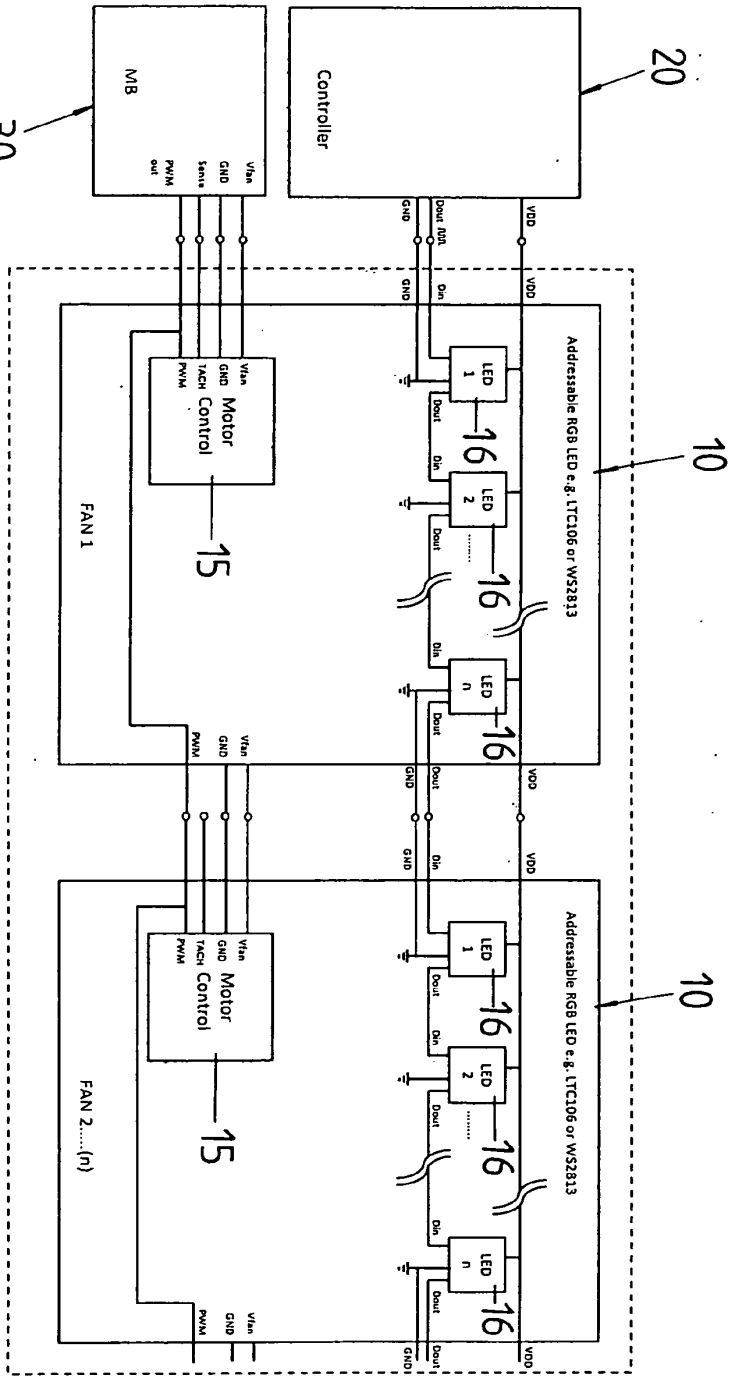
第一圖


10
16
16
16
16
PWM
FAN
IN
OUT
FAN
111
112

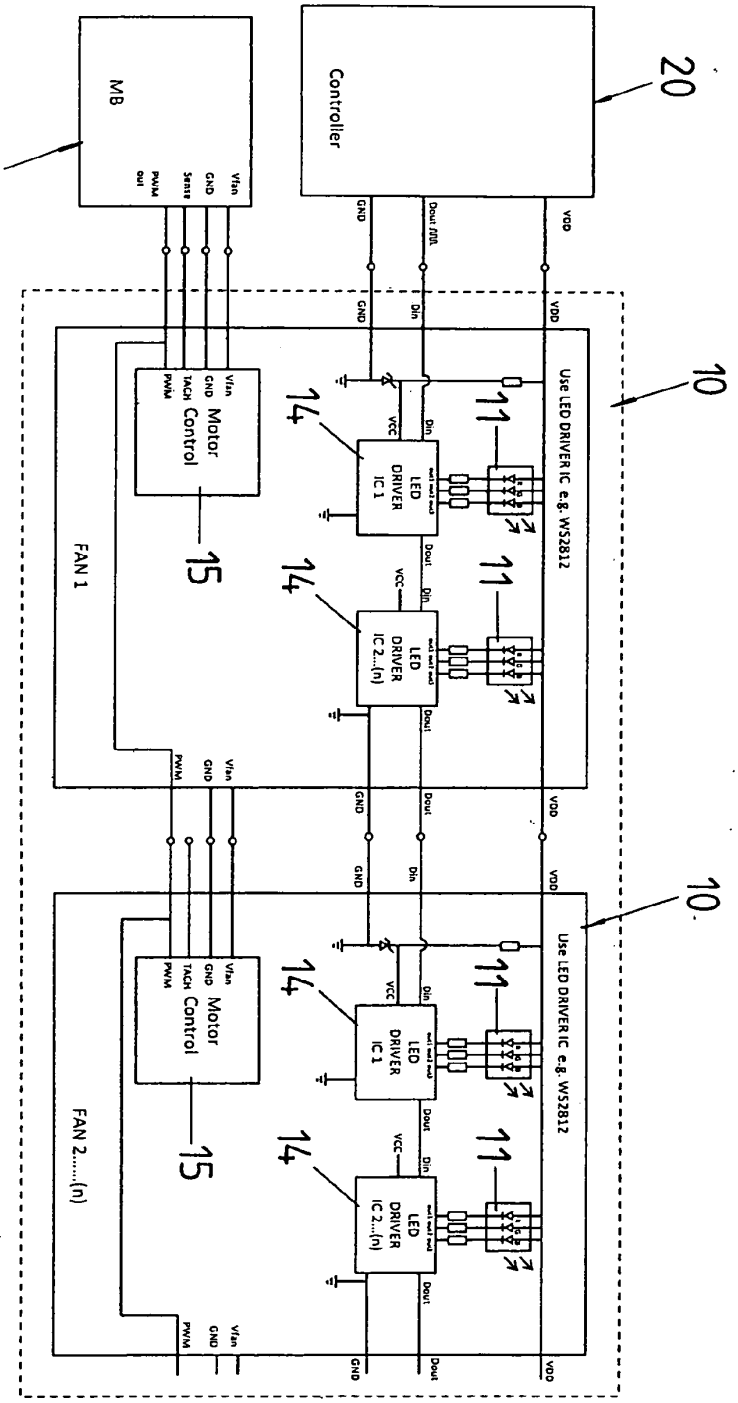
第二圖



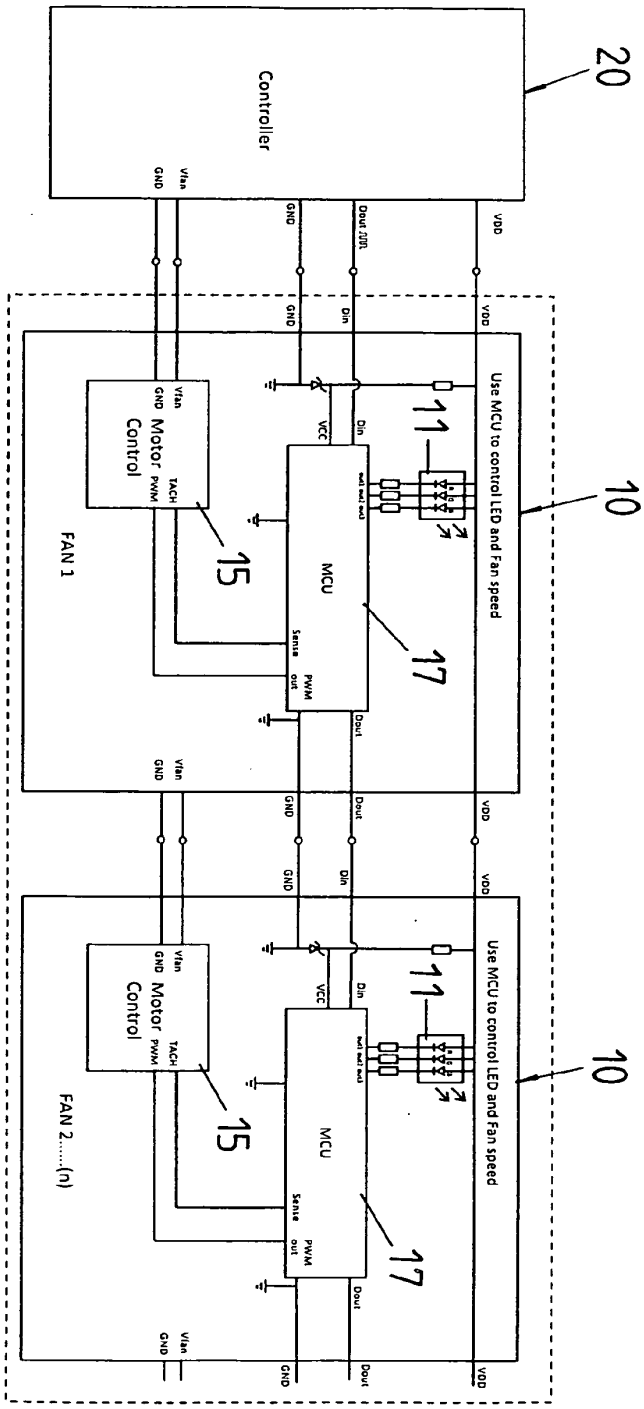

第三圖


20
Controller
30
MB
10
Addressable RGB LED e.g. LTC106 or WS2813
16
15
Motor Control
FAN 1
FAN 2.....(n)
LED 1
LED 2
LED n
GND
VDD
Din
Dout
PWM
TACH
Vfan
Sense
PWM out

第四圖


20
Controller
GND
Dout /DIN
VDD
30
MB
PWM out
Sense
GND
Vfan
10
Use LED DRIVER IC e.g. WS2812
GND
Din
VDD
11
14
VCC
LED DRIVER IC 1
LED DRIVER IC 2...(n)
Dout
Din
15
Motor Control
PWM
TACH
GND
Vfan
FAN 1
FAN 2.....(n)

第五圖


Controller
20
VDD
GND
Vfan
Dout /OUT
Din
Use MCU to control LED and Fan speed
10
11
Motor Control
TACH
PWM
15
MCU
Sense
PWM out
17
FAN 1
FAN 2.....(n)

第六圖

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2005-51085
(P2005-51085A)
(43)公開日　平成17年2月24日(2005.2.24)

| (51)Int.Cl.[7] | F I | | テーマコード（参考） |
|---|---|---|---|
| H05K 7/20 | H05K 7/20 | H | 5E322 |
| H01L 23/467 | H01L 23/46 | C | 5F036 |

審査請求 未請求　請求項の数 5　OL　（全 37 頁）

(21)出願番号　特願2003-282302(P2003-282302)
(22)出願日　平成15年7月30日(2003.7.30)

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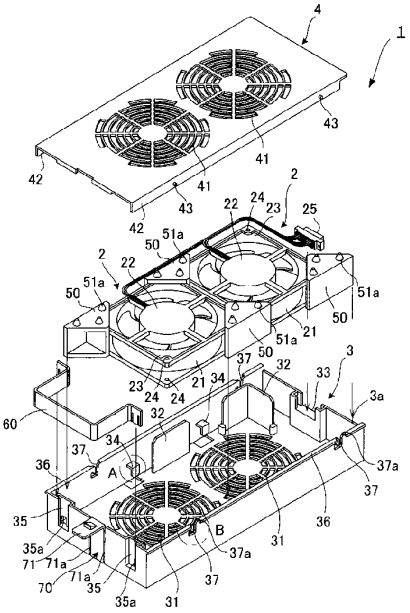
最終頁に続く

(54)【発明の名称】空冷ファンユニット

(57)【要約】
【課題】　取り扱いが容易であり、メンテナンス性の向上や構造の標準化推進が可能な空冷ファンユニットを提供する。
【解決手段】　空冷ファンユニット１は、外力により揺動する係止部７０を備える。その係止部７０には、シェルフ８０のファンユニット挿入口８１の対向面と当接する位置にそれぞれ対応して嵌合手段７２，７３が設けられている。シェルフ８０から空冷ファンユニット１を取り外す際には、係止部７０の鍔部７１に外力を加えて揺動させるだけで、嵌合手段７２，７３のいずれもがシェルフ８０からの脱離方向に動作する。このため、当該空冷ファンユニット１がシェルフ８０のファンユニット挿入口８１の対向面のいずれ側で係止されているかによらず、鍔部７１を押圧するという簡単な操作でこれを容易に取り外すことができる。
【選択図】　図１



【特許請求の範囲】
【請求項１】
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを支持するケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
前記ケーシングの前記シェルフへの取付方向後端側に弾性的に揺動可能に設けられた板状体からなり、その板状体の一部に揺動方向の外力を加えるための鍔部と、前記シェルフのファンユニット挿入口の対向面と当接する位置にそれぞれ設けられた複数の嵌合手段とを有し、少なくともいずれかの嵌合手段を介して前記シェルフに係止される係止部と、
を備え、
前記鍔部に加えられた外力によって前記係止部が揺動させられることにより、前記各嵌合手段がこれに連動して前記シェルフから脱離するように構成されたことを特徴とする空冷ファンユニット。
【請求項２】
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを支持するケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
前記ケーシングの内部に立設された軸状の本体を備え、前記本体の先端部に設けたスリット部分に、前記本体の幅よりも小さな幅と前記本体の幅よりも大きな長さを有する回転ピンを、その回転ピンの長手方向と直角な軸回りに回動可能に支持する複数のスタッドピンと、
前記回転ピンを含む前記スタッドピンの先端部を挿通させるための貫通孔と、前記貫通孔を横断するように形成され、前記貫通孔に挿通されて回動した前記回転ピンをその長手方向に沿って係止する係止溝とを有し、前記スタッドピンの軸方向に押圧されて弾性変形しつつその軸周りに回転し、前記係止溝に前記回転ピンを係止することで、前記ケーシングとの間に前記ファンと前記フィンガーガードとを弾性的に挟持するロックブッシュと、
を備えたことを特徴とする空冷ファンユニット。
【請求項３】
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを側方から挟み込むように収容して支持する一対のケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
軸状の本体の側面に、前記フィンガーガードの一部と前記ケーシングに設けた貫通孔とにそれぞれに嵌合する複数の嵌合溝が周設された複数のブッシュと、
を備え、
前記フィンガーガードの一部と前記ケーシングの貫通孔とを一致させた状態で前記各ブッシュを嵌合させることにより、前記ケーシングと前記フィンガーガードとを固定するように構成されたことを特徴とする空冷ファンユニット。
【請求項４】
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせる一つのファンと、

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前記ファンを支持するとともに、前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状の通風孔を有するケーシングと、
当該空冷ファンユニットを複数並列して接続固定できるように、前記各ケーシングに設けられた嵌合手段と、
を備えたことを特徴とする空冷ファンユニット。
【請求項５】
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
箱状の本体の一端面に前記ファンを挿入するための開口部を有し、前記ファンを収容して支持するとともに、前記ファンを載置する位置に前記回転翼に対面するように配置された格子状の通風孔を有するケーシングと、
前記ケーシングの開口部を覆うように配置されるとともに、前記ファンの回転翼に対面するように配置された格子状の通風孔を有し、前記ケーシングの一端側に設けられた揺動軸の周りに揺動することにより前記開口部を開放させるカバーと、
前記カバーと前記ケーシングとの間に設けられた嵌合部からなり、前記カバーを前記ケーシングに対して所定量持ち上げるまでその揺動を禁止する揺動制限手段と、
を備えたことを特徴とする空冷ファンユニット。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、電子機器の冷却用に取り付けられる空冷ファンユニットの構造に関し、特に、電子部品が収容されたシェルフ内を強制通風させる空冷ファンを、当該シェルフに対して固定させるための空冷ファンユニットに関する。
【背景技術】
【０００２】
近年、通信機器をはじめとする電子機器の高密度実装，ＬＳＩ等の高集積化，高出力化によって消費電力が増大しており、その対策の一つとして空冷ファンをユニット化して電子機器へ実装することが行われている。図３７は、このような空冷ファンユニットの構造の一例を表す分解斜視図である。
【０００３】
同図に示すように、この空冷ファンユニット１０１は、空冷用の複数のファン１０２を複数の部材で取り囲んでユニット化されている。具体的には、ファン１０２の翼径とほぼ同径の複数の開口穴を有する長方形板状のベース部材１０３にファン１０２を同軸状に載置した後、その前後にそれぞれフロントパネル１０４，リアパネル１０５を装着し、さらに、各ファン１０２の上に指差込み防止用の格子状のフィンガーガード１０６を載置する。そして、各フィンガーガード１０６の周縁部に上方から複数のネジ１０８を差込み、各ファン１０２の角部に設けられた挿通孔を挿通させた上でベース部材１０３のネジ孔に螺合させる。その結果、フィンガーガード１０６とベース部材１０３との間にファン２が介装された状態で固定される。さらに、ベース部材１０３の下面側にも開口穴を覆うように、フィンガーガード１０７がネジ１０９を介して螺合固定されている。
【０００４】
尚、本発明は公知・公用の技術に基づいて発明されたものであるため、先行技術文献については開示しない。
【発明の開示】
【発明が解決しようとする課題】
【０００５】
ところで、電子機器には小型化及び省スペース化の要請があるが、近年の高消費電力化に伴って高い冷却性能が要求される。このため、電子機器を構成する上で上記空冷ファンユニットを含む冷却ユニットの占める割合が１～２割程度にもなり、他のユニットの実装

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可能スペースが減少するといった問題が発生し、電子機器の高密度実装・軽量化開発においてネックとなっている。

【０００６】

こうした中、高密度実装化等により空冷ファンの搭載領域も縮小されることになるため、空冷ファンの故障時の交換等におけるメンテナンス性が犠牲となるケースが多々あるが、特に高発熱装置の場合には、空冷ファン故障による温度上昇を防止するために短時間で空冷ファンの交換を完了できる構造が求められている。

【０００７】

さらに、電子機器の小型化に伴う高密度実装を実現する上で、空冷ファンユニットに対しても小型化が求められている。しかし、従来のネジによる固定構造ではスペース的条件で空冷ファンユニットの固定位置が限定されるなどして、電子機器内の実装条件によっては構造を変える必要が生じる。このため、その都度設計変更を余儀なくされ、結果的に複数種類の空冷ファンユニットを製造する必要があり、製造コストが嵩むといった問題がある。

【０００８】

本発明はこのような点に鑑みてなされたものであり、取り扱いが容易であり、メンテナンス性の向上や構造の標準化推進が可能な空冷ファンユニットを提供することを目的とする。

【課題を解決するための手段】

【０００９】

本発明では上記問題を解決するために、図１～図７に示すように、電子機器を収容するシェルフ８０に取り付けられ、前記シェルフ８０内を強制通風して前記電子機器を冷却する空冷ファンユニット１において、内部の回転翼を駆動して通風作用を起こさせるファン２と、前記ファン２を支持するケーシング３と、前記ファン２の通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、前記ケーシング３の前記シェルフ８０への取付方向後端側に弾性的に揺動可能に設けられた板状体からなり、その板状体の一部に揺動方向の外力を加えるための鍔部７１と、前記シェルフ８０のファンユニット挿入口８１の対向面と当接する位置にそれぞれ設けられた複数の嵌合手段７２，７３とを有し、少なくともいずれかの嵌合手段７２，７３を介して前記シェルフ８０に係止される係止部７０と、を備え、前記鍔部７１に加えられた外力によって前記係止部７０が揺動させられることにより、前記各嵌合手段７２，７３がこれに連動して前記シェルフ８０から脱離するように構成されたことを特徴とする空冷ファンユニット１が提供される。

【００１０】

尚、ここでいう「フィンガーガード」は、例えば図２０に示すフィンガーガード４０４のように実際にフィンガーガードとしての形状を有する場合と、図１に示すようにカバー４に設けられた通風孔４１の部分等がフィンガーガードの機能を有する場合との双方を含む概念である（以下同様）。

【００１１】

また、係止部７０の嵌合手段７２，７３は、シェルフ８０側の係止部に嵌合可能な形状であればよく、凸状であるか凹状であるかなどは限定されない。また、これら嵌合手段７２，７３のいずれもがシェルフに係止されてもよいし、いずれかが係止されてもよい。

【００１２】

このような空冷ファンユニット１では、シェルフ８０のファンユニット挿入口８１に挿入されたときにそのファンユニット挿入口８１の対向面と当接する位置に対応して、嵌合手段７２，７３がそれぞれ配置される。このため、シェルフ８０側でそのファンユニット挿入口８１の対向面のいずれ側に係止部が存在していたとしても、当該空冷ファンユニット１を係止させることができる。つまり、シェルフ側の仕様によらず、空冷ファンユニット１を取り付けることができる。

【００１３】

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また、シェルフ８０から当該空冷ファンユニット１を取り外す際には、係止部７０の鍔部７１に外力を加えて揺動させるだけで、嵌合手段７２，７３のいずれもがシェルフ８０からの脱離方向に動作する。このため、当該空冷ファンユニット１がシェルフ８０のファンユニット挿入口８１の対向面のいずれ側で係止されているかによらず、鍔部７１を押圧するという簡単な操作でこれを容易に取り外すことができる。

【００１４】

また、本発明では、電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、内部の回転翼を駆動して通風作用を起こさせるファンと、前記ファンを支持するケーシングと、前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、前記ケーシングの内部に立設された軸状の本体を備え、前記本体の先端部に設けたスリット部分に、前記本体の幅よりも小さな幅と前記本体の幅よりも大きな長さを有する回転ピンを、その回転ピンの長手方向と直角な軸回りに回動可能に支持する複数のスタッドピンと、前記回転ピンを含む前記スタッドピンの先端部を挿通させるための貫通孔と、前記貫通孔を横断するように形成され、前記貫通孔に挿通されて回動した前記回転ピンをその長手方向に沿って係止する係止溝とを有し、前記スタッドピンの軸方向に押圧されて弾性変形しつつその軸周りに回転し、前記係止溝に前記回転ピンを係止することで、前記ケーシングとの間に前記ファンと前記フィンガーガードとを弾性的に挟持するロックブッシュと、を備えたことを特徴とする空冷ファンユニットが提供される。

【００１５】

このような空冷ファンユニットによれば、スタッドピンに対してロックブッシュを回転させつつ押し込んで回転ピンを係止させることにより、ケーシング，ファン，フィンガーガードを固定することができる。また、その逆の動作によりこれらを分離することもできる。このため、ネジによる組付けの場合のような工具が不要であり、その取付・取外作業を簡易かつ迅速に行うことができる。また、ロックブッシュの弾性による反力によりこれらケーシング，ファン，フィンガーガードを安定して固定することができる。

【発明の効果】

【００１６】

本発明の空冷ファンユニットは、シェルフのファンユニット挿入口の対向面と当接する係止部の双方の側にそれぞれ嵌合手段が設けられ、シェルフ側の仕様によらず当該空冷ファンユニットを取り付けることができるため、標準化推進が可能となる。

【００１７】

また、係止部の鍔部を押圧するという簡単な操作によって各嵌合手段が連動して脱離方向に動作し、空冷ファンユニットをワンタッチでシェルフから取り外すことができ、取り扱いが容易となり、メンテナンス性も向上する。

【００１８】

また、本発明の空冷ファンユニットは、スタッドピンとロックブッシュとの協働によってケーシング，ファン，フィンガーガードを簡易かつ迅速に取り付け、又は取り外すことができる。このため、空冷ファンユニットのメンテナンス性が向上する。

【発明を実施するための最良の形態】

【００１９】

以下、本発明の実施の形態を図面に基づいて詳細に説明する。

［第１の実施の形態］

第１の実施の形態にかかる空冷ファンユニットは、電子機器を収容するシェルフに取り付けられ、シェルフ内を強制通風して電子機器を冷却するためのものであり、図１は当該空冷ファンユニットの概略構成を表す分解斜視図である。

【００２０】

同図に示すように、空冷ファンユニット１は、通風用の２つのファン２と、ファン２を収容して支持するケーシング３と、ケーシング３の開口部３ａを閉塞するカバー４とから構成されている。

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【００２１】
ファン２は、筒状のファンケーシング２１の両端中央に回転翼を駆動するモータ２２が複数の梁によって固定されて構成されている。ファンケーシング２１は、その両端の周縁部から四方に延出したフランジ部２３を有し、全体として直方体形状の概形を有する。各フランジ部２３の先端部には、それぞれ固定用の孔２４が設けられている。モータ２２からは電源ケーブルが延出しており、外部電源に接続されるコネクタ２５につながっている。

【００２２】
図２に示すように、各ファン２の対角位置には防振用のゴムブッシュ５０が装着される。このゴムブッシュ５０は、三角柱状をなし、その隣接する２側面にはファンケーシング２１の角部と嵌合可能な一対の嵌合凹部５１が形成されている。両ファン２の接続箇所では、１つのゴムブッシュ５０が両ファン２に嵌合する。また、ゴムブッシュ５０のカバー４と対向する面の３箇所には、円錐状の凸部５１ａが突設されている。

【００２３】
図１に戻り、ケーシング３は、箱状の本体を有し、その底面の各ファン２が載置される位置には、その回転翼に対面するように格子状の通風孔３１が形成されている。この通風孔３１は、通風用の孔として機能するとともに、指詰め防止のためのフィンガーガードとしても機能する。また、ケーシング３の底面には、上述のようにファン２に取り付けられた各ゴムブッシュ５０を固定するための複数のリブ３２が立設されており、収容されたファン２を安定して固定できるようになっている。

【００２４】
また、ケーシング３のシェルフへの取付方向先端側には、コネクタ２５を固定するためのコネクタ収容部３３が設けられ、図４（ａ）に図１のＡ部断面を示すように、ケーシング３の内壁には、コネクタ２５につながる電源ケーブルを引っ掛けてガイドするためのガイド片３４が突設されている。

【００２５】
また、ケーシング３のシェルフへの取付方向に沿って延びる上部縁部には、水平方向外側に所定量延出したガイド部３６が設けられ、後述するシェルフのガイドレールにガイドされる。さらに、そのケーシング３の各上部縁部の両端部近傍には、カバー４をケーシング３に固定するために後述するカバー４のダボ４３を係止するＪ字状のスリット３７が設けられている。

【００２６】
さらに、ケーシング３のシェルフへの取付方向後端側には、空冷ファンユニット１をシェルフへ取り付ける際に作業員が把持する把手６０が取り付けられている。図３（ａ）は把手６０を表す斜視図であり、同図（ｂ）は把手６０の周辺部を示す平面図である。

【００２７】
同図（ａ）に示すように、把手６０は、板状部材を数箇所で屈曲して形成したＵ字状の本体を有し、その本体の両端部６１にケーシング３への取付用の嵌合爪６２が設けられている。この嵌合爪６２は、その端部６１の各２箇所に縦方向に平行に設けられたスリット６１ａによって分離された部分により構成され、ケーシング３の内方に向かって突出した嵌合突起６３が設けられている。

