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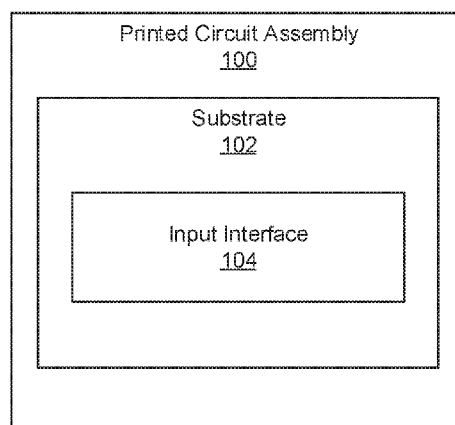


Fig. 1

(57) Abstract: In one example in accordance with the present disclosure, a printed circuit assembly is described. The printed circuit assembly includes a substrate on which hardware components are disposed. An input interface is disposed on the substrate. The input interface is disposed on an interior portion of the substrate such that a portable memory device coupled to the input interface is flush with an enclosure in which the printed circuit assembly is disposed.



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INPUT INTERFACES FOR FLUSH PORTABLE MEMORY DEVICE INSTALLATION

BACKGROUND

[0001] Computing devices are used every day in society by a variety of different types of users such as business personnel and individuals within their home. Some computing devices are portable such as a laptop computer or a tablet while others are larger and intended to be stationary. For example, the size and weight of desktop computers make it impractical to move them about.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] The accompanying drawings illustrate various examples of the principles described herein and are part of the specification. The illustrated examples are provided for illustration, and do not limit the scope of the claims.

[0003] Fig. 1 is a block diagram of a printed circuit assembly with an input interface for flush memory device installation, according to an example of the principles described herein.

[0004] Fig. 2 is a top view of a printed circuit assembly with an input interface for flush memory device installation, according to an example of the principles described herein.

[0005] Fig. 3 is a block diagram of a printed circuit assembly with an input interface for flush memory device installation, according to another example of the principles described herein.

[0006] Fig. 4 is a block diagram of a computing device with an input interface for flush memory device installation, according to another example of the principles described herein.

[0007] Figs. 5A-5C are isometric cut-away diagrams of a computing device with an input interface for flush memory device installation, according to another example of the principles described herein.

[0008] Fig. 6 is a block diagram of a computing device with an input interface for flush memory device installation, according to another example of the principles described herein.

[0009] Fig. 7 is an isometric cut-away diagram of a computing device with an input interface for flush memory device installation, according to another example of the principles described herein.

[0010] Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements. The figures are not necessarily to scale, and the size of some parts may be exaggerated to more clearly illustrate the example shown. Moreover, the drawings provide examples and/or implementations consistent with the description; however, the description is not limited to the examples and/or implementations provided in the drawings.

DETAILED DESCRIPTION

[0011] Computing devices are used around the world with many individuals using computing devices every day. Information can be transferred between different computing devices via portable memory devices. That is, a user can download documents, images, audio files, or other pieces of information to the portable memory device and remove the portable memory device from the computing device. The portable memory device can then be coupled to another computing device and the information uploaded to that computing device.

[0012] A universal serial bus (USB) flash drive is one type of portable memory device that is removable, rewriteable, small, and light to carry. A user inserts one of these USB flash drives into a USB port to upload and/or download information from the respective computing device.

[0013] While such portable memory devices are undoubtedly useful in facilitating data mobility and sharing of information, some developments may enhance the ease of implementation and the technical advantage they provide. For example, such portable memory devices are small and may be easily forgotten. Accordingly, if a user forgets their portable memory device, they may be unable to move the data from one computing device to another.

[0014] Moreover, such portable memory devices generally are external and protrude from the perimeter of a computing device to which they are coupled. Accordingly, a user, or an object, may strike the exposed portable memory device damaging it and/or the interface that receives it. In this case, the portable memory device may be rendered unusable and the interface itself may also be rendered unusable to any portable memory device.

[0015] Accordingly, the present specification describes a printed circuit assembly and computing device that resolve these and other issues. Specifically, the present printed circuit assembly includes an interface that is disposed on an interior portion of the printed circuit assembly. This printed circuit assembly is disposed in an enclosure of a computing device. Being that the interface is disposed on an interior portion of the printed circuit assembly, the entire portable memory device, and not just the electrical connector portion, is inserted into the computing device. That is, the portable memory device external surface is flush with the enclosure of the computing device. In this example, the portable memory device remains extractable.

[0016] Such a system prevents the complications that may arise when a user forgets the portable memory device. That is, the portable memory device is stored in the computing device itself such that a user does not have to keep track of both the computing device and the portable memory device separately.

[0017] Moreover, by being flush with the external enclosure, the portable memory device is protected against mechanical damage that may otherwise occur. To remove the portable memory device, the user may press on the portable memory device. A spring-loaded ejection mechanism may then partially eject the portable memory device such that a user may grab and fully remove it.

[0018] Specifically, the present specification describes a printed circuit assembly. The printed circuit assembly includes a substrate on which hardware components are disposed. An input interface of the printed circuit assembly is disposed on the substrate. The input interface is disposed on an interior portion of the substrate such that a portable memory device coupled to the input interface is flush with an enclosure in which the printed circuit assembly is disposed.

[0019] The present specification also describes a computing device. The computing device includes 1) a printed circuit assembly and 2) an enclosure to house the printed circuit assembly. A port is formed in the enclosure to receive a portable memory device. An input interface is disposed on the printed circuit assembly to establish an electrical connection between the printed circuit assembly and the portable memory device. In this example, the input interface is spaced a distance away from the port such that an inserted portable memory device is flush with the enclosure.

[0020] According to another example, the computing device includes the printed circuit assembly and the enclosure. The computing device also includes the port formed in the enclosure to receive a portable memory device. The portable memory device has a housing and a connector. The computing device also includes a universal serial bus (USB) interface disposed on the printed circuit assembly and disposed on an interior portion of the printed circuit assembly such that an inserted portable memory device coupled to the input interface is flush with the enclosure. An ejection device, responsive to user force, ejects the portable memory device.

[0021] Such a printed circuit assembly and computing device 1) provides for convenient storage of a portable memory device directly on the computing device, 2) prevents the likelihood that a portable memory device will not be available when desired, and 3) protects the portable memory device, the portable memory device interface on the computing device, and the computing device itself from mechanical damage.

