

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.

Petitioners

v.

KIWI INTELLECTUAL ASSETS CORPORATION
Patent Owner

Case No. IPR2026-00164
U.S. Patent No. RE50,307

**PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. RE50,307**

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PETITIONERS' EXHIBIT LIST¹

Exhibit	Description of Documents
EX1001	U.S. Patent No. RE50,307
EX1002	Prosecution History of U.S. Patent No. RE50,307
EX1003	Declaration of Sayfe Kiaei in support of petition for <i>inter partes</i> review of U.S. Patent No. RE50,307
EX1004	<i>KIWI Intellectual Assets Corp. v. Samsung Elecs. Co., Ltd.</i> , No. 2:25-cv-00811, Dkts. 1-6 to 1-9 (“Complaint Claim Charts”) (E.D. Tex. Aug. 18, 2025).
EX1005	U.S. Patent No. 7,094,089 (“Andre”), published Sep. 15, 2005 and granted Aug. 22, 2006
EX1006	Chinese Patent No. CN201038524Y (“Zhenyu”), granted Mar. 19, 2008, with certified translation
EX1007	Chinese Patent No. CN201113094Y (“Lufan”), granted Sep. 10, 2008, with certified translation
EX1008	Chinese Patent No. CN201204344Y (“Yuming”), granted Mar. 4, 2009, with certified translation
EX1009	U.S. Patent No. 7,231,473 (“Yen”), published Nov. 4, 2004 and granted Jun. 12, 2007
EX1010	U.S. Patent No. 6,854,984 (“Lee”), granted Feb. 15, 2005
EX1011	Declaration of Sylvia D. Hall-Ellis, Ph.D. in support of authenticity and public availability of documents for <i>inter partes</i> review of U.S. Patent No. RE50,307
EX1012	USB Implementers Forum, Inc., <i>Universal Serial Bus Specification</i> , rev. 1.0 (Jan. 15, 1996), published by Compaq Computer Corp., Digital Equip. Corp., IBM PC Co., Intel Corp.,

¹ Unless otherwise indicated, all citations are to Bates pages, and citations to U.S. patents are to column:line. Patent figures are cited by figure number.

	Microsoft Corp., NEC & Northern Telecom. Beaverton, OR: The USB-IF, 1996. (“USB1.0”)
EX1013	USB Implementers Forum, Inc., <i>Universal Serial Bus Specification</i> , rev. 1.1 (Sep. 23, 1998), published by Compaq Computer Corp., Intel Corp., Microsoft Corp. & NEC Corp. Beaverton, OR: The USB-IF, 1998. (“USB1.1”)
EX1014	USB Implementers Forum, Inc., <i>Universal Serial Bus Specification</i> , rev. 2.0 (Apr. 27, 2000), published by Compaq Computer Corp., Hewlett-Packard Co., Intel Corp., Lucent Techs. Inc., Microsoft Corp., NEC Corp. & Koninklijke Philips Elecs. N.V. Beaverton, OR: The USB-IF, 2000. (“USB2.0”)
EX1015	USB Implementers Forum, Inc., <i>Universal Serial Bus 3.0 Specification</i> , rev. 1.0 (Nov. 12, 2008), published by Hewlett-Packard Co., Intel Corp., Microsoft Corp., NEC Corp., ST-NXP Wireless & Texas Instruments. Beaverton, OR: The USB-IF, 2008. (“USB3.0”)
EX1016	U.S. Patent No. 8,198,563
EX1017	Prosecution History of U.S. Patent No. 8,198,563
EX1018	U.S. Patent No. RE49,287
EX1019	Prosecution History of U.S. Patent No. RE49,287
EX1020	U.S. Patent Publication No. 2009/0258539 (“Zheng”), published Oct. 15, 2009 and granted as U.S. Patent No. 7,744,382 on Jun. 29, 2010
EX1021	U.S. Patent No. 7,361,059 (“Harkabi”), published Feb. 24, 2005 and granted Apr. 22, 2008
EX1022	U.S. Patent No. 7,359,208 (“Ni ’208”), published Apr. 5, 2007 and granted Apr. 15, 2008
EX1023	U.S. Patent No. 7,269,004 (“Ni ’004”), published Sep. 11, 2007 and granted Sep. 11, 2007

EX1024	U.S. Patent Publication No. 2006/0024997 (“Teicher”), published Feb. 2, 2006 and granted as U.S. Patent No. 7,094,086 on Aug. 22, 2006
EX1025	PCT Publication No. WO-2009069969 (“Lee PCT”), published Jun. 4, 2009
EX1026	U.S. Patent No. 7,094,086 (“Teicher ’086”), published Feb. 2, 2006 and granted Aug. 22, 2006
EX1027	U.S. Patent No. 7,537,471 (“Teicher ’471”), published May 22, 2008 and granted May 26, 2009
EX1028	Petitioners’ Stipulation
EX1029	Chinese Patent No. CN201174439Y (“Guangmin”), granted Dec. 31, 2008, with certified translation
EX1030	Japanese Patent Publication No. JP2000277200A (“Yamada”), published Oct. 6, 2000, with certified translation
EX1031	Taiwanese Patent Publication No. TWM327587U (“Ruidu”), published Feb. 21, 2008, with certified translation
EX1032	U.S. Patent No. 5,741,148 (“Biernath”), issued April 21, 1998
EX1033	Bruno Carpentieri, <i>Computing beyond Moore’s Law</i> , ResearchGate (Oct. 10, 2015), https://www.researchgate.net/publication/282704681
EX1034	Neil Cumins, <i>Intel Processors Over the Years</i> , Business News Daily (Aug. 8, 2024), https://www.businessnewsdaily.com/10817-slideshow-intel-processors-over-the-years.html
EX1035	Priya Ganapati, <i>USB 3.0 to Deliver a Tenfold Speed Increase</i> , Wired Newsletter (Nov. 15, 2000), https://www.wired.com/2008/11/superspeed-us-1/
EX1036	<i>Xbox 360 First Impressions</i> , Hackaday (Nov. 27, 2005), https://hackaday.com/2005/11/27/xbox-360-first-impressions/

EX1037	Greg Suarez, <i>Sony PlayStation 2</i> , The Digital Bits (Nov. 15, 2000), https://archive.thedigitalbits.com/reviews/ps2/sonyps2.html
EX1038	<i>Apple disrespects its own Mac users with iPod's FireWire fiasco</i> , MacDailyNews (Feb. 24, 2005), https://macdailynews.com/2005/02/24/apple_disrespects_its_own_mac_users_with_ipods_firewire_fiasco/
EX1039	Charlie Sorrel, <i>Western Digital Passport 250GB Pocket Drive</i> , Wired Newsletter (Jun. 7, 2007), https://www.wired.com/2007/06/western-digital/
EX1040	[Filed Under Seal]

MANDATORY NOTICES UNDER 37 C.F.R 42.8(A)(1)

Real Party in Interest: The real parties in interest are Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., Petitioners.

Related Matters: U.S. Patent No. RE50,307 (“’307 patent”) is currently asserted by Patent Owner (“PO”) against Petitioners in the case styled: *Kiwi Intellectual Assets Corp. v. Samsung Electronics Co., Ltd. and Samsung Electronics Am., Inc.*, 2:25-cv-00811 (E.D. Tex.), which was originally filed on August 18, 2025.

Lead Counsel and Back-Up Counsel: Petitioners designate lead and back-up counsel as noted below. Powers of Attorney are filed concurrently herewith under 37 C.F.R. § 42.10(b).

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CLAIMS LISTING

Claim 34:

34[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
34[a]	a plastic base;
34[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
34[c]	a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface,
34[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
34[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
34[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
34[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
34[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
34[i]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
34[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
34[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
34[l]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
34[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the

	plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
34[n]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 35:

35	The socket structure of claim 34, wherein the tongue only contacts an interior portion of the plug when the plug is inserted.
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Claim 36:

36	The socket structure of claim 35, wherein a thickness of the tongue is less than a third of a height of the connection slot.
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Claim 37:

37	The socket structure of claim 34, wherein a portion of each of the first contacts, in the at least one row of first contacts, is coplanar with a portion of the first surface of the tongue.
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Claim 38:

38	The socket structure of claim 37, wherein a portion of each of the second contacts, in the at least one row of second contacts, is coplanar with a portion of the second surface of the tongue.
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Claim 39:

39	The socket structure of claim 34, further comprising a metal housing at least partially covering the plastic base.
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Claim 40:

40	The socket structure of claim 34, wherein the socket structure is a universal serial bus socket structure.
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Claim 41:

41	The socket structure of claim 34, wherein the tongue and the plastic base are integrally formed.
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Claim 42:

42	The socket structure of claim 34, wherein each contact of the first and second contacts is a portion of a respective terminal.
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Claim 43:

43	The socket structure of claim 34, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.
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Claim 44:

44	The socket structure of claim 34, wherein at least two of the first contacts are not in electrical communication with one another, and at least two of the second contacts are not in electrical communication with one another.
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Claim 45:

45	The socket structure of claim 34, further comprising a rear cover attached to the plastic base.
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Claim 46:

46	The socket structure of claim 45, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover.
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Claim 47:

47	The socket structure of claim 45, wherein each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.
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Claim 48:

48	The socket structure of claim 34, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 49:

49	The socket structure of claim 34, wherein at least two of the first contacts are not in electrical communication with one another.
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Claim 50:

50	The socket structure of claim 34, wherein at least two of the second contacts are not in electrical communication with one another.
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Claim 51:

51	The socket structure of claim 34, wherein the at least one row of first contacts and respective first pins are located at ends of respective ones of a row of first terminals and the at least one row of second contacts and respective second pins are located at ends of respective ones of a row of second terminals.
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Claim 52:

52	The socket structure of claim 34, wherein a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue.
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Claim 53:

53	The socket structure of claim 34, wherein a portion of one of the first contacts is at least partially included in the first surface with grooves.
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Claim 54:

54	The socket structure of claim 34, wherein a portion of one of the second contacts is at least partially included in the second surface with grooves.
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Claim 55:

55	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 34 and the plug.
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Claim 56:

56[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
56[a]	a plastic base;
56[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
56[c]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
56[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
56[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
56[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
56[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
56[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
56[i]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
56[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
56[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

56[I]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.
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Claim 57:

57	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 56 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 58:

58	The socket structure of claim 56, wherein the tongue and the plastic base are integrally formed.
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Claim 59:

59	The socket structure of claim 58, further comprising a metal housing at least partially covering the plastic base.
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Claim 60:

60	The socket structure of claim 59, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.
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Claim 61:

61	The socket structure of claim 60, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.
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Claim 62:

62	The socket structure of claim 61, wherein the at least one row of first contacts includes at least five contacts, and the at least one row of second contacts includes at least five contacts.
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Claim 63:

63	The socket structure of claim 62, wherein the tongue has chamfered corners on two sides of the tongue.
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Claim 64:

64	The socket structure of claim 63, wherein a tip of the tongue is tapered.
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Claim 65:

65	The socket structure of claim 64, wherein a thickness of the tongue is less than third of a height of the connection slot.
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Claim 66:

66	The socket structure of claim 65, wherein the socket structure is a universal serial bus socket structure.
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Claim 67:

67[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
67[a]	a plastic base;
67[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
67[c]	a tongue, which has a first surface with grooves, and a second surface with grooves, disposed opposite the first surface,
67[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

67[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
67[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
67[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
67[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
67[i]	the at least one row of first contacts includes at least six contacts, the at least one row of second contacts includes at least six contacts,
67[j]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
67[k]	the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
67[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
67[m]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
67[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
67[o]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 68:

68	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 67 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 69:

69	The socket structure of claim 67, wherein the tongue and the plastic base are integrally formed.
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Claim 70:

70	The socket structure of claim 69, further comprising a metal housing at least partially covering the plastic base.
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Claim 71:

71	The socket structure of claim 70, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.
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Claim 72:

72	The socket structure of claim 71, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.
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Claim 73:

73	The socket structure of claim 72, wherein the tongue has chamfered corners on two sides of the tongue.
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Claim 74:

74	The socket structure of claim 73, wherein a portion of the tongue opposite the plastic base is tapered.
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Claim 75:

75	The socket structure of claim 74, wherein a thickness of the tongue is less than third of a height of the connection slot.
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Claim 76:

76	The socket structure of claim 75, wherein the socket structure is a universal serial bus socket structure.
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Claim 77:

77	The socket structure of claim 76, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.
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Claim 78:

78[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
78[a]	a plastic base having a metal housing;
78[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
78[c]	a tongue, which has a first surface with grooves, and a second surface with grooves, disposed opposite the first surface,
78[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
78[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
78[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
78[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
78[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
78[i]	the at least one row of first contacts includes at least four contacts, the at least one row of second contacts includes at least four contacts,
78[j]	the socket structure is operative to simultaneously electrically connect via the first and the second contacts;

78[k]	the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
78[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
78[m]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
78[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
78[o]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 79:

79	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 78 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 80:

80	The socket structure of claim 78, wherein the tongue and the plastic base are integrally formed.
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Claim 81:

81	The socket structure of claim 80, wherein the metal housing at least partially covers the plastic base.
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Claim 82:

82	The socket structure of claim 81, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.
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Claim 83:

83	The socket structure of claim 82, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.
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Claim 84:

84	The socket structure of claim 83, wherein the tongue has chamfered corners on two sides of the tongue.
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Claim 85:

85	The socket structure of claim 84, wherein a portion of the tongue opposite the plastic base is tapered.
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Claim 86:

86	The socket structure of claim 85, wherein a thickness of the tongue is less than third of a height of the connection slot.
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Claim 87:

87	The socket structure of claim 86, wherein the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.
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Claim 88:

88[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
88[a]	a plastic base;
88[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
88[c]	a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface,
88[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
88[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
88[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
88[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
88[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
88[i]	the at least one row of first contacts includes more than four contacts, the at least one row of second contacts includes more than four contacts,
88[j]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
88[k]	the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
88[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
88[m]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

88[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
88[o]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 89:

89	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 88 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 90:

90	The socket structure of claim 88, wherein the tongue and the plastic base are integrally formed.
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Claim 91:

91	The socket structure of claim 90, wherein the metal housing at least partially covers the plastic base.
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Claim 92:

92	The socket structure of claim 91, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.
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Claim 93:

93	The socket structure of claim 92, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.
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Claim 94:

94	The socket structure of claim 93, wherein the tongue has chamfered corners on two sides of the tongue.
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Claim 95:

95	The socket structure of claim 94, wherein a portion of the tongue opposite the plastic base is tapered.
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Claim 96:

96	The socket structure of claim 95, wherein a thickness of the tongue is less than third of a height of the connection slot.
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Claim 97:

97[a]	The socket structure of claim 96, wherein: the socket structure is a universal serial bus socket structure and
97[b]	each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and
97[c]	each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,
97[d]	the tongue only contacts an interior portion of the plug when the plug is inserted,
97[e]	each contact of the first and second contacts is a portion of a respective terminal,
97[f]	a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue,
97[g]	the grooves in the first surface of the tongue each include a portion of one of the first contacts, and
97[h]	the grooves in the second surface of the tongue each include a portion of one of the second contacts.

Claim 98:

98[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
98[a]	a plastic base;

98[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
98[c]	a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface,
98[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
98[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
98[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
98[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
98[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
98[i]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
98[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
98[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
98[l]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
98[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
98[n]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 99:

99	An electrical connection system comprising the socket structure with the duplex electrical connection of claim 98 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 100:

100	The socket structure of claim 98, wherein the tongue and the plastic base are integrally formed.
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Claim 101:

101	The socket structure of claim 100, wherein the metal housing at least partially covers the plastic base.
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Claim 102:

102	The socket structure of claim 101, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.
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Claim 103:

103	The socket structure of claim 102, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.
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Claim 104:

104	The socket structure of claim 103, wherein the tongue has chamfered corners on two sides of the tongue.
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Claim 105:

105	The socket structure of claim 104, wherein a portion of the tongue opposite the plastic base is tapered.
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Claim 106:

106	The socket structure of claim 105, wherein a thickness of the tongue is less than third of a height of the connection slot.
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Claim 107:

107[a]	The socket structure of claim 106, wherein: the socket structure is a universal serial bus socket structure and
107[b]	each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and
107[c]	each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,
107[d]	the tongue only contacts an interior portion of the plug when the plug is inserted,
107[e]	each contact of the first and second contacts is a portion of a respective terminal,
107[f]	a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue,
107[g]	the grooves in the first surface of the tongue each include a portion of one of the first contacts, and
107[h]	the grooves in the second surface of the tongue each include a portion of one of the second contacts.

Claim 108:

108[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
108[a]	a plastic base;
108[b]	a metal housing at least partially covering the plastic base;
108[c]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

108[d]	a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface,
108[e]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
108[f]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
108[g]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
108[h]	at least one row of second contacts separately arranged on the second surface of the tongue; wherein:
108[i]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
108[j]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
108[k]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
108[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
108[m]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
108[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
108[o]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,
108[p]	the socket structure is a universal serial bus socket structure and

108[q]	each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover, and
108[r]	each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,
108[s]	the tongue only contacts an interior portion of the plug when the plug is inserted,
108[t]	each contact of the first and second contacts is connected to a respective portion of a respective terminal,
108[u]	the grooves in the first surface of the tongue each include a at least a portion of respective ones of the first contacts, and
108[v]	the grooves in the second surface of the tongue each include at least a portion of respective ones of the second contacts.

Claim 109:

109	An electrical connection socket and plug comprising the socket structure of claim 108 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 110:

110[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
110[a]	a plastic base;
110[b]	a metal housing at least partially covering the plastic base;
110[c]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
110[d]	a tongue, which has a top side with a first surface with grooves, and a bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
110[e]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
110[f]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein

110[g]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
110[h]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
110[i]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
110[j]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
110[k]	the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
110[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
110[m]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
110[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
110[o]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,
110[p]	the socket structure is a universal serial bus socket structure and
110[q]	each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover, and
110[r]	each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,
110[s]	the tongue only contacts an interior portion of the plug when the plug is inserted,
110[t]	each contact of the first and second contacts is a portion of a respective terminal,
110[u]	the grooves in the first surface of the tongue each include a respective portion of respective ones of the first contacts,

110[v]	the grooves in the second surface of the tongue each include a portion of respective ones of the second contacts,
110[w]	a portion of the tongue opposite the plastic base is tapered, and
110[x]	the tongue has chamfered edges on two opposite sides of the tongue.

Claim 111:

111	An electrical connection socket and plug comprising the socket structure of claim 110 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 112:

112[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
112[a]	a plastic base;
112[b]	a metal housing at least partially covering the plastic base;
112[c]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
112[d]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
112[e]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
112[f]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
112[g]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
112[h]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
112[i]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
112[j]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

112[k]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
112[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
112[m]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
112[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
112[o]	the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,
112[p]	the socket structure is a universal serial bus socket structure and
112[q]	each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover, and
112[r]	each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,
112[s]	the tongue only contacts an interior portion of the plug when the plug is inserted,
112[t]	each contact of the first and second contacts is connected to a portion of a respective terminal,
112[u]	the grooves in the first surface of the tongue each include at least a portion of respective ones of the first contacts,
112[v]	the grooves in the second surface of the tongue each include at least a portion of respective ones of the second contacts,
112[w]	a portion of the tongue opposite the plastic base is tapered,
112[x]	a thickness of the tongue, in at least one portion, is less than third of a height of the connection slot, and
112[y]	the tongue has chamfered edges on two opposite sides of the tongue.

Claim 113:

113	An electrical connection socket and plug comprising the socket structure of claim 112 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.
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Claim 114:

114[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
114[a]	a plastic base;
114[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
114[c]	a tongue, which has a first surface and a second surface disposed opposite the first surface and
114[d]	is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
114[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
114[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
114[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
114[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
114[i]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
114[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
114[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of

	connection terminals of the plug are electrically connected to the at least one row of second contacts and
114[l]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with up, down, left and right chambers around the tongue; and
114[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
114[n]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 115:

115[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
115[a]	a plastic base;
115[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
115[c]	a tongue, which has a top side with a first castellated surface and bottom side with a second castellated surface disposed opposite the first castellated surface and
115[d]	is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
115[e]	at least one row of first contacts separately arranged on the first castellated surface of the tongue, wherein
115[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
115[g]	at least one row of second contacts separately arranged on the second castellated surface of the tongue, wherein:
115[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base,

115[i]	the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and
115[j]	the socket structure is thereby configured for two separate operational states:
115[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second castellated surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
115[l]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with up, down, left and right chambers around the tongue; and
115[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first castellated surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
115[n]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 116:

116[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
116[a]	a plastic base;
116[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
116[c]	a tongue, which has a first surface and a second surface disposed opposite the first surface and
116[d]	is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
116[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein

116[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base, wherein
116[g]	a first portion of each of the first contacts is proud of a top-most surface of the tongue; and
116[h]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein
116[i]	a second portion of each of the second contacts is proud of a bottom-most surface of the tongue, and
116[j]	the socket structure is operative to simultaneously electrically connect on both sides of the tongue via the first and second contacts, wherein:
116[k]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base; and
116[l]	the socket structure is thereby configured for two separate operational states:
116[m]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
116[n]	the tongue is disposed at a middle within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
116[o]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
116[p]	the tongue is disposed at within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 117:

117[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
117[a]	a plastic base;

117[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
117[c]	a tongue, which has a top side with a first surface and bottom side with a second surface disposed opposite the first surface, and
117[d]	the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
117[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
117[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
117[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
117[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
117[i]	the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and
117[j]	the socket structure is thereby configured for two separate operational states:
117[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
117[l]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
117[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
117[n]	the tongue is centrally located within the connection, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 118:

118[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
118[a]	a plastic base;
118[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
118[c]	a tongue, which has a top side with a first surface and a bottom side with a second surface disposed opposite the first surface, and
118[d]	the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
118[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
118[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
118[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
118[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
118[i]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts;
118[j]	the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and
118[k]	the socket structure is thereby configured for two separate operational states:
118[l]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
118[m]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
118[n]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the

	plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
118[o]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 119:

119[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
119[a]	a plastic base;
119[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
119[c]	a tongue, which has a top side a first surface and a bottom side with a second surface disposed opposite the first surface, and
119[d]	the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
119[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
119[f]	each of the first contacts is electrically connected to a first pin extending out of the plastic base; and
119[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
119[h]	each of the second contacts is electrically connected to a second pin extending out of the plastic base;
119[i]	the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and
119[j]	the socket structure is thereby configured for two separate operational states:
119[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and

119[l]	the tongue is disposed at a middle within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
119[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
119[n]	the tongue is disposed at within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 120:

120[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
120[a]	a plastic base;
120[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
120[c]	a tongue, which has a top side with a first surface and a bottom side with a second surface disposed opposite the first surface, and
120[d]	the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;
120[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
120[f]	each of the first contacts is electrically connected to a first pin extending out of the plastic base; and
120[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
120[h]	each of the second contacts is electrically connected to a second pin extending out of the plastic base;
120[i]	the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

120[j]	the socket structure is thereby configured for two separate operational states:
120[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
120[l]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
120[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
120[n]	the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 130:

130[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
130[a]	a plastic base;
130[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
130[c]	a tongue, which has a first surface with recesses, and a second surface with recesses, the second surface disposed opposite the first surface,
130[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
130[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
130[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
130[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

130[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
130[i]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
130[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:
130[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
130[l]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
130[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
130[n]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 131:

131[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
131[a]	a plastic base;
131[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
131[c]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
131[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides

	of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
131[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
131[f]	each of the first contacts is electrically connected to a first pin extending out of the plastic base; and
131[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
131[h]	each of the second contacts is electrically connected to a second pin extending out of the plastic base;
131[i]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
131[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured such that:
131[k]	when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and
131[l]	when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

Claim 132:

132[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
132[a]	a plastic base;
132[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
132[c]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
132[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides

	of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
132[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
132[f]	each of the first contacts is electrically connected to a first pin extending out of the plastic base; and
132[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
132[h]	each of the second contacts is electrically connected to a second pin extending out of the plastic base;
132[i]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
132[j]	the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for reversible connection such that:
132[k]	when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and
132[l]	when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

Claim 133:

133[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
133[a]	a plastic base;
133[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
133[c]	a tongue, which has a first surface with recesses, and a second surface with recesses, the second surface disposed opposite the first surface,
133[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides

	of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
133[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
133[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
133[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
133[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
133[i]	the socket structure is operative to simultaneously electrically connect via the first and second contacts;
133[j]	some of the at least one row of first contacts has a functional reverse mirror configuration relative to some of the at least one row of second contacts, and the socket structure is thereby configured for two operational states:
133[k]	a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and
133[l]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and
133[m]	a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and
133[n]	the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

Claim 134:

134[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
134[a]	a plastic base;

134[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
134[c]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
134[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
134[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
134[f]	each of the first contacts is electrically connected to a first pin extending out of the plastic base; and
134[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
134[h]	each of the second contacts is electrically connected to a second pin extending out of the plastic base;
134[i]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
134[j]	at least some of the at least one row of first contacts has a functional reverse mirror configuration relative to at least some of the at least one row of second contacts, and the socket structure is thereby configured such that:
134[k]	when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and
134[l]	when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

Claim 135:

135[pre]	A socket structure with duplex electrical connection, the socket structure comprising:
135[a]	a plastic base;

135[b]	a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;
135[c]	a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface,
135[d]	the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;
135[e]	at least one row of first contacts separately arranged on the first surface of the tongue, wherein
135[f]	each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and
135[g]	at least one row of second contacts separately arranged on the second surface of the tongue, wherein:
135[h]	each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;
135[i]	the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;
135[j]	a portion of the at least one row of first contacts has a reverse mirror configuration relative to a portion of the at least one row of second contacts, and the socket structure is thereby configured for reversable connection such that:
135[k]	when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and
135[l]	when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

I. INTRODUCTION

The Office erred in granting the '307 patent, which reissued less than a year ago. The ninety-three Challenged Claims cover obvious variations of prior art that was before the Office (*e.g.*, Andre, Lufan, Zhenyu) but ignored during prosecution. The Examiner specifically erred by accepting applicants' arguments that the prior art lacked "simultaneous" electrical connections. As explained in Grounds 1-3 and 6-7, the Andre, Zhenyu, and Yuming references disclose the "simultaneous" limitation, under PO's broad interpretation in district court. As explained in Grounds 4-5, the combination of Lufan, Yuming, and Lee additionally disclose Petitioners' narrower interpretation of the limitation, as set forth in the intrinsic record.

II. REQUIREMENTS UNDER 37 C.F.R. 42.104

A. Grounds for Standing

Petitioners certify under 37 C.F.R. § 42.104(a) that the '307 patent is eligible for IPR and that Petitioners are not barred or estopped from requesting IPR on Grounds 1-7.

B. Identification of Challenge and Statement of Precise Relief Requested

This IPR, supported by the declaration of Dr. Sayfe Kiaei (EX1003), asserts the following grounds of unpatentability:

PO's Claim Interpretations	
Ground 1	<i>Andre</i> renders obvious claims 34-39, 41-65, 67-75, 78-86, 88-96, 98-106, 114-120, 130-135

Ground 2	<i>Andre with Lufan</i> renders obvious claims 34-120, 130-135
Ground 3	<i>Andre with Lufan, USB3.0</i> renders obvious claims 34-120, 130-135
Ground 6	<i>Lufan with Yuming, Yen, Zhenyu</i> renders obvious claims 34-51, 53-96, 98-106, 108-114, 117-120, 130-135
Ground 7	<i>Lufan with Yuming, Yen, Zhenyu, USB3.0</i> renders obvious claims 34-120, 130-135
Petitioners' or PO's Claim Interpretations	
Ground 4	<i>Lufan with Yuming and Lee</i> renders obvious claims 34-51, 53-96, 98-106, 108-114, 117-120, 130-135
Ground 5	<i>Lufan with Yuming, Lee, and USB3.0</i> renders obvious claims 34-120, 130-135

III. '307 PATENT

A. SPECIFICATION

The '307 patent discloses an electrical socket (left in Figs. 4A, 5A) that **(1)** has a **symmetric central tongue** 50 having contacts 61/71 on upper and lower tongue surfaces, EX1001, 5:54-65; **(2)** has a **functional reverse mirror configuration**, with upper(61)/lower(71) contacts having identical and reverse USB2.0 interfaces (upper: 4-3-2-1; lower: 1-2-3-4), *id.*, 6:26-7:8; and **(3)** allows a plug to be **reversibly inserted** right side up, Fig. 4A, or upside down, Fig. 5A, *id.*, 6:40-67.

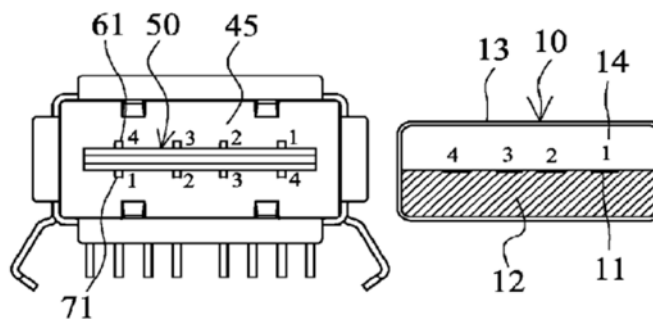


FIG. 4A

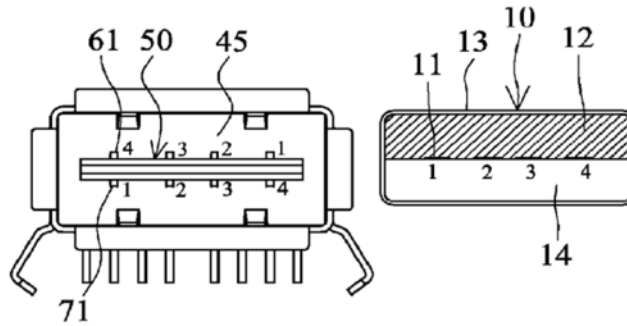


FIG. 5A

Further, the tongue must be operative to **simultaneously electrically connect** on both sides. The embodiment of the '307 patent describing “simultaneous[]” connections discloses a “dual-slot” socket where **two plugs** 21 may be inserted on the top **and** bottom of the tongue. EX1001, 8:35-9:13, Figs. 18-21.

