

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BizLink Technology, Inc.,

Petitioner,

v.

Anderson Power Products, Inc.,

Patent Owner.

Case No. IPR2024-00687

U.S. Patent No. 8,808,017

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,808,017**

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LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 8,808,017 to York et al. (“’017 Patent”)
1002	Prosecution history of U.S. Patent Application No. 13/734,025
1003	Declaration of Dr. Charles Eldering (“Eldering”)
1004	U.S. Patent No. 2,838,739 to E.D. Winkler (“ <i>Winkler</i> ”)
1005	U.S. Patent No. 8,182,278 to Kataoka et al. (“ <i>Kataoka</i> ”)
1006	U.S. Patent No. 3,909,099 to E.D. Winkler (“ <i>Winkler2</i> ”)
1007	U.S. Patent No. 4,634,211 to Poliak et al. (“ <i>Poliak</i> ”)
1008	Mroczkowski, Robert S., <i>Electrical Connector Handbook</i> (1998) (“Electrical Connector Handbook” or “the Handbook”)
1009	Complaint in <i>Anderson Power Products, Inc. v. BizLink Technology, Inc. et al.</i> , Case No. 3:23-cv-05436 (NDCA)
1010	Graf, Rudolf F., <i>Modern Dictionary of Electronics, Seventh Edition</i> (1999) (excerpt)
1011	<i>Electric Arc</i> , Wikipedia.org, available at https://en.wikipedia.org/wiki/Electric_arc
1012	Anderson Power Products Patent Marking Website, available at https://www.andersonpower.com/us/en/resources.html , last accessed April 30, 2024
1013	UK Patent Application Publication No. GB2359940A to Yazaki Corporation
1014	U.S. Patent No. 3,691,511 to Gerhard Leonhard Emil Billmann
1015	U.S. Patent No. 6,491,532 B1 to Schoepf et al.
1016	U.S. Patent No. 2,329,793 to N.R. Smith

Exhibit	Description
1017	Declaration of Kelley M. Hayes Greenhill
1018	Amazon.com product listing for <i>Electrical Connector Handbook: Technology and Applications, 1st Edition</i> , available at https://www.amazon.com/Electronic-Connector-Handbook-Technology-Applications/dp/0070414017 , last accessed March 23, 2024
1019	Anderson Power Products, Our History, available at https://www.andersonpower.com/us/en/about-us/timeline.html , last accessed April 30, 2024
1020	(18a) Newton's 3 rd Law, nasa.gov, available at https://pwg.gsfc.nasa.gov/stargaze/Snewton3.htm

TABLE OF CHALLENGED CLAIM LANGUAGE

Claim	Element	Claim Language
1	1[pre]	An electrical connector pair, comprising:
	1[a]	a first connector having a first insulating housing;
	1[b]	a first electrical contact supported within the first insulating housing,
	1[c]	the first electrical contact having a connecting surface that is substantially parallel with a longitudinal axis of the insulating housing and terminates in a leading end of the first electrical contact;
	1[d]	a second connector having a second insulating housing;
	1[e]	a second electrical contact supported within the second insulating housing,
	1[f]	the second electrical contact being configured to laterally engage with the connecting surface of the first electrical contact when the first connector is mated with the second connector;

Claim	Element	Claim Language
	1[g]	a first insulating barrier within the first connector extending beyond and covering the leading end of the first electrical contact; and
	1[h]	a second insulating barrier extending beyond the second electrical contact within the second connector,
	1[i]	the second insulating barrier being configured so as to be in close proximity with the first insulating barrier when the first and second connectors are partially disconnected and the first and second electrical contacts are separated by a short distance, thereby blocking substantially all through-air arcing paths between the first and second electrical contacts.
2		The connector pair of claim 1, further comprising a contact tensioning mechanism that presses the second electrical contact against the engaging surface of the first electrical contact when the first and second connectors are connected.
3		The connector pair of claim 2, wherein the contact tensioning mechanism includes a spring.

Claim	Element	Claim Language
4		The connector pair of claim 1, further comprising a barrier tensioning mechanism that presses the first and second insulating barriers against each other when the first and second connectors are partially disconnected and the first and second electrical contacts are separated by a short distance.
7		The connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a terminal for crimping to a wire.
8		The connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a terminal for soldering to a printed circuit or wiring board.
9		The connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a terminal for soldering a wire or and electrical component to the contact.
10		The connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a terminal using insulation displacement for attaching a wire to the contact.

Claim	Element	Claim Language
11		The connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a screw terminal for attaching a wire to the contact.
12		The connector pair of claim 1, wherein at least one of the first or second electrical contact is configured with a terminal using a spring mechanism for attaching at least one wire to the contact.

I. PRELIMINARY STATEMENT

Petitioner BizLink Technology, Inc. requests *inter partes* review of U.S. Patent 8,808,017 (Ex. 1001; “’017 patent”), assigned to Anderson Power Products, Inc. (“APP”), and cancellation of claims 1-4 and 7-12.

The ’017 patent issued without any rejection on the merits, *see* Ex. 1002, with claims that are unpatentable over references disclosing similar connector-plug structures for similar applications. Electrical connectors have been around since the introduction of electricity. The ’017 patent claims a pair of connectors with insulated housings, which were disclosed by *Winkler* decades earlier. The ’017 patent also claims “tensioning mechanisms” that press the electrical contacts and housings together, which were disclosed by *Winkler* and *Kataoka*. The remaining dependent claims amount to well-known techniques for connecting wires to terminals, which were disclosed by *Winkler*², *Poliak*, and the Electrical Connector Handbook. The Board should cancel all challenged claims.

II. OVERVIEW OF TECHNOLOGY

A. Electrical arcing

When an electric field exceeds a threshold known as the dielectric breakdown voltage, a conductive path can form between two electrodes, resulting in an electrical arc. Elderling, ¶27. Below are illustrations of different possible outcomes when two contacts have different electrical fields:

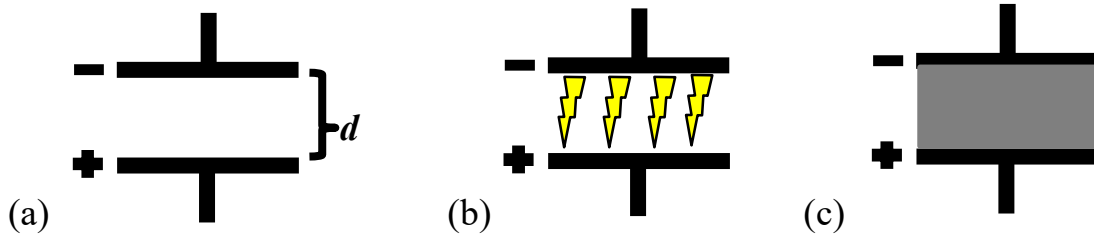


FIG. (a), above left, shows two plates separated by a distance d . POSITAs would have understood that the electric field between the plates is Electric field = Voltage/distance. The electric field increases as voltage increases or distance decreases. Eldering, ¶28.

FIG. (b), above center, illustrates arcs conducting electricity between plates. The word “arc” is defined as: “a luminous discharge of electricity through a gas characterized by a change in space potential in the immediate vicinity of the cathode; this change is approximately equal to the ionization potential of the gas.” Ex. 1010, 44; Eldering, ¶29.

FIG. (c), above right, represents a parallel plate capacitor with a solid dielectric between the plates. A solid dielectric exhibits a much higher breakdown voltage, which can reduce or prevent arcing. Eldering, ¶30.

B. Arcing in connectors

Arcing can occur in the parallel plate capacitor configuration shown above, but is more common between a charged point or edge and another point or edge. The image below depicts an arc between two electrode wires in a through-air path:

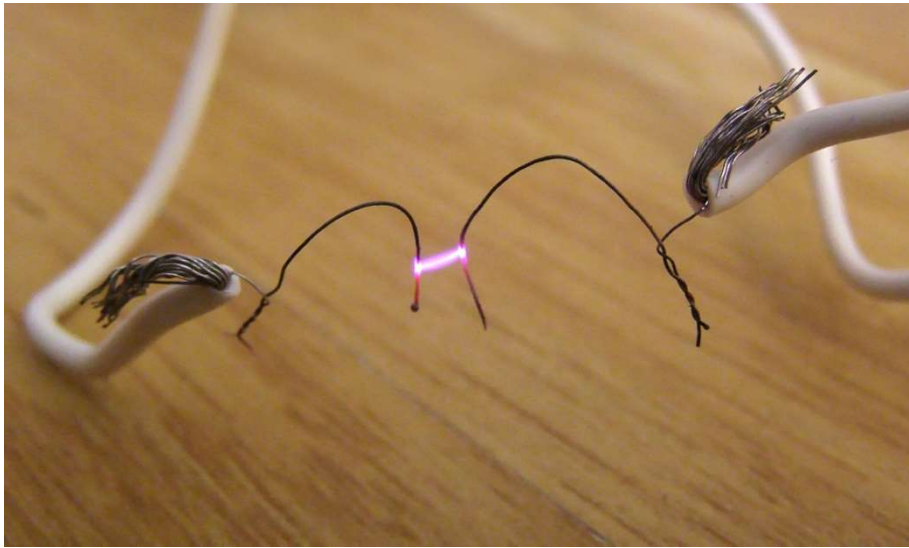


Image from Ex. 1011, captioned “Electric arc between strands of wire”

Eldering, ¶31.

In contrast to the parallel plate examples above, connectors usually have non-planar surfaces that have high-angle features (e.g. edges or protrusions), with higher electric fields. Dielectric breakdown and arcing can initiate at corners and edges in connector contacts. Eldering, ¶32.

Arcing between electrical contacts are well understood and generally avoided. As taught in the '017 patent: “[e]lectrical connectors generally should not be connected or disconnected while the electrical load is turned on. Electrical arcing between the separated contacts of a live connector present fire and burn hazards to the user, and any such arcing tends to reduce the useful life of the connector.” Ex. 1001, 1:13-18; Eldering, ¶33.

Arcing can reduce the useful life of the connector because the arcing process is violent and involves high-temperatures that can result in contact erosion, welding, and contamination, degrading the connector surfaces and increasing contact resistance. For example, as stated in a UK patent application published in 2001:

When the female connector is mated with the male connector in a conducting state, the front part of the male terminal first comes into contact with the front end of the female terminal, which causes to generate an arc discharge at the contacts to deteriorate or damage the contacts. Further, when the connectors are disengaged, the front end of the male terminal is last disengaged from the front end of the female terminal, which also causes to generate an arc discharge at the corresponding parts to deteriorate or damage the contacts.

The deterioration of or damage to the contacts prevents the contacts of the female and male terminals from establishing good conduction, which causes to deteriorate the connector in reliability.

Ex. 1013, 1:26-2:10; Eldering, ¶34.

One issue with respect to arcing in connectors arises when “the male and female connector elements are joined while having a voltage differential existing between the connector elements, called “hot plugging.” A connector in which the

female element is at a non-zero voltage and the male element is at zero voltage can be considered “hot plugging.” Elderling, ¶35.

The issue of plugging under load (“hot plugging”) was articulated by inventors over 50 years ago:

With plug connectors generally in use today, it has been found that separation of mating contact elements under load often cannot be carried out because the electrical arcs occurring as a result of the discontinuity of the electrical conducting path, cause a considerable wear of the material at the contact-making portion of the connectors. The burning of the contact and the damage effected thereby limit the utilization of such connectors and ultimately render such devices useless. Thus, the high transfer resistance occurring as the mating contact elements are separated bring about an undesirable electrical arc, the control of which has heretofore been either tolerated or eliminated by removing power from the equipment prior to disengagement of the electrical connectors.

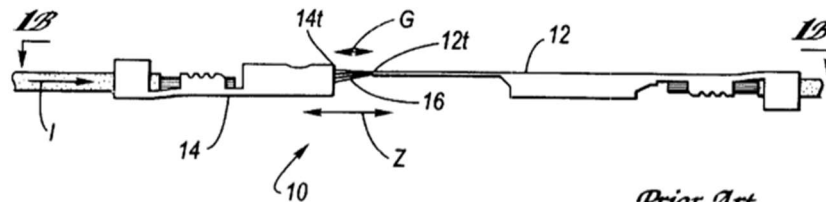
Ex. 1014, 1:14-28. “Hot plugging” cannot always be avoided, with well understood consequences:

[D]uring their service life, connectors can be plugged/unplugged under load many times (i.e. “hot plugged”).

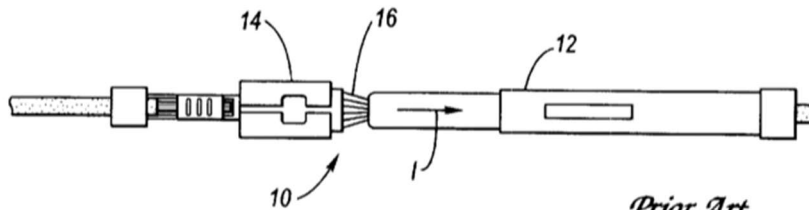
[U]nder specific conditions, a long arc may be generated at engage/disengage, which may cause extensive terminal erosion. This erosion

may damage the physical shape of the terminal, preventing re-engagement or proper terminal contact forces after assembly. Additionally, the electrical arc may have serious consequences for the environment or nearby personnel.

Ex. 1015, 1:17-49; Eldering, ¶36. The same patent illustrated and described an electrical arc taking a “most direct path” between terminals:



Prior Art
Fig. 1A



Prior Art
Fig. 1B

FIGS. 1A and 1B depict a pair of matable electrical connectors 10, wherein the male terminal 12 thereof has just been separated from the female terminal 14 thereof, and the tips of the terminals are presently within the terminal proximity zone Z. By “terminal proximity zone” is meant a zone length over which an electrical arc is most prone to arise when the terminals are subjected to an applied voltage (that is, when under load), which length may vary depending, for example, upon circuit load and atmospheric conditions. An electrical arc 16 leaps

between the closest tips 12i, 14i of the terminals 12,14, taking a most direct path therebetween. Because a most direct path is taken, the arc energy is maximal, resulting in potential for terminal erosion and for possible personnel injury.”

Ex. 1015, 1:17-49; Eldering, ¶37.

By 1943, inventors had already determined that arcing could be mitigated and avoided using insulating materials around contacts, and by closing air paths between adjacent contacts:

Arc-over failures of sockets are usually caused by arcs along air paths between the conductors, and not through the solid insulation. An object of my invention is connectors with male and female connector elements which effectively close all air paths between adjacent wires and contacts.

Ex. 1016, 1:17-23; Eldering, ¶38.

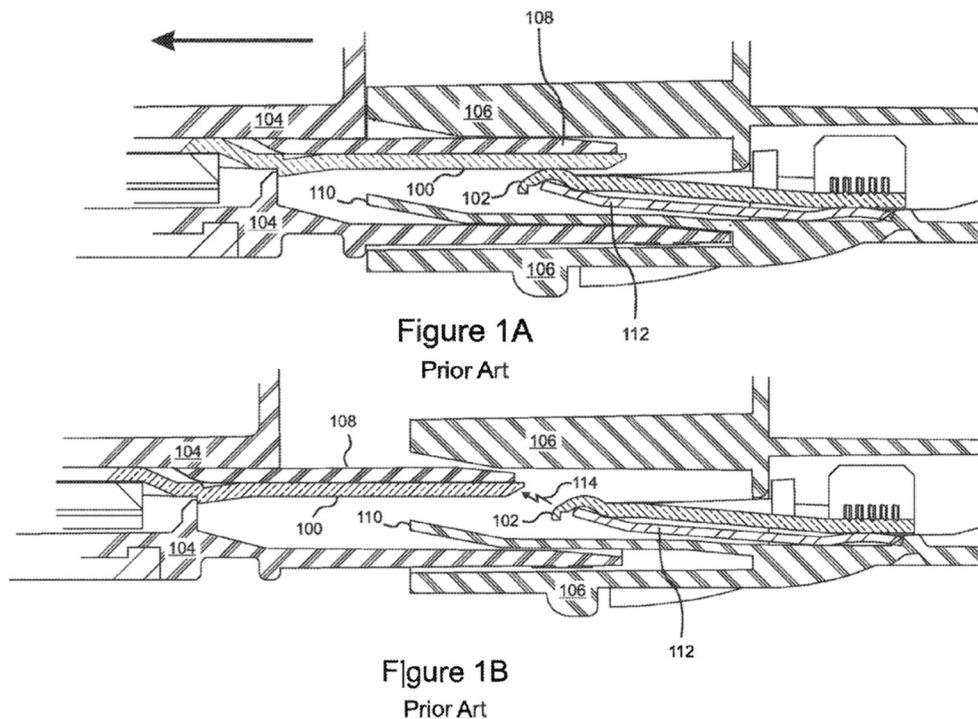
In summary, the problem of arcing between connectors under load, the related consequences of arcing, and the solution of blocking air paths between contacts to avoid arcing, have been well known and well understood for several decades prior to the '017 patent. Eldering, ¶39.

III. THE '017 PATENT

A. Alleged Invention

The '017 patent purports to address electrical arcing when connecting or disconnecting power connectors while current is flowing. Ex. 1001, 1:6-8. The patent discloses two ways for addressing this problem: 1) insulation barriers near connectors to block through-air arcing paths, and 2) a bimetal contact having a transitional segment of high resistivity. *Id.*, 1:55-2:22. The '017 patent has two independent claims: claim 1 recites insulation barriers; and claim 13 recites bimetal contacts. *Id.*, 4:20-24, 5:22-6:5; Eldering, ¶40. This petition focuses on claim 1 and several of its dependent claims.

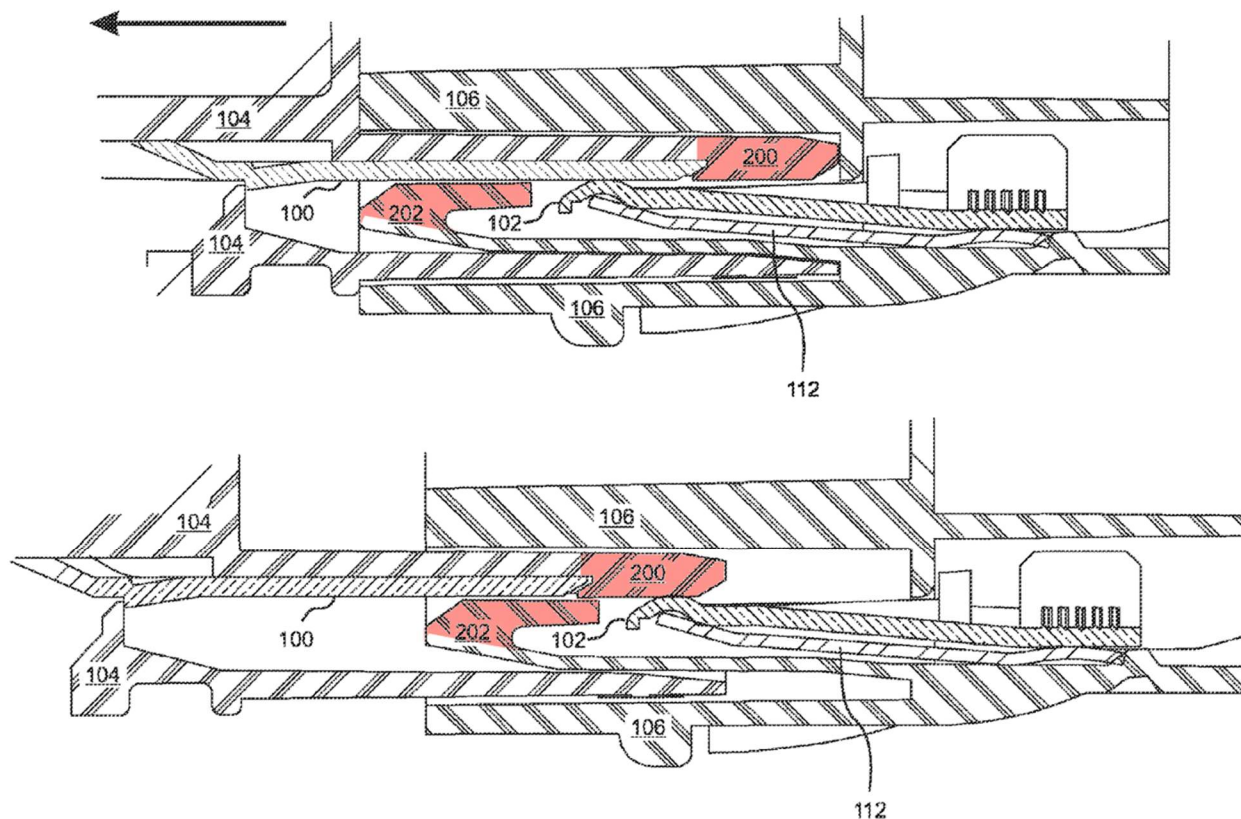
The '017 patent discloses the structure of a pair of electrical connectors, and admits that nearly all the disclosed structure was known prior art. In Figs. 1A and 1B, the '017 shows a prior art connector pair in a connected configuration (Fig. 1A) and arcing during disconnection (Fig. 1B):



Ex. 1001, Figs. 1A and 1B

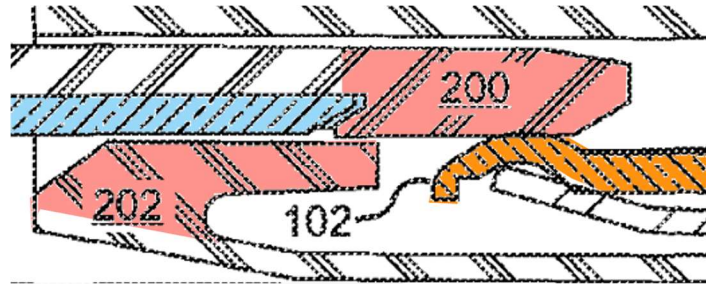
The prior art connector pair includes male contact 100 (a first electrical contact), female contact 102 (a second electrical contact), insulated housing 104 (a first insulated housing), insulated housing 106 (a second insulated housing), and spring 112 that presses the female contact 102 against the male contact 100. Patent Owner’s admission that these components were prior art is consistent with other prior publications. For example, the Electrical Connector Handbook describes a “basic connector” as including contact interface(s), contact spring members, and a connector housing. Ex. 1008, 11; Eldering, ¶41.

The '017 patent next discusses its insulation barriers, shown in Figs. 2A and 2B, and admits “[t]he embodiment is similar to the prior art design of FIG. 1A, except that the insulating support structures 108, 110 have been replaced by the insulating barrier structures 200, 202.” Ex. 1001, 3:20-23. Indeed, Figs. 2A and 2B use the same reference numerals to refer to prior art components shown in Figs 1A and 1B, and items 200 and 202 to identify what the alleged invention purportedly added. The diagram below identifies the *only* substantive differences between the admitted prior art in Figs. 1A-1B, and the alleged invention in Figs. 2A-2B:



Ex. 1001, Figs. 2A (top) and 2B (bottom) (annotated highlighting substantive differences from prior art Figs. 1A and 1B in red)

A portion of Fig. 2B is enlarged below, showing the **insulating barriers** in **red** engaged with one another to block through-air arcing paths between **male contact 100** (**blue**) and **female contact 102** (**orange**):



Ex. 1001, portion of Fig. 2A (annotated highlighting engaged **insulation barriers** in **red**, **male contact 100** in **blue**, and **female contact 102** in **orange**)

Therefore, the only difference from the prior art is the addition of insulating barriers that “engage with each other when the contacts are separated, thereby closing off all through-air paths between the contacts and suppressing arcing.” Ex. 1001, 1:64-2:3. The ’017 patent purports to address the issue that “arcing can still occur through an indirect path that by-passes the insulating barrier.” *Id.*, 1:42-47; Eldering, ¶42.

B. Priority Date

The ’017 patent was filed as Application Number 13/734,025 on January 4, 2013. Ex. 1001, Cover. For the purposes of this petition, Petitioner assumes an earliest priority date of January 4, 2013. Eldering, ¶43.

C. Claim Construction

The Board construes claims per *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Claims must be construed only to the extent necessary to resolve a controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

For this proceeding, Petitioner submits that no terms require express construction because the claims are invalid under any reasonable construction. Elderling, ¶¶44-46.

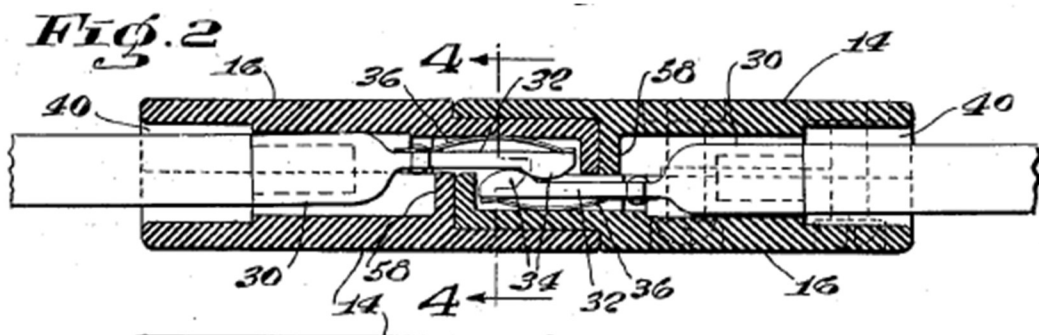
IV. STATEMENT OF PRECISE RELIEF REQUESTED

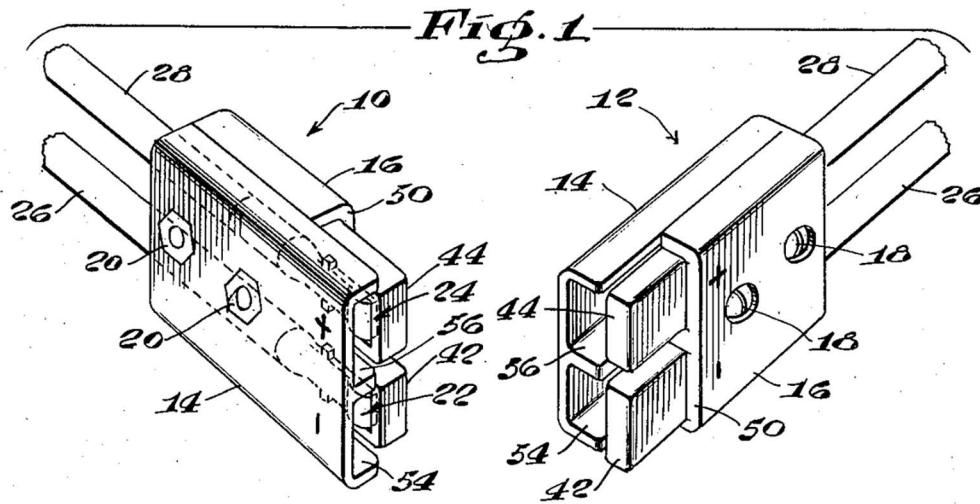
A. Prior Art

Ex. 1004	U.S. Patent No. 2,838,739 to E.D. Winkler (“ <i>Winkler</i> ”)
Ex. 1005	U.S. Patent No. 8,182,278 to Kataoka et al. (“ <i>Kataoka</i> ”)
Ex. 1006	U.S. Patent No. 3,909,099 to Edward D. Winkler (“ <i>Winkler2</i> ”)
Ex. 1007	U.S. Patent No. 4,634,211 to Poliak et al. (“ <i>Poliak</i> ”)
Ex. 1008	Mroczkowski, Robert S., <i>Electrical Connector Handbook</i> (1998) (“Electrical Connector Handbook” or “the Handbook”)

1. *Winkler* (Ex. 1004)

Winkler issued on June 10, 1958 and is prior art under at least 35 U.S.C. §§ 102(a), (b), and (e). *Winkler* discloses a pair of electrical connectors 10 and 12 with insulating sections 14 and 16—depicted below as connector 10 on the left and connector 12 at the right. Ex. 1004, Title, 1:67-70, Figs. 1, 2:





Winkler, Ex. 1004, Figs. 1, 2

Eldering, ¶¶48-49.

