IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Ewing et al.

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Examiner: Jeffrey Pwu

Real Party in Interest: American Power Conversion Corporation

Title: VERTICAL-MOUNT ELECTRICAL POWER DISTRIBUTION PLUGSTRIP

Art Unit: 3992

Examiner: Christopher E. Lee

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

REDACTED **DECLARATION OF DOUGLAS A. BORS**

Sir:

Douglas A. Bors, PE, declares as follows:

1. Below I present a brief description of my background followed by a discussion of certain facts and my opinions regarding the features claimed in the '543 patent. I also present my observations regarding the facts and opinions expressed by STI's declarants Michael Aucoin, KC Mares, Chris Hardin, and Carrel Ewing presented by STI in support of their response, including on the issue of commercial success.

A. GENERAL BACKGROUND AND QUALIFICATIONS

2. I am the President and Owner of Sophometrics Inc., a technology consulting, electrical engineering, facility planning, and business consulting company in Washington State. I founded Sophometrics in 2003 in order to extend my reach to include collaborative team making (in the area of architectural design), and business consulting including risk analysis, and reliability analysis.

3. I was previously at Sparling, Inc., from 1980 to 2002. Sparling is an electrical engineering and technology consulting company in Seattle, Washington. I had built my career at Sparling and became Vice President of Technology Consulting and a member of the Board of Directors. I created the technology consulting group at Sparling beginning with my own consulting work and grew the technology consulting practice to include a force of 35 individuals. Also, I was the Director of Education at Sparling and developed and taught the majority of corporate classes for both the technology consulting group and for electrical engineering staff. As the principle technologist at Sparling, the largest electrical engineering firm in Seattle at the time, I was tasked to address many of the leading-edge industry problems spanning over two decades.

4. I hold two Bachelor of Science degrees from MIT; one in electrical engineering and one in art and design (architecture). This combination of schooling, including engineering and design, plus professional engineering and design experience, and professional teaching, has fostered my ability to understand both the context and detail of design issues, construction problems, and application concerns in my fields of interest.

5. I hold two patents, both are concerned with the efficiency and reliability of power transfer devices, especially transfer devices related to power supplies, power regulation, and conversion of power from direct current (DC) to alternating current (AC) or from AC to DC.

B. BACKGROUND IN DATA CENTER DESIGN

6. Over the course of my career, I have been involved in the design of data center installations and other critical computer facilities as project manager and principal

in charge. My data center design work includes work for large companies such as Microsoft, Amazon, Starbucks, government organizations such as the State of Washington and the Navy, and collocation facility operators such as Exodus communications, among others. Over the course of my career, I have been the project manager for the design of over twenty data centers. My work includes design of the electrical equipment within data centers, as well as considerations such as the type of equipment used and the layout and power distribution for the data center. In addition to this design work, I also have performed forensics consulting work for critical facility electrical systems that have failed in unexpected ways to ascertain the cause of the failure.

7. My work designing data centers includes design work in the 1999-2000 time frame. For example, beginning in 1998 I designed a series of large-scale data centers for Amazon.com. At the time, Amazon.com was a young growing company. I was asked to work to re-design their data center from an 800 square foot facility to a 5,000 square foot facility, and to triple the size of their data center within the succeeding two years. I was the project manager for this transition. In connection with my work for Amazon.com, I designed every major aspect regarding electrical distribution and server room layout of their new data center.

8. As an another example, in 2003, I was asked to re-design and update the data center facility that Microsoft operated at Canyon Park, Washington, a high-density, mission critical data facility of over 30,000 square feet. The project required elimination of several aspects of automatically-controlled switching in the electrical distribution system that led to lowered reliability. Instead, we were tasked to add just enough manual control to improve the reliability of procedures required for yearly electrical system maintenance. At the time of our work, the data center was over four years old.

9. I am currently President of the Northwest Chapter of the 7x24 Exchange. The 7x24 Exchange is a trade organization focused on the design, provisioning, maintenance, and management of data centers. The 7x24 Exchange is the leading knowledge exchange for those who design, build, use and maintain mission-critical

enterprise information infrastructures, 7x24 Exchange's goal is to improve end-to-end reliability by promoting dialogue among these groups.

10. In addition to my design work, I also am a teacher and presenter on topics relating to the design and reliability issues associated with data centers and other critical computer facilities.

11. In late 1998 I was invited to teach a section for the IEEE Gold Book, focused on reliability calculations for electrical systems. This class was delivered in March 1999. While preparing for this class, I realized that the formal calculation method described in the IEEE Standard was useful for testing alternative data center electrical system topologies (i.e., testing various proposed arrangements of redundant electrical components). Thus, I applied the IEEE methods to my project and overlaid the results with the more common topologies used by practitioners in the critical facility design community in the Northwest. In this talk, I described how Amazon's particular arrangement for grouping computers to accomplish specific tasks suggested a modified layout of power circuits to the racks, especially, the layout of redundant individual branch-circuits. The improvement implied by the modification was nearly an order of magnitude reduction in predicted failures for data centers.

12. In May 2000, I presented a talk for the 7x24 Exchange National meeting in San Francisco, CA, titled PRA (Probability Reliability Analysis) in Action. This talk described the application of probability reliability analysis techniques stemming from the IEEE Gold book and applied to data center design.

13. In November, 2001, I presented a talk for the 7x24 Exchange National meeting in Scottsdale, AZ, titled Convergence of AC & DC Electrical Power Infrastructures. This talk described my experience with DC systems at Zama and the relationship of DC to AC in the topical areas of cost, reliability, and scalability.

14. In June, 2002, I presented a paper for EPRI's PQA 2002 North America event in Portland, OR. This paper described the application of probability reliability analysis techniques related to data center design (similar to the May, 2000 presentation noted above).

15. In addition to the above, I am currently a teacher for NEEA/BetterBricks. NEEA is the Northwest Energy Efficiency Alliance, a consortium of power utilities in a four state region in the Northwest. NEEA funds BetterBricks to serve as a research and teaching arm to help architects and design engineers create more efficient buildings. About eight years ago, in mid-2003, NEEA became interested in energy effective data centers and I have helped them present several classes concerned with efficient electrical systems in critical environments, including data centers.

16. As a result of my significant experience in data centers and other critical computer facilities I am intimately familiar with all aspects of the design and operation of data centers. I am also familiar with the needs and concerns of the owners and operators of data centers and other critical computer facilities. I am also intimately familiar with manufacturers of power distribution and other equipment that operates within such facilities, including American Power Conversion Corporation, Liebert, Eaton, Caterpillar, Cummings, MGE, and many others. Many of these manufacturers are suppliers of rack level power distribution units ("PDU") as well as other equipment used in data centers such as racks and enclosures, cooling and fire system equipment, environmental and power monitoring devices, larger floor mount PDUs, uninterruptible power supply units ("UPS"), and generators. My familiarity with these aspects of the design and operation of data center and other critical computing facilities includes intimate familiarity with these aspects in the 1999-2000 time frame, as well as today.

17. In light of my experience, I have been asked to consider the claims and disclosure of STI's '543 patent from the perspective of one having experience in the design and operation of reliable data centers, and specifically in the context of data center development through the 1990's and up to about 2000.

18. I understand that STI has asserted that one of skill in the art is a designer or a manufacturer of a PDU device. I also understand that STI has specifically asserted that such a person would have been unfamiliar with certain aspects of the operation of a data center and would be unfamiliar with certain needs of data center operators and technicians in and around 2000. Based on this assertion regarding the limitations of one

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