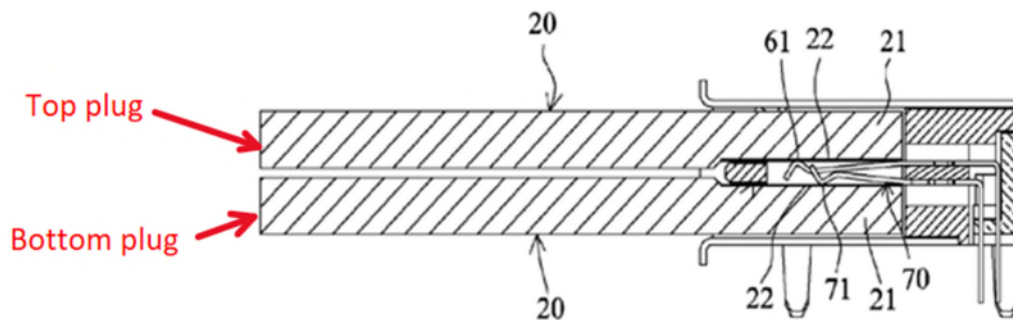


FIG. 19

EX1001, Fig. 19 (annotated),² Fig. 21.

B. FILE HISTORY

The Examiner cited prior art that disclosed (1) a **symmetric central tongue** 50; (2) with a **functional reverse mirror configuration**; and (3) that allows for

² All colored text/annotations added unless noted.

reversible insertion. EX1002, 186-290. Applicants did not dispute these disclosures and distinguished the art based on its purported failure to disclose a socket operative to “simultaneously electrically connect via the first and second contacts,” EX1002, 142-144, which applicants also characterized as allowing “two plugs to be inserted at the same time.”

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Applicant's representative discussed that Applicant's socket allows for plug to be inserted either way and two plugs to be inserted at the same time. Applicant's representative explained that Teicher allows the plug to be inserted either way but moves the tongue to block the opposite way once the plug is inserted. Applicant's representative explained that Lee allows for plug to be inserted either way, but due to the electrical circuitry only allows for one active plug at a time. Applicant's representative further explained combining Lee with Teicher is not possible due the deflection with the tongue. Examiner stated arguments appear to overcome the rejection of record but further search and consideration are need.

EX1002, 160.

IV. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA at the time of the '307 patent would have had either (i) a Master of Science in Electrical Engineering, or an equivalent field, or (ii) a Bachelor of Science in Electrical Engineering or an equivalent field and two years of experience in the design of electronic connectors. EX1003, ¶¶29-32.

V. CLAIM CONSTRUCTION

Petitioners propose that all terms be given their ordinary and customary meaning, except for—(1) **simultaneously electrically connect** terms (34[i], 48, 56[i], 57, 67[j], 68, 78[j], 79, 88[j], 89, 98[i], 99, 108[j], 109, 110[j], 111, 112[j], 113, 114[i], 115[i], 116[j], 117[i], 118[j], 119[i], 120[i], 130[i], 131[i], 132[i], 133[i], 134[i], 135[i]); (2) **duplex electrical connection** terms (preambles of claims 34, 56,

67, 78, 88, 98, 108, 110, 112, 114-120, 130-135 and claims 55, 57, 68, 79, 89, 99); and (3) **functional reverse mirror/reverse mirror** terms (34[j], 56[j], 67[k], 78[k], 88[k], 98[j], 108[k], 110[k], 112[k], 114[j], 118[i], 130[j], 131[j], 132[j], 133[j], 134[j], 135[j]). EX1003, ¶¶59-68.

The parties' different claim interpretations warrant consideration. For terms (1) and (2), Petitioners believe that, due to applicants' disclaimer, both require "*a dual-slot so that two plugs may be simultaneously connected thereto.*" §§III.A-B ("simultaneous[]" terms described as a "dual-slot" socket that allows insertion of two plugs); EX1001, 2:4-12 ("duplex electrical connection" described as "the socket structure may be used as a dual-slot and may be simultaneously electrically connected to two plugs."). EX1003, ¶¶60-65. For term (3), Petitioners believe that applicants' lexicography requires the socket's tongue to have "*identical predetermined sequences of contact functions on both sides, in reverse order.*" EX1001, 6:40-7:8 (defining "functional reverse mirror" in terms of two identical USB2.0 interfaces in reverse order). EX1003, ¶¶66-68.

Petitioners anticipate that PO will disagree and interpret terms (1) and (2) to cover a socket that accepts one plug and term (3) to cover a socket that has **different** sequences of contact functions on each side, consistent with PO's infringement allegations. *See, e.g.*, EX1004, 20-23, 91-94, 138-141, 203-206.

Because Petitioners' disclaimer/lexicography positions may not be adopted by the Board or district court, Petitioners present invalidity positions under both interpretations. *See* Grounds 4-5 (Petitioners' or PO's constructions), Grounds 1-3, 6-7 (PO's constructions).

VI. SUMMARY OF PRIOR ART

Petitioners assume without conceding that the Challenged Claims are entitled to an April 15, 2009 priority date and are subject to pre-AIA provisions of Title 35.

A. Andre (EX1005)

Andre issued on August 22, 2006 and is prior art under pre-AIA §§102(a)-(b), (e). Andre discloses a socket (Fig. 4A) that **(1)** has a **symmetric central tongue** having **upper** and **lower** contacts on the tongue surface, EX1005, 9:45-51; **(2)** has a **functional reverse mirror configuration**; and **(3)** allows for **reversible** insertion of a plug. EX1005, 3:49-4:2, 6:17-19, 6:33-43, 8:6-8, Figs. 2B-2C. Andre also describes that the socket **simultaneously** electrically connects to two sides of a single plug, under PO's interpretation of that term. EX1005, 12:64-13:3, 10:11-16.

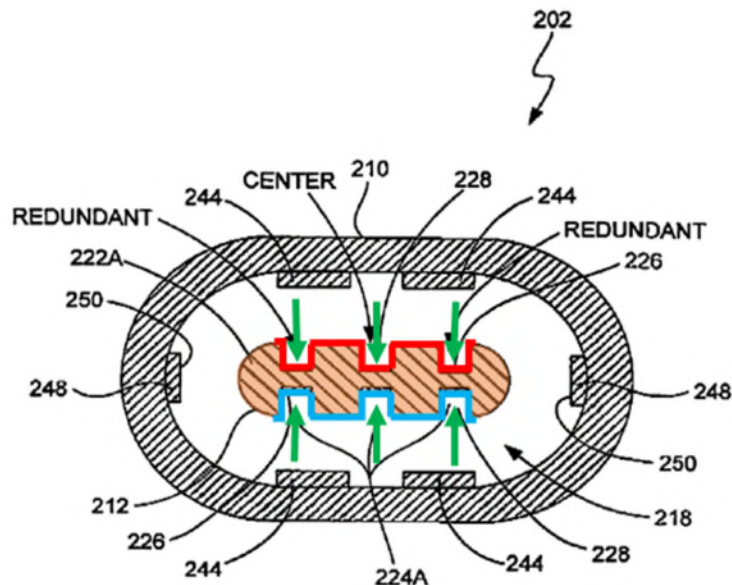


FIG. 4A

B. Zhenyu (EX1006)

Zhenyu published on March 19, 2008 and is prior art under pre-AIA §§102(a)-(b). Zhenyu discloses a USB plug (Fig. 4) that **(1)** has a **symmetric central** opening with contacts 1-4 and 5-8 on opposite walls, EX1006, 6-7; **(2)** has a **functional reverse mirror configuration** for contacts 1-4 and 5-8, as described in Grounds 6-7 (*id.*); and **(3)** allows **reversible** insertion of the plug into a socket, EX1006, 1. Both sides of plug can **simultaneously** electrically connect to a socket, under PO's interpretation of that term. EX1006, 7.

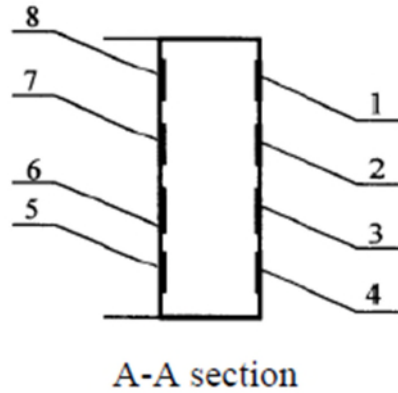


Fig. 4

C. Lufan (EX1007)

Lufan published on September 10, 2008 and is prior art under pre-AIA §§102(a)-(b). Lufan discloses a USB socket (Fig. 2) that **(1)** has a **symmetric central** tongue with contacts on both sides of the tongue, EX1007, 6; **(2)** has a **functional reverse mirror configuration** for the sets of contacts (*id.*); and **(3)** allows **reversible** insertion of a plug into the socket, EX1007, 1.

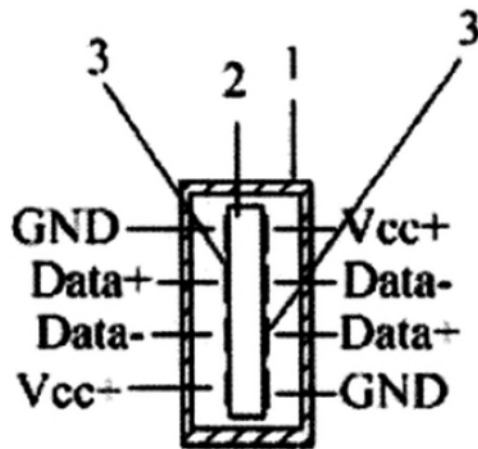
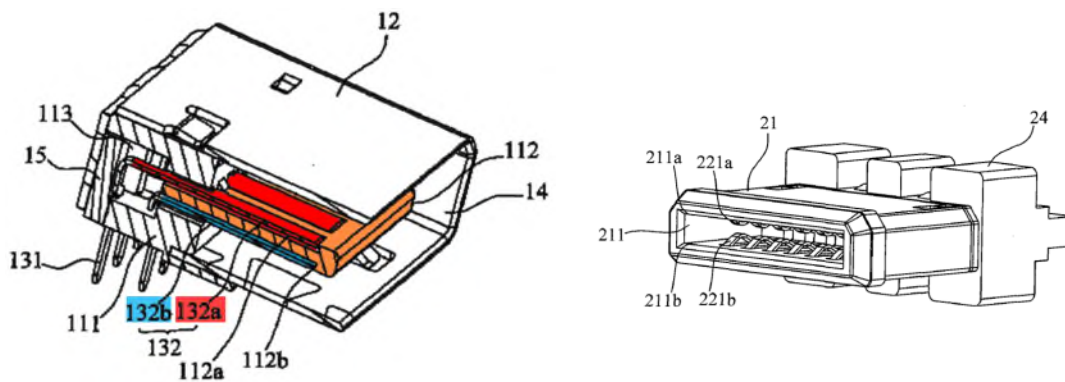


Fig. 2

D. Yuming (EX1008)

Yuming published on March 4, 2009 and is prior art under pre-AIA §§102(a)-(b). Yuming discloses a socket (Fig. 5) that has a **symmetric central tongue** (112) with two sets of contacts (132a and 132b) on either side of the tongue. EX1008, 7, Fig. 5. Yuming's plug (Fig. 4) also has two sides of contacts, and the socket and plug can **simultaneously** electrically connect, as analyzed in Grounds 4-7. EX1008, 8.



E. Yen (EX1009)

Yen issued on June 12, 2007 and is prior art under pre-AIA §§102(a)-(b), (e). Yen discloses an extension to USB called the “Dual-channel Universal Serial Bus” that adds data signals to increase USB’s data transmission rate. EX1009, 1:13-15, 1:22-23, 1:31-33, 2:46-48. Yen motivates adding a second USB interface to single-sided sockets and tongues.

F. Lee (EX1010)

Lee issued on February 15, 2005 and is prior art under pre-AIA §§102(a)-(b), (e). Lee discloses a Slim-USB-Plug, modified from standard USB plugs by

removing the metal casing. EX1010, 3:58-62. Lee motivates the insertion of two plugs into a double-sided socket, like Lufan's and Yuming's.

G. USB3.0 (EX1015)

USB3.0 is the Universal Serial Bus 3.0 specification published on November 12, 2008, and publicly available on the USB.org website, where a POSITA would have known to find it, and is prior art under pre-AIA §§102(a)-(b). EX1011, ¶¶44-46, Attachment 5; EX1003, ¶¶72-79. USB3.0 discloses well-known structural configurations for standard USB sockets operative to communicate via either USB3.0 or USB2.0 protocols. *Id.*; EX1015, 31.

VII. INVALIDITY

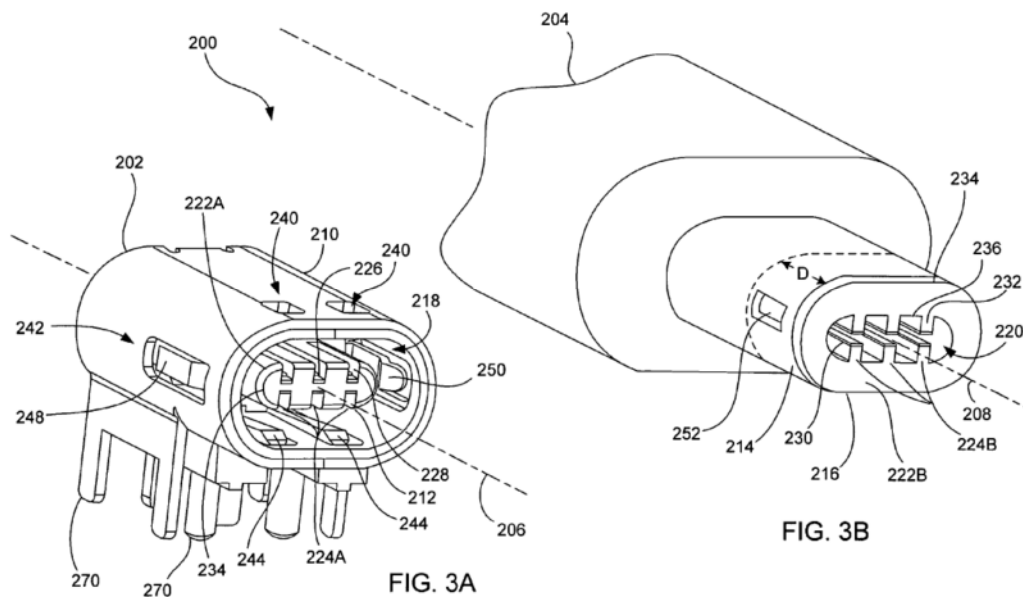
A. GROUND 1: ANDRE

Andre renders obvious the Challenged Claims that do not specify a USB interface (34-39, 41-65, 67-75, 78-86, 88-96, 98-106, 114-120, 130-135), under PO's interpretation of the simultaneous/duplex electrical connection terms. §V.

i. Independent Claim 34

34[pre]

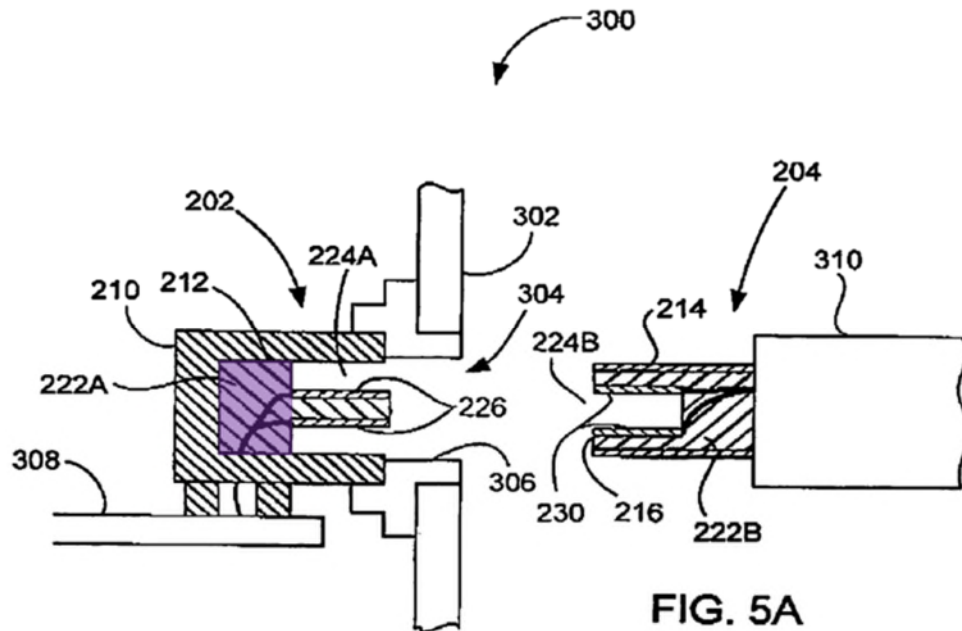
Andre's receptacle 202 is a socket with a “duplex electrical connection,” under PO's interpretation. §V.



EX1005, Figs. 3A-3B. Receptacle (left) is a reversible “socket structure” that receives a plug (right) into and out of the receptacle at 0/180 degrees. EX1005, 7:55-63, 10:11-16, 12:64-13:3; EX1003, ¶¶121-123.

34[a]

Andre's receptacle 202 (left) has a rear portion of the insulating member 222A (plastic base).



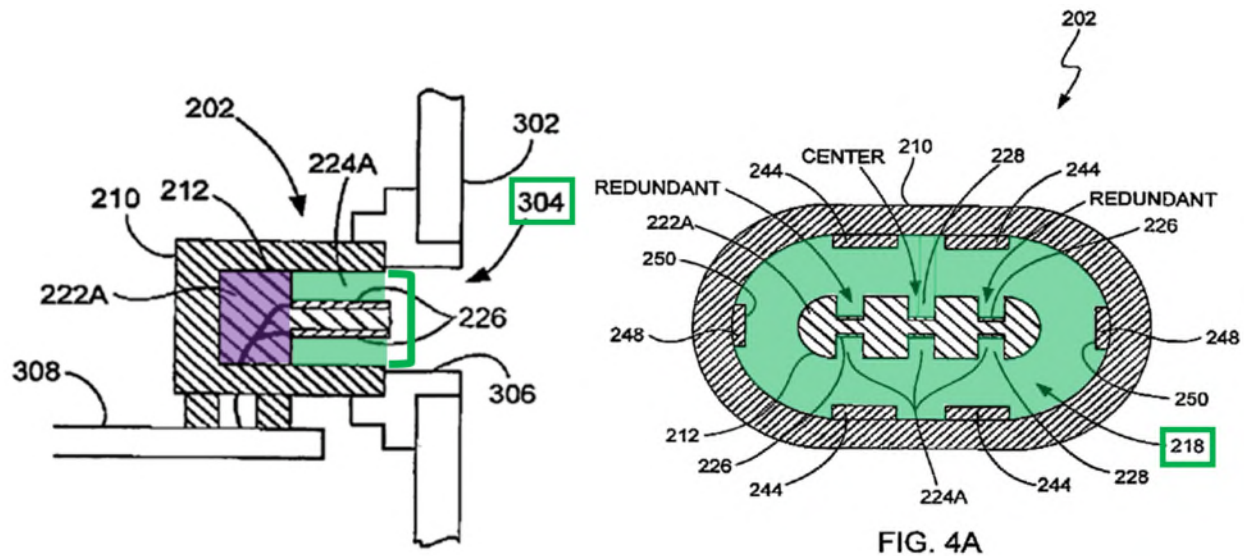
EX1005, Fig. 5A, 8:63-66. The insulating member “may be molded from various dielectric materials including *plastics*.”³ EX1005, 13:32-36. The insulating member is “press fit into the outer conductive shell[]” so it forms a base at a rear of receptacle 202. EX1005, 13:40-42; EX1003, ¶¶124-125.

34[b]

Receptacle 202 has an opening 304 (side-view, left) and gap 218 (front-view, right) that together form a *connection slot* in front of the rear portion of the insulating

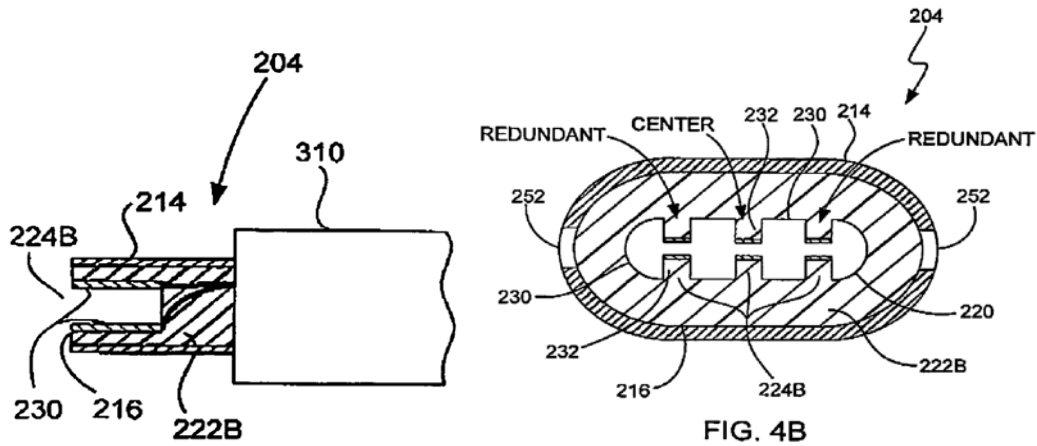
³ All emphasis added unless noted.

member 222A (plastic base) that is configured to be connected to Andre's plug 204 (which has rows of *connection terminals*).



EX1005, Figs. 5A (excerpt), 4A. Specifically, “opening 304 allows access for insertion of the plug 204 into the receptacle 202,” *id.*, 12:48-53, and “gap 218 is configured to receive” the plug. EX1005, 8:52-58, Fig. 3A. The gap 218 and opening 304 are at “the *front portion* of the inner electrode 212” in front of the rear portion of the insulating element 222A. EX1005, 8:52-56, 8:63-66.

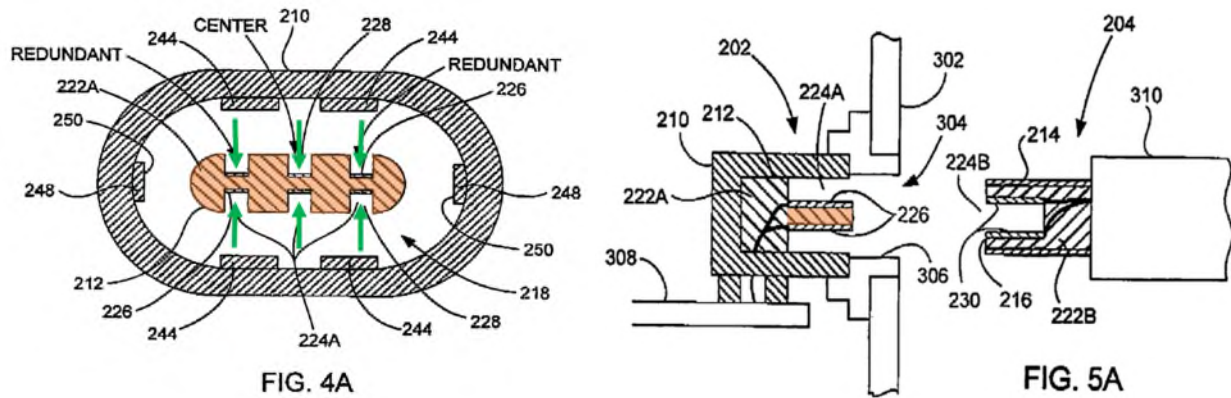
The plug has rows of electrical terminals 230, on the top and bottom of the opening. EX1005, 8:63-66, 9:57-61; EX1003, ¶¶126-129.



EX1005, Figs. 5A (plug side-view), 4B (plug front-view).

34[c]

Andre's **front portion of the insulating member 222A** (*tongue*) that contains inner electrode 212 has an upper surface (*first surface*) disposed opposite a lower surface (*second surface*) with **grooves 228** in each surface.



EX1005, Figs. 4A, 5A.

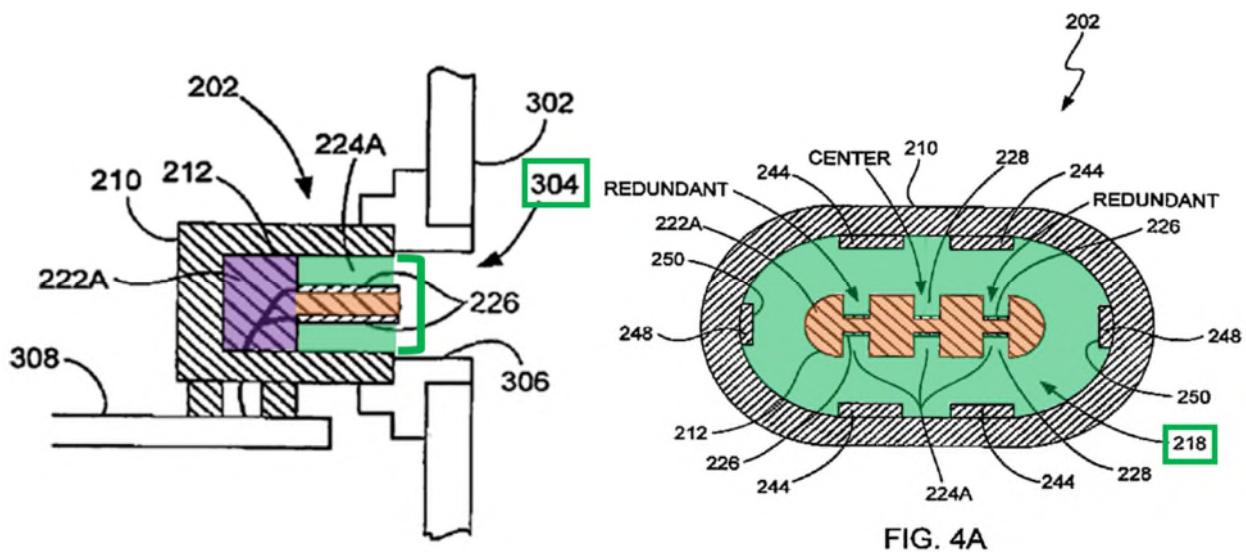
First, **front portion of insulating member 222A** is a tongue. It is located at the center of the receptacle 202 and is “dimensioned for sliding receipt” of the plug 204,

EX1005, 8:35-36, 8:54-58, and “provide[s] both a mechanical and electrical connection” to and is “easily engaged” with the plug. EX1005, 8:21-24, 10:20-27.

Second, **front portion of the insulating member 222A** has a top surface and a bottom surface, each with contact pads 226 that “are substantially planar and **positioned within upper and lower grooves or channels 228** in the insulating member 222A.” EX1005, Fig. 4A, 9:45-49, 12:37-41. Upper grooves 228 are on the top surface (*first surface*); lower grooves 228 are on the bottom surface (*second surface*). EX1003, ¶¶130-132.

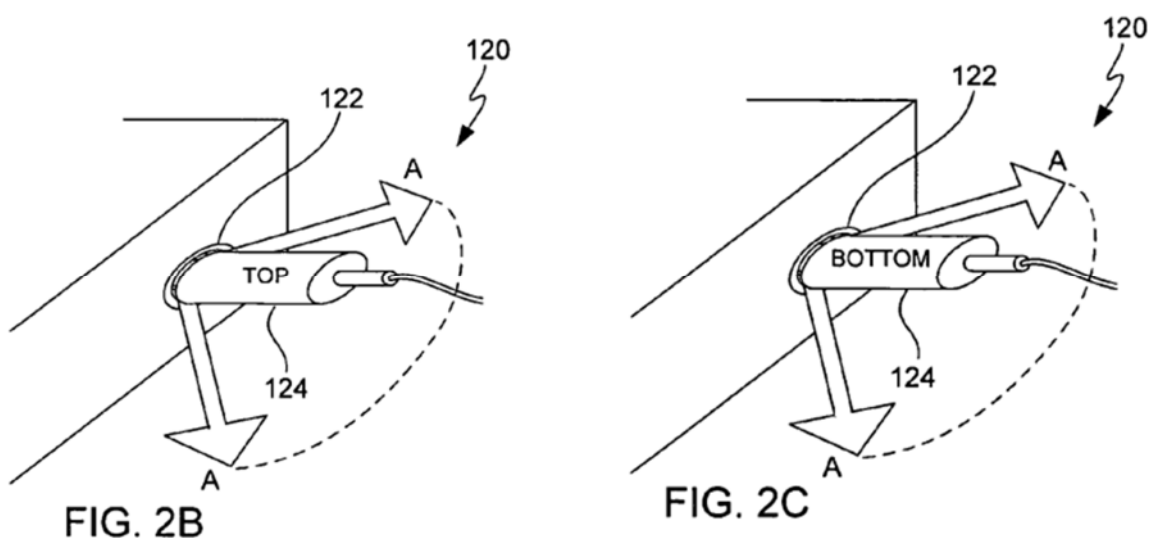
34[d]

Figures 4A and 5A show **front portion of the insulating member 222A** (*tongue*) disposed at one end of **rear portion of the insulating member 222A** (*plastic base*) within **gap 218** and **opening 304** (*connection slot*). EX1005, 8:54-56, 8:63-66, 6:39-44, 8:6-11.



EX1005, Figs. 5A (excerpt), 4A.

The chambers of the **gap 218** and **opening 304** on either side of the tongue allow Andre's plug to be normally and oppositely inserted into the receptacle “**at 0** [normally inserted] **and 180 degrees** [oppositely inserted].” EX1005, Figs. 2B-2C (below), 8:6-11. Reversibility is possible because the plug and receptacle (and receptacle **gap 218/opening 304**) are “symmetrical.” EX1005, 8:6-8 (“...configured to be 0/180 symmetrical...”), 6:39-44 (“...cross sectional shapes that are 0/180 symmetrical”), 8:56-59, Fig. 5A (showing symmetry); EX1003, ¶¶133-135.



34[e]

Andre's **upper contact pads 226** (row of *first contacts*) are separately arranged on the top surface (*first surface*) of **front portion of the insulating member 222A** (*tongue*), as shown below.