Both connectors have “an insulating housing surrounding and enclosing the terminals for maximum insulating protection.” Ex. 1004, 1:47-50. The insulated housing includes pockets 42, 44 enclosing terminals of each connector, leaving only the upper contact portions exposed. *Id.*, 3:7-13. *Winkler* recognizes that “arcing at the extreme ends thereof during [contact members’] disengagement” can occur. *Id.* 3:41-42. Eldering, ¶50.

Winkler was assigned on its face to Albert & J.M. Anderson Manufacturing Company, the predecessor of Patent Owner APP. Ex. 1019, 3. APP lists *Winkler* on its patent marking website, Ex. 1012, but failed to submit *Winkler* to the U.S. Patent Office. See Exs. 1001, 1002 (lacking any citation to *Winkler*).

2. *Kataoka* (Ex. 1005)

Kataoka issued on May 22, 2012 and is prior art under at least 35 U.S.C. §§102 (a) and (e). *Kataoka* discloses a “connector . . . for transmitting a large amount of power.” Ex. 1005, 1:12-14. *Kataoka*’s connector includes two sets of connector terminals and two sets of corresponding insulating members:

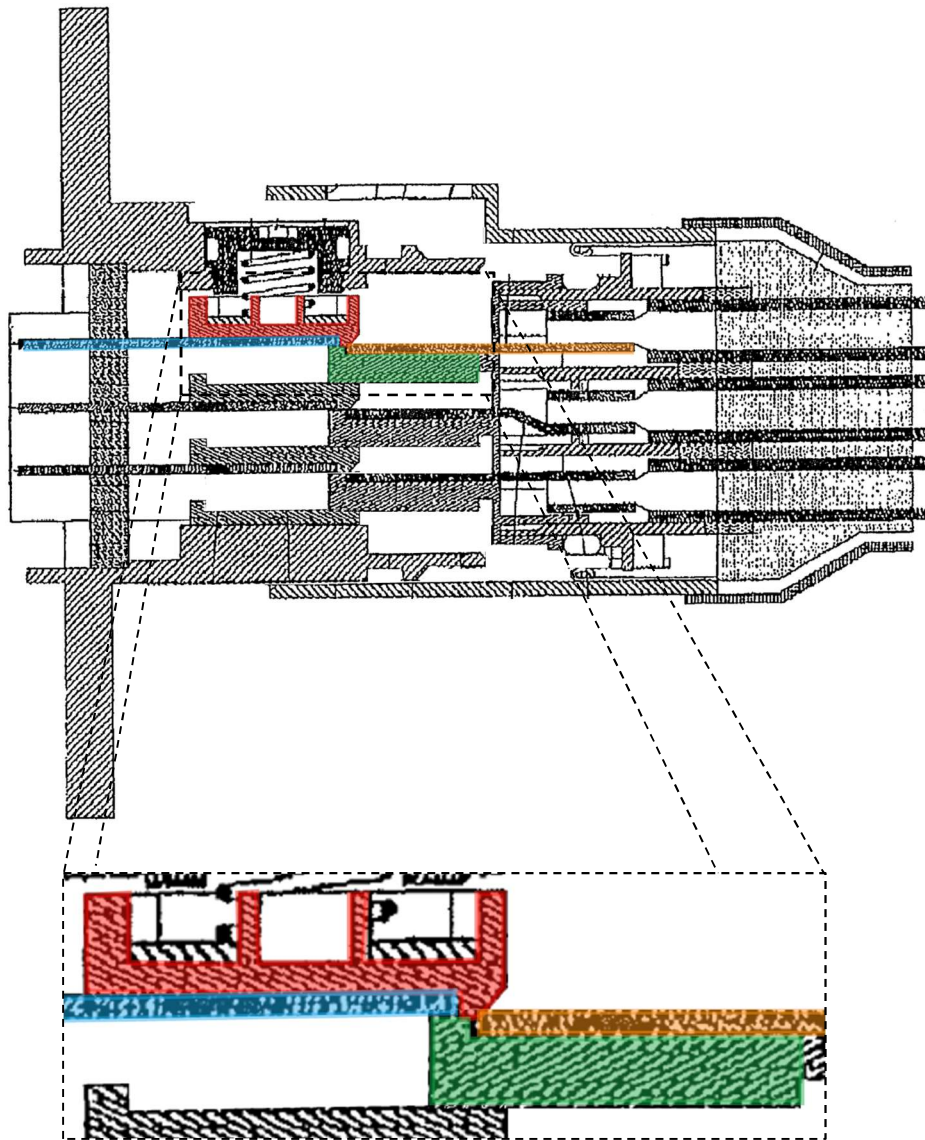
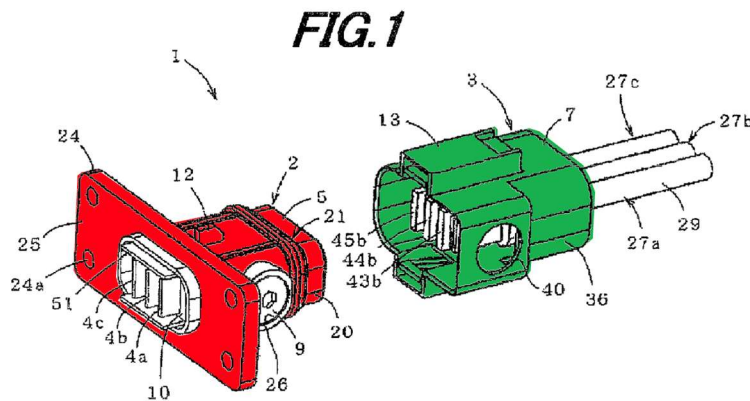


Diagram based on Ex. 1005, Fig. 3 (top), enlarged portion (bottom) (showing insulating members in **green** and **red** and electrical contacts in **blue** and **orange**)



Ex. 1005, Fig. 1 (annotated showing **first connector portion 2** in red and **second connector portion 3** in green)

Each connector portion has contacting terminals 4 and 6 (electrical contacts annotated in blue and orange) and insulating members shielding the corresponding electrical contacts. Ex. 1005, 4:58-5:33. *Kataoka* discloses covering electrical contacts with insulating barriers so the contacts “are not exposed in the non-fitted state and it is thereby possible to prevent unintentional contact and electric shock to a foreign object such as a hand or finger of a worker, etc.” Ex. 1005, 15:12-22 (emphases added); Eldering, ¶¶51-53.

3. *Winkler2* (Ex. 1006)

Winkler2 issued on September 30, 1975 and is prior art under at least 35 U.S.C. §§ 102 (a), (b), and (e). *Winkler2* discloses electrical connectors like *Winkler*. See Ex. 1006, Fig. 1; Ex. 1004, Fig. 1. *Winkler2* further discloses “electrical cable 22 is mechanically and electrically secured to the rigid terminal

member 16 by conventional means, such as, by crimping and/or soldering.” Ex. 1006, 2:12-14; Eldering, ¶¶54-55.

4. *Poliak* (Ex. 1007)

Poliak issued on January 6, 1987 and is prior art under at least 35 U.S.C. §§ 102(a), (b), and (e). Ex. 1007, cover. *Poliak* discloses a screw subassembly for a wiring device, Ex. 1007 title, having a screw that moves a carriage and an attached spring to press conductor wires against electrical terminals. Ex. 1007, abstract, 2:2-68, 4:58-5:15, 6:7-34, Fig. 5; Eldering, ¶¶56-57.

5. *The Handbook* (Ex. 1008)

The Handbook is a printed publication written by Robert S. Mroczkowski and identifies itself as published in 1998. Ex. 1008, 3; Eldering, ¶58. The Handbook was publicly accessible as of its publication date, was catalogued by the Library of Congress, and was publicly available before the ’017 filing date. Ex. 1017 ¶¶13-23. The Handbook was accessed by the public before the ’017 filing date; an Amazon.com webpage shows reviews for the Handbook in 2000 and 2010. Ex. 1018, 5. The Handbook is a prior art printed publication under at least 35 U.S.C. §§ 102(a) and (b).

The Handbook discloses design considerations, uses, and advantages of several different electrical connector types. Ex. 1008, 78. The Handbook demonstrates that several dependent claims of the ’017 patent would have been

obvious, such as those reciting insulation displacement and printed wiring boards.

Eldering, ¶59.

B. Grounds of Unpatentability

Claims 1-4 and 7-12 of the '017 patent are unpatentable in view of the following grounds:

Ground	Claim(s)	Basis Under 35 U.S.C.	Prior Art
1A	1-4, 9	§102	<i>Winkler</i> (Ex. 1004)
1B	7	§103	<i>Winkler</i> (Ex. 1004) in view of <i>Winkler2</i> (Ex. 1006)
1C	8, 10	§103	<i>Winkler</i> (Ex. 1004) in view of Handbook (Ex. 1008)
1D	11, 12	§103	<i>Winkler</i> (Ex. 1004) in view of <i>Poliak</i> (Ex. 1007)
2A	1-4	§102	<i>Kataoka</i> (Ex. 1005)

Ground	Claim(s)	Basis Under 35 U.S.C.	Prior Art
2B	7-10	§103	<i>Kataoka</i> (Ex. 1005) in view of the Handbook (Ex. 1008)

Eldering, ¶¶60-61.

V. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) would have had at least a bachelor’s degree in electrical engineering or a similar field and at least two years of experience working with electrical circuits or electrical connectors, including power connectors. Additional relevant work experience can compensate for less education, and vice versa. Eldering, ¶¶24-26.

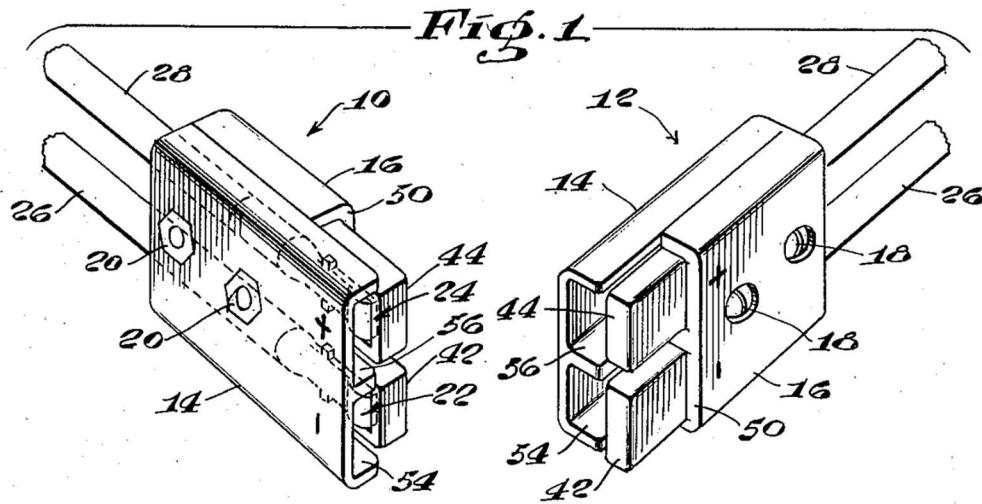
VI. CLAIMS 1-4 and 7-12 ARE UNPATENTABLE OVER THE PRIOR ART

A. Ground 1A: Claims 1-4 and 9 Are Anticipated by *Winkler*

1. Independent Claim 1

a. 1[pre]

Winkler discloses 1[pre]. *Winkler* discloses “a pair of two pole electrical cable connectors indicated at 10, 12.” Ex. 1004, 1:68-70. Figure 1 illustrates connectors 10 and 12:

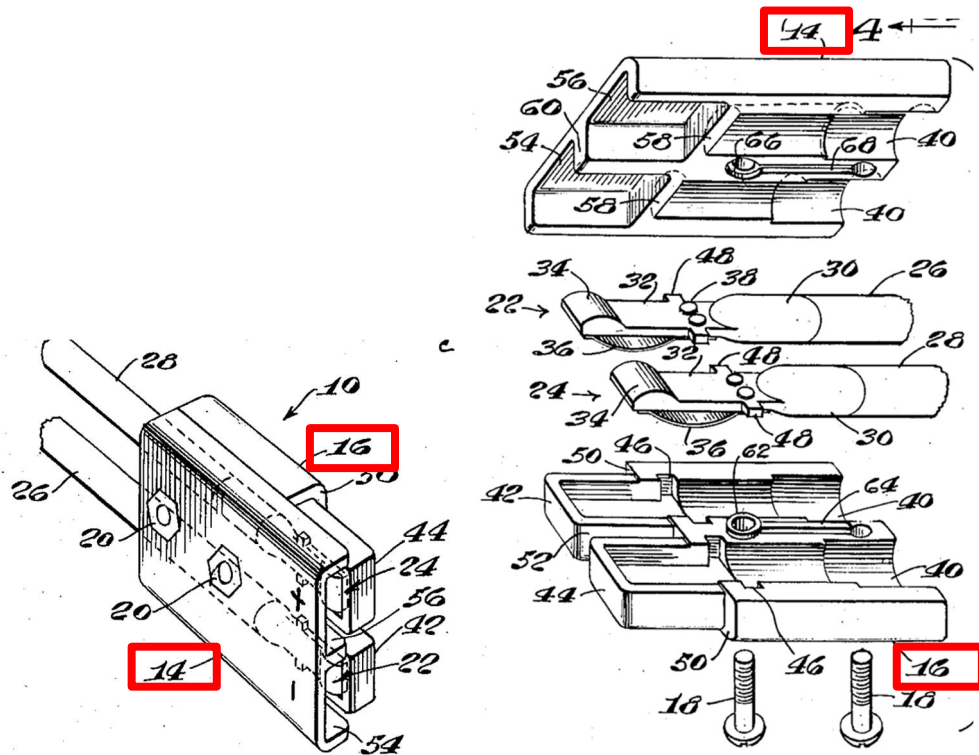


Winkler, Ex. 1004, Fig. 1 (showing a pair of connectors 10 and 12)

Eldering, ¶63.

b. 1[a]

Winkler discloses 1[a]. *Winkler* discloses a first connector 10 having “an insulating housing split longitudinally to form two half sections comprising an upper half section 14 and a lower half section 16, as viewed in Fig. 3.” Ex. 1004, 1:47-50, 1:68-2:2, 3:7-13, Fig. 1:

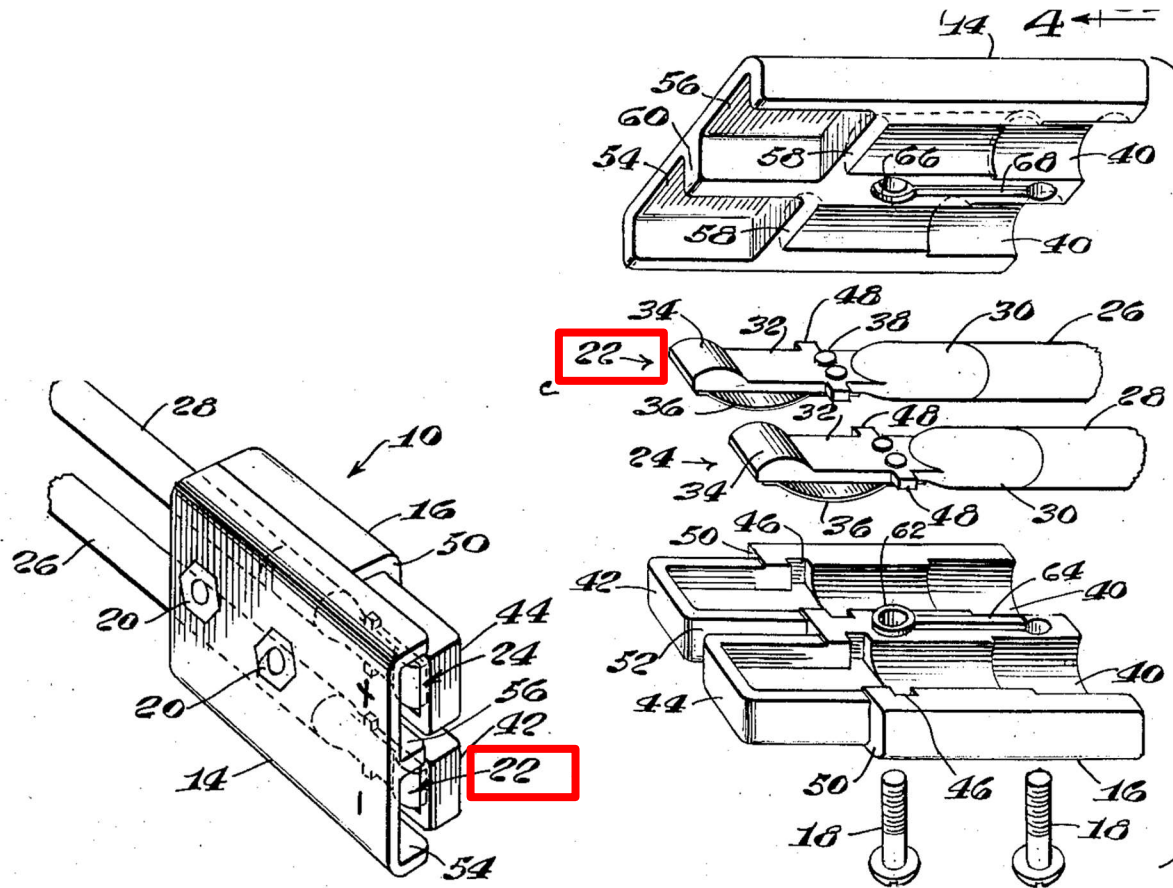


Ex. 1004, portion of Fig. 1 (left) and Fig. 3 (right) (annotated circling insulating housing sections 14 and 16)

Eldering, ¶64.

c. 1[b]

Winkler discloses 1[b]. *Winkler* discloses contact member 22 that forms a terminal for electrical cable 26. Ex. 1004, 2:4-7.



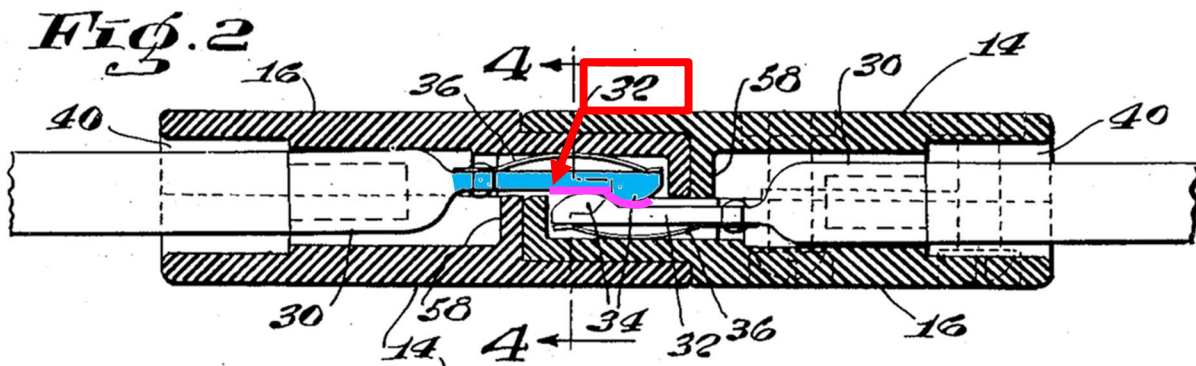
Ex. 1004, portion of Fig. 1 (left) and Fig. 3 (right)
(annotated circling contact member 22)

Eldering, ¶65.

Winkler Figure 1 shows contact member 22 being supported by insulated housing sections 14 and 16. Therefore, contact member 22 is a “first electrical contact supported within the first insulated housing,” as claimed. Eldering, ¶66.

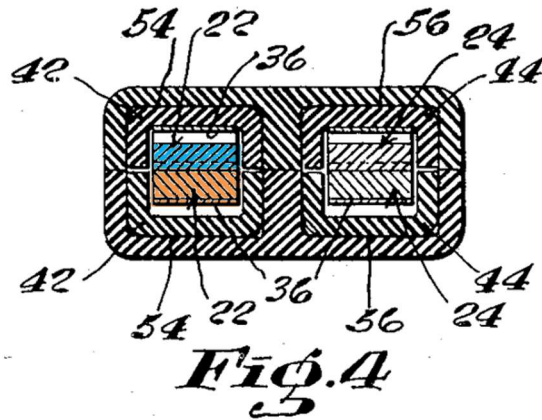
d. 1[c]

Winkler discloses 1[c]. *Winkler*'s contact member 22 (“first electrical contact”) has a contacting end with an “elongated flat portion 32.” Ex. 1004, 2:10-14.



Ex. 1004, Fig. 2 (annotated highlighting **contact member 22** in **blue**, circling elongated flat portion 32, and identifying a **connecting surface** in **pink**)

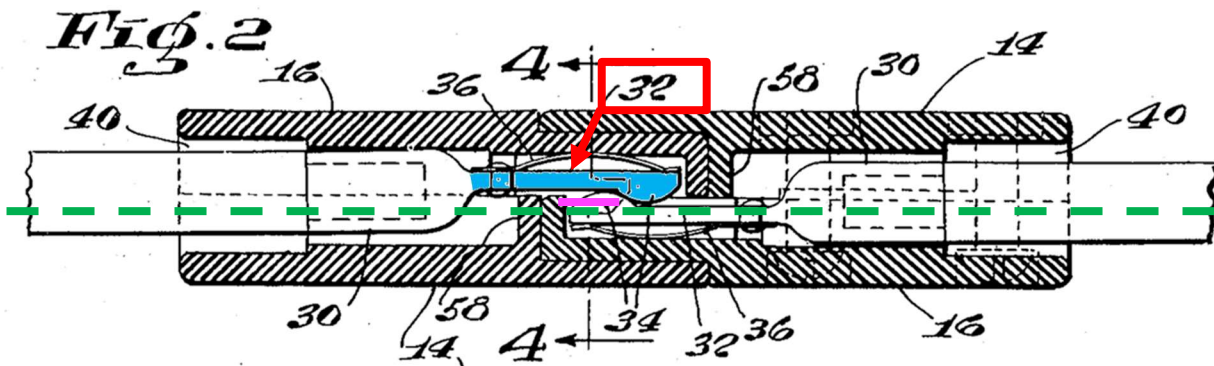
Contact member 22 includes elongated flat portion 32 that is a “connecting surface” as claimed, because a contact member from a mated connector establishes an electrical connection with elongated flat portion 32. Figure 4 shows a cross-sectional view of Fig. 2, with **second contact member 22** connecting to the flat elongated portion 32 of **first contact member 22**.



Ex. 1004, Fig. 4 (highlighting a second **contact member 22** in **orange**, and first **contact member 22** in **blue**)

Therefore, flat elongated portion 32 of contact member 22 is a “connecting surface,” as claimed. Eldering, ¶67.

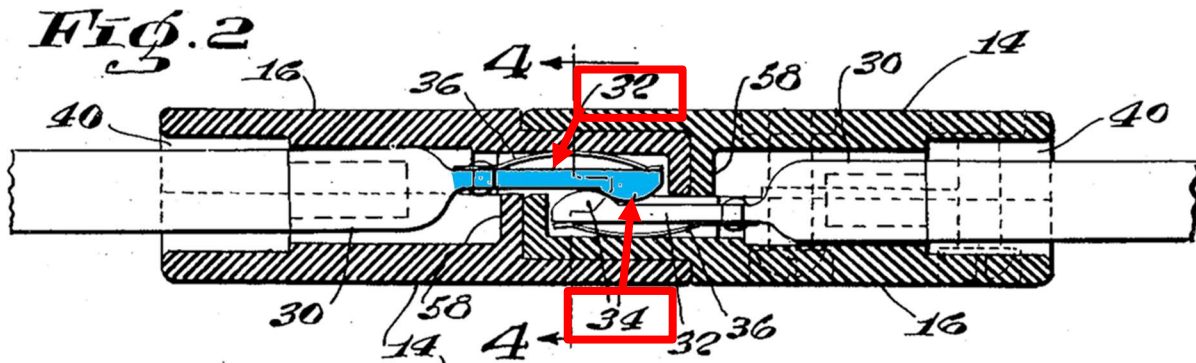
Furthermore, elongated flat portion 32 is parallel with a **longitudinal axis** of the insulating housing sections 14 and 16:



Ex. 1004, Fig. 2 (annotated highlighting **contact member 22** in **blue**, adding a **longitudinal axis** in **green**, circling elongated flat portion 32, and identifying a **connecting surface** in **pink**)

Eldering, ¶68.

The connecting surface of *Winkler*'s contact member 22 "terminates in a leading end of the first electrical contact," as claimed. *Winkler* Fig. 2 shows contact member 22 with a leading end called a "convex end portion 34." Ex. 1004, 2:10-14, Fig. 2:

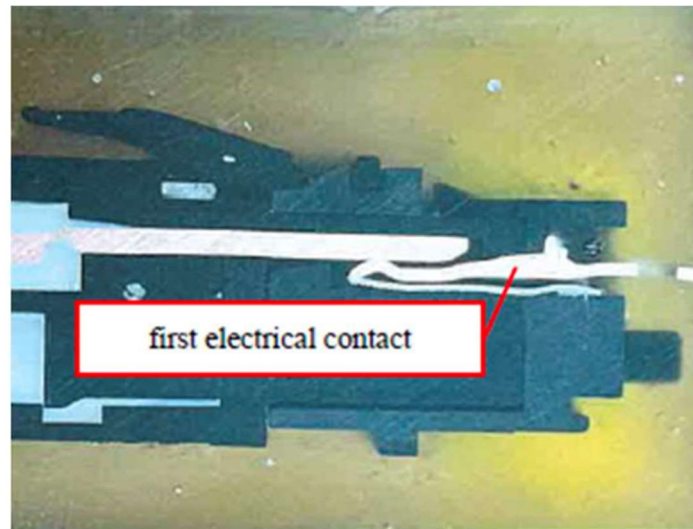


Ex. 1004, Fig. 2 (annotated highlighting *contact member 22* in blue, and circling elongated flat portion 32 and convex end portion 34)

The flat elongated portion 32 of contact member 22 ends at convex end portion 34, which is the leading end. Elderling, ¶69.

