

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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AMPHENOL CORP.,  
Petitioner

v.

PPC BROADBAND, INC.,  
Patent Owner

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Case No. IPR2023-01363  
Patent No. 9,008,483

**SUPPLEMENTAL DECLARATION OF DR. SAYFE KIAEI  
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT NO. 9,008,483**

**TABLE OF CONTENTS**

|                   |                                                                                                                                                                               |                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b><i>I.</i></b>  | <b><i>INTRODUCTION AND QUALIFICATIONS.....</i></b>                                                                                                                            | <b><i>6</i></b> |
| <b><i>II.</i></b> | <b><i>OPINIONS .....</i></b>                                                                                                                                                  | <b><i>7</i></b> |
| <b>A.</b>         | <b>Holmberg’s mid-span wall box meets the claimed drop interface box (DIB) .....</b>                                                                                          | <b>7</b>        |
| 1.                | Holmberg does not teach an intermediary box between the wall box and end subscribers .....                                                                                    | 7               |
| 2.                | Holmberg’s wall box provides service to the same type of end users as the ’483 Patent’s drop interface box .....                                                              | 10              |
| 3.                | Splice enclosures such as Holmberg’s wall box are reconfigurable after initial installation and designed to be re-entered .....                                               | 12              |
| <b>B.</b>         | <b>Holmberg does not intentionally block/restrict/limit access to the area behind the splice tray.....</b>                                                                    | <b>19</b>       |
| 1.                | Holmberg’s language does not teach or indicate to a POSITA that fastening the splice tray in place is designed to intentionally limit/block/restrict access .....             | 19              |
| <b>C.</b>         | <b>Holmberg’s splice tray must be unfastened and removed to add new connections, reconfigure existing connections, or perform repairs .....</b>                               | <b>26</b>       |
| <b>D.</b>         | <b>Dr. Eldering Identified a Need in Holmberg’s Enclosure That the Proposed Hinge Connection Satisfies, Strengthening the Motivation to Combine Holmberg and Battey .....</b> | <b>28</b>       |
| <b>E.</b>         | <b>Removing Holmberg’s splice tray after installation would not have damaged the fibers .....</b>                                                                             | <b>36</b>       |
| 1.                | Moving the splice tray from a “working position” to the fastened location creates slack, which allows for removing the tray without causing damage .....                      | 36              |
| <b>F.</b>         | <b>The Holmberg combination does not induce more strain than Holmberg’s native arrangement with fasteners .....</b>                                                           | <b>40</b>       |
| <b>G.</b>         | <b>Dependent Claim 2: A POSITA Would Have Been Motivated to use Blankenship’s Adapters in Place of Holmberg’s Splice Tray Holders .....</b>                                   | <b>41</b>       |

|             |                                                                                                                                                                                                                                     |           |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>H.</b>   | <b>Dependent Claim 10: A POSITA Would Have Been<br/>Motivated to Exchange Some Ease of Installation for<br/>Additional Security with Cowan’s clips—Holmberg Makes<br/>this Exact Tradeoff with Fiber Retention Members 292.....</b> | <b>42</b> |
| <b>III.</b> | <b>CONCLUSION.....</b>                                                                                                                                                                                                              | <b>45</b> |

**CLAIM LISTING**

**Claim 1:**

**Claim 1[Pre]:** A drop interface box configured to be mounted to a structure and to receive a drop cable from an optical fiber service provider distribution point and a plurality of distribution cables which distribute the optical fiber service, the drop interface box comprising:

**1(a)** a base unit having a drop cable entrance configured to receive the drop cable and having drop cable retaining mechanisms spaced apart and configured to retain a length of drop cable looped around the drop cable retaining mechanisms;

**1(b)** a cover having a hinged connection to the base unit to selectively enclose a storage area provided in the base unit; and

**1(c)** a fiber storage panel having a hinged connection to the base unit on a side opposite the hinged connection of the cover to the base unit such that the fiber storage panel is moveable relative to the base unit and configured to be stored between the base unit and the cover,

**1(d)** the fiber storage panel having first spools positioned to store a plurality of feed break-out cables coupleable to the drop cable, the fiber storage panel further having second spools positioned to store a plurality of distribution cables coupleable to the plurality of feed break-out cables.

**Claim 2:**

The drop interface box of claim 1, wherein the fiber storage panel further includes an adapter bracket configured to hold one or more adapters which couple the plurality of feed break-out cables to the plurality of distribution cables.

**Claim 10:**

The drop interface box of claim 1, wherein the drop cable retaining mechanisms in the base unit comprise storage clips positioned on opposing sides of the base unit.

**Claim 11:**

The drop interface box of claim 1, wherein the drop cable entrance further comprises slots formed in the base unit and configured to receive a cable clip which clips over the drop cable, the slots and the cable clip forming a substantially weather tight seal with the base unit.

**Claim 12:**

The drop interface box of claim 11, and further comprising a strain-relief clamp coupled to the base unit proximate the drop cable entrance.

**Claim 13:**

The drop interface box of claim 1, and further comprising a security mechanism for securing the cover to the base unit in a closed position.

I, Sayfe Kiaei, declare as follows:

## **I. INTRODUCTION AND QUALIFICATIONS**

1. I have been asked to respond to certain issues raised by Patent Owner in Patent Owner's Response (POR) dated June 14, 2024. All of my opinions expressed in my original declaration (Ex. 1003) remain the same and I have applied the legal framework set forth in my original declaration (Ex. 1003), which I incorporate by reference herein. Additionally, as before, I offer the below opinions and background knowledge from the lens of a person having ordinary skill in the art at the time of the earliest possible priority date of the '483 Patent, which I have been told to assume is April 5, 2011. I have reviewed the relevant portions of the POR (Paper 13) in connection with preparing this supplemental declaration.

2. As part of my work and in forming my opinions in connection with this proceeding, I have reviewed the following materials. For any prior art listed below, it is my opinion persons of ordinary skill in my field would reasonably rely upon such prior art in forming opinions regarding the subject matter of this proceeding:

- Materials relied on for my previous Declaration;
- Patent Owner's Response (POR) (Paper 13);
- Declaration of Dr. Eldering (Ex. 2007);
- Transcript of Deposition of Dr. Eldering (Ex. 1023) ("Eldering Depo. Tr.");
- Donald J. Sterling, Jr. *Technician's Guide to Fiber Optics*. Fourth Edition. 2004. (Ex. 1024) ("Sterling");
- International Publication No. WO 2005/091038 to Vo et al. (Ex. 1025) ("Vo");

- International Publication No. WO 2010/036549 to Desard et al. (Ex. 1026) (“*Desard*”);
- International Publication No. WO 2010/093794 to Bradea et al. (Ex. 1027) (“*Bradea*”);
- U.S. Patent No. 5,249,253 to Franckx et al. (Ex. 1028) (“*Franckx*”);
- John Crisp and Barry Elliott. *Introduction to Fiber Optics*. Third edition. 2005. (Ex. 1029) (“*Crisp*”);
- Eric. R. Pearson. *The Complete Guide to Fiber Optic Cable System Installation*. 1997. (Ex. 1030) (“*Pearson*”);
- Affidavit of Nathaniel E Frank-White. Fiber Optic Association, Inc. captures from the Internet Archive (Ex. 1031) (“*FOA*”);
- 31EE-202BS Fiber Optic Enclosure from Westell. May 2005. (Ex. 1032) (“*Westell*”);
- Any other materials I cite in support of this Declaration.

## II. OPINIONS

### A. Holmberg’s mid-span wall box meets the claimed drop interface box (DIB)

#### 1. *Holmberg does not teach an intermediary box between the wall box and end subscribers*

3. I understand that PPC’s expert, Dr. Eldering, believes Holmberg’s mid-span box, distinguishing it from a drop interface box (or NID)<sup>1</sup>, is separated from the subscriber by an intermediary drop terminal or other unit, which is responsible for directly terminating fiber to the customer. Eldering Depo. Tr., 37:3-42:10, 49:4-11.

