

Patent Owner's Demonstratives

**COMMSCOPE TECHNOLOGIES LLC,
v.
BELDEN, INC.,**

**Patent No. 9,991,030
IPR2023-01056**

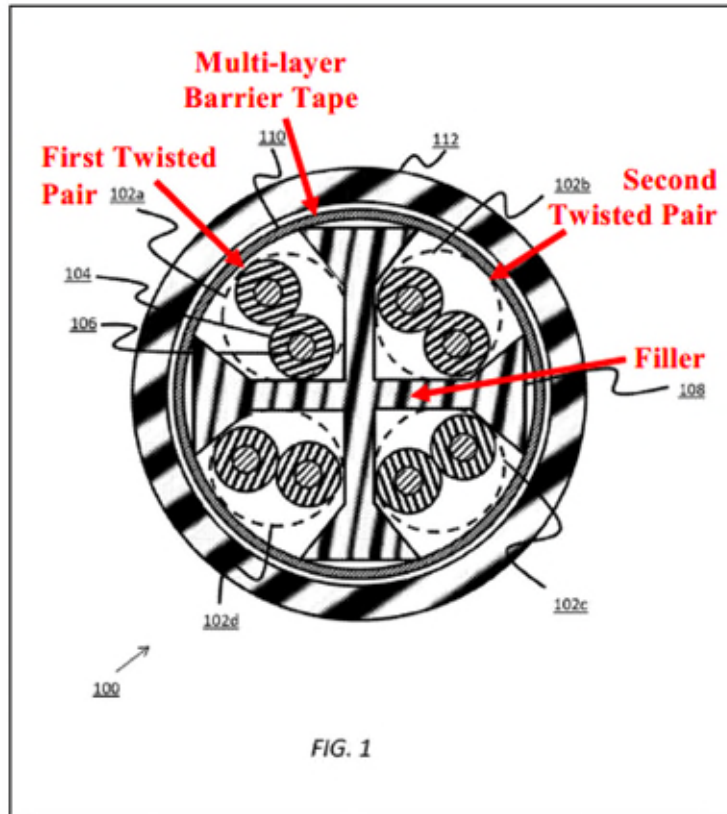
September 16, 2024

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

CommScope v. Belden
IPR2023-01056
Belden EX-2017

The '030 Patent

● Multi-Layer Barrier Tape



1. A cable, comprising:

a first twisted pair of insulated conductors;

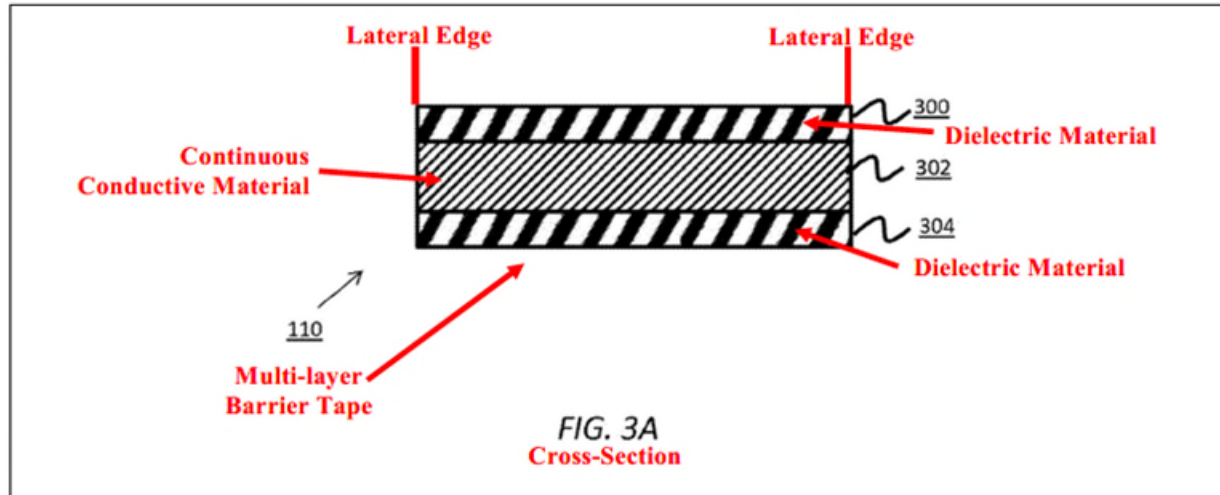
a second twisted pair of insulated conductors;

a filler separating the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and

a multi-layer conductive barrier tape comprising a continuous conductive material contained between two layers of a dielectric material, the conductive material of the barrier tape extending to each lateral edge of the two layers of the dielectric material, the barrier tape surrounding the first twisted pair of insulated conductors, the second twisted pair of insulated conductors, and the filler.

The '030 Patent

● Multi-Layer Barrier Tape



a multi-layer conductive barrier tape comprising a continuous conductive material contained between two layers of a dielectric material, the conductive material of the barrier tape extending to each lateral edge of the two layers of the dielectric material, the barrier tape surrounding the first twisted pair of insulated conductors, the second twisted pair of insulated conductors, and the filler.

Anticipation Grounds

- Institution Decision – No Anticipation
 - Cook (EX-1010) – Ground 1
 - “disparate embodiments”
 - Glew (EX-1008) – Ground 3
 - No continuous conductive material extending to lateral edges
 - Roberts (EX-1009) – Ground 5
 - No continuous conductive material extending to lateral edges

Ground 1 – Cook – No Anticipation

- Petition - “Disparate Embodiments”

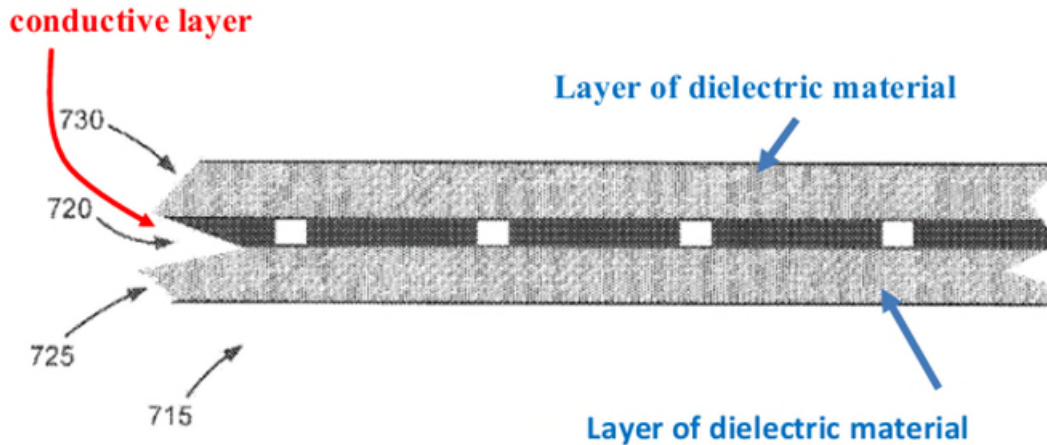
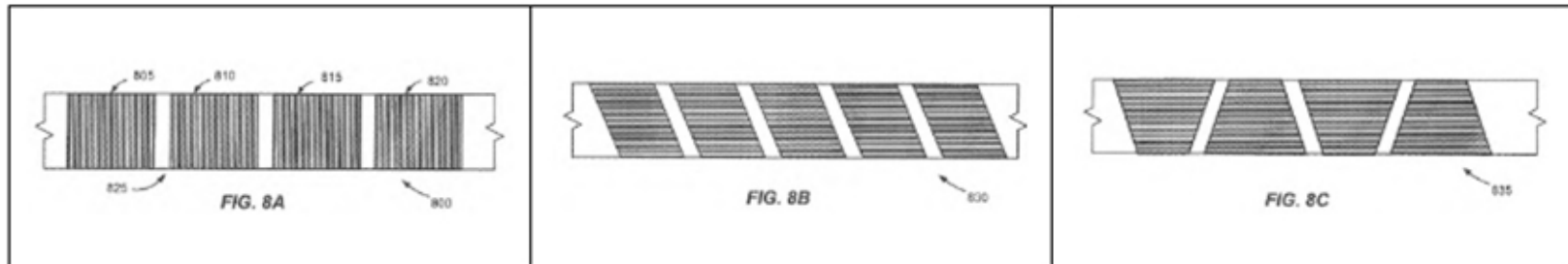
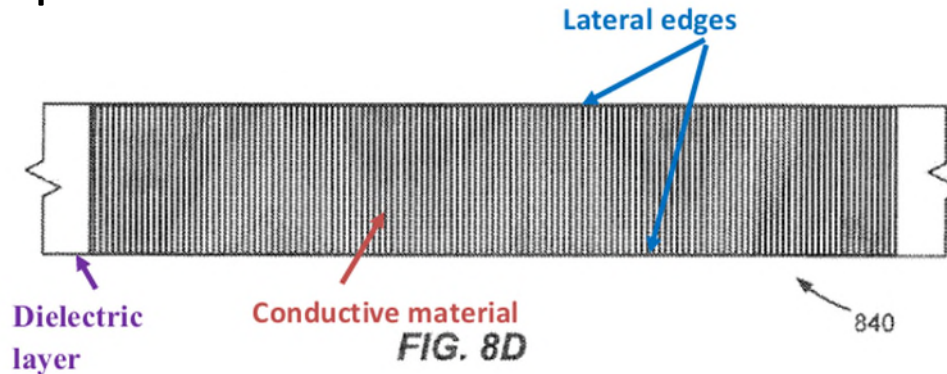
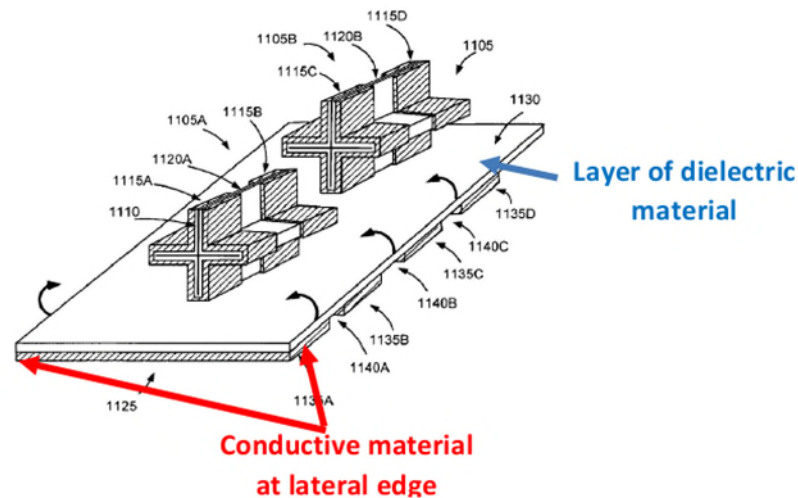