[0022] Turning now to the figures, Fig. 1 is a block diagram of a printed circuit assembly (100) with an input interface (104) for flush memory device

installation, according to an example of the principles described herein. In some examples, the printed circuit assembly (100) is the main circuit board in the computing device and facilitates communication between, and control over, hardware components of the computing device. Examples of hardware components that rely on the printed circuit assembly (100) for communication include the central processing unit, the chipset, the memory, the general purpose input/output devices, the port hardware, and others. The printed circuit assembly (100) may be referred to as a motherboard. A motherboard is the heart of a computing device. In some examples, the printed circuit assembly (100) also provides connectors for different peripheral devices.

[0023] Structurally, the printed circuit assembly (100) includes a substrate (102) on which the hardware components are disposed. In some examples, the substrate (102) may be formed of a variety of materials and may include metallic traces on/in the substrate (102) to couple various hardware components. For example, the traces may couple memory devices on the substrate (102) to the central processing unit (CPU) disposed on the substrate (102).

[0024] Of particular relevance, an input interface (104) is disposed on the substrate (102). The input interface (104) is to receive an external connection and provide a data and mechanical connection to a peripheral device. For example, the input interface (104) may receive a portable memory device. As a particular example, the portable memory device may have a universal serial bus (USB) type connector. In this example, the input interface (104) is a USB type interface (104) that receives the USB portable memory device.

[0025] As depicted in Fig. 2 below, the input interface (104) is disposed on an interior portion of the substrate (102). That is, rather than being at an edge of the substrate (102) as may be the case on other printed circuit assemblies, the input interface (104) is disposed on an interior portion. The distance between an edge of the printed circuit assembly (100) and the input interface (104) may correspond to the length of a portable memory device to be coupled to the printed circuit assembly (100). That is, were the input interface (104) to be disposed along an edge of the printed circuit assembly (100), the coupled

portable memory device would extend beyond the walls of the computing device in which the printed circuit assembly (100) is installed. By comparison, by placing the input interface (104) interior to the substrate (102), any coupled portable memory device would not extend as far out from the edge of the computing device. In some examples, the input interface (104) is a distance from the edge of the printed circuit assembly (100) such that a portable memory device that is coupled to the input interface (104) is flush with an external surface of the enclosure of the computing device.

[0026] Fig. 2 is a top view of a printed circuit assembly (100) with an input interface (104-1) for flush memory device installation, according to an example of the principles described herein. As described above, the printed circuit assembly (100), which may be a motherboard, is a component of a computing device (206) that holds hardware components of the computing device (206). The printed circuit assembly (100) is disposed within a computing device (206) which is depicted in Fig. 2 as a dashed line.

[0027] Some examples of hardware components are depicted in Fig. 2 without reference numbers. Examples of such components include a processor, resistors, memory slots, cooling components, and other hardware components.

[0028] Of particular relevance, a number of input interfaces (104) may be disposed on the substrate (102) that forms the printed circuit assembly (100). The input interfaces (104) receive connectors to any variety of peripheral components. For example, an input interface (104) may receive a connector to a keyboard or a mouse. Via these interfaces (104), data is transmitted between the input/output device and the hardware components on the printed circuit assembly (100) to carry out different functions.

[0029] In one example, an input interface (104) may receive a portable memory device. For example, at least one input interface (104) may be a universal serial bus (USB) interface (104) to receive a USB-type portable memory device. As described above, such a USB portable memory device can be inserted into the input interface (104) and data may be read from, or written to, the portable memory device.

[0030] In some examples, at least one of the input interfaces (104), for example a first input interface (104-1) may be disposed near an interior portion of the printed circuit assembly (100). In an even more specific example, the first input interface (104-1) may be removed from an edge of the computing device (206) such that an inserted portable memory device is flush with a surface of the computing device (206). For example, a portable memory device inserted into a third input interface (104-3) may extend outside of the computing device (206) boundary, which boundary is indicated by the dashed line. By comparison, the first input interface (104-1) is positioned on an interior portion. The distance that the first input interface (104-1) is positioned may vary and may correspond to a length of the portable memory device such that an external surface of the portable memory device is flush with the enclosure of the computing device (206). By being offset from the edge of the printed circuit assembly (100), the first input interface (104-1) allows for storage of a portable memory device entirely within the edges of the computing device (206) thus protecting it from mechanical damage during use.

[0031] Moreover, as it is entirely enclosed within the computing device (206), the input interface (104-1) which is disposed on an interior portion of the printed circuit assembly (100) allows for the portable memory device to be stored in the computing device (206) when not in use. As it is within the enclosure of the computing device (206), the portable memory device is protected from mechanical damage. For example, a laptop computing device (206) may be inserted and removed from a computer bag. Were a portable memory device to extend outside of the computing device (206), the portable memory device, input interface (104), and/or computing device (206) itself may be damaged upon insertion or removal from such a bag. Accordingly, by being placed on the printed circuit assembly (100) such that the portable memory device is entirely within the computing device (206), such mechanical damage is prevented and allows storing of the portable memory device within the computing device (206).

[0032] Fig. 3 is a block diagram of a printed circuit assembly (100) with an input interface (104) for flush memory device installation, according to another example of the principles described herein. As described above, the printed

circuit assembly (100) includes a substrate (102) to retain a number of hardware components. Specifically, a number of input interfaces (104) may be disposed on the substrate (102) with at least one of the interfaces (104), being disposed more centrally on the substrate (102) as compared to the other input interfaces (104) of the same type.

[0033] In some examples, the printed circuit assembly (100) includes additional components. For example, the printed circuit assembly (100) may include a number of locking devices (308) and a number of ejection devices (310). The quantity of each of these components may match the number of input interfaces (104).

[0034] Locking devices (308) may retain the portable memory devices in place. That is, the printed circuit assembly (100) may include a locking device (308) per interface (104) to retain a corresponding portable memory device in place. In some examples, the locking device (308) may be an interference fit between the portable memory device and the input interface (104). That is, the input interface (104) may include an opening slightly bigger than the portable memory device electrical connector such that upon insertion friction forces lock the portable memory device in place. In another example, other locking devices (308) may be implemented such as a magnetic type connection or a latch that hooks onto the portable memory device. While particular reference is made to a few types of locking device (308), any other variety of locking devices (308) may be implemented to 1) retain the portable memory device in place during use and 2) to retain the portable memory device in place during storage and/or transportation of the computing device (Fig. 2, 206). In these examples, the locking device (308) may be disposed on the substrate (Fig. 1, 102).

[0035] In this example, ejection devices (310) may also be disposed on the substrate (102) to facilitate ejection of the portable memory device. The ejection devices (310) as with the locking devices (308) may be per input interface (104). As described above, the portable memory device may be flush with an enclosure of the computing device (Fig. 2, 206). As such, it may be difficult to remove the portable memory device from the input interface (104). The ejection devices (310) facilitate such a removal. The ejection devices (310)

may be spring-loaded and may be responsive to user action. That is, the ejection devices (310) may be push-to-eject devices where a user pushes on the face of the portable memory device and the ejection device (310) then ejects the portable memory device a distance such that a user may readily grab the portable memory device. In other examples, a trigger activates the spring-loaded ejection device (310) to eject the portable memory device. While specific reference is made to a few particular types of ejection devices (310) any number of ejection devices (310) may be implemented to facilitate the simple and easy removal of the flush portable memory device.

