

Paper No. ____

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC.
Petitioner

v.

BELDEN INC.
Patent Owner

Case IPR _____
U.S. Patent No. 6,570,095
Issued: May 27, 2003
Filed: May 11, 2001

PETITION FOR *INTER PARTES* REVIEW OF U.S. PAT. NO.
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 41.100 ET SEQ.

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	GROUND FOR STANDING.....	1
III.	IDENTIFICATION OF THE CHALLENGE	1
	A. Prior Art.....	1
	B. Grounds	2
IV.	THE '095 PATENT	3
	A. Technology Background	3
	B. Overview of the '095 Patent.....	5
	C. Prosecution History	6
	D. The Challenged Claims	7
V.	PRIOR (UNFINISHED) <i>INTER PARTES</i> REEXAMINATIONS AND LAWUIT BETWEEN PATENT OWNER AND SUPERIOR ESSEX (2008-2012).....	8
VI.	LEVEL OF ORDINARY SKILL IN THE ART	11
VII.	CLAIM CONSTRUCTION	11
VIII.	GROUND 1: ROBERTS ANTICIPATES CLAIMS 27-29.....	18
	A. Roberts (EX-1009)	18
	B. Independent Claim 27	20
	C. Dependent Claim 28.....	29
	D. Dependent Claim 29.....	30
IX.	GROUND 2: ROBERTS AND ONE OR MORE OF JACHIMOWICZ AND GINGUE RENDER CLAIMS 30-33 OBVIOUS	31
	A. Overview of the Combination.....	31
	B. Dependent Claim 30.....	33
	C. Independent Claim 31	39
	D. Dependent Claim 32.....	39
	E. Dependent Claim 33	40
X.	GROUND 3: GMBH-866 ANTICIPATES CLAIMS 27-29	41

A.	GmbH-866 (EX-1010)	41
B.	Independent Claim 27	42
C.	Dependent Claim 28.....	50
D.	Dependent Claim 29.....	52
XI.	GROUND 4: GMBH-866 IN COMBINATION WITH ONE OR MORE OF JACHIMOQICZ AND GINGUE RENDERS CLAIMS 30-33 OBVIOUS	52
A.	Dependent Claim 30.....	53
B.	Independent Claim 31	57
C.	Dependent Claim 32.....	58
D.	Dependent Claim 33.....	58
XII.	GROUND 5: ROBERTS IN COMBINATION WITH ONE OR MORE OF GMBH-866, JACHIMOWICZ, AND GINGUE RENDERS CLAIMS 27-33 OBVIOUS.....	59
XIII.	GROUND 6: GMBH-866 IN COMBINATION WITH ONE OR MORE OF ROBERTS, JACHIMOWICZ, AND GINGUE RENDERS CLAIMS 27-33 OBVIOUS.....	61
XIV.	GROUND 7: YANAGIDA ANTICIPATES CLAIMS 27-29	64
A.	Yanagida (EX-1012)	64
B.	Independent Claim 27	65
C.	Dependent Claim 28.....	70
D.	Dependent Claim 29.....	72
XV.	GROUND 8: YANAGIDA AND ONE OR MORE OF JACHIMOWICZ AND GINGUE RENDERS CLAIMS 30-33 OBVIOUS	72
A.	Dependent Claim 30.....	73
B.	Independent Claim 31	76
C.	Dependent Claim 32.....	76
D.	Dependent Claim 33.....	77
XVI.	PURPORTED SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS.....	77
XVII.	DISCRETIONARY DENIAL IS NOT APPROPRIATE	78

A.	Discretionary Denial Under 35 U.S.C. §325(d) is Not Warranted	78
B.	Discretionary Denial Under 35 U.S.C. §314(a) is Not Warranted	80
XVIII.	MANDATORY NOTICES	82
A.	Real Parties-in-Interest	82
B.	Related Matters	82
C.	Lead and Back-Up Counsel	83
D.	Service Information	83
E.	Fees	83
	CLAIMS LISTING APPENDIX	84
	EXHIBIT LIST APPENDIX	87

I. INTRODUCTION

Patent No. 6,570,095 (“the ’095 patent”) discloses a data communications cable with an internal substantially flat dielectric separator member separating twisted pairs. The Roberts and GmbH-866 references teach this, anticipating many of the challenged claims. The remaining claims add that the dielectric separator includes a foamed polymer tape—an obvious material known and used in the cabling the field. The grounds presented in this Petition show that the challenged claims of the ’095 patent are invalid.

II. GROUNDS FOR STANDING

Petitioner certifies that the challenged claims of the ’095 patent are available for IPR and Petitioner is not barred or estopped from requesting IPR to challenge the claims on the grounds herein.

III. IDENTIFICATION OF THE CHALLENGE

A. Prior Art

The ’095 patent was filed on May 11, 2001 and claims priority to Application No. 09/257,844, filed on February 25, 1999. The ’095 patent has expired.

Below are the prior art references relied on by Grounds set forth in this petition:

- **U.S. Patent No. 3,622,683 (“Roberts”, EX-1009)**, issued on November 23, 1971.

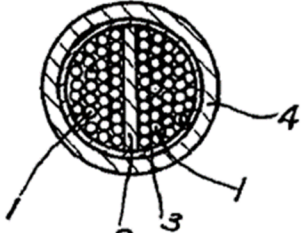
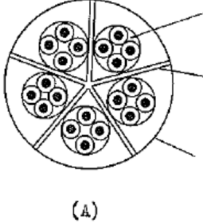
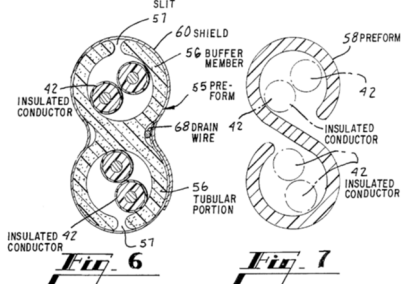
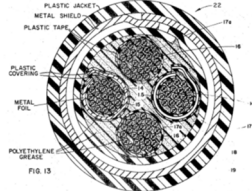
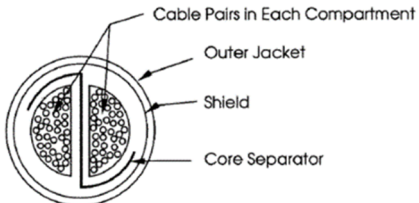
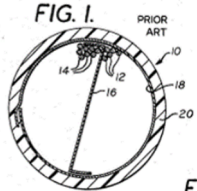
- **German Patent DE 297 19 866 U1 (“GmbH-866”, EX-1010)**, published on February 5, 1998.
- **Japanese Patent Publication S43-15474 (“Yanagida”, EX-1012)**, published on June 28, 1968.
- **U.S. Patent No. 5,670,748 (“Gingue”, EX-1013)**, issued on September 23, 1987.
- **U.S. Patent No. 3,894,172 (“Jachimowicz”, EX-1014)**, issued on July 8, 1975.

All are prior art under at least pre-AIA §§102(a)-(b).

B. Grounds

This petition shows that claims 27-33 of the '095 patent are invalid in view of the grounds specified below.

	Claims	Basis for Unpatentability
Ground 1	27-29	Anticipated by Roberts
Ground 2	30-33	Obvious in view of Roberts , one or more of Jachimowicz and Gingue, and/or the knowledge of a POSITA
Ground 3	27-29	Anticipated by GmbH-866
Ground 4	30-33	Obvious in view of GmbH-866 , one or more of Jachimowicz and Gingue, and/or the knowledge of a POSITA
Ground 5	27-33	Obvious in view of Roberts , one or more of GmbH-866, Jachimowicz, and Gingue, and/or the knowledge of a POSITA.
Ground 6	27-33	Obvious in view of GmbH-866 , one or more of Roberts, Jachimowicz, and Gingue, and/or the knowledge of a POSITA.
Ground 7	27-29	Anticipated by Yanagida

 Yanagida, Fig. 1 – plastic separator	 EX-1032, Fig. 3 – polyester tape separators
 EX-1015 (“Beggs”), Figs. 6, 7, 5:64-6:14, 6:52-56 – foamed polymer and/or dielectric tape separators	 Roberts, Fig. 13 – plastic tape-only separator (17a)
 EX-1017, Fig. 7-7 – core separator (See also EX-1018, Fig. 3-1)	 EX-1022, Fig. 1 – Z-screen separator

EX-1007, ¶42.

Separating twisted pairs using a foamed polymer, specifically, was also known by 1999. *E.g.*, EX-1015, Fig. 6, 6:1-3, cl. 19 (a “buffer” of foamed PVC separating twisted pairs); EX-1007, ¶¶44-47. The art taught that foaming a polymer (expanding it by adding air pockets) was known to both further “optimize the electrical characteristics (i.e., the dielectric constant and dissipation factor) of

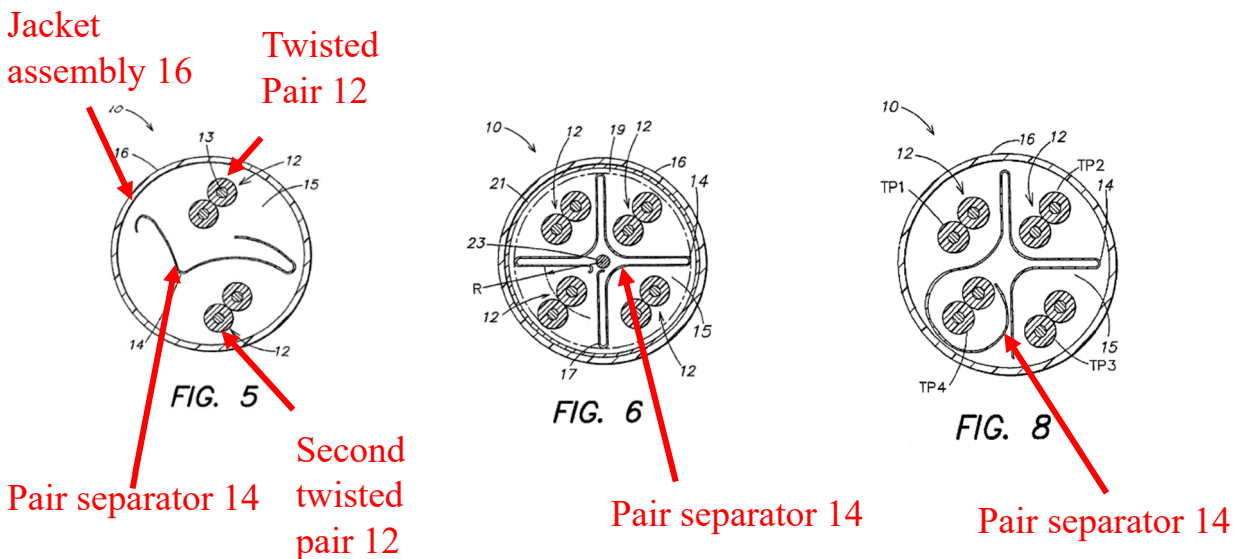
the material” and “decrease the amount of flammable material employed for a given volume of material.” Gingue, 4:5-9, 3:20-26; EX-1007, ¶¶46-48. Thus, in data communications cables “a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.” Gingue, 3:23-25.

B. Overview of the '095 Patent

The '095 Patent describes a communications cable with a plurality of twisted pairs, a “pair separator 14,” and a jacket 16. EX-1001, Abstract, 4:60-5:6; EX-1007, ¶54. The pair separator 14 and twisted pairs 12 are twisted together prior to the application of the jacket (a process also known in the art as “cabling”). EX-1001, 9:5-12; EX-1007, ¶54, ¶51. The pair separator 14 separates the twisted pairs to provide “a desired crosstalk isolation between each of the plurality of twisted pairs.” EX-1001, Abstract, *see also id.*, 4:60-5:6; EX-1007, ¶54. The pair separator 14 is configured to form grooves along a longitudinal length for the twisted pairs to be disposed within. EX-1001, Abstract; EX-1007, ¶56.

The pair separator 14 is “preferably a flame-retardant, low-dielectric constant, low-dissipation factor, foamed polymer tape,” though the '095 patent teaches the separator is not limited such materials. EX-1001, 5:25-27, 5:40-43; EX-1007, ¶55. The patent also claims a pair separator that has both a “dielectric layer” and a “conductive layer.” EX-1001, cls. 24-26; EX-1007, ¶55.

The '095 patent teaches the flat separator is folded into various shapes in the final cable assembly. Examples include:



Id., 5:1-7, 6:12-19, Figs. 5, 6 (annotated), Fig. 8 (annotated); EX-1007, ¶56.

C. Prosecution History

The Examiner initially rejected claims as obvious in view of Boucino (US 5,969,295) and Simons (US 3,911,200), and later rejected new claims over Friesen (US 6,194,663), Reede (US 6,255,593) and Gordon (US 1,976,847). EX-1037, 2, 5-11; EX-1038, 1-5. The Examiner also rejected claims 33-36 (which became issued claims 30-33) over the same combination plus the C&M Corporation publication disclosing foamed polymer. EX-1038, 5-6.

Ultimately the examiner allowed the claims, finding that the cited prior art did not teach or suggest a cable with all the claimed features in combination with:

- “the dielectric pair separator being substantially flat and being formed of a foamed polymer,” and
- “wherein the separator, the first twisted pair, and the second twisted pair are twisted about a common central axis to a twisted pair cable”

EX-1002, 6.

The Roberts, GmbH-866, Yanagida, Gingue, and Jachimowicz references in this Petition, none of which were considered in prosecution, show what the examiner found to be missing in the considered prior art. For example, Roberts and GmbH-866 each teach a cable with a substantially flat dielectric pair separator where the separator and the twisted pairs were twisted about a common axis. EX-1007, ¶¶120-126; 179-185. And Jachimowicz and Gingue teach using foamed polymer (including foamed polymer tape) to enhance the properties of data communication cables. EX-1007, ¶¶103-107, ¶¶141-158.

D. The Challenged Claims

Claims 27-33 are challenged. The two independent claims (27 and 31) recite similar limitations, except that claim 27 requires the pair separator to be “arranged within the [cable] jacket to form at least two grooves,” while claim 31 requires the pair separator to include a “substantially flat dielectric tape formed of a foamed polymer.” The Claims Listing Appendix lists the text of each of the claims and labels each element ([27.a], [27.b], etc.) for ease of reference.

V. Prior (Unfinished) *Inter Partes* Reexaminations and Lawsuit Between Patent Owner and Superior Essex (2008-2012)

From early 2008 to early 2012, Patent Owner was engaged in a lawsuit against a company called Superior Essex, along with a parallel set of *inter partes* reexaminations.¹ These disputes concerned a group of patents that included the '095 as well as two related patents—US 6,998,537 ('537 patent) and US 7,179,999 ('999 patent). All three have similar limitations related to communications cables having a separator separating twisted pairs.

The (Unfinished) Reexaminations:

None of the reexaminations involved Roberts (Grounds 1 and 2 in this Petition) as a lead reference. Roberts was cited only as a secondary reference for a different issue (that it was obvious to have a separator made entirely of dielectric). EX-1003, 17; EX-1006, 13.

The reexaminations did involve both (i) Gingue (foamed polymer) and (ii) evidence of purported secondary considerations. As to (i), where the distinction over the prior art was a “foamed polymer” limitation, both examiners found that limitation obvious in view of Gingue. EX-1006, 21-23 ('537 patent); EX-1003,

¹ *Belden Techs., Inc. et al. v. Superior Essex Inc. et al.*, Civ. No. 08-063-SLR (D. Del. Jan. 29, 2008); Reexamination No. 95/000,474 ('095 patent); Reexamination No. 95/000,476 ('537 patent); Reexamination No. 95/000,475 ('999 patent).

17-19 ('095 patent); EX-1034, 36-41 ('999 patent); EX-1007, ¶65. As to (ii), both examiners found that the purported secondary considerations evidence was not persuasive. EX-1003, 54 ('095 patent); EX-1006, 35 ('537 patent); EX-1034, 84-92 ('999 patent); EX-1007, ¶66.

The '095 patent reexaminations also involved GmbH-866. For this reference, however, the examiners² for the '095 patent and the related '999 patent reached conflicting conclusions. The '999 patent examiner found that GmbH-866 taught a “cabled about a common axis” limitation, while the '095 examiner reexaminations found GmbH-866 “at most . . . unclear and can be interpreted either way[.]” *Compare* EX-1034, 108-109 *with* EX-1003, 33-34 *and also* EX-1006, 9; EX-1007, ¶63.

None of the reexaminations reached finality. In early 2012 they were terminated at the request of the Patent Owner, following settlement of the district court litigation.³ EX-1045, 3-5; EX-1046, 4-6; EX-1047, 3-5.

² Two different examiners handled the three reexaminations—one the '095 and '537 patents, and another the '999 patent.

³ Patent Owner (Belden) and Superior Essex entered in a consent judgment and termination of the *inter partes* reexamination. The consent judgment did not

District Court Litigation:

There was a 2010 trial that included the issues of (i) whether claim 27 of the '095 patent was anticipated by GmbH-866 and (ii) whether claim 31 of the '095 patent was obvious in view of GmbH-866 and Gingue (teaching the claimed foamed polymer). The jury returned a verdict finding no on the first but yes on the second. *Belden Techs. Et al. v. Superior Essex Comm'cns LP et al.*, No. 08-63, Dkt. 245 at 2, 4 (D. Del. Sep. 16, 2010). The obviousness of claim 27 was not tried.

Patent Owner argued that the jury verdict was inconsistent because the only limitation in dispute regarding GmbH-866—the “twisted about a common axis” limitation—was shared by both claims. *Id.*, Dkt. 310, 9-10. The Judge concluded that the jury must have found “that modifying GmbH-866 to include such a twist would have been obvious to one of ordinary skill in the art given his relevant knowledge.” *Id.*, 12. However, that presented a procedural problem—earlier in the case the defendant had promised it would not argue at trial that the “twisted about a common axis” was an obvious variation of GmbH-866. Therefore the judge ordered a new trial. *Id.*, 13-14. Before the new trial was held, the parties settled.

involve CommScope (the Petitioner here) and did not reflect any final contested adjudication on the merits (it was a condition precedent of the settlement).

VI. LEVEL OF ORDINARY SKILL IN THE ART

The person of ordinary skill in the art of the '095 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). EX-1007, ¶13.

