

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC.
Petitioner

v.

BELDEN INC.
Patent Owner

IPR _____
U.S. Patent No. 10,832,833
Issued: November 10, 2020
Filed: March 18, 2019

EXPERT DECLARATION OF KENNETH CORNELISON

In Support of *Inter Partes* Review of U.S. Patent No. 10,832,833

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I, Kenneth Cornelison, declare as follows.

I. INTRODUCTION

1. I have been retained by Petitioner, CommScope Technologies LLC, (“CommScope” or “Ppetitioner”) to provide expert opinions in connection with a petition for *inter partes* review before the United States Patent and Trademark Office. I understand that this declaration involves my expert opinions and expert knowledge related to U.S. Patent No. 10,832,833 (“the ‘833 Patent”), titled “High Performance Data Communications Cable,” and its field of endeavor.

2. I have been asked to provide my independent technical review, analysis, insights, and opinions regarding the ‘833 Patent and the references that form the basis for the grounds of unpatentability set forth in the Petition for *Inter Partes* Review of the ‘833 Patent. The statements made herein are based on my own knowledge and opinions.

II. SUMMARY OF OPINIONS

To summarize the opinions stated herein, it is my opinion that the claims of the ‘833 Patent are invalid based on the following grounds:

	Claims	Basis for Unpatentability
Ground 1	1-8, 48-50	Anticipated by Cook
Ground 2	1-8, 48-50	Anticipated by Glew
Ground 3	1, 3-8, 48-50	Anticipated by Roberts

Ground 4	1, 3-8, 48-50	Obvious in view of Roberts and one or more of Jachimowicz-172 and/or the knowledge of a POSITA
Ground 5	1, 3-8, 48-50	Obvious in view of Grounds 3 and/or 4 and one or more of Jachimowicz-036 and/or the knowledge of a POSITA
Ground 6	1-8	Obvious in view of any of Grounds 3-5 and one or more of Simons and/or the knowledge of a POSITA
Ground 7	1-8, 48-50	Anticipated by Pfeiler

III. QUALIFICATIONS

3. I have 40+ years of experience in the wire and cable industry. My experience includes the design, development and testing of high-speed data cables. I obtained my BSEE in 1974 and I started working in the wire and cable industry in 1976. Through the late 1970s through the 2000s, I worked in the design, manufacturing and testing of wires and cables for companies including Anaconda, Alcatel, Belden and General Cable. My roles included being manager of product development and customer engineering, process development manager, and VP of Technology – Data Communications. Since leaving General Cable, I have consulted in the wire and cable industry, published several papers, given technical training and been actively involved in the International Wire and Cable Symposium (IWCS). The IWCS promotes, initiates, and coordinates the exchanging of technical information on wire, cable and fiber optics within industry and the government, through an annual IWCS Symposium. I have been an

instructor (or co-instructor) at the annual Symposiums held in 2013, 2014, 2015, 2016, 2018, 2019, 2022, and am currently expecting to be an instructor at the Symposium planned for 2023. I am a named inventor on more than 15 US patents.

4. I am being compensated for my time at the rate of \$175 per hour for time spent on this matter. I have no interest in the outcome of this proceeding, and my compensation is not dependent upon the outcome of this proceeding.

IV. MATERIALS CONSIDERED

5. My technical review, analysis, insights, and opinions are based on my experience and other qualifications discussed above, as well as my study of relevant materials.

6. I have reviewed and am familiar with the ‘833 Patent specification, claims, and prosecution history.

7. I have also reviewed and am familiar with each exhibit cited herein. I confirm that to the best of my knowledge the accompanying exhibits are true and accurate copies of what they purport to be, and that an expert in the field would reasonably rely on them to formulate opinions such as those set forth in this declaration.

Exhibit No.	Exhibit Description
1001	U.S. Patent No. 10,832,833 (the “‘833 Patent”)
1002	Office Action dated 06/28/2019

1003	Office Action dated 01/08/2020
1004	Amendment and Response to Non-Final Office Action dated 04/08/202
1005	Scheduling Order, C.A. No. 22-783-RGA (D. Del.)
1006	Expert Declaration of Kenneth Cornelison
1007	<i>Curriculum Vitae</i> of Kenneth Cornelison
1008	U.S. Patent Publication No. 2013/0248240 (Glew)
1009	U.S. Patent No. 3,622,683 (Roberts)
1010	U.S. Patent No. 9,363,935 (Cook)
1011	U.S. Patent No. 7,335,837 (Pfeiler)
1012	U.S. Patent No. 3,911,200 (Simons)
1013	U.S. Patent No. 3,233,036 (Jachimowicz-036)
1014	U.S. Patent No. 3,894,172 (Jachimowicz-172)
1015	U.S. Patent No. 4,428,787 (Pan)
1016	<i>Electronic Wire & Cable - A User's Guide: Performance and Selection</i> , Section 5: Multiconductor Cables, AT&T (1987)
1017	Whitham D. Reeve, <i>Subscriber Loop Signaling and Transmission Handbook – Digital</i> , IEEE Telecommunications Handbook Series (1995)
1018	Whitham D. Reeve, <i>Subscriber Loop Signaling and Transmission Handbook – Analog</i> , IEEE Telecommunications Handbook Series (1992)
1019	U.S. Patent No. 5,380,591 (“Keogh”)
1020	U.S. Patent No. 1,727,972 (“Ford”)
1021	U.S. Patent No. 1,956,730 (“Reichelt”)
1022	U.S. Patent No. 3,803,340 (Jachimowicz-340)
1023	Canadian Patent Application No. 2,058,046 (Tessier)
1024	U.S. Patent No. 4,262,164 (Nutt)
1025	U.S. Patent Pub. No. 2006/0169478 (Clark-478)
1026	U.S. Patent Publication No. 2010/0206609 (‘609 Publication)
1027	U.S. Patent No. 5,670,748 (Gingue)
1028	G.F. Moore, <i>Electric Cable Handbook</i> , BICCCables (3rd. Ed. 1997)

1029	<i>The New IEEE Standard Dictionary of Electrical and Electronics Terms</i> (5th ed. 1993)
1030	Neil Sclater and John Markus, <i>Electronics Dictionary</i> , McGraw-Hill (6th Ed. 1997)
1031	Draka – B03: Rodent protection (2009-01-19)
1032	U.S. Patent No. 5,427,643 (Aitken)
1033	U.S. Patent No. 4,213,280 (Sandborn)
1034	U.S. Patent No. 4,439,632 (Aloisio)
1035	U.S. Patent No. 4,327,248 (Campbell)
1036	U.S. Patent No. 5,518,836 (McCullough)
1037	U.S. Patent No. 4,755,629 (Beggs)
1038	Alcatel Cable Systems Product Catalog (circa 1988-1990)
1039	U.S. Patent No. 6,378,283 (Barton)
1040	U.S. Patent No. 6,570,095 (Clark)

8. In this declaration, I provide various annotated figures to aid in explaining my opinions. However, these figures are not intended to necessarily imply literal, precise physical or bodily combination or modification in exactly or only the way shown or annotated. Instead, I provide those figures only to help illustrate various concepts, and they should not be taken as showing the only disclosure of a particular element, or the only way that a person of ordinary skill in the art would have been motivated to modify or combine references.

V. RELEVANT LEGAL PRINCIPLES

A. Effective Filing Date

9. I understand that claims of a patent have an “effective filing date” and that obviousness is considered based on the prior art as of that date.

10. The utility application for the ‘833 Patent (application No. 16/356,825) was filed on March 18, 2019. It is a continuation of application No. 15/996,161, now U.S. Patent No. 10,236,099, which is a continuation of application No. 15/610,504, now U.S. Patent No. 9,991,030 (‘030 Patent), which was filed on May 31, 2017. The ‘030 Patent is a continuation of application No. 14/520,125, now U.S. Patent No. 9,697,929, and claims priority to a provisional application filed on October 23, 2013. Therefore, I am told that for the purposes of this proceeding, I have been asked to use October 23, 2013 as the effective filing date for the challenged claims.

B. Person of Ordinary Skill in the Art

11. I have been informed that a person of ordinary skill in the art (“POSITA”) is a person who is presumed to have complete knowledge of the relevant prior art and who would think along the lines of conventional wisdom in that art. The person of ordinary skill in the art has ordinary creativity and does not have extraordinary skill, e.g., is not an expert. I have been informed that factors to consider in determining the level of ordinary skill in the art include the educational

level of workers in the field, the types of problems addressed in the art, prior-art solutions to such problems, how quickly innovations are made, and the complexity of the technology.

12. The '833 Patent relates to data communication cables. Generally speaking, the '833 Patent discloses a cable having twisted-pair conductors, a filler that separates the pairs from each other, a barrier tape that surrounds the filler and twisted-pair conductors, and an outer jacket surrounding everything, such as illustrated below, and techniques to improve crosstalk characteristics.

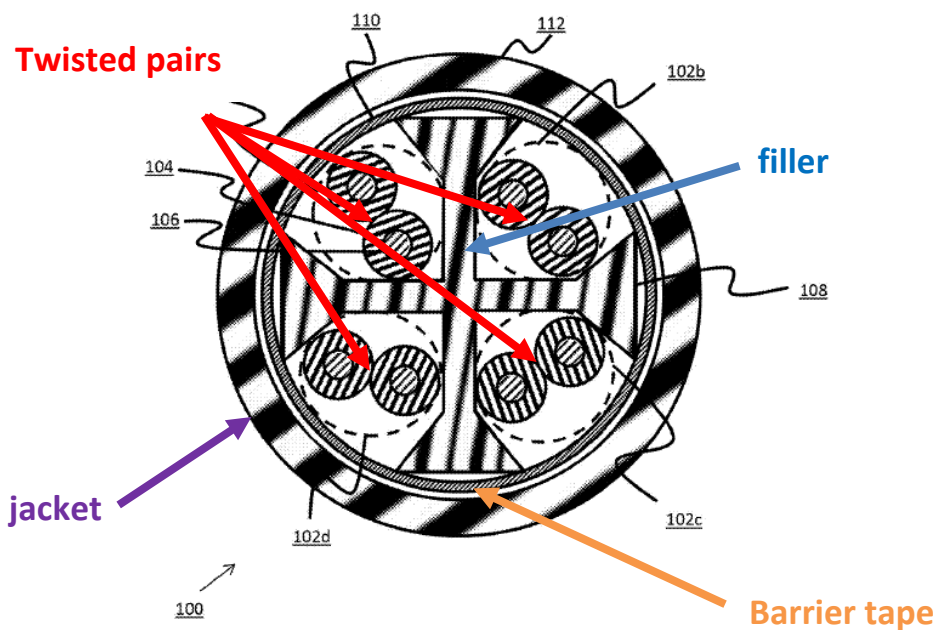


FIG. 1

See EX-1001 at Title, Abstract, FIG. 1, 2, 2:28-42, 6:26-7:8, 3:26-64. In view of the factors mentioned above and the discussion of the technical background herein, it is my opinion that a person of ordinary skill in the art of the '833 Patent would

have had a bachelor's degree in electrical engineering and a minimum of 3-4 years of industry experience in connection with designing, manufacturing, and testing of twisted-pair data cables. An individual with a master's degree in electrical engineering would require less industry experience (e.g., 1-2 years).

13. Throughout my declaration, even if I discuss my analysis in the present tense, I am always making my determinations based on what a POSITA would have known at the time of the invention.

C. Claim Construction Standard

14. I have been instructed by counsel on the law regarding claim construction and patent claims, and understand that a patent may include two types of claims—-independent claims and dependent claims. An independent claim stands alone and includes only the features it recites. A dependent claim can depend from an independent claim or another dependent claim. I understand that a dependent claim includes all the features that it recites in addition to all of the features recited in the claim from which it depends.

15. In an *inter partes* review proceeding such as this, I understand the claim of a patent shall be construed using the same claim construction standard that would be used to construe the claim in a civil action. I understand this includes construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution

history pertaining to the patent. For completeness, I understand this standard is different from the prior “broadest reasonable interpretation” standard that was used in certain earlier *inter partes* review proceedings.

16. I understand an appropriate dictionary definition may provide evidence explaining the ordinary and customary meaning as would be understood by a person of ordinary skill in the art.

17. I understand that if there are specific statements in the specification that define the invention with respect to a term, those statements are strong evidence of a definition for the term.

D. Anticipation and Obviousness Law

18. In this declaration I have been instructed by counsel on the law regarding anticipation and obviousness. I understand that a claim is invalid if it is anticipated or obvious.

1. Anticipation

19. I understand that anticipation of a claim requires that every element of a claim is expressly or inherently disclosed in a single prior art reference. I understand that an anticipating reference need not use the exact terms of the claims, but must describe the patented subject matter with sufficient clarity and detail to establish that the claimed subject matter existed in the prior art and that such existence would be recognized by persons of ordinary skill in the field of the

purported invention. I also understand that an anticipating reference must enable one of ordinary skill in the art to reduce the purported invention to practice without undue experimentation. Under what is known as inherency, I understand that if the prior art necessarily functions in accordance with, or includes the claimed limitations, it anticipates. I also understand that I may examine evidence that is outside of the prior art reference in determining whether a feature, while not expressly discussed in the reference, is necessarily present in that reference.

2. Obviousness

20. I understand that a patent claim is also invalid if the claims would have been obvious to a POSITA at the time of the invention. I understand that the obviousness inquiry should not be done in hindsight but rather from the perspective of a POSITA as of the time of the invention.

21. I understand that to obtain a patent, the claims must have been, as of the time of the invention, nonobvious in view of the prior art. I understand that an obviousness analysis involves comparing a claim to the prior art to determine whether the claimed invention would have been obvious to a POSITA at the time of the invention in view of the prior art and in light of the general knowledge in the art as a whole. I also understand that obviousness is ultimately a legal conclusion based on underlying facts of four general types, all of which must be considered:

(1) the scope and content of the prior art;

- (2) the level of ordinary skill in the art;
- (3) the differences between the claimed invention and the prior art;
- and
- (4) any objective indicia of nonobviousness.

22. I understand that a claim is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a POSITA at the time of the invention.

23. I understand that certain objective indicia can be important evidence regarding whether a patent is obvious. Such indicia include: industry acceptance; commercial success of products covered by the patent claims; long-felt need for the invention; failed attempts by others to make the invention; copying of the invention by others in the field; unexpected results achieved by the invention as compared to the closest prior art; praise of the invention by the infringer or others in the field; taking of licenses under the patent by others; expressions of surprise by experts and those skilled in the art at making the invention; and the patentee proceeded contrary to the accepted wisdom of the prior art. I understand that such evidence must have a nexus, or causal relationship to the elements of the claim. I am unaware of any such objective considerations having a nexus to the claims at issue in this proceeding.

24. I understand that obviousness can be established by combining multiple prior art references to meet each and every claim element, or by modifying a single prior art reference.

25. I understand that that a showing of obviousness based on the combination of references can require that, as of the patent's effective filing date, (1) a POSITA would have been motivated to combine prior art references to arrive at the claimed subject matter and (2) there would have been a reasonable expectation of success in achieving the claimed invention from such combination.

26. I also understand that to support a combination of multiple prior art references or a modification of a single reference, there must be a rationale explaining why a skilled artisan would combine or modify the references in the manner claimed and how the proposed combination or modification meets each and every claim element. This rationale may come from a teaching, suggestion, or motivation to combine. However, I understand that a specific teaching, suggestion, or motivation to combine elements in the prior art to achieve the claimed combination is not required for obviousness. Instead, I understand that a combination of known elements may be obvious in light of the interrelated teachings of the prior art, the effects of demands in the market, the background knowledge possessed by a POSITA, and inferences and creative steps that a POSITA would employ. But I also understand that a proposed combination or

modification of references can be susceptible to hindsight bias. When it appears hindsight bias is being used, I understand the modification or combination is not considered obvious.

27. I understand that exemplary rationales that may support a conclusion of obviousness include: combining or modifying prior art elements according to known methods to yield predictable results; simple substitutions of one known element for another to obtain predictable results; using a known technique to improve similar devices in the same way; applying a known technique to a known device ready for improvement to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art teachings to arrive at the claimed invention.

28. I understand that teaching away, e.g., discouragement from making the proposed modification, is strong evidence that the references are not combinable. I also understand that a disclosure of more than one alternative does not necessarily constitute a teaching away.

29. I understand that the combination does not need to result in the most desirable embodiment, but if the proposed combination does not have a reasonable expectation of success at the time of the invention, a POSITA would not have had an adequate teaching, suggestion, or motivation to combine the references.

30. I understand that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated or physically combined into the structure of the primary reference, but whether the claimed invention is rendered obvious by the teachings of the references as a whole.

VI. Technology Overview

31. The '833 Patent relates to data communications cables and purports to disclose ways to reduce "problems of cable to cable 'alien' crosstalk (ANEXT) and signal Return Loss (RL) in a cost effective manner." EX-1001 at 2:28-34, 5:33-37. None of the claims of the '833 Patent recite that they are limited to cables operating at particular high speeds. *Id.* at Claims 1-50.

32. Communications cables are typically constructed of twisted pairs of metal conductors. *See* EX-1008 (Glew) at ¶¶[0004-0005], EX-1025 (Clark-478) at ¶[0004], EX-1016 (AT&T User Guide 1987) at p. 7 ("Most of the cables within the scope of AT&T's EC&W product line utilize the twisted pair construction."). Twisted pairs were (and are) commonly referred to as simply "pairs" in the industry. *See, e.g.*, EX-1017 (Reeve 1995) at p. 18 ("Each cable pair consists of

two twisted insulated conductors.”). Each of the conductors of a twisted pair is typically wrapped in an insulating material, commonly a polymeric material. This was well known at the time the priority application was filed in 2013. *See, e.g.*, EX-1019 (Keogh) at 1:10-12 (“A typical telephone cable is constructed of twisted pairs of metal conductors for signal transmission. Each conductor is insulated with a polymeric material.”). A number of twisted pairs were then assembled into a cable and wrapped in a polymeric sheath or jacket. *Id.* at 1:12-16; *see also* EX-1016 at p. 7 (“Production of small cables of this type involves twisting individual pairs and grouping those twisted pairs to form either a cable or a unit for a larger cable.”)

33. Twisted pairs have been a staple of the cable industry for over a century. For example, telephone cable patents from the 1920s discuss using twisted pairs in electrical cables. *See, e.g.*, EX-1020 (Ford) at 2:55-57 (filed April 18, 1924; “A plurality of copper wires insulated with paper, cotton, silk, or other suitable materials, usually twisted together in pairs”); EX-1021 (Reichelt) at 1:43-47 (filed Sept. 11, 1929; “[] assembling and twisting a plurality of twisted pairs of individual insulated electrical conductors into a single compact group or so called cable unit”). When compared to untwisted pairs, twisted pairs have improved crosstalk and decreased unbalanced mutual capacitance. EX-1016 at p. 7 (“The two main reasons for twisting pairs of conductors are to minimize or eliminate

crosstalk and to decrease unbalanced mutual capacitance.”). Certain electrical parameters, such as impedance, are dependent on the spacing of the two conductors. Twisting the two conductors maintains consistent spacing between the two conductors along the length of the pair. The twisting also causes periodic reversals in the electrical field that surrounds the pair. These reversals also result in improved isolation from electrical fields produced by adjacent pairs or outside electrical fields. Twisted pairs also have a mechanical advantage in that the individual wires stay together, and the individual wires of the pair do not become intermixed.

34. An alternative to twisted pairs is twisted quads. Twisted quads require four wires arranged in a square or star and twisted about a central axis. Because twisted quads involve four wires twisted together to act as two pairs, less space is required for a twisted quad than two twisted pairs. However, twisted quads need to be a perfect square or interference between the opposite wires of the twisted quad can result. Twisted quads were primarily used in telephone cabling in Europe, while twisted pairs were favored in the United States. Generally, a POSITA can substitute twisted pairs for cable applications that use twisted quads and vice versa. Both are simply ways of arranging pairs to reduce crosstalk. Twisted pairs are generally favored over twisted quads for high frequency cable implementations.

35. Crosstalk was a well-known issue associated with communication cables at the time the priority application was filed. *See, e.g.*, Ex-1014 (Jachimowicz-172) at 1:8-16; Ex-1010 (Cook) at 1:55-67. Crosstalk can refer to crosstalk between adjacent pairs or groups of pairs, or crosstalk between adjacent cables. Crosstalk between pairs or groups of pairs was known to occur when a signal is transmitted over a first twisted pair—commonly referred to as a disturbing circuit—and that signal induces currents and electromotive forces in another twisted pair—referred to as the disturbed circuit. Ex-1009 (Roberts) at 3:22-28; *see also* Ex-1010 at 1:55-67; EX-1022 (Jachimowicz-340) at 1:7-11. This results in the disturbed circuit carrying two signals: (1) the information signal intended for transmission and (2) the unwanted signal induced by the disturbing pair. EX-1022 at 1:11-16. The unwanted signal is superimposed over the intended signal reducing the clarity and reliability of the transmission. *Id.*

36. Prior to 2013 (and also prior to 1999), there were several known ways to reduce crosstalk between pairs within a cable. For example, the twist lengths of the twisted pairs may be varied to prevent the electrical fields surrounding each pair from being in unison along their length and therefore more strongly influence the other. The twist lengths of the twisted pairs may also be varied to prevent the twisted pairs from nesting together. EX-1014 at 1:30-34. Nesting results when the circles circumscribing each twisted pair overlap with each other resulting in closer

proximity from pair to pair and stronger crosstalk between the pairs. *See, e.g.*, EX-1037 (Beggs) at 6:57-7:3, FIG. 8A. Preventing the twisted pairs from nesting together reduces crosstalk.

37. Another known way to reduce crosstalk was to physically separate a twisted pair or set of twisted pairs from each other such that the voltage induced by the disturbing pair on the disturbed pair is decreased. *See, e.g.*, EX-1023 (Tessier) at 3:17-31. The distance needed between twisted pairs to meet various performance requirements can be determined through mathematical models of the cable. *See id.* at 3:19-23. Though in my experience, experimentation is also often used to verify and finalize desired performance.

38. Various physical separators (or fillers) for reducing crosstalk between twisted pair conductors within a cable were known and used in the art prior to the filing of the priority application. Some fillers were made purely of plastic or polymers. *See, e.g.*, EX-1011 (Pfeiler) at FIG. 6 (discussed below); EX-1025 at ¶[0044]; EX-1023. Others were plastic-coated metallic tapes. *See, e.g.*, EX-1009 (Roberts; discussed below); EX-1025 at ¶[0047] (aluminum/mylar tape); EX-1022; EX-1018; EX-1017. Common plastic coatings included an olefin polymer such as polyethylene, polypropylene, polyethylene terephthalate (Mylar), or other plastic material. EX-1009 at 3:32-37. Still others included dielectric material with

electrically conductive inclusions, or coated with metal, or having a metal strip embedded therein. *See, e.g.*, EX-1008 at ¶¶[0149-154], FIGS. 8A, 8B, 9, 10A.

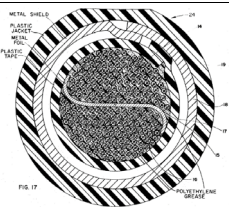
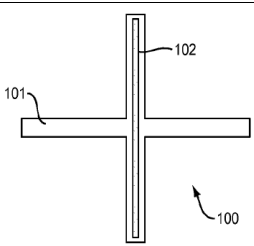
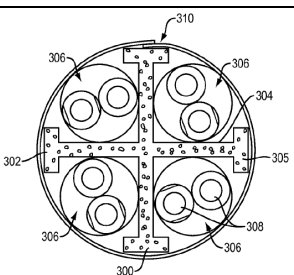
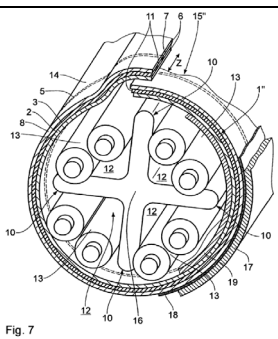
39. The designs of separators have evolved over time based on various considerations. One application involved dividing a cable containing many twisted pairs into two compartments. *See, e.g.*, EX-1009 at Abstract. Twisted pairs in one compartment were used to transmit signals in one direction, and twisted pairs in the other compartment were used to transmit signals in the opposite direction. *Id.* at 1:8-22. A shield was used to electrically isolate the two compartments in order to reduce near-end crosstalk (crosstalk that occurs when a twisted pair transmitting in one direction causes crosstalk on a nearby twisted pair transmitting in the opposite direction)¹. Isolating the two compartments was important because of the relative strength of the signals. The signal being transmitted at one end would be relatively stronger than the signal being received at that end because signal strength is diminished as it travels through the cable. Thus, the crosstalk caused by the transmit signal on the receive signal would be more significant due to the differences in signal strength. *See id.* at 1:22-26. Further, the shielding did not need

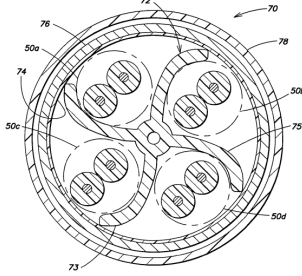
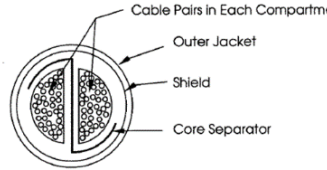
¹ EX-1029 (IEEE Dictionary) at p. 5 (“near-end crosstalk. Crosstalk that is propagated in a disturbed channel in the direction opposite to the direction of propagation of the current in the disturbing channel. *Note*: the terminal of the disturbing channel at which the near-end crosstalk is present is ordinarily near to or coincides with the energized terminal of the disturbing channel.”).

to completely surround compartments to prevent near-end crosstalk. The shield could simply be placed between compartments. *See, e.g., id.* at Fig. 17; 11:7-12.

40. Another application involved dividing a cable containing many twisted pairs into four or more compartments. *See, e.g., id.* at FIGS. 13-16. Those compartments could be defined by several distinct separators (e.g., multi-layer shield tapes 15 and plastic tapes 17 in Roberts’ FIGS. 13-14), or substantially “+” or cross-shaped separators such as in EX-1012 (Simons) (at FIG. 11) and EX-1008 (at FIGS. 9 & 10A) and EX-1010 (at FIGS. 1-2).

41. Below are some examples of separators known in the art prior to the invention date associated with the ‘833 Patent:

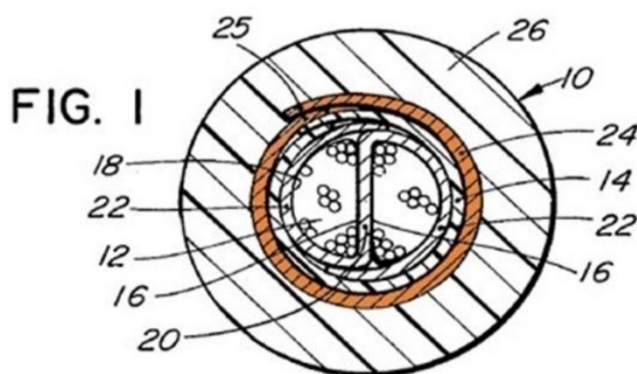
 EX-1009, Fig. 17 – plastic-coated metal tape separator	 EX-1008, Fig. 9 – metal strip encased in dielectric polymer
 EX-1010, FIG. 10A – plastic separator	 EX-1011, FIG. 7 – plastic separator

EX-1008, FIG. 10A – polymer-with-metal- inclusions separator	
 EX-1025, ¶[0047]. FIG. 2 – Aluminum/Mylar separator	 EX-1017, at p. 30 (Fig. 7-7 – core separator); <i>see also</i> EX-1016 (Fig. 3-1)

42. A POSITA would understand that a dielectric material is an insulator. *See, e.g.*, EX-1030 at p. 4 (dielectric). Polymers and plastics were generally known to be dielectric materials prior to the filing of the priority application. *See, e.g., id.* Specifically, olefin polymers such as polyethylene and polypropylene were known to have very low dielectric constants. EX-1027 (Gingue) at 2:8-13. Polyester layers were also known to be good dielectrics with low dielectric constants. An example of a common polyester used in cabling was Mylar.

43. Utilizing barrier tapes for surrounding the conductors within a cable and reducing crosstalk from other cables also was known prior to 2013. Some of those known barrier tapes had two layers: one being dielectric and the other being conductive (e.g., aluminum/Mylar tapes). *See, e.g.*, EX-1025 at ¶[0047] (“the binder 74 may also be conductive, for example, also an aluminum/mylar tape”); EX-1010 at 22:25-33, FIG. 7A.

44. Others had three layers, with an electrically conductive layer “sandwiched between multiple dielectric layers in order to form a shield.” *See, e.g.,* EX-1010 at 7:18-20. For example, in 1963, a patent issued for a “Corrosion Proof Shielding Tape for Shielding Telephone Cables” concerning a shielding tape having an aluminum strip coated on both major surfaces with a plastic protective film with high electrical resistivity. *See* EX-1013 at 2:52-65, Figure. Similarly, U.S. Patent No. 4,428,787 (“Pan”) (EX-1015) discloses wrapping an “aluminum shield 24” that is “coated on both sides with plastic” around the twisted pair conductors and separator within the cable:



EX-1015 at 2:62-3:18, FIG. 1 (annotated); *see also* EX-1014 at 3:25-27 (describing “shield 34” wrapped around the cable core and including a “strip of foil with a polyolefin coating on both sides”).

45. It was common for a barrier tape to be a metal tape with “plastic, such as polyethylene, firmly adhered to either one or more surfaces thereof” (e.g., on one side of the metal, sandwiching the metal, or fully encasing the metal). *See,*

e.g., EX-1009 at 4:16-24. These coated metal tapes acted as “electrical, as well as mechanical, shield[s]” surrounding the conductors inside the cable. *Id.* at 4:20-23. One common shield tape was a plastic/metal/plastic three-layer tape sold under the ZetabonTM brand name. *See* EX-1031 at p. 2 (“As standard the tape is 0.155 mm thick. . . . On both sides of the tape it is further coated with a 0.055 mm thick polymer coating. A common trade name for this material is ZetabonTM.”); *see also* EX-1036 at 17:42-56 (“Materials that are chemically compatible as a housing material include . . . a ZetabonTM brand of a plastic/metal/plastic laminate”); EX-1032 at 1:39-50 (“When plastic coated tapes, such as Zetabon (trade name of Dow Chemical) are spliced, the original plastic coating is removed from the ends to be spliced”); EX-1034 at 6:1-8 (“For example, the combination of a metallic strip which is pre-coated with an ethylene acrylic acid copolymer adhesive-like material is marketed by the Dow Chemical Company of Midland, Michigan under designations X0-5554.21 and X0-5554.28 and is referred to as Zetabon® plastic clad metal sheathing for electrical wire and cable.”); EX-1033 at 2:56-61, FIG. 5 (“The envelope 32 of FIG. 5 consists of a layer of flexible metal 34, such as aluminum, between two layers 36 and 38 of a plastic film, such as polyethylene; one example of such envelope 32 including these three layers 34, 36, 38 is found under the trademarks DOW A282 or ZETABON.”); EX-1035 at 1:17-28 (“Flexible metal tape suitable for use in tubing and electrical cable shields

. . . are well known in the art. Examples of an 8 and 12 mil aluminum tape coated on both sides with approximately 2 mils of a copolymer of ethylene and a monomer having a reactive carboxyl group suitable for use in the present invention are respectively sold under part numbers A282 and XO-5554.07 under the Trademark “Zetabon” by Dow Chemical Company.”).

46. A POSITA would have had familiarity (as I did and still do) with each of these different types of tapes and cables with such tapes and had such familiarity long prior to 2013.

VII. THE ‘833 Patent

47. The ‘833 Patent describes a communications cable with a plurality of twisted pairs and a filler 108 within a barrier tape and further surrounded by a jacket. *See* EX-1001 at Title, Abstract, FIG. 1, 6:20-62, 3:32-63.

48. The filler is, but need not be, cross-shaped and separates the twisted pairs from each other. *Id.* The filler includes arms that radiate from a central point to terminal portions, and that may, but need not, terminate anvil-shaped or T-shaped portions and provide structural stability to the cable. *Id.* at 6:48-61.

49. Various configurations of the pair separator are disclosed. For example, Figure 1 discloses a filler 108 in a cross shape where the terminal portions of the arms are anvil-shaped, while Figure 2E discloses a filler 108” in a cross shape where the terminal portions of the arms are T-shaped:

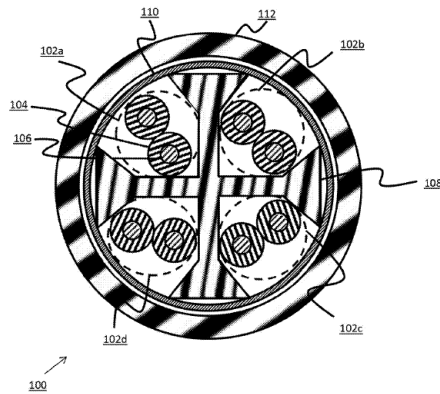


FIG. 1

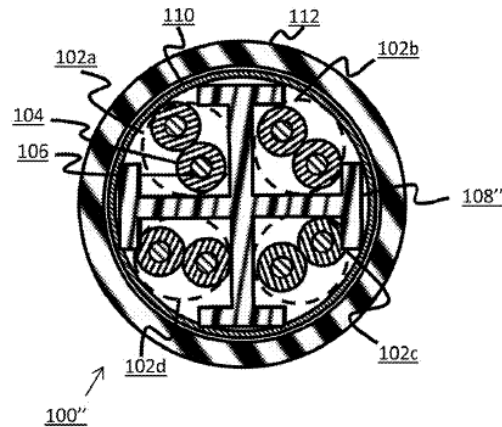


FIG. 2E

Id. at FIGS. 1, 2E.

50. The barrier tape that surrounds the filler and twisted pair conductors is disclosed as a “conductive barrier tape” (with associated numeral 110) that may be “a continuously conductive tape, a discontinuously conductive tape, a foil, a dielectric material, a combination of a foil and dielectric material, or any other such materials.” *Id.* at 7:32-51. In the embodiment illustrated, the conductive barrier tape has a multi-layer configuration, with a conductive layer (e.g., aluminum foil 102) sandwiched between two layers of dielectric material 300, 304, such as polyester (PET), as illustrated in FIG. 3A:

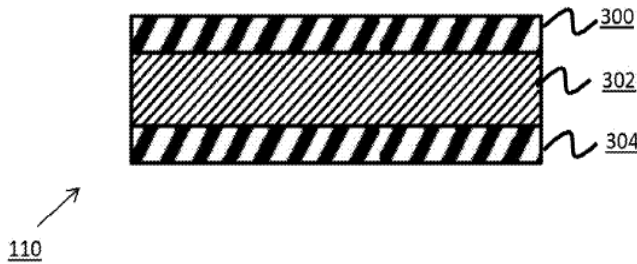


FIG. 3A

Id. at 7:38-45, FIG. 3A. The specification states that “Although shown edge to edge, in some embodiments, the conductive layer 302 may not extend to the edge of the tape 110. In such embodiments, the dielectric layers 300, 304 may completely encapsulate the conductive layer 302.” *Id.* at 7:55-60.

A. The Challenged Claims of the ‘833 Patent

51. The challenged claims include claims 1-8 and 48-50. These claims include four independent claims (1, 48-50) and 8 dependent claims (dependent claims 2-9).

B. Prosecution History

52. I have reviewed the prosecution history of the ‘833 Patent. I summarize it briefly here.

53. The utility application that became the ‘833 Patent (U.S. App. No. 16/356,825 (‘825 Application)) was filed on March 18, 2019 and claims priority from U.S. Application No. 15/996,161 (‘161 Application; which issued as U.S. Patent No. 10,236,999 (‘999 Patent)), which claims priority from U.S. Application

No. 15/610,504 (‘504 Application), which claims priority from U.S. Application No. 14/520,125 (‘125 Application), which claims further priority from U.S. Provisional Application No. 61/894,728, filed on October 23, 2013. EX-1001 at 1:5-20.

54. The ‘825 Application claims were originally rejected based on double-patenting in view of the ‘999 Patent. *See* EX-1002. And as pertinent to the claims that I am addressing in this declaration, pending application claims 51-53 (which issued as claims 48-50) also were rejected as anticipated by US Publication No. 2012/0222883 (“Nordin”). *See* EX-1003. To overcome the Nordin anticipation rejection, Patent Owner amended application claims 52 and 53 (which issued as claims 49 and 50) and argued that Nordin disclosed a three-layer barrier tape having a non-conductive layer sandwiched between two conductive layers whereas application claims 51-53 (now-issued claims 48-50) each required a three-layer barrier tape having a conductive layer sandwiched between non-conductive layers. *See* EX-1004. The Examiner then allowed the claims.

55. It does not appear that much of the prior art that I focus on in this declaration as anticipating or rendering obvious claims of the ‘833 Patent (Cook and Glew and Pfeiler) was considered during the prosecution of the ‘825 Application. The Roberts reference was discussed by both the Examiner and the Patent Owner during prosecution of earlier applications from which the ‘833 Patent

claims priority (e.g., U.S. Application No. 15/610,504) but was not discussed during prosecution of the '825 Application.

C. Prior proceedings on the '833 Patent

56. I am not aware of any prior proceedings involving the '833 Patent.

VIII. Claim Constructions

57. I understand that claim terms in a patent are to be given their plain and ordinary meaning, as would have been understood by a person having ordinary skill in the art, at the time of the alleged invention, which I am informed is October 23, 2013, considering the language of the claims, the specification, and the prosecution history of record.

58. I have given the claim terms their plain and ordinary meaning, as would have been understood by a person having ordinary skill in the art as of October 23, 2013, in view of the claims themselves, the specification of the '833 Patent, and its prosecution history.

59. The '833 Patent claims use some phrases that are not in the specification. For example, claim 1 recites that a “filler member . . . is configured to *non-conductively shield* the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable” and a “barrier tape . . . non-conductively shield[s]” portions of the first and second twisted pairs of conductors. EX-1001 at claim 1. Claim 8, which depends from

claim 1, recites that “the filler member and the barrier tape are configured to *non-conductively shield* the first and second twisted pairs of conductors along the longitudinal portion of the cable.” *Id.* at claim 8. Claim 9, which depends from claim 1, recites that “the filler member is configured to *non-conductively shield* the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.” *Id.* at claim 9. The phrase “non-conductively shield” does not appear anywhere in the specification.

60. This “non-conductively shield” phrase – and the claim elements reciting this phrase – seems ambiguous. For example, the ‘833 Patent specification discloses a “conductive barrier tape 110.” EX-1001 at 7:38-40, *see also id.* at 3:3-5 (“The cable also includes a conductive barrier tape surrounding the filler and plurality of twisted pairs of insulated conductors.”), 3:32-34 (same), 3:61-64 (“In yet another implementation of the cable, the barrier tape comprises a conductive material contained between two layers of a dielectric material.”). And the ‘833 Patent states that “[t]he conductive barrier tape 110 may comprise a continuously conductive tape, a discontinuously conductive tape, a foil, a dielectric material, a combination of a foil and dielectric material, or any other such materials.” *Id.* at 7:40-43. The ‘833 Patent then illustrates a cross section of the conductive barrier tape at FIG. 3A, and states “a conductive material 302, such as aluminum foil, is

located or contained between two layers of a dielectric material 300, 304, such as polyester (PET).” *Id.* at 7:48-51. FIG. 3A is reproduced below:

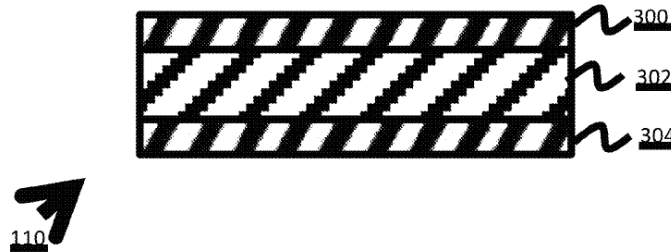


FIG. 3A

61. Claim 1 of the ‘833 Patent, consistent with the disclosed and described “conductive barrier tape”, recites “a barrier tape” that “includes a non-conductive layer and a conductive layer.” *Id.* at claim 1. However, claim 1 also recites that the claimed barrier tape with conductive layer (and disclosed as a “conductive barrier tape”) “non-conductively shields” portions of the twisted pairs of conductors. *Id.*

62. Claim 7, which depends from claim 1, further recites that “the filler member and the barrier tape non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.” *Id.* at claim 7.

63. Further, the ‘833 Patent discloses a “filler 108” that “may be of a non-conductive material such as flame retardant polyethylene (FRPE) or any other such low loss dielectric material.” *Id.* at 6:55-58. Consistent with that disclosure,

Claim 1 recites a filler member that “is made of a non-conductive material.” *Id.* at claim 1. Claim 1 then further recites that this filler “is configured to non-conductively shield” the twisted pairs of conductors from being electrically coupled to each other. *Id.*

64. Reading the claims in view of the specification, therefore, the claims recite that (i) the filler member (e.g., filler 108) is made of non-conductive material and is configured to non-conductively shield the twisted pairs of conductors (claims 1, 8) and that (ii) the *conductive* barrier tape (per the disclosed preferred embodiment), which includes one layer of conductive material and one layer of non-conductive material (claim 1), is configured to non-conductively shield portions of the twisted pairs of conductors (claim 1), and that (iii) the filler and the *conductive* barrier tape (per the disclosed preferred embodiment), which includes one layer of conductive material and one layer of non-conductive material (claim 1), are configured to non-conductively shield the twisted pairs of conductors (claim 7).

65. I have been told to assume that the patent claims should be interpreted so as not to exclude a preferred embodiment disclosed and described in the specification.

66. For purposes of my opinions provided herein, I have construed “filler member configured to non-conductively shield” the first and second twisted pairs

of conductors (or first and second side portions of the twisted pairs of conductors) to mean a filler member that includes dielectric material (or a layer of dielectric material) adjacent the conductors that blocks or protects the twisted pairs, as illustrated, for example, in FIG. 1 of the '833 Patent. The filler member may also contain conductive material. And if the filler member includes a layer of conductive material and one or more layers of non-conductive material then a layer of non-conductive material is between the non-conductively shielded components and the conductive layer.

67. Also for purposes of my opinions provided herein, I have construed that the barrier tape (comprising a layer of non-conductive material and a layer of conductive material) “is configured to non-conductively shield the first and second helically twisted pairs of conductors” (or “non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors”) to mean that the barrier tape blocks or protects the first and second twisted pairs from electrical interference outside the barrier (alien crosstalk), and includes the recited layer of non-conductive material positioned between the twisted pair conductors and the recited layer of conductive material, as illustrated, for example, in FIG. 1 of the '833 Patent.

IX. Overview of the Prior Art

A. Primary References

1. “Glew”: U.S. Patent Pub. No. 2013/0248240

68. Glew (EX-1008) published in September 2013.

69. Glew discloses, among other things, a cable having twisted-pair conductors, a dielectric filler member (or separator) with dispersed conductive particles that is positioned between those conductors to provide shielding of radiation between the pairs, a three-layer barrier tape surrounding the conductors and filler, and a jacket surrounding everything:

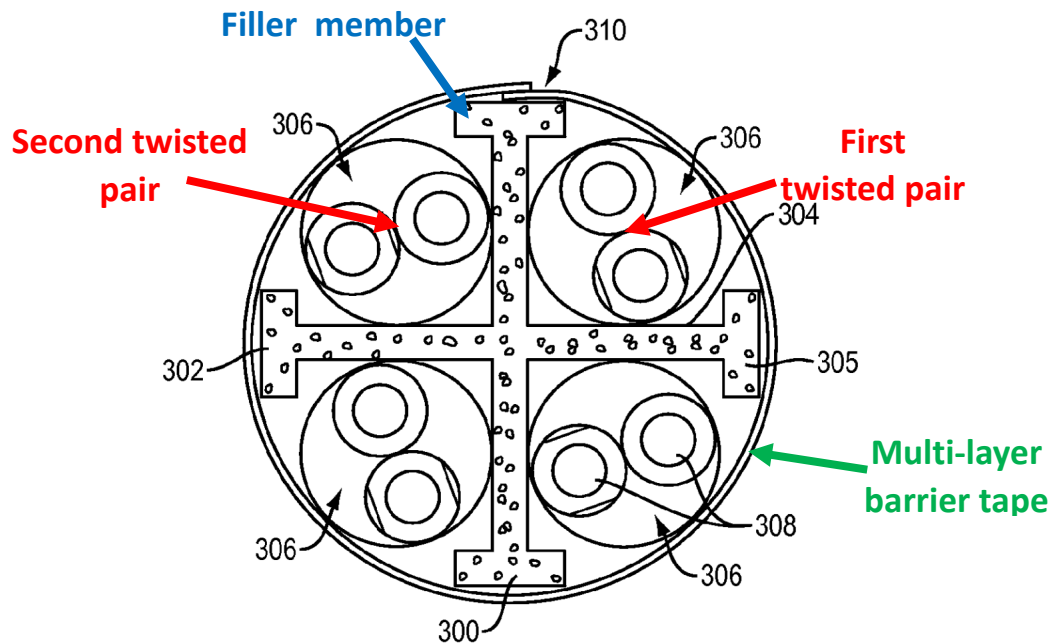
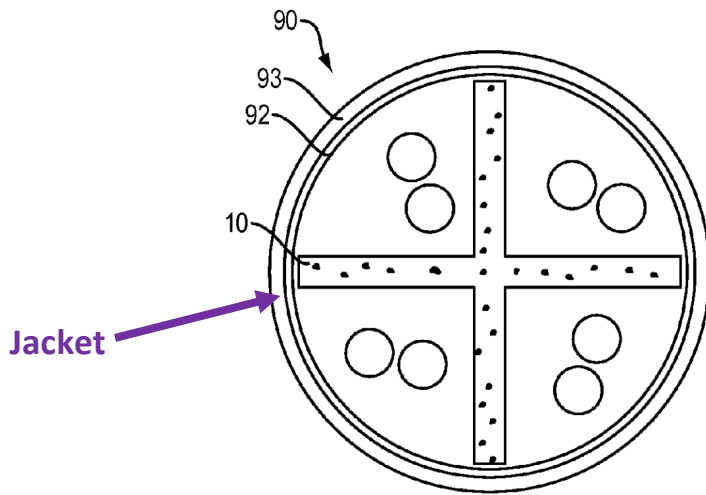
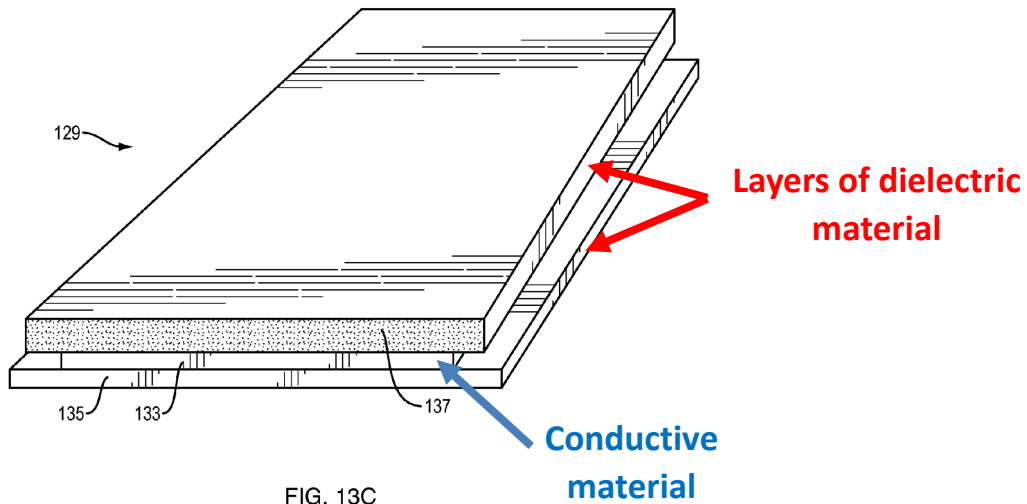


FIG. 10A

Schematic of 3-Layer Barrier Tape



See, e.g., EX-1008 at ¶¶ [0038], [0043], [0146-147], [0154], [0195], [0221-230],

FIGS. 6A-6B, 10A, 13C, 17A-B, 18A-B.

