

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC,
Petitioner,

v.

BELDEN INC.,
Patent Owner.

Case No. IPR2023-01062
Patent 6,570,095 B2

**DECLARATION OF DR. CHARLES A. ELDERING IN SUPPORT OF
PATENT OWNER PRELIMINARY RESPONSE**

CommScope v. Belden
IPR2023-01062

Belden EX-2001

Table of Contents

I.	Introduction.....	1
II.	Qualifications and Background	3
III.	Materials Considered	4
IV.	Relevant Legal Standards	8
	A. Level of Ordinary Skill in the Art.....	8
V.	The '095 Patent.....	10
VI.	Claim Construction.....	17
VII.	The Challenged Claims Are Not Anticipated Or Obvious.....	20
	A. Roberts Does Not Anticipate Claims 27-29. (Ground 1).....	20
	B. Yanagita Does Not Anticipate Claims 27-29. (Ground 7).....	32
	C. GmbH-866 Does Not Anticipate Claims 27-29 (Ground 3).	40
	D. The Combination Of Roberts And One Or More Of GmbH-866, Jachimowicz, And Gingue Does Not Render Obvious Claims 27- 33 (Ground 5).	47

I. INTRODUCTION

1. I, Dr. Charles A. Eldering, submit this declaration to state my opinions on the matters described below.

2. I have been retained on behalf of Patent Owner, Belden Inc. (“Belden”), as an independent expert for the above-identified *inter partes review* (“IPR”) proceeding involving Patent 6,570,095 B2 (“’095 Patent”).

3. Petitioner, CommScope Technologies LLC (“CommScope”), challenges claims 27-33 (the “Challenged Claims”) of the ’095 Patent.

4. I have been asked to, and have, reviewed the Expert Declaration of Kenneth Cornelison (“Cornelison” or “Mr. Cornelison”) in which Cornelison has asserted and offered opinions that all of the Challenged Claims are anticipated and/or obvious in view of the following prior art references: U.S. Patent No. 3,622,683 (“Roberts”) (EX-1009), German Patent DE 297 19 866 U1 (“GmbH-866”) (EX-1010), Japanese Patent Publication S43-15474 (“Yanagita”) (EX-1012), U.S. Patent No. 5,670,748 (“Gingue”) (EX-1013), and U.S. Patent No. 3,894,172 (“Jachimowicz”) (EX-1014) (collectively, the “Petitioner Prior Art”).

5. Petitioner sets forth eight different grounds, including three anticipation grounds and five obviousness grounds.

6. The anticipation grounds are as follows:

a. Ground 1 – Claims 27-29 are anticipated by Roberts

- b. Ground 3 – Claims 27-29 are anticipated by GmbH-866
- c. Ground 7 – Claims 27-29 are anticipated by Yanagita

7. The obviousness grounds are as follows:

- a. Ground 2 – Claims 30-33 are obvious in view of Roberts and one or more of Jachimowicz and Gingue
- b. Ground 4 – Claims 30-33 are obvious in view of GmbH-866 and one or more of Jachimowicz and Gingue
- c. Ground 5 – Claims 30-33 are obvious in view of Roberts and one or more of GmbH-866, Jachimowicz and Gingue
- d. Ground 6 – Claims 30-33 are obvious in view of GmbH-866 and one or more of Roberts, Jachimowicz and Gingue
- e. Ground 8 – Claims 30-33 are obvious in view of Yanagita and one or more of Jachimowicz and Gingue

8. I have been asked by Belden to prepare this Declaration setting forth my comments and opinions on whether the Challenged Claims would have been anticipated and/or obvious to a person of ordinary skill in the art at the time of the invention of the '095 Patent (1999) in light of the Petitioner Prior Art.

9. For the reasons that follow, I respectfully disagree with Mr. Cornelison. Instead, it is my opinion that the proposed grounds do not render any of the Challenged Claims anticipated or obvious. This Declaration sets forth my opinions

and the bases, reasons, and evidence relied upon in forming those opinions.

10. Although I am being compensated at a rate of \$475 per hour and reimbursed for reasonable out-of-pocket expenses, no part of my compensation depends on the outcome of these proceedings, and I have no other interest in these proceedings.

II. QUALIFICATIONS AND BACKGROUND

11. I believe that I am well qualified to serve as a technical expert in this matter based upon my educational and work experience.

12. I have degrees in both physics and electrical engineering, as well as extensive experience in the telecommunications industry.

13. I gained significant experience in the telecommunications industry as a systems engineer during my time with Alcatel in the 1990-1993 timeframe. During this time, I worked on the development of a Passive Optical Network (PON) telecommunications systems that delivered voice services to buildings over a fiber optic connection with the final connection to the subscriber being over twisted wire pair wiring. I was also involved in research regarding the use of Digital Subscriber Line (DSL) technology to deliver high-speed digital data services from the central office or a remote access point to the subscriber over twisted wire pair cable.

14. My later experience in the cable industry was gained during my time at General Instrument Corporation from 1993–1995. General Instrument was a

significant supplier of equipment to the Multiple System Operators (“MSO’s”). My work at General Instrument included development of products to put voice services over Hybrid Fiber Coaxial (HFC) networks including using the use of twisted wire pair cable for distribution of voice signals and in particular Plain Old Telephone Service (POTS) within the residence. I also developed detailed cost-performance analyses of traditional twisted wire pair, HFC, and Fiber to the Curb/Home (FTTC/FTTH) architectures for the delivery of residential voice, video, and data services.

15. Subsequent to my employment in the telecommunications industry and through my company, Technology, Patents, and Licensing, Inc. I gained further experience regarding the use of twisted wire pair cabling for transmission of high-speed digital signals using formats including but not limited to Asymmetric Digital Subscriber Line (ADSL) and Very High Bitrate Digital Subscriber Line (VDSL). This work included evaluation of crosstalk in these systems and optimization of the modulation format to increase the capacity of the system.

16. A copy of curriculum vitae is attached to this declaration as Appendix A.

III. MATERIALS CONSIDERED

17. I have been asked to provide my opinions regarding whether the Challenged Claims of the ’095 Patent would have been anticipated by and/or obvious

to a person having ordinary skill in the art at the time of the alleged invention, in light of the Petitioner Prior Art. It is my opinion that the Challenged Claims would not have been anticipated or obvious to a person having ordinary skill in the art at the earliest claimed priority date of the '095 Patent. (1999).

18. In forming my opinions expressed below, in addition to my own knowledge and experience based upon my work in the field of cable technology as described below, I have considered the documents provided to me by Belden's counsel ("counsel"):

EXHIBIT	DESCRIPTION
EX-1001	U.S. Patent No. 6,570,095 (the "'095 patent")
EX-1002	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Nov. 8, 2002 Notice of Allowance
EX-1003	Excerpt of Inter Partes Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Sept. 20, 2011 Action Closing Prosecution
EX-1004	U.S. Patent No. 6,998,537 (the "'537 patent")
EX-1005	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Nov. 2, 2004 Notice of Allowance
EX-1006	Excerpt of Inter Partes Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Sept. 20, 2011 Action Closing Prosecution
EX-1007	Declaration of Kenneth Cornelison
EX-1008	Curriculum Vitae of Kenneth Cornelison
EX-1009	U.S. Patent No. 3,622,683 ("Roberts")
EX-1010	English language translation of German Patent No. 297,19,866 U1 ("GmbH-866"), and attached Declaration of translator Anthea Heyes
EX-1011	German Patent No. 297,19,866 U1 (untranslated original)
EX-1012	English language translation of Japanese Patent Publication S43015470 ("Yanagita"), and attached Declaration of translator Anthea Heyes
EX-1013	U.S. Patent No. 5,670,748 ("Gingue")

EXHIBIT	DESCRIPTION
EX-1014	U.S. Patent No. 3,894,172 (“Jachimowicz”)
EX-1015	U.S. Patent No. 4,755,629 (“Beggs”)
EX-1016	Electronic Wire & Cable - A Users’ Guide: Performance and Selection, Section 5: Multiconductor Cables, AT&T (1987)
EX-1017	Whitham D. Reeve, Subscriber Loop Signaling and Transmission Handbook – Digital, IEEE Telecommunications Handbook Series (1995)
EX-1018	Whitham D. Reeve, Subscriber Loop Signaling and Transmission Handbook – Analog, IEEE Telecommunications Handbook Series (1992)
EX-1019	U.S. Patent No. 5,380,591
EX-1020	U.S. Patent No. 1,727,972
EX-1021	U.S. Patent No. 1,956,730
EX-1022	U.S. Patent No. 3,803,340 (Jachimowicz-340)
EX-1023	Canadian Patent Application No. 2,058,046
EX-1024	U.S. Patent No. 4,262,164
EX-1025	U.S. Patent Pub. No. 2006/0169478
EX-1026	U.S. Patent No. 4,253,890
EX-1027	U.S. Patent No. 5,283,390
EX-1028	U.S. Patent No. 5,969,295
EX-1029	G.F. Moore, Electric Cable Handbook, BICC Cables (3d. ed. 1997)
EX-1030	The New IEEE Standard Dictionary of Electrical and Electronics Terms (5th ed. 1993)
EX-1031	Neil Sclater and John Markus, Electronics Dictionary, McGraw-Hill (6th ed. 1997)
EX-1032	S. Yonechi et al., Application of Spacer Forming Technique to Communication Cables, International Wire & Cable Symposium Proceedings (1980)
EX-1033	U.S. Patent No. 7,179,999 (the “’999 patent”)
EX-1034	Excerpt of Inter Partes Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Oct. 14, 2011 Action Closing Prosecution
EX-1035	Alcatel Cable Systems Product Catalog
EX-1036	U.S. Patent No. 5,789,711
EX-1037	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Oct. 22, 2001 Non-Final Office Action
EX-1038	Excerpt of Prosecution History of U.S. Patent No. 6,570,095:

EXHIBIT	DESCRIPTION
	April 3, 2002 Final Office Action
EX-1039	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: March 3, 2004 Non-Final Office Action
EX-1040	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Terminal Disclaimer
EX-1041	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: May 18, 2004 Amendments
EX-1042	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: June 17, 2004 Final Office Action
EX-1043	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: September 20, 2004 Request for Continued Examination
EX-1044	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Sept. 9, 2005 Amendment
EX-1045	Excerpt of Inter Partes Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Feb. 24, 2012 Decision Granting Petition to Terminate Inter Partes Reexamination Proceeding
EX-1046	Excerpt of Inter Partes Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Feb. 24, 2012 Decision Granting Petition to Terminate Inter Partes Reexamination Proceedings
EX-1047	Excerpt of Inter Partes Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Feb. 24, 2012 Decision Granting Petition to Terminate Inter Partes Reexamination Proceedings
EX-1048	U.S. Patent No. 5,814,768
EX-1049	U.S. Patent No. 6,037,546
EX-1050	Excerpt of Inter Partes Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Jan. 11, 2010 Third Party Requester's Comments to Patent Owner's Response
EX-1051	Excerpt of Inter Partes Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Jan. 22, 2010 Third Party Requester's Comments to Patent Owner's Response
EX-1052	Belden Techs. et al. v. Superior Essex Comm'cns LP et al., No. 08-63-SLR, Dkt. 215 (D. Del. Aug. 8, 2010) – Claim Construction Order
EX-1053	Belden Inc. v. CommScope, Inc. et al., No. 22-783-RGA, Dkt. 292 (D. Del. May 26, 2023) – Scheduling Order
EX-1054	Declaration of Sylvia D. Hall-Ellis, PhD
EX-1055	English Translation of Japanese Patent Publication No. S43-15470

EXHIBIT	DESCRIPTION
	used in prior reexamination of US 6,998,537
EX-1056	Japanese Patent Publication No. S43-15470 (untranslated original)
EX-1057	English language translation of German Patent No. 297,19,866 U1 used in prior reexamination of US 6,998,537
EX-2001	Declaration of Dr. Charles A. Eldering in Support of Patent Owner Preliminary Response (“Eldering”)
EX-2002	Definition of “twisted pair” from Webster’s New World Telecom Dictionary, 2008

IV. RELEVANT LEGAL STANDARDS

19. In preparing this declaration and forming my opinions, I am relying on certain legal principles that counsel explained to me.

20. I have reviewed Mr. Cornelison’s summaries of the Relevant Legal Principles with respect to claim construction, anticipation, and obviousness. I do not disagree with those summaries.

A. LEVEL OF ORDINARY SKILL IN THE ART

21. I understand that a person of ordinary skill in the art is determined by considering (1) the type of problems encountered in the art, (2) prior art solutions to those problems, (3) the rapidity with which innovations are made, (4) the sophistication of the technology, and (5) the educational level of active workers in the field.

22. I understand that I must evaluate the ’095 Patent and the Petitioner Prior Art from the perspective of a person of ordinary skill in the art. That is, the ’095

Patent and the Petitioner Prior Art must be evaluated through the eyes of a person with ordinary skill in the relevant art at the time of the invention of this patent (“POSITA”).

23. I understand that the earliest application to which the '095 Patent claims priority was an application (No. 09/257,844) filed on February 25, 1999. I have been asked to assume that the invention date of the Challenged Claims is February 25, 1999 (*i.e.*, the time of the invention).

24. 7. It is my opinion that the '095 patent relates to telecommunications in general and telecommunications cables in particular. As stated in the “Field of Invention” portion of the specification of the '095 patent, “the invention relates to high-speed data communications cables having a light-weight, configurable core-refilling isolation pair separator that provides geometrical separation between the twisted pairs of insulated conductors.” '095 patent 1:16-20.

25. My opinions in this Declaration are based on the perspective of a person of ordinary skill in the art in the 1999 timeframe. This is true even if the testimony is stated in the present tense.

26. Based on the field of the invention and technological aspects, it is my opinion that a person of ordinary skill in the art of the '095 patent would have had at least a bachelor's degree in electrical engineering and a minimum of 3-4 years of industry experience in the telecommunications industry. I do not agree with Mr.

Cornelison that a POSITA would have to had direct industrial experience in the designing, manufacturing, and testing of twisted-pair data cables, as general experience in the field of telecommunications would include exposure to issues such as crosstalk, balanced and unbalanced transmission in transmission media including twisted wire pairs.

27. Based on my educational background and experience in the telecommunications field, and more specifically with telecommunications cables, I am qualified as at least a POSITA with respect to the '095 Patent. Thus, I am familiar with the knowledge of the POSITA. I am able to opine on how POSITA would have understood the disclosure and claims of the '095 Patent, the disclosures of the Petitioner Prior Art and other patents, the motivation to combine the prior art, and what combinations would have been obvious and not have been obvious to a POSITA.

28. Although my definition of a POSITA differs slightly from that offered by Mr. Cornelison, adoption of his definition would not change any of the analysis or opinions offered herein.

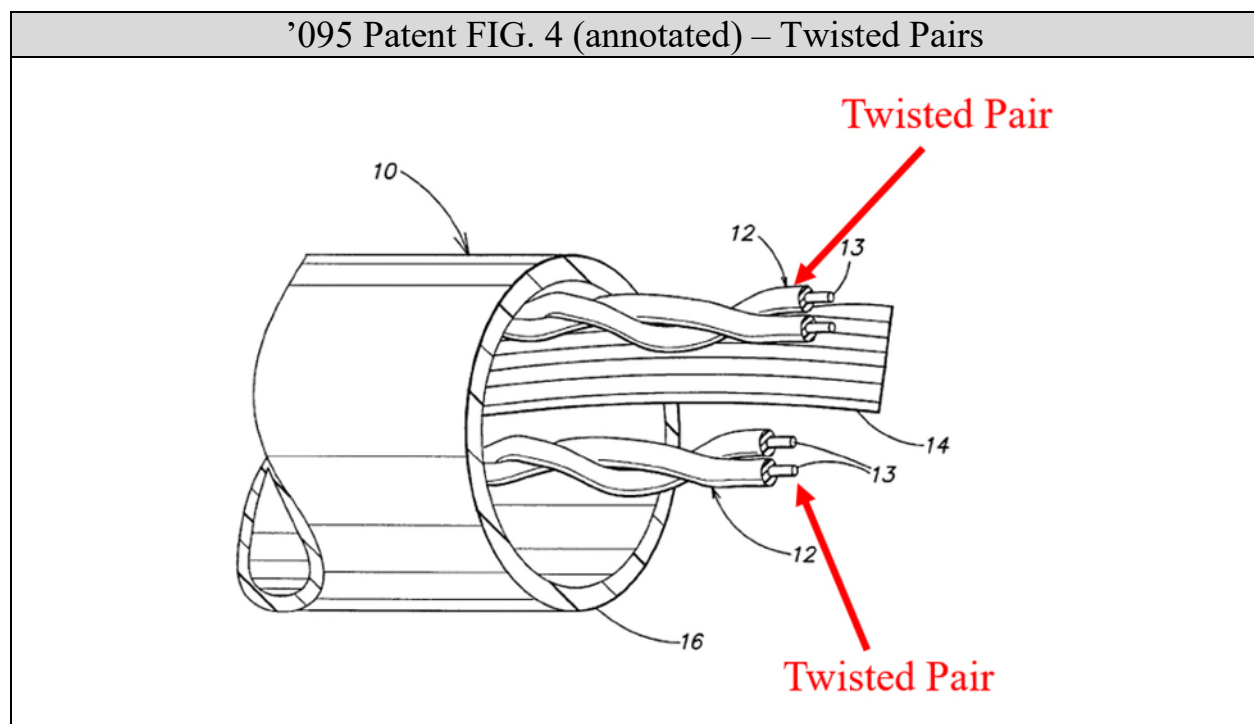
V. THE '095 PATENT

29. The inventions of the '095 Patent are directed to: “high-speed data communications cables using at least two twisted pairs of insulated conductors. More particularly, the invention relates to high-speed data communications cables

having a light weight, configurable core-refilling isolation pair separator that provides geometrical separation between the twisted pairs of insulated conductors.”

’095 Patent 1:14-21.