【００２８】
一方、同図（ｂ）に示すように、ケーシング３のシェルフへの取付方向後端側には、把手６０の端部６１を挿入して固定する一対の嵌合凹部３５が設けられている。この嵌合凹部３５の壁面には嵌合穴３５ａが設けられており、把手６０の嵌合突起６３をこれに嵌合させることにより、把手６０をケーシング３に対して脱落することなく固定する。尚、把手６０をケーシング３から取り外す際には、嵌合穴３５ａに嵌合した嵌合突起６３をケーシング３の内側から外側に押し出すことによりその嵌合状態を解除した後、把手６０を上方に引き抜くことによりこれを取り外す。

【００２９】

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また、ケーシング３のシェルフへの取付方向後端側には、把手６０に包囲されるように係止部７０が設けられ、シェルフとの間の取付機構を構成する。これについては後に詳述する。

【００３０】

図１に戻り、カバー４は、板状の本体を有し、ファン２の回転翼に対面するように格子状の通風孔４１が形成されている。この通風孔４１は、通風用の孔として機能するとともに、フィンガーガードとしても機能する。また、カバー４の本体のシェルフへの取付方向に沿った両縁部が下方に所定量折り曲げられて側壁４２を形成し、その側壁の両端部近傍には、カバー４をケーシング３に固定するための外方に突出した円柱状のダボ４３がそれぞれ設けられている。ダボ４３の直径は、スリット３７の幅よりもやや小さくなっている。

【００３１】

次に、空冷ファンユニット１の組付方法について説明する。

まず、図１に示すように、ゴムブッシュ５０を装着した状態のファン２，２をケーシング３のリブ３２に沿って取り付ける。

【００３２】

続いて、カバー４をケーシング３の開口部３ａを覆うように載置する。そして、カバー４のダボ４３とケーシング３のスリット３７の開口部３７ａとの位置を合わせた状態で、ゴムブッシュ５０の反力に抗してカバー４を上方から押し付ける。図４（ｂ）に図１のＢ部におけるダボ４３とスリット３７との嵌合動作を示すように、ダボ４３をスリット３７内で図中実線矢印の方向に押し込んでスライドさせ、スリット３７の先端部に嵌合させるように、カバー４を移動させる。

【００３３】

このとき、カバー４のケーシング３に対する横ズレに対し、ゴムブッシュ５０に突設された凸部５１ａが追従する。すなわち、本実施の形態では、ゴムブッシュ５０の平面を直接カバー４に当接させるのではなく、上述のように凸部５１ａの位置で散点的に当接させてカバー４との当接面を小さくすることにより、ゴムブッシュ５０とカバー４との間の摩擦力を小さくしている。その結果、ダボ４３をスリット３７に嵌合させる際に、カバー４をケーシング３に対してスムーズにずらすことができる。カバー４とケーシング３とは、ゴムブッシュ５０の反力によりガタつくことなく、安定して固定される。

【００３４】

尚、カバー４をケーシング３から取り外す際には、カバー４を上方から押圧してダボ４３を下方に押し込んだ状態で、上記とは逆の図中点線矢印の方向にスライドさせる。そして、ダボ４３がスリット３７の開口部３７ａにつながる直線部にくると、カバー４は、ゴムブッシュ５０の弾性力によって自然にケーシング３から外れる。

【００３５】

尚、ダボ４３とスリット３７の構造については、上記構造以外にも例えば図４（ｃ）に示した鍵状構造も考えられる。

すなわち、同図に示すように、ダボ４３’を鍵状に形成する一方、スリット３７’の形状もこれに合わせて鍵状とする。スリット３７’の直線部の幅ｗはダボ４３’の幅よりも大きく、また、スリット３７’の鍵部の高さｈはダボ４３’の鍵部の高さよりも大きく形成される。

【００３６】

このような構成では、カバー４をケーシング３に対して固定する際には、カバー４を上方から押圧してダボ４３’をスリット３７’に押し込んでスライドさせ、鍵部で嵌合させる。また、カバー４をケーシング３から取り外す際には、カバー４を上方から押圧してダボ４３’を押し込んだ状態でスリット３７’の直線部までスライドさせる。このとき、カバー４は、ゴムブッシュ５０の弾性力によって自然にケーシング３から外れる。

【００３７】

次に、空冷ファンユニット１とシェルフとの取付機構について説明する。図５は、本実

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施の形態の空冷ファンユニット１とシェルフ８０との取付構造を表す斜視図であり、図６は、空冷ファンユニット１を除いた状態でシェルフ８０を斜め上方からみた斜視図である。

【００３８】

図５に示すように、複数の空冷ファンユニット１は、シェルフ８０のファンユニット挿入口８１から挿入される。そして、空冷ファンユニット１が所定位置まで挿入されると、ケーシング３のシェルフ８０への取付方向後端側に設けられた係止部７０が、シェルフ８０のファンユニット挿入口８１の上下に互いに平行に設けられた上梁８２と下梁８３の間に係止される。

【００３９】

図６に示すように、下梁８３は、ステンレス製の板材を成形したものであり、空冷ファンユニット１の並列方向に延びるように設けられ、空冷ファンユニット１の幅に対応した所定の間隔でガイドレール設置部８４が直角に延出し、シェルフ８０の奥行方向に延びている。そして、ガイドレール設置部８４に沿ってガイドレール９０が配設されている。

【００４０】

図７（ａ）に図６のＣ方向矢視に対応する図を示すように、ガイドレール９０は、樹脂材を射出成形して形成され、凸状の断面を有する長尺状の本体を有する。その本体の下面の所定の複数箇所には係止突起９１が設けられており、この係止突起９１がガイドレール設置部８４に設けられた係止孔８４ａに嵌合することにより、ガイドレール９０がガイドレール設置部８４に固定される。下梁８３の隣接するガイドレール９０の中間位置には、空冷ファンユニット１の係止部７０を係止する係止孔８５が設けられている。

【００４１】

一方、空冷ファンユニット１におけるケーシング３のシェルフ８０への取付方向後端側には、上述のように係止部７０が設けられている。図７（ｂ）に図３（ｂ）のＤ－Ｄ断面に相当する図を示す。

【００４２】

同図に示すように、係止部７０は、ケーシング３に弾性的に揺動可能に設けられた板状体からなり、その板状体の一部に揺動方向の外力を加えるための鍔部７１と、シェルフ８０のファンユニット挿入口８１の上梁８２及び下梁８３の対向面と当接する位置にそれぞれ設けられた係止爪７２，７３（嵌合手段）とを有する。すなわち、係止部７０は、図１及び図３（ｂ）に示すように、ケーシング３の後側面から底面の所定位置にかけて一対のスリット７１ａを入れることによりケーシングの本体から部分的に分離されて形成されている。この係止部７０は、図７（ｂ）に示すように、その上端部がケーシング３の上端縁と同一平面上を後方に延出して鍔部７１を構成し、下端部がケーシング３の底面の一部を構成している。そして、スリット７１ａが途切れた残余の部分である下端部の先端をヒンジとしてケーシング３に対して弾性変形し、揺動できるようになっている。係止爪７２は鍔部７１の上面に突設されており、係止爪７３は下端部の下面に突設されている。また、係止部７０の幅方向の両側には、ケーシング３の内方に延出する一対のリブ７４が設けられており、係止部７０を補強している。

【００４３】

空冷ファンユニット１をシェルフ８０に装着する際には、空冷ファンユニット１をその左右のガイドレール９０に沿ってシェルフ８０内に挿入していく。すると、空冷ファンユニット１が所定の設置位置にきたところで下側の係止爪７３が下梁８３の係止孔８５に嵌合して係止され固定される。

【００４４】

一方、空冷ファンユニット１をシェルフ８０から取り外す際には、例えば同図に示すように、把手６０に親指以外の指を通し、まず親指で鍔部７１の上端部を上側に押して鍔部７１をケーシング３に対して弾性変形させて揺動させる。このとき、下側の係止爪７３がこれに連動してした下梁８３の係止孔８５から脱離する。そして、把手６０を手前側（シェルフ８０への挿入方向とは逆側）に引っ張ることにより、空冷ファンユニット１を取り

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外すことができる。

【００４５】

尚、以上においては、空冷ファンユニット１をシェルフ８０の開口部に乗せるような実装形態（下ロックタイプ）の取付構造について説明したが、空冷ファンユニット１をシェルフの開口部にぶら下げるような実装形態（上ロックタイプ）の取付構造についても本実施の形態を適用することができる。図８は、上ロックタイプのシェルフ１８０の正面図であり、図９は、空冷ファンユニット１を除いた状態でシェルフ１８０を斜め下方からみた斜視図である。

【００４６】

図８に示すように、シェルフ１８０は、上述したシェルフ８０とは異なり、そのガイドレール９０がファンユニット挿入口１８１の上側に設置されている。従って、図９に示すように、空冷ファンユニット１を装着する部分のシェルフ側の構成が、上述した図６の構成とは上下逆となっている。

【００４７】

すなわち、上梁１８２側にガイドレール設置部１８４が設けられ、ガイドレール９０が配設されている。上述したケーシング３のガイド部３６は、このガイドレール９０に支持される。また、上梁１８２の隣接するガイドレール９０の中間位置には、空冷ファンユニット１の係止部７０を係止する係止孔１８５が設けられている。図１０（ａ）は図９のＥ－Ｅ矢視断面図であり、図１０（ｂ）は同図（ａ）のＦ方向矢視図である。

【００４８】

これらの図に示すように、空冷ファンユニット１とシェルフ１８０との取付部の構成は、その取付構造が上下逆となっている以外は上記図６の構成と基本的に同様であるため、その説明については省略する。

【００４９】

図１１（ａ）に空冷ファンユニット１のシェルフ１８０への取付方法を示す。

同図に示すように、空冷ファンユニット１をシェルフ１８０に装着する際には、空冷ファンユニット１をその左右のガイドレール９０に沿ってシェルフ１８０内に挿入していく。すると、空冷ファンユニット１が所定の設置位置にきたところで上側の係止爪７２が上梁１８２の係止孔１８５に嵌合して係止され固定される。

【００５０】

一方、空冷ファンユニット１をシェルフ１８０から取り外す際には、例えば同図に示すように、把手６０に親指以外の指を通し、まず親指で鍔部７１の上端部を下側に押して鍔部７１をケーシング３に対して弾性変形させて揺動させる。このとき、上側の係止爪７２がこれに連動して上梁１８２の係止孔１８５から脱離する。そして、把手６０を手前側（シェルフ１８０への挿入方向とは逆側）に引っ張ることにより、空冷ファンユニット１を取り外すことができる。

【００５１】

尚、以上においては、シェルフ８０，１８０の上梁，下梁の形状として断面Ｌ字状のものを示したが、図１１（ｂ）に示すような断面Ｕ字状その他の形状であっても、係止部７０の係止爪と嵌合可能な係止孔が形成されているものであれば、本実施の形態を適用することができる。

【００５２】

以上に説明したように、本実施の形態の空冷ファンユニット１によれば、シェルフ８０のファンユニット挿入口８１に挿入された際にそのファンユニット挿入口８１の対向面と当接する位置に対応して、嵌合手段７２，７３がそれぞれ配置される。このため、シェルフ側でそのファンユニット挿入口８１の対向面のいずれ側に係止部が存在していたとしても、当該空冷ファンユニット１を係止させることができる。つまり、シェルフ側の仕様によらず、空冷ファンユニット１を取り付けることができる。

【００５３】

また、シェルフ８０から当該空冷ファンユニット１を取り外す際には、係止部７０の鍔

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部７１に外力を加えて揺動させるだけで、嵌合手段７２，７３のいずれもがシェルフ８０からの脱離方向に動作する。このため、当該空冷ファンユニット１がシェルフ８０のファンユニット挿入口８１の対向面のいずれ側で係止されているかによらず、鍔部７１を押圧するという簡単なワンタッチ操作でこれを容易に取り外すことができ、そのメンテナンス性を向上させることができる。

【００５４】

尚、近年、電子機器が小型化され、機械室等特殊な場所からユーザー近傍の事務所へと設置環境が変わってきているため、従来の金属から成るケーシングへのファンの直固定では、ファン回転の振動によりビビリ音及び共鳴音が発生し、かつ大型で高能力ファンの採用により非常に騒音が大きくなってきている。この点に関し、本実施の形態では、ゴムブッシュ５０による防振構造によりその騒音を防止又は抑制することができる。

【００５５】

以上、本実施の形態について説明したが、例えば以下に示す変形例を適用することも可能である。

図１２は、本実施の形態の第１の変形例にかかる空冷ファンユニットの構造を表す分解斜視図であり、図１３はその特徴部分であるファン近傍の構造を表す斜視図である。尚、本変形例は、ファンを支持するゴムブッシュの構造及びその支持構造が異なる以外は、上述した実施の形態と同様であるため、異なる構成部分についてのみ説明をする。

【００５６】

図１３に示すように、本変形例の空冷ファンユニットにおける防振用のゴムブッシュ１５０は、三角柱状をなし、１側面にはファンケーシング２１の角部と嵌合可能な嵌合凹部１５１が形成されている。本変形例では、各ファン２の対角に位置する２箇所にそれぞれゴムブッシュ１５０が配置されている。また、ゴムブッシュ１５０の上面の３箇所には、円錐状の凸部１５１ａが突設されている。

【００５７】

図１２に示すように、ケーシング３の底面には、ファン２に取り付けられた各ゴムブッシュ１５０を固定するための複数のリブ１３２が立設されており、収容されたファン２を安定に固定できるようになっている。

【００５８】

本変形例では、両ファン２のそれぞれがゴムブッシュ１５０に個別に支持され、ケーシング３内に配置される。

図１４は、本実施の形態の第２の変形例にかかる空冷ファンユニットの構造を表す分解斜視図であり、図１５はその特徴部分であるファン近傍の構造を表す斜視図である。尚、本変形例は、ファンを支持するゴムブッシュの構造及びその支持構造が異なる以外は、上述した実施の形態と同様であるため、異なる構成部分についてのみ説明をする。

【００５９】

図１５に示すように、本変形例の空冷ファンユニットにおける防振用のゴムブッシュ２５０は、四角柱状をなし、その４側面にファンケーシング２１の角部と嵌合可能な嵌合凹部２５１が形成されている。また、ゴムブッシュ２５０の上面の４箇所には、円錐状の凸部２５１ａが突設されている。本変形例では、両ファン２をその対角を付き合わせる方向に並列し、その対角線上に３つのゴムブッシュ２５０が配置されている。つまり、中央のゴムブッシュ２５０によって両ファン２の対角が直接接触するのが防止され、さらに、両端に位置する対角のそれぞれにゴムブッシュ２５０が配置されている。

【００６０】

図１４に示すように、ケーシング３の底面には、ファン２に取り付けられた各ゴムブッシュ２５０を固定するための複数のリブ２３２が立設されており、収容されたファン２を安定に固定できるようになっている。

【００６１】

本変形例は、ケーシング３内でのスペースのとり方の便宜上、両ファン２の配置態様を異ならせる必要がある場合などに有効である。

［第２の実施の形態］

次に、本発明の第２の実施の形態について説明する。尚、本実施の形態は、ケーシングのシェルフへの取付方向後端側の構成が異なる以外は、上記第１の実施の形態の構成と同様であるため、同様の構成部分については必要に応じて同一の符号を付して示す等してその説明を省略する。図１６は、本実施の形態にかかる空冷ファンユニットの特徴部分の概略構成を表す斜視図であり、図１７はその特徴部分を有する把手の斜視図である。また、図１８は、当該空冷ファンユニットの取付方法を示す説明図であり、図１６のＧ－Ｇ矢視断面図に相当する。

【００６２】

図１６に示すように、本実施の形態の空冷ファンユニット２０１の後端縁はテーパ状に形成されており、係止部２７０もそれに倣った形状を有する。

すなわち、図１６及び図１８に示すように、係止部２７０は、ケーシング２０３の後側面から底面の所定位置にかけて一対のスリット２７１ａを入れることによりケーシング２０３の本体から部分的に分離されて形成されている。この係止部２７０は、その上端部がケーシング２０３の上端縁と同一平面上をその内方に延出してフランジ部２７１を構成し、下端部がケーシング２０３の底面の一部を構成している。また、係止部２７０のフランジ部２７１と底面との中間位置からは鍔部２７２が外方（後方）に向かって延出している。この係止部２７０は、鍔部２７２に外力を加えることで、スリット２７１ａが途切れた下端先端部をヒンジとしてケーシング２０３に対して弾性変形し、揺動できるようになっている。フランジ部２７１の上面には係止爪２７３が突設されており、下端部の下面には係止爪２７４が突設されている。

【００６３】

また、ケーシング２０３に嵌合装着されるカバー２０４のフランジ部２７１に対応する位置には、そのフランジ部２７１を挿通して露出させるためのスリット２０４ａが設けられている。

【００６４】

一方、把手２６０は、図３に示した第１実施の形態の把手６０の構成において、その上部開口部を閉じたような構成を有する。すなわち、図１７に示すように、把手２６０は、板状部材を数箇所で屈曲して形成したＵ字状の本体２６１と、この本体２６１においてケーシング２０３との間に形成される上側開口部の片側端縁を閉塞するカバー部材２６２とにより構成されている。このため、把手２６０には上方からの指の挿入が禁止される。この把手２６０は、図１６に示すように、ケーシング２０３のシェルフへの取付方向後端側に、鍔部２７２を跨ぐように取り付けられている。

【００６５】

そして、図１８（ａ）に示すように、空冷ファンユニット２０１をシェルフに装着する際には、空冷ファンユニット２０１をその左右のガイドレール９０に沿ってシェルフ内に挿入していく。すると、空冷ファンユニット１が所定の設置位置にきたところで下側の係止爪２７４が下梁２８３の係止孔２８５に嵌合して係止され固定される。

【００６６】

一方、空冷ファンユニット２０１をシェルフから取り外す際には、例えば同図に示すように把手２６０に指を通す。このとき、把手２６０はその上部がカバー部材２６２によって塞がれているため、親指は鍔部２７２に触れることなくカバー部材２６２上に置かれる。一方、親指を除く指が取っての下方から挿入されて鍔部２７２の下面に当たる。このため、作業員が把手２６０を握ると自然に鍔部２７２に上側への押圧力が加わり、鍔部２７２をケーシング２０３に対して弾性変形させて揺動させる。このとき、下側の係止爪２７４がこれに連動して下梁２８３の係止孔２８５から脱離する。そして、把手２６０を手前側（シェルフへの挿入方向とは逆側）に引っ張ることにより、空冷ファンユニット２０１を取り外すことができる。

【００６７】

尚、以上においては、空冷ファンユニット２０１をシェルフの開口部に乗せる下ロック

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タイプの取付構造について説明したが、同図（ｂ）に示すような空冷ファンユニット２０１をシェルフの開口部にぶら下げる上ロックタイプの取付構造についても本実施の形態をそのまま適用することができる。

【００６８】

この場合、空冷ファンユニット２０１をシェルフに装着する際には、空冷ファンユニット２０１をその左右のガイドレール９０に沿ってシェルフ内に挿入していく。すると、空冷ファンユニット２０１が所定の設置位置にきたところで上側の係止爪２７３が上梁２８２の係止孔２８５に嵌合して係止され固定される。

【００６９】

一方、空冷ファンユニット１をシェルフから取り外す際には、上記と同様に把手２６０を握って手前側（シェルフへの挿入方向とは逆側）に引っ張る。このとき、上記と同様に自然に鍔部２７２に上側への押圧力が加わり、鍔部２７２をケーシング２０３に対して弾性変形させて揺動させる。このとき、上側の係止爪２７３がこれに連動して上梁２８２の係止孔２８５から脱離し、空冷ファンユニット２０１を取り外すことができる。

【００７０】

以上に説明したように、本実施の形態では、把手２６０に、鍔部２７２をシェルフからの脱離方向とは反対側へ付勢する指の挿入を禁止する誤操作防止構造が設けられている。このため、空冷ファンユニット２０１の取り外し作業中に、係止部２７０を誤って逆方向に揺動させ、空冷ファンユニット２０１を取り外せなくなるといった事態を回避することができる。その結果、作業を正確に効率よく行うことができる。

【００７１】

［第３の実施の形態］

次に、本発明の第３の実施の形態について説明する。尚、本実施の形態は、ケーシングのシェルフへの取付方向後端側の構成が異なる以外は、上記第１の実施の形態の構成と同様であるため、その異なる部分についてのみ説明する。図１９は、本実施の形態にかかる空冷ファンユニットの特徴部分の概略構成を表す斜視図であり、同図（ａ）及び（ｂ）はそのケーシングを斜め上方からみた図であり、同図（ｃ）は斜め下方からみた図である。

【００７２】

同図（ａ）に示すように、係止部３７０は、ケーシング３０３に弾性的に揺動可能に設けられた板状体からなり、その板状体の一部に揺動方向の外力を加えるための鍔部３７１と、シェルフの開口部の上梁及び下梁の対向面と当接する位置にそれぞれ設けられた係止爪３７２，３７３（嵌合手段）とを有する。

【００７３】

すなわち、係止部３７０は、ケーシング３０３の後側面から底面の所定位置にかけてスリット３７１ａを入れることによりケーシング３０３の本体から部分的に分離されて形成されている。この係止部３７０は、その上端部がケーシング３０３の上端縁と同一平面上を後方に延出して鍔部３７１を構成し、下端部がケーシング３０３の底面の一部を構成している。そして、スリット３７１ａが途切れた残余の部分である上部をヒンジとしてケーシング３０３に対して弾性変形し、揺動できるようになっている。上記第１の実施の形態とは、このヒンジの位置が上部にある点で異なっている。係止爪３７２は鍔部３７１の上面に突設されており、係止爪２７３は下端部の下面に突設されている。また、係止部３７０の幅方向の両側には、ケーシング３０３の内方に延出する一対のリブ３７４と、ケーシング３０３の外方に延出する一対のリブ３７５とが設けられており、係止部３７０を補強している。

【００７４】

この構造も上ロックタイプ及び下ロックタイプの双方に対応可能であり，鍔部を下方向に押し下げることにより、そのロック状態を容易に解除することができる。

［第４の実施の形態］

次に、本発明の第４の実施の形態について説明する。尚、本実施の形態において上記第１の実施の形態と同様の構成部分については同一の符号を付す等してその説明を省略する

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。図２０は、本実施の形態にかかる空冷ファンユニットの概略構成を表す斜視図である。

【００７５】

同図に示すように、本実施の形態にかかる空冷ファンユニット４０１は、通風用の２つのファン２と、ファン２を収容して支持する箱状のケーシング４０３と、各ファン２の通風経路の上方でその回転翼に対面するようにそれぞれ配置された２つの格子状のフィンガーガード４０４と、シェルフに取り付ける際の把手と係止部の両機能を兼用するフロントパネル４６０とから構成されている。ファン２とフィンガーガード４０４とは、ケーシング４０３の底面に立設された複数のスタッドピン４１０に挿通され、その各上端部にロックブッシュ４２０を組付けることにより、ケーシング４０３に対して固定されている。

【００７６】

フィンガーガード４０４は、同心円に配置された複数の円形のリング部４０４ａを９０度おきに放射状に配置した長尺Ｕ字状の架橋部４０４ｂにより接続して構成され、樹脂材を射出成形して一体的に形成されたものである。

【００７７】

スタッドピン４１０は、図２１にその分解斜視図（図２０のＨ部拡大図に相当）を示すように、円柱軸状の本体４１１を備える。そして、その本体４１１の下端部に設けられたギヤ状の接合部４１２が、ケーシング４０３に設けられた同形状の接合穴４０３ａに圧入され、その軸周りの回転が防止された状態で安定に固定されている。尚、スタッドピン４１０は、ケーシング４０３に対して一体的に形成することもできる。

【００７８】

また、本体４１１の上端部（先端部）にはスリット４１３が設けられ、回転ピン４１５がそのスリット４１３に挟まれるように回動可能に支持されている。回転ピン４１５は、本体４１１の径（幅）よりも小さな幅と本体４１１の径よりも大きな長さを有する。より詳しくは、本体４１１のスリット４１３の位置には、回転軸４１４の径よりも大きな孔４１１ａが直角方向に貫通して設けられている。一方、回転ピン４１５の軸方向中央部は潰れた形状をなし、その潰れた部分の幅がスリット４１３の幅にほぼ一致している。その中央部には、回転軸４１４の径と略同じ大きさの孔４１５ａが直角方向に貫通して設けられている。回転ピン４１５を本体４１１に組付ける際には、回転ピン４１５をスリット４１３に配置して孔４１５ａと孔４１１ａを合わせ、これらの孔に回転軸４１４を挿通する。このとき、回転軸４１４は、回転ピン４１５側の孔４１５ａに対して圧入されて固定される一方、本体４１１側の孔４１１ａに対しては隙間嵌め状態となり、回転ピン４１５がスタッドピン４１０に回動可能に支持される。また、スリット４１３の幅が回転ピン４１５の直径よりも狭くなっているため、回転ピン４１５が回転軸４１４を中心に回転しようとしても、回転ピン４１５の中央部以外の部分がスリット４１３に引っ掛かって阻止される。このため、回転ピン４１５は、所定位置まで回転するとそれ以上は容易に回転しないようになっているが、大きな外力を加えると、回転ピン４１５の中央部以外の部分がスリット４１３に入り込んでスリットを押し広げるような状態で回転させることができる。このように回転ピン４１５によりスタッドピン４１０のスリット４１３が押し広げられても、スタッドピン４１０側の孔４１１ａと回転軸４１４との間の隙間により、スリット４１３の変形をある程度吸収することができる。

【００７９】

ロックブッシュ４２０は、図２２（ａ）にその分解斜視図を示すように、上述した回転ピン４１５を支持可能な構造を有するロックブッシュ本体４２１と、ロックブッシュ本体４２１を挿入して包み込むように配置されるゴムブッシュ４２２と、ゴムブッシュ４２２の底面に装着されるワッシャ４２３とから構成される二種成形一体品である。

【００８０】

ロックブッシュ本体４２１は、円柱状をなし、その自軸方向に回転ピン４１５を水平状態で挿通させることが可能な貫通孔４２１ａと、この貫通孔４２１ａを直交するように横断し、回転ピン４１５がその長手方向に沿って係止できる深さを有する係止溝４２１ｂとを有する。