For the reasons above, *Winkler* discloses 1[c]. Elderling, ¶70.

Winkler's disclosure is also consistent with Patent Owner's apparent interpretation of 1[c], which Patent Owner mapped to an electrical contact that terminates in a rounded convex end:

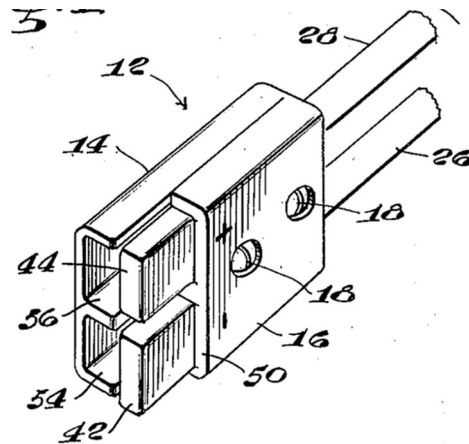


Ex. 1009 at 11 (showing Patent Owner’s interpretation of 1[c])

According to Patent Owner, a rounded convex portion of the first electrical contact can constitute the claimed “connecting surface” of 1[c]. Ex. 1009, 11. Therefore, *Winkler’s* convex portion 34 of contact member 22 constitutes substantially the same structure that Patent Owner alleges meets 1[c]. Eldering, ¶71.

e. 1[d]

Winkler discloses 1[d]. *Winkler* discloses identical connectors 10 and 12. Ex. 1004, 1:27-28, 2:4-10. Just as *Winkler’s* connector 10 constitutes the “first connector” of 1[b], connector 12 constitutes the “second connector” of 1[d]. Insulated housing halves 14 and 16 of connector 12 form the claimed “second insulating housing”:



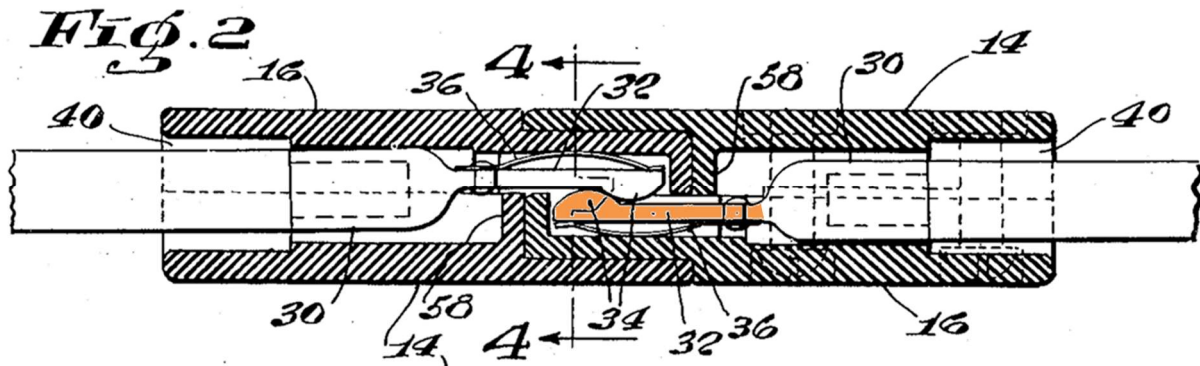
Ex. 1004, portion of Fig. 1

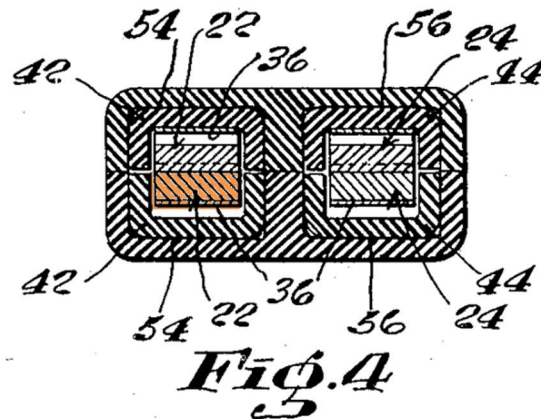
For these reasons and the reasons discussed in Section VI.A.1.c regarding connector 10, *Winkler* meets 1[d]. Eldering, ¶72.

f. 1[e]

Winkler discloses 1[e]. *Winkler* discloses that “each insulated housing is arranged to support two identical contact members 22, 24.” Ex, 1004, 2:4-6.

Winkler’s Figures 2 and 4 show a second **electrical contact 22** supported within the second insulating housing:



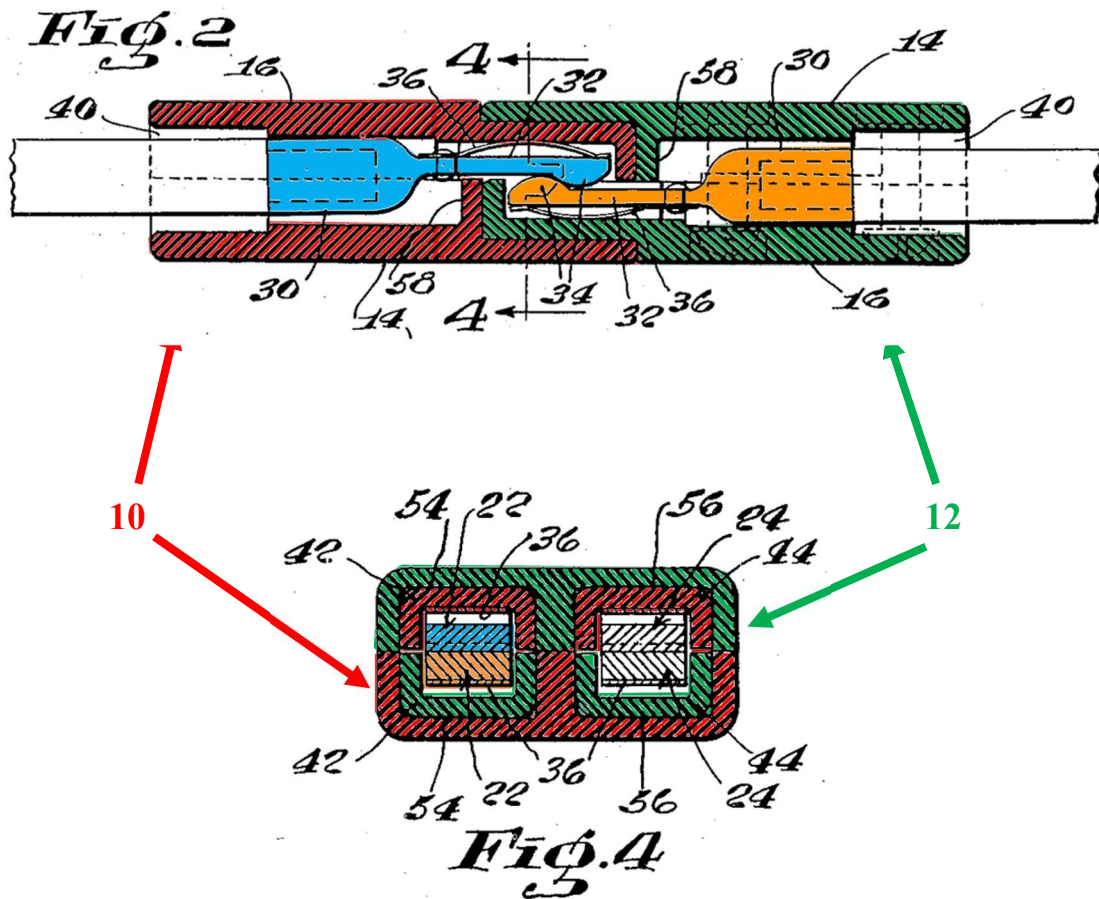


Ex. 1004, Figs. 2, 4 (annotated highlighting
a second **contact member 22** in **orange**)

Winkler discloses that contact member 22 is a terminal for electrical cable 26, and thus is an “electrical contact.” Ex. 1004, 2:4-7. For these reasons and those in Section VI.A.1.c regarding contact member 22 in the identical connector 10, *Winkler* meets 1[e]. Eldering, ¶73.

g. 1[f]

Winkler discloses 1[f]. *Winkler* discloses connectors 10 and 12 that, when mated, have contact members 22 (“electrical contacts”) that laterally engage. *Winkler* Figs. 2 and 4 show the mated connectors and lateral engagement of the electrical contacts:



Ex. 1004, Fig. 2 (annotated highlighting **first connector 10** in **red** mated with **second connector 12** in **green**, the **first connector** having a **first electrical contact** in **blue** that laterally engages with a **second electrical contact** in **orange**)

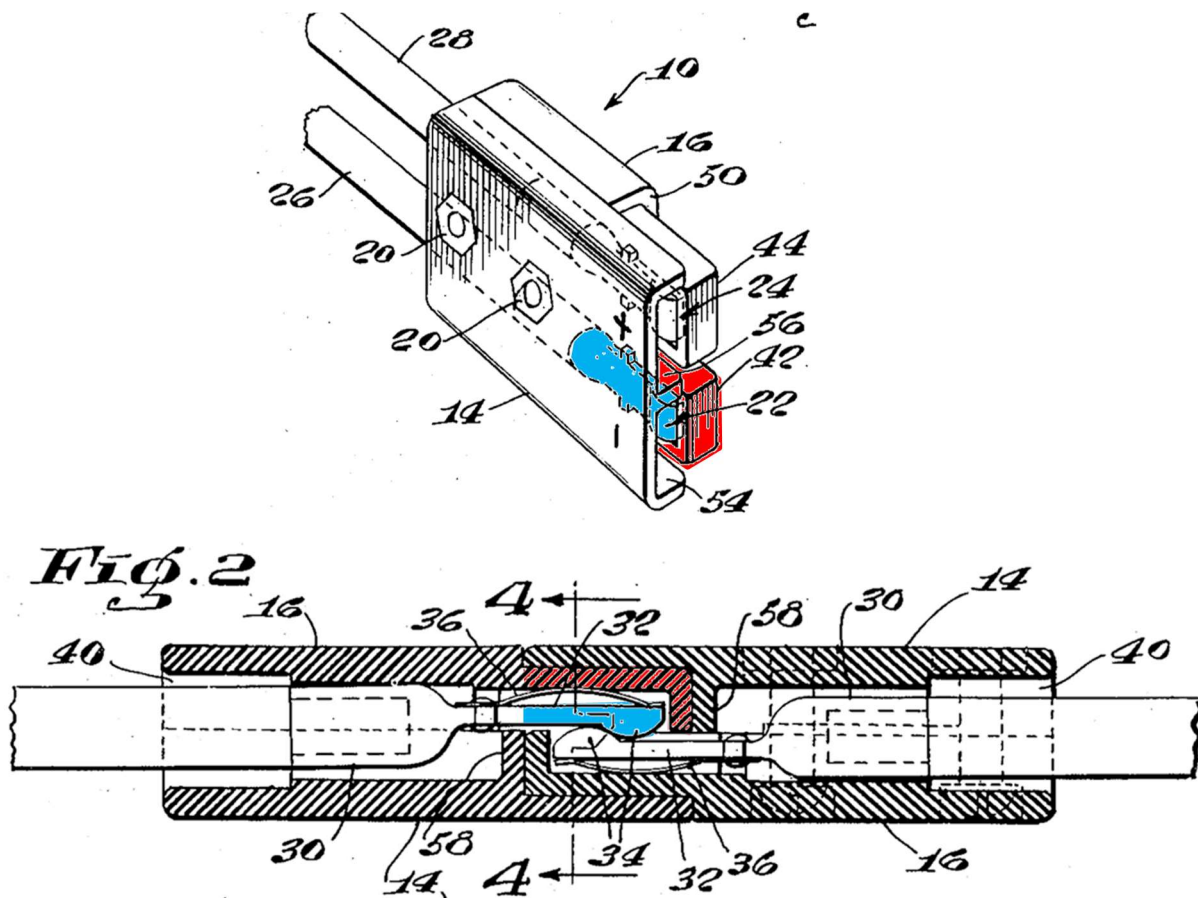
Eldering, ¶74.

Contact members 22 in *Winkler* (first and second electrical contacts)
“laterally engage” with one another as claimed because they are in “interlocking engagement with each other when fully engaged.” Ex. 1004, 4:50-56. The two spring-pressed contact members 22 slidably engage with one another, and “as the connectors approach full engagement, the springs 36 effect upward movement of the terminals in their pockets to present the curved portions 34 in hooked or

interlocked relation to each other.” *Id.*, 3:18-27. For these reasons, *Winkler* discloses 1[f]. Eldering, ¶75.

h. 1[g]

Winkler discloses 1[g]. *Winkler*’s connector 10 includes terminal receiving pocket 42 in housing section 16. Ex. 1004, 2:23-25. Receiving pocket 42 is a “first insulating barrier” that “cover[s] the leading end of the first electrical contact” as claimed, because receiving pocket 42 is “substantially U-shaped in cross section and closed at [its] outer end[.]” *Id.*, 2:25-26.



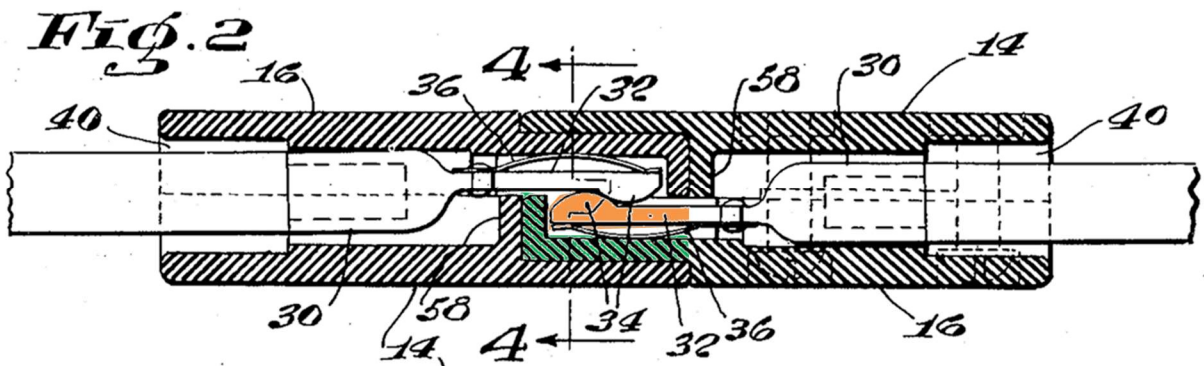
*Ex. 1004, portion of Fig. 1 (top), Fig. 2 (bottom) (annotated highlighting **contact member 22** in **blue**, and **receiving pocket 42** in **red**)*

Winkler states that contact member 22 is “enclosed in the pocket[] 42.” Ex. 1004, 3:7-9; *see also id.*, 2:39-40. Receiving pocket 42 is thus a first insulating barrier that extends beyond and covers a leading end of contact member 22, and constitutes the claimed “first insulating barrier” of 1[g]. Eldering, ¶76.

The '017 also admits an insulating barrier that “blocks the direct through-air path between the contacts” was known. Ex. 1001, 1:42-44; Eldering, ¶77.

i. 1[h]

Winkler discloses 1[h]. Because *Winkler* discloses identical connectors 10 and 12 having the same structure. Ex. 1004, 1:27-28, 2:4-10. Second connector 12 includes terminal receiving pocket 42 that is a “second insulating barrier extending beyond the second electrical contact” for the reasons above with respect to connector 10. *See* Section VI.A.1.h (1[g]). The “second insulating barrier” of the second connector is highlighted in green in *Winkler* Fig. 2, below:

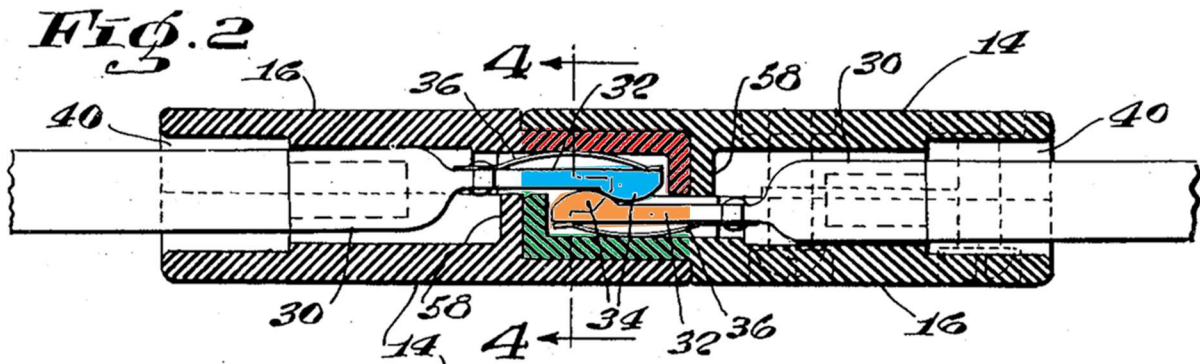


Ex. 1004, Fig. 2 (annotated highlighting **contact member 22** of a second connector in **orange**, and **receiving pocket 42** of the second connector in **green**)

Therefore, *Winkler* discloses 1[h]. Elderling, ¶78.

j. 1[i]

Winkler discloses 1[i]. *Winkler* discloses a first connector having a **first insulating barrier** and **first electrical contact**, and a second electrical connector having a **second insulating barrier** and **second electrical contact**:



Ex. 1004, Fig. 2 (annotated highlighting a **first electrical contact** in **blue** and a **first insulating barrier** in **red** of a first connector, and a **second electrical contact** in **orange** and a **second insulating barrier** in **green** of a second connector)

The first insulating barrier and the second insulating barrier are configured to be in close proximity when the first and second connectors are partially disconnected. A

diagram created based on *Winkler* Fig. 2 is provided below, showing connectors 10 and 12 partially disconnected:

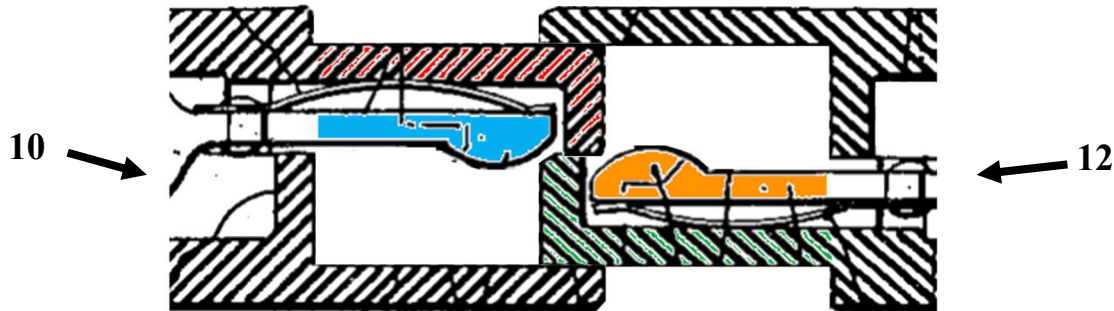
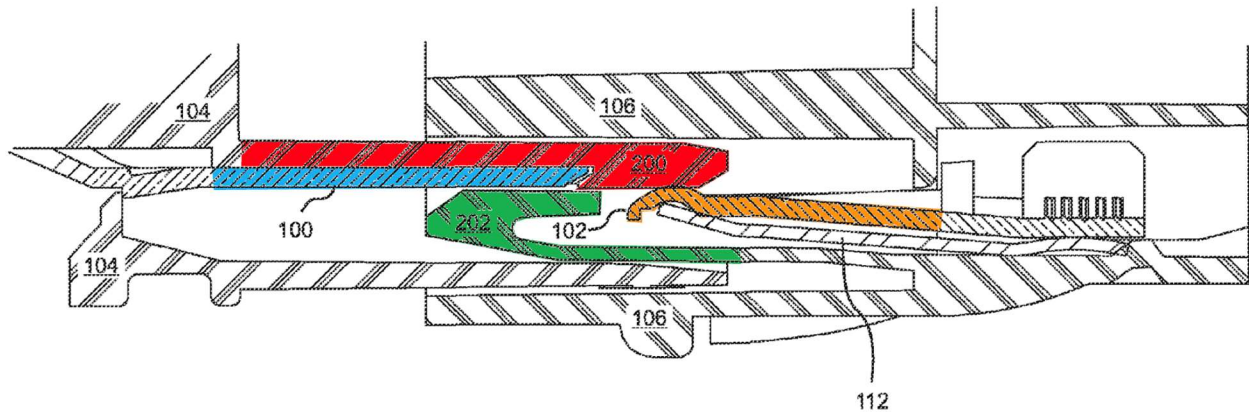


Diagram created based on Ex. 1004, Fig. 2, (modified to show connector 10 and connector 12 partially disconnected)

As illustrated in the diagram above, when connector 10 and connector 12 are partially disconnected, the **first contact member** (in **blue**) is separated from the **second contact member** (in **orange**) by a short distance, and the closed ends of the **first insulation barrier** (in **red**) and the **second insulation barrier** (in **green**) are in close proximity to one another. In the diagram above, the first and second insulation barriers block substantially all through-air arcing paths between the **first contact member** and the **second contact member**. Therefore, *Winkler* meets 1[i].
Eldering, ¶¶79-82.

Winkler exhibits the same arcing path-blocking functionality that the '017 patent depicts in Fig. 2B:



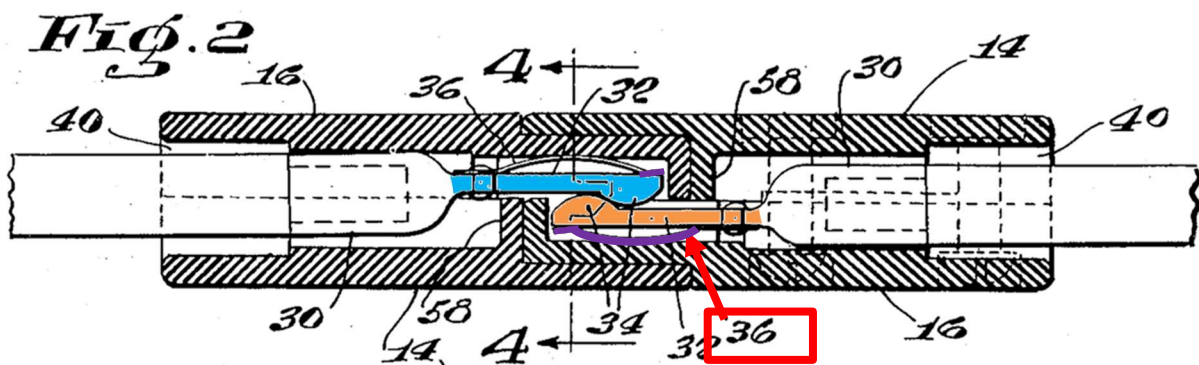
'017 Patent (Ex. 1001), Fig. 2B (highlighting **first barrier structure 200** in **red**, **second barrier structure 202** in **green**, **first contact 100** in **blue**, and **second contact 102** in **orange**)

Eldering, ¶83.

For the reasons above, *Winkler* discloses every limitation of independent claim 1, and thus anticipates claim 1. Eldering, ¶¶62, 84.

2. Claim 2

Winkler anticipates claim 2. *Winkler* discloses a leaf spring 36 that is a “contact tensioning mechanism.” Leaf spring 36 is shown in Fig. 2, below:



Ex. 1004, Fig. 2 (annotated highlighting **leaf spring 36** in **purple**, **first electrical contact** in **blue**, and **second electrical contact** in **orange**)

Figure 2 shows the first and second connectors being connected. **Leaf spring 36** (outlined in **purple** above) presses the **second electrical contact** (in **orange** above) against the engaging surface of the **first electrical contact** (in **blue** above) when the first and second connectors are connected. In particular, the **leaf spring 36** presses curved portion 34 of the **second electrical contact** against the curved portion 34 and the flat elongated portion 32 of the **first electrical contact**. *Winkler* states that “the contacting end of each terminal is enclosed in its respective pocket except for the engaging face thereof which is *resiliently urged by the leaf spring 36 toward the cooperating terminal*.” Ex. 1004, 2:39-43 (emphasis added). According to *Winkler*, flat elongated portion 32 is part of the “contacting end” of the terminal, and therefore elongated portion 32 of each electrical contact is also pressed against one another by leaf spring 36. *See id.*, 2:10-14, 4:41-43. *Winkler* further states that “springs 36 effect upward movement of the terminals in their pockets to present the curved portions 34 in hooked or interlocked relation to each other . . .” *Id.*, 3:24-27; Eldering, ¶85.

For the reasons above, leaf spring 36 constitutes the claimed “contact tensioning mechanism,” and *Winkler* anticipates claim 2. Eldering, ¶86.

3. Claim 3

Winkler anticipates claim 3. As discussed in Section VI.A.2, *Winkler* discloses the contact tensioning mechanism of claim 2. *Winkler* discloses a leaf

spring 36. Ex. 1004, 2:14-17, 2:28-32, 2:39-43, 3:23-27, 3:31-34. The '017 patent does not exclude or teach away from leaf springs. Therefore, *Winkler* anticipates claim 3. Eldering, ¶87.

4. Claim 4

Winkler anticipates claim 4. *Winkler* discloses the first and second insulating barriers of 1[g] and 1[h]. See Sections IV.A.1.h, IV.A.1.i. The first and second insulating barriers of *Winkler* are configured to be in close proximity when the first and second connectors are partially disconnected and the first and second electrical contacts are separated by a short distance, as explained above with respect to 1[i] and illustrated in a diagram created based on *Winkler* Fig. 2. See Section VI.A.1.j; Eldering, ¶88.