VII. CLAIM CONSTRUCTION⁴

This Petition applies the ordinary and customary meaning as would be understood by one of ordinary skill in the art in view of the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314–17 (Fed. Cir. 2005). For the purpose of this proceeding, Petitioner provides the below constructions. At this time, Petitioner does not believe it necessary for the Board to expressly construe additional terms.

⁴ Petitioner reserves all rights to raise claim construction arguments in any litigation concerning the '095 or '537 patent. For example, Patent Owner's efforts to read claims on accused products may raise controversies that require construction of certain terms.

1. Preamble - “data communications cable comprising” (claims 27-33)

The preamble of claims 27 and 31 does not limit the claims. The words “data communications cable” merely states an intended purpose. EX-1007, ¶73. The body of the claims recite a structurally complete cable; the preamble does not recite essential structure, is not relied on for antecedent basis for any claim element, and is not necessary to give life to the claim. *Id.*

2. “dielectric pair separator” (claims 27-33)

The ordinary and customary meaning of a “dielectric pair separator” in view of the intrinsic record is a separator that serves as a dielectric medium. EX-1007, ¶74.

“Dielectric pair separator” does not require that the separator *consists entirely* of dielectric. EX-1007, ¶75. For example, claim 24 requires a “dielectric pair separator,” and then further requires that the dielectric pair separator have both a “dielectric layer” and a “conductive layer”. EX-1001, cl. 24; *see also* EX-1004, cl. 14; EX-1007, ¶75. Further, there is nothing in the specification that indicates the pair separator must consist *solely* of dielectric material. EX-1007, ¶75.

This construction is consistent with the district court’s construction construing the term as a “pair separator that serves as a dielectric medium.” EX-1052, 2. The Court rejected Belden’s preferred construction (that it must be a

purely non-conductive separator) on the basis that it would be inconsistent with the language of claim 24 (as well as claim 19 of the related '537 patent). *Id.* Similarly, the examiner in the related '537 reexamination concluded that “the term ‘dielectric separator’ . . . should not be limited to a separator [that] consists of dielectric.”

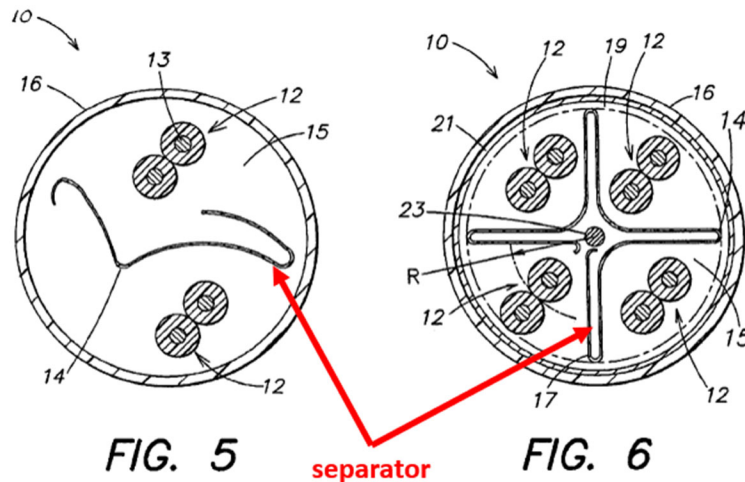
EX-1006, 12.

3. “configurable dielectric pair separator being *substantially flat*”/ “configurable dielectric pair separator . . . including a *substantially flat* dielectric tape” (claims 27-33)

The ordinary and customary meaning of a “substantially flat” separator in view of the intrinsic record is a separator that is a substantially flat member prior to being formed into the cable assembly; the term does not require that the separator be substantially flat in the finished cable. EX-1007, ¶76.

This is consistent with the specification. EX-1007, ¶77. The specification describes the separator 14 as “a flat configurable tape” that is “is supplied as a flat extruded tape” in the preferred embodiment. EX-1001, 6:12-25; EX-1007, ¶77.

The specification then explains that the pair separator 14 (a “flat configurable tape”) is arranged in various shapes in the final assembled cable:



EX-1001, Figs. 5, 6 (Annotated); EX-1007, ¶78. In Figure 5 (showing a cross-section view of Fig. 4) the pair separator 14 “is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator....” EX-1001, 5:1-5; EX-1007, ¶78. In Figure 6, “the pair separator 14 is a *flat* configurable tape ... that is *shaped to have the illustrated profile....*” EX-1001, 6:12-14 (emphasis added); EX-1007, ¶78. This is the only context the word “flat” is used as applied to the pair separator 14 (whether prior to or after assembling in the cable). EX-1007, ¶78.

The above construction is also consistent with the claims. Independent claim 27 and dependent claim 33 each requires that the dielectric pair separator is both “substantially flat” and “arranged within the jacket to form at least two grooves”. EX-1001; EX-1007, ¶79; *see also* EX-1004 (the related ’537 patent), cls. 2, 3, 17. Further, during prosecution of the related ’537 patent the patentee amended claim 1—initially reciting a “substantially flat configurable dielectric

separator disposed between the plurality of twisted pairs...in the finished communications cable”—to *add* a limitation (to distinguish the art) “so as to be substantially flat in a radial cross-section taken through the finished communications cable.” EX-1044, 3 (emphasis added); EX-1007, ¶79.

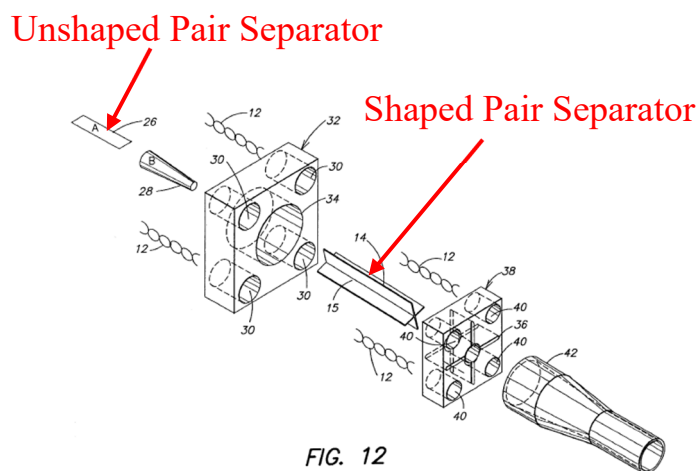
Both the Patent Office and the district court have agreed with Petitioner’s construction. The examiner in the prior ’537 patent reexamination found that “substantially flat” referred to the shape of the separator element as supplied, not necessarily in the cross-section of the finished cable. EX-1006, 10-11; EX-1007, ¶80. The district court construed similarly “substantially flat” as: “thin and substantially uniform in thickness,” explaining that the term cannot mean that the separator must have an overall profile that is substantially flat *after* arranging it. EX-1052, 3-4.

Finally, there is no support in the specification for a substantially flat configurable dielectric separator if that means it must be substantially flat in a radial cross-section of the finished cable. The specification discloses only arranging the separator into a folded shape in the final cable; there is no disclosure of a separator remaining flat in a radial cross-section of the finished cable. *E.g.*, EX-1001, Figs. 5-11, 13.

4. “Configurable” separator (claims 27-33)

The ordinary and customary meaning of a “configurable” separator in view of the intrinsic record is flexible enough to be formed or shaped in the course of making the cable. EX-1007, ¶81. This is consistent with the district court’s prior construction. EX-1052, 1-2; EX-1007, ¶84. “Configurable,” as used in the ’095 patent, does not require that the separator be *reconfigurable* or continue to remain “configurable” once in the finished cable assembly. *See also* EX-1007, ¶83.

This construction is consistent with the specification, which makes clear that the separator need only be able to form various shapes during the making of the cable. EX-1001, 8:66-9:2; EX-1007, ¶82. For example, the specification teaches that the separator is drawn from a reel and then “configured into a desired shape.” EX-1001, 8:59-9:2; Fig. 12; EX-1007, ¶82.



EX-1001, Fig. 12 (Annotated); EX-1007, ¶82. The configurable pair separator “is configured such that the twisted pairs are disposed within channels or grooves....”

EX-1001, 5:2-5; EX-1007, ¶82. The specification further describes the pair separator as “a flat configurable tape...that is shaped to have the illustrated profile....” EX-1001, 6:12-15; EX-1007, ¶82.

This construction is also supported by the claims, which recite that the “configurable” separator is “arranged within the jacket to form at least two grooves.” *E.g.*, EX-1001, cls. 27, 33. The plain meaning of this phrasing, in view of the specification, is that the separator is “configurable” into that shape during the cable manufacturing / assembly process, not that one is able to “reconfigure” the separator into that shape once the cable is manufactured.. EX-1007, ¶¶83-84.

In the related ’999 patent reexamination, the examiner also found no basis in the intrinsic record to limit “configurable” to require that the separator remain “configurable” once *inside* the assembled cable, or to require “configurable” at “normal manufacturing temperatures.” EX-1034, 111-113; EX-1007, ¶84. The examiner further noted, consistent with the understanding of a POSITA, that even heat-formed plastic members are “configurable” at “normal” manufacturing temperatures. *Id.*, 112-113; EX-1007, ¶84.

5. “Grooves” (claims 27-30, 33)

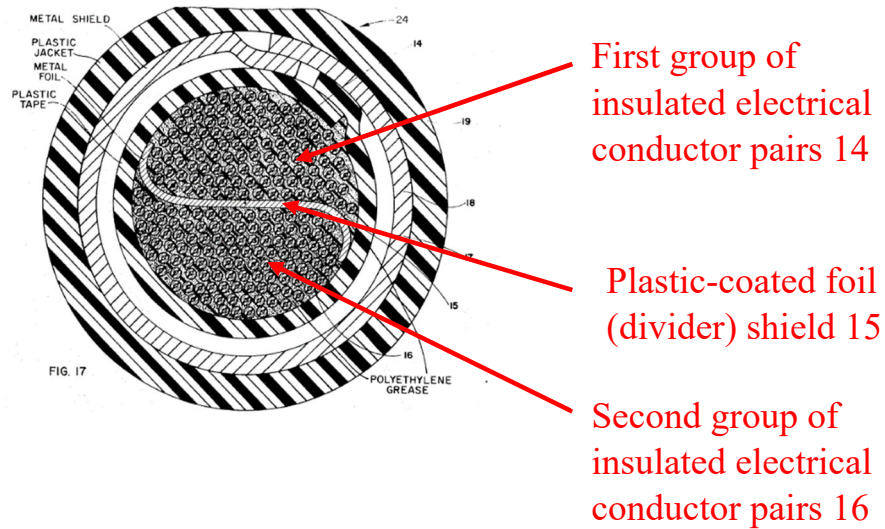
For the purpose of this proceeding, Petitioner adopts the definition provided by the district court in prior litigation: “Regions within a cable that are substantially physically separated from other regions with the cable by a pair separator; i.e., they are formed by, but need not be part of, the separator.” EX-1052, 3.

VIII. GROUND 1: ROBERTS ANTICIPATES CLAIMS 27-29

A. Roberts (EX-1009)

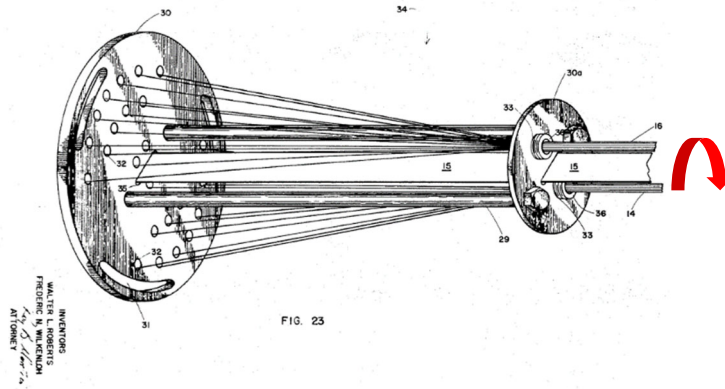
Roberts teaches a telephone cable that reduces crosstalk using various separators between electrical conductor pairs. EX-1007, ¶87; Roberts, Abstract, 13:34-36. Roberts teaches dividing a plurality of electrical conductor pairs into at least two groups by a “plastic-coated metal foil strip or tape.” Roberts, *e.g.*, Abstract, 3:28-52; 4:3-5, 10:52-62; 13:40-46 (“Dielectric protection can take the form of a firmly adhesive plastic coating...”); EX-1007, ¶¶87-89. By doing so, “crosstalk properties are [] vastly improved.” Roberts, Abstract; EX-1007, ¶87.

Roberts teaches various configurations for the dividing foil separating two groups of insulated electrical conductors (14) and (16). *E.g.*, *Id.*, 4:2-16, 10:42-62; EX-1007, ¶88. In one embodiment, foil strip shield or screen 15 has an “S” (serpentine) shape. *Id.*, 10:56-62, Fig. 17 (annotations added):



EX-1007, ¶91. This configuration requires less shield 15 material to manufacture, without the loss of desired electrical properties such as mitigation of near-end crosstalk. Roberts, 11:7-12; EX-1007, ¶92.

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.*, 12:14-29 (emphasis added); EX-1007, ¶¶93-94. This is accomplished using a manufacturing tool such as shown in Figure 23:



Id., Fig. 23 (annotation added), 12:12-14, 11:75-12:29, Fig. 23; EX-1007, ¶93.

B. Independent Claim 27

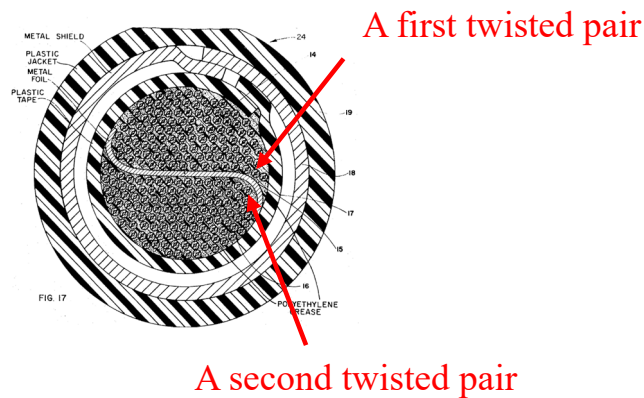
1. [27.pre] “A data communications cable comprising:”

The preamble is not limiting. Even if it were, Roberts discloses this. EX-1007, ¶¶108-112. Roberts discloses a “multiconductor cable” used in communications systems such as telephone networks. Roberts, *e.g.*, 1:1-21, Abstract; EX-1007, ¶109. Roberts discusses that its cable may be used for “pulse code modulator systems” and also transmitting carrier frequencies which a POSITA would understand are used to transmit data. EX-1009, 13:10-29, 1:20-29; EX-1007, ¶¶109-111.

2. [27.a] “a first twisted pair of insulated conductors; a second twisted pair of insulated conductors;”

Roberts teaches this element:

FIG. 17



Roberts, Fig. 17 (annotated), *see also id.*, Abstract, 12:6-8, 12:12-14; EX-1007, ¶113. Roberts describes “pairs” of insulated conductors. *E.g.*, Roberts, Abstract (“A plurality of insulated electrical conductors (*pairs*). . . By dividing electrical conductor telephone *pairs* . . . with plastic-coated metal foil, the crosstalk properties are so vastly improved”), 3:21-31 (discussing dividing a disturbing “circuit” from a disturbed “circuit”) (emphasis added); EX-1007, ¶114. Further, Roberts explains that the cable manufacturing process uses a die 30a shown at Figure 23 that has “holes (33) through which *twisted* electrical conductors (14) and (16) pass”:

FIG. 23 (manufacturing process)

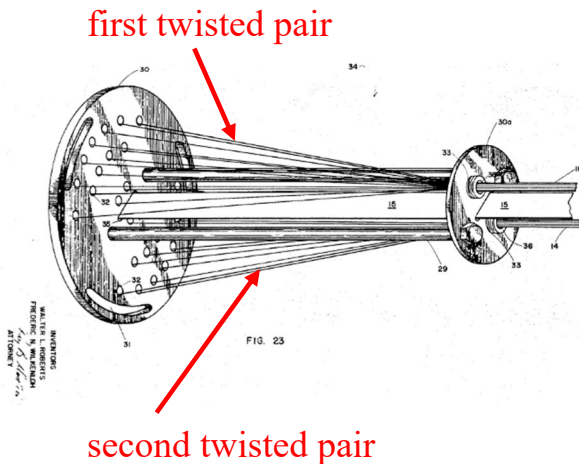
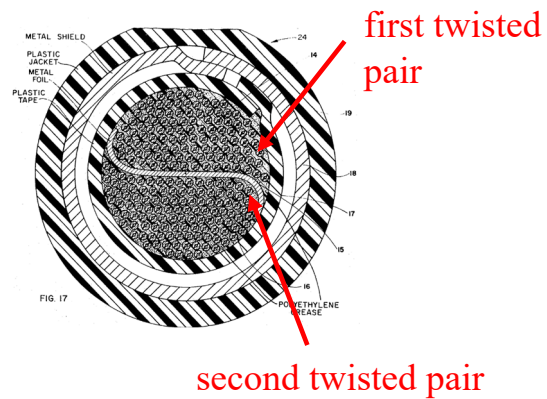


FIG. 17

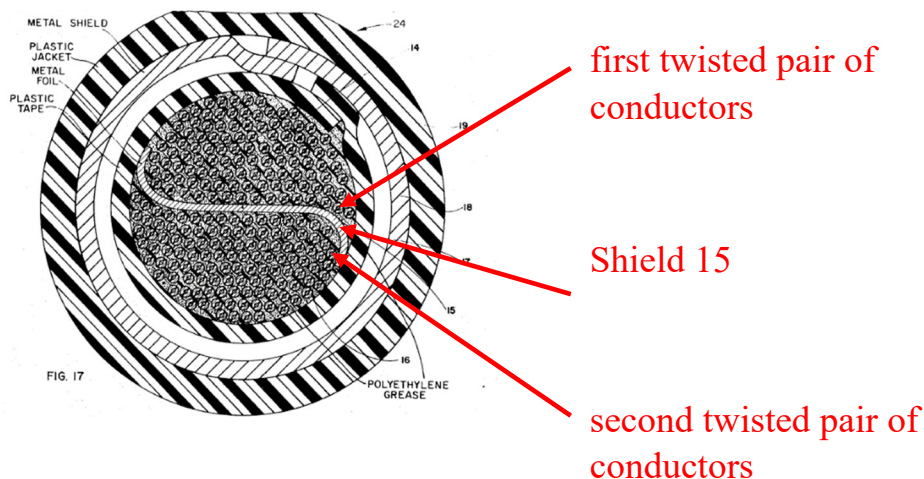


Roberts, 12:6-8, 12:5-14, Figs. 23, 17; *see also* EX-1016, 9; EX-1007, ¶116, ¶93.