2. “Cook”: U.S. Patent No. 9,363,935

70. Cook (EX-1010) issued on June 7, 2016 from an application filed on March 15, 2013. Cook describes a cable having twisted-pair conductors, a filler member (or separator) positioned between those conductors, a three-layer barrier tape surrounding the conductors and filler, and a jacket surrounding everything:

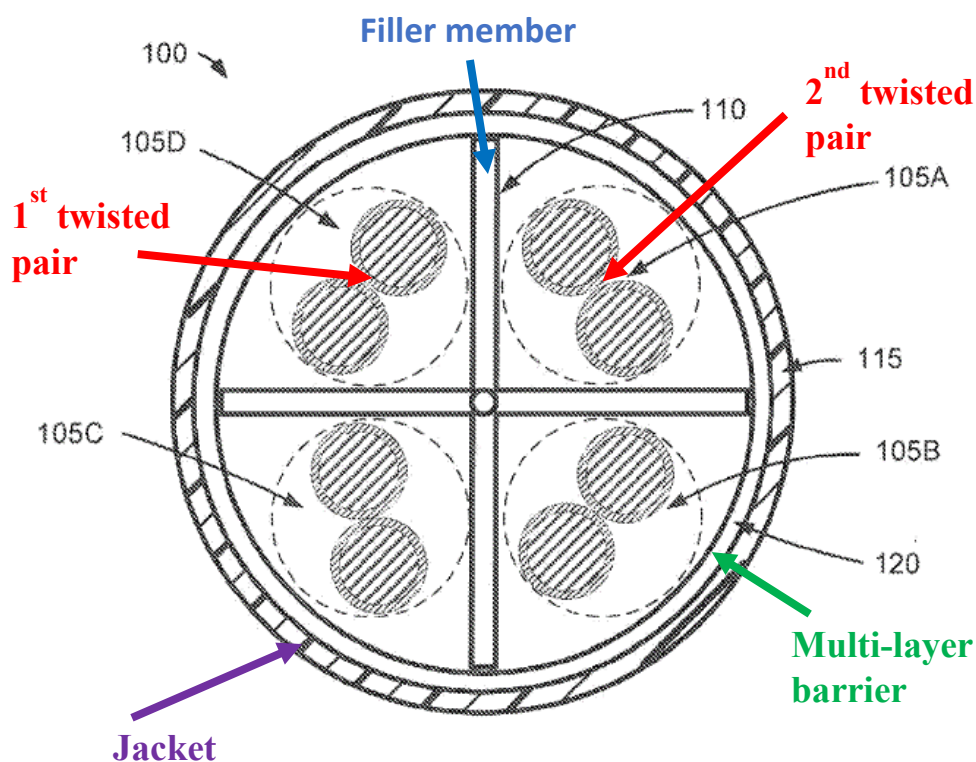


FIG. 1

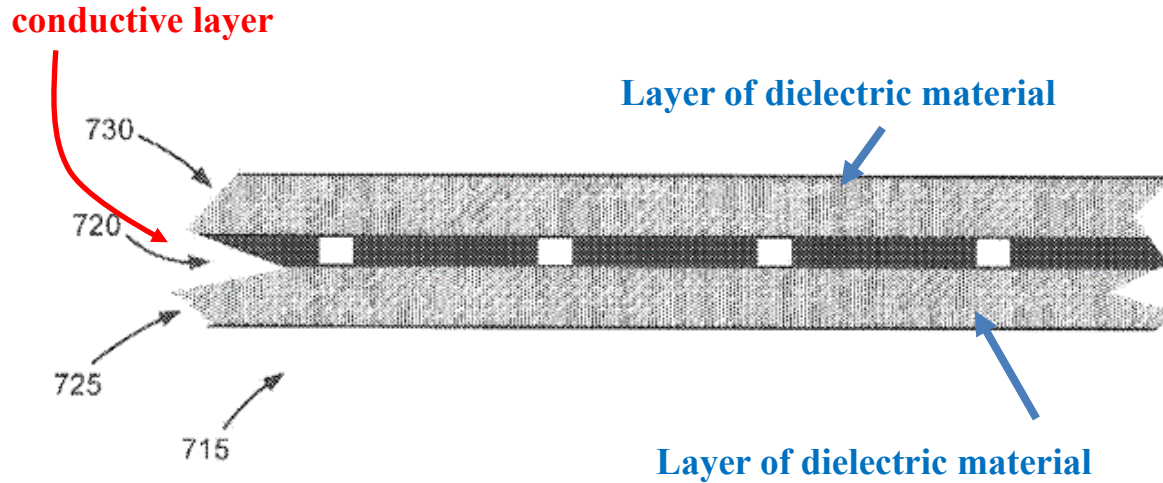
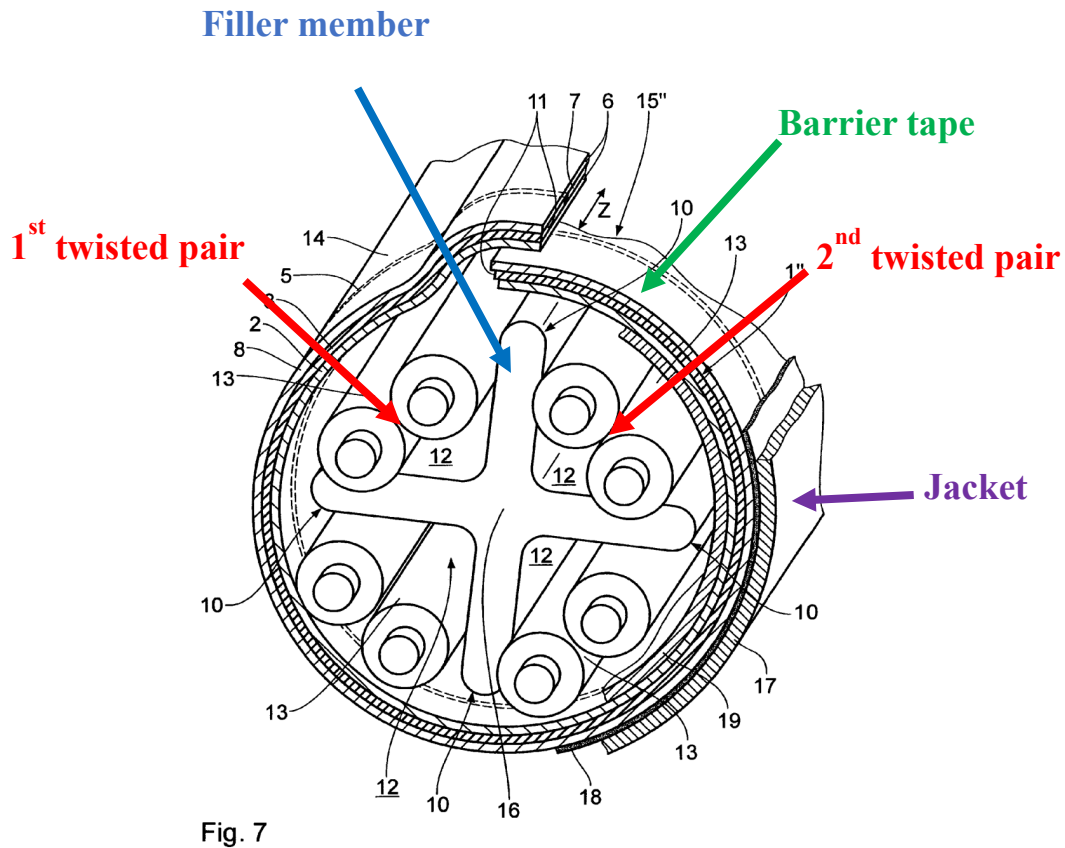


FIG. 7B

See, e.g., EX-1010, 4:5-10, 4:32-47, 4:55-59, 5:18-48, 5:63-6:22, 6:35-41, 15:3-14, 15:57-6:5, 22:39-41, 25:39-63, FIGS 1-2; 7B, 11.

3. “Pfeiler”: U.S. Patent No. 7,335,837

71. Pfeiler (EX-1011) issued on February 26, 2008. Pfeiler discloses a cable having twisted-pair conductors, a filler member (or separator) positioned between those conductors, a three-layer barrier tape surrounding the conductors and filler, and a jacket surrounding everything:



See, EX-1011, 4:13-20, 4:25-31, 4:42-53, FIGS 6-7 (“The jacket envelops the screening sheet”), FIG 7.

4. “Roberts”: U.S. Patent No. 3,622,683

72. Roberts (EX-1009) issued on November 3, 1971. Roberts is cited on the ‘833 Patent, and was considered as a secondary reference in connection with rejections during prosecution of a prior related U.S. Patent Application No. 15/610,504 (which issued as U.S. Patent No. 9,991,030) made based on Clark-478 (EX-1025) as a primary reference.

73. Roberts discloses a telephone cable, and a method of making it, that reduces crosstalk between electrical conductor pairs using a separator shield (or filler member) between the electrical conductor pairs. EX-1009 at Abstract; 13:34-36. Roberts teaches dividing a plurality of electrical conductor pairs into at least two portions by a “plastic-coated metal foil strip or tape.” *Id.* at Abstract; *see also id.* at 3:28-52. Roberts discloses that such separator may have a metal layer with both sides coated with dielectric so that it is sandwiched between dielectric layers, as illustrated in FIG. 5 below:

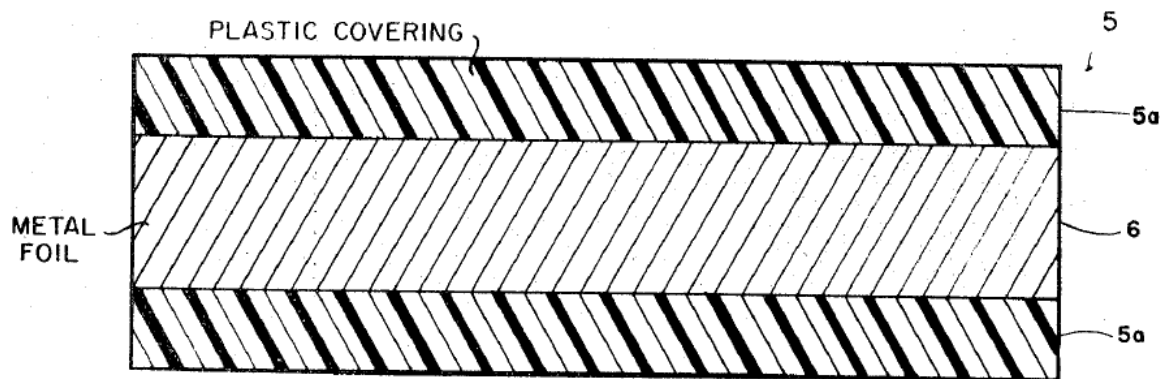
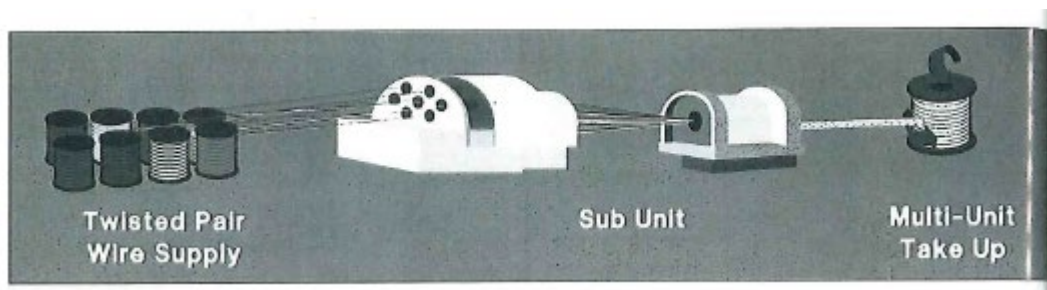


FIG. 5

Id. at 4:48-54, FIG. 5. Roberts teaches that his foil strip is preferably coated on both (or all) sides with a plastic coating, so that the plastic coating acts “as a dielectric.” *Id.* at 3:37-52; *see also id.* at 13:39-46 (“dielectric protection can take the form of a firmly adhesive plastic coating . . .”)

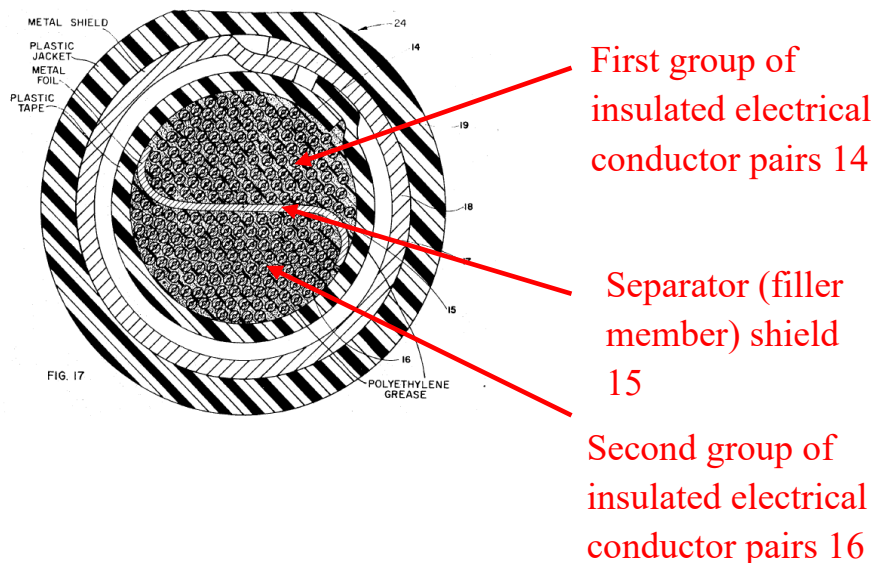
74. Roberts teaches the separator foil strip in various configurations to separate first and second groups of insulated electrical conductors (14) and (16)

from each other. *Id.* at 4:2-16, 10:42-62. A POSITA would understand that such insulated electrical conductors are groups of twisted pair wire supply. *E.g., id.* at Abstract (“**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 . . . dividing electrical conductor telephone *pairs* . . . with plastic-coated metal foil”) (emphasis added); EX-1017 at p. 11 (“The most commonly used transmission media in present-day digital loop applications is twisted pair metallic (copper) cable.”); EX-1018 at p. 3 (“The main and most important part of a conventional two-wire loop is an outside plant cable pair (two twisted conductors), which provides a bidirectional signaling and transmission path.”); EX-1016 at pp. 7-10. Twisted pairs were used in such cables at that time as they are today. In fact, it would have been uncommon for a cable of this type to have non-twisted pairs. *See* EX-1016 at p. 7. Typically, cables are manufactured by drawing twisted pairs through die plates into a laying tool that twists or “cables” the twisted pairs together. This is shown in cable manufacturing references. *See, e.g., id.* at p. 9-10. I have reproduced a figure showing this process below:



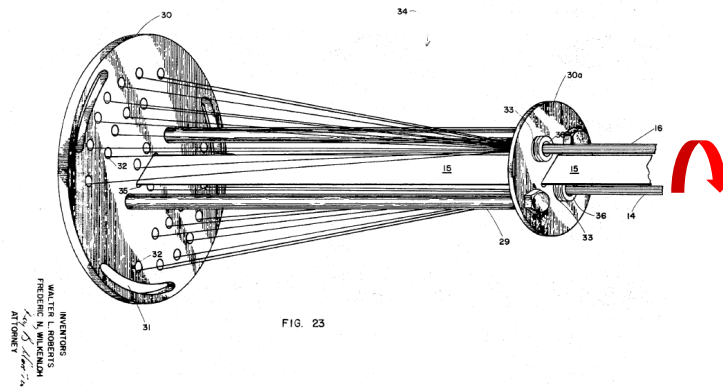
Id. at p. 9. These die plates appear to be implementing a similar cabling process as implemented by Roberts. Compare EX-1009 at Fig. 23, with EX-1016 at p. 9.

75. In one embodiment, separator shield or screen 15 may form an “S” (serpentine) shape separating groups of insulated electrical conductors. EX-1009 at 10:56-62, Fig. 17 (annotations added):



76. This configuration has the advantage of requiring less divider shield material to manufacture, without the loss of any desired electrical properties such as mitigation of near-end crosstalk. *Id.* at 11:8-12.

77. Roberts teaches that the embodiment of Figure 17 is created by forming a “*twisted composite*” formed from elements (14), (15), and (16)—the conductor pairs 14 and 16, the plastic-coated separator shield 15 twisted together about a common axis of the cable. *Id.* at 12:14-30 (emphasis added). This is accomplished using a manufacturing tool such as shown in Figure 23, that Roberts explains is used to manufacture the embodiment of Figure 17:



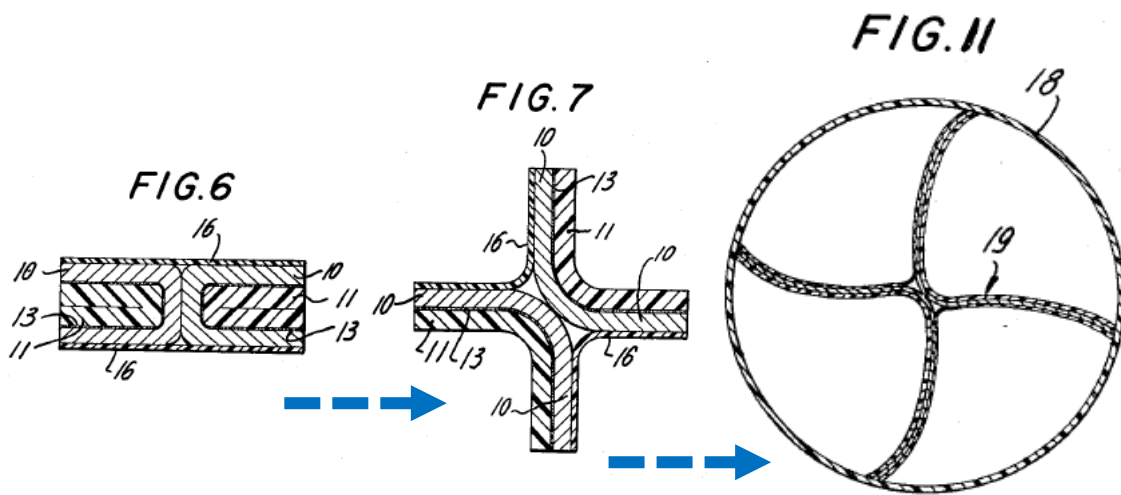
Id. at 12:12-14 (annotation added). To assemble the cable, insulated electrical conductors (twisted pairs) are pulled through holes 32 in dieplate 30 to holes 36 in dieplate 30a to form two sets of twisted insulated electrical conductors 14 and 16. *Id.* at 11:75-12:8; Fig. 23. The separator shield 15 is fed through center slot 35 in dieplates 30 and 30a. *Id.* at 12:2-4. The dieplates rotate while twisted pairs of conductors 14 and 16 and shield or screen 15 are fed through, producing the “twisted composite” of elements (14), (15), and (16). *Id.* at 12:14-29.

78. This twisted composite is subsequently wrapped with a metal tape shield 18. *Id.* at 12:30-39 (explaining that the composite is “traversed through a taping machine where metal tape (18) is applied thereto as shown in FIG. 17”). As Roberts explains, the metal shield 18 “longitudinally circumscribes and has nested therein,” the conductors and the separator shield 15. *Id.* at 10:42-62, FIG. 17. This metal tape shield 18 “can have a plastic, such as polyethylene, firmly adhered to either one or more surfaces thereof.” *Id.* at 4:20-23.

B. Secondary References

1. “Simons”: U.S. Patent No. 3,911,200 (EX-1012)

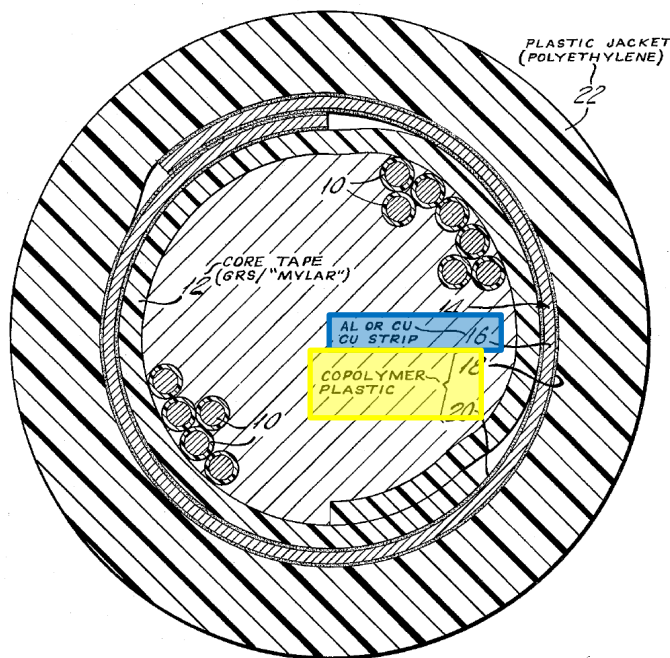
79. Simons (EX-1012) discloses “an improvement over the shielding means disclosed in [Roberts].” EX-1012 at 1:5-12. The Simons “improvement” includes using a multi-layer tape to form a four-arm filler to create four channels within the cable and separate conductors in the cable from each other:



Id. at 2:4-9, 2:18-20, 3:1-26, 3:42-46, FIGS. 1, 6, 7, 11.

2. “Jachimowicz-036”: U.S. Patent No. 3,233,036 (EX-1013)

80. Jachimowicz-036 (EX-1013) published in 1966 and teaches a shielding tape for shielding cables. EX-1013 at Title, 1:1-13. The shielding tape (“shield 14”) is a metal tape having the continuous metal layer sandwiched between two layers of a dielectric material and extending to the lateral edges of the dielectric material such as illustrated below.



Id. at 2:52-66, FIG. (annotated).

3. “Jachimowicz-172”: U.S. Patent No. 3,894,172 (EX-1014)

81. Jachimowicz-172 (EX-1014) issued in July 1975, and discloses a cable that uses multiple twisted pairs of insulated conductors. EX-1014 at 2:32-33 (“three pairs 10-14 [of insulated conductors] are each twisted with a different lay”); Fig. 2 (showing each twisted pair with a different lay), Fig. 4. Jachimowicz-172 also discloses the cable including an outer shield 34 that “may be a strip of aluminum foil with a polyolefin coating on both sides” *Id.* at 3:34-27.

X. GROUNDS OF INVALIDITY

A. GROUND 1: Cook Anticipates Claims 1-8, 48-50

a. Independent Claim 1

1. A cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors comprising: [1A] a first twisted pair of conductors having a first side portion and a first outwardly facing portion; [1B] a second twisted pair of conductors having a second side portion and a second outwardly facing portion; [1C] a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors;

82. Cook discloses these elements.

83. Cook discloses a cable (e.g., “cable 100”) for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors. *See, e.g.*, EX-1010 at

3:6-7, 3:28-51, 3:52-62, 4:5-21, 7:28-51, 4:55-66, 6:8-22, 6:50-7:1, 9:35-60, 13:31-36, 14:33-51, 15:3-14, FIG. 1.

84. Cook discloses a cable that has (a) a first twisted pair of conductors having a first side portion and a first outwardly facing portion; (b) a second twisted pair of conductors having a second side portion and a second outwardly facing portion; and (c) a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors, as illustrated for example in the annotated FIG. 1 below:

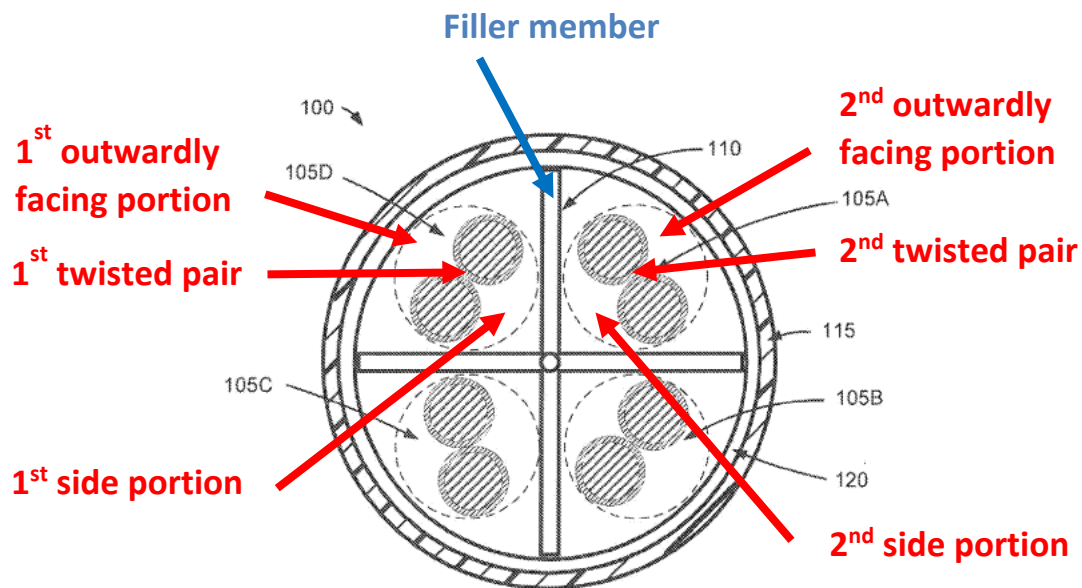


FIG. 1

Id. at 4:32-47, 4:55-59, 5:63-6:22, 15:57-63, FIGS 1-2.

85. The disclosed separator 110 (“filler member”) is “configured to non-conductively shield” as recited. Cook explains that separator 110 may “be formed as a tape that includes both a dielectric layer . . . and an electrically conductive layer.” *Id.* at 11:7-14; *see also id.* at 7:10-18. In different embodiments, the electrically conductive layer “may be sandwiched between two dielectric layers” or even have four layers, alternating between dielectric and conductive layers with one of the dielectric layers “to provide insulation between the electrically conductive layer and the twisted pairs.” *Id.* at 7:18-20, 11:26-39; *see also id.* at 16:4-19. Cook further discloses that the conductive layer may be discontinuous, such as illustrated in, for example, FIGS. 7A-7C and 8A-8C. *Id.* at 22:25-23:58. Cook also discloses that the filler can be formed of dielectric material without any electrically conductive material. *Id.* at 10:23-36.

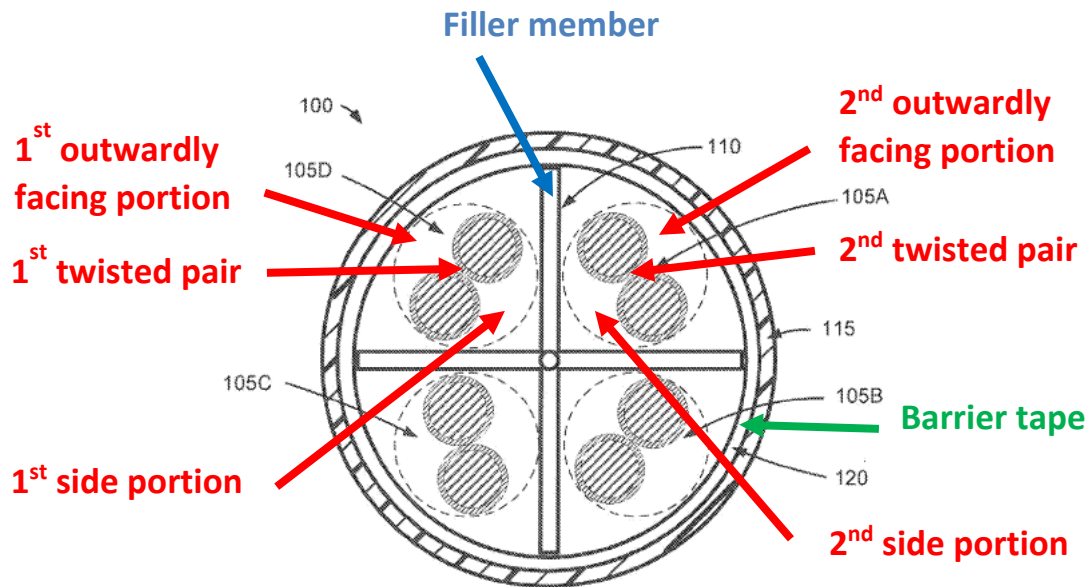
86. Cook also describes the separator as “shielding” between the twisted pairs. *See id.* at 3:27-31, 4:5-10, 9:36-41, 15:3-14.

87. A POSITA, therefore, would understand that Cook discloses that the filler member is configured to non-conductively shield the first side portion from the second side portion as recited.

88. Thus, Cook discloses these elements.

[1D] a barrier tape configured to encircle the filler member and the first and second outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors;

89. Cook discloses this element. As illustrated for example in the annotated Figure below, Cook discloses a shield 120 (“*barrier tape*”) encircling the separator (“*filler member*”) and the first and second twisted pairs of conductors:



Id. at 4:5-10, 4:32-47, 4:55-59, 5:46-48, 5:63-6:22, 6:35-41, 15:3-14, 15:57-63, 25:39-63, FIGS 1-2, 11.

90. Cook describes the shield as “a tape” or “formed on a dielectric tape,” or a “tape shield layer” of the cable. *See, e.g., id.* at 7:10-20, 11:8-39, 12:56-60, 22:30-41, 24:47-50.

91. The disclosed shield 120 “non-conductively shields” as recited. Cook describes the shield (“*barrier tape*”) as “shield[ing] the twisted pairs from external signals,” (*id.* at 4:5-10, 15:3-14), which a POSITA would understand to disclose shielding the outwardly facing portions of the twisted pairs. Cook discloses exemplary shields 120 (“barrier tapes”) comprising, for example, a layer of discontinuous electrically conductive material (e.g., spaced-apart metal patches) on a single dielectric layer or (ii) a layer of discontinuous electrically conductive material sandwiched between two dielectric layers. *See, e.g., id.* at 7:10-20, 22:25-41, 22:62-23:22, 23:49-58, FIGS. 7A-7B, 8A-8C, 11. In the case of two dielectric layers sandwiching the conductive layer, one of the dielectric layers “provide[s] insulation between the electrically conductive layer and the twisted pairs 105.” *Id.* at 11:33-36. In the case of a single dielectric layer, FIG. 11 illustrates such layer as folding or wrapping around the exterior of the separator and likewise positioned to provide insulation between the electrically conductive layer and twisted pairs. *Id.* at 25:39-63, FIG. 11.

92. Cook thus discloses that its barrier tape (which, in the cable, has a dielectric layer positioned between the twisted pairs conductors and the conductive

layer) is configured to encircle the filler member and outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors as recited.

93. Thus, Cook discloses this element.

[1E] a jacket configured to encircle the barrier tape;

94. Cook discloses this element. As illustrated for example in the annotated Figure below, Cook discloses a jacket (e.g., “jacket 115”) encircling the shield 120 (“*barrier tape*”):

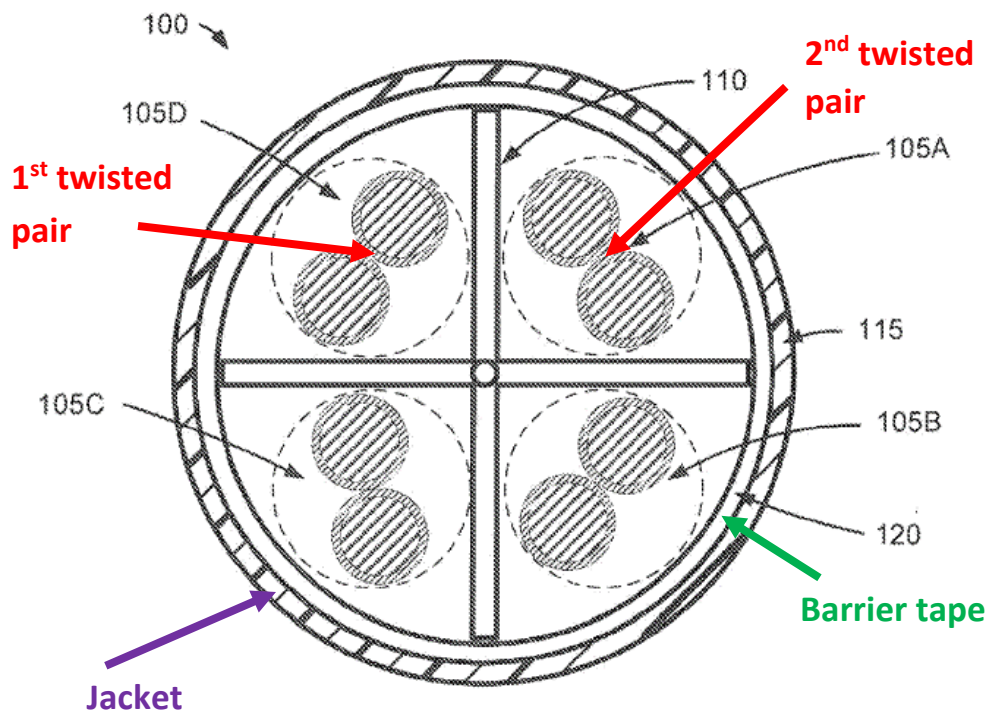


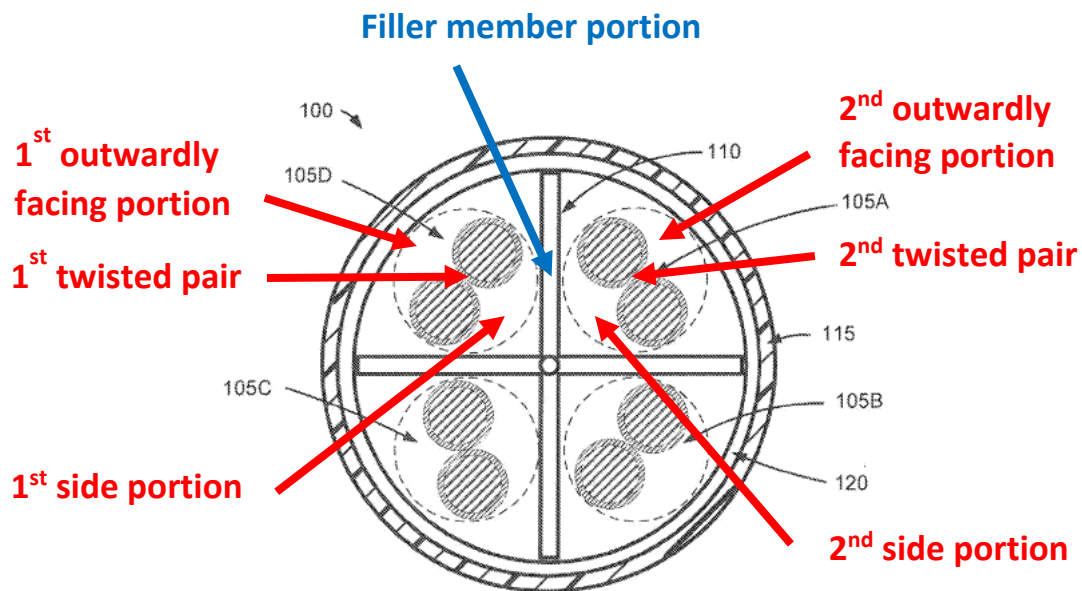
FIG. 1

Id. at 4:32-47, 4:55-59, 5:18-42, 15:57-16:5, FIGS 1-2. The jacket “enclose[s] the internal components of the cable 100, seal[s] the cable 100 from the environment, and provide[s] strength and structural support.” *Id.* at 5:18-20. Thus, Cook discloses this element.

[1F] wherein the second twisted pair of conductors is located adjacent to a portion of the filler member, and wherein the first twisted pair of conductors is located adjacent to the portion of the filler member;

95. Cook discloses this element.

96. As illustrated for example in the annotated Figure below, Cook discloses that the first and second twisted pairs of conductors are located adjacent to a portion of the filler member:



See, e.g., *id.* at 4:32-47, 4:55-59, 5:63-6:22, 15:57-16:3, FIGS 1-2. Thus, Cook discloses this element.

[1G] wherein the barrier tape includes a non-conductive layer and a conductive layer;

97. Cook discloses this element.

98. Cook discloses that shield 120 (“*barrier tape*”) may formed of a multi-layer tape as shown in FIG. 7A-7C. See, e.g., *id.* at 22:25-23:22, 23:49-58,

FIGS. 7A-7C, 8A-8C. Figure 7B (annotated below) has an “electrically conductive layer 720” that “is sandwiched between two dielectric layers 725, 730.”

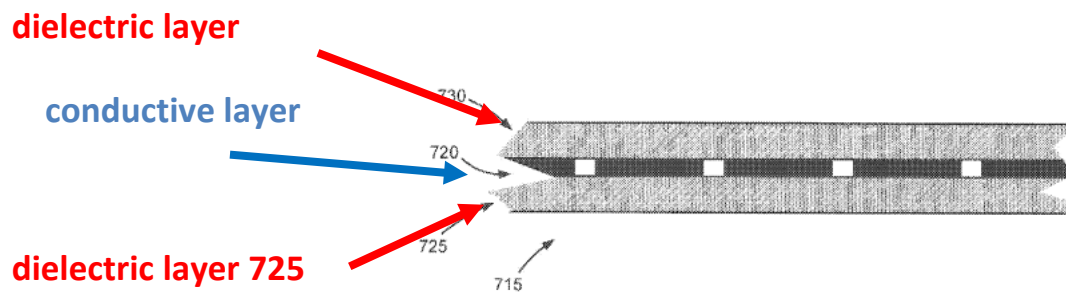


FIG. 7B

Id. at 22:39-41. Thus, Cook discloses this element.

[1H] wherein the filler member is made of a non-conductive material;

99. Cook discloses this element. Cook discloses that the separator (“*filler member*”) may be formed of, for example, at least one dielectric, non-conductive layer or substrate. *See, e.g., id.* at 9:41-52, 10:23-37, 11:8-39, 22:25-23:22, 23:49-58, FIGS. 7A-7C & 8A-8C. FIG. 7B (shown above) discloses a separator “in which an electrically conductive layer 720 is sandwiched between two dielectric layers 725, 730.” *Id.* at 22:39-41. Cook also discloses that the separator may include dielectric material with “no electrically conductive material.” *Id.* at 10:35-36. Thus, Cook discloses this element.

[1I] wherein the filler member includes a plurality of arms that are each configured to radially extend outwardly so as to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors;

100. Cook discloses this element.

101. FIG. 1 (annotated below), for example, illustrates Cook's separator 110 ("filler member"), which has arms that extend radially outward to form first and second channels as recited:

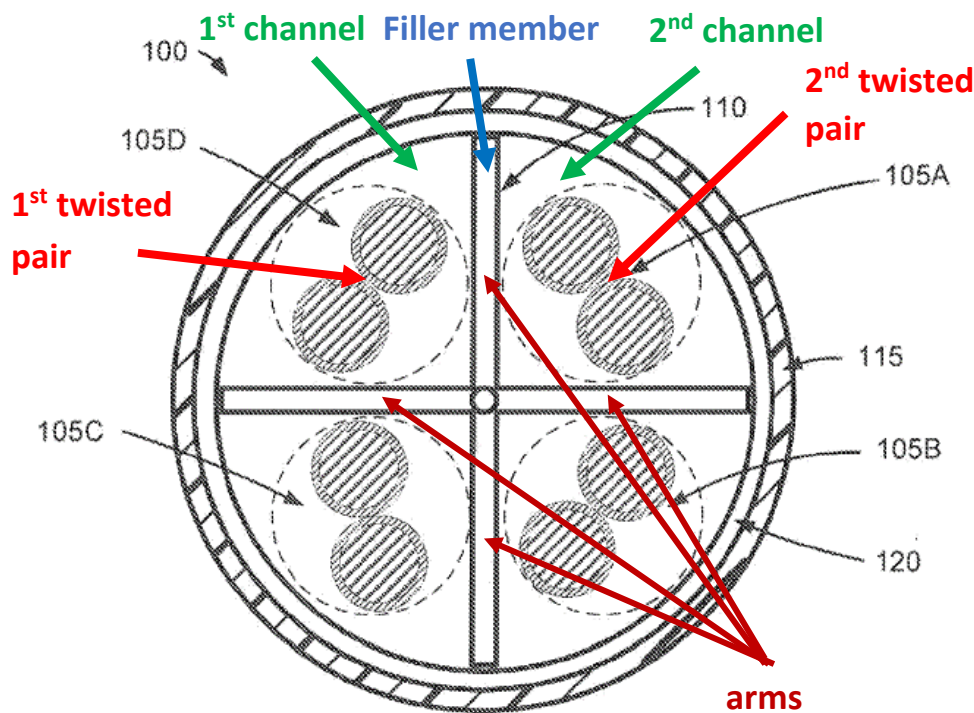


FIG. 1

See, e.g., *id.* 4:32-47, 4:55-59, 15:57-63, 19:50-53, FIGS 1-2 & 5A. Thus, Cook discloses this element.

[1J] wherein the first terminal portion of the filler member includes a first outwardly facing terminal surface, the second terminal portion of the filler member includes a second outwardly facing terminal surface, and the barrier tape is configured to encircle the first and second outwardly facing terminal surfaces and the first and second twisted pairs of conductors;

102. Cook discloses this element.

103. The '833 Patent associates the term "terminal portion" (or "terminal portions") with the filler arms (and ends of the filler arms). *See, e.g.*, EX-1001 at 2:43-47, 2:66-3:3, 5:48-53, 6:19-23, 6:58-67. Cook discloses that each filler member arm has a terminal portion with an outwardly facing terminal portion, and that the shield 120 (*barrier tape*) encircles such surfaces and the twisted pairs of conductors:

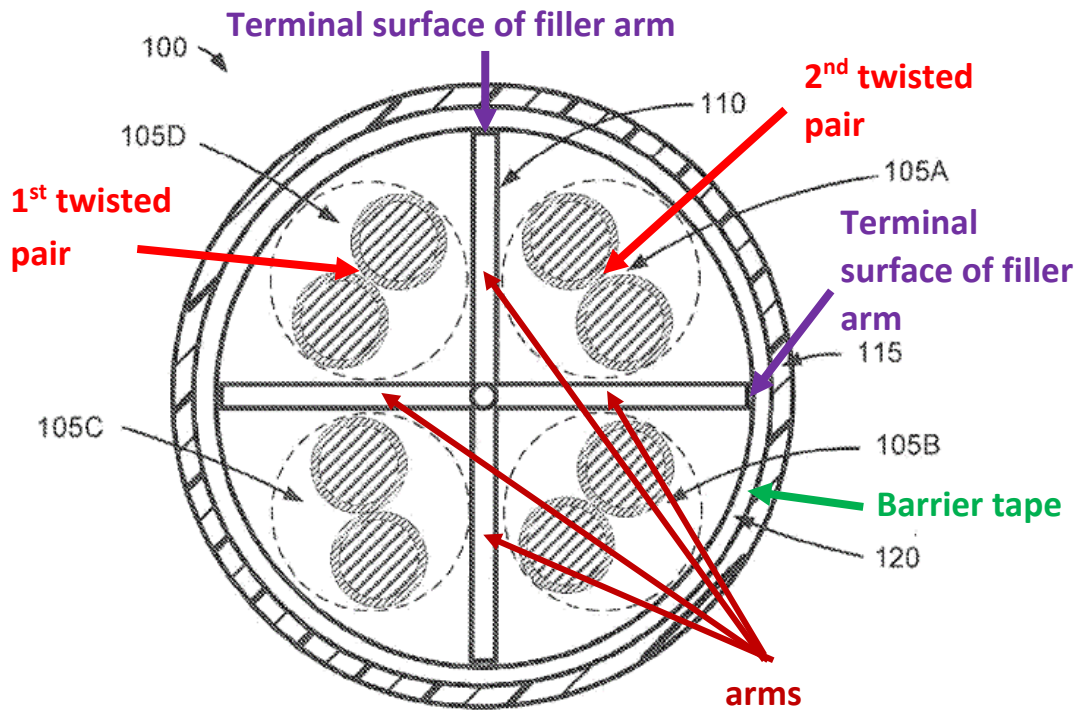


FIG. 1

See, e.g., EX-1010 at 4:32-47, 4:55-59, 15:57-63, 19:50-53, 25:39-53, FIGS 1-2,

11. Thus, Cook discloses this element.

[1K] wherein the filler member is configured to extend along a longitudinal portion of the cable and is configured to non-conductively shield the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable.

104. Cook discloses this element.

105. Cook discloses that the separator 110 extends “along the length of the cable 100. In other words, the separator 110 may be non-continuous, separated, segmented, or severed in a longitudinal direction such that discrete sections or

portions of the separator 110 are arranged longitudinally (e.g., end to end) along a length of the cable 100.” *Id.* at 7:43-49; *see also id.* at 17:17-40, 17:48-58, 19:20-37, FIGS. 4A-4B, 25:39-63. The adjacent sections may contact each other, or there may be gaps between them. *Id.* at 17:29-40. Or, instead of being discontinuous, the separator may be continuous with sections formed by “scoring or partially cut[ting]” the separator along its length. *Id.* at 18:65-19:2, 19:20-37.

106. Cook also discloses that the separator “maintains a desired orientation of the twisted pairs . . . along a longitudinal direction of the cable.” *Id.* at 7:39-41. An illustration of an exemplary embodiment with a longitudinally extending discontinuous separator is illustrated in FIG. 11. *Id.* at 25:39-63.

107. Cook also describes the separator/filler as “shielding between the twisted pairs” (*Id.* at 4:5-10, 15:3-14) and also, as discussed in connection with element [1C] above, is formed of dielectric material or a conductive layer sandwiched between dielectric layers, which discloses non-conductively shielding the first and second twisted pairs of conductors from being electrically coupled to each other as recited.

108. For the reasons given above, a POSITA would understand Cook to disclose this element, and a cable with all of the elements recited in Claim 1. Therefore, this claim is anticipated.

b. Dependent Claim 2. The cable of claim 1, wherein the filler member comprises a single unitary component of the cable, and the plurality of arms of the filler member form a cross shape.

109. Cook discloses this element. Cook discloses that the separator “may” be non-continuous along the length of the cable and comprise discrete sections, or portions, that can either contact each other or have gaps therebetween. *Id.* at 7:43-49; *see also* my analysis of element 1[K] above. However, Cook also discloses that separator may be a single, unitary component of the cable:

“In other example embodiments, a separator or any number of desired portions of a separator (e.g., a continuous separator, a discontinuous separator, etc.) may be scored or partially cut at one or more locations. The scoring may enhance the flexibility of the separator, and therefore, the flexibility of a cable in which the separator is incorporated. Indeed, a wide variety of different constructions may be utilized to form a separator.”