Winkler discloses the “barrier tensioning mechanism” of claim 4. As shown in the diagram below, outer portions of each connector housing in *Winkler* form narrow openings in the connectors, such that the first and second insulating barriers are pressed together when the connectors are partially disconnected:

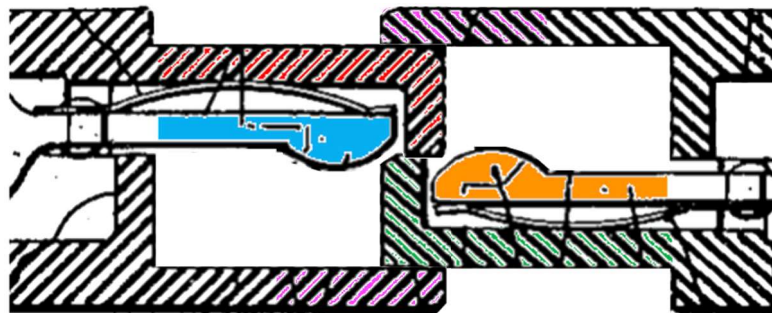


Diagram based on Ex. 1004, Fig. 2 (showing connectors 10 and 12 partially disconnected, with **barrier tensioning mechanisms** in **pink**, **first insulating barrier** in **red**, and **second insulating barrier** in **green**)

The **pink** highlighted portions of each connector housing are **barrier tensioning mechanisms** because they cause the **first insulating barrier** and the **second insulating barrier** to press against each another. Eldering, ¶89.

The '017 patent does not say anything about the claimed “barrier tensioning mechanism” other than stating “[s]ome embodiments include a spring or other tensioning mechanism that presses the male and female insulating barriers against each other when the connectors are partially disconnected.” Ex. 1001, 3:37-40. The '017 patent does not appear to require anything more than what *Winkler* discloses. Therefore, *Winkler* anticipates claim 4. Eldering, ¶90.

5. Claim 9

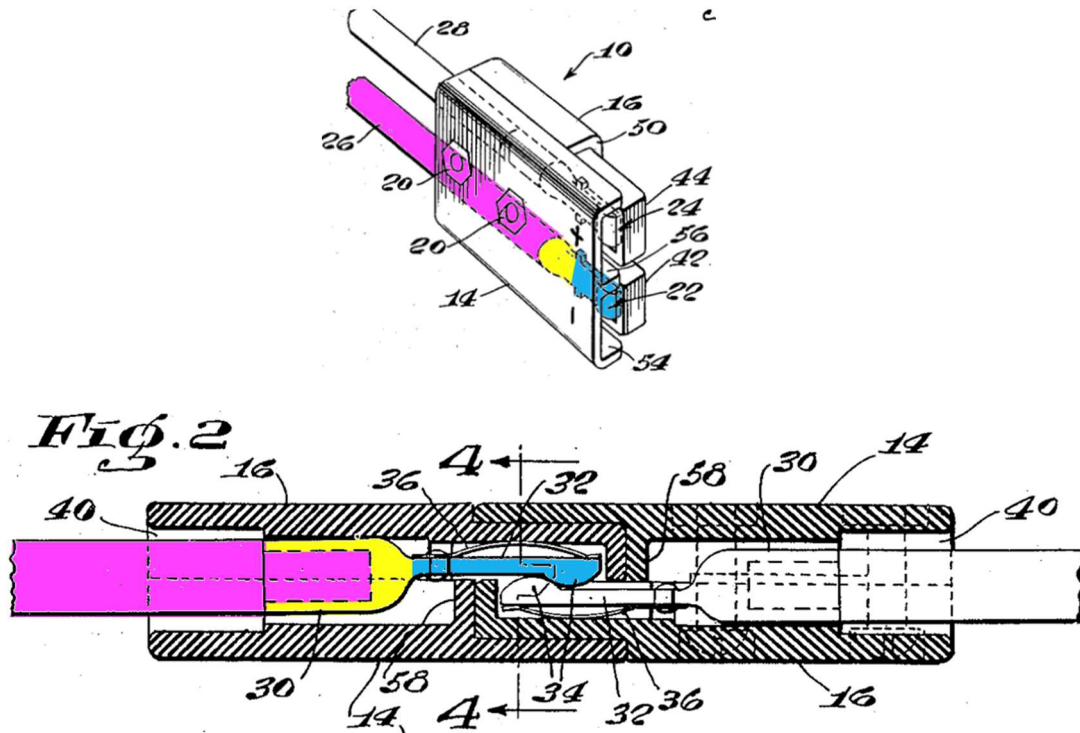
Winkler anticipates claim 9. As a preliminary matter, and solely for the purposes of this proceeding, Petitioner interprets “wire or and electrical component” in claim 9 as “wire or an electrical component.” *Winkler*’s contact members 22 are terminals formed as first and second electrical contacts. *See* Sections VI.A.1.c (1[b]), VI.A.1.f (1[e]). *Winkler* discloses that “each terminal is provided with cylindrical end portion 30 bored to receive the end of the cable into which it may be soldered.” Ex. 1004, 2:8-10. *Winkler*’s cable transfers electricity is thus a “wire” and an “electric component.” Eldering, ¶91.

The '017 patent does not distinguish claim 9 from *Winkler*, because “soldering,” “wire,” and “electrical component” do not appear anywhere in the '017 patent besides the claims. Therefore, *Winkler* anticipates claim 9. Elderling, ¶92.

B. Ground 1B: Claim 7 is Obvious Over *Winkler* in view of *Winkler2*

The combination of *Winkler* and *Winkler2* renders claim 7 obvious. Claim 7 recites “[t]he connector pair of claim 1, wherein at least one of the first and second electrical contacts includes a terminal for crimping to a wire.” *Winkler*’s electrical connectors have contact members 22 that are the first and second electrical contacts of claim 1. *See* Sections VI.A.1.c (1[b]), VI.A.1.e (1[d]); Elderling, ¶93.

Winkler further discloses attaching an end of cable 26 to cylindrical end portion 30 of contact member 22 by soldering. Ex. 1004, 2:8-10, Figs. 1 and 2:



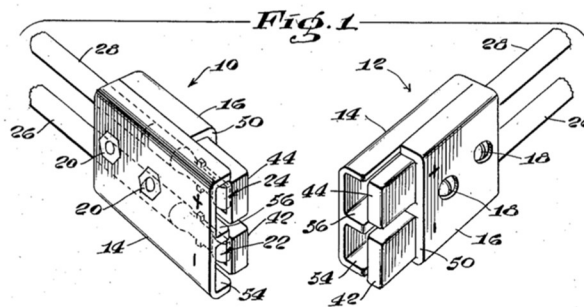
Ex. 1004, portion of Fig. 1 (top) and Fig. 2 (bottom)
(annotated highlighting **first connector terminal 22** in **blue**, **cylindrical end portion 30** of the terminal in **yellow**, and **cable 26** in **pink**)

A POSITA would have understood that *Winkler*'s cable 26 differs from the claimed "wire" in nomenclature only, not in substance. For example, the Handbook recites "wire/cable" interchangeably. See Ex. 1008, 21, 27; Eldering, ¶94.

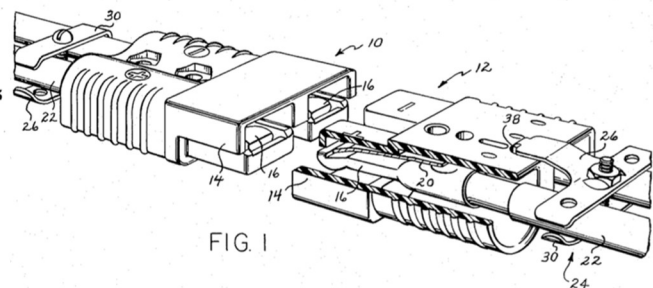
Winkler does not disclose "a terminal for crimping to a wire." However, claim 7 would have been obvious to a POSITA. For example, the Handbook discloses crimping to connect to a wire or cable, Ex. 1008, 13, regarding it as

among “the oldest of the technologies” “dating back to the 1940s.” Ex. 1008, 32; Elderling, ¶¶95, 168.

Winkler2 discloses a similar connector, having terminals for attaching wires using soldering and/or crimping. *Winkler2* is analogous art to *Winkler* and both are analogous art to the '017 patent. *Winkler2* and *Winkler* are by the same inventor, and both are in the same technical field of electrical connectors as the '017 patent. Ex. 1004, cover, 1:15; Ex. 1006, cover, 1:5-8. *Winkler2* discloses the same style of electrical connector as *Winkler*, with similar insulated housings and connector terminals, as can be seen by Figure 1 of each reference:

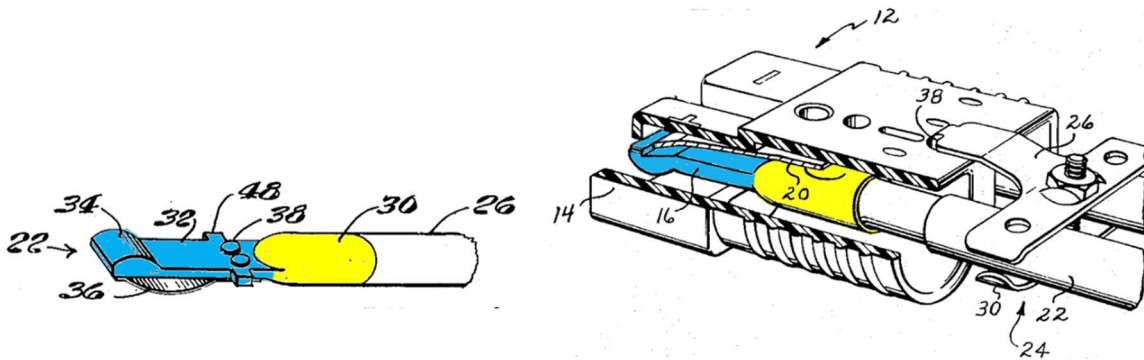


Ex. 1004, Fig. 1



Ex. 1006, Fig. 1

Like *Winkler*, *Winkler2* discloses an electrical contact called a “terminal member 16,” and shows terminal member 16 having cylindrical end portion like *Winkler*’s cylindrical end portion 30:



Ex. 1004, portion of Fig. 3 (left) and Ex. 1006, portion of Fig. 1 (right) (annotated highlighting electrical contacts in blue, and cylindrical end portions in yellow)

Eldering, ¶96.

In addition to disclosing the same general electrical connector as *Winkler*, *Winkler2* discloses a terminal for crimping to a wire. *Winkler2* discloses that “[a]n electrical cable 22 is mechanically and electrically secured to the rigid terminal member 16 by conventional means, such as, by crimping and/or soldering.” Ex. 1006, 2:12-14; Eldering, ¶97.

It would have been obvious to a POSITA by January 4, 2013 – the filing date of the ’017 patent – to modify *Winkler*’s contact member 22 to include a terminal for crimping a wire disclosed in *Winkler2*, to yield an electrical connector that attaches to wires using soldering and/or crimping, as disclosed in *Winkler2*. The modification would have involved the application of the known wire crimping technique or *Winkler2* to *Winkler*’s known electrical connector, to yield predictable

results of rigidly securing a cable to the contact member, ensuring a reliable and physical electrical connection. Eldering, ¶98.

Furthermore, modifying *Winkler* based on *Winkler2* would have involved applying known wire crimping techniques disclosed in *Winkler2*, to improve *Winkler*'s similar connectors with a strong mechanical connection. Even though *Winkler* discloses soldering a cable to a terminal, *Winkler2* discloses attaching a wire by crimping either in addition to soldering or instead of soldering. Ex. 1006, 2:12-14. *Winkler2* discloses both techniques as being "conventional" nearly forty years before the '017 patent. *Id.*; Eldering, ¶99.

POSITAs would have expected success in modifying *Winkler* to include *Winkler2*'s crimping terminal. As explained above, *Winkler* and *Winkler2* disclose very similar connector hardware, and thus *Winkler2* additional disclosure of a crimping terminal would have informed a POSITA that little or no connector component modification would have been needed, beyond modifying cylindrical end portion 30 to solder *and/or crimp* a wire such as cable 26. Any necessary modifications to *Winkler*'s components would have been within a POSITA's capabilities. For example, a POSITA would have been able to modify cylindrical end portion 30 of *Winkler*, if necessary, to allow the cylindrical walls to crimp a wire inserted into the cylindrical portion 30. Eldering, ¶100.

For these reasons, claim 7 would have been obvious based on *Winkler* in view of *Winkler*². Eldering, ¶101.

C. Ground 1C: Claims 8 and 10 are Obvious Over *Winkler* in view of the Handbook

1. Claim 8

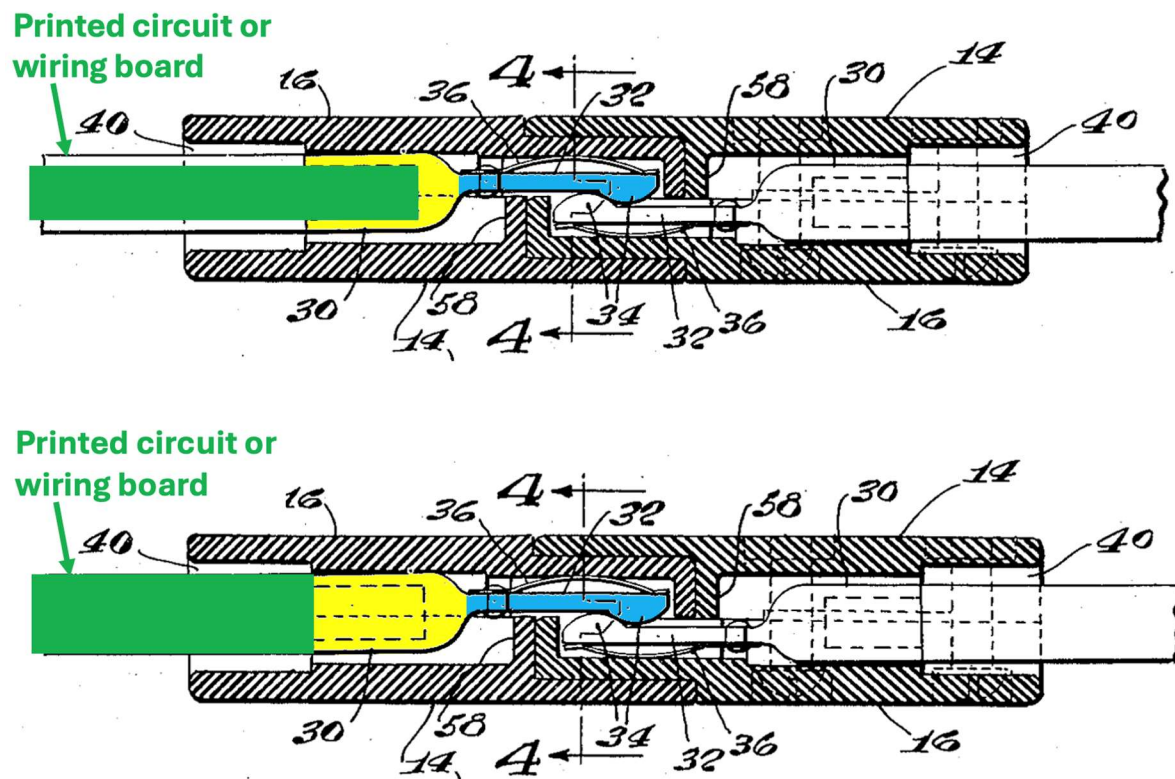
Winkler in combination with the Handbook renders claim 8 obvious. *Winkler* discloses electrical connectors 10 and 12 having contact members 22 that are the first and second electrical contacts of claim 1. *See* Sections VI.A.1.c, VI.A.1.e. Eldering, ¶102. *Winkler* also discloses its connector as being suitable for “general use,” including soldering a cable to cylindrical end portion 30 of contact member 22. *Winkler*, 1:16-20, 2:6-10; *see also* Section VI.B. Cylindrical end portion 30 is a “terminal for soldering,” as claimed. Eldering, ¶102.

Winkler’s connector terminal is capable of soldering to a printed circuit or wiring board (hereinafter “board”) because it can be soldered to cables, yet *Winkler* fails to explicitly disclose soldering to a board. The ’017 patent does not provide any details about the claimed “printed circuit or wiring board.” Eldering, ¶103.

The Handbook discloses soldering to a printed wiring board. According to the Handbook, “[t]here are two major media through which [permanent] connections are established: (a) wires or cables and (b) printed wiring boards (PWBs).” Ex. 1008, 21. PWBs have been used and known since at least the 1950s.

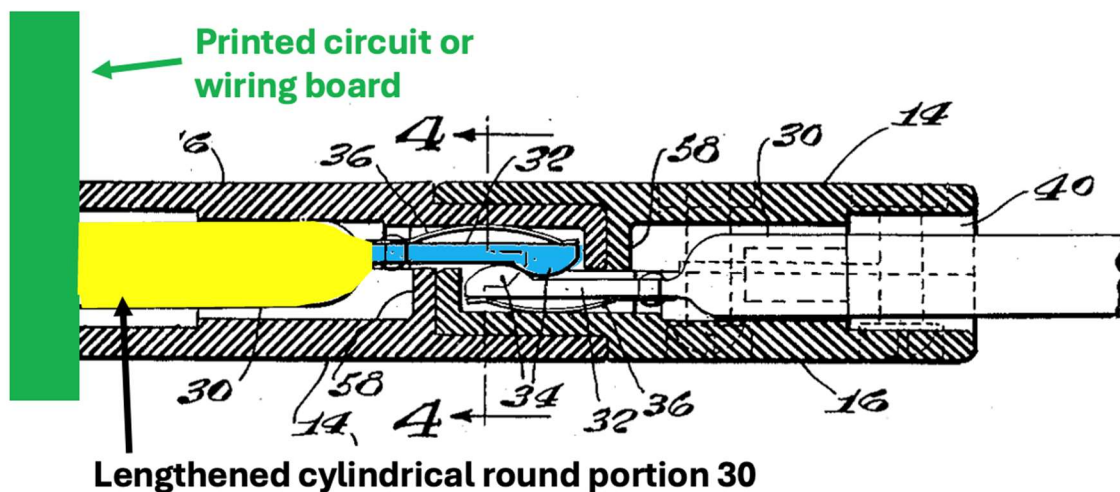
Id. The Handbook further discloses that “[s]oldering is the dominant metallurgical technology used in PWB applications” and discloses surface mount technology (SMT) as one of the two prevalent connection techniques for attaching electronics to a printed wiring board. *Id.* at 22, *see also* 74-77; Eldering, ¶104.

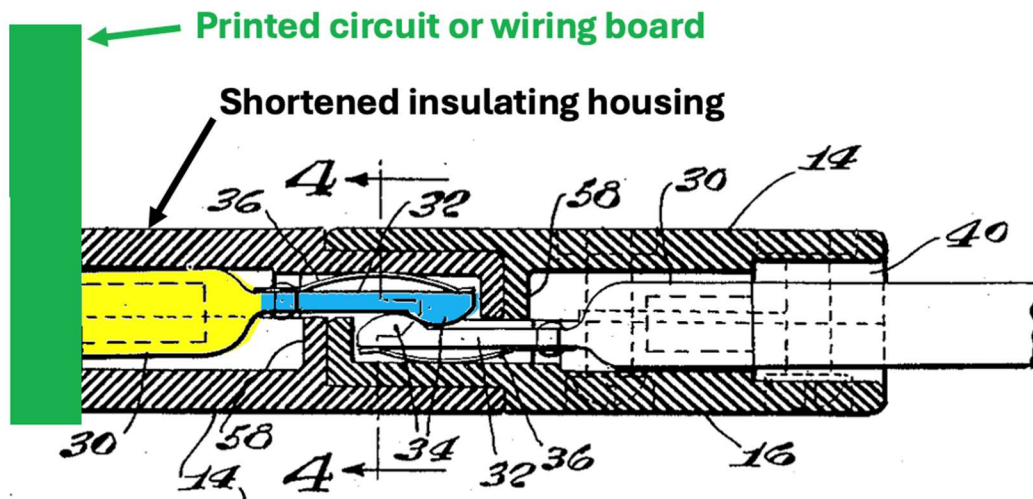
It would have been obvious to a POSITA at the time of the '017 patent to solder *Winkler*'s cylindrical end portion 30 to a board inserted within the end of housing portions 14 and 16, using the surface mount soldering techniques disclosed in the Handbook. Ex. 1008, 21-22, 74-77. This application of *Winkler*'s connector would have looked like one of the following examples:



Diagrams based on Winkler Fig. 2 (modified to show a **printed circuit or wiring board in green** soldered to **cylindrical end portion 30 in yellow**)

Alternatively, it would have been obvious to a POSITA to modify *Winkler*'s cylindrical end portion 30 (part of *Winkler*'s "terminal") for soldering a perpendicular board using surface mount techniques disclosed in the Handbook. It would have been obvious to lengthen cylindrical end portion 30, and/or to shorten housing portions 14 and 16, so that cylindrical end portion 30 extends to the end of the housing and contacts a board surface. The modified connector would have been soldered to the board using known techniques as disclosed in the Handbook. Ex. 1008, 21-22, 74-77. The modified connector of *Winkler* soldered to a board would have looked like one of the following examples:





Diagrams based on Winkler Fig. 2 (modified to show a **printed circuit or wiring board in green** soldered to **cylindrical end portion 30 in yellow**)

Eldering, ¶¶105-106.

Modifying *Winkler* based on the Handbook would have involved applying the known technique of surface mount soldering a connector to a printed wiring board as disclosed in the Handbook, to *Winkler*'s known connector, to yield predictable results of adding *Winkler*'s connector – having “maximum insulating protection” – to known electrical components such as printed circuit or wiring boards. Additionally, modifying *Winkler* for soldering to a board would have involved combining *Winkler*'s known electrical connector with known printed wiring boards disclosed in the Handbook, using known surface mount soldering techniques disclosed in the Handbook, to provide the predictable results discussed above. Indeed, the Handbook demonstrates that it was known to solder electrical

connectors to printed circuit or wiring boards. Ex. 1008, 21-22, 74-77; Eldering, ¶107.

A POSITA would have expected success in soldering *Winkler*'s connector to a board, without requiring any modification to *Winkler*'s connector. For example, a board sized to fit within *Winkler*'s connector housing would have allowed for soldering *Winkler*'s connector to the board without modifying connector components. Alternatively, a POSITA would have been capable of shortening insulated housings 14 and 16, and/or lengthening cylindrical end portion 30 to expose it for soldering to a board. Lengthening or shortening these components at the rear end of *Winkler*'s connector would not affect the design or functionality of contact members 22 and insulation barriers at the front end. Eldering, ¶108.

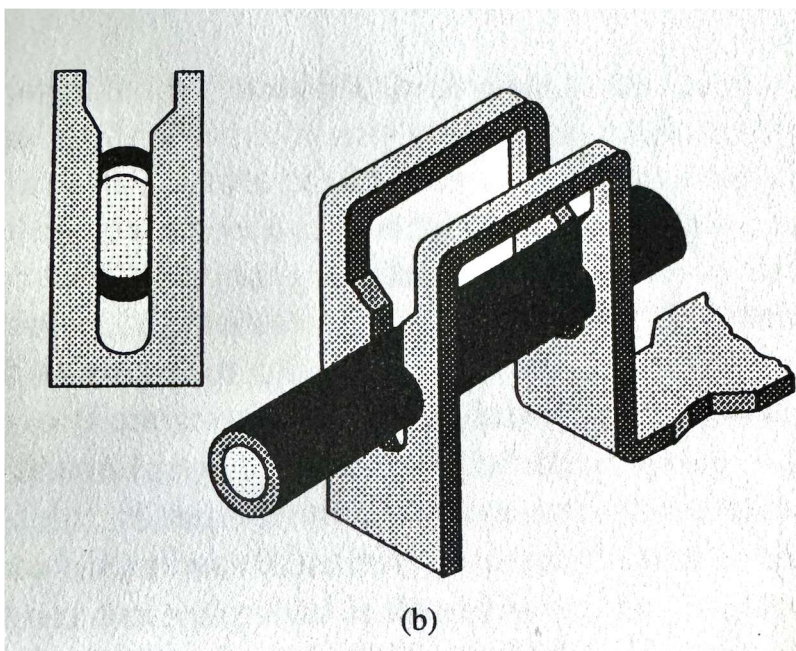
For these reasons, claim 8 would have been obvious based on *Winkler* in view of the Handbook. Eldering, ¶109.

2. Claim 10

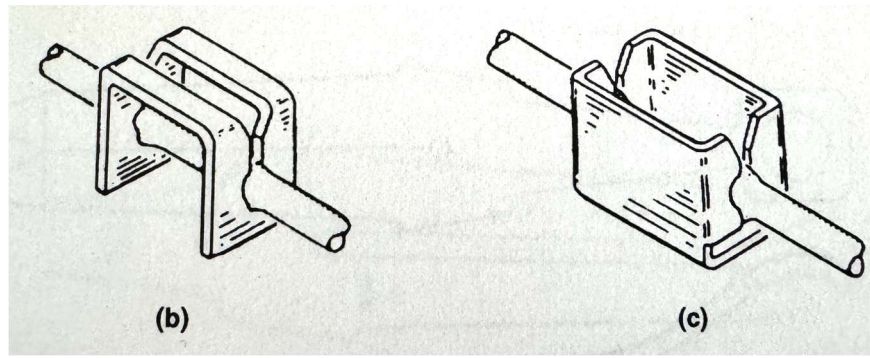
Winkler in combination with the Handbook renders claim 10 obvious. *Winkler* discloses electrical connectors 10 and 12 having contact members 22 that are first and second electrical contacts. See Sections VI.A.1.c (1[b]), VI.A.1.e (1[d]). *Winkler*'s contact members 22 include cylindrical end portion 30 that is a terminal for attaching a wire to contact member 22 by soldering, as explained with respect to claims 7 and 9. See Sections VI.A.5, VI.B. A POSITA would have

understood that soldering involves removing some insulation from cable 26 and attaching the cable wire to the terminal using solder. Ex. 1004, 2:4-10, Figs. 2, 3, 6, 7. Although this involves cable insulation “displacement,” *Winkler* does not use the exact “displacement” wording as claim 10 does. Eldering, ¶110.