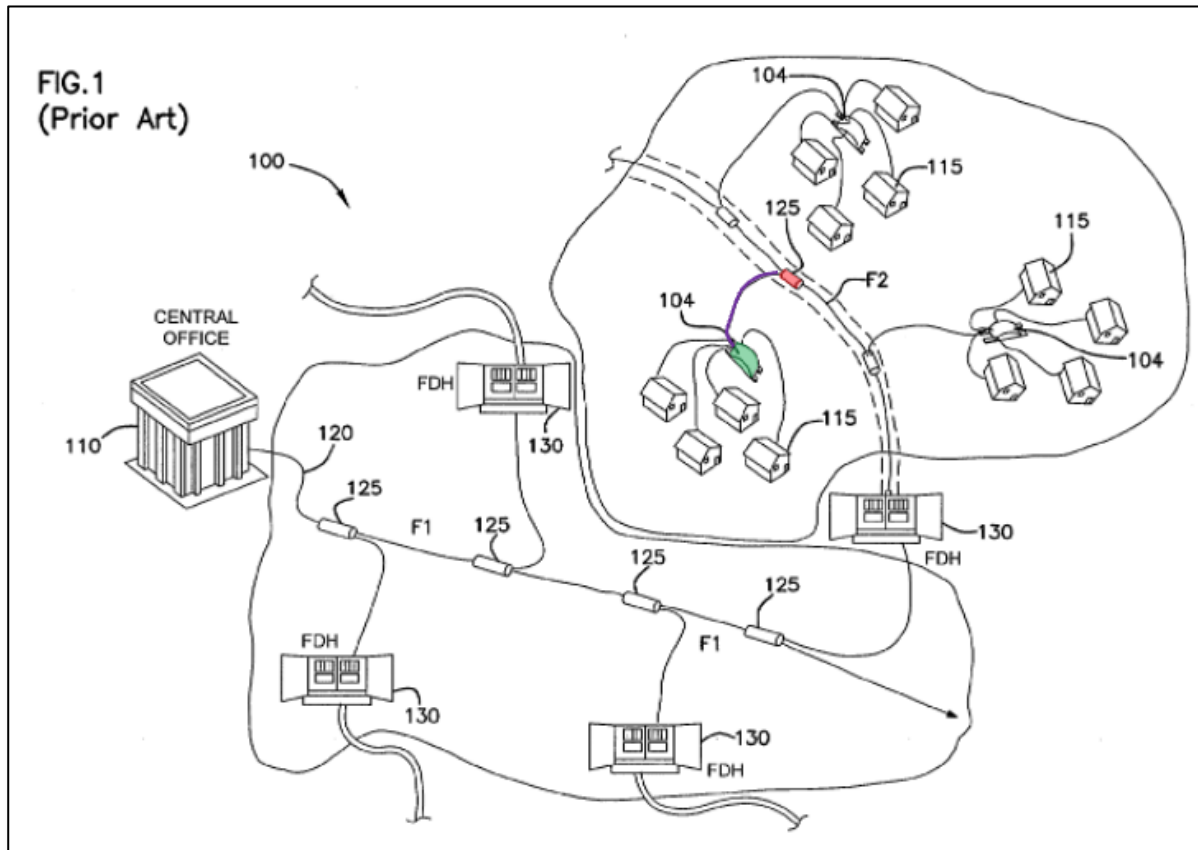
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<sup>1</sup> PO and its expert use DIB and NID interchangeably. I have similarly used these terms interchangeably.

4. I disagree with Dr. Eldering's interpretation of *Holmberg*. A POSITA would have understood that *Holmberg*'s wall box 200 directly serves subscribers without an intermediary box between the wall box and the subscriber. Inside *Holmberg*'s wall box 200, fibers of a drop cable are cut and spliced to fibers of a distribution cable to provide fiber optic connections to subscribers at multi-dwelling units, homes, and other buildings. *Holmberg*, [0034] ("It is preferred for wall boxes in accordance with the principles of the present disclosure to be used for indoor applications such as multi-dwelling units, or commercial buildings where a plurality of subscribers is located."), [0044], [0053] (teaching splicing terminated fibers to fibers of a distribution cable at wall box 200), [0007] (teaching wall boxes provided at different floors of a multi-dwelling unit and each wall box corresponds to a plurality of different subscribers). Accordingly, a POSITA would have understood that in *Holmberg*, the fibers of the distribution cable exiting wall box 200 are routed directly to a subscriber's unit.

5. Dr. Eldering testified that *Holmberg* teaches an intermediary box ("drop terminal 104") that serves as a drop interface box and is located "after" the wall box in a terminal location. Eldering Depo. Tr., 44:16-45:3, 49:4-11. I disagree. *Holmberg* references drop terminal 104 only in the Background section as a component of traditional prior art fiber optic network topologies. *Holmberg*, [0006] (teaching that prior art networks used mid-span access locations 125 (or "break-out

locations”) to connect the main cable to “drop terminals 104” that terminate fiber to subscriber locations). *Holmberg*’s Fig. 1 below depicts such a traditional “prior art” network and includes the sole depiction of drop terminal 104:



*Holmberg*, Fig. 1 (annotated), [0010] (“FIG. 1 shows a prior art passive fiber optic network.”).

6. In contrast, *Holmberg*’s wall box 200 is expressly taught as being “used for indoor applications such as multi-dwelling units, or commercial buildings where a plurality of subscribers is located.” *Holmberg*, [0034]. This aligns with *Holmberg*’s ¶ [0007] and Fig. 2, which describe wall boxes “provided at different floors of the

multi-dwelling unit with each wall box having optical coupling locations corresponding to a plurality of different subscribers (e.g., each resident on a given floor).” *Holmberg*, [0007]. A POSITA would have understood that *Holmberg*’s invention is directed to wall boxes designed to terminate fiber directly to end subscribers at a multi-dwelling unit:

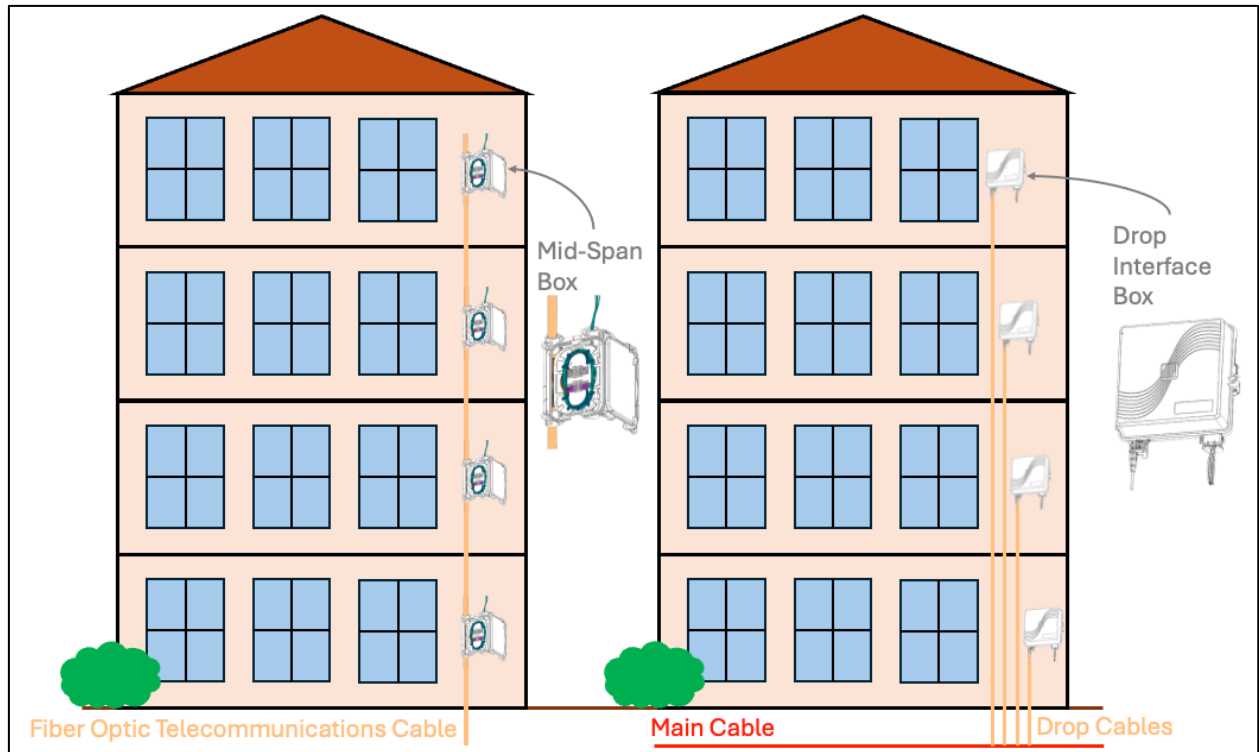
The present disclosure relates generally to ***wall boxes configured to be easily mounted at mid-span locations*** along the length of a fiber optic telecommunications cable. It is preferred for wall boxes in accordance with the principles of the present disclosure to be used ***for indoor applications such as multi-dwelling units***, or commercial buildings ***where a plurality of subscribers is located***.

*Holmberg*, [0034] (emphases added).

2. ***Holmberg’s wall box provides service to the same type of end users as the ’483 Patent’s drop interface box***

7. Both the ’483 Patent and *Holmberg* teach providing fiber optic service to end users in multi-dwelling units or other buildings. *Holmberg*, [0034] (“multi-dwelling units, or commercial buildings where a plurality of subscribers is located.”); ’483 Patent, 1:15-27 (“Disclosed embodiments relate to connection of an optical fiber feed or ‘drop’ cable from an optical fiber service provider to a distribution point at a residence, dwelling or other building, such as a multi-unit dwelling.”), *id.* (“The enclosure will generally be mounted on a multi-dwelling residence...”), 1:44-46, 3:17-24 (“DIB 100 mounts at a desired location of a premises 130, which will typically be a multi-dwelling or multi-business type of

premises in which multiple individual living spaces or units are included in a single larger building. However, DIB 100 is not limited to use in this type of premises.”). Indeed, both *Holmberg* and the ’483 Patent refer to “multi-dwelling units” or “multi-unit dwellings,” which a POSITA would have understood to be synonymous. Although the ’483 Patent does not expressly describe utilizing multiple boxes for a single multi-dwelling unit, a POSITA would have understood that larger multi-dwelling units (e.g., buildings with a large number of residents and/or multiple floors) could require multiple boxes to terminate fiber to different parts of the building. For example, a DIB may be dedicated to each floor—as *Holmberg* expressly describes. The main distinction between *Holmberg*’s wall box and the ’483 Patent’s DIB is that only *Holmberg*’s box can pass through fibers such that multiple boxes can be mounted on the same cable and distribute fiber service from that single cable. This is the point of *Holmberg*’s mid-span access arrangement—to terminate some fibers while passing through others. The ’483 Patent’s DIB, on the other hand, cannot pass through fibers. It requires a separate drop cable for each box. In sum, as depicted in the figure below, *Holmberg*’s wall box setup (left) and the ’483 Patent’s drop interface box setup (right) serve the same type of buildings and subscribers, but they accomplish this using different cable arrangements.