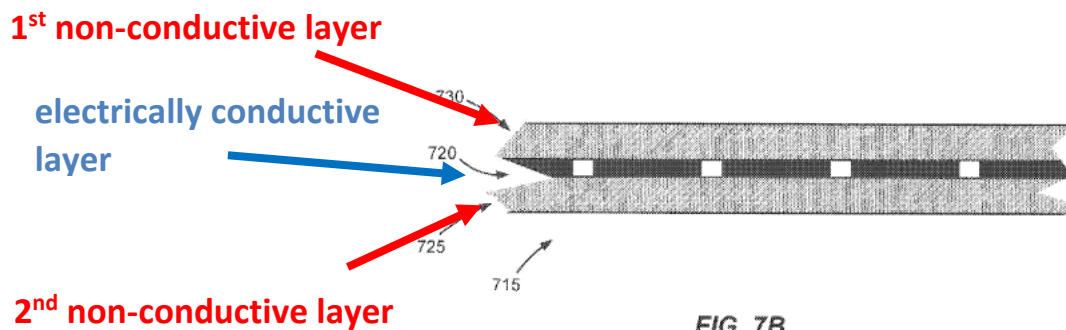
Id. at 19:30-37. Cook thus discloses a continuous, single unitary separator (as distinct from a “discontinuous separators”), with sections formed, for example, by “scoring or partially cut[ting]” the separator along its length. *Id.* at 18:65-19:2, 19:20-37.

110. Cook also discloses that the arms of the separator form a cross shape. *See, e.g., id.* at 11:55-56 (“flat tape separator may be formed into an X-shape or cross-shape”), 19:50-51 (“FIG 5A illustrates an example separator 500 having a cross, plus or X-shape.”), FIGS. 1, 2, 5A.

111. Thus, Cook discloses this element, and this claim is anticipated.

c. Dependent Claim 3. The cable of claim 1, wherein the non-conductive layer of the barrier tape comprises a first non-conductive layer and the barrier tape includes a second non-conductive layer.

112. Cook discloses this in, for example, FIG. 7B (annotated below), which discloses an exemplary multi-layer shield (*barrier tape*) where the non-conductive layer includes first and second non-conductive layers:



Id. at 22:39-41, FIG. 7B. In this respect (two non-conductive layers sandwiching a conductive layer), Cook’s three-layer dielectric-conductive-dielectric tape is like the barrier tape described in the ‘833 Patent:

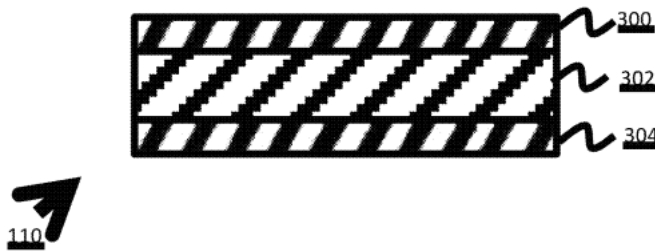


FIG. 3A

See EX-1001 at 7:40-41 (The barrier tape “may comprise a continuously conductive tape, a discontinuously conductive tape . . .”), 7:38-52, FIG. 3A.

113. Cook thus discloses this element, and this claim is anticipated.

d. Dependent Claim 4. The cable of claim 3, wherein the conductive layer of the barrier tape is positioned between the first and second non-conductive layers.

114. As discussed and shown above (regarding claim 3), Cook discloses the conductive layer sandwiched between (or positioned between) the first and second non-conductive layers. See above; see also EX-1010 at 22:25-41, FIG. 7B. Cook discloses that the conductive layer can either be discontinuous (as shown in FIG. 7B) or continuous. *Id.* at 6:50-7:20, 11:8-39, 11:64-12:5, 22:39-41, FIGS. 7B, 8A-8D. Cook thus discloses this element, and this claim is anticipated.

e. Dependent Claim 5. The cable of claim 3, wherein the first non-conductive layer comprises an inner non-conductive layer and the second non-conductive layer comprises an outer non-conductive layer.

115. Cook discloses claim 3 (as discussed above) and also this element.

116. As illustrated in, for example, FIG. 1, the barrier tape shield 120 encircles the separator/filler and twisted pairs. *Id.* at 4:41-44, 4:55-59, 5:46-48, FIGS. 1, 11. See also 15:57-16:5, FIG. 2. A POSITA would understand that Cook's three-layer barrier tape of FIG. 7B, when encircling the separator/filler and twisted pairs, has an inner non-conductive layer (i.e., the layer positioned between the twisted pairs and the dielectric layer) and an outer non-conductive layer (i.e., the layer positioned external to the conductive layer and facing the jacket 115). In the case of two non-conductive layers sandwiching the conductive layer, the inner non-conductive layer "provide[s] insulation between the electrically conductive layer and the twisted pairs 105." *Id.* at 11:33-36. This claim is therefore anticipated.

f. Dependent Claim 6. The cable of claim 1, wherein the filler member and the barrier tape are configured to extend along a longitudinal direction of the cable.

117. Cook discloses this element.

118. Cook discloses that the separator (*filler member*) "function[s] to position or orient the twisted pairs along a longitudinal direction of the cable" (*id.* at 3:12-14; *see also* 7:37-41) and that the shield 120 (*barrier tape*) "encases" the twisted pairs and the separator (*filler member*). *See, e.g., id.* at 4:55-62, 5:18-20, 6:35-40, 25:39-63, FIGS. 1, 2, 11. This discloses to a POSITA that the separator

and barrier tape are configured to extend along a longitudinal direction of the cable. Cook thus discloses this element, and this claim is anticipated.

g. Dependent Claim 7. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member and the barrier tape are configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

119. Cook discloses these elements.

120. Cook discloses that twisted pairs are “twisted together in a helical fashion to form a balanced transmission line.” *Id.* at 1:55-60. Cook also discloses that the twisted pairs and other cable components may be “helically stranded or twisted together.” *Id.* at 25:26-30. In addition, Cook discloses to a POSITA that the twisted pairs and separator (*filler member*) extend along the longitudinal direction of the cable (like the separator). *See, e.g., id.* at 3:12-14 (“A separator may function to position or orient the twisted pairs along a longitudinal direction of the cable.”); 7:37-41 (“The separator 110 may function to maintain a desired orientation of the twisted pairs 105 . . . along a longitudinal direction of the cable.”); 17:23-61, 25:39-63, FIGS. 4A-4B, 11. Cook thus discloses that twisted pairs are helically twisted pairs of conductors along the longitudinal portion of the cable.

121. In addition, Cook discloses the separator as “shielding between the twisted pairs” and the shield 120 (*barrier tape*) as “shield[ing] the twisted pairs from external signals.” *Id.* at 4:5-10, 15:3-14. And disclosed embodiments of each of the separator (*filler member*) and shield (*barrier tape*) have discontinuous portions of electrically conductive material sandwiched between dielectric layers that insulate the conductive layer. *See, e.g., id.* at 22:25-27, 22:39-41, FIG. 7B. Also see my discussion above concerning Cook’s disclosure of elements [1C], [1G], [1K].

122. Cook also discloses that the separator (*filler member*) may include dielectric material with “no electrically conductive material” at all (*id.* at 10:23-36), similar to the ‘833 Patent’s disclosed filler member made of FRPE or other “low loss dielectric material.” EX-1001 at 6:50-52. This, too, discloses the filler configured to non-conductively shield the first and second helically twisted pairs of conductors as recited.

123. Cook further discloses, as discussed in connection with element [1D], that shield 120 (*barrier tape*) “non-conductively shields” the twisted pair conductors along their longitudinal lengths and encircles them along their longitudinal lengths. *See* my analysis of Cook’s disclosure of element [1D]; *see also* EX-1010 at FIG. 1.

124. Cook thus discloses that the filler member and the barrier tape are configured to non-conductively shield the first and second helically twisted pairs of conductors as recited.

125. Thus, Cook discloses these elements, and this claim therefore is anticipated.

h. Dependent Claim 8. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

126. Cook discloses these elements. See my discussion concerning Cook's disclosure of the element in claim 7 above. Cook discloses that twisted pairs are "twisted together in a helical fashion to form a balanced transmission line." *Id.* at 1:55-60. Cook also discloses that the twisted pairs and other cable components may be "helically stranded or twisted together." *Id.* at 25:26-30. In addition, Cook discloses to a POSITA that the twisted pairs and separator (filler member) extend along the longitudinal direction of the cable (like the separator). *See, e.g., id.* at 3:12-14 ("A separator may function to position or orient the twisted pairs along a longitudinal direction of the cable."); 7:37-41 ("The separator 110 may function to maintain a desired orientation of the twisted pairs 105 . . . along a longitudinal direction of the cable."); 17:23-61, 25:39-63, FIGS. 4A-4B, 11.

127. In addition, Cook discloses the separator as “shielding between the twisted pairs” and the shield 120 (*barrier tape*) as “shield[ing] the twisted pairs from external signals.” *Id.* at 4:5-10, 15:3-14. And disclosed embodiments of each of the separator (*filler member*) and shield (*barrier tape*) have discontinuous portions of electrically conductive material sandwiched between dielectric layers that insulate the conductive layer. *See, e.g., id.* at 22:25-27, 22:39-41, FIG. 7B. Also see my discussion above concerning Cook’s disclosure of elements [1C], [1G], [1K].

128. Cook also discloses that the separator (*filler member*) may include dielectric material with “no electrically conductive material” at all (*id.* at 10:23-36), similar to the ‘833 Patent’s disclosed filler member made of FRPE or other “low loss dielectric material.” EX-1001 at 6:50-52.

129. Cook thus discloses that the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors as recited.

130. Cook thus discloses these elements, and this claim thus is anticipated.

i. Independent claim 48

48. A cable comprising: [48A] a plurality of twisted pair conductors;

131. Cook discloses a cable comprising a plurality of twisted pair conductors, as illustrated annotated FIG. 1:

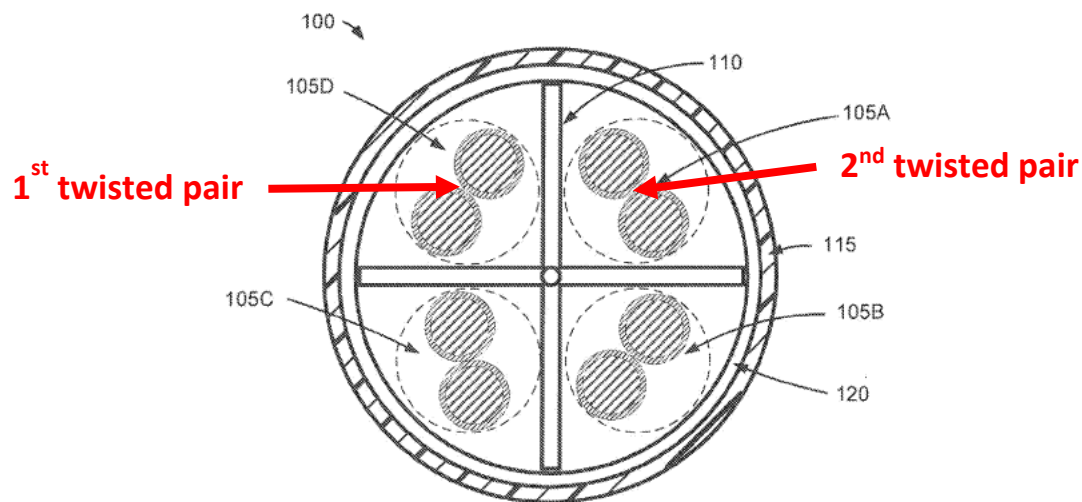


FIG. 1

See, e.g., EX-1010 at 4:32-47, 4:55-59, 5:63-6:22, 15:57-63, FIGS 1-2. See also my discussion regarding Cook's disclosure of claim elements [1A] and [1B] above.

132. Cook thus discloses this element.

[48B] a barrier tape that surrounds the plurality of twisted pair conductors, the barrier tape including an electrically conductive layer enclosed between inner and outer dielectric layers; and

133. Cook discloses this element.

134. Cook discloses a shield layer 120 (*barrier tape*) that surrounds the plurality of twisted pair conductors, with the shield layer including an electrically conductive layer enclosed between inner and outer dielectric layers, as illustrated

below and also explained above in connection with Cook's disclosure of [1D] and [1G]:

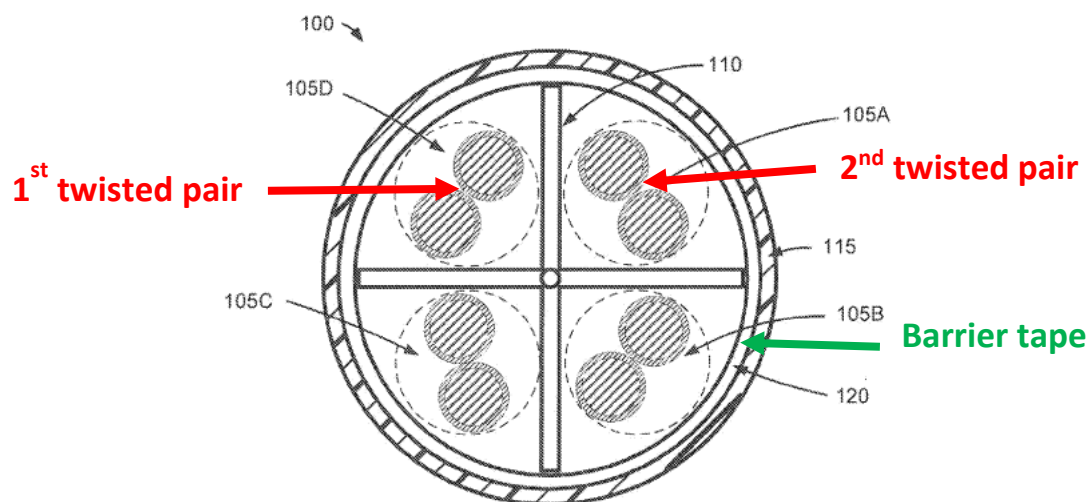
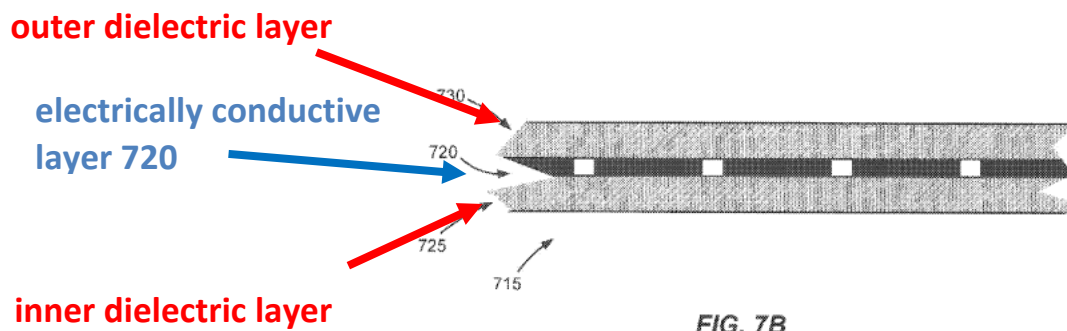


FIG. 1

See, e.g., *id.* at 4:5-10, 4:32-47, 4:55-59, 5:46-48, 5:63-6:22, 6:35-41, 15:3-14, 15:57-63, 25:39-63, FIGS 1-2, 11; *see also* my discussion regarding Cook's disclosure of [1D] and [1G] above.

135. Cook describes the shield 120 as “a tape” or “formed on a dielectric tape,” or a “tape shield layer” of the cable. EX-1010 at 7:10-20, 11:8-39, 12:56-60, 22:30-41, 24:47-50.

136. Cook also discloses that shield 120 (*barrier tape*) may formed of a multi-layer tape as shown in FIG. 7A-7C. See, e.g., *id.* at 22:25-23:22, 23:49-58, FIGS. 7A-7C, 8A-8C. Figure 7B (annotated below) has an “electrically conductive layer 720” that “is sandwiched between two dielectric layers 725, 730.”



See, e.g., *id.* at 22:39-41 (“electrically conductive layer 720 is sandwiched between two dielectric layers 725, 730), FIG.7B; see also, e.g., *id.* at 7:10-20 (describing barrier tape shield as having conductive layer “sandwiched between” dielectric layers). A POSITA would understand that Cook discloses that the shield (barrier tape) includes an electrically conductive layer enclosed between inner and outer dielectric layers.

137. Although Cook’s FIGS. 8A-8D illustrate the electrically conductive material of the conductive layer spanning fully across the width of the dielectric layers in the longitudinal direction, Cook states that it is only “In certain embodiments” that the shield “may span fully across” the width. *Id.* at 12:17-19, 12:22-23. Cook also states that:

“Conditional language, such as, among others, “can,” “could,” “might,” or “may,” unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments could include, while other embodiments do

not include, certain features, elements, and/or operations. Thus, such conditional language is not generally intended to imply that features, elements, and/or operations are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without user input or prompting, whether these features, elements, and/or operations are included or are to be performed in any particular embodiment.”

Id. at 25:64-26:9. A POSITA thus would understand Cook to disclose an embodiment of the shield (*barrier tape*) where the conductive layer does not span the full width.

138. Cook thus discloses the barrier tape having an electrically conductive layer enclosed between inner and outer dielectric layers as recited.

139. Cook thus discloses this element.

[48C] a jacket that surrounds the barrier tape.

140. As I discussed in connection with Cook’s disclosure of [1E] above, and as illustrated in the annotated FIG. 1 below, Cook discloses a cable with a jacket (e.g., “jacket 115”) that surrounds the shield 120 (*barrier tape*):

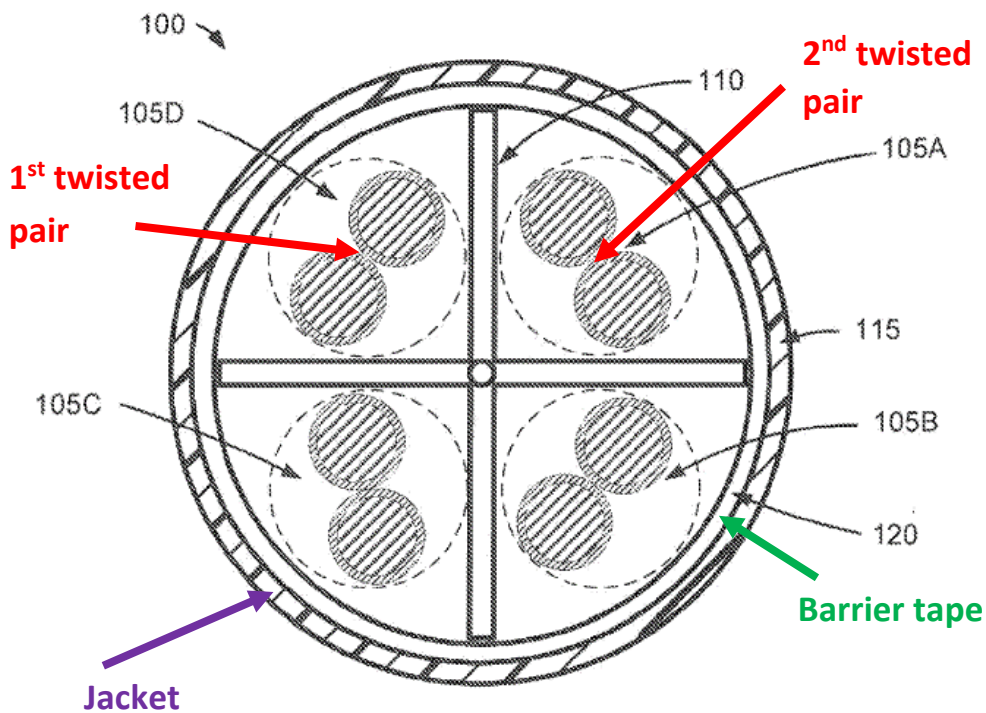


FIG. 1

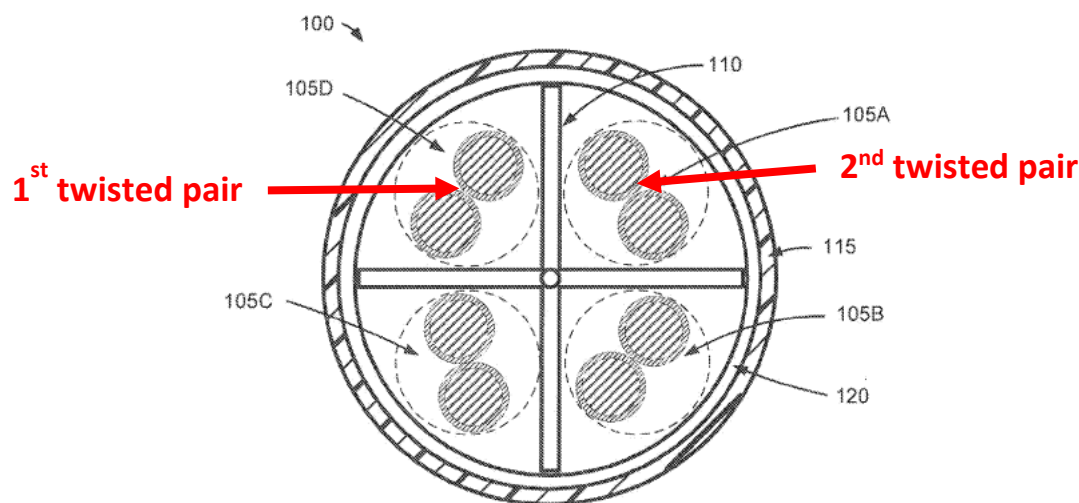
See, e.g., id. at 4:32-47, 4:55-59, 5:18-42, 15:57-16:5, FIGS 1-2. The jacket “enclose[s] the internal components of the cable 100, seal[s] the cable 100 from the environment, and provide[s] strength and structural support.” *Id.* at 5:18-20. Cook thus discloses this element.

141. For the reasons I provide above, a POSITA would understand Cook to disclose all elements of claim 48. Therefore, claim 48 is anticipated by Cook.

j. Independent claim 49

49. A cable comprising: [49A] a plurality of pairs of conductors extending along a longitudinal axis;

142. Cook discloses a cable comprising a plurality of pairs of conductors extending along a longitudinal axis, as illustrated in this annotated FIG. 1:



See, e.g., id. at 4:32-47, 4:55-59, 5:63-6:22, 15:57-63, FIGS 1-2.

143. As I explained in connection with Cook’s disclosure of Claim 7, Cook also discloses that the conductors extend along a longitudinal axis of the cable. For example, Cook discloses to a POSITA that the twisted pairs of conductors and (and also that the separator) extend along the longitudinal direction of the cable (like the separator). *See, e.g., id.* at 3:12-14 (“A separator may function to position or orient the twisted pairs along a longitudinal direction of the cable.”); 7:37-41 (“The separator 110 may function to maintain a desired orientation of the twisted pairs

105 . . . along a longitudinal direction of the cable.”); 17:23-61, 25:39-63, FIGS. 4A-4B, 11.

144. Cook thus discloses this element.

[49B] a barrier tape surrounding the plurality of pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer; and

145. This element is very similar element [48B]. As I explain in connection with Cook’s disclosure of element [48B] and the annotated figures below, Cook discloses a shield tape 120 (*barrier tape*) surrounding the plurality of pairs of conductors, with the shield tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer:

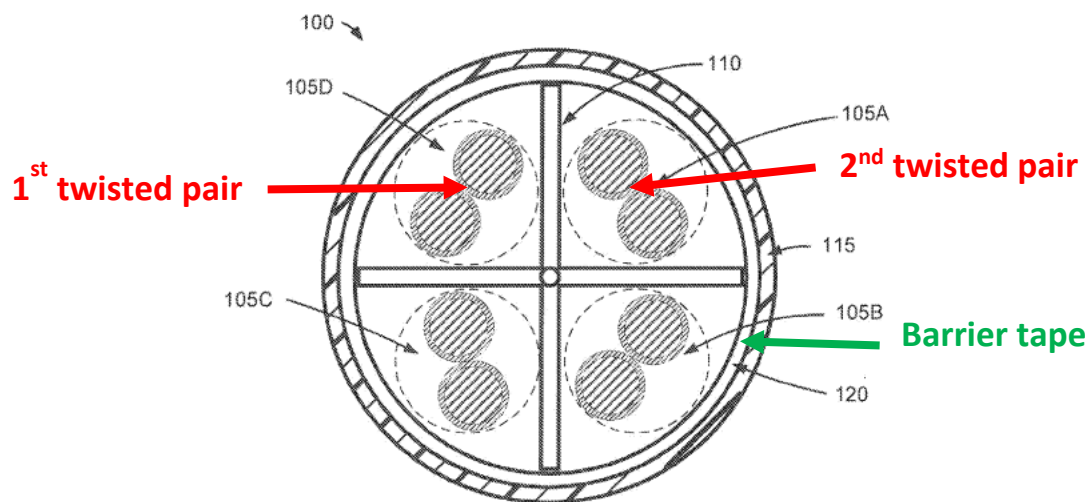
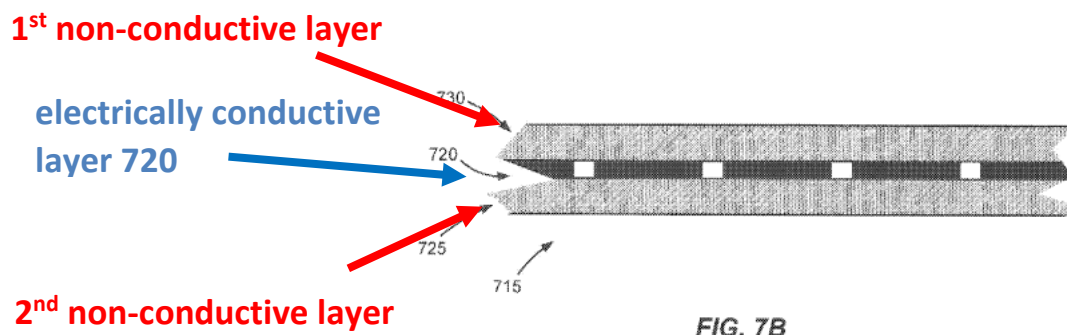


FIG. 1

See, e.g., *id.* at 4:5-10, 4:32-47, 4:55-59, 5:46-48, 5:63-6:22, 6:35-41, 15:3-14, 15:57-63, 25:39-63, FIGS 1-2, 11.



See, e.g., *id.* at 22:39-41 (“electrically conductive layer 720 is sandwiched between two dielectric layers 725, 730), FIG.7B; *see also*, e.g., *id.*, 7:10-20 (describing barrier tape shield as having conductive layer “sandwiched between” dielectric layers).

146. A POSITA would understand that Cook discloses that the shield (*barrier tape*) surrounds the conductors and includes the non-conductive and conductive layers as recited in this claim.

147. Cook thus discloses this element.

[49C] an outer jacket surrounding the barrier tape, the outer jacket comprising a non-conductive material.

148. As I already explained in connection with [1E] and [48C], and illustrated in the annotated figure below, Cook discloses an outer jacket 115 that surrounds the barrier tape:

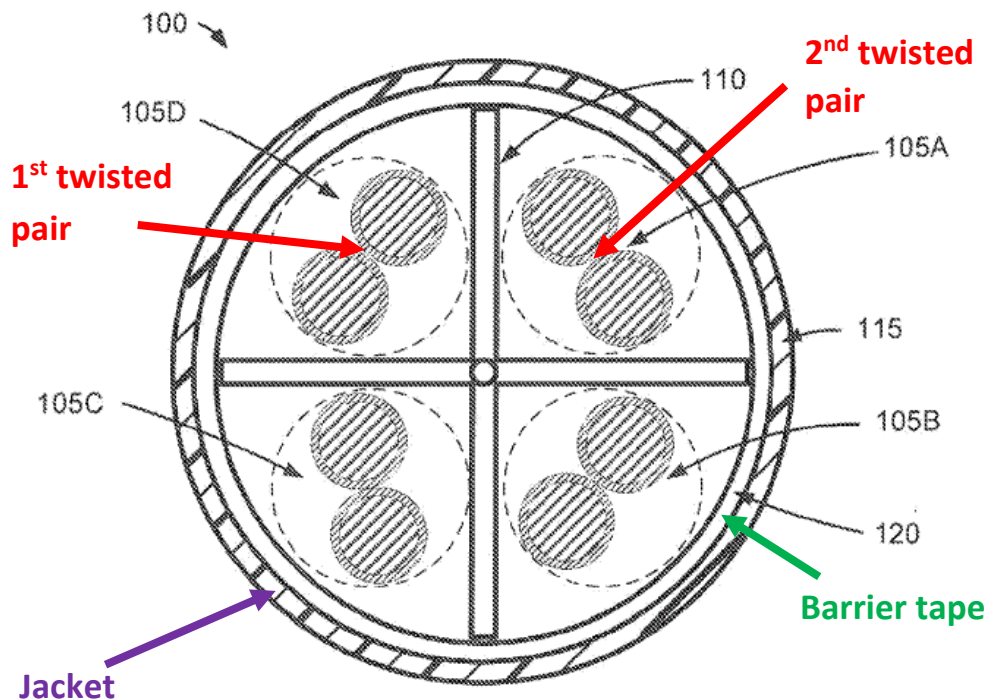


FIG. 1

See, e.g., id. at 4:32-47, 4:55-59, 5:18-42, 15:57-16:5, FIGS 1-2. See also my discussion concerning Cook’s disclosure of [1E] and [48C].

149. Cook also discloses that the jacket “may be formed from a wide variety of materials,” including non-conductive materials such as FEP and polyolefin. *Id.* at 5:20-31.

150. Cook thus discloses this element and the other elements of this claim.

151. This claim is thus anticipated.

k. Independent claim 50

152. Claim 50 is a method claim that recites essentially the same structural limitations as set forth in claims 48 and 49 but with method steps. It recites a plurality of “twisted pairs of conductors” (see elements [48A]/[49[A]) that are “surround[ed]” by a three-layer barrier tape having “a conductive layer positioned between [first and second] non-conductive layers” (see elements [48B]/[49B]), with the barrier tape “extending within” (e.g., being surrounded by) a jacket (see elements [48C]/[49C]), and also element [1E]). EX-1001, Claim 50. Cooks’ disclosure of a cable having twisted pairs conductors surrounded by a three-layer barrier tape as recited, with a jacket enclosing the conductors and tape, applies equally to the recited method steps, and results in performing the recited method steps. In other words, Cook’s disclosure of twisted pairs being surrounded by a three-layer non-conductive/conductive/non-conductive barrier tape discloses “surrounding” the twisted pairs with a barrier tape as recited in claim 50. Likewise, Cook’s disclosure of surrounding the barrier tape and conductors with a jacket discloses “extending the barrier tape within an outer jacket” as recited in claim 50. Using Cook’s cable and teaching as described for claims 48-49 above results in performing the method recited in claim 50 and renders claim 50 anticipated for the same reasons discussed above. *See*, my discussion above in Sections X(A)(b) and X(A)(c) concerning Cook’s disclosure of having a barrier

tape surrounding twisted pair conductors (and further being surrounded by (or extending within)) an outer jacket.

153. I provide a bit more detail below.

50. A method for reducing alien crosstalk between cables, the method comprising [50A] surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer and;

154. Cook discloses a cable (and method of making a cable) for reducing alien crosstalk between cables. *See, e.g.*, EX-1010 at 2:4-8, 3:6-7, 3:28-51, 3:52-62, 4:5-21, 7:28-51, 4:55-66, 6:8-22, 6:50-7:1, 9:35-60, 13:31-36, 14:33-51, 15:3-

14. Cook thus discloses a method for reducing alien crosstalk between cables.

155. The recited method step - surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer – is essentially the same as cable apparatus elements [48A]/[49A] (pairs/twisted pairs of conductors) and [48B]/[49B] (a barrier tape surrounding the conductors and having a conductive layer between non-conductive layers) but written in a method step form. As I explained in connection with those elements above, Cook discloses surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between first and second non-conductive layers. *See*

my discussion above regarding claims 48 and 49 (and more particularly, elements [48A], [48B], [49A] and [49B]. *See also, e.g.,* EX-1010 at 4:5-10, 4:32-47, 4:55-59, 5:46-48, 5:63-6:22, 6:35-41, 7:10-20, 15:3-14, 15:57-63, 22:39-41, 25:39-63, FIGS 1-2, 7B.

156. Cook's disclosure of a cable having twisted pairs conductors surrounded by a three-layer barrier tape as recited applies equally to the recited method step, and results in performing this step.

157. Cook thus discloses this element.

[50B] extending the barrier tape within an outer jacket.

158. The recited method step – extending the barrier tape within an outer jacket – is essentially the same as cable apparatus elements [48C]/[49C] (reciting a jacket “surrounding” the barrier tape) but written in a method step form. As A POSITA would understand that Cook's shield 120 (*barrier tape*), which is “disposed between the jacket 115 and the twisted pairs 105” (*id.* at 5:46-50, FIG. 1, claim 20), is extending within the outer jacket as recited. As I explained in connection with similar apparatus elements [1E], [48C] and [49C], Cook discloses that the jacket 115 encircles and “enclose[s] the internal components of the cable 100, seal[s] the cable 100 from the environment, and provide[s] strength and structural support.” *Id.* at 5:18-20.

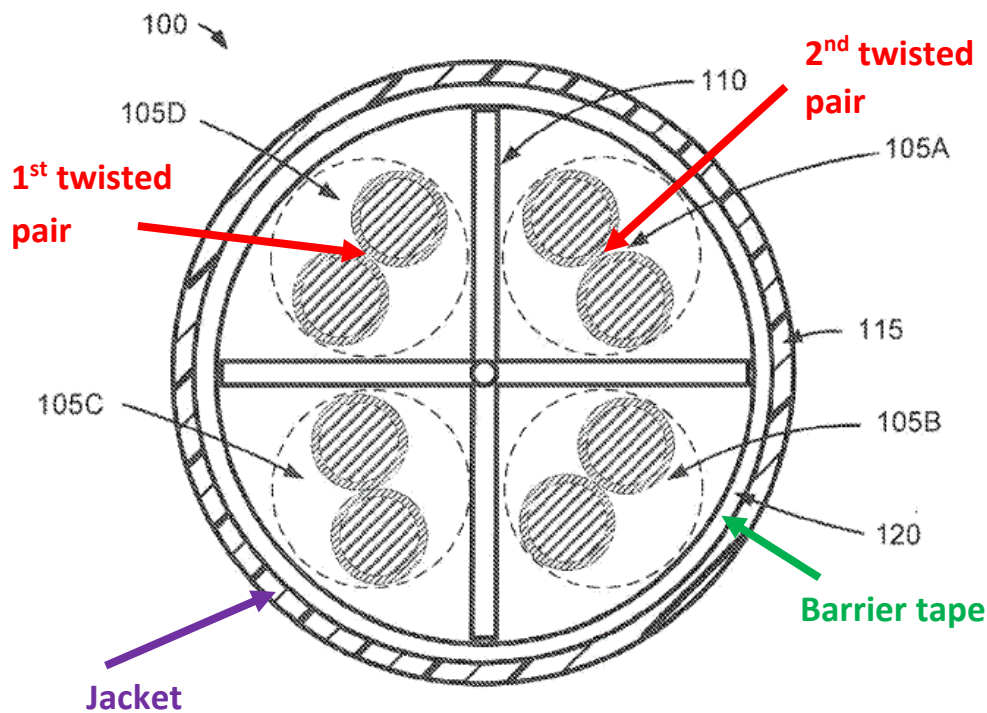


FIG. 1

Id. at 4:32-47, 4:55-59, 5:18-42, 15:57-16:5, FIGS 1-2.

159. Cook's disclosure of a cable having the jacket 115 surround and enclose the internal components of the cable applies equally to the recited method step, and results in performing this step.

160. Cook thus discloses this element, as well as the recited method, and anticipates claim 50.

B. GROUND 2: Glew Anticipates Claims 1-8, 48-50

a. Independent Claim 1

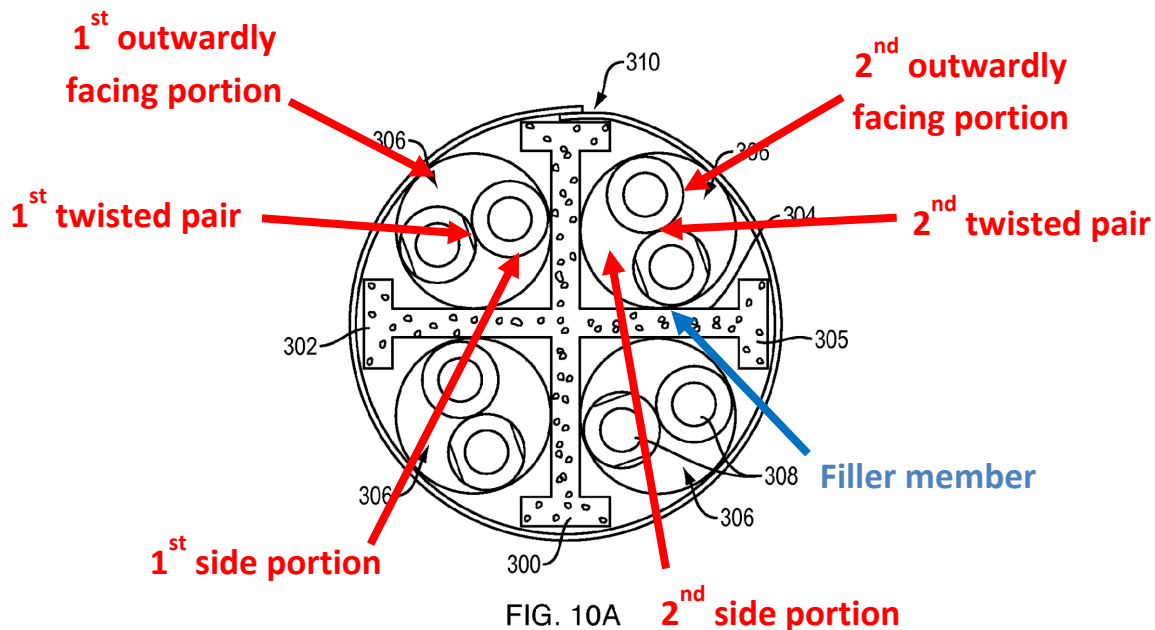
1. A cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors

comprising: [1A] a first twisted pair of conductors having a first side portion and a first outwardly facing portion; [1B] a second twisted pair of conductors having a second side portion and a second outwardly facing portion; [1C] a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors;

161. Glew discloses a cable with these elements.

162. Glew discloses that the invention relates to “shielding of communications cables,” and discloses a twisted pair cable in which “various compositions, methods and devices of the invention can be utilized to reduce or eliminate cross-talk between conductors within a cable or alien cross-talk between cables.” EX-1008 at ¶[0101], FIGS 6A, 6B, 10A.

163. Glew discloses a cable with first and second twisted pairs of conductors, and a filler member, as recited. This is illustrated for example in the annotated Figures below:



See, e.g., *id.* at ¶¶[0005], [0030],[0122], [0154], FIG 10A. Separator 300 (*filler member*) includes arms 304 and T-shaped flap portions 305 that form channels 306 in which the separate twisted pairs 308 can be disposed. *Id.* at ¶[0154]; FIG. 10A.

164. The disclosed separator 300 “is configured to non-conductively shield” between the twisted pairs. The disclosed separator is formed of a polymeric dielectric material (e.g., FEP, PFA, or MFA) that may have inclusions, such as metallic particles, distributed in the polymeric material to provide shielding of electromagnetic radiation. *Id.* at ¶¶[0120-121], [0154]; FIG. 10A.

Alternatively, Glew discloses polymeric cross-shaped separators (96, 97) with either a continuous metal coating (100) or a discontinuous coating formed of a patchwork of metal portions (101). *Id.* at ¶¶ [0149-150], FIGS. 8A, 8B. As another alternative, Glew discloses a polymeric cross-shaped separator having an

electrically conductive strip disposed internally within the dielectric polymeric body so that the strip is surrounded by the polymer:

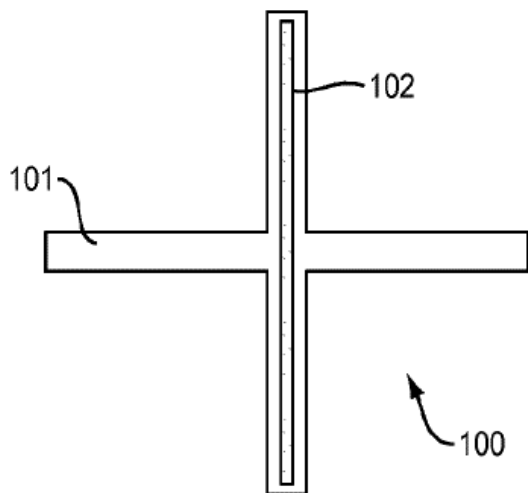


FIG. 9

Id. at ¶¶[0066], [0152], FIG. 9. Glew also incorporates by reference US Publication No. 2010/0206609 (“‘609 Publication”) (*see id.* at ¶¶[0144], [0159], [0219]), which discloses separators that are made of either conductive or insulative material. *See* EX-1026 at ¶¶[0067] (“The core may be formed of a conductive or insulative material to further reduce cross-talk, impedance and attenuation.”), [0073], [0087-88].

165. A POSITA would understand the disclosed separators – and particularly that of FIG. 9 and the insulative-material separator disclosed in the ‘609 Publication – to be configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the

second twisted pair of conductors as recited. A POSITA also would immediately understand Glew to disclose using separators such as those of FIG. 9 and identified in the '609 Publication as an alternative to the polymer/metal separator illustrated in FIG. 10A.

166. Glew thus discloses these elements.

[1D] a barrier tape configured to encircle the filler member and the first and second outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors;

167. Glew discloses this element. As shown in the annotated figure below, Glew discloses shielding material 310 (*barrier tape*) encircling the separator 300 (*filler member*) and the first and second twisted pairs of conductors (308):

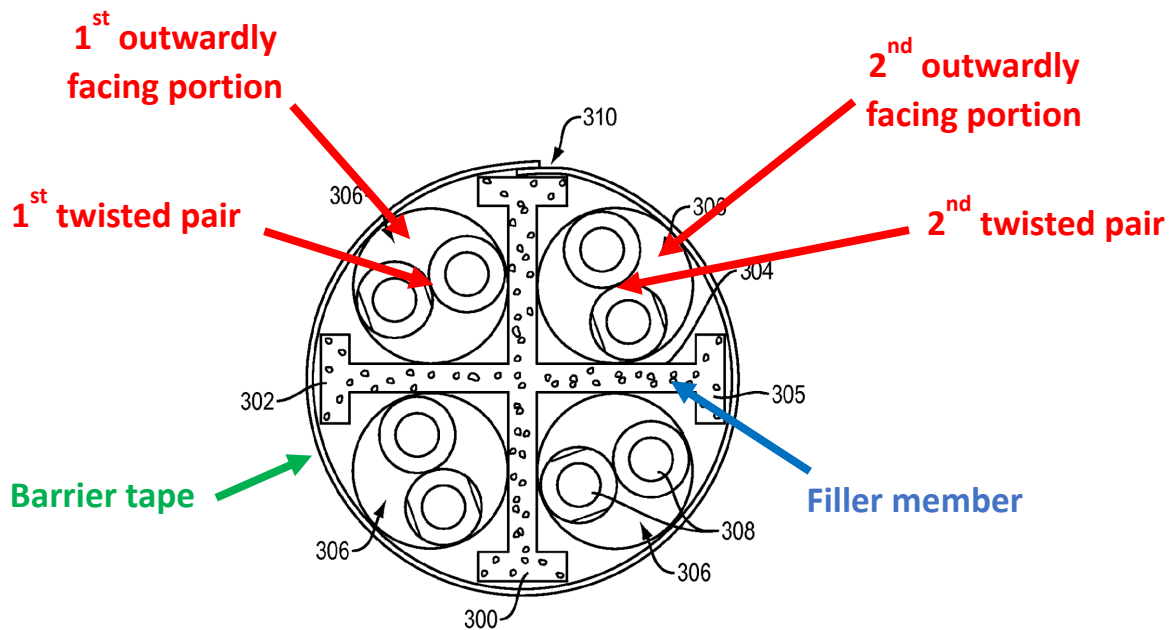


FIG. 10A

See, e.g., EX-1008 at ¶[0154], FIG 10A.

168. Glew states that the shielding material 300 “can be a multi-layer tape material, as discussed below with respect to FIGS. 13A, 13B, 13C, 13D” *Id.* at ¶[0154]. The multi-layer tapes in FIGS 13A-D include conductive layers and/or dielectric layers (that may have dispersed metallic particles) “to provide shielding of electromagnetic radiation.” *Id.* at ¶¶ [0030-34], [00164-65], [0186-198]. For example, the tape in Figure 13C has a multi-layer tape with a metallic layer 133 sandwiched between a dielectric substrate layer 135 and another dielectric layer 137, with the substrate dielectric layer 135 spacing the conductive layer from the conductors when the tape is encircling the conductors in the cable. *Id.* at ¶¶ [0195], [0197].

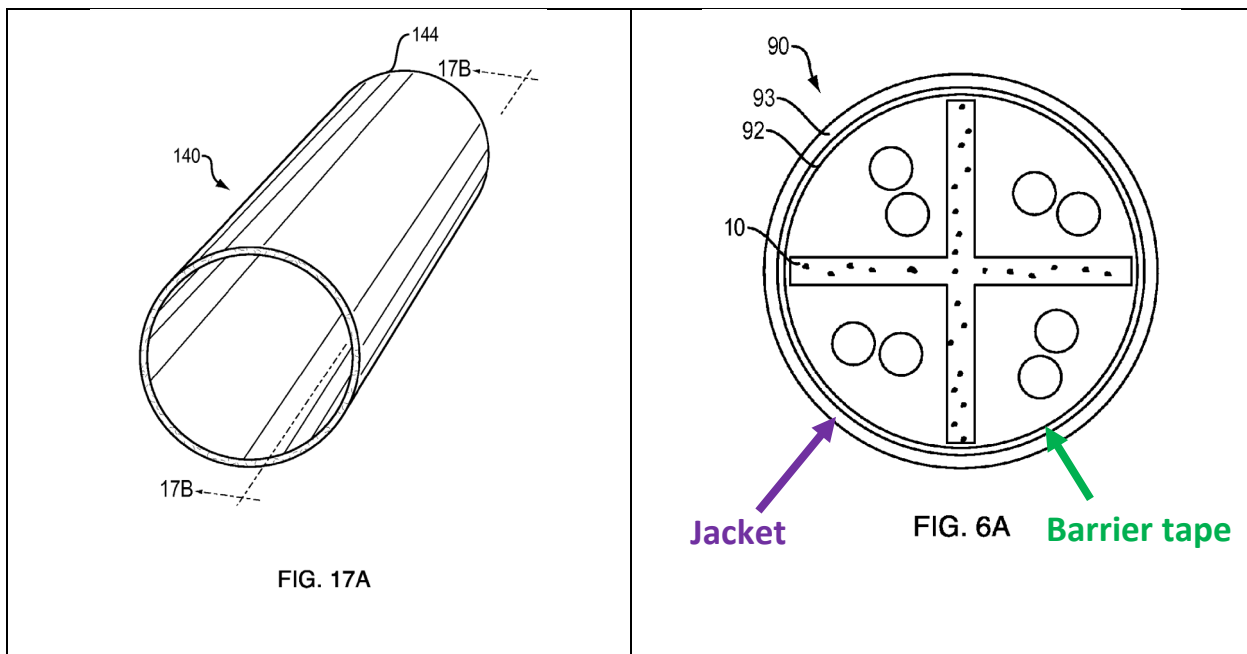
169. A POSITA would understand that this multi-layer barrier tape of, for example, FIG. 13C, is configured to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors as recited.

