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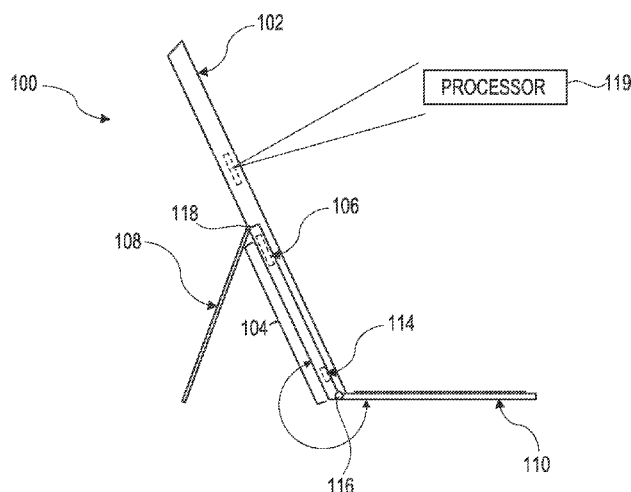


FIG. 1

(57) Abstract: Example implementations relate to computing devices with stowable keyboards. In some examples, a computing device may include a keyboard, a housing including a cavity, where the cavity includes a vent, and a kickstand attached to the housing, where when the computing device is in a closed orientation, the keyboard is to be in a stowed position in the cavity and the kickstand is to cover the cavity and the keyboard, and when the computing device is in an open orientation, the kickstand is to be in a deployed orientation such that the vent is exposed to provide airflow between the housing and an external environment.

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COMPUTING DEVICES WITH STOWABLE KEYBOARDS

Background

[0001] A computing device can allow a user to utilize computing device operations for work, education, gaming, multimedia, and/or other uses. Computing devices can be utilized in a non-mobile setting, such as at a desktop, and/or be portable to allow a user to carry or otherwise bring the computing device along while in a mobile setting.

Brief Description of the Drawings

[0002] FIG. 1 illustrates a side view of an example of a computing device with a stowable keyboard in a second open orientation consistent with the disclosure.

[0003] FIG. 2 illustrates a perspective view of an example of a computing device with a stowable keyboard in a first open orientation consistent with the disclosure.

[0004] FIG. 3 illustrates a perspective view of an example of a computing device with a stowable keyboard in a first open orientation consistent with the disclosure.

[0005] FIG. 4 a perspective view of an example of a computing device with stowable a keyboard in a first open orientation consistent with the disclosure.

[0006] FIG. 5A illustrates a partial side detail view of an example of a computing device with a stowable keyboard in a closed orientation consistent with the disclosure.

[0007] FIG. 5B illustrates a top view of an example of a computing device with a stowable keyboard in a closed orientation consistent with the disclosure.

[0008] FIG. 6 illustrates a side view of an example of a computing device in a plurality of orientations and form factors consistent with the disclosure.

[0009] FIG. 7 is a diagram of an example computing device with a stowable keyboard consistent with the disclosure.

Detailed Description

[0010] A user may utilize a computing device for various purposes, such as for business and/or recreational use. As used herein, the term “computing device” refers to an electronic system having a processing resource, memory resource, and/or an application-specific integrated circuit (ASIC) that can process information. A computing device can be, for example, a laptop computer, a notebook, and/or a tablet, among other types of computing devices.

[0011] Such computing devices may include a keyboard. As used herein, the term “keyboard” refers to a device utilizing an arrangement of buttons (e.g., keys) to input information into a computing device. A user utilizing the computing device can input information into the computing device via the keyboard. For example, a user may be working using the computing device by inputting information into the computing device, among other examples.

[0012] Some computing devices may be oriented in a traditional laptop form factor. For example, a computing device may be oriented in a clam-shell form factor having a display device, keyboard, and other computing device components in two separate housings.

[0013] A laptop form factor can provide a user with a keyboard and a display device so that the user can efficiently use the computing device for work, school, recreational use, etc. As used herein, the term “display device” refers to an output device that includes a display area that displays information provided by an electrical signal in a visual and/or tactile form. As used herein, the term “display area” refers to an area of a display device that displays information. For example, a computing device can include a display device having a display area that can display information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device.

[0014] A traditional laptop form factor computing device having a display device, keyboard, and other computing device components in two separate housings can provide a user with an accessible and familiar mechanism to perform tasks for work, school, and/or recreational use. However, a keyboard

included in a separate housing can result in wasted space within the housing including the keyboard.