The Handbook discloses the claimed “terminal using insulation displacement” as being well-known before the '017 patent, and as a known technique for mechanically and electrically attaching a wire/cable to an electrical contact. Ex. 1008, 13-14, Fig. 1.2:

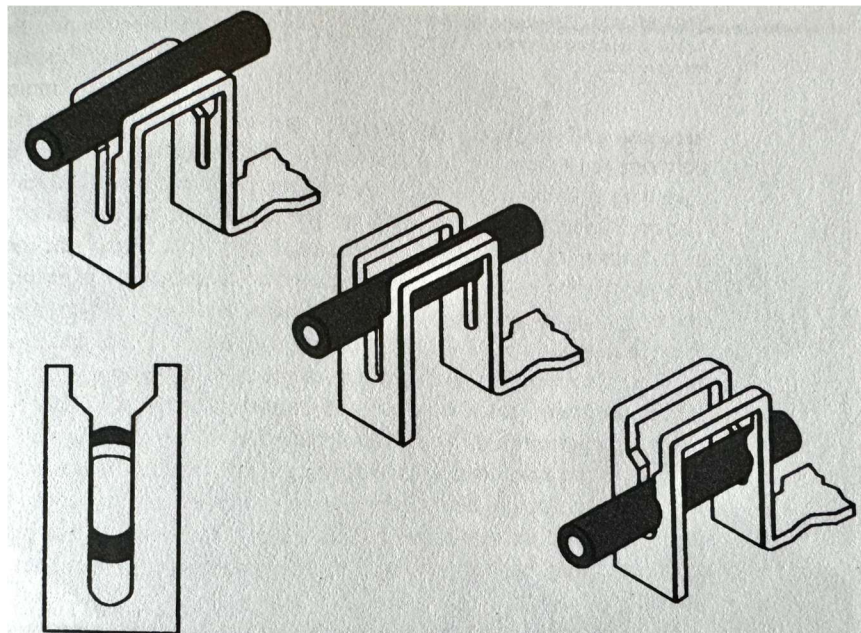


Ex. 1008, Fig. 1.2(b) (showing “Schematic illustrations of mechanical permanent connection technologies: . . . (b) insulation displacement”)



Ex. 1008, Fig. 9.32(b) and (c) (showing “Schematic illustrations of IDC terminal designs”)

As shown, wire/cable is inserted in the slotted terminal to displace insulation and form a conductive contact with the rest of the insulation intact. Ex. 1008, 14, Fig. 1.2, *see also* 56, Fig. 9.26:

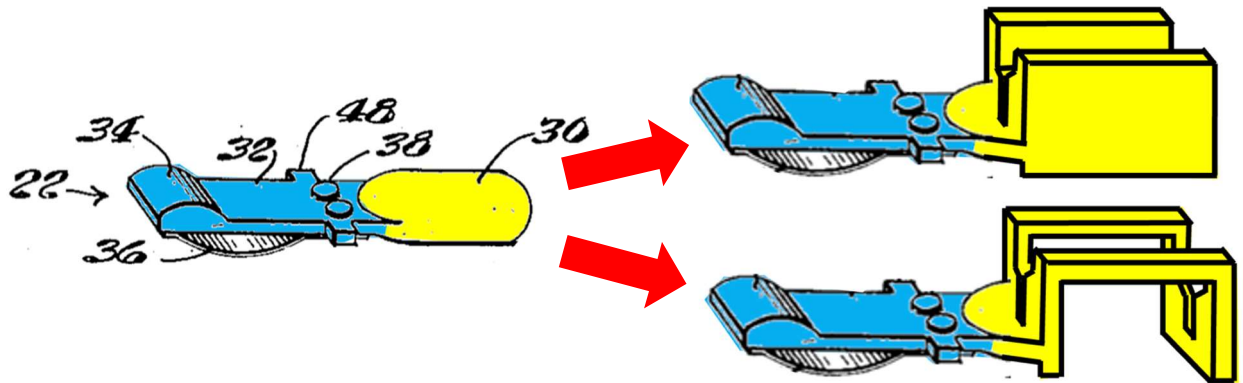


Ex. 1008, Fig. 9.26 (“Schematic of the insulation displacement connection process”)

Notably, the '017 patent does not mention “insulation displacement” besides claim 10. Nothing in the '017 patent distinguishes claim 10 from the Handbook's disclosure. Eldering, ¶111.

The Handbook is analogous art to *Winkler* and to the '017 patent. All three are in the same field of endeavor; like *Winkler* and the '017 patent, the Handbook discloses electrical connectors that attach to cables/wires. Eldering, ¶112.

It would have been obvious to a POSITA to modify contact member 22 in *Winkler*'s electrical connectors 10 and 12 to use insulation displacement as disclosed in the Handbook. The modification would have involved modifying or replacing cylindrical end portion 30 with an insulation displacement terminal to enable conductive coupling to a wire. For example, it would have been obvious to modify cylindrical end portion 30 to close the end of the terminal and include a slot for inserting a wire/cable. Such a modification would have amounted to applying the known insulation displacement technique disclosed in the Handbook to the known electrical connector contact of *Winkler*. As another alternative example, it would have been obvious to replace *Winkler*'s cylindrical end portion 30 with the Handbook's insulation displacement terminal. Under either modification, the modified contact member of *Winkler* would have had the following exemplary appearances:



Ex. 1004, portion of Fig. 3 (left), diagrams (right) created based on Ex. 1004, Fig. 3 and Ex. 1008, Figs. 1.2(b), 9.26, and 9.24 (b) and (c) (showing **contact member 22** of Winkler (**blue**) modified to have an **insulation displacement terminal (yellow)** of the Handbook)

Eldering, ¶113.

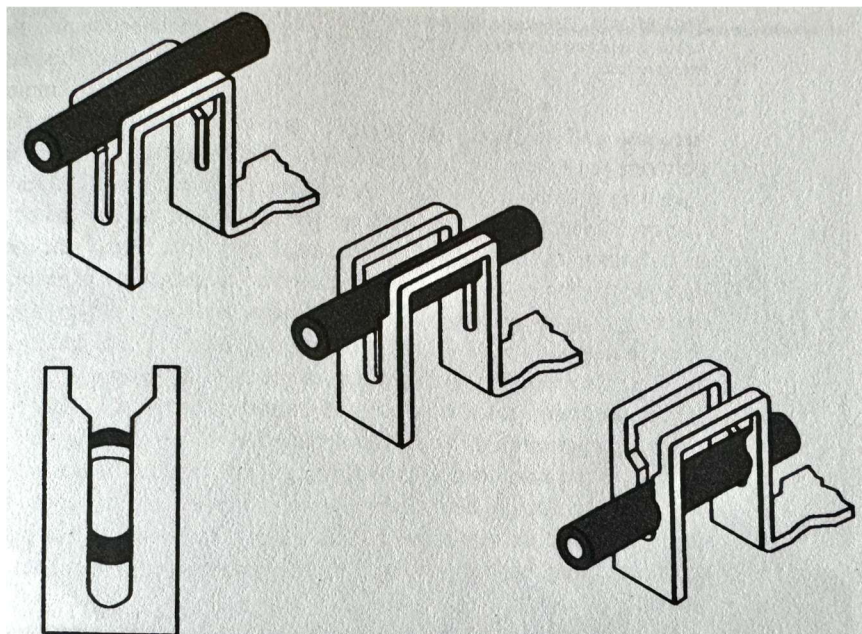
Winkler's connector was ready for improvements in wire connection techniques because *Winkler* discloses only the technique of soldering a wire to its terminals. A POSITA would have understood that soldering would have required additional equipment, steps, and skill to remove the cable insulation and solder the cable end to the terminal. Modifying *Winkler's* electrical connectors with insulation displacement terminals would have yielded predictable and advantageous results, simplifying the process of attaching a wire to the connector. For example, the Handbook teaches that:

[I]t is not necessary to remove the insulation from a wire to make an IDC [insulation displacement connection]. Instead, the insulation is displaced from the conductor by the contact beams as the wire is

inserted into the terminal. **This simple difference, along with lower connection force requirements, provides IDC technology with numerous advantages** with respect to connector assembly and application in the field.

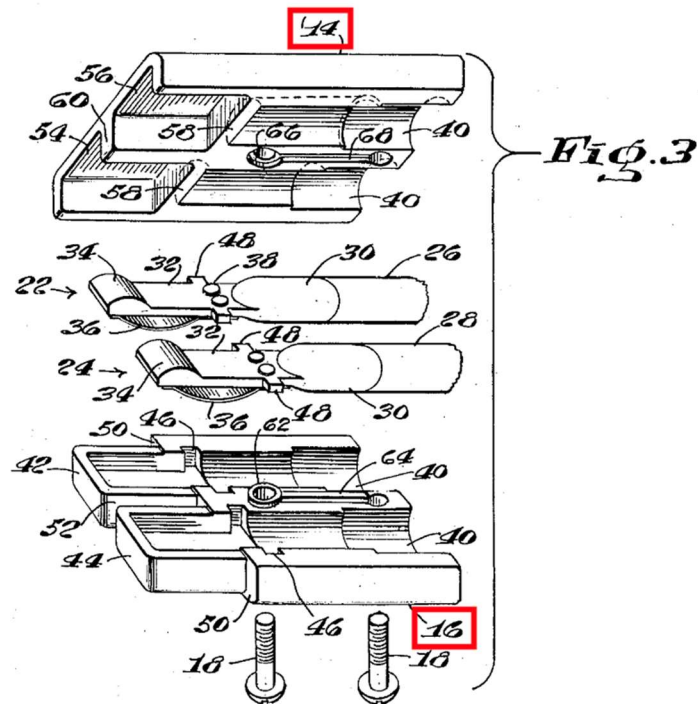
Ex. 1008, 55, *see also* 56-69. As the Handbook explains above, insulation displacement terminals needs no or little equipment, steps, or skill to attach a wire. Elderling, ¶114.

A POSITA would have expected success in modifying *Winkler* to have a terminal using insulation displacement for attaching a wire to the electrical contact. *Winkler*'s connectors would have required only minor modifications within the capabilities of a POSITA, to include slots in *Winkler*'s cylindrical end portion 30 for connecting a wire. Alternatively, POSITAs would have been capable of replacing cylindrical end portion 30 with insulation displacement connectors illustrated in the Handbook. At least Figure 9.26 of the Handbook illustrates how the right-hand side of the insulation displacement terminal would have attached to *Winkler*'s contact member 22:



Ex. 1008, Fig. 9.26

The housing halves 14 and 16 of *Winkler*'s connectors would not have required much, if any, modification to accommodate insulation displacement terminals:



Ex. 1004, Fig. 3 (annotated circling upper and lower housing sections 14 and 16)

The split housing of *Winkler*'s connectors would have allowed one to simply press a wire into an insulation displacement connector slot, before securing the two halves together using bolts 18 and nuts. A POSITA could have also enlarged one or both insulated housing halves 14 and 16 if needed, with no or little effect on the insulation barriers of the electrical contacts. *Eldering*, ¶115.

Furthermore, the '017 does not recite any details of the claimed "terminal using insulation displacement." The claimed terminal is part of "one of the first and second electrical connector." Claim 1, from which claim 10 depends, recites the "first connector having a first insulating housing" and the "second connector having a second insulating housing." A POSITA would have understood that the

insulation displacement terminal dimensions could have been adjusted based on the housing and/or wire dimensions. Additionally, a POSITA would have been capable of modifying, configuring, or shaping the connector housings to accommodate an insulation displacement terminal. Neither claim 1 nor claim 10 recites any specific dimension, shape, or configuration of the first and second insulator housing, or indicate whether each housing encloses only a part of or the entirety of the corresponding connector. Eldering, ¶116.

For the reasons above, claim 10 would have been obvious based on *Winkler* in view of the Handbook. Eldering, ¶117.

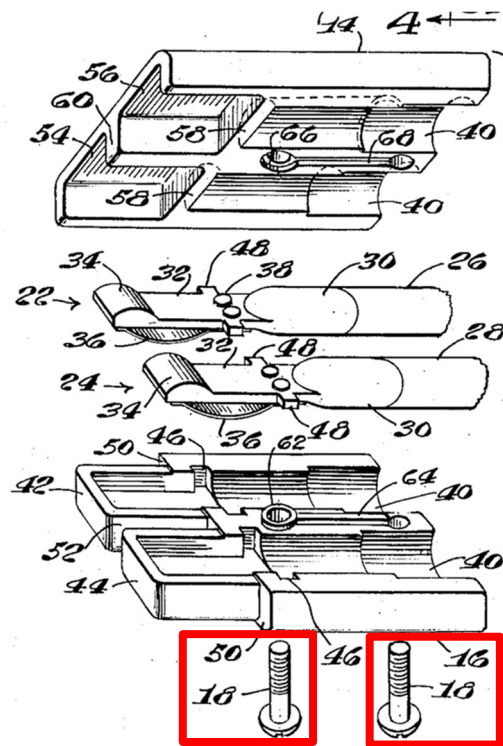
D. Ground 1D: Claims 11 And 12 Are Obvious Over *Winkler* In View Of *Poliak*

Winkler discloses the connector pair of claim 1 having first and second electrical contacts. *See* Sections VI.A.1.a (1[pre]), c (1[b]), f (1[e]). Claims 11 and 12 recite a screw terminal and spring mechanism, respectively, for attaching a wire to the contact. *Winkler* in view of *Poliak* renders obvious the additional limitations of claims 11 and 12. Eldering, ¶118.

Notably, “screw” and “spring” do not appear in the ’017 patent specification. Nor does the ’017 patent distinguish the limitations of claims 11 and 12 from the prior art combination discussed here. Eldering, ¶119.

1. Claim 11

Winkler in view of *Poliak* renders claim 11 obvious. *Winkler* discloses a connector having an insulated housing halves 14 and 16, joined using bolts 18 which are illustrated as threaded screws. Ex. 1004, 1:67-2:3, Fig. 1, Fig. 3:

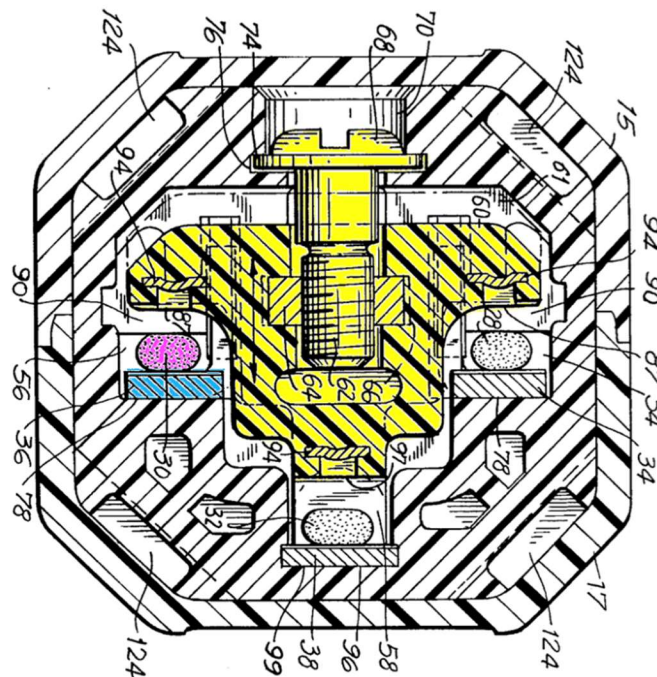


Ex. 1004, Fig. 3 in *Winkler* (annotated circling bolts 18)

Bolts 18 pass through holes between contact members 22 and 24 in the insulated housing halves, and are secured using nuts 20 (not shown above). Ex. 1004, Figs. 1, 3, 5, 7. Therefore, *Winkler* discloses a “screw terminal” as claimed, and the ’017 patent does not describe, illustrate, or otherwise explain a “screw terminal” in a distinguishing manner. Eldering, ¶120.

Winkler does not disclose a screw terminal being used “for attaching a wire to the [first or second electrical] contact” as claimed. *Poliak* does. *Eldering*, ¶121.

Poliak discloses a “device that electrically connects conductors from a cable to the electrical contacts of a plug or receptacle by means of a single fastener.” Ex. 1007, Abstract. The device includes a screw 62 that is rotated in relation to a nut 64, and nut 64 moves a carriage 60 to press conductors 28, 30, and 32 (i.e., wires) against electrical contacts 34, 36, and 38. *Id.*, 5:10-15, 6:7-29, Figs. 3, 5, 10-12. Three biasing springs 90 are also used to press the conductors tightly against the contacts. *Id.*, 6:30-34.



Ex. 1007, Fig. 5 in Poliak (rotated and annotated; screw 62, nut 64, and carriage 60 in yellow, conductor 30 in pink, and electric contact 36 in blue)

As shown above, **screw 62** can be rotated to move **carriage 60** downward, pressing a **conductor 30** against **electrical contact 36**. Biasing spring 90 (not highlighted above) presses conductor 30 to the contacts. Screw 62, carriage 60, and biasing spring 90 of *Poliak* constitute “a screw terminal *for attaching a wire to the contact*” as claimed in claim 11. Eldering, ¶122.

It would have been obvious to a POSITA to modify *Winkler*’s connectors to include *Poliak*’s screw terminal. *Poliak* is analogous art to both *Winkler* and the ’017 patent; all three are in the same field of endeavor of electrical connectors attached to wires. A POSITA would have found it obvious to modify *Winkler* based on *Poliak* in at least two alternative ways. Eldering, ¶123.

As a first alternative modification, a POSITA would have found it obvious to modify at least one of the existing bolts 18 and nuts 20 in *Winkler* to include the carriage 60 of *Poliak*, to press *Winkler*’s cable 26 against contact member 22. The modification would have involved replacing cylindrical end portion 30 of contact member 22 with an open, semi-circular, or flat end, and modifying one of *Winkler*’s existing bolts 18 to add a carriage and spring:

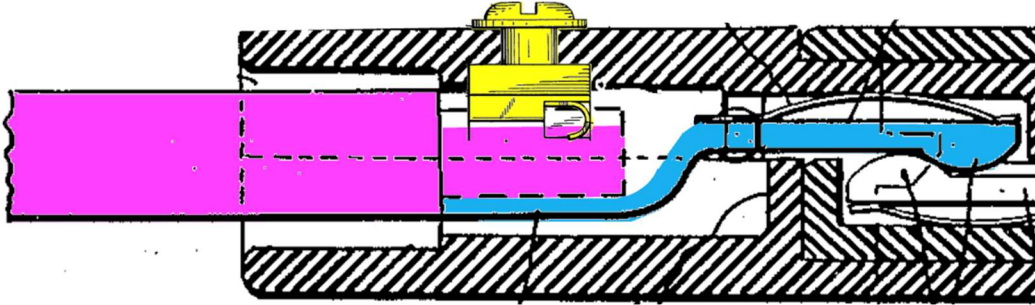


Diagram created based on Ex. 1004, Fig. 2 and Ex. 1007, Fig. 10 (annotated to show **electrical contact** in **blue**, **cable 26** in **pink** and modified to add **carriage 60** and **spring 90** of Poliak in **yellow**)

The resulting combination would have modified one of *Winkler*'s existing bolts 18 to move a carriage that secures cable 26 and/or cable 28 to contact member 22 and/or contact member 24, while the other bolt 18 secures the insulated housing halves together as taught by *Winkler*. Eldering, ¶124.

As a second alternative modification, a POSITA would have found it obvious to modify *Winkler*'s connectors to incorporate the *Poliak*'s carriage 60 and spring 90, and to add screw 62 and nut 64 of *Poliak*, thereby adding a third screw to *Winkler*'s connector. The combination would have looked similar to the cross-sectional diagram shown above, except that *Winkler*'s connector would include three screws: the existing two bolts 18 that connect the insulated housing halves, and a third screw dedicated to moving a carriage 60 and spring 90 from *Poliak*. Eldering, ¶125.

Modifying *Winkler* based on *Poliak* would have involved applying the known screw terminal-based wire connection technique and mechanism of *Poliak* to *Winkler*'s known electrical connectors. *Poliak* discloses that securing wiring cables to electrical contacts using screws was generally known and conventional even before filing *Poliak*. Ex. 1007, 1:10-17. *Poliak* also published decades before the '017 patent, and thus the screw terminal of *Poliak* was known long before the '017 patent. Eldering, ¶126.

Winkler's connector was ready for the improvements in connecting wires to electric contacts that *Poliak* discloses. *Winkler* discloses electrical contacts with ends bored for soldering cables. Ex. 1004, 2:4-10. Soldering was known to provide a good electrical connection (Ex. 1006, 1:28-29), but required additional equipment and time to solder wires to the electrical contacts. Thus, *Winkler*'s connectors were ready for improvements in techniques to attach wires to the connectors. Modification based on *Poliak* would have yielded predictable results. In particular, *Poliak* discloses its screw terminal as “an electrical wiring attachment device allowing quick attachment of electrical conductors to electrical contacts in a plug or receptacle that has few parts and is easy to assemble” and “accomplishes the task of attachment by the turning of a single screw.” Ex. 1007, 2:15-25. POSITAs would have recognized that *Winkler*'s connectors 10 and 12 would have

benefited from the addition of *Poliak*'s screw terminal to provide a quick cable attachment mechanism using a single screw. Eldering, ¶¶127-128.

A POSITA would have expected success in modifying *Winkler*'s connectors 10 and 12 to include the screw terminal of *Poliak*. Both *Winkler* and *Poliak* provide detailed illustrations that would have guided POSITAs how to incorporate *Poliak*'s screw terminal of into *Winkler*'s connector. The connectors of *Winkler* would have required only minor modification that would have been within the capabilities of a POSITA, guided by *Poliak*'s disclosure. For example, it would have been within the capabilities of a POSITA to repurpose one of two bolts 18 of *Winkler* to add the carriage 60 and spring 90 of *Poliak*, and to modify the insulated housing of *Winkler* to accommodate the additional components. It would have also been within the capabilities of a POSITA to alternatively reposition bolts 18 of *Winkler* to accommodate the screw terminal of *Poliak* including an additional screw, carriage 60, and spring 90. Eldering, ¶129.

For the reasons above, claim 11 would have been obvious based on *Winkler* in view of *Poliak*. Eldering, ¶130.

2. Claim 12

Claim 12 would have been obvious based on *Winkler* in view of *Poliak*. As explained with respect to claim 11, the combination of *Winkler* in view of *Poliak* discloses an electrical connector with a screw terminal for attaching a wire to an

electrical contact. *See* Section VI.C.1. The screw terminal of *Poliak* includes a biasing member/spring 90 that is moved by a carriage 60 to press a conductor wire tightly against an electrical contact. Ex. 1007, 5:47-58, 6:24-34, 8:10-12, Figs. 3, 5, 10-12. Therefore, the screw terminal of *Poliak* includes “a spring mechanism for attaching at least one wire to the contact” as claimed. As explained in Section VI.D.1, it would have been obvious to a POSITA to modify *Winkler*’s connectors to include *Poliak*’s screw terminal including a screw, carriage, and spring, to yield the predictable results of providing a quick attachment of cables to electrical contacts using a single screw. Eldering, ¶131.

It would have been obvious to a POSITA to include a spring mechanism in the terminal that attaches a cable to *Winkler*’s connectors. *Poliak* also teaches using its mechanism to provide “strongly biased connections” for one or more cables, with easy assembly and few parts, and teaches using spring 90 to aid the carriage 60 in tightly pressing conductors against the electrical contacts. Ex. 1007, 2:2-32, 6:27-32. More than a decade before the ’017 patent, the Electrical Connector Handbook disclosed the use of contact springs in electrical connectors to “allow[] for the formation of the permanent connections.” Ex. 1008, 15. For these additional reasons, it would have been obvious to modify *Winkler*’s connectors to include the terminal and spring mechanism of *Poliak*. Therefore, claim 12 would have been obvious based on *Winkler* in view of *Poliak*. Eldering, ¶132.

E. Ground 2A: Claims 1-4 Are Anticipated by *Kataoka*

1. Independent Claim 1

a. 1[pre]

Kataoka discloses an electrical connector 1 including a pair of a first connector portion 2 and a second connector portion 3. Ex. 1005, 4:43-52, Cover, Fig. 1.

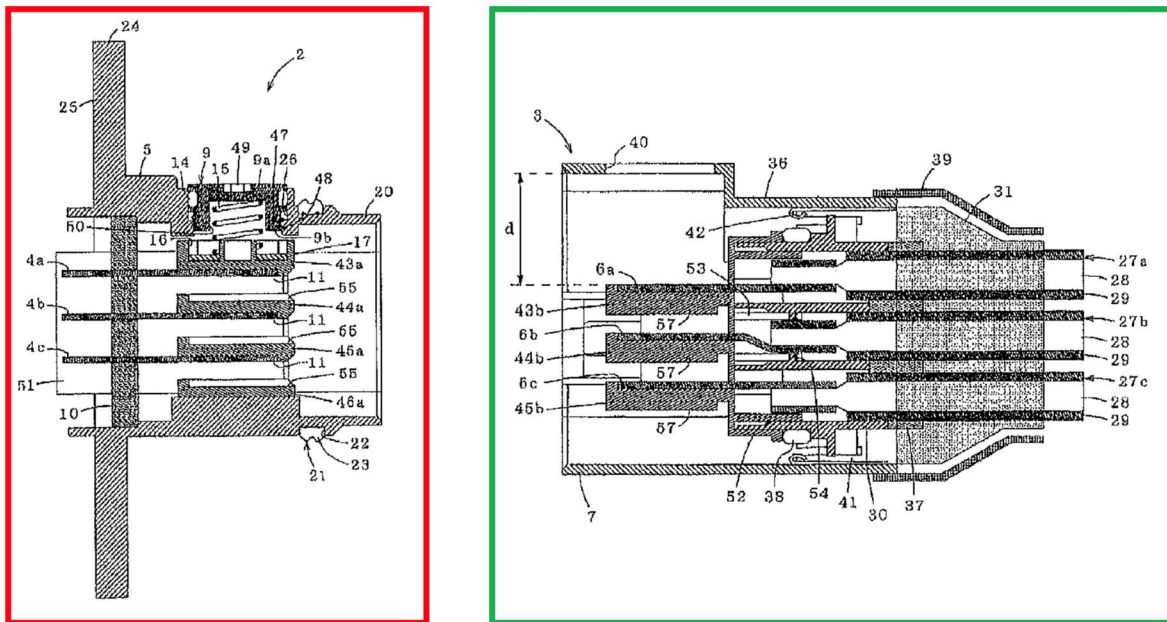
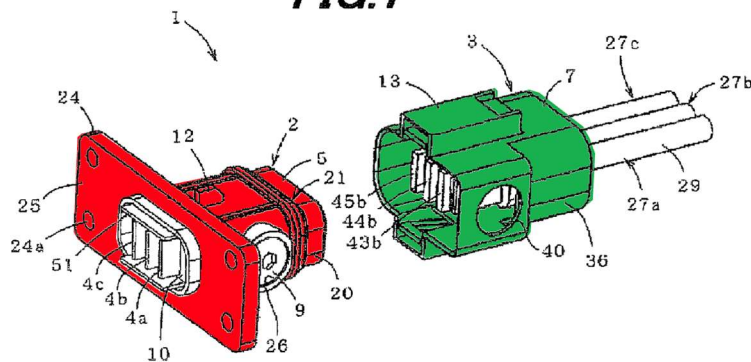


FIG. 1

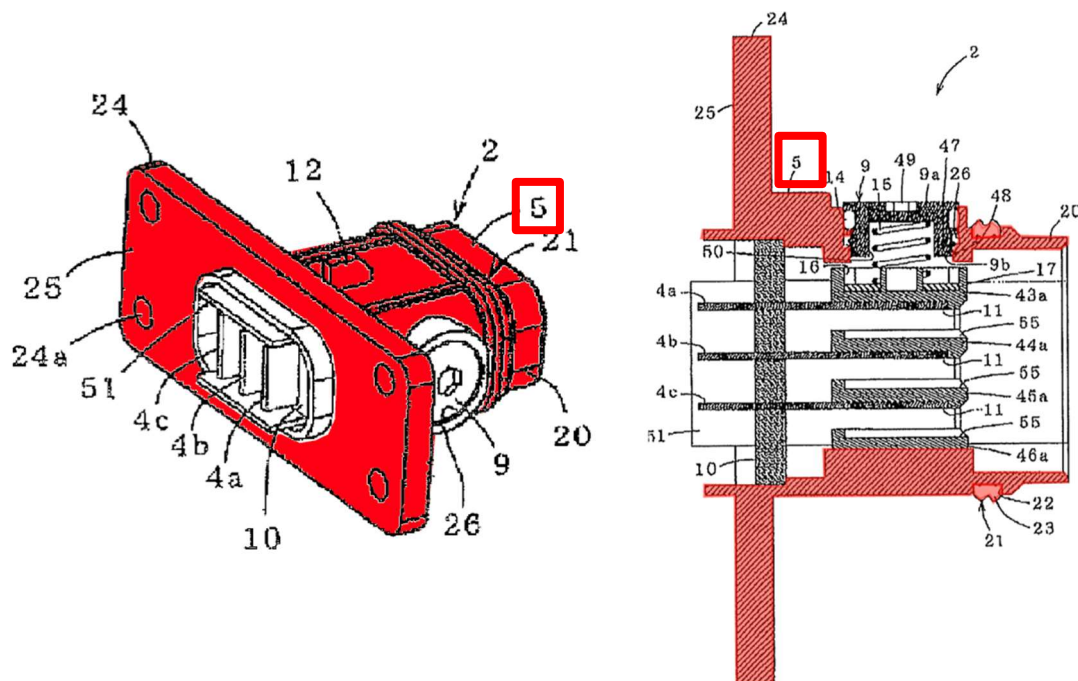


Ex. 1005, Cover (top), Fig. 1 (bottom) (annotated showing a **first connector portion 2** in **red** and a **second connector portion 3** in **green**)

Eldering, ¶134.

b. 1[a]

Kataoka discloses 1[a]. *Kataoka* discloses a first connector portion 2 that has a first terminal housing 5. Ex. 1005, 4:53-54, 8:50-67.



