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(54) Title: UNIVERSAL SERIAL CONNECTOR

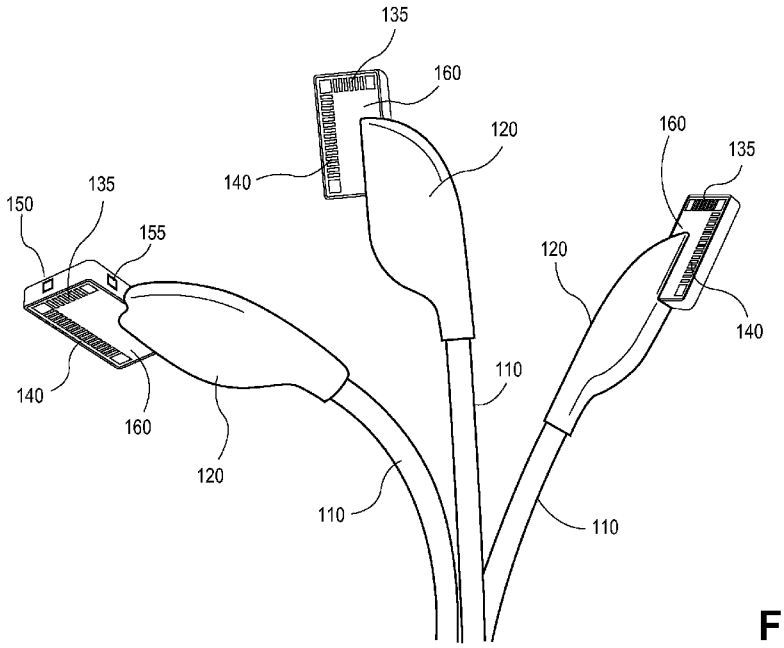

FIG. 1

(57) Abstract: An apparatus includes a connector body having a first side and a second side, and having a first edge and a second edge and a plurality of electrical connectors along the first edge and the second edge, wherein the connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format.

UNIVERSAL SERIAL CONNECTOR

TECHNICAL FIELD

[0001] Embodiments relate to universal serial connectors. More particularly, embodiments relate to a single connector that conforms to multiple form factors.

BACKGROUND

[0002] There currently exist many different types of Universal Serial Bus (USB) connectors, for example. Continuing the USB example, there are Type A plugs and Type B receptacles. Further, there are standard, mini and micro sizes. If a user has many different types of electronic devices (e.g., cellular phones, smart phones, tablets, cameras, recording devices) the user may have may different types of cables. Because these cables can become tangled together or lost. Thus, the user may have one or more cable, but may not have the desired cable.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings in which like reference numerals refer to similar elements.

Figure 1 illustrates one embodiment of a single connector that conforms to multiple USB formats.

Figure 2 is an illustration of one embodiment of a USB connector that can support multiple USB formats.

Figure 3 illustrates one embodiment of a single connector that conforms to multiple USB formats.

Figure 4 is a conceptual illustration of a connector that can support multiple USB formats with multiple devices.

Figure 5 illustrates a multiple-format USB cable connected to a smaller electronic device.

Figure 6 illustrates a multiple-format USB cable connected to a larger electronic device.

Figure 7 is a block diagram of one embodiment of an electronic system.

DETAILED DESCRIPTION

[0003] In the following description, numerous specific details are set forth. However, embodiments may be practiced without these specific details. In other instances, well-known circuits, structures and techniques have not been shown in detail in order not to obscure the understanding of this description.

[0004] There is described herein various embodiments of a single Universal Serial Bus (USB) connector that can fit both form factor constrained smaller devices and larger devices that have higher speed connections. In one embodiment, both the smaller and larger connectors have the same z-height. In one embodiment, the single connector can be intuitively plugged in to a small slot or a larger width slot for higher speed connections. While the examples herein are directed to USB interfaces other and/or additional interfaces can utilize similar connectors. USB refers to various standards available from USB Implementers Forum, Inc. and includes USB 1.0 released January 1996, USB 2.0 released April 2000, USB 3.0 released November 2008 as well as subsequent versions.

[0005] In one embodiment, the USB cable has the same connector on both ends. In one embodiment, the USB connect can operate in multiple directions and is "flipable" so that it can operate with either side up. In one embodiment, the USB connector combines both a straight connector and a right angle connector. In one embodiment, the connector has configurable pins depending on the orientation of the connector. In one embodiment, the connector includes detents in both orientations so that the connector can be held in place in multiple orientations. These detents can be more robust than standard USB connectors without the need for vulnerable tabs on either male or female connectors.

[0006] **Figure 1** illustrates one embodiment of a single connector that conforms to multiple USB formats. Figure 1 includes three views of the same embodiment that includes an open connector that can communicate according to two or more USB standards. In one embodiment, each cable 110 includes the same connectors on each end. In alternate embodiments, cable 110 can have different connectors on each end.

[0007] In one embodiment, cable 110 can include grip 120. In one embodiment, grip 120 provides an area for a user's fingers to grip the cable and connectors when inserting and/or removing connectors. In one the embodiment illustrated in Figure 1, connector body 140 has exposed connectors (135 and 140) on two edges. The connectors can function to operate according to two or more USB formats.

[0008] Also in the embodiment illustrated in Figure 1, connector body 160 can have connectors on two sides. Thus, there would not be a specified top and bottom as with current USB connectors. In one embodiment, connector body 140 has a shorter side 135 and a longer side 140. Shorter side 135 may be configured to communicate using one of the smaller USB formats (e.g., micro, mini) while longer side 140 may be configured to communicate using one of the larger USB formats. In one embodiment,

one or more of the connectors on connector body 140 is selectively operable based on the USB format in use. That is, one or more of the connectors may be disabled is not needed.

[0009] In one embodiment, connector body 140 can have one or more detents (e.g., 150, 155) that operate to hold the connector body within a USB receptacle of an electronic device (e.g., computer system, smartphone, tablet, camera, audio recording device).

[0010] **Figure 2** is an illustration of one embodiment of a USB connector that can support multiple USB formats. The example embodiment of Figure 2 operates in a similar manner as the example embodiment of Figure 1 except that connector body 240 has connectors 235 on only one edge. Like the embodiment of Figure 1, connector body 240 has connectors on both sides so that it can be functional with either side in the "up" position. The embodiment of Figure 2 may support, for example, USB Mini and USB Micro formats.

[0011] Connector body 260 is connected to cable 210 by grip 220. In one embodiment, grip 220 provides an area for a user's fingers to grip the cable and connectors when inserting and/or removing connectors. In one embodiment, each cable 210 includes the same connectors on each end. In alternate embodiments, cable 210 can have different connectors on each end.

[0012] **Figure 3** illustrates one embodiment of a single connector that conforms to multiple USB formats. Figure 3 includes two views of the same embodiment that includes an open connector that can communicate according to two or more USB standards. In one embodiment, each cable 310 includes the same connectors on each end. In alternate embodiments, cable 310 can have different connectors on each end.

[0013] In one the embodiment illustrated in Figure 3, connector body 340 has exposed connectors (335 and 340) on two edges. The connectors can function to operate according to two or more USB formats. Also in the embodiment illustrated in Figure 3, connector body 360 can have connectors on two sides. Thus, there would not be a specified top and bottom as with current USB connectors.

[0014] In one embodiment, connector body 340 has a shorter side 335 and a longer side 340. Shorter side 335 may be configured to communicate using one of the smaller USB formats (e.g., micro, mini) while longer side 340 may be configured to communicate using one of the larger USB formats. In one embodiment, one or more of the connectors on connector body 340 is selectively operable based on the USB format in use. That is, one or more of the connectors may be disabled is not needed.

[0015] In one embodiment, connector body 340 can have one or more detents (e.g., 350, 355) that operate to hold the connector body within a USB receptacle of an electronic device (e.g., computer system, smartphone, tablet, camera, audio recording device).