[0015] Other computing device form factors may be introduced allowing users to utilize their computing devices in different modes. For example, some computing devices may include a housing having a display device and other computing components with a detachable keyboard, multiple housings which can rotate relative to each other, etc. Further, certain computing devices may include a housing with a keyboard that is rotatable to a back side of the computing device. Additionally, such computing devices may allow for use in different modes, such as laptop modes, tablet modes, etc. However, such form factors can include various drawbacks. For example, the keyboard rotatable to the back side of the computing device may be exposed so that a user may not feel comfortable utilizing the computing device in a tablet mode when the keys may be pressed. Additionally, such computing devices may include expensive hinges for rotation of housings. Such designs may be more expensive while being limited in size, ergonomics, function, inconvenient to use, and inefficiently designed.

[0016] Computing devices with stowable keyboards, according to the disclosure, can allow for a computing device with a keyboard and a housing, where when the computing device is in a closed orientation, the keyboard is in a stowed position in a cavity in the housing and a kickstand covers the keyboard. When the computing device is in an open orientation, a vent located in the cavity can be exposed to provide airflow between the computing device housing and an external environment. Accordingly, computing devices with stowable keyboards can utilize a housing and a keyboard to optimize space utilization while providing a cost, size, and weight optimized computing device. Further, the kickstand can shield the cavity from liquids, allowing for liquid-resistant computing device design.

[0017] FIG. 1 illustrates a side view of an example of a computing device 100 with a stowable keyboard in a second open orientation consistent with the disclosure. As illustrated in FIG. 1, the computing device 100 can include a housing 102, a kickstand 108, and a keyboard 110. The housing 102 can

include a cavity 104, sensor 114, hinge 116, hinge 118, and processor 119.

The cavity 104 can include a vent 106.

[0018] The computing device 100 can include a keyboard 110. As described above, a user utilizing the computing device 100 can input information into the computing device 100 via the keyboard 110. For example, a user may be working using the computing device 100 by inputting information into the computing device 100, among other examples.

[0019] The keyboard 110 can be a touchpad enabled keyboard. As used herein, the term “touchpad enabled keyboard” refers to a device utilizing an arrangement of buttons (e.g., keys) that comprise a specialized surface and a tactile sensor such that the specialized surface can translate the motion and position of a user’s finger on the specialized surface relative to a position on a graphical user interface (GUI) of a display device when a user taps a button and/or slides their finger across the arrangement of buttons that comprise the specialized surface. For example, a user can utilize (e.g., press) the keys of the keyboard 110 to input information into the computing device 100 and/or slide their finger across the keys of the keyboard 110 in order to move a position of a cursor on a display device of the computing device 100.

[0020] The computing device 100 can include a housing 102. As used herein, the term “housing” refers to an outer shell of a device. For example, the housing 102 can be an outer shell making up a portion of the computing device 100. The housing 102 can include components of the computing device 100, including a display device, such as a motherboard, power supply, drives (e.g., floppy drives or optical drives such as CD-ROM, CD-RW, DVD-ROM, etc.), hard disk drives (e.g., hard disk drives, hybrid hard drives, solid state drives (SSD), etc.), video card, sound card, among other components of a computing device 100.

[0021] The keyboard 110 can be connected to the housing 102 via a hinge 116. As used herein, the term “hinge” refers to a device about which two attached portions are able to move. For example, the keyboard 110 can be rotated relative to the computing device 100 about the hinge 116, as is further described herein.

[0022] In some examples, the hinge 116 can be a friction hinge. As used herein, the term “friction hinge” refers to a hinge that offers resistance to motion. For example, the friction hinge 116 can offer resistance when the keyboard 110 is rotated relative to the housing 102 about the friction hinge 116. A friction hinge can offer physical resistance via friction such that when a user rotates the keyboard 110 about the friction hinge 116, the keyboard 110 does not rotate freely, which can prevent the keyboard 110 from contacting surfaces unintentionally (e.g., such as swinging into a desk or other surface) and prevent damage to the keyboard 110 and/or the computing device 100.

[0023] In some examples, the hinge 116 can be a spring-loaded hinge. As used herein, the term “spring-loaded hinge” refers to a hinge that, when activated, automatically move from a first position to a second position. For example, the hinge 116 can be spring-loaded such that when the spring 116 is activated, the keyboard 110 can be automatically rotated from a stowed position to the deployed orientation (e.g., as illustrated in FIG. 1). A spring-loaded hinge can allow a user to easily cause the keyboard 110 to rotate to the deployed position by activating the spring-loaded hinge.

[0024] In some examples, the keyboard 110 can be electrically connected to the computing device 100 via a dedicated electrical pathway. For example, the keyboard 110 can be wired to the computing device 100 in order to directly transmit and receive electrical signals to and from the computing device 100.