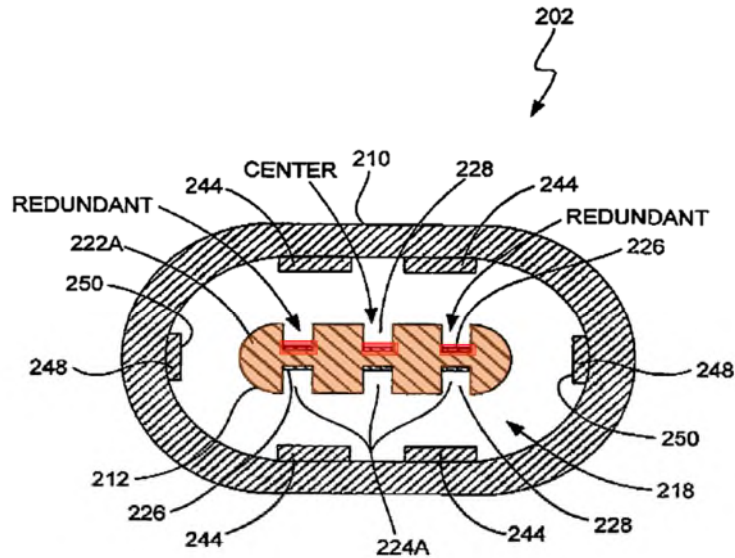
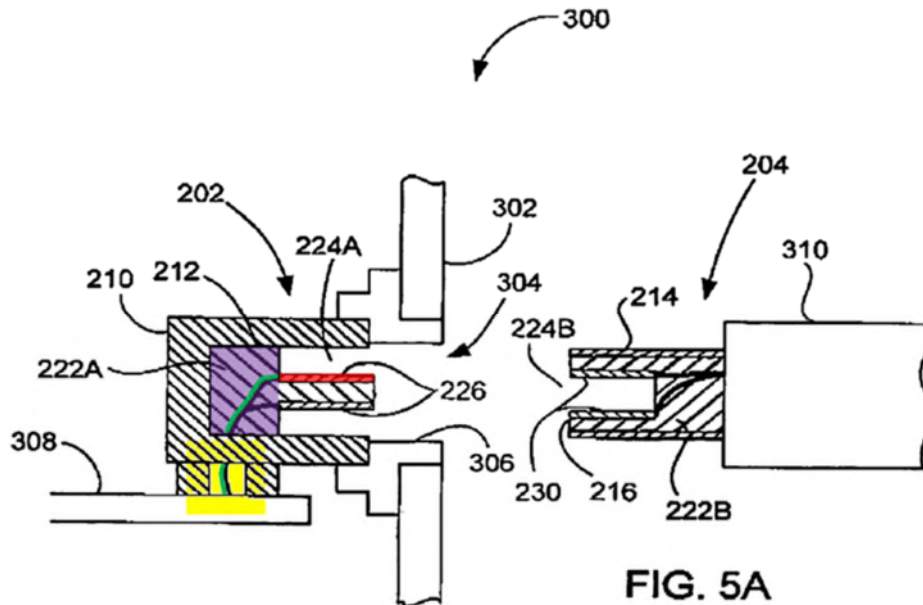


FIG. 4A

EX1005, Fig. 4A, 9:3-8, 9:45-47. The associated contact pads 226A in each contact area are “positioned within upper and lower grooves or channels 228 in the insulating member 222A.” EX1005, 9:45-49; EX1003, ¶¶136-137.

34[f]

Each **upper contact pad 226** (*each of the first contacts*) is connected to a respective **first wire** extending out of **rear portion of the insulating member 222A** (*first pin extending out of the plastic base*), as shown below.



EX1005, Fig. 5A.

Specifically, “[e]ach set of contact pads (upper/lower) is connected to a separate terminal or post, each of which is capable of being electrically connected to a PCB.” EX1005, 9:53-56. Each separate terminal/post may “include *a wire [pin]* embedded therein for connecting the contact pads to the PCB.” EX1005, 12:27-29. As shown above, the *first wire (first pin)* extends from *an upper contact pad 226* on the top surface of the tongue through *rear portion of the insulating member 222A (plastic base)* to a PCB 308. EX1005, Fig. 3A; EX1003, ¶¶138-141.

34[g]

Andre’s *lower contact pads 226 (row of second contacts)* are separately arranged on the bottom surface (*second surface*) of *front portion of the insulating member 222A (tongue)*, as shown below.

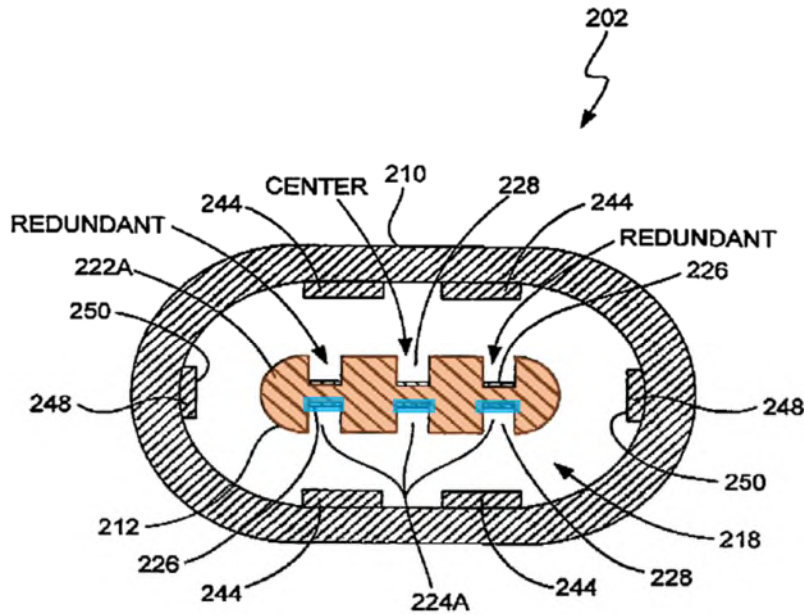
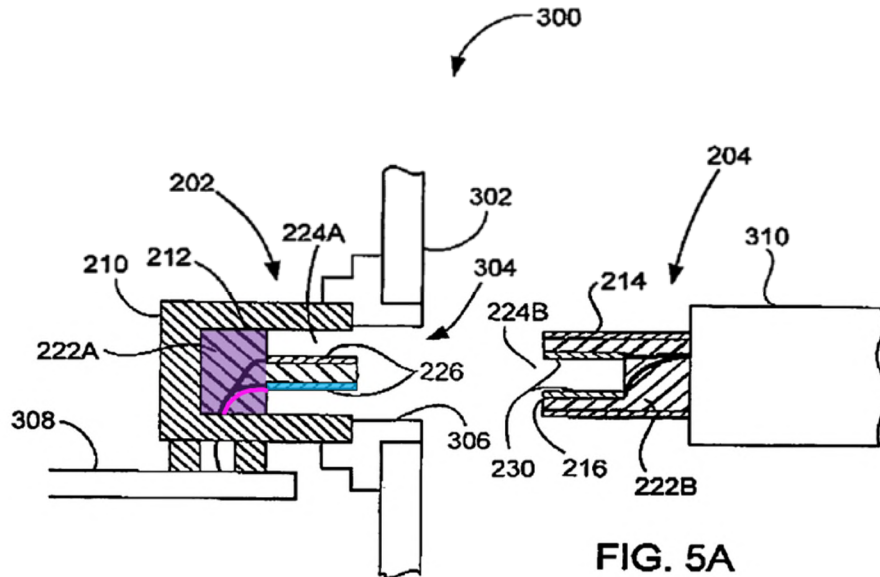


FIG. 4A

EX1005, Fig. 4A, 9:3-8, 9:45-47. Contact pads 226A in each contact area “are substantially planar and positioned within upper and lower grooves or channels 228 in the insulating member 222A.” EX1005, 9:45-49; EX1003, ¶¶142-143.

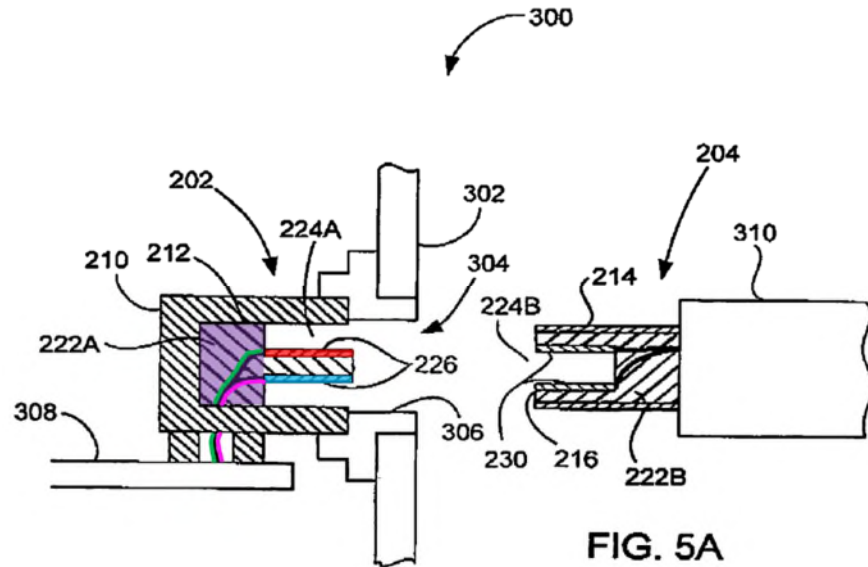
34[h]

It would have been obvious that each lower contact pad 226 (each of the second contacts) is connected to a respective second wire (second pin) extending out of rear portion of the insulating member 222A (plastic base). EX1003, ¶¶144-148.



EX1005, Fig. 5A.

Figure 5A shows separate wires (*pins*) extending from the upper and lower contact pads but does not expressly disclose whether both wires separately extend out of the plastic base. EX1005, 9:53-56, 12:27-29. As shown in modified Figure 5A below, it would have been obvious to a POSITA to implement Andre's embodiment to have two wires separately extending through the rear portion of the insulating member 222A, such that the *first pin* and *second pin* separately extend, *e.g.*, via separate posts, EX1005, 12:17-29, through a plastic base (as claimed) until connected together on the printed circuit board 308. EX1003, ¶145.



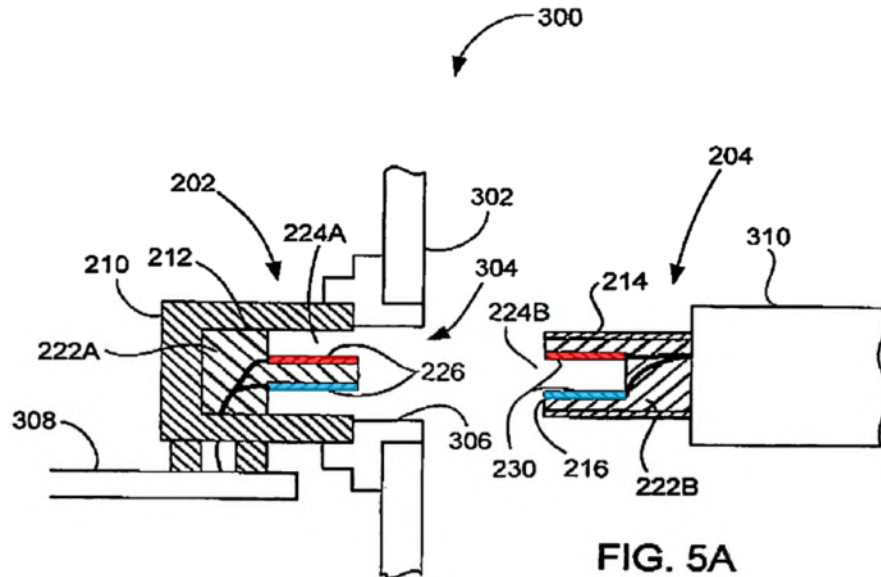
EX1005, Fig. 5A (modified).

A POSITA would have been motivated to implement Andre in this way to add redundancy and reliability. If two wires embedded in separate posts extend out of the plastic base for each upper/lower contact in a pair of redundant power contacts, then even if one external wire/post were to fail, power would still be provided to the socket. A POSITA would also have had a reasonable expectation of success, as it would simply involve moving the connection between two wires to a location outside of the housing, and Andre already contemplates that upper/lower contact pads could be connected elsewhere (“proximally, distally or somewhere in between”). EX1005, 9:51-53; EX1003, ¶¶144-148.

34[i]

Andre discloses 34[i] under PO's interpretation of "simultaneously electrically connect." §V. The upper contact pads 226 (*first contacts*) and lower

contact pads 226 (second contacts) electrically connect at the same time to different rows of contact pads 230 of plug 204.

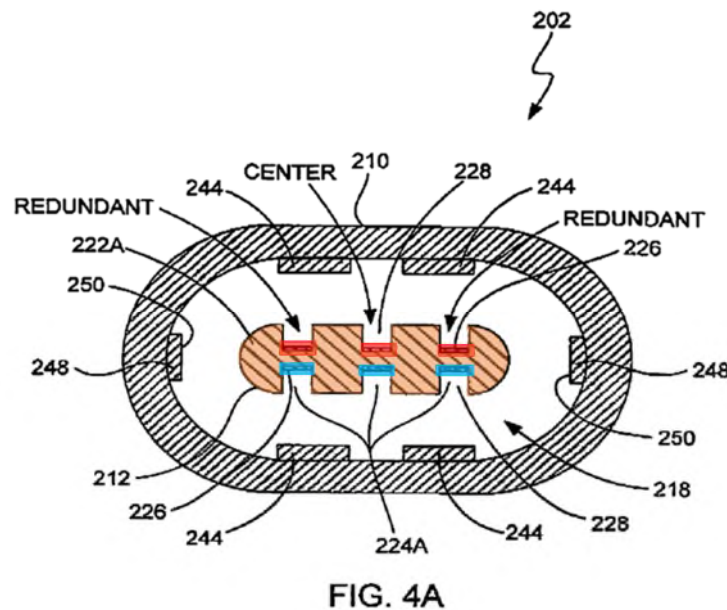


EX1005, Fig. 5A. Specifically, when the plug is inserted, “the inner electrodes 212 [receptacle, left] and 216 [plug, right] mate thus ensuring **electrical connection between the corresponding contacts** 224A and B, i.e., the **upper contact pads** contact each other and the **lower contact pads** contact each other.” EX1005, 12:64-13:3. When mated, “the rails 232 of the inner electrode 216 mate with the grooves 228 of the inner electrode 212 thus causing the **upper** and **lower contact pads 230** of the DC plug 204 to **electrically engage** the **upper** and **lower contact pads 226** of the DC receptacle 202.” EX1005, 10:11-16, Figs. 4A-4B; EX1003, ¶¶149-150.

34[j]

Under either party’s interpretation (§V), the **upper contact pads 226** (*first contacts*) have a functional reverse mirror configuration relative to **lower contact**

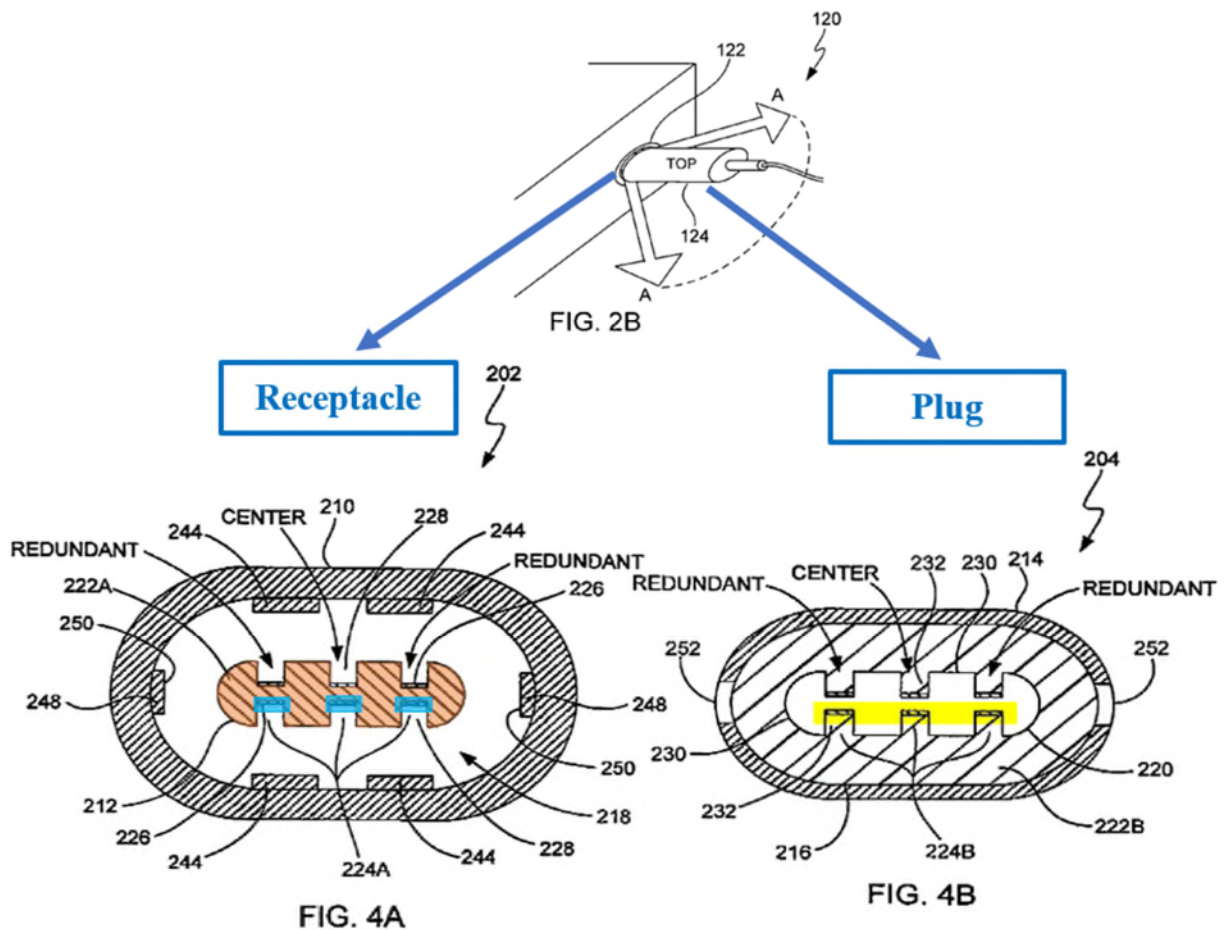
pads 226 (second contacts). Both sets of contacts have the “same pin layout on both sides of the center line”—specifically, “POWER,” “DATA,” “POWER”—such that the reverse of the upper contacts is identical to the lower contacts. EX1005, 6:33-35, 6:41-43 (“symmetrical on opposite sides of the major and minor axes...”), 9:5-25 (center data contacts and redundant power contacts “disposed an equal distance from the centerline 206...on opposing sides of the centerline 206...”). Moreover, each pair of upper/lower contact pads are “connected” for redundancy and therefore identical. EX1005, 9:51-53. This configuration allows Andre’s receptacle to receive a plug at 0 or 180 degrees (*two separate operational states*). EX1005, 6:17-23, 8:6-11, Figs. 2B-2C; EX1003, ¶151-154.



EX1005, Fig. 4A.

34[k]

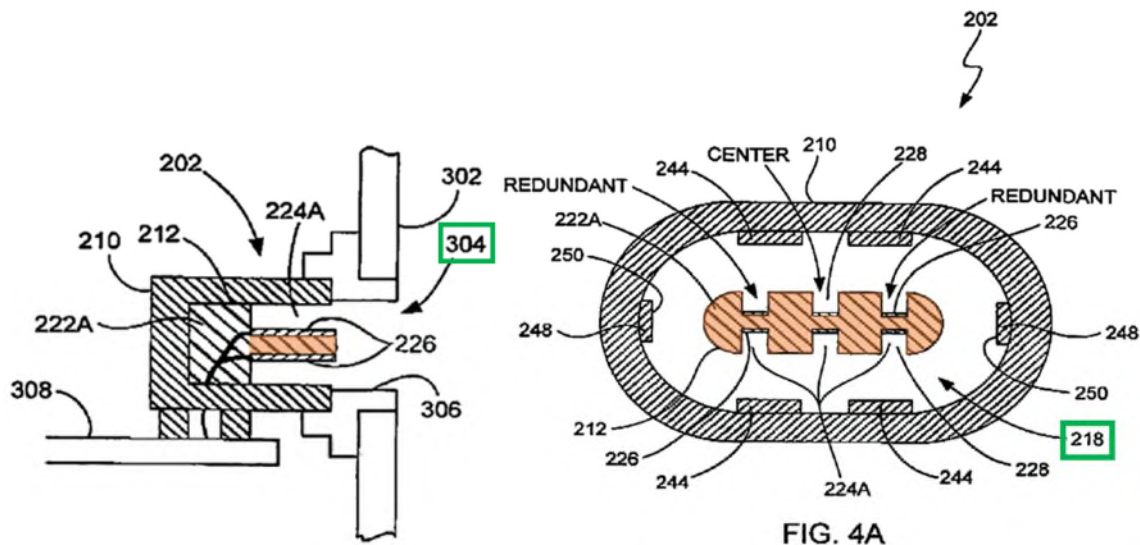
In Andre, the plug can be inserted face-up at 0 degrees (*first operational state when the plug is normally inserted*) such that one row of the **plug's terminals** (at least one row of connection terminals of the plug) faces the lower surface (*second surface*) of the **front portion of the insulating member 222A** (*tongue*) and electrically connects to the row of **lower contact pads 226** (*one row of second contacts*) in the receptacle.



EX1005, Figs. 2B, 4A-4B; §VII.A.i (34[i]-34[j]); EX1005, 8:6-11, 6:19-23, 12:64-13:3, 10:11-16, 5A-5B; EX1003, ¶¶155-157.

34[I]

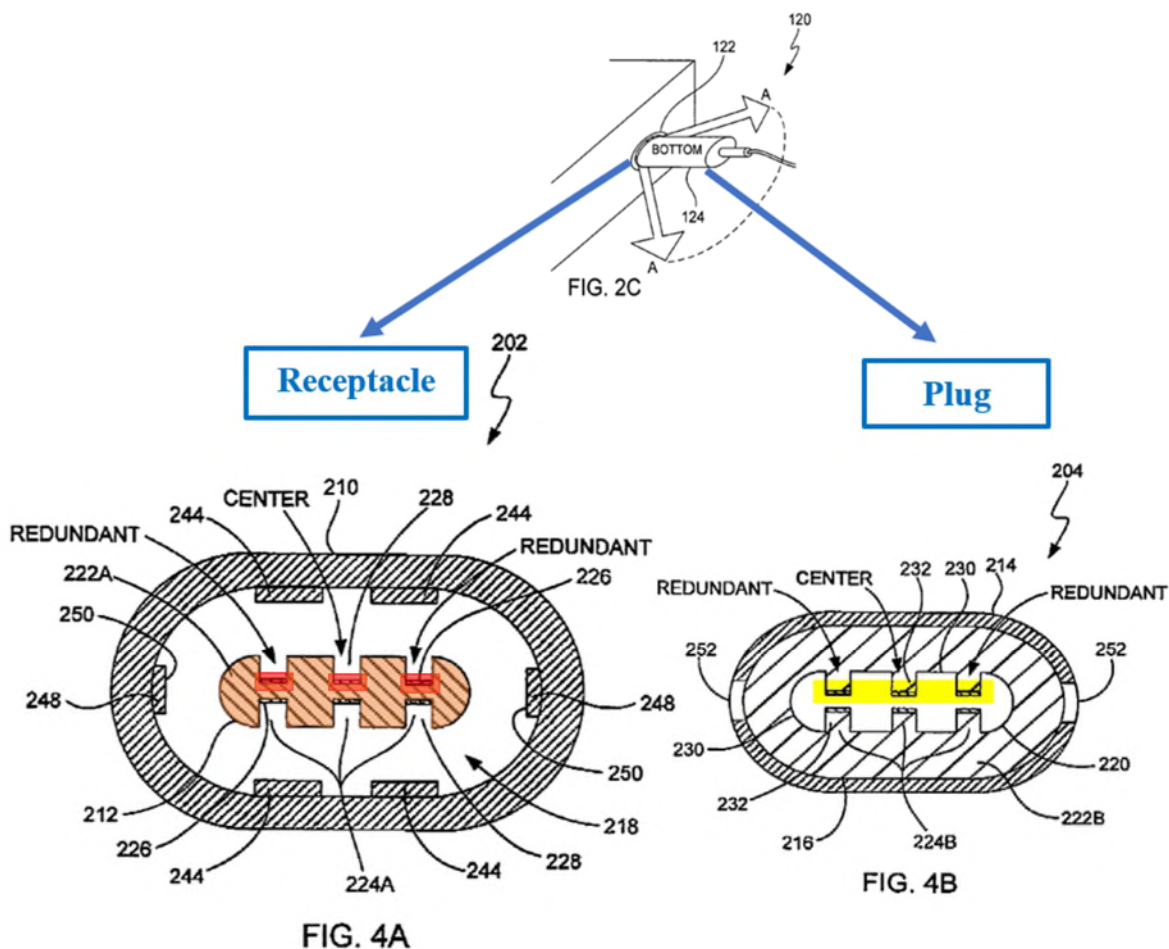
The front portion of the insulating member 222A (tongue) is disposed in the middle of the opening 304 and gap 218 (connection slot), creating symmetric up and down and left and right chambers around the tongue. EX1003, ¶¶158-160. Gap 218 forms chambers around the front portion of the insulating member 222A, §VII.A.i (34[b]), which are depicted as completely symmetrical in left-right and up-down directions.



EX1005, Figs. 5A (excerpt), 4A, 3A. Andre also describes that 0/180 degree insertion is “accomplished with *receiving and insertion elements having cross sectional shapes that are 0/180 symmetrical*. That is, the elements are *symmetrical on opposite sides of the major and minor axes....*” EX1005, 6:39-44, 8:6-11. And the plug and receptacle also “*are symmetrically placed* relative to one another along their centerlines 206 or 208” in the symmetrical chambers. EX1005, 8:45-49.

34[m]

In Andre, the plug can be inserted face-down at 180 degrees (*second operational state when the plug is oppositely inserted*) such that the one row of the **plug's terminals** (at least one row of connection terminals of the plug) now faces the upper surface (*first surface*) of the **front portion of the insulating member 222A** (*tongue*) and electrically connects to the row of **upper contact pads 226** (*one row of first contacts*) in the receptacle.



EX1005, Figs. 2C, 4A-4B; §VII.A.i (34[i]-34[j]); EX1005, 8:6-11, 6:19-23, 12:64-13:3, 10:11-16, 5A-5B; EX1003, ¶¶161-163.

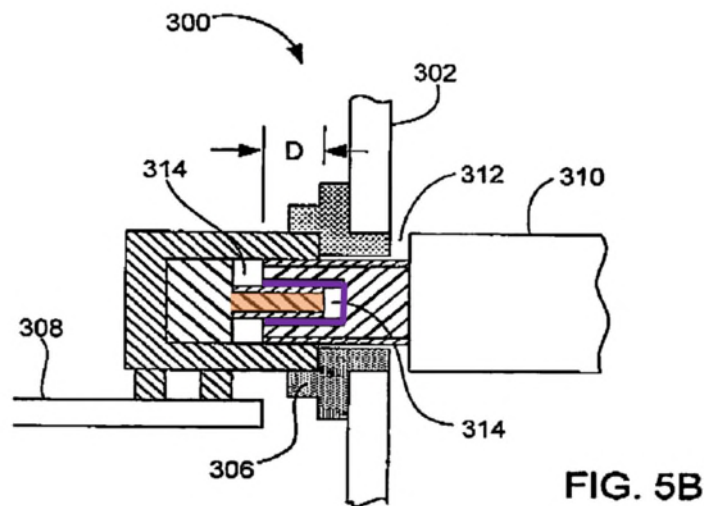
34[n]

34[n] is identical to 34[l] and disclosed for the same reasons. EX1003, ¶164.

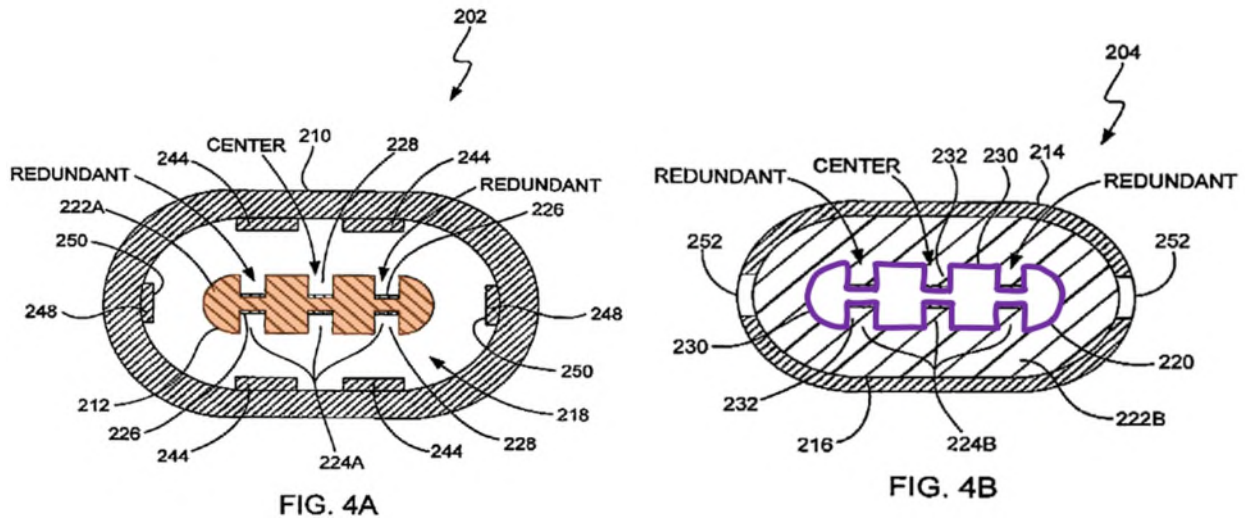
ii. Dependent Claims 35-39, 41-55

Claim 35

When receptacle 202 engages with plug 204, the **front portion of the insulating member 222A** (*tongue*) that contains inner electrode 212 inserts into and only contacts interior rails 232 within an **opening 220 of the plug 204** (*interior portion of the plug*). EX1003, ¶¶166-167.



EX1005, Fig. 5B, 10:4-16 (“the ***inner electrode 212*** of the DC receptacle 202 ***is mated within the inner electrode 216*** of the DC plug 204”).