8. A POSITA would have understood that because *Holmberg's* wall box services the same type of subscribers in the same “terminating” setup as the '483 Patent, *Holmberg's* wall box would have required an ability to easily disconnect and reconnect new subscribers. Eldering Depo. Tr. (Ex. 1023), 49:4-11 (admitting that serving multi-dwelling units requires an ability to easily connect and disconnect new subscribers). Therefore, *Holmberg's* wall box, like the DIB of the '483 Patent, would also have required the same easy access to add, remove, or otherwise reconfigure or fix end subscriber connections.

3. *Splice enclosures such as Holmberg's wall box are reconfigurable after initial installation and designed to be re-entered*

9. A POSITA would further have understood that accessing *Holmberg's* splice tray 230 would have been required to add, remove, fix, or otherwise reconfigure end subscriber connections. Further, a POSITA would have understood that *Holmberg's* splice tray (including the rear side and cables behind the splice tray) would have needed to be accessed to perform such modifications or repairs. A POSITA would have understood that a wall box such as *Holmberg's* would have been designed with this kind of reconfigurability in mind, and indeed this was commonly known and understood in the prior art, which I discuss at length below.

10. Specifically, numerous other prior art references teach adding connections, repairing fibers, or reconfiguring connections in mid-span boxes after initial installation. For example, *Battey 562* (Ex. 1010) teaches storing slack for future resplicing. *Battey 562* (Ex. 1010), [0038]. In another example, *Castonguay* (Ex. 1014) teaches a hinged tray and also teaches “installing or reconfiguring” connections. *Castonguay*, [0021], [0023], [0027], [0029]. *Sterling* (Ex. 1024) teaches splice closures have extra fiber stored for resplicing or rearranging splices. *Sterling*, 249 (“Organizers are specific to the splice they are designed to hold. In a typical application, the cable is removed to expose the fibers at the point they enter the closure. The length of fiber exposed is sufficient to loop it one or more times around the organizer. Such routing provides extra fiber for resplicing or rearrangement of splices.”).

11. *Vo* (Ex. 1025) teaches performing reconfigurations after installation and also teaches that while it was known that using preconnectorized cables was a solution to make reconfigurations after installation easier and cheaper than having to reconfigure or add splices, using preconnectorized cables required a tradeoff of requiring predetermined branch points and precise cable lengths. *Vo*, [0003]-[0004].

12. *Desard* (Ex. 1026) teaches a mid-span box that a technician can re-enter to add/remove a fiber drop. *Desard*, 8:25-31 (“Thus, a fiber bundle can be maintained or retained within the slack storage area of the enclosure while in operation. If a technician needs to re-enter the enclosure to add a drop or remove a drop, the fiber bundle held by the anchor(s) 116 is easily accessible and is removable, as is the slack storage tray 122.”), 11:8-16 (“If an installer needs to re-enter the enclosure ...”). A POSITA would have understood that adding/removing connections at multi-dwelling units (e.g., apartment buildings) or multi-business buildings would have been necessary because not all tenants would want to continue service, and some tenants would want to start service after initial installation had completed. Indeed, tenants come and go, and access to fiber optic service needs to be reconfigured accordingly over time. Thus, a POSITA would have been motivated to modify *Holmberg* per *Battey’s* teachings to utilize a hinged connection for the splice tray to provide easier access for a technician to perform reconfigurations, repairs, testing, or other maintenance whenever needed.

13. *Bradea* (Ex. 1027) teaches reconfigurable enclosures called “zone terminals” that are located in a mid-span access point of a fiber optic network. *Bradea*, [0006] (“Such zone terminals or devices may be located at a mid-span access point of a distribution cable optically connected to a service provider’s feeder cable.”), *id.* (“The fiber optic terminal is reconfigurable based on at least one of, a number of subscriber premises in the zone, a geographical relationship of the subscriber premises in the zone, and a demographic make-up of the subscriber premises in the zone.”), [0031]. Therefore, a POSITA would have understood from *Bradea* that a changing number of subscriber premises or subscribers would have required reconfiguration of the fiber optic terminal.

14. *Bradea* also teaches performing initial installation for a number of fiber optic connections, but also deferring adding some number of connections until a certain number of subscribers are available. For example, *Bradea* teaches an initial configuration to handle a 30% subscriber take rate and teaches deferring reconfiguring terminal boxes until the subscriber take rate is up to 50%. *Bradea* teaches that deferring reconfigurations in this manner saves on up-front costs for the service provider.

“In this way, a service provider can initially configure the zone for the current number of subscribers, for example single family units, to be connected to the fiber optic network. As an example, this may be 30% of the subscribers, referred to as a 30% take rate. The service provider

can defer the cost for the rest of the current and/or future subscribers.

Only at the time the demand for optical communication service changes, for example increasing to a 50% or higher take rate level, does the service provider incur the cost to reconfigure the zone to meet that 50% or higher take rate.”

*Bradea*, [0007], [0032]. A POSITA would have understood that adding connections after initial installation would thus have advantageously allowed service providers to save on up-front costs until such time as the additional connections are needed. Such an advantage would have applied to *Holmberg-Battey* as well, further motivating a POSITA to modify *Holmberg* to have easier access to the splice tray (including the rear side) and cables behind the splice tray to perform such reconfigurations.

15. In addition to reentering enclosures to add or reconfigure connections, *Franckx* (Ex. 1028) teaches hinged splice trays and reentering an enclosure for testing or repair purposes. *Franckx*, Abstract (“The enclosure and trays provide for access to the individual fibers for splicing or repair.”), 2:35-42 (“The splice cases tend to be bulky ... and difficult to re-enter for repair or testing.”), 6:28-40 (“The hinging allows chosen trays to be exposed for installation of the splice or for repair etc.”). A POSITA would have understood that providing easier access to *Holmberg-Battey*’s splice tray (including the rear side) and cables behind the splice tray would

also have made such testing and repairs more convenient for the technician performing the servicing.

16. *Crisp* (Ex. 1029) teaches storing spare fibers for future expansion and accessing enclosures for repairs or testing purposes. *Crisp*, 71 (“The cost of installing cable on site is much greater than the cost of the optic fiber alone, so it makes good sense to provide plenty of spare system capacity to allow for failures or expansion in the traffic to be carried. Extra fibers that are installed but not used do not deteriorate, so they can be left until required and are sometimes called *dark*, *spare* or *redundant* fibers. Nowadays, traffic that decreases in volume is a rare event indeed.”), 99 (“access for repairs or for testing purposes.”). As *Crisp* teaches, subscriber counts are likely to increase over time, which a POSITA would have understood would have necessitated adding or reconfiguring connections at the *Holmberg-Battey* wall box.

17. In another example, *Pearson* (Ex. 1030) teaches mid-span splicing is performed both during initial installation and during repair of broken cables. *Pearson*, 151 (“Splicing is the preferred method for making permanent connections between two fibers. Splices can be mid-span splices or pigtail splices. Mid-span splicing is performed during initial installation of two long lengths of fiber and during repair of broken cables.”). A POSITA would have understood that repairs of fiber optic cable are necessary when cables are damaged, and that this may require

adding new connections or repairing the cables by removing damaged areas and adding a new splice. Therefore, a POSITA would have been motivated to modify *Holmberg* per *Batthey's* teachings to make such access easier and more convenient for the technician including to save time when performing such repairs.

18. Numerous Internet Archive web page captures of the Fiber Optic Association, Inc. (FOA), which is a well-known non-profit professional society of fiber optics, also teach re-entering enclosures for restoration and “future work.” *FOA*, (Ex. 1031), 28 (“Finished splices are placed in a splice tray and placed in a splice closure outdoors or optionally in trays on patch panels indoors. They are sealed to prevent moisture reaching the splices and are designed to be re-entered for repair or re-routing fibers.”); *FOA*, 47-48 (“Care should be taken to ensure each fiber is carefully placed in the splice closure to prevent damage especially if the closure must be reentered in the future and the closure needs to be sealed carefully to prevent long term degradation. And, as we always warn splicers, careful identification marking inside the closure makes identifying fibers much easier if a later problem requires re-entry.”); *FOA*, 78 (“Take care with all splicing and termination hardware to maintain cable bend radiuses, prevent pinching or kinking of fibers and separate fibers to allow for future restoration, moves or other work.”).

