

BEZEL FOR COMPUTING DEVICE

BACKGROUND

[0001] Computing devices include personal computers, servers, storage systems and networking switches and routers etc. It is common for a computing device to have a main body and a bezel attached to the main body. The main body may for example be a casing which houses processors, memory, hard disks and other computing device components. A bezel is a cover which attaches to part of the main body.

[0002] In some examples the main body may have an opening through which internal components, such as disk drives, or processor boards and the like may be accessed. When the bezel is in place it covers the opening, thereby preventing access to the internal components. However, if the bezel is removed, or moved to an open position, then the opening is exposed allowing access to the internal components. In other examples the bezel may be a stationary bezel which includes an electronic display to display information about the status of the computing device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Examples will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a computing device according to the present disclosure when mounted on a table;

Figure 2 is a perspective view of a computing device according to the present disclosure when mounted on a wall;

Figure 3A is a schematic view of the computing device with the bezel in a first position;

Figure 3B is a schematic view of the computing device with the bezel in a second position;

Figure 4A is a schematic view of the computing device with the bezel in a first position;

Figure 4B is a schematic view of the computing device with the bezel in a second position;

Figure 5A is a schematic view of the computing device with the bezel in a first position;

Figure 5B is a schematic view of the computing device with the bezel in an open position;

Figure 5C is a schematic view of the computing device with the bezel in a second position;

Figure 5D is a schematic view of the computing device when the bezel abuts against the main body in the first position shown in Figures 4A and 5A;

Figure 6A is a schematic view showing the electrical connector of the bezel in a non-contact position in which it does not connect with an electrical connector of the computing device; and

Figure 6B is a schematic view showing the electrical connector of the bezel in a contact position in which it is to connect with an electrical connector of the computing device;

Figure 7 is a perspective view of the bezel as seen from behind;

Figure 8A is a close up perspective view of a movable electrical connector of the bezel;

Figure 8B is a close up cut-away view of the movable electrical connector of Figure 8A in a first position which is in a non-contact position;

Figure 8C is a close up cut-away view of the movable electrical connector of Figure 8A in a second position which is a contact position;

Figure 9 is a perspective view showing the electrical connector of the bezel connecting with an electrical connector of the computing device;

Figure 10A is a schematic view showing another example of a computing device with a bezel in a first position; and

Figure 10B is a schematic view showing the computing device of Figure 10A with the bezel in a second position.

DETAILED DESCRIPTION

[0004] In the following description the terms “a” and “an” are used to denote the presence of one or more of a particular element.

[0005] Figure 1 shows a perspective view of a computing device 1 which rests on a horizontal surface, such as a table 2. The computing device includes a main body 10, which houses components of the computing device, and a bezel 20. The bezel 20 is attached to the main body 10. In the position shown in Figure 1 the bezel extends over and covers a front face of the main body. The bezel includes an electronic display 30. The electronic display 30 may for example be a liquid crystal display (LCD) and may display information relating to the status of the computing device. In some examples, the display 30 may be a touch screen, or the bezel may include buttons or other input devices, so that instructions can be input to the computing device via the display, or input devices of the bezel. The bezel 20 has a flanges 22 at either end which wrap around the corresponding corner edges of the main body 10 of the computing device. The bezel 20 further includes a portion 24 which holds an electrical connector which will be described in more detail later. The electrical connector of the bezel is to connect to an electrical connector of the main body, so that electrical power and/or signals can be passed to the display from the main body.

[0006] Figure 2 shows the same computing device 1 when mounted to a vertical surface, such as a wall 3. The computing device now has a different orientation and has been rotated 90 degrees relative to its position in Figure 1. For example a surface 12 of the main body that was parallel with the horizontal table in Figure 1, is parallel with the vertical wall in Figure 2. Although not shown in Figure 2, a wall rack or other wall fixture may be used to support the computing device in place. There may be one, or several, locking features 15 such as a Kensington key on the main body to enable the computing device to be secured by a cable to the table, or wall rack etc.

[0007] The position of the bezel 20 is moved between Figure 1 and Figure 2 so that it rests on a different part of the main body 10. Whereas in Figure 1 the

bezel covers a front face of the computing device, in Figure 2 the bezel has been moved round to partially cover surface 12 of the computing device which was facing upwards in Figure 1. In this way the bezel 20 and its electronic display may be conveniently seen and accessed by the user regardless of whether the computing device is mounted vertically or horizontally.

[0008] The way in which the bezel moves can be more clearly seen in Figures 3A and 3B, which both show the computing device in a horizontal position, the same as in Figure 1. Like reference numerals denote like parts as in Figures 1 and 2. In these examples the bezel 20 is substantially planar and the plane of the bezel in the first position in Figure 3A is substantially perpendicular to the plane of the bezel 20 in Figure 3B. Thus, in Figure 3A the bezel 20 is in a first position in which it covers a front face 14 of the computing device. In Figure 3B the bezel is moved round to a second position in which it covers a part of the upper surface 12 of the main body and the front face 14 is exposed. As seen in Figure 3B, the front face 14 includes an opening through which various removable components of the computing device may be installed or removed. In this example, the removable components include disk drives 41 which may be installed in disk drive docks 40.

[0009] The main body has a first electrical connector 60 at a first location and a second electrical connector 70 at a second location. In this example the first electrical connector 60 is at the bottom of a front face 14 of the main body, while the second electrical connector 70 is at the top of the front face 14 of the main body. The bezel has an electrical connector behind the portion 24 of the bezel. When the bezel 20 is in the first position shown in Figure 3A, the bezel's electrical connector connects with the first electrical connector 60 and when the bezel 20 is in the second position shown in Figure 3B, the bezel's electrical connector connects with the second electrical connector 70. In this way electrical power, data and control signals may be conveyed from the main body of the computing device to the electronic display 30 of the bezel via the electrical connectors. Even though the bezel has moved between two different positions, it is able to connect with two different electrical connectors of the main

body and so its display is able to receive electrical power and/or signals in both positions.

[0010] Also shown in Figures 3A and 3B are a fan vent 16 on a side wall of the main body and input interfaces 17 and indicators 18 on a front face of the main body. These input interfaces and indicators may be covered when the bezel is in the first position, but the fan vent should not be covered by the bezel in either the first or second position. It is also worth noting that in this particular example, the computing device main body comprises two parts which are secured together: a compute section 10A housing processors etc. and a storage section 10B which may house storage devices such as disk drives etc. However, in other examples the computing device main body may be a single casing.

[0011] In one example to move from the first position to the second position, the bezel may be removed entirely from the main body and then re-attached in the second position. In another example, the bezel may maintain a connection with the main body of the computing device as it is moved from the first position to the second position. This may help to ensure that the electrical connector of the bezel is in good alignment with respective electrical connectors of the main body in both the first and second positions. It may also help to prevent the bezel being easily lost or misplaced.

[0012] Figures 4A, 4B and 5A to 5C are schematic diagrams showing an example of a mechanism for facilitating movement of the bezel 200 between the first and second positions. In Figure 4A the bezel 20 is in the first position and in Figure 4B the bezel 20 is in the second position. In this example, the bezel 20 is moved from the first position to the second position by a combination of rotating and sliding. Snapshots in the path of movement are shown in Figure 5A to 5C.