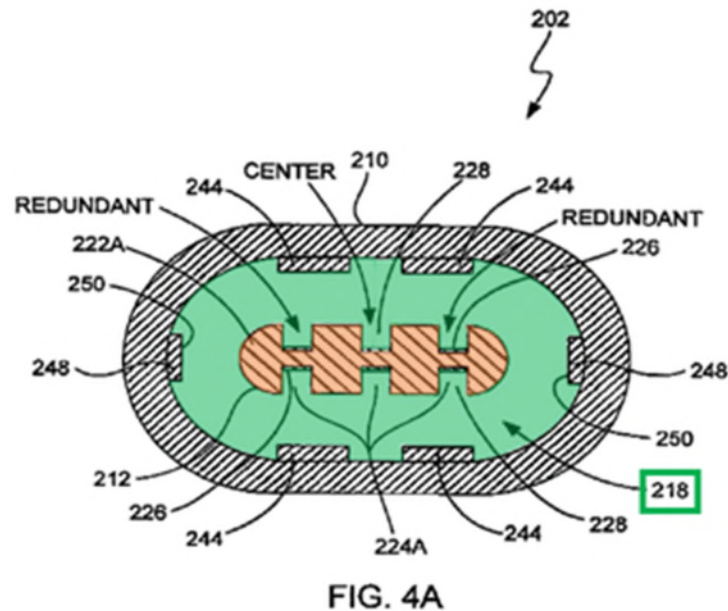


EX1005, Fig. 4A (receptacle), 4B (plug), Fig. 5B.

Claim 36

Andre renders obvious a tongue less than $\frac{1}{3}$ the connection slot thickness. EX1003, ¶¶168-174. Although Andre discloses no specific dimensions, the socket (below) is divided into three elements—a **tongue** centrally located within the socket's **connection slot**, which forms openings above and below the tongue—and a POSITA would have had a finite number of predictable options for relative thicknesses of these elements. The tongue could be (a) less than $\frac{1}{3}$ the connection slot, with larger openings above/below it; (b) exactly $\frac{1}{3}$ the connection slot, with equal-sized openings above/below; or (c) greater than $\frac{1}{3}$ the connection slot, with smaller openings above/below. EX1003, ¶¶168-170. Choosing one of these options is not inventive. *E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1006 (Fed. Cir. 2018) (“[I]t is not inventive to discover the optimum or workable ranges by routine experimentation.”); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 402-403

(2007) (a reason to choose among “a finite number of identified, predictable solutions” “is likely the product...of ordinary skill and common sense”).



EX1005, Fig. 4A (receptacle).

Indeed, the less than 1/3 thickness ratio should be presumed obvious because it “overlaps with a range disclosed in the prior art” (the thickness range for Andre’s tongue needed to leave openings for a plug). *UCB, Inc. v. Actavis Lab'ys UT, Inc.*, 65 F.4th 679, 689 (Fed. Cir. 2023) (presumption applies “[w]here a claimed range overlaps with a range disclosed in the prior art”) (citations omitted). Or, at the very least, it “abuts” the disclosed range (see EX1005, Fig. 4A, depicting about a 1/3 thickness ratio), and there is no “meaningful distinction” between Andre and the claim. *POSCO v. ArcelorMittal*, IPR2019-01275, Paper 31, 47-48 (P.T.A.B. Jan. 5, 2021) (presumption “where ‘the claimed range and the prior art range abut one

another[']”) (quoting *In re Brandt*, 886 F.3d 1171, 1177-78 (Fed. Cir. 2018)). In fact, the '307 patent discloses **no reason at all**, much less criticality or unexpected results, for the less than 1/3 thickness ratio. EX1003, ¶168.

Dr. Kiaie also explains that a POSITA's simple logic suggests and motivates the claimed range. A POSITA would have recognized that making each connection slot opening thicker than the tongue allows for thicker plug walls, which promotes robustness of the plug. EX1005, 3:65-66 (“Another aspect of the invention relates to DC plugs that are more robust.”). Indeed, unlike the socket's tongue, which is protected within the socket structure, a plug is not and is thus more likely to be damaged by user handling. EX1003, ¶¶171-173. When choosing how to divide the socket between the tongue and connection slot, a POSITA would have devoted the majority of thickness to the connection slot openings, so the plug walls would be largest to provide greatest mechanical strength, rendering the tongue less than 1/3 the thickness of the connection slot. *Id.*

There would also be a reasonable expectation of success. EX1003, ¶174. Andre discloses that the tongue can be made with various materials using an injection molding process, which could easily have achieved a tongue with a range of thicknesses, including as claimed. *Id.*; EX1005, 13:32-42.

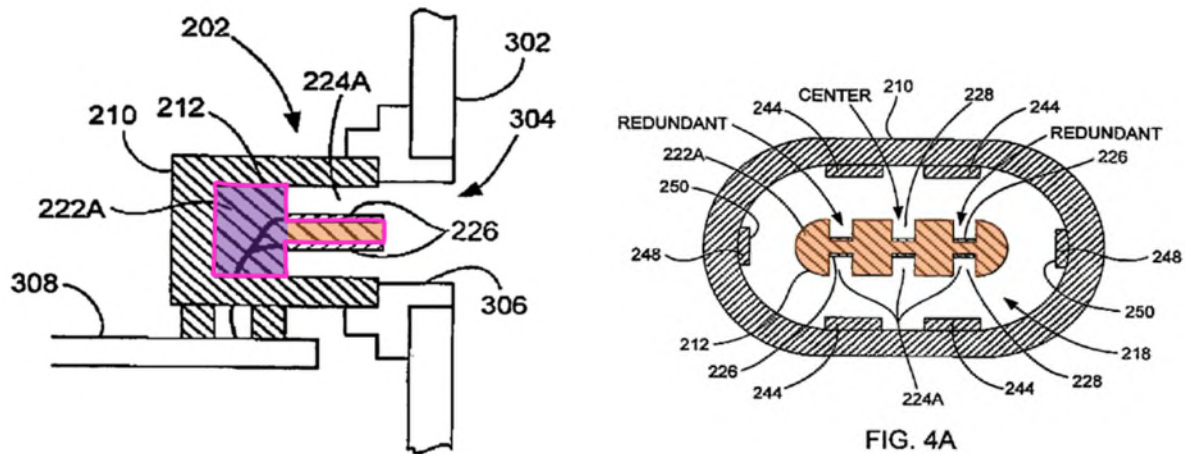
Claim 37

It would have been obvious to make upper contact pads 226 (*first contacts in the at least one row of first contacts*)—which are “substantially planar” to each other and “positioned at the base of the groove” (EX1005, 9:47-51, 9:5-8)—to also be coplanar with the base of the grooved portion, which is a portion of the top of the *front portion of insulating member 222A* (*a portion of the first surface of the tongue*). EX1003, ¶¶175-177.

A POSITA would have been motivated to implement this modification by Andre itself, which teaches that the contact pads may be “molded with the insulating member such that they are **embedded** in the insulating member.” EX1005, 13:38-40. It would have been obvious to make an embedded contact pad flush with a surface of the tongue (*coplanar*) to ensure a sufficient connection point with a plug. EX1003, ¶¶175-177. A POSITA would have had a reasonable expectation of success because the tongue is made through an injection molding process that could easily have been modified to embed contact pads. *Id.*; EX1005, 13:32-42.

Claim 38

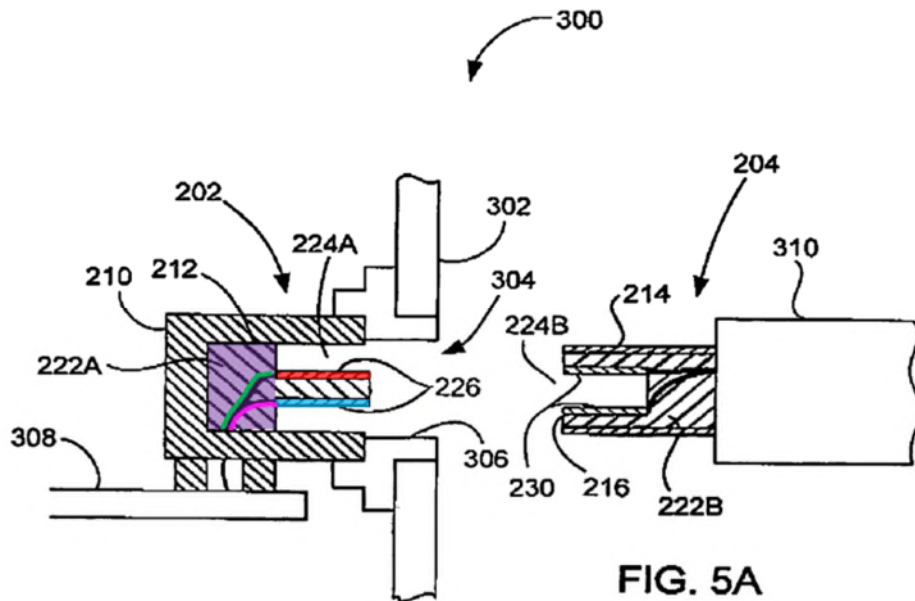
It would have been obvious to make lower contact pad 226 (*each of the second contacts in the at least one row of second contacts*) to also be coplanar with the top of the grooved portion, which is a portion of the bottom of the *front portion of*



EX1005, Figs. 5A (excerpt), 4A (element 222A is tongue and insulating base). Insulating member 222A is “typically [an] injection molded part[.]”—processes that a POSITA would have understood to form a single integral component. EX1005, 13:32-42; EX1003, ¶¶183-184.

Claim 42

In Andre, each of the **upper** and **lower contact pads 226** is a portion of a *first terminal* (together, **upper contact** and **first wire** within plastic base) and a *second terminal* (together, **lower contact** and **second wire** within plastic base), as shown below.



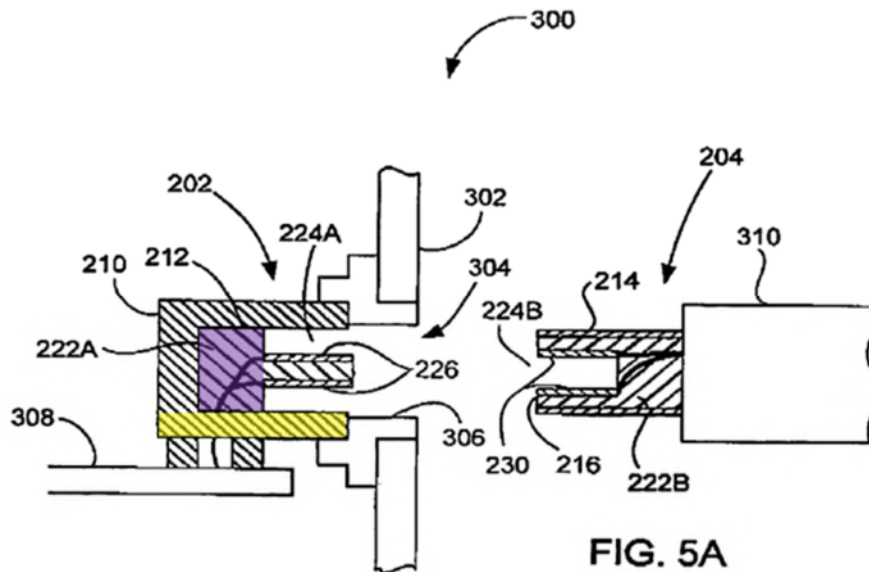
EX1005, Fig. 5A (modified), 9:53-56 (“[e]ach set of contact pads (upper/lower) is connected to a *separate terminal or post*, each of which is capable of being electrically connected to a PCB”); EX1003, ¶¶185-186.

Claim 43

This claim combines 34[f] and 34[h], with the addition that the first/second pins extend out of the plastic base “through a rear cover.” It would also have been obvious that the *first wire* (below left) and *second wire* (below right) extending out of plastic base (*first and second pins*) connecting each *upper contact pad 226* and *lower contact pad 226* (*each of the first and second contacts*) in 34[f] and 34[h] also extend out of a plastic base through a *rear portion* of the outer conductive shell 210 (*rear cover*). §VII.A.i; EX1005, 12:17-29; EX1003, ¶¶187-188.

Claim 45

In Andre, a rear portion of the outer conductive shell 210 (rear cover) extending from the front to rear of the socket is attached to the rear portion of the insulating member 222A (plastic base). EX1005, 13:32-42; EX1003, ¶191.



EX1005, Fig. 5A.

Claims 46-47

These claims are identical to claim 43 and disclosed for the same reasons. EX1003, ¶¶192-193.

Claim 48

Andre discloses a socket *connected to a plug and operative to simultaneously electrically connect via the first and second contacts*, under PO's interpretation, as described for 34[pre] and 34[i]. §§V, VII.A.i; EX1005, Fig. 5B (plug connected to socket); EX1003, ¶194.

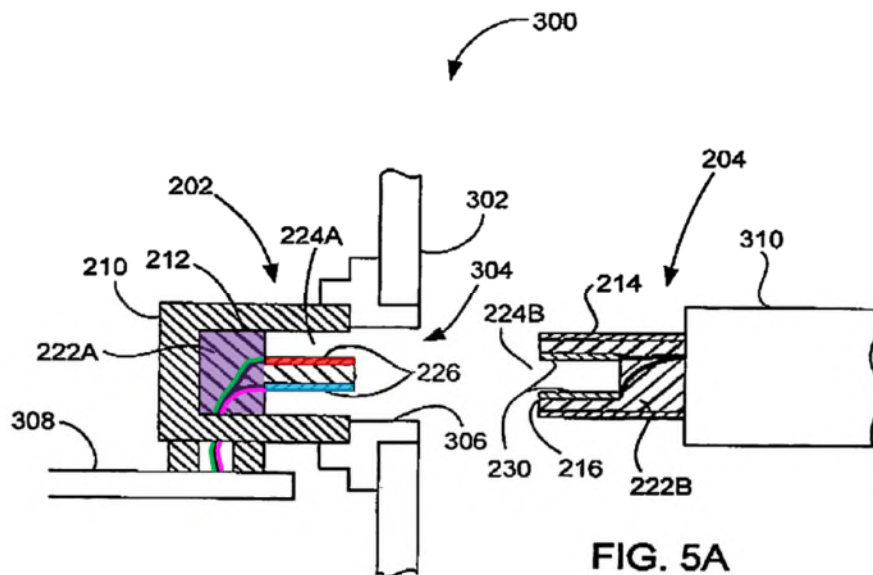
Claims 49-50

These claims are identical to claim 44 and invalid for the same reasons.

EX1003, ¶¶195-196.

Claim 51

Andre renders this limitation obvious for the reasons described for 34[f], 34[h], 42. §VII.A.i-ii. At either end of the *first terminal* are **upper contacts** (row of *first contacts*) and **first wires** extending out of the plastic base (*first pins*), and at either end of the *second terminal* are **lower contacts** (row of *second contacts*) and **second wires** extending out of the plastic base (*second pins*). EX1003, ¶197.



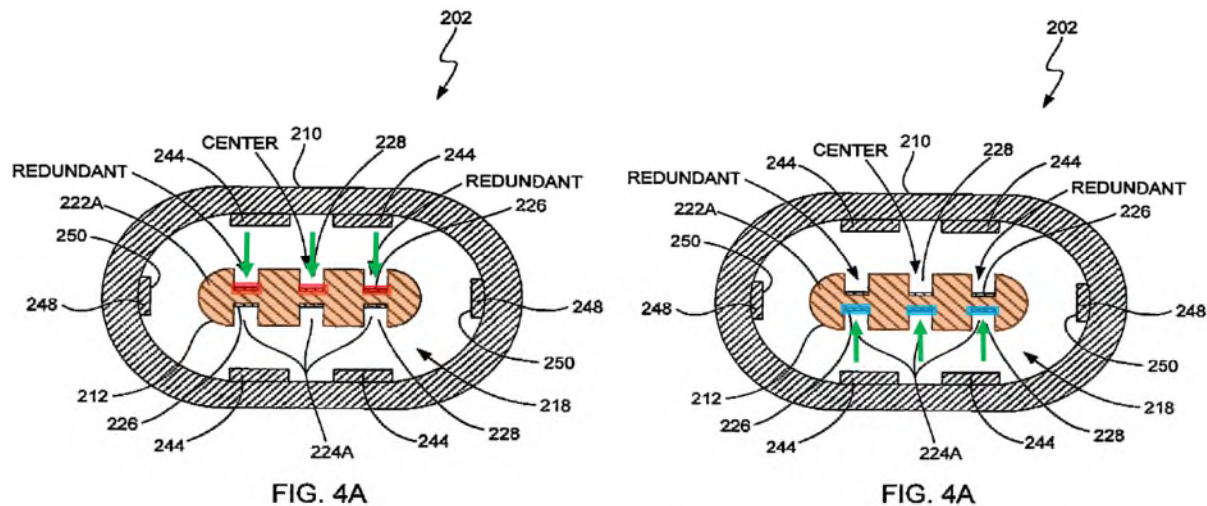
EX1005, Fig. 5A (modified).

Claim 52

Andre's **upper contact pads** (*first contacts*) project beyond (and are positioned on) a surface on the top of the tongue at the base of the **grooves** (*one surface*), and

Andre's **lower contact pads** (*second contacts*) project beyond (and are positioned on) a surface on the bottom of the tongue at the top of the **grooves** (*another surface*).

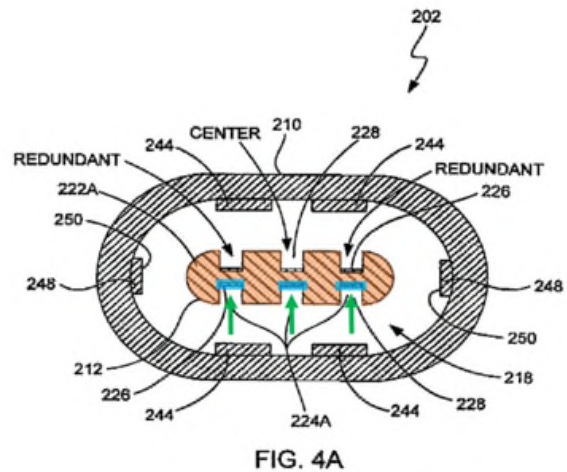
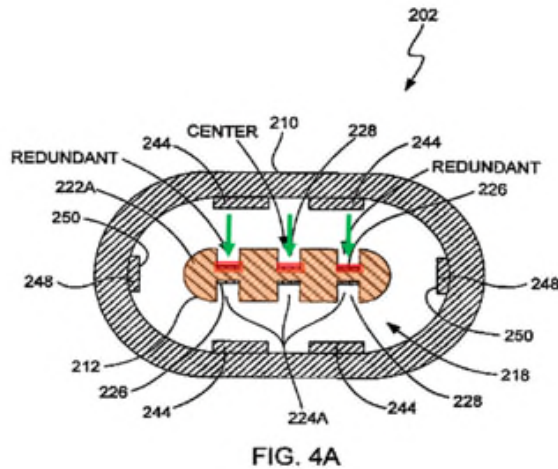
EX1003, ¶198.



EX1005, Fig.4A; EX1005, 9:45-56.

Claims 53-54

Andre renders these claims obvious. Andre's upper contact pads 226 (*first contacts*) are positioned at the base of grooves 228 (*grooves*) on the top surface (*first surface*) of the front portion of the insulating member 222A (*tongue*), and Andre's lower contact pads 226 (*second contacts*) are positioned at the top of grooves 228 (*grooves*) on the bottom surface (*second surface*) of the front portion of the insulating member 222A (*tongue*), as previously discussed. §VII.A.i (34[c]). Moreover, as described for claim 37, it would have been obvious to embed the contacts *in* the grooves, as recited here, as opposed to *on* the grooves, as shown in the figures. §VII.A.ii; EX1003, ¶¶199-202.



EX1005, Fig. 4A, 9:45-51.

Claim 55

Andre discloses a *connection system* with a socket having a *duplex electrical connection* and a plug, under PO's interpretation, as described for 34[pre], 34[i]. §§V, VII.A.i; EX1003, ¶203.

iii. Claim 56 and Dependent Claims 57-65

Claim 56 is substantially the same as claim 34 except (a) 56[c] specifies that the “first surface” of the tongue is on the “top side” and the “second surface” is on the “bottom side,” (b) 56[i] requires that the socket is “operative to simultaneously electrically connect **on the top and the bottom side** of the tongue (rather than “via the first and second contacts”), and (c) claim 56 does not include the “symmetrical” connection slot requirements. These differences do not change the invalidity analysis described for claim 34. Andre's tongue has a top and bottom side which are

simultaneously electrically connected to the plug, under PO's interpretation. §§VII.A.i (34[c], 34[i]), V; EX1005, 10:11-16, 12:64-13:3; EX1003, ¶¶204-205.

Claims 58-61, 65 are substantially identical to claims 41, 39, 44, 53/54, 36, respectively and invalid for the same reasons. §VII.A.ii; EX1003, ¶¶208-209, 217. The analysis is not impacted by the requirements of different intervening dependent claims. **Claim 57** is invalid for the reasons described for claims 55 and 48. §VII.A.ii; EX1003, ¶207. Andre's socket connects to a plug, with simultaneous electrical connections via the first and second contacts on either side of the tongue (under PO's interpretation). §V.

Claims 62-64 are analyzed further below.

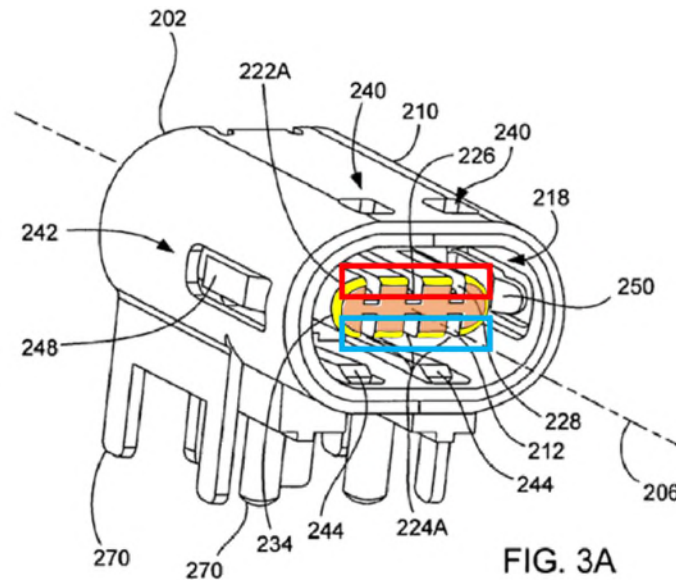
Claim 62

Andre renders claim 62 obvious. It would have been obvious to a POSITA to include two additional pairs of upper and lower contact pads 226, such that there are *six total contacts* in the linear array of **upper contact pads 226** (*first contacts*) and *six total contacts* in the linear array of **lower contact pads 226** (*second contacts*). EX1003, ¶¶210-213. The six contacts, for example, would be arranged as Power, Data, Data, Data, Data, Power, on each side of the tongue. *Id.* This arrangement is consistent with Andre's disclosure of adding more pairs of power or data contacts. EX1005, 6:28-30, 9:15-20 ("Although only one pair of redundant contacts is shown, it should be appreciated that this is not limitation and that more than one pair of

redundant contacts may be used.”). A POSITA would have thus been motivated by Andre to follow this teaching for reliability/backup (in case any contacts break) or to increase data transmission capacity using a single plug for user convenience, such as when “additional inputs” such as “Firewire, USB, network” are passed from the downstream “power converter” through the plug to the host, as Andre suggests. EX1005, 5:14-17; EX1003, ¶213. A POSITA would also have had a reasonable expectation of success because using more than four pins was known in the art (EX1015, 84 (*nine* pins)), and Andre already explains how to add contacts to maintain the functional reverse mirror configuration—“[w]hen plural, each set of redundant contacts is spaced further and further from the centerline within the same plane.” EX1005, 9:18-20; EX1003, ¶214.

Claim 63

Andre discloses that **front portion of the insulating member 222A (tongue)** “may include ***chamfered***...edges 234 for helping guide them into their respective gaps or openings.” EX1005, 10:20-23. Fig 3A shows **chamfered** **upper** and **lower tongue** surfaces. EX1003, ¶215.



Claim 64

Andre discloses front portion of the insulating member 222A (tongue) “may include...*tapered edges 234* for helping guide them into their respective gaps or openings.” EX1005, 10:20-23, Fig. 3A. A POSITA would have understood the taper to be at the tip (the outermost part) of the tongue to help with guidance. EX1003, ¶216.

iv. Independent Claim 67 and Dependent Claims 68-75

Claim 67 is substantially the same as claim 34, except (a) 67[d] adds that the plug is normally and oppositely inserted “based on an operational state when the socket structure is connected to the plug”; (b) 67[i] requires *six* contacts in each row; and (c) 67[k] recites a “reverse mirror” configuration rather than “functional reverse mirror” configuration. These differences do not change the invalidity analysis described for claims 34 and 62. Andre’s plug is normally/oppositely inserted based

on operational state. §VII.A.i (34[d], 34[j], 34[k], 34[m]). It would have been obvious to include six contacts on each side of Andre’s tongue, as described for claim 62. §VII.A.iii. Andre’s disclosure of “functional reverse mirror” also discloses “reverse mirror.” EX1003, ¶¶218-221.

Claims 68-73, 75 are substantially identical to claims 57, 41, 39, 44, 61, 63, 36, respectively, and invalid for the same reasons. §§VII.A.ii-iii. **Claim 74** (“a portion of the tongue opposite the plastic base is tapered”) is disclosed for the reasons described for claims 63-64. §VII.A.iii; EX1003, ¶¶222-223.

v. Independent Claim 78 and Dependent Claims 79-86

Claim 78 is substantially identical to claim 67, except claim 78 specifies that the socket’s plastic base has a “metal housing” (78[a]), there are “at least four” first and second contacts (78[i]), and the tongue is “at a central location” (78[m]-[n]). Andre discloses these limitations, as already described for claims 34, 39, 67, 70. §§VII.A.i-ii, iv; EX1003, ¶224.

Claims 79-86 are substantially the same as claims 57, 41, 39, 44, 61, 63, 74, 36, respectively, and invalid for the same reasons. §§VII.A.ii-iv; EX1003, ¶225.

vi. Independent Claim 88 and Dependent Claims 89-96

Claims 88-96 are substantially identical to claims 78-86 but without “metal housing” and are invalid for the same reasons. EX1003, ¶226.

vii. Independent Claim 98 and Dependent Claims 99-106

Claims 98-106 are substantially identical to claim 88-96 but without limiting the number of contacts and reciting “functional” in 98[j], and invalid for the same reasons. EX1003, ¶227.

viii. Independent Claims 114-120

Claim 114 is substantially the same as claim 98 but without “grooves” and is invalid for the same reasons. EX1003, ¶228.

Claims 115, 117-120 are invalid for the reasons explained for claim 114. All are substantially identical to claim 114 except (a) claims 115, 117, 119-120 remove the “functional reverse mirror” limitation; (b) claims 115, 117-120 require that “the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue” without reciting the word “simultaneously” (115[i]/117[i]/118[i]/119[i]/120[i]), and it would have been obvious for Andre to electrically connect on the top side, bottom side, or both, under PO’s interpretation, depending on the inserted plug, §VII.A.i (34[i]); and (c) claims 119 and 120 remove the word “respective” from certain limitations and refer to the tongue as in the “middle” or “centrally located,” which, if anything, broadens or does not substantially change the claim and does not change the obviousness in view of Andre. EX1003, ¶229. Finally, Claim 115 also requires “castellated” top/bottom tongue surfaces, which a POSITA would have understood to mean the top/bottom

surfaces at the edge of the tongue opposite the plastic base have a series of openings between tower-like elements above the contacts, which Andre also renders obvious. *Id.*, EX1005, Fig. 4A; §VII.A.iii (62).

Claim 116 is substantially the same as claim 98 but without “grooves” and “functional reverse mirror” and adds 116[g]/[i] requiring a portion of each of the first/second contacts to be proud of a top-most/bottom-most surface of the tongue. These additional limitations are met for the reasons described for claim 52—Andre’s contact pads project beyond a top-most surface of the tongue (at the base of the upper grooves) and project beyond a bottom-most surface of the tongue (at the top of the lower grooves). §§VII.A.ii, vii; EX1003, ¶230.

ix. Independent Claims 130-135

Claims 130 and 133 are invalid because they are substantially the same as claim 34 or broader because (a) in claim 133, “functional reverse mirror” applies only to “some” contacts,” and (b) both claims recite “recesses” rather than “grooves,” and grooves are a specific type of recess. §VII.A.i; EX1003, ¶231.

Claims 131-132, 134-135 are invalid because they are substantially the same as claim 34 except they (a) broaden scope by removing the symmetrical connection slot requirements and, for claims 131-132, 134, removing the word “respective” from certain limitations and, in claim 134-135, applying the “functional reverse mirror” limitation to “some”/a “portion” of contacts; and (b) recite “simultaneously

electrically connect on the top and the bottom side of the tongue,” which Andre does as described for claim 56, under PO’s interpretation. §§VII.A.i, iii; EX1003, ¶232.

B. GROUND 2: ANDRE WITH LUFAN

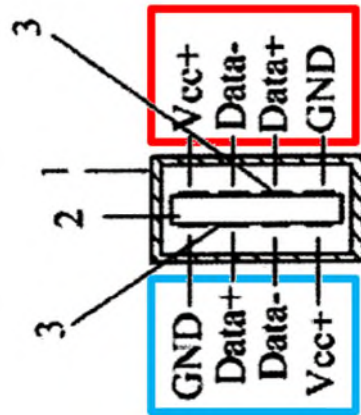
All Challenged Claims (34-120, 130-135), including those requiring a USB interface, would have been obvious in view of Andre and Lufan, which are analogous art. EX1003, ¶¶233-236. A POSITA would have been motivated to modify Andre’s connector to implement a socket with two USB interfaces, as disclosed in Lufan, with a reasonable expectation of success. *Id.*

i. Motivation to Combine

Andre relates to connectors for charging electronic devices, such as music players, cameras, and PDAs. EX1005, 4:11–14. Andre improved upon known connectors with a streamlined and easy-to-use design having a reversible, symmetric receptacle, which allows a plug to be inserted in two orientations with minimal insertion force. EX1005, Figs. 2B-2C, 6:17-19, 3:49-53, 3:66-4:2, 6:39-41. In addition to providing power, Andre’s socket can also include a “variety of corresponding electrical contact regions” where any number of contact regions may be “data contact region(s)” for data transmission. EX1005, 5:58-67, 9:21-23 (contacts “may correspond to data and/or power contacts”). Any of the power contacts could also be used for “returning current” (*e.g.*, GND). EX1005, 6:26-30; EX1003, ¶¶237-239.