[0036] Fig. 4 is a block diagram of a computing device (206) with an input interface (104) for flush memory device installation, according to another example of the principles described herein. A computing device (206) as used herein may refer to any number of devices that include processors and memory and other hardware components to carry out particular functions. For example, a computing device (206) may be a desktop computer, a laptop computer, a tablet, a mobile device such as a smartphone, a gaming system, a media entertainment server, or any other type of computing device (206).

[0037] The computing device (206) includes an enclosure (412) that houses the various components. The enclosure (412) may be formed of any material such as plastic or a metallic material, and may take on any form. In other words, the enclosure (412) is a component of the computing device (206) that contains the components that execute the computing operations and that protects these components from mechanical damage, debris, and any number of other undesirable contaminants. Specifically, the enclosure (412) houses the printed circuit assembly (100), which as described above is a component of a computing device (206) to which components such as a CPU, memory, and input/output interfaces are attached.

[0038] In this example, the computing device (206) includes the printed circuit assembly (100) as described above. The computing device (206) also includes the input interface (104) which receives an electrical connector from a peripheral component such as a portable memory device. To access the input interface (104), which is disposed on an interior portion of the printed circuit

board (100), the enclosure (412) includes a port (414) disposed in the enclosure (412) to receive the portable memory device. That is, the port (414) provides an access such that the portable memory device may be inserted to the interior of the enclosure (412) where it can mate with the input interface (104). As described above, the input interface (104) is positioned such that an inserted portable memory device is flush with the surface of the enclosure (412). Accordingly, the port (414) may be spaced from the inserted portable memory device such that the surface of the portable memory device is flush with the port (414) entrance.

[0039] In some examples, the port (414) is merely an opening with dimensions that are at least as large as the portable memory device such that the portable memory device can be inserted therein. In another example the port (414) is a tunnel that receives the portable memory device. In this example, the tunnel has a depth to match a length of the housing of the portable memory device. That is, the portable memory device has an electrical connector which is received in the input interface (104) and the remaining length of the portable memory device is entirely disposed within the tunnel. Thus, the computing device (206) provides storage for a portable memory device in an aesthetically and functionally pleasing fashion wherein the portable memory device does not extend out of the enclosure (412) thus protecting the portable memory device and computing device (206) components from mechanical damage.

[0040] Figs. 5A-5C are isometric cut-away diagrams of a computing device (206) with an input interface (104) for flush memory device installation, according to another example of the principles described herein. Specifically, Fig. 5A depicts a port (414) as an opening, Fig. 5B depicts the computing device (206) with a portable memory device disposed therein, and Fig. 5C depicts a port (414) as a tunnel. As described above, the computing device (206) refers to an electronic component with a processor and memory. The computing device (206) has an enclosure (412) that holds a printed circuit assembly (Fig. 1, 100) that is made up of at least a substrate (102) and a variety of input interfaces (104). The multiple input interfaces (104) may include

multiple input interfaces (104) of different types. For example, the group of input interfaces (104) may include USB type interfaces (104) that receive USB type electrical connectors such as used on a USB flash drive. As described above, the substrate (102) may include other components, however, for simplicity and clarity in illustration, those components are not depicted in Figs. 5A-5C.

[0041] As described above, at least one of the input interfaces (104-1) may be offset from an edge of the substrate (102). Specifically, this input interface (104-1) may be a distance, **D1**, away from the port (414) where a portable memory device is received. The distance, **D1**, may be such that the portable memory device is flush with the enclosure (412) when inserted. Such an example is depicted in Fig. 5B. Note that in some examples, the computing device (206) includes other input interfaces (104-2, 104-3). However, in these examples the input interfaces (104-2, 104-3) are not offset from the edge. As a result, any inserted connector protrudes from the enclosure (412) as depicted in Fig. 5B.

[0042] In the example depicted in Fig. 5A, the port (414) is an opening through which the portable memory device is inserted. A port (414) that is merely an opening is simple to manufacture and has a less complex and costly assembly operation.

[0043] Fig. 5B depicts the computing device (206) with multiple portable memory devices (516) disposed therein. In general, a portable memory device (516) includes various components. For example, the portable memory device (516) includes a connector that is inserted into the input interface (104). The connector establishes a mechanical and electrical coupling between the storage component of the portable memory device (516) and the printed circuit assembly (Fig. 1, 100) such that data can be read from, or written to, the portable memory device (516). The portable memory device (516) also includes a housing to house the components. Accordingly, the port (Fig. 4, 414) may be large enough to receive the housing and the connector and the distance, **D1**, between the input interface (104) and the port (Fig. 4, 414) may be such that the portable memory device (516) end surface aligns and is flush with the

computing device (206) enclosure (412) as depicted in Fig. 5B. As described, the flush alignment of the portable memory device (516-1) and the enclosure (412) is aesthetically pleasing, allows for storage of the portable memory device (516-1) within the computing device (206), and protects the portable memory device (516-1) and the computing device (206) from mechanical damage during use and storage.

[0044] Fig. 5B also depicts a second portable memory device (516-2) coupled to a second input interface (104-2) which second input interface (104-2) is not removed from an edge of the substrate (102). That is, as depicted in Fig. 5B, the inserted second portable memory device (516-2) is not flush with the edge of the enclosure (412). This exposed portable memory device (516-2) may be damaged during movement of the computing device (412) as it may collide with other objects. For example, the portable memory device (516-2) may strike the walls of a bag into which the computing device (206) is inserted, which could result in damage to the portable memory device (516) and/or the second input interface (104-2) that it is coupled to. A user could not leave the second portable memory device (516-2) in place for storage. Accordingly, a user would have to separate track the second portable memory device (516-2) in order to use it. In this scenario, the second portable memory device (516-2) is prone to get lost and therefore be unusable to the user. In some examples, any of the portable memory devices (516) may be secure devices meaning that the information is encrypted or otherwise protected. For example, the portable memory devices (516) may follow an authentication operation where a user enters authentication information such as biometric information, a passcode, etc.

[0045] Fig. 5C depicts yet another example of the computing device (206) that includes the enclosure (412), printed circuit assembly (Fig. 1, 100), and various input interfaces (104). In the example depicted in Fig. 5C, the port (414) is a tunnel that receives the entire portable memory device (Fig. 5B, 516). That is, the tunnel may have a cross sectional area that is larger than the largest cross-sectional area of the portable memory device (Fig. 5B, 516) which largest cross-sectional area may be the housing of the portable memory device (Fig.