FIG. 7B



Ground 1 – Cook – No Anticipation

● Petition - “Disparate Embodiments”



POR 19-25; SR 4-9; Pet. 20-22; Decision 16-17; Cook (EX-1010) FIGS. 7A, 8A-8D, 11; Eldering ¶¶ 35-54.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 1 – Cook – No Anticipation

- “continuous” conductive material

- Petitioner - Must extend to each longitudinal end of the tape

“continuous, [or] discontinuous.” EX-1010, 7:11-14. A POSITA would understand a multi-layer tape having continuous conductive material would extend to each longitudinal end, such as illustrated in the annotated figure below:

- Cornelison – Must extend to each longitudinal end of the tape

either end.” *Id.* at 6:53-56, 23:64-67. Therefore, a POSITA would understand Cook to also disclose a multi-layer tape having continuous conductive material extending to each longitudinal end, such as illustrated in the annotated figure below with the metal layer extending from end to end instead of being discontinuous patches:

Ground 1 – Cook – No Anticipation

- FIG. 8D – Not “**continuous** conductive material”
 - “**relatively** continuous **patch** of electrically conductive material”

shielding benefits. FIG. 8D illustrates a top level (or bottom level) view of a fourth example separator segment **840** (or shield layer). The separator segment **840** may include a **relatively continuous patch** of electrically conductive material running along **a longitudinal length** of the separator **840**. As desired, a dielectric end may be positioned at one end of the segment **840**. With a shield layer, a **relatively continuous shield** may be performed and, as desired, the electrically conductive material may be grounded at either end when a cable incorporating the shield layer is installed.

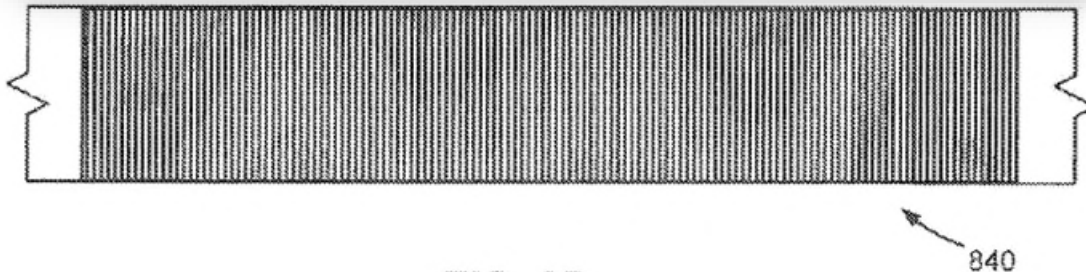
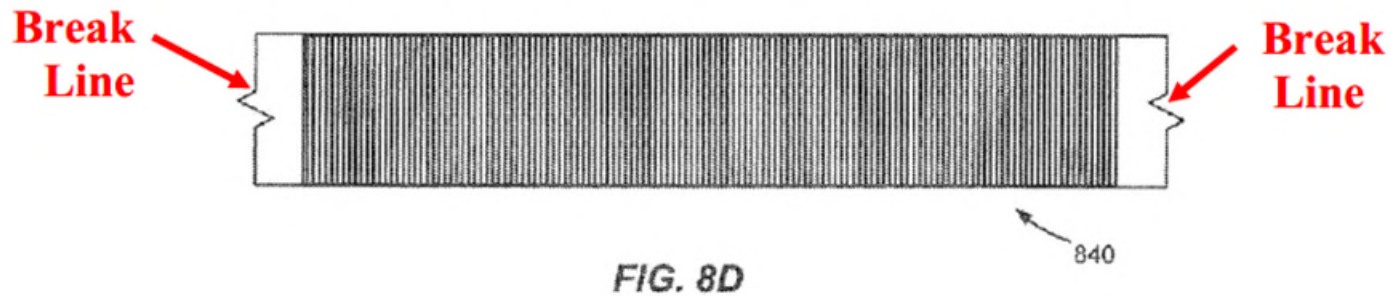
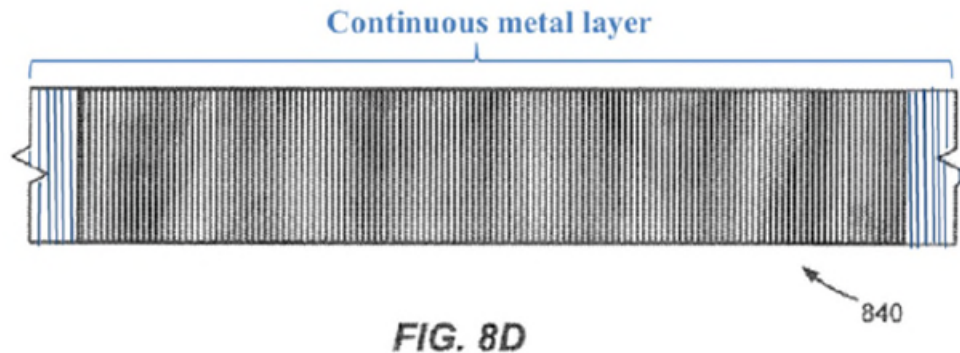


FIG. 8D

Ground 1 – Cook – No Anticipation

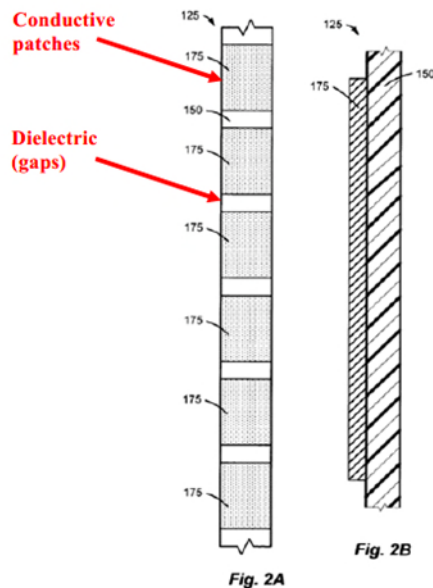
- FIG. 8D – Not “**continuous** conductive material”
 - “**relatively** continuous **patch** of electrically conductive material”



Ground 1 – Cook – No Anticipation

● Continuous – complications and disadvantages

McNutt (EX-2006) and Smith-641 (EX-2013)