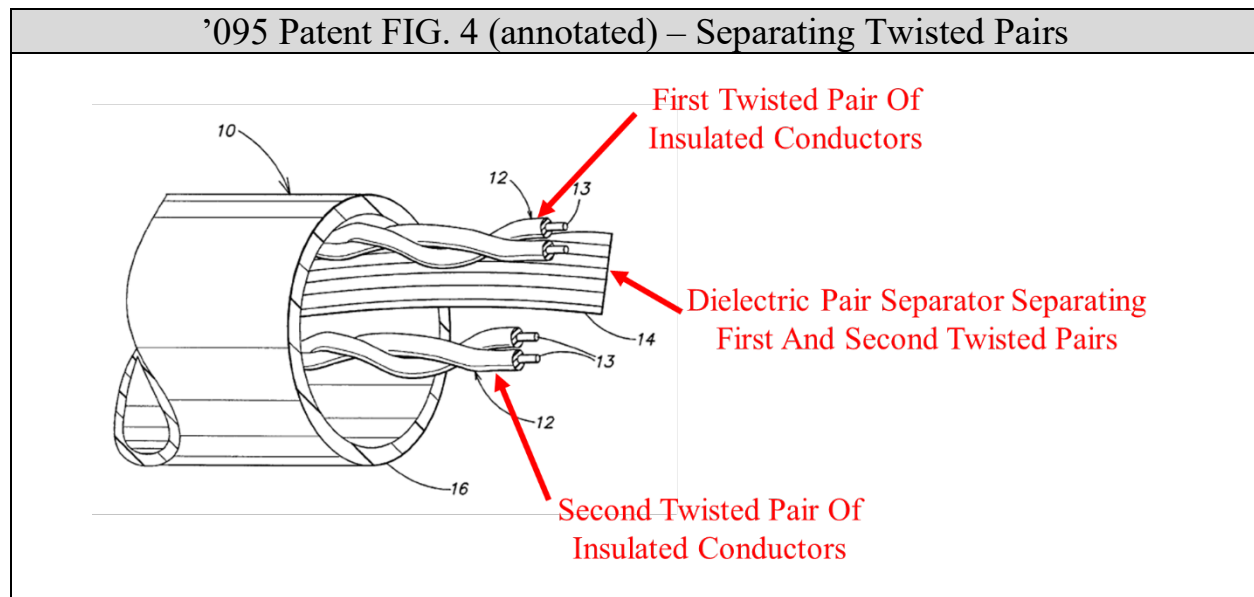
30. The specification of the ’095 Patent defines “twisted pairs” as “pairs of insulated conductors twisted together to form a balanced transmission line.” ’095 Patent 1:24-26. “FIG. 4 depicts an embodiment of a data communications cable 10 according to the present invention. The cable 10 includes *two twisted pairs 12* of insulated conductors 13.” ’095 Patent 4:59-61.



31. The ’095 Patent also relates to an improved data communications cable having “a plurality of twisted pairs of insulated conductors and a core made from a configurable, dielectric pair separator.” ’095 Patent 4:43-45.

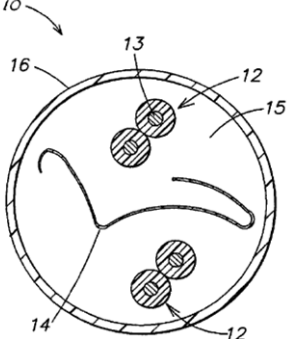
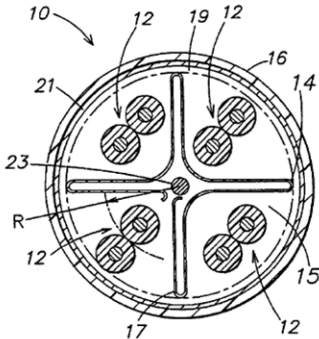
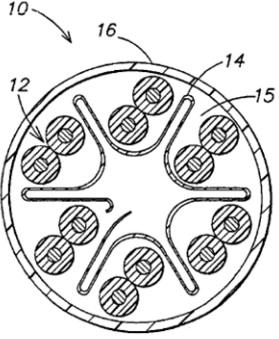
32. As the '095 Patent explains, “when twisted pairs are closely placed, such as in a cable, electrical energy may be transferred from one twisted pair of a cable to another twisted pair. Such energy transferred between twisted pairs is referred to as crosstalk. As operating frequencies increase, improved crosstalk isolation between the twisted pairs becomes more critical. '095 Patent 1:27-33.

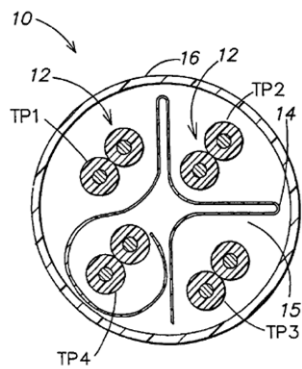
33. As shown in FIG. 4, “cable 10 includes two twisted pairs 12 of insulated conductors 13. The twisted pairs 12 are separated by a low dielectric constant, low dissipation factor, polymer ‘pair separator’ 14. The twisted pairs 12 and the pair separator 14 are encased within a jacket assembly 16.” '095 Patent 4:60-65, 1:19-20.



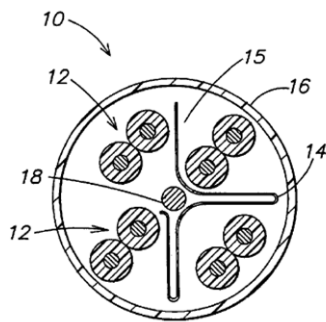
34. “[T]he pair separator improves the crosstalk isolation between the twisted pairs by providing desired spacing between the twisted pairs,” as it does in

each of the disclosed embodiments. '095 Patent 5:12-15.

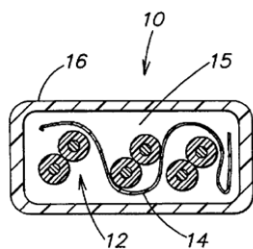
'095 Patent – Dielectric Pair Separator Provides Spacing Between Twisted Pairs	
 FIG. 5	“the pair separator improves the crosstalk isolation between the twisted pairs <i>by providing desired spacing between the twisted pairs.</i>” '095 Patent 5:12-15.
 FIG. 6	“The cable includes the low-dielectric constant, low-dissipation factor polymer pair separator 14 formed into a cable core in such a way as to physically separate the four twisted pairs 12, thereby decreasing field coupling between the twisted pairs, providing a desired opposite twisted pair-to-pair physical distance, as well as providing a desired adjacent pair separation.” '095 Patent 5:67-6:7.
 FIG. 7	“FIG. 7 depicts a cable 10 wherein six twisted pairs 12 are encased within the jacket assembly 16, and are separated from each other by the configurable pair separator 14.” '095 Patent 7:29-32.

'095 Patent – Dielectric Pair Separator Provides Spacing Between Twisted Pairs**FIG. 8**

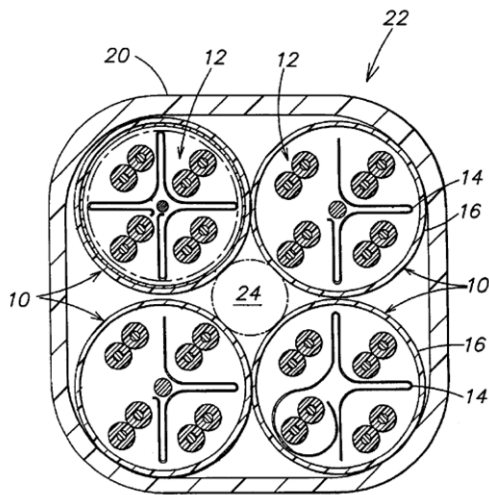
“Accordingly, with this embodiment of the cable of the invention, there can be selective enhancement of isolation between twisted pairs TP1-TP4, TP2-TP4, and TP3-TP4. It is to be appreciated that although the twisted pair TP4 has been illustrated as being isolated from the remainder of the twisted pairs, that any of the twisted pairs can be so wrapped with the filler and isolated.” ’095 Patent 7:55-61.

**FIG. 9**

“FIG. 9 depicts still another embodiment of the data communications cable 10 having multiple twisted pairs 12 encased within the jacket assembly 16 and physically separated from each other by the configurable pair separator 14 . . .” ’095 Patent 8:3-6.

**FIG. 10**

“Twisted pairs 12 are encased within a substantially flat jacket assembly 16 and physically separated from each other by the configurable pair separator 14.” ’095 Patent 8:26-28

'095 Patent – Dielectric Pair Separator Provides Spacing Between Twisted Pairs**FIG. 11**

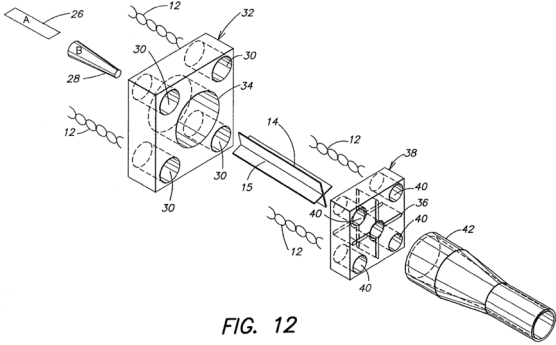
“In particular, each data cable 10 contains multiple twisted pairs 12 separated by the configurable pair separator 14 according to any of the above-described configurations, and encased in the jacket assembly 16.”
 '095 Patent 8:46-50.

35. In a twisted pair cable, “each twisted pair has a specified distance between twists along a longitudinal direction of the twisted pair, that distance being referred to as the ‘twist lay.’” '095 Patent 1:50-53.

36. The '095 Patent teaches that with the invention a reduction in the number of twist lays, namely a longer distance between twists, can be employed while achieving the same crosstalk isolation: “This embodiment of the invention [shown in Fig. 8] may also be used in conjunction with a lessening of the twist lays requirements for the twisted pairs, to provide cable having a same amount of isolation between twisted pairs as a cable with tighter twist lays. Accordingly, this embodiment of the cable according to the invention allows for selective design of isolation between particular twisted pairs of the cable and lessening of the twist lay requirements for the cable.” '095 Patent 7:62-8:2.

37. Accordingly, employing a dielectric pair separator between the various twisted pairs comprising the cable in order to physically distance them from each other provides “a high-speed data cable having multiple twisted pair wires with desired crosstalk performance, improved handling and termination capabilities, that is inexpensive, flexible and has a desired size.” ’095 Patent 2:60-64, 9:17-38.

38. In addition, the ’095 Patent teaches “bunching,” where the twisted pairs and pair separator combination may be additionally configured by twisting all of those components together when forming the data communications cable, to improve the mechanical properties of the cable, namely keeping the components of the cable in their respective positions. Regarding FIG. 12, the ’095 Patent teaches that:

'095 Patent FIG. 12	'095 Patent 9:2-12.
 FIG. 12	The formed pair separator 15 is then passed through opening 36 in second die 38 and brought together with the four twisted pairs 12 which are passed through corresponding openings 40 in the second die. The plurality of twisted pairs are then cabled with the formed pair separator by a third die 42, in an operation referred to as “bunching”. The third die places the twisted pairs in the channels 15 (see FIGS. 5-10) of the formed pair separator prior to twisting of the cable. It is to be appreciated that the cable can be twisted with any known twisting arrangement such as a helix, or an S-Z configuration.

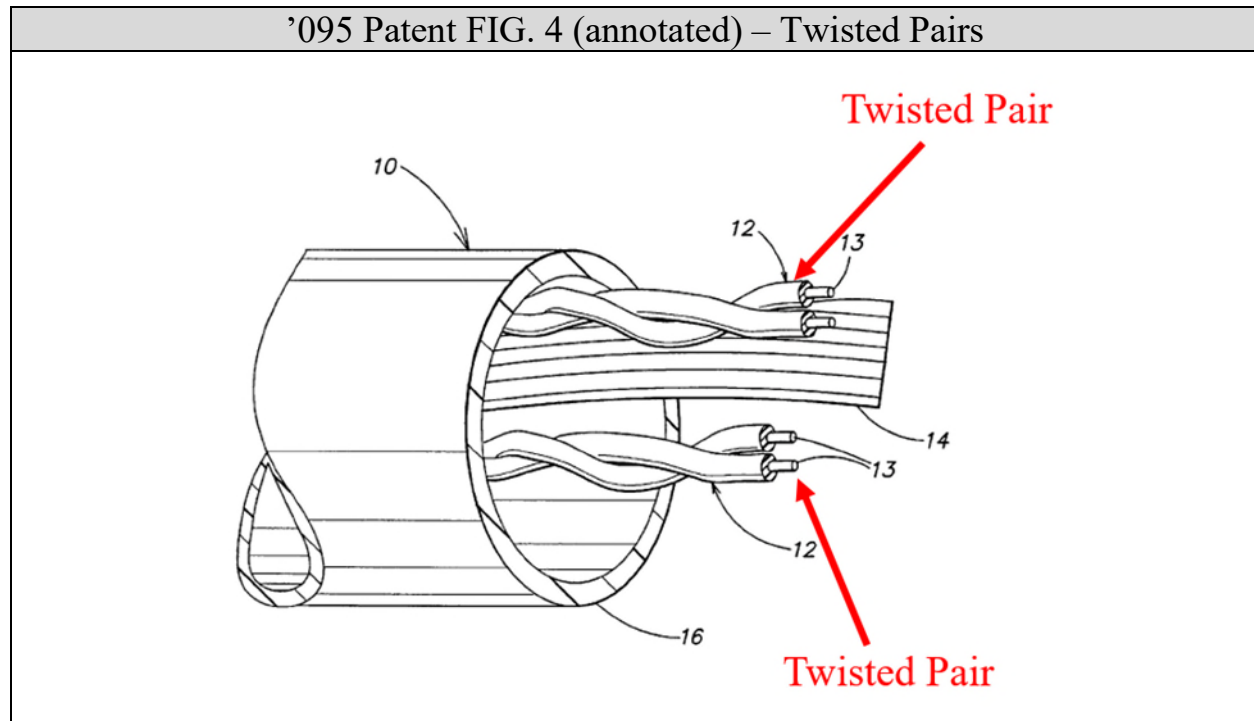
39. The “bunching” process taught by the ’095 Patent is different than, and entirely separate from, the helical twisting of a given pair of conductors together to form a “twisted pair.” Instead, the twisting associated with “bunching” involves all of the components in the cable, including the plurality of twisted pairs and the pair separator. ’095 Patent 9:2-12.

VI. CLAIM CONSTRUCTION

40. Neither Petitioner nor Cornelison proposed a construction for the term “twisted pair[s]” that appears over twenty times in the Challenged Claims. The specification of the ’095 Patent provides the following definition of the term: “High-speed data communications media in current usage include pairs of insulated conductors twisted together to form a balanced transmission line. Such pairs of

insulated conductors are referred to herein as ‘twisted pairs.’” ’095 Patent 1:23-26.

41. FIG. 4 of the ’095 Patent shows a “cable 10 includ[ing] two twisted pairs 12 of insulated conductors 13.” ’095 Patent 4:59-61.

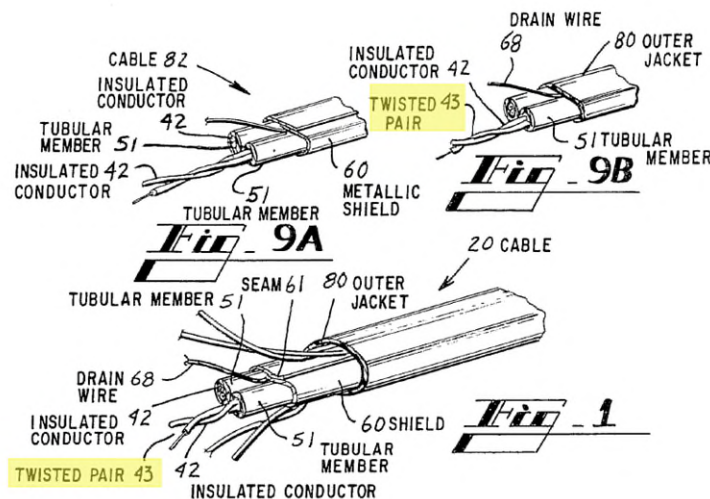


42. As shown in FIG. 4, the two, individual conductors in each pair (*i.e.*, each set of two separately insulated wires) are twisted together in a helix.

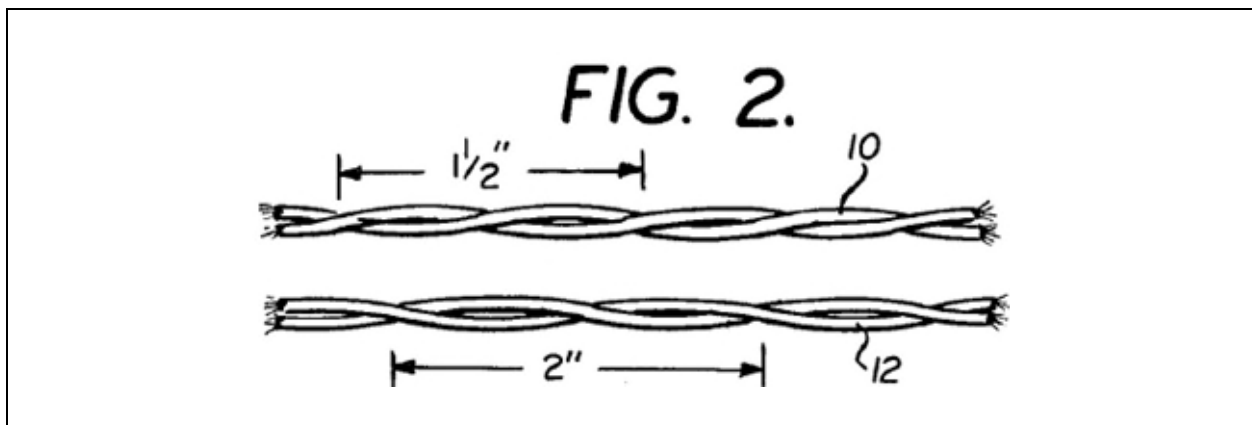
43. The ’095 Patent’s definition and depiction of twisted pairs is consistent with the definition of “twisted pairs” provided in a technical dictionary. See EX-2002 503 (“A twisted pair comprises two copper conductors, separately insulated by a dielectric material and smoothly twisted in a helix with a constant pitch or distance to make a 360° twist.”).

44. That plain and ordinary meaning of “twisted pair[s]” to a POSITA (*i.e.*,

requiring “*two* insulated conductors *twisted together*” as shown in FIG. 4 like the ’095 Patent’s definition that further requires that the pair form a balanced transmission line) is also shown in the figures and description of “twisted pair[s]” in some of Petitioner’s prior art references (*i.e.*, Beggs (EX-1015) and Jachimowicz (EX-1014)) that illustrate how twisted pairs constitute two insulated conductors twisted together in a helix.



Beggs 5:33-37, FIGS. 1, 9A, 9B.



Jachimowicz-172 2:66-3:4, FIG. 2 (twisted pairs 10 and 12).

45. The plain and ordinary meaning of the claimed “twisted pair[s]” that are separated by a dielectric pair separator to a POSITA is “two insulated conductors twisted together” as shown in FIG. 4 of the ’095 Patent.

VII. THE CHALLENGED CLAIMS ARE NOT ANTICIPATED OR OBVIOUS.

A. ROBERTS DOES NOT ANTICIPATE CLAIMS 27-29. (GROUND 1)

46. In Ground 1, Cornelison relied upon Roberts (EX-1009) to argue that claims 27-29 of the ’095 Patent were anticipated. EX-1007 ¶¶108-140. But Roberts does not teach separating a first “twisted pair” from a second “twisted pair” under the proper claim construction of “twisted pair” discussed above (i.e., “two insulated conductors twisted together” as shown in FIG. 4 of the ’095 Patent). In fact, Roberts does not even teach the use of any “twisted pairs.” Instead, Roberts teaches the use of a metallic shield to separate a bundle (i.e., more than a pair) of straight-line (i.e., non-twisted) transmitting wires (14) from another bundle of straight-line receiving wires (16). Roberts 1:14-31, FIGS. 1-3 and 17.