[0013] A pin and groove arrangement may be used to facilitate and guide this movement. For example, the main body 10 may have a groove 80 extending along a side wall 11 and a pin 23 of the bezel may fit in the groove such that it can rotate and slide laterally. There may be a pin and groove arrangement on both sides of the main body. In other examples, the groove may

be in the bezel flanges and a pin may project from each of the two side walls of the main body.

[0014] To get from the position of Figure 4A to Figure 4B the bezel may be rotated about the pin 23, which acts as a pivot point. Thus the bezel 20 may be rotated from the first position shown in Figure 5A to reach the position of Figure 5B. The first position may be thought of as a closed position as the front face of the main body of the computing device is covered, while the second position may be thought of as an open position as said face is not covered. From the position in Figure 5B, the bezel may be slid laterally to the position of Figure 5C which corresponds to the second position shown in Figure 4B. In this sliding motion the pin 23 is guided by and travels along the groove 80.

[0015] In the first position shown in Figure 4A, the bezel's electrical connector 90 connects with the first electrical connector 60 of the main body. In the second position shown in Figure 4B, the bezel's electrical connector 90 connects with the second electrical connector 70 of the main body. As the first and second electrical connectors may be in widely separated locations, the bezel may move some distance between the first and second positions and yet have an electrical connection to supply power to its display in both the first and second position. Further, as part of the movement of the bezel is a lateral sliding in which the pivot point itself moves, an electrical connection cannot be provided through a stationary hinge in a fixed location on the main body, but rather two separate electrical connectors 60, 70 are provided on the main body. In one example, so that the electrical connectors of the main body and the bezel can easily connect with each other, the electrical connectors may be blind mate connectors. A blind mate connector is a connector which has plural interlocking features that are to interface with interlocking features of another blind mate connector such that the two connectors may easily be connected without carefully visually checking and manually adjusting the relative positioning of both connectors. The interlocking features may be shaped so as to guide the blind mate connectors into connection with each other with some tolerance in their initial positioning. In one example the interlocking features may be teeth.

[0016] Figure 5D shows the bezel 20 being moved in the opposite direction back into the first position. Specifically in this example, the bezel is being rotated in a counter clockwise direction back towards the main body so that it can take up the first position shown in Figure 5A. In Figures 4A and 5A, the portion 24 of the bezel supports the bezel's electrical connector 90 in a position in which it is adjacent with and can make contact with the first electrical connector 60 of the main body.

[0017] It is possible to have a design in which the bezel's electrical connector 90 perfectly connects with the first electrical connector 60 at the end of its rotational trajectory from Figure 5D when the bezel abuts against the main body in the first position shown in Figures 4A and 5A. However, especially with wear and tear, there is a risk of misalignment. Accordingly, in one example, the bezel's electrical connector 90 itself is able to move relative to the bezel 20. An example is shown in Figures 6A and 6B.

[0018] Figure 6A is a schematic diagram showing a bottom part of the bezel 20 and main body 10, when the bezel is in the first position. A main part of the bezel 20 covers at least part of and extends substantially parallel to a face of the main body, while a part of the bezel 24 supports the electrical connector 90 in a position adjacent the first electrical connector 60 of the main body of the computing device. In Figure 6A the bezel electrical connector 90 is in a first position which is a non-contact position in which it does not contact the first electrical connector 60. For example, the connectors may be opposite each other, but with a gap between them. In Figure 6B the bezel electrical connector 90 has moved into a second position which is a contact position in which it connects with the first electrical connector 60. The movement may be in a direction substantially parallel with a plane of the main part of the bezel 20.

[0019] This movement between the non-contact position and the contact position may be under the influence of a magnetic or mechanical force. For instance when the bezel is in the first position, a spring may urge the bezel electrical connector 90 towards the first electrical connector 60. In the illustrated example, a magnetic force urges the electrical connector 90 to move. This

magnetic approach is simple to implement, may use just a small amount of space and can be implemented even if the bezel itself is very thin.

[0020] There are various ways in which a magnet urging force may be employed. For example, both the bezel electrical connector 90 and the first electrical connector may include magnets which attract each other, or one of the electrical connectors may include a magnet and the other of the electrical connectors may include a magnetic material. A magnet may be integral to an electrical connector, attached thereto, or in a location nearby in order to cause the aforementioned relative movement of the bezel electrical connector 90 and first electrical connectors 60 when the bezel 20 is in the first position. In the example of Figures 6A and 6B, a magnet 92 is located inside the bezel electrical connector 90.

[0021] While in the illustrated example the bezel electrical connector 90 moves relative to the bezel and the first electrical connector 60 is fixed relative to the main body, in another example the first electrical connector may move relative to the main body. Further, while the electrical connector 90 has been described as moving in relation to the first position of the bezel, the same approach may also be used in the second position of the bezel. That is magnets or springs etc may be used to effect movement of the bezel electrical connector 90 to contact the second electrical connector 70, or vice versa, when the bezel is in the second position shown in Figure 4B.

[0022] In the example of Figure 6A and 6B, the electrical connector of the bezel 90 is housed in a chamber. The chamber may be defined by walls of the supporting part 24 of the bezel. The chamber may at least partially enclose the electrical connector 90. In the illustrated example, the electrical connector 90 is able to move within a volume of space 24A within the chamber. In the contact position in Figure 6B the electrical connector projects out of the chamber and contacts the first electrical connector 60. In the non-contact position the electrical connector 90 does not project out of the chamber, or does not project out by far enough to contact with the electrical connector 60 of the main body. In the contact position of the electrical connector 90 may abut against a ledge 24B of the chamber.

[0023] Figure 7 is a perspective view from behind showing an example of the bezel 20 by itself. The bezel 20 may have a substantially planar main part 21 that is to extend over and cover at least a portion of a face of the main body of the computing device. The main part 21 may include some apertures for ventilation and/or decorative purposes. An electronic display 30 is mounted to or integrated into the main part 21 of the bezel. A pair of flanges 22 extend outwardly from each end of the main part 21 and may wrap around corners of the main body of the computing device when the bezel is attached thereto. A location pin 23 is provided on each flange and may pivotably attach to a feature of the main body of the computing device. An electrically conductive line 25, such as a cable, connects with the electronic display 30 and may be used to supply power and or electrical control signals to the display. An electrical connector supporting portion 24 of the bezel projects outwardly from the main part 21 in the same direction as the flanges 22. The portion 24 may be on an edge of the bezel which extends between the two flanges and may be integral with, or attached to, the main part 21. The portion 24 supports an electrical connector 90 of the bezel. In use, when the bezel is in the first position or the second position, described above, the electrical connector 90 may connect with an electrical connector of the main body of the computing device, so as to supply power and/or convey electrical control signals from the computing device to the electronic display via the conductive line 25.