170. Thus, Glew discloses this element.

[1E] a jacket configured to encircle the barrier tape;

171. Glew discloses this element.

172. Glew describes that cables include an outer jacket that surrounds the barrier tape and twisted pairs. *See, e.g., id.* at ¶¶[0038], [0043], [0146], [0221-233]. Glew illustrates exemplary outer jackets (e.g., FIG. 17A) and a cable with an outer jacket surrounding a metal barrier tape, as illustrated in the annotated figures below:



See id. at ¶¶ [0146-147], [221-230], FIGS 6A, 6B, 17A, 17B, 18A, 18B. Thus,

Glew discloses this element.

[1F] wherein the second twisted pair of conductors is located adjacent to a portion of the filler member, and wherein the first twisted pair of conductors is located adjacent to the portion of the filler member;

173. Glew discloses this element.

174. As illustrated in the annotated drawing below, Glew discloses that the first and second twisted pairs of conductors are located adjacent an arm of the separator 300 (portion of the filler member):

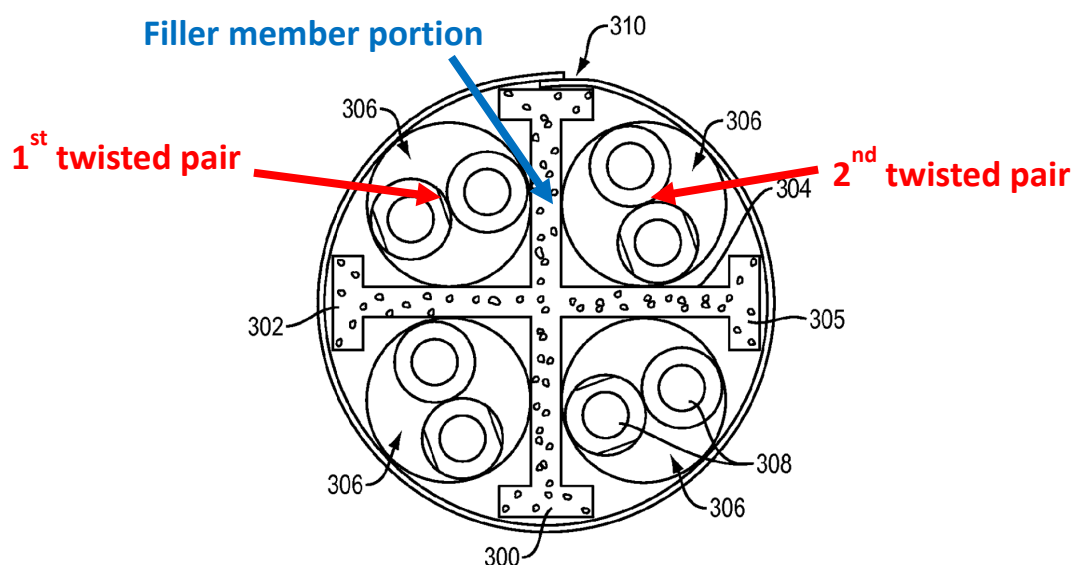


FIG. 10A

See id. at ¶ [0154], FIG 10A. Thus, Glew discloses this element.

[1G] wherein the barrier tape includes a non-conductive layer and a conductive layer;

175. Glew discloses this element.

176. The shielding material 310 is a “barrier tape” that “includes a non-conductive layer and a conductive layer.” Glew discloses that the shielding material “can be a multi-layer tape material, as discussed below with respects to FIGS. 13A, 13B, 13C, 13D” *Id.* at ¶[0154]. The multi-layered tape in FIG. 13C has “a thin metallic layer 133 (e.g., an aluminum foil layer) [that] is disposed between an underlying polymeric substrate 135 and a non-woven fabric layer 137.” *Id.* at ¶[0195]. The substrate layer 135 may be “insulative, dissipative or conductive.” *Id.* at ¶[0188]. The non-woven fabric layer 137 similarly can be “insulative, dissipative or conductive” and “be formed of a polymeric material” that is free of any metallic inclusions. *Id.* at ¶¶[0190], [0193], [0195], [0196]. FIG. 13C (annotated) is provided below:

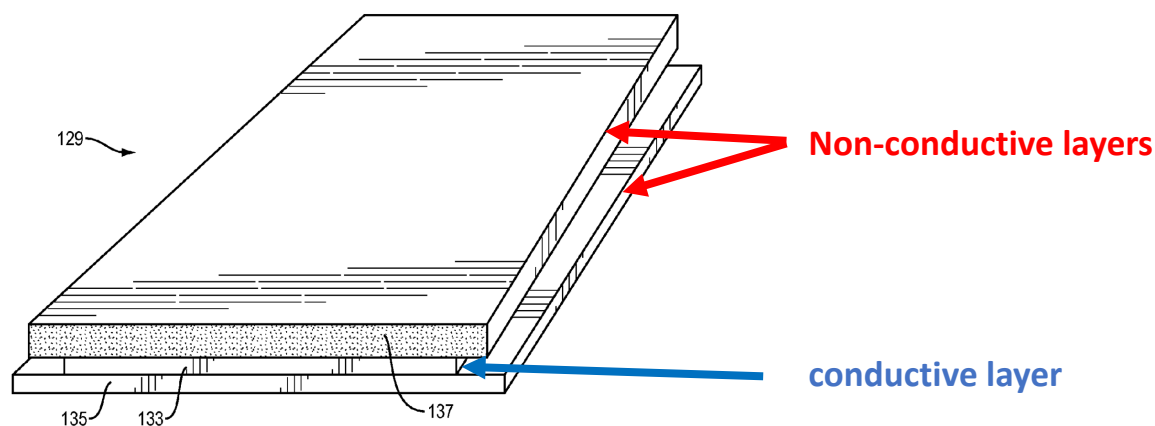


FIG. 13C

Id. at ¶¶[0154], [0193], [0195],[0197]; FIG 13C.

177. Thus, a POSITA would understand Glew to disclose this element.

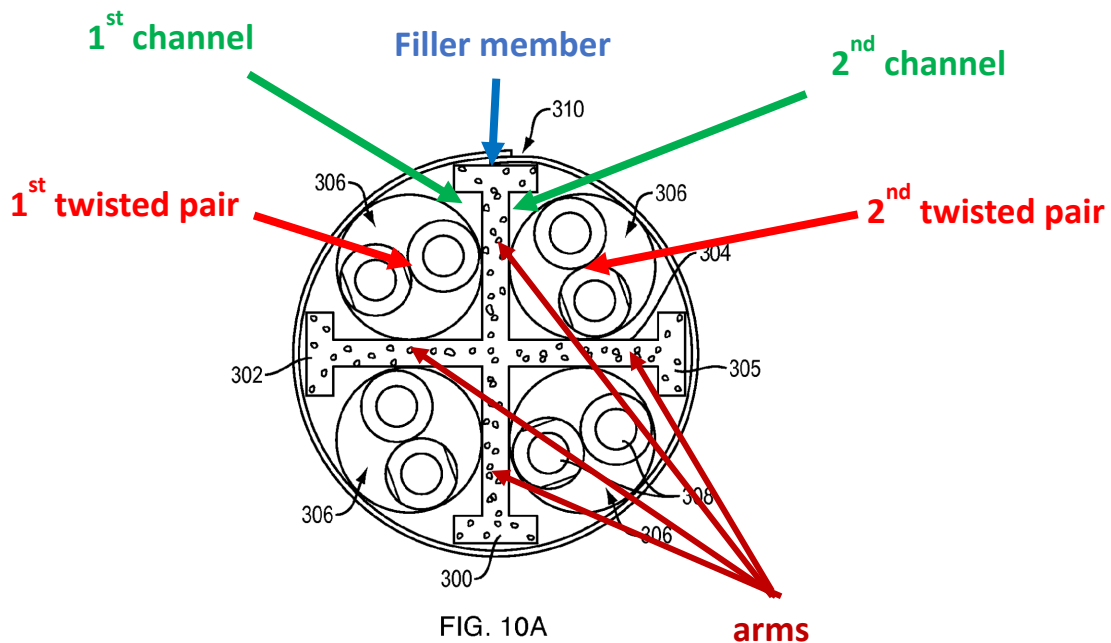
[1H] wherein the filler member is made of a non-conductive material;

178. Glew discloses this element. Glew discloses that the separator 300 (filler member) “can be formed of a polymeric material, such as FEP, PFA, MFA, and any of the other polymers discussed above,” which a POSITA would understand to disclose a non-conductive material. *Id.* at ¶[0154], FIG. 10A. See also my discussion re Glew’s disclosure of [1C] above. Thus, Glew discloses this element.

[1I] wherein the filler member includes a plurality of arms that are each configured to radially extend outwardly so as to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors;

179. Glew discloses this element.

180. As illustrated for example in the annotated FIG 10A below, the separator 300 (*filler member*) has arms 304 that extend radially outward to flap portions 305. The arms form first and second channels 306 that are shaped to partially enclose the first and second twisted pairs 308 as recited:



Id. at ¶0154, FIG. 10A. *See also*, FIGS. 5, 6A. Thus, Glew discloses this element.

[1J] wherein the first terminal portion of the filler member includes a first outwardly facing terminal surface, the second terminal portion of the filler member includes a second outwardly facing terminal surface, and the barrier tape is configured to encircle the first and second outwardly facing terminal surfaces and the first and second twisted pairs of conductors;

181. Glew discloses this element.

182. As indicated in Ground 1 regarding this element, the ‘833 Patent associates the term “terminal portion” (or “terminal portions”) with the filler arms (and ends of the filler arms). *See, e.g.*, EX-1001 at 2:43-47, 2:66-3:3, 5:48-53, 6:19-23, 6:58-67. Glew discloses that each filler member arm 304 has a flap portion 305 with an outward surface (outwardly facing terminal surface), and the

shielding material 310 (barrier tape) encircles these terminal surfaces and the twisted pairs of conductors 308:

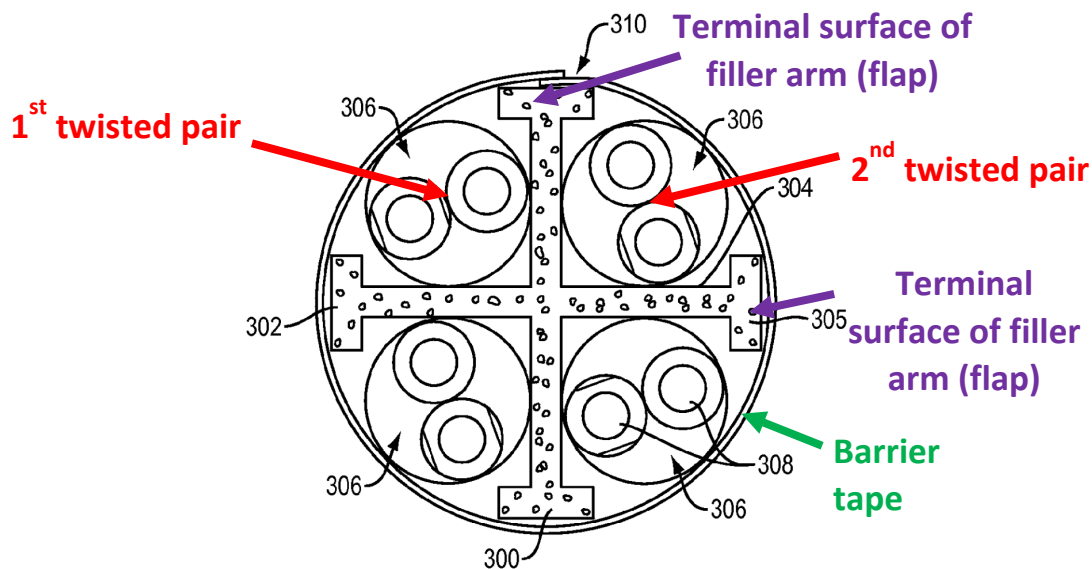


FIG. 10A

EX-1008 at ¶¶[0154], [0197], FIG. 10A. *See also*, FIG. 6A (barrier tape 92 encircling terminal portions of filler member 10). Thus, Glew discloses this element.

[1K] wherein the filler member is configured to extend along a longitudinal portion of the cable and is configured to non-conductively shield the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable.

183. Glew discloses this element. Glew discloses separators (*filler members*) that are “configured to extend along a longitudinal portion of a cable.”

For example, below is an exemplary separator that is formed as an elongated cross-shaped member that extends from a proximal end 20 to a distal end 30:

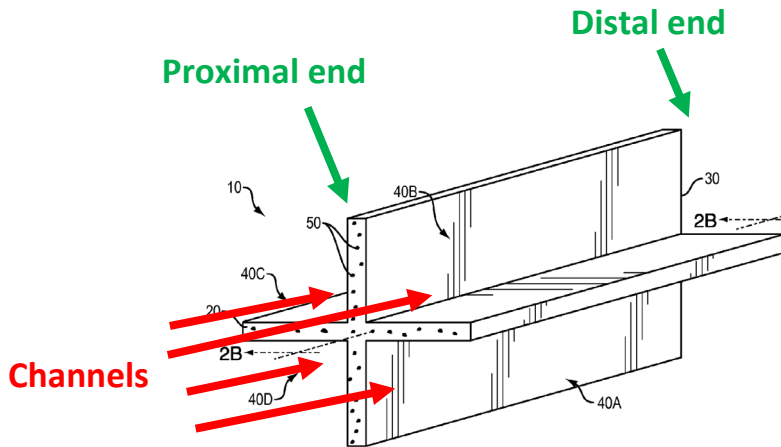


FIG. 2A

Id. at ¶¶ [0045], [0121-22]; FIG. 2A.

184. Glew discloses at least one separator (e.g., FIG. 9) that is “configured to non-conductively shield” the first and second conductor pairs “from being electrically coupled to each other along the longitudinal portion of the cable.” The separator defines channels (e.g., channels 40A, 40B, 40C, 40D in FIG 2A above) in which each twisted pair can be disposed. Figure 9 (below) discloses a cross-shaped separator embodiment having a metal insert encased in dielectric polymer, and Figure 10A (below) shows a twisted pair in each of the four channels 306 defined by the cross-shaped separator 300 (*filler member*).

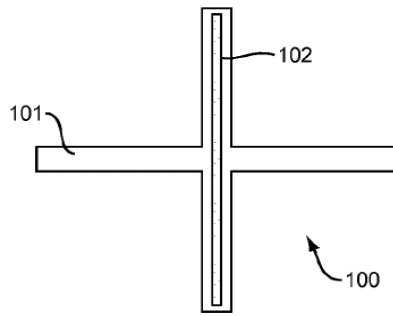


FIG. 9

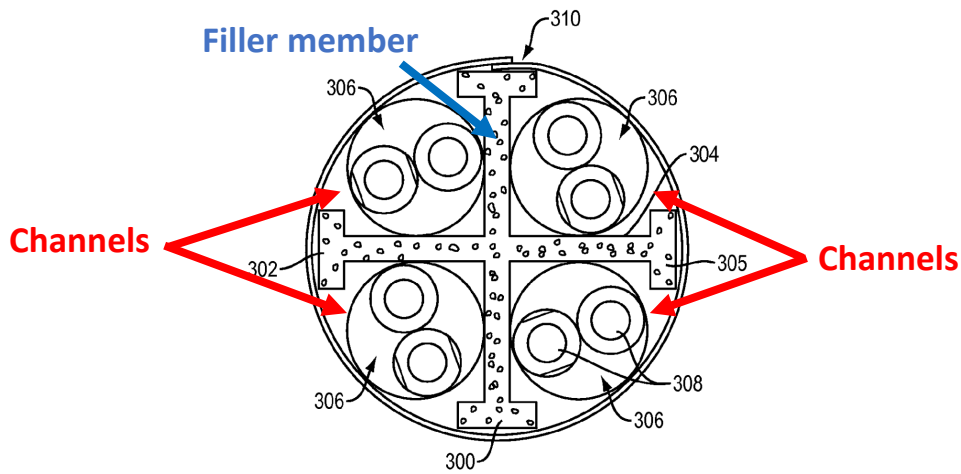


FIG. 10A

Id. at ¶ [0154], FIG. 10A.

185. Glew discloses that the separator 300 (*filler member*) illustrated in FIG. 10A is formed of a polymeric material with dispersed particles 50 (e.g., metal particles). *Id.* at ¶[0154], FIG. 10A. Glew discloses that the alternative separator illustrated in FIG. 9 is a dielectric polymeric cross-shaped separator having an electrically conductive strip disposed internally within the dielectric polymeric body so that the strip is surrounded by the polymer. *Id.* at ¶¶[0066], [0152], FIG. 9. Glew also incorporates by reference the ‘609 Publication, which discloses

separators that are made of either insulative or conductive material. *Id.* at ¶¶ [0144], [0159], [0219]; EX-1026 at ¶¶ [0067] (“The core may be formed of a conductive or insulative material to further reduce cross-talk, impedance and attenuation.”), [0073], [0087-88]. A POSITA would understand that Glew discloses that these separator configurations provide non-conductive shielding between the twisted pairs as recited. EX-1008 at ¶¶ [0045-0046], [0051], [0121-122], [0146], [0154]. A POSITA also would immediately understand Glew to disclose using separators such as those of FIG. 9 and identified in the ‘609 Publication as an alternative to the polymer/metal separator illustrated in FIG. 10A.

186. For the reasons given above, a POSITA would understand Glew to disclose this element and a cable with all of the elements recited in Claim 1.

187. Therefore, this claim is anticipated by Glew.

b. Dependent Claim 2. The cable of claim 1, wherein the filler member comprises a single unitary component of the cable, and the plurality of arms of the filler member form a cross shape.

188. Glew discloses this element. As illustrated in the annotated figure below, Glew discloses a separator 300 (*filler member*) that has four arms that “form a cross shape”:

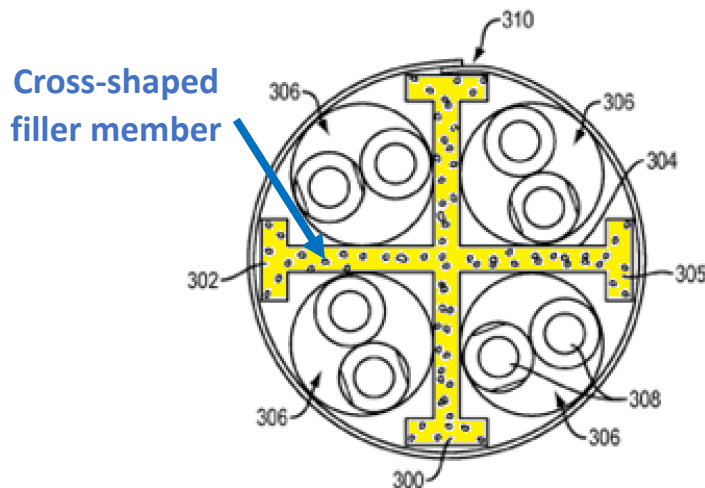


FIG. 10A

Id. at FIG 10A. Glew also describes other disclosed separators as having an “elongated cross-shaped form” and “cross-shaped ... profile.” *Id.* at ¶¶ [0121-122]; [0144], FIGS. 2A, 5; see also FIG. 9.

189. Glew also discloses that the separator (*filler member*) is a “single unitary component of the cable.” Glew teaches that the separators can be formed by extruding polymeric material into “an elongated cross-shaped form.” *Id.* at ¶¶ [0121-0122], [0148]. As an extruded component it would be a “single unitary component” as shown in the Glew figures.

190. Thus, this element is disclosed, and this claim is anticipated by Glew.

c. Dependent Claim 3. The cable of claim 1, wherein the non-conductive layer of the barrier tape comprises a first non-conductive layer and the barrier tape includes a second non-conductive layer.

191. Glew discloses this element. As I explained in connection with Glew’s disclosure of [1G], Glew discloses a multi-layer tape that can be used as

the shielding material 310 in the FIG 10A embodiment, which has a bottom dielectric polymeric substrate 135 (*first non-conductive layer*) and a non-woven fabric layer 137 formed of a polymeric material (*second non-conductive layer*). *Id.* at ¶¶[0154], [195], FIGS. 10A, 13C. See also my analysis of Glew’s disclosure of [1G]. Further, Glew discloses that each of the substrate and non-woven fabric layers 135, 137 may be formed of the same polymeric material and may be “insulative, dissipative or conductive.” *Id.* at ¶[0188]. An illustration of the barrier tape of FIG. 13C (annotated) is provided below:

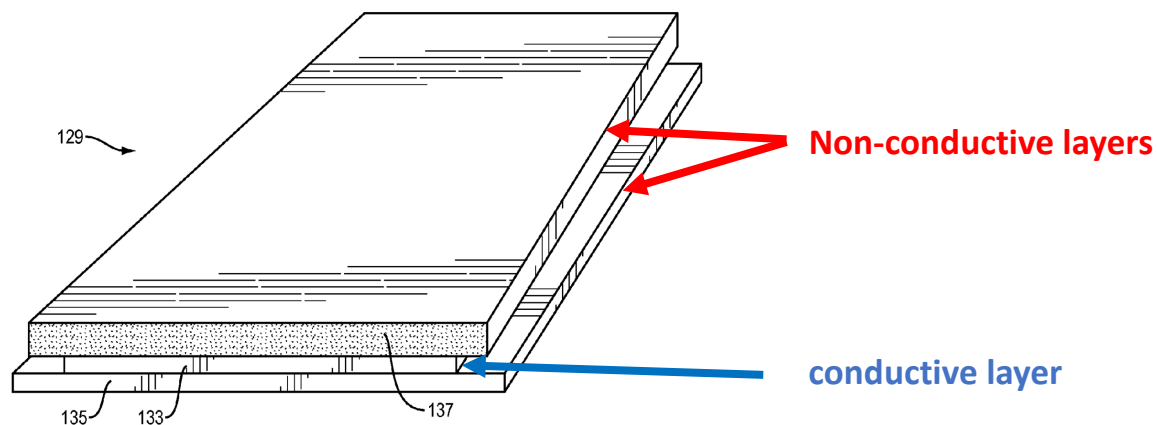


FIG. 13C

Id. at ¶¶[0154], [0193], [0195],[0197]; FIG 13C.

192. Glew thus discloses this element, and this claim is anticipated.

d. Dependent Claim 4. The cable of claim 3, wherein the conductive layer of the barrier tape is positioned between the first and second non-conductive layers.

193. As discussed and shown above (re claim 3), Glew discloses the conductive layer 133 sandwiched between (or positioned between) the first and second non-conductive layers 135, 137. *See* my analysis regarding Glew's disclosures of [1G] and Claim 3. Glew thus discloses this element, and this claim is anticipated.

e. Dependent Claim 5. The cable of claim 3, wherein the first non-conductive layer comprises an inner non-conductive layer and the second non-conductive layer comprises an outer non-conductive layer.

194. Glew discloses claim 3 (as discussed above) and this element.

195. Figure 10A shows a cable where the shielding material 310 is wrapped around the separator and twisted pairs. *Id.* at ¶[0154], FIG. 10A. When the shielding material 310 (*barrier tape*) is configured as a multi-layer tape as described in FIG. 13C and encircles the conductors and filler member, one of the non-conductive layers (e.g., the polymeric substrate layer) will be positioned between the twisted pairs and the conductive layer 133 (and therefore is an inner non-conductive layer) and the other non-conductive layer will be external to the conductive layer 133 (and be an outer non-conductive layer). *Id.* at ¶[0197], FIG. 10A.

196. This claim is therefore anticipated by Glew.

f. Dependent Claim 6. The cable of claim 1, wherein the filler member and the barrier tape are configured to extend along a longitudinal direction of the cable.

197. Glew discloses claim 3 (as discussed above) and also this element.

198. With respect to Glew's disclosure of the filler member "extending along a longitudinal direction of the cable," see my discussion above concerning Glew and the disclosure of element [1K].

199. Glew also discloses that the shield (*barrier tape*) is wrapped around the separator and twisted pairs of conductors for the purpose of shielding the twisted pairs, and thus reducing alien crosstalk from other cables. *Id.* at ¶¶[0030], [0101], *see also id.* at ¶[0197], disclosing that when the shield (barrier tape) "encircles" the filler and conductors, the substrate layer "provides a spacing between the conductive layer, e.g., metallic layer . . . , and the conductors encircled by the tape. The spacing between conductors and the conductive layer can reduce insertion loss in the cable." With reference to FIG. 10A, Glew discloses that the tape is a "shielding material 300." *Id.* at ¶[0154]. Glew also explains that the "tape can be used as an overall shield for a cable ..." *Id.* at ¶[0165]. A POSITA would understand that Glew's twisted pair conductors extend along the longitudinal direction of the cable, and that Glew's shielding tape does likewise.

200. This element is disclosed, and this claim therefore is anticipated by Glew.

- g. Dependent Claim 7. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member and the barrier tape are configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.**

201. Glew discloses these elements.

202. Glew discloses a cable with “twisted pair conductors” or “twisted-pair wires”, which a POSITA would understand to be conductor pairs that are twisted together in a helical manner to form a balanced transmission line. *Id.* at ¶¶[0030], [0036], [0122], [0143]. Glew also discloses that conventionally, “each twisted pair of conductors has a specific distance between twists along the longitudinal direction. That distance is referred to as the pair lay.” *Id.* at ¶[0005]. Glew further discloses to a POSITA that the pairs of conductors extend in the longitudinal direction along channels defined by a separator, which teaches that the twisted pairs extend “along the longitudinal direction of the cable” as recited. *Id.* at ¶¶[0005], [0060], [0122],[0143], [0154-155],[0157], FIGS. 2A, 5, 10A. A POSITA would understand this to disclose a cable having twisted pair conductors, with each pair being helically twisted along the longitudinal portion of the cable.

203. Further, in connection with the discussion of cables that include separators, Glew incorporates by reference the ‘609 Publication. *See id.* at ¶¶[0144], [0159], [0219]. The ‘609 publication explicitly teaches helically twisting

the separator and conductor pairs (which are disclosed as being twisted pairs). *See e.g.*, EX-1026 at ¶¶[0064] (“The various shaped sections of the core support-separator may be helixed along the length of the communications cable.”), [0086] (“Next, the method bunches the aligned plurality of transmission media and core using a second die which forces each of the plurality of the transmission media into contact with the surface features of the core which maintain a spatial relationship between each of plurality of transmission media. Finally, the bunched plurality of transmission media and core are optionally twisted to close the cable ...”), [0187] (“The anvil-shaped separator may be cabled with a Mixed configuration. The helically twisted portions (165) in turn define helically twisted conductor receiving grooves within the channels that accommodate the twisted pairs or individual optical fibers.”), [0195] (“[A]dding a helical twist allows for improving overall electrical performance design capability while preserving the desired geometry.”). Thus, for this reason too, a POSITA would understand Glew to disclose a cable having twisted pair conductors, with each pair being helically twisted along the longitudinal portion of the cable as recited. A POSITA also would immediately understand Glew to disclose using helically twisted pairs along the longitudinal portion of the cable as identified in the ‘609 Publication.

204. Glew also discloses that the separator (*filler member*) provides non-conductive shielding of the twisted pairs of conductors along the longitudinal

length of the cable as I explained in connection with Glew's disclosure of elements [1A-C] and [1K].

205. Glew further discloses that the barrier tape provides non-conductive shielding of the twisted pair conductors as I explained in connection with Glew's disclosure element [1D].

206. Since each of the filler and barrier tape (e.g., shielding material 310) extend along the longitudinal direction of the cable (see discussions above for Glew's disclosures of element [1K] and claim 6), a POSITA would understand Glew to disclose that these structures provide the recited shielding along the longitudinal portion.

207. These elements therefore are disclosed, and the claim is anticipated by Glew.

h. Dependent Claim 8. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

208. Glew discloses these elements. See my discussion concerning Glew's disclosure of the element in claim 7 above. As explained, Glew discloses that the twisted pairs of conductors are helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-

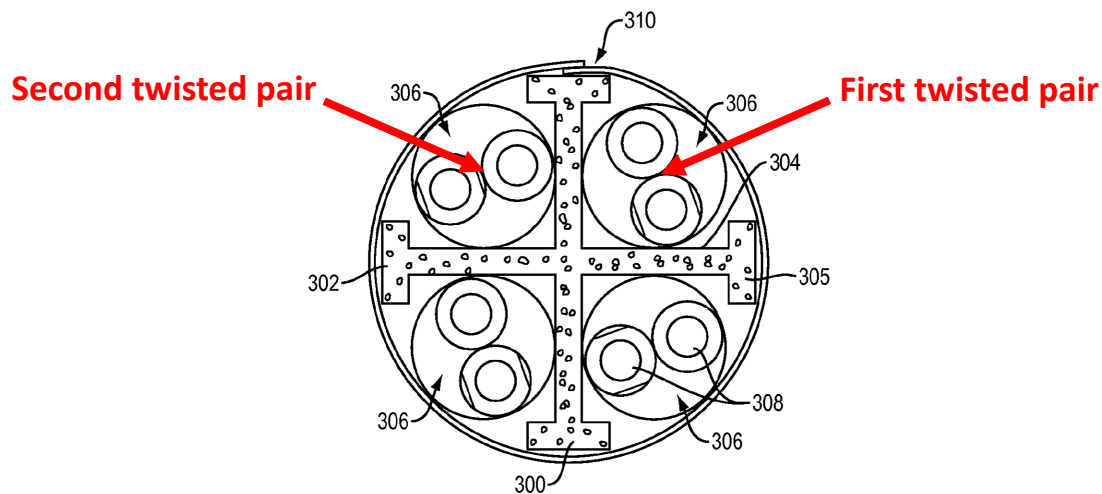
conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable. See Section X(B)(a)(7) above.

209. Glew thus discloses these elements, and this claim thus is anticipated by Glew.

i. Independent claim 48

48. A cable comprising: [48A] a plurality of twisted pair conductors;

210. Glew discloses a cable comprising a plurality of twisted pair conductors, as illustrated in the below annotated FIG. 1:

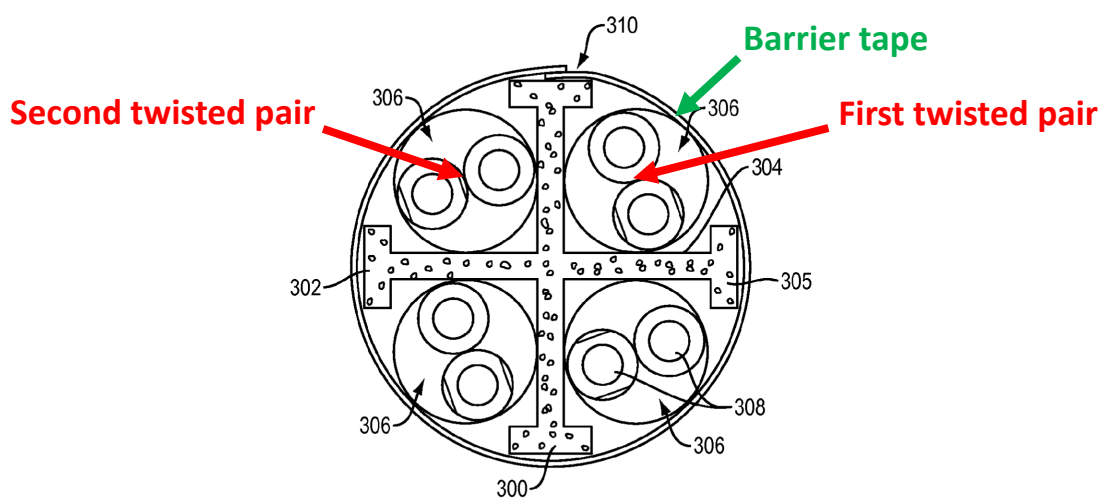


See, e.g., id. at ¶¶[0005], [0030],[0122], [0154], FIG. 10A. See also my discussion regarding Glew's disclosure of claim elements [1A] and [1B] above.

211. Glew thus discloses this element.

[48B] a barrier tape that surrounds the plurality of twisted pair conductors, the barrier tape including an electrically conductive layer enclosed between inner and outer dielectric layers; and

212. Glew discloses this element. As shown in the annotated FIG. 10A below, Glew discloses a shielding material 310 (*barrier tape*) that surrounds the plurality of twisted pair conductors:



Id. at ¶[0154], FIG. 10A. *See also* my discussion regarding Glew’s disclosure of [1D] and [1G] above.

213. Glew discloses that the shielding material 310 is a “multilayer conductive barrier tape” with an “electrically conductive layer enclosed between inner and outer dielectric layers.” The shielding material 310 in FIG. 10A “can be a multi-layer tape material, as discussed below with respects to FIGS. 13A, 13B, 13C, 13D” *Id.* at ¶[0154]. The multi-layered tape in FIG. 13C has “a thin

metallic layer 133 (e.g., an aluminum foil layer) [that] is disposed between an underlying polymeric substrate 135 and a non-woven fabric layer 137” that “can be formed of a polymeric material.” *Id.* at ¶[0195], FIG. 13C. This is illustrated in the annotated Figure below:

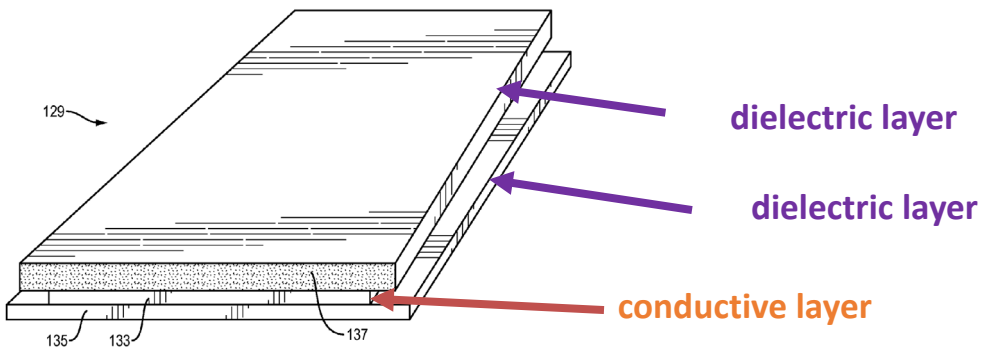


FIG. 13C

214. The substrate layer 135 may be “insulative, dissipative or conductive.” *Id.* at ¶[0188]. The non-woven fabric LAYER 137 likewise can be “insulative, dissipative or conductive” and “be formed of a polymeric material” that is free of any metallic inclusions. *Id.* at ¶¶ [0190], [0193], [0195], [0196]. Thus, the layers can be dielectric layers. When the shielding material 310 (*barrier tape*) is configured as a multi-layer tape as described in FIG. 13C and encircles the conductors and filler member, one of the dielectric layers (e.g., the polymeric substrate layer 135) will be positioned between the twisted pairs and the conductive layer 133 (and therefore is an inner dielectric layer) and the other dielectric layer 137 will be external to the conductive layer 133 (and be an outer dielectric). *See id.* at ¶[0197], FIG. 10A.

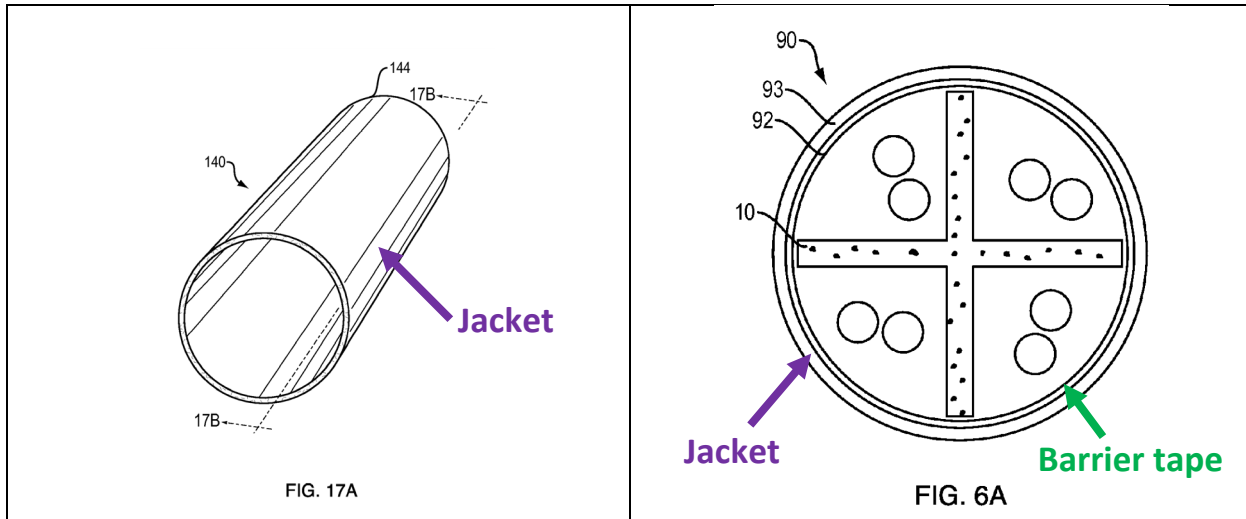
215. Still with reference to FIG. 13C, that illustration shows the dielectric layers extending beyond the side edges of the conductive metal layer, and Glew discloses also affixing the dielectric layers together by, for example, thermal or ultrasonic bonding. *Id.* at ¶¶[0199-200]. Such bonding would result, in the instance of a tape made with layers as shown in FIG. 13C, in the non-conductive layers metal layer being encased by the dielectric material of the two dielectric layers 135, 137.

216. Glew thus discloses the barrier tape having an electrically conductive layer enclosed between inner and outer dielectric layers as recited.

217. Glew thus discloses this element.

[48C] a jacket that surrounds the barrier tape.

218. As I discussed in connection with Glew's disclosure of [1E] above, and as illustrated in the annotated figures below, Glew describes an outer jacket that surrounds the barrier tape/layer and twisted pairs. *See, e.g., id.* at ¶¶[0038-0043], [0146], [0221-233], FIG. 17A, Glew illustrates (as indicated in the annotated figures below) an exemplary jacket, and a cable with an outer jacket surrounding barrier tape:



See *id.* at ¶¶ [0146-147], [0221-233], FIGS 6A, 6B, 17A, 18A, 18B.

219. Thus, Glew discloses this element and the recited cable, and anticipates claim 48.

j. Independent claim 49

49. A cable comprising: [49A] a plurality of pairs of conductors extending along a longitudinal axis;

220. Glew discloses a cable comprising a plurality of pairs of conductors for transmitting signals along the longitudinal length of the cable, as illustrated in the below annotated FIG. 1:

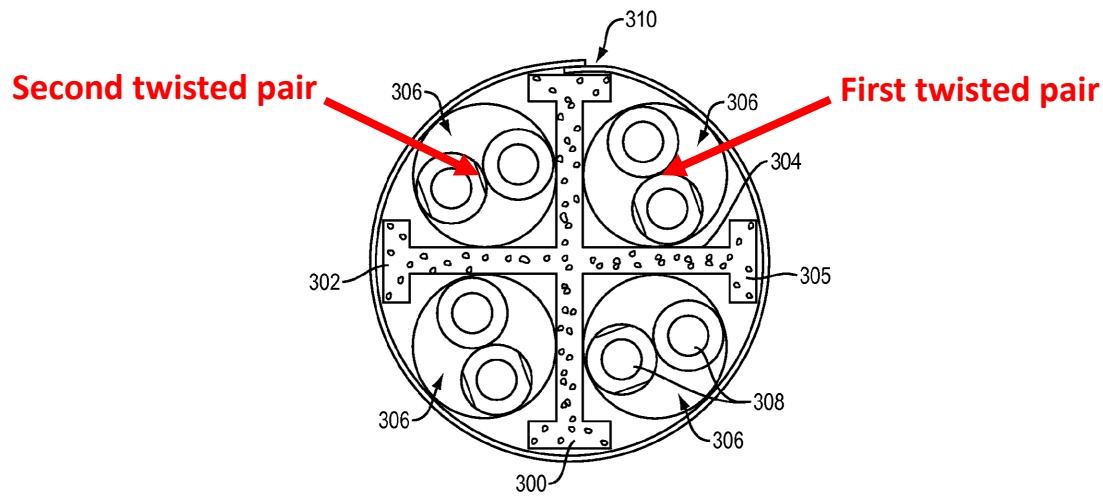


FIG. 10A

See, e.g., *id.* at ¶¶[0005], [0030],[0122], [0154], FIG. 10A.

221. Glew further discloses to a POSITA that the pairs of conductors extend in the longitudinal direction along channels defined by a separator, which teaches that the twisted pairs extend “along the longitudinal axis” as recited. *Id.* at ¶¶[0005], [0060], [0122],[0143], [0154-155], [0157], FIGS. 2A, 5, 10A.

222. Glew thus discloses this element.

[49B] a barrier tape surrounding the plurality of pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer; and

223. This element is very similar to element [48B]. As I explain in connection with Glew’s disclosure of [48B], Glew discloses the shield tape 310 (*barrier tape*) surrounding the plurality of pairs of conductors, with the shield tape comprising a conductive layer positioned between a first non-conductive layer and

a second non-conductive layer. *See* above analysis of Glew’s disclosure of element [48B].

224. Glew discloses that the shielding material 310 “surrounds the pairs of conductors” and comprises “a conductive layer positioned between a first non-conductive layer and a second non-conductive layer.” With reference to FIG. 10A, Glew discloses that the shielding material 310 that is “wrapped around the separator 300” and the pairs of conductors, and “can be a multi-layer tape material, as discussed below with respects to FIGS. 13A, 13B, 13C, 13D” *Id.* at ¶[0154]. The multi-layered tape in FIG. 13C has “a thin metallic layer 133 (e.g., an aluminum foil layer) [that] is disposed between an underlying polymeric substrate 135 and a non-woven fabric layer 137” that “can be formed of a polymeric material.” *Id.* at ¶[0195], FIG. 13C. This is illustrated in the annotated Figure below:

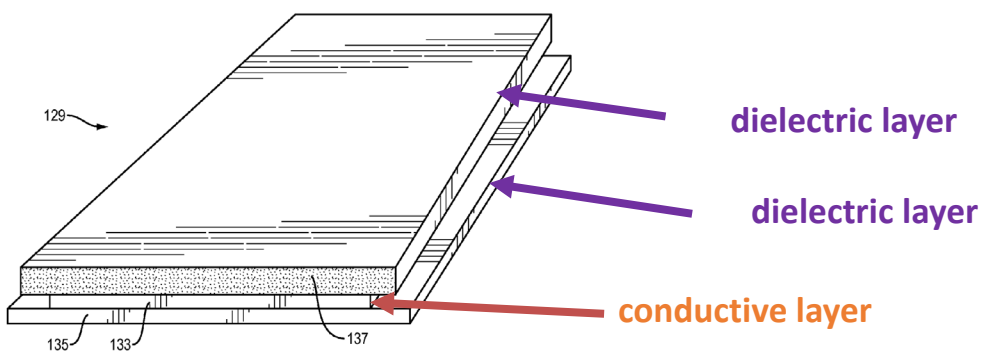


FIG. 13C

225. The substrate layer 135 may be “insulative, dissipative or conductive.” *Id.* at ¶[0188]. The non-woven fabric material 137 likewise can be

“insulative, dissipative or conductive” and “be formed of a polymeric material” that is free of any metallic inclusions. *Id.* at ¶¶ [0190], [0193], [0195], [0196].

226. A POSITA would thus understand that Glew discloses that the shield (*barrier tape*) surrounds the conductors and includes the non-conductive and conductive layers as recited in this claim.

227. Glew thus discloses this element.

[49C] an outer jacket surrounding the barrier tape, the outer jacket comprising a non-conductive material.

228. As I already explained in connection with Glew’s disclosure of [1E] and [48C], Glew discloses an outer jacket surrounding the barrier tape. *See above; see also, id.* at ¶¶[0038-43], [0146-147], [0221-233], FIGS 6A, 6B, 17A, 18A, 18B.

229. Glew also discloses that the jacket can be made of a polymeric shell comprising a polymer such as FEP, MFA or PFA, which discloses to a POSITA that the jacket comprises a non-conductive material. *Id.* at ¶¶ [0038], [0042], [0224].

230. Glew thus discloses this element and the other elements of this claim 49.

231. This claim thus is anticipated by Glew.

k. Independent claim 50

232. Claim 50 is a method claim that recites essentially the same structural limitations as set forth in claims 48 and 49 but with method steps. It recites a plurality of “twisted pairs of conductors” (see elements [48A]/[49[A]) that are “surround[ed]” by a three-layer barrier tape having “a conductive layer positioned between [first and second] non-conductive layers” (see elements [48B]/[49B]), with the barrier tape “extending within” (e.g., being surrounded by) a jacket (see elements [48C]/[49C]), and also element [1E]). Glew’s disclosure of a cable having twisted pairs conductors surrounded by a three-layer barrier tape as recited, with a jacket enclosing the conductors and tape, applies equally to the recited method steps, and results in performing the recited method steps. In other words, Glew’s disclosure of twisted pairs being surrounded by a three-layer non-conductive/conductive/non-conductive barrier tape discloses “surrounding” the twisted pairs with a barrier tape as recited in claim 50. Likewise, Glew’s disclosure of surrounding the barrier tape and conductors with a jacket discloses “extending the barrier tape within an outer jacket” as recited in claim 50. Using Glew’s cable and teaching as described for claims 48-49 above results in performing the method recited in claim 50 and renders claim 50 anticipated for the same reasons discussed above. *See* my discussion above in Sections X(B)(b) and X(B)(c) concerning Glew’s disclosure of having a barrier tape surrounding twisted

pair conductors (and further being surrounded by (or extending within)) an outer jacket.

233. I provide a bit more detail below.

50. A method for reducing alien crosstalk between cables, the method comprising [50A] surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer and;

234. Glew discloses a method for reducing alien crosstalk between cables. *See, e.g., id.* at ¶[01010] (“[T]he various compositions, methods and devices of the invention can be utilized to reduce or eliminate cross-talk between conductors within a cable or alien cross-talk between cables.”).

235. The recited method step - surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer – is essentially the same as cable apparatus elements [48B] and [49B] but written in a method step form. As I explained in connection with elements [48B] and [49B], Glew discloses surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between first and second non-conductive layers. *See* my discussion above regarding Glew’s disclosure of [48B] and [49B], *see also*, *e.g., id.* at ¶¶[0154], ¶[0188, [0190], [0193], [0195-196], FIGS. 10A, 13C.

236. Glew's disclosure of a cable having twisted pairs of conductors surrounded by a three-layer barrier tape as recited applies equally to the recited method step, and results in performing this step.

237. Glew thus discloses this element.

[50B] extending the barrier tape within an outer jacket.

238. A POSITA would understand that Glew's barrier tape shield (e.g., 310 in FIG. 10A) is extending within an outer jacket as recited. As I explained in connection with similar apparatus elements [1E], [48C] and [49C], Glew discloses a cable having an outer jacket that surrounds the multiple twisted pair conductors and the barrier tape for the length of the cable. *Id.* at ¶¶ [0038-43], [0146-147], [0221-233], FIGS 6A, 6B, 17A, 18A, 18B.