Ex. 1005, portion of Fig. 1 (left) and Fig. 4A (right)
(annotated showing **housing 5** in **red**.)

Housing 5 is an “insulating housing,” because it is formed of non-conductive resin.

Ex. 1005, 9:38-45. As shown above, housing 5 surrounds components of the connector. Housing 5 of first connector portion 2 surrounds and protects the internal contacts from the environment: Housing 5 includes cylindrical body 20

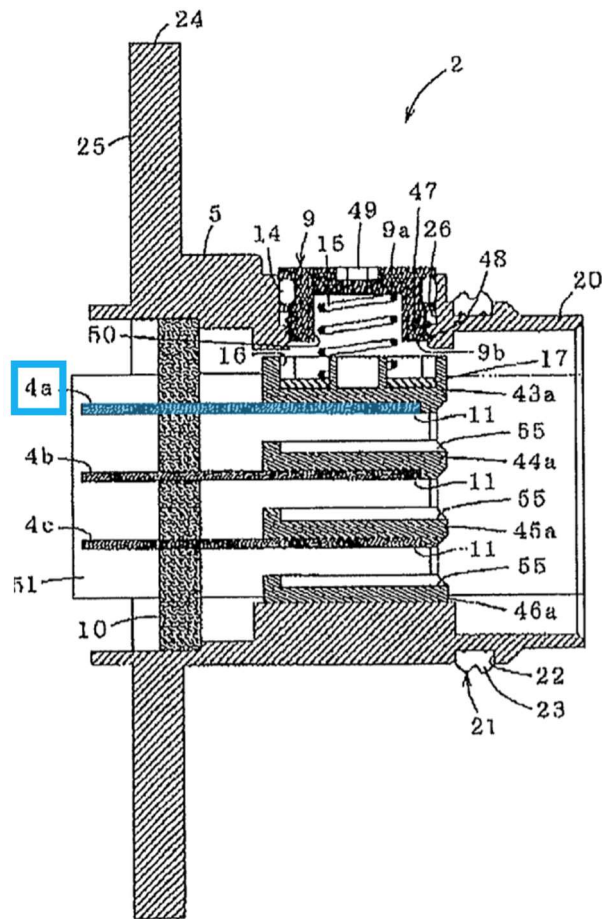
and a terminal housing waterproof structure 21 that protect the electrical terminals from elements such as water. Ex. 1005, 12:34-43. Eldering, ¶135.

In the '017 patent, “insulated housings” have the same functionality and purpose as in *Kataoka*. The '017 patent states that “[i]nsulated housings 104, 106 surround the male and female contacts, and shield the contacts from environmental hazards, as well as providing some protection to a user in case arcing occurs when the user is handling the connector pair.” Ex. 1001, 3:2-6. *Kataoka*’s housing 5 serves the same purposes, and thus *Kataoka* discloses 1[a]. Eldering, ¶136.

c. 1[b]

Kataoka discloses 1[b]. First connector portion 2 includes a first connecting terminal 4a, which is a “first *electrical* contact” because it electrically connects the first connector portion 2 to terminal 6a of second connector portion 3. Ex. 1005, 6:6-14, 8:38-49. *Kataoka* discloses that “electricity of different voltage and/or current is fed to each of the first connecting terminals 4a-4c” and that “[e]ach of the first connecting terminals 4a-4c should be formed of a highly conductive metal.” Ex. 1005, 6:60-7:3; Eldering, ¶137.

First connecting terminal 4a is also “supported within the first insulating housing,” as shown below:



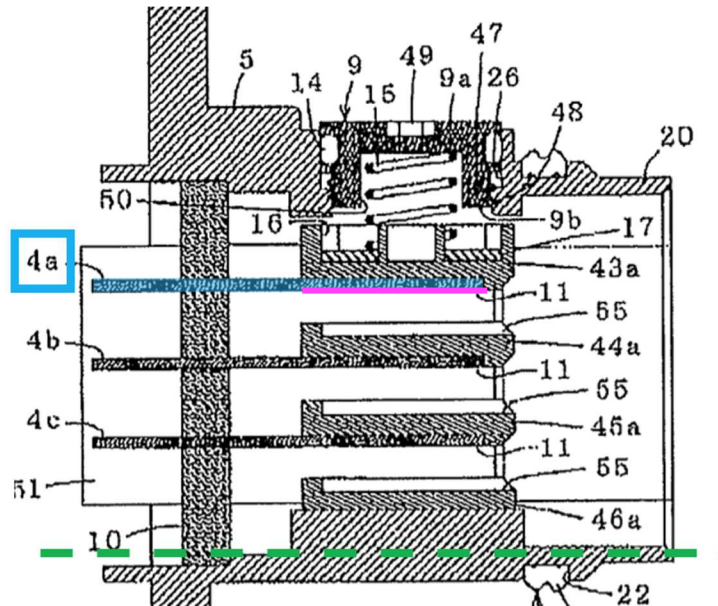
Ex. 1005, Fig. 4A (annotated showing first connection terminal 4a in blue)

First connecting terminal 4a is a “first electrical contact” that is supported within housing 5 (the “first insulated housing”). Therefore, *Kataoka* meets 1[b]. Eldering,

¶138.

d. 1[c]

Kataoka discloses 1[c]. First connecting terminal 4a (the “first electrical contact”) has a connecting surface that is substantially parallel with a longitudinal axis of housing 5 (“the insulated housing”):

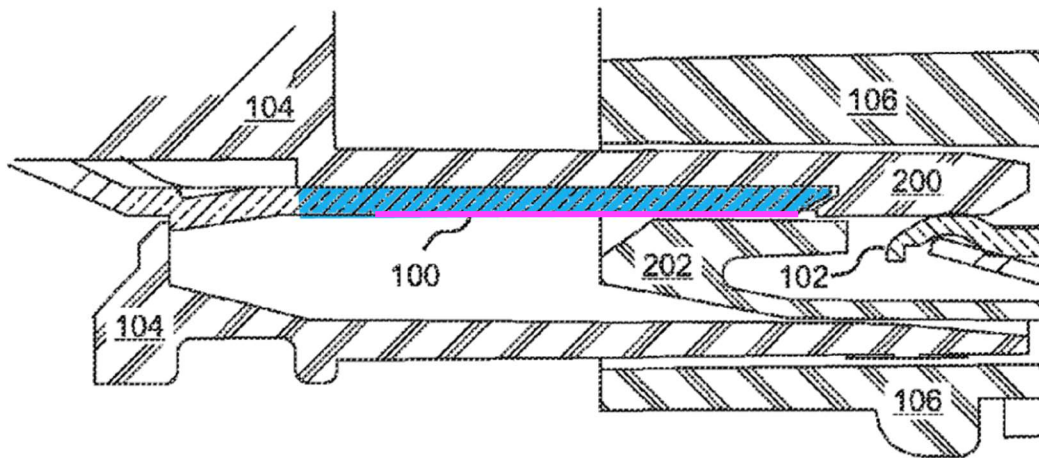


Ex. 1005, portion of Fig. 4A (annotated highlighting **first connection terminal 4a** in **blue**, indicating a **bottom surface** in **pink**, and indicating a **longitudinal axis of housing 5** as a **dashed green line**)

The **bottom surface** (in **pink**, above) of **first connection terminal 4a** is substantially parallel with the **longitudinal axis of housing 5**, represented by a dashed green line. The **bottom surface** is a “connecting surface” as claimed, because it connects with a second connection terminal 6a. Ex. 1005, Figs. 3, 10; Eldering, ¶139.

Furthermore, the connecting surface of first connection terminal 4a terminates at the right-hand side of first connection terminal 4a, which is a leading end of this electrical contact. Eldering, ¶140.

Notably the '017 illustrates the same structure for male contact 100:

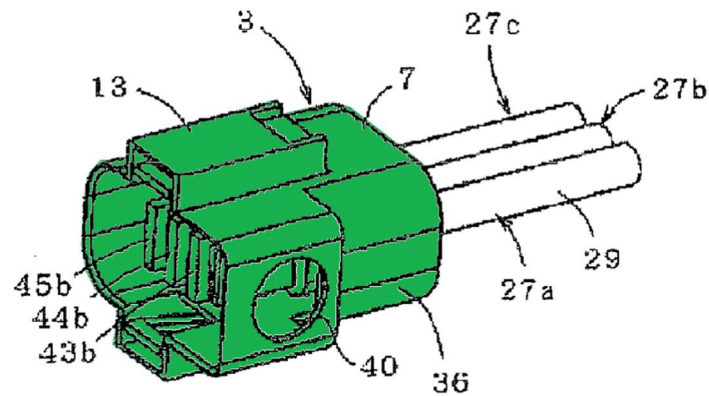


'017 Patent, portion of Fig. 2A (annotated highlighting *first male contact 100* in blue, and indicating a *connecting surface* in pink)

Kataoka's first connection terminal 4a has the same structure as first male contact 100 in the '017 patent; thus, *Kataoka* meets 1[c]. Eldering, ¶141.

e. 1[d]

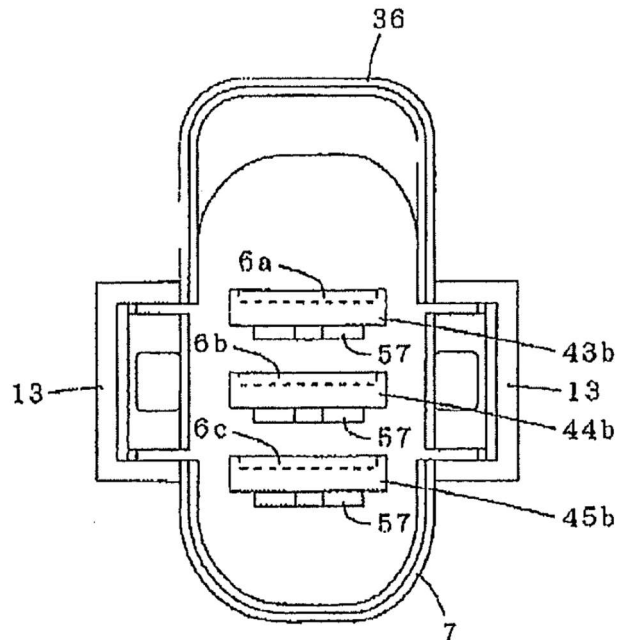
Kataoka discloses 1[d]. *Kataoka* discloses a second connector portion 3 having housing 7:



*Ex. 1005, portion of Fig. 1 (annotated highlighting
second connector portion 3 in green)*

Housing 7 includes cylindrical body 36 that surrounds second connecting terminals

6a-6c. Ex. 1005, 12:17-64, Figs. 1, 6B:



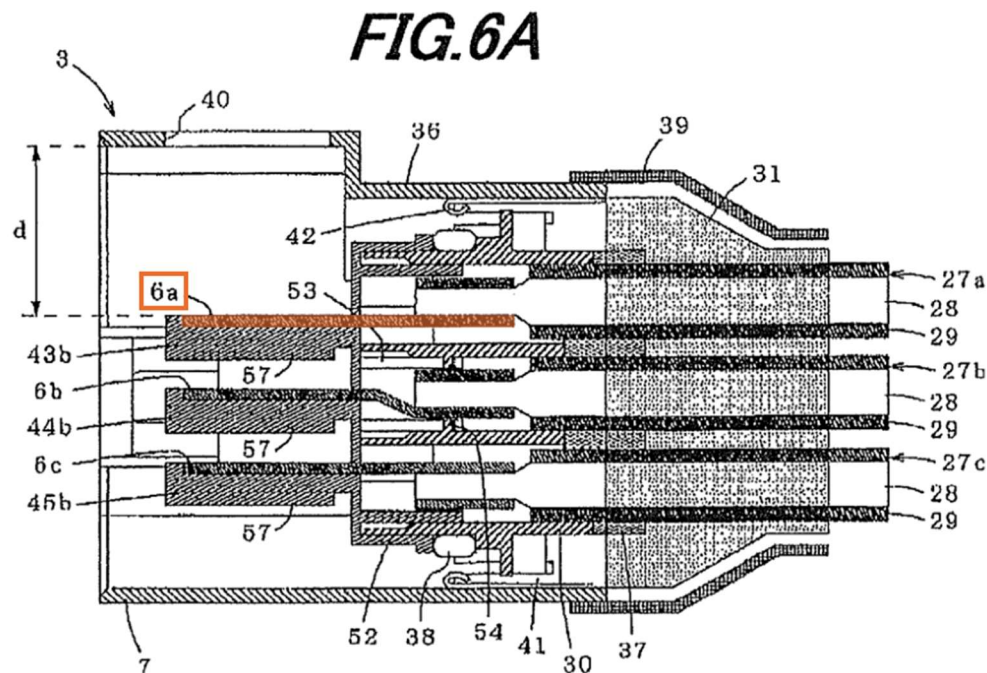
Ex. 1005, portion of Fig. 6B

Like housing 5 discussed above, second terminal housing 7 of second connector portion 3 surrounds the contact members and protects them from the environment.

Ex. 1005, 4:56-66, 10:19-29, 12:17-43, Figs. 6A, 6B. Therefore, housing 7 constitutes the claimed “insulating housing.” Eldering, ¶142.

f. 1[e]

Kataoka discloses 1[e]. Second connector portion 3 in *Kataoka* includes a second connecting terminal 6a. Ex. 1005, 4:56-5:9, 5:27-33, Fig. 6A.

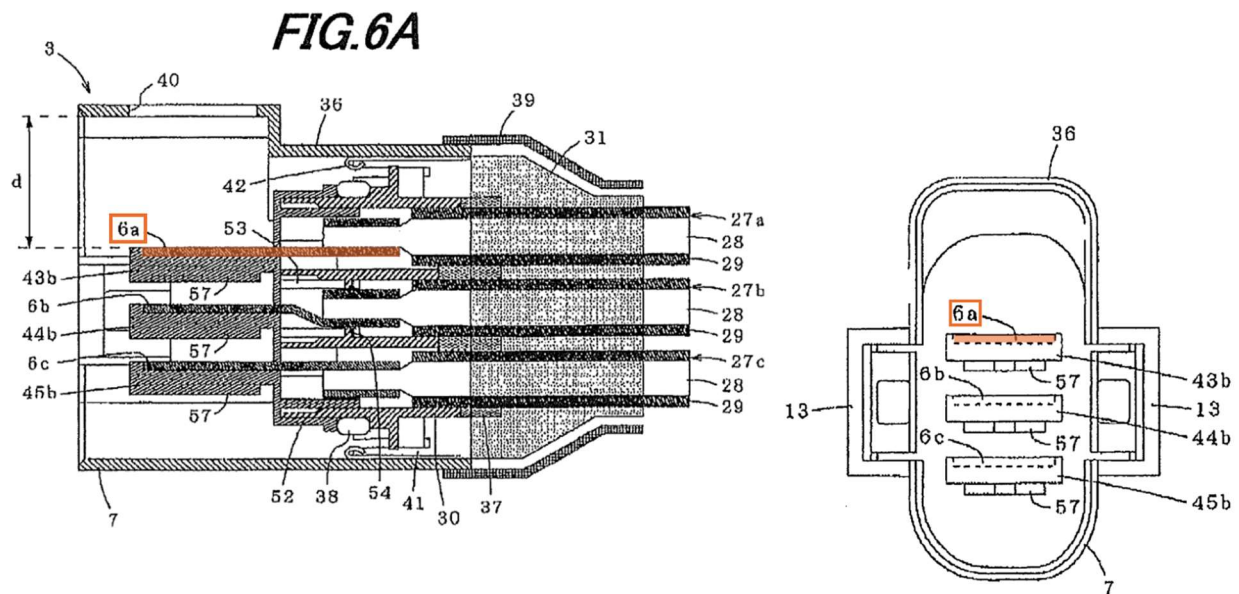


Ex. 1005, Fig. 6A (annotated highlighting **second connecting terminal 6a** in orange)

Second connecting terminals 6a-6c are “formed of a highly conductive material” and transmit “electricity of different voltage and/or current.” Ex. 1005, 10:45-59.

Therefore, second connecting terminal 6a is a “second electrical contact” as claimed. Elderling, ¶143.

Second connecting terminal 6a of *Kataoka* is “supported within the second insulating housing,” as claimed. *Kataoka* states “the second connector portion 3 has the second terminal housing 7 in which plural (three) aligned second connecting terminals (female terminals) 6a-6c are housed.” Ex. 1005, 10:19-22. Figures 6A and 6B show that second connecting terminal 6a is supported *within* housing 7, which surrounds the second connecting terminals 6a-6c:

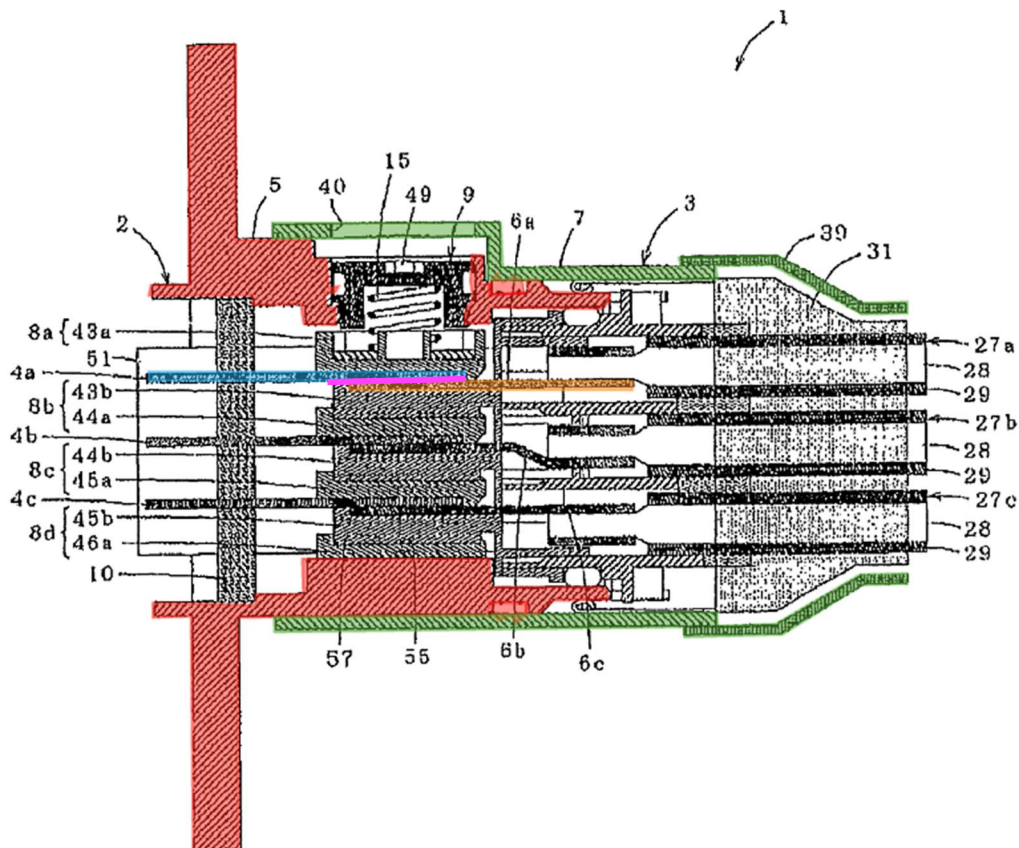


Ex. 1005, Fig. 6A (left) and portion of Fig. 6B (right)
(annotated highlighting **second connecting terminal 6a in orange**)

See also Ex. 1005, 12:17-43. Because second connecting terminal 6a is located inside housing 7, which includes cylindrical body 36, second connecting terminal 6a is a “second electrical contact supported within the second insulating housing” as claimed. Eldering, ¶144.

g. 1[f]

Kataoka discloses 1[f]. Second connecting terminal 6a in *Kataoka* is a “second electrical contact,” and first connecting terminal 4a is a “first electrical contact.” See Sections VI.E.1.c, VI.E.1.f. These first and second electrical contacts are “in surface-to-surface contact” with one another. Ex. 1005, 16:15-17, Fig. 3:

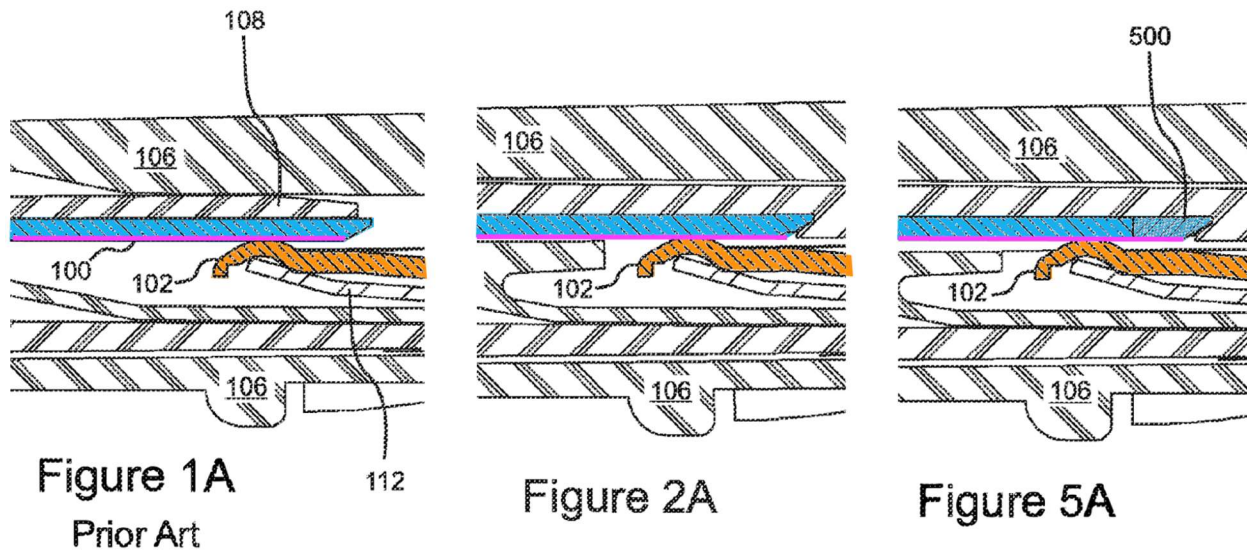


Ex. 1005, Fig. 3 (annotated highlighting a **first connector** in **red**, a **first electrical contact** in **blue**, a **second connector** in **green**, a **second electrical contact** in **orange**, and indicating a **connecting surface** in **pink**)

Figure 3 shows a **first connector** mated to a **second connector** because the figure illustrates “the connector after the first connector portion [2] is fitted to the second connector [3].” Ex. 1005, 4:6-7. Figure 3 also shows a **second connection terminal 6a** (the **second electrical contact**) laterally engaging the **bottom surface** (the **connecting surface**) of **first connection terminal 4a** (the **first electrical contact**). Therefore, the *Kataoka* meets 1[f]. Eldering, ¶145.

Kataoka further discloses a connecting member 9 “collectively fixing and electrically connecting the plural first connecting terminals 4a-4c to the plural second connecting terminals 6a-6c at each contact point by pressing the insulator 8a adjacent thereto.” Ex. 1005, 4:60-63, *see also* 8:38-49. First connecting terminals 4a-4c are pressed laterally against connecting terminals 6a-6c by a connecting member 9. For this additional reason, *Kataoka* meets 1[f]. Eldering, ¶146.