[0016] **Figure 4** is a conceptual illustration of a connector that can support multiple USB formats with multiple devices. The example of Figure 4 illustrates a cable as illustrated in Figure 3; however, other configurations/embodiments can be utilized in a similar manner.

[0017] In one the embodiment illustrated in Figure 4, cable 410 is connected to connector body 420, which has exposed connectors (430 and 440) on two edges. The connectors can function to operate according to two or more USB formats. Also in the embodiment illustrated in Figure 4, connector body 420 can have connectors on two sides. Thus, there would not be a specified top and bottom as with current USB connectors.

[0018] Connectors 430 may correspond to a smaller USB format and fits in receptacle 435. Because connectors 430 and receptacle 435 are smaller, they may be utilized with a smaller electronic device (e.g., 460). Electronic device 460 can be, for example, a smart phone, a camera, a recording device, a small tablet.

[0019] Similarly, connectors 440 may correspond to a larger USB format and fits in receptacle 445. Because connectors 440 and receptacle 445 are larger, they may be utilized with a larger electronic device (e.g., 470). Electronic device 470 can be, for example, a tablet, an ULTRABOOK™, a laptop, a desktop, a projector a storage device. ULTRABOOK™ is a trademark of Intel Corporation in the U.S. and/or other countries.

[0020] **Figure 5** illustrates a multiple-format USB cable connected to a smaller electronic device. In one embodiment, when connectors 430 (as indicated in Figure 4) are connected with receptacle 435 (as indicated in Figure 4) connectors 440 may be disabled. In one embodiment, one or more of connectors 430 may also be disabled depending on the format/protocol utilized to communicate with electronic device 460.

[0021] **Figure 6** illustrates a multiple-format USB cable connected to a larger electronic device. In one embodiment, when connectors 440 (as indicated in Figure 4) are connected with receptacle 445 (as indicated in Figure 4) connectors 430 may be disabled. In one embodiment, one or more of connectors 440 may also be disabled depending on the format/protocol utilized to communicate with electronic device 470.

[0022] **Figure 7** is a block diagram of one embodiment of an electronic system. The electronic system illustrated in Figure 7 is intended to represent a range of electronic systems (either wired or wireless) including, for example, desktop computer systems, laptop computer systems, cellular telephones, personal digital assistants (PDAs)

including cellular-enabled PDAs, set top boxes, tablets, etc. Alternative electronic systems may include more, fewer and/or different components.

[0023] Electronic system 700 includes bus 705 or other communication device to communicate information, and processor 710 coupled to bus 705 that may process information. While electronic system 700 is illustrated with a single processor, electronic system 700 may include multiple processors and/or co-processors. Electronic system 700 further may include random access memory (RAM) or other dynamic storage device 720 (referred to as main memory), coupled to bus 705 and may store information and instructions that may be executed by processor 710. Main memory 720 may also be used to store temporary variables or other intermediate information during execution of instructions by processor 710.

[0024] Electronic system 700 may also include read only memory (ROM) and/or other static storage device 730 coupled to bus 705 that may store static information and instructions for processor 710. Data storage device 740 may be coupled to bus 705 to store information and instructions. Data storage device 740 such as a magnetic disk or optical disc and corresponding drive may be coupled to electronic system 700.

[0025] Electronic system 700 may also be coupled via bus 705 to display device 750, such as a cathode ray tube (CRT) or liquid crystal display (LCD), to display information to a user. Alphanumeric input device 760, including alphanumeric and other keys, may be coupled to bus 705 to communicate information and command selections to processor 710. Another type of user input device is cursor control 770, such as a mouse, a trackball, or cursor direction keys to communicate direction information and command selections to processor 710 and to control cursor movement on display 750.

[0026] Electronic system 700 further may include network interface(s) 780 to provide access to a network, such as a local area network. Network interface(s) 780 may include,

for example, a wireless network interface having antenna 785, which may represent one or more antenna(e). Network interface(s) 780 may also include, for example, a wired network interface to communicate with remote devices via network cable 787, which may be, for example, an Ethernet cable, a coaxial cable, a fiber optic cable, a serial cable, a parallel cable and/or USB (or other protocol/standard/format) interfaces as described herein.

[0027] In one embodiment, network interface(s) 780 may provide access to a local area network, for example, by conforming to IEEE 802.11b and/or IEEE 802.11g standards, and/or the wireless network interface may provide access to a personal area network, for example, by conforming to Bluetooth standards. Other wireless network interfaces and/or protocols can also be supported.

[0028] IEEE 802.11b corresponds to IEEE Std. 802.11b-1999 entitled "Local and Metropolitan Area Networks, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Higher-Speed Physical Layer Extension in the 2.4 GHz Band," approved September 16, 1999 as well as related documents. IEEE 802.11g corresponds to IEEE Std. 802.11g-2003 entitled "Local and Metropolitan Area Networks, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, Amendment 4: Further Higher Rate Extension in the 2.4 GHz Band," approved June 27, 2003 as well as related documents. Bluetooth protocols are described in "Specification of the Bluetooth System: Core, Version 1.1," published February 22, 2001 by the Bluetooth Special Interest Group, Inc. Associated as well as previous or subsequent versions of the Bluetooth standard may also be supported.

[0029] In addition to, or instead of, communication via wireless LAN standards, network interface(s) 780 may provide wireless communications using, for example, Time Division, Multiple Access (TDMA) protocols, Global System for Mobile

Communications (GSM) protocols, Code Division, Multiple Access (CDMA) protocols, and/or any other type of wireless communications protocol.

[0030] In one embodiment, an apparatus includes a connector body having a top side and a bottom side, and having a first edge and a second edge and a plurality of electrical connectors along the first edge and the second edge, wherein the, wherein the connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format.

[0031] In one embodiment, the first interface format comprises a first Universal Serial Bus (USB)-compliant format and the second interface format comprises a second USB-compliant format. In one embodiment, the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the top side of the connector body and a second set of electrical connectors along the first edge on the bottom side of the connector body.

[0032] In one embodiment, the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the top side of the connector body and a fourth set of electrical connectors along the second edge on the bottom side of the connector body. In one embodiment, one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format.

[0033] In one embodiment, there are one or more detents on the connector body. In one embodiment, the first edge is longer than the second edge. In one embodiment, the connector body includes a grip portion connected to the connector body. In one embodiment, a cable having one or more transmission lines is coupled with one or more of the electrical connectors.

[0034] In one embodiment, an electrical connector cable includes a first connector body having a top side and a bottom side, and having a first edge and a second edge

and a plurality of electrical conductors. The connector body has first plurality of electrical connectors along the first edge and the second edge, the first plurality of electrical connectors coupled with a first end of the plurality of electrical conductors. The connectors on the first edge conform to a first Universal Serial Bus (USB)-compliant interface format and the connectors on the second edge conform to a second USB-compliant interface format.

[0035] In one embodiment, the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the top side of the connector body and a second set of electrical connectors along the first edge on the bottom side of the connector body. In one embodiment, the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the top side of the connector body and a fourth set of electrical connectors along the second edge on the bottom side of the connector body.

[0036] In one embodiment, the cable further includes a second connector body having a top side and a bottom side, and having a first edge and a second edge and a second plurality of electrical connectors along the first edge and the second edge. The second plurality of electrical connectors are coupled with a second end of the plurality of electrical conductors. The connectors on the first edge conform to the first USB-compliant interface format and the connectors on the second edge conform to the second USB-compliant interface format.

[0037] In one embodiment, an apparatus includes a connector body having a first side and a second side, and having a first edge and a second edge and a plurality of electrical connectors along the first edge and the second edge. The connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format. In one embodiment, the first interface format

comprises a first Universal Serial Bus (USB)-compliant format and the second interface format comprises a second USB-compliant format.