[0025] In some examples, the keyboard 110 can be wirelessly connected to the computing device 100. For example, the keyboard 110 can be wirelessly connected to the processor 119. In such examples, the keyboard 110 can be wirelessly connected the processor 119 of the computing device 100 via a wireless network relationship. Examples of such a network relationship can include a wireless local area network (WLAN), wide area network (WAN), personal area network (PAN), a distributed computing environment (e.g., a cloud computing environment), storage area network (SAN), Metropolitan area network (MAN), a cellular communications network, Long Term Evolution (LTE), visible light communication (VLC), Bluetooth, Worldwide Interoperability for

Microwave Access (WiMAX), infrared (IR) communication, Public Switched Telephone Network (PSTN), radio waves, and/or the Internet, among other types of network relationships.

[0026] Although the keyboard 110 is described above as being connected to the housing 102 of the computing device 100, examples of the disclosure are not so limited. In some examples, the keyboard 110 can be detachable from the housing 102. In such an example, the keyboard 110 can be in communication with the computing device 100 via a wired or wireless connection.

[0027] The housing 102 can include a cavity 104. As used herein, the term “cavity” refers to a hollow space within an object. For example, the cavity 104 can be a space within the housing 102 that can be exposed to an external environment around the computing device 100 when the kickstand 108 is in a deployed orientation, as is further described herein.

[0028] The cavity 104 can include a vent 106. As used herein, the term “vent” refers to an opening in a wall of an object. For example, the vent 106 can be an opening in a wall of the cavity 104. The vent 106 can serve as an inlet and/or outlet between an interior of the housing 102 and the external environment around the computing device 100. For example, when the vent 106 is exposed to the external environment around the computing device 100, air flow can occur through the vent 106 into and/or out of the housing 102, as is further described in connection with FIG. 5A.

[0029] The computing device 100 can include a kickstand 108. As used herein, the term “kickstand” refers to a piece of material used to prop up another object. For example, the kickstand 108 can be utilized to prop up the housing 102. As illustrated in FIG. 1, the kickstand 108 can be in a deployed orientation. For example, in the deployed orientation, the kickstand 108 can prop up the housing 102 so that a user can utilize the computing device 100 while the computing device 100 is in the second open orientation (e.g., as illustrated in FIG. 1), as is further described herein.

[0030] The kickstand 108 can be attached to the housing 102 via a hinge 118. For example, the kickstand 108 can be rotated relative to the housing 102

via the hinge 118. In some examples, the hinge 118 can be a friction hinge. For example, the friction hinge 118 can offer resistance when the hinge 118 is rotated relative to the housing 102 such that when a user rotates the hinge 118, the user can select a particular angle of the kickstand 108 relative to the housing 102 in order to select a comfortable viewing angle of the housing 102 (e.g., and a display device located in the housing 102) relative to a desk top or other surface on which the computing device 100 may be located.

[0031] As illustrated in FIG. 1, the computing device 100 can be in a second open orientation. As used herein, the term "second open orientation" refers to an orientation in which the kickstand 108 is in a deployed orientation and the keyboard 110 is in a deployed position such that the computing device 100 is oriented in a laptop form factor. As used herein, the term "laptop form factor" refers to an orientation of a computing device in which a first portion of the computing device is oriented in an open clamshell form-factor relative to a second portion of the computing device. For example, the housing 102 can be oriented in an open clamshell form-factor relative to the keyboard 110. Accordingly, the computing device 100 can be oriented in a laptop form factor when the computing device 100 is in the second open orientation, as illustrated in FIG. 1.

[0032] When the computing device 100 is in the second open orientation, the keyboard 110 can be in the deployed position outside of the cavity 104. For example, the keyboard 110 can be movable from a stowed position in the cavity 104 (e.g., as illustrated in FIGS. 2, 3, 5A, and 6) to the deployed position as illustrated in FIG. 1. For example, the keyboard 110 can be rotated about the hinge 116 from a stowed position in the cavity 104 to the deployed position as illustrated in FIG. 1.

[0033] When the kickstand 108 is in the deployed orientation, the vent 106 can be exposed to provide airflow between the housing 102 and the external environment. For example, airflow can occur between the housing 102 and the external environment in order to cool components of the computing device 100 located in the housing 102, as is further described in connection with FIG. 5A.

[0034] The keyboard 110 can be activated at the deployed position. As used herein, the term “activate” refers to a processor causing a hardware device to function. For example, the processor 119 can cause the keyboard 110 to function such that the keyboard 110 can receive inputs from a user and transmit the inputs to the processor 119.