Lufan has many overlapping characteristics with Andre’s connector. Like Andre, Lufan discloses an electrical socket focused on ease-of-use. Lufan improves

usability with a symmetrical design having a tongue in the middle of a socket, which allows the plug “to be inserted from both directions,” avoiding “the inconvenience of having to reorient the USB plug when inserted in the wrong direction....” EX1007, 1; EX1003, ¶240.



EX1007, Fig. 2.

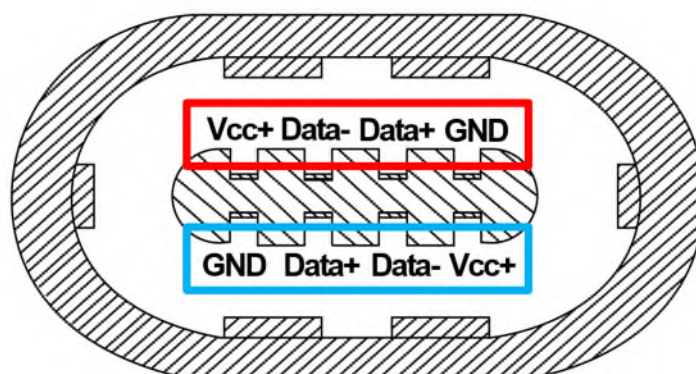
Lufan’s contacts are also ordered in a reverse mirror configuration. As shown above,⁴ Lufan implements a standard USB interface (VCC+, Data+, Data-, Ground) on each side of the socket. The contacts are “arranged in reverse order on either side” of the tongue; on one side, “power Vcc+, data- (data-), data+ (data+), and ground (GND),” and on the other side, “ground (GND), data+ (data+), data- (data-), and power Vcc+.” EX1007, 6. Like Andre, this configuration mirrors and reverses the

⁴ The Figure 2 image quality has been cleaned up according to Lufan’s specification.

contact sequence to enable identical electrical performance regardless of plug orientation. *Id.*; §VII.A.i (34[j]); EX1003, ¶241.

A POSITA would have been motivated to implement Andre’s socket design using Lufan’s USB interfaces on either side of Andre’s tongue. EX1003, ¶¶242-245. The combined socket, below in modified Andre Fig. 4A (“**Andre-Lufan-Socket**”), would have been straightforward to implement as an easy-to-use, streamlined connector requiring low insertion forces, as in Andre, with compliant USB interfaces. *Id.* It would simply require modifying Andre’s Fig. 4A embodiment so that (a) one set of redundant contacts provide a connection to Ground rather than Vcc+, which Andre already teaches can be done, EX1005, 6:26-30; and (b) one pair of central data contacts is added (one contact on the upper surface and one on the lower surface of Andre’s tongue), for two total pairs of data contacts, corresponding to Data+ and Data- in the USB interface—again, which Andre already teaches to do, EX1005, 5:58-67 (any number of contact regions may be “data contact region(s)”), 9:21-23 (contacts “may correspond to data and/or power contacts”). EX1003, ¶¶242-245. As in Andre, each pair of upper and lower contact pads would still be “connected” for redundancy and therefore identical. *Id.*; EX1005, 9:51-53.

Andre-Lufan-Socket



In view of the standardization of USB and its success in the market, a POSITA would have been motivated to make this combination and understood that modifying Andre to support a USB interface would expand the device’s marketability to users who owned or may buy USB peripherals, and who would be interested in a compatible host device for charging and data transmission. EX1003, ¶243; EX1038, 1 (iPod using USB); EX1015, 438 (5V of DC power); EX1005, 4:51-53 (specifying power supply in same range); EX1039, 1 (charging via USB).

Andre also motivates this modification by disclosing that its receptacle could be configured to comply with USB and receive “additional...data inputs (*e.g.*, Firewire, **USB**, network, etc.)” via a socket on a power converter. EX1005, 5:14-17, Fig. 1. To implement Andre’s teaching, a POSITA would have understood that the receptacle would need to include additional pins to carry the additional data signals set forth in the USB standard. EX1003, ¶244. In this regard, a POSITA would have been particularly motivated to turn to the USB-compliant interfaces of Lufan since

Lufan and Andre have similar features: (a) a socket with a central tongue and symmetrical chambers around the tongue; (b) data contacts on both sides of the tongue; (c) linearly symmetric data contacts; and (d) a reversible design to allow a plug to be inserted normally or oppositely. EX1003, ¶245. Turning to Lufan would also have been consistent with Andre’s teaching that a proper contact configuration should maintain reversibility, even when “the electrical contacts are not electrically identical.” *Id.*; EX1005, 3:55-59, 6:33-35.

A POSITA would have had a reasonable expectation of success in making this combination given the references’ similarities. EX1003, ¶¶246-248. The combination would have amounted to applying known elements (a double-sided USB interface on a central tongue in Lufan) to a known electrical connector (Andre’s socket/plug, both of which can include additional data contacts) using known methods (functional reverse mirror contact arrangements in plastic sockets) to yield predictable results (a reversible, double-sided USB connector). EX1003, ¶¶247-248. These changes would have been well within the skill of a POSITA, without requiring undue experimentation. *Id.* Indeed, the combination is already described by Andre, which expressly discloses how its design can be modified to implement a pair of power contacts as ground contacts and by adding pairs of redundant contacts that can be data pins in a linear array. EX1005, 1:66-2:2, 6:26-30, 9:5-18. EX1003, ¶246.

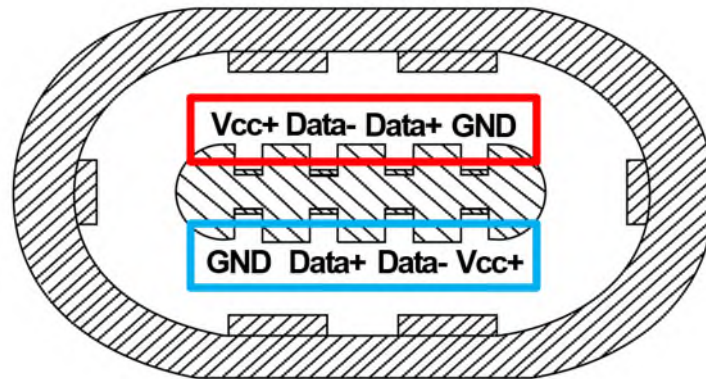
ii. **Independent Claim 34**

34[pre], 34[a]-34[i], 34[k]-34[n]: These elements recite structural socket elements, reversibility, and simultaneous connections, all of which are invalidated by Andre (under PO’s interpretation of 34[pre], 34[i]). §VII.A.i; EX1003, ¶¶250-255, 259. The Andre-Lufan-Socket adopts these features of Andre, §VII.B.i, and discloses these limitations for the reasons described for Ground 1.

34[j]. “...functional reverse mirror configuration...”

The Andre-Lufan-Socket discloses this limitation. The four **upper contact pads 226** (*first contacts*) have a functional reverse mirror configuration relative to the four **lower contact pads 226**: both sets of contacts are linearly arranged as “VCC+,” “DATA-,” “DATA+,” “GND” in reverse order, such that the reverse of the upper contact sequence is the same as the lower contact sequence. As in Andre, each pair of upper/lower contact pads would be “connected” for redundancy and therefore identical, EX1005. 9:51-53. And the Andre-Lufan-Socket can receive a plug at 0/180 degrees (*two operational states*). §VII.B.i; EX1003, ¶¶256-258.

Andre-Lufan-Socket



iii. Dependent Claims 35-55

Claims 35-39, 41-55: The Andre-Lufan-Socket discloses these claims for the reasons described in Ground 1. §VII.A.ii. The Andre-Lufan-Socket retains the structural configuration of Andre's socket; both have the same two-sided tongue with contacts in a reverse mirror configuration, which electrically connect to a plug. EX1003, ¶¶260-262, 264-275.

Claim 40: The Andre-Lufan-Socket is a USB socket structure. §VII.B.i; EX1003, ¶263.

iv. Independent Claim 56 and Dependent Claims 57-66

Claim 56 is substantially the same as claim 34, §VII.A.iii, and the Andre-Lufan-Socket discloses the differences (tongue has a top and bottom side simultaneously electrically connected to the plug, under PO's interpretation), §§VII.B.i, VII.B.ii (34[c], 34[i]), V; EX1003, ¶276. Andre and Lufan therefore render claim 56 invalid for the reasons described in claim 34.

Claims 58-61 and 65-66 are substantially identical to claims 41, 39, 44, 53/54, 36, 40, respectively, and are invalid in view of Andre with Lufan for the same reasons. §VII.B.i-iii; EX1003, ¶¶279-280, 288-289. The analysis is not impacted by the requirements of different intervening dependent claims, and **Claim 57** is invalid for the reasons described for claims 55 and 48. §VII.B.iii; EX1003, ¶278.

Claim 62 (at least five first/second contacts) is invalid for the same reasons described for Ground 1. §VII.A.iii (62). A POSITA would have been motivated to include additional power or data contacts at the top and bottom of the Andre-Lufan-Socket, as already taught by Andre, EX1005, 9:15-20, 6:28-30, for additional reliability or to increase data transmission capacity using a single plug for user convenience, such as when “additional inputs” from “Firewire, USB, network” are passed from the downstream “power converter” through the plug to the host. EX1005, 5:14-17. A POSITA would have had a reasonable expectation of success, as previously explained. EX1005, 9:18-20; EX1003, ¶¶281-285.

Claims 63 and 64 are invalid for the same reasons described for Ground 1; the Andre-Lufan-Socket implements Andre’s socket structure, including chamfered edges/tapered tongue. §VII.A.iii (63-64), VII.B.i; EX1003, ¶¶286-287.

v. Independent Claim 67 and Dependent Claims 68-77

Claim 67 is substantially the same as claim 34, and the differences do not change the invalidity analysis described for claim 34. §VII.A.iv. The Andre-Lufan-

Socket accepts a plug normally/oppositely based on the operational state. §VII.B.i-ii (34[d], 34[j], 34[k], 34[m]). It would have been obvious to include six contacts on each side of the Andre-Lufan tongue, §VII.B.iv (62), in a “reverse mirror” configuration, §VII.B.ii (34[j]); *see also* §VII.A.iv (67[k]). EX1003, ¶¶290-293.

Claims 68-73, 75-77 are identical to claims 57, 41, 39, 44, 61, 63, 36, 40, 43, respectively, and invalid for the same reasons. §§VII.B.iii-iv; EX1003, ¶294. For **Claim 77**, to the extent PO argues that outer conductive shell 210 cannot be both the “rear cover” and “metal housing,” it would have been obvious to make outer conductive shell 210 as two structures—a “metal housing” and a “rear cover” covering the plastic base. EX1003, ¶294. Andre itself states that the outer conductive layer can be “formed from two layers 211A and 211B” to create rigidity (EX1005, 13:24-28), which would have motivated a POSITA to use two layers (constituting a separate rear cover and metal housing, both over the plastic base) with a reasonable expectation of success. *Id.*

Claim 74 is disclosed for the reasons described for claims 63/64. §VII.B.iv; EX1003, ¶295.

vi. Independent Claim 78 and Dependent Claims 79-87

Claim 78 is substantially the same as claim 67, §VII.A.v, and the Andre-Lufan-Socket discloses those limitations, as described for claims 34, 39, 67, 70. §VII.B.i-ii, v; EX1003, ¶296.

Claims 79-86 are substantially the same as claims 57, 41, 39, 44, 61, 63, 74, 36, respectively, and invalid for the same reasons. §§VII.B.iii-v. **Claim 87** is a combination of claims 40 and 43 and invalid for the same reasons, and as described for claim 77. §§VII.B.iii, VII.B.v; EX1003, ¶¶297-298.

vii. Independent Claim 88 and Dependent Claims 89-97

Claims 88-96 are substantially the same as claims 78-86 but without “metal housing” and are invalid for the same reasons. Claims 97 recites the same limitations as claims 40, 43, 35, 42, 52, and 61, and is invalid for the same reasons, and as described for claim 77. §§VII.B.iii-iv, VII.B.v; EX1003, ¶299.

viii. Independent Claim 98 and Dependent Claims 99-107

Claims 98-107 are substantially the same as claim 88-97 but without limiting the number of contacts and reciting “functional” in 98[j] and invalid for the same reasons. EX1003, ¶300.

ix. Independent Claims 108, 110, 112 and Dependent Claims 109, 111, 113

Claim 108-109 are substantially the same as claims 98 and 57, except add the limitations of claims 35, 39, 40, 42, 43, and 61, all of which are disclosed by the Andre-Lufan-Socket. §VII.B.iii-iv. Claims 110-111 are invalid for the same reasons as 108, 56-57, 63-64, and Claims 112 and 113 are invalid for the same reasons as claims 110-111 and 36. §§VII.B.iii-iv; *see also* §VII.A.iv (67[k]); EX1003, ¶¶301-303; §VII.B.v (obviousness of metal housing/rear cover).

x. Independent Claims 114-120

Claim 114 is substantially the same as claim 98, §VII.A.viii, but without “grooves” and invalid for the same reasons. EX1003, ¶304.

Claims 115, 117-120 are invalid for the same reasons as claim 114, and because it would have been obvious for the Andre-Lufan-Socket to electrically connect on the top side, bottom side, or both, under PO’s interpretation, depending on the inserted plug, and to include castellated surfaces. VII.B.ii (34[i]); VII.A.viii; EX1003, ¶305.

Claim 116 is invalid for the same reasons as claim 98 but without “grooves” and “functional reverse mirror,” as well as because the contact pads of the Andre-Lufan-Socket are proud of a top-most and a bottom-most surface of certain portions of the tongue. §VII.B.iii (52). EX1003, ¶306.

xi. Independent Claims 130-135

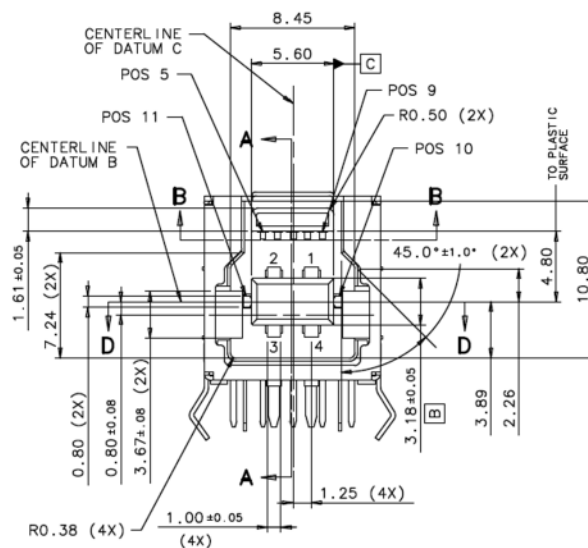
Claims 130-135 are invalid because they are substantially the same as claim 34 or broader as stated in Ground 1. §§VII.B.ii; VII.A.ix; EX1003, ¶¶307-308.

C. GROUND 3: ANDRE WITH LUFAN AND USB3.0

A POSITA would have been motivated to combine the Andre-Lufan-Socket with USB3.0, which is analogous art, to further render obvious the “thickness,” “proud”/“projections,” and “castellated” limitations. EX1003, ¶309.

i. Thickness Limitations: Claims 36, 65, 75, 86, 96, 106, 112[x]

As shown below, USB3.0 discloses a known USB-B tongue less than 1/3 thickness of a connection slot. EX1015, 91 (receptacle tongue (3.18mm) less than 1/3 connection slot height (10.80 mm)).



A POSITA would have made the Andre-Lufan-Socket with the same tongue-to-socket thickness ratio. EX1003, ¶¶310-312. A POSITA would have been motivated by the Andre-Lufan-Socket to adopt a tongue less than 1/3 thickness of a connection slot to increase robustness of the connection. §§VII.A.ii (36), VII.B.iii (36). A POSITA determining how to implement that structure would have looked to

USB3.0-B receptacle because, similar to the Andre-Lufan-Socket, it has a USB2.0 interface (1-2-3-4) across two sides of a tongue. EX1015, 91; EX1003, ¶312. There would have been a reasonable expectation of success based on decades-old teachings of symmetrical connectors with a tongue less than 1/3 connection slot thickness. EX1003, ¶312; EX1032, Fig. 1, 21:6-22:5 (tongue (18) thickness 221µm (18); connection slot thickness more than 800µm, including two openings, 304.8µm thickness (22, 24)).

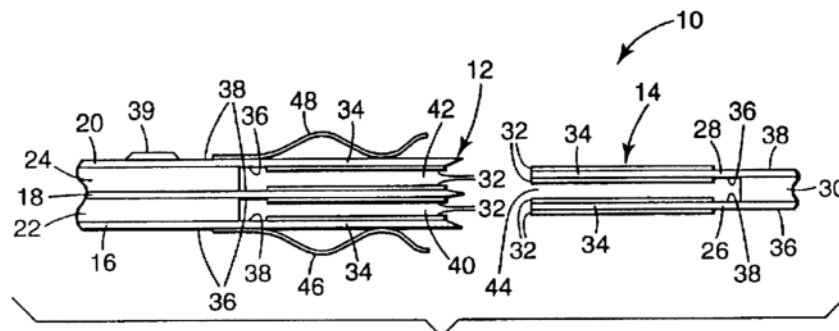
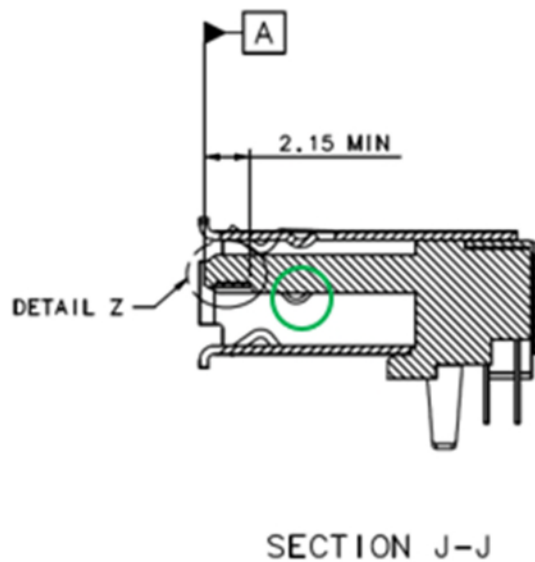


Fig. 1

ii. “Proud”/“Projections” Limitations: Claims 52, 97, 107, 116

Contacts that are “proud” or “projections” above a tongue surface are further rendered obvious in view of USB3.0, which discloses contacts that project above the surface of a tongue, as shown below.



EX1015, 77. A POSITA would have been motivated to include a projection along the length of a contact in the Andre-Lufan-Socket to further ensure a strong connection point with the inserted plug. EX1032, Fig. 10, 17:34-37 (“bumps” on contacts for “concentrating contact force”); EX1003, ¶313. USB3.0’s projections would have been a clear choice for implementation of Andre, among a finite set of options, with a reasonable expectation of success. EX1003, ¶313.

iii. **Castellated Surfaces: Claim 115**

USB3.0 also discloses Micro-USB with castellated tongue surfaces, providing a POSITA a reasonable expectation of success using such surfaces. EX1015, 96. Such surfaces would have been a predictable design choice among a finite set of options, with the benefit of enhancing connection interfaces. EX1003, ¶314.

D. GROUND 4: LUFAN WITH YUMING AND LEE

Claims 34-51, 53-96, 98-106, 108-114, 117-120, 130-135 would have been obvious in view of Lufan with Yuming and Lee under either party's claim interpretations. §V. The references are analogous art relating to electrical connectors. EX1003, ¶¶315-318.

i. Motivation to combine

Lufan discloses a USB socket with a central tongue 3 (“plug core”) with two symmetric sides of “metal conductive contacts.” EX1007, 1, Fig. 2. Lufan's two sides of contacts creates two USB interfaces in “reverse” order, as shown below. EX1007, 6; EX1003, ¶319. The socket's symmetry allows for reversible insertion of a plug. EX1007, 1.

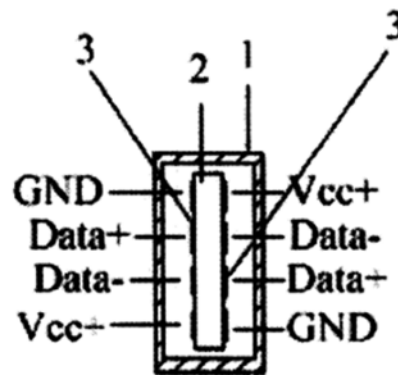


Fig. 2

Yuming discloses a similar socket structure with particular application for “X-Box” and “PS2,” EX1008, 4, both of which had USB connectors by 2009. EX1036; EX1037; EX1003, ¶320. Like Lufan, Yuming's socket has a central tongue with two groups of contacts (on upper/lower portions of the tongue). EX1008, 7, Fig. 5. The

contacts on each side of Yuming’s tongue are “electrically connected” to the terminals on *each* side of Yuming’s double-sided plug. EX1008, 8.

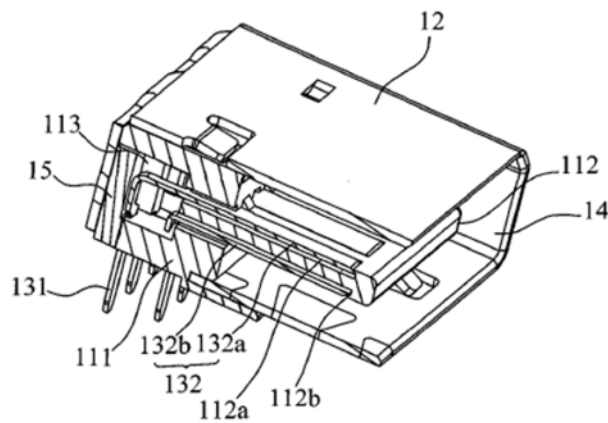
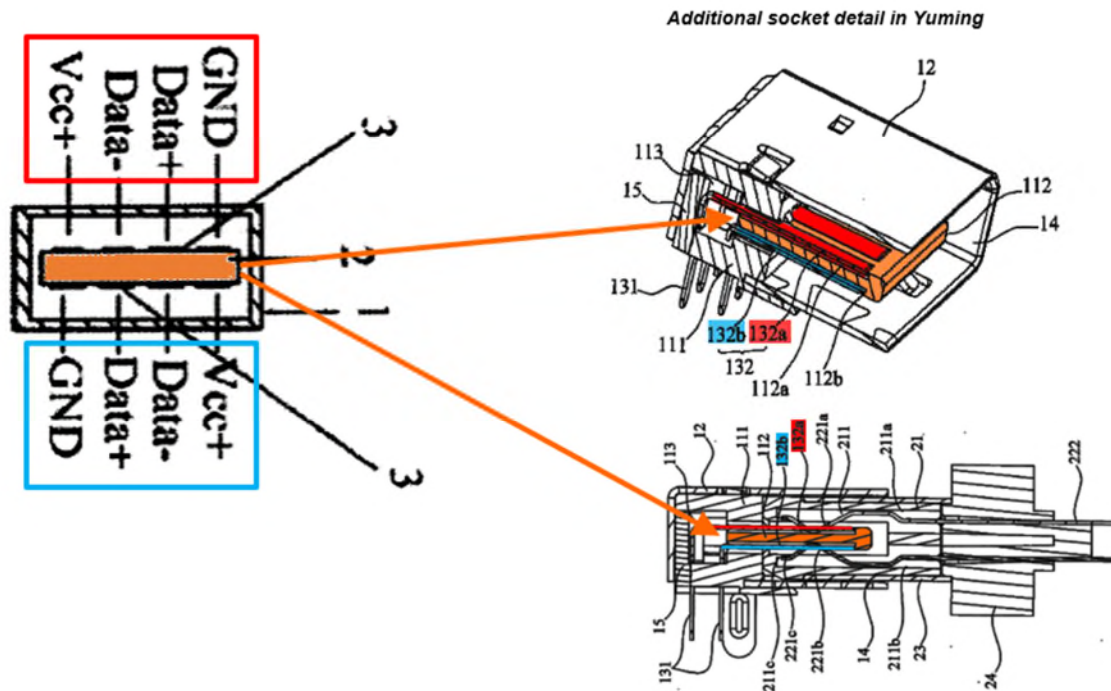


Fig. 5

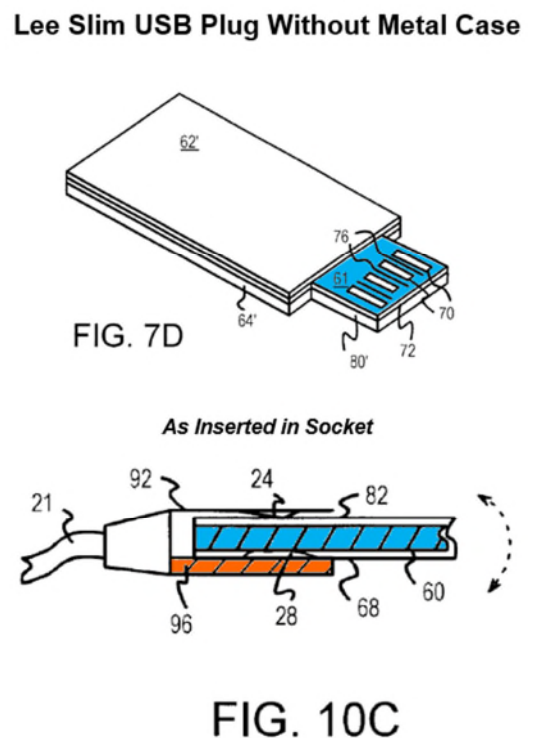
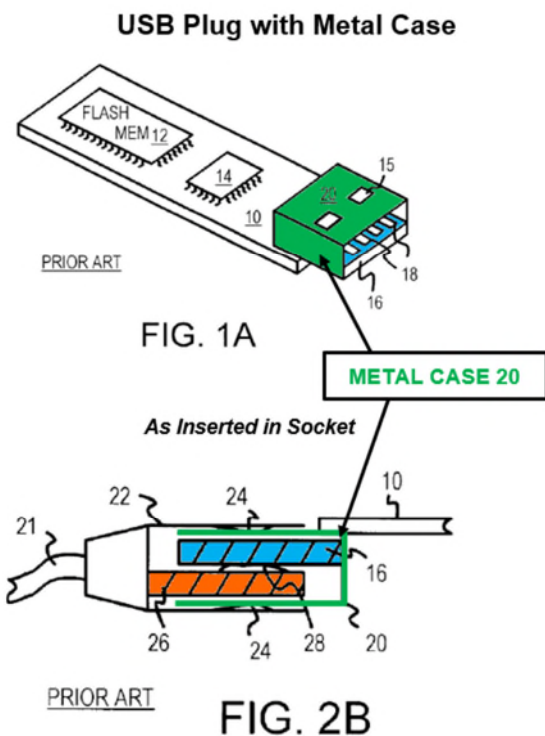
In view of these similarities, a POSITA would have been motivated to implement Lufan with the details of Yuming. EX1003, ¶321. The resulting combination shown below (“**Lufan-Yuming-Socket**”) simply adds known details from Yuming to the existing Lufan structure, including (a) the relationship between the tongue and body of the socket, (b) the topology of the tongue and method for affixing contacts; (c) the terminals and pins for connecting the contacts to the host; and (d) the active electrical connections on both sides of the socket. *Id.* A POSITA would have had a reasonable expectation of success in making this combination, which would have been a straightforward implementation consistent with ubiquitous sockets in the USB field. *Id.*

Lufan-Yuming-Socket



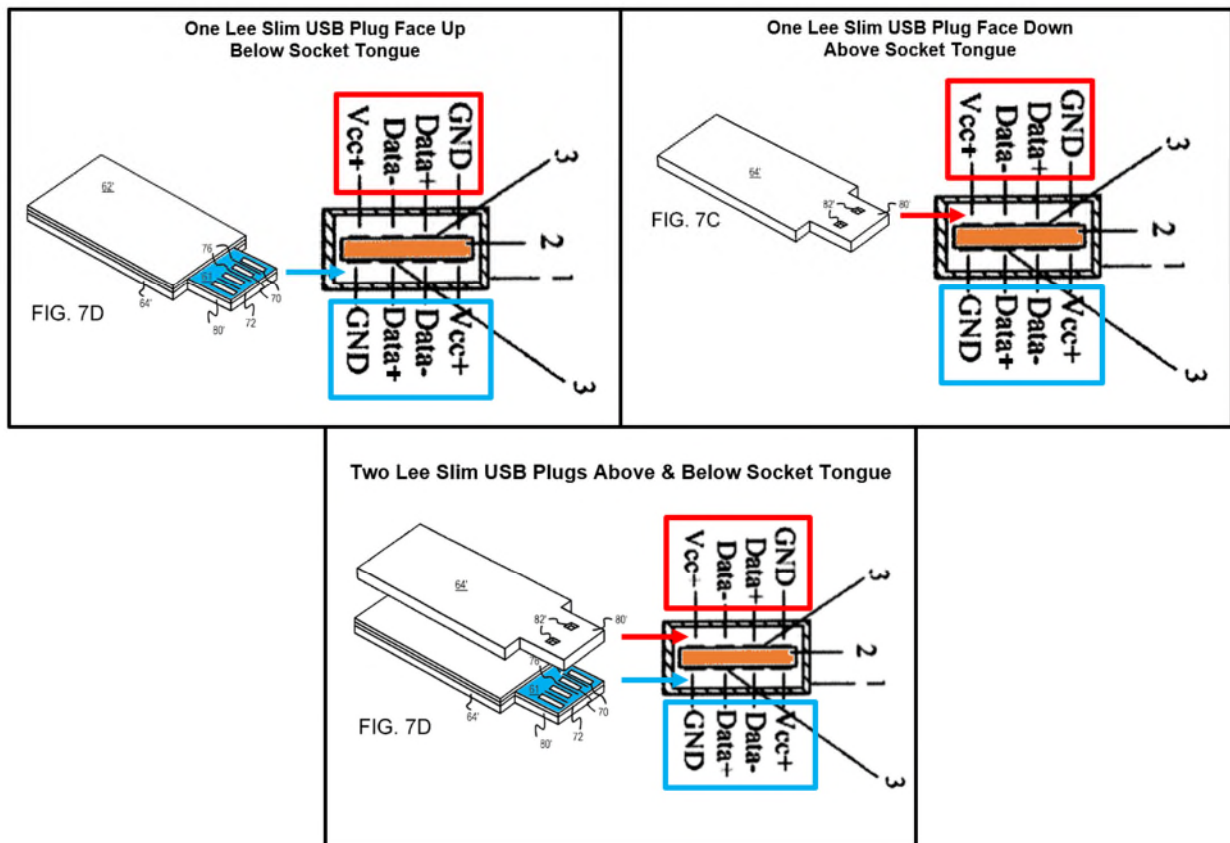
It would have been further obvious to combine the two active sides of contacts in the Lufan-Yuming-Socket with multiple USB plugs of the type in Lee. EX1003, ¶322. Lee’s USB plug improves on “cumbersome” and expensive standard USB plugs (below, top left) in which the USB contacts (Vcc+, D+, D-, GND) were typically surrounded by a “metal case” (20) that left an inconvenient empty gap above the plug (16). EX1010, 1:41-47. When these types of plugs were electrically mated with a socket (below, bottom left), not only did the plug have to be inserted on top of the socket’s tongue (26), but the side of the metal case with the gap also had to be inserted **below** the socket’s tongue, resulting in cumbersome handling for a user. EX1010, 2:19-28. Lee’s USB plug (below, top right) solved these issues by

removing the metal case entirely. The resulting plug (“**Lee Slim-USB-Plug**”) maintains the same electrical contacts (Vcc+, D+, D-, GND) as the standard USB plug but allows that plug to fit neatly above a USB **tongue** (below, bottom right) without insertion of a metal case below the tongue. EX1010, Fig. 10B, 7:51-58, 8:14-21. This design is more streamlined and easier to handle.