[0038] In one embodiment, the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the first side of the connector body and a second set of electrical connectors along the first edge on the second side of the connector body. In one embodiment, the plurality of electrical connectors include at least a third set of electrical connectors along the second edge on the first side of the connector body and a fourth set of electrical connectors along the second edge on the second side of the connector body.

[0039] In one embodiment, one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format. In one embodiment, the apparatus further includes one or more detents on the connector body. In one embodiment, the first edge is longer than the second edge. In one embodiment, the apparatus further includes a grip portion connected to the connector body. In one embodiment, the apparatus further includes a cable having one or more transmission lines coupled with one or more of the electrical connectors.

[0040] In one embodiment, an electrical cable includes a first connector body having a first side and a second side, and having a first edge and a second edge, a plurality of electrical conductors, and a first plurality of electrical connectors along the first edge and the second edge. The first plurality of electrical connectors are coupled with a first end of the plurality of electrical conductors. The connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format.

[0041] In one embodiment, the first interface format is a first Universal Serial Bus (USB)-compliant format and the second interface format is a second USB-compliant

format. In one embodiment, the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the top side of the connector body and a second set of electrical connectors along the first edge on the bottom side of the connector body. In one embodiment, the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the top side of the connector body and a fourth set of electrical connectors along the second edge on the bottom side of the connector body.

[0042] In one embodiment, the cable further includes a second connector body having a top side and a bottom side, and having a first edge and a second edge and a second plurality of electrical connectors along the first edge and the second edge, second plurality of electrical connectors coupled with a second end of the plurality of electrical conductors. The connectors on the first edge conform to the first USB-compliant interface format and the connectors on the second edge conform to the second USB-compliant interface format.

[0043] In one embodiment, one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format. In one embodiment, the cable further includes one or more detents on the connector body. In one embodiment, the first edge is longer than the second edge. In one embodiment, the cable further includes a grip portion connected to the connector body. In one embodiment, the cable further includes one or more transmission lines coupled with one or more of the electrical connectors.

[0044] In one embodiment, an apparatus includes a connector body having a first side and a second side, and having a first edge and a second edge and a plurality of electrical connectors along the first edge of the first side and the first edge of the second side. The connectors on the first edge of the first side conform to a first interface

format and the connectors on the first edge of the second side conform to a second interface format.

[0045] In one embodiment, the first interface format is a first Universal Serial Bus (USB)-compliant format and the second interface format is a second USB-compliant format. In one embodiment, the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the first side of the connector body and a fourth set of electrical connectors along the second edge on the second side of the connector body.

[0046] In one embodiment, one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format. In one embodiment, the apparatus further includes one or more detents on the connector body. In one embodiment, the first edge is longer than the second edge. In one embodiment, the apparatus further includes a grip portion connected to the connector body. In one embodiment, the apparatus further includes a cable having one or more transmission lines coupled with one or more of the electrical connectors.

[0047] In one embodiment, one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format. In one embodiment, the cable includes one or more detents on the connector body. In one embodiment, the first edge is longer than the second edge. In one embodiment, the cable includes a grip portion connected to the connector body. In one embodiment, the cable has one or more transmission lines coupled with one or more of the electrical connectors.

[0048] Reference in the specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment. The appearances of the phrase "in one embodiment" in various places

in the specification are not necessarily all referring to the same embodiment. The description is thus to be regarded as illustrative instead of limiting.

CLAIMS

What is claimed is:

1. An apparatus comprising:

a connector body having a first side and a second side, and having a first edge and a second edge; and

a plurality of electrical connectors along the first edge and the second edge, wherein the connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format.

2. The apparatus of claim 1 wherein the first interface format comprises a first Universal Serial Bus (USB)-compliant format and the second interface format comprises a second USB-compliant format.

3. The apparatus of claims 1 or 2 wherein the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the first side of the connector body and a second set of electrical connectors along the first edge on the second side of the connector body.

4. The apparatus of claim 3 wherein the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the first side of the connector body and a fourth set of electrical connectors along the second edge on the second side of the connector body.

5. The apparatus of claim 1 or 2 wherein one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format.

6. The apparatus of claim 1 or 2 further comprising one or more detents on the connector body.

7. The apparatus of claim 1 or 2 wherein the first edge is longer than the second edge.

8. The apparatus of claim 1 or 2 further comprising a grip portion connected to the connector body.

9. The apparatus of claim 1 or 2 further comprising a cable having one or more transmission lines coupled with one or more of the electrical connectors.

10. An electrical connector cable comprising:

a first connector body having a first side and a second side, and having a first edge and a second edge;

a plurality of electrical conductors; and

a first plurality of electrical connectors along the first edge and the second edge, the first plurality of electrical connectors coupled with a first end of the plurality of electrical conductors, wherein the connectors on the first edge conform to a first interface format and the connectors on the second edge conform to a second interface format.

11. The cable of claim 10 wherein the first interface format comprises a first Universal Serial Bus (USB)-compliant format and the second interface format comprises a second USB-compliant format.

12. The cable of claim 10 or 11 wherein the plurality of electrical connectors comprises at least a first set of electrical connectors along the first edge on the top side of the connector body and a second set of electrical connectors along the first edge on the bottom side of the connector body.

13. The cable of claim 12 wherein the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the top side of the connector body and a fourth set of electrical connectors along the second edge on the bottom side of the connector body.

14. The cable of claim 10 or 11 further comprising:

a second connector body having a top side and a bottom side, and having a first edge and a second edge; and

a second plurality of electrical connectors along the first edge and the second edge, second plurality of electrical connectors coupled with a second end of the plurality of electrical conductors, wherein the connectors on the first edge conform to the first USB-compliant interface format and the connectors on the second edge conform to the second USB-compliant interface format.

15. The cable of claim 10 or 11 wherein one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format.

16. The cable of claim 10 or 11 further comprising one or more detents on the connector body.

17. The cable of claim 10 or 11 wherein the first edge is longer than the second edge.

18. The cable of claim 10 or 11 further comprising a grip portion connected to the connector body.

19. The cable of claim 10 or 11 further comprising one or more transmission lines coupled with one or more of the electrical connectors.

20. An apparatus comprising:

a connector body having a first side and a second side, and having a first edge and a second edge; and

a plurality of electrical connectors along the first edge of the first side and the first edge of the second side, wherein the connectors on the first edge of the first side conform to a first interface format and the connectors on the first edge of the second side conform to a second interface format.

21. The apparatus of claim 20 wherein the first interface format comprises a first Universal Serial Bus (USB)-compliant format and the second interface format comprises a second USB-compliant format.

22. The apparatus of claim 20 or 21 wherein the plurality of electrical connectors comprises at least a third set of electrical connectors along the second edge on the first side of the connector body and a fourth set of electrical connectors along the second edge on the second side of the connector body.

23. The apparatus of claim 20 or 21 wherein one or more of the plurality of electrical connectors is to be selectively disabled based on an interface format.

24. The apparatus of claim 20 or 21 further comprising one or more detents on the connector body.

25. The apparatus of claim 20 or 21 wherein the first edge is longer than the second edge.

26. The apparatus of claim 20 or 21 further comprising a grip portion connected to the connector body.

27. The apparatus of claim 20 or 21 further comprising a cable having one or more transmission lines coupled with one or more of the electrical connectors.