A POSITA would have understood that these teachings indicate twisted pairs of insulated conductors. EX-1007, ¶¶116-119; ¶¶89-90; ¶¶33-35. In the communications cable field, unless specified otherwise a reference to “pairs” in this context was understood as a reference to twisted pairs. EX-1007, ¶118, ¶¶89-90, ¶¶33-35. Using twisted pairs was the conventional practice for data communication cables using pairs of copper conductors. EX-1007, ¶118, ¶¶89-90, ¶¶33-35; *see also, e.g.*, EX-1019, 1:10-15; EX-1016, 7; EX-1029, 23, 25, 33 Fig. 55.1; EX-1017, 11.

3. [27.b] “a configurable dielectric pair separator that separates the first and second twisted pairs of conductors, the configurable dielectric pair separator being substantially flat;”

Roberts has this element. EX-1007, ¶¶120-126. Roberts teaches a substantially flat shield or screen 15 of aluminum foil coated with plastic that serves as “dielectric protection” and separates a first and a second twisted pair of conductors (the *configurable dielectric pair separator*):



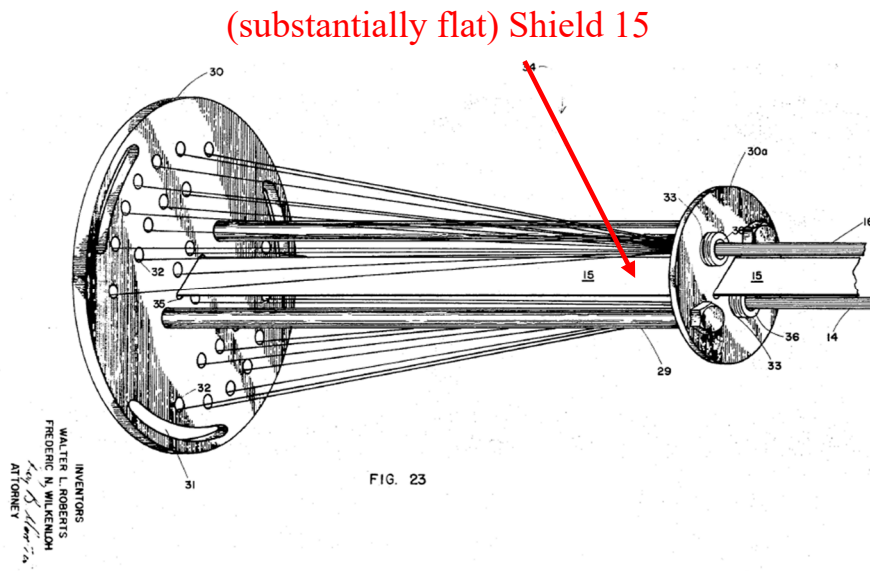
Roberts, Abstract (“A plurality of insulated electrical conductors (pairs) . . . are divided into at least two portions by plastic-coated metal foil strip or tape”); 10:48-62, 13:40-52, Fig. 17; EX-1007, ¶120 ¶89, ¶¶91-92.

Shield 15 is a *dielectric pair separator*. EX-1007, ¶121. “[The] aluminum foil shield [is] coated on both sides with the polyethylene terephthalate (Mylar) dielectric.” Roberts, 3:32-52; *see also id.* 10:59-60; EX-1007, ¶121, ¶88. Roberts describes the plastic coating on the shield 15 as “dielectric protection.” Roberts,

13:40-46; EX-1007, ¶121, ¶120, ¶88. Properly construed, the “dielectric pair separator” need not consist exclusively of dielectric; rather it merely must serve as a dielectric medium. *Supra*, §VII.3; EX-1007, ¶121. That is exactly what Roberts’ dielectric-coated shield 15 does. EX-1007, ¶¶121-122, ¶88; *see also* EX-1031, 4.

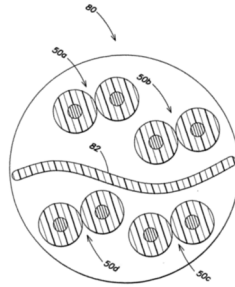
Shield 15 is *configurable*. EX-1007, ¶123. The shield is described as a “tape” and made of a thin metal foil with plastic coating. *E.g.*, Roberts at 3:32-52, 10:52-62, 13:40-46, Figs. 5, 8, 18, 21; EX-1007, ¶123, ¶¶88. The shield is sufficiently configurable such that it can be formed into “an ‘S’ (serpentine) shaped shield or screen” and also twisted along with the insulated electrical conductors to form a “twisted composite.” Roberts, 10:56-58, 12:14-30; Figs. 17, 23; EX-1007, ¶123, ¶91.

Shield 15 is *substantially flat* prior to being twisted into the final cable assembly. EX-1007, ¶124. Roberts teaches that shield 15 is a flat “plastic-coated metal foil strip or tape.” Roberts, Abstract, 10:57-61; EX-1007, ¶124, ¶87. Figure 23, which shows a manufacturing process for the cable of Figure 17 (Roberts, 12:12-15), also shows the shield 15 is flat prior to assembling into the finished cable:



Roberts at Fig. 23; EX-1007, ¶124, ¶93. As explained above, “substantially flat,” properly construed, only requires that the dielectric pair separator is initially a substantially flat member prior to being formed into the cable. *Supra*, §VII.3.

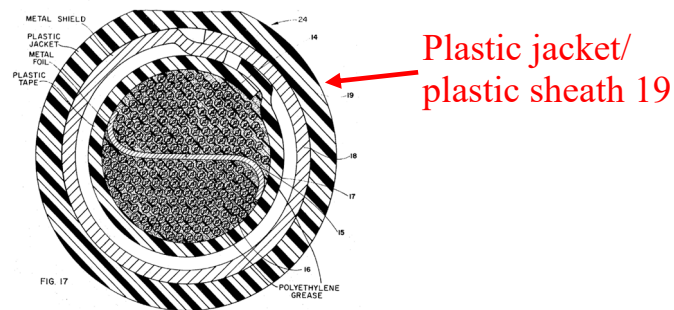
Even if “substantially flat” is interpreted to require the separator to be substantially flat *after* assembly into the final cable, a POSITA would understand Fig. 17 of Roberts to show the shield 15 in a substantially flat form in the final cable assembly. EX-1007, ¶125-126. For example, in a different publication Patent Owner shows a separator cross-section that is similar to the one in Roberts Fig. 17, and describes that “separator” as a “substantially flat configurable tape”:



EX-1025, Fig. 3, ¶¶0044; EX-1007, ¶125.

4. [27.c] “a jacket enclosing the first and second twisted pairs of insulated conductors and the dielectric pair separator; and”

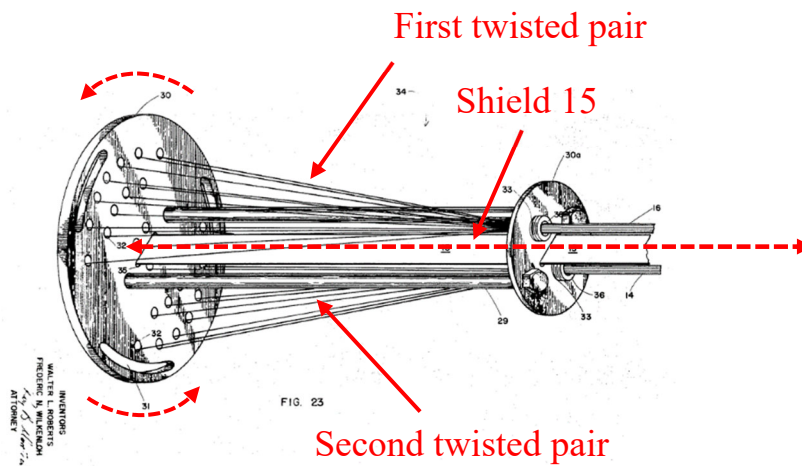
Roberts teaches this. Roberts has a “plastic jacket”/“plastic sheath 19” (*jacket*) enclosing the first and second twisted pairs of insulated conductors and the shield 15. Roberts at 12:33-36; Figure 17 (annotated):



EX-1007, ¶¶127-128.

5. [27.d] “wherein the configurable dielectric pair separator, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable; and”

Roberts teaches this. EX-1007, ¶¶129-130. Shield 15 (*configurable dielectric pair separator*) and the insulated electrical conductors 14, 16 (*first and second twisted pairs of insulated conductors*) are twisted about a common central axis. EX-1007, ¶¶129-130, ¶¶93-94. The cable assembly shown in Figure 17 includes a “*twisted composite* formed from elements (14), (15), and (16).” Roberts at 12:14-29 (emphasis added); EX-1007, ¶129, ¶¶93-94. Roberts explains that the cable in Figure 17 is produced by applying a twist about an axis running between the centers of the die plates (a *common central axis*):

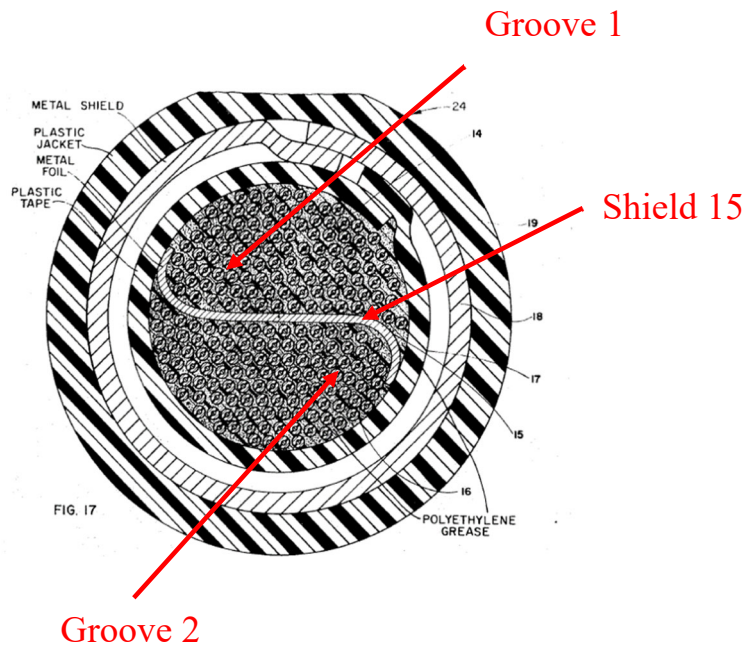


Roberts, Fig. 23 (Annotated), 11:75-12:26 (“twisting and therefore composite forming”); EX-1007, ¶130, ¶¶93-94. The outer tapes and plastic jacket are applied

downstream to form the twisted pair cable. Roberts, 12:26-38; EX-1007, ¶¶130, ¶¶93-94.

6. [27.e] “wherein the configurable dielectric pair separator is arranged within the jacket to form at least two grooves.”

Roberts teaches this. EX-1007, ¶¶131-132. Shield 15 (*configurable dielectric pair separator*) is arranged within the plastic jacket to form at least two grooves:



Roberts, Fig. 17 (Annotated); *see also id.* 10:55-57; 12:22-26; EX-1007, ¶¶131-132.

- C. **Claim 28: “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator is arranged to provide a sufficient spacing between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors so as to provide a desired crosstalk isolation between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors.”**

Roberts teaches this. EX-1007, ¶¶133-138. The dielectric-plastic-coated shield 15 (*configurable dielectric pair separator*) is arranged to provide sufficient spacing between the first and second twisted pairs of insulated conductors so as to provide a desired crosstalk isolation⁵ between those twisted pairs. *E.g.*, Roberts, Abstract (“cable structure possessing improved crosstalk properties”; “***crosstalk properties are so vastly improved***”) (emphasis added), 13:30-45 (“improved nearend crosstalk properties are realized”); EX-1007, ¶¶133-138.

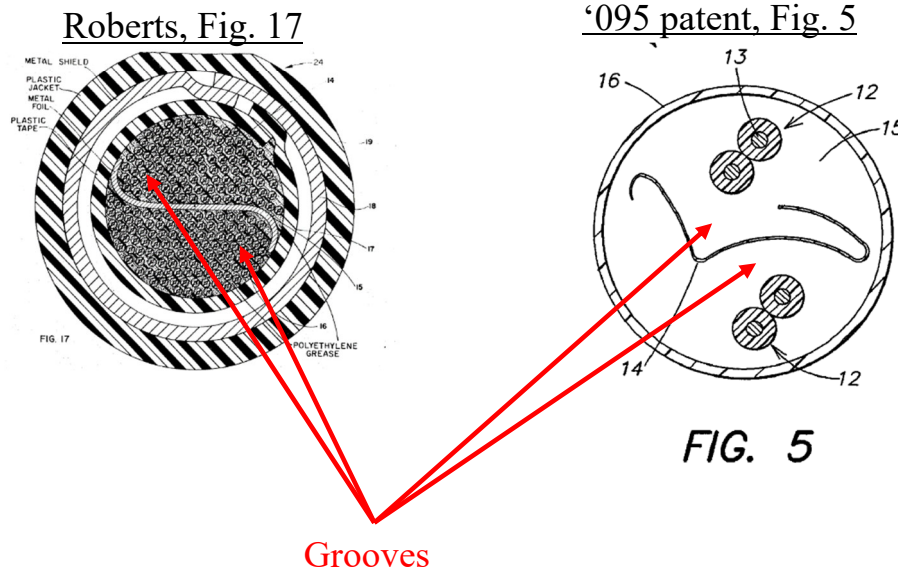
Shield 15 is arranged to provide the sufficient spacing by being placed so as to “divid[e]” a twisted pair in one group (14) from a twisted pair in the other group (16). Roberts, Fig. 17, 10:50-52, 13:34-36, 4:57-60; EX-1007, ¶135, ¶137. A POSITA would have known that an arrangement of a separator providing such

⁵ Though not a ground that can be raised in this Petition, this claim is invalid under Section 112. The specification does not provide any details regarding the required amount of spacing, nor clear teaching what the amount of desired crosstalk isolation is.

“vastly improved” crosstalk properties meant providing an increased crosstalk *isolation* (a desired crosstalk isolation). EX-1007, ¶134, ¶137, ¶87. Roberts also measures the crosstalk of cables practicing the invention, and explains that nearend crosstalk was significantly reduced compared to conventional cables “not employing a shield or screening tape.” Roberts, 12:52-13:29; *see also id.* 13:34-36; EX-1007, ¶137, ¶134, ¶87.

D. Claim 29: “The data communications cable as claimed in claim 27, wherein the at least two grooves do not form completely enclosed channels.”

Roberts teaches this. EX-1007, ¶¶139-140. Shield 15 (*configurable dielectric separator*) forms at least two grooves that do not form completely enclosed channels:



Roberts, Fig. 17; EX-1001, Fig. 1; *see also* Roberts at 10:54-55; EX-1007, ¶139.

Roberts' grooves are like the grooves 15 in Fig. 5 of the '095 patent at Figure 5, which the '095 patent says "do not form completely enclosed channels." EX-1001, 5:6-7; EX-1007, ¶139.

IX. GROUND 2: ROBERTS AND ONE OR MORE OF JACHIMOWICZ AND GINGUE RENDER CLAIMS 30-33 OBVIOUS

A. Overview of the Combination

Roberts does not disclose a dielectric pair separator that includes a dielectric tape formed of a foamed polymer, as required by claims 30-33. However, Jachimowicz discloses a foamed polymer tape, and Jachimowicz and Gingue each teach the benefits of using such a foamed polymer in data communications cables as an insulating/isolation member. EX-1007, ¶142; ¶¶103-107. And separating twisted pairs with a foamed polymer buffer was already known in the art. *E.g.*, EX-1015, Fig. 6 and cl. 19 (a "buffer" of foamed PVC separating twisted pairs); EX-1007, ¶141. It would have been obvious in view of the teachings of Jachimowicz and/or Gingue to use a foamed polymer tape with Roberts' "plastic-coated metal foil strip or tape" separator 15, to predictably improve cable performance and reliability. EX-1007, ¶¶141-158.

Indeed, during the reexaminations of this patent and the related '537 and '999 patents, both reexamination examiners thought that the "foamed polymer" limitations did not provide a patentable distinction over the teachings of Gingue.

EX-1006, 21-23 ('537 patent); EX-1003, 17-19 ('095 patent); EX-1034, 36-41 ('999 patent); EX-1007, ¶65.

1. Jachimowicz (EX-1014)

Jachimowicz teaches a data communications cable (for sending “pulse code modulated signals”) with multiple sets of twisted pairs of conductors that are then “assembled in a twisted cable core.” Jachimowicz, Abstract, 1:6-16; EX-1007, ¶105. Jachimowicz teaches an embodiment with three twisted pairs of conductors 10, 12, and 14. *Id.*, 2:28-34, Fig. 1; EX-1007, ¶106. A layer or “*tape made of foamed thermoplastic*” supported by a film such as Mylar or polypropylene or other material” may be applied over the twisted pairs to hold them together and prevent lay distortion. *Id.* at 2:46-54 (emphasis added); EX-1007, ¶107. Jachimowicz provides a metal shield 24 over the “jacket or tape of foamed material 20,” explaining that the layer of foamed tape provides the further advantage of separating the twisted conductor pairs from the metal shield. *Id.*, 2:56-59; EX-1007, ¶107.

2. Gingue (EX-1013)

Gingue discloses a composite insulation for electrical conductors in jacketed cables, including “data transmission cables,” that includes a layer of “foamed polymeric material.” Gingue, Abstract, 1:8-10, 5:18-22; EX-1007, ¶103. The foamed polymer material has “reduced flame spread” while also having “favorable

electrical properties.” Gingue, 1:9-12; *see also id.* 3:20-26 (“In general, the electrical performance of an insulating material is enhanced by foaming or expanding the corresponding material. Foaming also decreases the amount of flammable material....”); EX-1007, ¶103. The foamed polymeric inner layer “optimizes the electrical characteristics (i.e., the dielectric constant and dissipation factor) of the material”. Gingue, 4:5-9; EX-1007, ¶104. In the preferred embodiment, the foamed polymeric layer also includes an additive that renders the layer flame retardant and smoke suppressant. Gingue, 4:37-39; EX-1007, ¶104.