5B, 516). The length of the tunnel may match the length of the portable memory device (Fig. 5B, 516) housing. That is, the connector of the portable memory device (Fig. 5B, 516) may be disposed in the first input interface (1, 104-1) and the housing of the portable memory device (Fig. 5B, 516) may be entirely disposed within the tunnel such that the end surface of the portable memory device (Fig. 5B, 516) housing is flush with the enclosure (412).

[0046] The tunnel may be formed of the same material as the enclosure (412), specifically the tunnel may be formed of a plastic material. Such a tunnel provides a barrier between the portable memory device (Fig. 5B, 516) and the components disposed on the substrate (102). The tunnel also serves as an alignment mechanism guiding the electrical connector of the portable memory device (Fig. 5B, 516) into electrical and physical connection with the input interface (104-1) that is offset from the edge of the substrate (102).

[0047] Fig. 6 is a block diagram of a computing device (206) with an input interface (104) for flush memory device (Fig. 5B, 516) installation, according to another example of the principles described herein. In this example, the computing device (206) includes an enclosure (412) to house the printed circuit assembly (100) and various other hardware components. The enclosure (412) also includes a port (414) through which a portable memory device (Fig. 5B, 516) is inserted such that it may interface with the input interface (104) which is offset from the edge of the substrate (Fig. 1, 102).

[0048] As described above, a locking device (308) retains a corresponding portable memory device (Fig. 5B, 516) in place. In some examples, the locking device (308) is integrated into the enclosure (412). That is, in this example rather than being disposed on the substrate (Fig. 1, 102), the locking device (308) may be formed on the enclosure (412) for example a wall of the enclosure (412). In another example, the locking device (308) may be formed in the tunnel that forms the port (414). The locking devices (308) may be a magnetic type connection or a latch that hooks onto the portable memory device (Fig. 5B, 516). While particular reference is made to a few types of locking device (308) any other variety of locking devices (308) may be implemented to 1) retain the portable memory device (Fig. 5B, 516) in place during use and 2) to retain the

portable memory device (Fig. 5B, 516) in place during storage and/or transportation of the computing device (206).

[0049] The ejection devices (310) as with the locking devices (308) may be per input interface (104). In this example, ejection devices (310) may also be integral to the enclosure (412) to facilitate ejection of the portable memory device. For example, a trigger of the spring-loaded ejection device (310) may be disposed on an exterior surface of the enclosure (412). While specific reference is made to a few particular types of ejection devices (310) any number of ejection devices (310) may be implemented to facilitate the simple and easy removal of the flush portable memory device.

[0050] Fig. 7 is an isometric cut-away diagram of a computing device (206) with an input interface (104) for flush memory device (Fig. 5B, 516) installation, according to another example of the principles described herein. Specifically, Fig. 7 depicts the computing device (206) with a portable memory device (516) installed therein. In addition to other components, Fig. 7 depicts an example of the locking device (308) that retains the portable memory device (516) in place. As described above, in some examples, the locking device (308) may be a latch that interfaces with a ledge or other physical structure of the portable memory device (516). In some examples, the ejection device (Fig. 3, 310) may operate to deactivate the locking device (308). For example, the ejection device (Fig. 3, 310) may disengage the latch that forms the locking device (308).

[0051] In addition to deactivating the locking device (308), the ejection device (Fig. 3, 310) may eject the portable memory device (516). In some examples, the ejection device (Fig. 3, 310) may be spring-loaded. For example, the spring-loaded ejection device may be a push-to-eject device responsive to user force. For example, a user may press on an end of the portable memory device (516) as indicated by the arrow (720). Responsive to this force, the ejection device (Fig. 3, 310) releases the locking device (308) and ejects the portable memory device (516) a distance such that it may be grabbed by a user and removed.

[0052] In some examples, rather than relying on a push-to-eject mechanism, the computing device (206) includes a trigger (718) which ejects the portable

memory device (516). Similar to a push-to-eject system, depressing the trigger (718), which may be on an external surface of the enclosure (412), releases the locking device (308) and allows a spring to eject the portable memory device (516) a distance such that it may be grabbed by a user and removed.

[0053] Such a printed circuit assembly and computing device 1) provides for convenient storage of a portable memory device directly on the computing device, 2) prevents the likelihood that a portable memory device will not be available when desired, and 3) protects the portable memory device, the portable memory device interface on the computing device, and the computing device itself from mechanical damage.

CLAIMS

What is claimed is:

1. A printed circuit assembly, comprising:
a substrate on which hardware components are disposed; and
an input interface disposed on the substrate and disposed on an interior portion of the substrate such that a portable memory device coupled to the input interface is flush with an enclosure in which the printed circuit assembly is disposed.
2. The printed circuit assembly of claim 1, wherein the input interface is a universal serial bus (USB) interface.
3. The printed circuit assembly of claim 1, further comprising a locking device disposed on the substrate to retain an inserted portable memory device.
4. The printed circuit assembly of claim 1, further comprising a spring-loaded ejection device to, responsive to user action, eject the portable memory device.
5. A computing device, comprising:
a printed circuit assembly;
an enclosure to house the printed circuit assembly; and
a port formed in the enclosure to receive a portable memory device;
an input interface disposed on the printed circuit assembly to establish an electrical connection between the printed circuit assembly and the portable memory device, wherein the input interface is a distance away from the port such that an inserted portable memory device is flush with the enclosure.

6. The computing device of claim 5, wherein the distance between the port and the input interface matches a length of a housing of the portable memory device.
7. The computing device of claim 5, further comprising a locking device to retain an inserted portable memory device.
8. The computing device of claim 7, further comprising a spring-loaded ejection device to eject the portable memory device.
9. The computing device of claim 8, wherein the spring-loaded ejection device is to eject the portable memory device responsive to user force against the portable memory device.
10. The computing device of claim 8, wherein a trigger for the spring-loaded ejection device is disposed on an exterior surface of the enclosure.
11. The computing device of claim 8, wherein at least one of the locking device and the spring-loaded ejection device are integral to the enclosure.
12. The computing device of claim 5, further comprising the portable memory device.
13. A computing device, comprising:
 - a printed circuit assembly;
 - an enclosure to house the printed circuit assembly;
 - a port formed in the enclosure to receive a portable memory device, the portable memory device having a housing and a connector;
 - a universal serial bus (USB) interface disposed on the printed circuit assembly and disposed on an interior portion of the printed circuit assembly such that an inserted portable memory device coupled to the input interface is flush with the enclosure; and

an ejection device to, responsive to user force, eject the portable memory device.