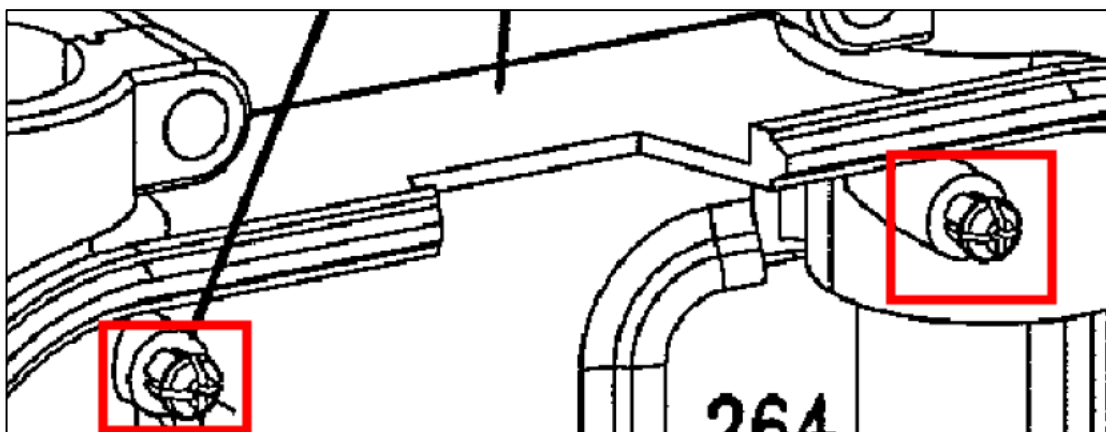
19. In a particular mid-span enclosure example, *FOA* teaches re-entering the mid-span access enclosure. *FOA*, 48 (“The remaining buffer tubes can be placed

in the storage section of a splice closure while the exposed fibers are spliced to other cables and stored in a splice tray. As with any splice closure, care must be taken to not damage fibers or kink buffer tubes during the process and to properly store all fibers and buffer tubes to allow reentry without harming any fibers if necessary.”). *FOA* also teaches including extra fibers in the cables for future expansion and in case of repairs. *FOA*, 28-29, 31 (“If cables are accidentally cut, excess margin will be needed to accommodate splices for restoration.”).

**B. Holmberg does not intentionally block/restrict/limit access to the area behind the splice tray**

**1. *Holmberg’s language does not teach or indicate to a POSITA that fastening the splice tray in place is designed to intentionally limit/block/restrict access***

20. *Holmberg* teaches using removable fasteners to secure splice tray 230 in place. As shown in Fig. 6 of *Holmberg*, fasteners 276 are depicted as common crosshead screws.



*Holmberg*, Fig. 6 (excerpt, annotated).

21. For a number of reasons, discussed below, a POSITA would not have understood that *Holmberg's* use of common screws suggests an intent to block/limit/restrict access to the rear of the splice tray or cables located behind the splice tray after initial installation.

**a) PPC admits Holmberg's fasteners are removable**

22. Both PPC and Dr. Eldering have admitted that *Holmberg's* fasteners are removable. POR, 38, 57; Ex. 2007, 155, 182 (“Holmberg teaches the use of fasteners 276 that would need to be unscrewed to remove the splice tray 230[.]”), 221, 223 (“a technician would have to consciously remove the fasteners[.]”); Eldering Depo. Tr., 69:25-70:3. Further, Dr. Eldering suggested that while working on *Holmberg's* wall box, a technician may utilize one or two of *Holmberg's* fasteners to temporarily secure the splice tray while performing splicing operations and then remove the fasteners to continue the installation process. Eldering Depo. Tr., 60:20-61:18. A POSITA would have understood that *Holmberg's* easily removable screws indicated that *Holmberg* did not intend to limit or restrict access to the splice tray (including the rear side or cables behind the splice tray). *Holmberg's* easily removable fasteners were simply a chosen mechanism to hold splice tray 230 in place and to permit easy removal when needed.

**b) Holmberg does not teach or suggest any of the well-known security measures for limiting or restricting access**

23. A POSITA would have understood that prior art solutions for limiting or restricting access were known. That *Holmberg* does not teach any such security measures for the embodiments relied upon in the Proposed Grounds strongly suggests that *Holmberg* did not intend to limit or restrict access to splice tray 230.

24. For example, “*Westell*” (a technical document describing the 31EE-202BS fiber optic enclosure from Westell) teaches a “lockable, *Telco-access-only*, Facility equipment and wiring compartment on the left” side of an enclosure, “which conceals the Telco/Facility connectors, the lightning protection scheme, and ground wiring.” *Westell* (Ex. 1032), 1. *Westell* teaches that this special, lockable compartment “is for Telco use only and requires a special pin-in-socket hex tool to open.” *Id.* Additionally, *Westell* teaches the left side area is “protected from customer access by a lockable, hinged door that requires a special 3/8” hex nut driver (can wrench or 216 tool) to open.” *Westell*, 3. A POSITA would have understood that while *Westell* teaches such specialized locking mechanisms were for preventing customer access, such locking mechanisms (or similar locking mechanism) would have prevented access to technicians without the requisite tools, if it were so desired. However, in this example, technicians would have had access to the secured area of the enclosure.

25. In another example, *Bradea* (Ex. 1027) teaches a service provider using an epoxy weld to permanently prevent field access to an enclosure, in direct contrast

to using screws or other fasteners for a re-enterable enclosure. *Bradea*, [0068]. Specifically, *Bradea* teaches the optical terminal is “re-enterable” to provide ready access to the interior and that the base 142 and cover 144 may be provided with a fastening mechanism “such as, but not limited to, clasps, fasteners, threaded bolts or screws and inserts, or other conventional means for securing the cover 144 to the base 142 in the closed configuration.” *Bradea*, [0068]. Thus, *Bradea* expressly teaches using screws to allow for re-enterable access to an enclosure. *Bradea* contrasts the use of screws for a field re-enterable box with a box that is not re-enterable in the field by a technician because the box is welded shut with epoxy. *Bradea*, [0068] (“Alternatively, in certain locations the service provider may determine that it is not desirable that optical terminal be enterable in the field, and, therefore, may decide to fasten the base 142 to the cover 144 by welding, for example using an epoxy type of weld.”). *Desard* (Ex. 1026) also teaches using screws to secure a cover in place, but the screws and cover are removed when performing reconfigurations. *Desard*, 9:12-17, 11:8-16 (re-entering the enclosure).

26. *Holmberg*’s embodiment relied upon in the Proposed Grounds does not use any such security measures (e.g., specialized locks or epoxy welding). Instead, it proposed standard removable screws for securing splice tray 230. A POSITA would have understood that *Holmberg*’s silence regarding security measures indicates that *Holmberg* did not intentionally block/limit/restrict access to the

fibers/cables or area behind the splice tray. Indeed, a POSITA would have understood from *Bradea's* teachings and *Desard's* teachings that screws were not intended to block/limit/restrict access but were used with re-enterable enclosures, whereas other prior art solutions, such as an epoxy weld, were actually intended to block/limit/restrict access, and other prior art solutions, such as locks or security bits, were designed to prevent access to some people, but not all (e.g., allow access to only certain technicians or allow access to all technicians but prevent customer access).

27. *Holmberg* does teach security features in other embodiments (not relied upon in the Proposed Grounds), including the embodiment depicted in Fig. 19. In this alternative embodiment, the enclosure provides different levels of access to different technicians. *Holmberg*, [0058]-[0059]. These embodiments demonstrate that, even when *Holmberg* restricts access to some technicians, it still ensures the full enclosure remains unrestricted for *other* technicians. Accordingly, a POSITA would have understood that *Holmberg's* intent is to make splice tray 230 available to some or all technicians, rather than broadly restrict access as PPC alleges.

**c) A POSITA would understand that potential service disruption due to fiber damages is accounted for by training technicians to exercise caution, rather than completely preventing them from accessing the fiber enclosure**

28. PPC argues that, because mid-span boxes have fibers that pass further “downstream,” this suggests that *Holmberg* intended splice tray 230 to remain in

place, preventing a technician from disturbing the pass through cables behind splice tray 230. POR, 8, 13, 28, 37-38. I disagree. I discuss in the following two paragraphs, technicians must be careful when entering any optical fiber enclosure and receive training to help mitigate the risks of potentially damaging the fibers. Indeed, the risk of interrupting service exists for both mid-span boxes like *Holmberg's* wall box and the DIB of the '483 Patent. Eldering Depo. Tr., 34:23-36:1 (disagreeing with the notion that service interruptions are a risk only for enclosures that have pass through fibers, such as mid-span boxes). A POSITA would have understood that the approach taken in industry to mitigate the risk of damage to optical fibers is that technicians are trained to always exercise caution when working with optical fibers to avoid service interruptions for any subscribers "downstream" of the box (including directly connected to the box) caused by damage to the optical fibers.

**d) Fiber optic technicians are trained and receive certifications to help avoid damaging fiber optic cables and splices when working**

**(1) Fiber optic technicians receive training**

29. PPC argues that technicians unfamiliar with a particular box might damage fibers or the drop cable if the tray were removed. POR, 57-58; Ex. 2007, ¶223. I disagree. Fiber optic technicians receive training, can earn certifications (including Certified Fiber Optic Technician "CFOT" from the FOA), and have educational opportunities to practice their trade. FOA, 93, 95, 112, 121, 128-130.

Technicians receive training on how to handle optical fibers and how to prevent damage when working. Of course, no one is perfect, but training helps prevent problems including damage to the fibers or splices when performing repairs or reconfigurations and teaches technicians what should or should not be done when working with optical fibers. Further, as I discuss in the next paragraph, fiber optic projects are well documented, so a technician will know what to expect in the field before heading to the job site.