239. Glew's disclosure of a cable having the outer jacket surround and enclose the internal components of the cable applies equally to the recited method step, and results in performing this step.

240. Glew thus discloses this element, and a POSITA would understand that Glew discloses the recited method and anticipates claim 50.

C. GROUND 3: Roberts Anticipates Claims 1, 3-8, 48-50

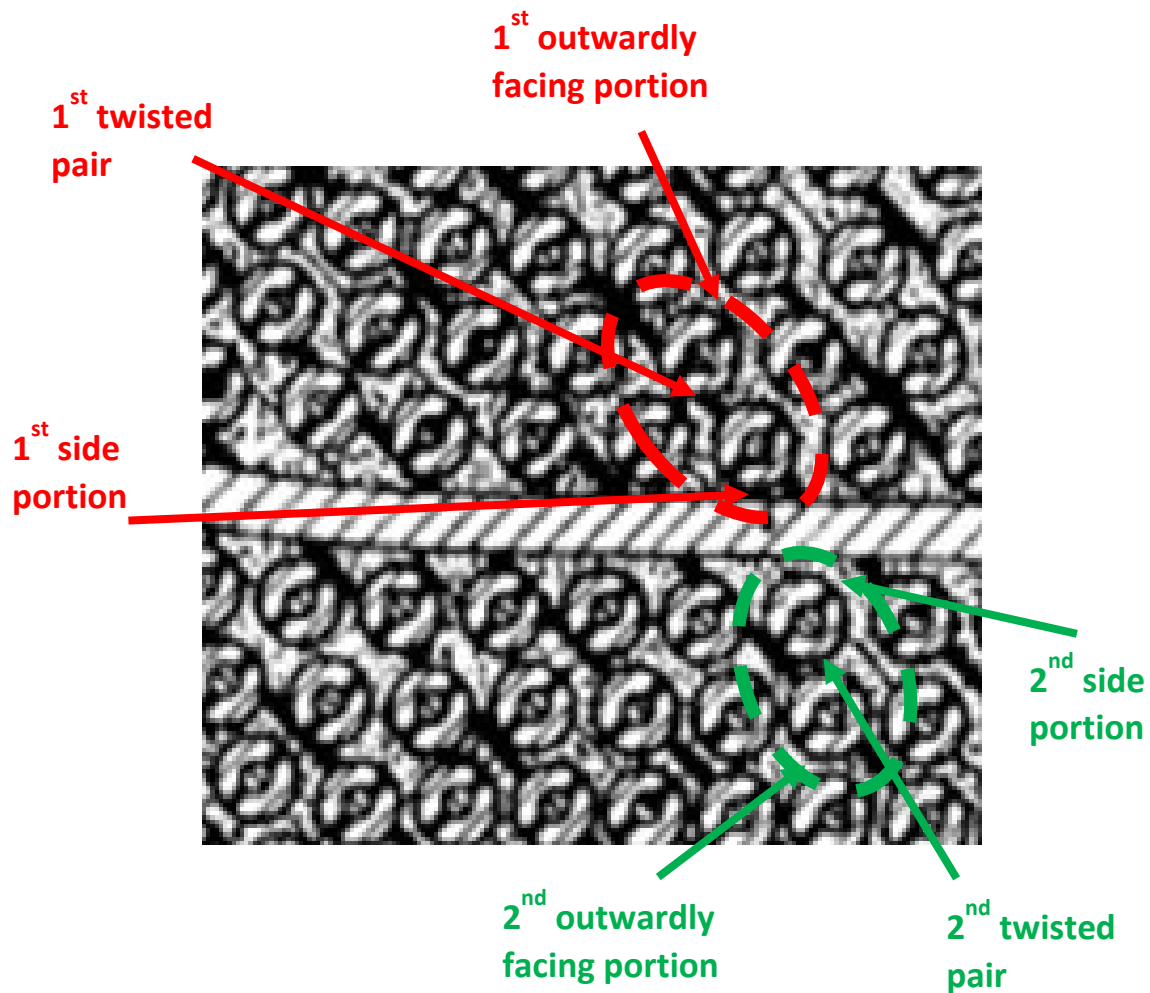
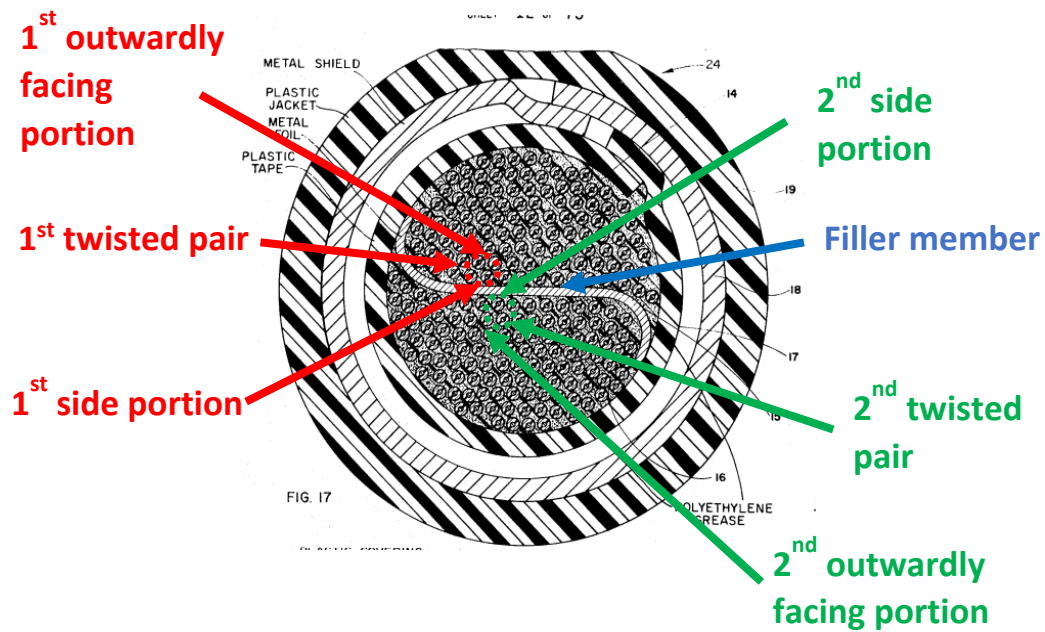
a. Independent Claim 1

1. A cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors comprising: [1A] a first twisted pair of conductors

having a first side portion and a first outwardly facing portion; [1B] a second twisted pair of conductors having a second side portion and a second outwardly facing portion; [1C] a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors;

241. Roberts discloses a cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors. EX-1009 at Title, Abstract, 1:5-40, 2:72-75, 3:16-22, 3:32-59, 4:1-26, 10:42-11:16, FIGS. 1&17.

242. Roberts discloses a cable with first and second twisted pairs of conductors, and a filler member, as recited. The cross-sectional view of FIG. 17 does not specifically identify which conductor is twistedly paired with another conductor of the pair. A POSITA would recognize that each conductor in a twisted pair of conductors would be adjacent to each other. I have circled (in red and green) adjacent conductors to indicate twisted pair conductors. This is illustrated in the annotated Figures below:



See, e.g., id. at Abstract, 10:48-62, 12:5-8, FIGS. 17 & 23.

243. Roberts discloses “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” and explains how measurements “between pairs” demonstrate that dividing the “pairs” as disclosed is an improvement over the prior art. Roberts at Abstract (“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 . . . By dividing electrical conductor telephone ***pairs*** . . . with plastic-coated metal foil, the crosstalk properties are so vastly improved”). A POSITA would plainly understand that the pairs were used in Roberts’ cable. Roberts discusses reducing crosstalk between a disturbing “circuit” and a disturbed “circuit.” *Id.* at 3:21-28. Roberts’ solution is to place a shield between the disturbing circuit and the disturbed circuit that attenuates the wave energy produced by the disturbing circuit. *Id.* at 3:28-31. Other prior art references, including EX-1022 (Jachimowicz-340), use the “disturbing” and “disturbed” language and recognize that each circuit requires a pair. *See* EX-1022 at 1:7-10 (defining crosstalk as “the induction of current in the ‘***disturbed***’ pair by currents flowing in the ‘***disturbing***’ pair.” (emphasis added)). Jachimowicz-340 is particularly informative as it discusses the solutions taught by Roberts including an S or Z shaped screen. *Id.* at 1:42-48.

244. Further, Roberts indicates that groups of electrical conductors 14 and 16, such as those shown in Fig. 17, are comprised of groups of twisted pairs of insulated conductors. Roberts explains that the cable manufacturing process uses a die plate 30a shown at Figure 23 that has “holes (33) through which *twisted* electrical conductors (14) and (16) pass” and that the apparatus shown in Figure 23 is used to manufacture the cable shown in Figure 17:

FIG. 23 (manufacturing process)

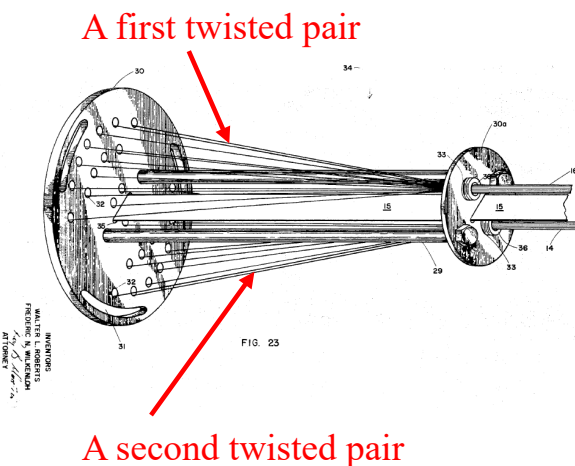
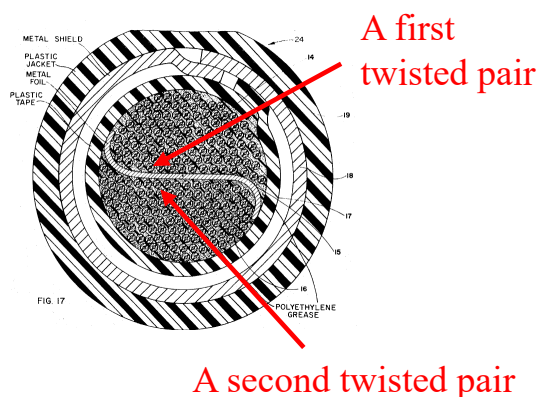


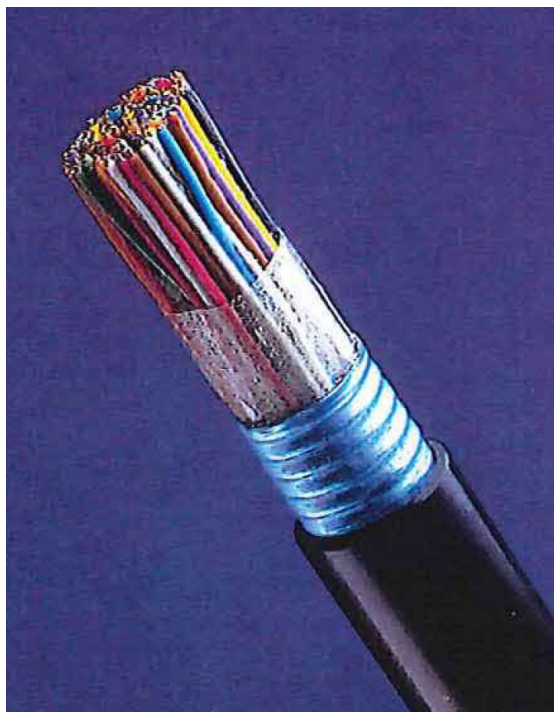
FIG. 17 (assembled cable)



EX-1009 at 12:6-8, 12:12-14, Figs. 23, 17.

245. A POSITA would understand that each strand being pulled through the dieplate holes 32 to hole 33 in dieplate 30a, as depicted and described in Figure 23, is a twisted pair. *Id.* at 12:5-12, Fig. 23; EX-1016 at p. 9 (“twisted pair wire supply” provides insulated twisted pairs that are then fed through a dieplate into the stranding machine).

246. In addition, the Roberts FIGS. 1-4 illustrations of the conductors 14/16 is consistent with cables and twisted pair conductors as shown in prior art literature, such as the catalog pages below (which lack the Roberts' internal separator shield 15):



Cable Construction

CONDUCTORS: Solid bare annealed copper. Sizes 19, 22, 24 and 26 AWG (.9, .64, .5 and .4mm).

INSULATION: Individual copper conductors are insulated with a dual extruded cellular inner layer and a color coded solid outer layer of high density polyethylene or polypropylene.

TWISTED PAIRS: Insulated conductors twisted to form pairs with varying lays to minimize crosstalk and meet capacitance unbalance limitations.

EX-1038 at p. 20 (102.01).²

² This Alcatel Cable Systems product catalog was publicly available and distributed by Alcatel during my employment with Alcatel Cable Systems, which was in the 1988-1992 time period.

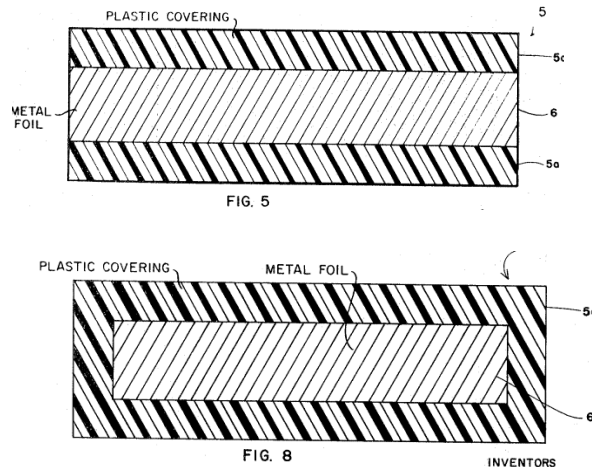
247. The use of twisted pairs in data communications cables was conventional and common practice both at the time of the Roberts patent (1968) and the '833 Patent priority date (2013). *See, e.g.*, EX-1040 at 1:23-2:52; EX-1019 at 1:10-15 (“A typical telephone cable is constructed of twisted pairs of metal conductors . . .”); EX-1016 at p. 7 (“Most of the cables within the scope of AT&T’s EC&W product line utilize the twisted pair construction.”); EX-1014 at 2:32-33 (“three pairs 10-14 [of insulated conductors] are each twisted with a different lay”); EX-1028 at pp. 23 (“Twisted Pair Data Cables”), 25 (“Cables with twisted pairs are used where balanced signal transmission is required, together with low crosstalk”), 33 (Fig. 55.1 (cross-section of telecommunication twisted pair cable)); EX-1017 at p. 11 (“The most commonly used transmission media in present-day digital loop applications is twisted pair metallic (copper) cable”); EX-1038 at p. 20. In fact, unless it was specified expressly that a pair was *untwisted*, a POSITA would have assumed that it was twisted. This is because, as I explained above, twisting pairs of conductors was common and known to help prevent electrical noise and minimize cross talk. *See* above paragraphs 32-33; EX-1016 at p. 7 (“The two main reasons for twisting pairs of conductors are to minimize or eliminate crosstalk and to decrease unbalanced mutual capacitance.”).

248. By the time of invention associated with the '833 Patent, "In a conventional cable, each twisted pair of conductors has a specified distance between twists along the longitudinal direction" of the cable. EX-1008 at ¶[0005].

249. A POSITA would therefore understand that Roberts is disclosing a cable with a multitude of twisted pairs of conductors.

250. The cross-sectional view of FIG. 17 of Roberts does not specifically identify which conductor is twistedly paired with another conductor of the pair. However, a POSITA would recognize that each conductor in a twisted pair of conductors would be adjacent to each other. I have circled above (in red and green; *see* paragraph 242) adjacent conductors to indicate twisted pair conductors.

251. As Roberts explains, the separator "shield" 15 in FIG. 17 (*filler member*) can be "a metal foil coated on both sides with a plastic, or a metal foil completely surrounded by a plastic." EX-1009 at 10:50-62, FIG. 17. This is illustrated below:



Id. at 7:32-41, 7:71-8:4, 10:50-62, 11:7-16, FIGS. 1, 8, 18, 21. In one embodiment, the metal layer is aluminum foil and the plastic material is Mylar, a non-conductive dielectric. *See, e.g., id.* at 3:50-66. Roberts explains that the dielectric coatings on the foil “keep unwanted currents ... from reaching the metallic shield (aluminum foil),” and thus the separator shield 15 “non-conductively” shields the twisted pairs from each other. *Id.* at 3:37-45.

252. For the reasons expressed above, a POSITA would understand that Roberts discloses the filler member is configured to non-conductively shield the respective portions of the respective twisted pairs of conductors as recited.

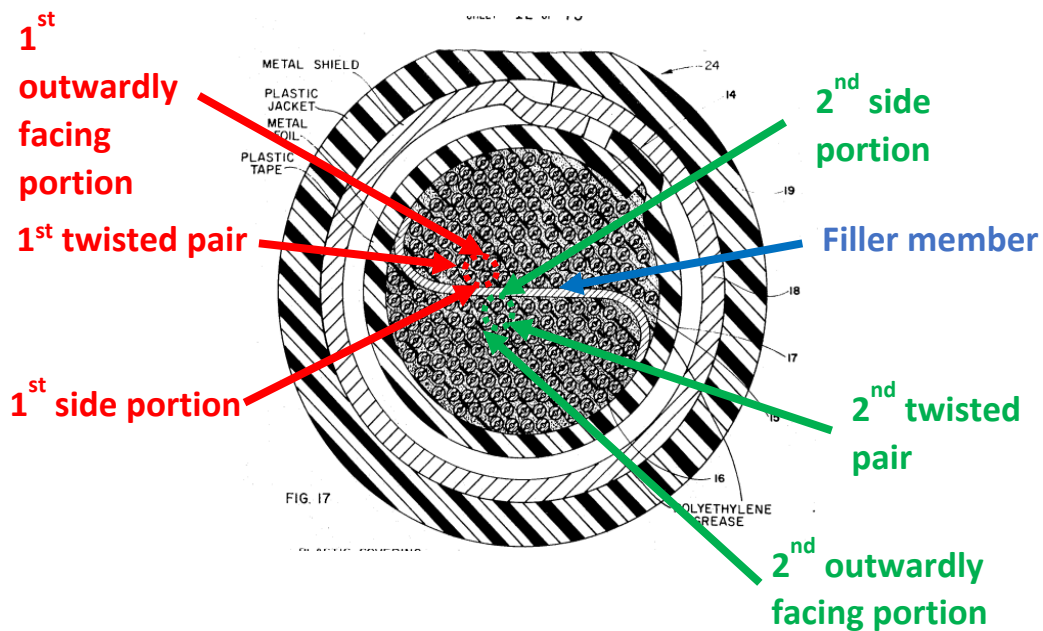
253. Thus, Roberts discloses these elements.

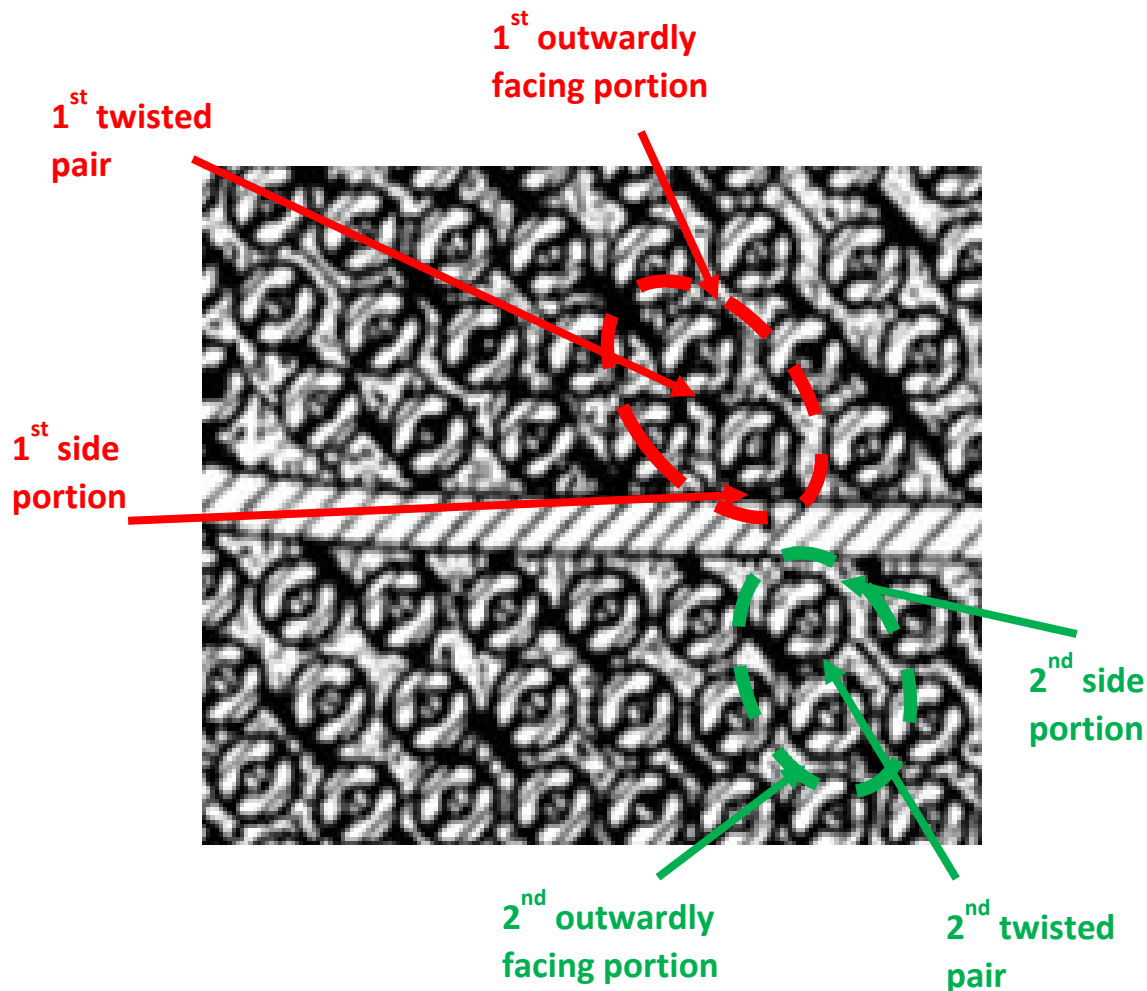
[1D] a barrier tape configured to encircle the filler member and the first and second outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors;

254. Roberts discloses this element.

255. Roberts shows the recited barrier tape, as illustrated in the annotated

Figure below:





See, e.g., *id.* at 4:15-23, 10:42-51, 12:30-36, FIG. 17.

256. As Roberts explains, the metal shield 18 (*barrier tape*) – which is just inside the plastic jacket – “longitudinally circumscribes and has nested therein,” the conductors and the shield 15 (*filler member*). *Id.* at 10:42-62, FIG. 17.

Roberts also describes that during manufacture, the conductors-filler composite is “traversed through a taping machine where metal tape (18) is applied thereto as shown in FIG. 17.” Roberts at 12:30-33.

257. Roberts further describes the metal shield 18 as “metal tape” (or “metal armor tape”) that operates “as an electrical, as well as a mechanical, shield” and that “can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof.” *Id.* at 4:15-23, 12:30-36. Thus, as with the Roberts metal foil shield (15) that may be “coated on one side,” or “coated on both sides with a plastic”, Roberts discloses a metal shield 18 being a metal tape with the metal and plastic layers having the same layers as in, for example, Roberts FIGS. 5 and the ‘833 Patent FIG. 3A, which are provided (with coloring) below:

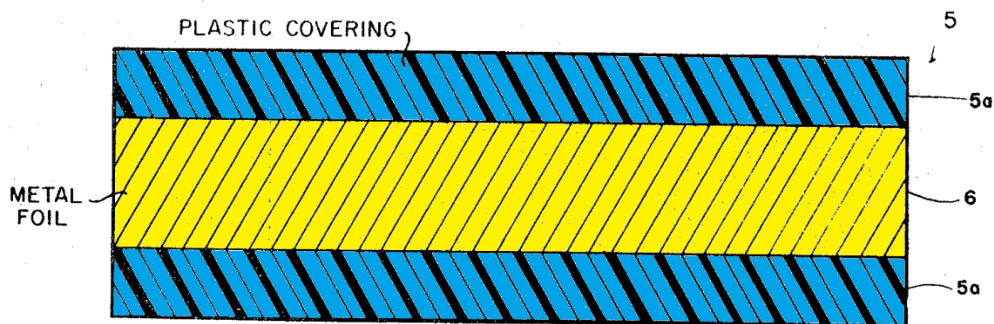


FIG. 5

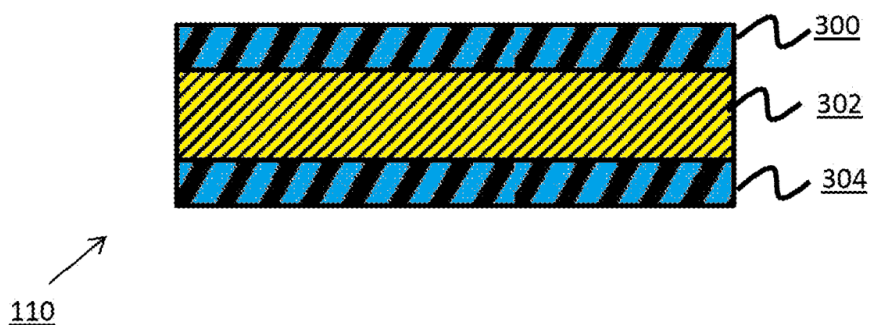


FIG. 3A

Id. at 4:48-60, 10:52-62, FIG. 5; X-1001 at 7:38-51, FIG. 3A.

258. Roberts also discloses that the cable is of “conventional telephone cable design” except that the conductors are divided into the separate portions by the filler (i.e., the plastic-coated foil). *Id.* at Abstract. A POSITA at the time of the invention in Roberts would understand that the conventional design includes the metal armor tape 18 having the continuous metal layer sandwiched between two layers of a dielectric material and extending to the lateral edges of the dielectric material, such as illustrated below with respect to “shield 14” and in plastic-clad metal tape products sold under the “Zetabon” trademark.

See EX-1013 at 2:52-66, Figure; EX-1014 at 3:23-27 (describing “shield 34” wrapped around the cable core and including a “strip of foil with a polyolefin coating on both sides”); *see also* Paragraphs 44-45 above (and references cited therein).

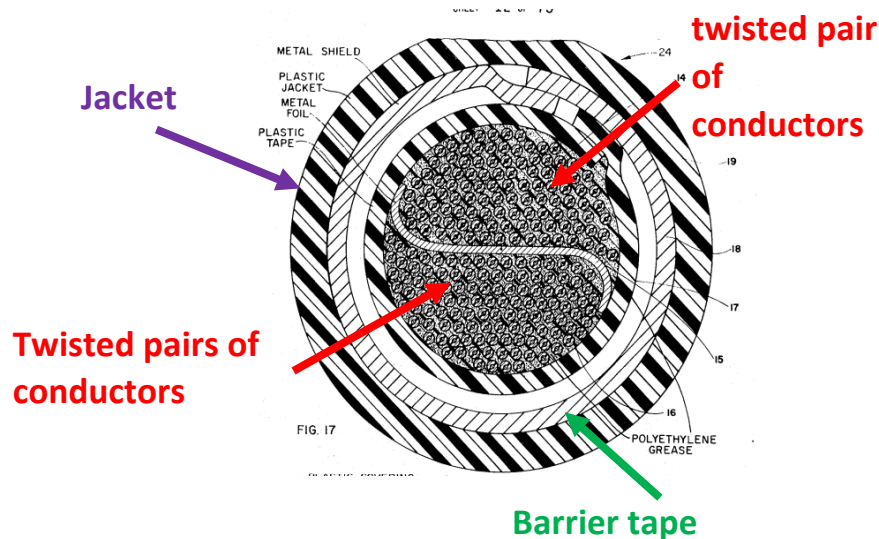
259. With this arrangement, a POSITA would understand that the metal shield 18 non-conductively shields the first and second outwardly facing portions of the first and second twisted pairs of conductors as recited.

260. Thus, Roberts discloses this element.

[1E] a jacket configured to encircle the barrier tape;

261. Roberts discloses this element.

262. Roberts discloses the cable has an outer cable sheath 19 (“jacket”) encircling the barrier tape (i.e., metal shield 18) as illustrated in the annotated Figure below:



EX-1009 at 7:25-35, 7:65-8:7, 10:42-51, 12:30-36, FIGS. 13, 14 & 17. As Roberts explains, “there is an outer cable sheath (19) longitudinally circumscribing” the barrier tape, filler, and conductors. *Id.* at 10:42-62, FIG. 17. Roberts also describes that during manufacture, the barrier-conductors-filler composite is “traversed

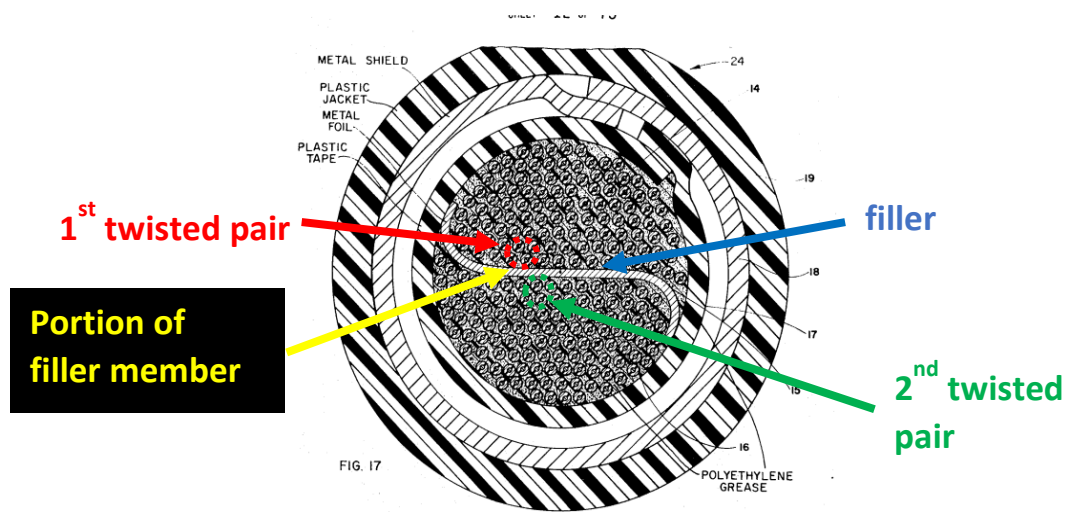
through an extruder head so as to extrude on the outer peripheral surface of the metal armor tape (18) the plastic sheath (19).” *Id.* at 12:33-36.

263. Therefore, this element is disclosed.

[1F] wherein the second twisted pair of conductors is located adjacent to a portion of the filler member, and wherein the first twisted pair of conductors is located adjacent to the portion of the filler member;

264. Roberts discloses this element.

265. As illustrated in the annotated figure below, the first and second twisted pairs of conductors are located adjacent to a portion of the filler member (a central portion of the filler member that separates the two pairs):



See id. at Abstract, 10:48-62, FIGS. 17 & 23, Claims 11, 13.

266. Thus, a POSITA would understand Roberts to disclose this element.

[1G] wherein the barrier tape includes a non-conductive layer and a conductive layer;

267. Roberts discloses this element.

268. As explained in connection with Roberts' disclosure of element [1D] (see above), Roberts discloses that its metal armor shield 18 (*barrier tape*) is metal and "can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof." *Id.* at 4:15-23, 10:43-46, 12:30-36. Roberts thus discloses the barrier tape with the metal and plastic layers having the layers as shown in, for example, Roberts FIGS. 5 and the '833 Patent FIG. 3A, which are provided (with coloring) below:

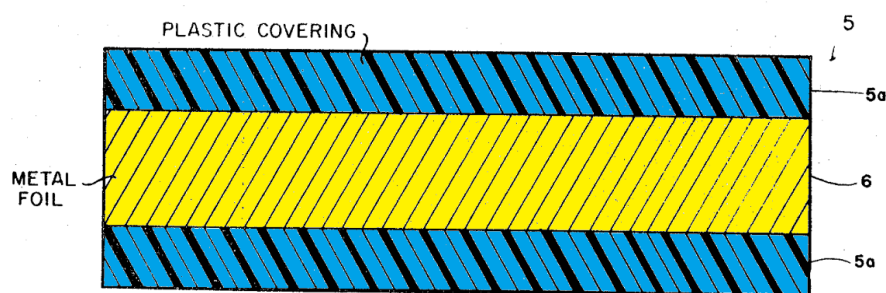


FIG. 5

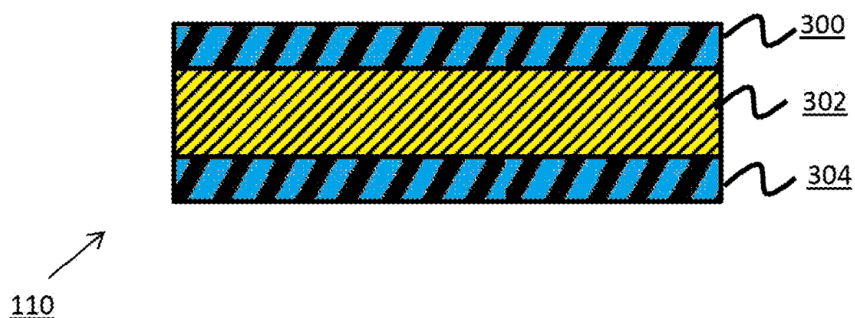
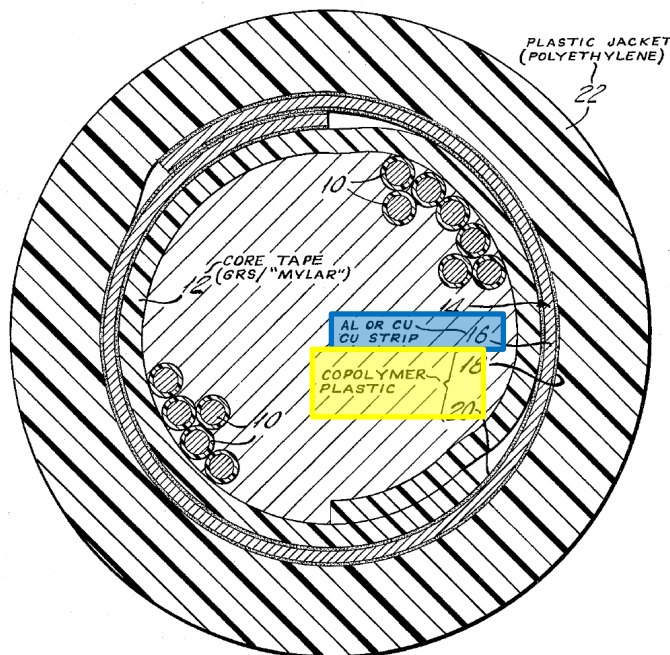


FIG. 3A

Id. at 4:48-60, 10:52-62, FIG. 5; EX-1001 at 7:38-51, FIG. 3A.

269. Roberts also discloses that the cable is of “conventional telephone cable design” except that the conductors are divided into separate portions by the filler (i.e., the plastic-coated foil). *Id.* at Abstract. A POSITA at the time of the invention in Roberts would understand that the conventional design includes the metal armor tape 18 having the continuous metal layer sandwiched between two layers of a dielectric material and extending to the lateral edges of the dielectric material, such as illustrated below with respect to “shield 14” and in plastic-clad metal tape products sold under the “Zetabon” trademark.



See EX-1013 at 2:52-66, Figure; EX-1014 at 3:23-27 (describing “shield 34” wrapped around the cable core and including a “strip of foil with a polyolefin coating on both sides”); see also Paragraphs 44-45 above (and references cited therein)

270. Roberts, therefore, discloses this element.

[1H] wherein the filler member is made of a non-conductive material;

271. Roberts discloses this element.

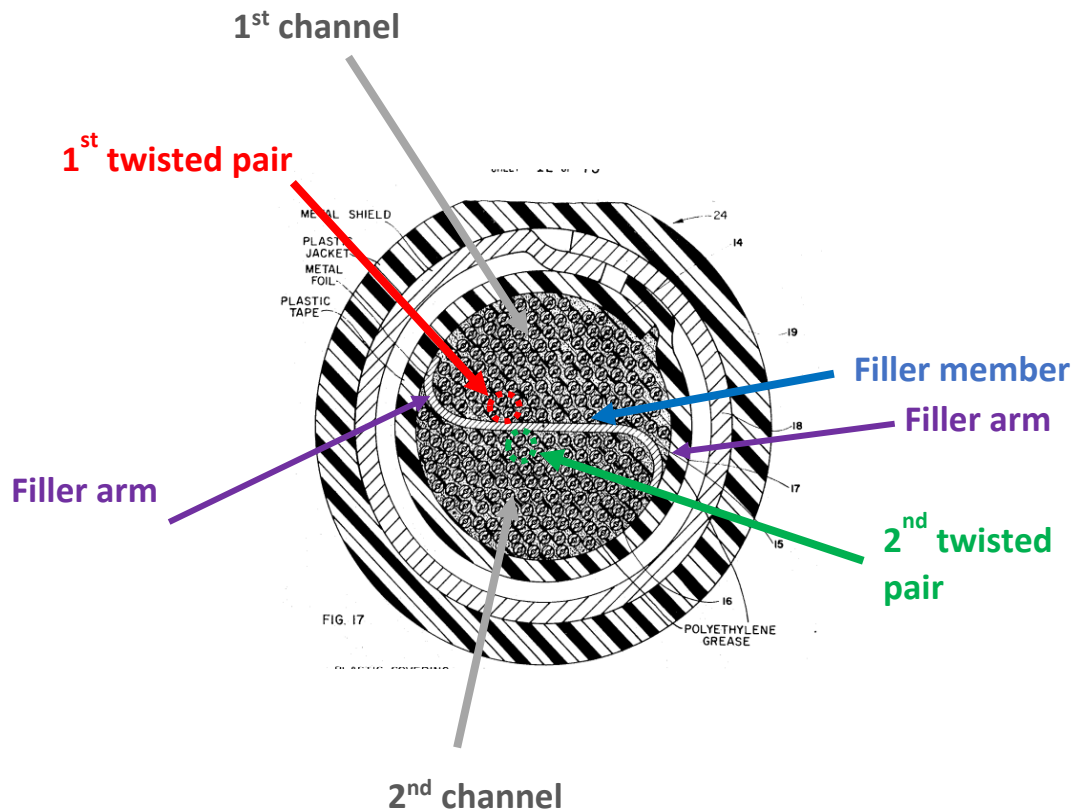
272. As explained in connection [1C], Roberts discloses that shield 15 (*filler member*) is coated on one side, both sides, or completely surrounded by a plastic material such as Mylar. *See, e.g.*, EX-1009 at 3:50-66, 12:48-62, 11:13-16, FIGS. 5, 7, 18, 19, 21.

273. Roberts thus discloses the shield 15 (*filler member*) is made of a non-conductive material, such as Mylar, and therefore discloses this element.

[1I] wherein the filler member includes a plurality of arms that are each configured to radially extend outwardly so as to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors;

274. Roberts discloses this element.

275. As illustrated, for example, in FIG. 17 (annotated below), Roberts's shield 15 (*filler member*) has arms that extend radially outward to form first and second channels as recited:



Id. at 10:50-62, FIG. 17, Claim 11.

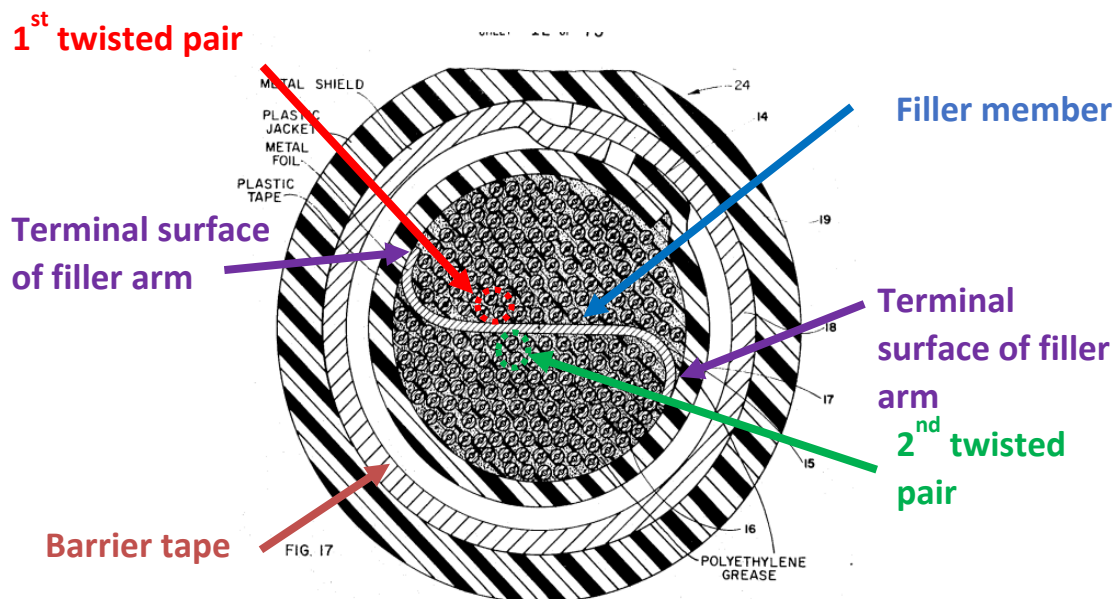
276. Therefore, this element is disclosed.

[1J] wherein the first terminal portion of the filler member includes a first outwardly facing terminal surface, the second terminal portion of the filler member includes a second outwardly facing terminal surface, and the barrier tape is configured to encircle the first and second outwardly facing terminal surfaces and the first and second twisted pairs of conductors;

277. Roberts discloses this element.

278. The ‘833 Patent associates the term “terminal portion” (or “terminal portions”) with the filler arms (and ends of the filler arms). *See, e.g.*, EX-1001 at 2:43-47, 2:66-3:3, 5:48-53, 6:19-23, 6:58-67. As illustrated in the annotated figure

below, Roberts discloses that each filler member arm has an outwardly facing terminal surface, and the metal armor shield 18 (*barrier tape*) encircles such surfaces and twisted pairs:



See, e.g., EX-1009 at 10:42-62, FIG. 17; see also my discussion concerning how Roberts discloses element [1D].

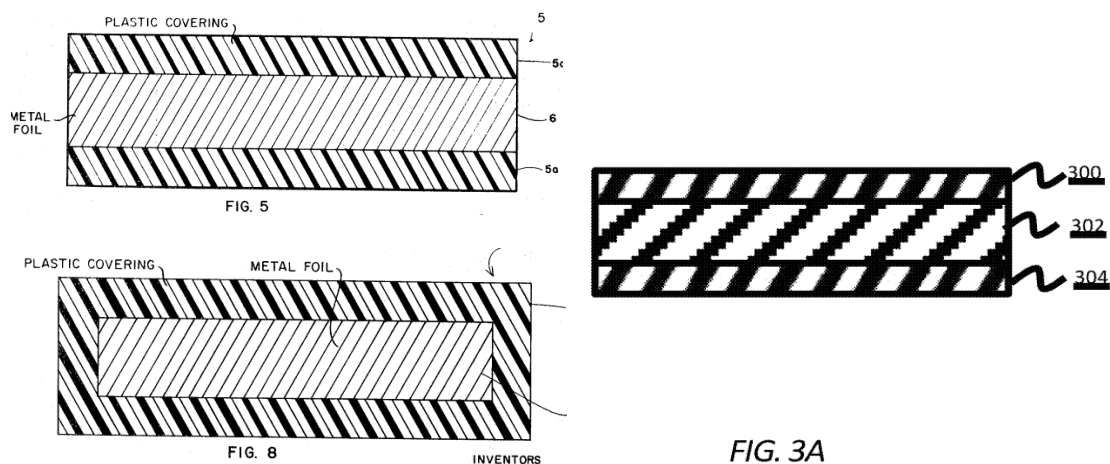
279. Roberts thus discloses this element.

[1K] wherein the filler member is configured to extend along a longitudinal portion of the cable and is configured to non-conductively shield the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable.

280. Roberts discloses this element.

281. As explained in connection with [1A-C] and [1H], Roberts's shield 15 (*filler member*) divides the twisted pairs from each other and is configured to “non-

conductively shield” because it includes “a metal foil coated on both sides with a plastic, or a metal foil completely surrounded by a plastic.” *Id.* at Abstract, 7:32-41, 7:71-8:4, 10:50-62, 11:7-16, FIGS. 1, 8, 18, 21. In that regard, the Roberts filler member has a construction like that shown in FIG. 3A of the ‘833 Patent, as illustrated:



Id. at FIGS. 5 & 8; ‘833 Patent at FIG. 3A.

282. Roberts discloses that inclusion of a shield “shows greatly improved” and “vastly improved” properties with respect to “conductive coupling (crosstalk)” between the conductors on opposite sides of the shield. *Id.* at Abstract, 11:7-16, *see also id.* at Title, 12:71-36, FIG. 24.

283. A POSITA would also understand that Roberts’ conductors and filler shield extend longitudinally along the cable, particularly given the disclosure that the jacket and armor shield longitudinally circumscribe the conductors and filler. *See, e.g., id.* at 4:15-20; 10:42-62, 12:30-36, FIGS. 1, 17 & 23.

284. Roberts thus discloses this element and every element of this claim to a POSITA.

285. For the reasons given above, a POSITA would understand Roberts to disclose a cable with the elements recited in Claim 1 and anticipate this claim.

b. Dependent Claim 3. The cable of claim 1, wherein the non-conductive layer of the barrier tape comprises a first non-conductive layer and the barrier tape includes a second non-conductive layer.

286. Roberts discloses this element. As I explained in connection with Roberts's disclosure of [1D] and [1G] (*see* above), Roberts discloses that its barrier tape (referred to as a "metal tape" or "metal armor tape") "can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof." *Id.* at 4:15-20; 10:43-46, 12:30-36. This discloses the barrier tape comprising a first non-conductive layer (plastic adhered to one surface) and a second non-conductive layer (plastic adhered to a second surface). Roberts also discloses that the cable is of "conventional telephone cable design" that includes structure (the filler member) for dividing the conductors into the separate portions. *Id.* at Abstract. One conventional prior art metal armor tape was a three-layer tape (with a conductive layer sandwiched between non-conductive layers). *See* EX-1013 at 2:52-66, Figure; EX-1014 at 3:23-27 (describing "shield 34" wrapped around the cable core and including a "strip of foil with a polyolefin coating on both sides");

EX-1015 at 2:62-3:20, FIG. 1; Paragraphs 44-45 above (and references cited therein); and my discussion of Robert's disclosure of element [1G].

287. Thus, a POSITA would thus understand Roberts to disclose this element, and this claim is anticipated.

c. Dependent Claim 4. The cable of claim 3, wherein the conductive layer of the barrier tape is positioned between the first and second non-conductive layers.

