UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VANGUARD PRODUCTS GROUP, INC., D/B/A VANGUARD PROTEX GLOBAL

Petitioner

v.

INVUE SECURITY PRODUCTS, INC.

Patent Owner

Case No.: IPR2020-00069
U.S. Patent No. 10,043,358

DECLARATION OF ERIC R. PEARSON
IN SUPPORT OF PATENT OWNER'S PRELIMINARY RESPONSE

EXHIBIT 2002

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VANGUARD PRODUCTS GROUP, INC., D/B/A VANGUARD PROTEX GLOBAL

Petitioner

v.

INVUE SECURITY PRODUCTS, INC.

Patent Owner

Case No.: IPR2019-1206
U.S. Patent No. 9,818,274

DECLARATION OF ERIC R. PEARSON
IN SUPPORT OF PATENT OWNER'S PRELIMINARY RESPONSE

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I, Eric R. Pearson, declare as follows:

1. I have personal knowledge of the facts stated in this declaration. If called to testify under oath, I could and would testify to these facts.

I. INTRODUCTION

2. I have been retained by Patent Owner InVue Security Products, Inc. ("InVue") as a subject matter expert in the present *Inter-Partes* Review ("IPR") of U.S. Patent No. 9,818,274 ("the '274 patent") before the Patent Trial & Appeal Board at the U.S. Patent and Trademark Office (IPR2019-1206).

3. I am being compensated in this matter at my standard consulting rate of $500 per hour. My compensation in this matter is not in any way dependent upon the outcome of this proceeding or upon any particular opinion that I provide in this declaration or that I may provide at any point during this proceeding.

4. I understand that this declaration is being presented as part of InVue's Patent Owner Preliminary Response to Petitioner Vanguard Product Group, Inc.'s ("Vanguard") Petition requesting *inter partes* review of the '274 patent. I have been informed that, if a review of the '274 patent is instituted, InVue will have the opportunity to present a Patent Owner Response thereafter. I reserve the right to supplement my opinions, as well as the bases for my opinions, expressed in this declaration in light of additional materials, including evidence that may be provided to me after submission of this declaration.

II. QUALIFICATIONS AND EXPERIENCE

5. I have over 41 years of experience with fiber optics in varying capacities.

6. My first fiber optic assignment was with Corning Glass Works, now known as Corning Incorporated (1978-1979). In that position, I began as a Senior process engineer and was promoted to co-manager of a four-shift manufacturing operation in the Corning optical waveguide pilot plant. My job involved managing the development of a consistent manufacturing process from an inconsistent process developed by the R&D scientists and engineers. While research and development personnel are happy when a process works once or twice, manufacturing process personnel want the process to work properly every time.

7. My second assignment was with Times Fiber Communications (1979-1981). I was the Plant Manager for both fiber and fiber cable manufacturing. That position required that I design, develop, and co-supervise the building of a manufacturing plant for production of both optical fibers and optical fiber cables. As a result of these first two fiber assignments, I became knowledgeable regarding the optical and physical performance of glass optical fibers and the packaging of fibers into cables to achieve mechanical and environmental performance goals.

8. In 1981, I established my consulting practice. My first major fiber assignment was as Business Manager for Whitmor Waveguides, a division of

Whitmor Wire and Cable (1982-1986). In that assignment, I was responsible for: a) design and development of approximately 200 fiber-optic cable and sensor products; b) design of fiber cable manufacturing equipment; c) sales, marketing, and testing of fiber-optic cables; d) establishing a cable assembly facility; and e) developing an optical fiber sensor that functioned by indicating structural bending from transmission power changes that were induced by micro-bending. From my assignments at Times Fiber Communications and at Whitmor Waveguides, I developed an understanding of fiber-optic cable specifications, cable performance during handling, and fiber in a sensor mechanism. These assignments required me to consider and address the effects and remedies of various aspects of fiber bending, such as those likely to occur in embodiments of the '274 patent and certain references relied upon by Petitioner, including International Publication No. WO 2011/045058 to Brenner (Ex. VPG-1003, "Brenner"). More specifically, this experience provides me with the ability to opine on power losses in fibers and cables during bending.

9. For approximately four years after Whitmor Waveguides, I provided technical and marketing consulting services to companies interested in, or involved in, fiber-optic communications. Starting in 1990 and continuing to the present day, I develop and deliver training programs on fiber optic network design and installation.

10. Some of these assignments included design and delivery of fiber links and networks. Others included designing optoelectronic transmitters and receivers. These assignments expanded my understanding of the processes of conversion of optical to electrical and electrical to optical transmission, processes that are relevant to the transceivers addressed in this proceeding. The processes of signal conversion of optical to electrical, electrical to optical and optical transmission through air and fiber are the same for distances, both short (e.g., a matter of feet) and long (e.g., kilometers). Accordingly, I am qualified and able to opine on the transmission of optical signals in both sensors and transmission links.