**(2) Fiber optic projects are well documented so technicians unfamiliar with a particular project can consult documentation**

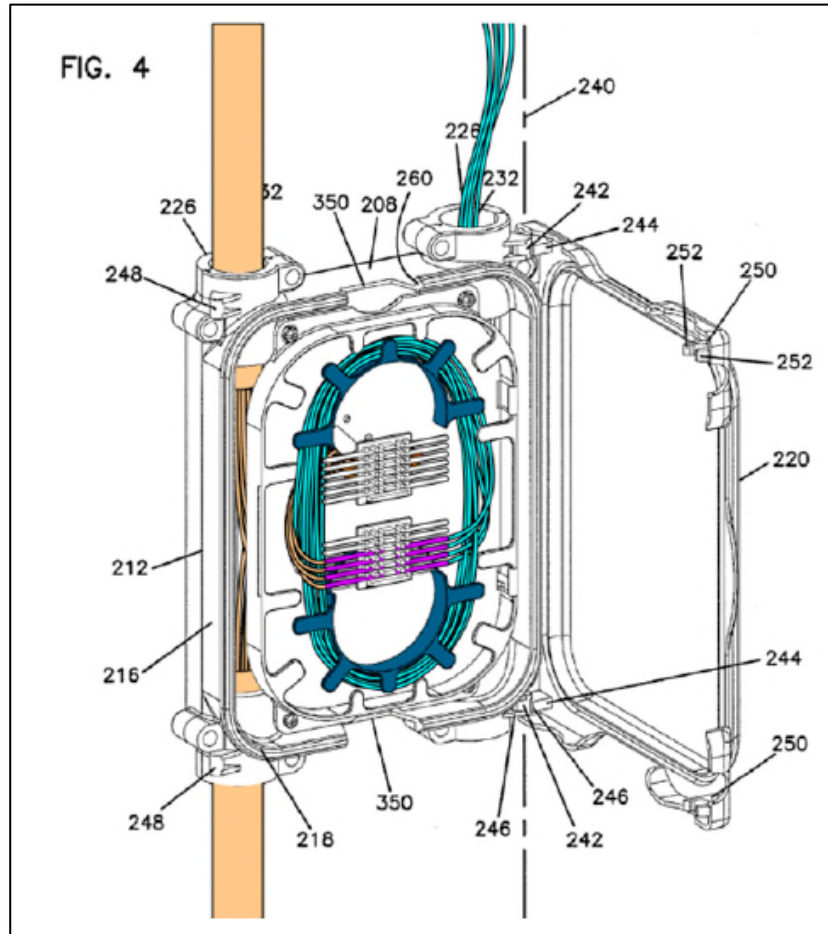
30. A POSITA would have understood that fiber optic projects are well documented and that the documentation is stored for future use. Specifically, the complete cable layout of a project is documented and stored so a technician can reference exactly where every fiber is at and know what to do when a repair or reconfiguration is needed. *FOA*, 69, 85, 120-121, 127. Supplies such as extra cables and adapters are also stored in case they are needed for future repairs. *FOA*, 68-69, 78, 120, 127. Thus, a POSITA would have understood that a technician would not have haphazardly rotated *Holmberg-Battey's* hinged splice tray nor rotated the tray at all unless it were needed, and if it were needed, a technician would have known how to perform such a rotation in a manner that would not have damaged fibers or splices.

**C. Holmberg's splice tray must be unfastened and removed to add new connections, reconfigure existing connections, or perform repairs**

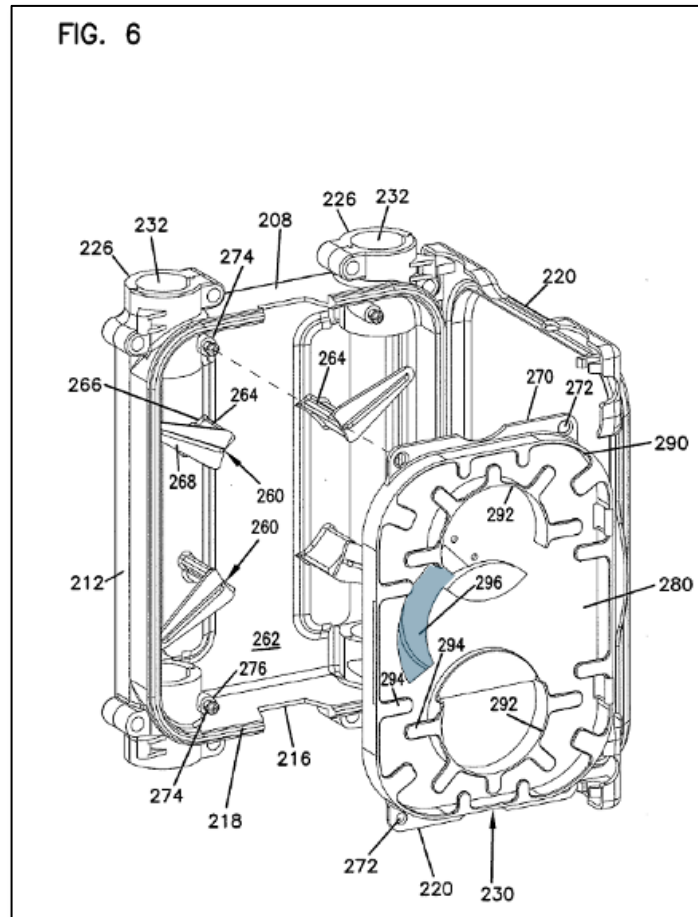
31. To modify connections (e.g., to make repairs), PPC suggests that a technician could adequately access fibers behind the splice tray without removing fasteners 276. POR, 37. Specifically, the POR alleges that “terminated fibers from the main fiber cable that are spooled on the back side of the splice tray 230 can be accessed by a technician through the opening 296 in the splice tray . . . without having to remove the splice tray 230.” *Id.* I disagree. While performing splicing, the splice tray is not fastened in place. A POSITA would have understood that this allows a technician to route fibers through openings 296 of splice tray 230. *Holmberg*, [0053]. *Holmberg* does not teach a technician is able to reach through openings 296 nor is there any teaching that openings 296 would be large enough for a technician's hand to reach through, especially with multiple fibers passing through, splices in place, and slack wrapped around fiber retention walls 292. *Id.* Therefore, a POSITA would have understood that fibers from the rear of the splice tray (or drop cable) cannot be accessed via openings 296 while the splice tray is fastened in place, or at the very least such access would have been very difficult, and a POSITA would have understood that a technician would have sought to remove splice tray 230.

32. Further, a POSITA would have understood from PPC's annotated Fig. 4 that there is no easy way for a technician to access fibers behind the splice tray 230

while the tray is fastened in place. For example, opening 296 is not visible with the teal fibers, orange fibers, and purple splices in the way:



POR, 36 (*Holmberg*, Fig. 4 (PPC's annotations)). As shown in Fig. 6 below, the location of opening 296 is underneath the installed fibers and splices illustrated above and would be blocked in a post-installation state:



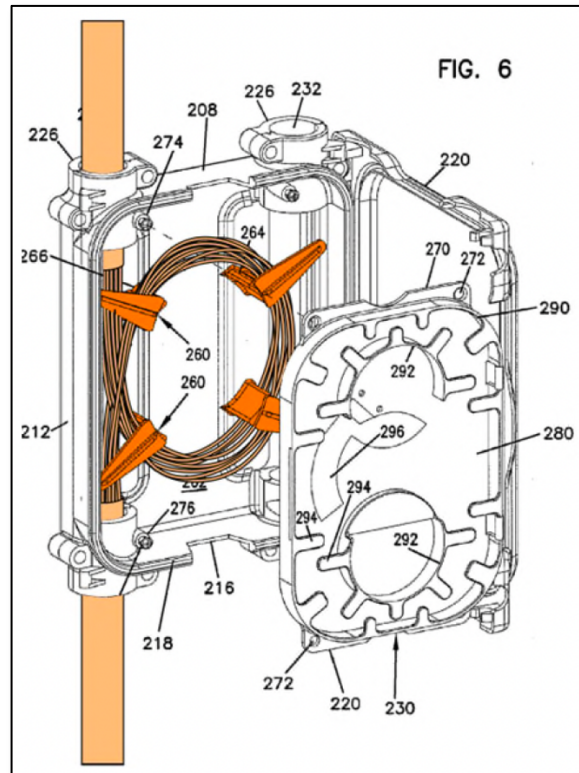
*Holmberg*, Fig. 6 (annotated). In sum, when splice tray 230 is secured in place with all the fibers spooled and spliced in a post-installation state, opening 296 is blocked, making it difficult, if not impossible, to access fibers on the back side spool 298.

**D. Dr. Eldering Identified a Need in *Holmberg*'s Enclosure That the Proposed Hinge Connection Satisfies, Strengthening the Motivation to Combine *Holmberg* and *Batthey***

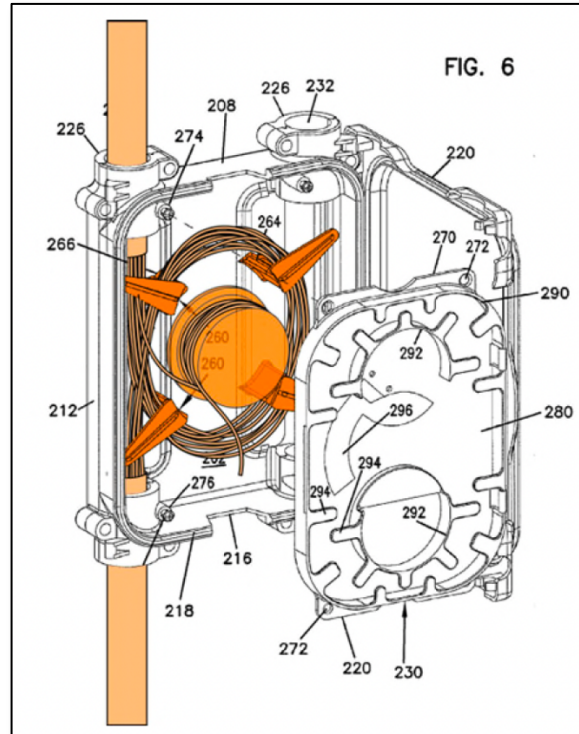
33. In my original declaration (Ex. 1003), I explained that a POSITA would have been motivated to modify *Holmberg*'s splice tray 230 with a hinged connection pursuant to *Batthey*, improving convenience and the ease with which a technician can access the tray. Ex. 1003, ¶¶90-93. Dr. Eldering's description of *Holmberg*'s

installation process identified a weakness in *Holmberg's* native structure that makes the initial installation inconvenient and difficult. Namely, Dr. Eldering explained that *Holmberg's* enclosure has no mechanism for holding splice tray 230 in place while a technician routes, splices, and spools fibers. Eldering Depo. Tr., 53:4-62:8. As set forth in the subsequent paragraphs, a POSITA would have recognized that adding a hinge, as in the Proposed Grounds, solves this weakness in *Holmberg's* process, providing a third hand to keep the tray in place during installation, which allows the technician to use both hands for the routing, splicing, and spooling operations.