288. As discussed and shown above (regarding claim 3), Roberts discloses this element. Roberts discloses that the metal tape 18 (*barrier tape*) the conductive layer sandwiched between (or positioned between) the first and second non-conductive layers. The barrier tape (referred to as a "metal tape" or "metal armor tape") "can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof" (e.g., plastic layers on oppose surfaces of the metal). EX-1009 at 4:15-20; 10:43-46, 12:30-36. Roberts also discloses that the cable is of "conventional telephone cable design" that includes structure (the filler member) for dividing the conductors into the separate portions. *Id.* at Abstract. One conventional prior art metal armor tape was a three-layer tape (with a conductive layer sandwiched between non-conductive layers). See my analysis regarding Roberts's disclosures of element [1G] and Claim 3.

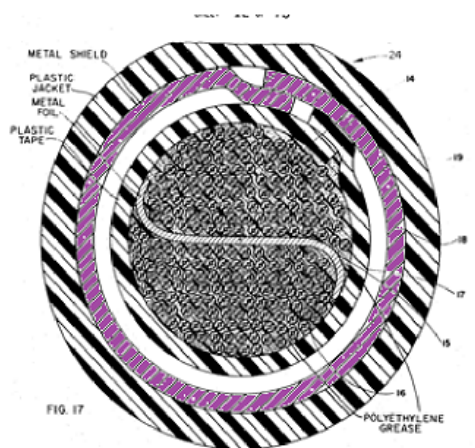
289. Roberts thus discloses this element, and this claim is anticipated.

- d. **Dependent Claim 5. The cable of claim 3, wherein the first non-conductive layer comprises an inner non-conductive layer and the second non-conductive layer comprises an outer non-conductive layer.**

290. Roberts discloses claim 3 (as discussed above) and discloses this element.

291. As explained above in connection with [1G] and claim 3, Roberts discloses a metal tape 18 (*barrier tape*) having the metal positioned between a first non-conductive layer and a second non-conductive layer. See my analysis above concerning Roberts's disclosure of element [1G] and claim 3.

292. Annotated Figure 17 below shows the metal tape shield 18 (*barrier tape*) colored in purple:



When the three-layer metal shield (*barrier tape*) encircles the conductors and filler member, one of the non-conductive layers will be positioned between the twisted pairs and the conductive layer (and therefore is an inner non-conductive layer) and

the other non-conductive layer will be external to the conductive layer (and be an outer non-conductive layer).

293. Roberts thus discloses this element, and anticipates this claim.

e. Dependent Claim 6. The cable of claim 1, wherein the filler member and the barrier tape are configured to extend along a longitudinal direction of the cable.

294. Roberts discloses this element.

295. As explained in connection with [1K], Roberts discloses the filler member configured to extend along a longitudinal direction of the cable. *See my analysis of Roberts's disclosure of element [1K], see also EX-1009 at 10:42-68 (describing cross-sectional view), 12:12-39 (describing manufacturing steps associated with making the cable), FIGS. 17 & 23.*

296. Roberts likewise discloses that the armor shield 18 (*barrier tape*) is configured to “longitudinally circumscribe[] and have nested therein” the electrical conductors and filler member. *See id.* at 10:42-62, 12:13-38. Therefore, a POSITA would understand that Roberts's barrier tape extends along a longitudinal direction of the cable also. *See also Roberts at FIG. 1,*

297. This element is disclosed, and this claim therefore is anticipated by Roberts.

- f. Dependent Claim 7. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member and the barrier tape are configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.**

298. Roberts discloses these elements.

299. As I explained above concerning Roberts' disclosure of elements [1A-C], Roberts discloses "insulated conductors (pairs), of an otherwise conventional telephone cable design . . ." and utilizing a manufacturing die with holes through which "twisted electrical conductors" pass. *See id.* at Abstract, 10:48-62, 12:5-8, FIGS. 17 & 23. A POSITA would understand Roberts to thus disclose that the cable includes twisted pairs of conductors. See my analysis concerning elements [1A-C].

300. A POSITA would also have understood that conventional cable design – at the time of Roberts and also by the time of the invention associated with the '833 Patent – included utilizing twisted pair conductors that were helically twisted, i.e., conductor pairs helically twisted along the longitudinal portion of the cable. *See* paragraphs 44-45 above. For example, by the time of invention associated with the '833 Patent invention, "In a conventional cable, each twisted pair of conductors has a specified distance between twists along the longitudinal direction" of the cable. EX-1008 at ¶[0005]. A POSITA would understand that

Roberts is disclosing helically twisting each pair of conductors along the length of the cable.

301. Further, Roberts discloses manufacturing a cable using a manufacturing die having holes through which “twisted electrical conductors (14) and (16) pass” (EX-1009 at 12:5-8, FIG. 22) and explains, with respect to the embodiment of FIG. 17, that the conductors and shield 15 (*filler*) in FIG. 17 are twisted into a “twisted composite” during manufacturing. EX-1008 at 12:12-30, FIG. 23. A POSITA also would understand this to disclose that the pairs of conductors are helically twisted pairs of conductors along the longitudinal axis of the cable.

302. As discussed above in connection with elements [1A-C] and [1K], the filler member (referred to in Roberts as “shield (15)” (e.g., *id.* at 10:50-62, 12:15)) extends longitudinally along the cable and is configured to non-conductively shield the first and second twisted pairs along the longitudinal portion of the cable. *See* my analysis above regarding Roberts disclosing elements [1A-C] and [1K]; *see also id.* at 10:42-62, 12:13-39, FIGS. 17 & 23.

303. Also as discussed above in connection with element [1D], Roberts further discloses that the barrier tape “longitudinally circumscribes and has nested therein,” the conductors and the shield 15 (*filler member*). *Id.* at 10:42-62, FIG.

17. The barrier tape also provided non-conductive shielding of the twisted pair conductors as I explained in connection with Roberts's disclosure of element [1D].

304. Since each of the filler and barrier tape (e.g., shielding material 310) extend along the longitudinal direction of the cable (see discussions above for Roberts's disclosures of element [1K] and claim 6), a POSITA would understand Roberts to disclose that these structures provide the recited shielding along the longitudinal portion.

305. A POSITA would understand Roberts to disclose this element, and this claim therefore is anticipated by Roberts.

g. Dependent Claim 8. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

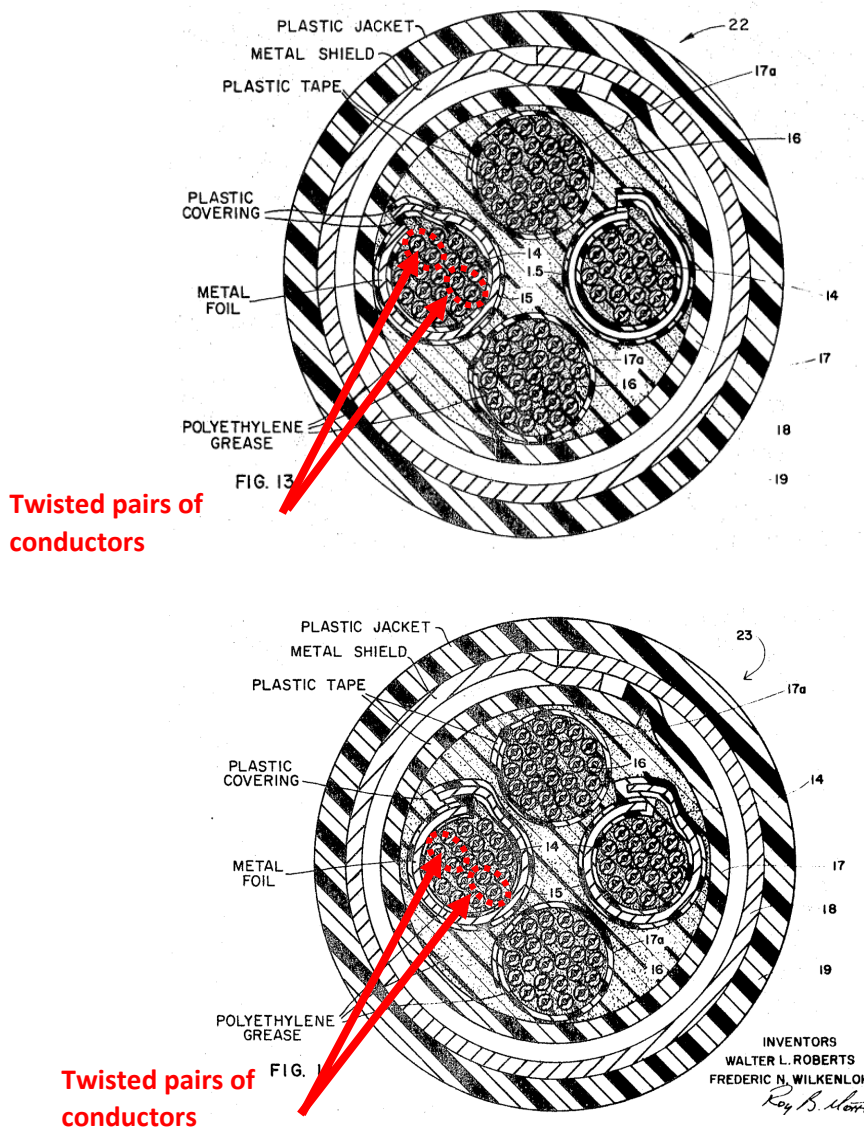
306. Roberts discloses these elements. See my discussion concerning Roberts's disclosure of the element in claim 7 above. As explained, Roberts discloses to a POSITA that the twisted pairs of conductors are helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable. See Section X(C)(a)(7) above.

307. Roberts thus discloses these elements, and this claim is anticipated.

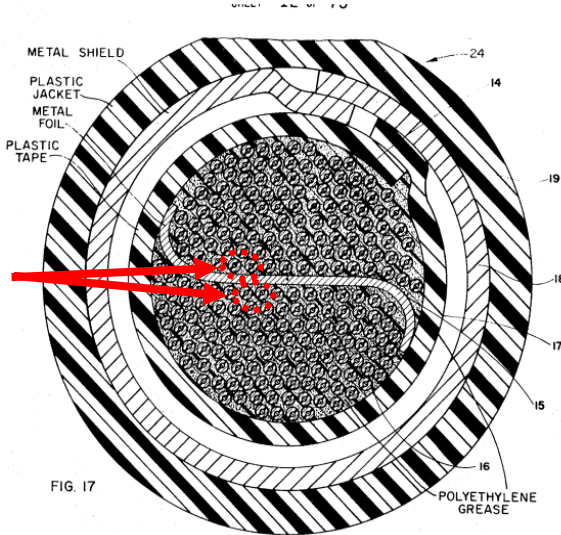
h. Independent claim 48

48. A cable comprising: [48A] a plurality of twisted pair conductors;

308. Roberts discloses a cable comprising a plurality of twisted pair conductors, as illustrated for example in each of the annotated Figures below:



twisted pairs of
conductors



See EX-1009 at Abstract, 4:1-15, 10:48-50, 7:26-51, 12:5-8, FIGS. 1, 13, 14 & 17.

As explained in more detail regarding elements [1A-C], the disclosed conductors are twisted pair conductors on each side of the shield 15. See my analysis of Roberts's disclosure of elements [1A-C] above.

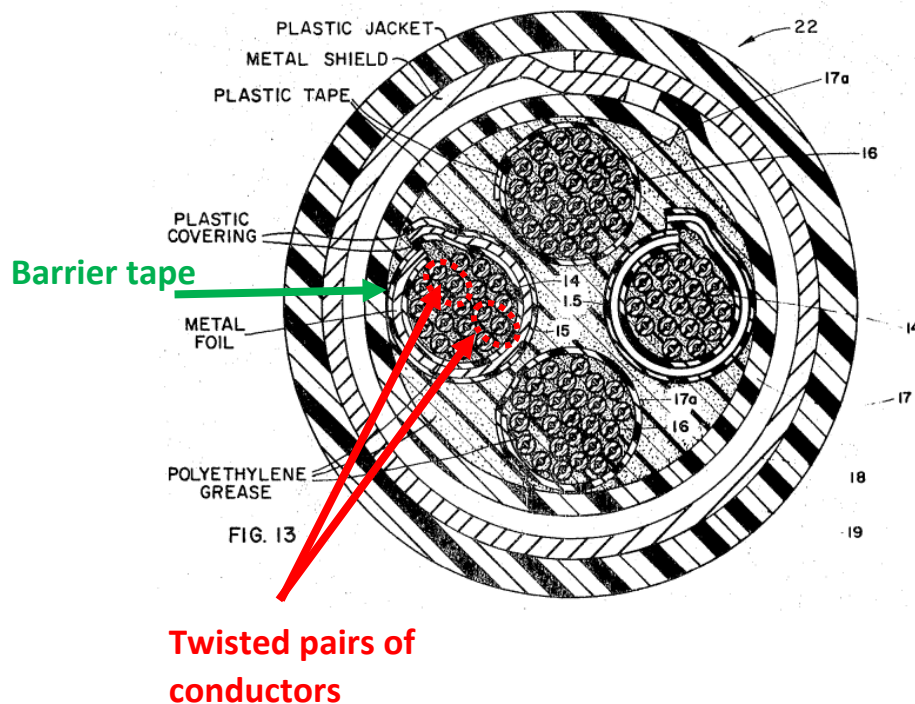
309. The cross-sectional views of FIGs 13, 14 and do not specifically identify which conductor is twistedly paired with another conductor of the pair. A POSITA would recognize that each conductor in a twisted pair of conductors would be adjacent to each other. I have circled (in red and green) adjacent conductors to indicate twisted pair conductors.

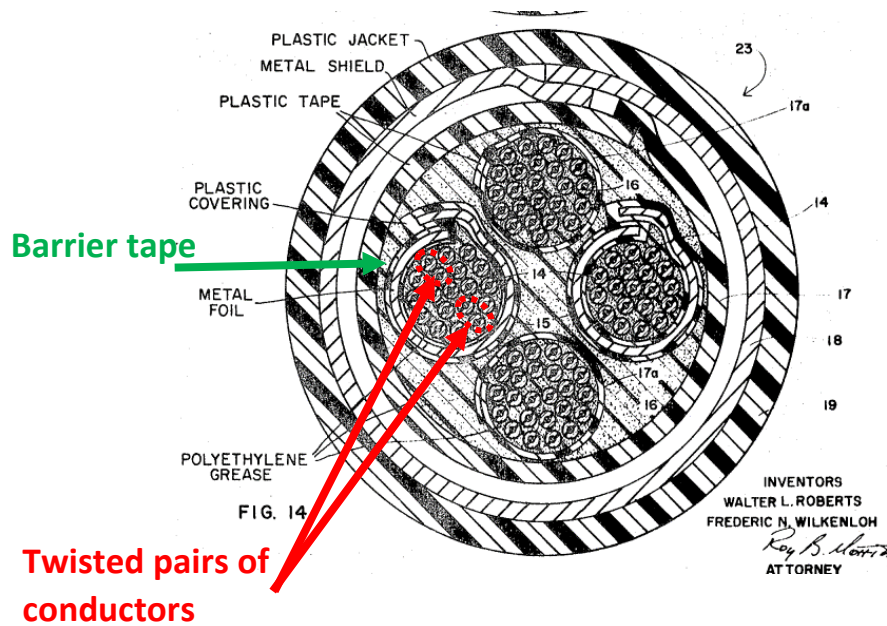
310. Roberts thus discloses this element.

[48B] a barrier tape that surrounds the plurality of twisted pair conductors, the barrier tape including an electrically conductive layer enclosed between inner and outer dielectric layers; and

311. Roberts discloses this element.

312. With reference to the different cables shown in FIGS. 13 (annotated below) and 14 (annotated below), Roberts discloses a shield 15 (*barrier tape*) with a metal layer coated on both sides with plastic layers (FIG. 13) or a metal layer fully coated on all sides in plastic (FIG. 14), and that surrounds the plurality of twisted pair conductors:





Id. at 2:55-63, 2:72-75, 7:26-51, 7:65-8:9.

313. Roberts specifically calls shield 15 a “tape” that has a metal electrically conductive layer between dielectric layers of plastic (or is surrounded on all sides by plastic) as illustrated below:

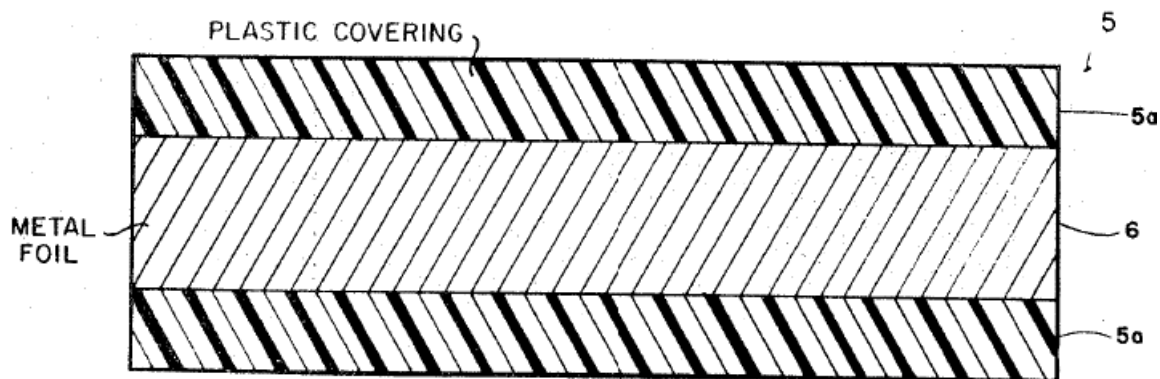


FIG. 5

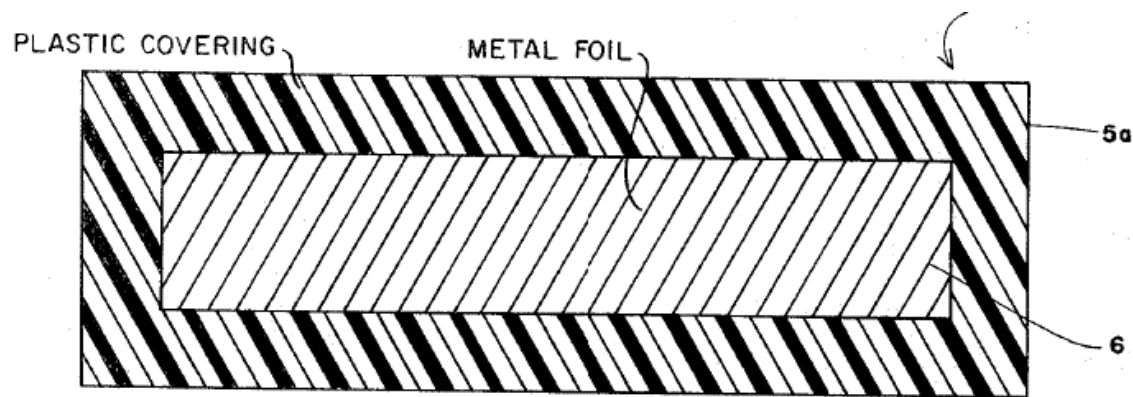


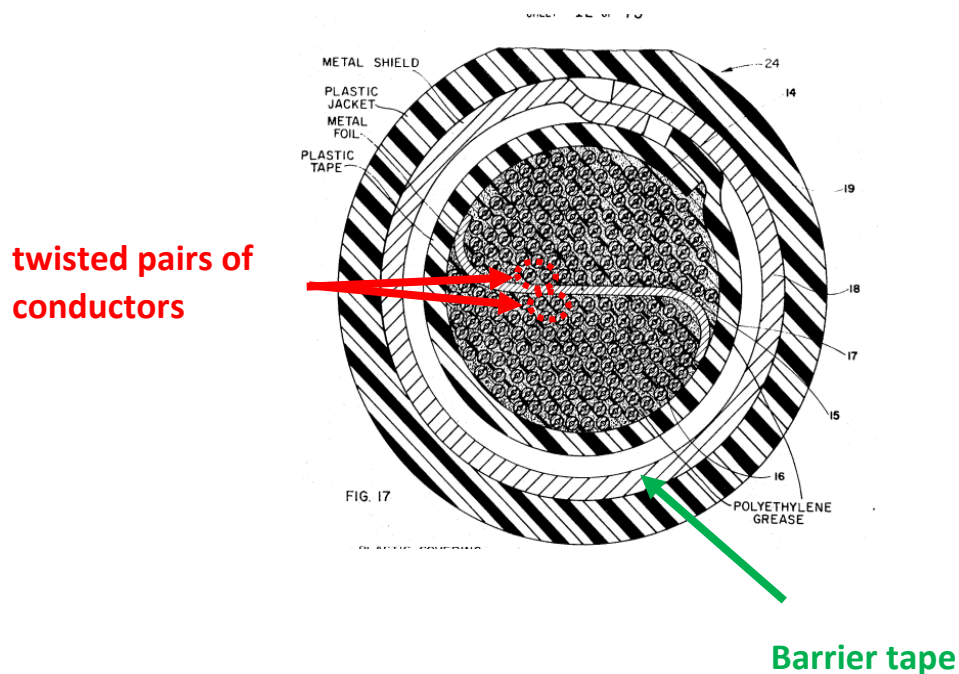
FIG. 8

INVENTORS

Id. at 7:32-41, 7:71-8:4, 11:57-58, 12:4. The disclosed three-layer tape in Roberts FIGS. 5 and 8 is virtually identical to the three-layer tape disclosed in the '833 Patent. *Compare id.* at 4:48-55, 7:32-41, 7:71-8:4, FIGS. 5 & 8, with EX-1001 at 7:38-60, FIG. 3A.

314. When the tape shield 15 encircles the twisted pairs of conductors (e.g., as illustrated in FIG. 14), the conductive layer is enclosed between an inner outer dielectric layer and an outer dielectric layer (vis-à-vis the enclosed twisted pair conductors). Thus, Roberts discloses this element.

315. Roberts also discloses the recited barrier tape in the cable of Figure 17, as discussed above with respect to, for example, element [1D]. In particular, such cable (as well as the FIG. 13-14 cables) has a metal armor shield 18 (*barrier tape*) that surrounds all of the twisted pair conductors within the cable and includes a conductive layer enclosed between inner and outer dielectric layers, as illustrated below:



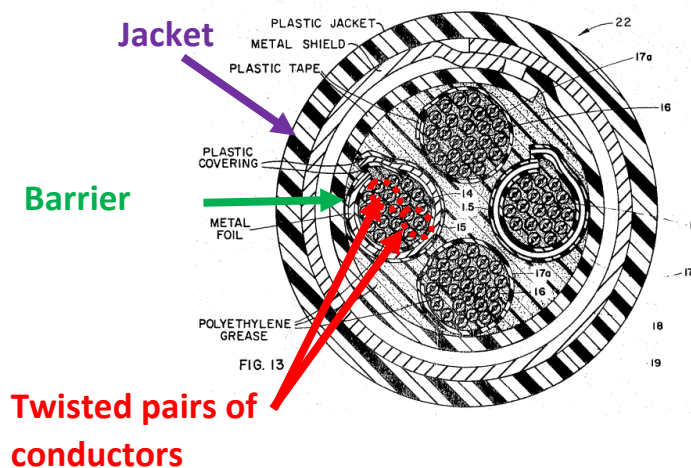
See EX-1009 at 4:15-23, 10:42-51, 12:30-36, FIG. 17; see also my analysis of Roberts disclosing elements [1D] and [1G] and claims 3-5. Roberts describes the shield as a “metal tape” that “can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof” (Roberts at 4:16-23), which discloses the recited barrier tape. See my analysis of Roberts disclosing element [1D] and [1G] and claims 3-5.

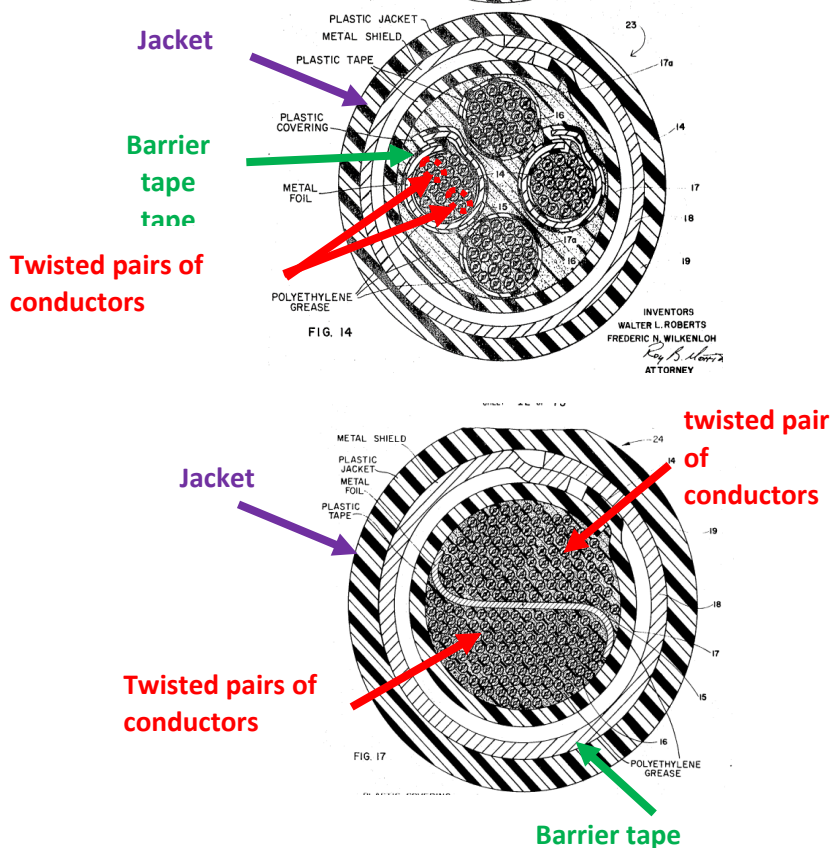
316. A POSITA would understand that Roberts discloses that each of the shield tapes 15 and 18 includes an electrically conductive layer enclosed between inner and outer dielectric layers.

317. Roberts thus discloses this element.

[48C] a jacket that surrounds the barrier tape.

318. Each of Roberts's disclosed cables includes a jacket (e.g., "PLASTIC JACKET" 19 in the figures below) that surrounds the barrier tape and twisted pair conductors:





See EX-1009 at 7:25-35, 7:65-8:7, 10:42-51, 12:30-36, FIGS. 13, 14 & 17; see also *id.* at 4:22-26 (“Disposed on the outer most surface of metal shield (18) is a molded plastic sheath (19). This outer most plastic sheath is the customary extruded polyethylene that can be and usually is filled with carbon black.”), FIG. 1.

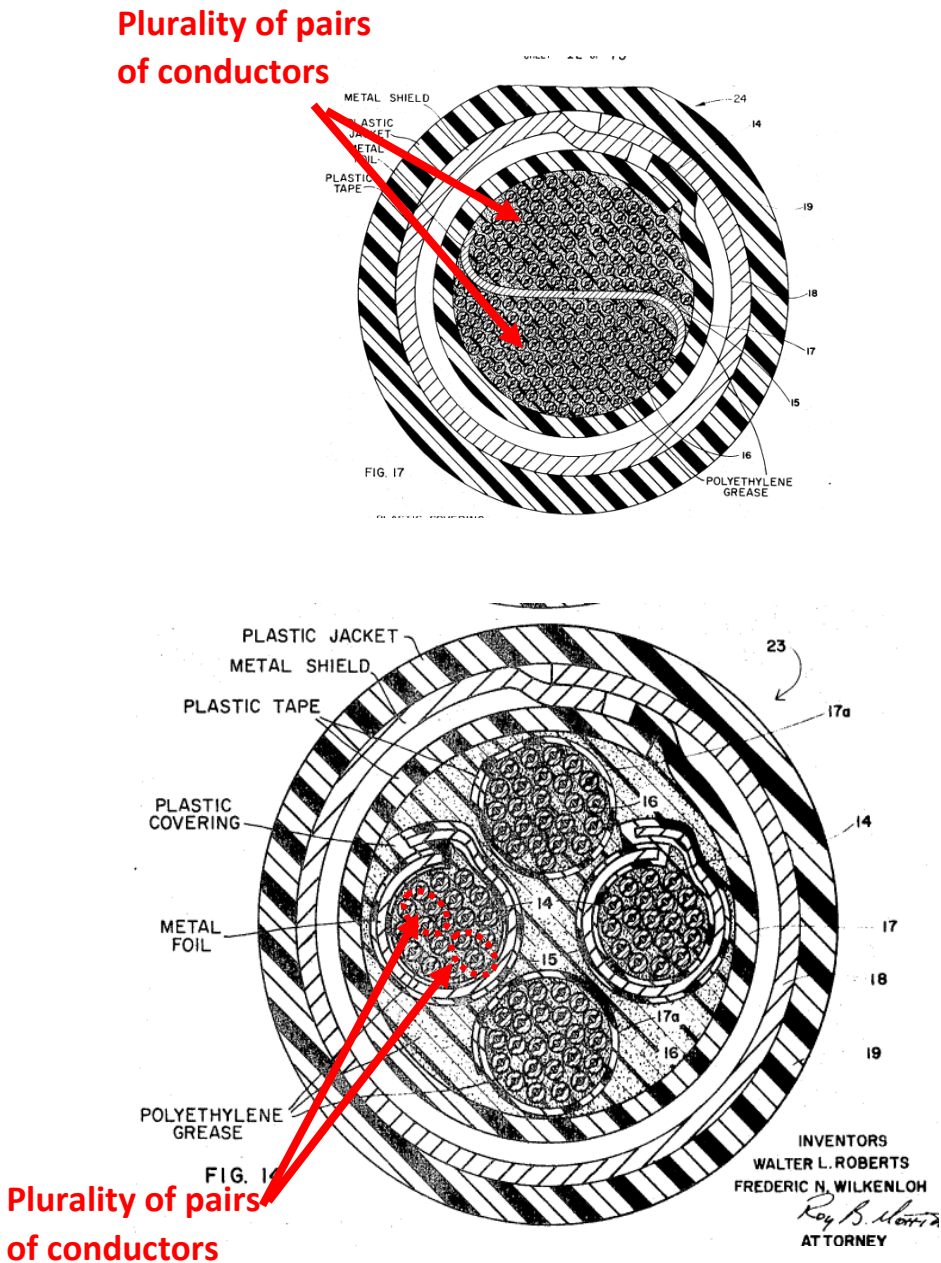
319. Thus, Roberts discloses this element.

320. Roberts discloses all elements of the recited cable, and anticipates claim 48.

i. Independent claim 49

49. A cable comprising: [49A] a plurality of pairs of conductors extending along a longitudinal axis;

321. Roberts discloses multiple cables, each having a “plurality of insulated electrical conductors (pairs)” (or “a plurality of insulated conductors (14) and (16)”) that extend along a longitudinal axis of the cable, as illustrated for example in the annotated Figures below:



See id. at Abstract, 10:48-50, 12:5-8, FIGS. 1, 13, 14 & 17. See also Roberts at FIG. 1 (showing conductors extending along longitudinal axis of the cable); *see also* my explanation that Roberts' disclosed pairs of conductors are twisted pairs of conductors in connection with, for example, elements [1A-C] and [48A] above.

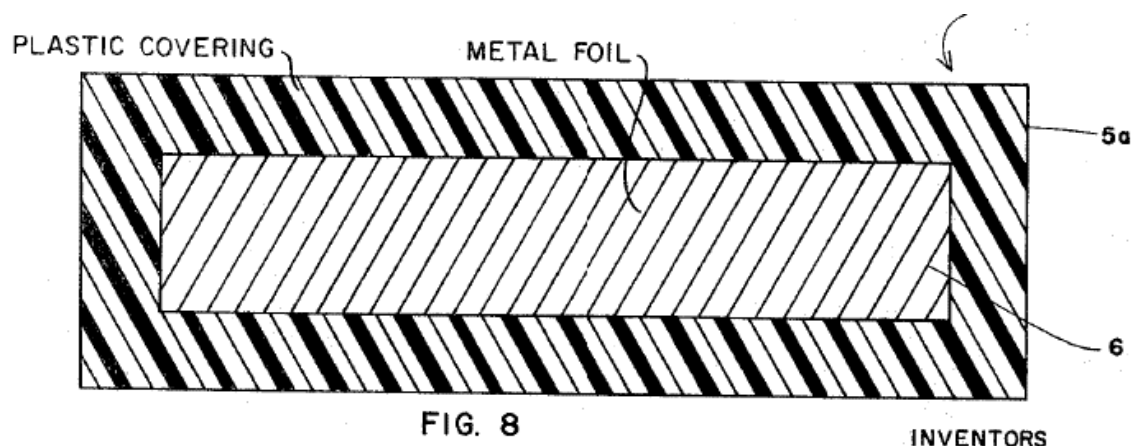
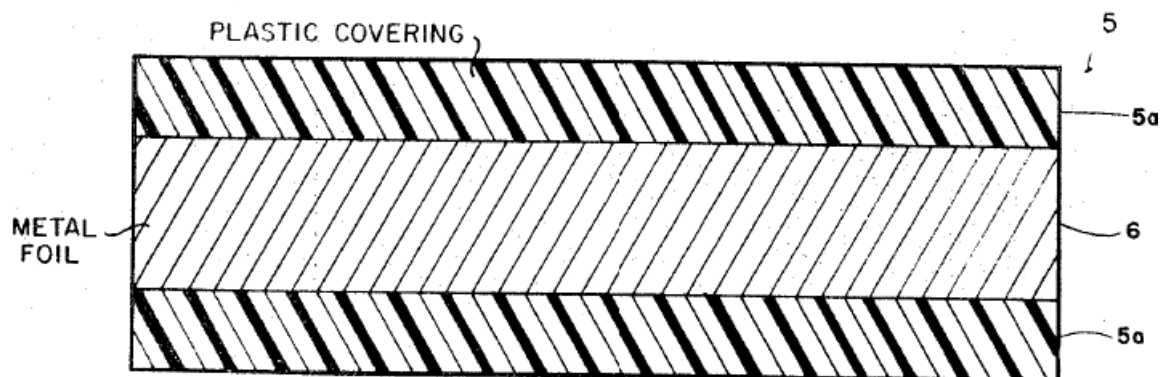
322. Roberts thus discloses this element.

[49B] a barrier tape surrounding the plurality of pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer; and

323. This element is very similar to element [48B]. As I explain in connection with Roberts's disclosure of [48B], Roberts discloses multiple cables, each with a barrier tape surrounding the pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer. See above analysis of Roberts's disclosure of element [48B].

324. For example, the cables shown in FIGS. 13 (annotated below) and 14 (annotated below) each include a shield 15 (*barrier tape*) with a metal layer coated on both sides with plastic layers (FIG. 13) or a metal layer fully coated on all sides in plastic (FIG. 14), and that surrounds the plurality of twisted pair conductors:

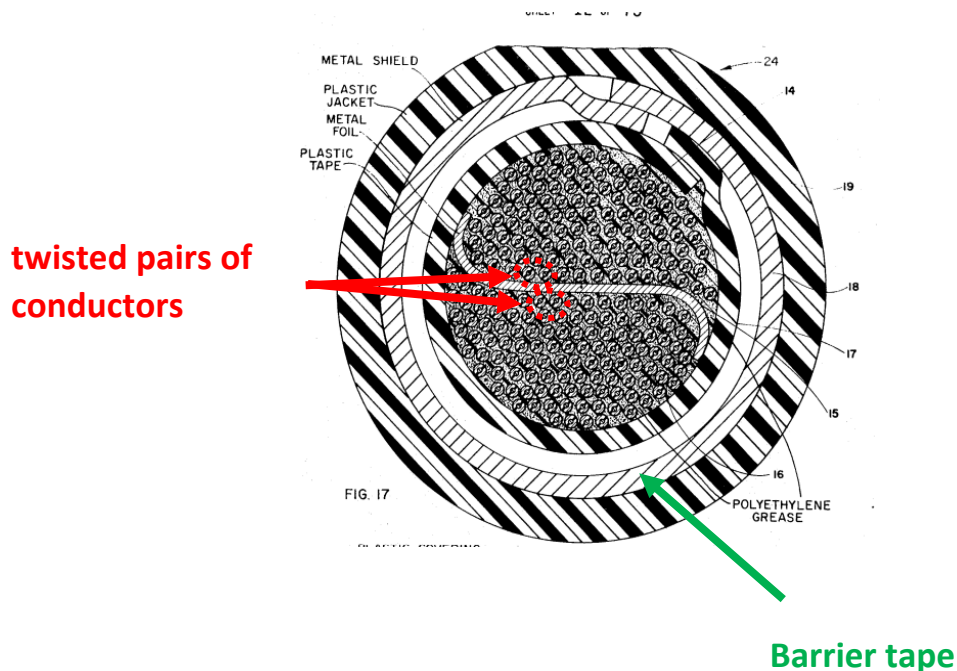
325. Roberts specifically calls shield 15 a “tape” that has a metal electrically conductive layer between dielectric layers of plastic (or is surrounded on all sides by plastic) as illustrated below:



Id. at 7:32-41, 7:71-8:4, 11:57-58, 12:4. The disclosed three-layer tape of Roberts FIGS. 5 and 8 is virtually identical to the three-layer tape disclosed in the ‘833 Patent. *Compare id.* at 4:48-55, 7:32-41, 7:71-8:4, FIGS. 5 & 8 with EX-1001 at 7:38-60, FIG. 3A.

326. Thus, Roberts discloses this element in its FIG. 13 and FIG. 14 cables.

327. Roberts also discloses the recited barrier tape in the cable of Figure 17, as discussed above with respect to, for example, elements [1D], [1G], and [48B]. In particular, such cable (as well as the FIG. 13-14 cables) has a metal armor shield 18 (*barrier tape*) that surrounds all of the twisted pair conductors within the cable and includes a conductive layer enclosed between inner and outer dielectric layers, as illustrated below:



See EX-1009 at 4:15-23, 10:42-51, 12:30-36, FIG. 17; see also my analysis of Roberts disclosing elements [1D] and [1G] and claims 3-4. Roberts describes the shield as a “metal tape” that “can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof” (Roberts at 4:16-23), which

discloses the recited barrier tape. See my analysis of Roberts disclosing elements [1D] , [1G] and [48B], and claims 3-4.

328. A POSITA would understand that Roberts discloses that each of the shield tapes 15 and 18 surrounds a plurality of pairs of conductors and includes an electrically conductive layer enclosed between inner and outer dielectric layers.

329. A POSITA would thus understand that Roberts discloses several cables, each of which include this element.

[49C] an outer jacket surrounding the barrier tape, the outer jacket comprising a non-conductive material.

330. As I already explained in connection with Roberts's disclosure of elements [1E] and [48C], Roberts discloses an outer jacket (e.g., "PLASTIC JACKET" in Figures 13-14 and 17) surrounding the barrier tape (and other cable components). See my analysis of Roberts disclosing elements [1E] and [48C]; see also EX-1009 at 10:42-51, FIGS. 1, 13, 14 & 17.

331. Roberts also discloses that the jacket may be a "plastic sheath" such as "the customary extruded polyethylene." *Id.* at 4:23-26, 12:33-36. Roberts thus discloses that the jacket comprises a non-conductive material.

332. Roberts thus discloses this element and the other elements of this claim 49. The claim is anticipated.

j. Independent claim 50

333. Claim 50 is a method claim that recites essentially the same structural limitations as set forth in claims 48 and 49 but with method steps. It recites a plurality of “twisted pairs of conductors” (see elements [48A]/[49[A]) that are “surround[ed]” by a three-layer barrier tape having “a conductive layer positioned between [first and second] non-conductive layers” (see elements [48B]/[49B]), with the barrier tape “extending within” (e.g., being surrounded by) a jacket (see elements [48C]/[49C]), and also element [1E]). Roberts’ disclosure of a cable having twisted pairs conductors surrounded by a three-layer barrier tape as recited, with a jacket enclosing the conductors and tape, applies equally to the recited method steps, and results in performing the recited method steps. In other words, Roberts’ disclosure of twisted pairs being surrounded by a three-layer non-conductive/conductive/non-conductive barrier tape discloses “surrounding” the twisted pairs with a barrier tape as recited in claim 50. Likewise, Roberts’ disclosure of surrounding the barrier tape and conductors with a jacket discloses “extending the barrier tape within an outer jacket” as recited in claim 50. Using Roberts’ cable and teaching as described for claims 48-49 above results in performing the method recited in claim 50 and renders claim 50 anticipated for the same reasons discussed above. *See* my discussion above in Sections X(C)(b) and X(C)(c) concerning Roberts’ disclosure of having a barrier tape surrounding

twisted pair conductors (and further being surrounded by (or extending within) an outer jacket.

334. I provide a bit more detail below.

50. A method for reducing alien crosstalk between cables, the method comprising [50A] surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer and;

335. Roberts discloses a method of reducing alien crosstalk between cables by, for example, including a metal armor tape 18 that works as both a mechanical and electrical shield. *See, e.g., id.* at 4:15-23

336. The recited method step - surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer – is essentially the same as cable apparatus elements [48B] and [49B] but written in a method step form. As I explained in connection with elements [48B] and [49B], Roberts discloses surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between first and second non-conductive layers. *See* my discussion above regarding Roberts’s disclosure of [48B] and [49B]; *see also, e.g.,* EX-1009 at 2:55-63, 2:72-75, 4:15-23, 4:48-60, 7:26-51, 7:65-8:9, 10:42-51, 11:57-58, 12:4, 12:30-36, FIGS. 5, 8, 13-14, 17.

337. Roberts' disclosure of a cable having twisted pairs of conductors surrounded by a three-layer barrier tape as recited applies equally to the recited method step, and results in performing this step.

338. Roberts thus discloses this element.

[50B] extending the barrier tape within an outer jacket.

339. As explained in connection with similar elements [48C] and [49C], Roberts discloses cables that each has an outer sheath (e.g., plastic jacket) that longitudinally surrounds the cable core components, including the conductors, the metal foil tape (15) and the metal tape (18). *See* my analysis of Roberts disclosing elements [48C] and [49C]; *see also*, EX-1009 at 4:1-26, 10:42-53, FIGS. 1, 13-14, 17. Also, Roberts discloses traversing the cable core components "through an extruder head so as to extrude on the outer peripheral surface of metal armor tape (18) the plastic sheath (19)." EX-1009 at 12:30-36.

340. Roberts' disclosure of a cable having the outer jacket surround and enclose the internal components of the cable, including each of the metal foil tape (15) and the metal tape (18), applies equally to the recited method step, and results in performing this step.

341. Roberts thus discloses this element.

342. A POSITA thus would understand that Roberts's barrier tape is extending within an outer jacket as recited, and that Roberts discloses the recited method and anticipates claim 50.

D. GROUND 4: Claims 1, 3-8, 48-50 are Obvious in view of Roberts and one or more of Jachimowicz-172 and/or the knowledge of a POSITA

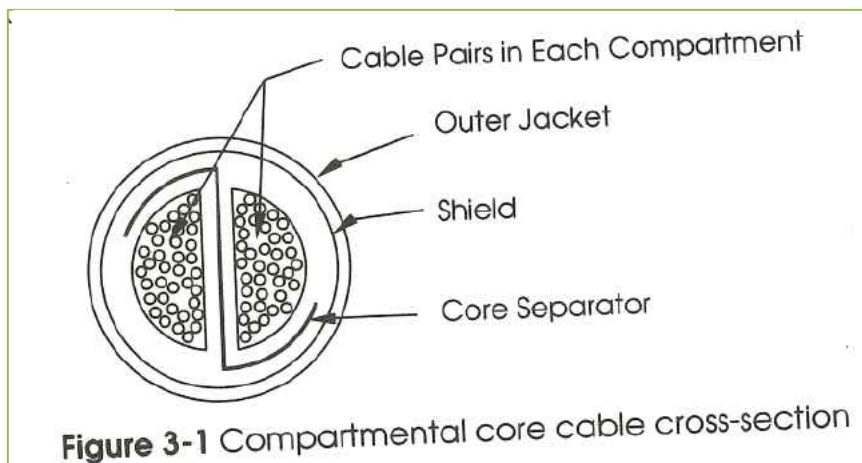
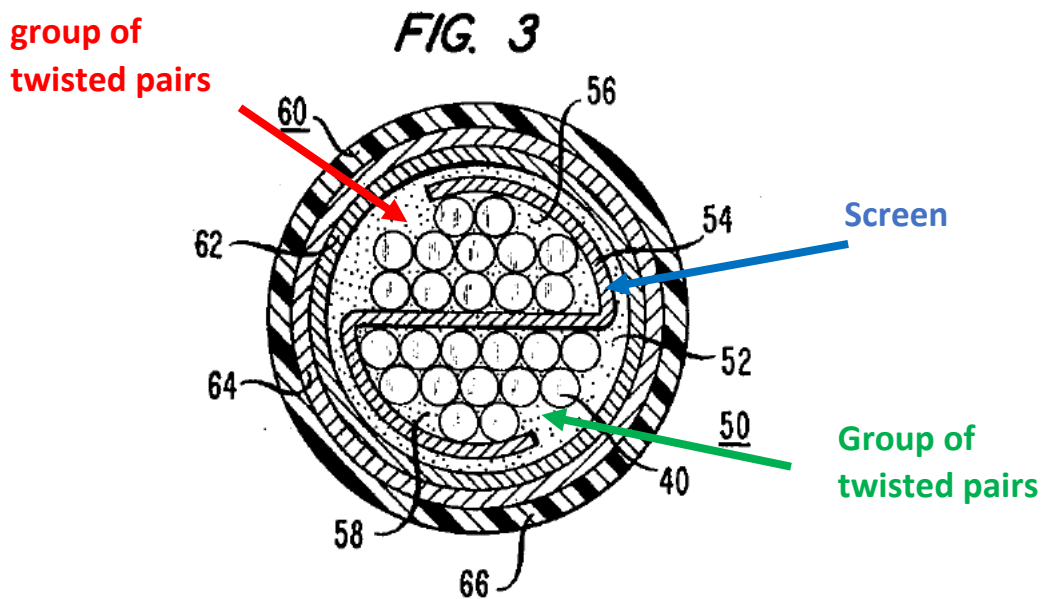
343. I explained above that Roberts teaches the use of twisted pairs of insulated conductors. See, e.g., Sections IX(A)(4) and (X)(C)(a)(elements [1A], [1B] and X(C)(b)(element [48A]) and X(C)(d)(element [50A])). However, I have been asked to assume that Roberts is deemed to not disclose "twisted pairs of insulated conductors." Even with that assumption, it is my opinion that it would have been obvious to a POSITA at the time of the invention to replace Roberts' conductors (14) and (16) with twisted pairs of insulated conductors.

344. First, Roberts specifically refers to its insulated conductors as being "pairs" and "twisted." EX-1009 at Abstract, 3:5-8, 12:5-8, FIG. 22. Roberts also refers to this aspect of the cable design (using pairs of insulated conductors) as "conventional." *Id.* at Abstract. As I explained above (*see* paragraphs 32-33) and Sections X(C)(a) regarding elements [1A] and [1B], X(C)(b) regarding element [48A], and X(C)(d) regarding element [50A], and IX(A)(4)), twisted pair insulated conductors were – and have been – conventional since long before the invention date associated with the '833 Patent. It would have been obvious for a POSITA to

use conventional twisted pair insulated conductors as conductors (14) and (16) in the Roberts cable.