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【００８１】
また、同図（ｂ）にロックブッシュ本体４２１をその底部からみた斜視図を示すように、ロックブッシュ本体４２１の貫通孔４２１ａは、全体として回転ピン４１５の長手方向に沿った角形状の断面を有し、その中央部がその角形状の幅よりもやや大きな径を有する円断面となっている。
【００８２】
ゴムブッシュ４２２は、同図（ｃ）にその断面図を示すように、段付円筒形状をなし、下半部に内方に突出したフランジ部４２２ａを有する。そして、その上段部にロックブッシュ本体４２１を嵌入し、下段部にワッシャ４２３を嵌入できるようになっている。
【００８３】
ワッシャ４２３は、円板状の本体中央に、ロックブッシュ本体４２１の貫通孔４２１ａと同様の断面を有する孔４２３ａを有する。
フロントパネル４６０は、図２０及び図２４（ａ）に示すように、樹脂材を射出成形したものであり、ケーシング４０３の前壁部を構成する長方形板状のシャーシ４６１とシャーシ４６１の両端部から後方に延出して把手部を構成する把手４６２と、シャーシ４６１の下端中央から前後に延出する係止部４６３とから構成されている。シャーシ４６１の両サイドには、前方に延出するガイド４６４がそれぞれ設けられており、そのガイド４６４の先端には、外側に向かって鋭角な斜面形状をした係止突起４６４ａが形成されている。フロントパネル４６０の係止突起４６４ａを除く両ガイド４６４間の外側幅寸法は、ケーシング４０３の両側面の内側幅寸法に一致している。
【００８４】
一方、これに対応するように、ケーシング４０３の側壁後端には、フロントパネル４６０のガイド４６４を嵌合させるための嵌合凹部４３１が設けられている。この嵌合凹部４３１は、ケーシング４０３の側壁後端にガイド４６４とほぼ同形状のスリットを設け、その外側に板片を貼り付けることにより、係止突起４６４ａを係止させる係止孔４３１ａを形成することにより構成されている。
【００８５】
把手４６２は、その上下左右に傾斜面を有し、その先端に指で握れる把手部を形成している。
係止部４６３は、フロントパネル４６０底面中央で一旦前方に延びるフランジ部４６６と、フランジ部４６６に形成した一対のスリット４６６ａによって当該フランジ部４６６と分離した鍔部４６７とを備えている。この鍔部４６７は、さらに後方に延びつつ上方にも湾曲し、フランジ部４６６と同一平面上にある底面には、シェルフの奥行き方向に対して鋭角な斜面形状をした係止爪４６７ａが下方に突設されている。
【００８６】
このため、図２４（ｂ）に示すように、空冷ファンユニット４０１をシェルフの開口部に載せるような実装形態（ＰＵＬＬ　ＦＡＮ）の場合、空冷ファンユニット４０１をシェルフに装着する際には、空冷ファンユニット４０１が所定の設置位置にきたところで下側の係止爪４６７ａがシェルフの下梁の係止孔に嵌合して係止されロックされる。
【００８７】
一方、空冷ファンユニット４０１をシェルフから取り外す際には、例えば同図に示すように、把手４６２に指を差し込んで、鍔部４６７を上側に押し上げることにより、係止爪４６７ａがシェルフの係止孔から脱離してロックが解除される。そして、把手４６２を手前側（シェルフへの挿入方向とは逆側）に引っ張ることにより、空冷ファンユニット４０１を取り外すことができる。
【００８８】
尚、図２５（ａ）に示すように、フロントパネル４６０を上下ひっくり返してケーシング４０３に取り付けることにより、空冷ファンユニット４０１をシェルフの下側にぶら下げるような実装形態（ＰＵＳＨ　ＦＡＮ）についても対応することができる。
【００８９】

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この場合は同図（ｂ）に示すように、空冷ファンユニット４０１が所定の設置位置にきたところで上側の係止爪４６７ａがシェルフの上梁の係止孔に嵌合して係止されロックされる。

【００９０】

一方、空冷ファンユニット４０１をシェルフから取り外す際には、例えば同図に示すように、把手４６２に指を差し込んで、鍔部４６７を下方に押し下げることにより、係止爪４６７ａがシェルフの係止孔から脱離してロックが解除される。そして、把手４６２を手前側（シェルフへの挿入方向とは逆側）に引っ張ることにより、空冷ファンユニット４０１を取り外すことができる。

【００９１】

次に、空冷ファンユニット４０１の組付方法について、図２０及び図２３に基づいて説明する。図２３（ａ）は、スタッドピン４１０とロックブッシュ４２０の係止部を表す斜視図であり、同図（ｂ）はそのＩ－Ｉ断面図であり、同図（ｃ）はそのＪ－Ｊ断面図及びＫ－Ｋ断面図である。

【００９２】

図２０を参照して、空冷ファンユニット４０１の各部品を組付ける際には、まず、各スタッドピン４１０を各ファン２の固定用の孔２４に挿入し、ファン２をケーシング４０３上に搭載する。そして、各フィンガーガード４０４の架橋部４０４ｂの先端部を、ファン２の各フランジ部２３の先端部に設けられた孔２４に合せて搭載し、各ロックブッシュ４２０を各スタッドピン４１０に対してロックする。

【００９３】

すなわち、図２３（ａ）に示すように、スタッドピン４１０の先端の回転ピン４１５をほぼ垂直に立てた状態で、ロックブッシュ４２０を、その貫通孔４２１ａの中央をスタッドピン４１０の軸線に一致させるようにして挿入した後、同図（ｂ）に示すように、回転ピン４１５を回動させて水平にする。このとき、同図（ｃ）の左図（Ｊ－Ｊ断面）に示すように、回転ピン４１５は貫通孔４２１ａ内に収容された状態になっている。

【００９４】

そして、同図（ｃ）の中央図（Ｊ－Ｊ断面）に示すように、ロックブッシュ４２０を下方に押し込みながらスタッドピン４１０の回転ピン４１５をロックブッシュ４２０の上面まで飛び出させて、ロックブッシュ４２０を９０度回転させ、回転ピン４１５を係止溝４２１ｂに合うように位置させて手を放す。このとき、同図（ｃ）の右図（Ｋ－Ｋ断面）に示すように、回転ピン４１５はゴムブッシュ４２２の弾性力で係止溝４２１ｂへ押し込まれて係止され、その結果、ロックブッシュ４２０がスタッドピン４１０に対してロックされる。このようにして、ファン２及びフィンガーガード４０４が、ケーシング４０３とロックブッシュ４２０との間に弾性的に挟持される。

【００９５】

次に、ケーシング４０３の前面にフロントパネル４６０を嵌め込む。

図２０及び図２４を参照して、まず、フロントパネル４６０の両サイドのガイド４６４をシャーシ４６１の嵌合凹部４３１に沿って挿入する。このとき、係止突起４６４ａの存在により、ガイド４６４は内側に湾曲した状態で嵌合凹部４３１の内側に沿って挿入されるが、係止突起４６４ａがケーシング４０３の係止孔４３１ａの位置にくると、弾性復帰してその係止突起４６４ａが係止孔４３１ａに嵌合して係止されことにより、フロントパネル４６０がケーシング４０３に対して固定される。

【００９６】

尚、空冷ファンユニット４０１を分解する際には、上記と逆の手法で各部品を取り外す。特に、ロックブッシュ４２０をスタッドピン４１０から取り外す際には、ロックブッシュ４２０を押し込んでスタッドピン４１０の回転ピン４１５をロックブッシュ本体４２１の上面まで飛び出させて貫通孔４２１ａの位置まで回転させる。回転ピン４１５がこの貫通孔４２１ａの位置まできたときに手を離せば、ゴムブッシュ４２２の弾性力により、ロックブッシュ４２０がスタッドピン４１０から外れる。

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【００９７】
図２６は、本実施の形態の変形例にかかるロックブッシュの構成を表す斜視図である。同図（ａ）は本変形例のロックブッシュの分解斜視図であり、同図（ｂ）はそのＬ－Ｌ矢視断面図であり、同図（ｃ）は当該ロックブッシュを構成するロックブッシュ本体をその底部からみた斜視図である。
【００９８】
尚、本変形例は、ロックブッシュを構成するロックブッシュ本体の構造が異なる以外は上述した実施の形態と同様であるため、同様の構成部分については同一の符号を付す等してその説明を省略する。
【００９９】
本変形例のロックブッシュ４２０’を構成するロックブッシュ本体４２１’は、同図（ｂ）に同図（ａ）のＬ－Ｌ断面切断図を示すように、円柱状をなし、その自軸方向に回転ピン４１５を水平状態で挿通させることが可能な貫通孔４２１ａと、この貫通孔４２１ａを直交するように横断し、回転ピン４１５がその長手方向に沿って係止できる深さを有する係止溝４２１ｂとを有する。また、係止溝４２１ｂの片側先端縁から貫通孔４２１ａにかけて螺旋状に傾斜する斜面４２１ｃが形成され、回転ピン４１５をこの斜面４２１ｃに沿って係止溝４２１ｂ又は貫通孔４２１ａにガイドできるようになっている。この斜面４２１ｃは、ロックブッシュ本体４２１の中心を基準として点対称な位置に形成されている。
【０１００】
この場合、空冷ファンユニット４０１をシェルフに装着する際には、ロックブッシュ４２０を下方に軽く押し込みながら９０度回転させる。すると、回転ピン４１５はゴムブッシュ４２２の斜面４２１ｃを伝って上昇し、係止溝４２１ｂに嵌まり込む。このとき、回転ピン４１５がゴムブッシュ４２２の弾性力で係止溝４２１ｂに係止され、その結果、ロックブッシュ４２０がスタッドピン４１０に対してロックされる。このようにして、ファン２及びフィンガーガード４０４が、ケーシング４０３とロックブッシュ４２０との間に弾性的に挟持される。
【０１０１】
一方、空冷ファンユニット４０１を分解する際には、上記と逆の手法で各部品を取り外す。特に、ロックブッシュ４２０をスタッドピン４１０から取り外す際には、ロックブッシュ４２０を軽く押し込みながら少し回転させることで、回転ピン４１５がロックブッシュ本体４２１の斜面４２１ｃを伝って自然に下降し、貫通孔４２１ａから抜ける。
【０１０２】
以上に説明したように、本実施の形態の空冷ファンユニット４０１によれば、スタッドピン４１０に対してロックブッシュ４２０を回転させつつ押し込んで回転ピンを係止させることにより、ケーシング４０３，ファン２，フィンガーガード４０４を固定することができる。また、その逆の動作によりこれらを分離することもできる。このため、ネジによる組付けの場合のような工具が不要であり、その取付・取外作業を簡易かつ迅速に行うことができる。また、ロックブッシュ４２０の弾性による反力によりこれらケーシング４０３，ファン２，フィンガーガード４０４を安定して固定することができる。
【０１０３】
また、係止溝４２１ｂと貫通孔４２１ａとの間に螺旋状に傾斜する斜面４２１ｃを形成することで、回転ピン４１５の係止溝４２１ｂへの脱着がよりスムーズかつ小さな力で容易に行うことができる。
【０１０４】
［第５の実施の形態］
次に、本発明の第５の実施の形態について説明する。尚、本実施の形態において上記各実施の形態と同様の構成部分については同一の符号を付す等してその説明を省略する。図２７は、本実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。
【０１０５】

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同図に示すように、本実施の形態にかかる空冷ファンユニット５０１は、通風用の２つのファン２と、ファン２を横方向から収容して支持する左右一対のケーシング５０３と、各ファン２の通風経路の前後（上下）にその回転翼に対面するようにそれぞれ配置された４つの格子状のフィンガーガード４０４と、シェルフに取り付ける際の把手と係止部の両機能を兼用するフロントパネル４６０と、シェルフへの挿通方向先端側でコネクタ２５を保持するリアパネル５０５とから構成されている。ファン２とフィンガーガード４０４とは、複数の固定用ブッシュ５２０によって固定されている。

【０１０６】

ケーシング５０３は、長尺板状の部材をその幅方向に立設させて構成され、その側面には、ファン２の側面を取り囲んで収容・支持するための複数のリブ５０４が突設され、ファン収容部５０４ｂを形成している。この複数のリブ５０４のうち上下のリブ５０４には、ファン２の固定用の孔２４に対応した固定用の孔５０４ａが形成されている。また、ケーシング５０３の前後には、フロントパネル４６０とリアパネル５０５を嵌合装着させるための嵌合凹部５５１，５５２が設けられている。これら嵌合凹部５５１，５５２の構成は、第４の実施の形態の嵌合凹部４３１の構成と同様であるため、その説明を省略する。

【０１０７】

リアパネル５０５は、樹脂材を射出成形したものであり、ケーシング５０３の前方で壁部を構成する長方形板状のシャーシ５６１と、シャーシ５６１の両サイドで後方に延出するガイド５６２とから構成されている。シャーシ５６１の上部中央には、コネクタ２５を固定するためのコネクタ収容部３３が設けられている。尚、ガイド５６２の構成及びそのケーシング５０３との取付構造は、第４の実施の形態のガイド４６４の構成及びそのケーシング４０３との取付構造と同様であるため、その説明を省略する。

【０１０８】

固定用ブッシュ５２０は、ゴムからなり、図２８にそのファン２及びフィンガーガード４０４への取付断面図を示すように、円柱状の本体に３つの環状リブ５２１，５２２，５２３が所定間隔で周設されて構成されている。その先端のリブ５２１は後方（図中上方）にやや拡径するテーパ状に形成され、後端のリブ５２３はフィンガーガード４０４のスリットの幅よりもやや大きな外径を有する。そして、中央のリブ５２２は、後端のリブ５２３よりも大きくフランジ状をなしている。そして、これらのリブ間に嵌合溝を形成している。

【０１０９】

次に、空冷ファンユニット５０１の組付方法について説明する。

図２７に示すように、まず、ケーシング５０３と各ファン２とを、ファン収容部５０４ｂにファン２の側面を収容するようにして組付ける。このとき、ファン２の固定用の孔２４とケーシング５０３の固定用の孔５０４ａとを一致させる。

【０１１０】

そして、この状態から各フィンガーガード４０４を取り付ける。すなわち、図２８に示すように、まず、固定用ブッシュ５２０をそのリブ５２３側でフィンガーガード４０４の先端部に取り付けておく。このとき、固定用ブッシュ５２０は、中央のリブ５２２と後端のリブ５２３との間に架橋部４０４ｂの先端部を挟み込む態様でフィンガーガード４０４に取り付けられる。

【０１１１】

そして、この状態から、フィンガーガード４０４が取り付けられた各固定用ブッシュ５２０を、その先端からケーシング５０３の孔５０４ａに差し込む。このとき、先端のリブ５２１が少し弾性変形しながら孔５０４ａを貫通すると、その後端部が逆止構造となって逆方向に抜けることを禁止する。これにより、固定用ブッシュ５２０は、その先端のリブ５２１と中央のリブ５２２とによってリブ５０４を挟持する態様でケーシング５０３に固定される。また、先端のリブ５２１の先端部がファン２の孔２４に挿通されるため、この固定用ブッシュ５２０を介してファン２とケーシング５０３とが間接的に固定される。以上のようにして、ファン２，ケーシング５０３及びフィンガーガード４０４の固定が完了

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する。

【０１１２】

そして、この状態からフロントパネル４６０とリアパネル５０５を嵌合装着させることにより、組付けが完了する。

以上に説明したように、本実施の形態の空冷ファンユニット５０１によれば、固定用ブッシュ５２０を用いてファン２，ケーシング５０３及びフィンガーガード４０４の脱着を簡易に行うことができ、ネジ等による接合の場合よりも迅速に行うことができる。

【０１１３】

［第６の実施の形態］

次に、本発明の第６の実施の形態について説明する。尚、本実施の形態において上記各実施の形態と同様の構成部分については同一の符号を付す等してその説明を省略する。図２９は、本実施の形態にかかる空冷ファンユニットの概略構成を表す斜視図であり、図３０はその分解斜視図である。

【０１１４】

図２９及び図３０に示すように、本実施の形態にかかる空冷ファンユニット６０１は、通風用の１つのファン２に対して１つのケーシング６０３がこれを収容するコンパクトな構成を有する。そして、必要に応じて複数の空冷ファンユニット６０１を連結して大規模な空冷ファンユニットを構成することもできる。

【０１１５】

本実施の形態の空冷ファンユニット６０１は、１つのファン２と、ファン２を内部に収容するとともに上方から支持するケーシング６０３と、このケーシング６０３の下部開口部を閉塞するカバー６０４とから構成されている。

【０１１６】

すなわち、図３１（ａ）に図３０のＭ－Ｍ矢視断面図を示すように、ケーシング６０３は、円筒状の本体の上端を覆うように上カバー部６１１が設けられており、この上カバー部６１１に対してファン２が組付けられている。上カバー部６１１には、ファン２の回転翼に対面するように格子状の通風孔６１２が形成されている。この通風孔６１２は、通風用の孔として機能するとともに、フィンガーガードとしても機能する。

【０１１７】

また、ケーシング６０３の下端縁からは外方に向かって上カバー部６１１の形状に対応したフランジ部６１３が延設されており、このフランジ部６１３に複数の係止孔６１３ａが設けられている。

【０１１８】

一方、カバー６０４は、図３０にも示されるように、略正方形状の板材からなり、ファン２の回転翼に対面する位置には格子状の通風孔６２１が形成されている。この通風孔６２１は、通風用の孔として機能するとともに、フィンガーガードとしても機能する。また、カバー６０４の４つの角隅部の上記係止孔６１３ａに対応する位置には、爪状の係止突起６０４ａが突設されており、この係止突起６０４ａを係止孔６１３ａに嵌合させることにより、カバー６０４がケーシング６０３に対して固定され、ケーシング６０３の下部開口部を閉塞する。

【０１１９】

また、図３１（ｂ）に示すように、ケーシング６０３の内部及び外部にはファン２のモータにつながる電源ケーブル６５０が配線されており、その先端に設けられたコネクタ２５がケーシング６０３の前後にネジＳにより螺合固定されている。

【０１２０】

また、図２９及び図３０に示すように、ケーシング６０３の側壁の後端側には一対のガイド６１６が設けられ、先端側には一対の嵌合凹部６１７が設けられている。これらガイド６１６と嵌合凹部６１７の構成は、それぞれ図２４で示したガイド４６４，嵌合凹部４３１の構成と同様であるため、その説明については省略するが、これらが嵌合して固定されることにより、複数の空冷ファンユニット６０１が連続的に固定できるようになってい

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る。尚、本実施の形態において、ガイド６１６及び嵌合凹部６１７が嵌合手段を構成する。

【０１２１】

さらに、空冷ファンユニット６０１には、フロントパネル６６０が取付可能に構成されている。このフロントパネル６６０は、図２４に示したフロントパネル４６０に対し、ガイド６１６を接続可能な嵌合凹部６６１が設けられた側壁が連設された構成を有する。この両側壁の先端にはプレート６６２が接続され、フロントパネル６６０の強度を高めている。このプレート６６２の中央には、コネクタ２５を挿通可能な窓６６２ａが設けられている。

【０１２２】

以上に説明したように、本実施の形態の空冷ファンユニット６０１によれば、空冷ファンユニット６０１をコンパクトに形成することができるとともに、必要に応じて複数接続することにより、大規模な空冷ファンユニットとして構成することもできる。このため、空冷ファンユニットとしての汎用性が高い。

【０１２３】

［第７の実施の形態］

次に、本発明の第７の実施の形態について説明する。尚、本実施の形態において上記各実施の形態と同様の構成部分については同一の符号を付す等してその説明を省略する。図３２は、本実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。

【０１２４】

同図に示すように、本実施の形態にかかる空冷ファンユニット７０１は、通風用の２つのファン２と、ファン２を収容して支持するケーシング７０３と、ケーシング７０３の開口部を閉塞するカバー７０４とから構成されている。

【０１２５】

ケーシング７０３は、第１の実施の形態で示したケーシング３とほぼ同様の形状を有するが、その両側面の後端側上部には断面長円状の凸部７１１が縦方向に延びて設けられ、両側面の先端側上部には三角錐形状の凸部７１２と、中心部に円形の凹溝７１３ａを有する円柱状の凸部７１３が設けられている。また、両側面の下部には、シェルフ側のガイドレールにガイドされるガイド部７１６が、その先端部から後端部に亘って延設されている。

【０１２６】

また、ケーシング７０３の後部上端縁の中央には、シェルフ側の梁に係止される係止部７１４が設けられ、その両側には、カバー７０４を押える爪部７１８が形成されており、爪が変形し易いように周辺にスリットが形成されている。

【０１２７】

さらに、ケーシング７０３の底面には、各ファン２の回転翼に対面するように格子状の通風孔７１５が形成されている。この通風孔７１５は、通風用の孔として機能するとともに、フィンガーガードとしても機能する。また、この底面の通風孔７１５の周りにおいて、ファン２の固定用の孔２４に対応する複数箇所には座ぐり７５５が設けられ、その座ぐり７５５にファン２を固定するための固定用ブッシュ７５０を挿通する孔７５５ａが形成されている。固定用ブッシュ７５０の頭部分は、この座ぐり７５５に収容される。

【０１２８】

一方、カバー７０４は、第１の実施の形態で示したカバー４と同様に、板状の本体において各ファン２の回転翼に対面する位置に格子状の通風孔７４１が形成されている。この通風孔７４１は、通風用の孔として機能するとともに、フィンガーガードとしても機能する。また、このカバー７０４の通風孔７４１の周りにおいて、ファン２の固定用の孔２４に対応する複数箇所には座ぐり７５４が設けられ、その座ぐり７５４にファン２を固定するための固定用ブッシュ７５０を挿通する孔７５４ａが形成されている。固定用ブッシュ７５０の頭部分は、この座ぐり７５４に収容される。

【０１２９】

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また、カバー７０４の本体のシェルフへの取付方向に沿った両縁部が下方に所定量折り曲げられて側壁７４２を形成し、その側壁７４２の後端部近傍には、上記凸部７１１に嵌合する長円状の切欠穴７４３が設けられている。また、側壁７４２の先端部近傍には、ケーシング７０３の円柱形状の凸部７１３を係止可能な縦方向に延びる長円状のガイド穴７４４が形成されている。

【０１３０】

さらに、カバー７０４の先端側には、当該カバー４と分割して構成された押えカバー７４７が設けられ、その押えカバー７４７の両側面の内側には、ケーシング７０３の凸部７１３に形成された円形の凹溝７１３ａに嵌合する凸部７４７ａと、三角錐形状の凸部７１２に嵌合する嵌合孔７４７ｂが設けられている。

【０１３１】

次に、空冷ファンユニット７０１の組付方法について説明する。

まず、ファン２の孔２４と座ぐり７５５の孔７５５ａとを一致させるように、各ファン２をケーシング７０３内に配置する。そして、ケーシング７０３の底面側から複数の固定用ブッシュ７５０を挿入し、各ファン２をケーシング７０３内に固定する。

【０１３２】

続いて、ケーシング７０３の凸部７１１，凸部７１３に、カバー７０４の切欠穴７４３，ガイド穴７４４をそれぞれ嵌め込んで、カバー７０４をケーシング７０３に固定する。このとき、カバー７０４は、ケーシング７０３の長円状の凸部７１１によって凸部７１３回りの回動が阻止されている。

【０１３３】

そして、カバー７０４の孔７５４ａに固定用ブッシュ７５０を挿通し、その先端をファン２の孔２４に係止させることにより、カバー７０４とファン２とを固定する。

そしてさらに、押えカバー７４７の内側の凸部７４７ａをケーシング７０３の凹溝７１３ａに合わせ、ケーシング７０３にカバー７０４を覆い被せるようにして嵌め込んで固定する。

【０１３４】

一方、カバー７０４をケーシング７０３に対して開放する際には、カバー７０４を持ち上げて凸部７１１から脱離させた後、カバー７０４を回動させる。

すなわち、カバー７０４を閉じた状態からそのまま回動させようとしても、カバー７０４の回動軸近傍の固定用ブッシュ７５０がファン２の固定用の孔２４に嵌合しているため、その回動が困難である。これを強制的に回動させると、固定用ブッシュ７５０を変形させたり破損させる虞がある。そこで、本実施の形態では、一旦カバー７０４を水平にして持ち上げるように構成している。ただし、カバー７０４を持ち上げる前にこれが回動することを防止するために、長円状の凸部７１１を設けている。カバー７０４には、この凸部７１１に対応した長円状の切欠穴７４３があり、これら凸部７１１と切欠穴７４３とが互いに嵌合しているため、カバー７０４を持ち上げるまでは当該カバー７０４が回転しないような構造になっているのである。

【０１３５】

また、押えカバー７４７は、カバー７０４の回転軸が簡単に上方へ移動するのを防ぐためのものである。すなわち、ケーシング７０３の先端部には、三角錐の先端角の一辺に面取りがされた形状の凸部７１２があり、押えカバー７４７には、この凸部７１２に対応した嵌合孔７４７ｂが形成されている。カバー７０４に対して分割された押えカバー７４７は、図３３に示すように、その回動時には、所定の大きさの回動方向の外力を付与することにより、三角錐の凸部７１２の先端角一辺の面取り部傾斜７１２ａに沿って徐々にその側面が外側に膨れ、ロックが解除される。

【０１３６】

押さえカバー７４７を閉じる際には、所定の大きさの上記とは逆の回動方向の外力を付与することにより、凸部７１２の他の傾斜面７１２ｂに沿ってその側面が徐々に外側に膨れ、最終的に嵌合孔７４７ｂが凸部７１２に嵌まり込んでロックされる。

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【０１３７】
次に、空冷ファンユニット７０１において、カバー７０４を開放させる手順について、図３４及び図３５に基づいて説明する。
まず、図３４（ａ）のようにカバー７０４及び押えカバー７４７が閉じた状態から、同図（ｂ）に示すように、押えカバー７４７を回動させて開く。この状態を図３５（ａ）に示す。
【０１３８】
続いて、図３４（ｃ）のように、カバー７０４を水平に保持した状態でこれを上方に持ち上げる。この状態を図３５（ｂ）に示す。
そして、図３４（ｄ）のように、カバー７０４を回動させて開く。この状態を図３５（ｃ）に示す。この状態でファン２の交換等が可能になる。
【０１３９】
以上に説明したように、本実施の形態の空冷ファンユニット７０１によれば、固定用ブッシュ７５０を用いてファン２，カバー７０４，ケーシング７０３の固定を簡易に行うことができ、ネジ等による接合の場合よりも迅速に行うことができる。また、カバー７０４をケーシング７０３に対して持ち上げて揺動させることで、カバー７０４を容易に開放させることができる。このため、メンテナンスの際にも都合が良い。
【０１４０】
尚、本実施の形態では、凸部７１２を三角錐形状に構成したが、図３６（ａ）の部分斜視図に示すように、これを三角柱形状の凸部７１２′として構成してもよい。また、凸部７１２と嵌合孔７４７ｂをケーシング７０３に対して平行に形成したが、同図（ｂ）の部分側面図に示すように、これらに対応する凸部７１２′と嵌合孔７４７ｂ′をケーシング７０３に対して角度を持たせて形成してもよい。
【産業上の利用可能性】
【０１４１】
電子機器を収容するシェルフに取り付けられ、シェルフ内を強制通風して電子機器を冷却する装置に適用することができる。
（付記１）
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを支持するケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
前記ケーシングの前記シェルフへの取付方向後端側に弾性的に揺動可能に設けられた板状体からなり、その板状体の一部に揺動方向の外力を加えるための鍔部と、前記シェルフのファンユニット挿入口の対向面と当接する位置にそれぞれ設けられた複数の嵌合手段とを有し、少なくともいずれかの嵌合手段を介して前記シェルフに係止される係止部と、
を備え、
前記鍔部に加えられた外力によって前記係止部が揺動させられることにより、前記各嵌合手段がこれに連動して前記シェルフから脱離するように構成されたことを特徴とする空冷ファンユニット。
【０１４２】
（付記２）
前記ケーシングが箱状に形成され、
前記係止部は、前記ケーシングの後端側の側壁にスリットを設けることにより、前記ケーシングの本体から部分的に分離されるとともに、その残余の部分で形成されるヒンジ部を中心として弾性変形して揺動可能に構成されたことを特徴とする付記１記載の空冷ファンユニット。
【０１４３】