47. Roberts is directed to a system for isolating straight-line transmit and receive wires in an unbalanced transmission system using a conductive metallic shield. Roberts discloses dividing the individual straight-line conductors of a non-twisted pair by placing a conductive (i.e., metallic) shield between them.

A plurality of insulated electrical conductors (pairs), of an otherwise conventional telephone cable design are divided into at least two portions by plastic-coated metal foil strip or tape. Measurements

between pairs, divided by this plastic-coated metal foil, of unwanted energy transferred from one conductor to another by means of mutual inductive, capacity, or conductive coupling (crosstalk), shows greatly improved properties over undivided cable pairs or divided cable pairs of prior art. By dividing electrical conductor telephone pairs within a telephone cable structure with plastic-coated metal foil, the crosstalk properties are [] vastly improved . . .

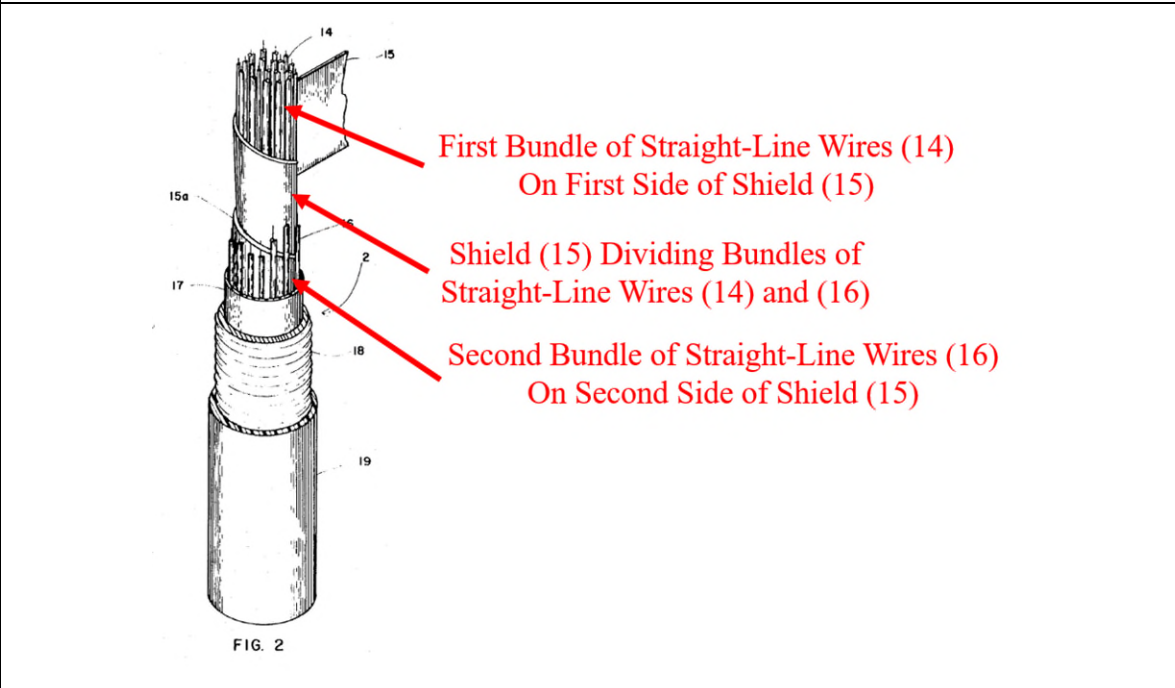
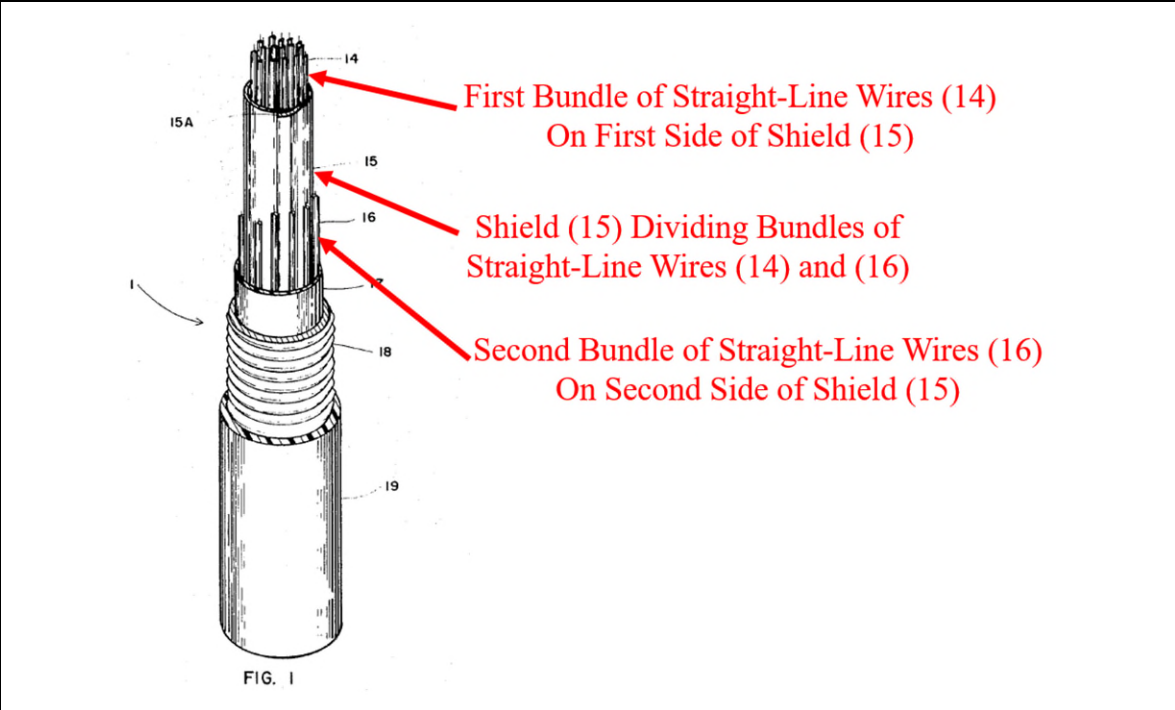
Roberts Abstract.

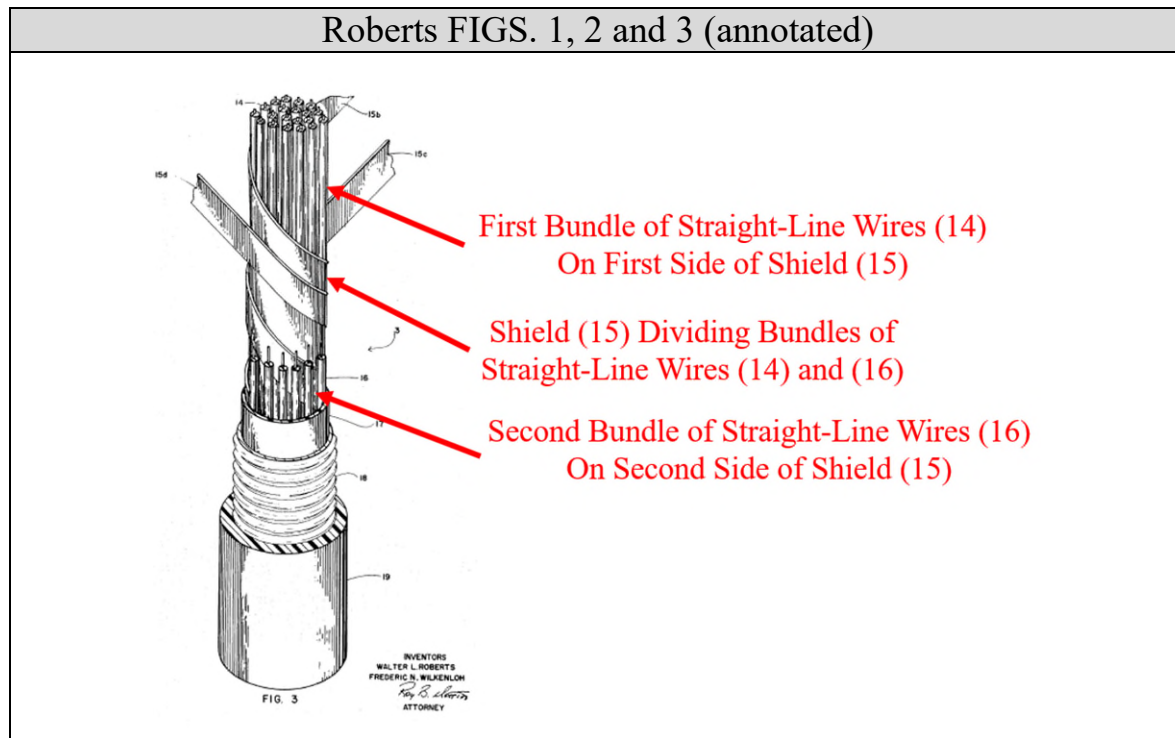
Accordingly, it is the purpose of this disclosure, to show how to arrange the conductors of a cable into two concentric groups, with a shield between the two groups of conductors. In such an arrangement of a cable, those conductors on one side of the shield may all be used for transmitting carrier frequencies in one direction, while the returned channels for transmission in the opposite direction will be applied to the conductors on the other side of the shield. . . . The instant invention also envisions and incorporates the concept of two distinct bundles of conductors inside a cable structure, one such bundle being electrically shielded from the other bundles and neither one of the aforesaid bundles necessarily being concentric around the other.

Roberts 1:14-31.

48. FIGS. 1, 2 and 3 of Roberts show the use of individual straight-line wires in each of the disclosed conductor bundles (14) and (16)—not “twisted” and not “pairs” of conductors—with the distinct bundles being separated by a metallic tape shield (15):

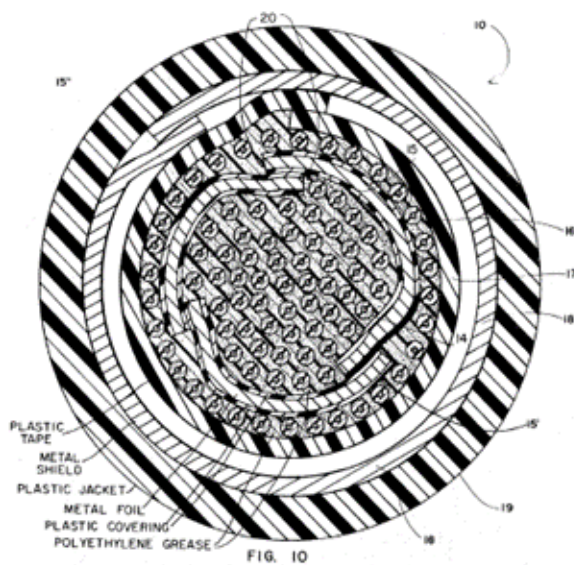
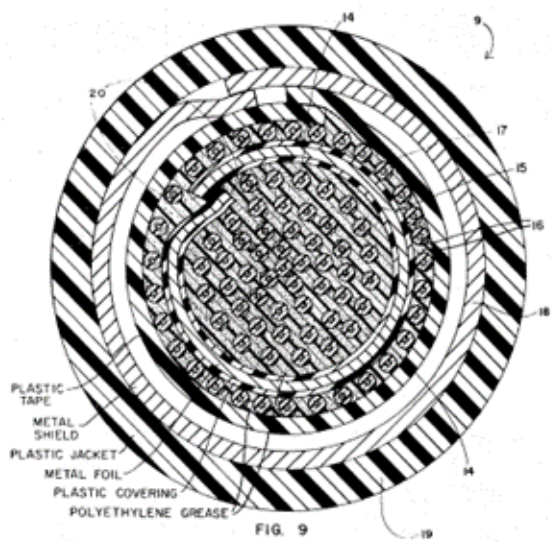
Roberts FIGS. 1, 2 and 3 (annotated)

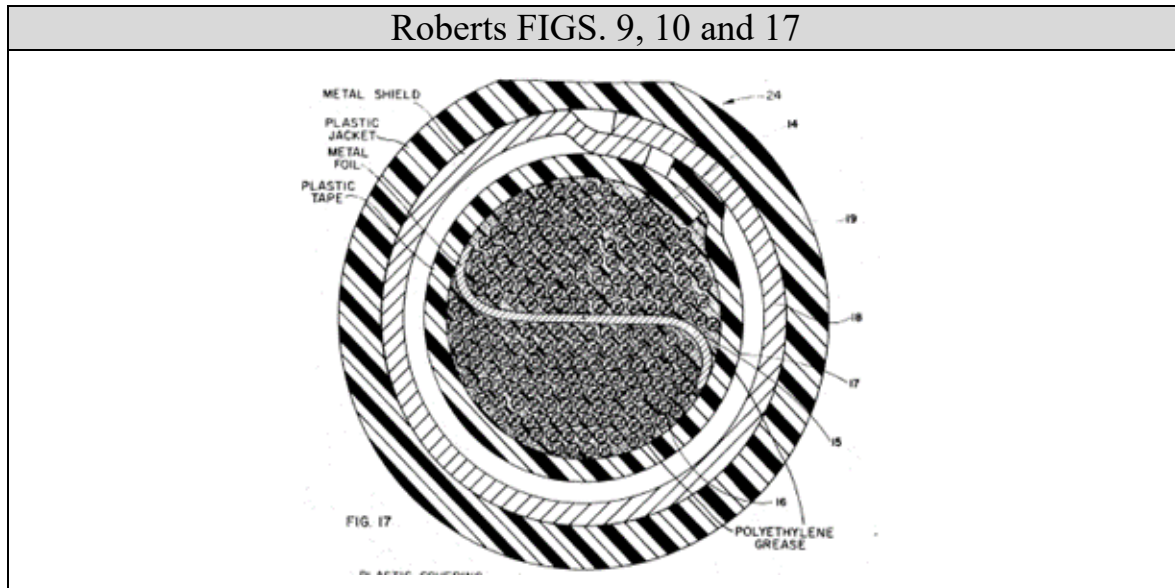




49. The cross-sectional view of the embodiment in Roberts relied on by Cornelison (FIG. 17) depicts conductors in conductor groups (14) and (16) in the same manner as the cross-sectional views of the cables shown in FIGS. 1 and 3 above, further teaching a POSITA how the conductors in Roberts are bundles of straight-line conductors, not twisted pairs. Roberts 2:39-46, 2-75.

Roberts FIGS. 9, 10 and 17





50. Roberts does not teach that its bundle of straight-line transmitting wires (14) could be the first twisted pair of insulated conductors limitations required by claims 27-29 of the '095 Patent. Roberts also does not teach that its bundle of straight-line receiving wires (16) could be the second twisted pair of insulated conductors required by claims 27-29 of the '095 Patent. The insulated electrical conductors that Roberts discloses cannot be the claimed “twisted pairs.” It would not make sense to a POSITA for the conductors disclosed in Roberts to be considered first and second twisted pairs.

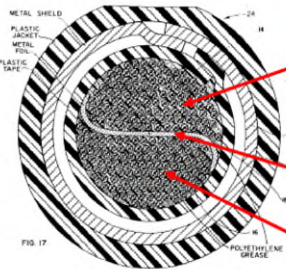
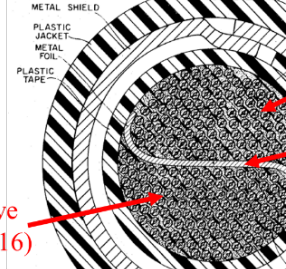
51. Cornelison fails to provide any citation to Roberts disclosing the presence or even suggestion of twisted pairs, let alone separated twisted pairs. Instead, Roberts discloses: “In order to transmit currents of the same frequency in both directions within the same cable, more particularly when the currents to be

transmitted are of carrier frequencies, it is desirable that the conductors used for transmitting in one direction be shielded (electrically) from those transmitting in the opposite direction.” Roberts 1:8-14. The non-twisted configuration disclosed in Roberts consists of (1) a bundle (i.e., more than a pair) of straight-line “transmit” wires (14) that are designed to transmit signals in one direction, (2) a bundle of straight-line “receive” wires (16) that are designed to receive signals in the opposite direction (i.e., reception), and (3) a metallic shield (15) between the transmit bundle of straight-line wires and the receive bundle of straight-line wires.

52. Roberts does not disclose that any “pair” of twisted wires are located on the same side of the shield. This makes sense because the purpose of Roberts’ teachings center on separating a non-twisted bundle of transmit wires from a non-twisted bundle of receive wires, not to separate a first twisted transmit and receive wire pair from a second twisted transmit and receive wire pair from each other.

53. Cornelison incorrectly labeled Roberts Figure 17 as if its bundle (i.e., more than a pair) of non-twisted “transmit” wires (14), which are located are one side of a metallic shield (15), could satisfy the “first twisted pair of insulated conductors” claim limitations at issue. Cornelison incorrectly labeled Roberts Figure 17 as if its bundle of “receive” wires (16), which are located on the other side of such shield (15), could satisfy the “second twisted pair of insulated conductors” claim limitations at issue. EX-1007 ¶¶87-94. 26. Cornelison states, in paragraph

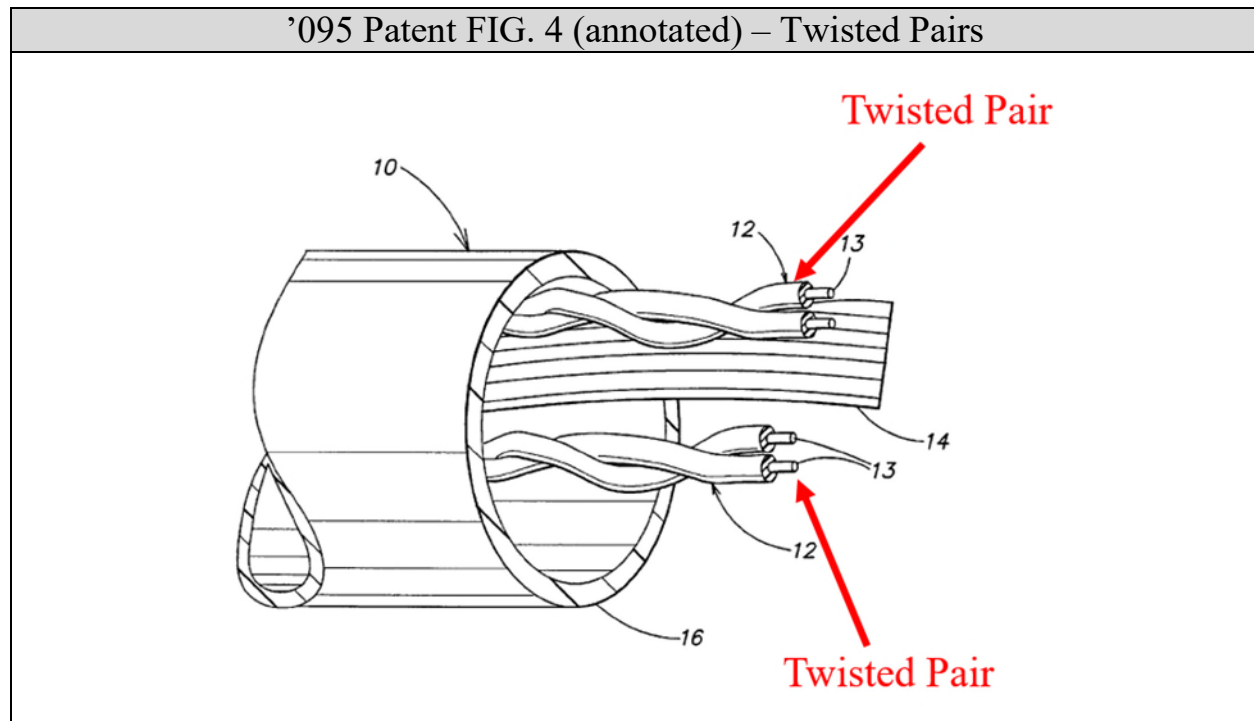
89 of his declaration that “[a] POSITA would understand that such insulated electrical conductors are groups of twisted pairs.” This statement is made without basis and contradicts the specific teachings of Roberts. In fact, a POSITA reading Roberts would have understood Roberts to teach individual wires separated by a shield. The fact that two individual wires, one on one side of the shield and the other on the other side of the shield, can form a transmit and receive pair does not imply, in any way, that the wires are twisted together.