11. In addition, from 1995 to 2007, I was a Director of the Fiber Optic Association. From the FOA, I have five certifications: Certified Fiber Optic Technician (CFOT), Certified Fiber Optic Specialist in Connector Installation (CFOS/C), Certified Fiber Optic Specialist in Splicing (CFOS/S), Certified Fiber Optic Specialist in Testing (CFOS/T), and Certified Fiber Optic Specialist in Instruction (CFOS/I).

12. My certifications and involvement with the Fiber Optic Association resulted in presenting training programs that have resulted in certification of more than 1000 installation personnel. These programs have resulted in the certifications of: CFOT, CFOS/C, CFOS/T, and CFOS/S.

13. In addition, I have provided extensive training services to those seeking to become competent in fiber optic design, installation, and operation. To date, I have trained nearly 9,000 individuals in fiber optics, providing me with strong insight into the level of ordinary skill in this field. As a result of these activities, the Fiber Optic Associate has recognized me as a "Master Instructor."

14. I have also been designated as a Master Instructor by the Building Industry Consulting Services International (BICSI). For BICSI, I developed and presented the fiber-optic network design program, F0110. From 1999 until 2014, I presented this program. Because of my experience in network design, I can opine on issues concerning fiber link transmission, optical power loss in link components, and component reliability.

15. I have authored more than 100 articles for trade journals and books. I present a partial list in my curriculum vitae provided as Appendix A.

16. I am listed in: Who's Who Worldwide, Who's Who of Business Leaders, Who's Who in Technology and Who's Who in California. I have been quoted in fiber optic and related trade journals. From 1986-2002, I was a Member, Editorial Advisory Board, Fiberoptic Product News.

17. I have two degrees in Metallurgy and Materials Science: a Bachelor of Science from Massachusetts Institute of Technology (1969) and a Master of Science from Case Western Reserve University (1971).

III. LEGAL PRINCIPLES

18. I am not an attorney, nor have I independently researched the law on the issue of patent validity. Attorneys for the Patent Owner explained certain legal principles to me that I have relied upon in forming my opinions set forth in this declaration.

19. I have been asked to provide my opinions regarding the validity of the '274 patent in light of the arguments and evidence offered by Petitioner and John "Jack" Figh, Jr., identified by Petitioner as its expert, as it relates to the purported motivation or reasons to combine International Publication No. WO 2011/045058 to Brenner (Ex. VPG-1003, "Brenner") and U.S. Patent No. 5,912,619 to Vogt (Ex. VPG-1005, "Vogt"). Petition at 18-23; Ex. 1007 ¶¶ 43-49, 62-72.

20. I have been informed by counsel that in *Inter Partes* Review, the petitioner bears the burden of proving unpatentability by a preponderance of the evidence.

21. I have been further informed that patents and other publications that are publicly available even one day before the "effective filing date" of the '274 patent are considered "prior art" to the patent. I have been informed that, in certain circumstances, the effective filing date for a patent may be earlier than the patent's filing date. Although I do not have any reason to believe that this distinction has any relevance in the circumstances of this proceeding, I have been told to assume

for the purposes of this declaration that the effective filing date for the '274 patent is the earliest possible priority date for this patent, or May 28, 2015. I understand that, in assuming this date as the effective filing date, I am also establishing the time at which the state of the art is measured. By selecting the earliest possible date, I understand that I am also making the most conservative estimate of the state of the art.

22. I understand that Petitioner has alleged in its Petition that claims 1, 2, 4, 9-11, 14, 15, 19-25, 28, 30, 31, 33-36, 38, and 39 of the '274 patent are invalid as obvious in view of various combinations of references. I have been informed that an obviousness inquiry assesses whether the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art.

23. I have been further informed that a determination of obviousness involves consideration of: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the relevant art; and (4) objective indicia of non-obviousness. In reviewing the combination of different elements found in the prior art, I understand from counsel that it is important to examine the motivation or reasons that one of ordinary skill would or would not combine those elements and whether there would be a

reasonable expectation of success in making the combination. I understand that the reason to select and combine features may be found in the prior art, in the nature of any need or problem in the field addressed by the patent, in the knowledge of a person of ordinary skill in the art, or in the common sense or the ordinary level of creativity exhibited by a person of ordinary skill in the art as of the effective filing date. I further understand that the reason need not be express or explicitly disclosed in a given prior art reference.

24. In contrast, I have been informed that there if there is no motivation or reason to combine disclosures from different prior art references, if there is no reasonable expectation of success in the combination, or if the prior art provides information that would have taught away from the combination or otherwise expressed doubt regarding the likelihood of success of the combination, then the patent claim is not obvious.