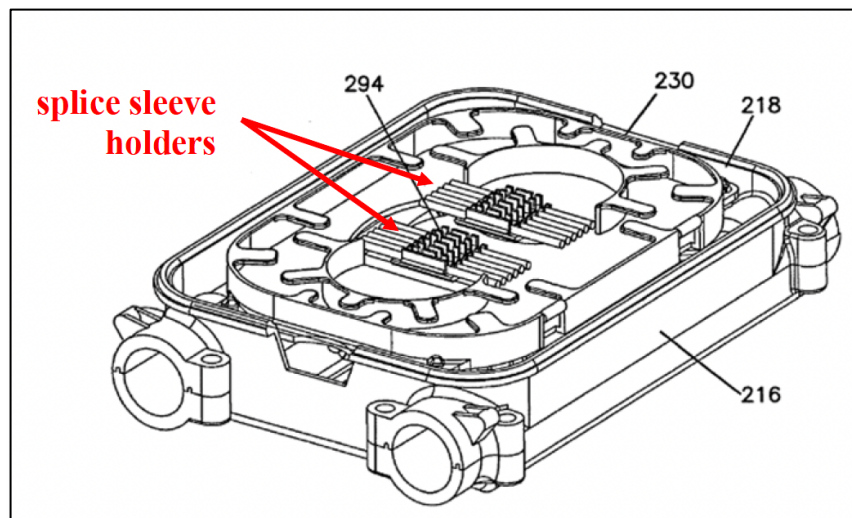
34. As set forth in the POR, the installation process includes an initial step of removing the jacket from the main cable, which is then looped around bend radius limiters 264. POR, 31-32. PPC's annotated Fig. 6 below illustrates this step:



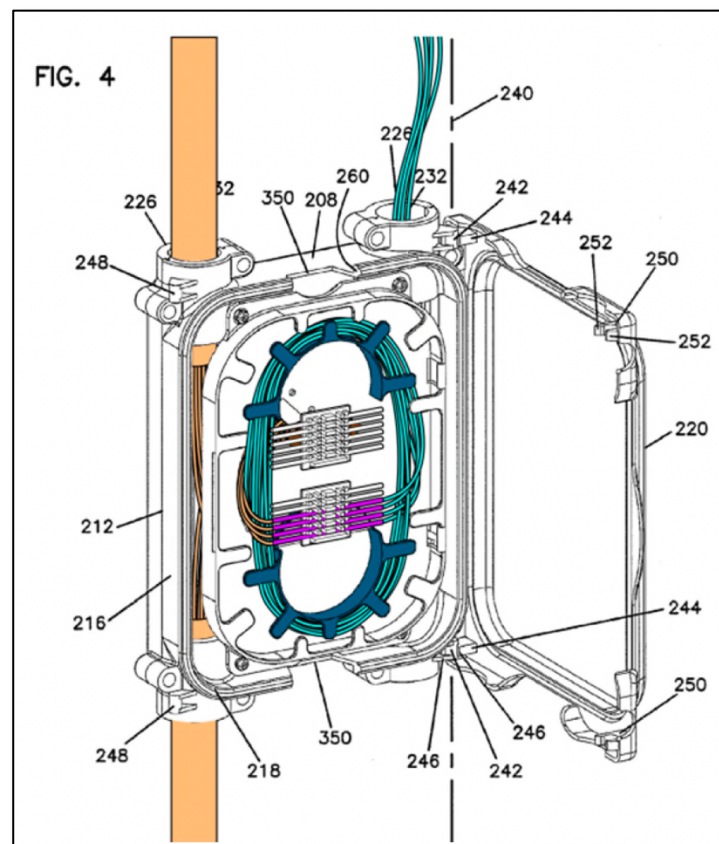
35. Next, as shown in PPC's annotated figure below, selected fibers are cut and spooled around spool structure 298 on the back side of splice tray 230. POR, 33-34.



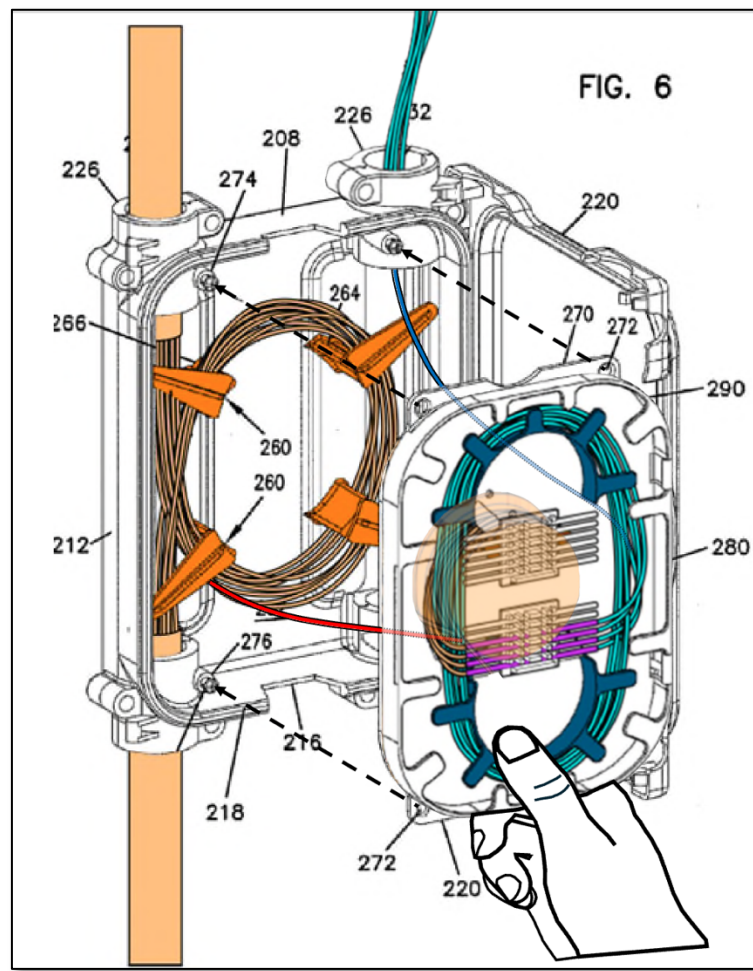
36. When a cut fiber is ready to be spliced, it is routed through opening 296 of splice tray 230 (i.e., from the back to the front of the tray) where it is spliced to an output fiber, and the spliced connection is placed in splice sleeve holder 294 (shown below). POR, 35.



37. Finally, after all the cut fibers have been spliced and their splices secured in the splice sleeve holders, the output fibers (teal) are wrapped around the storage fingers on the front side of splice tray 230. POR, 36-37. Then, as illustrated below, the (teal) output fibers are routed out of the enclosure and the splice tray is secured to the back of the box with the four fasteners 276. *Id.* (“Once the main cable fibers are spliced to the output or drop cable fibers, and the excess or slack fibers from main fiber cable (pass-through and terminated) and output cables have been securely spooled, the splice tray 230 is fastened to the enclosure 202 with four fasteners 276[.]”). PPC’s annotated Fig. 4 is depicted below.



38. Importantly, the steps described in ¶¶37-40 above occur with a floating splice tray 230—there is no mechanism in *Holmberg* to hold splice tray 230 in place while all these routing and splicing steps are performed. When asked how the technician deals with the floating tray during installation, Dr. Eldering speculated, a “technician [might] use one hand to hold the splice tray” while routing fibers. Eldering Depo. Tr., 53:4-54:9. The annotated figure below depicts a technician’s hand holding splice tray 230 with all the fibers and splices in place prior to placing it against the back wall of the enclosure to be secured with fasteners 276:



*Holmberg*, Fig. 6 (annotated).

39. While I agree that certain steps in the process may reasonably be accomplished with one hand, while the other is occupied holding the tray, a technician would have needed two hands to perform certain tasks, such as splicing. Indeed, a fusion splicing process requires cleaving the ends of both fibers, placing these cleaved ends in a fusion splicing machine, and then returning the spliced fibers to the splice sleeve holder of splice tray 230. A POSITA would have understood that the splicing procedure would typically (if not always) require two hands. Even Dr. Eldering admitted that splicing procedures are “much easier” to perform with two hands. Eldering Depo. Tr., 60:22-25.