[0024] Figure 8A is a perspective view showing the supporting portion 24 and other nearby parts of the bezel in more detail. The electrical connector 90 is housed in a chamber. The electrical connector 90 includes a plurality of teeth 94 that are to connect with electrical connector 60 or 70 of the main body. Magnets 92 are integrated into the electrical connector. Figures 8B and 8C are cut-away views showing the inside of the chamber. The electrical connector 90 is able to move within the chamber. In Figure 8B the electrical connector 90 is shown in a non-contact position in which it is lower in the chamber so as not to contact with an electrical connector of the main body (not shown). In Figure 8C the electrical connector 90 is shown in a contact position in which it projects out of the

chamber so as to contact with an electrical connector of the main body (not shown).

[0025] In the contact position in Figure 8C, the teeth 94 project out of the chamber and there is a gap 24A between the bottom of the electrical connector 90 and floor of the chamber. In some examples, in the contact position, parts of the electrical connector 90 may abut against a ledge 24B of the chamber. In the illustrated example, the electrical connector 90 does not connect with the electrical cable 25 in the position shown in Figure 8B, but does connect with the electrical cable in the position shown in Figure 8C. However, in other examples the arrangement may be different such that the cable 25 connects with the electrical connector 90 in both positions, for instance in other examples the cable 25 may extend into the chamber.

[0026] Figure 9 is a perspective view showing one example of an electrical connector 60 of a main body and an electrical connector 90 of a bezel interfacing together. The connector 70 of the main body may connect in a similar way. Figure 9 is just one example and in other examples the connectors may have different numbers of teeth, different shapes of teeth, or even no teeth at all.

[0027] Various modifications and variations are possible while remaining within the scope of the disclosure. For instance while the above examples describe a combination of lateral sliding and rotational movement between the first and second positions of the bezel, in other examples there could be just rotational movement, or just lateral movement. For example, Figure 10A and 10B are schematic diagrams showing an arrangement in which a bezel 20 slides laterally between a first position shown in Figure 10A and a second position shown in Figure 10B. In the first position the bezel 20 covers a first part of a surface of the main body 10. For example, it may cover a part of front face of the main body and may cover an opening through which removable components such as hard disks may installed or removed. In the second position, the bezel does not cover said part of the surface of the surface of the main body, but it may cover a second part of a surface of the main body. In the first position, shown in Figure 10A, an electrical connector 90 of the bezel

connects with a first electrical connector 60 of the main body. In the second position, shown in Figure 10B, the electrical connector 90 of the bezel connects with the second electrical connector 70 of the main body.

[0028] As used in the present disclosure, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless expressly stated otherwise. It should be further understood that the terms “comprises” and/or “comprising” when used in this specification are taken to specify the presence of stated features, integers, blocks, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, blocks, operations, elements, components, and/or groups thereof. As used in the present disclosure, the term “and/or” includes any and all combinations of one or more of the associated listed items.

[0029] It should also be understood that although the terms ‘first’, ‘second’ etc. may have been used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, “first electrical connector” could be termed “second electrical connector”, and, similarly, “second electrical connector” could be termed “first electrical connector”, without departing from the scope of the present disclosure. In this example, the “first electrical connector” and “second electrical connector” are not the same connectors.

[0030] It will be appreciated that numerous variations and/or modifications may be made to the various features shown in the examples without departing from the scope of the disclosure as broadly described. The examples are, therefore, to be considered in all respects as illustrative and not restrictive.

WHAT IS CLAIMED IS:

1. A computing device comprising:
 - a main body to house computing components;
 - a first electrical connector at a first location on the main body;
 - a second electrical connector at a second location on the main body;
 - a bezel including an electronic display and an electrical connector for the display,
 - the bezel being movable between a first position, in which the electrical connector of the bezel connects with the first electrical connector, and a second position in which the electrical connector of the bezel connects with the second electrical connector.
2. The computing device of claim 1 wherein a plane of the bezel in the first position is substantially perpendicular to a plane of the bezel in the second position.
3. The computing device of claim 1 wherein in the first position the bezel covers a dock for a removable computing device thereby preventing removal of the removable computing device while the bezel is in the first position.
4. The computing device of claim 1 wherein the first electrical connector, second electrical connector and the electrical connector of the bezel are blind mate connectors.
5. The computing device of claim 1 wherein the bezel is movable from the first position to the second position by a combination of rotating and sliding.

6. The computing device of claim 1 wherein the bezel and the main body have a pin and groove arrangement in which the pin and groove are able to rotate and move laterally relative to each other.
7. The computing device of claim 1 wherein, when the bezel is in the first position, the electrical connector of the bezel is movable relative to the bezel from a non-contact position in which it is not in contact with the first electrical connector of the main body to a contact position in which it is in contact with the first electrical connector of the main body.
8. The computing device of claim 1 wherein the electrical connector of the bezel includes a magnet and is to move under the influence of a magnetic force when the bezel is in the first position.
9. The computing device of claim 1 wherein the first location is at the bottom of a front wall of the main body and the second location is at the top of a front wall of the main body.
10. A bezel for a computing device, the bezel comprising:
 - a main part to cover a face of the computing device, the main part including an electronic display;
 - a pair of flanges at opposing edges of the main part to wrap around corresponding edges of the computing device;
 - a chamber to house an electrical connector; and
 - an electrically conductive line to connect the electronic display with the electrical connector;wherein the electrical connector includes a magnet and wherein the electrical connector is movable under a magnetic force from a first position in which the electrical connector is housed in and does not project from the chamber to a second position in which at least part of the electrical connector projects from the chamber and may interface with an electrical connector of a computing device.

11. The bezel of claim 10 wherein each flange includes a locating pin to connect the bezel in a pivotable manner to the computing device.
12. The bezel of claim 10 wherein the main part is substantially planar, the chamber is located at an end of the main part and projects outwardly from the main part in the same direction as the flanges and the electrical connector is movable in a direction substantially parallel to the plane of the main part.
13. A computing device comprising:
 - a main body including a first electrical connector;
 - a bezel including an electronic display and a bezel electrical connector;
 - wherein the bezel is attached to the main body such that it is rotatable between a closed position in which the bezel covers at least portion of a face of the main body of the computing device and an open position in which the bezel does not cover said portion of the face of the main body of the computing device;
 - and a spring or magnet which is to impel at least one of the first electrical connector and the bezel electrical connector to move towards and connect with the other one of the first electrical connector and the bezel electrical connector, after the bezel is rotated to the closed position.
14. The computing device of claim 13 wherein the second electrical connector is supported in a chamber of the bezel and the spring or magnet is to move the second electrical connector within the chamber from a non-connecting position to a connecting position in which it connects with the first electrical connector.
15. The computing device of claim 13 wherein the bezel is movable to a second position in which it covers another portion of the main body and wherein in the second position of the bezel, the bezel electrical connector connects with a second electrical connector of the main body, the second

electrical connector being fixed to the main body in a different location to the first electrical connector.