25. I also understand that it is impermissible to employ hindsight by merely reconstructing the subject matter of the patent from prior art references without a reasonable rationale justifying the combination of elements from the prior art. In other words, I understand that the claimed invention may not be used as a template to guide the obviousness analysis, but that the inquiry must focus on what a person of ordinary skill in the art would have understood prior to the effective filing date of the patent at issue.

IV. MATERIALS CONSIDERED

26. In preparing this declaration, I considered the '274 patent, the Petition for *Inter Partes* Review in this proceeding and its exhibits, the file histories of the '274 patent and its child application (resulting in U.S. Patent No. 10,062,253), the publications set forth in Appendix B to this declaration, any other references cited herein, and my extensive experience in the field of fiber optics. I reserve the right to consider additional materials that may be brought to my attention during the course of this proceeding.

V. CLAIM CONSTRUCTION UNDER 37 C.F.R. § 42.104(B)(3)

A. Level of Ordinary Skill in the Art

27. A person of ordinary skill in the art ("POSA") would have at least a Bachelor of Science degree in electrical engineering, mechanical engineering, materials science, or some equivalent level of education, as well as experience with the design and application of fiber optic cabling, optical communication components, and data transmission.

28. I disagree with Petitioner's identification of the level of ordinary skill, both on the basis of what it includes and what it omits. *See* Petition at 4.

29. In particular, I disagree that the subject matter of the challenged claims of the '274 patent require four to five years of experience working with "point-of-purchase anti-theft devices." Although I recognize that the preamble to

the challenged claims of the '274 patent is written in the context of "[a] security system for securing an item of merchandise," this specific application is not uniquely relevant to the interaction of optical sensors, transceivers, and cabling otherwise addressed, for example, in claim 1 of the '274 patent.

30. Indeed, many of the references that the Petition relies upon have no exclusive relationship to "point-of-purchase anti-theft devices." For example, U.S. Patent No. 6,169,295 to Koo (Ex. VPG-1004, "Koo") "relates generally to infrared (IR) sensors and transmitters, and more particularly to integrated IR transceiver modules." Koo at 1:4-6. Likewise, Vogt (Ex. VPG-1005) "relates to a system for monitoring relative displacement between one object and another object normally located adjacent to, or in close proximity of, the sensor employing energy in the frequency of light…." Vogt at 1:14-18. Simply put, a skilled artisan need not have extensive experience in "point of purchase anti-theft devices" in order to understand the teachings of these references, which have numerous uses beyond this one limited application.

31. Instead, the challenged claims of the '274 patent fundamentally involve optical communication using optical components and cabling as applied in a particular application. Mere experience with point of purchase anti-theft devices or general engineering education alone would not suffice to give a POSA knowledge sufficient to understand the many intricacies of a broad field such as

optical communication. Therefore, in my opinion, specific experience with optical fiber, sensors, and other optical communication components is absolutely essential to qualify an individual as having even an ordinary level or skill in the art. This requisite knowledge is absent from Petitioner's formulation of the level of ordinary skill, an omission having great significance, as I will show in my analysis below.

B. Claim Construction

32. I have not been asked to consider claim construction. Rather, I have been told that, for the purposes of this declaration, I should adopt the claim constructions proposed by Petitioner and otherwise consider all remaining claim terms to carry their plain and ordinary meaning to one of ordinary skill in the art.

VI. THE PETITION HAS FAILED TO ESTABLISH THE OBVIOUSNESS OF ANY OF THE CHALLENGED CLAIMS

33. In my opinion, Petitioner has failed to establish the obviousness of any of the challenged claims, at least because Petitioner has failed to provide a reasonable rationale explaining why one of ordinary skill in the art would replace the optical waveguide disclosed in Brenner with the standard electrical conductors purportedly disclosed in Vogt. *See* Petition at 22-23.

34. As explained more fully below, the rationale provided by Petitioner for combining these aspects of Brenner and Vogt is: (1) contrary to the state of the art of fiber optics as of May 2015, the earliest possible priority date for the '274 patent, and (2) based on assumptions that are neither supported in the Petition nor

inherently true. To the contrary, Petitioner's assumptions are false and thus fail to support its proposed rationale.

35. In particular, Petitioner explicitly states that a component of the system disclosed in Brenner—an optical waveguide—is unfit for the purpose for which Brenner discloses it and thus a skilled artisan would be motivated to discard it out of hand. Petition at 19, 21; Declaration of John "Jack" Figh, Jr. (Ex. VPG-1007, "Figh Decl.") at ¶¶ 44-45. I disagree.