14. The computing device of claim 13, wherein the port is an opening.
15. The computing device of claim 13, wherein the port is a tunnel.

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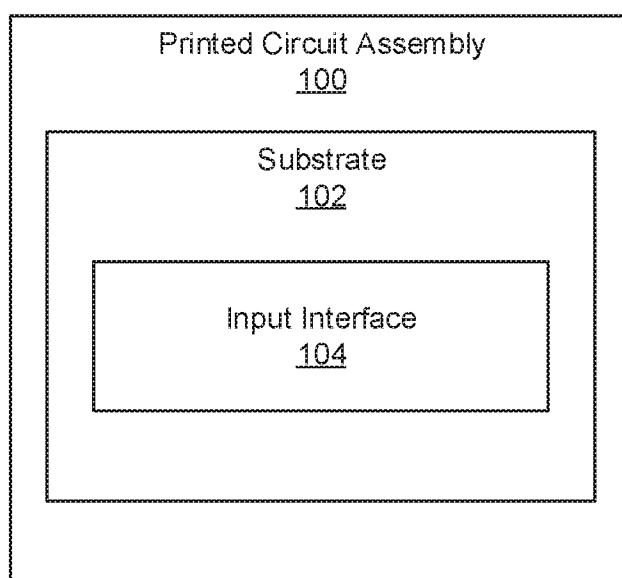


Fig. 1

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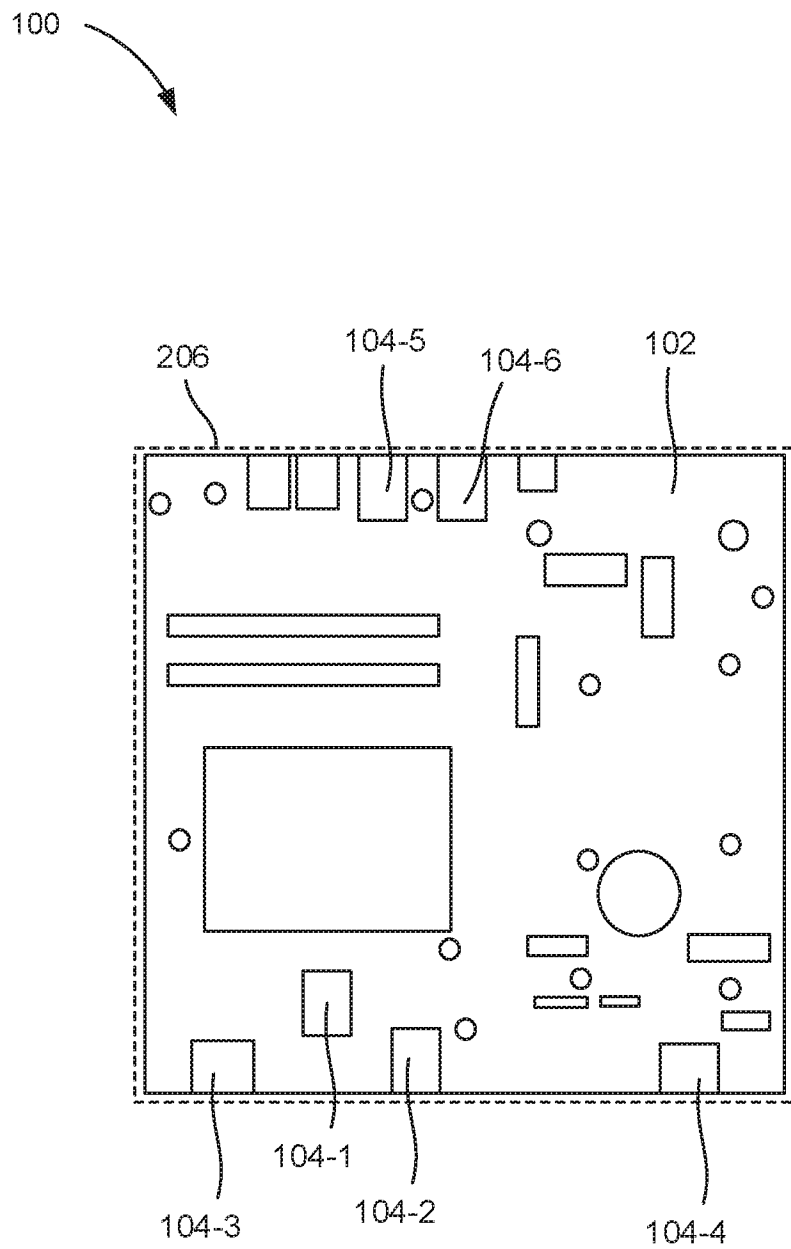


Fig. 2

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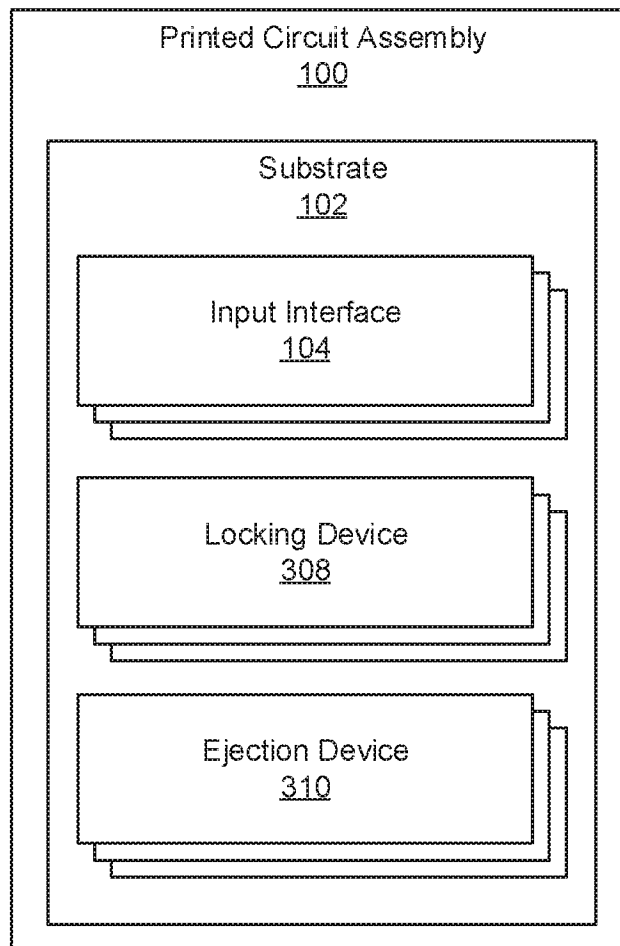