Petitioner’s Depiction of Roberts (Pet. 19, Cornelison ¶91)	Roberts Actual Disclosure (Roberts 1:5-31)
 First group of insulated electrical conductor pairs 14 Plastic-coated foil (divider) shield 15 Second group of insulated electrical conductor pairs 16	 Transmit Wires (14) Shield (15) Receive Wires (16)

Pet. 19, 21-22,

54. Cornelison’s labels are wrong. The wire groups of Roberts consist of two sets of wires, one set used to transmit in one direction, the other used for transmission in the other direction (e.g., reception). These are clearly not a “twisted pair of insulated conductors.” Cornelison takes liberties with elements 14 and 16 of Roberts, discussed in the specification as “the first and second group of insulated conductors (14) and (16)” (Roberts 4:12-13) by calling them “twisted wire pairs 14”

and twisted wire pairs 16” in his declaration (EX-1007 ¶113). Cornelison then goes on to misconstrue the language in the Abstract of Roberts, which clearly discusses the dividing of the pair (transmit and receive wires) by the plastic-coated metal foil, by stating that the pairs are twisted wire pairs when there is in fact, no teaching of that. Furthermore, dividing a twisted wire pair with a metal separator is impossible, unless the twisted wire pairs are untwisted. Nowhere does Roberts disclose or refer to “pairs” as constituting two conductors in the same conductor group (14) or (16). In fact, Roberts teaches the opposite: “it is desirable that conductors used for transmitting in one direction be shielded (electrically) from those transmitting in the opposite direction.” Roberts 1:10-14. As shown previously, the ’095 Patent defines a “twisted pair” as a “pair[] of insulated conductors twisted together to form a balanced transmission line,” as shown in FIG. 4 of the ’095 Patent:

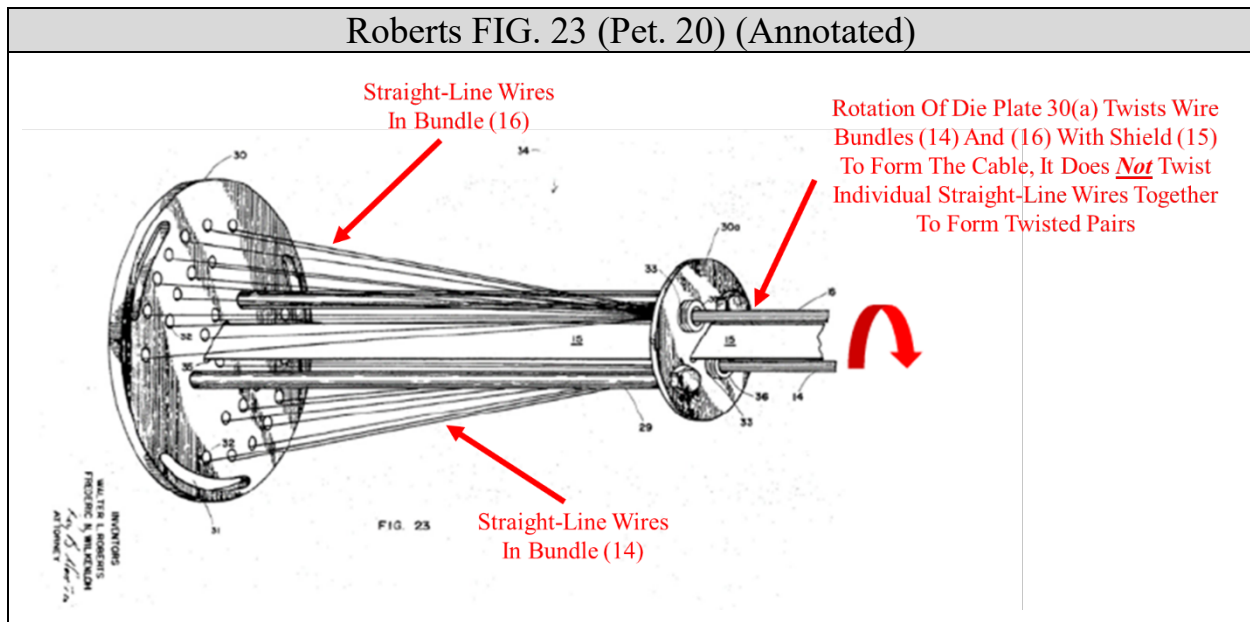


55. In Roberts, the transmit and receive conductor “pairs” are on opposite sides of the shield (15), and therefore cannot be “twisted together,” as defined and claimed in the '095 Patent.

56. As shown above, the alleged wires in Roberts are not twisted, but rather bundled straight-line conductors. Such a non-twisted bundle of straight-line transmit wires (14) in Roberts cannot constitute the claimed “first twisted pair of insulated conductors,” and such a non-twisted bundle of straight-line receive wires (16) in Roberts cannot constitute the claimed “second twisted pair of insulated conductors”.

57. Cornelison also pointed to Roberts’ teachings about its cable manufacturing processes. EX-1007 ¶94 (“To assemble the cable, insulated electrical conductors (twisted pairs) are pulled through holes 32 in dieplate 30 to holes 36 in

dieplate 30a to form two sets of twisted insulated electrical conductors 14 and 16.”). But the “twisting” in Roberts is not referring to twisted pairs (i.e., “two insulated conductors twisted together”). Instead, it is referring to the twisting of all of the cable’s components together as part of the cable assembly process. Neither FIG. 23, nor its corresponding disclosure, discuss or refer to “twisted pairs” of wires:



58. FIG. 23 “is an enlarged diagrammatic view of a rotating die member used to apply the plastic-coated metal foil shield between first and second groups of electrical conductors.” Roberts 3:11-13. “This particular die means is made up of dieplates (30) and (30a), spaced apart by two crossbar means (29).” Roberts 11:71-72. Roberts further teaches that the composite grouping of electrical conductors (14) and (16), along with shield (15), can all be twisted together as part of the cable manufacturing process. Roberts 12:12-26. Accordingly, as the straight line and

individual electrical conductors pass through the holes (33) of the rotating die plate (30(a)), they are assembled together to form a bundle of transmit wires (14) that is separated from a bundle of receive wires (16) by metallic shield tape (15).

59. The cable manufacturing process taught here in Roberts, in which all of the components of the cable are twisted together to form the cable, is akin to the cable “bunching” process taught in the ’095 Patent, which has nothing to do with twisting two insulated conductors together to form a twisted pair, as defined in the ’095 Patent. ¶.

60. Roberts’ teaching of the use of a rotating die plate (30(a)) to rotate its bundle of straight-line transmit wires (14) and its bundle of straight-line receive wires (16) along with the shield (15) cannot support Cornelison’s position that Roberts’ bundle of straight-line transmit wires (14) could satisfy the claimed first twisted pair of electrical conductor limitations required by the Challenged Claims. Nor can it support Cornelison’s position that Roberts’ bundle of straight-line receive wires (16) could satisfy the claimed second twisted pair of electrical conductor limitations required by the Challenged Claims. The “conductor pairs” referred to in Roberts are untwisted straight-line conductors that at all times remain on opposite sides of shield (15). A POSITA would never understand them to be “twisted together” as required to form a “twisted pair.” Cornelison goes on, in paragraph 118 of his declaration, to present his opinion that a POSITA would understand the pairs

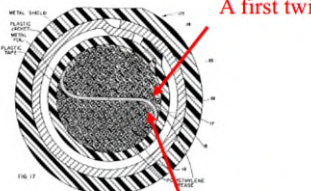
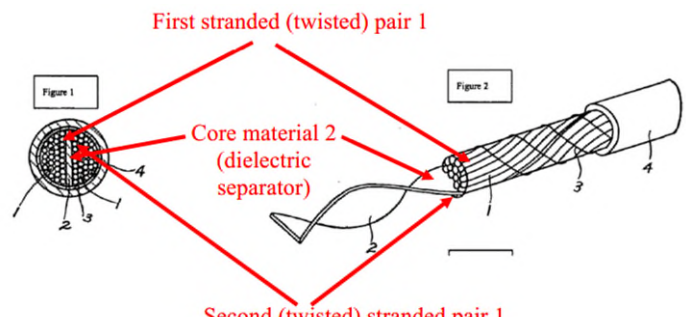
of copper conductors in Roberts to be twisted wire pairs. Cornelison goes onto to make the unsubstantiated claim that “[u]nless it was specified expressly that a “pair” of copper conductors in a communications cable was untwisted, as of late 1998/early 1999 a POSITA would have understood that it was twisted. EX-1007 ¶118. He cites an AT&T reference stating that “most” cables within the AT&T product line were twisted wire pairs and a reference that states that a “typical” telephone cable is constructed of twisted pairs of metal conductors. Cornelison attempts to base his conclusory statement with these cites – which are clearly not absolute statements – to conclude that a POSITA would read the pairs of Roberts as twisted wire pairs. I disagree. A POSITA would read the pairs of Roberts to be as taught, which are individual wires that form a pair separated by a metal divider.

61. For all these reasons, Roberts fails to teach or suggest the separating “a first twisted pair of insulated conductors” and “a second twisted pair of insulated conductors” elements required by the ’095 Patent claims. Roberts fails to anticipate claim 27. Because claims 28 and 29 depend from independent claim 27, Roberts fails to disclose each and every element of claims 28 and 29 and does not anticipate claims 28 and 29.

B. YANAGITA DOES NOT ANTICIPATE CLAIMS 27-29. (GROUND 7)

62. Cornelison alleged that Yanagita (EX-1012) anticipates claims 27-29 of the ’095 Patent. EX-1007 ¶¶254-277 But the arguments Cornelison made

regarding Yanagita are the same as he made regarding Roberts, because both Roberts and Yanagita disclose separated bundles of straight-line conductors, not twisted pairs of insulated conductors:

Petitioner's Roberts Allegations (Pet. 21)	Petitioner's Yanagita Allegations (Pet. 66)
FIG. 17 	

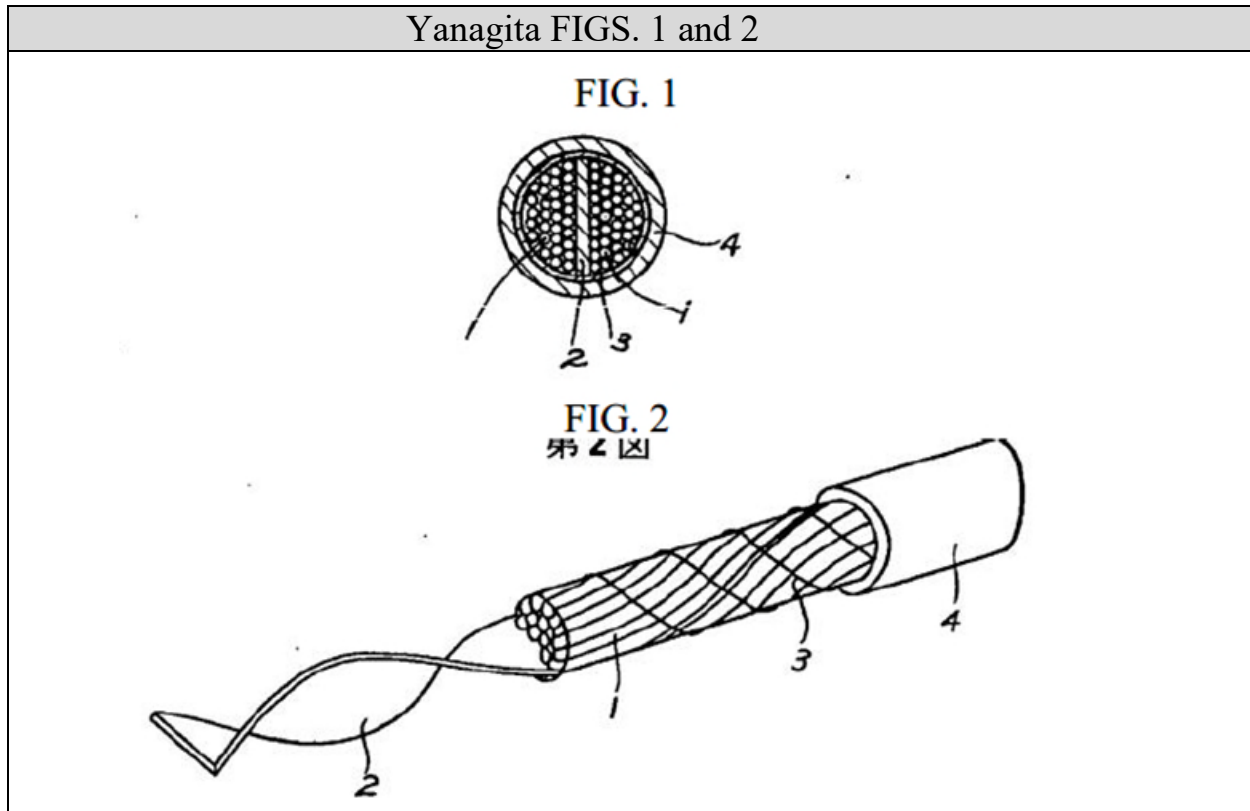
63. Cornelison asserted that Yanagita, an English translation of the underlying Japanese language patent application publication, discloses “twisted pairs” of conductors.¹ It does not. In fact, Yanagita never even mentions the reduction of crosstalk in a cable or the separation of twisted pairs.

64. The invention of Yanagita relates “to an alternately twisted cable that prevents twisting of a wire core from becoming undone.” Yanagita 1 (col. 1). Yanagita discloses laying groups (i.e., bundles (not pairs)) of parallel wires (i.e., untwisted wires) over a twisted core material such that “the twisting will not become

¹ Cornelison refers to EX-1012 as “Yanagida” throughout the Declaration when the certified translation in EX-1012 actually reads “Yanagita.”

undone even when a tensile force is applied, in the lengthwise direction, to the wire core.” Yanagita 1 (col. 2).

65. Yanagita discloses separated bundles (i.e., not pairs) of straight-line conductors:



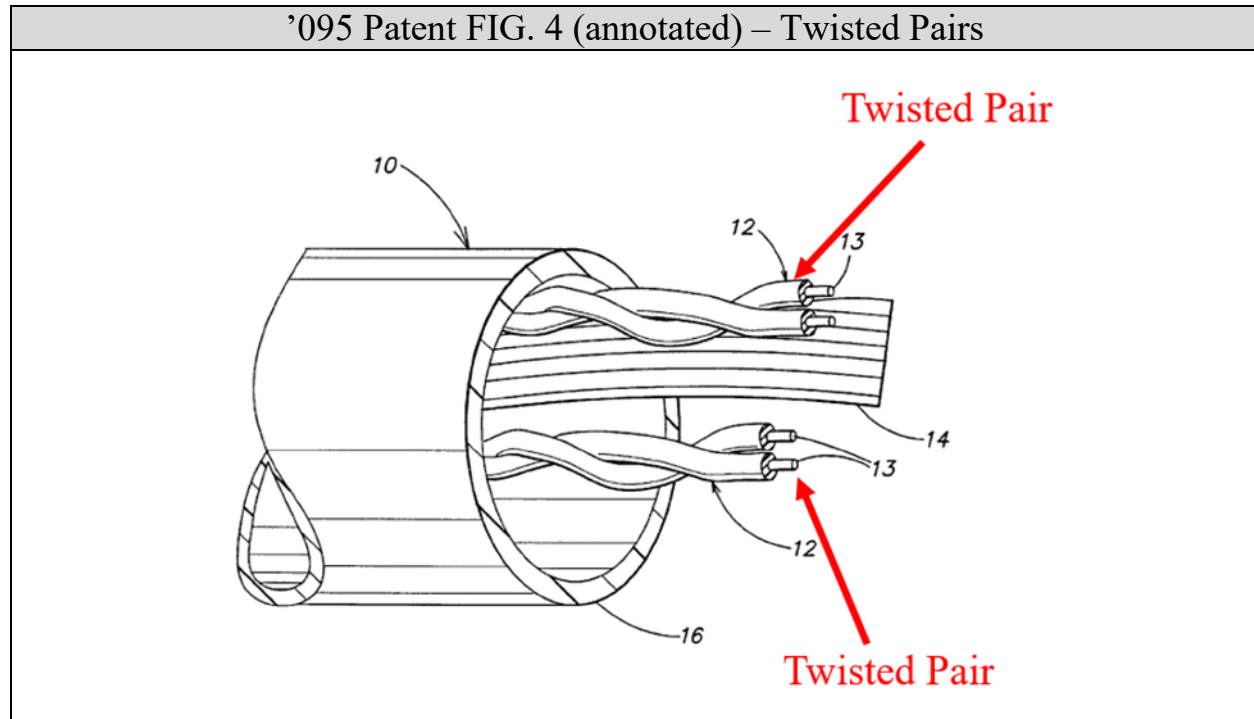
The present invention focuses on this point, and a first invention thereof is an alternately twisted cable wherein a large number of insulated wire strands, or that wherein the insulated wire strands are twisted together, are laid, while twisting along the surfaces, along both surfaces of a core material that is made by forming a plate-shaped body so that the direction of the surface thereof gradually changes in a reciprocatingly twisted shape, applying a pressing coil on the outer periphery thereof, and covering the outer periphery thereof with a cable sheath, and a second invention is an alternately twisted cable wherein a portion of the aforementioned core body is replaced with a connecting portion.