40. Dr. Eldering’s proposed two possible solutions for what to do with the tray while performing the two-handed splicing operation—temporarily securing the tray with one or two of fasteners 276 or simply letting the splice tray hang from the fibers. Eldering Depo. Tr., 60:20-61:15. A POSITA would not have viewed letting the splice tray hang from fibers as a viable solution. Optical fibers are delicate and subject to damage, as PPC stressed throughout the POR. Hanging the weight of the tray (including any excess fiber and/or splices put in place) on optical fibers would have disadvantageously risked damaging the optical fibers.

41. Dr. Eldering’s other proposed solution of fastening one or two fasteners to secure the splice tray would have effectively functioned similar to the proposed

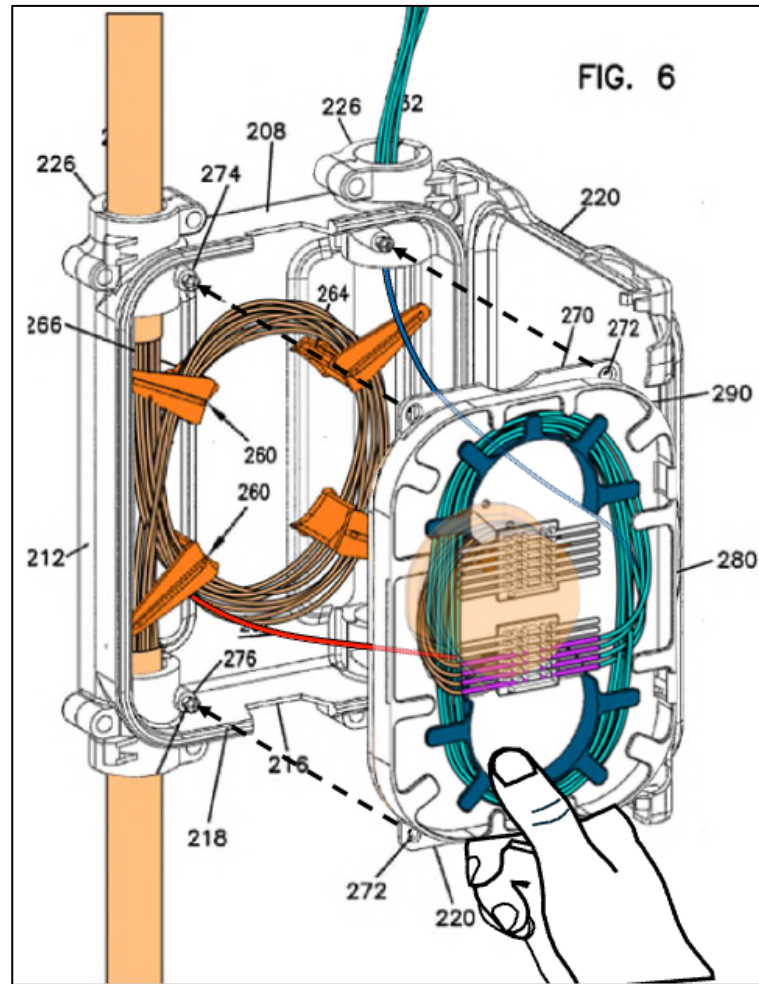
hinged connection in *Holmberg-Battey*. That is, the splice tray would have been secured on one side, for example, and held aloft so the technician would not have needed to hold the splice tray. Holding the splice tray up in this manner would have functioned as a “third hand” like the proposed hinge modification, such that a technician would not have had to hold the splice tray while performing splicing tasks or other tasks. The proposed hinge modification would have allowed the technician to use both hands and would have kept the splice tray elevated. However, a POSITA would have understood that using a hinged connection would have provided benefits over using one or two fasteners, as Dr. Eldering suggested. For example, using fasteners requires a technician to fasten and unfasten screws (which must be kept track of during the installation procedure) to gain access to the back of the tray. The hinge solution of the Proposed Combination imposes no such requirement. Additionally, the fastener approach proposed by Dr. Eldering requires the technician to carry additional tools (e.g., a screwdriver) to loosen/tighten the fasteners when using a hinged connection. Thus, a POSITA would have expected a significant improvement in convenience and ease of access to both sides of the splice tray when using a hinged connection as proposed in the Petition. In particular, there would have been a convenience benefit to accommodate repeatedly having to route individual cut fibers from the back of the splice tray to the front through opening 296 in order to perform the splicing operation. There would have been additional benefit by not

having to hold the tray aloft or waste time fastening the tray in place and unfastening the tray repeatedly (for example, each time a splice needs to be made).

**E. Removing Holmberg's splice tray after installation would not have damaged the fibers**

***1. Moving the splice tray from a "working position" to the fastened location creates slack, which allows for removing the tray without causing damage***

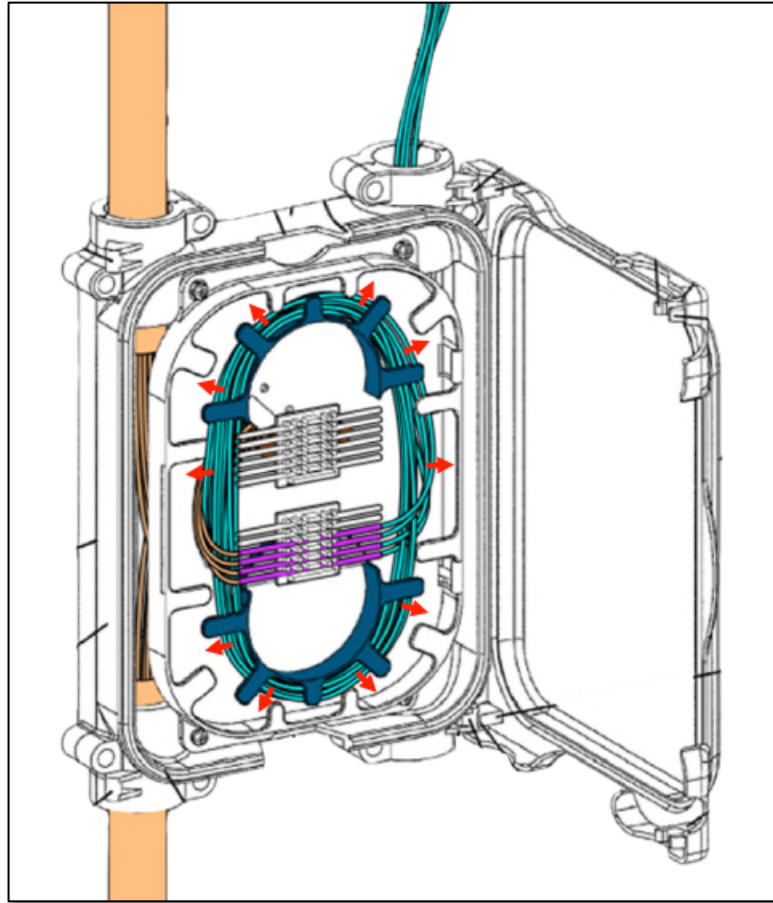
42. A POSITA would have understood that when working with the splice tray to install splices and wind slack on retention mechanisms (e.g., spool structure 298, fiber storage walls 292, fiber retention fingers 294), the tray would have been at some distance away from the fully installed position. This is because a POSITA would have needed some clearance to work with fibers behind the splice tray (e.g., terminating fibers from the drop cable) and to wind extra slack on spool structure 298. The annotated figure below illustrates the path—via dotted lines—splice tray 230 follows when moving from a "working position" to a secured/installed position.



*Holmberg*, Fig. 6 (annotated).

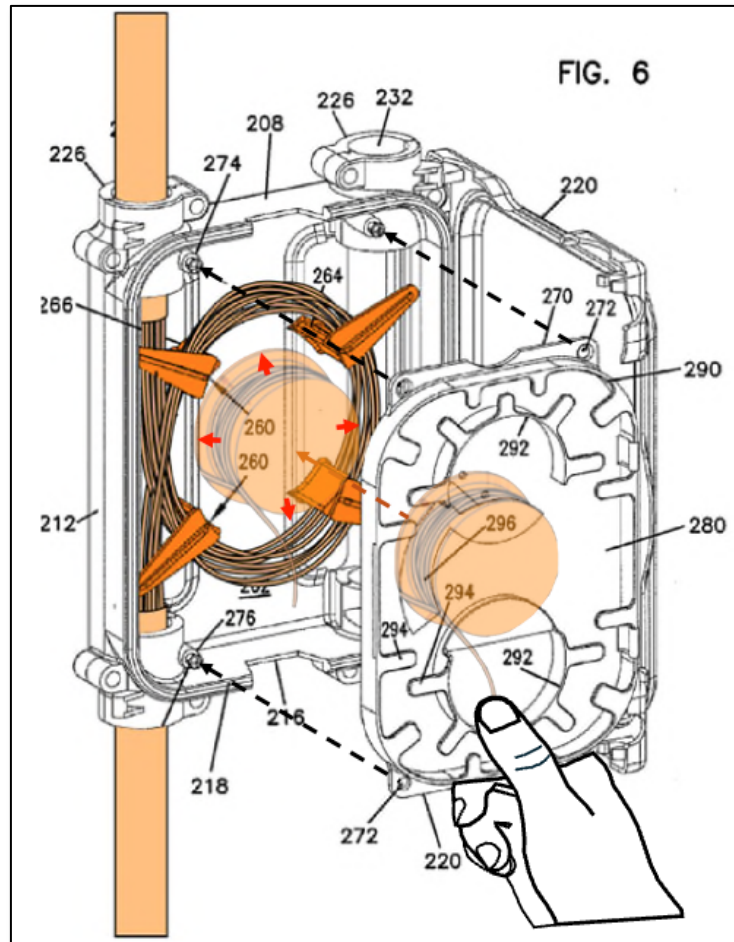
43. A POSITA would have understood that the fiber connecting splice tray to the main enclosure at the “working position” would create slack around the fiber retention structures as the tray is moved from the “working position” to the secured/installed position. For example as depicted in the annotated figure 4 below, when moving splice tray 230 from the working position to the installed position, the teal output fibers would have created slack around the retaining fingers (navy) on

the front side of the splice tray, where the red arrows depict the direction in which slack would be created:



*Holmberg*, Fig. 4 (annotated).