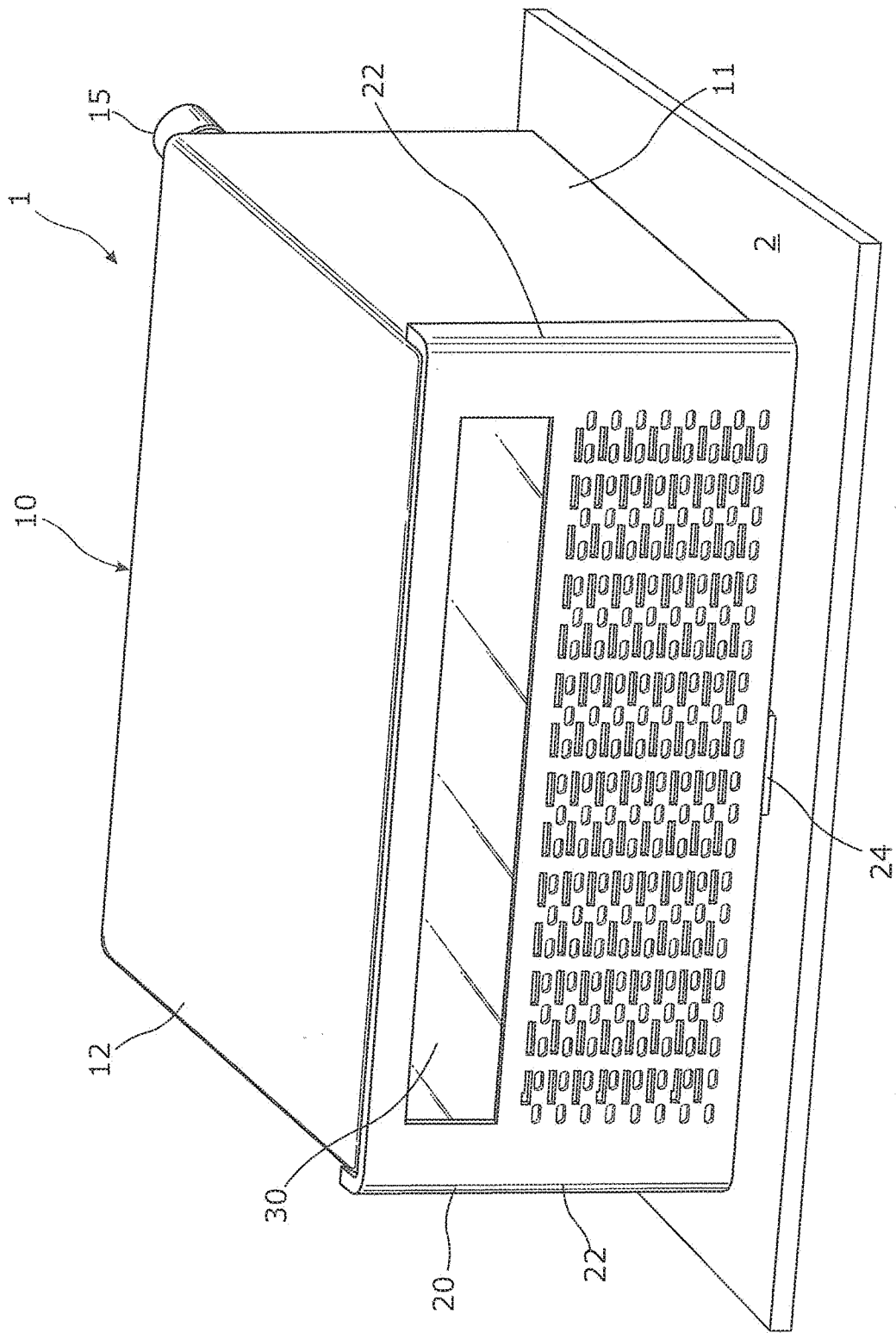


Fig. 1

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