Notably, “laterally engage” does not appear anywhere in the ’017 patent other than in claim 1. Ex. 1001, 4:30. The ’017 patent illustrates a top side surface of the **second connector** (**orange**) touching a **bottom surface** (**pink**) of the **first connector** (**blue**):



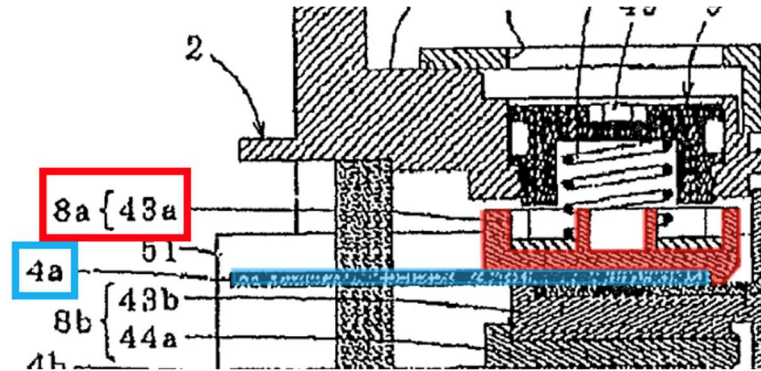
'017 Patent, portions of Figs. 1A, 2A, 3A (annotated highlighting **male contact 100** in **blue**, **female contact 102** in **orange**, and indicating a **connecting surface** in **pink**)

In the '017 patent embodiments shown in Figures 2A and 5A, a bottom surface of the first electrical contact is a connecting surface that engages a top surface of the second electrical contact, in the exact same manner as the prior art shown in Figure 1A. *Kataoka* discloses the same engagement between first connecting terminal 4a and second connecting terminal 6a. Therefore, *Kataoka* meets 1[f]. *Eldering*, ¶¶147-148.

h. 1[g]

Kataoka discloses 1[g]. First connector portion 2 includes first connecting terminals 4a-4c “sandwiched by the insulators 8a-8d formed of a non-conductive resin with a predetermined thickness, thereby forming a laminated structure.” Ex. 1005, 4:65-5:9. Insulator 8a includes first insulating member 43a. Ex. 1005, 5:10-

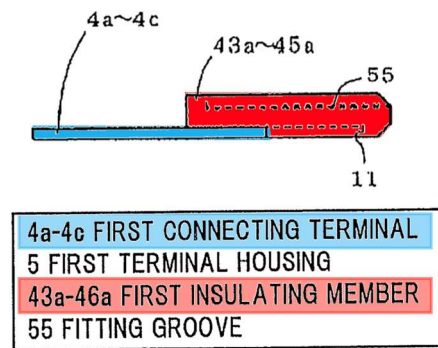
16, Fig. 3. First insulating member 43a is fixed to the end of first connecting terminal 4a (the first electrical contact). Ex. 1005, 14:23-26.



Ex. 1005, portion of Fig. 3 (annotated highlighting **insulator 8a** and **first insulating member 43a** in red, and **first connecting terminal 4a** in blue)

Insulating member 43a of insulator 8a is an “insulating barrier” because it is formed of non-conductive material and because it “ensure[s] insulation between the contact points (or between a contact point and the first terminal housing).” Ex. 1005, 5:37-38, *see also* 6:42-45; Eldering, ¶149.

Insulating member 43a is a first insulating barrier “extending beyond and covering the leading end of the first electrical contact” as claimed. *Kataoka* discloses that “first insulating members 43a–45a are positioned and fixed so as to protrude on the front-end side of the first connecting terminals 4a–4c.” Ex. 1005, 7:4-6, Fig. 5A:



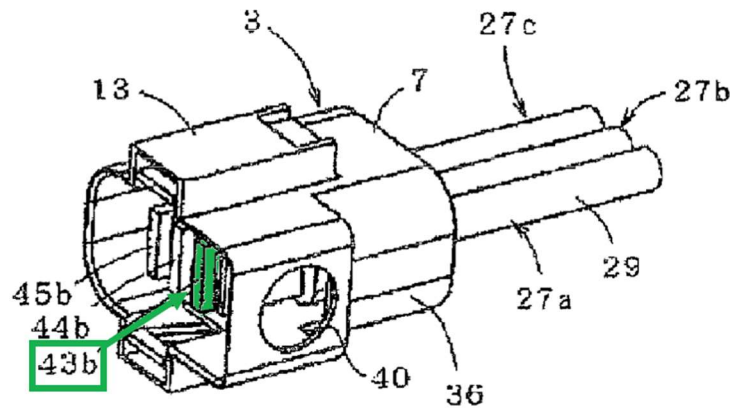
Ex. 1005, Fig. 5A (legend repositioned, and annotated highlighting **first connecting terminal 4a** in **blue**, and **first insulating member 43a** in **red**)

In Fig. 5A above, the **first insulating member 43a** (**red**) extends to the right beyond the end of **first connecting terminal 4a** (**blue**). The **first insulating member 43a** also covers the righthand end of **first connecting terminal 4a** – the “leading end” of the first electrical contact – when the connectors are mated. Ex. 1005, Fig 3 (above). *Kataoka* explains that “second connecting terminals 6a-6c do not contact with the end surface of the first connecting terminals 4a-4c when the first connector portion 2 is fitted to the second connector portion 3.” Ex. 1005, 7:24-26; Eldering, ¶150.

For the reasons above, *Kataoka* discloses 1[g]. Eldering, ¶151.

i. 1[h]

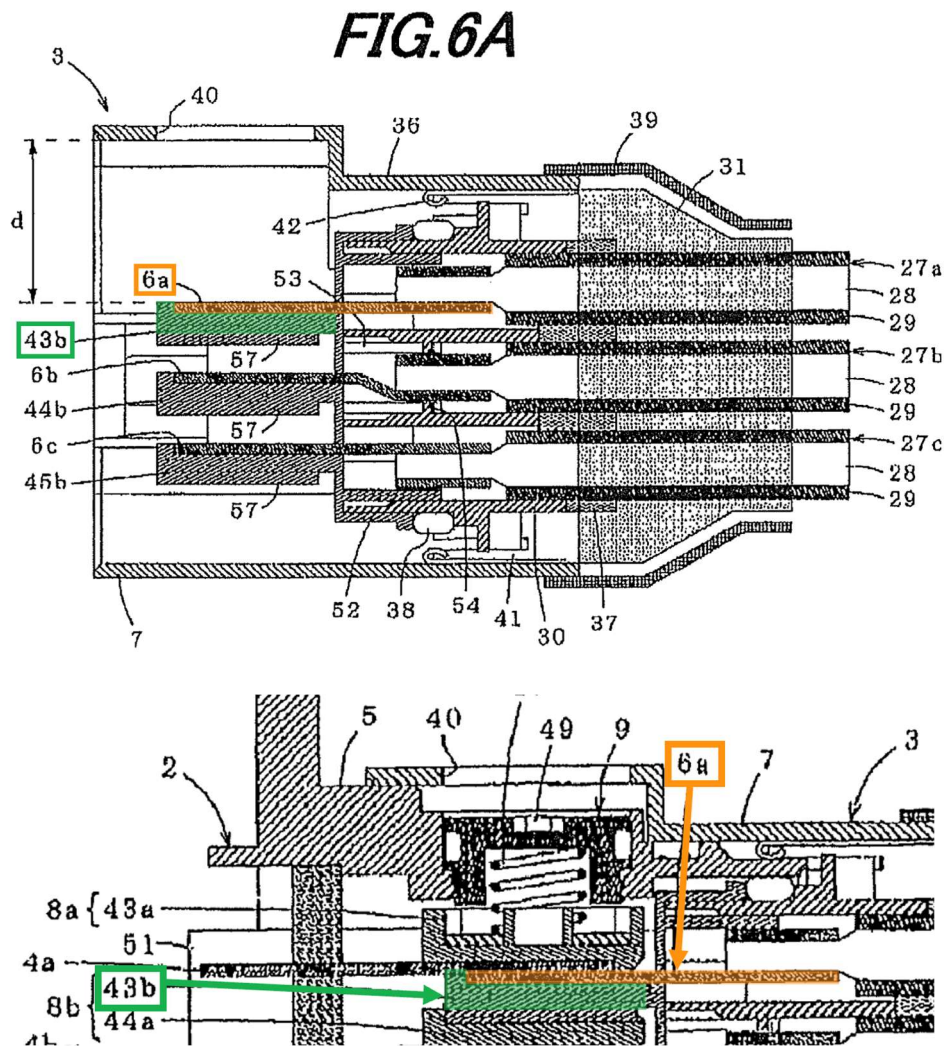
Kataoka discloses 1[h]. Second connector portion 3 (the second connector) includes a second insulating member 43b. Ex. 1005, Figs. 1, 3, 6A.



Ex. 1005, portion of Fig. 1 (annotated highlighting **second insulating member 43b** in **green**, of second connector portion 3)

Figure 1 above shows **second insulating member 43b (green)** is *within* the second connector portion 3. *See also* Ex. 1005, Fig. 6A (below). Therefore, second insulating member 43b is “a second insulating member . . . within the second connector” as claimed. Eldering, ¶152.

Second insulating member 43b is a “second insulating barrier extending beyond the second electrical contact” as claimed. Second connecting terminal 6a is a “second electrical contact.” *See* Section VI.E.1.f (1[e]). *Kataoka* discloses that “[w]hen the second connecting terminal 6a (or 6b or 6c) is adjacent thereto, the second insulating members 43b-45b are fixed to another surface of the adjacent second connecting terminal 6a (or 6b or 6c) so as to cover at least an end surface thereof on a front-end side in a fitting direction.” Ex. 1005, 5:28-33. Figures 6A and 3, below, show **second insulating member 43b (green)** extending beyond the left end of **second connecting terminal 6a (orange)**:



*Ex. 1005, Fig. 6A (top) and portion of Fig. 3 (bottom) (annotated highlighting **second connecting terminal 6a in orange**, and **second insulating member 43b in green**)*

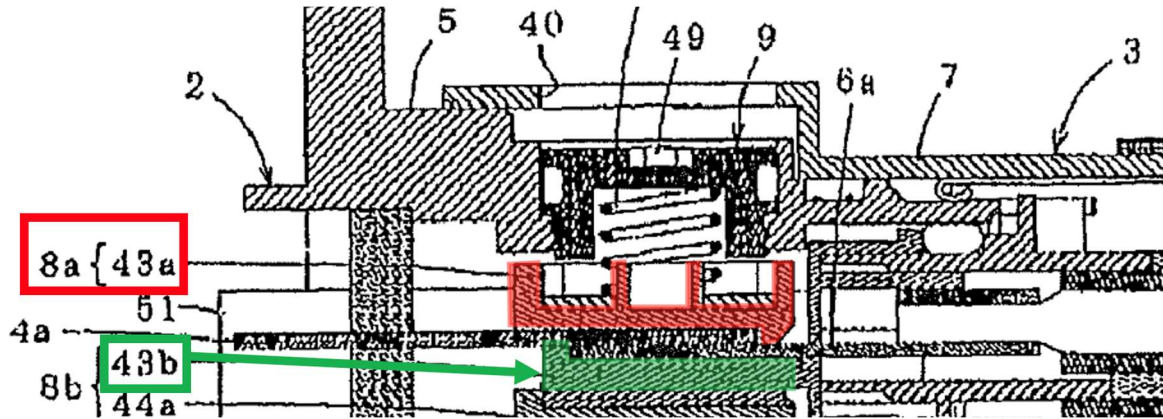
Eldering, ¶153.

For the reasons above, *Kataoka* meets 1[h]. Eldering, ¶154.

j. 1[i]

Kataoka discloses 1[i]. **Second insulating member 43b** (the second insulating barrier) of second connector portion 3 (the second connector) is

“configured to as to be in close proximity” with **first insulating member 43a** (the first insulating barrier) of the first connector portion 2 (the first connector):



Ex. 1005, portion of Fig. 3 (annotated highlighting **first insulating member 43a** in red and **second insulating member 43b** in green)

Kataoka discloses that the first insulating member 43 overlaps with second insulating member 43b. Ex. 1005, 13:50-52, Fig. 3 (above). *Kataoka* also discloses connecting member 9 that presses insulator 8a (having first insulating member 43a) against insulator 8b (having second insulating member 43b), to sandwich the electrical contacts together. Ex. 1005, 14:50-65, Fig. 3. Therefore, *Kataoka*’s second insulating barrier (**second insulating member 43b**) is configured to be in close proximity to the first insulating barrier (**first insulating member 43a**) when the first and second connector portions are connected. Eldering, ¶155.

Kataoka’s second insulating barrier is also “configured to be in close proximity with the first insulating barrier when the first and second connectors are *partially disconnected*,” as claimed. A diagram based on the cover image of

Kataoka shows how the **first connector (red)** and **second connector (green)** are connected to one another:

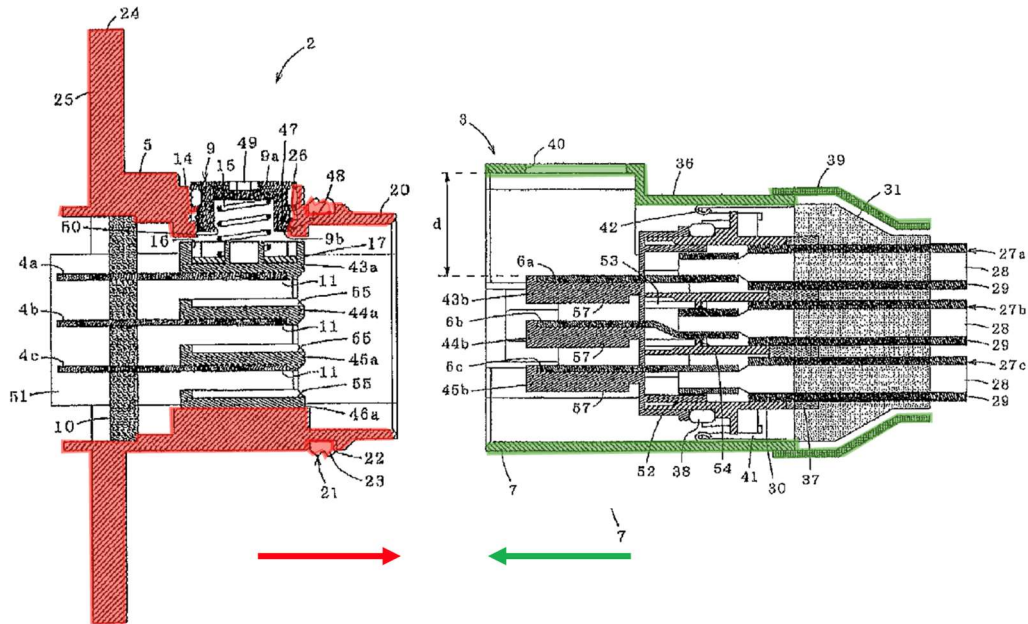


Diagram created based on Ex. 1005, Cover (showing a cross section of a **first connector** in **red** and a **second connector** in **green**, with arrows indicating the direction of fitting the first and second connector)

Another diagram shows the first and second connectors in a partially connected/disconnected configuration:

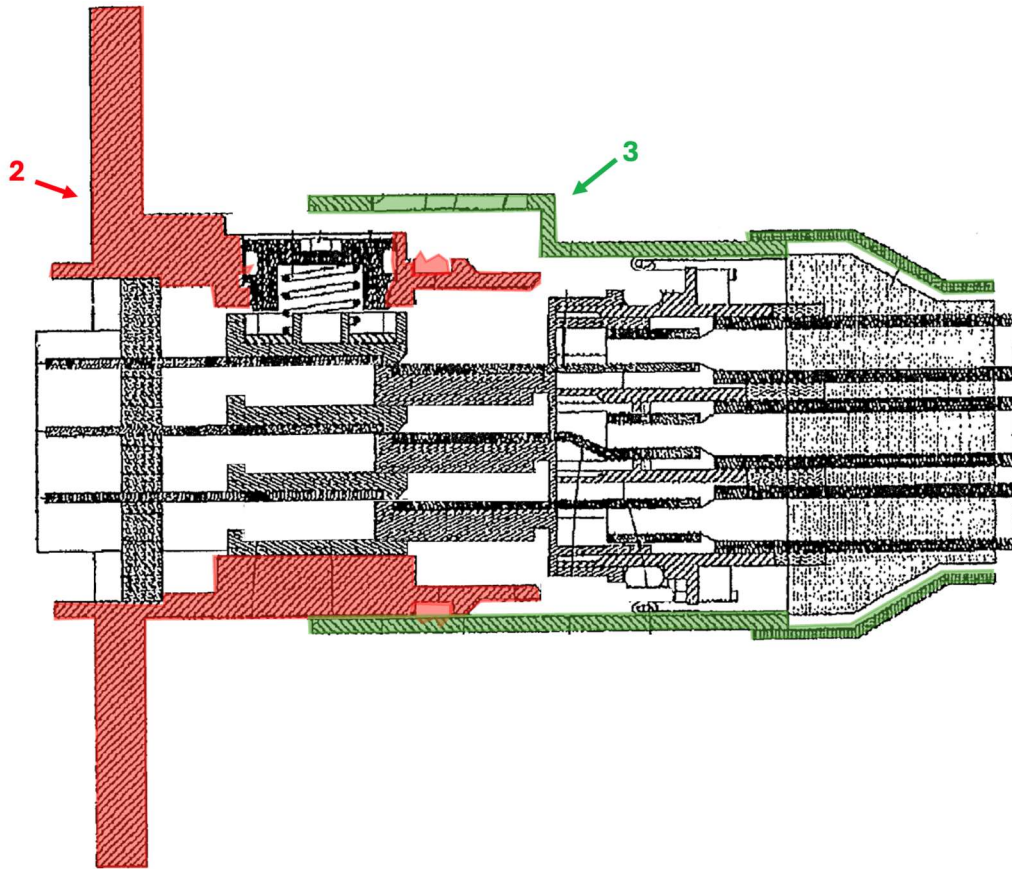


Diagram created based on Ex. 1005, Fig. 3 (showing a **first connector in red** and a **second connector in green** in a partially disconnected configuration)

Eldering, ¶156. When first connector portion 2 (the first connector) and second connector portion 3 (the second connector) of *Kataoka* are partially disconnected, and the first and second electrical contacts are separated by a short distance, the first and second insulating barriers of *Kataoka* are in close proximity, as illustrated below:

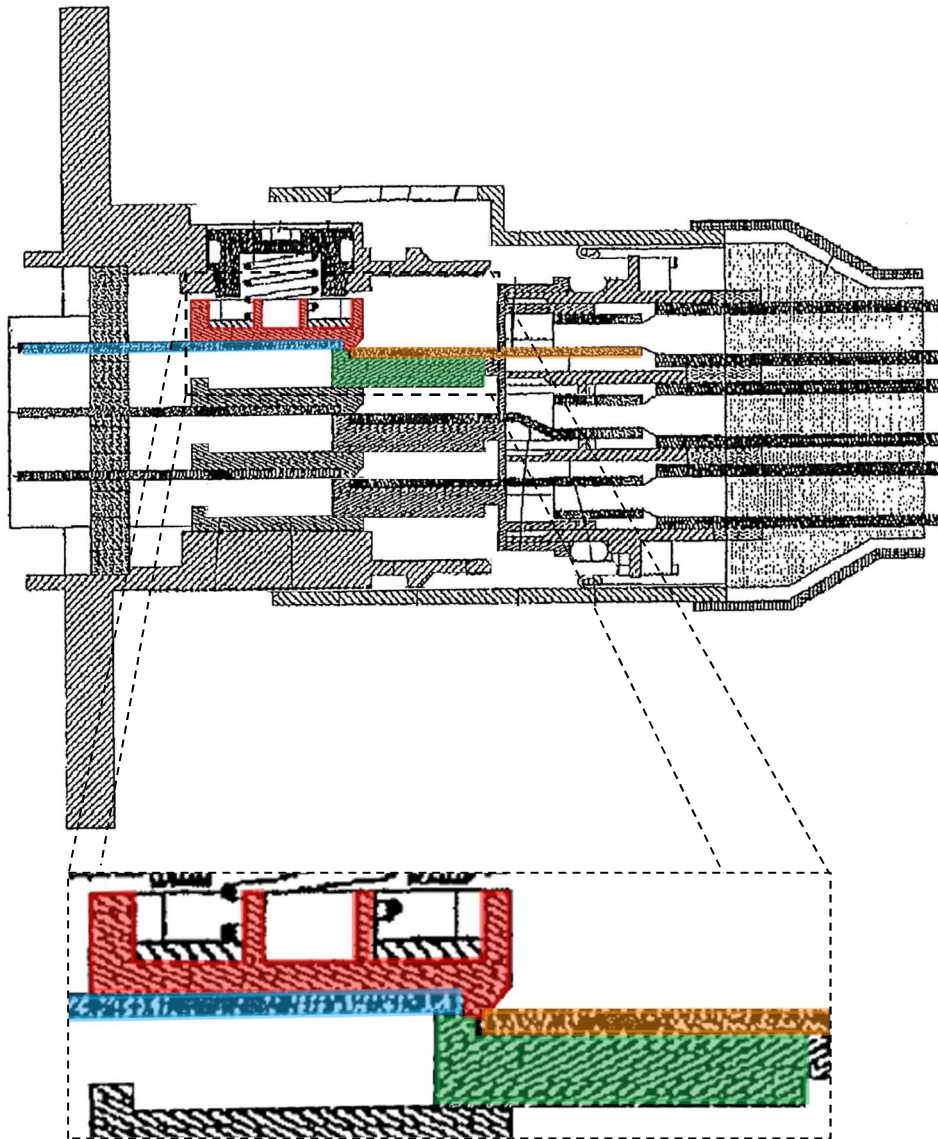


*Diagram created based on Ex. 1005, Fig. 3 (top), and enlarged portion (bottom) (showing a **first insulating barrier** in **red** and a **second insulating barrier** in **green** of a connector pair in a partially disconnected configuration, a **first electrical contact** in **blue**, and a **second electrical contact** in **orange**)*

When *Kataoka*'s connectors are partially disconnected, the **first electrical contact** (**blue**) and the **second electrical contact** (**orange**) are separated by a short distance. In this configuration, the leading portion of both the **first insulating barrier** (**red**) and the **second insulating barrier** (**green**) are in close proximity.

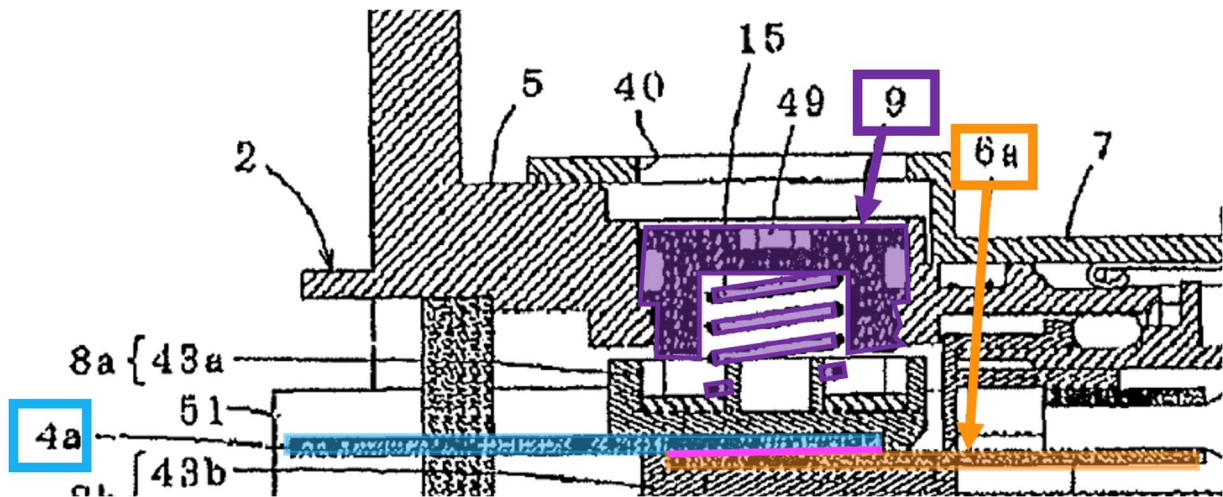
As shown above, the **first insulating barrier** and the **second insulating barrier** “block[] substantially all through-air arcing paths between the **first** and **second electrical contacts**,” as claimed. This is apparent because there is no air gap or other through-air arcing path between the **first insulating barrier** and the **second insulating barrier**. Eldering, ¶156.

The diagram above is consistent with *Kataoka*’s disclosure of preventing electric shock by fixing first insulating members 43a and second insulating member 43b to the surfaces of first connecting terminal 4a and second connecting terminal 6a, respectively, so that the terminals are “not exposed in the non-fitted state.” Ex. 1005, 15:12-22. Therefore, *Kataoka* discloses 1[i]. Eldering, ¶157.

For the reasons above, *Kataoka* discloses every limitation of independent claim 1, and anticipates claim 1. Eldering, ¶133, 158.

2. Claim 2

Kataoka anticipates claim 2. *Kataoka* discloses connecting member 9 “collectively fixing and electrically connecting the plural first connecting terminals 4a-4c to the plural second connecting terminals 6a-6c at each contact point by pressing the insulator 8a adjacent thereto.” Ex. 1005, 4:60-63, *see also* 8:13-19, 8:38-49, 14:50-65, Fig. 3:



Ex. 1005, portion of Fig. 3 (annotated highlighting connecting member 9 in purple, first connecting terminal 4a in blue, and second connecting terminal 6a in orange, and indicating a connecting surface in pink)

Figure 3 shows first connector portion 2 and second connector portion 3 in a “fitted” or connected configuration. **Connecting member 9** includes elastic member 15, such as a spring, that presses on insulator 8a which, in turn, presses the **second connecting terminal 6a** against the **connecting surface** of the **first connecting terminal 4a**. Even if Fig. 3 above was interpreted as showing **connecting member 9** pressing the **first connecting terminal 4a** against **second connecting terminal 4b**, a POSITA would have understood that under Newtons 3rd law, when one object exerts a force on a second object, the second object exerts an equal and opposite force on the first. Ex. 1020, 1; Eldering, ¶¶159-160.

For these reasons, connecting member 9 of *Kataoka* constitutes the “contact tensioning mechanism” of claim 2. Eldering, ¶161.

3. Claim 3

Kataoka anticipates claim 3. *Kataoka*'s connecting member 9 meets claim 2. See Section VI.E.2. Connecting member 9 includes elastic member 15 such as a spring. Ex. 1005, 8:13-19. Furthermore, the figures of *Kataoka* illustrate a cross-sectional view of elastic member 15 being a coil or helical spring. See Section VI.E.2.; Ex. 1005, Figs. 3, 4A, 10. For these reasons, *Kataoka* discloses claim 3. Eldering, ¶162.