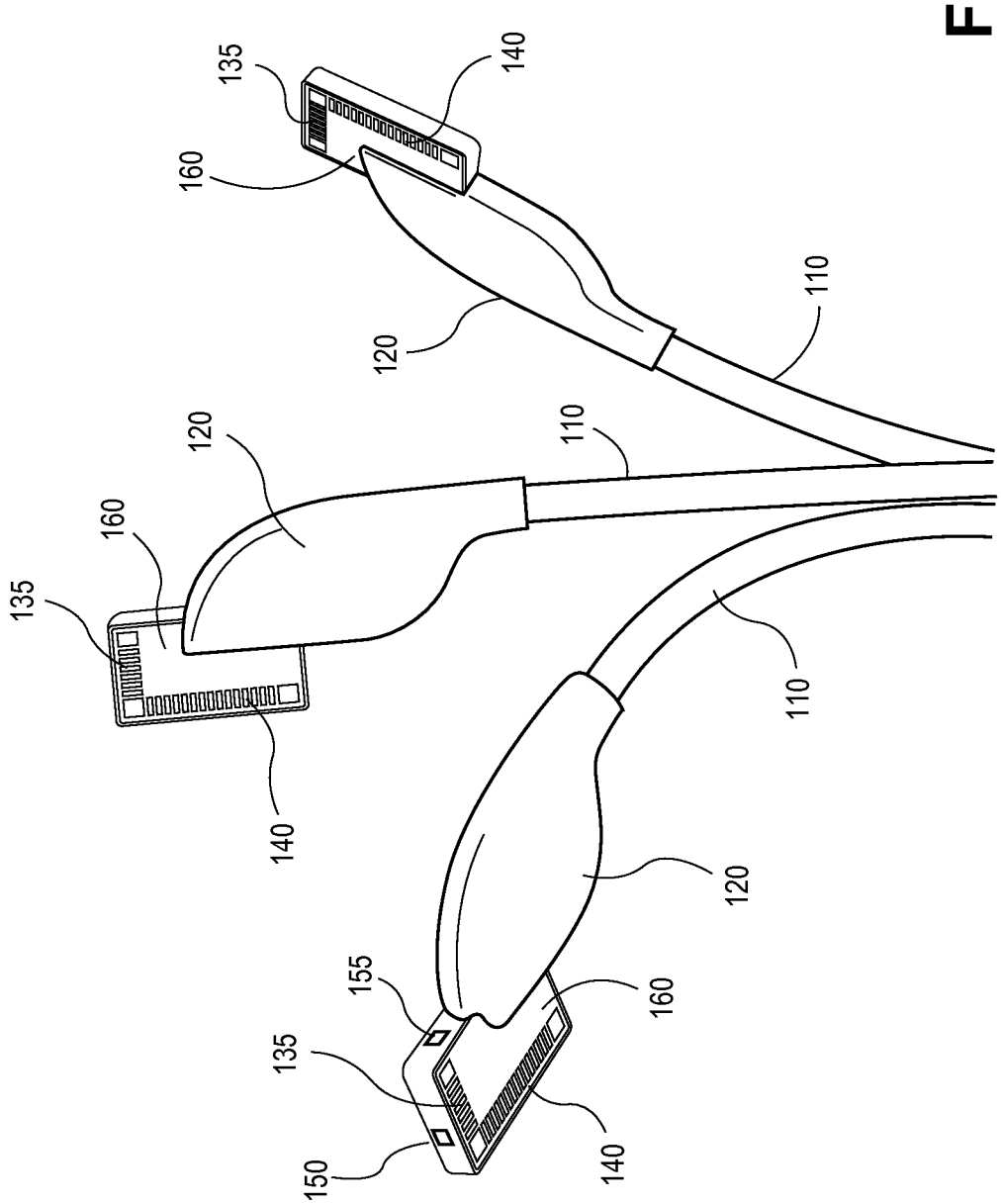
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FIG. 1