Explaining this for an illustrated embodiment, 1 is an insulated wire or that wherein insulated wires are twisted together, laid divided onto both sides of a core material 2, with the outer periphery thereof wrapped with a rough wrapping yarn for applying pressure, with the outer periphery then covered with a cable sheath 4. The core material 2 is formed in a reciprocatingly twisted shape so that the directions of both sides gradually change along the lengthwise direction thereof, as depicted best in FIG. 2.

Yanagita 1 (col. 1).

66. Yanagita's text and Figures teach a bundle of insulated wires that are laid on opposite sides of a core material and twisted together along the surfaces of the core in a longitudinal direction.

67. As depicted in FIG. 2, the resulting twisting of the insulated wire or groups of insulated wires follows the contour of the inner core. But nowhere does Yanagita even refer to two individual conductors forming or being part of a "pair," let alone teach that two conductors are "twisted together" to form a "twisted pair." Accordingly, the groups of wires disclosed in Yanagita cannot be "twisted pairs" as defined by the '095 Patent.



68. Cornelison only relied upon two citations to the asserted certified Yanagita translation itself regarding the twisted pair claim limitations at issue. EX-1007 ¶257.

69. The first of these citations paraphrases Yanagita by stating that “Yanagida explains it pertains to cables with a plurality of ‘strands of insulated wires or pairs thereof’ that run along the surface of the core material. Yanagida, 1[col.1].” EX-1007 ¶257. But when read in context, the cited language is drawn to the prior art, not any embodiment disclosed in Yanagita:

There is a trend to often using, as communication cables, so-called “alternatingly twisted cables,” wherein that wherein a large number of strands of insulated wires or pairs thereof or quad strands, or units thereof, are twisted together so as to reverse the direction of twisting thereof with given periodicity. However, there is a shortcoming with

this type of cable in that, when a tensile force is applied in the lengthwise direction of the cable core prior to application of the cable sheathing, in particular, the twisting of the cable core becomes undone, and while there has been a variety of innovations to prevent this, each has problems in practice.

Yanagita 1 (col. 1).

70. But there is no disclosure of twisted pairs, or of separating twisted pairs, in this language (or elsewhere) in Yanagita. A POSITA would understand this disclosure to teach that a large number of insulated wires are all twisted together in such a manner that they rotate in a periodical manner along the length of a cable, in a similar manner to that depicted in Yanagita FIG. 2 shown above (absent the inventive core).

71. This teaching in Yanagita is akin to the cable manufacturing process disclosed in Roberts and the cable “bunching” process taught in the ’095 Patent, as discussed above. A POSITA would not understand this to teach twisted pairs in any way.

72. Yanagita also identifies the problem in the art of “alternatingly twisted cables” in which “the twisting of the cable core becomes undone” “when a tensile force is applied in the lengthwise direction of the cable core prior to application of the cable sheathing.” Yanagita 1 (col. 1). Yanagita presents a solution to that problem that involves the use of a core material to provide improved mechanical characteristics and avoid unraveling of the cable.

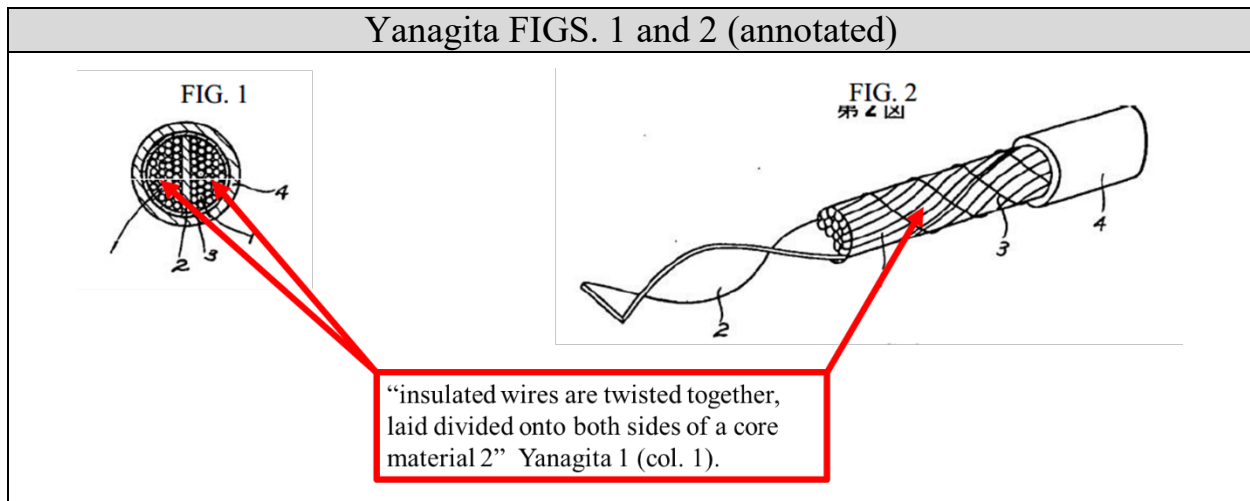
73. Cornelison misleadingly connected Yanagita’s discussion of the prior art and associated problem with disparate elements of the disclosed solution in an attempt to read on claim 27 of the ’095 Patent. As shown here, the cited language in Yanagita not only fails to disclose what Cornelison asserts it discloses (i.e., twisted pairs), but it also misrepresents what Yanagita actually teaches.

74. Cornelison’s second citation to Yanagita, read in context, also does not teach the “twisted pair” claim elements at issue. EX-1007 ¶257 (“element 1 can be where ‘insulated wires are twisted together’”).

Explaining this for an illustrated embodiment, 1 is an insulated wire or that wherein insulated wires are twisted together, laid divided onto both sides of a core material 2, with the outer periphery thereof wrapped with a rough wrapping yarn for applying pressure, with the outer periphery then covered with a cable sheath 4.

Yanagita 1 (col. 1) (language cited and relied on in the Petition emphasized).

75. But as shown above, and like Roberts, Yanagita discloses that element 1 is an insulated wire or a bundle of insulated wires that are laid on opposite sides of a core and twisted together along the surfaces of the core in a longitudinal direction, as plainly shown in FIGS. 1 and 2.



76. Here again, there is no teaching of “twisted pairs,” as required by the ’095 Patent claims at issue, and Cornelison’s allegations are the same misrepresentations he made regarding Roberts and its disclosed groups of bundled straight-line conductors separated by a shield. Cornelison selects individual straight-line conductors (1) on either side of the core material (2) and labels them twisted pairs. But there is nothing in Yanagita to suggest that these individual straight-line conductors are part of a “pair” of conductors, let alone that they are “twisted together” to form a “twisted pair” as required by the Challenged Claims.

77. Yanagita fails to teach or suggest the separating “a first twisted pair of insulated conductors” and “a second twisted pair of insulated conductors” elements required by the Challenged Claims. Accordingly, Yanagita fails to anticipate claim 27. Because claims 28 and 29 depend from independent claim 27, Yanagita fails to disclose each and every element of claims 28 and 29 and does not anticipate claims

28 and 29.

C. GMBH-866 DOES NOT ANTICIPATE CLAIMS 27-29 (GROUND 3).

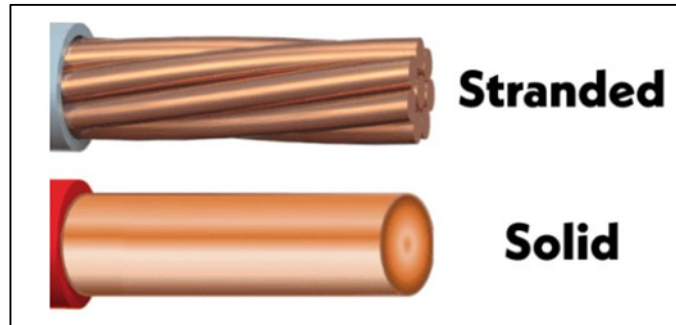
78. Cornelison alleged that GmbH-866 (EX-1010) anticipates claims 27-29 of the '095 Patent. EX-1007 ¶¶171-204. But Cornelison again failed to demonstrate how GmbH-866 teaches or suggests each and every limitation of the Challenged Claims.

79. Like Roberts and Yanagita, nowhere does GmbH-866 teach or suggest that the electrical conductors it discloses are “twisted pairs,” nor are the words “twisted pair” ever even used. Cornelison relied upon just two out-of-context snippets of disclosure in GmbH-866 as allegedly disclosing the “twisted pair” limitations in claim 27 of the '095 Patent. EX-1007 ¶174 ((1) “A data transfer cable . . . shown in Fig. 1, comprises four pairs 1, each consisting of two isolated, stranded copper conductors 2 or wires” and (2) “invention can also comprise just two pairs of stranded conductors” (emphasis omitted)). Cornelison’s theory is based on GmbH-866’s mere use of the word “stranded.” But neither of these snippets, read in context, teaches or suggests “twisted pairs,” or separating twisted pairs, as disclosed and claimed in the '095 Patent.

80. The first citation is not referring to twisted pairs as claimed in the '095 Patent, but rather the fact that the conductor pairs in GmbH-866 are disclosed as consisting of either stranded copper conductors or solid wires. Cornelison

misconstrues the stranded conductors of the GmbH-866 reference in his declaration, concluding that “stranded copper conductors 2 or wires” in the GmbH-866 reference refers to twisted wire pairs. EX-1007 ¶¶174-177. Cornelison provides no explanation other than making the conclusory statements that “[a] POSITA would have understood that “stranded” in this context means “twisted” and that “it was conventional practice to use twisted (stranded) pairs of insulated copper wires in data communications cables as of February 1999 and for decades prior.” Contrary to Cornelison’s unsupported allegations, in the context of GmbH-866’s usage of the term, a POSITA would understand “stranded” to mean a particular type of wire composition.

81. At the time of invention of GmbH-866, it was well known that a standard conductive wire could be comprised of either (1) a single solid core wire containing a single, solid strand of conductive material (typically copper), or (2) stranded conductors, each conductor containing a number of smaller diameter strands of conductive material (i.e., smaller diameter wires, again typically copper) that are twisted together to form the overall larger single conductor.



82. Depending on the application, stranded conductors could have several advantages over solid core wire, including improved mechanical robustness and superior electrical characteristics. In particular, a stranded conductor is more flexible and less subject to cracking when bent, and the use of multiple strands can have better high-frequency performance due to reduced skin effect, where high-frequency currents flow close to the surface of the conductor.

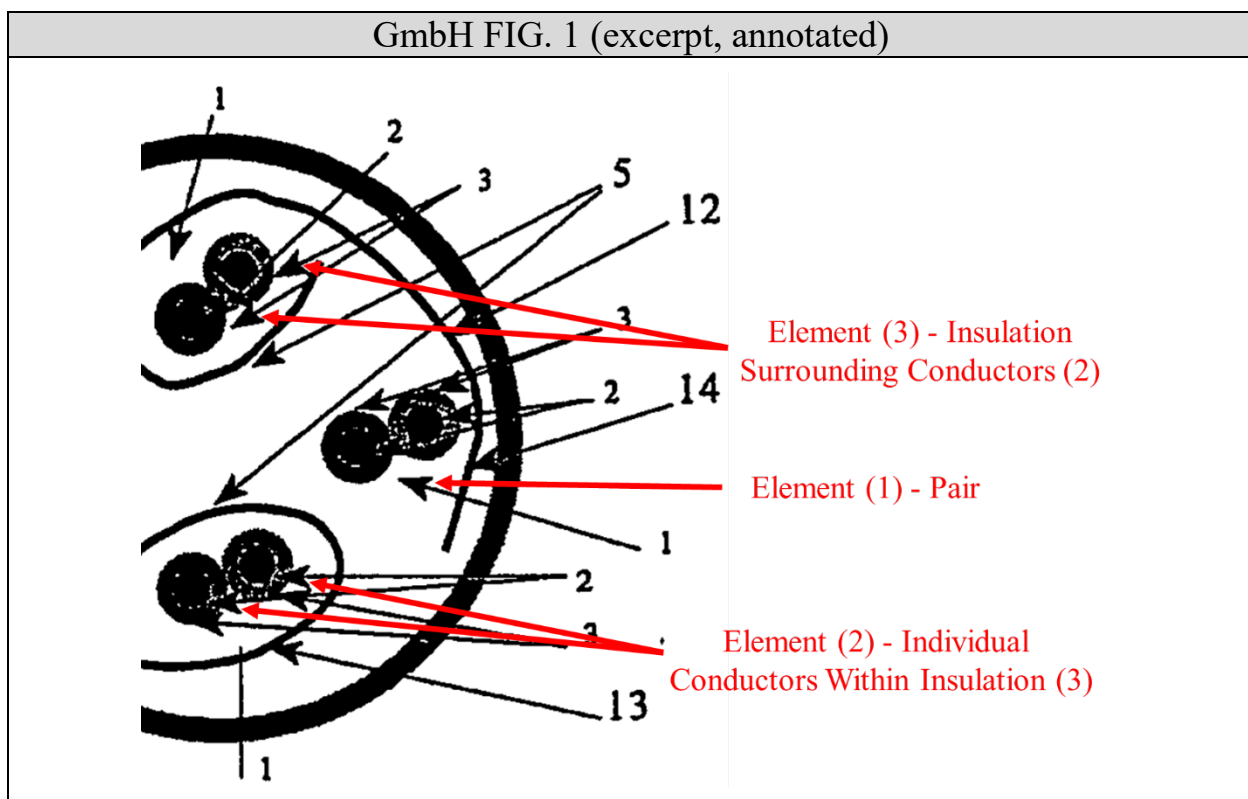
83. GmbH-866 is directed to “a data transfer cable consisting of at least n -pairs, n being an even-numbered multiple of 1, of two isolated conductors in each case, a shielding of the conductor pairs that consists of an electrically conductive material, and an outer cable sheath.” GmbH-866 2. A POSITA would understand that the “two isolated conductors” referred to here not only fails to teach or suggest the use of “twisted pairs,” it teaches away from them being twisted pairs because they are both physically and electromagnetically intertwined, not isolated.

A data transfer cable according to the invention, shown in Fig. 1, comprises four pairs 1, each consisting of two isolated, stranded copper conductors 2 or wires. Optionally, these copper conductors or wires may comprise a conductor coating, for example, of tin. The effective

diameter of said copper conductors or wires is in particular 0.4 to 0.66 mm. The copper conductors or wires preferably have an insulation 3 consisting of a thermoplastic polymer, in particular polyethylene, cell polyethylene, foam-skin polyethylene, skin-foam-skin polyethylene, polypropylene, or cell polypropylene.

GmbH-866 3.

84. The figures of GmbH-866 demonstrate that element (1) refers to a conductor pair, element (2) refers to each of the two individual conductors within a pair, and element (3) refers to the insulation surrounding each of the individual conductors:



85. The description of the cable here in GmbH-866 does not teach in any way that the pairs, element (1), in and of themselves are stranded. If GmbH-866

were in fact teaching that the conductor pairs were themselves stranded a POSITA would expect some teaching that the two conductors, element (2), are twisted together within a given pair (1). Instead, GmbH-866 merely teaches that the individual copper conductors (2), in and of themselves, are stranded.

86. The description here in GmbH-866 goes on to describe the effective diameter of the individual copper conductors or wires as “0.4 to 0.66mm,” which a POSITA would understand to be typical for both stranded copper conductors or solid wires in a data transfer cable, as depicted in element (2). In fact a twisted pair is not typically referred to as having a “diameter” at all. As would be appreciated by a POSITA, a twisted wire pair would not be described as having a “diameter” given its highly oblong/elliptical shape which is certainly not circular given the nature and cross-sectional geometry of twisting two wires together. Furthermore an elliptical shape is not described by a diameter but rather by a major axis and a minor axis.

87. The stranded copper conductor or wire is described as preferably having an insulation, element (3), which, as shown above in annotated FIG. 1, surrounds each of the individual stranded copper conductors or wires. The description does not teach or suggest that the insulation (3) along with the conductors (2) are twisted together or stranded in any way. If GmbH-866 were teaching twisted pairs—which it is not—a POSITA would expect GmbH-866 to teach that the conductors and their surrounding insulation are stranded together. But GmbH-866

contains no such teaching.

88. A POSITA would understand GmbH-866 as teaching that each of the disclosed pairs (1) consists of two conductors, and that those conductors can be either stranded copper conductors or solid wires.

89. The second citation Cornelison relies upon also fails to teach the separated twisted pairs limitations required by the Challenged Claims of the '095 Patent. EX-1007 ¶174 (“invention can also comprise just two pairs of stranded conductors”) (emphasis omitted).

90. GmbH-866 teaches that all of the components of the cable (i.e., not just the individual conductors (2) of a pair (1), but rather all of the components) can be combined together during assembly of the cable and “stranded,” much like Roberts and Yanagita disclose that groups of untwisted, straight-line wires can all be bundled together as part of the cable assembly process, and the cable “bunching” taught in the '095 Patent, discussed above. In fact, Cornelison admitted that “[t]wisting ... all the components of a cable” is called “cabling or stranding.” EX-1007 ¶193.

91. GmbH-866 teaches “stranding or cabling” the components of the data transfer cable as follows:

The stranding of the pairs 1 can consist in what is known as a helix stranding or in an SZ stranding (alternating, right-left stranding). In the case of an SZ stranding of the pairs, preferably, the spacing of the reversal points of the stranding direction can be dimensioned such that the transfer frequency corresponding to the spacing of the reversal

points is above the defined upper frequency limit. . . . The structure described above is common to all embodiments of the data transfer cable according to the invention. However, it is possible not only, as shown, for four pairs 1 to be provided, but rather that a data transfer cable according to the invention can also comprise just two pairs of stranded conductors. Any desired n-pairs can be provided, n being an even-numbered multiple of 1.

GmbH-866 3-4.

92. As Cornelison admitted, GmbH-866 teaches that the pairs (1) are stranded together into a helical or SZ form, not that the individual conductors (2) of each pair are twisted together to form a twisted pair.

93. Out of the entire paragraph cited above, Cornelison cited one out-of-context snippet from the second to last sentence to try to support its allegation that GmbH-866 teaches the missing separated twisted pairs limitations. EX-1007 ¶174 (“invention can also comprise just two pairs of stranded conductors” (emphasis omitted)). But a POSITA reading the full paragraph in context would understand that there is no such disclosure here.

94. Cornelison admitted that the language preceding the relied on snippet teaches that the components of the cable, including all of the conductor pairs (1), can be stranded into either a helical or SZ configuration. Rather than teaching separated twisted pairs here, a POSITA would understand GmbH-866 as teaching that, although the data transfer cable is shown having four pairs (1) of conductors that are stranded as described, it can alternatively have any even multiple number of pairs

(1) of conductors, for example, 2, 4, 6, 8, and so on. But there is nothing in that text that would indicate or suggest to a POSITA that the individual conductors (2) are twisted together to form “twisted pairs” as claimed.