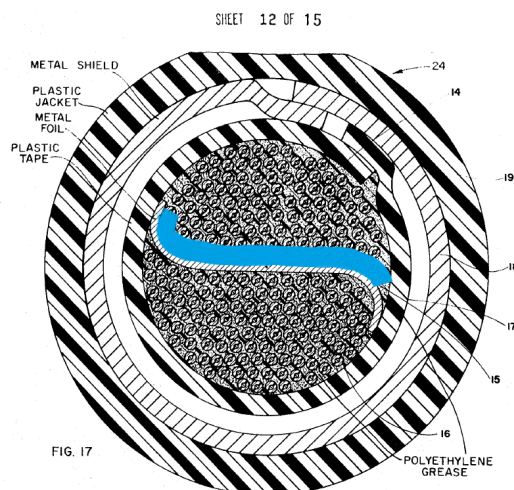
B. Claim 30: “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator comprises a foamed polymer tape.”

Roberts teaches all the elements of independent claim 27, as explained in Ground 1. EX-1007, ¶¶108-140. Roberts does not disclose “wherein the configurable dielectric pair separator comprises a foamed polymer tape,” as required by claim 30.

Jachimowicz teaches a “*tape made of foamed thermoplastic* supported by a film such as Mylar or polypropylene” over a set of multiple twisted pairs in a telephone communications cable. Jachimowicz, 2:46-54 (emphasis added); *see also id.* 2:56-59 (“foamed polyethylene 20”); EX-1007, ¶142, ¶107. Gingue teaches insulation for electrical conductors in “data transmission cables,” that includes a layer of “*foamed polymeric* material.” Gingue, Abstract, 1:8-10

(emphasis added), 4:1-2, 4:22-36 (“foamed polyethylene or foamed polypropylene”), 5:18-22; EX-1007, ¶142, ¶103. In view of the teachings of Jachimowicz and Gingue, it would be apparent to a POSITA that such a foamed polymer tape would be dielectric, having a very low dielectric constant. Polymers such as polyethylene have a “very low dielectric constant” (Gingue, 2:10-14), and foaming a polymer lowers the dielectric constant even more (Gingue, 3:20-25). EX-1007, ¶143, ¶¶44-45, ¶48. Jachimowicz teaches the foamed polymer may be “foamed polyethylene”—the polymer Gingue says is “very low dielectric constant.” Jachimowicz, 2:46-54; EX-1007, ¶143, ¶¶44-46, ¶48, ¶104, ¶107.

A POSITA would have been motivated, with a reasonable expectation of success, to modify the Roberts “plastic-coated metal foil strip or tape” 15 to include a substantially flat dielectric foamed polymer tape in view of Gingue and/or Jachimowicz, either instead or in addition to the non-foamed plastic coating on shield 15, on either one or both sides of the shield. EX-1007, ¶¶144-158. A conceptual example is shown below:



Roberts, Fig. 17 (dielectric foamed polymer tape in annotated in blue); EX-1007, ¶144.

A POSITA would have been motivated to make this modification due to market pressure to increase communications cable performance and reliability. EX-1007, ¶145, ¶143, ¶¶146-152. By 1999, those in the communications cable industry knew that transmission loss degraded cable performance, and that metal shielding around twisted pairs (such as that shown by Roberts) caused undesirable transmission loss. EX-1007, ¶145, ¶48; EX-1015, 2:54-65 (“[A]s the electric and magnetic fields are confined [by shielding], capacitance . . . change[s] in such a way as to increase transmission loss.”). This modification would have been expected to predictably improve the performance and reliability of Roberts’ cable, for at least two reasons. EX-1007, ¶¶145-152.

First, a POSITA would have expected the foamed tape to reduce transmission losses by reducing the capacitance between the twisted pairs and the

conductive shield 15, thereby reducing current leaking out from the twisted pairs. EX-1007, ¶146, ¶48. Two known ways to effectively reduce the transmission loss-causing capacitance were (i) lowering the dielectric constant of the material between conductors, and (2) increasing the distance between conductors. EX-1007, ¶¶146-149; Jachimowicz, 2:55-60; EX-1015, 2:62-64. A POSITA would have been motivated to add a foamed polymer tape to Roberts' shield 15 as explained above to predictably accomplish both at the same time. EX-1007, ¶¶147-149. As explained above, in view of the teachings of Jachimowicz and Gingue the foamed polymer tape would be understood to be a dielectric with a low dielectric constant, thus adding to Roberts shield would predictably lower the dielectric constant between the shield and the conductors of the twisted pairs. EX-1007, ¶¶146-148, ¶¶103-107. Foamed polymer tape would also predictably increase the distance between twisted pairs and the conductive layer of Roberts' shield 15, as foaming a polymer creates an "expanded" material by adding air pockets. EX-1007, ¶¶146-147, ¶149.

Second, a foamed polymer tape would have been expected to provide an enhanced dielectric barrier between Roberts' metal foil shield 15 and the twisted pairs. EX-1007, ¶¶150-152. Roberts teaches that the plastic coating on the metal foil strip/tape 15 provides "dielectric protection" from unwanted electrical energy escaping holes in the copper conductor insulation. Roberts, 13:41-45, 3:39-51; EX-

1007, ¶¶150-151. This is also known as protection against dielectric breakdown. EX-1007, ¶¶150-151. Modifying Roberts to include a foamed polymer tape would have predictably improved this protection both by providing additional dielectric insulating material between the groups of twisted pairs and the metal foil strip/tape 15 and by increasing the distance between them—reducing the risk of dielectric breakdown. EX-1007, ¶152.

A POSITA would have had a reasonable expectation of success in modifying Roberts' plastic-coated metal foil strip or tape 15 to include a foamed polymer tape given the nearly complete overlap in the technology. EX-1007, ¶¶153-156. For example, Jachimowicz's foamed polymer tape is "supported by a film such as Mylar or polypropylene or other material." Jachimowicz, 2:46-54; EX-1007, ¶154, ¶107. Roberts already discloses coating shield 15 with Mylar or polypropylene, and that the plastic coating can be on one side of the metal shield, both, or completely surround it. Roberts, 3:35-37, 10:55-61; EX-1007, ¶154. Roberts also teaches that twisted pairs can be separated by a Mylar-only plastic tape 17a. Roberts, 7:43-46, Fig. 13; EX-1007, ¶154. Thus a POSITA would expect to easily provide a Mylar or polypropylene-backed foamed polymer tape attached to or next to Roberts' shield 15. EX-1007, ¶154. Each reference also teaches constructions of data communications cables having copper wires, and therefore a POSITA

would have expected to be able to predictably combine the teachings using only routine skill. EX-1007, ¶153.

Further, making Roberts' cable to include a foamed polymer tape with the shield 15 would not have required any substantial modifications of the manufacturing process Roberts teaches. EX-1007, ¶155; *see* Roberts, 11:70-12:30, Fig. 23. For example, a POSITA would have expected to simply provide a foamed polymer tape on the outside of Roberts' plastic-coated foil strip or tape while laying up the cable s. EX-1007, ¶155. Or, a POSITA could have used a foamed polymer-coated aluminum tape to feed into the cabling machine as the separator 15, as foamed polymer-coated aluminum shielding was already known in the art. EX-1007, ¶155; EX-1027, 2:50-52. Finally, a POSITA would have also expected to use the foamed polymer insulator described in Gingue as the plastic coating (or in addition to the plastic coating) on the Roberts shield member 15 to obtain a predictable result and improve the cable in the same way as Gingue taught: improved electrical performance due to the low(er) dielectric constant provided by the foaming of the insulation material. EX-1007, ¶156, ¶¶146-148, ¶¶103-104. Thus, the modification would have been obvious. EX-1007, ¶158.

C. Independent Claim 31

1. [31.pre], [31.a], [31.b], [31.d], [31.e]

Elements 31.pre, 31.a, 31.b, 31.d, and 31.e are like claim elements 27.pre, 27.a, 27.b., 27.c, and 27.d, respectively. Therefore Roberts discloses these elements for the same reasons as explained above. *Supra*, VIII.B; EX-1007, ¶¶108-132, ¶¶159-161, ¶¶164-166.

2. [31.c] “the configurable dielectric pair separator including a substantially flat dielectric tape formed of a foamed polymer;”

Roberts in combination with one or more of Jachimowicz and Gingue teaches a configurable dielectric pair separator including a *substantially flat dielectric tape formed of a foamed polymer*, as explained above with respect to claim 30. *Supra*, §IX.B; EX-1007, ¶¶141-158, ¶16. A POSITA would have found this element obvious for the same reasons as explained above with respect to claim 30. EX-1007, ¶¶162-163.

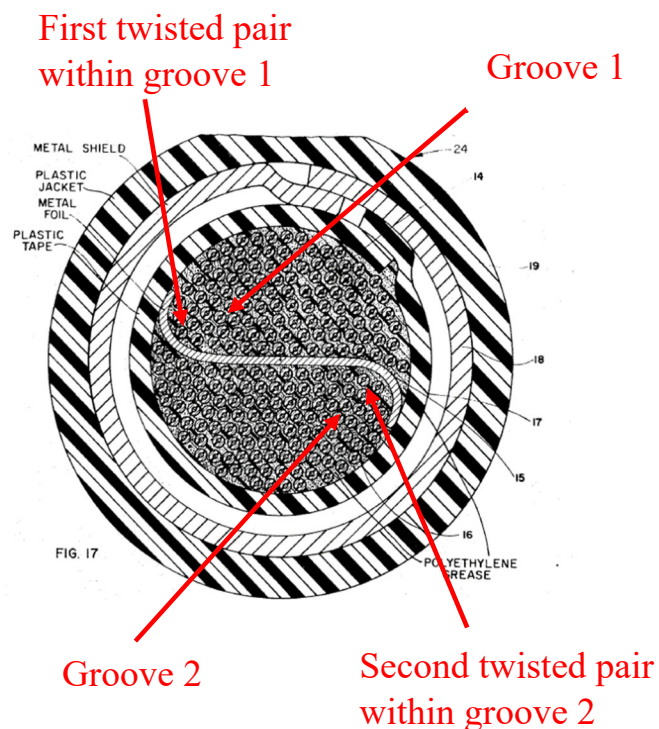
D. Dependent claim 32

Roberts teaches claim 32, for the same reasons explained above with respect to claim 28. *Supra*, §VIII.B.7; EX-1007, ¶¶167-169, ¶¶133-138. Also, because the modification of Roberts to include a foamed polymer tape would provide and maintain an even greater spacing between a twisted pair on one side of the separator and a twisted pair on the other side, the modification would result in an

arrangement that provides an even larger amount of desirable cross talk isolation, and an obvious modification to make. EX-1007, ¶167.

E. Dependent claim 33: “The data communications cable as claimed in claim 31, wherein the configurable dielectric pair separator is arranged within the jacket to provide at least two grooves, at least one twisted pair of conductors being disposed within each of the at least two grooves.”

Roberts teaches this, for the same reasons explained above with respect to claim element 27.e. *Supra*, §VIII.B.6, EX-1007, ¶170, ¶¶131-132. Roberts further teaches that at least one twisted pair of conductors is disposed within each of the at least two grooves:



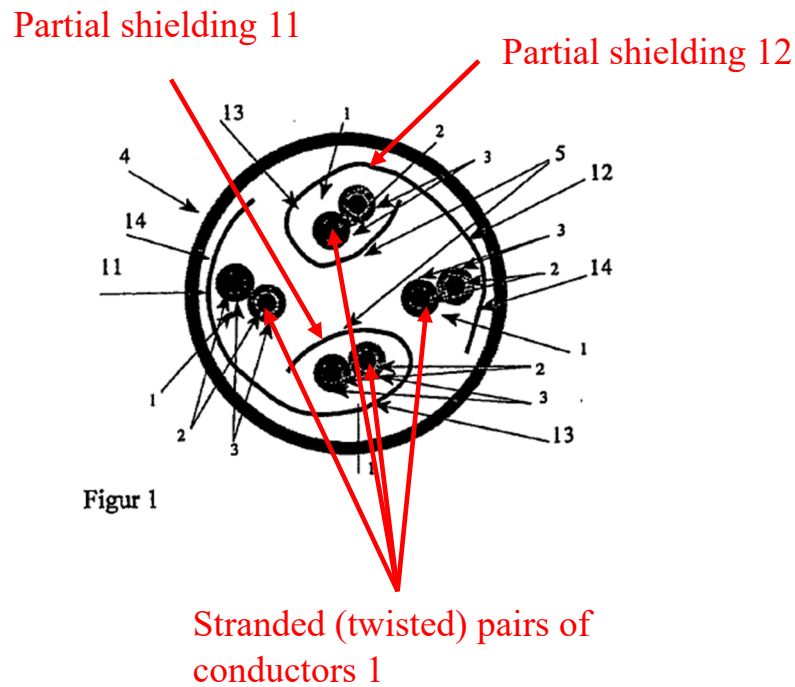
EX-1007, ¶170.

X. GROUND 3: GmbH-866 ANTICIPATES CLAIMS 27-29

A. GmbH-866 (EX-1010)

GmbH-866 teaches a “data transfer cable” having multiple twisted pairs of insulated conductors that are “divided” from each other by a preferably plastic-coated metal foil shielding. GmbH-866, 3, 4; EX-1007, ¶95. This creates cables with “optimized transfer properties,” including “low crosstalk”, at a lowered manufacturing cost. GmbH-866, 2; EX-1007, ¶95.

Each conductor pair consists of two insulated wires “stranded” (twisted) together. *E.g.*, GmbH-866, 3; EX-1007, ¶96. The shielding 5 preferably consists of metal foils that are “laminated with plastics material.” GmbH-866, 5; EX-1007, ¶97. The plastic-coated shieldings 5 can be “formed of two mutually independent partial shieldings 11, 12” that “divide[the cable] into four shielding sectors 6 to 9” with a (twisted) conductor pair “extend[ing] in each shielding sector”:



GmbH-866, 2, 4; Fig. 1 (annotated); EX-1007, ¶98.

The stranded pairs of electrical conductors 1 and the partial shieldings 11, 12 are twisted or cabled together about a common axis to form the finished cable.

E.g., GmbH-866, 5 (“partial shieldings 11, 12 . . . are applied together with the stranding [of] the conductor pairs 1”), 6; EX-1007, ¶99.

B. Independent Claim 27

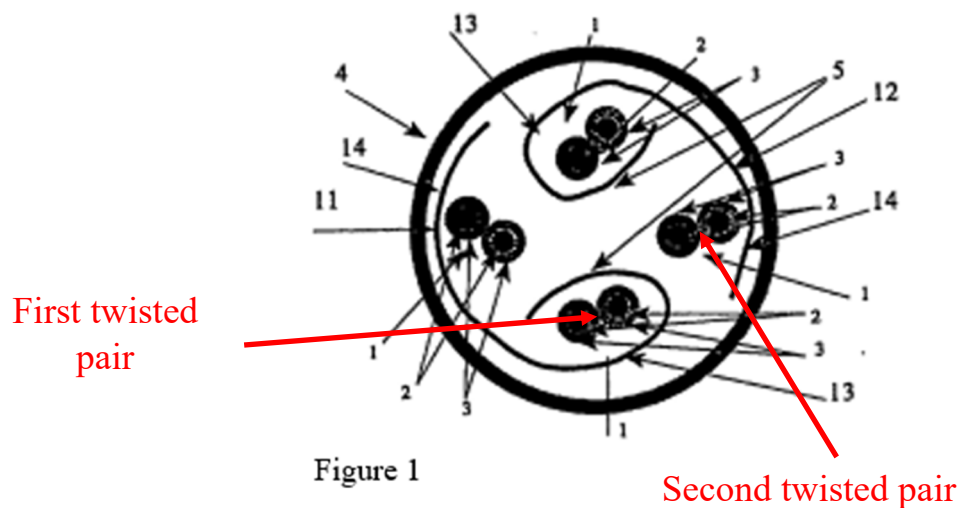
1. [27.pre] “A data communications cable comprising:”

The preamble is not limiting. Even if it were, GmbH-866 teaches this.

GmbH-866 at Title (“Data transfer cable”), 2 (describing data transfer “1 to 100 MHz or 1 to 600 MHz”); EX-1007, ¶¶172-173, ¶95.

2. [27.a] “a first twisted pair of insulated conductors; a second twisted pair of insulated conductors;”

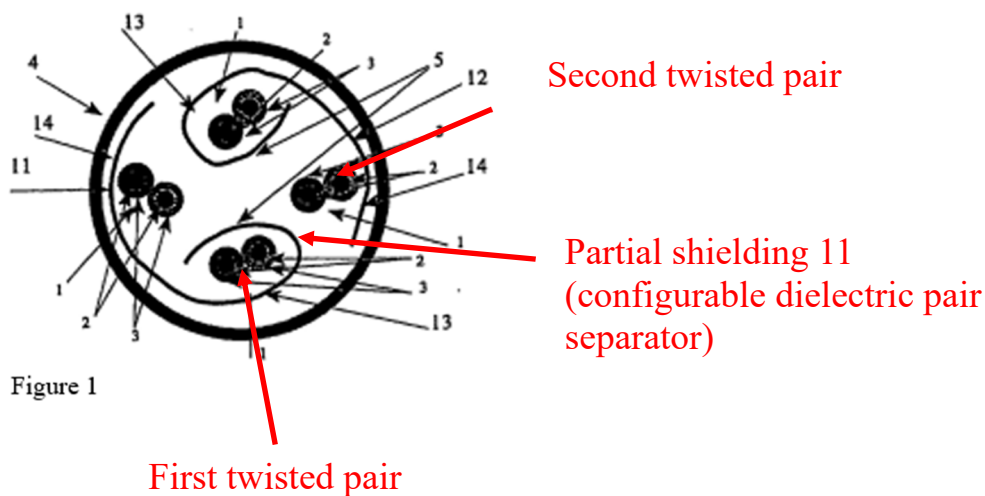
GmbH-866 discloses this element. EX-1007, ¶¶174-178. “A data transfer cable...shown in Fig. 1, comprises four pairs 1, each consisting of *two* isolated, *stranded copper conductors 2 or wires.*” GmbH-866, 3, 4 (“invention can also comprise just two *pairs of stranded conductors*”) (emphasis added); EX-1007, ¶174, ¶96.