[0035] The processor 119 can determine an orientation of the computing device 100 and activate the keyboard 110 in response to the keyboard 110 being in the deployed position (e.g., computing device 100 being in the second open position). The processor 119 can determine the orientation of the computing device 100 via a sensor 114. As used herein, the term “sensor” refers a device to detect events and/or changes in its environment and transmit the detected events and/or changes for processing and/or analysis. For example, the sensor 114 can determine whether the keyboard 110 is in a deployed position (e.g., as illustrated in FIG. 1) or in a stowed position (e.g., as illustrated in FIGS. 2, 3, 5A, and 6). In response to the determination of the position of the keyboard 110, the processor 119 can toggle the keyboard 110, as is further described herein.

[0036] In some examples, the sensor 114 can be a Hall effect sensor. As used herein, the term “Hall effect sensor” refers to a device to measure the magnitude of a magnetic field. Although not illustrated in FIG. 1, the keyboard 110 can include a magnet. In response to the Hall effect sensor measuring a magnitude of a magnetic field (e.g., from the magnet) that is below a threshold magnitude, the processor 119 can determine the keyboard 110 is in the deployed position. In response to the Hall effect sensor measuring a magnitude of a magnetic field (e.g., from the magnet) that exceeds a threshold magnitude, the processor 119 can determine the keyboard 110 is in a stowed position, as is further described in connection with FIGS. 2 and 3.

[0037] In some examples, the sensor 114 can be a switch. As used herein, the term “switch” refers to a device that can connect or disconnect a conducting path in an electrical circuit. For example, in response to the switch having disconnected a conducting path in an electrical circuit (e.g., in response

to the keyboard 110 being in the deployed position), the processor 119 can determine the keyboard 110 is in the deployed position.

[0038] The processor 119 can toggle the keyboard 110 based on the determination of the position of the keyboard 110 via the sensor 114. As used herein, the term “toggle” refers to switch from one state to another state. For example, in response to the sensor 114 determining the keyboard 110 is in the deployed position, the processor 119 can determine the computing device 100 is in the second open orientation and can activate the keyboard 110.

[0039] When the computing device 100 is in the second open orientation, in some examples, the processor 119 can cause the computing device 100 to operate in a high-power mode. As used herein, the term “high-power mode” refers to a mode of operation of the computing device 100 in which an operating voltage of a computing device and/or a clock rate of a computing device is increased relative to a low-power mode to increase an operating speed of computing device components relative to the low-power mode. For example, the computing device 100 can be utilized for certain tasks which may ask for additional processing capabilities. For instance, certain video editing, gaming, and/or other processes may ask for additional processing, video processing, and/or clock speeds, among other criteria, which may in turn increase power consumption and heat generation by the computing device 100. As described above, when the computing device 100 is in the second open orientation, the vent 106 can be exposed to the external environment to allow air flow between the external environment and the housing 102, which can compensate for the increased heat generation when the computing device 100 is in the high-power mode.

[0040] Although not illustrated in FIG. 1, the housing 102 can include a fan. As used herein, the term “fan” refers to a device used to generate airflow. For example, the fan can be activated to increase airflow between the external environment of the computing device 100 and an interior of the housing 102 via the vent 106. When the computing device 100 is in the second open orientation, the fan can be activated to provide the airflow between the housing 102 and the external environment via the vent 106.

[0041] As illustrated in FIG. 1, the computing device 100 is in the second open orientation. The computing device 100 can be movable to first open orientation. For example, the keyboard 110 can be rotated about the hinge 116 to a stowed position in the cavity 104 so that the computing device is in the first open orientation, as is further described in connection with FIGS. 2-4.

[0042] FIG. 2 illustrates a perspective view of an example of a computing device 200 with a stowable keyboard in a first open orientation consistent with the disclosure. As illustrated in FIG. 2, the computing device 200 can include housing 202, a cavity 204, a kickstand 208, and a keyboard 210.

[0043] As illustrated in FIG. 2, the computing device 200 can be in a first open orientation. As used herein, the term “first open orientation” refers to an orientation in which the kickstand 208 is in a deployed orientation and the keyboard 210 is in a stowed position in the cavity 204 such that the computing device 200 is oriented in a media form factor. As used herein, the term “media form factor” refers to an orientation of a computing device in which a first portion of the computing device is propped up by a second portion of the computing device. This may also be referred to as a tent or a presentation mode, in some examples. For example, the housing 202 can be propped up by the kickstand 208. Accordingly, the computing device 200 can be oriented in a media form factor when the computing device 200 is in the first open orientation.