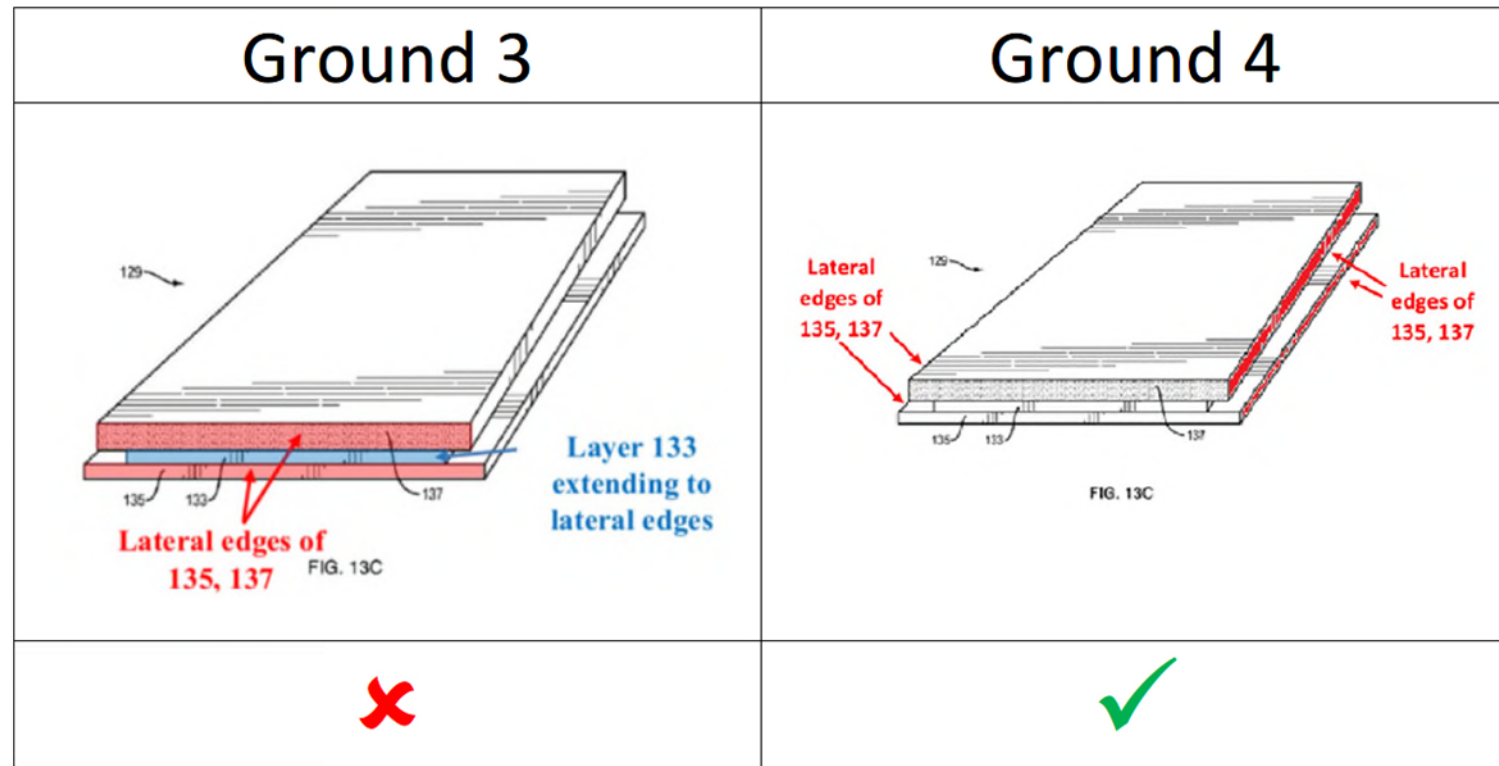
One approach to addressing crosstalk between communication cables is to circumferentially encase each cable in a continuous shield, such as a flexible metallic tube or a foil that coaxially surrounds the cable's conductors. However, shielding based on convention technology can be expensive to manufacture and/or cumbersome to install in the field. In particular, complications can arise when a cable is encased by a shield that is electrically continuous between the two ends of the cable.

In a typical application, each cable end is connected to a terminal device such as an electrical transmitter, receiver, or transceiver. The continuous shield can inadvertently carry voltage along the cable, for example from one terminal device at one end of the cable towards another terminal device at the other end of the cable. If a person contacts the shielding, the person may receive a shock if the shielding is not properly grounded. Accordingly, continuous cable shields are typically grounded at both ends of the cable to reduce shock hazards and loop currents that can interfere with transmitted signals.

Such a continuous shield can also set up standing waves of electromagnetic energy based on signals received from nearby energy sources. In this scenario, the shield's standing wave can radiate electromagnetic energy, somewhat like an antenna, that may interfere with wireless communication devices or other sensitive equipment operating nearby.

Ground 3 – Glew – No Anticipation

- Petition – Two Different “Lateral Edges”



POR 31-34; SR 13-15; Pet. 37, 49; Glew (EX-1008) FIG. 13C; Eldering ¶¶ 66-69, 73; Cornelison ¶¶ 136, 174.

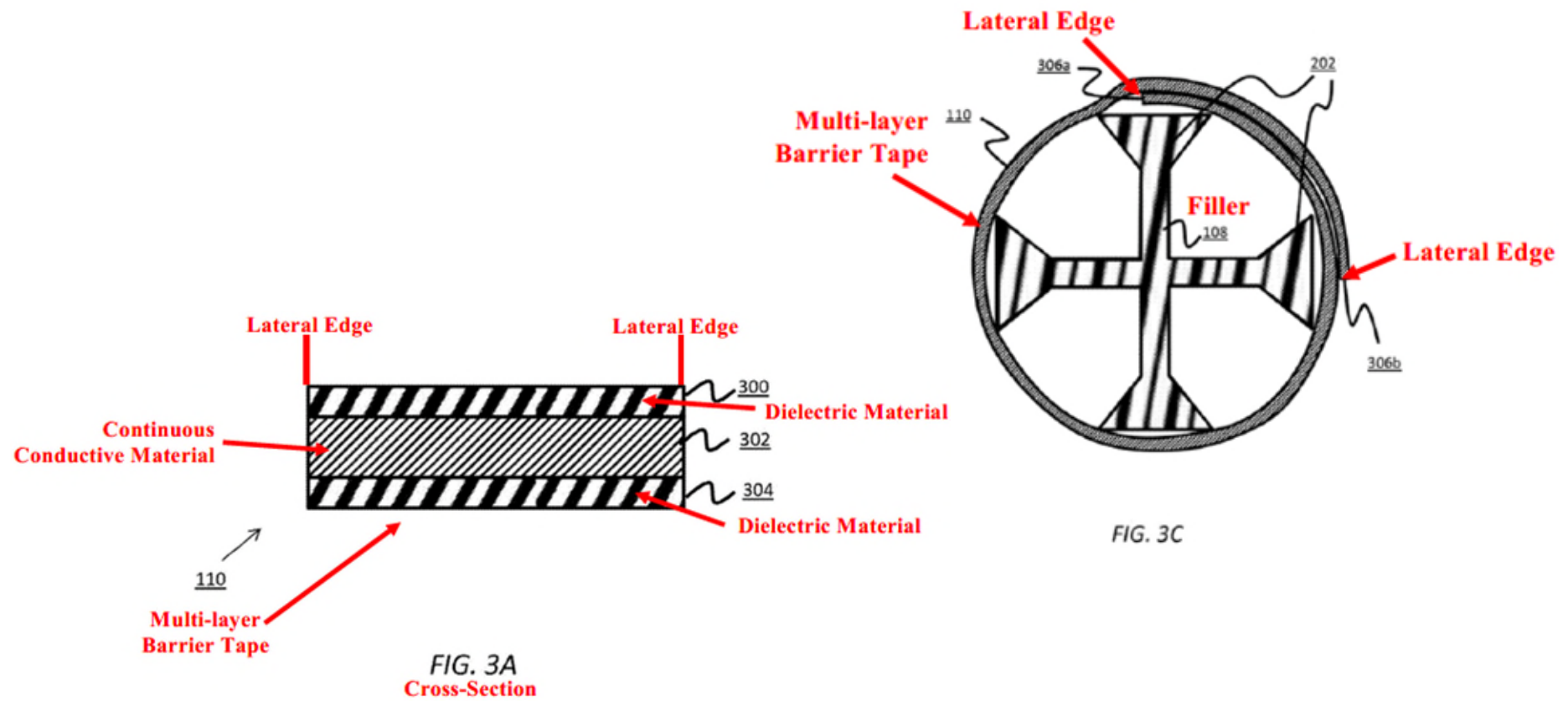
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Claim Construction – “lateral edge”

- “lateral edge” – Claims 1 & 18
 - “the conductive material of the barrier tape extending to each **lateral edge** of the two layers of the dielectric material”
- Patent Owner construction of “lateral edge”
 - “the edge running along the side of the tape parallel to the longitudinal direction”