GmbH-866 at Fig. 1 (Annotated); EX-1007, ¶176. “Stranded” was understood to mean “twisted.” EX-1007, ¶174. GmbH-866 also teaches that the twisted pairs consist of insulated conductors: “[the] wires preferably have an *insulation 3*”. GmbH-866 at 3 (emphasis added); EX-1007, ¶175.

3. [27.b] “a configurable dielectric pair separator that separates the first and second twisted pairs of conductors, the configurable dielectric pair separator being substantially flat;”

GmbH-866 discloses a cable with partial shieldings 11, 12 (each a *configurable dielectric pair separator*) that each *separate* the first and second twisted pairs and is *substantially flat*:



GmbH-866, Fig. 1; EX-1007, ¶179, ¶¶97-98.

The partial shielding 11 or 12 is a *dielectric* pair separator. EX-1007, ¶181. GmbH-866 teaches that the partial shielding is preferably made from “metal foils, in particular, aluminum foils or aluminum foils laminated with plastics material.” GmbH-866, 5; EX-1007, ¶181, ¶97. A POSITA would recognize that such a plastic material used to laminate aluminum foil is a dielectric. EX-1007, ¶181, ¶¶44-45; EX-1031, 4 (dielectrics include “plastic film”); Roberts, 13:40-45 (“dielectric

protection can take the form of a firmly adhesive plastic coating”). As explained above, a “dielectric pair separator” need not consist *exclusively* of dielectric.

Supra, §VII.2. Rather, it serves as a dielectric medium. *Id.*; EX-1007, ¶181. A POSITA would recognize that the plastic-laminated aluminum foil shield taught by GmbH-866 does that, creating an insulating layer between the metal foil and adjacent components. EX-1007, ¶181.

The partial shielding 11 or 12 is *configurable*. For example, it is formed into the shape of the number “6” in one embodiment:

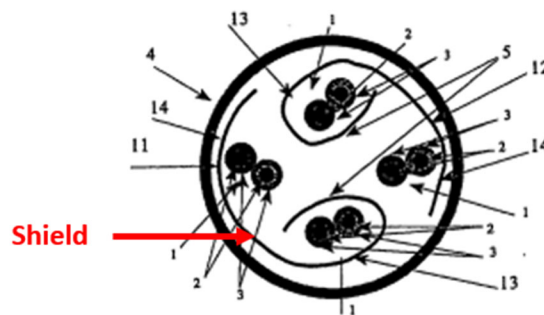
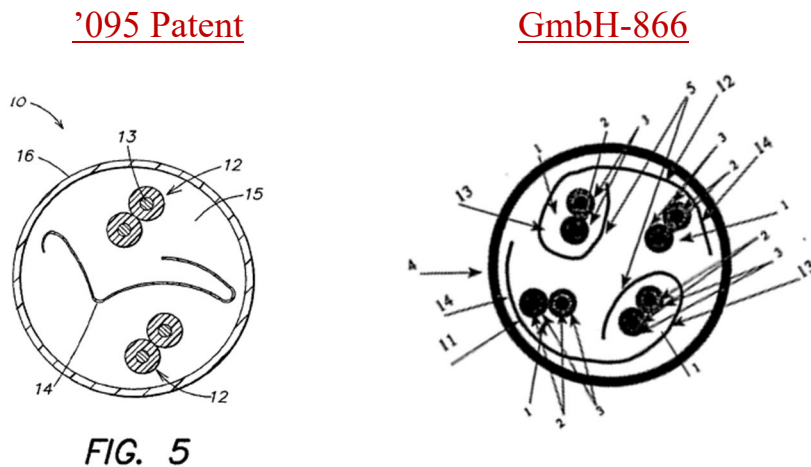


Figure 1

GmbH-866, 4 and Fig. 1; EX-1007, ¶182.

The partial shielding 11 or 12 is also *substantially flat* prior to application to the twisted pairs. EX-1007, ¶¶183-185. As explained above, this is what “substantially flat” requires. *Supra*, §VII.3. Shieldings 11, 12 are preferably made from aluminum foil laminated with plastic, with the thickness of the aluminum being between 20 and 60 µm. GmbH-866, 5; EX-1007, ¶183. A POSITA would recognize such a member as substantially flat. EX-1007, ¶183. Further, as

explained above the Patent Owner previously argued (during the reexamination) that Figure 4 of the '095 patent shows a separator that is substantially flat. Figure 5 of the '095 patent shows the Figure 4 embodiment in cross section with a configuration like Figure 1 of GmbH-866:



Compare EX-1001, Figs. 4, 5 and 4:15-16 with GmbH, Fig. 1; EX-1007, ¶184.

4. [27.c] “a jacket enclosing the first and second twisted pairs of insulated conductors and the dielectric pair separator; and”

GmbH-866 has a cable sheath 4 (*jacket*) enclosing the insulated *twisted pairs* 1 and the partial shieldings 11, 12 (each a *dielectric pair separator*):

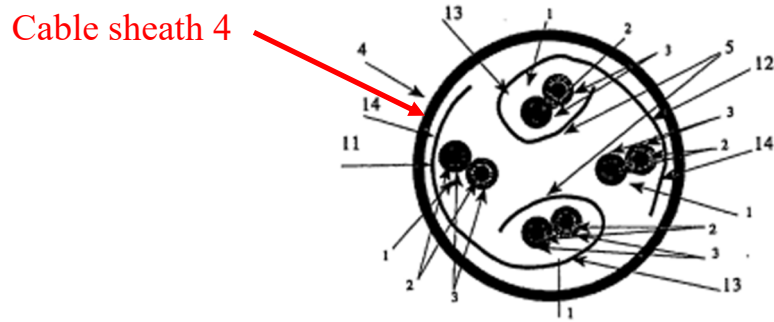


Figure 1

Gmbh-866, 4; Fig. 1; EX-1007, ¶¶186-187.

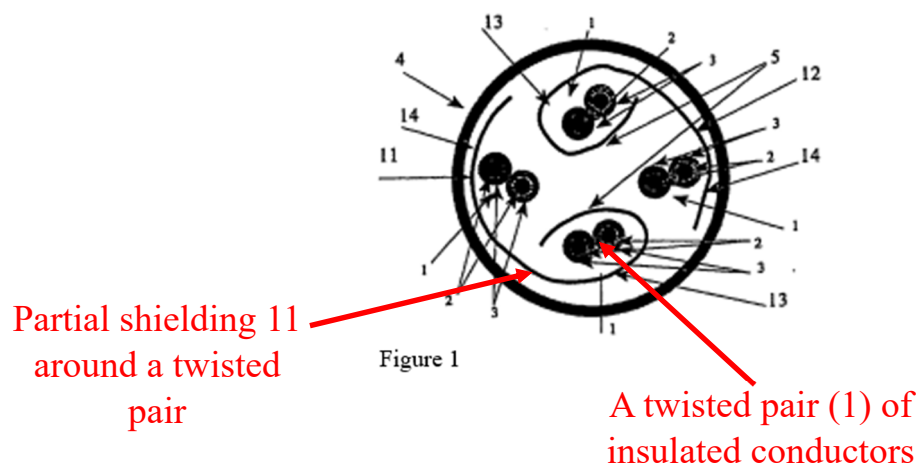
5. [27.d] “wherein the configurable dielectric pair separator, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable; and”

GmbH-866 discloses this claim element. EX-1007, ¶¶188-194. “[S]tranding of the pairs can consist in what is known as a helix stranding or an SZ stranding.” GmbH-866, 3; EX-1007, ¶188. Helix stranding is in a single direction about a common axis. EX-1007, ¶188. SZ stranding also involves stranding about a common axis but with alternating twist directions. *Id.* Both result in twisting the twisted pairs about a central axis to form a twisted pair cable. *Id.*

GmbH-866 teaches that the twisting during assembly includes partial shieldings 11, 12—in other words, it teaches applying the partial shieldings *with* the stranding of the pairs. *E.g.*, GmbH-866, 2-3 (“application or *introduction of the shielding* into the cable *to take place by means of stranding...*”), 5 (“partial shieldings 11, 12 or 17, 18 are *applied together* with the stranding [of] the

conductor pairs 1”) (emphasis added); EX-1007, ¶189. GmbH-866 also teaches that the laying tools provided for partial shieldings 11, 12 “can assist the change in stranding direction” when doing SZ stranding. GmbH-866, 5-6; EX-1007, ¶189.

These teachings in GmbH-866 do not only refer to twisting the individual wires into stranded pairs for several reasons. EX-1007, ¶¶190-193. First, if GmbH-866 was referring only to twisting of individual pairs into stranded pairs, its additional teaching that the partial shieldings 11, 12 are “applied together” with the stranding of conductor pairs would end up (illogically) with the partial shieldings between the individual wires of each pair. EX-1007, ¶190. But the Figures show partial shieldings 11, 12 partially *around* the twisted pairs, not between individual wires of each pair:



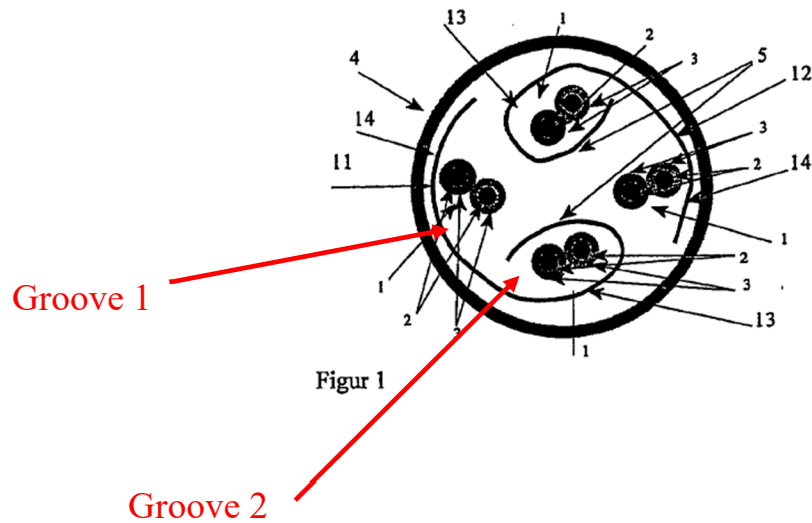
GmbH-866, Fig. 1-5; EX-1007, ¶190. Second, the description that the partial shieldings 11, 12 are “applied together” with the stranding and that this “can assist”

in changing the direction of the stranding indicates to a POSITA that the cable components are being stranded together about a common axis to form the final cable assembly. GmbH-866, 5-6; EX-1007, ¶191. Third, SZ stranding of *individual* wires in a twisted pair (as opposed to simply SZ-stranding multiple sets of twisted pairs) would have been extremely uncommon as of 1999 (and even today), due to the detrimental tendency to become unwound when moved or stretched. EX-1007, ¶192.

GmbH-866 describes twisting all the components of a cable about a central axis in the final cable assembly (also called “stranding” or “cabling”). EX-1007, ¶¶190-194, ¶¶51-53. That was the most common cable construction (cable components twisted about a common axis) for data communications cables as of February 1999. EX-1007, ¶193, ¶¶51-53; EX-1016, 9-10; Roberts, Figs. 22-23, 11:28-31, 12:17-26; Jackomowicz, 1:54-56, 2:4-5, 3:21-22.

6. [27.e] “wherein the configurable dielectric pair separator is arranged within the jacket to form at least two grooves.”

GmbH-866 discloses this. EX-1007, ¶195-196. A partial shielding 11 (or 12) (*configurable dielectric pair separator*) is arranged within cable sheath 4 (*jacket*) such that it forms at least two grooves:

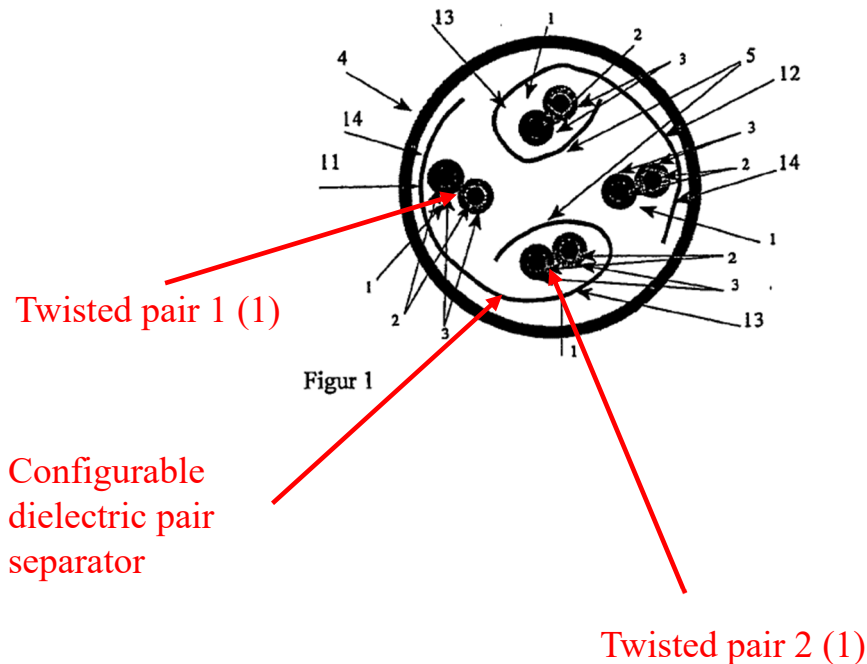


GmbH-866, Fig. 1 (Annotated), 3, *see also id.* Figs. 2-5; EX-1007, ¶195.

- C. **Claim 28:** “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator is arranged to provide a sufficient spacing between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors so as to provide a desired crosstalk isolation between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors.”

GmbH-866 teaches this. EX-1007, ¶¶197-202. Partial shielding 11 (or 12) (*configurable dielectric separator*) is arranged to provide sufficient spacing between the first and second twisted pairs of insulated conductors so as to provide a desired crosstalk isolation between those twisted pairs. *E.g.*, GmbH-866 (teaching an invention for cables “in communication networks that require optimized transmission characteristics, especially . . . **low crosstalk**”) (emphasis added); EX-1007, ¶197-98, ¶95. The partial shielding is arranged to “divid[e] the cable cross section into at least two shielding sectors, and one conductor pair (1)

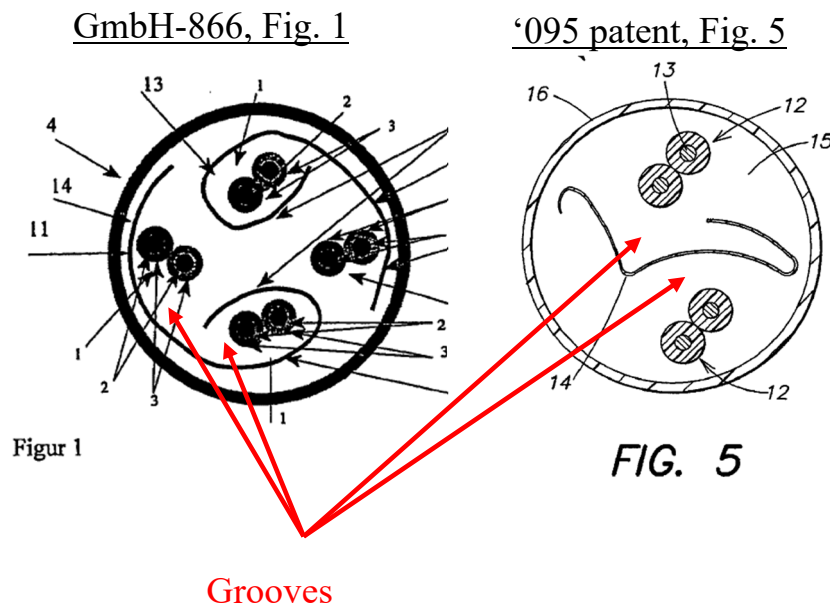
extends in each shielding sector.” GmbH-866, cl. 1; *see also id.*, 4 (“cable cross section is divided into four shielding sectors”):



GmbH-866, Fig. 1 (annotation added); EX-1007, ¶¶199-200. Further, the arrangement of the partial shieldings 11, 12 provides a curved shape for the separator (partial shielding 11 or 12) that keeps the twisted pairs apart. EX-1007, ¶200. It was known in the art that keeping twisted pairs physically spaced apart provides a desired crosstalk isolation. EX-1007, ¶200, ¶40; EX-1023, 3:17-24; EX-1015, 7:58-61. The examiner conducting the ’095/’537 reexaminations, prior to their termination, also agreed that GmbH-866 disclosed a separator that provided “sufficient spacing to provide a desired crosstalk isolation.” EX-1003, 15.

D. Claim 29: “The data communications cable as claimed in claim 27, wherein the at least two grooves do not form completely enclosed channels.”

The grooves formed by partial shielding 11 do not form completely enclosed channels. GmbH-866 at Fig. 1. EX-1007, ¶¶203-204 These grooves are like the grooves 15 depicted in Fig. 5 of the ‘095 patent, which the ‘095 says “do not form completely enclosed channels”:



GmbH-866, Fig. 1; ‘095 patent, 5:6-7, Fig. 5; EX-1007, ¶203.