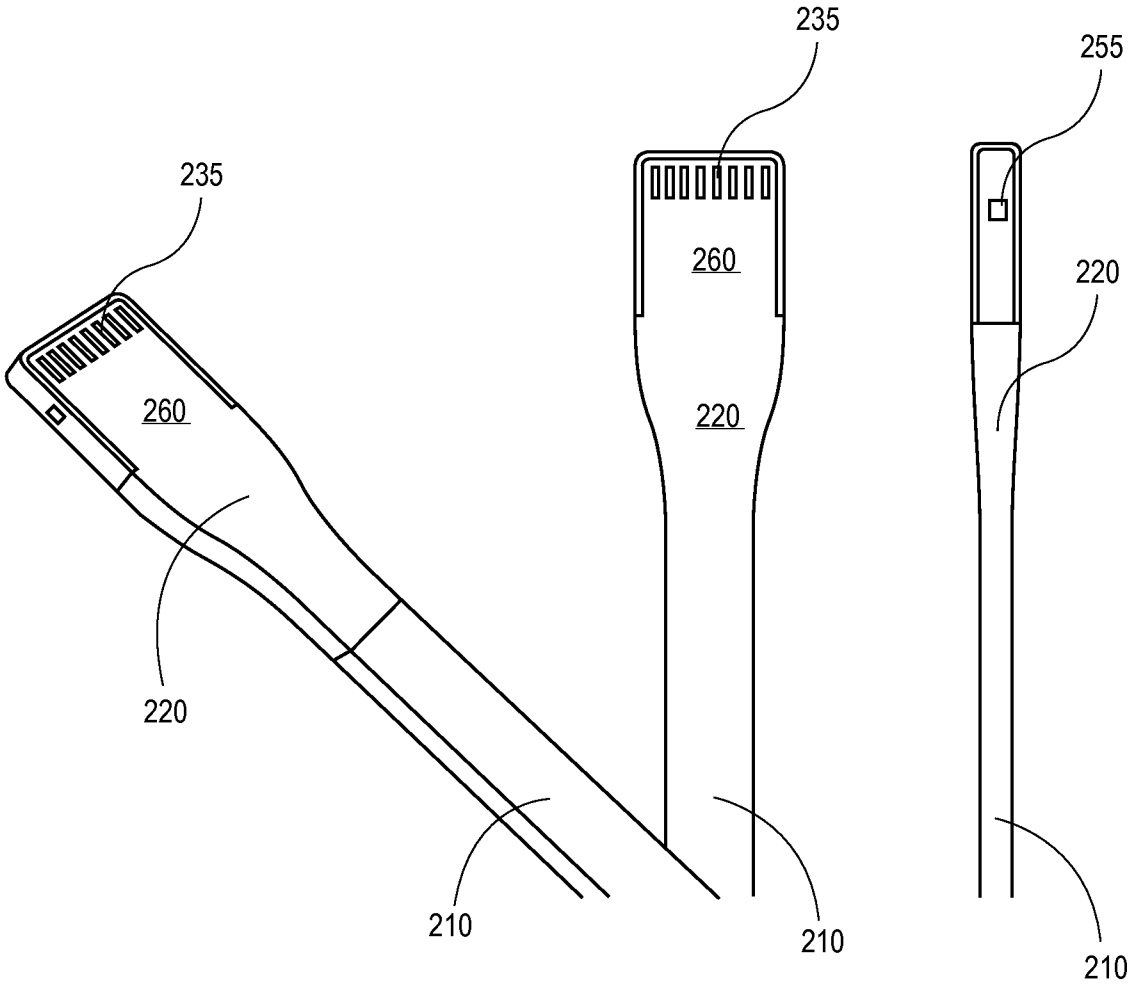

FIG. 2

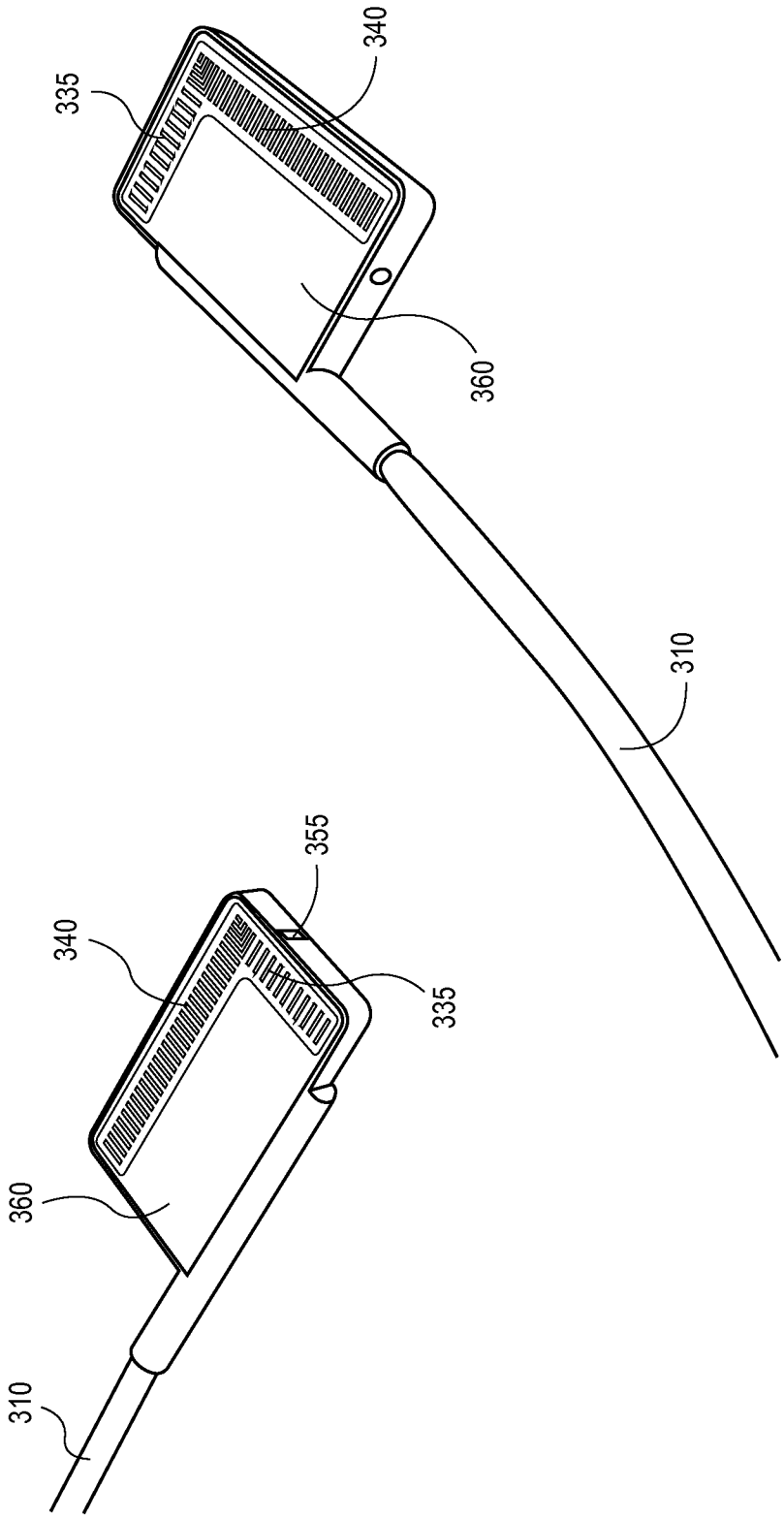

FIG. 3

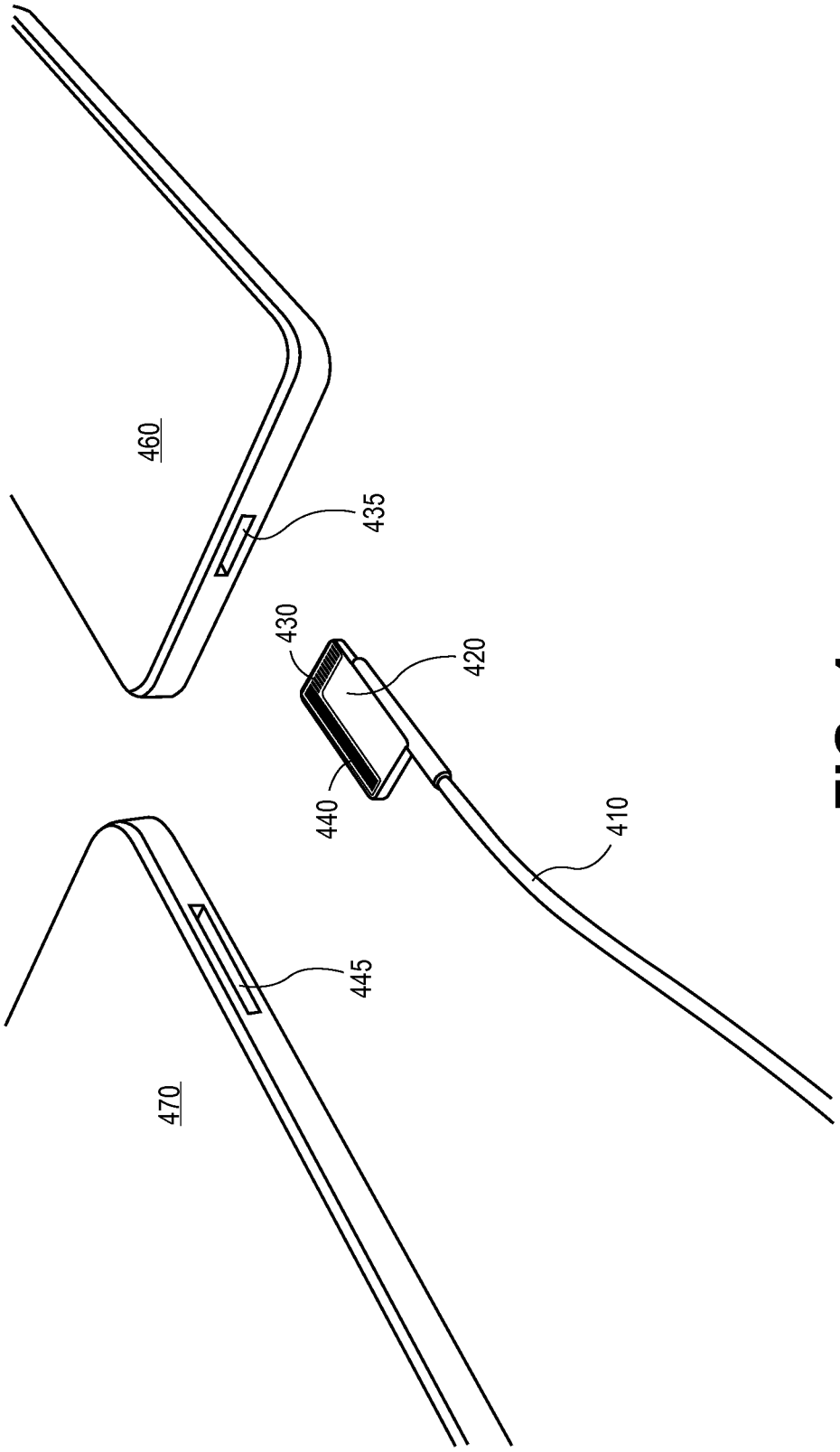

FIG. 4

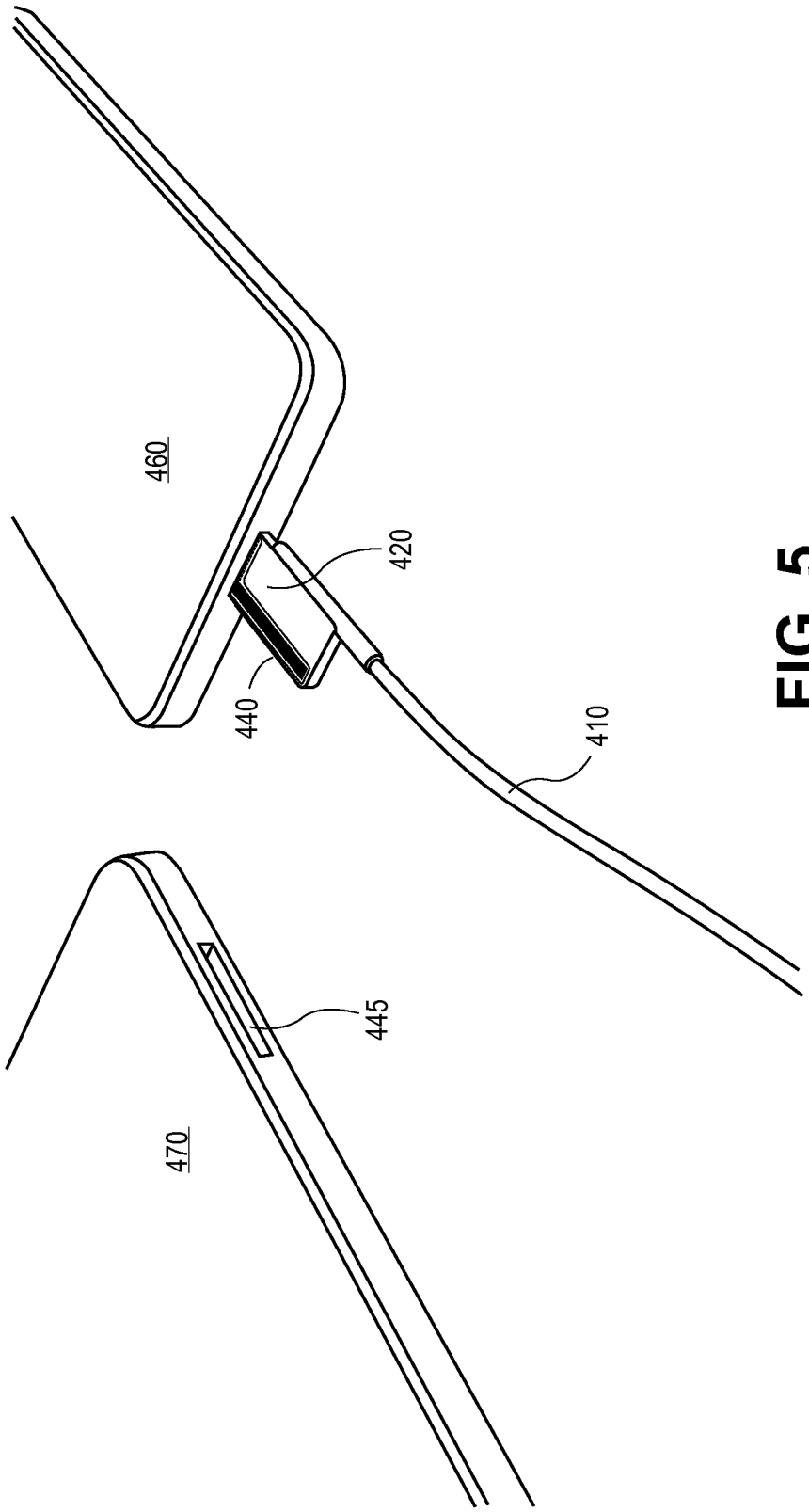

FIG. 5

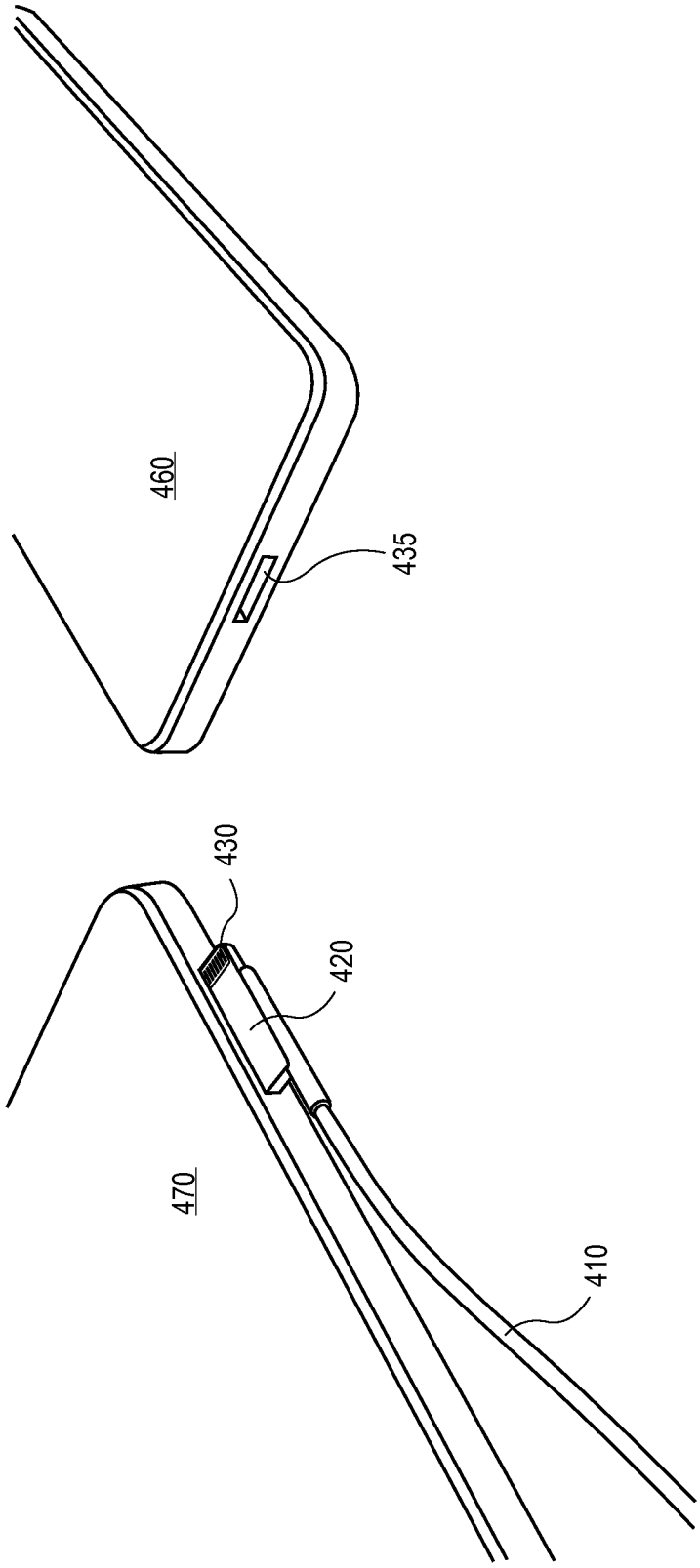

FIG. 6

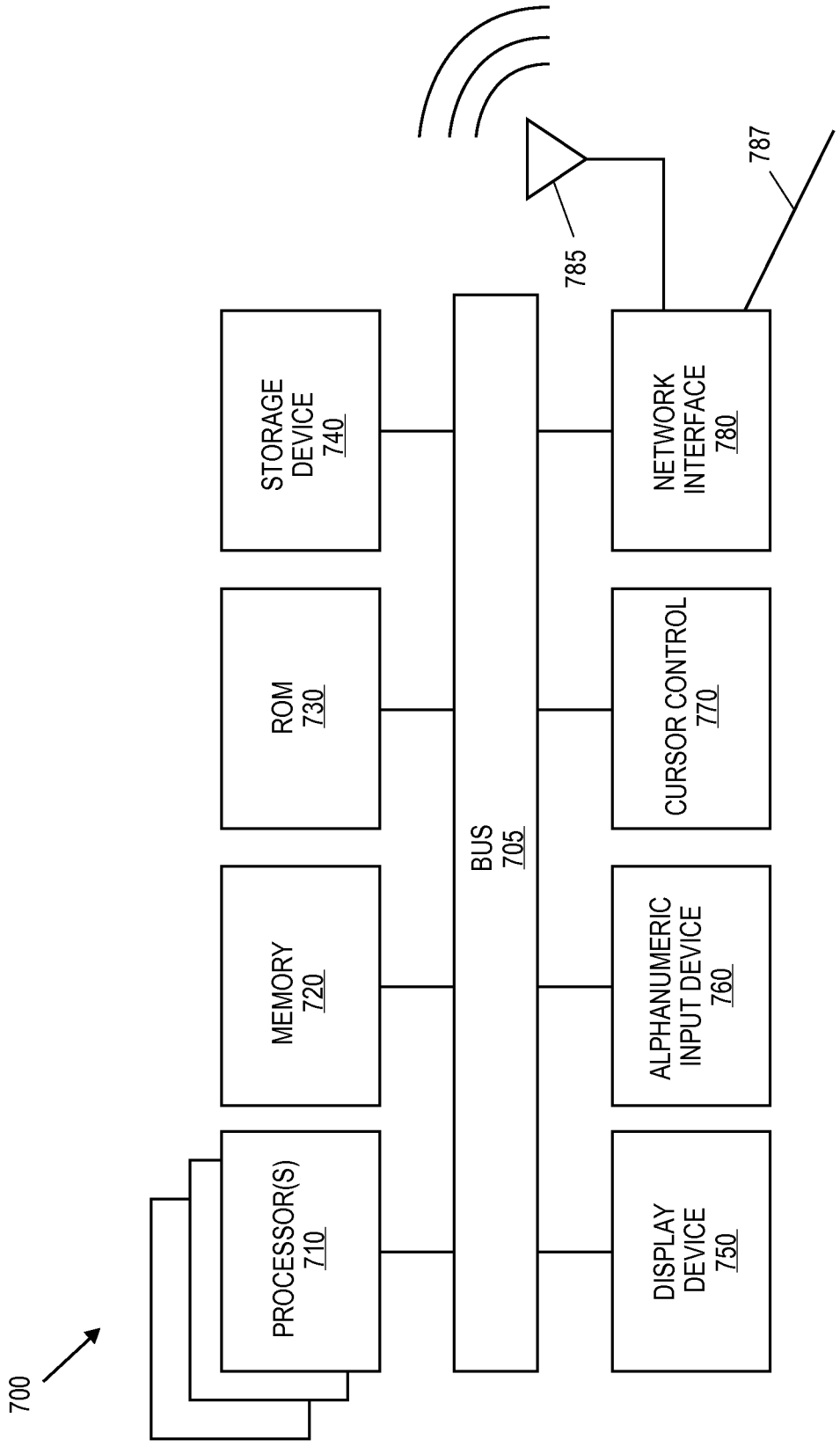
700
PROCESSOR(S)
710
MEMORY
720
ROM
730
STORAGE DEVICE
740
BUS
705
DISPLAY DEVICE
750
ALPHANUMERIC INPUT DEVICE
760
CURSOR CONTROL
770
NETWORK INTERFACE
780
785
787

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/078022

A. CLASSIFICATION OF SUBJECT MATTER

H01R 13/648(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01R 13/648; G06K 07/00; G06K 07/06; H01R 31/06; H01R 24/62; G06K 19/067

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: Universal Serial Bus (USB), connector, compatible

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006-0286865 A1 (HORNG-YEE CHOU et al.) 21 December 2006 See paragraphs [0006]-[0007], [0047]-[0048], [0050]-[0053], [0071], [0073]-[0075], [0085]-[0086], claim 49 and figures 1A-1B, 4B-4E, 7A-7D.	1-27