345. Further, Jachimowicz-172 teaches a data communications cable that uses multiple twisted pairs of insulated conductors. EX-1014 at 2:32-34 (“three pairs 10-14 [of insulated conductors] are each twisted with a different lay”); Fig. 2 (showing each twisted pair with a different lay), Fig. 4. By 2013 and well before, twisting pairs of insulated conductors into multiple sets of “twisted pairs” was the most common and conventional way to provide insulated conductors in data communications cables. *See, e.g.*, EX-1040 at 1:23-2:52; EX-1016 at p. 7 (“Most of the cables within the scope of AT&T’s EC&W product line utilize the twisted pair construction.”), 50-51 (showing “pair twisting” as the first step in making cable core units); EX-1011 at 1:15-28 (teaching that “customary data transmission cables use several of the above twisted pairs, for example four”); EX-1008 at ¶[0004] (explaining that “cables normally have four or more twisted pairs of conductors”); EX-1017 at pp. 15-24. It was known to use twisted pairs of conductors instead of straight conductors because twisting the pairs of conductors helped to minimize or eliminate crosstalk and to decrease unbalanced mutual capacitance. EX-1016 at p. 7; EX-1038 at p. 20. Additionally, twisting pairs provides a mechanical advantage. The individual conductors of the pairs stay grouped together and maintain their shape when the cable is laid out.

346. Further, by the time of the invention (indeed, by the 1960s), telecommunication cables such as disclosed by Roberts typically utilized twisted pairs of insulated conductors that were separated into at least two groups by a screen, such as illustrated below:



EX-1024 (Nutt) at 4:18-35; EX-1018 at p. 8 (FIG. 3-1); EX-1017 at FIG. 7-7.

347. Roberts also discloses that – with the exception of the plastic-coated metal shield (15) (*filler*) separating the pair groups – the cable design is otherwise “conventional.” EX-1009 at Abstract.

348. To the extent Roberts is found to not expressly teach that the plurality of insulated conductors in the cables it teaches are provided as twisted pairs, it would have been an obvious and routine modification to configure the insulated conductors in Roberts as twisted pairs.

349. A POSITA would have been motivated to do this to get the known, predictable mechanical and electrical performance benefits of twisted pairs, and to avoid the known drawbacks of using a plurality of non-twisted pair insulated conductors in a data communications cable. For example, twisted pairs have the mechanical advantage of keeping the two conductors grouped together during the cabling process. Twisted pairs also have the electrical advantage of minimizing or eliminating crosstalk and decreasing unbalanced mutual capacitance. EX-1016 at p. 7; EX-1038 at p. 20. A POSITA would have had a reasonable expectation of success in doing this because providing multiple conductors in data communications cables such as that disclosed by Roberts was the common, conventional way to construct such a cable. For example, patents were filed in the 1920s on telephone cables using twisted pairs. *See, e.g.*, EX-1020 at 2:55-57 (filed April 18, 1924; “[a] plurality of copper wires insulated with paper, cotton, silk, or

other suitable materials, usually twisted together in pairs”); EX-1021 at 1:43-47 (filed Sept. 11, 1929; “assembling and twisting a plurality of twisted pairs of individual insulated electrical conductors into a single compact group or so called cable unit”). It would have been simple to feed twisted pairs through Roberts’ die plates. For example, AT&T produced a user’s guide showing twisted pairs being fed into die plates in a similar manner as Roberts. *Compare*, EX-1016 at p. 9, *with* Roberts at Fig. 23. There is nothing about Roberts’ specific cable that would make using twisted pairs unusually difficult or require anything other than routine skill.

350. A POSITA also would have a reasonable expectation of success. The use of twisted-pair conductors was common, and worked.

351. For the reasons expressed above in Ground 3, the so-modified Roberts cable (to include first/second twisted pairs of conductors) includes all of the recited elements in claims 1-8 and 48-50, and would render these claims obvious to a POSITA also.

E. GROUND 5: Claims 1, 3-8, 48-50 are Obvious in view of Grounds 3 and/or 4 and one or more of Jachimowicz-036 and/or the knowledge of a POSITA

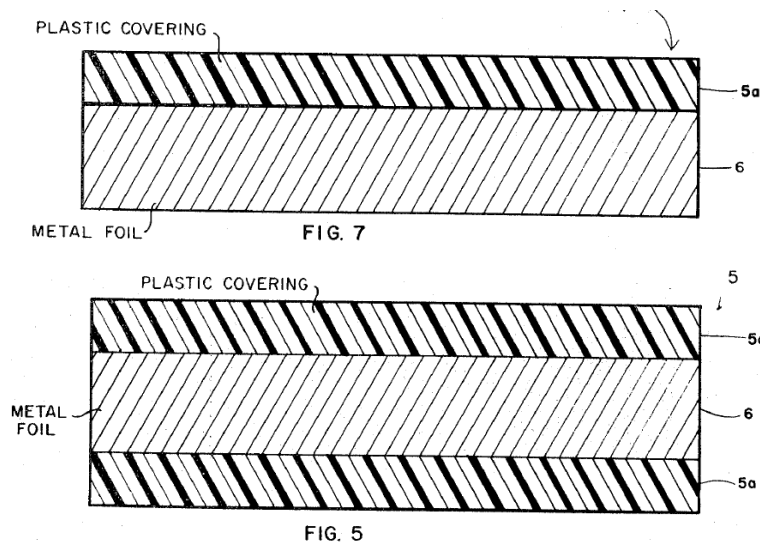
352. I explained above that Roberts’ disclosure of metal tape shield 18 including “plastic . . . firmly adhered to either one or more surfaces thereof” (EX-1009 at 4:20-23) teaches the tape shield 18 having metal and dielectric layers as recited in the various claims. *See* Sections X(E)(a)(element [1D]) and X(E)(b).

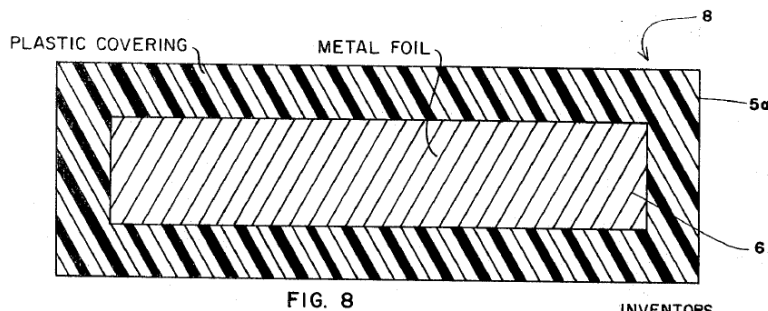
However, I have been asked to assume that Roberts' metal tape shield 18 does not disclose the recited multi-layer barrier tape (elements [1D], [1G]; [48B], [49B], [50A], claims 3-5). Even with that assumption, it is my opinion that it would have been obvious to a POSITA at the time of the invention to replace Roberts' metal tape shield 18 with one as recited in Jachimowicz-036.

353. First, I believe that I should not have to make that assumption.

Roberts' metal tape shield 18 is disclosed to "have a plastic such as polyethylene, firmly adhered to either one or more surfaces thereof." EX-1009 at 4:20-23.

Illustrations of a metal tape having plastic adhered to one surface, two surfaces, or all surfaces are shown in Roberts' FIGS. 5, 7 and 8:





Id. at FIGS. 5, 7, 8. Thus, Roberts discloses a multi-layer barrier tape having the metal conductive layer positioned/enclosed between dielectric/non-conductive layers.

354. But even with that assumption, Roberts discloses that the inventive cable design is largely “conventional” and includes a metal armor tape shield 18. *Id.* at Abstract, 4:15-23, 12:30-36, FIGS. 1, 17. This metal tape 18 circumscribes the conductors and interior separating shield 15 (as well as other cable components), is corrugated, operates “as an electrical, as well as a mechanical, shield” and “can have a plastic, such as a polyethylene, firmly adhered to either one or more surfaces thereof.” *Id.* at 4:15-23, 12:30-36, FIGS. 1, 17.

355. Roberts also discloses that its interior metal shield 15 (*filler*) is a metal tape where the metal may be coated with just one layer, or may be sandwiched between – and extending to the lateral edges of – two layers of a dielectric just as shown for the ‘833 Patent’s disclosed conductive barrier tape (see below):

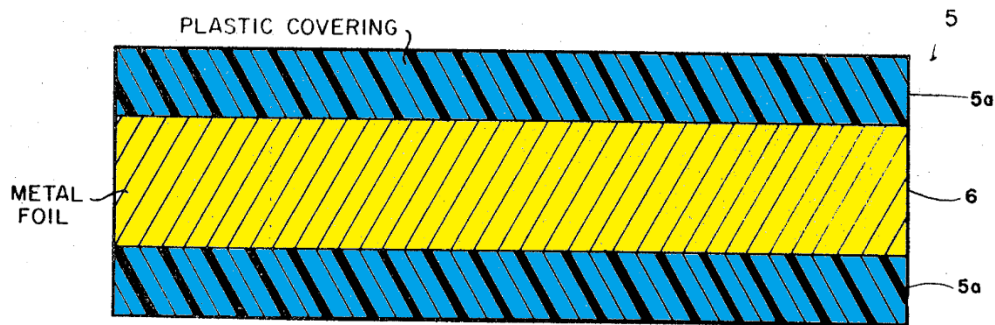


FIG. 5

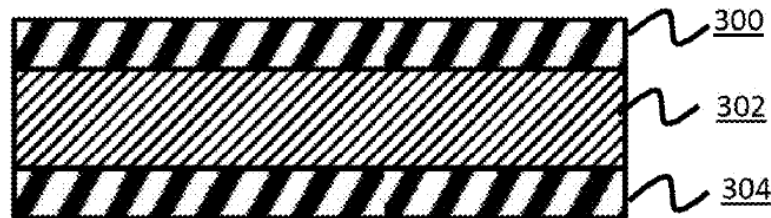


FIG. 3A

110

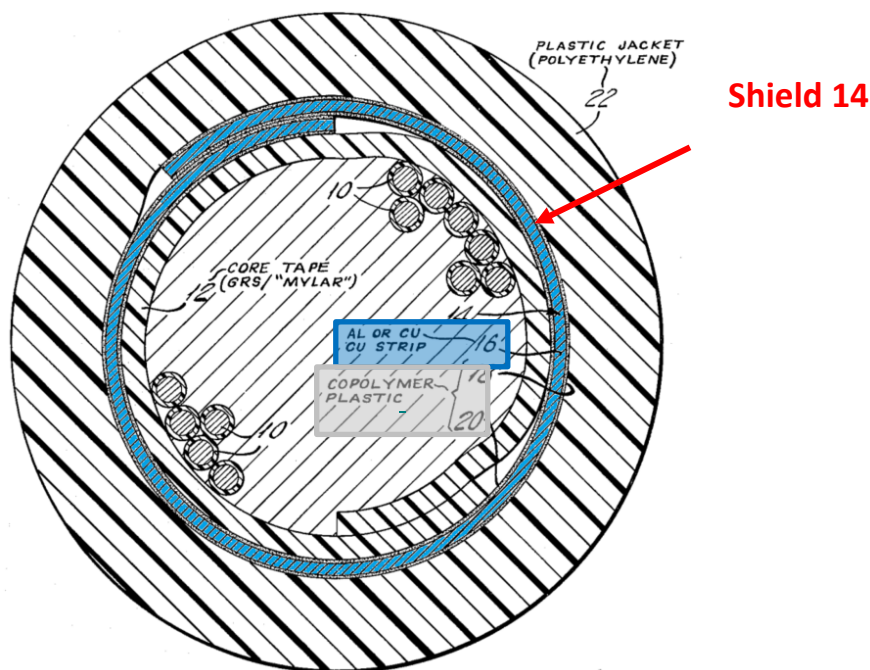
Id. at 4:48-60, 10:52-62, FIG. 5; EX-1001 at 7:38-51, FIG. 3A.

356. Roberts also discloses that this plastic-metal-plastic three-layer shield 15 can also be corrugated and act “as a shield from both a structural and electrical standpoint.” *Id.* at 4:48-57.

357. Roberts thus discloses that each of the metal tape shield 18 (barrier tape) and the interior metal shield 15 (filler) may be corrugated shields (mechanical and electrical) comprising metal conductive layer between two dielectric/non-conductive layers. A POSITA, thus, would be motivated by Roberts’ own disclosure to utilize a conductive barrier tape that had the cross section of,

e.g., Roberts' FIG. 5 as the metal tape shield 18, which meets the multi-layer barrier tape as recited in elements [1D], [1G]; [48B], [49B], [50A], and claims 3-5.

358. In addition, a POSITA would know that metal tape shields such as disclosed by Roberts typically had the continuous conductive material (metal tape) coated on each side with a dielectric material and extending to the lateral edges of each layer of dielectric material. One such shield is illustrated in Jachimowicz-376, having the metal conductive layer 16 (blue) extending between the lateral edges of the dielectric layers 18, 20 (grey):



EX-1013 at 1:42-52, 2:52-66, Figure 3. Another such shield (“aluminum shield 24” that “is coated on both sides with plastic”) is described in EX-1015 at 3:15-19, FIG. 1. Similarly, Jachimowicz-172 (discussed in Ground 4 above) discloses

surrounding the cable components with a “shield 34” that is a “strip of foil with a polyolefin coating on both sides.” EX-1014 at 3:23-27, FIG. 3.

359. Likewise, other well-known multi-layer shields, such as those sold under the Zetabon trademark, have a continuous metal layer sandwiched between and extending to the lateral edges of the dielectric layers. *See* paragraph 44-45 (and references cited therein) above. A POSITA would have first-hand knowledge of the plastic/metal/plastic Zetabon tape.

360. Three-layer conductive barrier tapes having the three-layer design recited in the claims were common and well-known. A POSITA would have been motivated to use tapes with such designs, particularly in view of Roberts’ disclosing use of a metal tape with plastic layers on one or more surfaces thereof. And a POSITA would have a reasonable expectation of success, given Roberts’ disclosure and given that such tapes, like Roberts’ shield 18, can be corrugated and provide an electrical, as well as mechanical, shield. *See* EX-1013, 2:52-72.

361. For the reasons expressed above in Ground 3, Roberts modified to have metal shield 18 be the recited multi-layer shield surrounding the conductors would also include all of the other recited elements of claims 1-8 and 48-50, and would render these claims invalid as obvious to a POSITA also.

362. Further, as I explained above in connection with Ground 4, if one assumed that Roberts did not disclose “twisted pairs of insulated conductors” then

it would have been obvious to a POSITA to modify Roberts to include twisted pairs of insulated conductors. *See* my discussion above in Ground 4. Making a modification to Roberts – if one assumed Roberts did not expressly disclose both the twisted pairs of insulated conductors and/or the multi-layer barrier tape recited in the claims – to include either or both the twisted pairs of insulated conductors (as recited in the claims) and the multi-layer barrier tape (as recited in the claims) would have been obvious to a POSITA for the reasons I already provided.

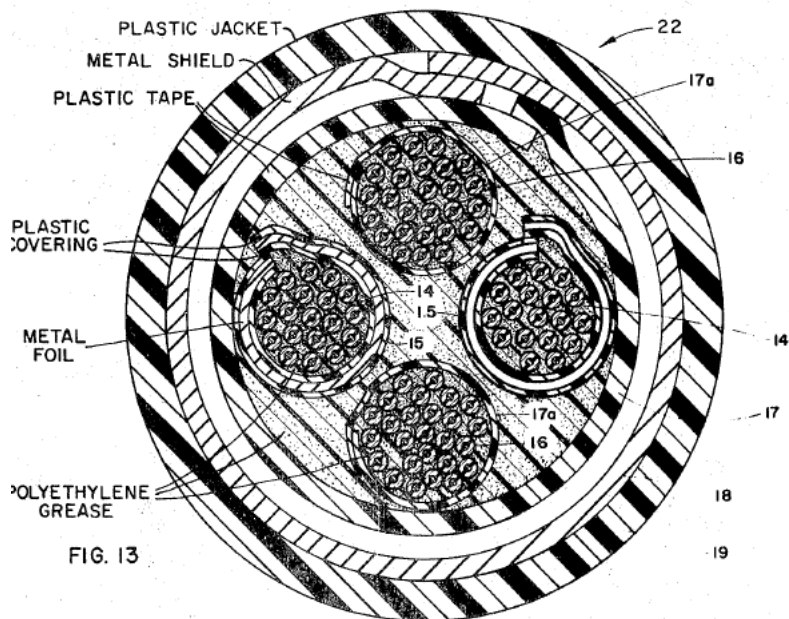
Utilizing twisted pairs and three-layer dielectric/conductive/dielectric barrier tapes were well known and common to POSITAs, POSITAs would have been motivated to utilize such well known cable components, and they provided advantages well-understood by POSITAS as already explained above. And Roberts modified to have metal shield 18 be the recited multi-layer shield surrounding the conductors and also to have twisted pairs of insulated conductors would include all of the other recited elements of claims 1-8 and 48-50, and would render these claims invalid as obvious to a POSITA also even if both modifications supposedly had to be made to Roberts.

F. GROUND 6: Claims 1-8 are Obvious in view of any of Grounds 3-5 and further in view of Simons and/or the knowledge of a POSITA.

2. The cable of claim 1, wherein the filler member comprises a single unitary component of the cable, and the plurality of arms of the filler member form a cross shape.

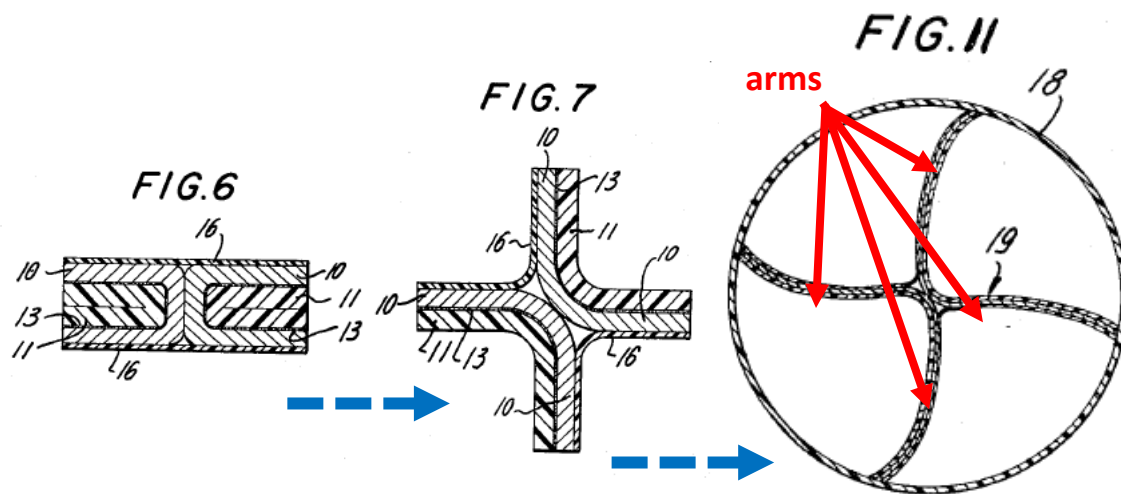
363. As I discuss in Ground 3, it is my opinion that Roberts discloses all of the elements of Claims 1 and 3-8. Roberts also discloses that the shield 15 (*filler member*) comprises a single unitary component of the cable as recited in dependent claim 2. *See* EX-1009 at 4:1-26, 10:42-63, 11:17-65, 11:70-12:38. FIGS. 1, 13-14, 17, 22-23. However, Roberts does not teach the further claim 2 limitation that “a plurality of arms of the filler member forms a cross shape.”

364. Although the Roberts shield 15 (*filler member*) shown in FIG. 17 separates the conductors into only two groups and does not include four arms, Roberts also discloses separating the conductors into four separate groups (instead of just two), using several plastic-coated metal shields 15 to circumscribe two of the groups and plastic tapes 17a to circumscribe the other two groups, as illustrated below:



Id. at 7:25-51, FIG. 13; *see also id.* at FIG. 14.

365. Simons (EX-1012) discloses “an improvement over the shielding means disclosed in [Roberts].” EX-1012 at 1:5-12. The Simons “improvement” includes a cross-shaped shielding tape 19 (filler) with four arms that form four compartments (or channels) to separate the four groups of conductors from each other:



Id. at 2:4-9, 2:18-20, 3:1-26, 3:42-46, FIGS. 1, 6, 7, 11. As Simons explains, the shielding tape of FIG. 6 “is fed into the cabler” and “opens as in FIG. 7 to a system having four fins forming four longitudinal parallel shielding compartments.” *Id.* at 3:15-26. Simons FIG. 11 illustrates a cable with “a four-compartment shielding tape 19, for example, as shown in FIGS. 6 and 7.” *Id.* at 3:42-46. Simons further discloses how to manufacture and insert the shielding tape into the cable. *Id.* at 3:1-26.

366. As illustrated in Figures 6, 7 and 11, the shielding tape also has plastic/dielectric film 11, 16 on each surface facing the compartment so that such film is between the conductive metal layer 10 and the compartment and the tape thus non-conductively shields conductors within a compartment from conductors in other compartments. *Id.* at 1:45-48 (referring to the shielding tape as being an

“encapsulated film/foil laminated longitudinal multiconductor cable electrostatic shielding tapes of this invention”).

367. The Simons filler has four arms and forms a cross shape. Below is a comparison of Simons FIG. 11 and a published patent application (identifying William T. Clark – one of the inventors of the ‘833 Patent – as an inventor) describing a “separator 72” as “cross or ‘+’ shaped.”

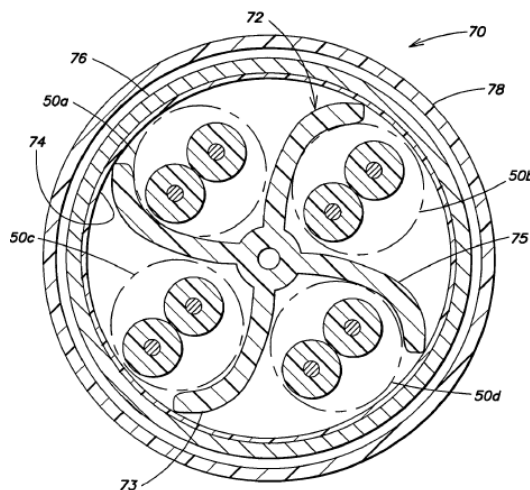
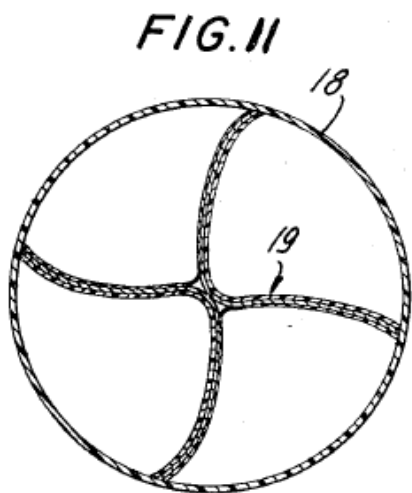


FIG. 2

Id. at FIG. 2; EX-1025 at ¶[0041], FIG. 2.

368. A POSITA at the time of the invention would be motivated to modify Roberts (or Roberts as modified per Grounds 4 and/or 5) to use Simons’s “improved” four-arm shield-tape as a filler – particularly when separating conductors into four groups (as disclosed in, e.g., FIG. 13 of Roberts). Simons discloses that such design is an “improvement” of Roberts and provides examples as to why it is an improvement. EX-1012 at 1:5-12, 3:33-44, 4:1-9. A POSITA

also would have had a reasonable expectation that such improvement would be successful. The shield would work to shield the conductor groups within the compartments.

369. In my opinion, it would have been obvious to a POSITA at the time of the invention of the '833 Patent to modify Roberts (and/or the Roberts as modified per Grounds 4 and/or 5) to further include the unitary filler member of Simons, which includes a plurality of arms that extend radially outward to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors (and, indeed, four total channels) as recited in claim element [1I], with the arms forming a cross shape (as recited in claim 2). With that modified filler member, Roberts would have all of the elements of claims 1-8.

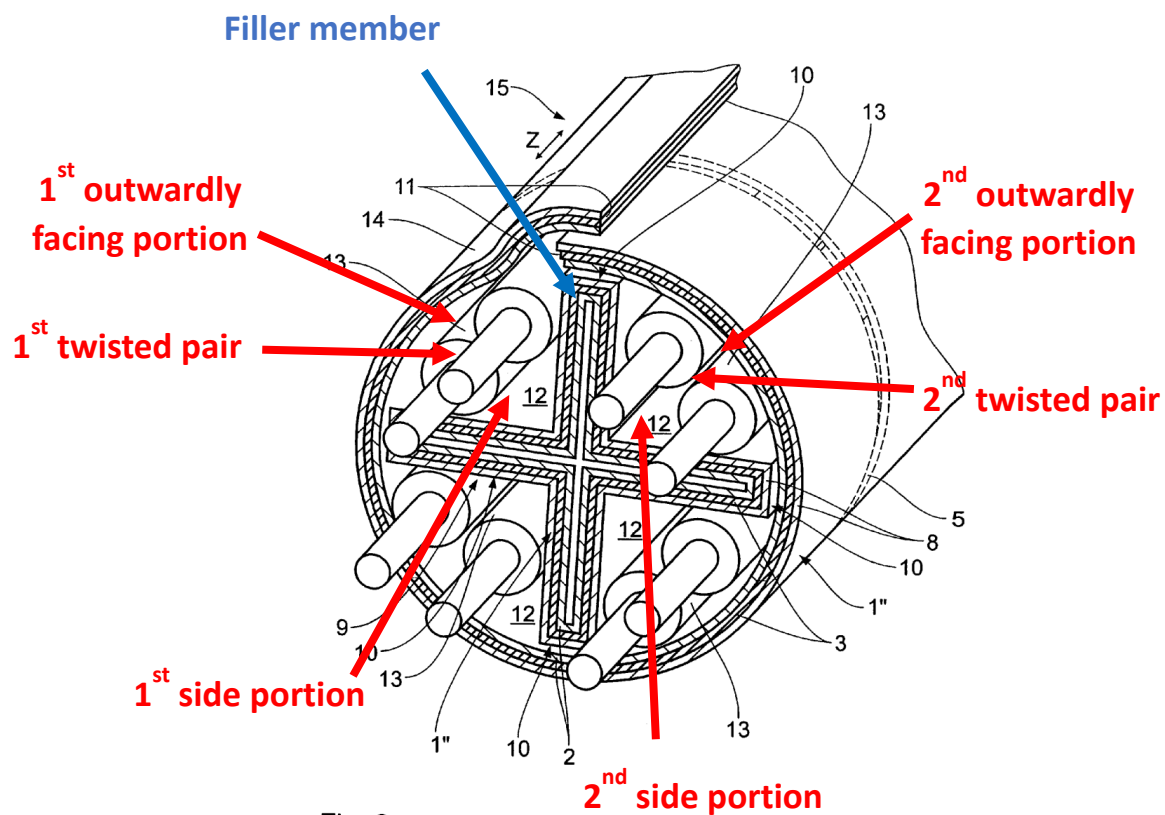
G. GROUND 7: Pfeiler Anticipates Claims 1-8, 48-50

a. Independent Claim 1

1. A cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors comprising: [1A] a first twisted pair of conductors having a first side portion and a first outwardly facing portion; [1B] a second twisted pair of conductors having a second side portion and a second outwardly facing portion; [1C] a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors;

370. Pfeiler discloses a cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors. *See* EX-1011 at 1:9-14, 2:42-58, FIGS 6-7. Pfeiler explains that the cable includes an external envelop with a screening sheet that “drastically reduces so-called cable crosstalk – also termed Alien-NEXT and Alien-EL-FEXT.” *Id.* at 2:42-53. The screening sheet has a conductive layer having pieces of foil separated by gaps with geometric values chosen “such that no peaks of impedance or return loss ... will occur in the range of transmission frequency of the data transmission cable.” *Id.* at 1:59-64, 2:4-13, FIGS 1-3.

371. Pfeiler discloses a cable with first and second twisted pairs of conductors, and a filler member, as recited. This is illustrated in the annotated Figures below:



373. The disclosed filler member (e.g., internal separating structure 9) is configured to non-conductively shield between the twisted pairs as recited. For example, Pfeiler explains that “[i]nternal cable crosstalk between the individual twisted pairs is strictly reduced by the screening sheet being integrated into the internal supporting and separating structure.” *Id.* at 2:54-58, FIG. 6. The shielding is non-conductive because the metallic screening layer 3 (of the screening sheet 1) is formed of discontinuous metalized sections separated by gaps (*id.* at 3:23-33, FIGS. 1 and 6) and the screening layer 3 (colored in **blue**, below) is positioned between two non-conductive layers, dielectric layers 2, 8 (colored in **red** and **brown**), as illustrated below, such that a dielectric layer is between the metallic screening layer and the conductors. *Id.* at 3:22-27, 3:38-49, 4:13-15, FIGS. 4 and 6. In addition, Pfeiler discloses that with this design, “there is no continuous conductive connection in the longitudinal direction of the screening sheet, which completely precludes any flow of potential compensation currents.” *Id.* at 1:63-66.

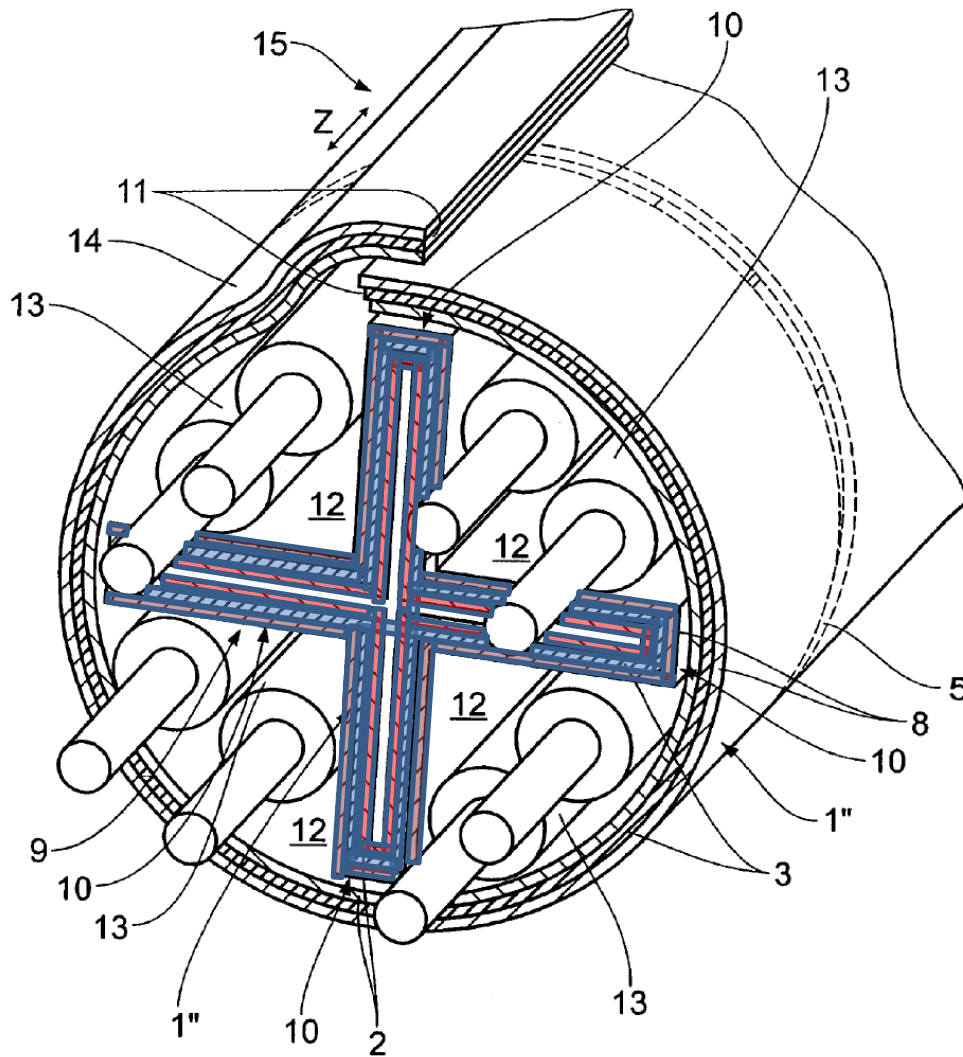


Fig. 6

Id. at 4:16-35, FIGS. 4-6.

374. The filler member of FIG. 7 – extruded “insulated plastic material” – also is configured to non-conductively shield between the twisted pairs as recited. That filler member “is a customary cruciform section 16 extruded from insulating plastic material.” *Id.* at 4:42-47, FIG. 7. In the context of the ‘833 Patent, which discloses a filler made of FRPE “or any other low loss dielectric material” (EX-

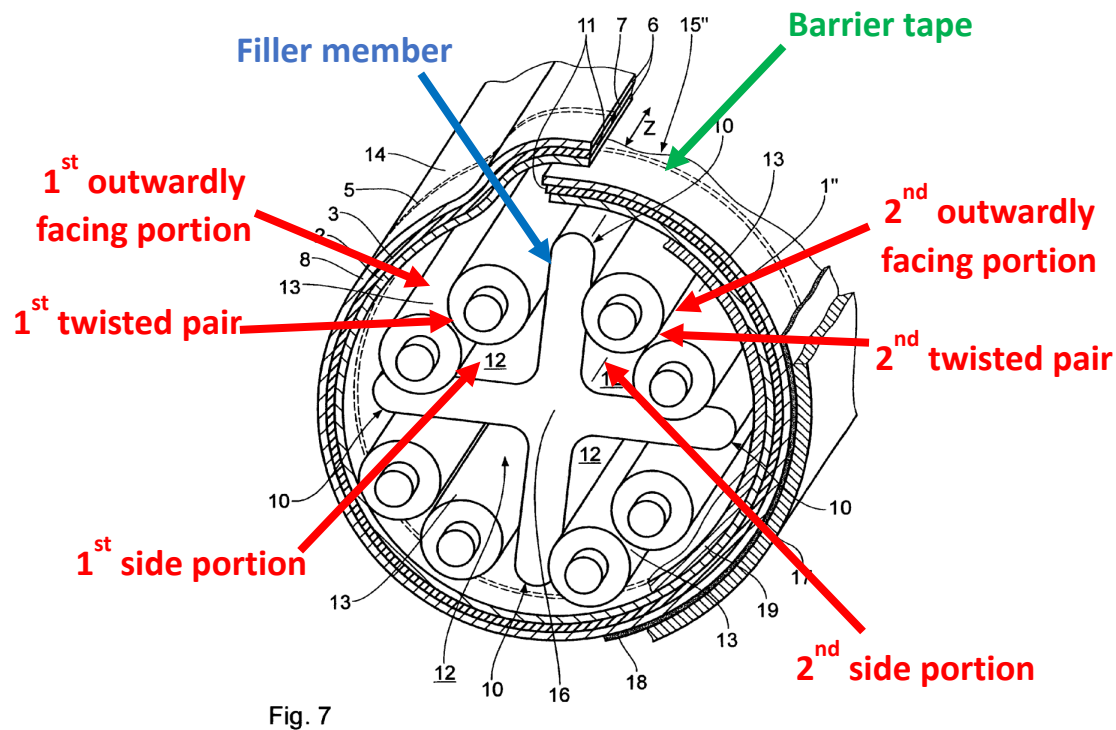
1001 at 6:55-58), Pfeiler's extruded insulating material also is low loss dielectric material and also non-conductively shields as recited in the claim.

375. For the reasons expressed above, a POSITA would understand that discloses a cable having the elements [1A-C].

[1D] a barrier tape configured to encircle the filler member and the first and second outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors;

376. Pfeiler discloses this element.

377. Pfeiler discloses an external envelope¹⁴ (*barrier tape*) encircling the filler member (e.g., cruciform section 16) and the first and second twisted pairs of conductors:



See, e.g., EX-1011 at 4:28-31, 4:42-46, FIGS 6-7.

378. The external envelope 14 is a tape. It consists of a “multi-layer strip-type screening sheet” that has a thin conductive layer sandwiched between two thin plastic layers. *Id.* at 3:22-27, 3:38-40, 4:13-15, FIGS. 1, 6-7. Pfeiler discloses that the screening sheet protects the twisted pairs in the cable from “irradiat[ing] interfering energy” and that it “drastically reduces [alien] crosstalk” which is external crosstalk from other cables. *Id.* at 2:46-54. This teaching discloses that the external envelope (i.e., barrier tape) shields the outwardly facing portions of the twisted pairs as recited in the claim.

379. Pfeiler also discloses that this shielding is “non-conductive.” The barrier tape (e.g., external envelope having screening sheet 1”) comprises a layer of

discontinuous electrically conductive material (e.g., spaced-apart metal patches) that is sandwiched between two dielectric layers (layers 2 and 8). *Id.* at 1:58-63, 3:25-37, 4:13-15, FIGS. 1-2, 6-7. According to Pfeiler, because the conductive material is not continuous “there is no continuous electrically conductive connection in the longitudinal direction of the screening sheet.” *Id.* at 1:63-65. Moreover, the two outside dielectric layers 2,8 of the screening sheet (barrier tape) insulate the inner conductive layer 3. *Id.* at 3:38-44, 3:57-62, FIGS. 1-2, 6-7.

380. Pfeiler thus discloses that its barrier tape non-conductively shields the first and second outwardly facing portions of the first and second twisted pairs of conductors as recited.

381. This element is therefore disclosed.

[1E] a jacket configured to encircle the barrier tape;

382. Pfeiler discloses this element.

383. Pfeiler discloses a cable further having a jacket (e.g., “external protecting jacket 17”) encircling the barrier tape (i.e., external envelope 14 consisting of a screening sheet 1”) as illustrated in the annotated Figure below:

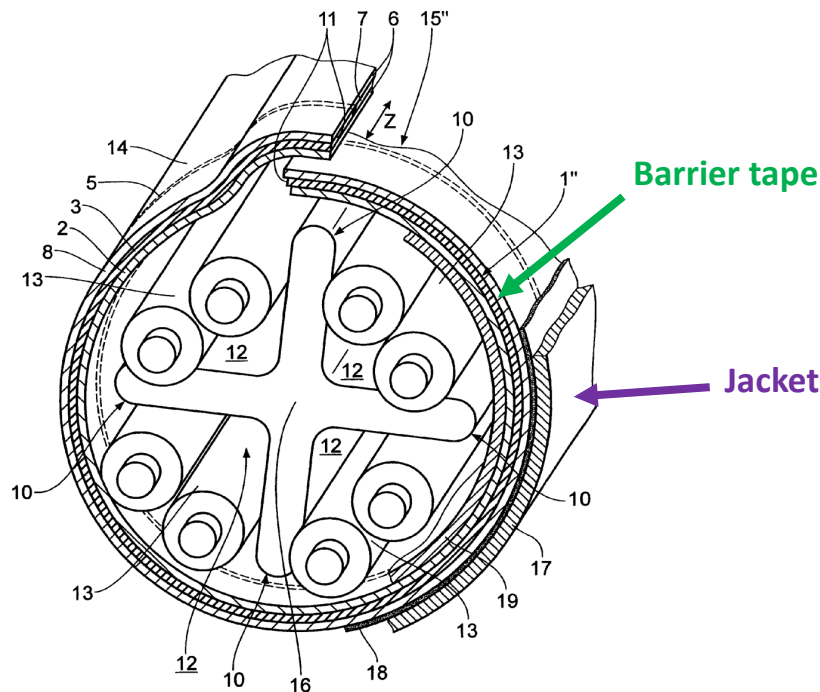


Fig. 7

Id. at 4:47-53 (“The jacket envelops the screening sheet”), FIG 7.

384. Therefore, this element is disclosed.

[1F] wherein the second twisted pair of conductors is located adjacent to a portion of the filler member, and wherein the first twisted pair of conductors is located adjacent to the portion of the filler member;

385. Pfeiler discloses this element.

386. Pfeiler discloses that the first and second twisted pairs of conductors are located adjacent to a portion of the filler member, as illustrated in the annotated drawing below:

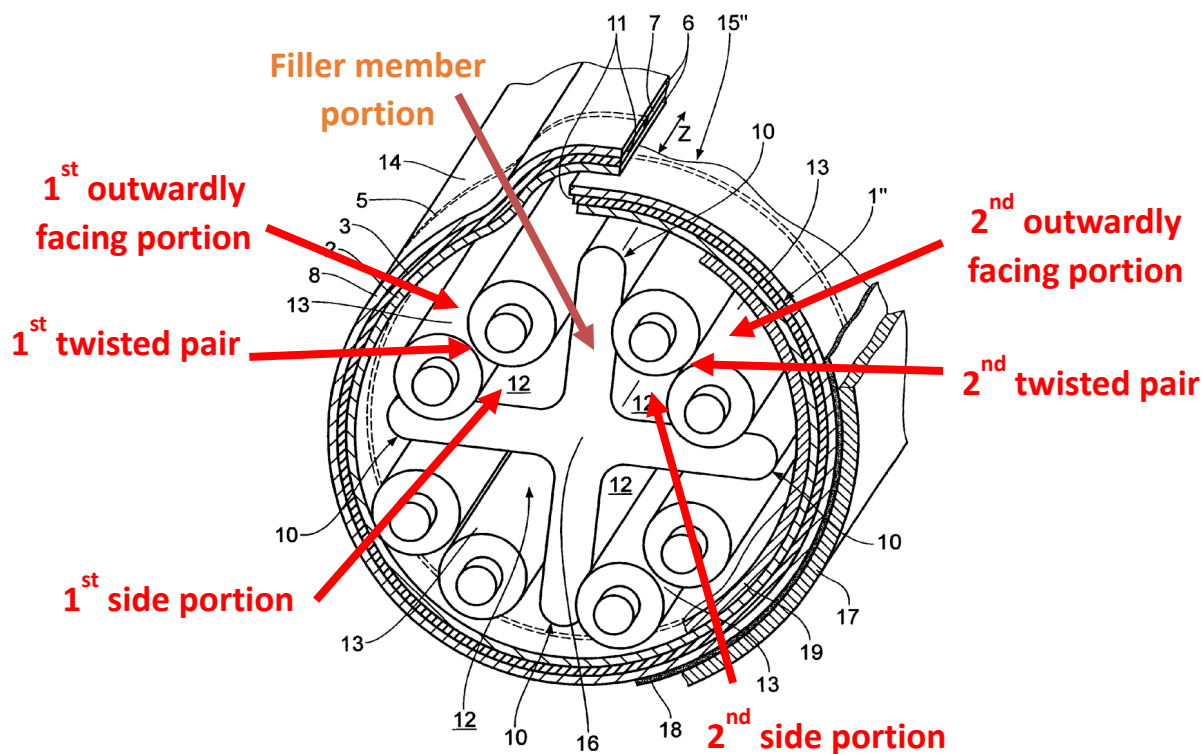


Fig. 7

Id. at 4:13-20, 4:25-32, 4:42-47, FIGS 6-7.

387. Thus, a POSITA would understand Pfeiler to disclose this element.

[1G] wherein the barrier tape includes a non-conductive layer and a conductive layer;

388. Pfeiler discloses this element.

389. As shown in the annotated figure below, Pfeiler discloses that the screening sheet 1'' (i.e., the barrier tape) includes a dielectric layer (e.g., "substrate layer 2" or "substrate layer 8") and a conductive layer (e.g., "screening layer 3") that consists of metalized sections separated by gaps 5:

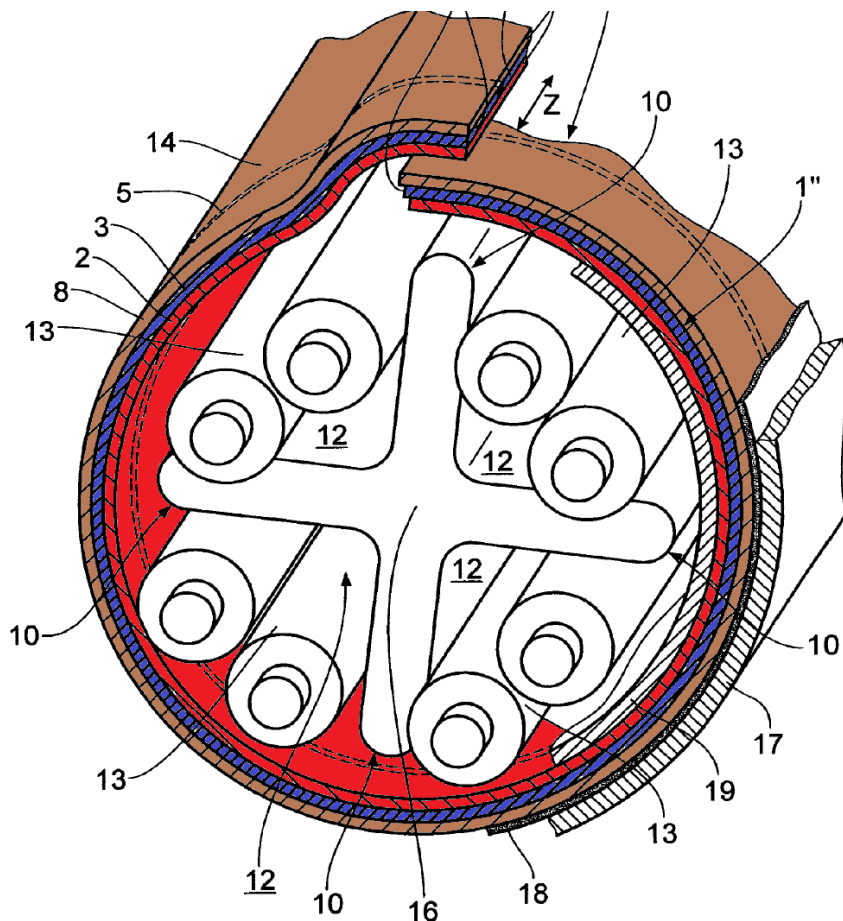


Fig. 7

Id. at 4:13-20, 4:25-32, 4:42-47, FIG. 7.

391. Thus, a POSITA would understand Pfeiler to disclose this element.

392. Although Pfeiler's "screening layer 3" consists of spaced-apart "pieces of metal foil 4," a POSITA would recognize that each piece is conductive. *Id.* at 3:25-27. And the '833 Patent discloses that its "conductive barrier tape 110" may be "conductive or partially conductive" and comprise, among other things, either "a continuously conductive tape [or] a discontinuously conductive tape" (EX-1001 at 2:30-32, 7:38-42), which a POSITA would understand to mean as

comprising either a continuously conductive layer or a discontinuously conductive layer (like in Pfeiler). Pfeiler's screening layer 3 is a conductive layer.

393. Pfeiler, therefore, discloses this element.

[1H] wherein the filler member is made of a non-conductive material;

394. Pfeiler discloses this element.

395. Pfeiler discloses a plus-shaped filler member that can have one or more dielectric layers (e.g., the support and separating structure 9 in FIG. 6), or alternatively can be made entirely of an extruded plastic material (see cruciform structure 16 in FIG 7). EX-1011 at 3:22-27, 3:38-41, 4:13-25, 4:42-47; FIGS. 1, 6-7. This discloses to a POSITA that the filler member is made of a non-conductive material.