The Lee Slim-USB-Plug would have easily worked with the Lufan-Yuming-Socket—both structurally and electrically. EX1003, ¶323. The Lufan-Yuming-Socket already has **two** standard USB sockets on either side of its double-sided tongue, **either** or **both** of which can mate with a standard USB interface. EX1007, 4-5. If a Lee Slim-USB-Plug were inserted face up (below, top left), it would

structurally and electrically mate with the **bottom contacts** of the **tongue** in the Lufan-Yuming-Socket; if a Lee Slim-USB-Plug were inserted face down (below, top right), it would structurally and electrically mate with the **top contacts** of the **tongue**; and if two Lee Slim-USB-Plugs were inserted on both sides of the socket, they would structurally and electrically mate with contacts on **both** sides of the **tongue** (below, bottom). EX1003, ¶324.



A POSITA would have been motivated to use the Lufan-Yuming-Socket with one or two Lee Slim-USB-Plugs. EX1003, ¶325. At that time, ordinary artisans were looking for ways to connect two plugs, for example for two memory cards, into sockets in a small-sized area. EX1030, 3. Lee itself describes the need for

“allow[ing] more devices and/or more memory chips to be powered.” EX1010, 8:30-32. Multiple references solved this problem with a socket structure that allowed for simultaneous insertion of multiple plugs. For example, CN201174439Y (“Guangmin”) discloses inserting two memory cards (20 and 30) into a single socket to increase the amount of available memory while saving space. EX1029, 11, Fig. 2 (below).

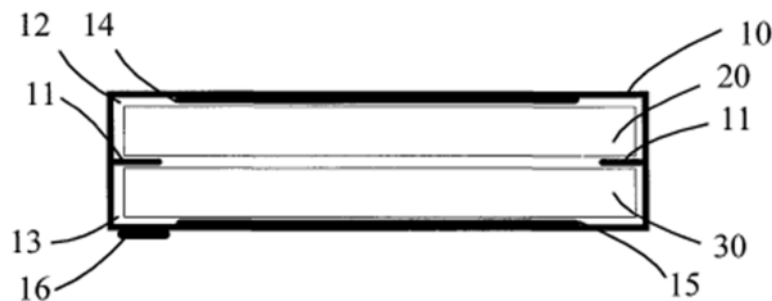


Fig. 2

See also EX1030, Figs. 4-5 (disclosing a similar structure); EX1031, Fig. 4, 10 (“simultaneously connect an eSATA device and a USB device” on either side of socket tongue).

A POSITA would have had a reasonable expectation of success in making the combination. EX1003, ¶326. Lee has the same dimensions and electrical contacts as a standard USB2.0 plug, and the Lufan-Yuming-Socket is designed structurally and electrically to connect to such standard USB2.0 plugs, on both sides of the socket’s tongue. *Id.* The prior art describes this configuration in at least as much detail as the ’307 patent. EX1001, 8:35-9:12. Mating the Lee Slim-USB-Plug with the Lufan-

Yuming-Socket would require, at most, small mechanical tweaks known to a POSITA and already contemplated by the prior art (*e.g.*, including a bend in plug contacts, as in Yuming and Lee, EX1008, Fig. 6, EX1010, 4:1-8, or adding metal springs to socket housing, EX1010, 6:56-57, which were known in the art, EX1010, Fig. 1B, and consistent with Yuming’s purpose to increase reliability of plug connection, EX1008, 4). EX1003, ¶¶326-327.

ii. **Independent Claim 34**

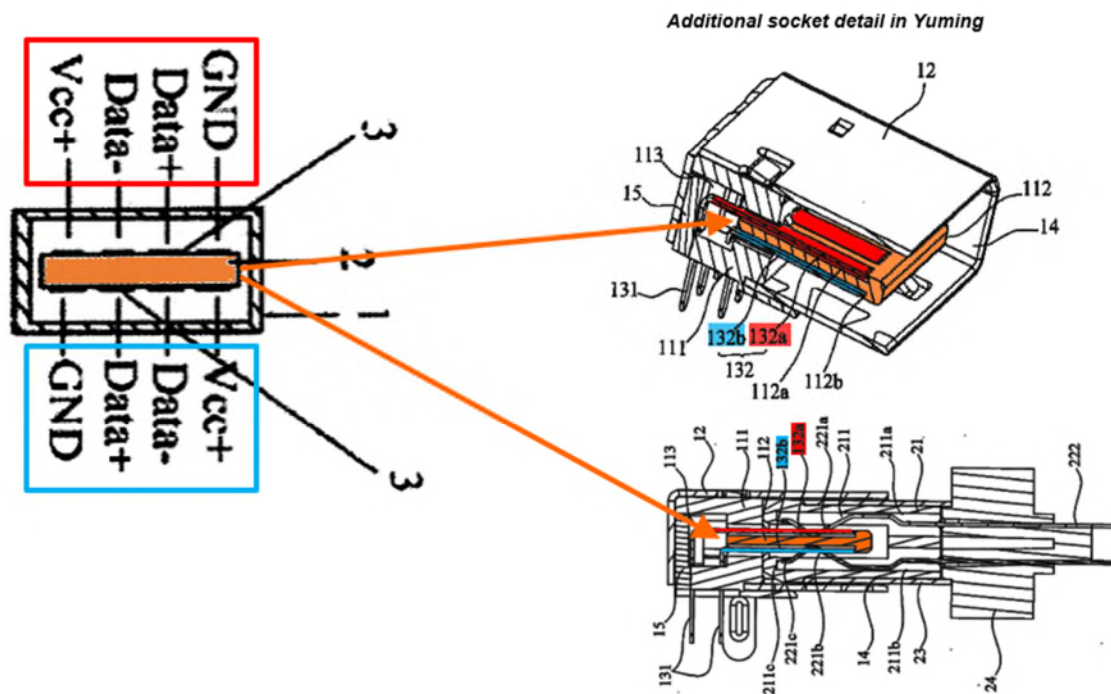
34[pre]

The Lufan-Yuming-Socket discloses 34[pre], under either party’s interpretation of “duplex electrical socket.” §V. The reversible socket allows **two** Lee Slim-USB-Plugs to be inserted in normal/opposite orientations. §VII.D.i; EX1003, ¶328.

34[a]

The Lufan-Yuming-Socket has an “insulating” *base* (element 111). EX1008, 7 (“insulating seat 11 consists of a main body portion 111”), Fig. 5 (below, right). A POSITA would have been motivated to select *plastic* for element 111 with a reasonable expectation of success. EX1003, ¶¶329-330. Plastic indeed was an obvious, common electrically insulating material for sockets and one of the most cost-effective and manufacturable materials used before 2009, as reflected in the prior art. EX1005, 13:31-33 (insulating members molded from “dielectric materials including plastics such as ABS and/or nylon”).

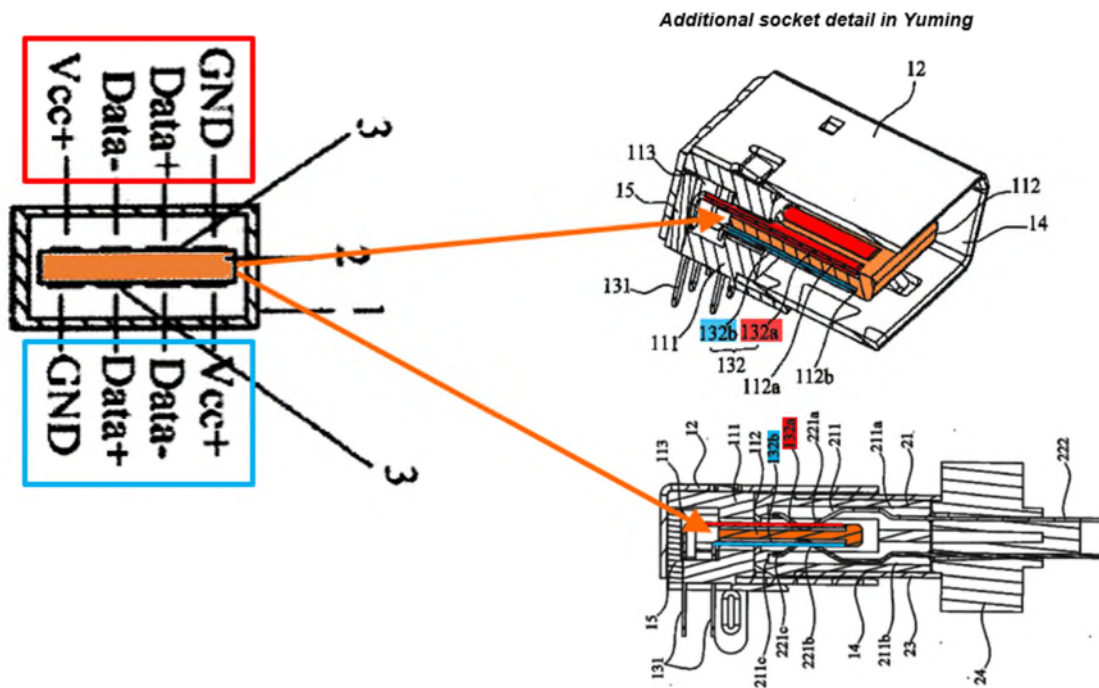
Lufan-Yuming-Socket



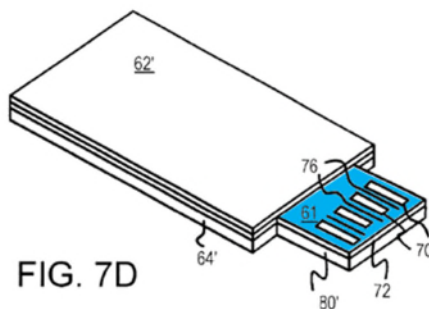
34[b]

The Lufan-Yuming-Socket allows insertion of a plug in the gap 14 (*connection slot*) around the *tongue*, where the gap is also in front of the insulating base (element 111) (*plastic base*). §VII.D.i; EX1003, ¶¶331-332; EX1008, 7, Fig. 5 (below, right).

Lufan-Yuming-Socket



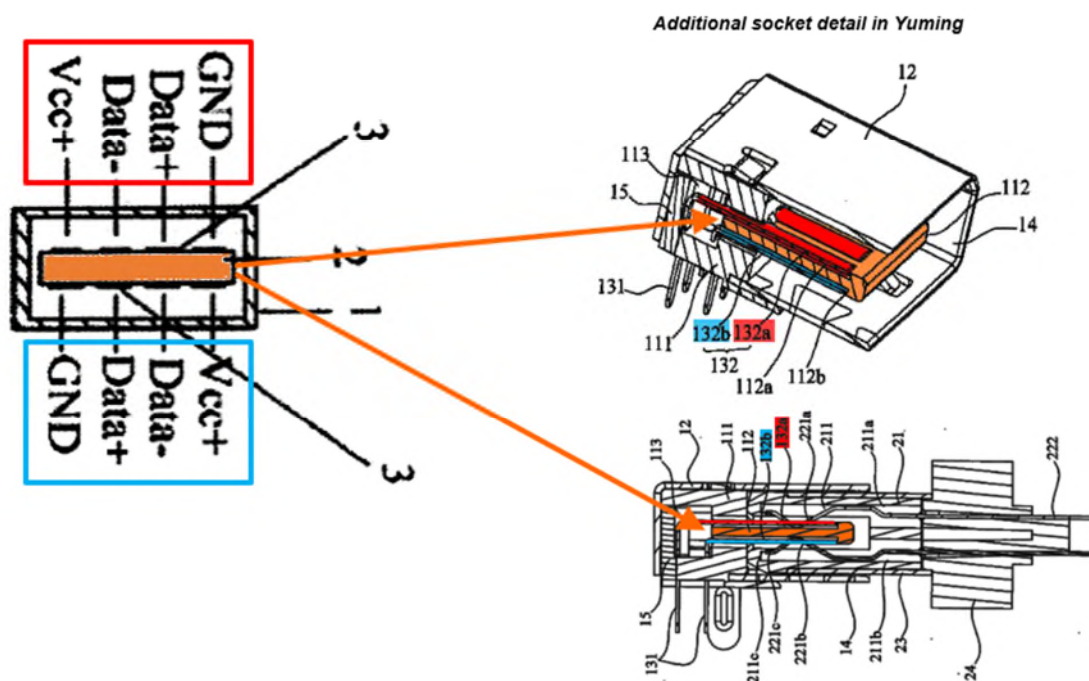
Moreover, each Lee Slim-USB-Plug has a row of contacts (*row of connection terminals*), to be inserted into the Lufan-Yuming-Socket. EX1010, Figs. 7D, 10B, 7:51-58, 8:14-21.



34[c]

The Lufan-Yuming-Socket has a *tongue* with *first and second surfaces* disposed opposite each other (upper/lower tongue surfaces), with *grooves* on either side. EX1007, 6, Fig. 2; EX1008, 7 (describing 112a, 112b as “upper” and “lower terminal groove[s]” on the tongue for “fixedly position[ing]” contacts to the tongue), Figs. 5, 7; EX1003, ¶¶333-336.

Lufan-Yuming-Socket

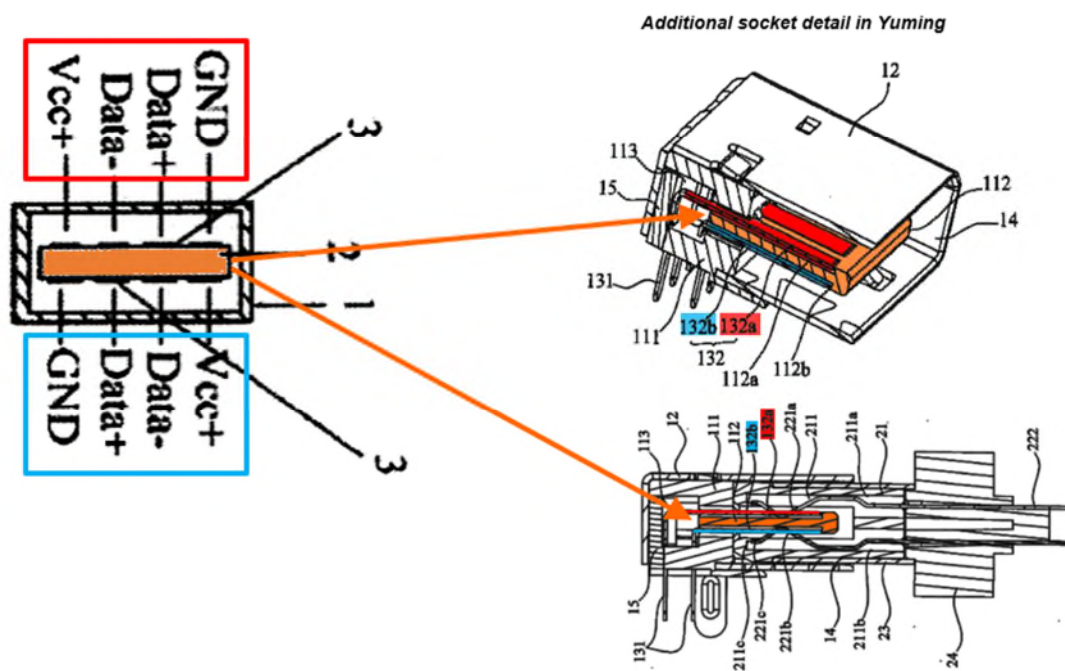


34[d]

Yuming shows the *tongue* disposed on one end of the insulating base (element 111) (*plastic base*) in the *connection slot*. EX1008, 7, Fig. 5 (below right). Lufan discloses a centrally located *tongue* forming symmetric connection slot *chambers*

allowing the plug to be inserted at 0 degrees (*normally*) or 180 degrees (*oppositely*). EX1007, Fig. 2 (below left), 1 (tongue “located in the middle of the metal shell..., enabling the USB plug to be inserted from both directions”); §VII.D.i; EX1003, ¶¶337-338.

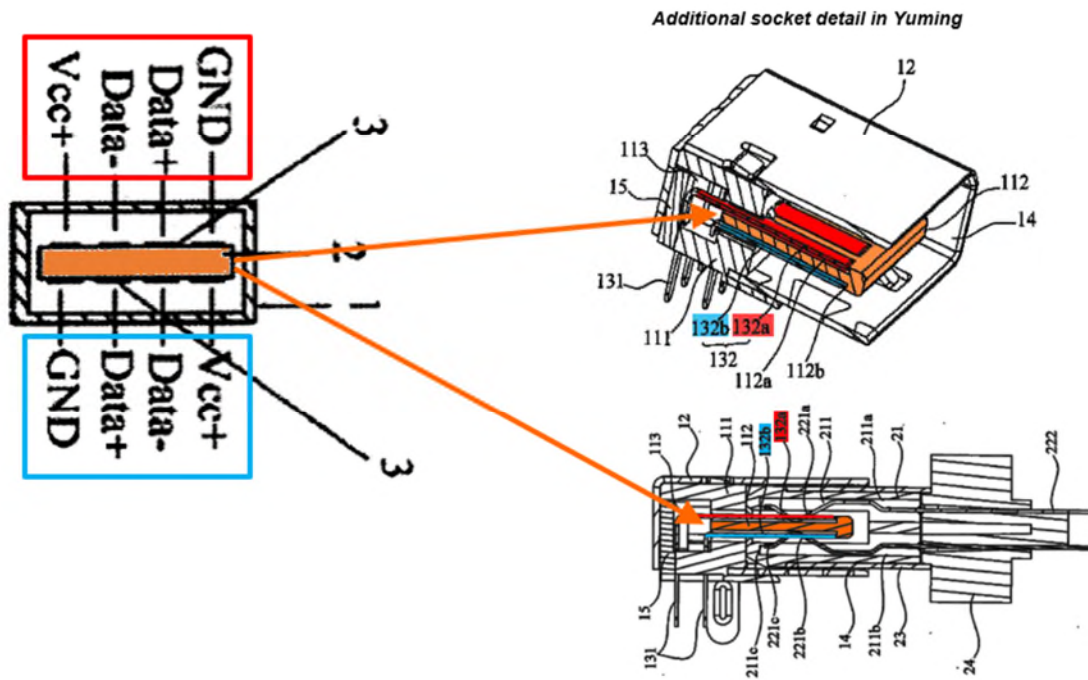
Lufan-Yuming-Socket



34[e]

The Lufan-Yuming-Socket has **one row of first contacts** on one surface of the **tongue** (**top contacts** of Lufan—Figure 2, **elements 132a** in Yuming—Figure 5). EX1007, 6, Fig. 2; EX1008, 7, Figs. 5, 7; EX1003, ¶339.

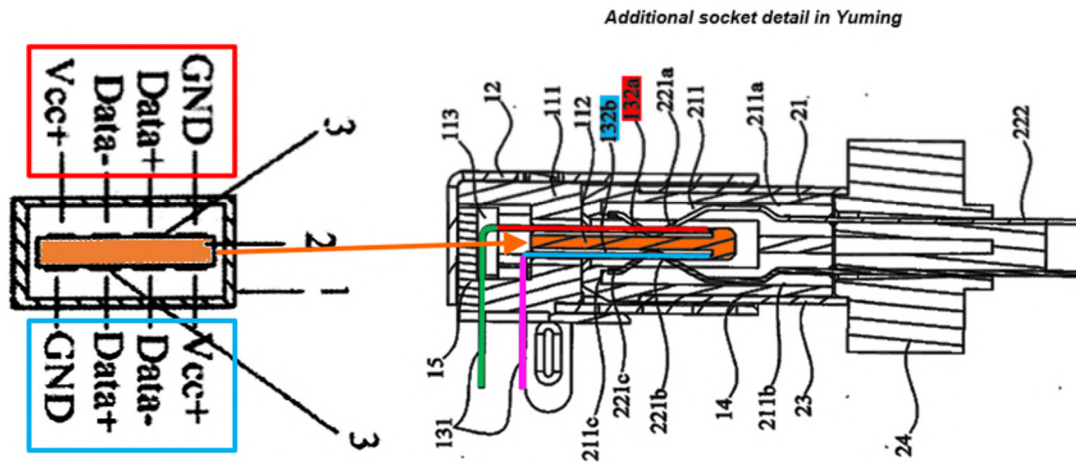
Lufan-Yuming-Socket



34[f]

Yuming's Figure 7 (below right) shows **contacts 132a** on the top side of the **tongue** (*first contacts*) are electrically connected to a *respective green 131* extending through the insulating seat (element 111) (*plastic base*). EX1008, 7 (portions 131 “vertically embedded in the tail end of the main body 111”); EX1003, ¶340.

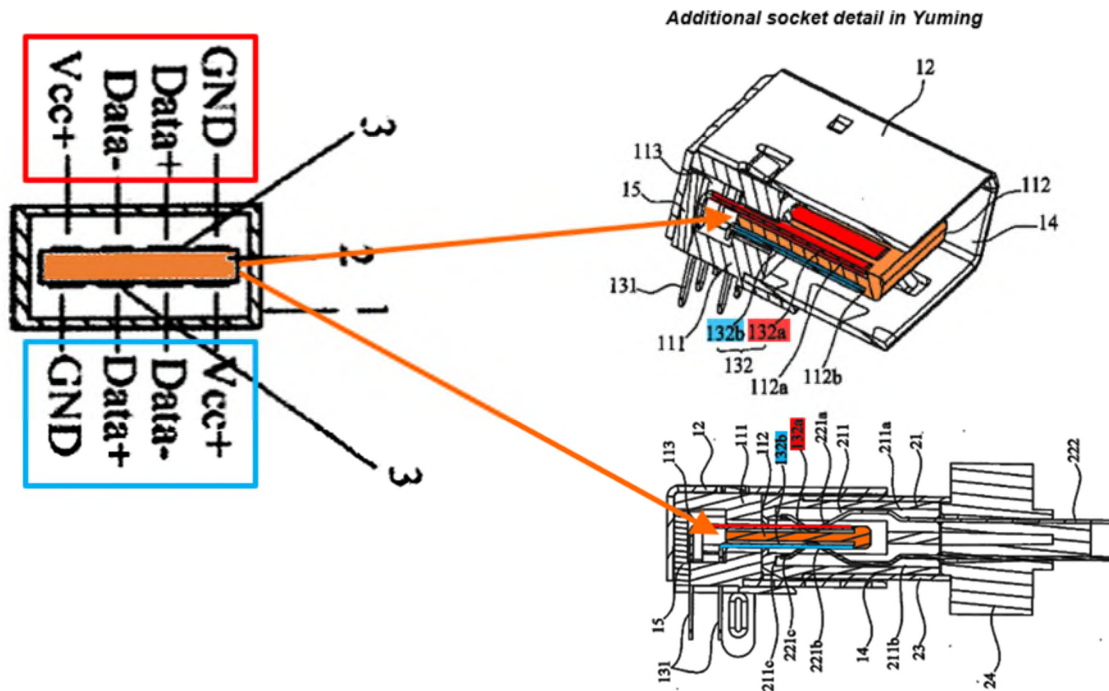
Lufan-Yuming-Socket



34[g]

The Lufan-Yuming-Socket has **one row of second contacts** separately arranged on another *surface* of the **tongue** (**bottom contacts** of Lufan—Figure 2, **elements 132b** in Yuming—Figure 5). EX1007, 6, Fig. 2; EX1008, 7, Figs. 5, 7; EX1003, ¶341.

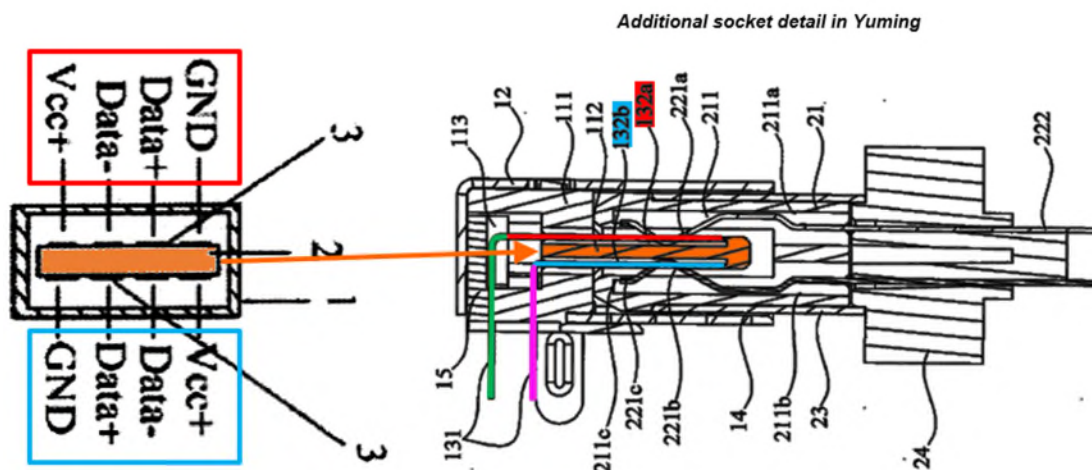
Lufan-Yuming-Socket



34[h]

Yuming's Figure 7 (below right) shows [contacts 132b](#) on the bottom side of the [tongue](#) (*second contacts*) are electrically connected to a different *respective pin 131* extending through the insulating seat (element 111) (*plastic base*). EX1008, 7 (portions 131 “vertically embedded in the tail end of the main body 111”); EX1003, ¶342.

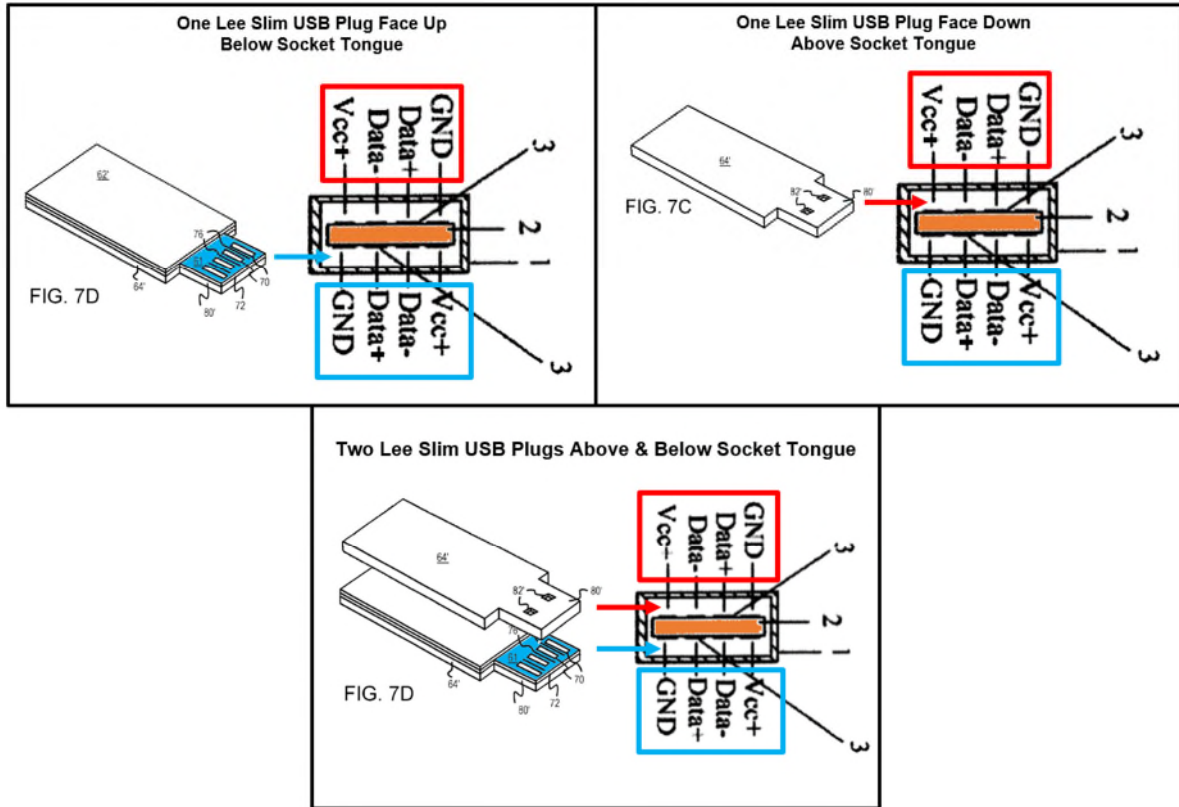
Lufan-Yuming-Socket



34[i]

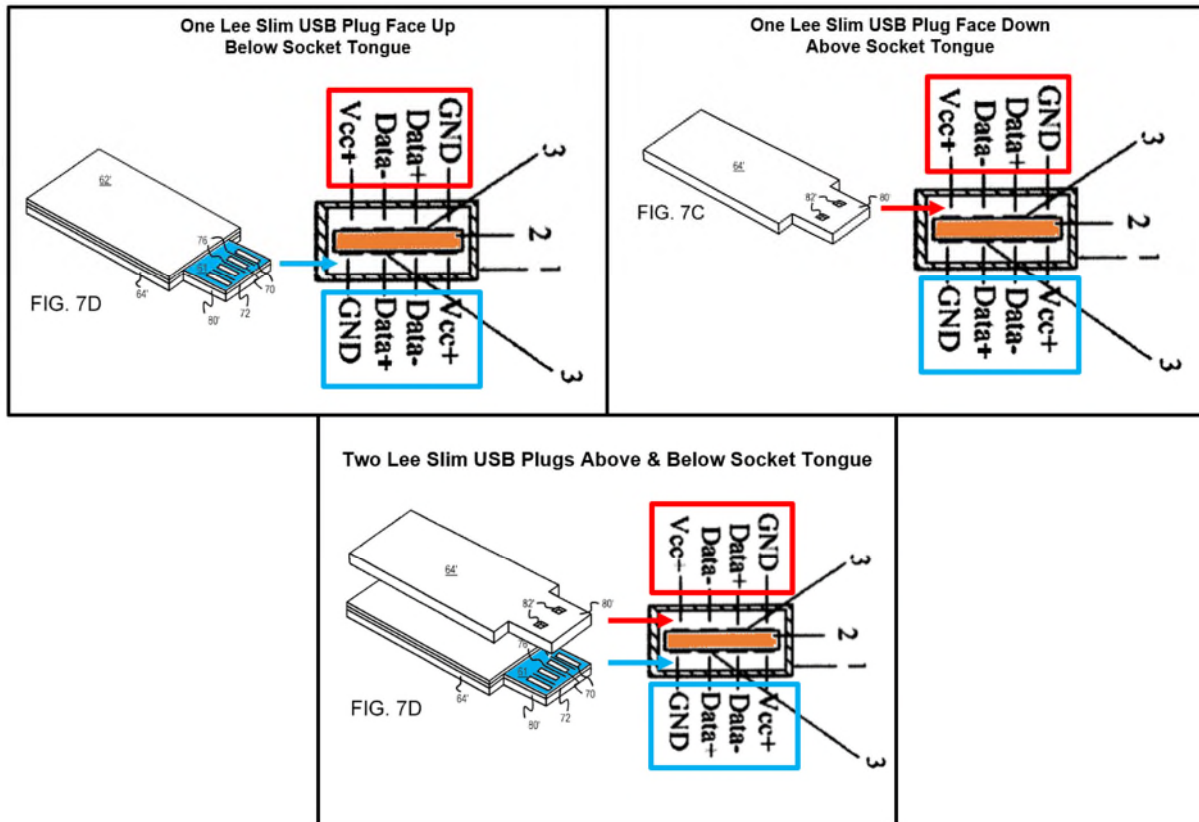
The Lufan-Yuming-Socket discloses 34[i], under either party’s interpretation.