36. In order to understand the numerous flaws in this rationale, it is useful to briefly address the security system disclosed in Brenner. Brenner teaches an apparatus for securing objects, more particularly exhibited goods, against theft. Brenner at 1. The security system of Brenner includes a sensor unit, a base unit, and a securing tether connecting the sensor and base units. *Id*. The securing tether includes an optical waveguide (i.e., a fiber optic cable) within the tether that is used to communicate optical signals between the sensor and base units. *Id.* at 2.

37. The sensor unit of Brenner is attached to an item sought to be protected. *Id*. at 1. In doing so, a push-button on the surface of the sensor unit is depressed. *Id*. Thus, in the event that the protected item is removed, the push-button is released, causing the sensor unit to send an optical signal through the optical waveguide to the base unit. *Id*. at 2. As an alternative safety mechanism, Brenner explains that the sensor unit may be connected to the optical waveguide in

such a way that the end of the waveguide terminating at the sensor unit is exposed when a protected item is unexpectedly removed, permitting light to travel down the optical waveguide to the base unit and triggering an alarm. *Id*. at 4.

38. Brenner further teaches various embodiments of the securing tether that might be useful in enabling handlers of the protected items to lift the item from its resting position and thus inspect the item. In one instance, Brenner suggests that the securing tether may constitute a spiral cable. *Id*. at 5. One can understand a spiral cable to be shaped like the cord of a corded telephone. In another embodiment, Brenner teaches that the securing tether may be wound in a winding device under tensile stress. *Id*. In other words, the winding device might be a reel that retracts the securing tether automatically following extension of the tether by a customer.

39. According to the Petition, a POSA would have been motivated to modify the system of Brenner by replacing the optical waveguide. The Petition seeks to support this conclusion by reliance on Mr. Figh's assertion that "[i]t is a well-known fact that when an optical waveguide is subjected to bending or winding, it is prone to at least two types of signal loss: 'curvature loss' and 'microbend loss.'" Petition at 19; Figh Decl. ¶ 44. As a result of these losses, the Petition argues that "[a] POSA would have immediately realized that the optical waveguide [of Brenner] in a spiral cable or when wound under tensile stress would

be prone to signal loss and physical damage." Figh Decl. at ¶ 44; Petition at 19. On this basis, the Petition concludes that a POSA would have recognized that the system "is prone to reliability issues due to signal loss in the optical waveguide." Petition at 21; Figh Decl. ¶ 45. Thus, the skilled artisan would purportedly have been motivated to replace the optical waveguide of Brenner with electrical conductors. Petition at 22-23.

40. I disagree. Aside from directly contradicting Brenner's express indication that the optical waveguide would be reliable when used in this exact scenario, these statements contain numerous errors, omissions, and improper assumptions that are inconsistent with the state of the art as of May 28, 2015 and which negate the ultimate conclusion drawn in the Petition. I will address each of these omissions and improper assumptions in turn.

41. First, the Petition errs in making the false assumption that "curvature loss" and "microbend loss" necessarily result in "signal loss." To explain this error, it is first necessary to understand what these terms mean.

42. I begin with the term "signal loss." Light traveling through an optical fiber has a specific intensity. As the light travels along its path, it is scattered by the atoms in the core (center region) of the fiber towards the side of the fiber. This main mechanism for such power loss is known as Rayleigh scattering. This mechanism is analogous to observing light from a flashlight from the side of the

beam in a dark, dusty room. The light in the beam is scattered to the side by the dust particles. This scattering results in a reduction of intensity, a **power loss,** of the forward traveling beam.

43. In an optical fiber, there is a similar reduction in power. In an optical fiber, reduction in intensity (power loss) from Rayleigh scattering occurs when this scattered power arrives at the core/cladding boundary of the fiber at an angle greater than the critical angle of the fiber. Dennis Derickson, Fiber Optic Test and Measurement, 448 (1998) (Ex. 2011); *see also* Ex. 1002 at 545-546 (defining "macrobend," "macrobend attenuation," and "macrobending"). Such power escapes from the core and is lost from the forward traveling power. Ex. 2011 at 448 ("The mechanism (Rayleigh scattering) does not cause elimination or conversion of optical energy but simply forces a part of the optical wave (that is, energy or power) to escape from the waveguide."); Optical Fiber Loss and Attenuation, *available at* https://www.fiberoptics4sale.com/blogs/archive-posts/95048006-optical-fiber-loss-and-attenuation (Ex. 2012) at 5-7.

44. **Signal loss**, in contrast, addresses the ability of an optical receiver to detect the light intensity (aka, power level) and convert that optical power into an electrical signal nearly identical to the electrical signal presented to the optical transmitter for transmission. Only when the power of the light at the receiver drops below the operational threshold (that is, the receiver sensitivity) of a given

receiver does signal loss occur. Martin H. Weik, Fiber Optics Standard Dictionary, 263 (2d ed. 1989) (Ex. 2005) (defining "receiver optical sensitivity" as "[t]he worst-case value of input optical power (dBm) coupled into a receiver, as measured on the line side of the receiver connector under specified standard or extended operating conditions, that is necessary to achieve the manufacturer–specified bit error ratio (BER) as measured under standard procedures").