95. While GmbH-866 discusses individual conductors (2) being comprised of stranded copper conductors or solid wires, and teaches stranding all of components of the data transfer cable into helical and SZ bundles, it does not teach or suggest twisted pairs, or separating twisted pairs, as required by the '095 Patent claims at issue.

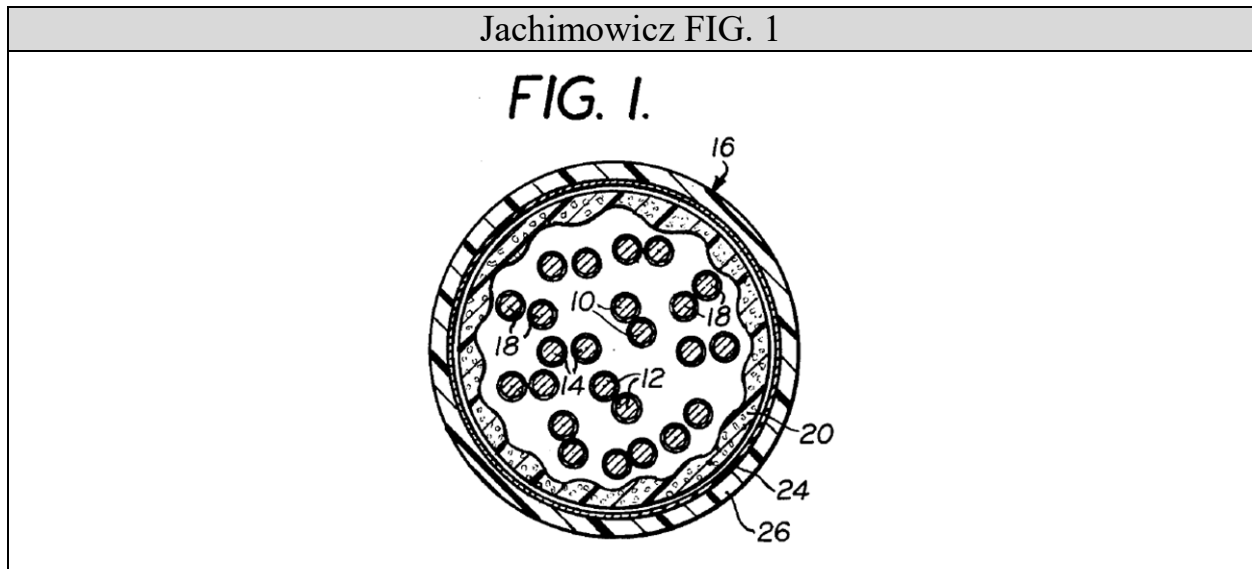
96. GmbH-866 fails to teach or suggest the critical separating “a first twisted pair of insulated conductors” and “a second twisted pair of insulated conductors” elements required by the '095 Patent claims at issue. Accordingly, GmbH-866 fails to anticipate claim 27. Likewise, because claims 28 and 29 depend from independent claim 27, GmbH-866 fails to disclose each and every element of claims 28 and 29 and does not anticipate claims 28 and 29.

D. THE COMBINATION OF ROBERTS AND ONE OR MORE OF GMBH-866, JACHIMOWICZ, AND GINGUE DOES NOT RENDER OBVIOUS CLAIMS 27-33 (GROUND 5).

97. Cornelison argued in the alternative that “even if [Roberts] did not teach [the use of twisted pairs], it would have been an obvious thing to do.” EX-1007 ¶233. Cornelison relied upon GmbH-866 and Jachimowicz for the alternative argument. EX-1007 ¶¶234-235.

98. But as shown regarding Ground 3, GmbH-866 also fails to teach or suggest the separation of “twisted pairs” as described and claimed in the ’095 Patent. As a result, any combination of Roberts and GmbH-866 also fails to teach or suggest the separation of twisted pairs claim limitations at issue.

99. Jachimowicz discloses a different crosstalk solution that involves locking multiple twisted pairs together in a telephone cable with nothing separating them:



The pairs 10, 12 and 14 are located centrally in a cable unit 16; and there are other pairs of conductors, each indicated by the reference character [sic] 18 located in a circle around the three pairs 10 14. Each of the pairs 18 is twisted and all of the pairs in the unit 16 have a different lay to their twist.

Jachimowicz 2:35-40.

Each pair within the, unit 16 has a different lay to its twist so that crosstalk separation is obtained between the pairs.

Jachimowicz 3:4-6

To lock the pairs 10, 11, 14 and 18 together and prevent lay distortion when the bundle is handled in manufacturing processes or at installation, a thin jacket of foamed polyethylene 20 is extruded over the bundle. The pairs can be held together in the bundle in other ways, if desired, as by applying a tape made of foamed thermoplastic supported by a film such as Mylar or polypropylene, or other material.

Jachimowicz 2:46-53.

The pairs 10, 12, 14 and 18 are locked in reference to each other by means of the foamed jacket 20 or foamed tape, previously described. The interstices between the pairs in the unit 16 are preferably left with only air within them.

Jachimowicz 3:50-56.

100. A POSITA would understand that Jachimowicz repeatedly teaches that twisted pairs are bunched together without any separator at all between them, as described above and shown in FIG. 1. This is opposite to the crosstalk solution taught by the '095 Patent, which separates twisted pairs.

101. Cornelison relied upon Jachimowicz to establish that twisted pairs were known in the art. What Cornelison failed to provide is any objective motivation as to why a POSITA would have modified Roberts to “use twisted pairs” (Pet. 60), let alone provide any teaching or suggestion in Roberts or Jachimowicz as to why a POSITA would have been motivated to do so.

102. Roberts is entitled “Telephone Cable With Improved Crosstalk Properties” (Roberts cover), and teaches a single cable that separates groups of wires

transmitting in one direction from groups of wires receiving/transmitting in the opposite direction with a metallic shield:

In such an arrangement of a cable, those conductors on one side of the shield may all be used for transmitting carrier frequencies in one direction, while the returned channels for transmission in the opposite direction will be applied to the conductors on the other side of the shield. The shield has the effect of reducing so called 'near end' crosstalk since the weak attenuated currents coming in at a repeater point are in a compartment of the cable electrically shielded from a large amplified current entering the conductors in the other compartment of the cable.

Roberts 1:13-31.

Electrical shielding efficiency of the cable structure disclosed by the instant invention is improved at about the same rate that crosstalk coupling would degrade normal crosstalk performance in otherwise unshielded cables. . . . Such an improvement . . . would in fact achieve about the same crosstalk performance characteristics as would be obtained using separate cables, one such cable transmitting in one direction and the other cable transmitting in an opposite direction. This improved performance is achieved at much less cost.

Roberts 13:10-29.

In summary, the instant disclosure has shown the advantages of dividing a cable core into at least two groups by a metal foil. The two groups thus formed are used for transmission, one group transmitting in one direction and the other group transmitting in an opposite direction. By screening or shielding one transmitting group of insulated electrical conductors, improved nearend crosstalk properties are realized.

Roberts 13:30-36.

103. Roberts already provides an effective solution to the problem of

crosstalk in a communications cable. That solution was separating the individual straight-line conductors of a non-twisted pair by placing a conductive (i.e., metallic) shield between them. Since Roberts already provides a solution to the crosstalk problem solved by the '095 Patent, there would be no motivation to modify Roberts to include the additional and redundant twisted pairs of Jachimowicz, that are part of the redundant Jachimowicz crosstalk solution.

104. It is not disputed that twisted pairs were known in the art long before the priority date of any of the asserted prior art references, including Roberts. Yet despite twisted pairs being known, Roberts still chose a different solution to the crosstalk problem—one that did not utilize twisted pairs. Cornelison failed to provide a single citation to any teaching or suggestion regarding why a POSITA would have been motivated to modify the Roberts crosstalk solution by replacing individual straight-line conductors separated by a metallic shield with twisted pairs of conductors separated by a shield.

105. Cornelison stated that twisted pairs were “common and conventional,” and that it would have been “an obvious and routine modification” to use them in Roberts that “would have had a reasonable expectation of success.” EX-1007 ¶¶236, 239. But Cornelison failed to provide any reason why a POSITA would have been motivated to make such combination at the time. In any event, a POSITA would not have been so motivated.

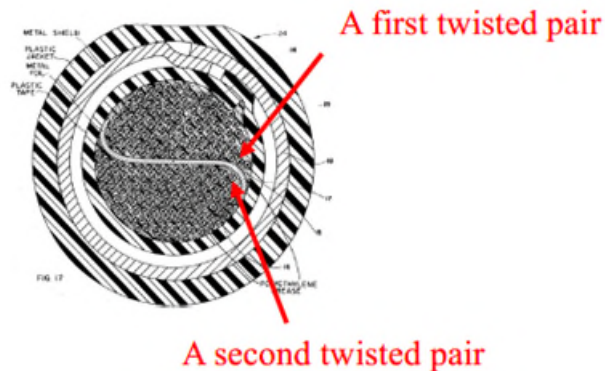
106. Cornelison’s only theory that a POSITA would be motivated to use twisted pairs in Roberts is that “[t]wisted pairs also have the electrical advantage of minimizing or eliminating crosstalk and decreasing unbalanced mutual capacitance.” EX-1007 ¶238. But lowering crosstalk and decreasing unbalanced mutual capacitance is precisely the problem addressed in and the solution provided by Roberts, which is separating straight-line conductor pairs with a metallic shield to achieve those exact improvements. Roberts Abstract (“Measurements between pairs, divided by this plastic-coated metal foil, of unwanted energy transferred from one conductor to another by means of mutual inductive, capacity, or conductive coupling (crosstalk), shows greatly improved properties over undivided cable pairs or divided cable pairs of prior art.”). At the time of the Roberts’ invention, twisted pairs were known, and yet Roberts chose to solve the crosstalk problem in a different way without using twisted pairs.

107. Other than highlight the known benefits of twisted pairs, Cornelison failed to provide any additional motivation regarding why a POSITA would have modified the Roberts crosstalk solution by replacing each of its straight-line conductors with twisted pairs of conductors. Nor did Cornelison explain how or why substituting individual straight-line conductors in Roberts with twisted pairs would provide any “electrical benefit” or improvement over the crosstalk solution Roberts already provided.

108. Regarding the alleged “mechanical advantage” of “keeping the two conductors grouped together during the cabling process” (EX-1007 ¶238), Cornelison’s position literally makes no sense, since the crosstalk solution in Roberts is the opposite of the use of twisted pairs in this regard. The solution proposed by Roberts is to divide and separate the conductors of a given transmit and receive pair. Roberts Abstract (“By dividing electrical conductor telephone pairs within a telephone cable structure with plastic-coated metal foil, the crosstalk properties are so vastly improved that a greater spacing between repeaters can be designed into a telephone cable system, as compared to a cable system employing prior art divided or undivided cable pairs.”). Cornelison’s alleged Roberts combination would require that the transmit and receive wire pairs (14, 16), which Roberts teaches are two straight-line conductors on opposite sides of the metallic shield, be substituted with two twisted pairs of conductors on opposite sides of the shield, as Petitioner alleged in Ground 1.

Petitioner's Proposed Modification Of Roberts (Pet. 21, Cornelison ¶113)

FIG. 17



109. Rather than “keeping the two conductors grouped together” as Cornelison alleged, Roberts teaches separating the wires in a pair. Accordingly, Petitioner’s alleged motivation to combine by “ensuring the individual wires in a pair stay together” makes no sense whatsoever in the Roberts solution. Petitioner failed to explain how or why substituting individual straight-line conductors in Roberts with twisted pairs would provide any additional “mechanical benefit” or improvement over the crosstalk solution Roberts already provided.

110. A POSITA would further be discouraged from combining twisted pairs with Roberts for a number of reasons, such as because of how the alleged substitution would alter the principle of operation in Roberts.

111. First, replacing the individual straight-line conductors with twisted pairs would double the number of wires in the Roberts cable. This alone would increase the overall cross sectional area of the cable to nearly double that of the

original Roberts cable. Doubling the number of wires and the overall cable cross section would significantly increase the amount of materials needed to construct a cable of a given length, thereby increasing the cost of the modified cable over the original Roberts cable. This would eviscerate the advantages that the Roberts cable already offered, namely a space-saving, economical cable for two-way transmission which utilized a single wire in each transmit direction for a given transmit-receive pair, and a metallic shield between them to control crosstalk. The Roberts solution – already a complete economical cable for two-way transmission – was not in need of improvement by utilizing twisted wire pairs.

112. The increased cable cross section and resulting increase in diameter also would lower the flexibility of the overall cable, reducing the number of applications it could be utilized in, either because of space or turn radius requirements.

113. Switching from a single wire transmitting in each direction to a twisted pair transmitting in each direction would require a far more complex cable termination solution involving double the number of wire terminations. This would increase the cost and complexity associated with using such a cable solution, which would discourage a POSITA from designing such a cable.

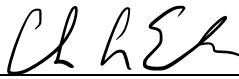
114. For all of these reasons, Cornelison failed to establish how Roberts in combination with one or more of GmbH-866, Jachimowicz or Gingue renders claims

27-33 obvious.

115. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

116. I declare that all statements made herein of my own knowledge are true and that all statements made on 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 Section 1001 of Title 18 of the United States Code.

Dated: September 21, 2023

By: 

Charles A. Eldering, Ph.D.

APPENDIX A

Curriculum Vitae
Dr. Charles A. Eldering

CAsE Analysis, Inc.
620 Wilson Ave, PMB 101
Brooklyn, NY 11207

215.913.7214
cae@caseanalysisgroup.com

AREAS OF SPECIALIZATION: Extensive technical and market expertise in the areas of telecommunications, microelectronics, consumer electronics, targeted advertising, location-based services, data mining, and bioinformatics, with over 30 years of industrial experience. Highly skilled in the management and utilization of patents including infringement analysis and documentation of use of claimed technology.

EDUCATION:

- 1989 University of California; Davis, California
 Ph.D. Electrical Engineering
- 1985 Syracuse University; Syracuse, New York
 M.S. Solid State Science and Technology
- 1981 Carnegie Mellon University; Pittsburgh, Pennsylvania
 B.S. Physics

OTHER QUALIFICATIONS:

Registered U.S. Patent Agent. Registration No. 39,180
FCC Licensed General Class Amateur Radio Operator, N3YRB

EMPLOYMENT HISTORY:

December 2013 to present:

CAsE Analysis, Inc.
Founder & President

September 2022 to present

SitNet LLC
Founder and Managing Member

May 2000 to December 2021

Expanse Networks/Expanse Bioinformatics
Founder and President

December 1997 to December 2013:

Technology, Patents & Licensing, Inc. (now TechPats)
Founder and President

October 1995 to November 1997:

Next Level Communications, Rohnert Park, CA
Director, Advanced Systems Engineering

September 1993 to September 1995:

General Instrument Corporation, Hatboro, PA
Manager, Fiber-to-the-Curb/Switched Digital Video Systems; March 1995 to September 1995
Manager, Broadband Systems Engineering; January 1994 to March 1995
Senior Project Engineer, Systems Engineering; September 1993 to December 1993

January 1990 to August 1993:

Alcatel, Madrid, Spain
Senior Engineer/Manager, Fiber in the Loop R&D; October 1990 to August 1993
Consultant; January 1990 to September 1990

June 1986 to August 1990:

University of California, Davis, CA
Researcher, Department of Electrical and Computer Engineering

October 1981 to May 1986:

United States Air Force, Rome Laboratory, Rome, NY

Officer

EXPERT WITNESSING:

1. *CommScope Technologies v. Belden Nos.*, IPR2023-01056, -01058, -01061, -01062 (PTAB)
2. *PPC v. Perfect Vision Manufacturing, Inc.*, Case No. 4:22-CV-204 (Eastern District of Arkansas)
3. *PPC v. Perfect Vision Manufacturing, Inc.*, Case No. 4:22-CV-163 (Eastern District of Arkansas)
4. *PCC v. CommScope Technologies, LLC*, Case No. 22-783-RGA (District of Delaware)
5. *PPC v. Charles Industries, LLC and Amphenol Corporation*, Case No. 1:22-CV-01517 (District of Delaware)
6. *Belden v. CommScope, Inc.*, Case No. 22-782-RGA (District of Delaware)
7. *Amphenol Corporation v. PPC Broadband, Inc.*, Nos. IPR2022-00718, -00719, -00720 and -00721 (PTAB).
8. *PPC Broadband, Inc. v. Amphenol Corporation*, Nos. IPR2022, -00830, -00831, -00946, -00947, -01087, -01088 (PTAB).
9. *Sony Corporation and Sony Electronics Inc. v. ARRIS International plc, ARRIS Group, Inc., ARRIS Technology, Inc., ARRIS Enterprises LLC, ARRIS Solutions, Inc. and ARRIS Global Ltd. (formerly Pace Ltd.)*, In the Matter of Certain Digital Cable and Satellite Products, Set-Top Boxes, Gateways, and Components Thereof, United States International Trade Commission, Washington, D.C. (Investigation No. 337-TA-1049).
10. *Unified Patents Inc. v. Harry Heslop & Sportbrain Holdings, LLC*, No. IPR2016-01464 (PTAB).
11. *Unified Patents Inc. v. Hybrid Audio, LLC*, No. IPR2016-01265 (PTAB).
12. *Unified Patents Inc. v. Qurio Holdings, Inc.*, No. IPR2015-01991 (PTAB).
13. *Unified Patents Inc. v. Rothschild Connected Devices Innovations, LLC*, No. IPR2016-00535 (PTAB).
14. *Unified Patents Inc. v. FO2GO LLC*, No. IPR2016-00454 (PTAB).
15. *Unified Patents Inc. v. Nonend Inventions, NV*, No. IPR2016-00174 (PTAB).
16. *Unified Patents Inc. v. iMTX Strategic, LLC*, No. IPR2015-01061 (PTAB).
17. *Unified Patents Inc. v. TransVideo Electronics, Ltd.*, No. IPR2015-01519 (PTAB).
18. *PPC Broadband, Inc. d/b/a PPC v. Times Fiber Communications, Inc.*, United States District Court for the Northern District of New York (Civil Action No. 5:13-cv-460-TJM-DEP)
19. *PPC Broadband, Inc. d/b/a PPC v. Corning Gilbert, Inc.*, United States District Court for the Northern District of New York (Civil Action No. 5:13-cv-00538-GLS-DEP).
20. *PPC Broadband, Inc. v. Corning Optical Communications RF, LLC, In the Matter of Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same*, United States International Trade Commission, Washington, D.C. (Investigation No. 337-TA-938).
21. *BroadSoft, Inc. v. CallWave Communications, LLC*, United States District Court for the District of Delaware (DED-1-13-cv-00711-RGA).