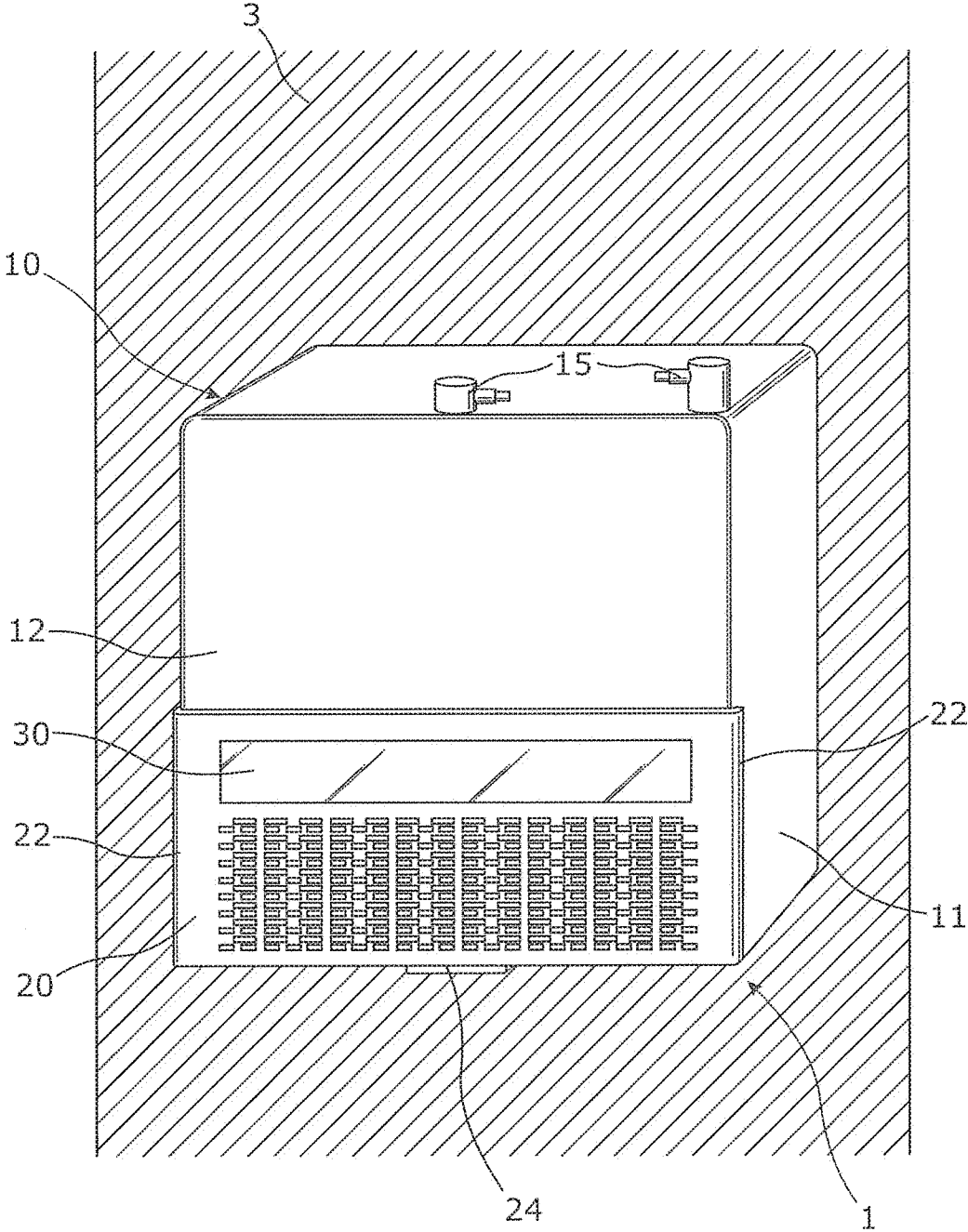
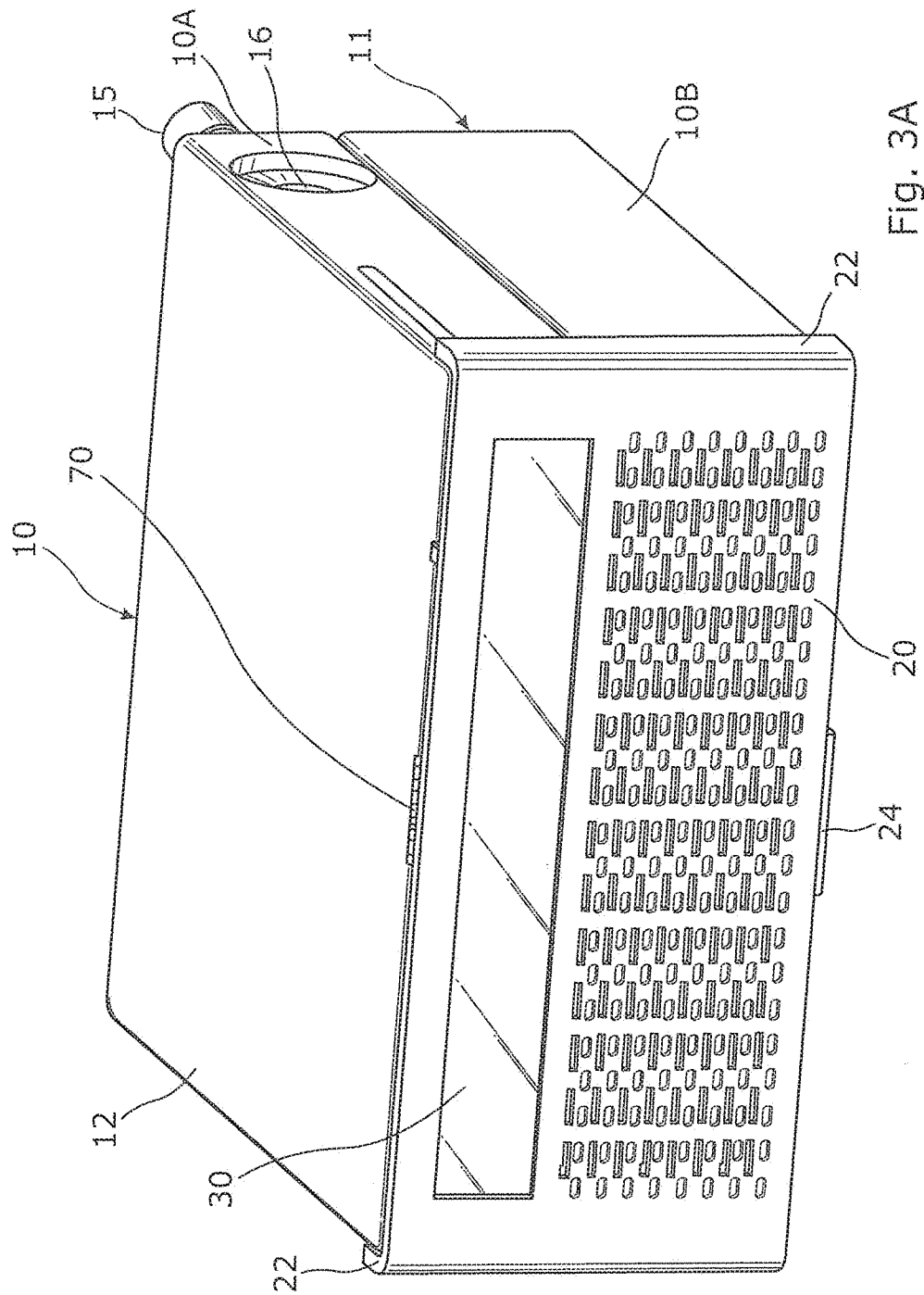
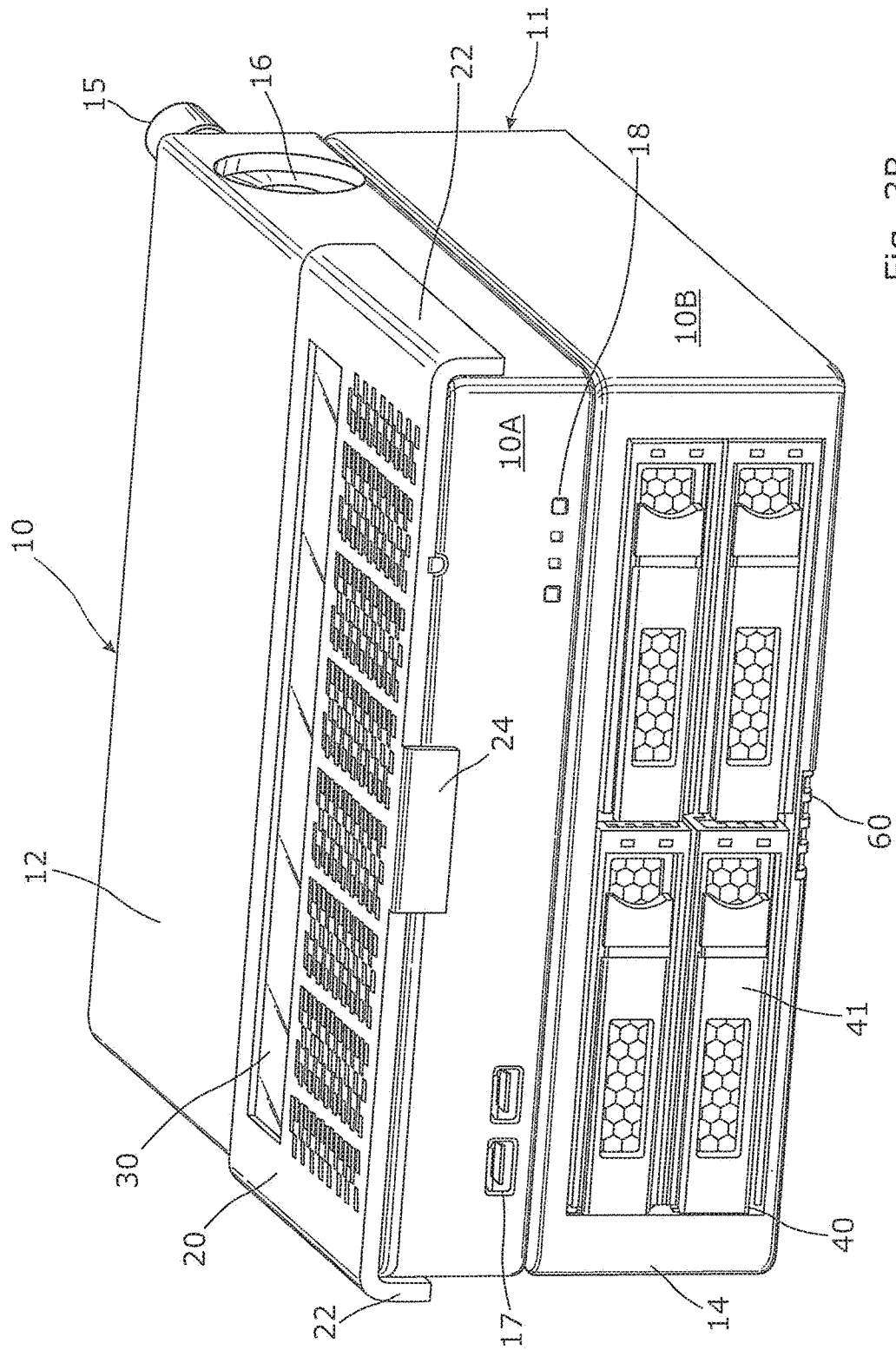