45. As a result, a POSA would understand that the transmission of light in an optical fiber is likely to result in a power loss, but such a loss does not necessarily result in a signal loss. Moreover, different optical receivers have different signal loss thresholds, that is, sensitivities (*see* ¶ 44), depending on the design and materials employed in the manufacture of the receiver. As such, a POSA would understand that a power loss in the transmission of light through an optical fiber may result in signal loss in one optical receiver but that same power loss may not result in signal loss in an optical receiver that functions at reduced signal strength (power) level.

46. "Curvature loss" refers to power loss associated with macrobending of optical fiber. Exhibit VPG-1002 at 196. In optical fibers, a macrobend is a bend large enough to be seen by the human eye. What Are Bend Insensitive Fiber Optic Cables, *available at* https://patchbox.com/blog/the-patchblogs-1/post/what-are-bend-insensitive-fiber-optic-cables-11 (Ex. 2013). To avoid significant power

losses, the radius of a macrobend in optical fiber should be greater than the minimum "bend radius". At a radius less than this minimum, light arrives at the core/cladding boundary at an angle greater than the "critical angle" of the optical fiber. Such light escapes from the core and results in power loss. This power loss may, or may not, result in signal loss, depending of the amount of power loss and sensitivity of the receiver. *See* ¶ 45; Exhibit VPG-1002 at 545; *see also* Ex. 2005 at 158. The "bend radius" of optical fiber represents how sharply a cable can safely bend at any given point without experiencing physical damage and degradation of receiver performance. Why Not Use Bend Insensitive Fiber Optic Cable to Reduce Bend Radius?, *available at* https://community.fs.com/blog/why-not-use-bend-insensitive-fiber-optic-cable-to-reduce-bend-radius.html (Ex. 2014) at 1.

47. "Microbend loss" is attributed to "optical power loss caused by a microbend, i.e., a small bend, kink or abrupt discontinuity" in the optical fiber. Exhibit VPG-1002 at 575-76. In certain circumstances, these disruptions in the interface between the optical fiber core (it's central region), and its cladding (its outer region) can cause light waves to scatter, decreasing the power level of the light within the fiber core.

48. In light of these definitions, it is evident that the Petition errs in assuming that "curvature loss" and "microbend loss" in an optical waveguide (i.e.,

an optical fiber) result in signal loss. Both curvature loss and microbend loss refer to power losses, not signal loss. Further, neither the Petition nor Mr. Figh's declaration provide any analysis of the factors necessary to calculate whether and how much power loss would occur in the Brenner system and whether that power loss would be sufficient to result in signal loss by the optical receiver/transceiver in the base unit of the system described in Brenner. Such an analysis would require at least a knowledge of the power delivered by the optical transmitter in the sensor unit, the materials and composition of the optical fiber (from which an appropriate bend radius could be determined), whether the optical fiber employed a sheath to support the fiber and, if so, the material and composition of that sheath, the type of receiver employed and the minimum power it requires to generate an accurate electrical signal. Without this analysis of the specific application taught by Brenner, it is purely speculative for the Petition to conclude that the Brenner system is prone to signal loss. This point is only further accentuated by the Petition's failure to address that Brenner specifically indicates the waveguide can be successfully used. Ex. VPG-1002 at 2 (indicating that transmission using a waveguide is possible and preferred: "According to the invention, said problem is solved in that the securing tether has an optical waveguide…."); *id*. at 3 (indicating that "the optoelectronic signal transfer device operates practically without wear.").

49. The second error in Petitioner's analysis arises in its assertion that "[a] POSA would have immediately realized that the optical waveguide [of Brenner] in a spiral cable or when wound under tensile stress would be prone to signal loss and physical damage." Figh Decl. at ¶ 44; Petition at 19. In other words, Petitioner contends that the spiraling or winding of the cable would generate curvature loss and microbending loss leading to signal loss and physical damage. Petitioner similarly argues that a POSA would have recognized that the Brenner system "is prone to reliability issues due to signal loss in the optical waveguide." Petition at 21; Figh Decl. ¶ 45.