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（付記３）
前記ケーシングの前記シェルフへの取付方向後端側に、前記鍔部を跨ぐように設けられた把手を備え、
前記把手には、前記嵌合手段の脱離方向とは反対側へ前記鍔部を付勢する指の挿入を禁止する誤操作防止構造が設けられたことを特徴とする付記１記載の空冷ファンユニット。
【０１４４】
（付記４）
前記誤操作防止構造は、前記把手の本体と前記ケーシングとの間に形成される開放部の片側端縁をカバー部材により閉塞して構成されたことを特徴とする付記３記載の空冷ファンユニット。
【０１４５】
（付記５）
前記ケーシングの前記シェルフへの取付方向後端側に脱着可能に設けられ、前記把手と前記係止部とを一体化したフロントパネルを備えたことを特徴とする付記３記載の空冷ファンユニット。
【０１４６】
（付記６）
電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを支持するケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
前記ケーシングの内部に立設された軸状の本体を備え、前記本体の先端部に設けたスリット部分に、前記本体の幅よりも小さな幅と前記本体の幅よりも大きな長さを有する回転ピンを、その回転ピンの長手方向と直角な軸回りに回動可能に支持する複数のスタッドピンと、
前記回転ピンを含む前記スタッドピンの先端部を挿通させるための貫通孔と、前記貫通孔を横断するように形成され、前記貫通孔に挿通されて回動した前記回転ピンをその長手方向に沿って係止する係止溝とを有し、前記スタッドピンの軸方向に押圧されて弾性変形しつつその軸周りに回転し、前記係止溝に前記回転ピンを係止することで、前記ケーシングとの間に前記ファンと前記フィンガーガードとを弾性的に挟持するロックブッシュと、
を備えたことを特徴とする空冷ファンユニット。
【０１４７】
（付記７）
前記ロックブッシュの貫通孔が前記回転ピンの長さよりも大きな幅を有する一方、前記係止溝の先端縁から前記貫通孔にかけて螺旋状に傾斜する斜面を有し、
前記ロックブッシュを前記スタッドピンから取り外す際には、前記ロックブッシュを前記スタッドピンの軸方向に押圧しつつ回転させて前記回転ピンを前記斜面に載せることにより、前記回転ピンが前記斜面に沿って摺動して前記貫通孔に逃げるように構成されたことを特徴とする付記６記載の空冷ファンユニット。
【０１４８】
（付記８）
当該空冷ファンユニットを前記シェルフに挿入する際に把持する把手と、前記シェルフのファンユニット挿入口に係止されることにより、当該空冷ファンユニットを前記シェルフに固定させる係止部とを一体化して構成されるとともに、前記ケーシングの前記シェルフへの取付方向後端側に脱着可能に設けられたフロントパネルを備えたことを特徴とする付記６記載の空冷ファンユニット。
【０１４９】
（付記９）

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電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
前記ファンを側方から挟み込むように収容して支持する一対のケーシングと、
前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状のフィンガーガードと、
軸状の本体の側面に、前記フィンガーガードの一部と前記ケーシングに設けた貫通孔とにそれぞれに嵌合する複数の嵌合溝が周設された複数のブッシュと、
を備え、
前記フィンガーガードの一部と前記ケーシングの貫通孔とを一致させた状態で前記各ブッシュを嵌合させることにより、前記ケーシングと前記フィンガーガードとを固定するように構成されたことを特徴とする空冷ファンユニット。

【０１５０】

（付記１０）

前記ファンの周縁部には複数の固定用の孔が形成され、前記ブッシュの先端を前記固定用孔に係止させることにより、前記ファンを前記ケーシングに対して固定したことを特徴とする付記９記載の空冷ファンユニット。

【０１５１】

（付記１１）

当該空冷ファンユニットを前記シェルフに挿入する際に把持する把手と、前記シェルフのファンユニット挿入口に係止されることにより、当該空冷ファンユニットを前記シェルフに固定させる係止部とを一体化して構成されるとともに、前記ケーシングの前記シェルフへの取付方向後端側に脱着可能に設けられたフロントパネルを備えたことを特徴とする付記９記載の空冷ファンユニット。

【０１５２】

（付記１２）

電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせる一つのファンと、
前記ファンを支持するとともに、前記ファンの通風経路の前後で前記回転翼に対面するようにそれぞれ配置された格子状の通風孔を有するケーシングと、
当該空冷ファンユニットを複数並列して接続固定できるように、前記各ケーシングに設けられた嵌合手段と、
を備えたことを特徴とする空冷ファンユニット。

【０１５３】

（付記１３）

当該空冷ファンユニットを前記シェルフに挿入する際に把持する把手と、前記シェルフのファンユニット挿入口に係止されることにより、当該空冷ファンユニットを前記シェルフに固定させる係止部とを一体化して構成されるとともに、前記ケーシングの前記シェルフへの取付方向後端側に脱着可能に設けられたフロントパネルを備えたことを特徴とする付記１２記載の空冷ファンユニット。

【０１５４】

（付記１４）

電子機器を収容するシェルフに取り付けられ、前記シェルフ内を強制通風して前記電子機器を冷却する空冷ファンユニットにおいて、
内部の回転翼を駆動して通風作用を起こさせるファンと、
箱状の本体の一端面に前記ファンを挿入するための開口部を有し、前記ファンを収容して支持するとともに、前記ファンを載置する位置に前記回転翼に対面するように配置された格子状の通風孔を有するケーシングと、
前記ケーシングの開口部を覆うように配置されるとともに、前記ファンの回転翼に対面

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するように配置された格子状の通風孔を有し、前記ケーシングの一端側に設けられた揺動軸の周りに揺動することにより前記開口部を開放させるカバーと、
前記カバーと前記ケーシングとの間に設けられた嵌合部からなり、前記カバーを前記ケーシングに対して所定量持ち上げるまでその揺動を禁止する揺動制限手段と、
を備えたことを特徴とする空冷ファンユニット。
【０１５５】
（付記１５）
前記カバーに設けられた複数の取付孔を貫通するように嵌合装着された複数の固定用ブッシュを備える一方、前記ファンの周縁部には複数の固定用の孔が形成され、前記固定用ブッシュの先端を前記固定用の孔に係止させることにより、前記ファンを前記カバーに対して固定できるように構成され、
前記揺動制限手段は、前記カバーが持ち上げられて、前記固定用ブッシュの先端が前記ファンの固定用の孔から外れるまで、前記カバーの揺動を禁止することを特徴とする付記１４記載の空冷ファンユニット。
【０１５６】
（付記１６）
前記カバーの端部を覆うように設けられ、前記ケーシングに設けられた回動軸の周りに回動可能に構成され、その回動基点において前記ケーシングと嵌合して前記カバーの持ち上げを禁止する一方、その回動終点において前記カバーの持ち上げ禁止を解除する押えカバーを備えたことを特徴とする付記１４記載の空冷ファンユニット。
【０１５７】
（付記１７）
前記押えカバーに所定の大きさの回動方向の外力を付与することにより、前記押えカバーと前記ケーシングとの嵌合状態をその嵌合部の弾性変形により解除する嵌合解除構造を有することを特徴とする付記１６記載の空冷ファンユニット。
【０１５８】
（付記１８）
当該空冷ファンユニットを前記シェルフに挿入する際に把持する把手と、前記シェルフのファンユニット挿入口に係止されることにより、当該空冷ファンユニットを前記シェルフに固定させる係止部とを一体化して構成されるとともに、前記ケーシングの前記シェルフへの取付方向後端側に脱着可能に設けられたフロントパネルを備えたことを特徴とする付記１４記載の空冷ファンユニット。
【図面の簡単な説明】
【０１５９】
【図１】本発明の第１の実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。
【図２】第１の実施の形態の空冷ファンユニットを構成するファンとゴムブッシュとの取付構造を表す分解斜視図である。
【図３】第１の実施の形態の空冷ファンユニットを構成する把手の周辺構造を表す説明図である。
【図４】第１の実施の形態の空冷ファンユニットを構成するケーシングとカバーの構造を表す説明図である。
【図５】第１の実施の形態の空冷ファンユニットとシェルフとの取付構造を表す斜視図である。
【図６】第１の実施の形態の空冷ファンユニットを除いた状態でシェルフを斜め上方からみた斜視図である。
【図７】図６のＣ方向矢視及び図３（ｂ）のＤ－Ｄ断面に相当する図である。
【図８】上ロックタイプのシェルフの正面図である。
【図９】空冷ファンユニットを除いた状態で上ロックタイプのシェルフを斜め下方からみた斜視図である。

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【図１０】図９のＥ－Ｅ矢視断面図及びそのＦ方向矢視図である。
【図１１】第１の実施の形態の空冷ファンユニットのシェルフへの取付方法を示す説明図である。
【図１２】第１の変形例にかかる空冷ファンユニットの構造を表す分解斜視図である。
【図１３】第１の変形例の特徴部分であるファン近傍の構造を表す斜視図である。
【図１４】第２の変形例にかかる空冷ファンユニットの構造を表す分解斜視図である。
【図１５】第２の変形例の特徴部分であるファン近傍の構造を表す斜視図である。
【図１６】第２の実施の形態にかかる空冷ファンユニットの特徴部分の概略構成を表す斜視図である。
【図１７】第２の実施の形態の特徴部分を有する把手の斜視図である。
【図１８】第２の実施の形態の空冷ファンユニットの取付方法を示す説明図である。
【図１９】第３の実施の形態にかかる空冷ファンユニットの特徴部分の概略構成を表す斜視図である。
【図２０】第４の実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。
【図２１】第４の実施の形態の特徴部分であるスタッドピンの構成を表す分解斜視図である。
【図２２】第４の実施の形態の特徴部分であるロックブッシュの構成を表す説明図である。
【図２３】第４の実施の形態のスタッドピンとロックブッシュとの係止部を表す斜視図等である。
【図２４】第４の実施の形態の空冷ファンユニットを構成するフロントパネルの構造を表す説明図である。
【図２５】第４の実施の形態の空冷ファンユニットを構成するフロントパネルの構造を表す説明図である。
【図２６】第４の実施の形態の変形例にかかるロックブッシュの構成を表す斜視図ある。
【図２７】第５の実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。
【図２８】第５の実施の形態の空冷ファンユニットの組付構成を表す説明図である。
【図２９】第６の実施の形態にかかる空冷ファンユニットの概略構成を表す斜視図である。
【図３０】第６の実施の形態の空冷ファンユニットの分解斜視図である。
【図３１】第６の実施の形態の空冷ファンユニットの構成を表す説明図である。
【図３２】第７の実施の形態にかかる空冷ファンユニットの概略構成を表す分解斜視図である。
【図３３】第７の実施の形態の空冷ファンユニットを構成するケーシングの構造を表す説明図である。
【図３４】第７の実施の形態の空冷ファンユニットにおいて、ケーシングからカバーを取り外す手順を表す説明図である。
【図３５】第７の実施の形態の空冷ファンユニットにおいて、ケーシングからカバーを取り外す手順を表す説明図である。
【図３６】第７の実施の形態の変形例にかかるケーシングの構造を表す説明図である。
【図３７】従来の空冷ファンユニットの構造の一例を表す分解斜視図である。
【符号の説明】
【０１６０】
１，２０１，４０１，５０１，６０１，７０１　空冷ファンユニット
２　ファン
３，２０３，３０３，４０３，５０３，６０３，７０３　ケーシング
４，２０４，６０４，７０４　カバー
２１　ファンケーシング

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３１，４１　通風孔
５０，１５０，２５０　ゴムブッシュ
６０，２６０　把手
７０，２７０，３７０　係止部
７１，２７２，３７１　鍔部
７１ａ　スリット
７２，７３，３７２，３７３　係止爪
８０，１８０　シェルフ
８１，１８１　ファンユニット挿入口
８２，１８２，２８２　上梁
８３，２８３　下梁
８５，１８５，２８５　係止孔
９０　ガイドレール
２６２　カバー部材
４０４　フィンガーガード
４１０　スタッドピン
４１３　スリット
４１５　回転ピン
４２０　ロックブッシュ
４２１　ロックブッシュ本体
４２１ａ　貫通孔
４２１ｂ　係止溝
４２１ｃ　斜面
４３１　嵌合凹部
４６０　フロントパネル
４６２　把手
４６３　係止部
４６７　鍔部
５０４ｂ　ファン収容部
５２０　固定用ブッシュ
５５１　嵌合凹部
６１２，６２１　通風孔
６１６　ガイド
６１７　嵌合凹部
６６０　フロントパネル
７１４　係止部
７１５，７４１　通風孔
７４７　押えカバー
７５０　固定用ブッシュ

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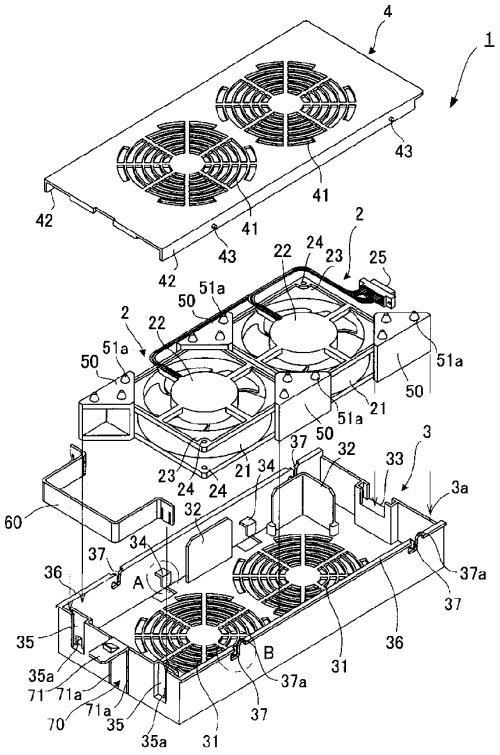
【図１】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1
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35a
71
71a
70
31
B

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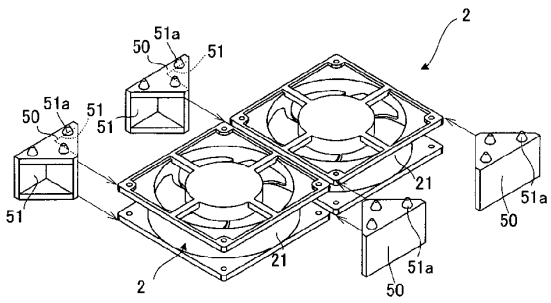
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51
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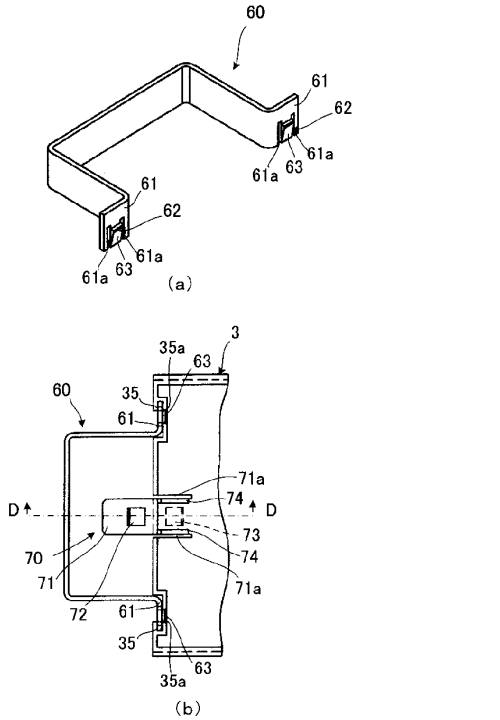
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61
62
61a
63
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3
35a
35
71a
74
D
73
70
71
72
(b)

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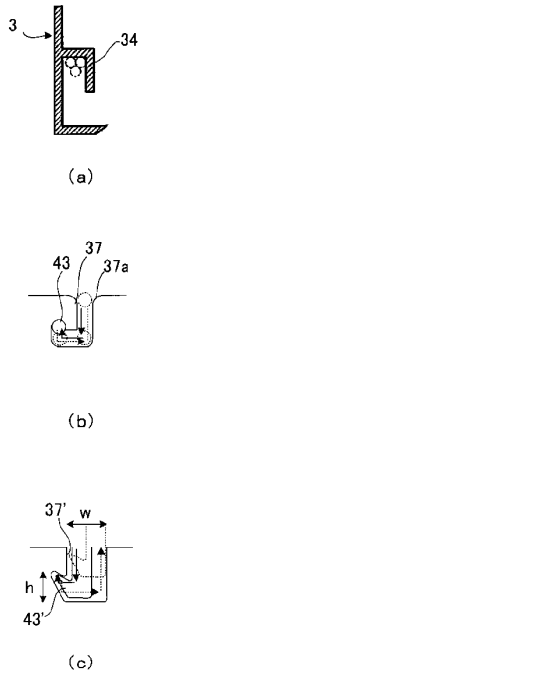
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34
(a)
43
37
37a
(b)
37'
w
h
43'
(c)

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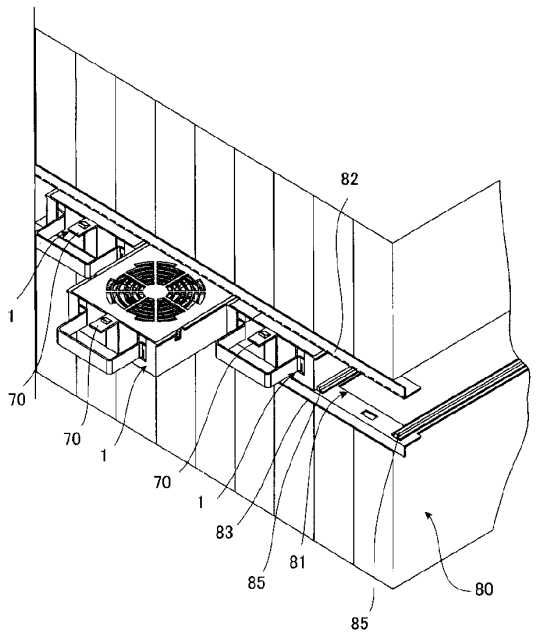
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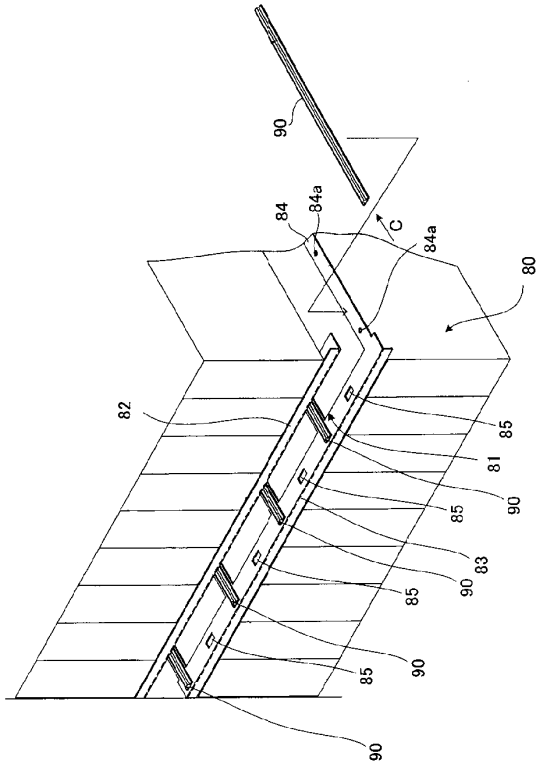
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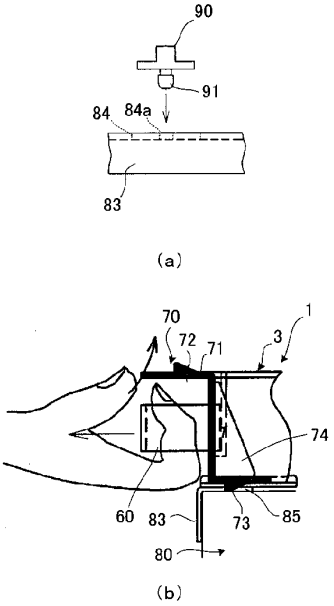
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73
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80
(b)

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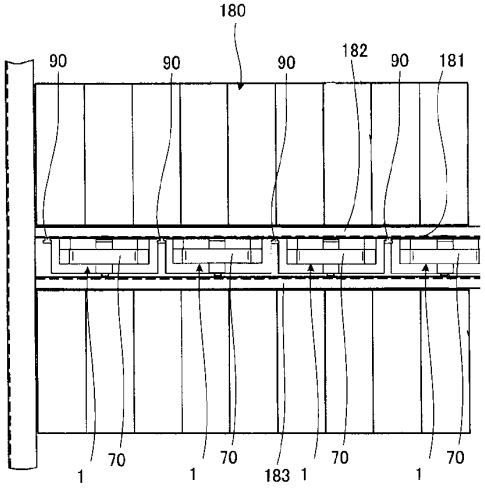
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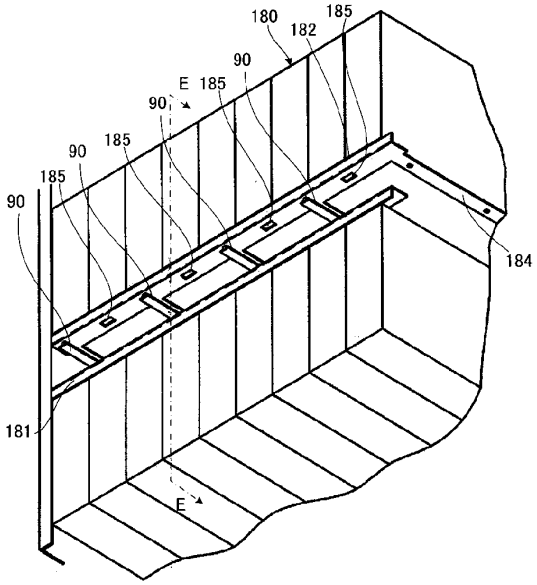


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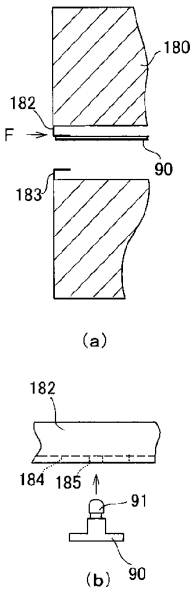


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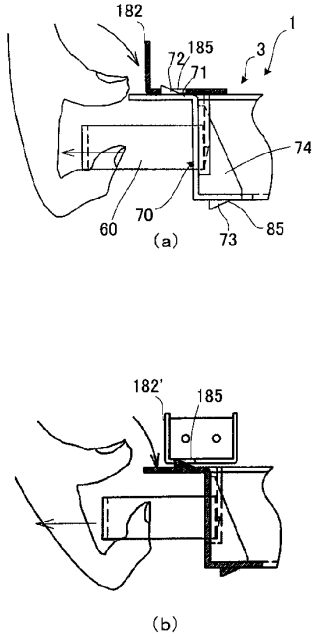


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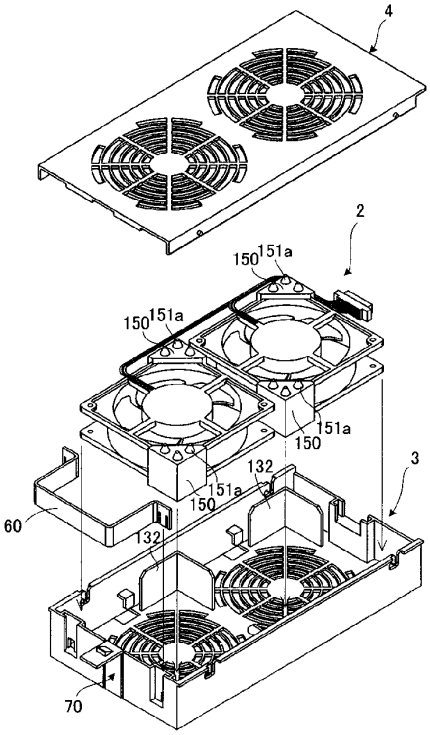

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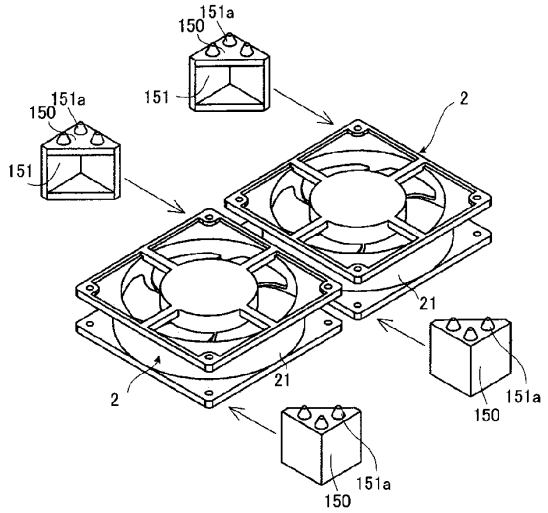


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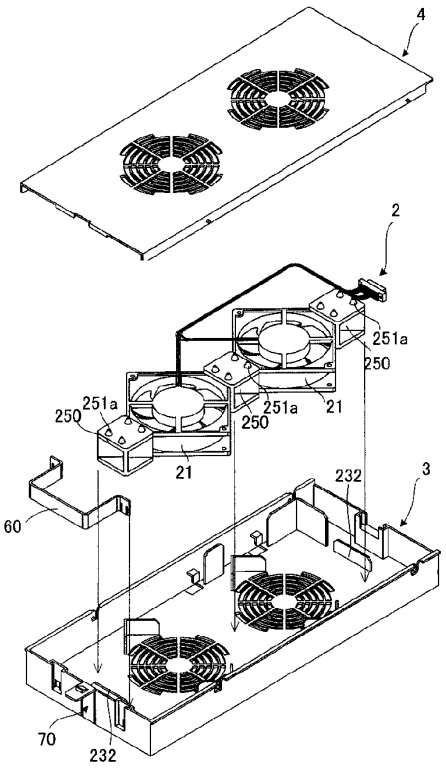


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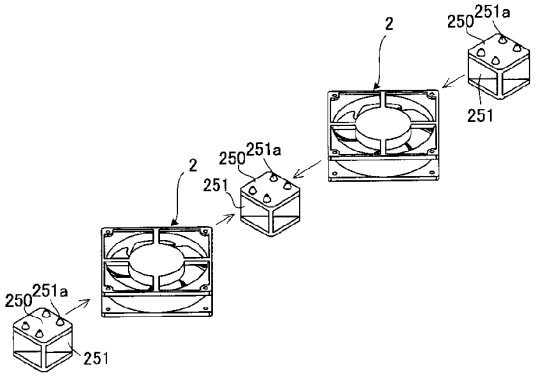


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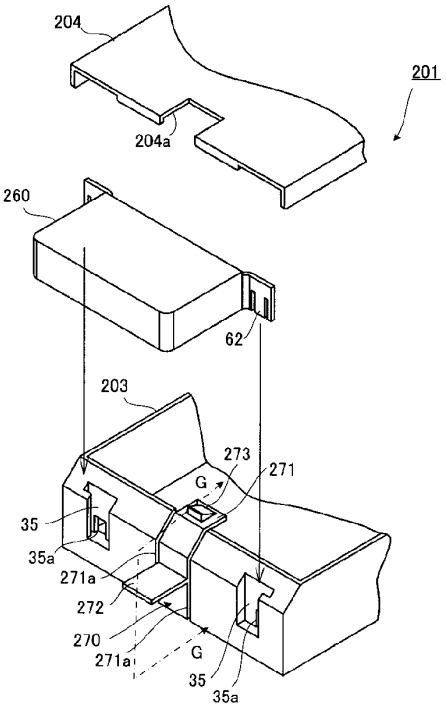

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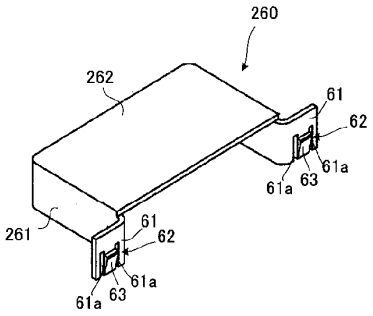


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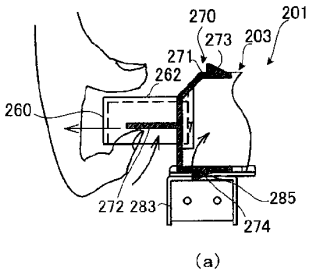