A	US 2008-0191033 A1 (EDWIN J. CUELLAR et al.) 14 August 2008 See paragraphs [0036]-[0037], claims 1-3 and figures 1A-1B.	1-27
A	KR 10-2010-0029910 A (KI HYUNG KIM) 18 March 2010 See paragraphs [0016]-[0018], [0022]-[0024], [0028]-[0041], claims 1, 3 and figures 4-5.	1-27
A	US 6435409 B1 (KUANG-HUA HU) 20 August 2002 See column 2, lines 9-53, claims 1-2 and figures 3-4.	1-27
A	KR 10-0791583 B1 (YUNGS GROUP, INC.) 04 January 2008 See paragraphs [0048], [0052], [0058], [0066], [0070], [0074]-[0076], claim 1 and figures 1a, 2a-2b, 5-7.	1-27

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 September 2014 (24.09.2014)	**24 September 2014 (24.09.2014)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/078022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006-0286865 A1	21/12/2006	AU 1999-29734 A1	06/09/1999
		AU 1999-60212 A1	21/03/2000
		AU 1999-61310 A1	21/03/2000
		AU 2000-20200 A1	03/04/2000
		AU 2001-26352 A1	16/07/2001
		AU 2001-269765 A8	17/12/2001
		AU 2001-47725 A1	03/10/2001
		AU 2001-69765 A1	17/12/2001
		AU 2002-15644 A1	29/08/2002
		AU 2002-15644 B2	06/07/2006