50. Once again, I disagree. This assertion finds absolutely no support in materials presented by Petitioner. For the reasons discussed above, an analysis of the source power, transmission power loss, and power requirements of the receiver would be necessary to conclude that signal loss was likely to occur. Likewise, knowledge of the physical damage to the optical fiber would require knowledge of the fiber materials and forces acting on it. None of that information is provided by Petitioner. Indeed, the reference relied upon by Mr. Figh acknowledges that "curvature loss" occurs only "if the radius of the bend [of the optical fiber] is less than the critical radius." Exhibit VPG-1002 at 196. While the reference thereby acknowledges that bend radii exist for optical fiber where minimal or no energy loss occurs, Mr. Figh has not identified any circumstances under which the bend

radius (i.e., the critical radius) of optical fiber that was known and commercially available in or before May 2015 would have been violated such that the optical fiber could not have been used in the form of a "spiral cable … [or] wound in a winding device" as disclosed in Brenner. Brenner at 5-6. In fact, Mr. Figh has not analyzed the bend radius at all with respect to Brenner nor identified what bend radius would be typical in the relevant field. In the absence of such analysis, Petitioner's and Mr. Figh's unequivocal claim that optical fibers are prone to signal loss due to curvature loss and microbend loss is entirely speculative.

51. Nor would such information be within the knowledge of a POSA without the additional information about the materials, dimensions, other design considerations of the optical fibers and transceivers employed in the Brenner system. Brenner itself does not provide this information. In fact, Brenner provides only a conceptual blueprint and leaves it up to the skilled artisan to work out the design details. As such, a POSA would design the elements of Brenner system so as to avoid the power loss and signal loss constraints of which Petitioner warns. For example, a POSA would avoid curvature loss concerns by designing a coiled cord or winding device for use in the Brenner system that exceeds the minimum bend radius for the optical fiber material and size selected for the application.

52. Not only does Brenner itself directly contradict the Petition's assertion that coiled cords employing optical fiber would result in signal loss (Brenner at 5

(teaching that transmission is nearly without loss)), but other art available well before May 2015 expressly demonstrates that optical fiber was known and was commercially available that could readily be utilized with the security system of Brenner and was not "prone to reliability issues due to signal loss" when incorporated into a security tether. At least as early as 2005, "[o]ptical fiber coiled cords" (i.e., the spiral cable disclosed in Brenner at 5) were known. *See* U.S. Patent 7,349,610 to Ohsono (Ex. 2004) (hereinafter "Ohsono") at 1:19.

53. Indeed, in 2005 optical fiber that was suitable for use in "coiled cords in which no damage is caused to the optical fiber cord when the optical fiber cord is tensioned" was known and disclosed in Ohsono. *Id.* at 2:37-40 (emphasis added). U.S. Patent 7,349,610 to Ohsono disclosed optical fiber which could be wound to a diameter of between 12mm to 16mm (approximately 1/2 inch), resulting in insignificant loss. *Id.* at 4:37-49.

54. In addition to engineering the physical dimensions of the system so as to avoid significant power losses, a POSA could further limit power loss by the selection of fiber material. For example, most commonly, optical fiber has a circular cross-section and is often made from silica glass or another type of glass. Bob Chomycz, Fiber-Optic Installations: A Practical Guide, 19 (2000) (Ex. 2015) ("The core and cladding are commonly made from pure silica glass."). However, plastic optical fiber can be used in short-distance applications (such as in Brenner).

One reference indicates commercialization of plastic optical fiber by Mitsubishi Rayon and others in 1986. Plastic Optical Fiber: An Overview, *available at* https://www.sciencedirect.com/topics/materials-science/plastic-optical-fiber (Ex. 2016) at 2 (referenced in the initial paragraph of Section 10.7.1). I am aware of plastic fiber manufacturing as early as 1965.

55. A POSA would understand that, unlike glass fiber, plastic fiber is less sensitive to bending power losses than is glass fiber. Plastic fiber has a critical angle, or numerical aperture, that is larger than that of glass fiber. As the critical angle increases, the minimum radius to which a fiber can be bent without power loss decreases. Numerical Aperture, *available at* https://www.rp-photonics.com/numerical_aperture.html (Ex. 2017) at 5-6 (RP Photonics Encyclopedia entry for "Numerical Aperture" stating that "a higher NA has the following consequences:… bend losses are reduced; the fiber can be more strongly bent before bend losses become significant.") Notably, Brenner does not disclose the material of the optical fiber to be employed in its system. Thus, even if one were to accept Petitioner's unsupported contention that the power losses in the Brenner system attributable to curvature loss and microbending loss were so excessive as to result in signal loss, a POSA would recognize that merely employing plastic optical fiber would provide a much simpler solution than

fundamentally changing the entire system to replace the optical fiber with electrical conductors, as Petitioner proposes.