44. Similarly, as depicted below in another annotated Fig. 6, the extra fiber from moving the splice tray creates slack around spool 298 (annotated orange) which is located on the rear side of splice tray 230:



*Holmberg*, Fig. 6 (annotated).

45. *Holmberg*'s enclosure specifically accounts for and accommodates this slack with its retention mechanisms. For example, that spool 298 on the back side of the tray includes flanges for retaining fiber, so the fiber does not slide off. *Holmberg*, [0044] (teaching that "spool structure 298 [] includes an annular flange 302 . . . [that] assists in retaining fibers spooled about the spool 300 from sliding off the end of the spool"). Similarly, the front side of splice tray 230 includes alternating and opposing fingers for retaining output fibers. *Holmberg*, [0043]. Dr. Eldering admitted that

these opposing (and alternating) retention fingers prevent loose fiber from “spill[ing] out,” ensuring the “fiber stays in that splice tray.” Eldering Depo. Tr., 72:23-74:20.

46. A POSITA would have understood from *Holmberg’s* design features that accommodate slack and from the mechanics involved in *Holmberg’s* installation process that the optical fibers are not tightly wound around retaining mechanisms when the splice tray is secured against the back wall of *Holmberg’s* enclosure with fasteners 276. Because the tray moves from the “working position” to the secured position, slack is necessarily present. This slack allows for the tray to be removed from its secured position without causing strain or other damage. Accordingly, PPC and Dr. Eldering are incorrect that fibers must be unspooled for the tray to be removed from the secured position.

**F. The Holmberg combination does not induce more strain than Holmberg’s native arrangement with fasteners**

47. As I discussed above, when the splice tray is moved from a working position to the fastened position, there is slack. See ¶¶33-41 above. When the tray is removed from the fastened position, the slack prevents strain in the cables, and additional slack can be made by unspooling some of the spooled fiber from either spool structure 298 or fiber storage walls 292. Because this slack exists, the *Holmberg-Batley* combination likewise would not damage the fibers. Specifically, changing from fasteners to a hinged connection would not change the fact that slack results from moving the tray from a “working position” (tray rotated in an open

position) to an “installed position” (tray resting in a “closed” position). Accordingly, a POSITA would understand that a technician would be able to rotate the splice tray from its secured position to a working position without damaging the fibers.

48. I understand that PPC has argued a POSITA would have been motivated to totally remove the fibers when accessing the back of *Holmberg*’s splice tray, rather than rotate the tray on a hinge. POR, 62-63. I disagree. As I discussed above, the hinge connection provides a significant convenience benefit, serving as a “third hand” during splicing. As I also discussed above, the hinge arrangement places no additional strain on the fibers than *Holmberg*’s native process as a result of *Holmberg*’s intentional slack retained in the tray’s secured location. A POSITA would not have accepted the hassle of removing all the fibers to access the rear of splice tray, rather than use a hinge, particularly where the hinge does not increase the risk of damage and provides its own significant convenience benefit.

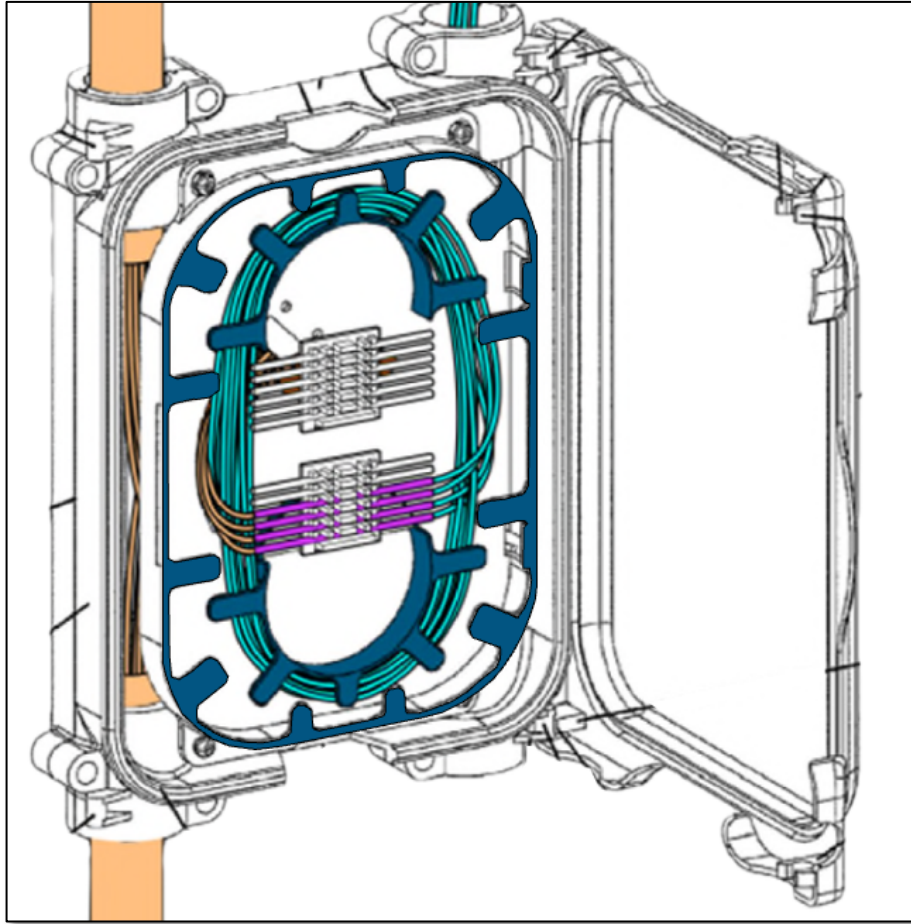
**G. Dependent Claim 2: A POSITA Would Have Been Motivated to use Blankenship’s Adapters in Place of Holmberg’s Splice Tray Holders**

49. Regarding the Petition’s proposal that a POSITA would have been motivated to use *Blankenship*’s adapters in *Holmberg*’s enclosure in lieu of splice sleeve holder 294, I understand that PPC and its expert argue that adapters in other *Holmberg* embodiments make the proposed combination superfluous. POR, 65-71. I disagree. The *Blankenship* adapters in the Petition’s mapping and the adapters in

*Holmberg's* other embodiments serve entirely separate purposes. Indeed, a POSITA would have understood that the *Holmberg* combination would have benefited from *Blankenship's* adapter bracket 66 regardless of other, separate adapters on the outer cover of the wall box. *Blankenship's* adapter bracket would have been utilized to replace *Holmberg's* splicing (replacing splice sleeve holder 294) such that splicing would not have been necessary on splice tray 230. The adapters in *Holmberg's* other embodiments (e.g., in Figs. 16-18) attach to the outside of the enclosure, connecting external connectorized fibers to the internal fibers. In these embodiments, the connections secured on splice tray 230 are still required, and *Holmberg* is clear that splice tray 230 remains a critical component of these alternative embodiments. Eldering Depo. Tr., 75:18-79:5; *Holmberg*, [0056], Figs. 16-18. Accordingly, these external adapters are not superfluous of *Blankenship's* adapters in the proposed combination, and a POSITA would have understood that regardless of the adapters on the outer cover, modifying the *Holmberg* combination per *Blankenship's* teachings would have been advantageous.

**H. Dependent Claim 10: A POSITA Would Have Been Motivated to Exchange Some Ease of Installation for Additional Security with Cowan's clips—Holmberg Makes this Exact Tradeoff with Fiber Retention Members 292**

50. I have been asked to assess the alternating and opposing fingers on the front side of *Holmberg's* splice tray 230, which are depicted below (annotated navy):



A POSITA would understand that this design represents a tradeoff between ease of installation and securely holding the fibers in place. Namely, installing fiber using this structure requires a technician to carefully weave the fibers through both sets of retaining fingers (inwardly-facing and outwardly-facing). This is more difficult and less convenient than if only the outwardly-facing fingers were present. However, the alternating and opposing structures provide greater security for the optical fibers than if only outwardly-facing fingers were present. As I discussed in my original declaration, a POSITA would have been motivated to modify *Holmberg* with *Cowen*'s clips that fully encompass the retained fibers, improving the security of the

fiber retention. Ex. 1003, ¶¶152-155. That proposed modification would indeed have implicated a tradeoff similar to the tradeoff in *Holmberg's* splice tray 230. Namely, *Cowen's* clips would have increased security at the cost of a slightly less convenient installation process. A POSITA, however, have understood that tradeoff and would have been willing to accept the additional security at the expense of some additional complexity during installation.

### III. CONCLUSION

51. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001. If called to testify as to the truth of the matters stated herein, I could and would testify competently.

Date: 9-6-2024

Respectfully submitted:



By:

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Dr. Sayfe Kiaei