Fig. 2

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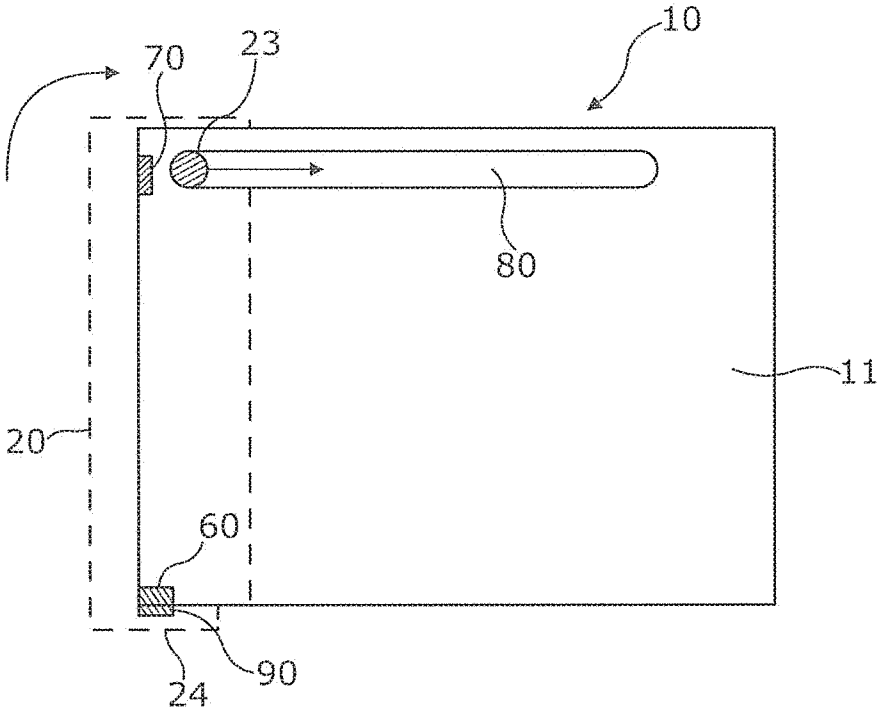


Fig. 4A

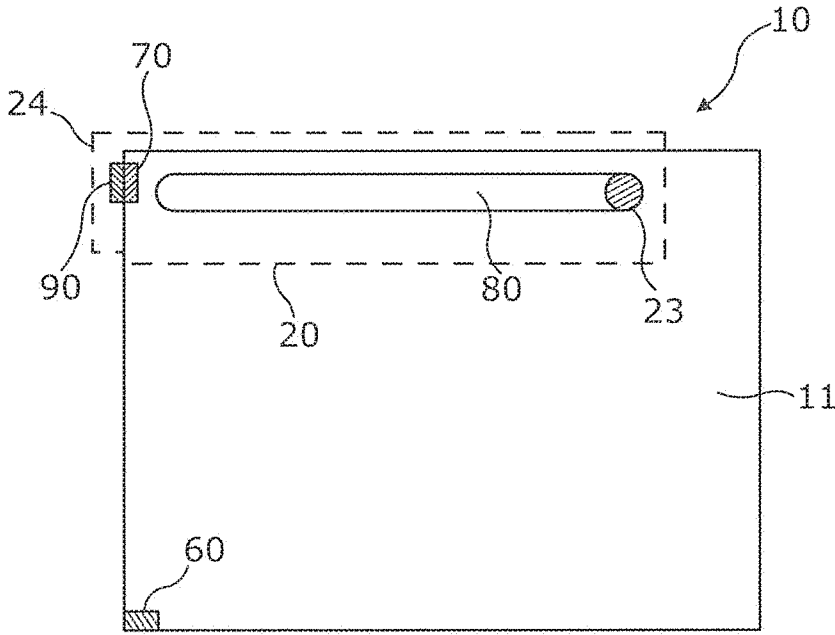
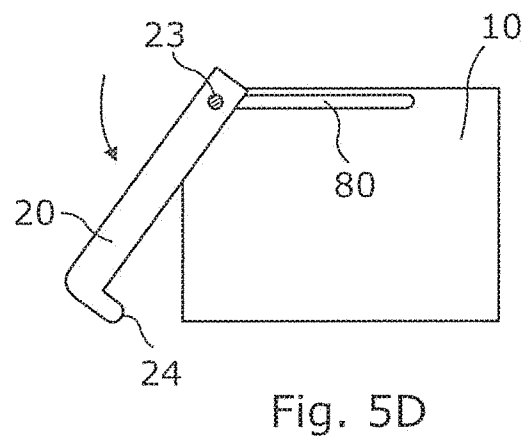
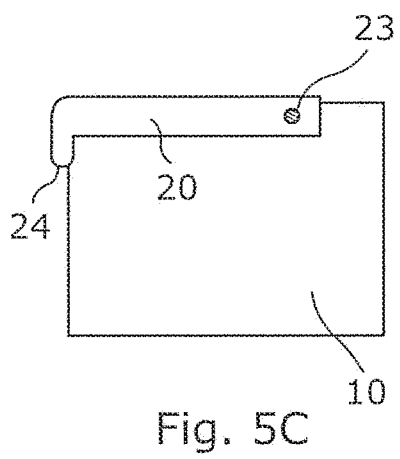
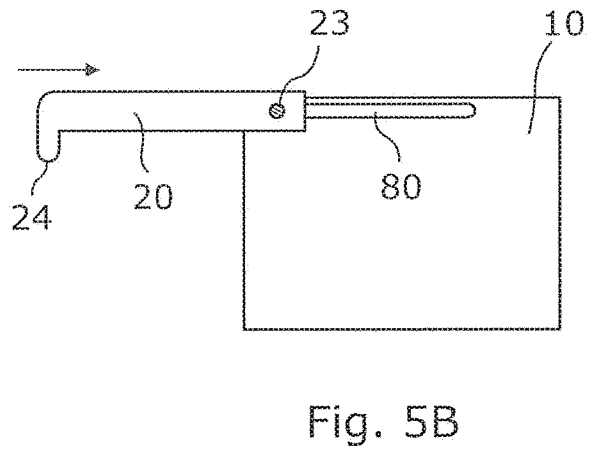
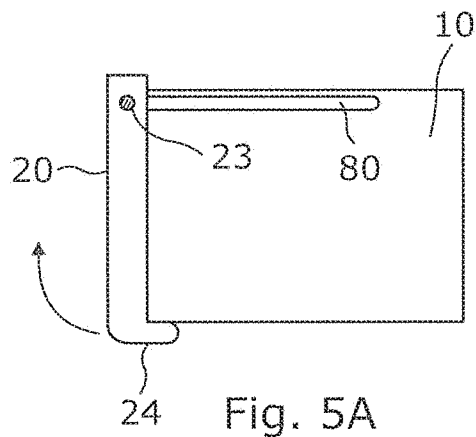