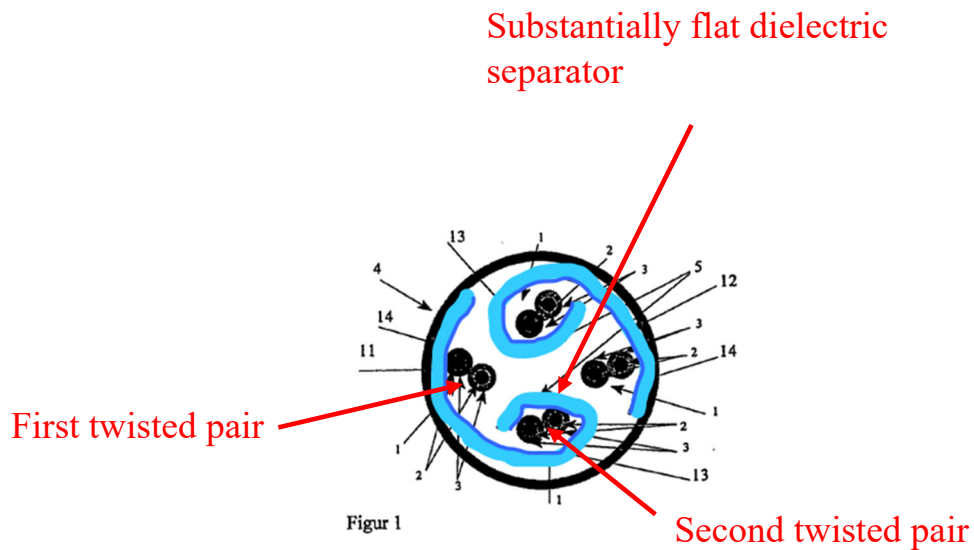
XI. GROUND 4: GmbH-866 IN COMBINATION WITH ONE OR MORE OF JACHIMOWICZ AND GINGUE RENDERS CLAIMS 30-33 OBVIOUS

GmbH-866 does not teach a dielectric pair separator that includes a foamed polymer tape recited in claims 30-33. However, Jachimowicz discloses foamed polymer tape, and Jachimowicz and Gingue each teach the benefits of using such a foamed polymer in data communications cables as an insulating/isolation member,

as explained above with respect to Ground 2. *Supra*, §IX.A; EX-1007, ¶¶205-206; ¶¶103-107; ¶¶141-143. It would have been obvious in view of Jachimowicz and/or Gingue to use a foamed polymer tape with the partial shielding 11 and/or 12 taught by GmbH-866. EX-1007, ¶¶205-220.

A. Claim 30: “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator comprises a foamed polymer tape.”

GmbH-866 teaches all the elements of independent claim 27, as explained in Ground 3 above. EX-1007, ¶205, ¶¶171-196. GmbH-866 does not teach that the separator comprises a foamed polymer tape, as required by claim 30. In view of the further teachings of Jachimowicz and/or Gingue, a POSITA would have been motivated, with a reasonable expectation of success, to modify one or more of the partial shieldings 11, 12 (*configurable pair dielectric separator*) of GmbH-866 to include a substantially flat dielectric foamed polymer tape, either instead or in addition to the non-foamed plastic coating on shieldings 11, 12. EX-1007, ¶¶205-214. A conceptual example of this modification is below:



GmbH-866, Fig. 1 (dielectric foamed polymer tape in blue); EX-1007, ¶210.

A POSITA would have been motivated to make this modification due to market pressure to increase communications cable performance, reliability, and safety. EX-1007, ¶209, ¶145. By 1999, those in the communications cable industry knew that transmission loss degraded cable performance, and that communications cables should be flame retardant. EX-1007, ¶¶211-214, ¶46, ¶¶49-50. Further, metal shielding around twisted pairs (such as that shown by GmbH-866) was known to cause undesirable transmission loss. EX-1007, ¶208, ¶212, ¶¶49-50; EX-1015, 2:54-66. And, separating twisted pairs with a foamed polymer buffer was already known in the art. *E.g.*, EX-1015 (Beggs) Fig. 6 and cl. 19 (a “buffer” of foamed PVC separating twisted pairs); EX-1007, ¶208. In particular, the modification would have been expected to improve the electrical performance of

the cable by: (1) reducing transmission losses, (2) providing enhanced protection against dielectric breakdown, and (3) improving the flame resistance of the cable. EX-1007, ¶¶210-214.

The **first** and **second** motivations (reducing transmission losses and providing enhanced dielectric protection) were explained above with respect to Roberts. *Supra*, §IX. GmbH-866, like Roberts, discloses “shieldings” of plastic film-coated metal foil to separate twisted pairs. EX-1010, 5 (“aluminum foils laminated with plastics material”); EX-1007, ¶212, ¶¶87-89, ¶97-98. A POSITA would have been motivated to make the obvious modification—adding a low-dielectric constant foamed tape to the plastic-coated metal “partial shieldings” 11 and/or 12 of GmbH-866, for the same reasons. *Supra*, §IX; EX-1007, ¶¶144-152.

A POSITA would also have been motivated to make this modification to GmbH-866 for a **third** reason: to enhance the flame retardance of the cable. EX-1007, ¶213. It was known that communications cables like that of GmbH-866—which could be used indoors—should be flame resistant. EX-1007, ¶¶213-214; Gingue, 2:1-4; EX-1015, 1:36-38 (“Because the cable may be used in occupied building spaces, flame retardance is also important”). Foaming a polymer was known to have the benefit of increasing flame resistance of a cable, and it was known that foamed polymer could also include a flame-retardant additive. *E.g.*, Gingue, 3:20-26, 4:37-39; EX-1007, ¶213, ¶¶103-104. Modifying GmbH-866 to

include flame-retardant foamed polymer tape as part of its separator would have been expected to predictably improve the flame resistance of the cable. EX-1007, ¶¶213-214.

A POSITA would have had a reasonable expectation of success in modifying the shielding 11 and/or 12 to include a substantially flat foamed polymer tape given the substantial overlap in the technology discussed by GmbH-866, Jachimowicz and Gingue. EX-1007, ¶¶215-218. All teach constructions of communications twisted pair cables, and therefore a POSITA would have expected to be able to predictably combine the teachings using only routine skill in the field. EX-1007, ¶215. For example, GmbH-866 already teaches a metal foil “laminated with plastics material.” GmbH-866, 5; EX-1007, ¶215. A POSITA would have easily been able to substitute the non-foamed plastic coating GmbH-866 already teaches for a foamed polymer tape such as that described by Jachimowicz. EX-1007, ¶215. A POSITA also would have expected to be able to, alternatively, simply add the foamed polymer tape to the top of the GmbH-866 plastic-coated foil shieldings 11,12 during the cabling process. EX-1007, ¶216.

Further, manufacturing would not have required anything beyond ordinary, routine processes and engineering at the time. EX-1007, ¶217. For example, a POSITA would have expected to be able to provide a foil member with a substantially flat foamed polymer tape (such as that taught by Jachimowicz)

through the die of a standard cabling machine to be twisted into the final cable assembly, in the same way the partial shieldings 11, 12 disclosed by GmbH-866 would be. EX-1007, ¶217; Ex. 1027, 2:50-52. Further, a POSITA would have easily been able to use the foamed polymer insulating material described in Gingue as the plastic laminate on the shieldings described in GmbH-866 to obtain a predictable result and improved the cable in the same way as in Gingue: a beneficial balance of improved electrical performance and flame retardance. EX-1007, ¶217, ¶¶103-104. Thus the modification would be obvious. EX-1007, ¶¶219-220.

B. Independent Claim 31

1. [31.pre], [31.a], [31.b], [31.d], [31.e]

Elements 31.pre, 31.a, 31.b, 31.d and 31.e are like claim elements 27.pre, 27.a, 27.b., 27.c, and 27.d, respectively. EX-1007, ¶¶221-223, ¶¶226-228.

Therefore GmbH-866 discloses these elements for the same reasons as explained above. *Supra*, §X.B; ¶¶221-223, ¶¶226-228, ¶¶171-196.

2. [31.c] “the configurable dielectric pair separator including a substantially flat dielectric tape formed of a foamed polymer;”

GmbH-866 in combination with one or more of Jachimowicz and Gingue teaches that the configurable dielectric pair separator may include a *substantially flat dielectric tape formed of a foamed polymer*, as explained above with respect to claim 30. *Supra*, §XI.A; EX-1007, ¶¶224-225. A POSITA would have found this

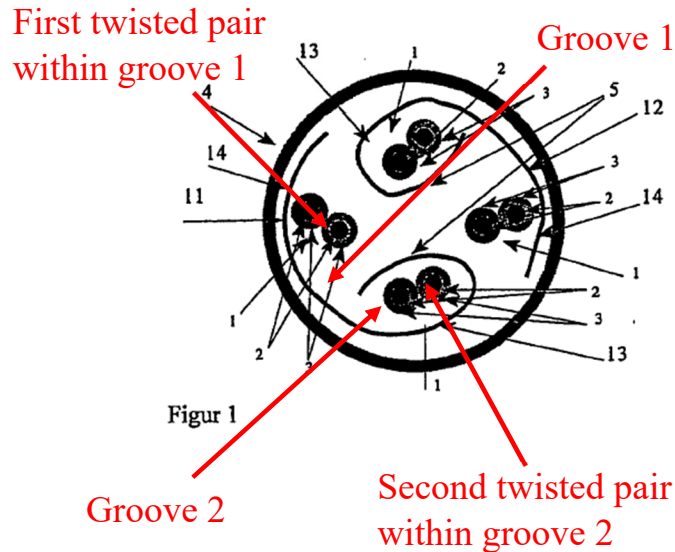
element obvious for the same reasons as explained above with respect to claim 30. EX-1007, ¶¶224-225, ¶¶205-220.

C. Dependent Claim 32

GmbH-866 teaches claim 32, for the same reasons explained above with respect to claim 28. *Supra*, §X.C; EX-1007, ¶¶229-230, ¶¶197-202. Because the modification of GmbH-866 to include a foamed polymer tape would provide and maintain an even greater spacing between a twisted pairs on opposite sides of the separator, the obvious modification would result in an arrangement that provides an even larger amount of desirable cross talk isolation. EX-1007, ¶¶229-230, 197-202.

D. Dependent Claim 33

GmbH-866 teaches this, for the same reasons explained above with respect to claim element 27.e. *Supra*, §X.B.6; EX-1007, ¶¶231-232, ¶¶195-196. GmbH-866 further teaches that at least one twisted pair of conductors is disposed within each of the at least two grooves:



EX-1007, ¶231.

XII. GROUND 5: ROBERTS IN COMBINATION WITH ONE OR MORE OF GmbH-866, JACHIMOWICZ, AND GINGUE RENDERS CLAIMS 27-33 OBVIOUS

If Roberts is found to not disclose first and second (or a plurality of) twisted pairs of insulated conductors (elements [27.a], [31.a]), use of twisted pairs of insulated conductors in a cable like that taught by Roberts would have been obvious for all the reasons identified in Grounds 1 and 2, further in view of one or more of GmbH-866 and Jachimowicz. EX-1007, ¶¶233-240.

GmbH-866 teaches a data communications cable assembly that is similar to Roberts, having a plurality of insulated copper conductors separated by a plastic-coated metal shielding. *See generally* GmbH-866, Fig. 1; EX-1007, ¶234. GmbH-866 teaches that the insulated copper conductors are twisted pairs. GmbH-866, 3 (“four pairs 1, each consisting of two isolated, stranded copper conductors 2 or

wires”); EX-1007, ¶234, ¶96. Jachimowicz also teaches a data communications cable that uses multiple twisted pairs of insulated conductors. Jachimowicz, 2:32-33 (“three pairs 10-14 [of insulated conductors] are each twisted with a different lay”); Fig. 2 (showing multiple twisted pairs); EX-1007, ¶235, ¶105.

By 1999 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. EX-1007, ¶236, ¶¶33-35; *see also, e.g.*, EX-1019, 1:10-15 (“A typical telephone cable is constructed of twisted pairs of metal conductors . . .”) EX-1017, 11 (“The most commonly used transmission media in present-day digital loop applications is twisted pair metallic (copper) cable”). Twisted pairs were known to provide the electrical benefits of lower crosstalk and decreased unbalanced mutual capacitance, along with the mechanical benefits of ensuring the individual wires in a pair stay together. EX-1007, ¶236, ¶35; *see also, e.g.* EX-1016, 7.

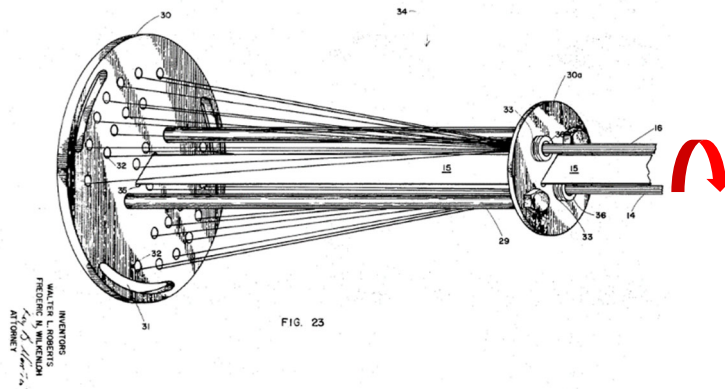
To the extent Roberts is found to not expressly teach that its “pairs” are *twisted* pairs, it would have been an obvious and routine modification to use twisted pairs. EX-1007, ¶¶237-240. A POSITA would have been motivated to do this to obtain the known, predictable mechanical and performance benefits of twisted pairs (*e.g.*, lower crosstalk, ensuring the paired wires stay together). EX-1007, ¶238, ¶35. A POSITA would have had a reasonable expectation of success in

doing this because using twisted pairs in a telephone communications cable like Roberts was the most common, conventional way to construct such a cable. EX-1007, ¶239, ¶¶33-35. Further, there was nothing about Roberts’ specific cable that would make using twisted pairs unusually difficult or require anything other than routine skill. EX-1007, ¶239.

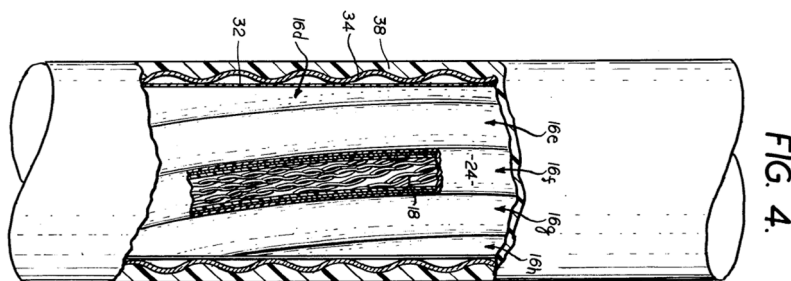
XIII. GROUND 6: GmbH-866 IN COMBINATION WITH ONE OR MORE OF ROBERTS, JACHIMOWICZ, AND GINGUE RENDERS CLAIMS 27-33 OBVIOUS

If GmbH-866 is found to not disclose “wherein the configurable dielectric pair separator, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable” (elements [27.e], [31.d]), claims 27-33 would have been obvious for all the reasons identified in Grounds 3 and 4, further in view of one or more of Roberts and Jachimowicz. EX-1007, ¶¶241-253.

As explained above, Roberts teaches twisting (cabling) conductor pairs 14 and 16 and the plastic-coated metal shield together about a common axis to form the cable assembly. Roberts at 12:14-29 (forming a “*twisted composite*” of the twisted pairs and the separator 15) (emphasis added); EX-1007, ¶243, ¶¶93-94, ¶¶129-130. As discussed for Ground 1 above, Roberts describes a cabling tool to accomplish this:



Roberts at 11:70-12:38, Fig. 23; EX-1007, ¶243. Jachimowicz similarly teaches sets of twisted pairs bundled together into units 16, with the multiple units 16 then “cabled” together into the overall cable 30. Jachimowicz, 3:2-11, 3:18-24, Fig. 3; *see also id.* 3:41-42 (“units 16d, 16e, 16f, 16g . . . are cabled with a long lay”), Fig. 4; cl. 1; 2:4-5 (“identical shield units are then cabled together”):



Id. at Fig. 4; EX-1007, ¶244.

Twisting the components of a cable about a common axis to form the final assembled cable, known in the art as “cabling,” was the most common way to construct cables that included copper twisted pair wires by 1999 and also long before. EX-1007, ¶245, ¶¶51-53; *see also, e.g.*, EX-1016, 9-10. The reason is that

by 1999 it was known that doing so it increased the strength and flexibility of the finished cable and also improved impedance uniformity. EX-1007, ¶246-251, ¶¶51-53.

A POSITA would have been motivated, with a reasonable expectation of success, to twist the components of the GmbH-866 cable, including the twisted pairs and the partial shieldings 11, 12 about a common axis to obtain these known and predictable benefits. EX-1007, ¶¶251-253. For example, twisting cable components about a common axis was known to be the most effective way to avoid issues resulting from asymmetric stresses on the inside and outside diameters of the cable when a cable bends. Further, twisting the cable components about a common axis was known to result in a cable that was less stiff and easier to bend, as the cable components experience less concentrated tensile and compression stress. These stresses can cause the twisted pairs to separate if the pairs themselves are not twisted (cabled) along with the separator about a common axis, which can degrade crosstalk performance and low return loss. EX-1007, ¶¶247-249, ¶¶51-53. Twisting the cable components about a common axis avoids this risk. EX-1007, ¶¶247-249, ¶¶51-53.

A POSITA would have had a reasonable expectation of success. EX-1007, ¶252. Twisting the components about a common axis (“cabling”) was a well-known, common, and predictable technique long before 1999. EX-1007, ¶252, ¶51.

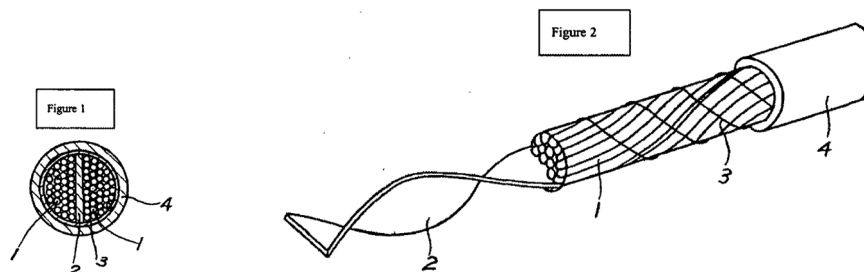
In fact, it was the most common way to assemble twisted pair cables. EX-1007, ¶245; EX-1016, 9-10; Roberts, Figs. 22-23, 11:28-31, 12:17-26; Jachimowicz, 1:54-56, 2:4-5, 3:21-22. Further, there is nothing about the GmbH-866 cable that would have prevented a POSITA from the conventional practice of cabling the components about a common axis, nor was there anything about the GmbH-866 construction that would make cabling the components require anything more than routine skill in the art. EX-1007, ¶252.