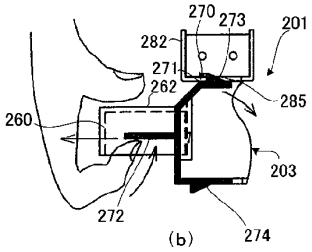


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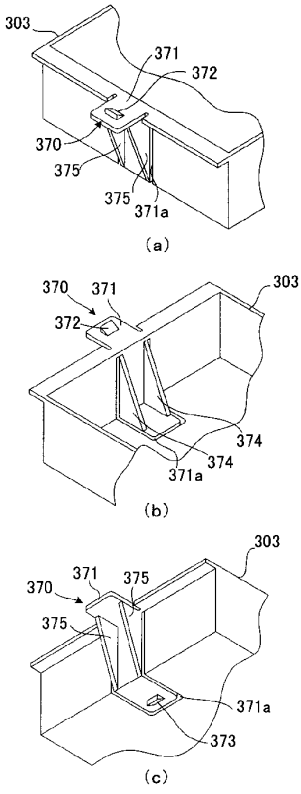


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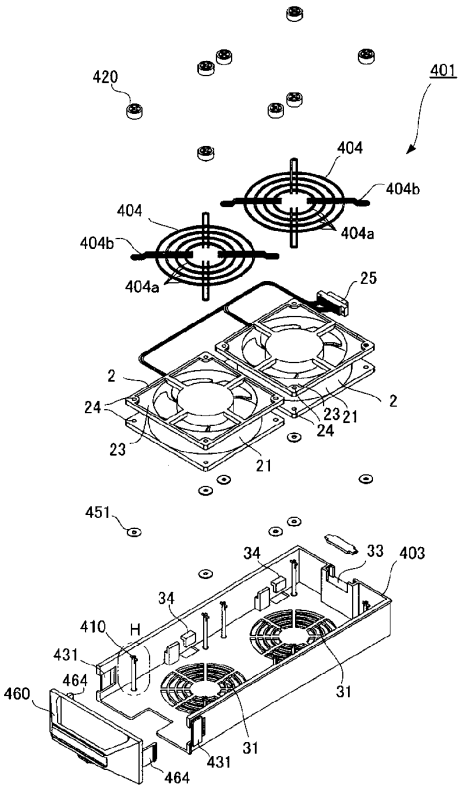

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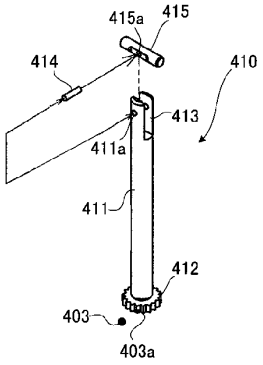


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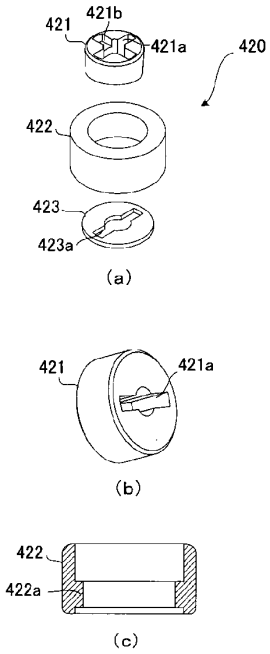


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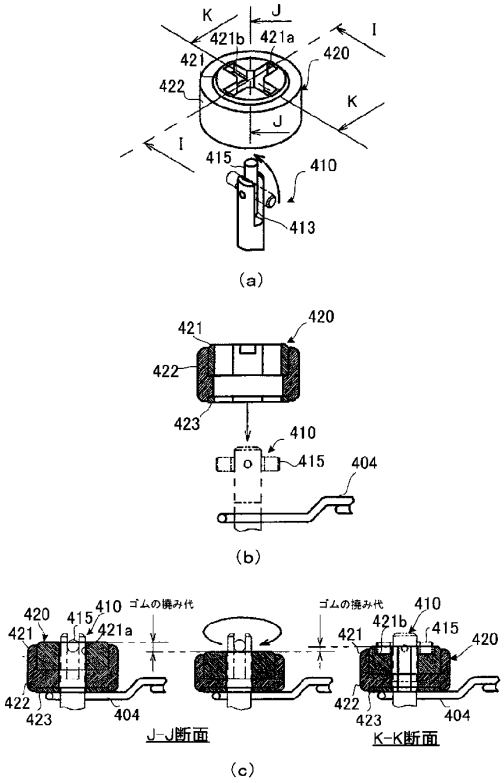


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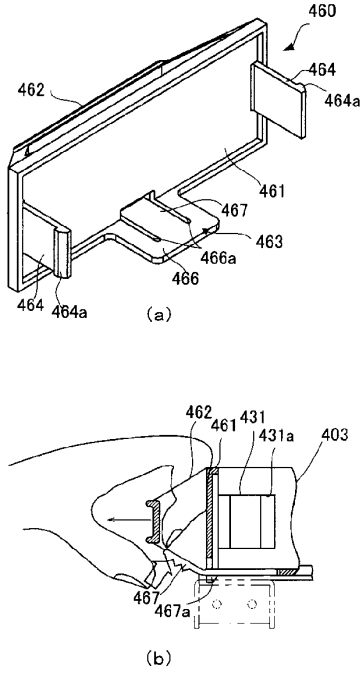

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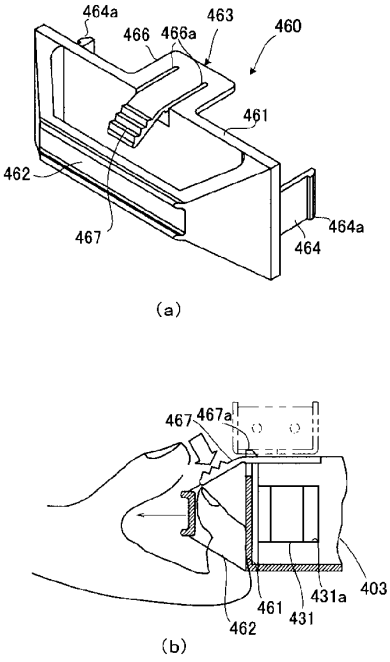


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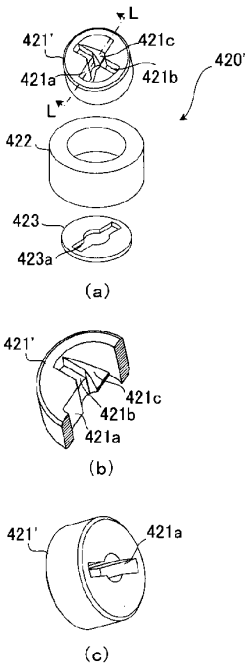


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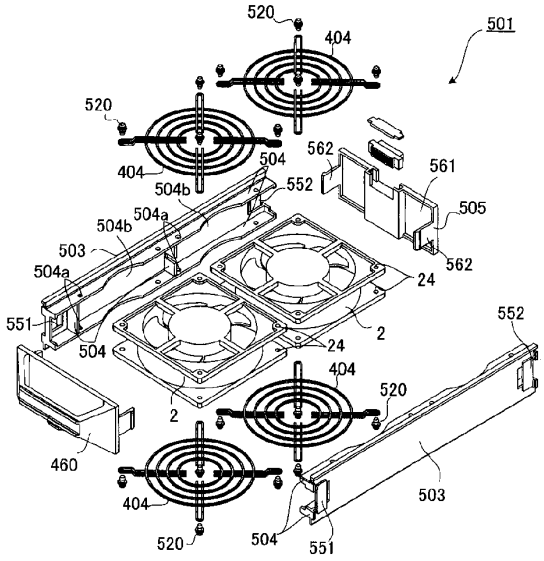


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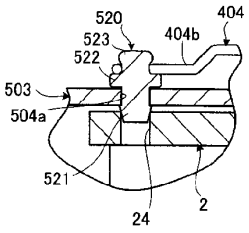

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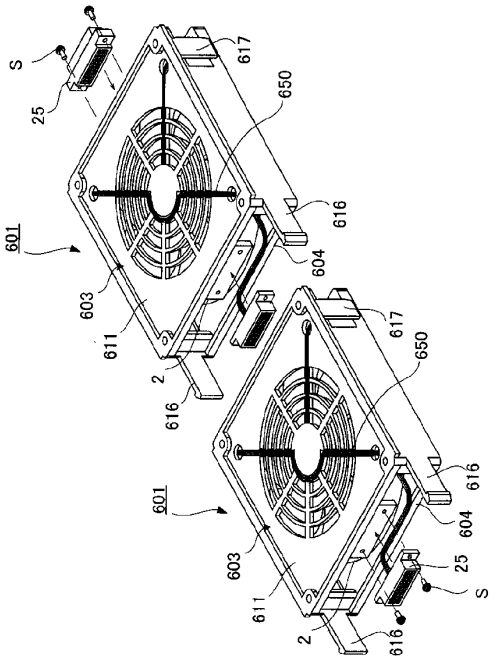


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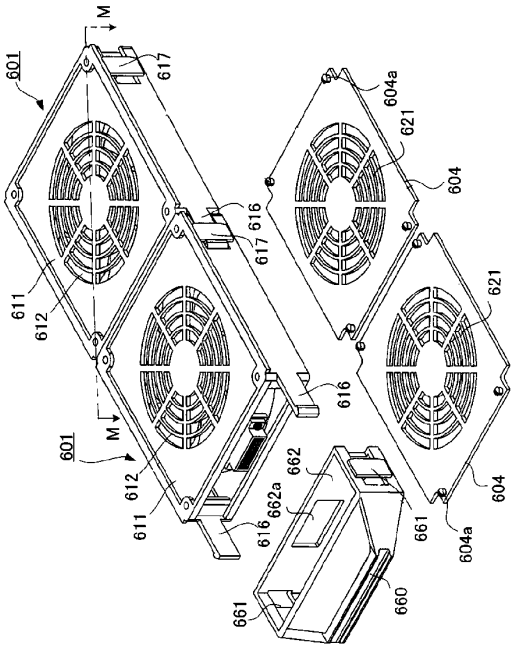


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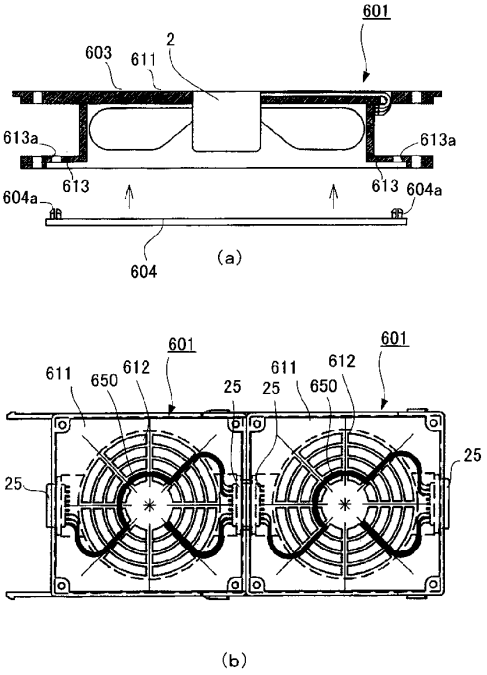


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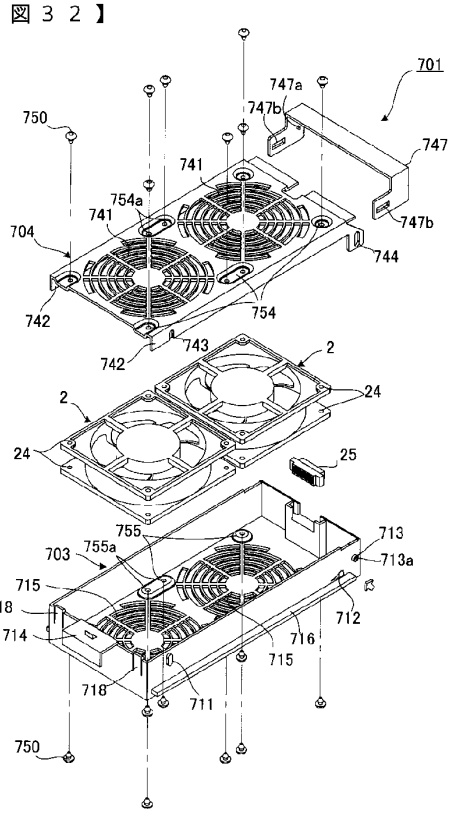

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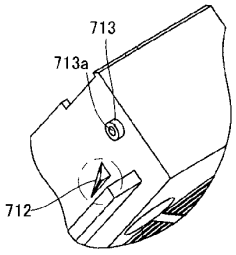


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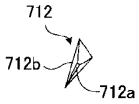
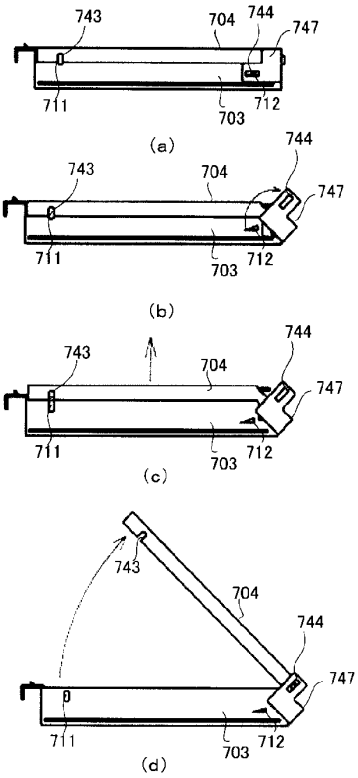



(b)

【図３４】

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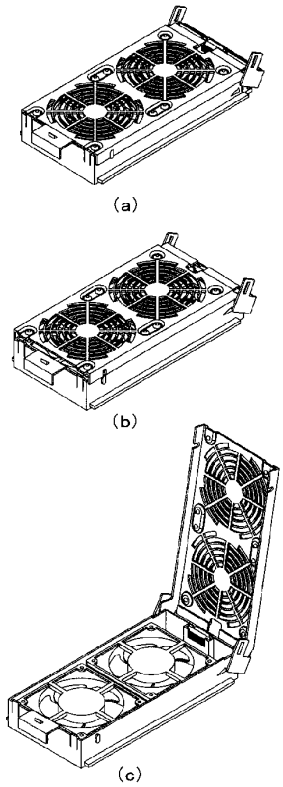
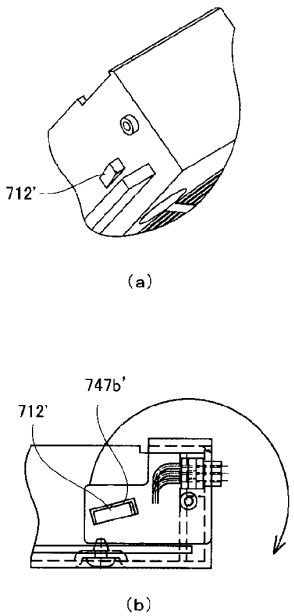


(a)

(b)

(c)

【図３６】



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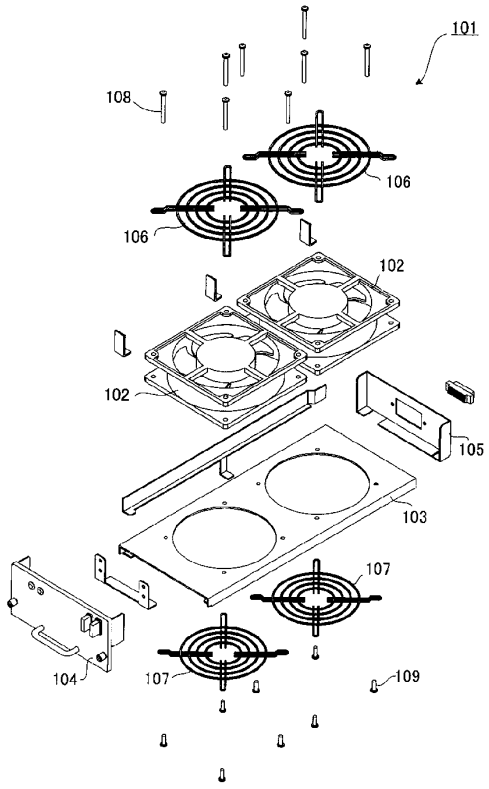

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Ｆターム(参考) 5E322 AB04 BB03
5F036 AA01 BA04 BB35

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 90/019,565 | 07/02/2024 | 10690336 | 16445.0001-00000 | 5828 |

37705 7590 02/04/2025

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| EXAMINER |
|---|
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| ART UNIT | PAPER NUMBER |
|---|---|
| 3993 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 02/04/2025 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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# *EX PARTE* REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,565* .

PATENT UNDER REEXAMINATION *10690336* .

ART UNIT *3993* .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### *Service of Papers*

After the filing of a request for reexamination by a third part requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 C.F.R. 1.248. *See* 37 C.F.R. 1.550(c).

### *Submissions*

Submissions after this Office action will be governed by the requirements of 37 C.F.R. 1.116 after final rejection and by 37 C.F.R. 41.33 after appeal, which will be strictly enforced.

### *Amendment in Reexamination Proceedings*

Patent Owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 C.F.R. 1.52(a) and (b), and must be accompanied by any fees required by 37 C.F.R. 1.20(c). *See* MPEP § 2250, subsection IV, for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

***Notice of Concurrent Proceedings***

Patent Owner is reminded of the continuing responsibility under 37 C.F.R. 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the patent throughout the course of this reexamination proceeding. Likewise, the third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. *See* MPEP §§ 2207, 2282, and 2286.

***Brief Description of the Proceedings***

The Third Party Requester (TPR) requested reexamination of claims 1-5 of U.S. Patent No. 10,690,336 (hereinafter the '336 patent) based upon the following proposed rejections:

**Ground 1:** Claims 1-4 are unpatentable in light of Fujitsu (JP 2018041147 A, hereinafter Fujitsu) in combination with Tsai (CN 207064277 U, hereinafter Tsai).

**Ground 2:** Claim 5 is unpatentable in light of Fujitsu in combination with Tsai and Chou et al. (US 2008/0279694 A1, hereinafter Chou).

**Ground 3:** Claims 1, 2, and 4 are unpatentable in light of Lai (US 2017/0314777 A1, hereinafter Lai) in combination with Fujitsu.

**Ground 4:** Claim 5 is unpatentable in light of Lai in combination with Fujitsu and Chou.

An order was mailed on July 18, 2024, finding that Grounds 1-4 above raised a substantial new question of patentability (SNQ). In a letter filed July 29, 2024, Patent Owner (PO) waived the right under 37 C.F.R. 1.530 to file a Patent Owner Statement.

A non-final Office action was mailed on October 17, 2024. In the response filed December 17, 2024, Patent Owner presented arguments with respect to the rejections of claims

1-5, amended claim 4, and introduced new claims 6-48. New claim 41 is independent. Claims 1-48 are now pending in this reexamination proceeding.

***Response to Arguments and Declaration***

The examiner notes that the Declaration of David B. Tuckerman, Ph.D., filed December 17, 2024, (hereinafter, Declaration) is based on opinions and arguments similar to those reflected in Patent Owner's Remarks filed December 17, 2024 (hereinafter, Remarks). The Remarks and the Declaration will be addressed together under this heading.

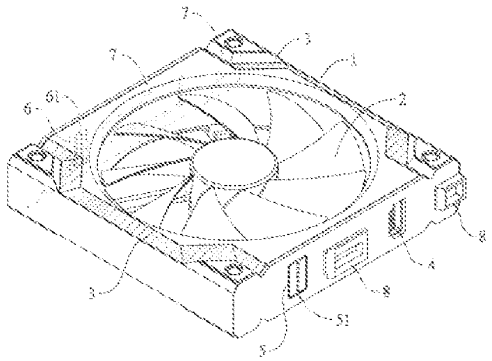
*1. The '336 Patent - Claim Interpretation*

In the Remarks filed December 17, 2024 (hereinafter, the Remarks), under the heading "Overview of '336 Patent," Patent Owner construes the term "top of the body" to refer specifically to a top surface or a front face of the body. *See* Remarks, pg. 12-16 and 21 (arguing at pg. 21 that "top of the body" refers to "the front face of the fan body"); and Declaration, ¶ 24. Patent Owner construes the term "side of the body" to refer specifically to one of four lateral-facing side surfaces of the body that is perpendicular to the rotational axis of the fan. *See* Remarks, pg. 12-16; Declaration ¶ 24. However, the claims are not so limited, nor does the patent specification define the phrase "side of the body" with such precision or specificity. Rather, the claim states only that the fan includes "a first connector on one side of the body, and a second connector on another side of the body." In reexamination, claims are given the broadest reasonable interpretation consistent with the specification; limitations in the specification are not read into the claims. *See In re Yamamoto*, 740 F.2d 1569, 222 USPQ 934 (Fed. Cir. 1984). In this case, the patent specification restates the language of the claims (*see* col. 2:65-67) but does

not further define the term "side". There is no reference number in the drawings indicating what part(s) or region(s) of the body would fall within the scope of the term "side." It is consistent with the patent disclosure to interpret the term "side" as referring either to lateral sides or to lateral areas or regions of the body, either with respect to a central line through the body or with respect to the central fan axis, because the position of the first and second connectors (5, 6) shown in Figs. 1-2 is consistent with such usage and because the disclosure does not include any more precise definition of the term "side." Any of these interpretations would be consistent with dictionary definitions of the term "side," which include "one of the lateral surfaces of an object, as opposed to the front, back, top, and bottom" (*Random House Kernerman Webster's College Dictionary*, definition 3), "either of two lateral parts or areas of a thing" (*Id.*, definition 4), or "region, direction, or position with reference to a central line, space, or point" (*Id.*, definition 8). The interpretation of "side" according to either of the latter two definitions is also consistent with the language of the specification and claims describing the body as having a fan in center (*e.g.*, as the reference point from which the sides are defined), the first connector on one side, and the second connector on another side. Moreover, the examiner notes that claim 1 also uses the term "sides" in line 4 to refer to "at least two sides of the fan at the top of the body." The term "side" appears here to refer generally to lateral areas or regions rather than to precise surfaces, which argues in favor of a broad construction of the term "side" when interpreting the language of the patent claims. Patent Owner's argument that one of ordinary skill in the art "would have known that a fan body typically has four sides distinct from and adjacent to the top and the bottom" (Remarks, pg. 15; Declaration, ¶ 32) is not persuasive, because the scope of the invention is defined by the language of the claims, not by what is "typical" in the art. In this case, neither the claims nor the patent specification use the term "side" with such precision, as discussed above.

Patent Owner further argues that interpreting the term "side" to refer generally to a lateral area or region would make the term "top of the body" meaningless because half of the top of the body would be on one side and the other half of the top of the body would be on the other side. *See* Remarks, pg. 13; Declaration, ¶ 25-26. This argument is not persuasive because the terms "top" and "side" are not necessarily mutually exclusive, and there is nothing in the language of the claim to make them so. (For example, the claim does not recite a rectangular body having a top surface, a bottom surface, and four lateral side surfaces.) In other words, an area of the body could reasonably be considered to be both on top of the body and on one side of the body. For example, one could reasonably say that the illumination areas (3) of the disclosed illumination fan are on top of the body on two sides (*see* Fig. 1 below).

***Fig. 1 of the '336 Patent***



Patent Owner further argues that interpreting the term "side" to refer generally to a lateral area or region could render the claim indefinite depending on how the lateral areas or regions were divided. *See* Remarks, pg. 14-16; Declaration, ¶ 27-31. This argument appears to conflate breadth with indefiniteness. The examiner's interpretation of the term "side" is broader than the interpretation put forth by Patent Owner. However, breadth is not the same as indefiniteness. *See* MPEP § 2173.04, citing *In re Miller,* 441 F.2d 689, 169 USPQ 597 (CCPA 1971); *In re Gardner,* 427 F.2d 786, 788, 166 USPQ 138, 140 (CCPA 1970). Patent Owner's argument that a

broad reading of the term "side" would mean that the sides could be defined differently from what is recited in the claim is not persuasive because the invention is limited by the claim. In other words, the claim requires that the first connector is on "one side" and the second connector is on "another side," which is sufficient to exclude the "nonsensical" hypothetical examples (to use Patent Owner's term) put forth by Patent Owner in which both connectors are on the same side of the body or each connector is on both sides of the body (*see* Remarks, pg. 14-15).

2. *Claim 1 as anticipated by Lai or obvious over Lai in view of Fujitsu*[1]

The Declaration summarizes the disclosure of Lai, noting that Lai's disclosure is brief and pointing out alleged inconsistencies in Lai such as the number of nodes illustrated in the schematic view of Fig. 2 at the input (111) and output (112) as compared to the number of inputs and outputs illustrated in the circuit diagrams of Figs. 4-6, and the motor supply lines in Figs. 4-6 not being drawn in such a way as to connect through from the input to the output (though noting that one of ordinary skill in the art would infer that the motor supply lines Vfan and GND do connect from the input to the output). *See* Declaration, ¶ 42. The Declaration argues that, due to these alleged deficiencies, Lai teaches nothing to one of ordinary skill in the art. *Id.,* ¶ 43. In response, the examiner notes that a reference "is prior art for all that it teaches," even if that reference discloses an inoperative device. *Beckman Instruments v. LKB Produkter AB,* 892 F.2d 1547, 1551, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989). Here, the examiner is not persuaded that Lai discloses an inoperative device. In any case, Lai is prior art for all that it teaches, and the examiner notes that what Lai *does* teach is commensurate in scope with what is both claimed and disclosed in the '336 patent. Like Lai, the '336 patent is also brief. Moreover, unlike Lai, the

[1] Claim 2, although included in the heading of Section 2 of the Remarks, is substantively addressed in Section 4 of the Remarks, to which the examiner responds below.

'336 patent does not provide any circuit diagrams or electrical schematics whatsoever, nor does the '336 patent offer any explanation of how illumination is provided to the illumination areas (either structurally or functionally) or how the power socket is electrically connected with the first connector, the second connector, the fan, and the illumination area to accomplish the claimed results of driving the fan and illumination area of one or more fans into rotation and illumination. Rather, the specification of the '336 patent simply repeats the claim language (col. 1:53-2:2; col. 3:1-16), and the drawings show only the exterior appearance of the fans. For these reasons, even if Lai were considered to be incomplete in some respects, Lai provides sufficient teaching commensurate in scope with the broad language of the patent claims and accompanying patent disclosure.

a. Illumination area at top of body

Patent Owner argues that Lai's LEDs (16) are not located at the top of the body. *See* Remarks, pg. 19-22; Declaration, ¶¶ 45-50. In response, the examiner notes that claim 1 does not require LEDs located at the top of the body. Rather, claim 1 recites "an illumination area on at least two sides of the fan at top of the body." The term "illumination area" is interpreted to mean an area that is illuminated. The patent disclosure is silent with respect to the source of illumination in the illumination area, much less the location of the source of the illumination. For these reasons, the limitation "an illumination area on at least two sides of the fan at top of the body" does not require that the source of the illumination is located on the top of the body and would appear to encompass illumination areas which are lit from below (*e.g.*, from an LED within the body of the fan). The limitation "on at least two sides of the fan" could be interpreted, on one hand, as referring to two lateral regions of the illumination fan as a whole (*i.e.*,

interpreting "the fan" as referring to the "illumination fan" recited in the preamble), two lateral regions of the center fan (*i.e.*, the "fan" recited in line 3 of claim 1), or two lateral regions of the body defined with respect to the center fan. The term "top of the body" is interpreted as a relative positional term, referring to a part of the body that can be oriented upwardly. The term "top" is interpreted in view of the patent disclosure as encompassing an area of the fan that can be upwardly oriented. The term "top" is not necessarily limited to a specific topmost surface of the body. This interpretation is consistent with the disclosure of the '336 patent, which illustrates the illumination areas (3, Fig. 1) being recessed below a topmost surface of the body.