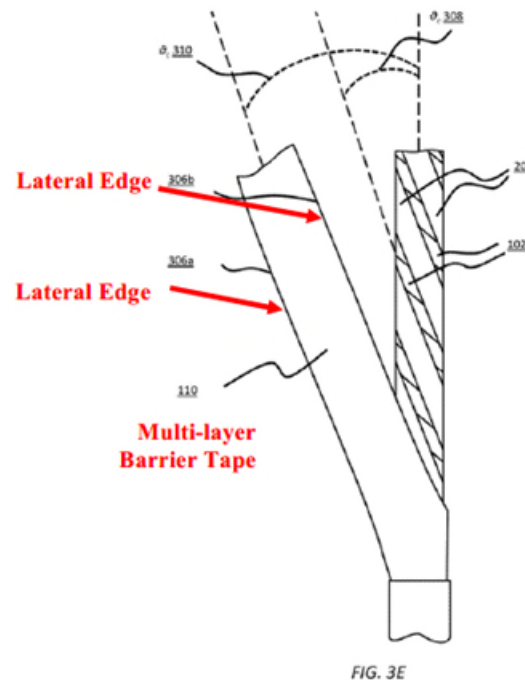
Claim Construction – “lateral edge”

- “conductive edges” 306a, 306b



Claim Construction – “lateral edge”

- “conductive edges” 306a, 306b



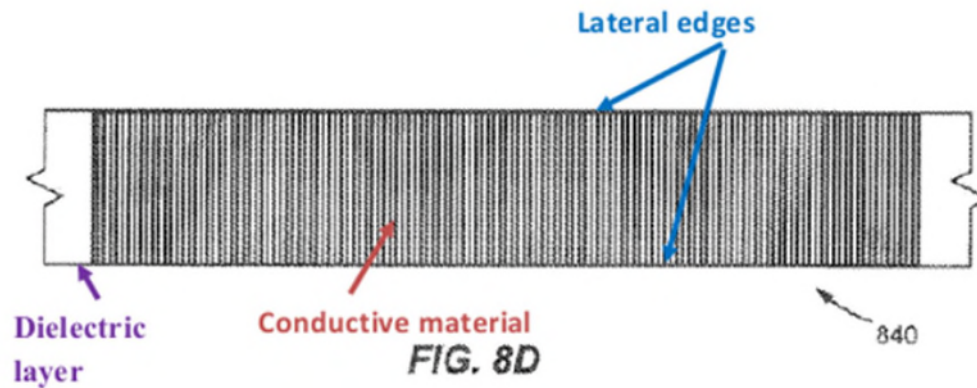
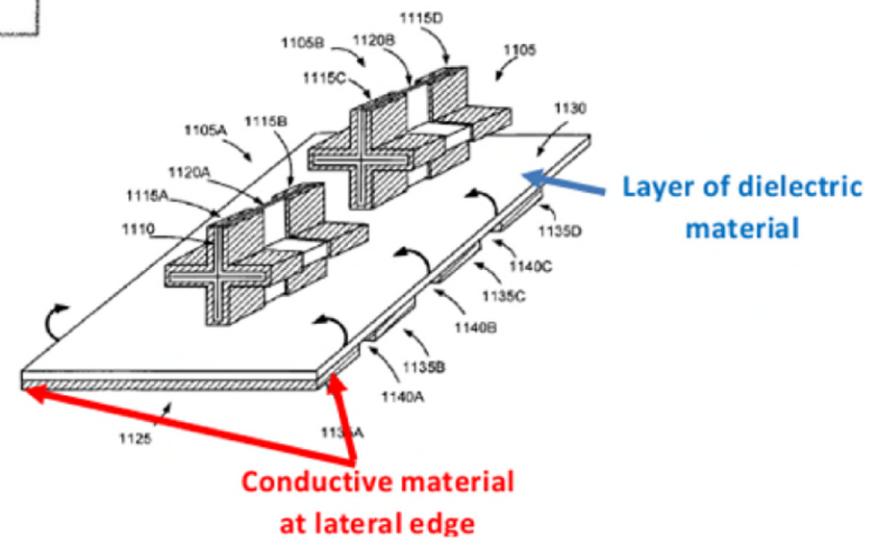
- “lateral edge”

- “the edge running along the side of the tape parallel to the longitudinal direction”

Claim Construction- “lateral edge”

● Petitioner’s Own Prior Art

– Cook (EX-1010) (Ground 1)

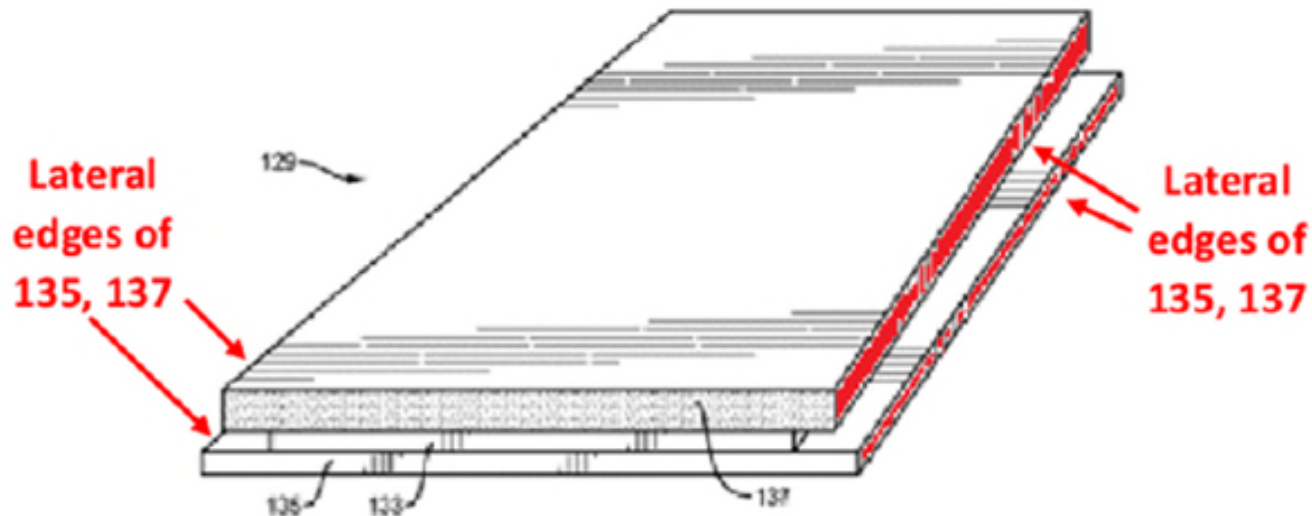


POR 13-14; Pet. 20-21; Cook (EX-1010) 23:58-67, FIGS. 8D, 11;
Eldering ¶¶ 39, 61-63.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

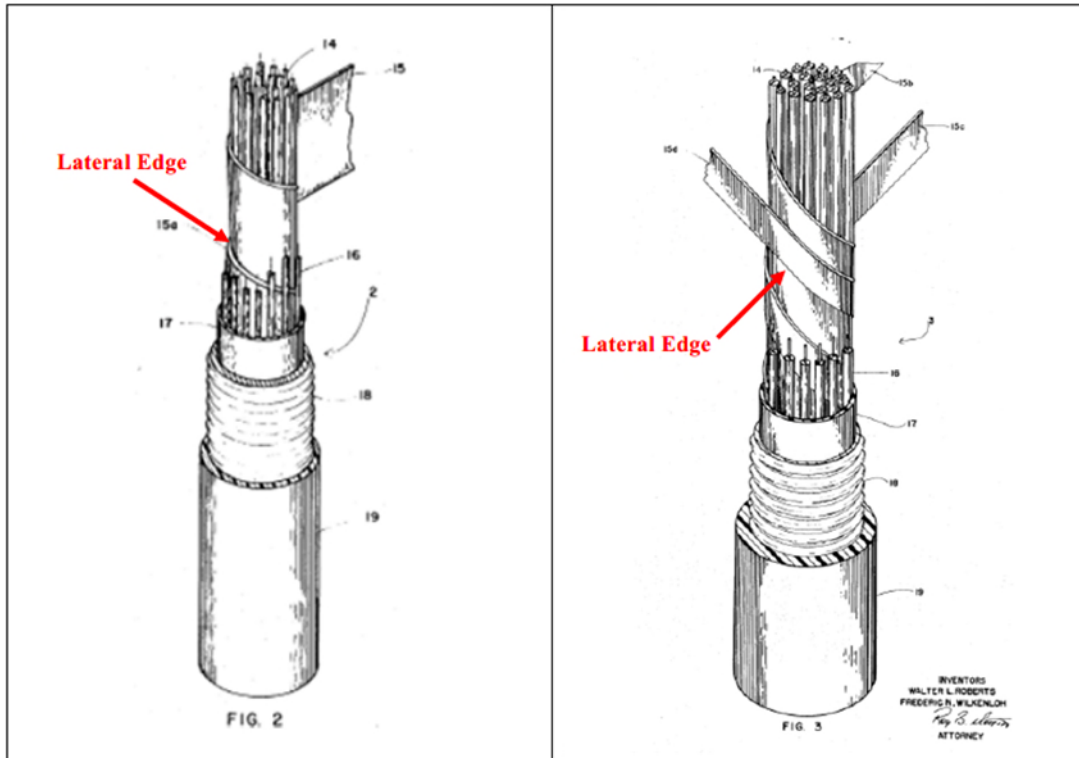
Claim Construction- “lateral edge”