XIV. GROUND 7: YANAGIDA ANTICIPATES CLAIMS 27-29

A. Yanagida (EX-1012)

Yanagida relates to alternately twisted communications cables. Yanagida, 1[col.1]; EX-1007, ¶100. The cables can include a plurality of “pairs” of stranded insulated wires 1. *Id.*; *see also* EX-1055, 1 (“stranded pairs”)⁶; EX-1007, ¶100.

Yanagida teaches a cable formed with a “reciprocatingly twisted” core material 2 running through its center, and the wires 1 (e.g., the “stranded” (twisted) pairs) running along the surface of the twisted core material 2:



⁶ Yanagida English translation from related '537 patent reexamination file.

Yanagida, 1[col.1]; Figs. 1, 2; EX-1007, ¶101. The core element 2 is made from “hard plastic, or the like.” Yanagida, 1[col.1]; EX-1007, ¶101. The core 2 divides the groups of twisted pairs, preventing the twisted pairs from unravelling even when tensile force is applied in the longitudinal direction (a common problem for alternately stranded cables). Yanagida, 1[col.1]; EX-1007, ¶101. A “cable sheath 4” covers the assembly to complete the cable. Yanagida, 1[col.1]; EX-1007, ¶101.

The twisted core 2 is initially a flat plate body. Yanagida, 1[col.1]; EX-1007, ¶102. During manufacture the core is thermally formed to create the helical form. *Id.* Yanagida, 1[col.1]; EX-1007, ¶102. Twisted pairs are then laid along the facing of both surfaces. Yanagida, 1[col.1]; EX-1007, ¶102.

B. Independent Claim 27

1. [27.pre] “1. A data communications cable comprising:”

The preamble is not limiting. Even if it were, Yanagida teaches this. *E.g.*, Yanagida, 1[col.1] (“communications cables”). A POSITA would understand a communications cable with twisted pairs is a data communications cables. EX-1007, ¶¶254-256.

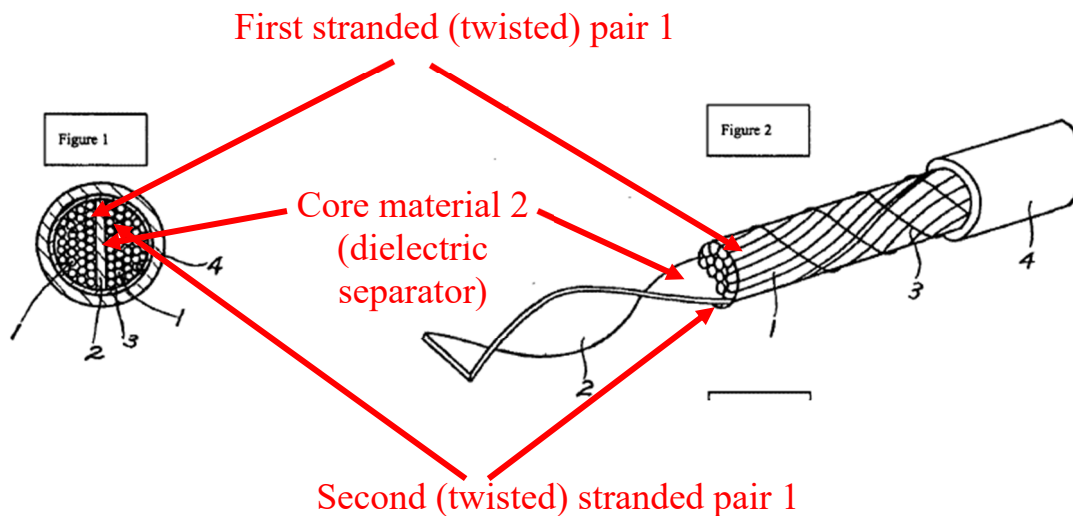
2. [27.a] “a first twisted pair of insulated conductors; a second twisted pair of insulated conductors;”

Yanagida discloses this. EX-1007, ¶¶257-258. Yanagida discloses a plurality of “strands of insulated wires or pairs thereof” that run along the surface of the core material. Yanagida, 1[col.1]; *see also id.* (element 1 can be where “insulated

wires are twisted together”); EX-1055, 1 (“stranded pairs”); EX-1007, ¶257, ¶100, ¶118 (reference to “pairs” was understood to be reference to twisted pairs). The terms “stranded” and “twisted” are used synonymously in the industry. EX-1007, ¶257.

3. [27.b] “a configurable dielectric pair separator that separates the first and second twisted pairs of conductors, the configurable dielectric pair separator being substantially flat;”

Yanagida discloses this. EX-1007, ¶¶259-264. A configurable dielectric “core material 2” (*configurable dielectric pair separator*) separates the first and second twisted pairs of conductors and is substantially flat:



Yanagida, 1[col.1], Figs. 1, 2; EX-1007, ¶259.

Core material 2 is formed from a “flat plate-shaped hard plastic.” Yanagida, 1[col.1]; EX-1007, ¶260. A POSITA understands plastic is *dielectric*. EX-1007, ¶260, ¶44; EX-1031, 4.

Core material 2 is *configurable*. EX-1007, ¶261. It is formed into a helical shape from a “flat” plate body. Yanagida, 1[col.1] (“[core material 2] is formed in a reciprocatingly twisted shape.”), Figs. 1-2; EX-1007, ¶261, ¶102. This is also consistent with the examiner’s view in the ’999 patent reexamination, which found that Yanagida discloses a “configurable” separator. EX-1034, 108-113, 55-56.⁷

Core material 2 is *substantially flat*. EX-1007, ¶263. Core material 2 is initially a flat “plate body” prior to being thermally formed into a helical separator. Yanagida, 1[col.1], Figs. 1, 2; EX-1007, ¶263. Core material 2 is also substantially flat in cross section through the finished cable. Yanagida, Fig. 1; EX-1007, ¶263.

4. [27.c] “a jacket enclosing the first and second twisted pairs of insulated conductors and the dielectric pair separator; and”

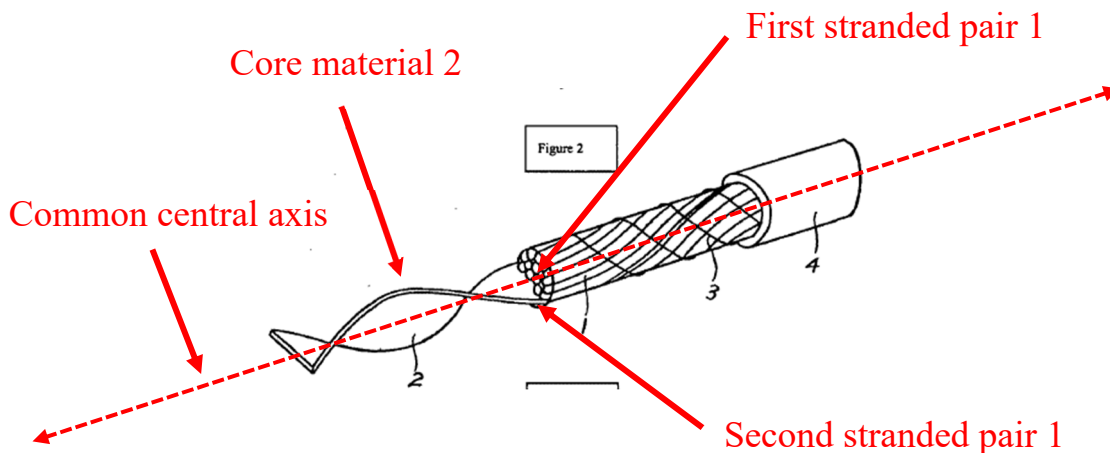
Yanagida teaches this. EX-1007, ¶¶265-266. The outer periphery of Yanagida’s cable is “covered with a cable sheath 4” (*jacket*) and therefore encloses

⁷ The examiner in the ’537 patent reexamination found that Yanagida did not teach a “configurable” separator because it described the separator as “rigid.” EX-1006, 27. But the examiner didn’t explain why it wasn’t “configurable” in view of the examiner’s parallel conclusion that, as Yanagida explains, the separator started as flat and was configured into the illustrated shape during the manufacturing process.

the first and second twisted pairs and the core material 2 (the *dielectric pair separator*). Yanagida, 1[col.1]; Figs. 1-2; EX-1007, ¶265.

5. [27.d] “wherein the configurable dielectric pair separator, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable;”

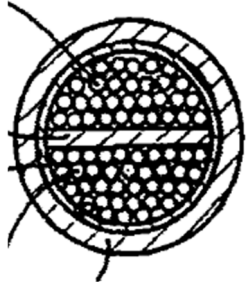
Yanagida teaches this. EX-1007, ¶¶267-268. Core material 2 and the twisted pairs are twisted about a common central axis, forming a twisted pair cable: the core material 2 is helically shaped, and the stranded pairs run along the surface of (and therefore following the twist about the common axis of) that helical core material 2.



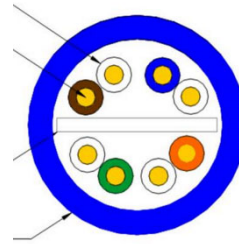
Yanagida, 1[col.1], Fig. 2 (Annotated); EX-1007, ¶267, ¶¶101-102.

6. [27.e] “and wherein the configurable dielectric pair separator is arranged within the jacket to form at least two grooves.”

Patent Owner has accused Petitioner’s products of infringing this claim by citing a cable cross section that looks like Yanagida’s:



Yanagida cross section, Fig. 1
(rotated 90 degrees)



Cross section of Petitioner
product identified and accused
by Patent Owner

Yanagida’s core material 2 (*dielectric pair separator*) is formed with twisted pair running along opposite surfaces of it. Yanagida, 1[col.1]; Figs. 1-2. If the phrase “separator is arranged within the jacket to form at least two grooves” is construed to include configurations where the separator is straight in a radial cross section and would only form a “groove” if viewed in conjunction with part of the interior surface of the cable sheath, then Yanagida discloses this element.⁸ EX-1007, ¶¶269-270.

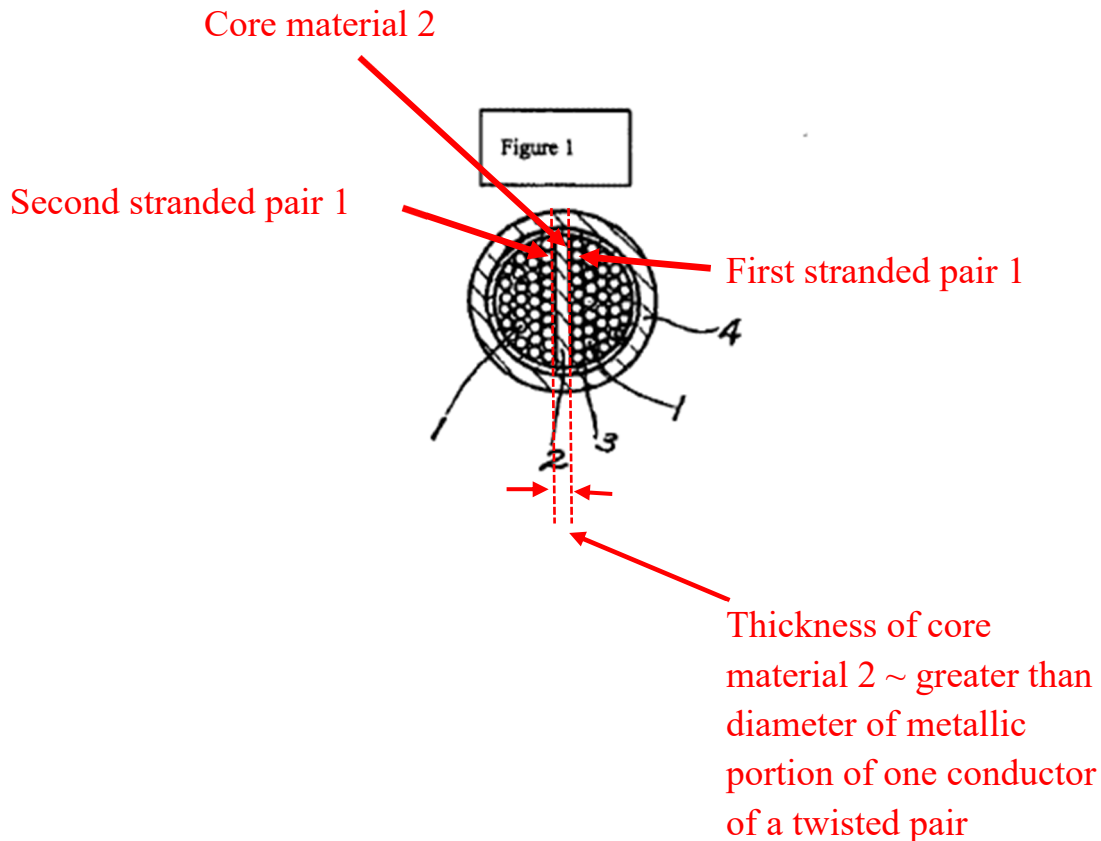
⁸ For the purpose of this *inter partes* review challenge only, Petitioner accepts that the district court construction of “groove” can be read this broadly. Therefore, in

- C. **Claim 28: “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator is arranged to provide a sufficient spacing between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors so as to provide a desired crosstalk isolation between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors.”**

A POSITA would understand that Yanagida at least inherently discloses this.

EX-1007, ¶¶271-275. Yanagida teaches a plastic separator (core material 2) that provides a physical barrier between a twisted pair on one side and a twisted pair on the other side. Yanagida, 1[col.1] (core material 2 is “plastic”), Figs. 1-2; EX-1007, ¶¶272-273, ¶39 (prevents nesting). Yanagida also indicates that core material 2 is approximately equal to or greater than the width of a wire of a twisted pair:

this *inter partes* review it does not appear the Board needs to expressly construe the groove in element 27.e.



Yanagida, Fig. 1; EX-1007, ¶271. It was known by at least 1999 that increasing and then maintaining the distance between adjacent twisted pairs effectively reduced crosstalk between them. EX-1007, ¶273, ¶40; *see also, e.g.*, EX-1023, 3:17-24; EX-1015, 7:58-61. Beggs, for example, teaches that a “buffer” that creates a spacing less than what Yanagida indicates (a buffer equal to at least the radius (i.e. one-half the diameter) of a conductor wire) provides a cable “suitable for high frequency data transmission” with adequate “crosstalk” isolation. EX-1015, 6:10-14, 1:39-46; EX-1007, ¶273. A POSITA would understand that Yanagida’s core material 2 provides a sufficient spacing between the pairs on

opposite sides of the separator to provide a desired crosstalk isolation between them. EX-1007, ¶¶274-275.

D. Claim 29: “The data communications cable as claimed in claim 27, wherein the at least two grooves do not form completely enclosed channels.”

If the “arranged within the jacket to form at least two grooves” element of claim 27.e is construed to include configurations where the separator is straight in a radial cross section in the final assembled cable, then Yanagida also discloses the limitation of claim 29. EX-1007, ¶¶276-277. The core material 2 would not (itself) form completely enclosed channels. Yanagida, Figs. 1-2; EX276-1007, ¶¶276.

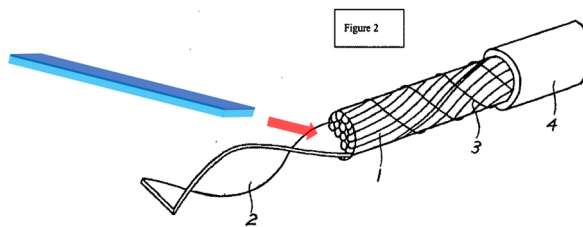
XV. GROUND 8: YANAGIDA AND ONE OR MORE OF JACHIMOWICZ AND GINGUE RENDERS CLAIMS 30-33 OBVIOUS

Yanagida does not teach a dielectric pair separator that includes a foamed polymer tape as required by claims 30-33. However, Jachimowicz discloses foamed polymer tape, and Jachimowicz and Gingue each teach the benefits of using such a low-dielectric foamed polymer in data communications cables as an insulating/isolation member, as explained above with respect to Ground 2. *Supra*, §IX.A; EX-1007, ¶¶278, ¶¶103-107, ¶¶142-143. It would have been obvious in view of Jachimowicz and/or Gingue to add foamed polymer tape alongside Yanagida’s plastic core material 2 with the laying of the twisted pairs, to predictably improve cable performance, reliability, and safety. EX-1007, ¶¶278-290.

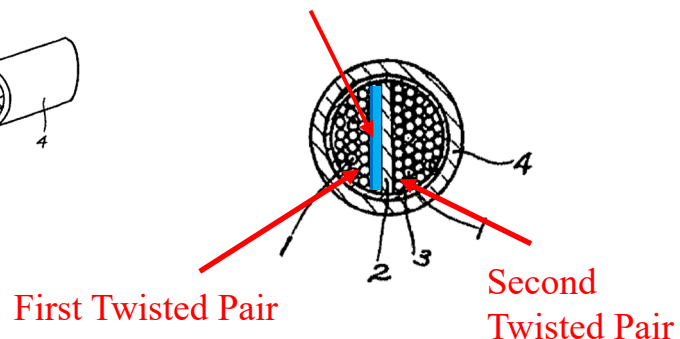
A. Claim 30: “The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator comprises a foamed polymer tape.”

Yanagida teaches all the elements of independent claim 27, as explained in Ground 7 above. EX-1007, ¶¶278; ¶¶254-270. Yanagida does not teach a separator that comprises a foamed polymer tape, as required by claim 30. In view of the further teachings of Jachimowicz and/or Gingue, a POSITA would have been motivated, with a reasonable expectation of success, to modify Yanagida by laying substantially flat dielectric foamed polymer tape alongside Yanagida’s core material 2 along with the laying of the twisted pairs. EX-1007, ¶¶278-290. A conceptual example of this modification is below:

Foamed polymer tape



Dielectric separator comprises a foamed polymer tape



EX-1007, ¶¶280.

A POSITA would have been motivated to make this modification due to market pressure to increase communications cable performance and safety. EX-1007, ¶¶282-286. By 1999, it was known that transmission loss and crosstalk

degraded cable performance, and that communications cables should be flame retardant. EX-1007, ¶¶281, ¶46, ¶¶103-104. In particular, a POSITA would have been motivated to modify Yanagida to add low-dielectric foamed polymer tape alongside core material 2 of Yanagida's cable, in view of Jachimowicz and/or Gingue, for three reasons. EX-1007, ¶¶282-286.