Turning to Lai, Lai discloses an illumination area that is illuminated by LEDs which are shown at reference number 16 in Fig. 2 and at reference number 11 in Fig. 3. The examiner recognizes that Lai teaches positioning the LEDs themselves on what Patent Owner characterizes as inward-facing circular walls, as shown in Fig. 3. However, the illumination area provided by the LEDs of Lai is considered to be "on at least two sides of the fan at top of the body" in the sense that the LEDs illuminate the center fan (10) on at least two lateral regions of the center fan in an upwardly oriented area of the body (*e.g.*, such that the illuminated area is visible from above when the fan is oriented as shown in Fig. 3).

In response to Patent Owner's argument that the LEDs of Lai would illuminate the fan rather than permitting "direct viewing of the LEDs" (Remarks, pg. 21; Declaration, ¶ 49). the examiner maintains that this argument is not commensurate in scope with the claims. Claim 1 explicitly recites the illumination area being "on at least two sides *of the fan* at top of the body," which is reasonably understood to encompass illumination of the fan itself. Neither the claims nor the patent disclosure describe direct viewing of LEDs. Patent Owner recognizes that the LEDs of Lai would direct light onto the fan blades in such a way as to "create frontal visibility of

the illumination" (*see* Declaration, ¶ 50; *see also* Remarks, pg. 21, citing the Declaration at ¶ 50 as including the phrase "create visibility of the illumination" but deleting the term "frontal"). Patent Owner states that the term "top" corresponds to a "front" of the fan. *See* Remarks, pg. 21:3-4; Declaration, ¶ 49:1-2. The statement in the Declaration that the LEDs of Lai would be reflected off of the fan blades and thus "create frontal visibility of the illumination" is understood to mean that the area subject to illumination by the LEDs includes at least two sides of the fan at the top/front of the fan body, which the examiner believes to be all that is required by the recitation of "an illumination area on at least two sides of the fan at top of the body."

In response to Patent Owner's argument that "an illuminated area being visible in a top view is not the same as an illumination area being physically located at the top of the body" (Remarks, pg. 21; Declaration, ¶ 50), the claim language does not clearly require that the "illumination area" is a structural component that is physically located at the top of the body. Rather, the term "illumination area" is reasonably interpreted as encompassing an area that is illuminated, rather than a particular source of illumination, as discussed above. This interpretation is consistent with the patent disclosure, which shows a recessed illumination area (3) without disclosing the source (or the location of the source) of the illumination.

b. Power socket and first connector on one side and second connector on another side

Patent Owner argues that Lai does not disclose any socket or connector. *See* Remarks, pg. 22-24; Declaration, ¶ 51-56. The examiner notes that the claim term "power socket" is interpreted as referring to an opening for making an electrical connection for transmission of power. The term "connector" is interpreted to mean a thing that connects. It is a broad term. Lai clearly teaches that the illumination fan (10) is configured for transmission of power between the

controller (20) and the illumination fan (10). This is plainly evident both from the functions of the fan described through Lai's specification (*see, e.g.*, ¶¶ 3 and 11-16) and from the circuit diagrams (Figs. 4-6), which each illustrate an input power supply at "VDD" for connecting a fan (10) to a controller (when the fan is configured as FAN 1, Figs. 4-6) or to an adjacent fan (when the fan is configured as FAN 2, Figs. 4-6).[2] Fig. 3 of Lai shows a window or opening (*i.e.*, a socket) in one side of each fan body, specifically in one lateral-facing side surface of the fan body, for connecting a transmission line from the controller (at 13 in Fig. 3) or from an adjacent fan (at 12 in Fig. 3) to the fan input in order to supply power to the fan(s), which corresponds to a power socket as claimed. As shown in Figs. 4-6, each fan (10) includes additional input connections on one side of the fan (10), indicated by the open circles in the lines connecting the input of the fan (at left of each fan 10 in Figs. 4-6) either to the output of the controller (when the fan is configured as FAN 1) or to the output of an adjacent fan (when the fan is configured as FAN 2), in addition to the VDD connection discussed above. Any one of these connections would read on the first connector as broadly claimed. On the opposite side of each fan are corresponding output connections (*e.g.*, at Dout or Vfan shown at right of each fan in Figs. 4-6). Any of these corresponding connections would read on the second connector as broadly claimed.

Patent Owner also argues that the conditional claim language "when the first connector of the body is connected with a second connector of a body of another illumination fan" necessarily requires both a connected state and a disconnected state and argues that Lai does not teach both connected and disconnected states. *See* Remarks, pg. 23; Declaration, ¶ 54. In response, the examiner notes that the claim does not recite a disconnected state, and the conditional claim language does not require a disconnected state. The claim is directed to a single illumination fan.

[2] The examiner notes that a clearer copy of Lai's figures is available in Taiwanese Patent No. M528403 to Lai, supplied with this Office action for Patent Owner's convenience.

The conditional limitation describes a function that occurs under the condition of the first connector of the fan being connected to a second connector of another fan. The examiner finds nothing in this limitation that requires the connection to be disconnectable. In other words, the term "when" could reasonably cover all states of the fan (*e.g.*, the "when" clause being always satisfied). Lai clearly teaches two fans in a connected state, as shown in Figs. 3-6. Moreover, the examiner finds nothing in Lai to suggest that two adjacent fans must be permanently and irreversibly connected, which appears to be what Patent Owner is suggesting. The schematic drawing of Fig. 2 shows the single output (112) of the fan which is not connected to a second fan. Even if *arguendo* a disconnected state were required, the illumination fan of Lai would be in a disconnected state prior to being assembled in series with other fans. The fan output is understood to be connected to a second fan when in use, as shown in Fig. 3 (the fans being connected by transmission line 12) and in the circuit diagram of Figs. 4-6 discussed above.

Patent Owner emphasizes Lai's use of the word "single" to describe the input (111) and output (112) of each illumination fan (10) and the transmission lines (12, 13) between the controller (20) and the fan (10) and between adjacent fans. *See* Remarks, pg. 24; Declaration, ¶ 56. The single input (111) and single output (112) are shown in the schematic view of Fig. 2. The transmission lines (12, 13) are shown in Fig. 3. One of ordinary skill in the art would understand from Lai's disclosure, considered as a whole, that the single input (111) and single output (112) each include multiple connectors -- *e.g.*, the VDD connectors, the Din/Dout connectors, the Vfan connectors, etc., as discussed above. The claim does not exclude a power socket and a first connector that are collocated in the manner described by Lai. With respect to the transmission lines, it would be readily apparent to one of ordinary skill in the art that the "single transmission line" of Lai would include multiple wires (*e.g.*, as a bundled cable) for making the multiple

connections shown in the circuit diagrams, without having to "split [the transmission line] in two" as argued by Patent Owner (Remarks, pg. 24; Declaration, ¶ 56).

Patent Owner further argues that Lai teaches the input (111) and output (112) being on the same side of the body (not on "one side" and "another side" as recited in the claim) due to the arrangement of the input and output shown in Fig. 2. *See* Remarks, pg. 24-26; Declaration, ¶¶ 57-58. In response, the examiner notes first that Fig. 2 is "a schematic view" (Lai, ¶ 6) showing wiring from six nodes at the "single input" and six nodes at the "single output" to a plurality of LED's and to the central fan. Because Fig. 2 is a schematic, Fig. 2 is not definitive with respect to the physical location of the inputs and outputs on the fan body. In contrast, Fig. 3 shows "a planar view" that more clearly shows the external appearance of the fan body. Fig. 3 shows a window or opening on one side of the first fan body (specifically, on one lateral-facing side surface of the fan body) through which the controller (20) is connected to the first fan (10) via the transmission line (13). Fig. 3 shows a second transmission line (12) extending from another side of the first fan body (specifically, another lateral-facing side surface of the fan body) to connect the first fan (10) to a second fan (10). One of ordinary skill in the art would reasonably understand Fig. 3 to teach locating the power socket and the first connector (*e.g.*., the fan connections for connecting the first fan to the controller 20 via the transmission line 13) on a side of the fan body that is opposite the second connector (*i.e.*, the fan connections for connecting to the second fan 10 via the transmission line 12) on another side of the body, so that the fans can be readily connected in a series as shown in Fig. 3 without having to wrap transmission lines around the exterior of the fan bodies (this being Lai's improvement over the prior art as illustrated in Fig. 1; *see* ¶ 2). The examiner recognizes that, like the schematic of Fig. 2, the circuit diagrams of Figs. 4-6 also do not definitively show the physical locations of the

connectors. However, considering Lai's disclosure as a whole, particularly in view of Fig. 3 as discussed above, one of ordinary skill in the art would understand that positioning the collocated power socket and first connector on one side of the body and the second connector on another side of the body would be a suitable solution for accomplishing the serial connection taught by Lai.

In this context, Patent Owner appears to argue that the word "on" in the phrases "on one side" and "on another side" requires that the recited features be positioned on an outer surface of the respective sides, as opposed to being recessed within the surfaces (arguing that the input 111 and output 112 of Lai are not "on" the side in question but are instead "behind" the side; *see* Remarks, pg. 25-26; Declaration, ¶¶ 57-58). This appears to the examiner to be an overly narrow interpretation of the word "on," particularly in view of the '336 patent disclosure which shows that, in the disclosed embodiment, the socket "on" the one side is recessed within (or "behind") the side. *See* power socket 4 in Fig. 1 of the '336 patent. The windows in Lai's fan body that open to the sides of the body, specifically, to the lateral-facing side surfaces of the body as shown in Fig. 3, are reasonably understood to be on the respective sides of the body as claimed.

Patent Owner further argues that the circuit diagrams of Figs. 4-6 do not include any elements corresponding to the single input (111) or single output (112) because the circuit diagrams show communication pathways, not spatial positioning. *See* Remarks, pg. 26-27; Declaration, ¶ 59-60. While the examiner recognizes that the circuit diagrams do not show spatial positioning, the examiner maintains that one of ordinary skill in the art would reasonably conclude that the circuit diagrams of Figs. 4-6 show the communication pathways that correspond to the single input (111) and single output (112) of the illumination fan that are schematically illustrated in Fig. 2, for connection by transmission lines (12, 13) as shown in Fig.

3, since Figs. 2-6 of Lai are all directed to illustrating the LED fan of Lai's invention (*see, e.g.,* ¶¶ 6-10, which describe Figs. 2-6 as respectively showing a schematic view, a planar view, and circuit diagrams "according to the present invention"). Figs. 4-6 are therefore informative as to the multiple connections between the controller, a first fan, and a second fan that define the communication pathways for power and data transmission to the LEDs and center fan via the input, output, and transmission lines when the controller and fans are connected in series. It is the examiner's position that the spatial arrangement of the inputs "on one side of the body" and the outputs "on another side of the body" is most clearly shown in the planar view of Fig. 3.

c. Power socket electrically connected with the first connector

Patent Owner argues that because the power socket and the first connector of Lai are distinct connections within the single input, they cannot be electrically connected without short circuiting. *See* Remarks, pg. 28-29; Declaration, ¶¶ 62-63. As a preliminary matter, the examiner notes that the '336 patent disclosure does not provide any special definition of the phrase "electrically connected" or explain how or in what sense the power socket and first connector are electrically connected. The phrase "electrically connected" is interpreted according to its plain and ordinary meaning to mean that the power socket and first connector are connected as part of a functioning electrical circuit. In Lai, the power socket (voltage supply as at VDD, Figs. 4-6) is understood to be electrically connected to the first connector (*e.g.*, Din or Vfan) because they are both part of the functioning circuit of the fan. The examiner finds no evidence or persuasive reasoning in support of Patent Owner's position that the phrase "electrically connected" requires cross-wiring of the power socket and the first connector.

d. When first connector is connected with second connector of another fan, a fan and illumination area of the other fan are respectively driven into rotation and illumination

Patent Owner argues that the first connector of Lai is a signal line that is not supplied with power from the power socket. *See* Remarks, pg. 29-30; Declaration, ¶¶64-69. In response, the examiner notes that both the claim and the '336 patent disclosure as a whole are silent with respect to the manner in which the functional limitations are accomplished "when the first connector is connected with the second connector of another fan." For example, the '336 patent disclosure does not show or describe how the power socket, first and second connectors, fan, and illumination area are electrically connected to achieve the claimed function. The '336 patent disclosure includes no circuit diagrams or written explanation to further define this function or explain how it is accomplished. The '336 patent disclosure thus provides no special definitions for any of the terms or relationships described in the conditional functional limitation. Patent Owner's arguments appear to assume some specific electrical relationship between the power socket, first and second connectors, fan, and illumination areas that is neither claimed nor disclosed. Considering the breadth of the claim language and the silence of the patent disclosure, the conditional functional limitation is interpreted to mean only what it says -- that when the first connector is connected with a second connector of another fan, then a fan and illumination area of the other fan are respectively driven into rotation and illumination. That is clearly what occurs when one fan of Lai is connected to another fan of Lai. When the first connector of one fan (10) is connected to the second connector of another fan (10), for example, via a transmission line (12) as shown in Fig. 3, both fans rotate and light up under the control of the LED fan controller

(20; "an LED fan controller device can adjust each individual LED light on multiple LED fans while simultaneously control all fan speeds too," ¶ 16).

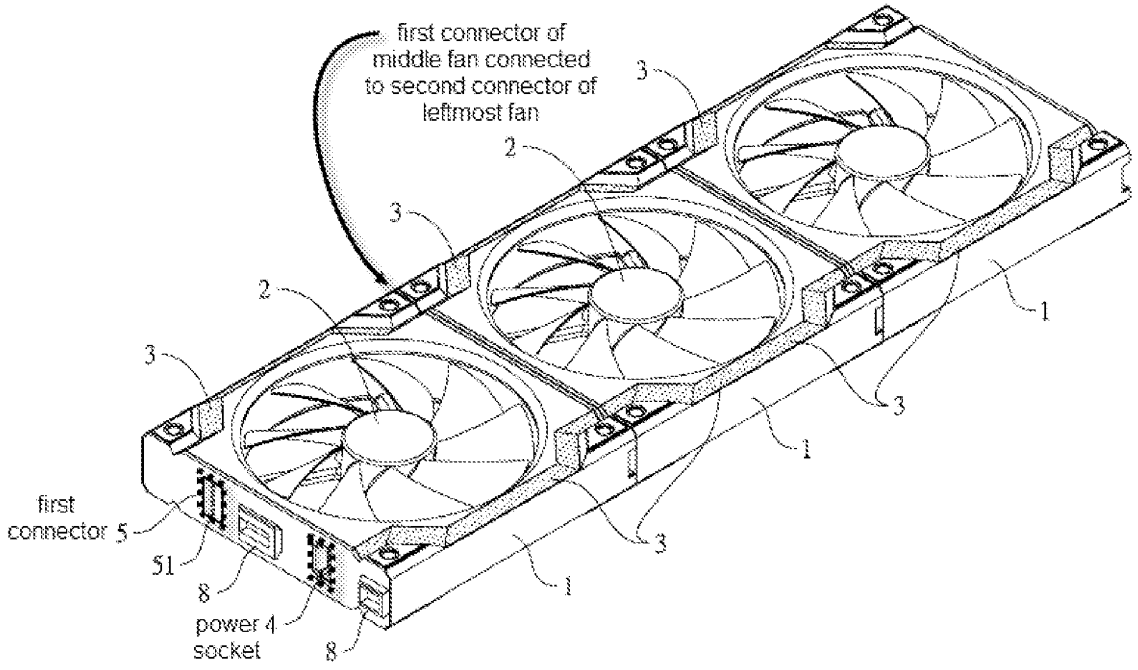
Patent Owner further argues that the second connector of a second fan would be too far away from a first connector of another fan to be connected to each other, identifying the positively claimed fan as the fan on the left in Fig. 3 and functionally claimed "another illumination fan" as the fan on the right in Fig. 3. *See* Remarks, pg. 30-31; Declaration, ¶¶ 65-68/ Patent Owner's arguments appear to lose sight of the fact that the claim is directed to a single fan with a power socket and first and second connectors. In Lai, the power socket of the fan is understood to be supplied with power when the fan input is connected *either* to the controller (as at transmission line 13 in Fig. 3, when the fan is configured as FAN 1) *or* to the output of a second fan (as at transmission line 12 in Fig. 3, when the fan is configured as FAN 2), depending on whether the fan is connected directly to the controller (as is the case with the leftmost fan in Fig. 3) or indirectly to the controller via another fan (as is the case with the rightmost fan in Fig. 3). When connecting multiple fans in series as shown in Fig. 3 of Lai, a first connector (*i.e.*, an input) of one fan is connected to an adjacent second connector (*i.e.*, an output) of another fan. This type of connection is shown at transmission line 12 in Fig. 2, which connects the input of the rightmost fan to the output of the leftmost fan.

Patent Owner's suggestion of connecting the *non-adjacent* inputs and outputs of two fans appears to arise from the somewhat vague conditional limitations in claim 1, which appear to describe two different conditional use scenarios. Claim 1 includes the following two conditional "when" clauses:

- "when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination" in lines 9-11; and
- "when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination" in lines 12-14.

Fig. 3 of the '336 patent shows connected fans. Using Fig. 3 for reference, the first "when" clause is understood to refer, for example, to a fan configuration in which power is supplied to the power socket (4) of the positively claimed fan, corresponding to the configuration of the leftmost fan in Fig. 3. When power is supplied to the power socket (4) of the leftmost fan, then the fan and illumination area of that fan are respectively driven into rotation and illumination. The second "when" clause, by contrast, appears to refer to a different configuration in which, instead of supplying power to the power socket of the positively claimed fan, the first connector (5) of the positively claimed fan is instead connected to a second connector of another fan (and, presumably, a power socket of the "another fan" is supplied with power), corresponding to the configuration of the middle fan in Fig. 3. *See* annotated Fig. 3 below.

***Fig. 3 of the '336 Patent***
*(Annotated by Examiner)*




The claim description of two different conditional use scenarios appears to have led to some confusion reflected in Patent Owner's Remarks as to which connector of which fan is connected to which connector of which other fan. It is the examiner's position that Lai teaches an illumination fan having all of the structural features as claimed, and that the illumination fan of Lai is configured in such a way that the conditional functional limitations are satisfied when the power socket at the input of the illumination fan is supplied with power and when the input connectors of the illumination fan are connected to the output connectors of another illumination fan, as discussed in detail above.

On pg. 31 of the Remarks (and corresponding ¶ 67-68 of the Declaration), Patent Owner reiterates the position that the conditional limitation "when the first connector … is connected with a second connector" necessarily requires a disconnected state. The examiner disagrees with

this position for the reasons discussed above. Patent Owner asserts that the illumination fans of Lai are "permanently connected via the 'single transmission line 12'." Remarks, pg. 31; Declaration, ¶ 68. The examiner finds no evidence to support this interpretation of Lai. To be clear, it is the examiner's position that the claim language does not require a disconnected state; however, even if *arguendo* the claim were to be construed as requiring a disconnected state, then Lai appears to disclose such a state by virtue of the fact that the fans are each individual fans assembled together into a series of fans, and if not disconnectable then at the very least existing in a disconnected state prior to assembly.

e. Fujitsu - power socket and first connector on same side

Relevant to the proposed combination of Lai and Fujitsu, Patent Owner asserts that Fujitsu is not analogous art, arguing that Fujitsu is not in the same field of endeavor as the claimed invention and is not reasonably pertinent to the problem confronting the inventor. The Declaration asserts that the claimed invention is in the field of "illumination fans for personal computers" while Fujitsu is in the art of "cooling fans for high-reliability high-end servers." Declaration, ¶ 76. (*See also* Remarks, pg. 43-44, where this issue is discussed in the context of the proposed combination of Fujitsu and Tsai.) In response, the examiner notes that Patent Owner's arguments too narrowly define the respective fields of endeavor. With respect to the field of endeavor of the '336 patent, the Background of the Invention in the '336 patent states:

> Moreover, more attention has been focused on **heat dissipation inside the housings of the computers with increased demands for higher specifications of the computers.** Therefore, fans are usually provided during assembly to dispel heat accumulated inside a housing to the outside. However, each fan has to be connected to the power supply through an independent power cable, so the number of fans that can be assembled is limited by the finite number of connections available on the power supply. **Thus in turn limits the efficiency of heat dissipation. Furthermore, the additional wire inside the housing makes cable routing and management more cumbersome.**

Col. 1:29-40 (emphasis added).

With respect to the problem confronting the inventor in the '336 patent, the Summary of the Invention in the '336 patent further states:

> In view of the above shortcomings and problems, the inventor, through years of continued research and improvements int eh field, has finally come up with the present invention that **improves efficiency of heat dissipation inside a computer housing** unlike the structures of the prior art.

Col. 1:44-49 (emphasis added).

Considering the disclosure of the '336 patent, it is reasonable to say that the field of endeavor of the '336 patent is heat dissipation fans for computers and that the problem confronting the inventor was efficiency of heat dissipation inside a computer housing and improved cable routing and management.

Turning to Fujitsu, Fujitsu states: "The present invention relates to an electronic device, a cooling fan controller, a cooling fan control program, and a cooling fan controlling method." Fujitsu, ¶ 1. Fujitsu states that "[t]he electronic device is not limited to a server, and can be a device that includes various electronic apparatus such as information processing device, communication device that ought to be cooled." *Id*, ¶ 25. With respect to the problem to be solved, Fujitsu is similarly concerned with cooling efficiency, stating:

> On the other side, because cooling efficiency and lower power consumption is desirable in the servers in the recent years, rotation speed control or state monitoring of each fan unit is performed by a management and monitoring unit of the entire server. Accordingly, it is conceivable to physically connect a control signal line of each fan unit to the management and monitoring unit to identify and control each fan unit inside the server casing. **However, because the number of signal lines must be wired in accordance with the number of installed fan units in such a configuration, wiring of the signal lines becomes difficult as the number of installed fan units increases.**
>
> To solve such a problem, in a structure in which the fan units are hot-swappable by sliding operation as explained above, **it is possible to adopt a serial interface capable of monitoring and controlling the fan units by using fewer signal lines. For example, the plurality of the fan**

> **units is connected in a daisy chain form by using a serial interface such as Inter-Integrated Circuit (I2C).**

Fujitsu, ¶ 5-6.

Considering the disclosure of Fujitsu, it is reasonable to say that Fujitsu's field of endeavor is cooling fans for an electronic device, which is the same field of endeavor as the '336 patent. Moreover, Fujitsu's disclosure is reasonably pertinent to the problem of efficient heat dissipation and improved cable routing and management confronting the inventor. For these reasons, the examiner concludes that Fujitsu is analogous art. *See* MPEP § 2141.01(a).

In the non-final Office action, the examiner found that Fujitsu teaches a fan (10, Figs. 5-7) with a power socket (female power connector CNA and/or CNB, *see* ¶¶ 31 and 39) and a first connector (inter-fan connector CNC, ¶ 31) on one side of the body, and a second connector (inter-fan connector CND) on another side of the body. For clarity, the examiner notes that Patent Owner does not appear to dispute the examiner's finding that Fujitsu teaches a first connector (CNC) on one side of the body and a second connector (CND) on a second side of the body. Patent Owner's arguments are directed to the location of the power socket of Fujitsu. Patent Owner argues that Fujitsu's power socket (CNA or CNB) is located on a front side surface or a rear side surface of the fan, not on the same right side surface on which the first connector (CNC) is situated. *See* Remarks, pg. 32-41; Declaration, ¶¶85-100.

Patent Owner relies here on the construction of the term "side" to mean specifically one of four lateral-facing side surfaces of the body that is perpendicular to the rotational axis of the fan, as discussed above under Section 1 of this Response to Arguments. Patent Owner's argument is not persuasive for the following reasons. First, the proposed interpretation of the term "side" is narrower than is warranted by the claim language or the '336 patent specification,

as discussed above. Fujitsu's power socket (CNA or CNB) is generally located on the same side of the fan body as the first connector (CNC), *i.e.*, the lateral area to the right of the fan in Figs. 7A-B. Second, even if *arguendo* the term "side" were narrowly interpreted to mean a lateral side surface of the body, the structure of Fujitsu's power socket (CNA or CNB) directly abuts the same lateral side surface of the body on which the first connector (CNC) is located, as shown in Figs. 7A-B, and is thus reasonably considered to be on that same side. Third, even if *arguendo* the claim language were interpreted as requiring a power socket that opens to the same lateral-facing side surface of the fan on which the first connector is located, this arrangement would have been obvious in view of the combination of Lai and Fujitsu on which the rejection under 35 U.S.C. 103 is based.

In response to Patent Owner's argument that it would not have been obvious to modify Fujitsu by relocating the power socket (CNA/CNB) to open toward the same lateral-facing side surface of the body on which the first connector (CNC) is located because it would interfere with hot-swapping the fans of Fujitsu (Remarks, pg. 41; Declaration, ¶ 97-100), the examiner notes that the rejection under discussion in this section is based on a proposed modification of Lai, not of Fujitsu. Hot swapping is not an issue in the serial fan arrangement of Lai. Rather, Lai is concerned with serially connecting fans in such a way as to improve cable management (*i.e.*, as an improvement over the prior art of Fig. 1; *see* ¶ 2). As noted above, Fujitsu is also concerned with serially connecting fans in such a way that simplifies wiring of signal lines. *See* Fujitsu, ¶ 5-6. One of ordinary skill in the art would reasonably understand that the invention of Lai may benefit from the teaching of Fujitsu with respect to the arrangement of connectors on opposite sides of the fan body in order to simplify wiring of the fans. Considering the structure, function, and intended use of Lai's fan, it would have been obvious to one of ordinary skill in the art to

locate the power socket and the first connector on one side of the body, including on one lateral-facing side surface of the body, and the second connector on another side of the body, including the lateral-facing side surface of the body that is opposite the first connector, as taught by Fujitsu, in order to facilitate the serial arrangement of fans shown in Fig. 3 of Lai (and similarly in Figs. 5-6 of Fujitsu).

f. Fujitsu and Tsai - Illumination area on at least two sides of fan at top of body

Under Section 2.f. of the Remarks, pg. 42-45, Patent Owner argues that Fujitsu and Tsai do not teach the illumination area being on at least two sides of the fan at the top of the body, citing the non-final Office action at pg. 12. The examiner notes that, in the rejection under discussion, Lai is relied upon to teach the illumination area on two sides of the fan at top of the body, as discussed above in response to Section 2.a. of the Remarks. It appears that the arguments in Section 2.f. of the Remarks are presented in response to the rejection of claim 1 under 35 U.S.C. 103 as unpatentable over Fujitsu in view of Tsai, not the rejection over Lai in Fujitsu. For that reason, these arguments will be addressed in Section 3 below.