Fig. 4B

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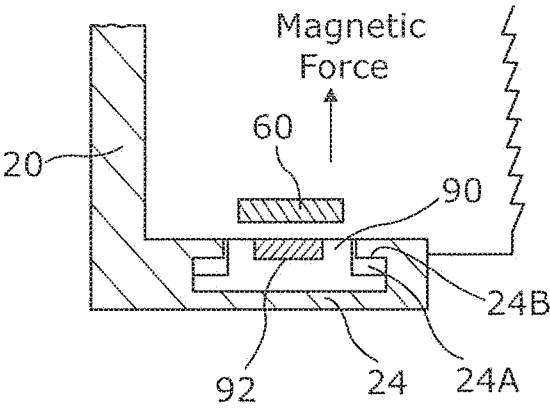


Fig. 6A

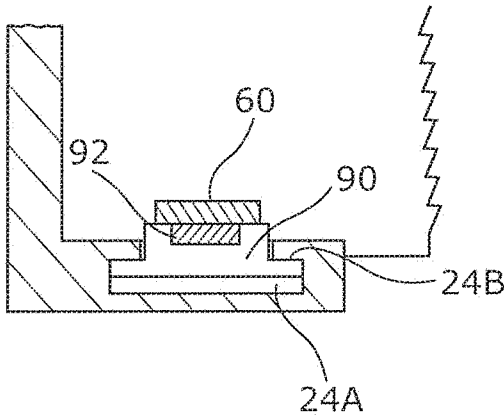


Fig. 6B

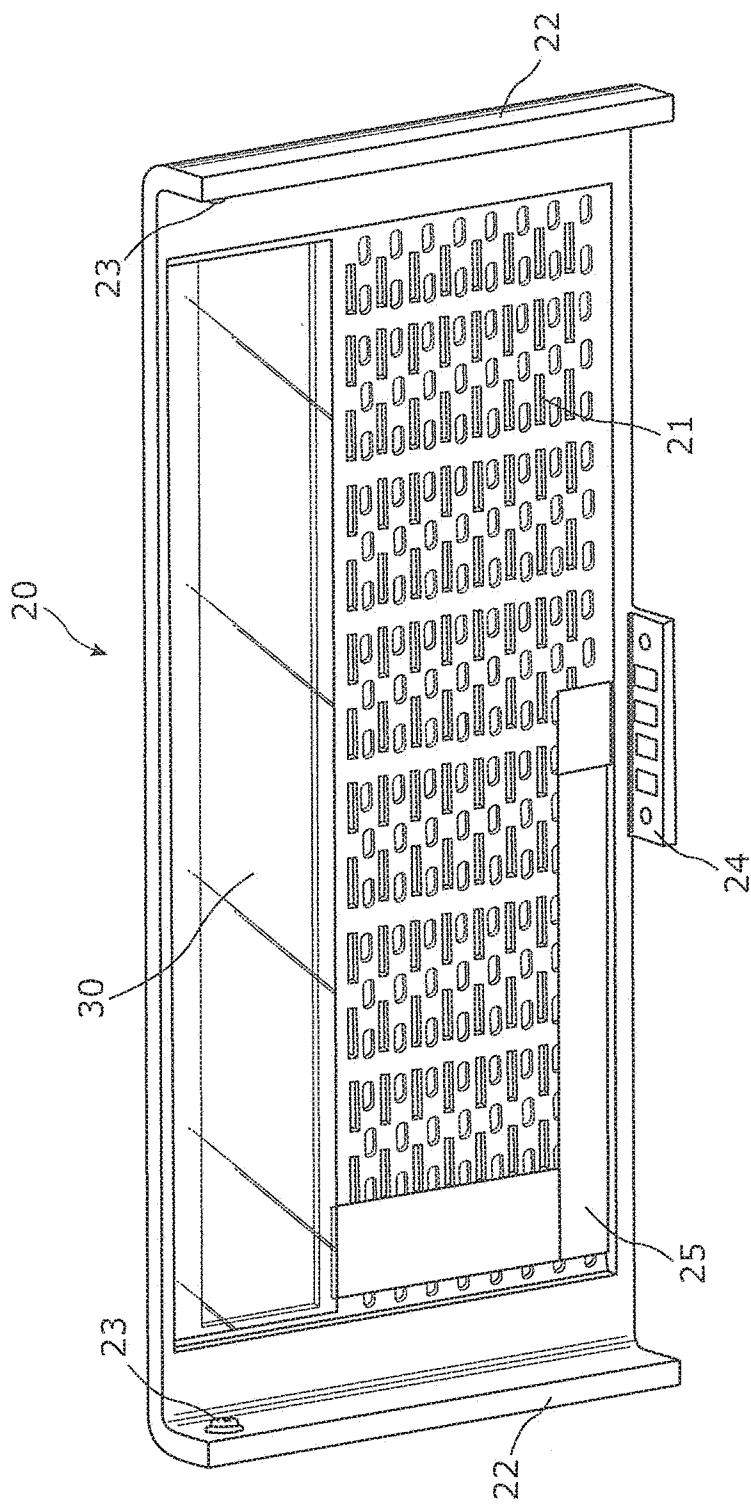


Fig. 7

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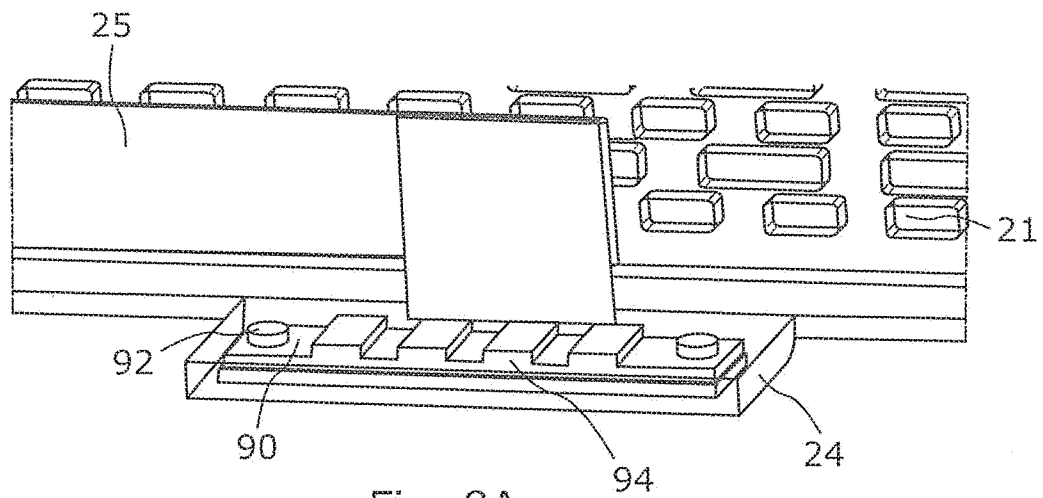