		AU 2002-337822 A8	22/04/2003
		AU 2002-362087 A1	23/06/2003
		AU 2003-267265 A1	08/04/2004
		AU 2003-301638 A1	13/05/2004
		CA 2280865 A1	27/08/1998
		CA 2280865 C	12/08/2008
		CA 2345300 A1	09/03/2000
		CA 2345300 C	24/01/2012
		CA 2345463 A1	23/03/2000
		CA 2345463 C	18/11/2008
		CA 2373569 A1	28/08/2002
		CA 2402552 A1	27/09/2001
		CA 2402552 C	02/10/2007
		CA 2412426 A1	13/12/2001
		CA 2412426 C	04/09/2007
		CA 2461338 A1	17/04/2003
		CA 2461338 C	20/12/2011
		CA 2469001 A1	19/06/2003
		CA 2469001 C	17/06/2008
		CA 2499993 A1	01/04/2004
		CA 2499993 C	06/08/2013
		CA 2521079 A1	04/11/2004
		CA 2762083 A1	09/03/2000
		CA 2762083 C	06/08/2013
		CN 100472856 C	25/03/2009
		CN 100487678 C	13/05/2009
		CN 100501702 C	17/06/2009
		CN 101097551 A	02/01/2008
		CN 101097551 C	02/01/2008
		CN 101118783 A	06/02/2008
		CN 101122865 A	13/02/2008
		CN 101122865 B	14/07/2010
		CN 101122887 A	13/02/2008
		CN 101398764 A	01/04/2009
		CN 101398785 A	01/04/2009
		CN 101399075 A	01/04/2009
		CN 101399076 A	01/04/2009
		CN 101403997 A	08/04/2009
		CN 101409111 A	15/04/2009