22. *Netflix, Inc., v. OpenTV, Inc.*, No. IPR2014-00252 (PTAB).
23. *Mediatube Corp and Northvu Inc. v. Bell Canada and Bell Aliant Regional Communications, Limited Partnership*, Canadian Federal Court (C.A. T-705-13).
24. *John Mezzalingua Associates, Inc. d/b/a PPC v. Corning Gilbert Inc.*, United States District Court for the District of Arizona (Case No. 2: 12-CV-12-02208-SMM).
25. *Corning Gilbert Inc., v. PPC Broadband, Inc.*, No. IPR2013-00345 (PTAB).
26. *Corning Gilbert Inc., v. PPC Broadband, Inc.*, No. IPR2013-00340 (PTAB).
27. *Corning Gilbert Inc., v. PPC Broadband, Inc.*, No. IPR2013-00342 (PTAB).
28. *Corning Gilbert Inc., v. PPC Broadband, Inc.*, No. IPR2013-00346 (PTAB).
29. *Corning Gilbert Inc., v. PPC Broadband, Inc.*, No. IPR2013-00347 (PTAB).
30. *PPC Broadband, Inc. v. Corning Gilbert Inc.*, United States District Court for the Northern District of New York (Civil Action No. 5:13-cv-1310).
31. *PPC Broadband, Inc. d/b/a PPC v. Corning Gilbert, Inc.*, United States District Court for the Northern District of New York (Civil Action No. 11-cv-00761-GLS-DEP).
32. *Corning Gilbert, Inc. v. The United States of America, et al.* in the United States Court of International Trade (Case No. 11-00511).
33. *Parus Holdings, Inc. v National Airtran Airways, Inc., Airtran Holdings, Inc., Airtran Holdings, LLC* in the United States District Court for the Middle District of Florida, Tampa Division (Case No. 8:11-cv-01685-EAK-TBM).
34. *John Mezzalingua Associates, Inc. d/b/a PPC v. International Communications Manufacturing Corporation, Randall A. Holliday, and Belden Inc.* in the United States District Court for the Western District of Wisconsin (Case No. 3:11-cv-00424-bbc).
35. *eTool Development, Inc., and eTool Patent Holdings Corp. v National Semiconductor Corporation* in the United States District Court for the Eastern District of Texas, Marshall Division (Case No. 2:08-cv-196).
36. *John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. PCT International, Inc.* in the United States District Court for the Western District of Texas, San Antonio Division (Case No. 5:09-cv-00410-RF).
37. *John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. PACE Electronics, Inc. (d/b/a PACE International) and Perfect 10 Antenna Company* in the United States District Court for the Western District of Minnesota (Case No. 0:10-cv-00064 MJD/JJG).
38. *John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. Hanjiang Fei Yu Electronics Equipment Factory, Zhongguang Electronics, Yangzhou Zhongguang Electronics Co., Ltd., and Yangzhou Zhongguang Foreign Trade Co., Ltd.* in Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same, United States International Trade Commission, Washington, D.C. (Investigation No. 377-TA-650).
39. *Arrow Communication Laboratories, Inc. v. John Mezzalingua Associates, Inc.*, in the Northern District of New York (Civil Action No. 05-CV-1456 (NAM/DEP) (Lead Case); 05-CV-0703 (NAM/DEP) (Member Case).
40. *Agrizap Inc. v. Woodstream Corporation* in the United States District Court for the Eastern District of Pennsylvania (Case No. 04-CV-03925-RK).

41. *John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. Corning Gilbert, Inc.* in the United States District Court for the Western District of Wisconsin (Case No. 03-C-0354-S).
42. *John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. Arris International, Inc.* in the United States District Court for the Western District of Wisconsin (Case No. 03-C-0353-C).
43. *Arris International, Inc., and Randall A. Holliday, v. John Mezzalingua Associates, Inc. d/b/a PPC* in the United States District Court for the District of Colorado, Denver Division (Case No. CA 01-WM-2061).

REVIEWED PUBLICATIONS:

1. Eric E. Bensen, Charles A. Eldering, Jim Longacre, Anthony W. Shaw, Daniel H. Sherr, Matthew W. Stavish, and John M. White, "Patent Commentaries Analyzing the America Invents Act," *Lexis Nexis*, 2011.
2. Malcolm T. "Ty" Meeks and Charles A. Eldering, PhD, "Patent Valuation: Aren't We Forgetting Something? Making the Case for Claims Analysis in Patent Valuation by Proposing a Patent Valuation Method and a Patent-Specific Discount Rate Using the CAPM", *Northwestern Journal of Technology and Intellectual Property*, (Fall, 2010) Vol. 9, No. 3.
3. C.A. Eldering, "Technology and Competition: A Five-Year Outlook for the Telecommunications Marketplace," in *Communications Deregulation and FCC Reform*, J.A. Eisenach and R.J. May, eds. (Kluwer Academic Publishers, 2001).
4. S.C. Durant, E.J. Basinski, K.L. Cerrone, C.A. Eldering and M. Ishimaru, "Patent Portfolio Development," in *Electronic Software Patents: Law and Practice*, S.W. Lundberg and S.C. Durant, eds. (BNA Books, 2000).
5. C.A. Eldering, "Patents and Telecommunications", Guest Editorial in *IEEE Communications Magazine*, vol. 38, no. 7, p. 96 (July 2000).
6. C.A. Eldering, M.L. Sylla, J.A. Eisenach, "Is There a Moore's Law for Bandwidth?," in *IEEE Communications Magazine*, vol. 37, no. 10, pp. 117-121 (October 1999).
7. C.A. Eldering, "Impact and Results of Telecommunications Deregulation," Guest Editorial in *IEEE Communications Magazine*, vol. 37, no. 10, p. 98 (October 1999).
8. C.A. Eldering, "Prospects for Broadband Deployment in a Deregulated Environment", Guest Editorial in *IEEE Communications Magazine*, vol. 36, no. 7, p. 86 (July 1998).
9. S. Wang, S.T. Kowel, C.A. Eldering, "Differential Detection with Polymer-Based Etalon Modulators," *IEEE Journal of Lightwave Technology*, vol. 16, no. 3, pp. 448-452 (March 1998).
10. C.A. Eldering, J.P. Blasko, A. Brown, "Comparative Analysis of Provisional Patents Under US and UK Law," *Journal of the Patent and Trademark Office Society*, vol. 79, no. 11, pp. 791-881 (November 1997).
11. C.A. Eldering, "Customer Premises Equipment for Residential Broadband Networks," *IEEE Communications Magazine*, vol. 35, no. 6, pp. 114-121 (June 1997).
12. N. Omoigui, M. Sirbu, C.A. Eldering, and N. Himayat, "Comparing Integrated Broadband Architectures from an Economic and Public Policy Perspective," in *The Internet and Telecommunications Policy Research*, G.W. Brock and G.L. Rosston, eds. (Lawrence Erlbaum Associates, NJ, 1996).
13. C.A. Eldering, N. Himayat and F.M. Gardner, "CATV Return Path Characterization for Reliable Communications," *IEEE Communications Magazine*, vol. 33, no. 8, pp. 62-69 (August 1995).
14. D. Shen, S.T. Kowel, and C.A. Eldering, "Amorphous Silicon Thin-Film Photodetectors for Optical Interconnection," *Optical Engineering*, vol. 34, no. 3, pp. 881-886 (March 1995).
15. C.A. Eldering, F. Herrerias, R. Martín, P.J. García, "Burst Mode Clock Recovery System for Fiber Optic Receivers," *IEEE Journal of Lightwave Technology*, vol. 12, no. 2, pp. 271-279 (February 1994).
16. C.A. Eldering, "Theoretical Determination of Sensitivity Penalty for Burst Mode Fiber Optic Receivers," *IEEE Journal of Lightwave Technology*, vol. 11, no. 12, pp. 2145-2149 (December 1993).

17. C.A. Eldering and A. Martín, "An Out-of-Band Signalling Technique for Passive Optical Networks," *International Journal of Digital and Analog Communication Systems*, vol. 6, pp. 49-52 (1993).
18. C.A. Eldering, A. Dienes, and S.T. Kowel, "Time Response Limitations of Etalons as Calculated From Frequency Analysis," *Optical Engineering*, vol. 32, no. 3, pp. 464-468 (March 1993).
19. S.T. Kowel and C.A. Eldering, "Polymer Etalons and Free Space Interconnects," in *Polymers for Lightwave and Integrated Optics: Technology and Applications*, Lawrence A. Hornak, Editor (Marcel Dekker, 1992).
20. C.A. Eldering, A. Knoesen and S.T. Kowel, "Use of Fabry-Perot Devices for the Characterization of Polymeric Electro-Optic Films," *Journal of Applied Physics*, vol. 69, no. 6, pp. 3676-3686 (March 15, 1991).
21. C.A. Eldering, S.T. Kowel, M.A. Mortazavi and P. Brinkley, "Electro-Optic Polymer Materials and Devices for Global Optical Interconnects," *Applied Optics*, vol. 29, no. 8, pp. 1142-1149 (March 1990).
22. C.A. Eldering, S.T. Kowel, and A. Knoesen, "Electrically Induced Transmissivity Modulation in Polymeric Thin Film Fabry-Perot Etalons," *Applied Optics*, vol. 28, no. 20, pp. 4442-4445 (October 1989).
23. C.A. Eldering, S.T. Kowel, A. Knoesen, B.L. Anderson and B.G. Higgins, "Characterization of Modulated Spin-Coated and L/B Thin Film Etalons," *Thin Solid Films* vol. 179, pp. 535-542 (1989).
24. S.T. Kowel, R. Selfridge, C.A. Eldering, N. Matloff, P. Stroeve, B. Higgins, M.P. Srinivasan and L.B. Coleman, "Future Applications of Ordered Polymeric Thin Films," in *Thin Solid Films*, vol. 152, pp. 377-403 (1987).

PUBLICATIONS IN CONFERENCE PROCEEDINGS:

1. C.A. Eldering, "An Overview of Wired Broadband Access Systems," *Proceedings of the IEEE Sarnoff Symposium on Advances on Wired and Wireless Communications*, pp. 1-7 (Trenton, NJ, March 19, 1997).
2. R. Mason, N. Himayat, C.A. Eldering, N. Omoigui, M. Sirbu "Overview of Hybrid Fiber-Coax and Fiber-in-the-Loop Architectures," *Proceedings of the 1995 National Fiber Optic Engineers Conference*, pp. 284-291 (Boston, MA, June 18-22, 1995).
3. C.A. Eldering, F.M. Gardner, N. Himayat, "Performance Comparison of Multiple-Access Techniques in Hybrid Fiber-Coax Return Systems," *1995 Optical Fiber Conference Technical Digest* (San Diego, CA, Feb 26- Mar 3, 1995).
4. N. Himayat, C.A. Eldering, M. Kolber, E. Dickinson, "Characteristics of Hybrid Fiber-Coax Return Systems," *1995 SCTE Conference on Emerging Technologies Proceedings Manual* (Orlando, FL, Jan 4-6, 1995).
5. C.A. Eldering, M. Kauffman, D. Grubb, S. Warwick, and G. Hawley, "Engineering Requirements for Hybrid Fiber-Coax Telephony Systems," *1994 NCTA Technical Papers* (New Orleans, LA, May 23-25, 1994).
6. D.S. Shen, S.T. Kowel, and C.A. Eldering, "Amorphous Silicon Thin Film Photodetectors for Optical Interconnection", *Proceedings of the International Parallel Processing Symposium* (Cancún, Mexico, April 26-29, 1994).
7. C.A. Eldering, G. Van der Plas, and J. De Groote, "Burst and Bit Synchronization Methods for Passive Optical Networks," *Proceedings of the Fourth IEEE Workshop on Local Optical Networks* (Versailles, France, September 1992).
8. C.A. Eldering and A. Martín, "System Specification and Requirements for Fiber in the Loop Systems," *Proceedings of SPIE Symposium on Opto-Electronics/Fibers* (Boston, MA, September 1992).
9. C.A. Eldering, F. Neira and J. Rueda, "The First Generation of Fiber Provided Subscriber Services for Spain," *Proceedings, Telco 92* (Madrid, Spain, May 1992).

10. P.J. García, R. Martín, C.A. Eldering, A. Martín, "Consideraciones de Diseño de Sistemas TDM/TDMA por Fibra Optica para el Area de Distribución de Abonados," *Proceedings, TELECOM I+D* (Madrid, Spain, November 1991).
11. C.A. Eldering, S. Allaire, A. Martín, R. Martín, F. Marcel, "Transmitter and Receiver Requirements for Time Division Multiple Access Passive Optical Networks," *Proceedings of the Third IEEE Workshop on Local Optical Networks* (Tokyo, Japan, September 1991).
12. J. Rueda García and C.A. Eldering, "Subscriber Loop Optical Distribution Architecture (SODA): A Cost Effective TDM/TDMA Fiber System," *Fiber Networks for Telephony and CATV*, SPIE vol. 1578, pp. 68-78 (Boston, MA, September 1991).
13. D. Yankelevich, A. Knoesen, C.A. Eldering and S.T. Kowel, "Reflection-Mode Polymeric Interference Modulators," *Proceedings of the SPIE Symposium on Optical Applied Science and Engineering* (San Diego, CA, August 1991).
14. C.A. Eldering, A. Knoesen and S.T. Kowel, "Characterization of Polymeric Electro-Optic Films Using Metal Mirror/Electrode Fabry-Perot Etalons," *Nonlinear Optical Properties of Organic Materials III*, SPIE Vol. 1337, pp. 348-357 (San Diego, CA, July 1990).
15. M. Landgraf, C.A. Eldering, P.F. Brinkley and S.T. Kowel, "Receiver and Transmitter Designs for Optical Interconnects," *Optical Information-Processing Systems and Architectures II*, SPIE vol. 1347, pp. 580-591 (San Diego, CA, July 1990).
16. C.A. Eldering, S.T. Kowel , P. Brinkley, N. Matloff, T. Schubert, R. Gosula, "Fixed Optical Interconnects for Concurrent Computing Systems," *Optical Information Processing Systems and Architectures* , SPIE vol. 1151, pp. 72-82 (San Diego, CA, August 1989).
17. N. Matloff, T. Schubert, S. Kowel, C.A. Eldering and M. Loving, "Performance Analysis of the OPTIMUL Multiprocessor Interconnect," *Proceedings of the IEEE Phoenix International Conference on Computers and Communications* (Phoenix, AZ, 1989).
18. N. Matloff, S.T. Kowel and C.A. Eldering, "OPTIMUL: An Optical Interconnect for Multiprocessor Systems," *Proceedings of the 1988 ACM International Conference on Supercomputing*, (St- Malo, France, 1988).
19. D.J. Burns, M.T. Pronobis, C.A. Eldering and R.J. Hillman, "Reliability/Design Assessment by Internal Node Timing Margin Analysis Using Laser Photocurrent Injection," *Proceedings of the IEEE International Reliability Physics Symposium*, pp. 76-82 (Las Vegas, NV, 1984).
20. M.J. Walter, C.A. Eldering, K.M. Krevis and J.R. Haberer, "Internal Node Testing by Tester Aided Voltage Contrast," *Proceedings of the International Symposium for Testing and Failure Analysis*, pp. 156-161 (San Jose, CA, 1982).

PRESENTATIONS:

1. Eldering, C.A., Moderator, Panel on A Framework for Strategic Patenting, 8th Annual IP Dealmakers Forum (New York, 2021).
2. Eldering, C.A., Chair of Inaugural 2018 LF Dealmakers Forum (New York, NY, 2018).
3. Eldering, C.A., Moderator, Panel on Leveraging Data to Identify Valuable Patents, 5th Annual IP Dealmakers Forum (New York, NY, 2018).
4. Eldering, C.A., Moderator, Panel on Trade Secrets – What IP Investors Need to Know, 6th Annual IP Dealmakers Forum (New York, NY, 2016)
5. Eldering, C.A. and de Wit, S., IP Under the Microscope: Using Patent Valuation Wisely. Presentation to CIP Forum 2011 (Gothenburg, Sweden, 2011).
6. Eldering, C.A. What's a patent worth? Presentation to Princeton Chapter of American Society of Appraisers, Princeton, NJ (May 18, 2009).
7. Eldering, C.A. Patent Purchasing: What makes a patent transaction possible? 10th Annual Intellectual Property Institute – WSBA Continuing Legal Education, (March 11, 2005).

8. Eldering, C. A. and Paratore, B. Video Technology-Past, Present & Future. *United States Patent and Trademark Office Technology Fair*, (June 10, 2004).
9. Eldering, C.A. Testimony before the PA House Committee. *House Bill 1516*, (January 27, 2000).
10. Eisenach, J., R. May and Eldering, C.A. *Regulatory Overkill: Pennsylvania's Proposal to Breakup Bell Atlantic*, (December 16, 1999).
11. Eldering, C.A. Comments before the Federal Communications Commission. *Regulating Cable Internet Services*, (May 25, 1999).
12. Eldering, C.A. Panel participant in The ADSL Forum. *Washington DC Summit*, (March, 1999).
13. Eldering, C.A. Panel participant in Online Advertising: What It Is, Where It Is Going. *Speech in the Digital World: The First Amendment and Advertising*, sponsored by the Progress and Freedom Foundation, (November, 1998).
14. Eldering, C.A. Panel participant in Deregulating Digital Transport: The Bandwidth Crisis and the Role of Government. *Progress & Freedom Foundation's 5th Annual Cyberspace and the American Dream Aspen Summit 1998*, (August, 1998), broadcast on C-SPAN.
15. Eldering, C.A. Evolution of Broadband Access Technologies and Systems. *Networld + Interop '97; The 4th Annual Engineer Conference*, (May, 1997).
16. Eldering, C.A. An Overview of Wired Broadband Access Systems. *IEEE Sarnoff Symposium on Advances on Wired and Wireless Communications*, (March, 1997).
17. Eldering, C.A. Technology: Past and Present – The Impact of Network Competitors. Communications Media Center at New York Law School, *Seminar on Cable TV Franchise Renewals: Business as Usual or A Time for New Priorities?*, (November, 1996).
18. Eldering, C.A. Broadband Access Technologies. *The 8th Annual Digital Audio/Video Workshop*, (October, 1996).
19. Eldering, C.A. Burst Mode Receivers for Fiber Optic Networks. *1995 IEEE/LEOS Summer Topical Meetings on IC's for New Age Lightwave Communications*, (August, 1995).
20. Eldering, C.A. Performance Comparison of Multiple-Access Techniques in Hybrid Fiber-Coax Return Systems. *1995 Optical Fiber Conference*, (February, 1995).
21. Eldering, C.A. Characteristics of Hybrid Fiber-Coax Return Systems. *1995 SCTE Conference on Emerging Technologies*, (January, 1995).
22. Eldering, C.A. Engineering Requirements for Hybrid Fiber-Coax Telephony Systems. *NCTA Engineering Committees 1994 Technical Program*, (May, 1994).
23. Eldering, C.A. Burst and Bit Synchronization Methods for Passive Optical Networks. *Fourth IEEE Workshop in Local Optical Networks*, (September, 1992).
24. Eldering, C.A. Transmitter and Receiver Requirements for Time Division Multiple Access Passive Optical Networks. *Third IEEE Workshop on Local Optical Networks*, (September, 1991).
25. Eldering, C.A. Subscriber Loop Optical Distribution Architecture (SODA): A Cost Effective TDM/TDMA Fiber System. *Fiber Networks for Telephony and CATV*, (September, 1991).
26. Eldering, C.A. Fixed Optical Interconnects for Concurrent Computing Systems. *Optical Information Processing Systems and Architectures*, (August, 1989).