Fig. 3

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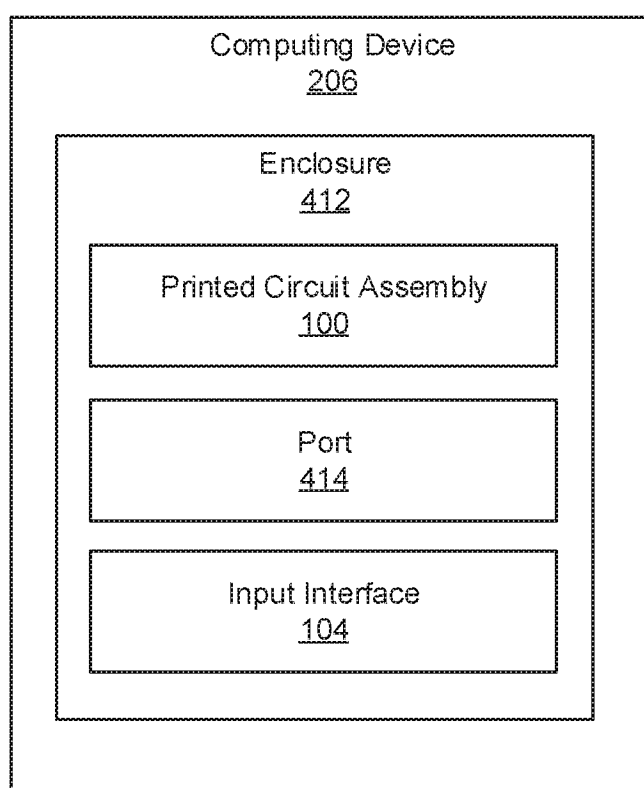


Fig. 4

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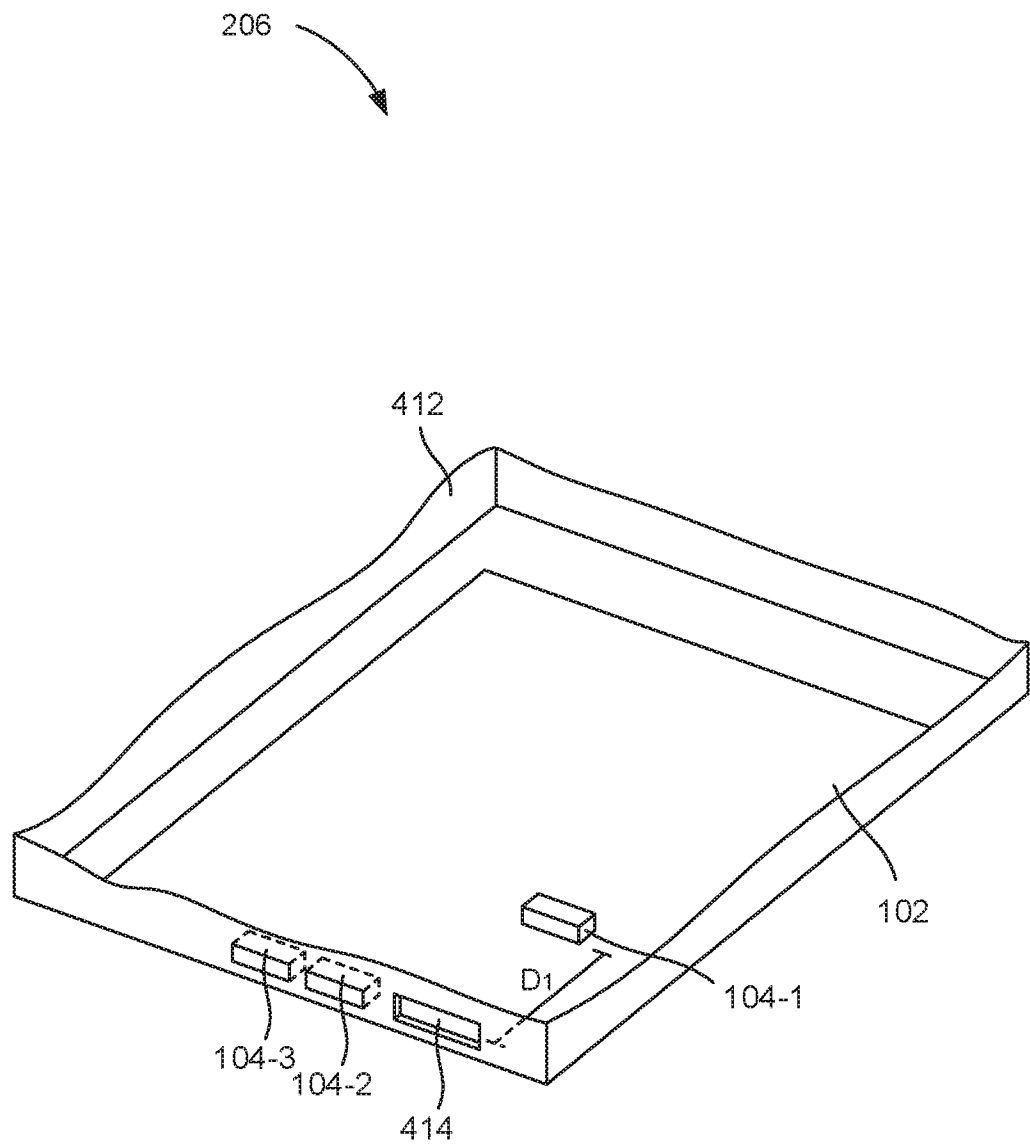