- Petitioner’s Own Prior Art
 - Glew (EX-1008) (Ground 4)



Claim Construction- “lateral edge”

- Petitioner’s Own Prior Art
 - Roberts (EX-1009) – “lateral edges”

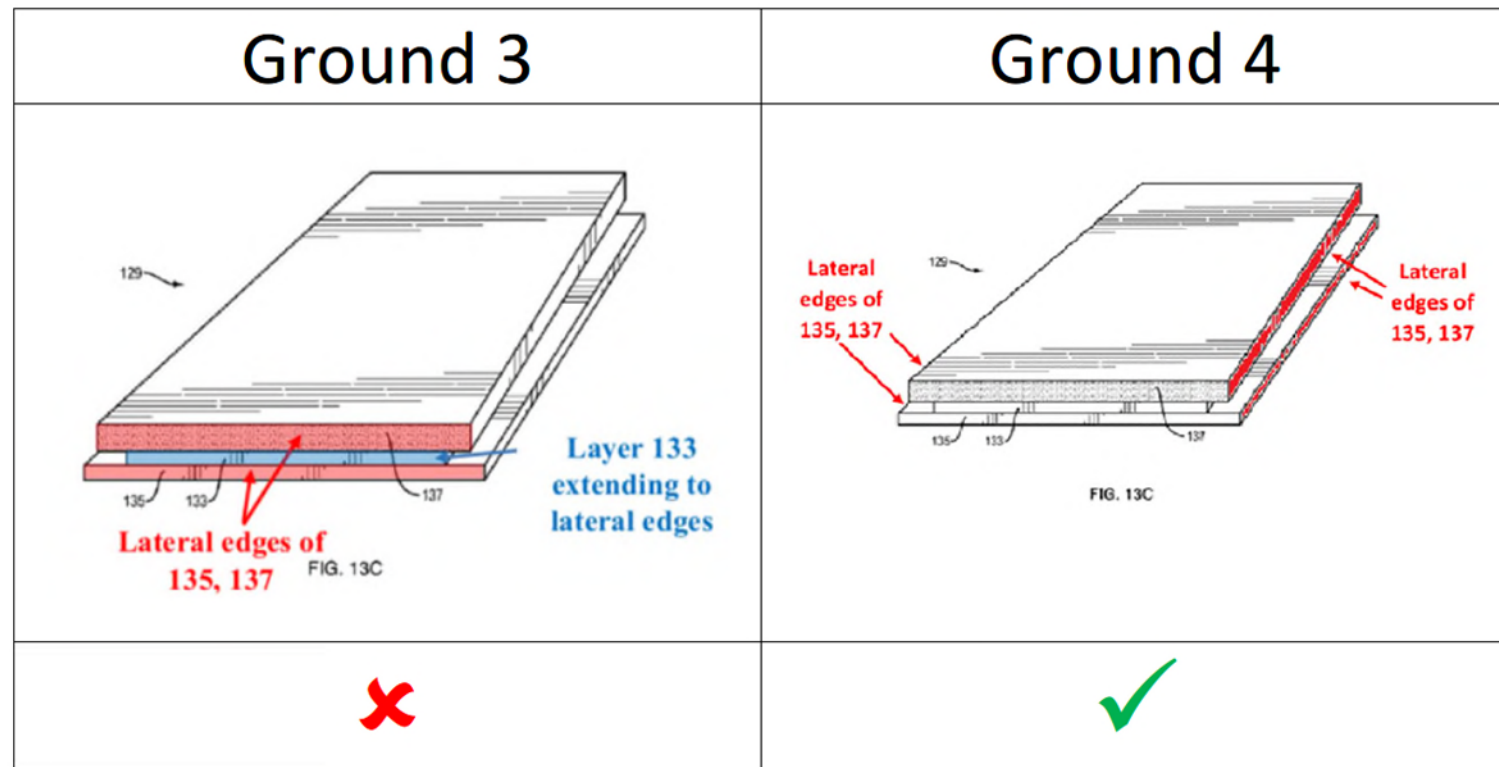


POR 14-16; Roberts (EX-1009) 2:20-24, 2:42-46, 4:27-33, 4:34-40, 5:65-75,
FIGS. 2, 3, 10; Eldering ¶¶ 64-65.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 3 – Glew – No Anticipation

- Petition – Two Different “Lateral Edges”

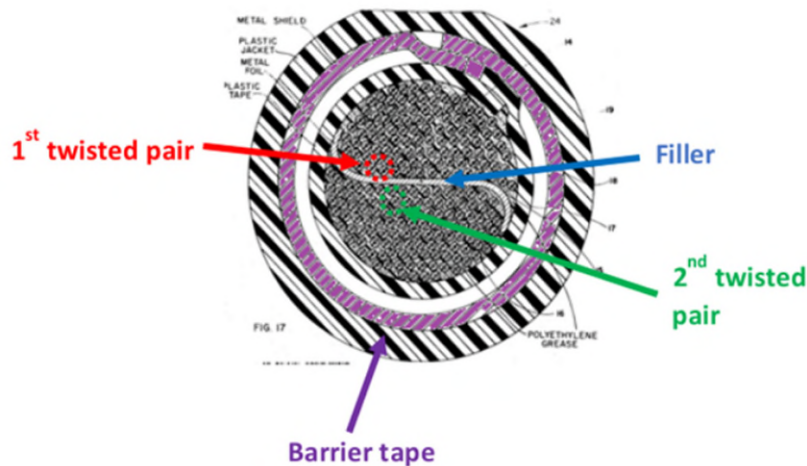
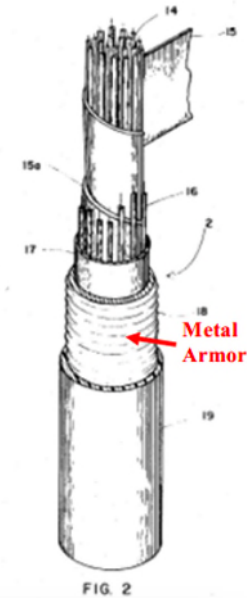


POR 31-34; SR 13-15; Pet. 37, 49; Glew (EX-1008) FIG. 13C; Eldering ¶¶ 66-69, 73; Cornelison ¶¶ 136, 174.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 5 – Roberts – No Anticipation

- Metal **Armor** Shield 18 is different than **Thin Foil** Shield 15



gated to increase its mechanical strength. For the purposes of this disclosure, when reference is made to a shield, other than element (18), an electrical shield is meant. Even though the word “shield” has an accepted double meaning, i.e. electrical as well as mechanical (armor) protection, the metal foil shield of the instant invention connote primarily an electrical shield.

Ground 5 – Roberts – No Anticipation

- Metal **Armor** Shield 18 is different than **Thin Foil** Shield 15

each other by the teachings of the cited reference”). As noted by Patent Owner, Roberts does not disclose that metal armor shield 18 includes the claimed conductive material contained between two layers of a dielectric material, where the conductive material extends to each lateral edge of the two layers of the dielectric material, and Petitioner improperly relies on shield 15 to impute “a metal layer that is continuous and has lateral edges flush with the edges of the dielectric layers” to metal armor shield 18. Prelim. Resp. 32–33, 35. Petitioner does not, on this record, provide sufficient explanation and reasoning as to how or why the relied-upon properties of shield 15 may be imported into or construed as being the same as the properties of shield 18. Additionally, although Petitioner relies on

Ground 5 – Roberts – No Anticipation

- Dependent Claims 3 and 9 require **helical** twisting

3. The cable of claim 1, wherein the filler has a **helical twist** at a first angle.

9. The cable of claim 3, wherein the first twisted pair of insulated conductors and the second twisted pair of insulated conductors have a **helical twist** around the filler at the first angle.

Ground 5 – Roberts – No Anticipation

- Petition never explained how Roberts “twisted composite” disclosed “helical” twisting

2. Claim 3:

“3. The cable of claim 1, wherein the filler has a helical twist at a first angle.”

Roberts discloses that the conductors and shield 15 (*filler*) in FIG. 17 are twisted into a “twisted composite” during manufacturing. EX-1009, 12:12-30, FIG. 23. Thus, this element is disclosed. EX-1006, ¶¶211-213.

3. Claim 9:

“9. The cable of claim 3, wherein the first twisted pair of insulated conductors and the second twisted pair of insulated conductors have a helical twist around the filler at the first angle.”