396. Thus, Pfeiler discloses this element.

[1I] wherein the filler member includes a plurality of arms that are each configured to radially extend outwardly so as to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors;

397. Pfeiler discloses this element.

398. As indicated in the below annotated FIG. 7, Pfeiler's filler member (separator 16) has arms (i.e., ribs 10) that extend radially outward to form first and second channels (i.e., grooves 12) as recited:

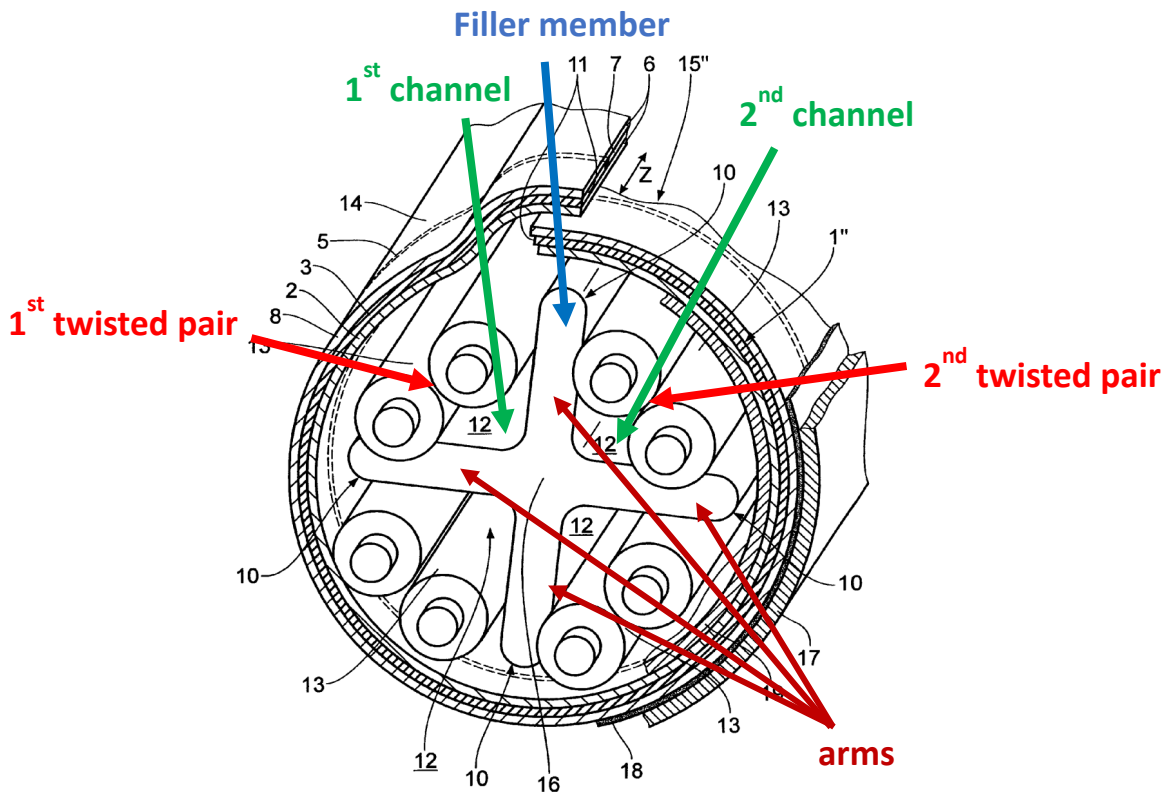


Fig. 7

See, e.g., *id.* at 4:25-32, FIGS 6-7. The cable of FIG. 6 also include a filler member disclosing this element:

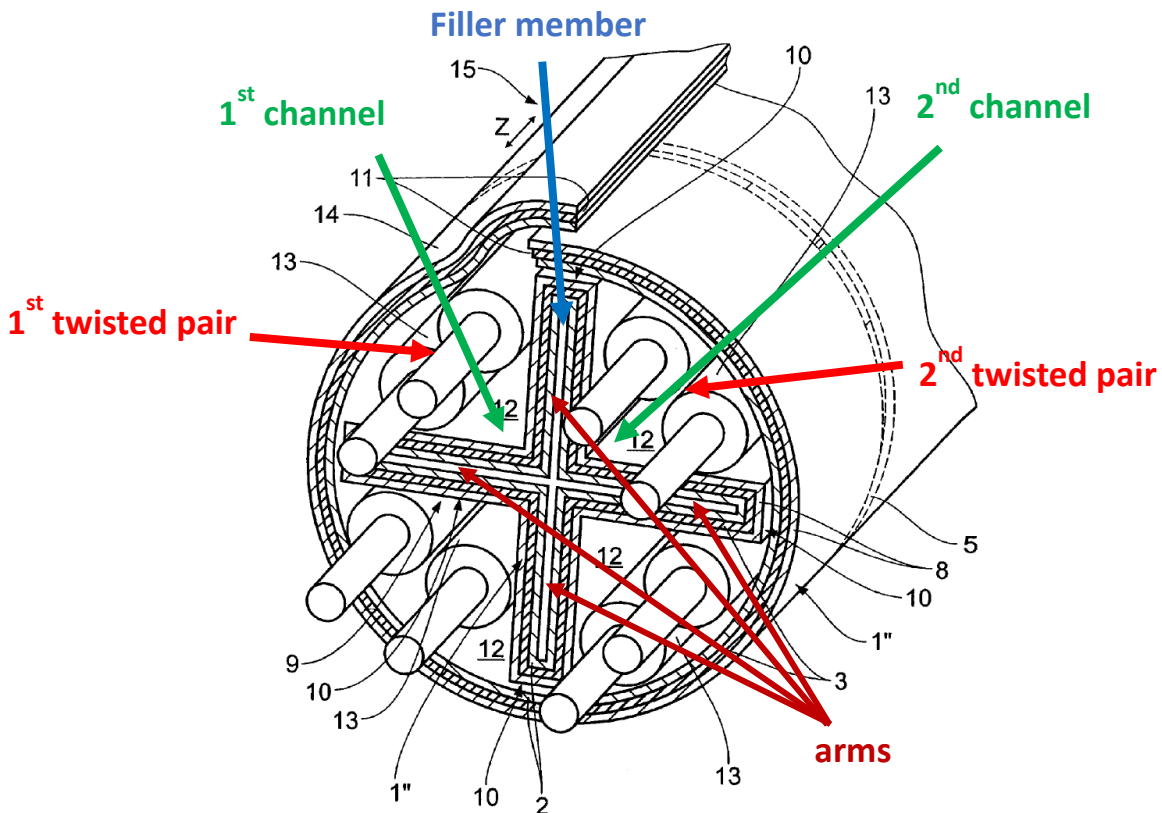


Fig. 6

399. Therefore, this element is disclosed.

[1J] wherein the first terminal portion of the filler member includes a first outwardly facing terminal surface, the second terminal portion of the filler member includes a second outwardly facing terminal surface, and the barrier tape is configured to encircle the first and second outwardly facing terminal surfaces and the first and second twisted pairs of conductors;

400. Pfeiler discloses this element.

401. The '833 Patent associates the term "terminal portion" (or "terminal portions") with the filler arms (and ends of the filler arms). *See, e.g.*, EX-1001 at 2:43-47, 2:66-3:3, 5:48-53, 6:19-23, 6:58-67. As illustrated in the annotated FIG.

7 below, Pfeiler discloses that each filler member arm has an outwardly facing terminal surface and the barrier tape (screening sheet 1'') encircles these surfaces and twisted pairs of conductors:

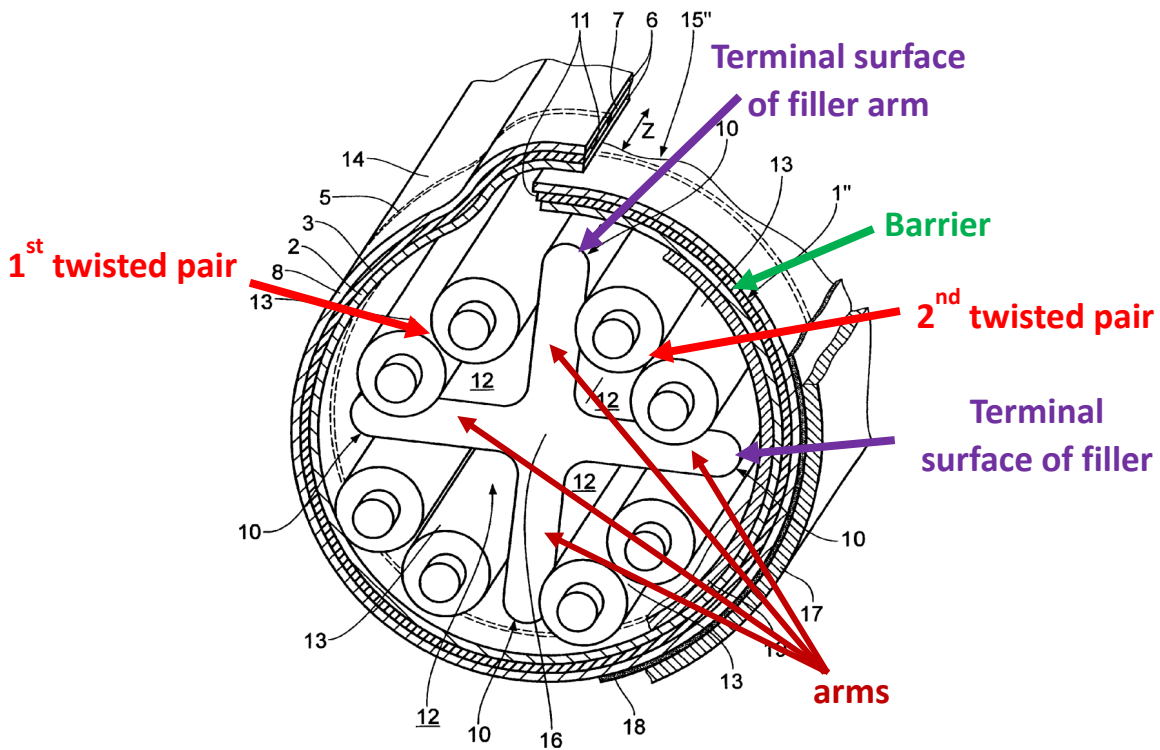


Fig. 7

See EX-1011 at 4:28-31, 4:42-46, FIGS. 4, 6-7. The cable of FIG. 6 also discloses this element. See Pfeiler at FIG. 6.

402. Therefore, this element is disclosed.

[1K] wherein the filler member is configured to extend along a longitudinal portion of the cable and is configured to non-conductively shield the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable.

403. Pfeiler discloses this element.

404. Pfeiler discloses that the filler member (e.g., separating structure 9 (FIG. 6) or customary cruciform section 16 (FIG. 7.)) extends along, and non-conductively shields the twisted pairs along, the longitudinal portion of the cable. The filler member has ribs 10, and the twisted pairs “are accommodated in each of the quadrantal zones 12 between the separating ribs and thus screened from each other by the screening layer inside the ribs 10.” *Id.* at 4:25-32. Pfeiler also discloses that the separating structure/cruciform section reduces crosstalk between the twisted pairs, which occurs because the separating and support structure, along with the twisted pairs, extends along the longitudinal direction of the cable *Id.*

405. Pfeiler also discloses that the filler member “non-conductively” shields for the same reasons included in the discussion above for Pfeiler’s disclosure of claim elements [1A-C].

406. For the reasons given above, a POSITA would understand Pfeilerto disclose this element and a cable with all of the elements recited in Claim 1.

407. Therefore, this claim is anticipated by Pfeiler.

b. Dependent Claim 2. The cable of claim 1, wherein the filler member comprises a single unitary component of the cable, and the plurality of arms of the filler member form a cross shape.

408. Pfeiler discloses this element.

409. Pfeiler discloses the filler member of FIG. 6 is a screening sheet “folded down itself along the longitudinal strip direction Z in such a way that four separating ribs 10 of star configuration are produced.” *Id.* at 4:16-20, 4:25-32, FIGS. 4-6. As a sheet that is folded down on itself, this filler member is a single unitary component. And, as shown in FIG. 6, this filler member has a plurality of arms and forms a cross shape. *Id.* at FIG. 6.

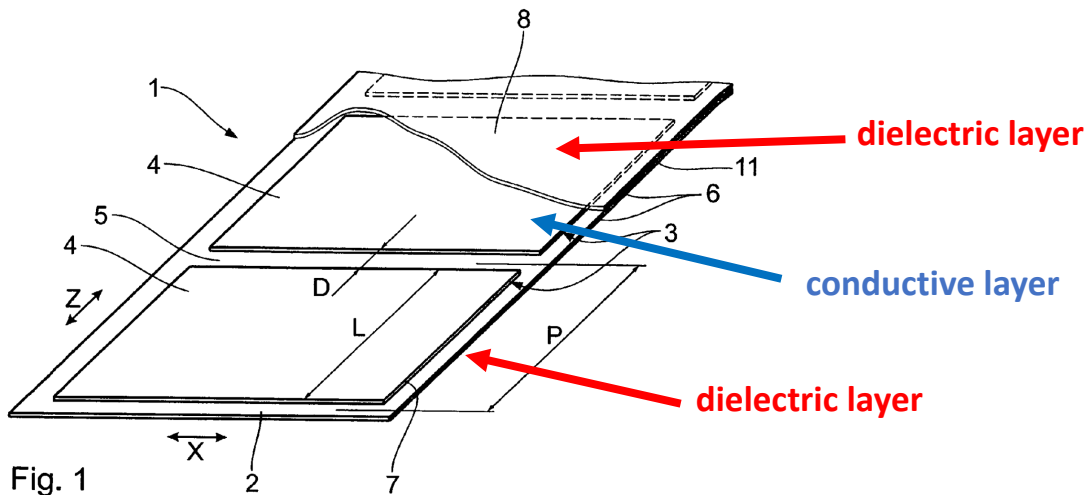
410. Likewise, Pfeiler’s filler member of FIG. 7 is “a customary cruciform section 16 extruded from insulating plastic material.” *Id.* at 4:26-29, 4:42-47. As an extruded component it would be a single unitary component. And, as shown in FIG. 7, this filler member also has a plurality of arms and forms a cross shape. *Id.* at FIG. 7.

411. Thus, Pfeiler discloses this element, and this claim is anticipated by Pfeiler.

c. Dependent Claim 3. The cable of claim 1, wherein the non-conductive layer of the barrier tape comprises a first non-conductive layer and the barrier tape includes a second non-conductive layer.

412. Pfeiler discloses this element.

413. As illustrated in annotated FIG. 1 below, Pfeiler discloses the conductive layer 3 of the barrier tape (screening sheet 1) is sandwiched between first and second dielectric layers 2,8:



Id. at 3:22-27, 3:38-44, 4:13-15 FIGS. 1-3, 6-7. This also is shown, for example, in annotated FIG. 7 below, with the nonconductive layers 2, 8 of screening sheet 1” in **red** and **brown**, and the conductive layer 5 of screening sheet 1” in **blue**:

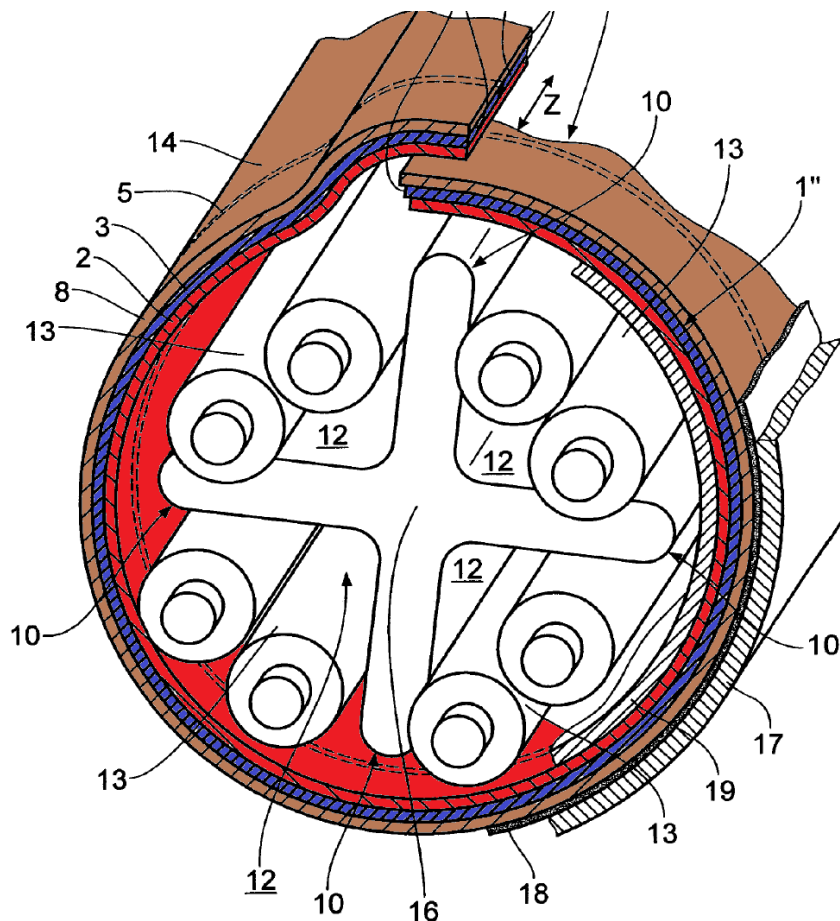


Fig. 7

Id. at 4:13-20, 4:25-32, 4:42-47, FIG. 7. FIG. 6 also shows these three layers in screening sheet 1". *Id.* at FIG. 6.

414. A POSITA would thus understand Pfeiler to disclose this element, and this claim is anticipated.

d. Dependent Claim 4. The cable of claim 3, wherein the conductive layer of the barrier tape is positioned between the first and second non-conductive layers.

415. As discussed and shown above (regarding claim 3), Pfeiler discloses this element. Pfeiler discloses that conductive layer of each screening sheet (e.g., sheet 1 and 1") (*barrier tape*) is sandwiched between (or positioned between) the

first and second non-conductive layers. *See* my analysis regarding Pfeiler's disclosures of element [1G] and Claim 3; *see also* EX-1011 at 3:22-27, 3:38-39, 3:45-47, 4:13-15; FIGS 1-2, 6-7.

416. Pfeiler thus discloses this element, and this claim is anticipated.

e. Dependent Claim 5. The cable of claim 3, wherein the first non-conductive layer comprises an inner non-conductive layer and the second non-conductive layer comprises an outer non-conductive layer.

417. Pfeiler discloses this element.

418. As explained above in connection with [1G] and claim 3, Pfeiler discloses that each screening sheet (e.g., 1 and 1") (*barrier tape*) includes the metal conductive layer positioned between a first non-conductive layer and a second non-conductive layer. *See* my analysis above concerning Pfeiler's disclosure of element [1G] and claim 3; *see also* EX-1011 at 3:22-27, 3:38-39, 3:45-47, 4:13-15; FIGS 1-2, 6-7.

419. When the three-layer tape encircles the conductors and filler member, one of the non-conductive layers will be positioned between the twisted pairs and the conductive layer (and therefore is an inner non-conductive layer) and the other non-conductive layer will be external to the conductive layer (and be an outer non-conductive layer). This is illustrated in the annotated FIG. 7 below, with the

nonconductive layers 2, 8 of screening sheet 1'' in **red** and **brown**, and the conductive layer 5 of screening sheet 1'' in **blue**:

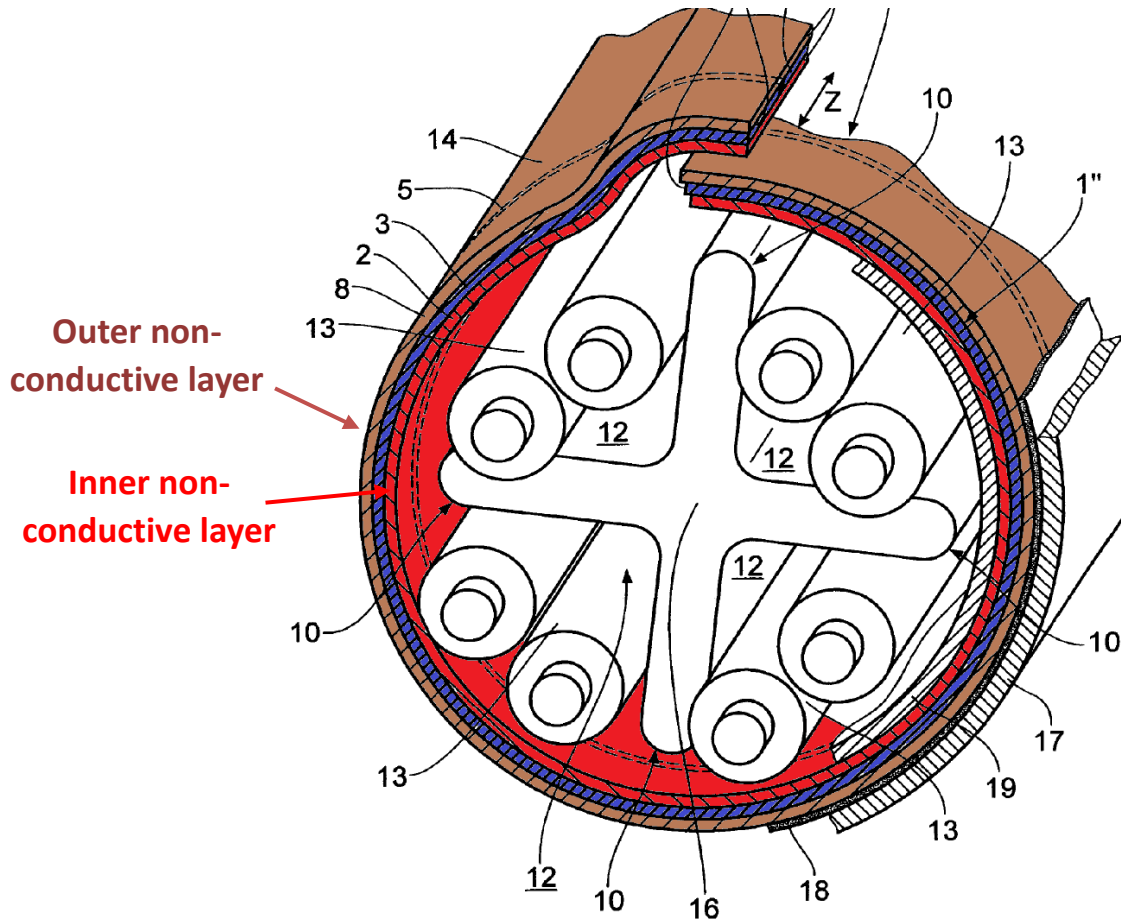


Fig. 7

Id. at 4:13-20, 4:25-32, 4:42-47, FIG. 7. FIG. 6 also shows these three layers in screening sheet 1'' with inner and outer non-conductive layers. *See id.* at FIG. 6

420. Pfeiler thus discloses this element, and this claim is anticipated.

f. Dependent Claim 6. The cable of claim 1, wherein the filler member and the barrier tape are configured to extend along a longitudinal direction of the cable.

421. Pfeiler discloses this element.

422. As explained in connection with [1K], Pfeiler discloses the filler member is configured to extend along a longitudinal direction of the cable. *See* my analysis of Pfeiler's disclosure of element [1K]; *see also* EX-1011 at FIGS. 5-7.

423. In addition, Pfeiler describes the screening sheet (*barrier tape*) as an "external envelope," and Pfeiler explains that "[t]he entire array of the internal supporting and separating structure 9 and the four twisted-pair lines 13 are insulated by an external envelope which again consists of a screening sheet 1'" EX-1011 at 4:28-31; *see also id.* at 2:46-50. Since the twisted pairs extend along the longitudinal direction of the cable, the insulating external envelope does likewise. In addition, FIGS. 6-7 illustrate the longitudinally extending conductors, filler member and barrier tape.

424. This claim therefore is anticipated by Pfeiler.

g. Dependent Claim 7. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member and the barrier tape are configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

425. Pfeiler discloses these elements.

426. Pfeiler discloses cables with "intertwisted pairs of lines, so-called twisted pairs" and "twisted pairs" and "twisted pair lines 13," which a POSITA would understand to be conductor pairs that are twisted together in a helical

manner to form a balanced transmission line. *See id.* at 1:13-18, 2:42-50, 4:25.

Pfeiler also discloses that the twisted pairs and other cable components (such as the filler member) may be stranded together along a helical axis when the screening sheet (*barrier tape*) is applied over them. *See id.* at 2:28-36 (describing the cable being “stranded” at an “angle of stranding”).

427. Pfeiler further discloses to a POSITA that the twisted pairs (and also the separator/filler member and the screening sheet (*barrier tape*) extend along the longitudinal direction of the cable. *See, e.g., id.* at FIGS. 5-7.

428. Pfeiler also discloses the separator/filler provides non-conductive shielding as discussed above for elements [1A-C] and [1K]. See my analysis of Pfeiler’s disclosure of those elements. In addition, Pfeiler discloses that the barrier tape discloses non-conductive shielding as discussed above for element [1D]. See my analysis of Pfeiler’s disclosure of element [1D].

429. Since each of the filler (separating structure 9) and barrier tape (i.e., external envelope 14) extend along the longitudinal direction of the cable (see discussions above for [1K] and claim 6), these structures provide the recited shielding along the longitudinal portion.

430. Pfeiler thus discloses this element, and this claim is anticipated by Pfeiler.

- h. Dependent Claim 8. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.**

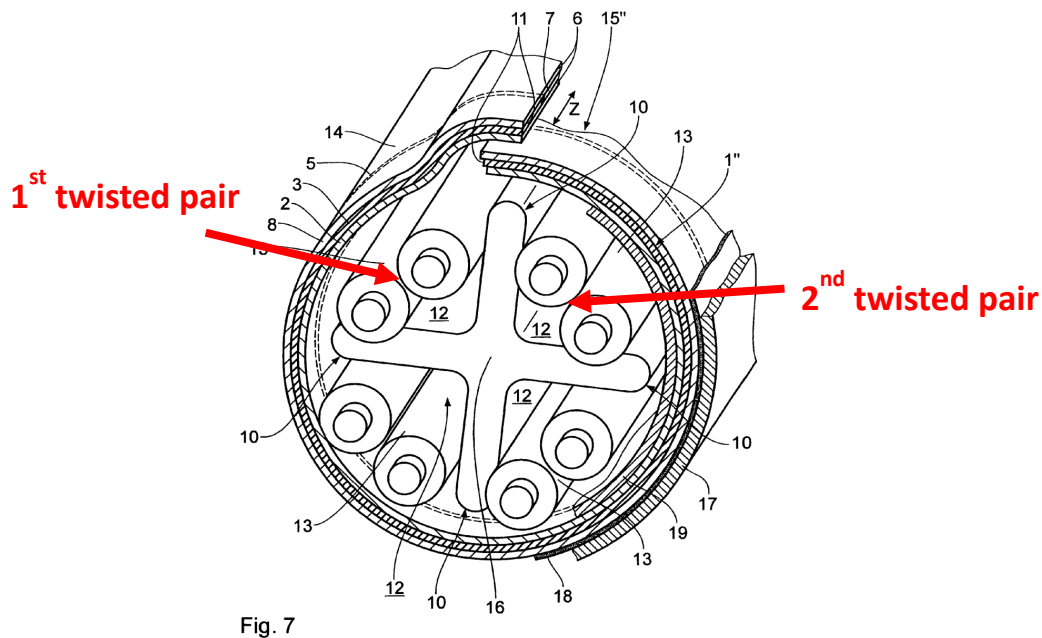
431. Pfeiler discloses these elements. See my discussion concerning Pfeiler's disclosure of the element in claim 7 above. As explained, Pfeiler discloses to a POSITA that the twisted pairs of conductors are helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable. See my analysis of Pfeiler's disclosure of claim 7 in Section X(G)(7) above.

432. Pfeiler thus discloses these elements, and this claim is anticipated.

i. Independent claim 48

48. A cable comprising: [48A] a plurality of twisted pair conductors;

433. Pfeiler discloses a cable comprising a plurality of twisted pair conductors, as illustrated for example in the annotated Figure below:



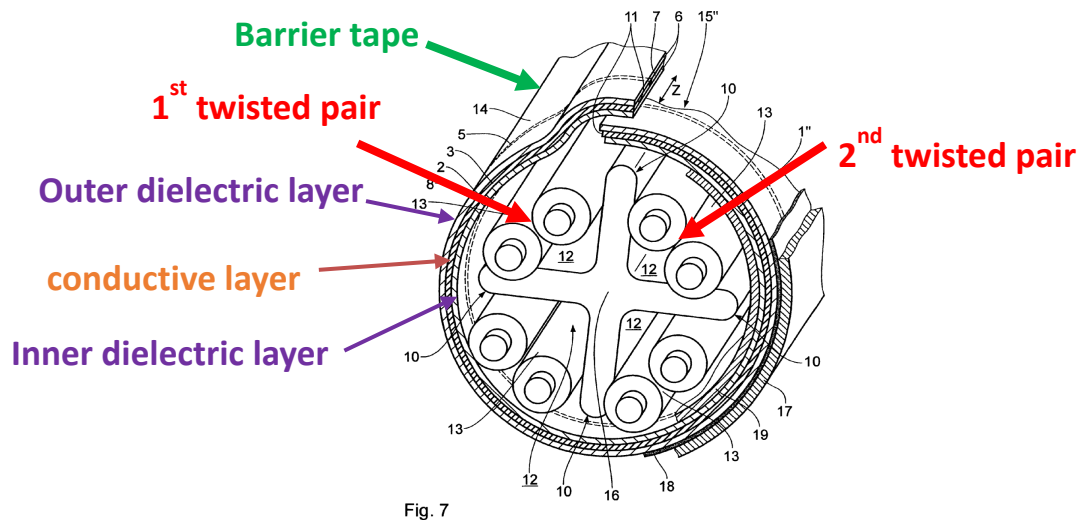
See EX-1011 at 4:25-32, 4:42-47, FIGS 6-7. Also see my analysis of Pfeiler’s disclosure of elements [1A-C] above.

434. Pfeiler thus discloses this element.

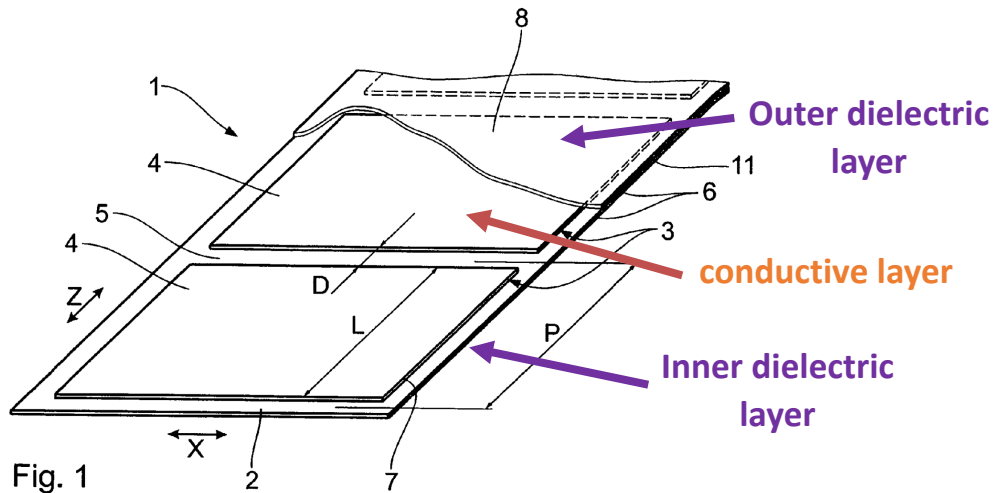
[48B] a barrier tape that surrounds the plurality of twisted pair conductors, the barrier tape including an electrically conductive layer enclosed between inner and outer dielectric layers; and

435. Pfeiler discloses this element.

436. As discussed in connection with element [1G], Pfeiler discloses a screening sheet (*barrier tape*) that forms an “external envelope” surrounding the conductors, and the screening sheet includes two dielectric layers (2, 8) sandwiching a conductive layer (3) between them. This is illustrated in the annotated Figure below:



See *id.* at 4:28-31, 4:42-46, FIGS 6-7. In the annotated Figure below, the inner and outer nonconductive layers 2, 8 of screening sheet 1'' are colored in **red** and **brown**, and the conductive layer 5 of screening sheet 1'' is colored in **blue**:



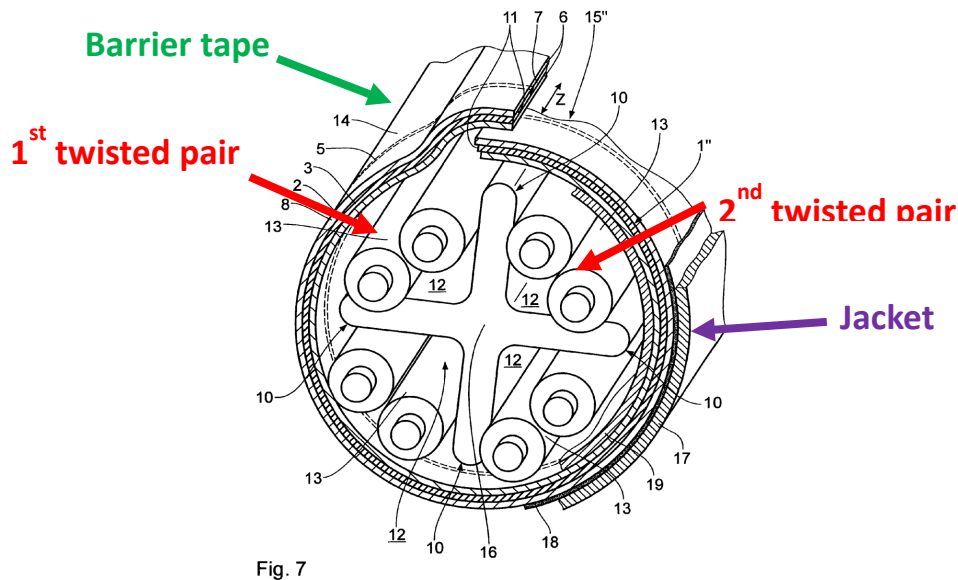
See *id.* at 3:22-27, 3:38-44.

438. As explained above in connection with element [1G], Pfeiler's conductive layer is discontinuous, but comprises conductive materials and thus is at least "partially conductive" or "discontinuously conductive" in the words of the '833 Patent and, thus, is a conductive layer. EX-1001 at 2:38-31, 7:40-42

439. A POSITA thus would understand that Pfeiler discloses this element.

[48C] a jacket that surrounds the barrier tape.

440. As explained in connection with element [1E], Pfeiler discloses a cable further having a jacket (e.g., "external protecting jacket 17") that surrounds the barrier tape (i.e., external envelope 14 consisting of a screening sheet 1") as illustrated in the annotated Figure below:



EX-1011 at 4:13-20, 4:25-32, 4:42-47, FIGS 6-7.

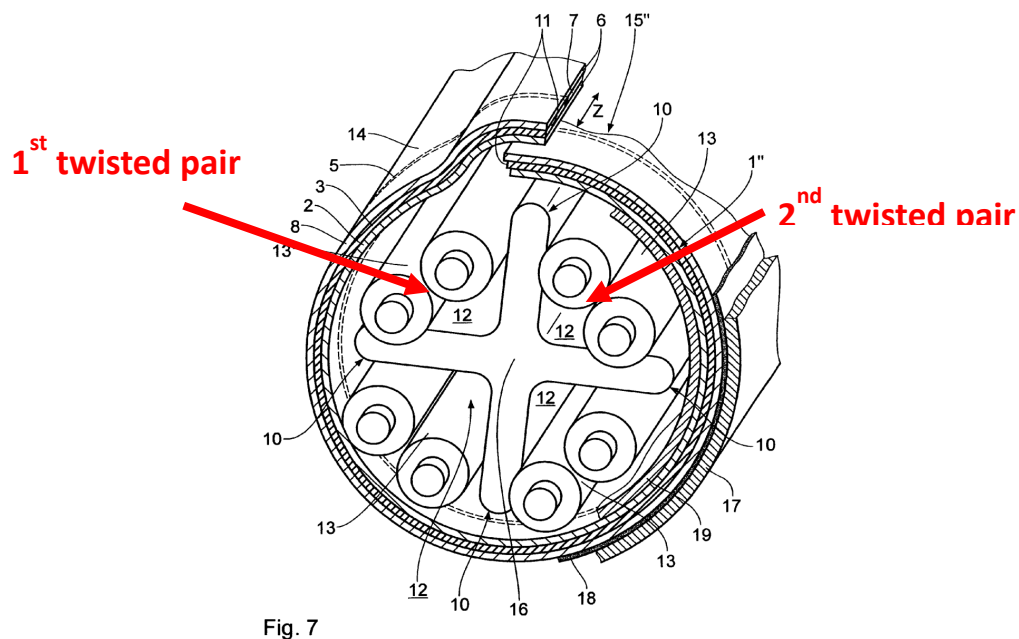
441. Thus, Pfeiler discloses this element.

442. For the foregoing reasons, Pfeiler discloses all elements of the recited cable, and anticipates claim 48.

j. Independent claim 49

49. A cable comprising: [49A] a plurality of pairs of conductors extending along a longitudinal axis;

443. Pfeiler discloses a cable having multiple conductor pairs that extend along a longitudinal axis of the cable:

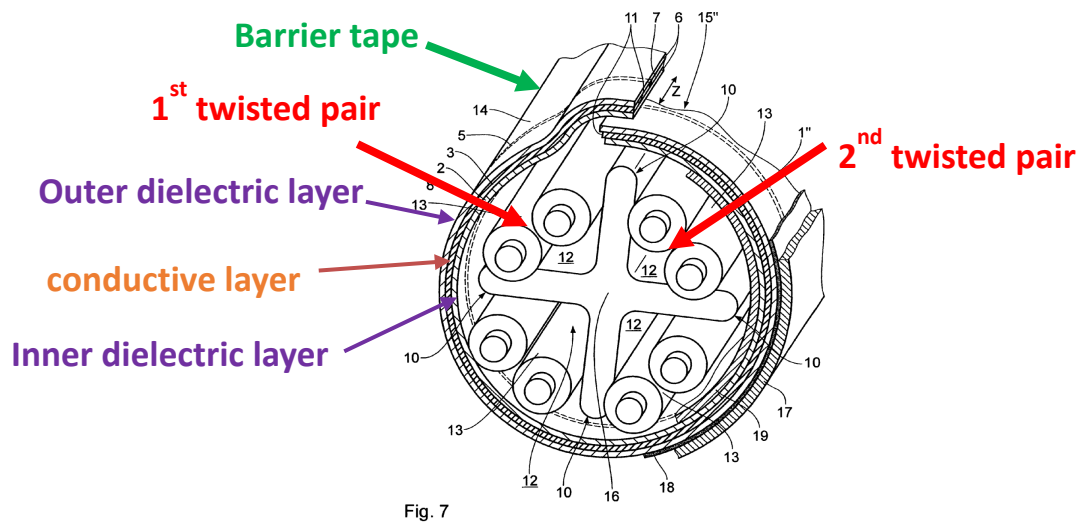


See, e.g., *id.* at 4:25-32, 4:42-458 FIGS 6-7. See also my analysis of Pfeiler’s disclosure of claim 7 and element [48A].

444. Pfeiler therefore discloses this element.

[49B] a barrier tape surrounding the plurality of pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer; and

445. This element is very similar to element [48B]. As I explain in connection with Pfeiler’s disclosure of [48B], Pfeiler discloses a screening sheet (*barrier tape*) that forms an “external envelope” surrounding the conductors, and the screening sheet includes two dielectric layers (2, 8) sandwiching a conductive layer (3) between them. This is illustrated in the annotated Figure below:



See *id.* at 3:22-27, 3:38-44, 4:28-31, 4:42-47, FIGS. 1, 6-7. See also my analysis of Pfeiler’s disclosure of element [48B].

446. A POSITA would thus understand that Pfeiler discloses a cable with this recited element.

[49C] an outer jacket surrounding the barrier tape, the outer jacket comprising a non-conductive material.

447. As I already explained in connection with Pfeiler’s disclosure of elements [1E] and [48C], Pfeiler discloses an “external protecting jacket 17” that surrounds the barrier tape. See my analysis of Pfeiler’s disclosure of elements [1E] and [48B]; see also EX-1011 at 4:13-20, 4:25-32, 4:42-47, FIGS 6-7.

448. Pfeiler discloses that the external protecting jacket is made of “polymeric insulating material”. *Id.* at 4:47-49. A POSITA would understand such material to comprise a non-conductive material.

449. Pfeiler thus discloses this element and the other elements of this claim 49. The claim is anticipated.

k. Independent claim 50

450. Claim 50 is a method claim that recites essentially the same structural limitations as set forth in claims 48 and 49 but with method steps. It recites a plurality of “twisted pairs of conductors” (see elements [48A]/[49[A]) that are “surround[ed]” by a three-layer barrier tape having “a conductive layer positioned between [first and second] non-conductive layers” (see elements [48B]/[49B]), with the barrier tape “extending within” (e.g., being surrounded by) a jacket (see elements [48C]/[49C]), and also element [1E]). Pfeiler’s disclosure of a cable having twisted pairs conductors surrounded by a three-layer barrier tape as recited, with a jacket enclosing the conductors and tape, applies equally to the recited method steps, and results in performing the recited method steps. In other words, Pfeiler’s disclosure of twisted pairs being surrounded by a three-layer non-conductive/conductive/non-conductive barrier tape discloses “surrounding” the twisted pairs with a barrier tape as recited in claim 50. Likewise, Pfeiler’s disclosure of surrounding the barrier tape and conductors with a jacket discloses “extending the barrier tape within an outer jacket” as recited in claim 50. Using Pfeiler’s cable and teaching as described for claims 48-49 above results in performing the method recited in claim 50 and renders claim 50 anticipated for the

same reasons discussed above. *See* my discussion above in Sections X(G)(b) and X(G)(c) concerning Pfeiler's disclosure of having a barrier tape surrounding twisted pair conductors (and further being surrounded by (or extending within) an outer jacket.

451. I provide a bit more detail below.

50. A method for reducing alien crosstalk between cables, the method comprising [50A] surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer and;

452. Pfeiler discloses a method of reducing alien crosstalk between cables.

See EX-1011 at 2:42-53.

453. The recited method step - surrounding a plurality of twisted pair conductors with a barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer – is essentially the same as cable apparatus elements [48B] and [49B] but written in a method step form. As I explained in connection with elements [48B] and [49B], Pfeiler discloses surrounding a plurality of twisted pair conductors with a barrier tape (i.e., envelope 14 formed by screening sheet 1”) comprising a conductive layer positioned between first and second non-conductive layers. *See* my discussion

above regarding Pfeiler's disclosure of elements [48B] and [49B]; *see also, e.g., id.* at 3:22-27, 3:38-44, 4:28-31, 4:42-47, FIGS. 1, 6-7.

454. Pfeiler's disclosure of a cable having twisted pairs of conductors surrounded by a three-layer barrier tape as recited applies equally to the recited method step, and results in performing this step.

455. Pfeiler thus discloses this element.

[50B] extending the barrier tape within an outer jacket.

456. As explained in connection with similar elements [48C] and [49C], Pfeiler discloses an outer jacket ("external protecting jacket 17") that "envelopes the screening sheet 1" and united with the screening sheet with an adhesive. See Pfeiler at 4:47-54, FIG. 7. See also my analysis of Pfeiler's disclosure of elements [48C] and [49C].

457. Pfeiler's disclosure of a cable having the outer jacket surround and enclose the internal components of the cable, including the screening sheet (*barrier tape*), applies equally to the recited method step, and results in performing this step.

458. Pfeiler thus discloses this element.

459. A POSITA thus would understand that Pfeiler's barrier tape is extending within an outer jacket as recited, and that Pfeiler anticipates claim 50.

XI. CONCLUSION

460. In signing this declaration, I understand that the declaration will be filed as evidence in the 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 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.

461. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

Executed on: 6/11/23

By: Kenneth Cornelison
Kenneth Cornelison

XII. Claims Listing Appendix

U.S. Patent No. 10,832,833

Claims 1-8, 48-50

Designation	Claim 1
	1. A cable for reducing alien cross-talk and return loss between adjacent twisted pairs of conductors comprising:
Element 1A	a first twisted pair of conductors having a first side portion and a first outwardly facing portion;
Element 1B	a second twisted pair of conductors having a second side portion and a second outwardly facing portion;
Element 1C	a filler member configured to non-conductively shield the first side portion of the first twisted pair of conductors from the second side portion of the second twisted pair of conductors;
Element 1D	a barrier tape configured to encircle the filler member and the first and second outwardly facing portions of the first and second twisted pairs of conductors so as to non-conductively shield the first and second outwardly facing portions of the first and second twisted pairs of conductors;
Element 1E	a jacket configured to encircle the barrier tape;
Element 1F	wherein the second twisted pair of conductors is located adjacent to a portion of the filler member, and wherein the first twisted pair of conductors is located adjacent to the portion of the filler member;

Element 1G	wherein the barrier tape includes a non-conductive layer and a conductive layer;
Element 1H	wherein the filler member is made of a non-conductive material;
Element 1I	wherein the filler member includes a plurality of arms that are each configured to radially extend outwardly so as to form a first channel shaped to partially enclose the first twisted pair of conductors and a second channel shaped to partially enclose the second twisted pair of conductors;
Element 1J	wherein the first terminal portion of the filler member includes a first outwardly facing terminal surface, the second terminal portion of the filler member includes a second outwardly facing terminal surface, and the barrier tape is configured to encircle the first and second outwardly facing terminal surfaces and the first and second twisted pairs of conductors;
Element 1K	wherein the filler member is configured to extend along a longitudinal portion of the cable and is configured to non-conductively shield the first and second twisted pairs of conductors from being electrically coupled to each other along the longitudinal portion of the cable.

Designation	Claim 2
	2. The cable of claim 1, wherein the filler member comprises a single unitary component of the cable, and the plurality of arms of the filler member form a cross shape.

Designation	Claim 3
	3. The cable of claim 1, wherein the non-conductive layer of the barrier tape comprises a first non-conductive layer and the barrier tape includes a second non-conductive layer.

Designation	Claim 4
	4. The cable of claim 3, wherein the conductive layer of the barrier tape is positioned between the first and second non-conductive layers.

Designation	Claim 5
	5. The cable of claim 3, wherein the first non-conductive layer comprises an inner non-conductive layer and the second non-conductive layer comprises an outer non-conductive layer.

Designation	Claim 6
	6. The cable of claim 1, wherein the filler member and the barrier tape are configured to extend along a longitudinal direction of the cable.

Designation	Claim 7
	7. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member and the barrier tape are configured to non-conductively shield the first and second

	helically twisted pairs of conductors along the longitudinal portion of the cable.
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Designation	Claim 8
	8. The cable of claim 1, wherein the first and second twisted pairs of conductors comprise first and second helically twisted pairs of conductors along the longitudinal portion of the cable, and the filler member is configured to non-conductively shield the first and second helically twisted pairs of conductors along the longitudinal portion of the cable.

Designation	Claim 48
	48. A cable comprising:
Element 48A	a plurality of twisted pair conductors;
Element 48B	a barrier tape that surrounds the plurality of twisted pair conductors, the barrier tape including an electrically conductive layer enclosed between inner and outer dielectric layers; and
Element 48C	a jacket that surrounds the barrier tape.

Designation	Claim 49
	49. A cable comprising:
Element 49A	a plurality of pairs of conductors extending along a longitudinal axis;
Element 49B	a barrier tape surrounding the plurality of pairs of conductors, the barrier tape comprising a conductive layer positioned between a first non-conductive layer and a second non-conductive layer; and

Element 49C	an outer jacket surrounding the barrier tape, the outer jacket comprising a non-conductive material.
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