Fig. 5A

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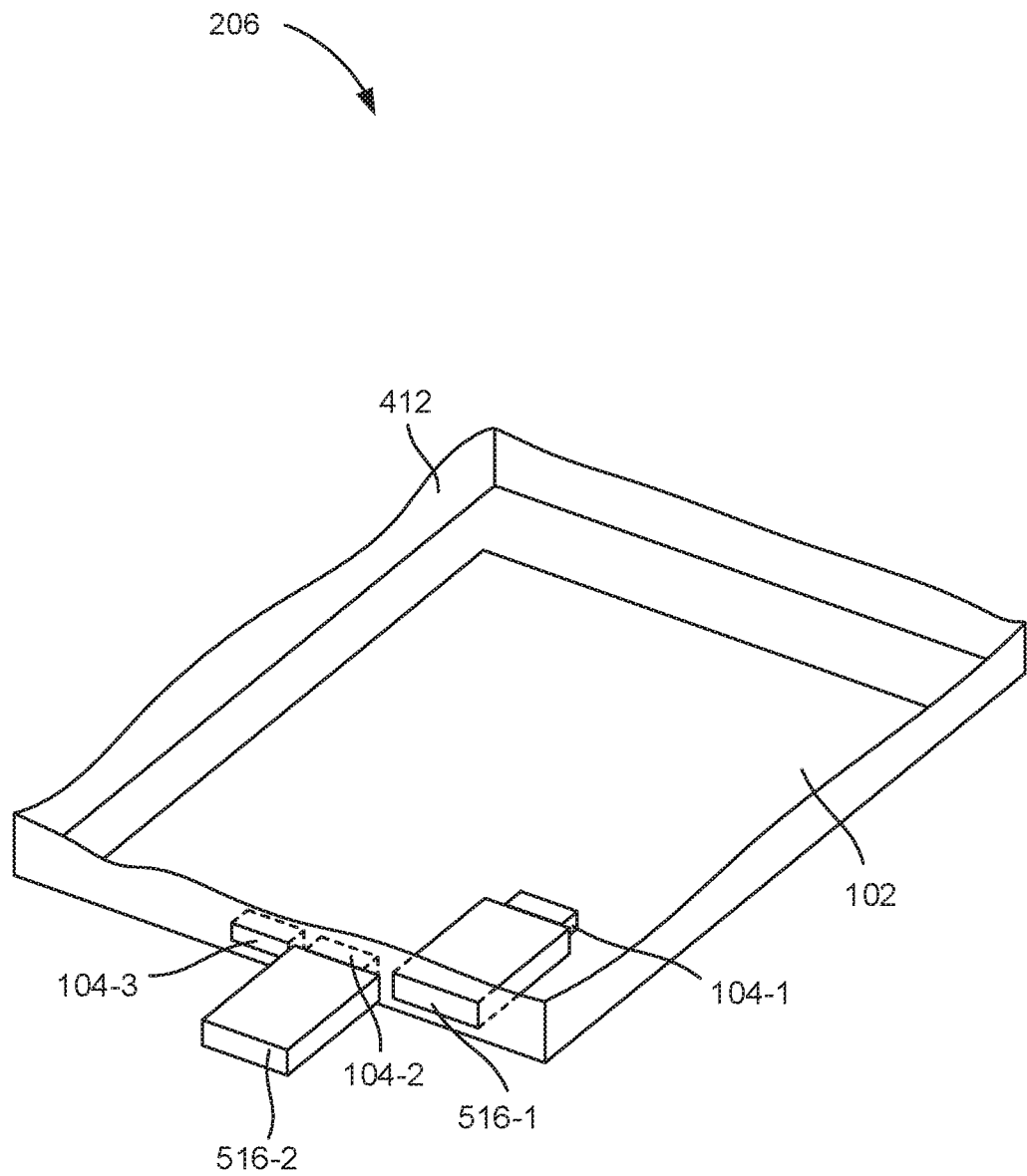


Fig. 5B

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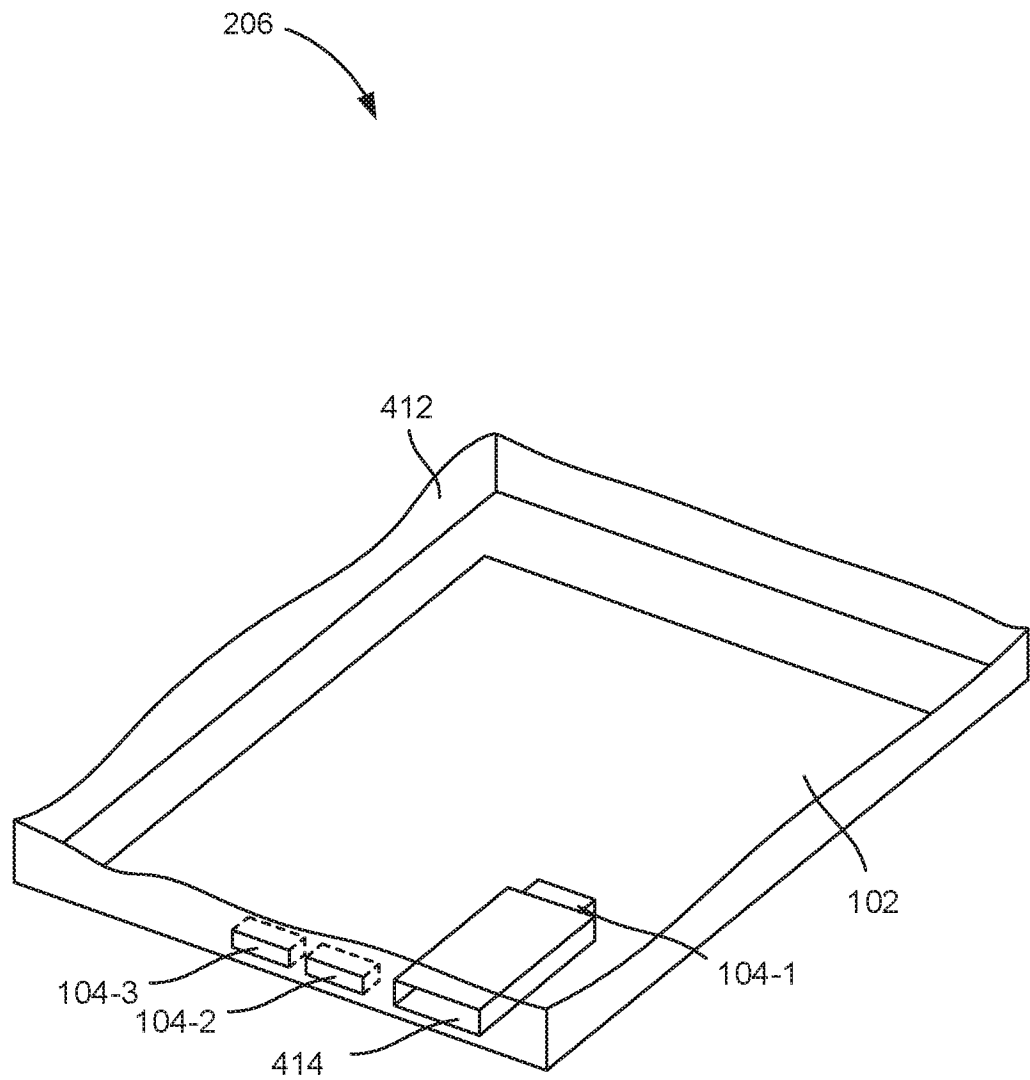