TEACHING APPOINTMENTS:

- University of California at Davis. Lecturer, Electronics Laboratory, (1987-88).
- State University of New York, Utica/Rome. Adjunct Professor, Electronics, (1985-86).

REPORTS, THESES, OTHER PUBLICATIONS:

1. Charles Eldering and Juan Gisone. Claims-based patent valuation. *Intellectual Asset Management Magazine*, (Issue 50 November/December 2011).
2. Charles A. Eldering, Technology, Patents & Licensing, Inc. and Expanse Networks, Inc., Amici Curiae Supporting MercExchange L.L.C., *eBay Inc. v. MercExchange L.L.C.*, on Writ of Certiorari to the United States Court of Appeals for the Federal Circuit (2006).
3. Keeler, P. and C.A. Eldering, S. Weiswasser, A. Weixel and H. Feld. *Reply Comments of Next Level Communications*, CC Docket No. 98-147. FCC Proceedings on Deployment of Wireline Services Offering Advanced Telecommunications Capability. (October 16, 1998).
4. Eisenach, J. and C.A. Eldering. *Comments of the Progress and Freedom Foundation*, CC Docket No. 98-146. FCC Proceedings on Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996. (September 14, 1998).
5. Eames, T., C.A. Eldering and J. Bernstein. *Reply Comments of Next Level Communications*, RM no. 9244, file no. CCB/CPD 98-15. FCC Proceedings on Petition of Alliance for Public Technology Requesting Issuance of Notice of Inquiry and Notice of Proposed Rulemaking to Implement Section 706 of the 1996 Telecommunications Act. (May 4, 1998).
6. Eames, T., C.A. Eldering and J. Bernstein. *Comments of Next Level Communications*, CC Docket No. 98-11. FCC Proceedings on Petition of Bell Atlantic Corporation for Relief from Barriers to Deployment of Advanced Telecommunications Services. (April 6, 1998).
7. Bernstein, J., T. Eames and C.A. Eldering. *Comments of Next Level Communications*, CC Docket No. 98-32. FCC Proceedings on Petition of Ameritech Corporation to Remove Barriers to Invest in Advanced Telecommunications Capacity. (April 6, 1998).
8. Eldering, C.A. and J. Bernstein. *Comments of Next Level Communications*, CC Docket No. 98-26. Petition of US West Communications, Inc. for Relief from Barriers to Deployment of Advanced Telecommunications Services. (April 6, 1998).
9. Eames, T. and C.A. Eldering. Going All-Digital. *Telephony*, (August 18, 1997).
10. Blasko, J.P., C.A. Eldering and A. Brown. Provisional Applications Offer Patentees Priority. *National Law Journal*, (June 16, 1997).
11. Eames, T., B. Weeks and C.A. Eldering. A Winning Solution. *Telephony*, (June 2, 1997): 150-162.
12. Eldering, C.A. Analysis of Fiber to the Curb and Fiber to the Home Architectures. Internal Report prepared for *Telettra España*. (August, 1990).
13. Eldering, C.A. Electro-Optic Polymeric Thin Films and Device. *Ph.D. Dissertation*, University of California, Davis, (1997).
14. Eldering, C.A., B.J. Walker, S.P. Ilitzki and D.J. Holtzhauer. Temperature Measurements Using Infrared Techniques. *Internal Government Report*, Rome Air Development Center (March, 1986).
15. Eldering, C.A. Evaluation of the Use of p-n Structures as Photodetectors in Silicon Integrated Circuits. *Master's Thesis*, (June, 1985), also published as a Government technical report, RADC-TR-85-123.

ISSUED US PATENTS:

1. U.S. Patent 11,166,074 Creating customized programming content
2. U.S. Patent 11,003,694 Learning systems for pangenetic-based recommendations
3. U.S. Patent 10,667,009 Profiling and identification of television viewers

4. U.S. Patent 10,438,240 Methods and systems using a multi-platform targeted advertising system to select advertisements within a target geographic area
5. U.S. Patent 10,379,812 Treatment determination and impact analysis
6. U.S. Patent 10,231,031 Queue based advertisement scheduling and sales
7. U.S. Patent 10,206,012 Queue based head-end advertisement scheduling method and apparatus
8. U.S. Patent 10,116,983 System and method for managing advertising in program streams
9. U.S. Patent 10,182,258 Profiling and identification of television viewers
10. U.S. Patent 10,104,414 Method and system for targeted advertisement filtering and storage
11. U.S. Patent 9,918,117 System and method for managing advertising in program streams
12. U.S. Patent 9,906,819 Advertisement management system for digital video streams
13. U.S. Patent 9,888,297 Queue based advertisement scheduling and sales
14. U.S. Patent 9,602,884 Customizing programming content
15. U.S. Patent 9,582,647 Attribute combination discovery for predisposition determination
16. U.S. Patent 9,544,631 Queue-based head-end advertisement scheduling method and apparatus
17. U.S. Patent 9,524,194 Performing services on behalf of physical devices
18. U.S. Patent 9,479,803 Alternative advertising in prerecorded media
19. U.S. Patent 9,473,814 Profiling and identification of television users
20. U.S. Patent 9,426,315 Grouping advertisement subavails
21. U.S. Patent 9,432,733 Queue based advertisement scheduling and sales
22. U.S. Patent 9,390,423 Methods and systems for verifying advertisements in a multi-platform targeted advertising system
23. U.S. Patent 9,232,252 Queue-based head-end advertisement scheduling method and apparatus
24. U.S. Patent 9,170,992 Treatment determination and impact analysis
25. U.S. Patent 9,165,604 Alternative advertising in prerecorded media
26. U.S. Patent 9,147,112 Advertisement Detection
27. U.S. Patent 9,124,949 Grouping advertisement subavails
28. U.S. Patent 9,043,827 Method and system for providing conditional access to encrypted content
29. U.S. Patent 9,031,870 Pangenetic Web User Behavior Prediction System
30. U.S. Patent 8,934,843 Weighting factor adjustment in adaptive antenna arrays
31. U.S. Patent 8,930,204 Determining lifestyle recommendations using aggregated personal information
32. U.S. Patent 8,837,920 Alternative Advertising in prerecorded media
33. U.S. Patent 8,813,126 Advertisement Filtering and Storage for Targeted Advertisement Systems
34. U.S. Patent 8,789,091 Queue based advertisement scheduling and sales
35. U.S. Patent 8,788,286 Side effects prediction using co-associating bioattributes
36. U.S. Patent 8,788,283 Modifiable attribute identification
37. U.S. Patent 8,776,111 Methods and systems for generating subscriber usage profiles in a multi-platform targeted advertising system
38. U.S. Patent 8,775,287 Method and system for determining insurance needs

39. U.S. Patent 8,677,401 Grouping advertisement subavails
40. U.S. Patent 8,667,536 Profiling and identification of television viewers
41. U.S. Patent 8,655,915 Pangenetic web item recommendation system
42. U.S. Patent 8,655,908 Predisposition modification
43. U.S. Patent 8,655,899 Attribute method and system
44. U.S. Patent 8,635,087 Aggregating personal information
45. U.S. Patent 8,634,652 Video entity recognition in compressed digital video streams
46. U.S. Patent 8,606,761 Lifestyle optimization and behavior modification
47. U.S. Patent 8,581,873 Elastomeric wave tactile Interface
48. U.S. Patent 8,577,296 Weighting factor adjustment in adaptive antenna arrays
49. U.S. Patent 8,570,938 Method and system for adaptive antenna array pairing
50. U.S. Patent 8,484,677 Advertisement monitoring system
51. U.S. Patent 8,473,457 Method of distributing contact and calendar records
52. U.S. Patent 8,458,121 Predisposition prediction using attribute combinations
53. U.S. Patent 8,458,097 System, method and software for healthcare selection based on pangenetic data
54. U.S. Patent 8,452,619 Masked data record access
55. U.S. Patent 8,424,043 Method and system for detecting unscheduled events and recording programming streams
56. U.S. Patent 8,417,675 Method of distributing contact and calendar records
57. U.S. Patent 8,386,519 Pangenetic web item recommendation system
58. U.S. Patent 8,374,387 Video entity recognition in compressed digital video streams
59. U.S. Patent 8,365,216 Video stream modification to defeat detection
60. U.S. Patent 8,358,204 Dynamic tactile interface
61. U.S. Patent 8,346,307 Method of displaying contact information
62. U.S. Patent 8,335,854 Performing services on behalf of low-power devices
63. U.S. Patent 8,326,648 System for secure mobile healthcare selection
64. U.S. Patent 8,306,975 Expanded interest recommendation engine and variable personalization
65. U.S. Patent 8,290,351 Alternative advertising in prerecorded media
66. U.S. Patent 8,280,633 Weather risk estimation system and method
67. U.S. Patent 8,273,425 Nanotube assisted self-cleaning material
68. U.S. Patent 8,266,256 Virtualization for low-power networks
69. U.S. Patent 8,258,956 RFID tag filtering and monitoring
70. U.S. Patent 8,255,403 Pangenetic web satisfaction prediction system
71. U.S. Patent 8,253,703 Elastomeric wave tactile interface
72. U.S. Patent 8,234,244 Method of distributing contact and calendar records
73. U.S. Patent 8,225,347 Advertisement filtering and storage for targeted advertisement systems
74. U.S. Patent 8,224,835 Expanding attribute profiles
75. U.S. Patent 8,209,319 Compiling co-associating bioattributes

- 76. U.S. Patent 8,200,509 Masked data record access
- 77. U.S. Patent 8,185,597 Providing notifications to an individual in a multi-dimensional personal information network
- 78. U.S. Patent 8,185,461 Longevity analysis and modifiable attribute identification
- 79. U.S. Patent 8,180,675 System and method for automatically managing avail inventory data and avail pricing
- 80. U.S. Patent 8,151,295 Queue based advertisement scheduling and sales
- 81. U.S. Patent 8,150,422 Method of displaying contact information
- 82. U.S. Patent 8,126,486 Adaptive antenna weighting system for wireless local area and personal area networks
- 83. U.S. Patent 8,121,915 Generating financial plans using a personal information aggregator
- 84. U.S. Patent 8,116,616 Alternative advertising in prerecorded media
- 85. U.S. Patent 8,108,406 Pangenetic web user behavior prediction system
- 86. U.S. Patent 8,099,424 Treatment determination and impact analysis
- 87. U.S. Patent 8,087,045 Grouping advertisement subavails
- 88. U.S. Patent 8,077,021 Dynamic tactile interface
- 89. U.S. Patent 8,075,980 Diffraction grating assisted self-cleaning material
- 90. U.S. Patent 8,073,708 Aggregating personal healthcare information
- 91. U.S. Patent 8,073,194 Video entity recognition in compressed digital video streams
- 92. U.S. Patent 8,072,314 Secondary card reader
- 93. U.S. Patent 8,065,324 Weight and diet attribute combination discovery
- 94. U.S. Patent 8,055,643 Predisposition modification
- 95. U.S. Patent 8,051,033 Predisposition prediction using attribute combinations
- 96. U.S. Patent 8,046,798 Profiling and identification of television viewers
- 97. U.S. Patent 8,024,348 Expanding attribute profiles
- 98. U.S. Patent 7,984,466 Advertising management system for digital video streams
- 99. U.S. Patent 7,970,827 Providing notifications to an individual in a multi-dimensional personal information network
- 100.U.S. Patent 7,962,934 Advertising monitoring system
- 101.U.S. Patent 7,952,480 RFID tag filtering and monitoring
- 102.U.S. Patent 7,949,565 Privacy-protected advertising system
- 103.U.S. Patent 7,941,434 Efficiently compiling co-associating bioattributes
- 104.U.S. Patent 7,941,329 Insurance optimization and longevity analysis
- 105.U.S. Patent 7,933,912 Compiling co-associating bioattributes using expanded bioattribute profiles
- 106.U.S. Patent 7,930,714 Video detection and insertion
- 107.U.S. Patent 7,917,438 System for secure mobile healthcare selection
- 108.U.S. Patent 7,870,576 Targeted advertising through electronic program guide
- 109.U.S. Patent 7,844,609 Attribute combination discovery
- 110.U.S. Patent 7,818,310 Predisposition modification

111.U.S. Patent 7,810,114	Advertisement filtering and storage for targeted advertisement systems
112.U.S. Patent 7,809,154	Video entity recognition in compressed digital video streams
113.U.S. Patent 7,801,956	Providing notifications to an individual in a multi-dimensional personal information network
114.U.S. Patent 7,797,302	Compiling co-associating bioattributes
115.U.S. Patent 7,694,318	Video detection and insertion
116.U.S. Patent 7,690,013	Advertisement monitoring system
117.U.S. Patent 7,690,011	Video stream modification to defeat detection
118.U.S. Patent 7,689,682	Obtaining lists of nodes of a multi-dimensional network
119.U.S. Patent 7,500,258	Advertisement subgroups for digital streams
120.U.S. Patent 7,440,674	Alternative advertising in prerecorded media
121.U.S. Patent 7,432,811	RFID tag filtering and monitoring
122.U.S. Patent 7,420,458	Secondary card reader
123.U.S. Patent 7,331,057	Grouping advertisement subavails
124.U.S. Patent 7,328,448	Advertisement distribution system for distributing targeted advertisements in television systems
125.U.S. Patent 7,313,811	Optical conversion device
126.U.S. Patent 7,298,264	RFID tag filtering and monitoring
127.U.S. Patent 7,260,823	Profiling and identification of television viewers
128.U.S. Patent 7,240,355	Subscriber characterization system with filters
129.U.S. Patent 7,177,844	Apparatus and method for activation of a security module in a set-top retail environment
130.U.S. Patent 7,152,237	Delivering advertisements to the set-top-box
131.U.S. Patent 7,150,030	Subscriber characterization system
132.U.S. Patent 7,062,510	Consumer profiling and advertisement selection system
133.U.S. Patent 7,039,932	Queue-based head-end advertisement scheduling method and apparatus
134.U.S. Patent 6,915,530	Ingress detection and characterization by time/frequency map
135.U.S. Patent 6,882,709	Enhanced broadband telephony services
136.U.S. Patent 6,880,170	Ingress detection and attenuation
137.U.S. Patent 6,820,277	Advertising management system for digital video streams
138.U.S. Patent 6,714,917	Subscriber identification based on electronic program guide data
139.U.S. Patent 6,704,930	Advertisement insertion techniques for digital video streams
140.U.S. Patent 6,684,194	Subscriber identification system
141.U.S. Patent 6,615,039	Advertisement subgroups for digital streams
142.U.S. Patent 6,560,578	Advertisement selection system supporting discretionary target market characteristics
143.U.S. Patent 6,457,010	Client-server based subscriber characterization system
144.U.S. Patent 6,324,519	Advertisement auction system
145.U.S. Patent 6,321,384	Noise reduction in cable return paths

146.U.S. Patent 6,317,884	Video, data, and telephony gateway
147.U.S. Patent 6,298,348	Consumer profiling system
148.U.S. Patent 6,216,129	Advertisement selection system supporting discretionary target market characteristics
149.U.S. Patent 6,078,593	Method and apparatus for reliable operation of universal voice grade cards
150.U.S. Patent 5,881,362	Method of ingress noise reduction in cable return paths
151.U.S. Patent 5,742,591	Interference cancellation system for CATV return transmissions
152.U.S. Patent 5,479,451	Method and device for data recovery in burst mode systems
153.U.S. Patent 5,408,525	Diverter interface between two telecommunication lines and a station set
154.U.S. Patent 5,357,588	Opto-electronic transducer device for optical link termination equipment and application thereof to various types of optical link
155.U.S. Patent 4,813,772	Electro-optical interface
156.U.S. Patent 4,698,587	Method of characterizing critical timing paths and analyzing timing related failure modes in very large scale integrated circuits

FUNDED RESEARCH PROPOSALS:

- Raised \$3.6 million in capital (December 1999 through April 2000) for Expanse Networks, Inc. for development of systems and intellectual property in the area of targeted advertising.
- Kowel, S.T., A. Knoesen (principal investigators) and C.A. Eldering (proposal co-author), *Polymeric Ultrathin Film Multilayered Modulators*, funded by NSF Quantum Electronics, Waves and Beams Program for approximately \$300,000 over 3 years.

PROFESSIONAL ACTIVITIES AND PUBLIC RECOGNITION:

- Recognized in *IAM Strategy 250 – The World's Leading IP Strategists* published by *Intellectual Asset Management (IAM) Magazine* (2009-2011). *IAM Strategy 300* (2012-2013).
- Certified Passive Home Consultant, *Passive Home Institute*.
- Guest Editor. Feature topic: Patents and Telecommunications. *IEEE Communications Magazine* (July, 2000).
- Cited in "Who Owns the Knowledge Economy? Patent Wars." *The Economist*, (April 8-14, 2000).
- Cited in "Access: Not a Rocket Science" *Cable World*, (February, 2000).
- Cited in "Patents Considered Vital to Thrive on the Internet." *New York Times Outlook 2000*, (December, 1999).
- Guest Editor for Feature topic: Broadband Technologies and Trials. *IEEE Communications Magazine* (October, 1999).
- Guest Editor for Feature topic: Broadband Deployment in a Deregulated Environment. *IEEE Communications Magazine* (July, 1998).
- Member of *Network Reliability and Interoperability Council* and contributor to NRIC reports to FCC on interoperability and telecommunications deregulation.
- Senior Member, *IEEE*.
- Chair, *Access Subcommittee of IEEE Communications Society*.
- Member, Technical Program Committee and Session Chair, *IEEE Communications Society Broadband '96 Conference*.
- Invited speaker, 1995 *IEEE/LEOS Summer Topical Meeting*.

- Co-chair, 1991 *SPIE Fibers '91 Conference*.
- Chair, 1993 *SPIE Conference on LANs and MANS*.
- Invited participant, 1990 *Gordon Conference on Organic Thin Films*.

LANGUAGES:

- English: native language
- Spanish: speak, read, and write
- Portuguese: speak, read and write
- German: working knowledge
- Italian: working knowledge