*3. Claim 1 as unpatentable over Fujitsu in view of Tsai*

a. Illumination area on two sides of fan at top of the body

Under the Section 2.f. heading, Patent Owner argues that Fujitsu does not teach the illumination area being on at least two sides of the fan at the top of the body, citing the non-final Office action at pg. 12. *See* Remarks, pg. 42-43. In the non-final Office action, the examiner acknowledged that Fujitsu does not teach the claimed arrangement of the illumination area but maintained that the claimed arrangement of the illumination area is taught by Tsai and would be

obvious to include in the invention of Fujitsu in order to enhance the aesthetic appearance of the fan. Patent Owner does not appear to dispute the examiner's finding that Tsai teaches an illumination area on two sides of the fan at top of the body. Rather, Patent Owner argues that Fujitsu is not pertinent to an illumination fan (Remarks, pg. 43; Declaration, ¶ 76) and that it would not have been obvious to modify Fujitsu in view of Tsai (Remarks, pg. 43-44, citing the Declaration, ¶¶ 75-76). Patent Owner's argument that Fujitsu is not analogous art has been addressed above under section heading 2.e.

With respect to the combination of Fujitsu and Tsai, Patent Owner argues that it would not have been obvious to add an illumination area as taught by Tsai to the fan of Fujitsu because Fujitsu's fan is used inside a server, where illumination areas on two sides of the fan at the top would not be widely viewable and would undesirably increase fan cost, power consumption, and heat load. *See* Remarks, pg. 43; Declaration, ¶ 75-89. This argument is not persuasive because Fujitsu discloses that a server is only one example of an electronic device that can be cooled by the fan. As noted above, Fujitsu states that "[t]he electronic device is not limited to a server, and can be a device that includes various electronic apparatus such as information processing device, communication device that ought to be cooled." Fujitsu, ¶ 25. A personal computer, argued by Patent Owner to be the preferred application of an illumination fan, would fall within the scope of an information processing device that ought to be cooled. Fujitsu's teaching regarding the desirability of low power consumption, cited by Patent Owner, is made in the context of a discussion of the advantages of rotation speed control or state monitoring for each fan unit, not with respect to illumination features. *See* Fujitsu ¶ 5. Additionally, the examiner notes that the illumination feature taught by Tsai is provided by a translucent light-guiding ring (20, Fig. 1) which can be used in combination with a single LED to distribute light in an annular pattern

around the fan (*see* ¶ 34), which would not appear to significantly increase cost, power consumption, or heat load as compared to the fan of Fujitsu, which also includes an LED. The examiner finds no evidence in the present record to support Patent Owner's position that the addition of an illumination feature such as that taught by Tsai would be prohibitively expensive or undesirably increase power consumption or heat load to such an extent as to outweigh the aesthetic benefits for use in situations where such benefits would be desirable, whether in a server, an information processing device, or a communication device as disclosed by Fujitsu.

Patent Owner further argues that the combination of Fujitsu and Tsai does not meet limitation "an illumination area on at least two sides of the fan at top of the body" because Fujitsu teaches an indicator lamp on one side of the body (not "top" of the body) and because the indicator lamp of Fujitsu does not make the fan an "illumination" fan as recited in the preamble. *See* Remarks, pg. 44-45; Declaration, ¶¶ 77-84. These arguments are not persuasive because the rejection is not based on Fujitsu alone but on the combination of Fujitsu and Tsai. The claimed arrangement of the illumination area is clearly taught by Tsai and would have been obvious to include in the fan of Fujitsu to yield the aesthetic benefits taught by Tsai, as discussed above. The fan resulting from the proposed combination would reasonably be considered an illumination fan as claimed.

b. Power socket and first connector on one side of the body

Under the Section 3 heading, Patent Owner argues that Fujitsu and Tsai do not disclose a power socket and a first connector on one side of a body as recited in claim 1. *See* Remarks, pg. 45-46, citing the arguments with respect to Fujitsu advanced under the Section 2.e. heading. To summarize the examiner's position as it applies to the rejection of claim 1 under 35 U.S.C. 103

as unpatentable over Fujitsu in view of Tsai, Fujitsu's power socket (CNA or CNB, Figs. 7A-B) is generally located on the same side of the fan body as the first connector (CNC), *i.e.*, the lateral area to the right of the fan in Figs. 7A-B. Moreover, even if *arguendo* the term "side" were narrowly interpreted to mean a lateral side surface of the body, the structure of Fujitsu's power socket (CNA or CNB) directly abuts the same lateral side surface of the body on which the first connector (CNC) is located, as shown in Figs. 7A-B, and is thus reasonably considered to be on that same side. Therefore, absent any more specific definition of the term "side" in either the specification or claims, Fujitsu is understood to teach a power socket and first connector on one side of the body.

*4. Claim 2 - Electrically conductive terminal and contact surface taught by Lai*

Patent Owner refers to the arguments set forth in Section 2 with respect to claim 1, which are addressed above. With respect to claim 2, Patent Owner further argues that neither Lai nor Fujitsu disclose an electrically conductive terminal in the first connector and an electrically conductive contact surface in the second connector. *See* Remarks, pg. 46. In response, the examiner maintains that one of ordinary skill in the art would clearly understand from the respective disclosures of Lai and Fujitsu that first and second connectors of the fan would respectively include an electrically conductive terminal and an electrically conductive contact surface, these being necessary components for transmitting the power and control signals (i.e., conducting electricity) to the multiple fans when connected in series, as discussed in the prior Office action. Patent Owner has not provided any argument or evidence to the contrary.

*5. Claim 3 - Continuous illumination area obvious over Lai, or Fujitsu in view of Tsai*

In the heading of Section 5, Patent Owner states that "neither Lai nor Fujitsu discloses the continuous illumination areas of claim 3," but Patent Owner has not provided any arguments or evidence pointing out any supposed errors in the rejections of claim 3, relying instead on the features of claim 1 as argued in Section 2, addressed above. *See* Remarks, pg. 46-47. The examiner maintains that a continuous illumination area would have been obvious in view of Lai, or obvious over Fujitsu in view of Tsai, for the reasons set forth in the non-final Office action and again below.

*6. Claim 4 - Groove and engaging block taught by Fujitsu*

In the heading of Section 6, Patent Owner states that "Fujitsu does not disclose a groove and an engaging block of claim 4," but Patent Owner has not provided any arguments or evidence pointing out any supposed errors in the rejections of claim 4, relying instead on the features of claim 1 as argued in Section 2, addressed above. *See* Remarks, pg. 47. The examiner maintains that Fujitsu does teach this feature, for the reasons set forth in the non-final Office action and again below.

*7. Claim 5 - Groove on two sides and an engaging block taught by Chou*

In the heading of Section 7, Patent Owner states that "Chou does not disclose a groove on two sides and an engaging block of claim 5," but Patent Owner has not provided any arguments or evidence pointing out any supposed errors in the rejections of claim 5, relying instead on the features of claim 1 as argued in Section 2, addressed above. *See* Remarks, pg. 47. The examiner maintains that Chou does teach this feature, for the reasons set forth in the non-final Office action and again below.

***Claim Rejections - 35 USC § 112***

The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

**Amended claim 4 and new claims 18-20, 33-36, 37-40, 42, and 44-47 are rejected under 35 U.S.C. 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention.**

Regarding **amended claim 4 and new claim 44**, the limitation "an engaging block of the body of another illumination fan is provided on another side thereof" in lines 3-4 renders the claims indefinite, because this describes a structural feature ("an engaging block") of a fan that is not being positively claimed ("another illumination fan"). Considering the preamble, the claims appear to be directed to a single illumination fan ("An illumination fan") configured for a functional relationship with another illumination fan ("connectable with at least one illumination fan for a computer"). The "another illumination fan" is not positively claimed as part of the invention. It is unclear whether or in what sense the claimed illumination fan of claims 4 and 44 is further limited by the description of structural features of another fan that is not positively claimed.

Regarding **claims 18-20 and 33**, the limitations "is electrically connected" (in claims 18 and 20) and "is connected" (in claims 19 and 33), describing connection of the claimed fan to another fan, render the claims indefinite because, as noted above, the claims appear to be directed to a single illumination fan configured for a functional relationship with another illumination fan. It is unclear whether the recited connections between the claimed fan and another fan mean that the claimed fan is *configured to make* such a connection, or that the recited connection is *positively required*. For example, it is unclear whether infringement would occur

when an illumination fan is made that is configured to make the claimed connections to another fan, or only when that illumination fan is actually connected to another fan in the manner claimed. **Claims 34-36** are rejected in view of their dependency from claim 33.

Regarding **claim 37**, it is unclear what configuration of connections between fans is being described. In particular, it is unclear whether the two references to "another illumination fan" in lines 3 and 5 both refer to the same illumination fan. For the purpose of examination, both references to "another illumination fan" are interpreted as referring to the same illumination fan.

**Claims 38-40** are rejected in view of their dependency from claim 37. Moreover, it is unclear whether subsequent references to "the another illumination fan" and "another illumination fan" in each of claims 38-40 refer to the same "another illumination fan" recited in claim 1 or claim 37 (or any preceding claim in the chain of dependency), or to a different illumination fan. Claims 38-40 are particularly confusing due to the apparent description of both the first connector and the second connector of the claimed illumination fan being connected to a respective connector of another illumination fan, with the connection of the *second connector* of the claimed fan to a first connector of another fan being apparently somehow conditional upon the connection of the *first connector* of the claimed fan to a second connector of another fan. It is unclear what configuration of fans is being described, and it is unclear in what sense or to what extent the one illumination fan to which the claims are directed would be limited by the configuration described.

Regarding **claim 42**, the limitation "an electrically conductive contact surface is provided in the second connector of the another illumination fan" in lines 3-4 renders the scope of the claim indefinite, because it appears to be further defining a structural feature of "another illumination fan" that is not positively claimed. As noted above, the claims are directed to a

single illumination fan configured for a functional relationship with another illumination fan ("connectable with at least one other illumination fan," preamble). It is unclear whether or to what extent the claimed illumination fan is limited by features of the "another illumination fan."

Regarding **claim 45**, the limitation "a groove is provided … on each of two sides of the body of the another illumination fan" in lines 2-3 renders the scope of the claim indefinite, because it appears to again be defining a structural feature of "another illumination fan" that is not positively claimed. It is unclear whether or to what extent the claimed illumination fan is limited by features of the "another illumination fan." Moreover, the limitation "the body of the illumination fan is connected with the body of the another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the another illumination fan" in lines 3-6 renders the claim indefinite, because it is unclear whether this describes a function of the claimed illumination fan, in which case the claim would be directed to a single illumination fan configured for connection as claimed; or a positive structural connection, in which case the claim would appear to require two illumination fans and an engaging block that are actually connected in the claimed configuration.

Regarding **claims 46 and 47**, it is unclear what configuration of fans Patent Owner is attempting to describe. Claims 46 and 47 each appear to describe both the first connector and the second connector of the claimed illumination fan being connected to a respective connector of the same "another illumination fan," with the connection of the *second connector* of the claimed fan to a first connector of another fan being somehow conditional upon the connection of the *first connector* of the claimed fan to a second connector of the other fan. It is unclear what configuration of fans and connections is being described, and it is unclear in what sense or to

what extent the one illumination fan to which the claims are directed would be limited by the configuration described.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.
>
> (a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-2, 6-11, 21-42, and 46-48 are rejected under 35 U.S.C. 102(a)(1) and 102(a)(2) as anticipated by Lai or, in the alternative, under 35 U.S.C. 103 as obvious over Lai in view of Fujitsu.**

Regarding **claims 1 and 41**, Lai discloses an illumination fan (LED fan 10, Fig. 3) connectible with at least one other[3] illumination fan (¶ 12)[4], comprising: a body provided with a fan in a center of the body (*see* Fig. 3), an illumination area (*i.e.*, an area that is illuminated) on at

[3] The word "other" added in the preamble of new claim 41 does not meaningfully limit the claim.
[4] The preamble phrase "for a computer" describes an intended use of the claimed fan and does not further limit its structure. Therefore, the phrase "for a computer" is not a claim limitation. *See* MPEP § 2111.02, subsection II.

least two sides of the fan at a top of the body (*i.e.*, being illuminated by LEDs 16, Figs. 2 and 4-6; ¶¶ 11 and 13-16), a power socket and a first connector (shown as input 111 in schematic view of Fig. 2, the power socket being the input power supply connection of the fan 10, and the first connector being any other of the input connections of the fan 10 for connecting the fan 10 to the controller 20 or to an adjacent fan 10, as shown in Figs. 4-6) on one side of the body (i.e., on the side closest to the controller 20, Fig. 3), and a second connector (shown as output 112 in schematic view of Fig. 2, from the fan 10 to the next fan 10 in series, connected via transmission line 12 in Fig. 3; *see also* Figs. 4-6) on another side of the body (i.e., on the side closest to the next fan 10 in the series, Fig. 3), wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area (*see* Figs. 2 and 4-5), such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination (¶ 16), and when the first connector of the body is connected with a second connector of a body of another illumination fan (*i.e.*, when the input connectors of one fan are connected with the output connectors of the adjacent fan in the series, *e.g.*, via a transmission line 12, Fig. 3), a fan and an illumination area of the body of the other illumination fan are respectively driven into rotation and illumination (¶ 16).

Although the schematic view of the fan shown in Fig. 2 of Lai illustrates the input (111) and the output connectors (112) on the same side of the fan body, the fan shown in Fig. 3 of Lai is understood to show the input and output connectors on opposite sides of the fan body, *e.g.*, for connection to a controller (20) on one side via a transmission line (13) and to another fan on another side via another transmission line (12), or for connection to one fan on one side via a

first transmission line (12) and to another fan on the other side via a second transmission line (12). For that reason, Lai is understood to anticipate claim 1.

If there is any doubt regarding the examiner's interpretation of Lai as disclosing the power socket and the first connector being on one side of the body and the second connector being on another side of the body, then Fujitsu clearly discloses a fan (fan unit 10, Figs. 5-7) comprising: a body (fan unit 10) provided with a power socket (female power connector CNA and/or CNB, *see* ¶¶ 31 and 39) and a first connector (inter-fan connector CNC, ¶ 31) on one side of the body, and a second connector (inter-fan connector CND) on another side of the body. The power socket (CNA, CNB) is electrically connected with the first connector (CNC), the second connector (CND), a fan (11), and an illumination area (12; *see* Fig. 14). When the power socket (CNA, CNB) on the one side of the body is supplied with power, the fan (11) and the illumination area (12) of the body are respectively driven into rotation and illumination (*see* ¶¶ 27, 31, and 39-40). When the first connector (CNC) of the body is connected with the second connector (CND) of a body of another illumination fan, a fan (11) and an illumination area (12) of the body of the other illumination fan are respectively driven into rotation and illumination ("two adjacent fan units 10 among the plurality of fan units 10 are connected via inter-fan connectors CNC and CND that transmit the pulse signal from one end side to the other end side, and supplies power from one end side to the other end side," ¶ 31). Therefore, it would have been obvious to one of ordinary skill in the art to provide the body of Lai with a power socket and a first connector on one side of the body (*e.g.,* on the side adjacent to the controller, to which the transmission line 13 is attached in Fig. 3 of Lai) and a second connector on another side of the body (*e.g.*, on the side adjacent to the next fan in series, to which the transmission line 12 is

attached in Fig. 3 of Lai), as taught by Fujitsu, in order to facilitate a serial arrangement of fans (as shown in Fig. 3 of Lai and Figs. 5-6 of Fujitsu).

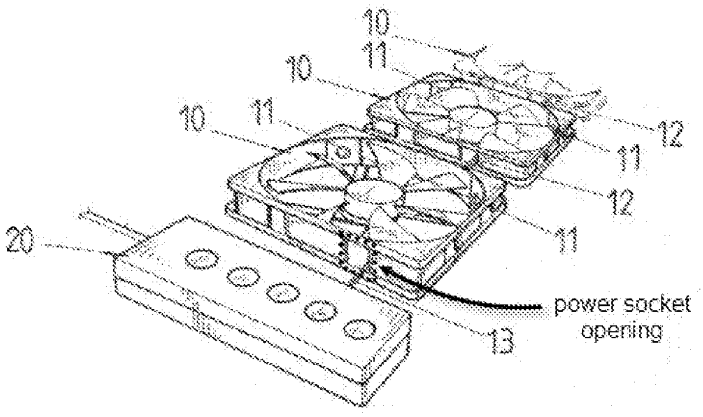
Regarding **claims 2 and 42**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Lai further teaches an electrically conductive terminal (any one or more of the input nodes of fan 10 shown in Figs. 4-6) provided in the first connector of the illumination fan, and an electrically conductive contact surface (any one or more of the output nodes of fan 10 shown in Figs. 4-6) is provided in the second connector of the illumination fan and of the "another" illumination fan (the two fans 10 being substantially identical, such that the electrically conductive contact surface is understood to be provided in the second connector of both fans 10) for being electrically connected with the electrically conductive terminal of an adjacent fan (via transmission line 12, Fig. 3), such that when the first connector of the body of the illumination fan is connected with the second connector of the body of another illumination fan (via transmission line 12), the fan and the illumination area of the body of the other illumination fan are respectively driven into rotation and illumination (¶ 16, such that the controller 20 connected to the first fan "can adjust each individual LED light on multiple LED fans while simultaneously control[ing] all fan speeds too"). One of ordinary skill in the art would clearly understand from the disclosure of Lai that the input and output nodes of the fan respectively include an electrically conductive terminal and an electrically conductive contact surface, these being necessary components for transmitting the power and control signals (i.e., conducting electricity) to the multiple fans when connected in series.

Regarding **claims 6-8 and 9-11**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 2, respectively. Lai further teaches

the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claims 6 and 9**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claims 7 and 10**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claims 8 and 11**).

Regarding **claim 21**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 1. Lai further teaches the power socket on one side of the illumination fan has an opening (*see* annotated Fig. 3 below) located on the one side of the illumination fan.

***Fig. 3 of Lai***
*Annotated by Examiner*




Regarding **claims 22-24**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 21. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 22**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3)

(**claim 23**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 24**).

Regarding **claim 25**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 1. Lai further teaches an electrically conductive contact surface (any one or more of the output nodes of fan 10 shown in Figs. 4-6) is provided in the second connector and is located on the another side of the body of the illumination fan (*i.e.*, for electrical connection via transmission line 12, Fig. 3). One of ordinary skill in the art would clearly understand from the disclosure of Lai that the output nodes of the fan include an electrically conductive contact surface, this being a necessary component for transmitting the power and control signals (i.e., conducting electricity) to the multiple fans when connected in series.

Regarding **claims 26-28**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 25. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 26**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claim 27**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 28**).

Regarding **claim 29**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 1. Lai further teaches an electrically conductive terminal (any one or more of the input nodes of fan 10 shown in Figs. 4-6) is provided in the first connector and is located on the one side of the body of the illumination fan (*e.g.*, for electrical connection to the controller 20 via transmission line 13, Fig. 3). One of ordinary skill in the art

would clearly understand from the disclosure of Lai that the input nodes of the fan include an electrically conductive terminal, this being a necessary component for transmitting the power and control signals (i.e., conducting electricity) to the multiple fans when connected in series.

Regarding **claims 30-32**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 29. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 30**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claim 31**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 32**).

Regarding **claim 33**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 1. Lai further teaches that, in use, the second connector of the illumination fan is connected with a first connector of the another illumination fan (*i.e.,* the output connector of one fan is electrically connected with the input connector of another fan via a transmission line 12, Fig. 3; *see also* Figs. 4-6, showing the electrical connections between FAN 1 and FAN 2).

Regarding **claims 34-36**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 29. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 34**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claim 35**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 36**).

Regarding **claim 37**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 2. Claim 37 is interpreted to mean that when the first connector of the claimed fan is connected to a second connector of another fan, the connection is an electrical connection. In the case of Lai, when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan (*i.e.*, when the input of one fan is connected to the output of another fan, via transmission line 12, Fig. 3), the connection is an electrical connection (for transmitting power and signals between the two fans; *see* Figs. 4-6 and ¶¶ 12-16).

Regarding **claims 38-40**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 37. As discussed above in the rejections under 35 USC 112(b), it is unclear what is being described in claims 38-40. As the claims are best understood by the examiner, Lai appears to teach the limitations of claims 38-40 because when the first connector of one fan of Lai is electrically connected to the second connector of another fan of Lai (*i.e.*, when the input and output of adjacent fans are connected by a transmission line 12, Fig. 3), the second connector of the one fan is also electrically connected to the first connector of the other fan via the internal circuitry of the two fans, as part of a functional electrical circuit (*e.g.*, for transmitting power and control signals from the controller 20 to a third fan in series).

Regarding **claims 46 and 47**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 41. As discussed above in the rejections under 35 USC 112(b), it is unclear what is being described in claims 46 and 47. As the claims are best understood by the examiner, Lai appears to teach the limitations of claims 46 and 47 because when the first connector of one fan of Lai is electrically connected to the second

connector of another fan of Lai (*i.e.*, when the input and output of adjacent fans are connected by a transmission line 12, Fig. 3), then the first connector of the one fan is electrically connected to the second connector of the other fan (via the transmission line 12) (**claim 46**) and the second connector of the one fan is also electrically connected to the first connector of the other fan via the internal circuitry of the two fans, as part of a functional electrical circuit (*e.g.*, for transmitting power and control signals from the controller 20 to a third fan in series) (**claims 46 and 47**).

Regarding **claim 48**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 41. Claim 48 is interpreted to mean that when the first connector of the claimed fan is connected to a second connector of another fan, the connection is an electrical connection. In the case of Lai, when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan (*i.e.*, when the input of one fan is connected to the output of another fan, via transmission line 12, Fig. 3), the connection is an electrical connection (for transmitting power and signals between the two fans; *see* Figs. 4-6 and ¶¶ 12-16).

### *Claim Rejections - 35 USC § 103*

**Claims 3, 12-14, and 43 are rejected under 35 U.S.C. 103 as obvious over Lai, or Lai in view of Fujitsu.**

Regarding **claims 3 and 43**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Lai does not explicitly teach that the illumination areas of two connected fan bodies form a continuous illumination area. However, the arrangement of the illumination areas is understood to be a

matter of aesthetic design choice, there being no objective evidence of record to indicate that the continuous configuration of the illumination areas serves any mechanical function. It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify or further modify the invention of Lai by arranging the illumination areas in any desired aesthetic configuration, including a continuous illumination area (e.g., by extending the illuminated area to adjacent edges of the connected fans), in order to enhance the aesthetic appearance of the fans, since the courts have held that "matters relating to ornamentation only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention over the prior art." *See* MPEP 2144.04, subsection I, citing *In re Seid*, 161 F.2d 229, 73 USPQ 431 (CCPA 1947).

Regarding **claims 12-14**, the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 3. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 12**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claim 13**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 14**).

**Claims 4, 15-17, and 44 are rejected under 35 U.S.C. 103 as obvious over Lai in view of Fujitsu.**

Regarding **claims 4 and 44**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Lai does not teach a groove and an engaging block for connecting the fan bodies. However, Fujitsu further teaches a

groove (*i.e.*, the female socket of connector CND) is provided on one side of the body of the illumination fan, while an engaging block (*i.e.*, the projection of the connector CNC) of the body of another illumination fan is provided on another side thereof to be engaged into the groove (¶ 38), such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of another illumination fan, the body of the illumination fan is connected with the body of the other illumination fan (¶ 38; *see* Figs. 5-6). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify or further modify the invention of Lai by providing a groove on one side of the body and an engaging block on another side of the body, as taught by Fujitsu, in order to facilitate a secure connection between adjacent fan bodies.

Regarding **claims 15-17**, the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 4. Lai further teaches the top of the body (at top in Fig. 3) is adjacent to the one side of the body of the illumination fan (*i.e.*, the side from which the transmission line 13 extends in Fig. 3) (**claim 15**) and to the another side of the body of the illumination fan (*i.e.*, the side from which the transmission line 12 extends in Fig. 3) (**claim 16**), and the one side and the another side of the body of the illumination fan are adjacent to a bottom of the body of the illumination fan (at bottom in Fig. 3) (**claim 17**).

**Claims 5, 18-20, and 45 are rejected under 35 U.S.C. 103 as obvious over Lai, or Lai in view of Fujitsu, in further view of Chou.**

Regarding **claims 5 and 45**, Lai or the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Lai does not teach a groove provided on two sides of the body and an engaging block. However, in the fan art, Chou

discloses a fan body (Figs. 2 and 4) with a groove (sliding rail 246, Fig. 2; ¶ 22) on each of two sides of the body of the fan and on each of two sides of the body of another fan, configured such that the fan body can be connected with the body of the other fan by respectively engaging an engaging block (connecting member 46; ¶ 26) with one of the grooves on the sides of the fan body and one of the grooves on the sides of the other fan body (*see* Fig. 4, the engaging block 46 engaging the sliding rails 246 of the pair of fans 4). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify or further modify the invention of Lai by providing a groove as taught by Chou on two sides of the body and connecting the body to the body of another illumination fan by respectively engaging an engaging block as taught by Chou with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the other illumination fan, in order to facilitate a secure connection of adjacent fans.

Regarding **claim 18**, the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 5. Lai further teaches that, in use, the first connector of the illumination fan is electrically connected with the second connector of another illumination fan (*i.e.*, the input connector of one fan is electrically connected with the output connector of another fan via a transmission line 12, Fig. 3; *see also* Figs. 4-6, showing the electrical connections between FAN 1 and FAN 2).

Regarding **claims 19 and 20**, the modified Lai teaches the claimed invention substantially as claimed, as set forth above for claim 5. Lai further teaches that, in use, the second connector of the illumination fan is connected (**claim 19**), specifically, electrically connected (**claim 20**), with a first connector of the another illumination fan (*i.e.,* the output connector of one fan is electrically connected with the input connector of another fan via a

transmission line 12, Fig. 3; *see also* Figs. 4-6, showing the electrical connections between FAN 1 and FAN 2).

**Claims 1-4, 6-17, 21-44, and 46-48 are rejected under 35 U.S.C. 103 as being unpatentable over Fujitsu in view of Tsai.**

Regarding **claims 1 and 41**, Fujitsu discloses an illumination fan (fan unit 10, Figs. 5-7, illuminated at indicator lamp 12; *see* ¶¶ 25-26 and 40) connectable with at least one other[5] illumination fan (*see* Figs. 5-6) for a computer (e.g., a server or other "electronic apparatus such as information processing device," ¶ 25), comprising: a body (fan unit 10) provided with a fan (cooling fan 11) in a center of the body (*see* Fig. 7; ¶27), an illumination area (indicator lamp 12, Fig. 7, ¶ 40), a power socket (female power connector CNA and/or CNB, *see* ¶¶ 31 and 39) and a first connector (inter-fan connector CNC, ¶ 31) on one side of the body, and a second connector (inter-fan connector CND) on another side of the body. The power socket (CNA, CNB) is electrically connected with the first connector (CNC), the second connector (CND), the fan (11), and the illumination area (12; *see* Fig. 14). When the power socket (CNA, CNB) on the one side of the body is supplied with power, the fan (11) and the illumination area (12) of the body are respectively driven into rotation and illumination (*see* ¶¶ 27, 31, and 39-40). When the first connector (CNC) of the body is connected with the second connector (CND) of a body of another illumination fan, a fan (11) and an illumination area (12) of the body of the other illumination fan are respectively driven into rotation and illumination ("two adjacent fan units 10 among the plurality of fan units 10 are connected via inter-fan connectors CNC and CND that

[5] The word "other" added in the preamble of new claim 41 does not meaningfully limit the claim.

transmit the pulse signal from one end side to the other end side, and supplies power from one end side to the other end side," ¶ 31).