56. My disagreement with Petitioner's position is further supported by the availability of 'bend insensitive' fibers. At least as early as 2007, bend insensitive optical fibers were introduced and available in the marketplace. Bend Insensitive Fiber, *available at* https://www.thefoa.org/tech//ref/fiber/BIfiber.html (Ex. 2018) at 2. These optical fibers could be bent to small radii without significant loss. *Id.*; *see also* U.S. Patent No. 7,272,289 to Bickham at 1:50-62 (Ex. 2008) (disclosing in 2007 an operable optical waveguide fiber having a bend radius of 10 mm (i.e., a bend diameter of 20 mm)); U.S. Patent No. 7,680,381 to Bookbinder (Ex. 2009) (disclosing same in 2010); U.S. Patent Publication No. US2009/0060437 (Ex. 2019) at ¶¶ 7-9, 95 (disclosing in 2009 bend insensitive fiber operable with a bend radius between 4-15 mm). These known and commercially available bend insensitive optical fibers would function reliably as part of the security system disclosed in Brenner. A POSA would have recognized that bend insensitive optical fiber was commercially available in or before 2015, and that such fibers would function reliably as part of the security system disclosed in Brenner. For this reason, a POSA would not have been motivated to modify Brenner by replacing the waveguide.

57. Nor would a POSA have considered the issue of microbending loss to be a concern. One with experience or knowledge of optical fibers and communications would understand that the issues associated with microbending are significant only in applications that involve long distance optical communication, not over the very short distances involved in theft-security devices like, e.g., Brenner. U.S. Publication No. US2006/0045449 (Ex. 2003) at ¶ 20 (noting that "[m]icrobend losses are usually negligible for short lengths of fiber."); *id* at ¶ 36 (defining "short lengths" as including local communications systems, such as for premises wiring and patch cabling); *see also* U.S. Patent Publication No. US2010/0124396 (Ex. 2020) at ¶ 57 (defining "short sections of fiber (1-20 meters)" as appropriate for "fiber-to-the-home, access fiber, fiber-in-the-home applications, and fiber jumpers"). Over the very short distance represented by the securing tether of *Brenner,* any power loss attributable to microbends would be inconsequential and would not result in any signal loss with appropriately chosen transceivers.

58. Accordingly, contrary to the argument advanced in the Petition, a POSA would not have concluded that a spiral or wound cable would be prone to signal loss and physical damage or would otherwise present reliability concerns. For the reasons explained above, this statement is simply incorrect and inconsistent with the state of the art as of May 2015.

59. Third, and finally, the Petition errs in concluding that a POSA would have been motivated to modify the system of Brenner by replacing the optical waveguide with electrical conductors. Petition at 21-22; Figh Decl. ¶¶ 47-48. As demonstrated above, a POSA would have recognized that they have many options in designing the dimensions and materials employed in the Brenner system and would therefore have been able to avoid any power loss concerns. As such, a POSA would have found it much simpler to implement Brenner as described, rather than scrapping the optical waveguide in favor an undisclosed system employing electrical conductors, which itself would require engineering to design.

60. Moreover, adopting Petitioner's suggestion would have required a POSA to ignore that, as of 2015, the use of standard electrical conductors presents its own set of problems, including fatigue failure, from the same cable-bending concerns raised in Mr. Figh's declaration. For example, U.S. Patent 8,698,618 (Ex. 2010) to Henson (hereinafter "Henson"), which issued in April 2014, teaches away from the use of security cables including standard electrical conductors and identifies a "need to completely eliminate multi-conductor retractors in the retail display industry." Henson at 2:47-3:3; 3:11-12.

61. A POSA, knowing the teachings of Henson, would have been discouraged from employing standard electrical conductors in security cables. Because the optical waveguide of Brenner provided the skilled artisan with an

effective and reliable alternative, a POSA would not have been motivated to modify Brenner by replacing the waveguide with a security tether including standard electrical conductor.

62. I understand that each and every ground for invalidity advanced by Petitioner depends on the faulty reasoning set forth in the Petition and addressed above. Because the Petition fails to provide any plausible rationale or motivation to modify the Brenner system as proposed by Petitioner, the Petition fails to set forth any valid obviousness allegation. Accordingly, I conclude that Petitioner has failed to establish the obviousness of the challenged claims of the '274 patent.

VII. CONCLUSION

63. For the reasons set forth above, I conclude that a person of ordinary skill in the art as of May 2015 would have implemented Brenner exactly as disclosed, selecting optical fibers and components known in the art to eliminate any concerns that would result in signal loss. The skilled artisan would have had no reason—and Petitioner does not identify any valid reason—to discard the optical waveguide disclosed in Brenner in favor of designing a new system from scratch using electrical conductors. In the absence of such a rationale justifying the combination of Brenner with other references, as proposed by Petitioner, I conclude that Petitioner's proposed combinations do not render any claim of the '274 patent invalid as obvious.