4. Claim 4

Kataoka anticipates claim 4. *Kataoka* discloses connecting member 9 that “press[es] the adjacent insulator 8a” which includes first insulating member 43a (the first insulating barrier of claim 1). Ex. 1005, 6:10-13, *see also* 5:10-16, 5:51-57, Figs. 3, 4A, 10. A diagram created based on *Kataoka* Fig. 3 illustrates how the connecting member would press insulating member 43a (the first insulating barrier) of insulator 8a against the second insulating barrier, when the connectors are partially disconnected:

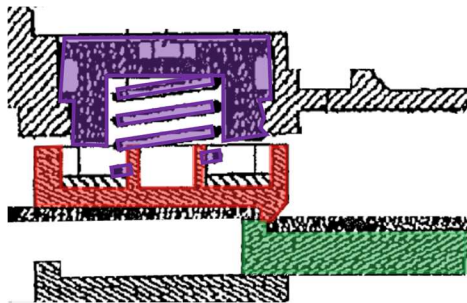


Diagram created based on Ex. 1005, Fig. 3 (showing a **first insulating barrier in red** and a **second insulating barrier in green** of a connector pair in a partially disconnected configuration, and a **connecting member 9 in purple**)

The diagram above shows part of the first connector portion 2 (the first connector) and part of the second connector portion 3 (the second connector) of *Kataoka* in a partially-disconnected configuration. The first and second electrical contacts (not highlighted above) are separated by a short distance in this configuration. As shown, **first insulating barrier 43a (red)** of insulator 8a is pressed against the **second insulating barrier 43b (green)** by **connecting member 9 (purple)**.

Eldering, ¶163.

For these reasons, connecting member 9 constitutes the “barrier tensioning mechanism” of claim 4. Eldering, ¶164.

F. Ground 2B: Claims 7-10 Are Obvious Over *Kataoka* In View Of the Handbook

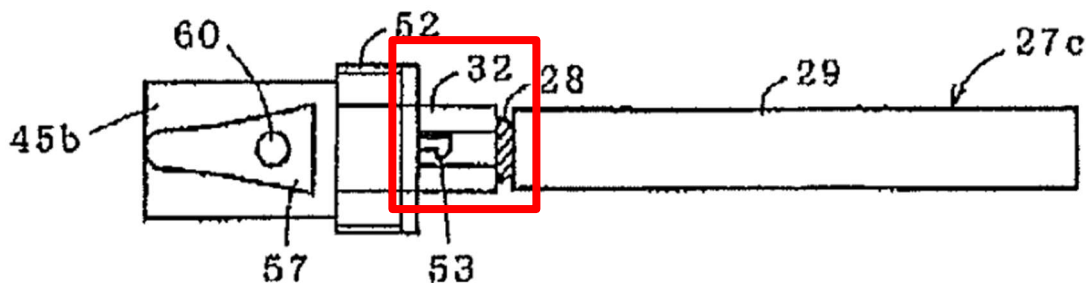
Kataoka in view of the Handbook renders claims 7-10 obvious. Claims 7-10 recite a terminal for connecting the first or second electrical contact using various known, common, and decades-old techniques, such as soldering, crimping, and insulation displacement. The '017 patent does not describe claims 7-10 at all; several terms of claims 7-10 do not appear anywhere in the '017 patent specification or figures. For example, “crimping,” “solder,” and “terminal” do not

appear anywhere in the '017 patent other than dependent claims 7-12. Eldering, ¶165.

As explained in further detail below, claims 7-10 are obvious over *Kataoka* in view of the Handbook. Eldering, ¶166.

1. Claim 7

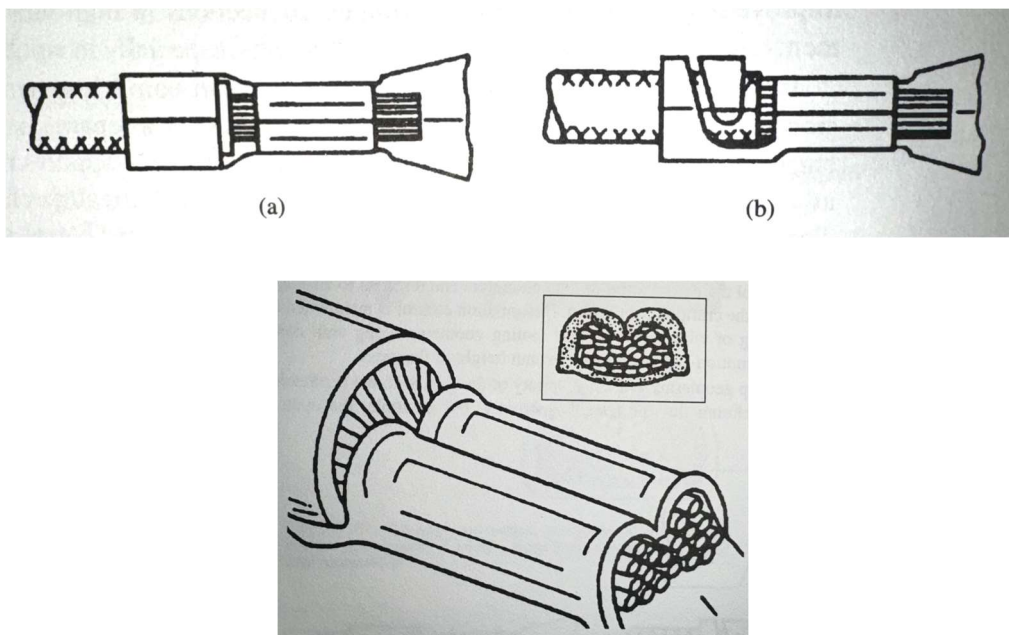
Claim 7 is obvious over *Kataoka* in view of the Handbook. *Kataoka* discloses the connector pair of claim 1 including first and second electrical contacts. *See* Sections VI.E.1.d (1[c]), VI.E.1.f (1[e]). *Kataoka* further discloses second connecting terminal 6a that connects to a cable and is thus “a terminal for [connecting] to a wire” as claimed. Ex. 1005, Figs. 6A, 6B, 10:30-59. Second connecting terminal 6a has a “caulking portion 32” for attaching an exposed conductor at a cable end. Ex. 1005, 10:30-59, Figs. 7-8. Additionally, Figs. 7A, 7B, 8A, 8B, 11A, 11B, 12A, and 12B illustrate a terminal connecting to a wire, and shows a crimping-like terminal in Fig. 12B:



Ex. 1005, Fig. 12B. (annotated circling caulking portion 32 which appears as a crimping terminal)

Although *Kataoka* illustrates a terminal for crimping to a wire, *Kataoka* does not expressly disclose crimping. Eldering, ¶167.

The Handbook discloses crimping as a known type of connection to a wire or cable, and discloses crimped wire connections as among “the oldest of the technologies” for connecting a wire or cable, “dating back to the 1940s.” Ex. 1008, 13, 32. The Handbook illustrates crimp terminals like the “caulking portion 32” in Fig. 12B of *Kataoka*, above:



Ex. 1008, 37, 39, showing Fig. 9.8 (top) and Fig. 9.10 (bottom)

Therefore, the Handbook discloses a terminal for crimping to a wire. Eldering, ¶168.

It would have been obvious to a POSITA to implement *Kataoka*'s caulking portion 32 with a terminal for crimping to a wire as disclosed in the Handbook. The Handbook is analogous art to *Kataoka* and both are analogous art to the '017 patent, as all three are in the same field of endeavor of electrical connectors. Modifying *Kataoka* based on the Handbook would have involved simple substitution of *Kataoka*'s caulking portion 32 for the Handbook's known crimping terminal, to obtain the predictable results of making a permanent connection to a wire/cable using a well-known crimping technique. Ex. 1008, 32-33. The modification would have also involved applying the Handbook's known crimping technique to *Kataoka*'s known "caulking portion 32." *Kataoka*'s connector was ready for improvement, because *Kataoka* does not describe how wires are connected to caulking portion 32. However, both *Kataoka* and the Handbook have similar hardware for connecting wires. Ex. 1008, 32-33; Ex. 1005, 10:30-59, Figs. 7-8, 12B; Eldering, ¶169.

A POSITA would have expected success in modifying *Kataoka*'s caulking portion 32 (*Kataoka*'s terminal) for crimping to a wire, as disclosed in the Handbook. As explained above, *Kataoka*'s caulking portion 32 looks like the crimping terminals in the Handbook. There would be few, if any, changes needed to *Kataoka*'s hardware to crimp caulking portion 32 to a wire. Instead, a POSITA would only need to deform caulking portion 32 to form a permanent connection

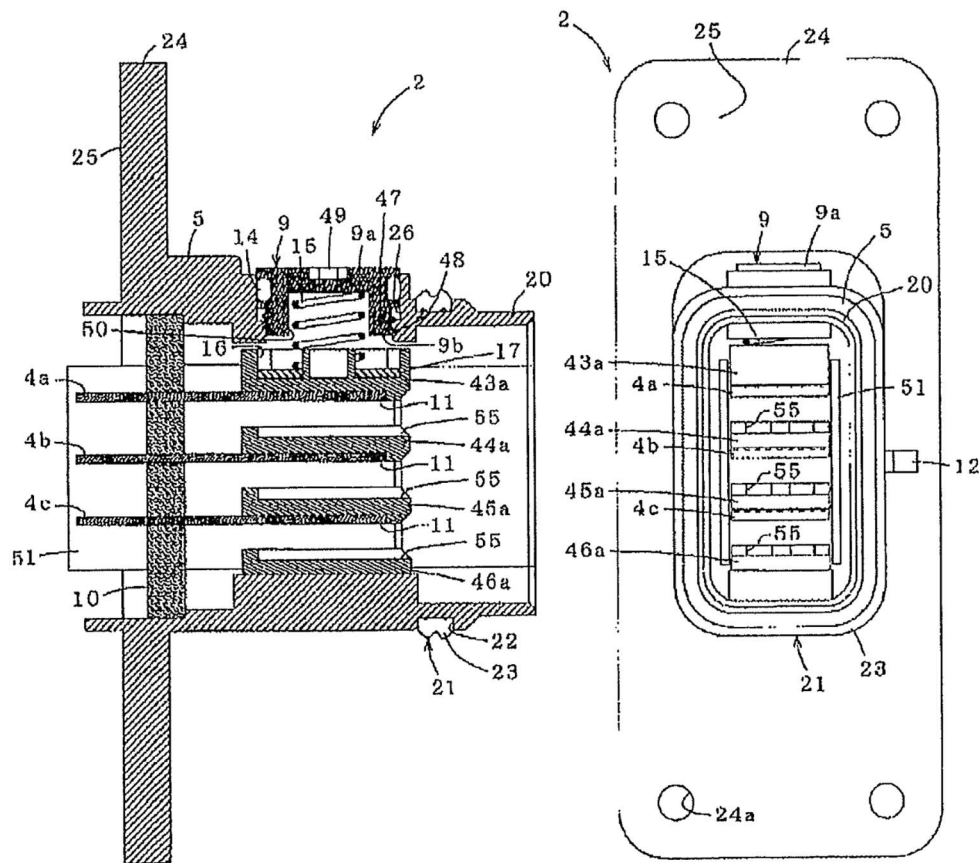
with a wire, guided by the Handbook's disclosure of known crimping techniques.

Ex. 1008, 32-55; Eldering, ¶170.

For the reasons above, claim 7 would have been obvious based on *Kataoka* in view of the Handbook. Eldering, ¶171.

2. Claim 8

Claim 8 is obvious over *Kataoka* in view of the Handbook. *Kataoka* discloses the connector pair of claim 1 including first and second electrical contacts. *See* Sections VI.E.1.d (1[c]), VI.E.1.f. *Kataoka* further discloses first connector portion 2 having a first connecting terminal 4a. Ex. 1005, Figs. 4A, 4B:



Ex. 1005, Figs. 4A (left) and 4B (right)

The first connecting terminals 4a-4c are formed of “highly conductive metal such as silver, copper or aluminum.” Ex. 1005, 6:65-67. First connector portion 2 (shown above) is “fitted to a shield case of [a] motor, and portions of the first connecting terminals 4a-4c exposed from the first terminal housing 5 are connected to each terminal of a terminal block which is installed in the shield case of the motor.” Ex. 1005, 5:60-65. Therefore, *Kataoka* discloses an exposed terminal that can be connected to an electronic device such as a motor. Indeed, any conductive metal component can be soldered to a printed circuit or wiring board, with enough

heat depending on the type of solder used. Eldering, ¶172. Nevertheless, *Kataoka* fails to expressly disclose using a terminal “for soldering to a printed circuit or wiring board” as recited in claim 8. The Handbook discloses the claimed usage. Eldering, ¶172.

The Handbook discloses soldering to a printed wiring board. According to the Handbook, “[t]here are two major media through which [permanent] connections are established: (a) wires or cables and (b) printed wiring boards (PWBs).” Ex. 1008, 21. PWBs have been used and known since at least the 1950s. *Id.* The Handbook further discloses that “[s]oldering is the dominant metallurgical technology used in PWB applications” and discloses surface mount technology (SMT) as one of the two prevalent connection techniques for attaching electronics to a printed wiring board. *Id.* at 22, *see also* 74-77; Eldering, ¶173.

It would have been obvious to a POSITA to use the first connecting terminal 4a of *Kataoka*’s first connector portion 2 as a terminal for soldering to a printed circuit or wiring board (“board”), as disclosed in the Handbook. The combination would have involved combining *Kataoka*’s known terminal with the known board of the Handbook, using known surface mount soldering techniques disclosed in the Handbook. Ex. 1008, 74-77. For example, a POSITA would have found it obvious to solder the exposed end of connecting terminal 4a (i.e., the left side of 4a, in *Kataoka*’s Fig. 4A above) to a board of a device such as an electric motor, using

the Handbook's surface mount soldering technique. The combination would have yielded predictable results of providing a permanent electrical connection between *Kataoka*'s first connector portion that is intended for use in an electric motor (Ex. 1005, 5:60-6:3) and a power supply or control board of the motor that is a printed circuit or wiring board. Eldering, ¶174.

A POSITA would have expected success in combining *Kataoka* with the Handbook's teaching of soldering to a board. *Kataoka*'s metallic connecting terminal 4a has an exposed end that would not require any physical modification to solder to a board. A POSITA would have been guided by the Handbook's disclosure about how to solder the exposed end of connecting terminal 4a to a printed wiring board using surface mount technology. Eldering, ¶175.

For the reasons above, claim 8 would have been obvious based on *Kataoka* in view of the Handbook. Eldering, ¶176.

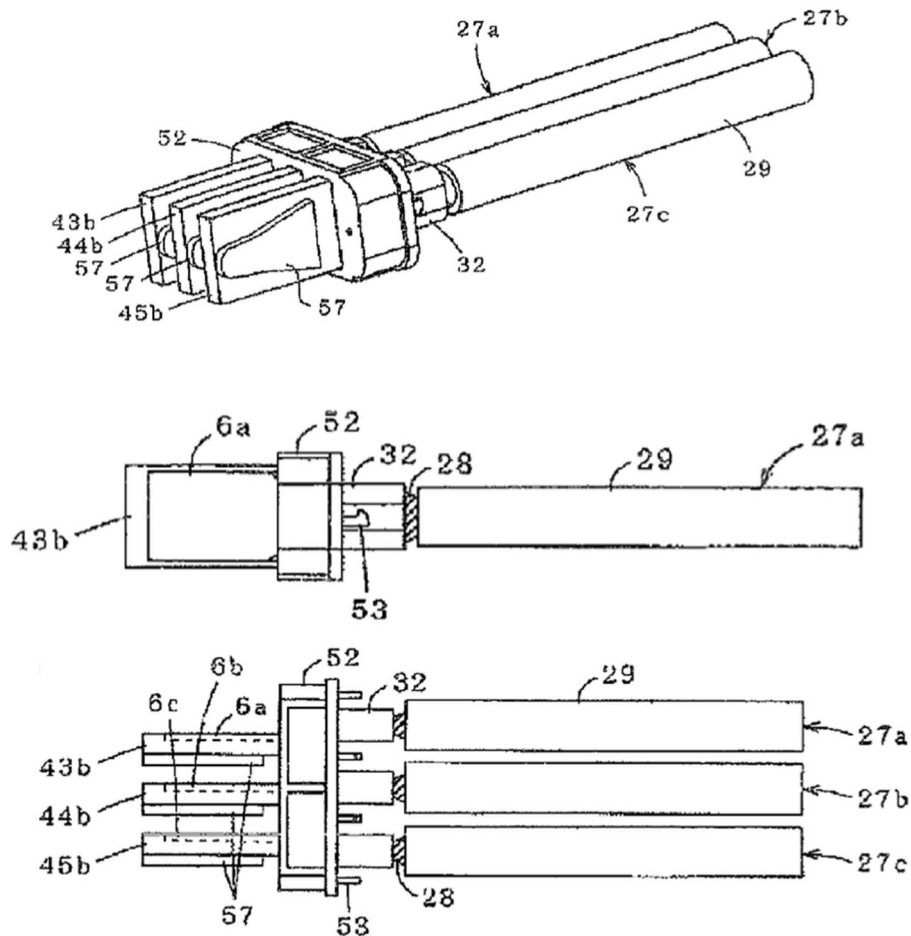
3. Claim 9

Claim 9 is obvious based on *Kataoka* in view of the Handbook for the reasons discussed above with respect to claim 8. *See* Section VI.F.2. The combination of *Kataoka* and the Handbook includes a terminal for soldering to a printed wiring board. *Id.* A printed wiring board is an "electrical component," and the '017 patent does not define "electrical component" in a manner that distinguishes a printed wiring board. Additionally, *Kataoka* discloses connecting

an exposed end of connecting terminal 4a to “a terminal block which is installed in the shield case of the motor.” Ex. 1005, 5:60-65. A POSITA would have understood that an electrical terminal block is another example of an “electrical component.” As explained for claim 8, it would have been obvious to a POSITA to solder *Kataoka*’s connecting terminal 4a to permanently connect with an electrical component, such as a printed wiring board. *See* Section VI.F.2. Therefore, claim 9 is obvious for the same reasons that claim 8 is obvious based on *Kataoka* in view of the Handbook. Eldering, ¶177.

4. Claim 10

Kataoka in view of the Handbook renders claim 10 obvious. *Kataoka* discloses the connector pair of claim 1 including first and second electrical contacts. *See* Sections VI.A.1.d (1[c]), VI.A.1.f (1[e]). *Kataoka* further discloses a metallic second connecting terminal 6a that connects to cable 27a and is “a terminal for [connecting] to a wire” as claimed. Ex. 1005, Figs. 6A, 6B, 10:30-59. Second connecting terminal 6a (the electrical contact) has a “caulking portion 32” for attaching an exposed conductor at an end of cable 27a. Ex. 1005, 10:30-59, Figs. 7-8, Figs 9A-9D:



Ex. 1005, Figs. 9A (top), 9B (middle), 9D (bottom)

As shown above, caulking portion 32 of the metal second connecting terminal 6a encircles the end of cable 27a. *Kataoka* does not explain specifically how caulking portion 32 connects to cable 27a. Furthermore, in the figures above, the insulation layer 29 appears to be removed at the end of cable 27a, such that caulking portion 32 attaches to the bare metallic conductors of cable 27a. Thus, *Kataoka* teaches, but fails to expressly disclose, a terminal “for using insulation displacement for attaching a wire to the contact” as claimed. Eldering, ¶178.

The Handbook discloses an insulation displacement connector as being known for mechanically and electrically attaching a wire/cable to an electrical contact, to form a permanent connection. Ex. 1008, 13-14, Figs. 1.2, 9.32, 9.26. The Handbook is analogous art to *Kataoka* and both are analogous art to the '017 patent. All three are in the same field of endeavor; like *Kataoka* and the '017 patent, the Handbook discloses electrical connectors that attach to cables/wires. Eldering, ¶¶179-180.

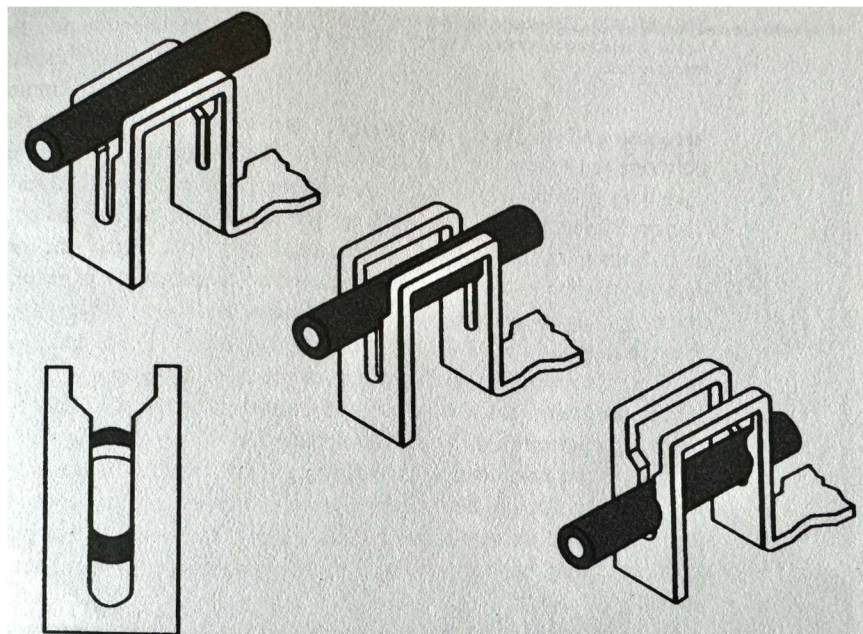
It would have been obvious to modify caulking portion 32 in *Kataoka*'s second connecting terminal 6a to use insulation displacement as disclosed in the Handbook. The modification would have involved modifying or replacing caulking portion 32 with an insulation displacement terminal. For example, it would have been obvious to close the end of caulking portion 32 and include a slot for inserting a wire/cable. Such a modification would have amounted to applying the Handbook's known insulation displacement technique to *Kataoka*'s known electrical connector. Alternatively, it would have been obvious to replace *Kataoka*'s caulking portion 32 with the Handbook's insulation displacement terminal. Under either modification, the modified connecting terminal would have appeared similar to Figs. 9A-9D of *Kataoka*, except with slotted terminals in place of caulking portions 32. Eldering, ¶¶181-182.

POSITAs would have understood that dimensions of *Kataoka*'s modified caulking portion 32 could have been adjusted based on the dimensions of the second terminal housing 7. Ex. 1005, Figs. 1, 3, 6B. Additionally, it would have been within the capabilities of a POSITA to modify the second terminal housing 7, if necessary, to accommodate an insulation displacement terminal in place of caulking portion 32. Eldering, ¶183.

Kataoka's electrical connector was ready for improvements in wire connection techniques, because *Kataoka* is silent regarding techniques to secure cable 27a to the caulking portion 32 of second connecting terminal 6a. POSITAs would have understood that connecting cable 27a to a caulking portion 32 as illustrated in Figs. 9A-9D of *Kataoka* would have required equipment to remove insulation and to connect the bare cable to the terminal using known techniques such as soldering or crimping. An insulation displacement terminal would have improved *Kataoka*, because the Handbook teaches that insulation removal is not necessary. Ex. 1008, 55, *see also* 55-69. Therefore, modifying *Kataoka*'s terminal to use insulation displacement would have yielded the predictable results of simplifying the process of permanently attaching a wire/cable to the connector, without the need for additional equipment or skill. Eldering, ¶184.

A POSITA would have expected success in modifying *Kataoka* to have an insulation displacement terminal for attaching a wire. Second connecting terminal

6a of *Kataoka* would have required only minor modifications that were within the capabilities of a POSITA. For example, only minor modifications would have been needed to reshape the metallic caulking portion 32 of *Kataoka* to have slots for connecting a wire. Alternatively, POSITAs would have been capable of replacing caulking portion 32, which looks like a crimping terminal, with the insulation displacement terminals illustrated in the Handbook. At least Figure 9.26 of the Handbook illustrates how the right-hand side of the insulation displacement terminal would have attached to *Kataoka*'s second connecting terminal 6a:



Ex. 1008, Fig. 9.26

A POSITA would have understood that any necessary changes to the caulking portion side of *Kataoka*'s second connector portion 2 would have had no effect on

the mating surfaces of first and second connecting terminals 4a and 4b, or to *Kataoka*'s insulation barriers. Eldering, ¶185.

For the reasons above, claim 10 would have been obvious based on *Kataoka* in view of the Handbook. Eldering, ¶186.

VII. DISCRETIONARY DENIAL IS NOT WARRANTED

A. Denial of Institution Is Not Warranted Under *Fintiv*

At this time, no factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5-6 (PTAB Mar. 20, 2020), weigh in favor of non-institution under 35 U.S.C. § 314(a). In the related litigation, no case management conference and no pre-trial conference have yet occurred, and no case schedule or trial date has yet been set.

B. Denial of Institution Is Not Warranted Under § 325(d)

No other proceeding involving the '017 patent is pending or has been brought before the Patent Office. None of the prior art references in this petition (*Winkler*, *Winkler2*, *Kataoka*, *Poliak*, and the Handbook) was before the examiner during prosecution. *See* Ex. 1002. Thus, the same or substantially the same prior art or arguments have not been presented to the Office, and denial of institution is not warranted under § 325(d).

VIII. MANDATORY NOTICES

A. Real Parties-in-Interest

The real parties-in-interest are BizLink Technology, Inc., BizLink Holding Inc., and BizLink International Corp.

B. Related Matters

The '017 patent is currently asserted in *Anderson Power Products, Inc. v. BizLink Technology, Inc. et al.*, Case No. 3:23-cv-05436 (NDCA). Petitioner is not aware of any other judicial or administrative matter that would affect, or be affected by, a decision in this proceeding.

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Petitioner consents to electronic service by email at the above email addresses.

IX. GROUNDS FOR STANDING

Petitioner certifies that the '017 patent is available for IPR, and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds identified herein.

X. CONCLUSION

Petitioner has established a reasonable likelihood that the challenged claims are unpatentable, and requests institution of *inter partes* review and cancellation of each challenged claim. The Office may charge any required fees to Deposit Account No. 06-0916.

Date: May 13, 2024

Respectfully Submitted,

/Ming-Tao Yang/
Ming-Tao Yang, Lead Counsel
Reg. No. 62,019

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing PETITION FOR *INTER PARTES* REVIEW contains 13,992 words, excluding the parts of this Petition that are exempted under 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

Dated: May 13, 2024

/Ming-Tao Yang/
Ming-Tao Yang, Lead Counsel
Reg. No. 62,019

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that the foregoing Petition for *Inter Partes* Review, the associated Power of Attorney, and Exhibits 1001 through 1020 are being served on May 13, 2024, via FedEx Priority Overnight on the correspondence address of record indicated in the Patent Office's Patent Center system for U.S. Patent No. 8,808,017.

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A courtesy copy has also been mailed to litigation counsel for Patent Owner
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Dated: May 13, 2024

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