First, to reduce transmission losses by reducing the capacitance between twisted pairs on either side of the separator. EX-1007, ¶282. It was known that current leakage arises when two conductors are separated by a dielectric material, forming a capacitor. EX-1007, ¶282, ¶48. Given that Yanagida's cable has twisted pairs disposed immediately across from other twisted pairs on either side of the core material 2, such current leakage would happen. EX-1007, ¶282. Adding the low-dielectric foamed polymer tape taught by Jachimowicz and/or Gingue would have predictably lowered the capacitance between those twisted pairs, by both lowering the dielectric constant of the separator, and by increasing the distance between pairs on either side of the separator. EX-1007, ¶¶283-284, ¶¶103-107.

Second, to decrease crosstalk between the twisted pairs or groups of twisted pairs on opposite sides of the core material separator. EX-1007, ¶285. Adding foamed polymer tape would have been expected to increase the distance between the twisted pairs on either side of the separator. EX-1007, ¶285. Increasing and then maintaining the distance between adjacent twisted pairs was known to

effectively reduce crosstalk. EX-1007, ¶285, ¶40; EX-1023, 3:17-24; EX-1015, 7:58-61.

Third, to enhance the flame retardance of the cable. EX-1007, ¶286. Gingue teaches it was known cables should be flame resistant, and that adding flame retardant foamed polymer (e.g., to Yanagida's plastic core 2) would have been expected to predictably improve the flame resistance of the cable. EX-1007, ¶286, ¶¶103-104; Gingue at 4:37-39, 2:1-4; EX-1015, 1:36-38

A POSITA would have had a reasonable expectation of success in modifying Yanagida to add foamed polymer tape alongside the core member 2 given the substantial overlap in the technology discussed by Yanagida, Jachimowicz and Gingue. EX-1007, ¶287. All teach constructions of data communications cables, and therefore a POSITA would have expected to be able to predictably combine the teachings using only routine skill in the field. *Id.* Doing so would have been straightforward and would not have required any skill beyond routine engineering. *Id.* For example, laying a foamed polymer tape alongside Yanagida's twisted core material 2 as part of the manufacturing process would have been considered routine, and a POSITA would have expected to be able to feed the foamed polymer tape into the cable assembly alongside the core material 2 as the twisted pairs of wires were "laid divided onto both sides of a core material 2," as described by Yanagida. Yanagida, 1[col.1]; EX-1007, ¶288.

B. Independent Claim 31

1. [31.pre], [31.a], [31.b], [31.d], [31.e]

These elements are like claim elements 27.pre, 27.a, 27.b., 27.c, and 27.d, respectively. EX-1007, ¶¶291-293, ¶¶296-298. Therefore Yanagadia discloses these elements for the same reasons as explained above in Ground 7. *Supra*, §XIV.B.

EX-1007, ¶291-293, ¶¶296-298, ¶¶254-270.

2. [31.c] “the configurable dielectric pair separator including a substantially flat dielectric tape formed of a foamed polymer;”

Yanagida in combination with one or more of Jachimowicz and Gingue teaches that the configurable dielectric pair separator may include a *substantially flat dielectric tape formed of a foamed polymer*, as explained above with respect to claim 30. *Supra*, §XV.B; EX-1007, ¶¶294-295, ¶¶278-290. A POSITA would have found this element obvious for the same reasons as explained above with respect to claim 30. EX-1007, ¶¶294-295, ¶¶278-290.

C. Dependent Claim 32

Yanagida teaches claim 32, for the same reasons explained above with respect to claim 28 in Ground 7. *Supra*, §XIV.C; EX-1007, ¶¶299-300; ¶¶271-275. Modifying Yanagida to include a foamed polymer tape would be obvious because it provides a greater spacing between a twisted pair on one side of the separator and a twisted pair on the other side and would result in an arrangement that

provides a larger amount of desirable cross talk isolation. EX-1007, ¶299-300; ¶¶271-275, ¶40.

D. Dependent Claim 33

If the claim phrase “separator is arranged within the jacket to form at least two grooves” is construed to include configurations where the separator is straight in a radial cross section, then Yanagida teaches this. *Supra*, XIV.B.6. EX-1007, ¶¶301-302; ¶¶269-270. Yanagida shows twisted pairs run along the surface of the core material, and thus to the extent it discloses the claimed two grooves, at least one twisted pair is in each groove. Yanagida, 1. EX-1007, ¶301.

XVI. PURPORTED SECONDARY CONSIDERATIONS OF NONOBVIOUSNES

In the earlier *inter partes* reexamination proceedings and district court lawsuit, Patent Owner introduced purported secondary considerations evidence of nonobviousness. This evidence is insufficient to avoid institution and insufficient to ultimately save the challenged claims for at least two reasons.

First, many of the challenged grounds in this Petition rely on anticipation, not obviousness, making secondary considerations evidence irrelevant. *See supra*, at Grounds 1, 3, and 7.

Second, prior to termination, the examiners in all three *inter partes* reexaminations found the purported secondary considerations evidence unpersuasive. In the '095 and '537 patent reexaminations, the examiner found that

the evidence provided by the patentee was “not ... persuasive” for various reasons, including that the patentee failed to establish nexus. EX-1003, 54 (’095 patent); EX-1006, 35 (’537 patent); EX-1034, 84-92 (’999 patent); *see also* EX-1007, ¶66. To the extent Patent Owner would introduce the same evidence in this proceeding, it would be unpersuasive for at least the same failure to establish nexus (*e.g.*, the patentee failed to show that success was from the claimed features, rather than from a commercial real estate boom). *See also Liquidia Technologies Inc. v. United Therapeutics Corp.*, IPR2020-00770, Paper 14 at 8 (Mar. 30, 2020) (no obligation to even address secondary considerations in a petition where that evidence has previously been found unpersuasive).

XVII. DISCRETIONARY DENIAL IS NOT APPROPRIATE

A. Discretionary Denial Under 35 U.S.C. §325(d) is Not Warranted

The Board uses a two-part framework to analyze Section 325(d): (1) whether the same or substantially the same art or arguments previously were presented to the Office; and (2) if either condition is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. Here denial under Section 325(d) is not warranted for at least three reasons.

First, none of the prior art presented in this IPR was cited or considered by the Examiner during original prosecution of the ’095 patent.

Second, this Petition does not rely on art or arguments that are substantially the same as what was presented in original prosecution. Unlike original prosecution, this Petition relies on anticipation grounds rather than only obviousness. Further, each of Roberts, GmbH-866, and Yanagida are new references and disclose imitations the examiner found missing from the prior art of record (e.g., the claimed components in combination with twisted pairs and a separator that are twisted about a common axis of the finished cable). EX-1002, 6. Also, Jachimowicz—teaching foamed polymer tape—was not considered during prosecution.

Third, the subsequent *inter partes* reexamination proceedings involving the '095 patent does not provide any reason for a discretionary denial. One, all were terminated prior to reaching finality. Thus the Patent Office has never concluded the review of the claims it started. Two, neither Roberts (Grounds 1 and 2) nor Yanagida (Grounds 7 and 8) was presented to or considered by the Office during the '095 patent reexamination. Three, as to GmbH-866 and Yanagida, the examiners in the (later terminated) reexaminations had reached conflicting conclusions; this Petition explains why the conclusions of the '999 examiner were correct and those of the '537/'095 examiner were not. *Supra*, §V, §XIV.B.3.FN7.

Four, the grounds of this Petition are not cumulative of the reexamination grounds, in any event. For example, Roberts and Yanagida are newly presented

here as anticipation challenges to claims 27-29. Further, in the '095 reexamination the examiner found that GmbH-866 did not disclose the “twisted about a common central axis” limitation; each of Roberts and Yanagida plainly teaches this.

Thus all of the *Becton* factors weigh against discretionary denial: (a) (similarities and material differences between art), (b) (cumulative nature of art), (c) (extent to which art was evaluated), and (d)-(f) (extent of overlap, whether/how examiner erred, whether additional evidence warrants reconsideration).

B. Discretionary Denial Under 35 U.S.C. §314(a) Is Not Warranted

Discretionary denial under §314(a) is not warranted.

First, the Petitioner has not presented multiple petitions challenging the claims of the '095 patent. Also, Petitioner was not a party to or related to the parties in the prior *inter partes* re-examination proceedings, and those prior proceedings were terminated before reaching any finality.

Second, while there is a parallel district court litigation in the District of Delaware (*Belden Inc. v. CommScope, Inc. et al.*, No. 22-783 (D. Del.), “Delaware case”), the *Fintiv* factors also do not favor denying institution.

One, trial is not scheduled in the district court case until October 20, 2025. EX-1053, 13 (¶16). This is nearly a year after a final written decision will have issued (approximately December 2024). Discretionary denial is not appropriate in this circumstance.

Two, Petitioner intends to move for a stay of the litigation, and such motions are often granted in the District of Delaware. *Analog Devices, Inc. v. Xilinx, Inc.*, C.A. No. 1-19-cv-02225-RGA, D.I. 197 (Feb. 22, 2021) (granting stay post-institution); *Targus Int'l LLC v. Victorinox Swiss Army, Inc.*, C.A. No. 1-20-cv-00464-RGA, D.I. 199 (July 14, 2021) (granting stay post-institution).

Three, it is still early in the district court litigation. No claim construction opinions have been issued, no written discovery has occurred and no depositions have been taken, and no expert reports have been submitted, which weighs against a denial. *Apple Inc. v. Fintiv Inc.*, IPR2020-00019, Paper 11 at 10 (PTAB Mar. 20, 2020) (precedential).

Four, if this IPR is instituted, Petitioner intends to seek a stay with stipulation to not raise in district court any of the grounds raised in this Petition, which also weighs against a denial.

Five, “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents ***compelling evidence of unpatentability***.” PTO Director’s Memorandum at 2. Even if the other *Fintiv* factors weighed in favor of denying institution (they do not), this Petition presents “compelling” evidence of unpatentability. For example, each of the Roberts and GmbH-866 references anticipates many of the challenged

claims. *See supra*, §VIII, §X. The Board should institute and proceed to trial on the merits of this challenge.

XVIII. MANDATORY NOTICES

A. Real Parties-in-Interest

CommScope Technologies LLC, CommScope, Inc. of North Carolina, CommScope, Inc., and CommScope Holding Company, Company, Inc. are the real parties-in-interest.

B. Related Matters

The challenged patent, as well as three additional patents, were asserted against petitioner CommScope in a complaint in *Belden Inc. v. CommScope, Inc. et al.*, No. 1:22-cv-00783 (D. Del.), which was served on June 14, 2022. One of the additional patents, U.S. Patent No. 6,998,537, is related to (and in the same family as) the challenged patent. Petitioner is filing a separate Petition for *Inter Partes* Review that challenges several claims of U.S. Patent No. 6,998,537. Petitioner is also filing two other Petitions for *Inter Partes* Review that challenge claims of the other two patents asserted in the lawsuit.

Petitioner also identifies the following terminated proceedings: *Belden Techs., Inc. et al. v. Superior Essex Inc. et al.*, Civ. No. 08-063-SLR (D. Del.); Reexamination No. 95/000,476 ('537 patent); Reexamination No. 95/000,474 ('095 patent); Reexamination No. 95/000,475 ('999 patent).

To the best of Petitioner's knowledge the '095 patent has not been challenged in any IPR prior to this proceeding.

C. Lead and Back-Up Counsel

Lead Counsel	Back-Up Counsel
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D. Service Information

Please address all correspondence and service to all counsel listed above.

Petitioner consents to service by email at the email addresses listed.

E. Fees

Petitioner authorizes the Patent Office to charge Deposit Account No. 502880 for the fee set forth in 37 C.F.R. § 42.15(a) and any other required fees.

Dated: June 13, 2023

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Claims Listing Appendix
U.S. Patent No. 6,570,095
Independent claims 27, 31
Dependent claims 28, 29, 30, 32, 33

Reference	Claim Limitation
Independent Claim 27	
[27.pre]	A data communications cable comprising:
[27.a]	a first twisted pair of insulated conductors; a second twisted pair of insulated conductors;
[27.b]	a configurable dielectric pair separator that separates the first and second twisted pairs of conductors, the configurable dielectric pair separator being substantially flat;
[27.c]	a jacket enclosing the first and second twisted pairs of insulated conductors and the dielectric pair separator;
[27.d]	and wherein the configurable dielectric pair separator, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable; and
[27.e]	wherein the configurable dielectric pair separator is arranged within the jacket to form at least two grooves.

Claim 28	
[28]	The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator is arranged to provide a sufficient spacing between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors so as to provide a desired crosstalk isolation between the first twisted pair of insulated conductors and the second twisted pair of insulated conductors.

Claim 29	
[29]	The data communications cable as claimed in claim 27, wherein the at least two grooves do not form completely enclosed channels.

Claim 30	
[30]	The data communications cable as claimed in claim 27, wherein the configurable dielectric pair separator comprises a foamed polymer tape.

Independent Claim 31	
[31.pre]	A data communications cable comprising:
[31.a]	a plurality of twisted pairs of insulated conductors;

[31.b]	a configurable dielectric pair separator disposed between at least two of the plurality of twisted pairs of insulated conductors,
[31.c]	the configurable dielectric pair separator including a substantially flat dielectric tape formed of a foamed polymer;
[31.d]	a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric pair separator; and
[31.e]	wherein the plurality of twisted pairs of insulated conductors and the configurable dielectric pair separator are twisted about a common axis to formn[sic] a twisted pair cable.

Claim 32

32	The data communications cable as claimed in claim 31, wherein the configurable dielectric pair separator is arranged to provide a sufficient spacing between the at least two twisted pairs of insulated conductors so as to provide a desired crosstalk isolation between the at least two twisted pairs of insulated conductors.
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Claim 33

33	The data communications cable as claimed in claim 31, wherein the configurable dielectric pair separator is arranged within the jacket to provide at least two grooves, at least one twisted pair of conductors being disposed within each of the at least two grooves.
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Exhibit List Appendix

Exhibit No.	Exhibit Description
1001	U.S. Patent No. 6,570,095 (the “ 095 patent ”)
1002	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Nov. 8, 2002 Notice of Allowance
1003	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Sept. 20, 2011 Action Closing Prosecution
1004	U.S. Patent No. 6,998,537 (the “ 537 patent ”)
1005	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Nov. 2, 2004 Notice of Allowance
1006	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Sept. 20, 2011 Action Closing Prosecution
1007	Declaration of Kenneth Cornelison
1008	<i>Curriculum Vitae</i> of Kenneth Cornelison
1009	U.S. Patent No. 3,622,683 (“ Roberts ”)
1010	English language translation of German Patent No. 297,19,866 U1 (“ GmbH-866 ”), and attached Declaration of translator Anthea Heyes
1011	German Patent No. 297,19,866 U1 (untranslated original)
1012	English language translation of Japanese Patent Publication S43015470 (“ Yanagida ”), and attached Declaration of translator Anthea Heyes
1013	U.S. Patent No. 5,670,748 (“ Gingue ”)
1014	U.S. Patent No. 3,894,172 (“ Jachimowicz ”)
1015	U.S. Patent No. 4,755,629 (“ Beggs ”)
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
1020	U.S. Patent No. 1,727,972

1021	U.S. Patent No. 1,956,730
1022	U.S. Patent No. 3,803,340 (Jachimowicz-340)
1023	Canadian Patent Application No. 2,058,046
1024	U.S. Patent No. 4,262,164
1025	U.S. Patent Pub. No. 2006/0169478
1026	U.S. Patent No. 4,253,890
1027	U.S. Patent No. 5,283,390
1028	U.S. Patent No. 5,969,295
1029	G.F. Moore, <i>Electric Cable Handbook</i> , BICC Cables (3d. ed. 1997)
1030	<i>The New IEEE Standard Dictionary of Electrical and Electronics Terms</i> (5th ed. 1993)
1031	Neil Sclater and John Markus, <i>Electronics Dictionary</i> , McGraw-Hill (6th ed. 1997)
1032	S. Yonechi et al., <i>Application of Spacer Forming Technique to Communication Cables</i> , International Wire & Cable Symposium Proceedings (1980)
1033	U.S. Patent No. 7,179,999 (the “999 patent”)
1034	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Oct. 14, 2011 Action Closing Prosecution
1035	Alcatel Cable Systems Product Catalog
1036	U.S. Patent No. 5,789,711
1037	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Oct. 22, 2001 Non-Final Office Action
1038	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: April 3, 2002 Final Office Action
1039	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: March 3, 2004 Non-Final Office Action
1040	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Terminal Disclaimer
1041	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: May 18, 2004 Amendments
1042	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: June 17, 2004 Final Office Action
1043	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: September 20, 2004 Request for Continued Examination

1044	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Sept. 9, 2005 Amendment
1045	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceeding
1046	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceedings
1047	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceedings
1048	U.S. Patent No. 5,814,768
1049	U.S. Patent No. 6,037,546
1050	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Jan. 11, 2010 Third Party Requester's Comments to Patent Owner's Response
1051	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Jan. 22, 2010 Third Party Requester's Comments to Patent Owner's Response
1052	<i>Belden Techs. et al. v. Superior Essex Comm'cns LP et al.</i> , No. 08-63-SLR, Dkt. 215 (D. Del. Aug. 8, 2010) – Claim Construction Order
1053	<i>Belden Inc. v. CommScope, Inc. et al.</i> , No. 22-783-RGA, Dkt. 292 (D. Del. May 26, 2023) – Scheduling Order
1054	Declaration of Sylvia D. Hall-Ellis, PhD
1055	English Translation of Japanese Patent Publication No. S43-15470 used in prior reexamination of US 6,998,537
1056	Japanese Patent Publication No. S43-15470 (untranslated original)
1057	English language translation of German Patent No. 297,19,866 U1 used in prior reexamination of US 6,998,537

CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,993 words per Microsoft Word's word count tool, which complies with requirement of 14,000 words allowed under 37 CFR § 42.24(a)(i).

Dated: June 13, 2023

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on June 13, 2023 a complete and entire copy of this PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 6,570,095 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42 and all supporting exhibits were provided by Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

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Dated: June 13, 2023

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