Fujitsu does not disclose that the illumination area is on at least two sides of the fan at the top of the body. However, in the art of illumination fans, Tsai teaches a fan body (Figs. 1-4) with a fan (motor 41 with blades 42) in a center of the body and an illumination area (translucent light-guiding ring 20, ¶ 34) on at least two sides of the fan (41, 42) at a top of the body (*see* Fig. 1, the illumination area defined by the annular light-guiding ring 20 surrounding the fan 41, 42 on all sides at the top of the body). Tsai teaches that this arrangement is advantageous for providing an attractive and colorful appearance to the fan (¶ 1-3). Therefore, it would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the invention of Fujitsu by arranging the illumination area on at least two sides of the fan at the top of the body, as taught by Tsai, in order to enhance the aesthetic appearance of the fan.

Regarding **claims 2 and 42**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Fujitsu further discloses an electrically conductive terminal is provided in the first connector (CNC) and an electrically conductive contact surface is provided in the second connector (CND) of the illumination fan as well as in the substantially identical second connector (CND) of the another illumination fan for being electrically connected with the electrically conductive terminal ("a connector CNC (male) that enables power supply and live connection of the control signal/monitoring signal is provided by protruding on the right side surface … A connector CND (female) that enables power supply and live connection of the control signal/monitoring signal is provided by recessing on the left side surface … Two adjacent fan units 10 are connected so as to

enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38), such that when the first connector of the body of the illumination fan is connected with the second connector of the body of the another illumination fan, the fan and the illumination area of the body of the another illumination fan are respectively driven into rotation and illumination (¶ 31). One of ordinary skill in the art would clearly understand from the disclosure of Fujitsu that the connectors CNC, CND include an electrically conductive terminal and an electrically conductive contact surface, these being necessary components for enabling the power supply and transmitting the control signal (i.e., conducting electricity) to multiple fans connected in series.

Regarding **claims 3 and 43**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. The annular illumination area taught by Tsai extends to the outer periphery of the fan (*see* light-guiding ring 20 of Tsai, Fig. 1). Thus, when the fan bodies of Fujitsu are modified to include illumination areas in the configuration taught by Tsai, the illumination areas of two connected fan bodies will form a continuous illumination area due to the immediate proximity of the two illumination areas at the adjacent outer peripheries of the two fan bodies.

Regarding **claims 4 and 44**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Fujitsu further teaches a groove (*i.e.*, the female socket of connector CND) is provided on one side of the body of the illumination fan, while an engaging block (*i.e.*, the projection of the connector CNC) is provided on another side of the body of the another illumination fan (the CNC connector being provided on each of the fans in series) to be engaged into the groove of the body of the

illumination fan (¶ 38), such that when the groove of the body of the illumination fan is engaged with the engaging block of the body of another illumination fan, the body of the illumination fan is connected with the body of the other illumination fan (¶ 38; *see* Figs. 5-6).

Regarding **claims 6-8, 9-11, 12-14, and 15-17**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claims 1, 2, 3, and 4, respectively. Fujitsu further teaches the top of the body (*i.e.*, the front area when oriented as shown in Figs. 7A-B) is adjacent to the one side of the body of the illumination fan (at right in Fig. 7A-B) (**claims 6, 9, 12, and 15**) and to the another side of the body of the illumination fan (at left in Fig. 7A-B) (**claims 7, 10, 13, and 16**), and the one side and another side of the body of the illumination fan are adjacent to a bottom (*i.e.*, the back area when oriented as shown in Figs. 7A-B) of the body of the illumination fan (**claims 8, 11, 14, and 17**).

Regarding **claim 21**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 1. Fujitsu further teaches the power socket (CNA or CNB) on the one side of the illumination fan has an opening (the connectors CNA and CNB being "female connectors," ¶ 39) located on the one side (*i.e.*, the right lateral side in Figs. 7A-B) of the illumination fan.

Regarding **claims 22-24**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 21. Fujitsu further teaches the top of the body (*i.e.*, the front area when oriented as shown in Figs. 7A-B) is adjacent to the one side of the body of the illumination fan (at right in Fig. 7A-B) (**claim 22**) and to the another side of the body of the illumination fan (at left in Fig. 7A-B) (**claim 23**), and the one side and another side of the body of the illumination fan are adjacent to a bottom (*i.e.*, the back area when oriented as shown in Figs. 7A-B) of the body of the illumination fan (**claim 24**).

Regarding **claim 25**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 1. Fujitsu further discloses an electrically conductive contact surface is provided in the second connector (CND) of the illumination fan and is located on the another side of the illumination fan (at left in Figs. 7A-B; "A connector CND (female) that enables power supply and live connection of the control signal/monitoring signal is provided by recessing on the left side surface … Two adjacent fan units 10 are connected so as to enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38). One of ordinary skill in the art would clearly understand from the disclosure of Fujitsu that the connector CND includes an electrically conductive contact surface, this being a necessary component for enabling the power supply and transmitting the control signal (i.e., conducting electricity) to multiple fans connected in series.

Regarding **claims 26-28**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 25. Fujitsu further teaches the top of the body (*i.e.*, the front area when oriented as shown in Figs. 7A-B) is adjacent to the one side of the body of the illumination fan (at right in Fig. 7A-B) (**claim 26**) and to the another side of the body of the illumination fan (at left in Fig. 7A-B) (**claim 27**), and the one side and another side of the body of the illumination fan are adjacent to a bottom (*i.e.*, the back area when oriented as shown in Figs. 7A-B) of the body of the illumination fan (**claim 28**).

Regarding **claim 29**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 1. Fujitsu further discloses an electrically conductive terminal is provided in the first connector (CNC) of the illumination fan and is located on the one side of the body of the illumination fan (at right in Figs. 7A-B; "a connector CNC (male) that

enables power supply and live connection of the control signal/monitoring signal is provided by protruding on the right side surface … Two adjacent fan units 10 are connected so as to enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38). One of ordinary skill in the art would clearly understand from the disclosure of Fujitsu that the connector CNC includes an electrically conductive terminal, this being a necessary component for enabling the power supply and transmitting the control signal (i.e., conducting electricity) to multiple fans connected in series.

Regarding **claims 30-32**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 29. Fujitsu further teaches the top of the body (*i.e.*, the front area when oriented as shown in Figs. 7A-B) is adjacent to the one side of the body of the illumination fan (at right in Fig. 7A-B) (**claim 30**) and to the another side of the body of the illumination fan (at left in Fig. 7A-B) (**claim 31**), and the one side and another side of the body of the illumination fan are adjacent to a bottom (*i.e.*, the back area when oriented as shown in Figs. 7A-B) of the body of the illumination fan (**claim 32**).

Regarding **claim 33**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 1. Fujitsu further teaches the second connector (CND) of the illumination fan is connected with a first connector (CNC) of another illumination fan ("Two adjacent fan units 10 are connected so as to enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38).

Regarding **claims 34-36**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 33. Fujitsu further teaches the top of the body (*i.e.*, the

front area when oriented as shown in Figs. 7A-B) is adjacent to the one side of the body of the illumination fan (at right in Fig. 7A-B) (**claim 34**) and to the another side of the body of the illumination fan (at left in Fig. 7A-B) (**claim 35**), and the one side and another side of the body of the illumination fan are adjacent to a bottom (*i.e.*, the back area when oriented as shown in Figs. 7A-B) of the body of the illumination fan (**claim 36**).

Regarding **claim 37**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 2. Claim 37 is interpreted to mean that when the first connector of the claimed fan is connected to a second connector of another fan, the connection is an electrical connection. In the case of Fujitsu, when the first connector (CNC) of the body of the illumination fan is connected with the second connector (CND) of the body of the another illumination fan, the connection is an electrical connection (¶ 38).

Regarding **claims 38-40**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 37. As discussed above in the rejections under 35 USC 112(b), it is unclear what is being described in claims 38-40. As the claims are best understood by the examiner, Fujitsu appears to teach the limitations of claims 38-40 because when the first connector (CNC) of one fan of Fujitsu is electrically connected to the second connector (CND) of another fan of Fujitsu, the second connector (CND) of the one fan is also electrically connected to the first connector (CNC) of the other fan via the internal circuitry of the two fans, as part of a functional electrical circuit (*e.g.*, for transmitting power and control signals to a third fan in series).

Regarding **claims 46-47**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 41. As discussed above in the rejections under 35 USC 112(b), it is unclear what is being described in claims 46 and 47. As the claims are best

understood by the examiner, Fujitsu appears to teach the limitations of claims 46 and 47 because when the first connector (CNC) of one fan of Fujitsu is electrically connected to the second connector (CND) of another fan of Fujitsu, then the first connector of the one fan is electrically connected to the second connector of the other fan (¶ 38) (**claim 46**) and the second connector (CND) of the one fan is also electrically connected to the first connector (CNC) of the other fan via the internal circuitry of the two fans, as part of a functional electrical circuit (*e.g.*, for transmitting power and control signals to a third fan in series) (**claims 46 and 47**).

Regarding **claim 48**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 41. Claim 48 is interpreted to mean that when the first connector of the claimed fan is connected to a second connector of another fan, the connection is an electrical connection. In the case of Fujitsu, when the first connector (CNC) of the body of the fan is connected with the second connector (CND) of the body of the another illumination fan, the connection is an electrical connection (for transmitting power and signals between the two fans; ¶ 38).

**Claims 5, 18-20, and 45 are rejected under 35 U.S.C. 103 as being unpatentable over Fujitsu in view of Tsai, in further view of Chou.**

Regarding **claims 5 and 45**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claims 1 and 41, respectively. Fujitsu and Tsai do not teach a groove provided on two sides of the body and the body being connected with the body of another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the other illumination fan. Fujitsu discloses that the two fans, connected as discussed

above for claim 1, are supported in the computer casing in a sliding arrangement (*see* Figs. 5-6 and ¶ 36), but Fujitsu is silent with respect to the structure for accomplishing this function. However, in the fan art, Chou discloses a fan body (Figs. 2 and 4) with a groove (sliding rail 246, Fig. 2; ¶ 22) on each of two sides of the body of the fan and on each of two sides of the body of another fan, configured such that the fan body can be connected with the other fan body by respectively engaging an engaging block (connecting member 46; ¶ 26) with one of the grooves on the sides of the fan body and one of the grooves on the sides of the other fan body (*see* Fig. 4, the engaging block 46 sliding along the sliding rails 246 of the pair of fans 4). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to further modify the invention of Fujitsu by providing a groove as taught by Chou on two sides of the body and connecting the body to the body of another illumination fan by respectively engaging an engaging block as taught by Chou with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of the other illumination fan, in order to support the connected fans as the fans are slid into and out of the computer casing.

Regarding **claim 18**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 5. Fujitsu further teaches that, in use, the first connector (CNC) of the illumination fan is electrically connected with the second connector (CND) of the another illumination fan ("Two adjacent fan units 10 are connected so as to enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38).

Regarding **claims 19-20**, the modified Fujitsu teaches the claimed invention substantially as claimed, as set forth above for claim 5. Fujitsu further teaches the second connector (CND) of

the illumination fan is connected (**claim 19**), specifically, electrically connected (**claim 20**), with a first connector (CNC) of another illumination fan ("Two adjacent fan units 10 are connected so as to enable power supply and transmission of the control signal/monitoring signal by engaging the connector CNC of the fan unit 10 on one side and the connector CND of the fan unit 10 on the other end," ¶ 38).

### *Citation of Pertinent Prior Art*

The following prior art, cited in the Petition for *Inter Partes* Review of U.S. Patent No. 10,690,336 in IPR2024-01230, is considered pertinent to the disclosure of the '336 patent: Huang (US Patent No. 10,082,286), Echazaretta (US Patent Pub. 2008/0124234), Liu (US Patent Pub. 2015/0233391), and Hasegawa (JP 2005-051085 A).

### *Conclusion*

Patent owner's amendment filed December 17, 2024, necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

A shortened statutory period for response to this action is set to expire TWO (2) MONTHS from the mailing date of this action.

**Extensions of time under 37 CFR 1.136(a) do not apply in reexamination proceedings.** The provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

**Extensions of time in reexamination proceedings are provided for in 37 CFR 1.550(c).** A request for extension of time must specify the requested period of extension and it

must be accompanied by the petition fee set forth in 37 CFR 1.17(g)(1). Any request for an extension in a third party requested ex parte reexamination must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request will not effect any extension of time. A request for an extension of time in a third party requested ex parte reexamination will be granted only for sufficient cause, and for a reasonable time specified. Any request for extension in a patent owner requested ex parte reexamination (including reexamination ordered under 35 U.S.C. 257) for up to two months from the time period set in the Office action must be filed no later than two months from the expiration of the time period set in the Office action. A request for an extension in a patent owner requested ex parte reexamination for more than two months from the time period set in the Office action must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request for an extension for more than two months will not effect the extension. The time for taking action in a patent owner requested ex parte reexamination will not be extended for more than two months from the time period set in the Office action in the absence of sufficient cause or for more than a reasonable time.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional two months. In no event, however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP § 2265.

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

By E-filing: Registered users may submit via the Patent Center, at: https://patentcenter.uspto.gov/

By Mail: Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Knox Building
501 Dulany St.
Alexandria, VA 22314

For Patent Center transmissions, 37 CFR 1.8(a)(1) (i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if: (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4); and, (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning the status of this proceeding, should be directed to the Central Reexamination Unit (CRU) at telephone number: (571) 272-7705. The CRU's fax number is: (571) 273-9900. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAURA L DAVISON whose telephone number is (571) 270-0189. The examiner can normally be reached Monday - Friday, 8:00 a.m. - 4:00 p.m. ET.

/Laura Davison/
Reexamination Specialist, Art Unit 3993

Conferees:

/JOSHUA KADING/
Reexamination Specialist, Art Unit 3993

/Patricia L Engle/
SPRS, Art Unit 3993

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 90/019,565 | 07/02/2024 | 10690336 | 16445.0001-00000 | 5828 |

37705 7590 02/25/2025

GREENBERG TRAURIG (DEN)
1144 15th Street, Suite 3300
DENVER, CO 80202

| EXAMINER | |
|---|---|
| DAVISON, LAURA L | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3993 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 02/25/2025 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| *Ex Parte Reexamination Interview Summary* | Control No. 90/019,565 | Patent Under Reexamination 10690336 | |
|---|---|---|---|
| | Examiner Laura L Davison | Art Unit 3993 | AIA (FITF) Status Yes |

All participants (USPTO personnel, patent owner, patent owner's representative):

| | |
|---|---|
| (1) Laura Davison | (3) Eileen Lillis |
| (2) Joshua Kading | (4) Michael Dixon and Kyle Chen |

Date of Interview: 20 February 2025

Type: a) ☐ Telephonic b) ☑ Video Conference
c) ☐ Personal (copy given to: 1) ☐ patent owner 2) ☐ patent owners representative)

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☑ No.
If Yes, brief description: _____

Agreement with respect to the claims f) ☐ was reached. g) ☑ was not reached. h) ☐ N/A.
Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 41 .

Identification of prior art discussed: Lai (US 20170314777), Fujitsu (JP 2018041147), Tsai (CN 207064277), and Hasegawa (JP 2005051085) .

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: See Continuation Sheet .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW
(37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNERS STATEMENT CAN NOT BE WAIVED.
**EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

| | | |
|---|---|---|
| /Laura Davison/<br>Reexamination Specialist, Art Unit 399 | /JOSHUA KADING/<br>Reexamination Specialist, Art Unit 399 | /EILEEN D LILLIS/<br>SPRS, Art Unit 3993 |

cc: Requester (if third party requester)

Continuation of Description of the general nature of what was agreed to if an agreement was reached, or any other comments: Mr. Dixon argued that finality of the outstanding Office action was premature because the rejection of claim 4 under 35 USC 112(b) was a new ground of rejection not necessitated by amendment . See attached Interview Agenda. Examiner Davison maintained that the rejection was necessitated by the amendment of claim 4 to change "an engaging block" to refer to an engaging block of another fan rather than of the claimed fan, as was originally recited in claim 4. However, with respect to the finality of the outstanding Office action, Examiner Davison indicated that, upon receipt of a response to the outstanding Office action, prosecution of this reexamination proceeding will be reopened for further consideration of Hasegawa, cited in IPR2024-01230.

Mr. Dixon proposed amendment of claim 41 to describe the illumination area as an "illuminating illumination area." Examiner Davison maintained that Lai's illumination area is also illuminating, via the recessed LEDs. Further amendment was discussed to recite the illumination area being on a top surface of the body on two sides of the center fan. Examiner Davison cited Tsai as teaching this feature. Mr. Dixon argued that the light guiding ring (20, Figs. 1-2) of Tsai is not an illuminating illumination area because it is not electrically connected with the power socket, as required by claim 41. Examiner Davison maintained that "an illuminating illumination area" would read on the assembly of the light guiding ring (20) and LEDs (32) of Tsai which illuminate an area on the top surface of the fan body.

Mr. Dixon also proposed amendment of claim 41 to describe the power socket as having an opening on one side surface of the body, the first connector as being on the same one side surface of the body, and the second connector as being on another side surface of the body, as reflected in the attached Interview Agenda, and additionally to describe the first connector as an electrically conductive contact surface on the one side surface. Examiner Davison indicated that, if included in a response to the outstanding Office action, amendments to this effect would be considered in view of the art of record and Hasegawa. Examiner Davison indicated that a distinctive feature of the disclosed invention appears to be the electrical contact surfaces of the first and second electrical connectors being flush with the respective side surfaces in combination with the mechanical engagement structure defined by the engagement block and groove on those same respective side surfaces, as illustrated in Figs. 2 and 4 but not yet clearly claimed. No agreement was reached.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| In re the application of: | ) | Group Art Unit: 3993 |
| 10,690,336 | ) | Examiner: Davison, Laura L. |
| Application No.: 90/019,565 | ) | |
| Filed: July 2, 2024 | ) | |
| Confirmation No.: 5828 | ) | |
| Atty. Ref: 219491.010000 | ) | |
| For: "Illumination Fan Connectable with at Least One Illumination Fan for a Computer" | ) | |

**INTERVIEW AGENDA**

Dear Examiner Davison:

Thank you for scheduling a telephonic interview in this reexamination proceeding. We would like to discuss the following items and related issues:

1. **112 Rejection**

- We believe the 112 rejection is a new ground of rejection **not** necessitated by amendment because the rejection could have been first presented in the non-final office action issued on October 17, 2024. As such, the outstanding office action should have been non-final to allow us an opportunity to respond.

- Claim 4 depending from original claim 1 was amended with only a clarifying amendment **with identical language** already in **originally issued** claims 1 and 4.

> 4. (Currently Amended) The illumination fan connectable with at least one illumination fan for a computer of claim 1, wherein a groove is provided on one side of the body of the illumination fan, while an engaging block of the body of another illumination fan is provided on another side thereof to be engaged into the groove, such that when the groove of the body of the illumination fan is engaged with the engaging

block **of the body of another illumination fan**, the body of the illumination fan is connected with the body of another illumination fan.

1. (Original) An illumination fan connectable with at least one illumination fan for a computer . . . when the first connector of the body is connected with a second connector **of a body of another illumination fan**, a fan and an illumination area **of the body of another illumination fan** are respectively driven into rotation and illumination.

- **Originally issued** claims 2 and 3-5 depending from original claim 1 also recite structural limitations of "the body of another illumination fan." Thus, we respectfully request that the outstanding office action be made non-final so that we can respond to the 112 rejection.

- Patent owner respectfully requests your guidance on how to amend the claims to remedy the 112 rejection.

**2. Amended Claim 41**

- Because of an inadvertent oversight, we failed to include the claim language that we believe you wanted to see to overcome the cited references. The proposed amended claim 41 below includes your suggested amendments:

41. (Currently Amended) An illumination fan connectable with at least one other illumination fan for a computer, comprising:

a body, provided with a fan in a center of the body,

an illuminating illumination area on at least two sides of the fan at a top of the body,

a power socket having an opening and a first connector on one side surface of the body, and a second connector on another side surface of the body,

wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illuminating illumination area, such that when the power socket having the opening on the one side surface of the body is supplied with power, the fan and the illuminating illumination area of the body are respectively driven into rotation and illumination, and

when the first connector on the one side surface of the body is connected with a second connector of a body of another illumination fan, a fan and an illuminating illumination area of the body of the another illumination fan are respectively driven into rotation and illumination.



**Thermaltake Tech. Co. v. Lian Li Ind. Co., Ex-2007**
**Page 1007 of 1016, IPR2024-01230**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 90/019,565 | 07/02/2024 | 10690336 | 16445.0001-00000 | 5828 |

37705 7590 03/12/2025

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| EXAMINER |
|---|
| DAVISON, LAURA L |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3993 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 03/12/2025 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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March 12, 2025

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

**EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM**

REEXAMINATION CONTROL NO. : 90019565
PATENT NO. : 10690336
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

UNITED STATES DEPARTMENT OF COMMERCE
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| APPLICATION NO./ CONTROL NO. | FILING DATE | FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION | ATTORNEY DOCKET NO. |
|---|---|---|---|
| 90/019,565 | 07/02/2024 | 10690336 | 16445.0001-00000 |

GREENBERG TRAURIG (DEN)
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| EXAMINER | |
|---|---|
| Laura Davison | |
| ART UNIT | PAPER |
| 3992 | 20250312 |

DATE MAILED: 12 March 2025

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

This communication is to inform the parties of this ex parte reexamination proceeding (90/019,565), that on March 12, 2025, the Patent Trial and Appeal Board (PTAB) issued an Order in IPR2024-01230 staying the instant reexamination proceeding pending the termination or completion of the IPR2024-01230 trial proceeding (See attached).

The PTAB further ordered that all time periods for filing further papers in the Reexamination tolled for the duration of the stay, and that no further papers shall be filed in the reexamination while this stay remains in place, without authorization. The PTAB's Order further held that when the stay is lifted, a paper will be sent resetting the time periods for responding to any outstanding papers in Reexamination Control No. 90/019,565.

/Stephne Stein/
Managing Quality Assurance Specilaist, CRU

PTO-90C (Rev.04-03)

Trials@uspto.gov
Tel: 571-272-7822

Paper 14
Entered: March 12, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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THERMALTAKE TECHNOLOGY CO., LTD. and
THERMALTAKE INC.,
Petitioner,

v.

LIAN LI INDUSTRIAL CO., LTD., and
CHEN, CHIEN-HAO,
Patent Owner.

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IPR2024-01230
Patent 10,690,336 B1

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Before MONICA S. ULLAGADDI, SHARON FENICK, and ANDREAS BALTATZIS, *Administrative Patent Judges*.

BALTATZIS, *Administrative Patent Judge*.

ORDER
*Sua Sponte* Staying Concurrent Ex Parte Reexamination
*35 U.S.C. § 315(d); 37 C.F.R. § 42.122(a)*

## I. INTRODUCTION

On February 19, 2025, we instituted *inter partes* review in the above-referenced case, as to claims 1–5 ("the challenged claims") of U.S. Patent No. 10,690,336 B1 ("the '336 patent"). Paper 12.

A third-party requester, Axpertec, Inc., filed a Request for *Ex Parte* Reexamination ("EPR") of claims 1–5 of the '336 patent. Ex. 1020. The request was granted in Reexamination Control No. 90/019,565 on July 18, 2024. Ex. 1021. The EPR remains pending as of the institution date. *See* Ex. 3003; *see* Ex. 3004.

The Board has authority to stay a reexamination involving a patent challenged in an *inter partes* review. *See* 35 U.S.C. § 315(d); 37 C.F.R. § 42.122(a); *see also* Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654, 16,657 (Apr. 22, 2019) ("Notice") (The Board may *sua sponte* impose a stay of a concurrent Office proceeding any time after institution of an AIA trial proceeding.). For the reasons discussed below, we determine that there is good cause to stay Reexamination Control No. 90/019,565 pending resolution of this *inter partes* review.

## II. ANALYSIS

The Notice outlines factors the Board may consider in AIA trials in deciding whether to stay a parallel reexamination involving the same patent. *See* Notice, 84 Fed. Reg. at 16,657. We discuss each factor below.

*A. Whether the claims challenged in the AIA proceeding are the same as or depend directly or indirectly from claims at issue in the concurrent parallel Office proceeding*

The claims challenged in the AIA proceeding (claims 1–5) are the same claims at issue in the EPR. *See* Ex. 1021, 6; Ex. 2001, 1. This factor favors a stay.

*B. Whether the same grounds of unpatentability or the same prior art are at issue in both proceedings*

The same prior art, e.g., Lai, US 2017/0314777 A1 (Ex. 1012), and Tsuji, JP 2018041147 A (Ex. 1006), is at issue in this *inter partes* review and the EPR. *See* Paper 12, 6–7; Ex. 1021, 5; *see also* Paper 6 ("Prelim. Resp."), 1 ("[T]he central reexamination unit issued an office action ('the EPR Action') rejecting all claims (1–5) of the '336 patent based on the same primary references of Lai (US20170314777) and Tsuji (JP2018041147A; called Fujitsu in the EPR action) as used in this IPR."). This factor favors a stay.

*C. Whether the concurrent parallel Office proceeding will duplicate efforts within the Office*

Because the same claims at issue in this *inter partes* review are also at issue in the EPR, allowing both to proceed concurrently would duplicate efforts. This factor favors a stay.

*D. Whether the concurrent parallel Office proceeding could result in inconsistent results between proceedings (e.g., whether substantially similar issues are presented in the concurrent parallel Office proceeding)*

Because the same claims at issue in this *inter partes* review are also at issue in the EPR, there is a possibility of inconsistent results. This factor favors a stay.

*E. Whether amending the claim scope in one proceeding would affect the claim scope in another proceeding*

Because the same claims at issue in this *inter partes* review are also at issue in the EPR and Patent Owner may amend the scope of the claims in either proceeding, this factor favors a stay.

*F. The respective timeline and stage of each proceeding*

In this *inter partes* review, we entered a decision granting institution on February 19, 2025. In our decision, we instituted trial; according to statute a final decision must issue by February 19, 2026. Patent Owner notifies the Board that the Office issued a Final Office Action in the EPR on February 4, 2025, rejecting all claims (including claims 1–5). Ex. 3003; *see also* Ex. 3004, 3. However, prosecution has not closed in the EPR and Patent Owner retains the ability to file an after-final amendment or appeal to the Board. Accordingly, significant work remains in each proceeding. This factor is neutral.

*G. The statutory deadlines of the respective proceedings*

This *inter partes* review is subject to a statutory deadline that requires a final decision within one year of institution, absent a good cause extension. 35 U.S.C. § 316(a)(11). The EPR is required to be "conducted with special dispatch," but is not subject to a specific deadline. 35 U.S.C. § 305. This factor favors a stay.

*H. Whether a decision in one proceeding would likely simplify issues in the concurrent parallel Office proceeding or render it moot*

Because both proceedings involve the same claims, a decision in one proceeding could potentially simplify or render moot the other proceeding.

However, considering the current stages of the proceedings and the statutory deadline for this proceeding, this factor favors a stay.

## III. CONCLUSION

For the foregoing reasons, we find good cause for staying Reexamination Control No. 90/019,565 pending resolution of this *inter partes* review. *See also* Notice, 84 Fed. Reg. at 16,656 ("Good cause for staying a case may exist if, for example, an ongoing AIA proceeding, which is subject to statutory deadlines, is addressing the same or overlapping claims of a patent at issue in a parallel Office proceeding.").

## IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Reexamination Control No. 90/019,565 is stayed pending the termination or completion of IPR2024-01230;

FURTHER ORDERED that all time periods for filing further papers in Reexamination Control No. 90/019,565 are tolled for the duration of the stay, and no further papers shall be filed in the reexamination while this stay remains in place, without authorization; and

FURTHER ORDERED that, when the stay is lifted, a paper will be sent resetting the time periods for responding to any outstanding papers in Reexamination Control No. 90/019,565.

IPR2024-01230
Patent 10,690,336 B1

PETITIONER:

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