Fig. 5C

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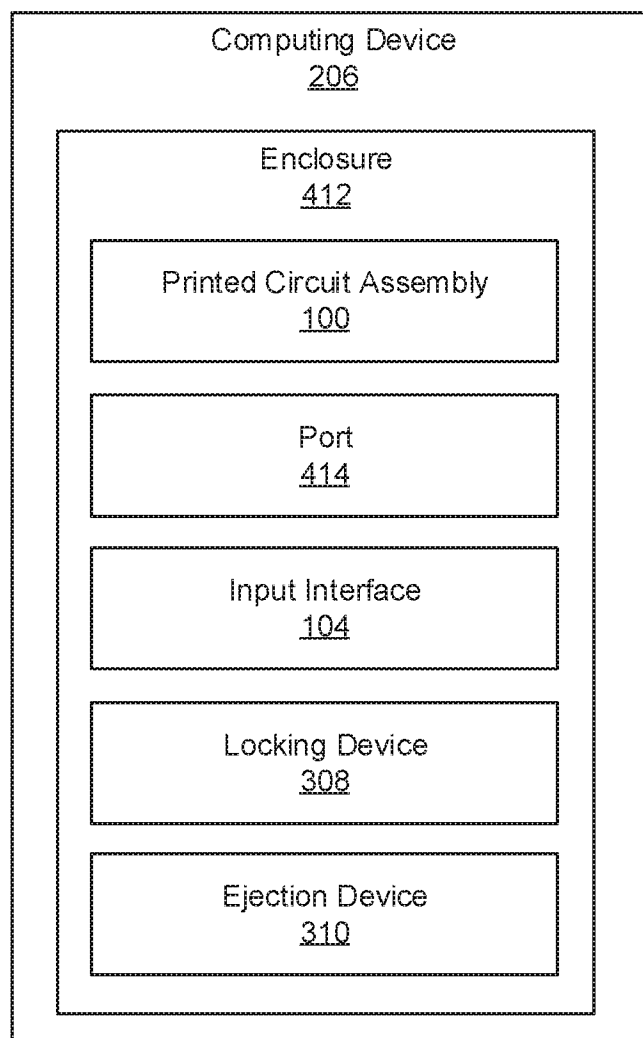


Fig. 6

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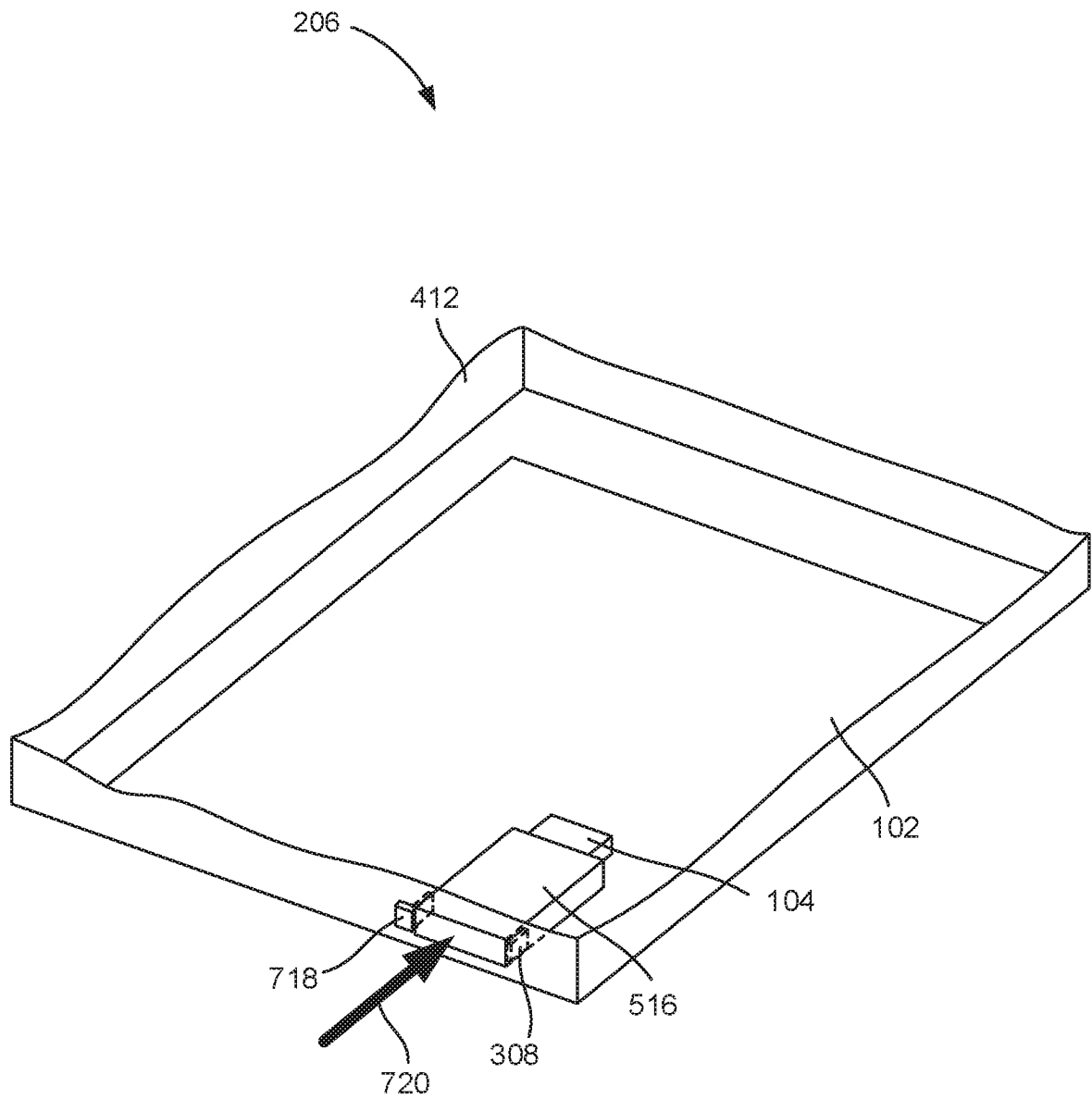


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2018/064270

A. CLASSIFICATION OF SUBJECT MATTER

H01R 12/50 (2011.01)

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 H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatSearch (RUPTO internal), USPTO, PAJ, K-PION, Esp@cenet, Information Retrieval System of FIPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7352601 B1 (MICHAEL PAUL MINNEMAN et al) 01.04.2008, col.9, line 56-col.10, line 10, col.12, lines 32-63, claims 30, 60, 61	1-15
A	US 6503092 B1 (YAMAICHI ELECTRONICS CO., LTD.) 07.01.2003	1-15
A	US 5179505 A (FIJI PHOTO FILM CO., LTD.) 12.01.1993	1-15
A	US 7349228 B1 (EXTREME NETWORKS) 25.03.2008	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:		"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document but published on or after the international filing date	"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
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

13 August 2019 (13.08.2019)

Date of mailing of the international search report

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