§V. The Lufan-Yuming-Socket mates with **two** Lee Slim-USB-Plugs. §VII.D.i. Each side of the Lufan-Yuming-Socket electrically connects to both plugs at the same time. *Id.*; EX1008, 8 (“The contact portions 221a and 221b” of each side of the plug “are electrically connected to the terminal mating parts 132a and 132b” on each side of a socket “thereby achieving electrical signal continuity.”); EX1003, ¶343.



34[j]

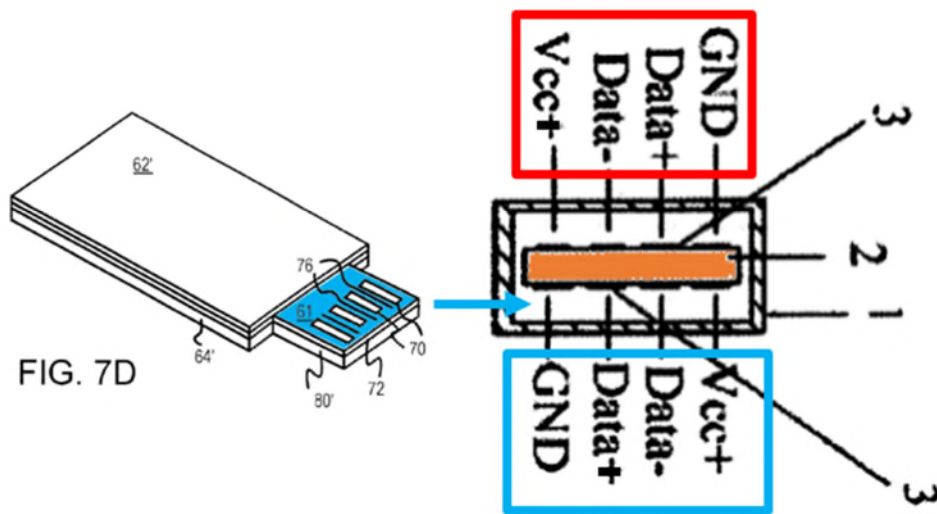
The Lufan-Yuming-Socket's first and second contacts have a *functional reverse mirror configuration* (side 1: **Vcc+**, **D-**, **D+**, **GND**; side 2: **GND**, **D+**, **D-**, **Vcc+**), under either party's interpretation. §V; EX1007, 6. The configuration allows one Lee Slim-USB-Plug to be inserted at 0 degrees (*one operational state*) and another to be inserted at 180 degrees (*another operational state*). §VII.D.i; EX1007, 4-5 (reverse order "allow[s] the USB male connector to be inserted into the USB socket from both directions"); EX1003, ¶¶344-346; EX1001, 6:40-7.



34[k]

One Lee Slim-USB-Plug can be inserted at 0 degrees (*first operational state when plug is normally inserted*). §VII.D.i; EX1007, 4-5. In this state, the *connection terminals* on the plug connect to contacts on the *second surface* of the *tongue* in the socket (bottom side of socket). §VII.D.i; EX1003, ¶¶347-348.

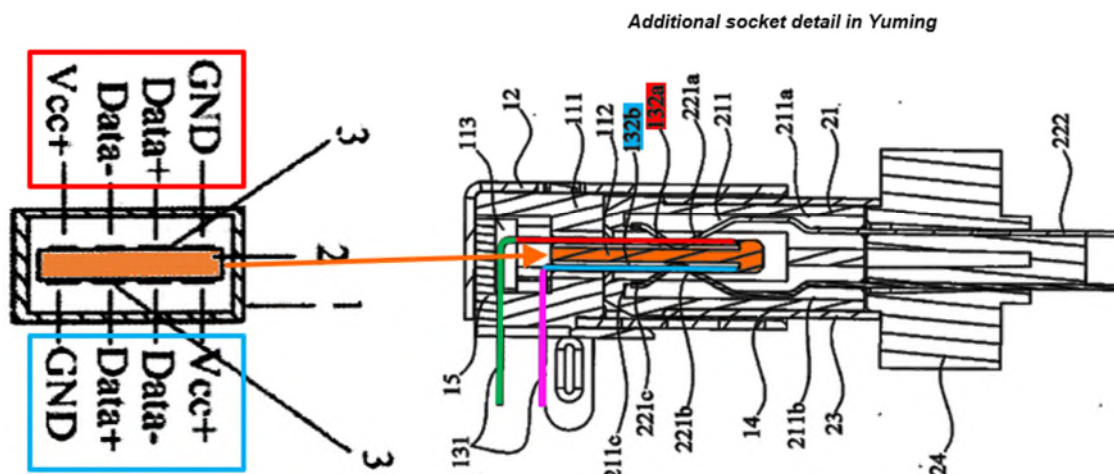
One Lee Slim USB Plug Face Up
Below Socket Tongue



34[I]

Lufan's Figure 2 (below left) discloses a **tongue** "located in the middle of the metal shell" with *symmetrical connection slot chambers* in all directions to facilitate reversible operation. EX1007, 1, 4. This *up/down and left/right symmetry* is also consistent with Yuming's figures. EX1008, Figs. 5, 7; §VII.D.ii (34[j]); EX1003, ¶349.

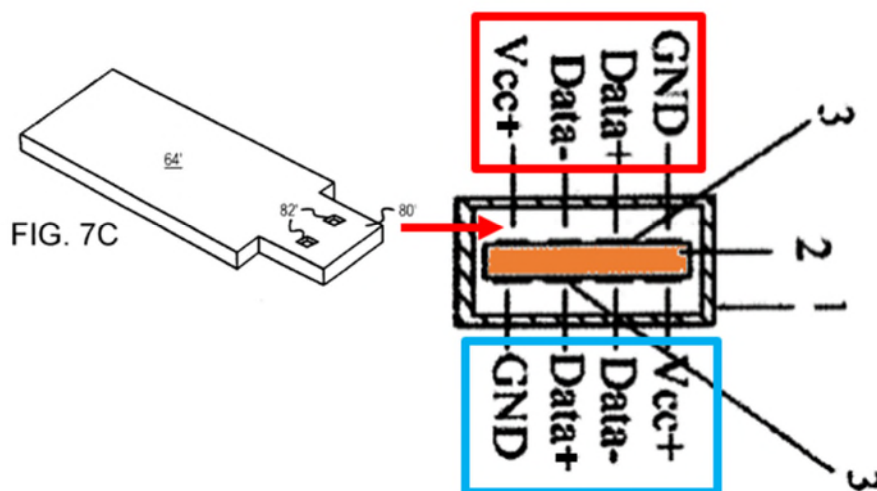
Lufan-Yuming-Socket



34[m]

Another Lee Slim-USB-Plug can also be inserted at 180 degrees (*second operational state when plug is oppositely inserted*). EX1007, 4-5. In this state, the *connection terminals* on the plug connect to contacts on the *first surface* of the *tongue* in the socket (top side of socket). §VII.D.i; EX1003, ¶¶350-351.

One Lee Slim USB Plug Face Down Above Socket Tongue



34[n]

This limitation is the same as 34[l] and invalid for the same reasons. EX1003, ¶352.

iii. Dependent Claims 35-51, 53-55

Claim 35

When one or more Lee Slim-USB-Plug(s) is/are inserted into the socket (face-down, face-up, or dual-slot mode), the tongue only contacts the plug surface with USB2.0 contacts (*an interior portion of the plug*). Indeed, by design, the exterior surface/metal casing has been removed from the Lee Slim-USB-Plugs, leaving only an interior surface. §VII.D.i. This tracks the '307 patent embodiment with “simultaneous” connections, which discloses two plugs like Lee’s inserted into a socket with USB contacts face-down/face-up. EX1001, 8:40-9:12, Figs. 19-21; EX1003, ¶¶354-355.

Claim 36

The Lufan-Yuming-Socket renders obvious a tongue less than 1/3 the connection slot thickness. The Lufan-Yuming-Socket (below, left) is divided into three elements—a **tongue** centrally located within the socket’s connection slot, which forms openings above and below the tongue. §VII.D.i. As previously described, with this configuration, a POSITA would have had a finite number of predictable options for thickness, and choosing one of these options is not inventive. §VII.A.ii (36). The necessary tongue thickness of the Lufan-Yuming-Socket

A thickness of less than 1/3 of the connection slot is also consistent with Yuming's drawings, which depict thicker upper/lower plug walls compared to the socket tongue 112 such that the tongue is less than 1/3 connection slot thickness. EX1008, Figs. 4, 7; EX1003, ¶360.



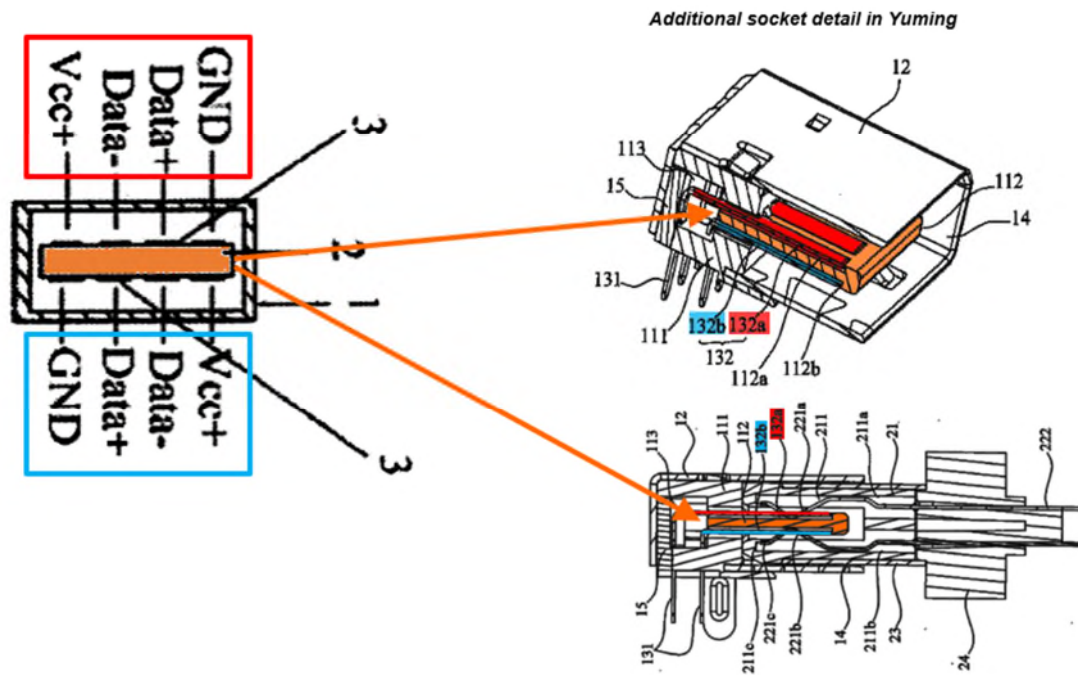
Dr. Kiaie also explains that simple logic motivates the claimed range; making the Lufan-Yuming-Socket's connection slot thicker than the tongue allows for a thicker plug, which promotes plug robustness. EX1003, ¶359; EX1008, 1 (“the structure forms a more stable connection...”), 4 (similar). Decreasing the thickness of the Lufan-Yuming-Socket's tongue, which is protected, to allow thicker connection slots and plug walls, which are exposed, is common sense. §VII.A.ii (36); EX1003, ¶359.

A POSITA would have had a reasonable expectation of success. Yuming discloses that the tongue is made of insulating material, EX1008, 7, which a POSITA would have known could easily form a tongue with a range of thicknesses, including thicknesses less than 1/3 of the connection slot, consistent with known electrical connectors. EX1015, 91, 96; EX1003, ¶361.

Claim 37

Yuming discloses that each **upper contact 132a** (*each of the first contacts in the at least one row of first contacts*) is embedded in a top surface of the **tongue 112** (*a portion of the first surface of the tongue*) such that the top surface of the contact is *coplanar* with the top surface of the tongue. EX1008, 7, Fig. 7; EX1003, ¶362.

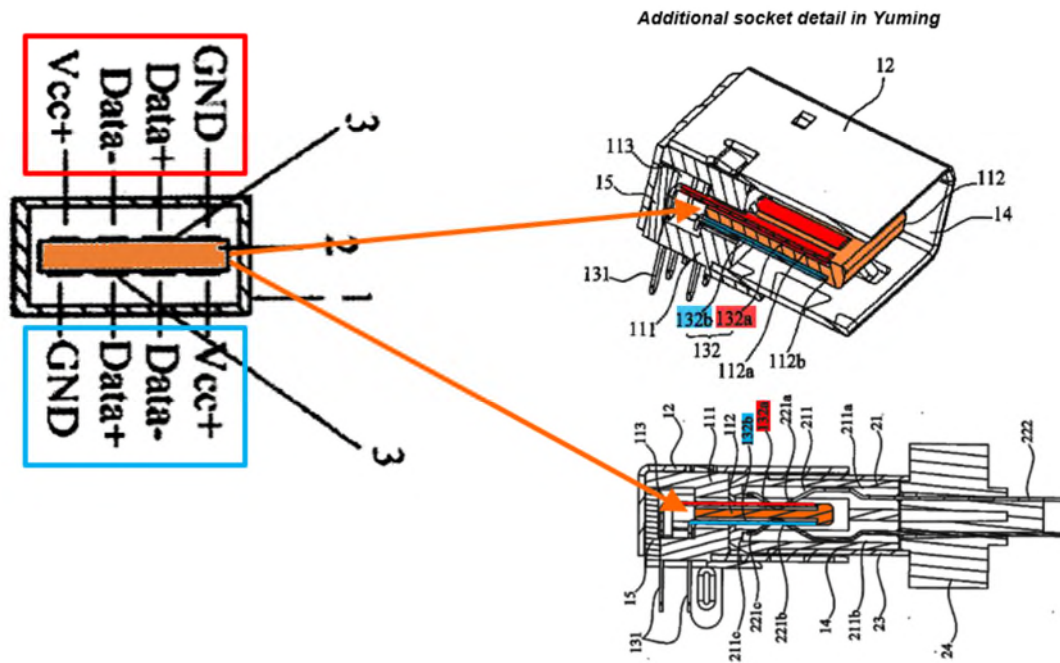
Lufan-Yuming-Socket



Claim 38

Yuming discloses that each **lower contact 132b** (*each of the second contacts in the at least one row of first contacts*) is embedded in a bottom surface of the **tongue 112** (*a portion of the second surface of the tongue*) such that the bottom surface of the contact is *coplanar* with the bottom surface of the tongue. EX1008, 7, Fig. 7; EX1003, ¶363.

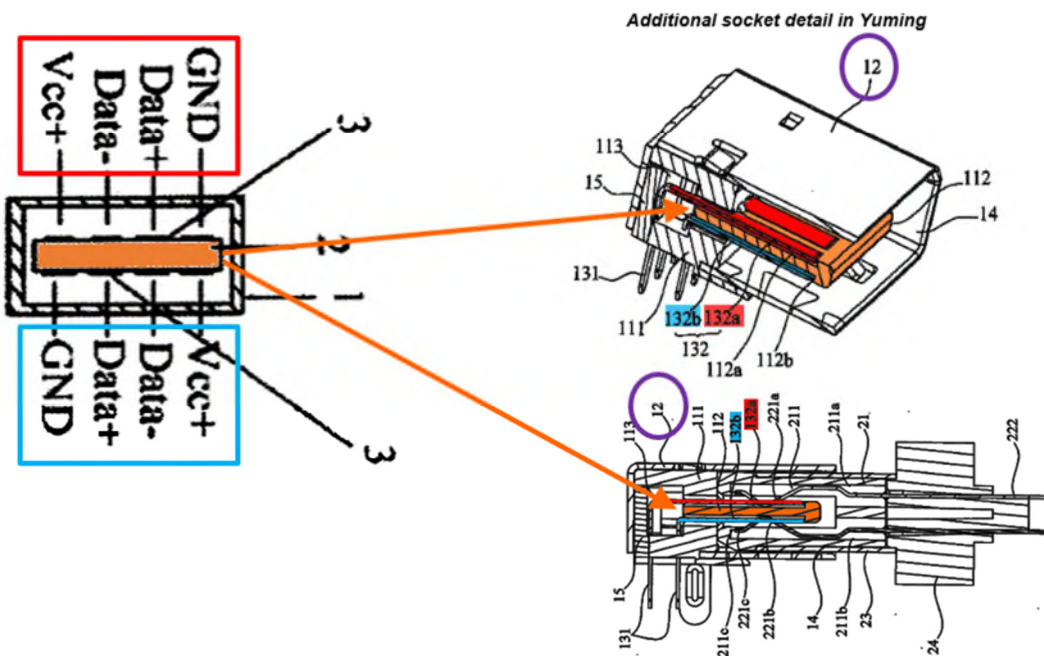
Lufan-Yuming-Socket



Claim 39

The socket includes a “shielding metal shell 12” (*metal housing*) that covers insulating base (element 111) (*plastic base*). EX1008, 7 (“shielding metal shell covers the main body”); EX1003, ¶364.

Lufan-Yuming-Socket



Claim 40

The Lufan-Yuming-Socket is a USB structure. §VII.D.i. EX1003, ¶365.

Claim 41

The tongue 112 and insulating base (element 111) are *integrally formed*.

EX1008, 7 (“[an] insulating seat consist[ing] of a main body portion 111 and a *tongue piece 112 that integrally extends from the main body portion 111*”);

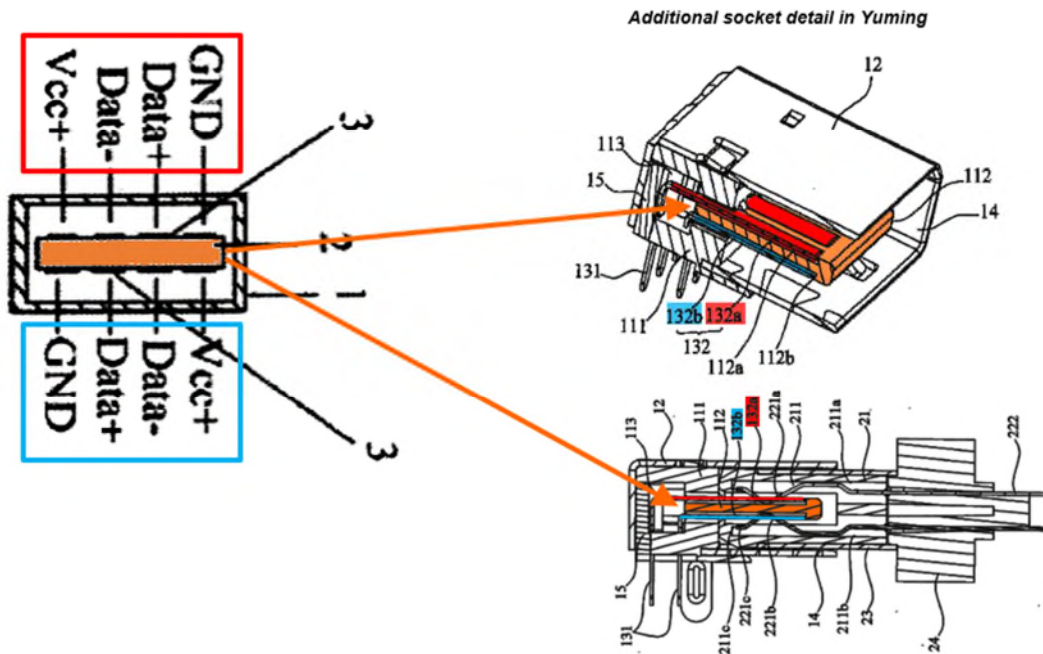
EX1003, ¶366.

Claim 42

Each of the **upper** and **lower** contacts **132a/132b** (*each contact of the first and second contacts*) are a portion of the upper and lower terminals 13 (*portion of a respective terminal*). EX1008, 7 (“...electrical signal terminal 13 include a pin part

131 that is soldered to a circuit board and a **mating part 132** that is formed by bending the pin part 131 into a horizontal direction 131”); EX1003, ¶367.

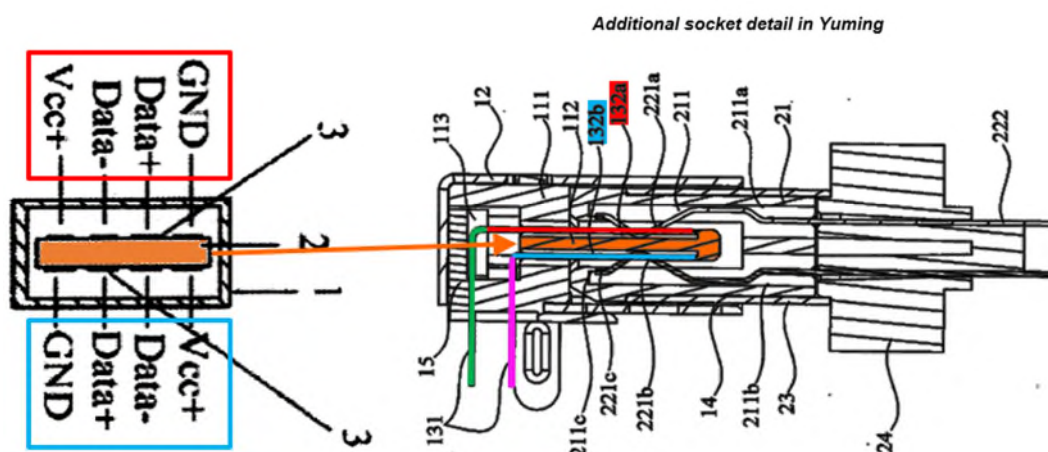
Lufan-Yuming-Socket



Claim 43

This limitation is nearly identical to 34[f], 34[h] (§VII.A.ii (43)) and invalid for the same reasons. In the Lufan-Yuming-Socket, **first and second pins** further extend through the shielding metal shell 12 (*rear cover*). §VII.D.ii (34[f], [h]). The “shielding metal shell 12 covers the main body portion” 111, including the bottom of the socket where the pins extend. EX1008, 7, Fig. 7; EX1003, ¶368.

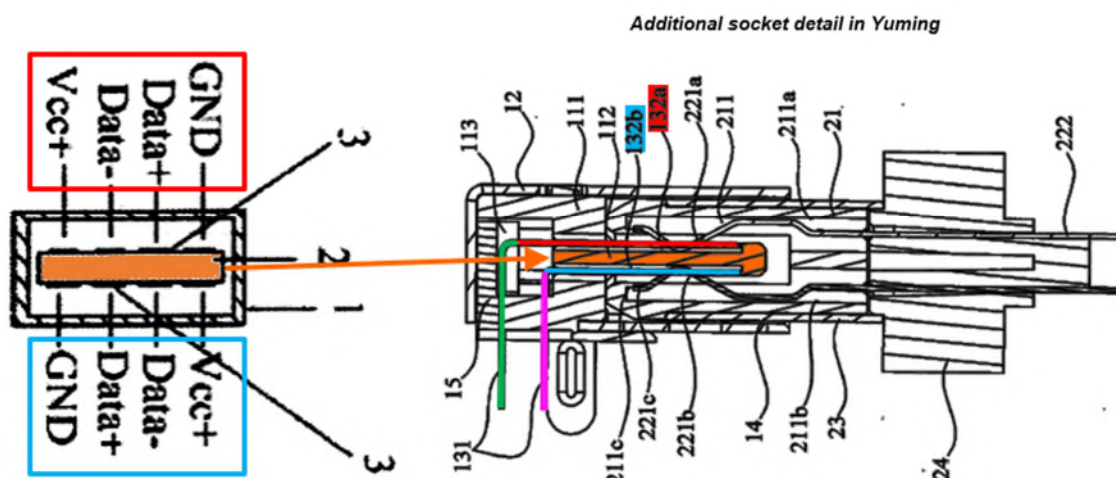
Lufan-Yuming-Socket



Claim 44

As shown below, each side of contacts includes at least one power contact (VCC+) and one ground contact (GND) (*at least two of the first and second contacts*). A POSITA would have understood that VCC+ and GND contacts are not in electrical communication; if they were in electrical communication, the USB circuit would be shorted and the circuit would not operate. EX1003, ¶369.

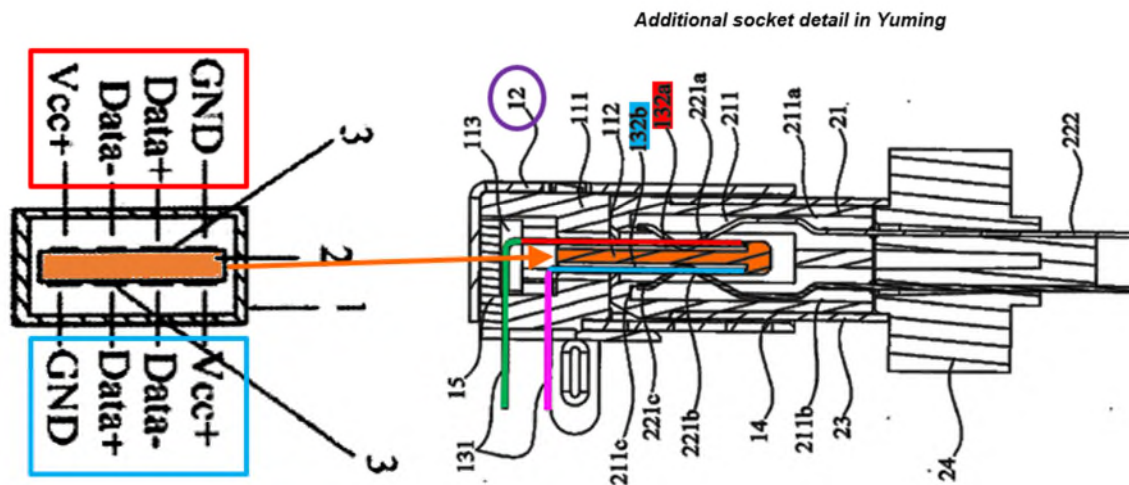
Lufan-Yuming-Socket



Claim 45

Shielding metal shell 12 (rear cover) is attached to the insulating base (element 111) portion of the main body (*plastic base*). EX1008, 7 (“shielding metal shell 12 covers the main body portion” and “insulating seat 11 consists of a main body portion 111”); EX1003, ¶370.

Lufan-Yuming-Socket



Claims 46-47

These claims are identical to claim 43 and disclosed for the same reasons. EX1003, ¶¶371-372.

Claim 48

The Lufan-Yuming-Socket discloses a socket connected to one or more *plugs* and *operative to simultaneously electrically connect via the first and second contacts*, as described previously. §§VII.D.ii (34[pre], 34[i]); EX1003, ¶373.

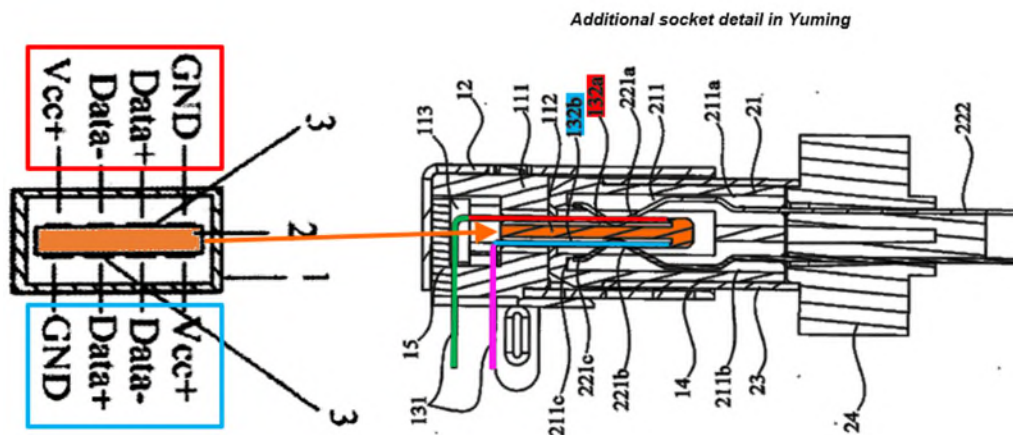
Claims 49-50

These claims are identical to claim 44 and invalid for the same reasons. EX1003, ¶¶374-375.