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/078022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CN 101425324 A	06/05/2009
		CN 101630375 A	20/01/2010
		CN 101644995 A	10/02/2010
		CN 101644995 B	28/12/2011
		CN 101727976 A	09/06/2010
		CN 101727976 B	19/09/2012
		CN 101923512 A	22/12/2010
		CN 101923512 B	20/03/2013
		CN 102469715 A	23/05/2012
		CN 1325584 C	11/07/2007
		CN 1373166 A	09/10/2002
		CN 1806356 A	19/07/2006
		EP 0937764 A1	25/08/1999
		EP 0985007 A1	15/03/2000
		EP 0985007 B1	17/05/2006
		EP 0985007 B2	03/11/2010
		EP 1007308 A1	14/06/2000
		EP 1007308 B1	12/11/2003
		EP 1127098 A1	29/08/2001
		EP 1236776 A1	04/09/2002
		EP 1236776 B1	21/12/2005
		EP 1236776 B2	25/11/2009
		EP 1268054 A1	02/01/2003
		EP 1268054 B1	05/12/2012
		EP 1309396 A2	14/05/2003
		EP 1309396 B1	21/09/2011
		EP 1358124 A2	05/11/2003
		EP 1358124 B1	11/03/2009
		EP 1386708 A2	04/02/2004
		EP 1386708 A3	04/06/2008
		EP 1386708 B1	18/06/2014
		EP 1448725 A2	25/08/2004
		EP 1450725 A2	01/09/2004
		EP 1542592 A1	22/06/2005
		EP 1559165 A2	03/08/2005
		EP 1629549 A2	01/03/2006
		EP 1629549 B1	26/10/2011
		EP 1889970 A1	20/02/2008
		JP 11-335658 A	07/12/1999
		JP 2001-005945 A	12/01/2001
		JP 2001-118046 A	27/04/2001
		JP 2001-513697 A	04/09/2001
		JP 2001-513828 A	04/09/2001
		JP 2002-309151 A	23/10/2002
		JP 2002-523610 A	30/07/2002
		JP 2003-527735 A	16/09/2003
		JP 2003-528419 A	24/09/2003
		JP 2004-507341 A	11/03/2004
		JP 2005-511186 A	28/04/2005
		JP 2005-537386 A	08/12/2005

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/078022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2006-508501 A	09/03/2006
		JP 2006-524898 A	02/11/2006
		JP 2007-332523 A	27/12/2007
		JP 2008-173635 A	31/07/2008
		JP 2009-084577 A	23/04/2009
		JP 2010-272544 A	02/12/2010
		JP 3274433 B2	15/04/2002
		JP 3338417 B2	28/10/2002
		JP 4097944 B2	11/06/2008
		JP 4178170 B2	12/11/2008
		JP 4471342 B2	02/06/2010
		JP 4704563 B2	15/06/2011
		KR 10-0797125 B1	22/01/2008
		KR 10-0893564 B1	17/04/2009
		KR 10-0988295 B1	18/10/2010
		TW 200813713 A	16/03/2008
		TW 200842887 A	01/11/2008
		TW 200915080 A	01/04/2009
		TW 200917017 A	16/04/2009
		TW 200917256 A	16/04/2009
		TW 200926394 A	16/06/2009
		TW 201005652 A	01/02/2010
		TW I351599 B	01/11/2011
		US 6103393 A	15/08/2000
		US 6153123 A	28/11/2000
		US 6159267 A	12/12/2000
		US 6168731 B1	02/01/2001
		US 6180029 B1	30/01/2001
		US 6193908 B1	27/02/2001
		US 6197218 B1	06/03/2001
		US 6210604 B1	03/04/2001
		US 6277169 B1	21/08/2001
		US 6316100 B1	13/11/2001
		US 6338809 B1	15/01/2002
		US 6360562 B1	26/03/2002
		US 6507349 B1	14/01/2003
		US 6547130 B1	15/04/2003
		US 6555022 B2	29/04/2003
		US 6592608 B2	15/07/2003
		US 6602439 B1	05/08/2003
		US 6623856 B1	23/09/2003
		US 6627115 B2	30/09/2003
		US 6635348 B1	21/10/2003
		US 6645398 B1	11/11/2003
		US 6660185 B2	09/12/2003
		US 6660680 B1	09/12/2003
		US 6679937 B1	20/01/2004
		US 6685727 B2	03/02/2004
		US 6689186 B1	10/02/2004
		US 6699304 B1	02/03/2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 6709408 B2	23/03/2004
		US 6730245 B2	04/05/2004
		US 6753108 B1	22/06/2004
		US 6770226 B2	03/08/2004
		US 6780350 B1	24/08/2004
		US 6854984 B1	15/02/2005
		US 6866929 B2	15/03/2005
		US 6872185 B2	29/03/2005
		US 6874044 B1	29/03/2005
		US 6875372 B1	05/04/2005
		US 6887928 B2	03/05/2005
		US 6890309 B2	10/05/2005
		US 6899329 B2	31/05/2005
		US 6908440 B2	21/06/2005
		US 6911412 B2	28/06/2005
		US 6955601 B2	18/10/2005
		US 6967183 B2	22/11/2005
		US 6991754 B2	31/01/2006
		US 6993934 B2	07/02/2006
		US 6994802 B2	07/02/2006
		US 7001410 B2	21/02/2006
		US 7004794 B2	28/02/2006
		US 7004994 B2	28/02/2006
		US 7005085 B2	28/02/2006
		US 7021971 B2	04/04/2006
		US 7022261 B2	04/04/2006
		US 7035110 B1	25/04/2006
		US 7037451 B2	02/05/2006
		US 7044802 B2	16/05/2006
		US 7066976 B2	27/06/2006
		US 7067070 B2	27/06/2006
		US 7069369 B2	27/06/2006
		US 7073010 B2	04/07/2006
		US 7082056 B2	25/07/2006
		US 7083747 B2	01/08/2006
		US 7087198 B2	08/08/2006
		US 7087341 B2	08/08/2006
		US 7094074 B2	22/08/2006
		US 7094370 B2	22/08/2006
		US 7095617 B1	22/08/2006
		US 7097686 B2	29/08/2006
		US 7098163 B2	29/08/2006
		US 7103684 B2	05/09/2006
		US 7103765 B2	05/09/2006
		US 7104848 B1	12/09/2006
		US 7108560 B1	19/09/2006
		US 7125287 B1	24/10/2006
		US 7125919 B2	24/10/2006
		US 7128852 B2	31/10/2006
		US 7130958 B2	31/10/2006

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/078022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7138159 B2	21/11/2006
		US 7138354 B2	21/11/2006
		US 7141528 B2	28/11/2006
		US 7150920 B2	19/12/2006
		US 7172663 B2	06/02/2007
		US 7174628 B1	13/02/2007
		US 7182646 B1	27/02/2007
		US 7186147 B1	06/03/2007
		US 7211345 B2	01/05/2007
		US 7226547 B2	05/06/2007
		US 7229572 B2	12/06/2007
		US 7243185 B2	10/07/2007
		US 7249978 B1	31/07/2007
		US 7255954 B2	14/08/2007
		US 7257714 B1	14/08/2007
		US 7259967 B2	21/08/2007
		US 7264992 B2	04/09/2007
		US 7269004 B1	11/09/2007
		US 7296345 B1	20/11/2007
		US 7297024 B2	20/11/2007
		US 7299316 B2	20/11/2007
US 2008-0191033 A1	14/08/2008	AT 477551 T	15/08/2010
		CN 1947134 A	11/04/2007
		CN 1947134 C	11/04/2007
		DE 602005022848 D1	23/09/2010
		EP 1735737 A1	27/12/2006
		EP 1735737 B1	11/08/2010
		JP 2007-533036 A	15/11/2007
		JP 4913726 B2	11/04/2012
		KR 10-1040051 B1	09/06/2011
		KR 10-2007-0012404 A	25/01/2007
		TW 270888 A	11/01/2007
		TW 270888 B	11/01/2007
		US 2005-0230484 A1	20/10/2005
		US 2007-0032101 A1	08/02/2007
		US 7152801 B2	26/12/2006
		US 7364090 B2	29/04/2008
		WO 2005-106781 A1	10/11/2005
KR 10-2010-0029910 A	18/03/2010	KR 10-1006160 B1	07/01/2011
US 6435409 B1	20/08/2002	None	
KR 10-0791583 B1	04/01/2008	AU 2008-201390 A1	16/10/2008
		AU 2008-201390 B2	17/03/2011
		CN 101276963 A	01/10/2008
		CN 101276963 B	15/12/2010
		EP 1976074 A2	01/10/2008
		EP 1976074 A3	05/10/2011

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/078022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2008-259192 A	23/10/2008
		US 2008-0236866 A1	02/10/2008
		US 7909651 B2	22/03/2011