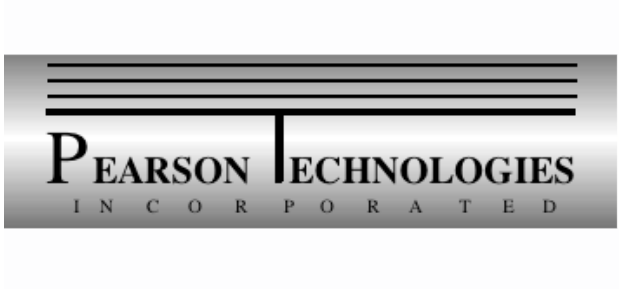
I hereby declare, under penalty of perjury, that all statements made herein based on my own personal knowledge are true and that all statements made based on information and belief are believed by me to be true. I have been warned, and I understand, that willful false statements and the like are punishable by fine, imprisonment, or both under 18 U.S.C. § 1001, and may jeopardize the validity of the '274 patent involved in this proceeding.

Dated: 10/10/2019

Eric R. Pearson

Appendix A

Declaration of Eric R. Pearson in Support of Patent Owner's Preliminary Response



Pearson Technologies Site Map

HOME

Training Technical Services Benefits Satisfied Clients Free Resources

Gallery Training Products Contact Experience

36 Years Of Superior Fiber Optic Services And Products

SIGNIFICANT & EXTENSIVE FIBER OPTIC EXPERIENCE

TECHNICAL ASSIGNMENTS

Pearson Technologies Inc. has:

- Developed optical fiber manufacturing capability (Times-Fiber Communications, Corning Inc.)
- Developed optical cable manufacturing capability (Times-Fiber Communications, Whitmor Waveguides)
- Developed optical cable assembly operations for three clients
- Designed 200 fiber cables
- Developed fiber and cable manufacturing equipment
- Designed the first 50-fiber cable for plenum use (Strategic Defense Initiative Headquarters)
- Designed 32 FO transmission systems
- Designed and developed field installation equipment
- Managed and performed field installations
- Created more than 18 fiber optic training programs
- Created 20 fiber optic training manuals
- Made more than 540 fiber optic presentations

Provided support in 18 lawsuits

Trained more than 8900 in fiber optic communications

MARKETING ASSIGNMENTS

Pearson Technologies Inc. has:

Developed a profitable multi-million dollar cable and assembly business unit (Whitmor Waveguides)

Assisted fiber, cable, and connector companies in evaluation of potential entry into market

Assisted in evaluations of purchase of businesses

Conducted a confidential survey of reputation

Assisted companies in evaluation of market opportunities for products to be supplied to the fiber optic industry

Conducted the first market study of plastic optical fibers [POF]

FOUNDER'S EXPERIENCE

Mr. Eric R. Pearson, CFOS/C/T/S/I has been active in fiber optics for 39 years, 37 as President of Pearson Technologies Inc. His consulting work, training work and publications have earned him an excellent technical reputation.

For 12 years [1995-2007], Mr. Pearson was a Director of the Fiber Optic Association. His responsibilities included development of the certification process and examinations. He has been recognized as an FOA Master Instructor.

For 15 years [1999-2014], Mr. Pearson was a BICSI Master Instructor and developer of FO110: Fiber Optic Network Design.

He is listed in: Who's Who Worldwide, Who's Who of Business Leaders, Who's Who in Technology and Who's Who in California. He has written approximately 100 articles, reports, and presentations. He is frequently quoted in fiber optic and related trade journals. From 1986-2002, he was a Member, Editorial Advisory Board, Fiberoptic Product News.

Mr. Pearson has two degrees in Metallurgy and Materials Science: a Bachelor of Science from Massachusetts Institute of Technology and a Master of Science from Case Western Reserve University.

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Data Communications
Connection Technology
Atlantic Tech
Electrical Contractor
Interconnection
Broadcast Engineering

8 September 2018

Appendix B

Declaration of Eric R. Pearson in Support of Patent Owner's Preliminary Response

Materials Considered

- Petition for *Inter Partes* Review of U.S. Patent No. 10,062,253 Challenging Claims 1, 2, 4, 8, 9, 13, 15-19, 27, 28, 30, and 32 Under 35 U.S.C. § 321, 37 C.F.R. § 42.104
- Petition for *Inter Partes* Review of U.S. Patent No. 9,818,274 Challenging Claims 1, 2, 4, 9-11, 14, 15, 19-25, 28, 20, 22-26, 38 and 39 Under 35 U.S.C. § 321, 37 C.F.R. § 42.104
- U.S. Patent No. 9,818,274 (the '274 patent)
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- U.S. Patent No. 10,062,253 (the '253 patent)
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- Communication Standard Dictionary by Martin H. Weik (Ex. VPG-1002)
- English translation of International Patent Publication No. WO 2011/045058 ("Brenner")
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