Roberts discloses that the conductors and shield 15 (*filler*) are twisted into a “twisted composite” during manufacturing. EX-1009, 12:12-30. Thus, they are helically twisted around the filler at the same angle (i.e., the first angle). EX-1006, ¶¶214-215.

Obviousness Grounds

- Ground 4 – Glew and Glew/Cook
 - Not obvious to extend conductive material to lateral edges
- Ground 7 – Roberts/Jachimowicz-172
 - Not obvious to extend conductive material to lateral edges
- Ground 10 – Clark/Roberts/Glew
 - Not obvious to extend conductive material to lateral edges

Exposed Continuous Conductive Edge Shield - Disadvantages

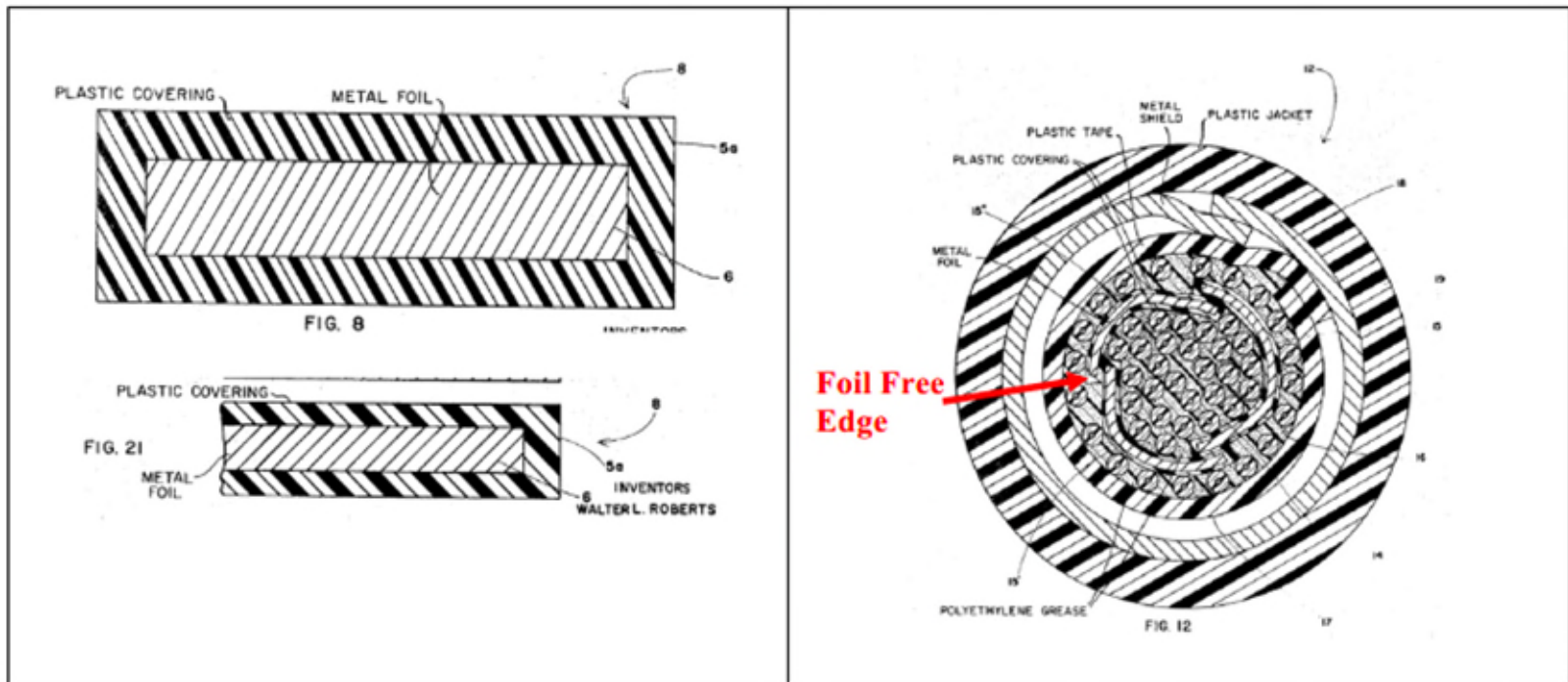
● Roberts (EX-1009)

It is also an embodiment of the instant invention to employ as a shield, a metal foil which is completely surrounded on all sides by a plastic coating, e.g., an aluminum foil, completely surrounded by polyethylene terephthalate (Mylar), polyethylene, polypropylene, polystyrene or PVC. An aluminum foil, which is coated only on its two major surfaces with a plastic, still has exposed naked aluminum surfaces at the edges thereof. When considering a cable of many miles in length, this amount of exposed conductive metal becomes significant. Therefore, the instant invention takes this into account in one of two ways: the first way is to employ a metal foil which is completely surrounded by plastic. As an example, such a foil would be envisioned as being aluminum with the plastic covering being polyethylene terephthalate (Mylar). Another way to mitigate undesirable electrical properties created by having an exposed surface (edge) of metal to the electrical conductors is to fill that portion of the space created by the plastic-coated metal foil shield not otherwise occupied by the electrical conductors therein with a polyethylene greaselike material. This greaselike material acts as both a dielectric protection, as well as an inhibitor of any subsequent incoming moisture. This particular feature will be more fully discussed later.

POR 37-40, 65-66; SR 20; Roberts (EX-1009) 3:52-74, 4:68-5:15, 5:48-54, 6:15-28, FIGS. 9 & 10; Eldering ¶¶ 88-89.

Exposed Continuous Conductive Edge Shield - Disadvantages

- Roberts (EX-1009)



POR 37-40, 65-66; SR 20; Roberts (EX-1009) 2:37-38, 2:47-53, 3:1-7, 6:29-65, 6:66-7:25, FIGS. 8, 11, 12, 14, 16, 21; Eldering ¶ 90.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Exposed Continuous Conductive Edge Shield - Disadvantages

- Foil Free Edges (Kroushl (EX-2007))

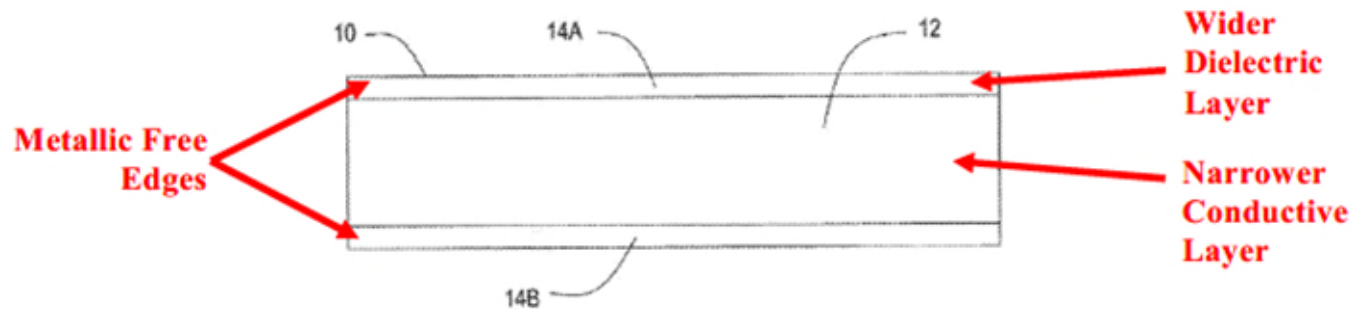


FIG. 1

[0028] Another advantage of metallic free zones 14a and 14b is that they can help prevent the unintentional shorting of adjacent metallic segments 16 when the tape is applied around the cable core. For example, if discontinuous metallic

Exposed Continuous Conductive Edge Shield - Disadvantages

● Foil Free Edges (NEPTAPE (EX-2008/EX-2009))

NEPTAPE® Foil Free Edge Shielding Tapes: General Information

Construction:

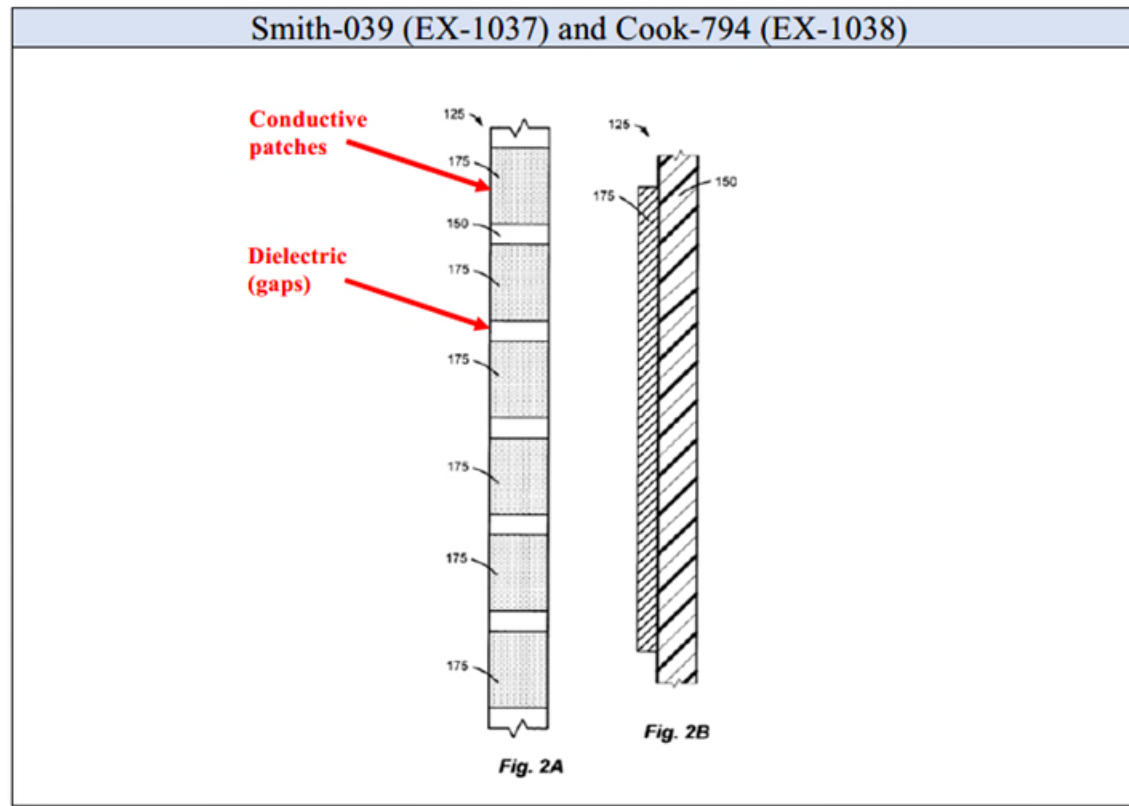
- Foil free edge tapes offer a film/film/foil construction with a wider, thicker top film layer which overlaps the foil, providing **non-conductive foil free edges**.
- Standard foil free edge laminates are constructed with aluminum foil and polyester film.

General Features/Benefits:

- Foil free film edge provides isolation between pairs, **preventing shield to shield shorts** and eliminating the need for a polyester overwrap.
- Cost saving - eliminates the need to purchase and inventory two tapes.

Exposed Continuous Conductive Edge Shield - Disadvantages

- Petitioner Prior Art Exposed Conductive Edges
 - Discontinuous conductive layer

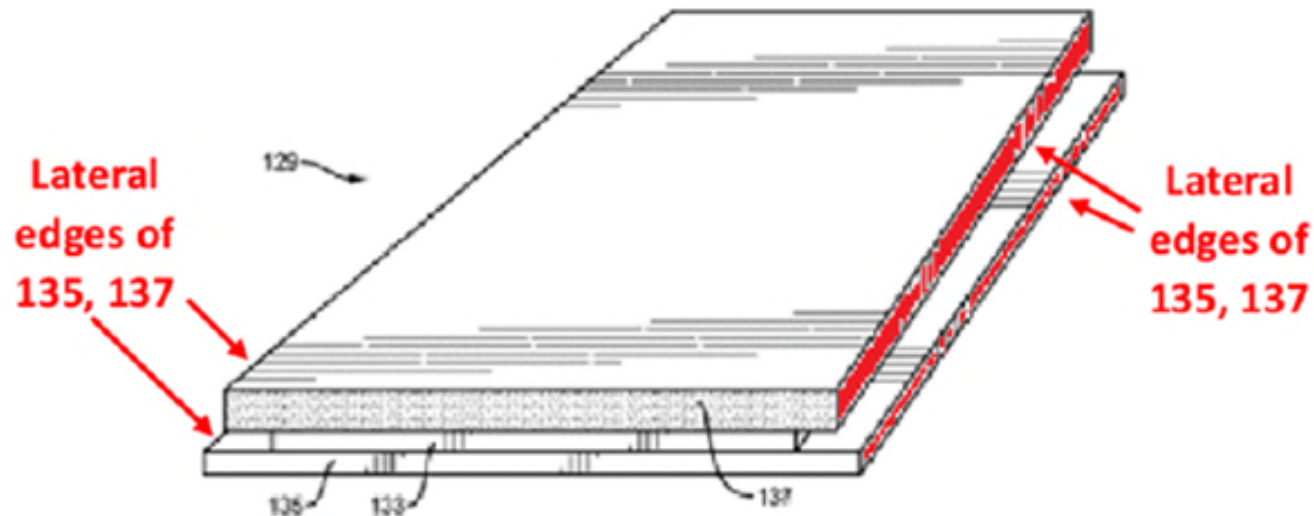


POR 37; 42-46; SR Smith-039 (EX-1037); Cook-794 (EX-1038);
Eldering ¶¶ 161-164.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 4 – Glew and Glew/Cook – Not Obvious

- Several known techniques to manufacture tape shown in FIG. 13C having different widths



POR 36-37. 54-56; SR 15-16; Glew (EX-1008) ¶¶ [0195], [0199], [0200];
Eldering ¶ 160.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 4 – Glew and Glew/Cook – Not Obvious

- Petitioner Prior Art Exposed Conductive Edges – Slitting
 - Other manufacturing techniques

[0060] While the illustrated embodiment of Process 300 creates conductive patches on a wide piece of film and then slits the resulting material into individual segmented tapes 125, that sequence is merely one possibility. Alternatively, a wide roll of dielectric film can be slit into strips of appropriate width that are wound onto individual rolls. A metallization machine can then apply conductive patches 175 to each narrow-width roll, thereby producing the segmented tape 125. Moreover, a cable manufacturer might purchase pre-sized rolls of the substrate film 150 and then apply the conductive patches 175 thereto to create corresponding rolls of the segmented tape 125. In an exemplary embodiment, the substrate film 410 is applied over the conductive patches 175 as illustrated in FIG. 4.

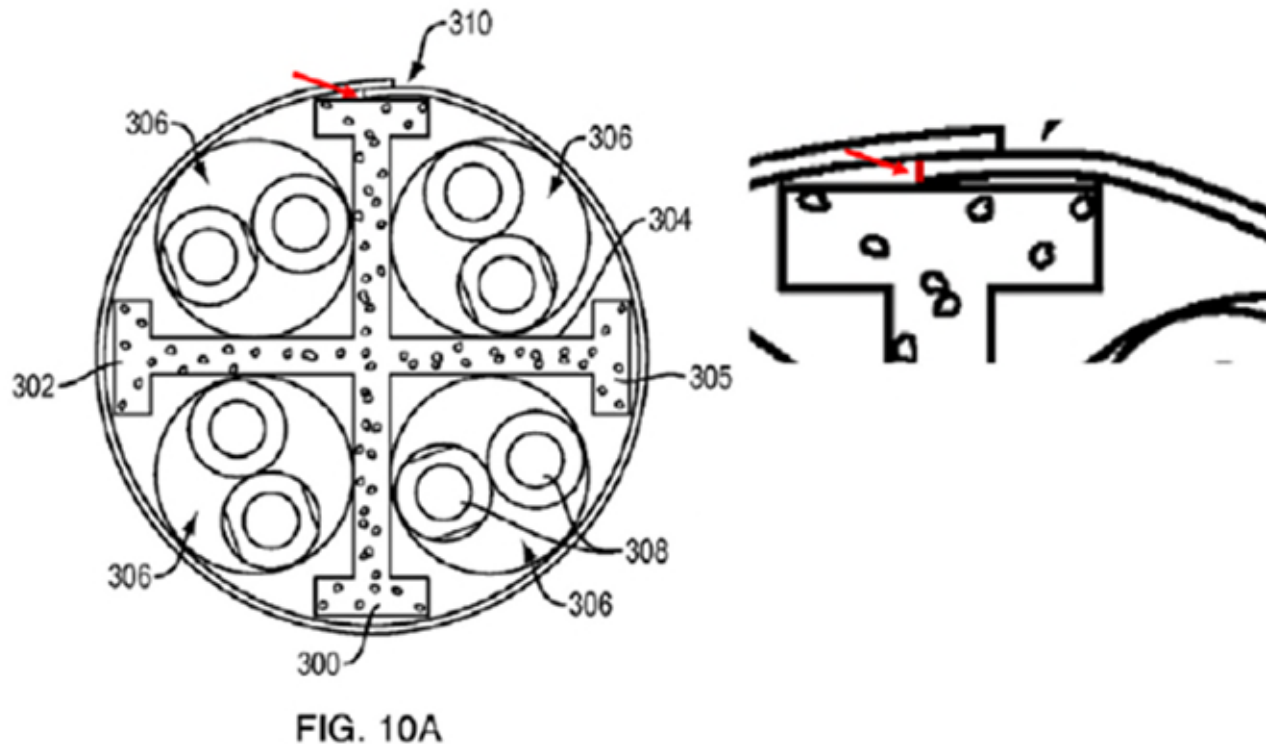
Ground 4 – Glew and Glew/Cook – Not Obvious

- Petitioner provides no evidentiary support that manufacturing of Glew FIG. 13C would be more complex and costly

178. A POSITA would find it obvious to make the three layers of the multi-layer tape flush with each other (i.e., have the metal layer extend to the side edges of the dielectric layers in FIG. 13C). Doing so would provide the benefits of Glew's disclosed tape and doing so also would be generally simpler and cheaper to manufacture.