Claim 51

The Lufan-Yuming-Socket discloses this limitation as described in 34[f], 34[h], 42. §VII.D.ii. The upper and lower terminals 13 (*first and second terminals*) each have one end that is a contact portion 132a and 132b (*first and second contacts*) and another end that connects to two pin parts 131 (*green and pink*) that extend out of the plastic base (*first and second pins*). EX1003, ¶376.

Lufan-Yuming-Socket



Claims 53-54

The Lufan-Yuming-Socket discloses these claims for the reasons as 34[c] and claim 37. §VII.D.ii-iii (34[c], 37) (contacts embedded *in* tongue surface); EX1008, 7 (112a, 112b are “upper” and “lower terminal groove[s]” on the tongue for “fixedly position[ing]” contacts to the tongue); EX1003, ¶¶377-378.

Claim 55

The Lufan-Yuming-Socket discloses a *connection system* with a socket having a *duplex electrical connection* and a plug, as described for claim 34. §VII.D.ii (34[pre], 34[i]); EX1003, ¶379.

iv. Independent Claim 56 and Dependent Claims 57-66

Claim 56 is substantially the same as claim 34 (§VII.A.iii) and the differences do not substantively change the analysis of Lufan-Yuming-Socket, which renders claim 56 obvious for the same reasons as claim 34. § VII.D.ii. The tongue of Lufan-Yuming-Socket has a top side and bottom side which are simultaneously electrically connected, under either party's interpretation, to two Lee Slim-USB-Plugs. §§V, VII.D.ii (34[c], 34[i]); EX1003, ¶¶380-381.

Claims 58-61 and 65-66 are substantially identical to claims 41, 39, 44, 53/54, 36, 40, respectively, and are invalid in view of the Lufan-Yuming-Socket for the same reasons. §§VII.D.iii; EX1003, ¶¶384-385, 391-392. The analysis is not impacted by different intervening dependent claims. **Claim 57** is also invalid for the same reasons as claims 48 and 55. §§VII.D.iii; EX1003, ¶383. The Lufan-Yuming-Socket connects to two Lee Slim-USB-Plugs, with simultaneous electrical connections via the first and second contacts (under either party's interpretation). §V.

Claims 62-64 are analyzed further below.

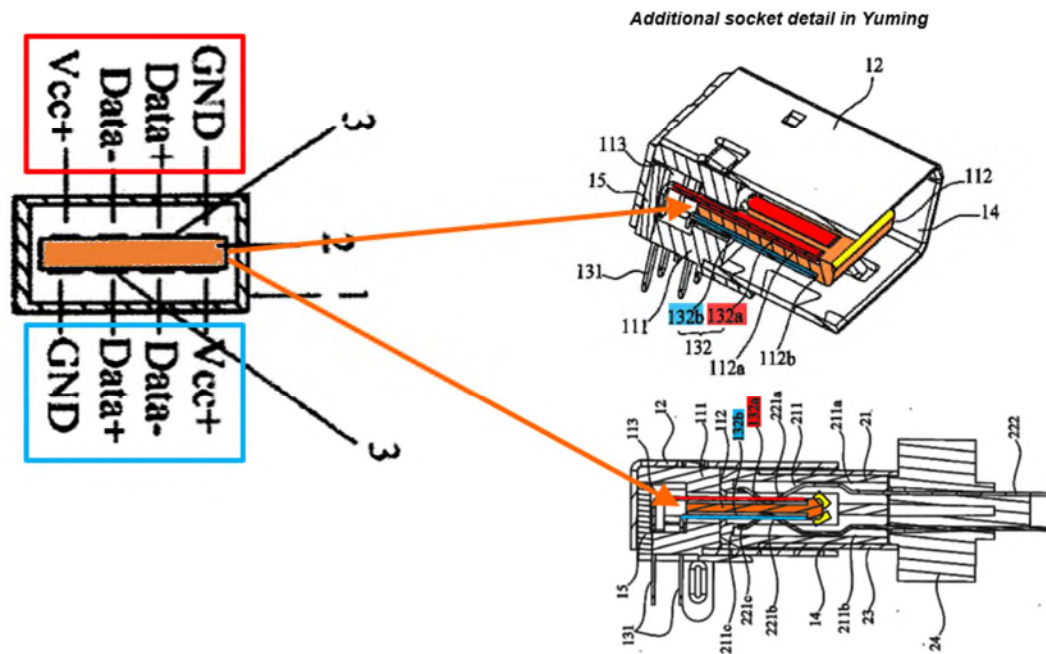
Claim 62

The Lufan-Yuming-Socket renders this limitation obvious. EX1003, ¶386. Yuming describes that each side of its symmetrical socket can include *six first contacts and six second contacts*. EX1008, 7 (“...6-pin terminal mating part 132a and 132b”). A POSITA would have been motivated, with a reasonable expectation of success, to include all six contacts in the Lufan-Yuming-Socket, as Lee discloses a similar “extended” USB interface, and a six-contact socket would have allowed use of the socket for multiple types of plugs and/or added channels to increase data transmission rates, consistent with known extended interfaces. EX1010, 7:59-65 (“The Slim connector may be widened to accommodate extra metal contacts to become an extended-USB connector for future USB specification.”); EX1015, 84; EX1003, ¶386.

Claim 63

The Lufan-Yuming-Socket renders this limitation obvious. Yuming’s drawings show a *tongue with chamfered edges on the top and bottom of the tongue*, EX1008, Fig. 5 (top right), Fig. 7 (bottom right), which would have been an obvious implementation of the Lufan-Yuming-Socket because chamfered edges help guide the tongue into the insertion gap, as described in Andre. §VII.A.iii (63/64); EX1003, ¶¶387-388.

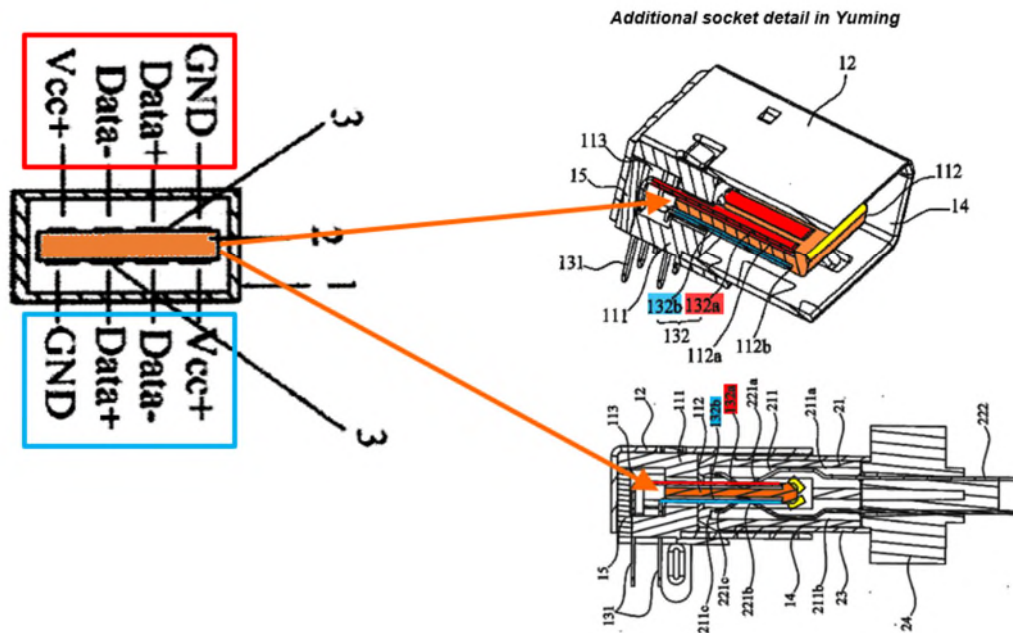
Lufan-Yuming-Socket



Claim 64

The Lufan-Yuming-Socket renders this limitation obvious. Yuming's drawings show a tongue *that tapers toward its tip*, EX1008, Fig. 5 (top right), Fig. 7 (bottom right), which would have been an obvious implementation of the Lufan-Yuming-Socket because a tapered tip helps guide the tongue into the insertion gap, as described in Andre. §VII.A.iii (63/64); EX1003, ¶¶389-390.

Lufan-Yuming-Socket



v. Independent Claim 67 and Dependent Claims 68-77

Claim 67 is substantially the same as claim 34. §VII.A.iv. These differences do not change the invalidity analysis. The Lufan-Yuming-Socket accepts a plug normally/oppositely based on the operational state. §VII.D.ii (34[d], 34[j], 34[k], 34[m]). It would have been obvious to include six contacts on each side of the tongue, §VII.D.iv (62), in a “reverse mirror” configuration, under either party’s interpretation of that term. §§VII.D.ii (34[j]), V; *see also* §VII.A.iv (67[k]); EX1003, ¶¶393-396.

Claims 68-73, 75-77 are substantially identical to claims 57, 41, 39, 44, 61, 63, 36, 40, and 43, respectively, and invalid for the same reasons. §§VII.D.iii-iv. **Claim 74** (“a portion of the tongue opposite the plastic base is tapered”) is obvious

for the same reasons as claims 63 and 64. §VII.D.iv. For **Claim 77**, to the extent PO argues that the shielding metal shell cannot be both the “rear cover” and “metal housing,” it would have been obvious to make the shell as two different layers to increase rigidity, which would correspond to the two claim elements. §VII.B.v; EX1003, ¶¶397-398.

vi. Independent Claim 78 and Dependent Claims 79-87

Claim 78 is substantially the same as claim 67, §VII.A.v, and the Lufan-Yuming-Socket discloses those limitations, as described for claims 34, 39, 67, 70. §§VII.D.ii, iv. Claims 79-86 are substantially the same as claims 57, 41, 39, 44, 61, 63, 74, 36 and invalid for the same reasons. §§VII.D.iii-v. Claim 87 is a combination of claims 40 and 43 and invalid for the same reasons, and as described for claim 77. §§VII.D.iii, v; EX1003, ¶¶399-401.

vii. Independent Claim 88 and Dependent Claims 89-96

Claims 88-96 are substantially identical to claims 78-86 but without “metal housing” and invalid for the same reasons. EX1003, ¶402.

viii. Independent Claim 98 and Dependent Claims 99-106

Claims 98-106 are substantially identical to claim 88-96, but without limiting the number of contacts and reciting “functional” in 98[j], and invalid for the same reasons. EX1003, ¶403.

ix. Independent Claims 108, 110, 112 and Dependent Claim 109, 111, 113

Claims 108-109 are substantially the same as claims 98 and 57, except add the limitations of claim 35, 39, 40, 42, 43, and 61, which are disclosed by the Lufan-Yuming-Socket. §VII.D.iii-iv. Claims 110-111 are invalid for the same reasons as 108, 56-57, 63-64; Claims 112 and 113 are invalid for the same reasons as claims 110-111 and 36. §§VII.D.iii-iv; §VII.A.iv (67[j]); EX1003, ¶¶404-406; §VII.D.v (obviousness of metal housing/rear cover).

x. Independent Claims 114, 117-120

Claim 114 is substantially the same as claim 98, §VII.A.viii, and invalid for the same reasons. EX1003, ¶407.

Claims 117-120 are invalid for the same reasons as claim 114, and because the Lufan-Yuming-Socket can electrically connect on the top or bottom side or both, depending on the plug that is inserted. §§VII.D.iv (56); VII.A.viii; EX1003, ¶408.

xi. Independent Claims 130-135

Claims 130-135 are invalid because they are substantially the same as claim 34 or broader. §§VII.A.ix, VII.D.ii; EX1003, ¶¶409-410.

E. GROUND 5: GROUND 4 WITH USB3.0

A POSITA would have been motivated to combine the Lufan-Yuming-Socket with USB3.0, which is analogous art, to render obvious claims 52, 97, 107, 115, 116 (including “proud”/“projections,” “castellated” limitations) and further render obvious “thickness” and “chamfered/tapered” limitations. EX1003, ¶411. By 2009, USB3.0 was most current USB infrastructure and included USB2.0 backwards compatibility, as implemented in the Lufan-Yuming-Socket. *Id.*; EX1015, 31.

i. Thickness Limitations: Claims 36, 65, 75, 86, 96, 106, 112[x]

As described for §VII.C.i, USB3.0 discloses a known USB3.0-B tongue less than 1/3 thickness of a connection slot. EX1015, 91. A POSITA would have been motivated by the Lufan-Yuming-Socket to adopt a tongue at this thickness ratio to increase robustness. §§VII.D.iii (36). A POSITA implementing that structure would have looked to USB3.0-B with a reasonable expectation of success because, similar to the Lufan-Yuming-Socket, it has a USB2.0 interface across two sides of a tongue, and similar thickness ratios had been implemented for decades. EX1015, 91; EX1003, ¶412; EX1032, Fig. 1, 21:6-22:5.

ii. “Proud”/“Projections” Limitations: Claims 52, 97, 107, 116

USB3.0 describes contacts projecting above a tongue’s surface. §VII.C.2. A POSITA would have been motivated to use such projections with the Lufan-Yuming-Socket. Lufan and Yuming do not require a specific contact shape, and USB3.0 would have been a clear choice, among a finite set of options, with a

reasonable expectation of success. EX1003, ¶413. Such contacts would ensure a strong connection point with the inserted plug. *Id.*; EX1032, Fig. 10, 17:34-37.

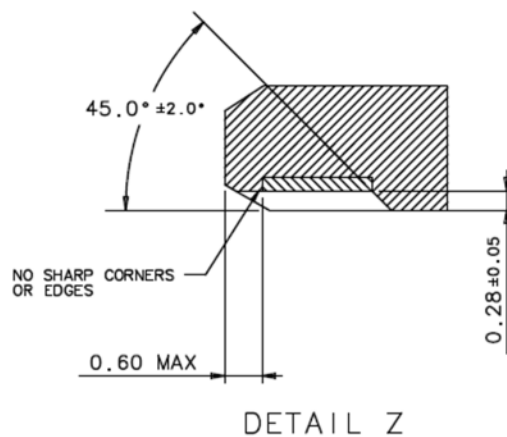
Claims 97 and 107 combine claims 52 (97[f]/107[f]) and 40, 43, 35, 42, 61, and would have been obvious as explained above and for those claims and claim 77 (obviousness of metal housing/rear cover). §§VII.D.iii-v. Claim 116 is materially the same as claim 98 with the addition of contacts proud of surfaces of a tongue, §VII.A.ix, which are obvious for the reasons explained above. EX1003, ¶¶414-415.

iii. Castellated Surfaces: Claim 115

USB3.0 also discloses Micro-USB with castellated tongue surfaces, providing a POSITA reasonable expectation of success using such surfaces. EX1015, 96. Such surfaces would have been a predictable design choice for the Lufan-Yuming-Socket among a finite set of options available to a POSITA, with the benefit of enhancing the connection between interfaces. EX1003, ¶416.

iv. Chamfered and Tapered Tongue Limitations in Claims 63-64, 73-74, 84-85, 94-95, 104-105, 110[w]-110[x], 112[w], 112[y]

The chamfered and tapered limitations addressed in Ground 4 are also disclosed by USB3.0. The A-type connector has a tongue that is chamfered and tapered toward its tip:



EX1015, 77. This design is consistent with Yuming's disclosures. EX1008, Fig. 5. A POSITA would have been motivated to use chamfered and tapered shapes, as explained for Ground 4 §VII.D.iv (63-64) with a reasonable expectation of success, in view of known benefits (*e.g.*, ease of insertion) and widespread adoption of this shape, allowing use of existing manufacturing techniques. EX1003, ¶417.

F. GROUND 6: LUFAN WITH YUMING, YEN, ZHENYU

Claims 34-51, 53-96, 98-106, 108-114, 117-120, 130-135 would have been obvious in view of the Lufan-Yuming-Socket with Zhenyu and Yen, under PO's claim interpretations. §V. The references are analogous art relating to electrical connectors. EX1003, ¶¶418-420.

i. Motivation to combine

A POSITA would have been motivated by Yen, which is directed to a USB data protocol, EX1010, Abstract, to combine the Lufan-Yuming-Socket with the USB plug of Zhenyu. The combination addresses a key problem by 2009: how to increase USB data rate. EX1003, ¶422; EX1035, 1 (slow USB2.0 data rates); EX1015, 43 (introducing SuperSpeed USB for higher data rate). By 2009, there were several known solutions to this problem. Yen provides an example of one known protocol for increasing data rates while maintaining compliance with USB2.0. Zhenyu (plug) with the Lufan-Yuming-Socket provide suitable structures for implementing that protocol. EX1003, ¶423.

Yen

Yen discloses a "Dual-channel Universal Serial Bus" protocol ("DCUSB") that provides a "high-speed" protocol for increasing USB2.0 data rate. EX1009, 1:13-15, 1:22-23; EX1003, ¶¶424-429. DCUSB "uses the same packet structure as USB 2.0" with a second channel to "create[] a dual-channel mode." EX1009, 2:53-3:30, Fig. 4. Specifically, "in addition to using V_{BUS} , $D+$, $D-$ and GND signals,"

DCUSB requires a second set of differential data contacts (D1+/D1-) for sending/receiving USB packets. The resulting signals—“V_{BUS}, D0+, D0-, D1+, D1- and GND”—“accelerate data transmission rate” up to “twice as high” as USB2.0, while maintaining compatibility with USB2.0. EX1009, 1:31-33, 2:46-48, Fig.5.

The protocol allows switching between single-channel (standard USB2.0) and dual-channel modes using a Chirp sequence. EX1009, 2:9-27. If a host and device are both DCUSB-capable, both data channels (D0+/D0- and D1+/D1-) can be enabled. EX1009, 2:23-27.

A POSITA would have used the Lufan-Yuming-Socket with Zhenyu’s plug to implement DCUSB

Yen describes the DCUSB protocol but not the physical structure of the connector between a DCUSB host controller (*e.g.*, computer) and device (*e.g.*, data storage media). EX1003, ¶¶430-431. To implement DCUSB, a POSITA would have recognized that the plug and socket should be (a) compliant with USB2.0 for backwards compatibility; and (b) provide two data channels. *Id.* The Lufan-Yuming-Socket with Zhenyu (plug) provide obvious structures, among a finite set of predictable options, that satisfy these requirements. *Id.*

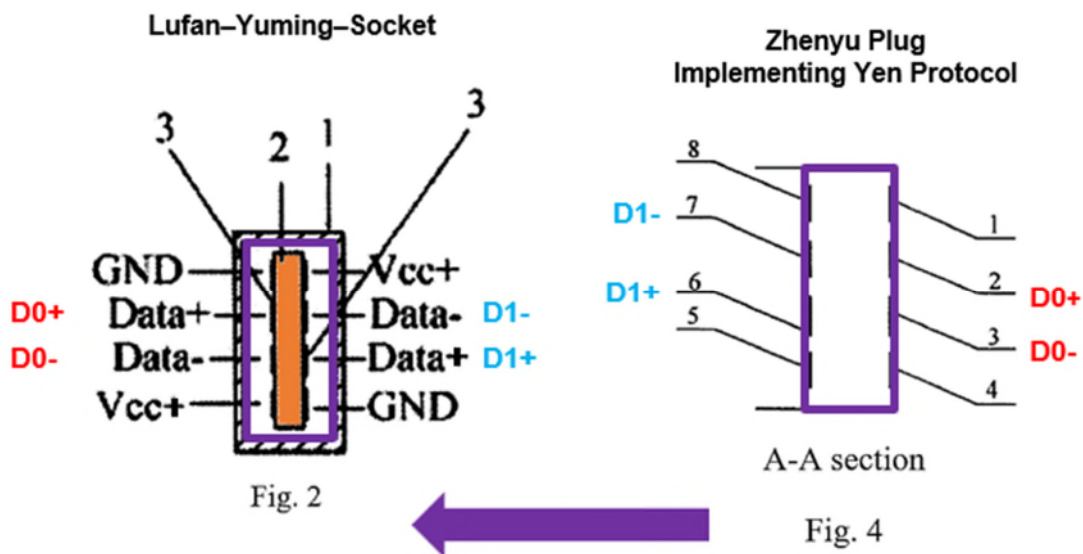
As explained in Ground 4, the Lufan-Yuming-Socket has a central tongue with two symmetric sides of contacts. EX1007, 1, 4, Fig. 2; EX1008, 7, Fig. 5. The two sides of contacts create two USB interfaces in “reverse” order (side 1: “power Vcc+, data- (data-), data+ (data+), and ground (GND)”; side 2: “ground (GND),

data+ (data+), data- (data-), and power Vcc+”). EX1007, 6; EX1003, ¶432. Contacts on each side of the Lufan-Yuming-Socket’s tongue can be “electrically connected” to terminals on each side of a double-sided plug. EX1008, 8.

Zhenyu, correspondingly, discloses a double-sided USB2.0-compliant plug that is symmetrical, reversible, “user-friendly and compact.” EX1006, 1. It would have been apparent to a POSITA that the Lufan-Yuming-Socket would mate with Zhenyu’s plug. EX1007, 1, 4, Fig. 2; EX1003, ¶433. Like the Lufan-Yuming-Socket, Zhenyu’s plug has two sides of contacts, each forming a “complete set of USB interface contacts,” in reverse order (side 1: power (8), data- (7), data+ (6), ground (5); side 2: ground (1), data+ (2), data- (3), power (4)). EX1006, 6-7. The symmetry allows for reversible insertion of a plug, at 0/180 degrees. *Id.* Also like the Lufan-Yuming-Socket, both sides of Zhenyu’s plug can be used at the same time, as desired: “[t]he contact points on the right and left sides can also ***use all contact points or only some of them***, depending on the actual application of the device.” EX1006, 7.

The Lufan-Yuming-Socket and Zhenyu’s plug are therefore an ideal fit for Yen’s protocol. EX1003, ¶434. To implement DCUSB dual-channel mode, one differential pair in the Lufan-Yuming-Socket and Zhenyu’s plug would be D0+/D0- signals, and the other would be D1+/D1- signals (as shown below). *Id.* Zhenyu’s plug (below, right) fits around the Lufan-Yuming-Socket tongue (below, left) and

connects the two data channels (one on each side) regardless of the direction of insertion. EX1003, ¶434.



A POSITA would have had a reasonable expectation of success in implementing the Lufan-Yuming-Socket and Zhenyu's plug with DCUSB by connecting the Lufan-Yuming-Socket to both sides of Zhenyu's plug, as taught in Yuming. EX1003, ¶¶435-436. Yen discloses significant detail (more than in the '307 patent), including exemplary wiring, for implementing two active data channels. *Id.*; EX1009, Fig. 5, 3:31-41; EX1001, 8:35-9:12. And in DCUSB, the D0+/D0- and D1+/D1- interfaces can transmit all types of USB2.0 data packets, EX1009, 2:56-60, so either set of differential data contacts in Lufan and Zhenyu could be implemented as D0+/D0- or D1+/D1-, making it fully compatible with Lufan's and Zhenyu's reversibility. EX1003, ¶¶435-436. Yen's Chirp sequence could easily have been

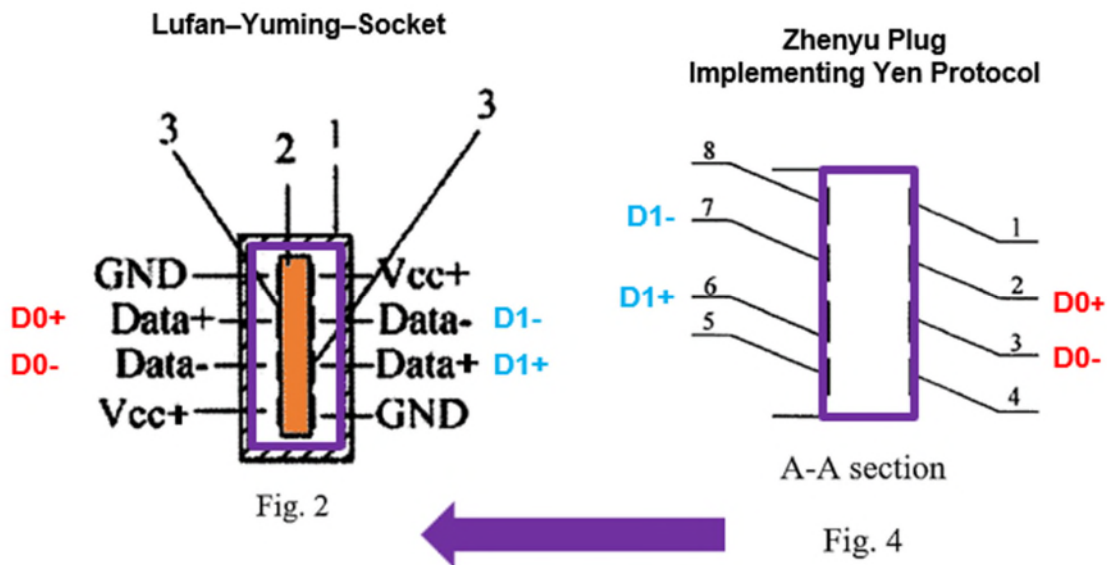
used to identify which side is treated as D0/D0+ and which side is treated as D1+/D1-. *Id.*

ii. **Obviousness**

Claims 34-51, 53-96, 98-106, 108-114, 117-120, 130-135 would have been obvious in view of the Lufan-Yuming-Socket, Zhenyu, and Yen for the reasons described for Ground 4, with the following modifications (EX1003, ¶¶437-506):

- A. Each “simultaneous,” “duplex electrical socket,” and “functional reverse mirror” limitation (§V) is disclosed by the Lufan-Yuming-Socket, Zhenyu, and Yen **only** under PO’s claim interpretation. The combination is a socket with a double-sided tongue reversibly mating with a single plug, with two sides of active data channels. §§V, VII.F.i, EX1003, ¶¶437, 445-447.
- B. For limitations requiring a plug having one row of connection terminals and normal/opposite insertion in two operational states, in all Challenged Claims, the Lufan-Yuming-Socket discloses a centrally located tongue forming symmetric connection slot *chambers* allowing the Zhenyu plug, with two rows of connection terminals, to be inserted at 0 degrees (*normally*) or 180 degrees (*oppositely*). §VII.F.i (reversible insertion of Zhenyu plug); EX1007, Fig. 2, 1 (tongue “located in the middle of the metal shell..., enabling the USB plug to be inserted from both directions”); EX1003, ¶¶439-440, 442-443, 446-450.

C. Claims 35, 108, 110, 112 (tongue only contacting an interior portion of a plug) are invalid. When Zhenyu’s plug is inserted into the Lufan-Yuming-Socket, the tongue only contacts the plug’s interior walls. EX1008, 8 (“tongue piece 112 extends into the socket interface 211”); §VII.D.ii (34[b], 34[d]); EX1003, ¶¶453, 500-502.



D. For thickness limitations (36, 65, 75, 86, 96, 106, 112[x]), the same obviousness applies as in Ground 4. EX1003, ¶¶454-459, 487, 493, 495, 498-499, 502; §VII.D.iii (36). A POSITA would have recognized that making the Lufan-Yuming-Socket’s connection slot thicker than the tongue allows for thicker plug walls, which promote robustness of Zhenyu’s plug. EX1003, ¶457; EX1008, 1 (“the structure forms a more stable connection...”) 4 (similar). A POSITA would have recognized that decreasing the thickness of the Lufan-Yuming-Socket’s tongue, which is

mechanically protected, allows thicker (and mechanically stronger) connection slots and plug walls, which are exposed. EX1003, ¶¶457-458.

E. For claims requiring more than four contacts (62, 67[i], 78[i], 88[i]), the Lufan-Yuming-Socket, Zhenyu, and Yen render this limitation obvious. Yuming describes that each side of its symmetrical socket can include *six first contacts and six second contacts*. EX1008, 7 (“...6-pin terminal mating part 132a and 132b”). A POSITA would have been motivated to include (with a reasonable expectation of success) all six contacts in the Lufan-Yuming-Socket for the reasons described above; the six contacts would have implemented two full dual-channel USB interfaces disclosed in Yen—one on either side of the Lufan-Yuming-Socket—which would have further increased the data rate by doubling the number of data channels. EX1009, 1:35-37; §VII.F.i; EX1003, ¶¶485, 489-492, 495, 498.

G. GROUND 7: GROUND 6 WITH USB3.0

A POSITA would have been motivated to combine USB3.0 with Ground 6, for the same reasons described in Ground 5. §VII.E. The combination renders obvious claims 52, 97, 107, 116 (“proud”/“projections”) and 115 (castellated surfaces), and further renders obvious claims 36, 65, 75, 86, 96, 106, 112[x] (thickness) and 63-64, 73-74, 84-85, 94-95, 104-105, 110[w]-110[x], 112[w]-112[y] (chamfered/tapered tongue), as described in Ground 5. EX1003, ¶507.

VIII. SECONDARY CONSIDERATIONS

Petitioners are aware of no evidence of secondary considerations that would rebut a finding of obviousness and reserve the right to rebut any purported evidence raised by PO.

IX. CONCLUSION

Petitioner respectfully requests that IPR be instituted and the challenged claims be cancelled.

Dated: December 3, 2025

Respectfully submitted,

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CERTIFICATION UNDER 37 C.F.R. §42.24(d)

Pursuant to 37 C.F.R. §42.24(d), the undersigned hereby certifies that the word count under §42.24(a)(1) for the foregoing Petition for *Inter Partes* Review totals 13,946 words, within the 14,000 word limit allowed under §42.24(a)(1)(i).

Dated: December 3, 2025

/ Eliot D. Williams /
Eliot D. Williams

CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §§42.6(e) and 42.105, the undersigned certifies that on December 3, 2025, a complete and entire copy of the **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. RE50,307 UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §§42.100 ET SEQ.** (“Petition”) including exhibits and testimony relied upon were served via Fedex Overnight Delivery on the Patent Owner at the correspondence address of record for the subject patent at:

Jason H. Vick
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2370 E. 160th Pl
Thornton, CO 80602

A complete copy was also served via electronic mail to counsel of record for Patent Owner in the litigation pending before the U.S. District Court for the Eastern District of Texas entitled *Kiwi Intellectual Assets Corporation v. Samsung Electronics Co., Ltd., Samsung Electronics America, Inc.*, No. 2:25-cv-00811 at:

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Dated: December 3, 2025

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