Fig. 8A

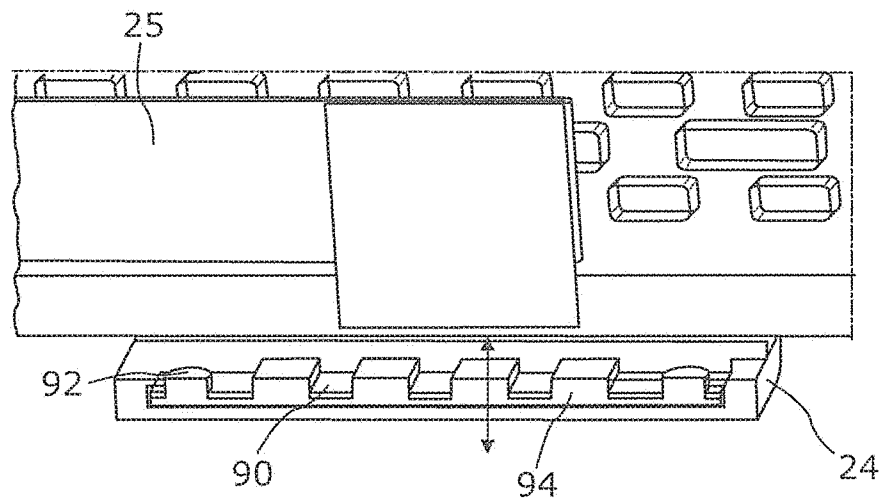


Fig. 8B

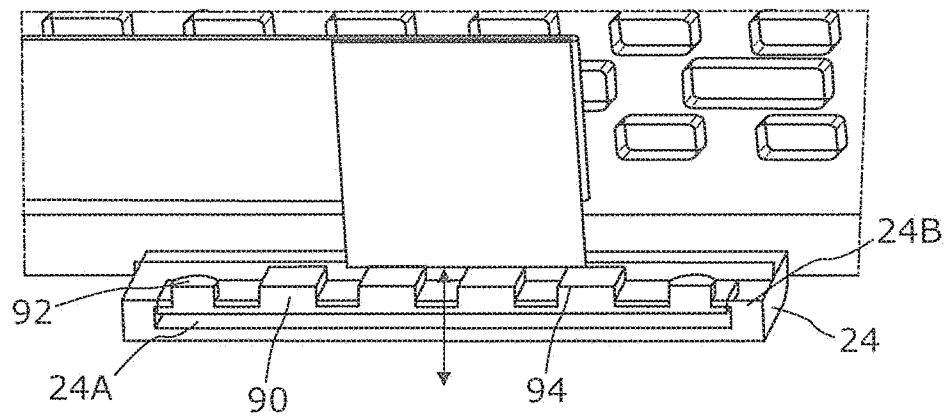


Fig. 8C

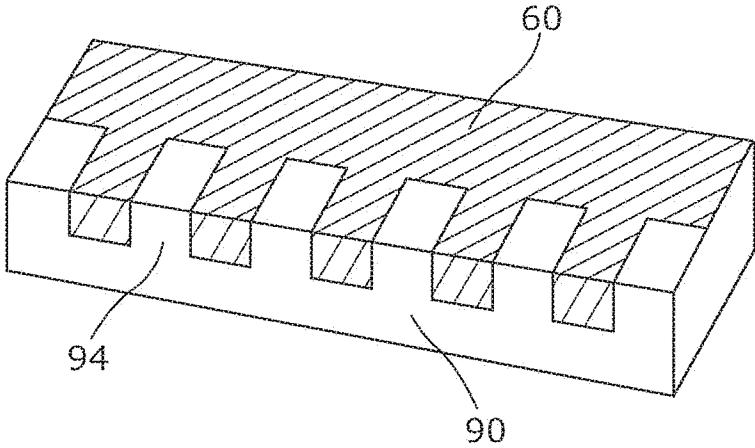


Fig. 9

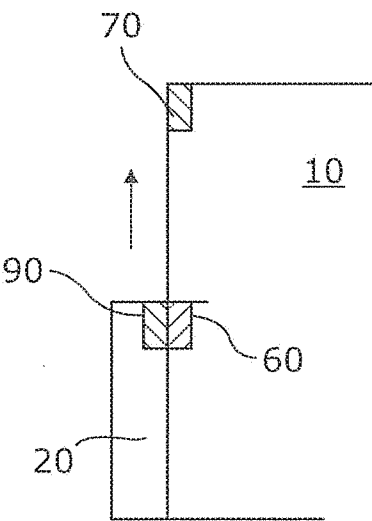


Fig. 10A

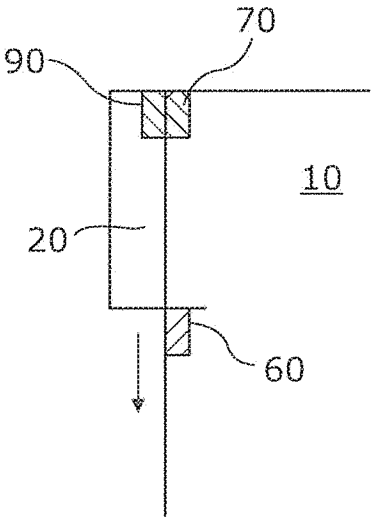


Fig. 10B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/067672**A. CLASSIFICATION OF SUBJECT MATTER****G06F 1/18(2006.01)i, H05K 7/18(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)

G06F 1/18; H05K 7/16; H05K 5/02; G06F 1/16; H05K 7/18

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: computing device, electrical connector, bezel, movable, display

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002-0109966 A1 (TOM CROWLEY) 15 August 2002 See paragraphs [0005]-[0007], [0017]-[0020], [0027]; and figures 1, 5.	1-15
A	US 2015-0109724 A1 (WISTRON CORPORATION) 23 April 2015 See paragraphs [0006]-[0008], [0020]-[0022]; and figure 1.	1-15
A	US 2004-0001321 A1 (WAN-CHENG LIN et al.) 01 January 2004 See paragraphs [0006]-[0008]; and figure 1.	1-15
A	US 2012-0056520 A1 (YUNG-LUNG LIU et al.) 08 March 2012 See paragraphs [0007]-[0008], [0019]-[0026]; and figures 1-2.	1-15
A	WO 2006-107606 A2 (HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.) 12 October 2006 See page 2, lines 23-30; and figures 1, 2B.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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