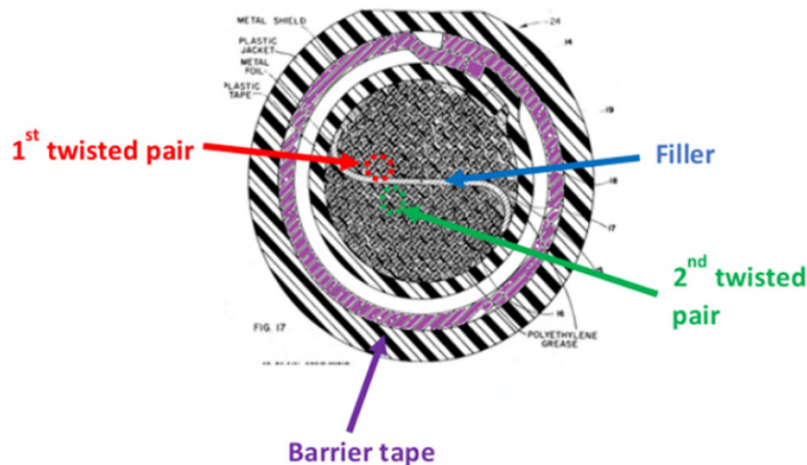
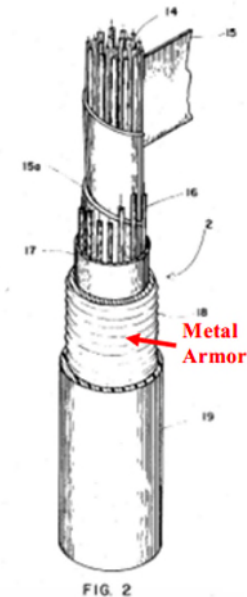
Ground 4 – Glew and Glew/Cook – Not Obvious

- Glew's Foil-Free Edge Prevents Shorting



Ground 7 – Roberts and Roberts/Jachowicz-036 – Not Obvious

- Metal **Armor** Shield 18 is different than **Thin Foil** Shield 15



gated to increase its mechanical strength. For the purposes of this disclosure, when reference is made to a shield, other than element (18), an electrical shield is meant. Even though the word “shield” has an accepted double meaning, i.e. electrical as well as mechanical (armor) protection, the metal foil shield of the instant invention connote primarily an electrical shield.

POR 47-51, 62-64; SR 21-24; Roberts (EX-1009) 4:15-22, 4:62-67, 10:42-48, 11:43-49, FIGS. 1-3, 17; Eldering ¶¶ 76-82. 110.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 7 – Roberts and Roberts/Jachowicz-036 – Not Obvious

● Disadvantages of exposed continuous conductive edge

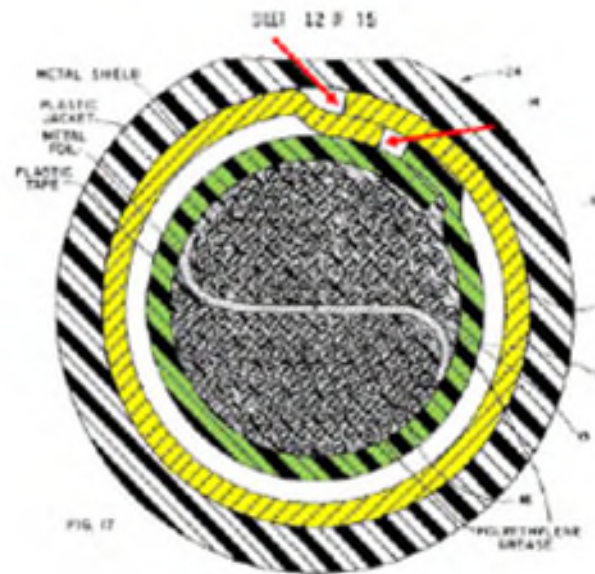
It is also an embodiment of the instant invention to employ as a shield, a metal foil which is completely surrounded on all sides by a plastic coating, e.g., an aluminum foil, completely surrounded by polyethylene terephthalate (Mylar), polyethylene, polypropylene, polystyrene or PVC. An aluminum foil, which is coated only on its two major surfaces with a plastic, still has exposed naked aluminum surfaces at the edges thereof. When considering a cable of many miles in length, this amount of exposed conductive metal becomes significant. Therefore, the instant invention takes this into account in one of two ways: the first way is to employ a metal foil which is completely surrounded by plastic. As an example, such a foil would be envisioned as being aluminum with the plastic covering being polyethylene terephthalate (Mylar). Another way to mitigate undesirable electrical properties created by having an exposed surface (edge) of metal to the electrical conductors is to fill that portion of the space created by the plastic-coated metal foil shield not otherwise occupied by the electrical conductors therein with a polyethylene greaselike material. This greaselike material acts as both a dielectric protection, as well as an inhibitor of any subsequent incoming moisture. This particular feature will be more fully discussed later.

POR 37-40, 65-69; SR 20, 24; Roberts (EX-1009) 3:52-74, 4:68-5:15, 5:48-54, 6:15-28, FIGS. 9 & 10; Eldering ¶¶ 88-89.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 7 – Roberts and Roberts/Jachowicz-036 – Not Obvious

- Disadvantages of exposed continuous conductive edge
 - Pinholes in Mylar insulation (conductors, foil, tape)



POR 39; SR 20, 24-26; Roberts (EX-1009) 1:32-40, 1:69-71, 3:32-66, 4:10-14, 4:70-5:5, 6:10-15, 6:60-65, 7:21-25, 7:42-46, 8:6-9, 8:44-47, 9:6-9.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 7 – Roberts and Roberts/Jachowicz-036 – Not Obvious

- Jachimowicz-036 (EX-1013)

- Thin shield 14 used for corrosion protection – **not armor**

Feb. 1, 1966

L. JACHIMOWICZ

3,233,036

CORROSION PROOF SHIELDING TAPE FOR SHIELDING TELEPHONE CABLES

Filed Nov. 1, 1963

applied to both sides of the strip in a flexible protective film which has high electrical resistivity, high resistance to chemicals and moisture, and exceptionally good adhesion to the strip to withstand both manufacturing processes such as corrugating and to prevent delamination in corrosive atmospheres or liquids. The polyethylene films generally satisfy the requirements of resistivity and resistance to chemicals and moisture. However, polyethylene does not

Ground 10 – Clark-478, Roberts, and Glew – Not Obvious

- None of the prior art references disclose or render obvious a barrier tape with conductive material extending to lateral edges
 - Glew – Grounds 3-4
 - Roberts – Grounds 5-7
 - Clark-478 – no two dielectric layers (admitted)

As the Examiner found during prosecution, Clark-478 discloses all of this element except the barrier tape having three layers, with a conductive material contained between two layers of a dielectric material. *See* EX-1002, pp. 7-8; EX-1006, ¶¶279-280; EX-1025, ¶¶[0041], [0047], FIG. 2. Instead, Clark-478 discloses a two-layer barrier tape (i.e., aluminum/mylar binder 74) surrounding the filler and twisted pairs:

Ground 10 – Clark-478, Roberts, and Glew – Not Obvious

- Petitioner's alleged motivation to modify Clark-478 discourages extending conductive material to lateral edge and exposing metal layer to the conductors

maintaining internal cross-talk isolation characteristics. POSITAs have been motivated to isolate the conductors from the metal layer of a shield since at least the 1960s, as exemplified by Roberts, which discloses adding mylar and also a grease-like dielectric material to cables to help isolate the conductors from the metal layer in multi-layer shields. *See* EX-1009, 3:37-75, 4:48-5:15; EX-1006, ¶291.

PO's Expert (Eldering) - POSITA

- Eldering
 - Ph.D in electrical engineering
 - Significant experience with twisted pair data cables
- Petitioner
 - Never alleged that Eldering is not a POSITA
 - Never objected to Eldering declaration testimony (37 C.F.R. § 42.64(b))
- POSITA
 - No requirement for experience with tapes (manufacturing, sizing, slitting)