[0044] As illustrated in FIG. 2, the keyboard 210 can be in a stowed position in the cavity 204. As used herein, the term “stowed” refers to an object being placed into a receptacle such that the object is at least partially encompassed by the receptacle. For example, the keyboard 210 can be sized such that the keyboard 210 can be rotated into the cavity 204 from the deployed position (e.g., as previously described in connection with FIG. 1) such that the keyboard 210 can be located within the cavity 204 as illustrated in FIG. 2.

[0045] When the computing device 200 is in the first open orientation, the keyboard 210 can be rotatable from the stowed position in the cavity 204 to the deployed position about a hinge such that the computing device 200 is in the second open orientation, as previously described in connection with FIG. 1. In some examples, the keyboard 210 can be rotated about a hinge (e.g., hinge

116, previously described in connection with FIG. 1) such that when a user presses a button, the keyboard 210 can be released from the stowed position in the cavity 204 and rotate to the deployed position. In some examples, a user can manually rotate the keyboard 210 from the stowed position in the cavity 204 to the deployed position.

[0046] FIG. 3 illustrates a perspective view of an example of a computing device 300 with a stowable keyboard in a first open orientation consistent with the disclosure. As illustrated in FIG. 3, the computing device 300 can include housing 302, a kickstand 308, and a keyboard 310. The housing 302 can include a cavity 304, a vent 306, and a sensor 314. The kickstand 308 can include a polymer seal 315.

[0047] As previously described in connection with FIG. 1, the housing 302 can include a sensor 314. A processor can determine an orientation of the computing device 300 and deactivate the keyboard 310 in response to the keyboard 310 being in the stowed position (e.g., computing device 300 being in the first open position).

[0048] The processor can determine the orientation of the computing device 300 via the sensor 314. For example, the sensor 314 can determine whether the keyboard 310 is in a deployed position (e.g., as previously illustrated in FIG. 1) or in the stowed position (e.g., as illustrated in FIGS. 2, 3, 5A, and 6). In response to the determination of the position of the keyboard 310, the processor can toggle the keyboard 310, as is further described herein.

[0049] The processor can toggle the keyboard 310 based on the determination of the position of the keyboard 310 via the sensor 314. For example, in response to the sensor 314 determining the keyboard 310 is in the stowed position, the processor can determine the computing device 300 is in the first open orientation and can deactivate the keyboard 310. Deactivating the keyboard 310 can prevent a user from accidentally providing inputs (e.g., by pressing the keys, sliding their finger across the keys/specialized touchpad surface unintentionally, etc.) to the computing device 300 via the keyboard 310.

[0050] When the computing device 300 is in the first open orientation, the kickstand 308 can be in the deployed orientation and the keyboard 310 can be

in the stowed position in the cavity 304 such that the vent 306 is exposed to provide airflow between the housing 302 and the external environment. For example, as illustrated in FIG. 3, the vent 306 can be located above the location of the stowed keyboard 310 such that the vent 306 can allow for airflow between an interior of the housing 302 and the external environment around the computing device 300.

[0051] Although not illustrated in FIG. 3, in some examples, the vent 306 can be located behind the keyboard 310 when the keyboard 310 is in the stowed position. In such an example, the vent 306 can allow for airflow between the housing 302 and the external environment via vents and/or other spaces in the keyboard 310. For instance, the keyboard 310 can include spaces and/or gaps between components of the keyboard (e.g., the keys, frame, specialized surface and tactile sensors, etc.) to allow airflow to occur through the keyboard 310 and into and/or out of the housing 302 via the vent 306.

[0052] When the computing device 300 is in the first open orientation, in some examples, the processor can cause the computing device 300 to operate in a high-power mode, as described above.

[0053] As illustrated in FIG. 3, the computing device 300 is in the first open orientation. The computing device 300 can be movable to a closed orientation. For example, the keyboard 310 can remain in a stowed position in the cavity 304 and the kickstand 308 can be rotated to a covered orientation to cover the cavity 304, as is further described in connection with FIG. 5A.

[0054] When the computing device 300 is moved to the closed orientation, the polymer seal 315 can provide a seal between the cavity 304 and the kickstand 308. As used herein, the term “polymer seal” refers to an object of a particular substance that can provide a mechanical seal between two or more mating surfaces. For example, when the computing device 300 is moved to the closed orientation, the kickstand 308 can compress the polymer seal 315 against a mating surface of the housing 302. The polymer seal 315 can shield the cavity 304 from liquids, dust, or other contaminants to prevent the

computing device 300 from being damaged by interaction with such contaminants.

[0055] The polymer seal 315 can be located around an edge of the kickstand 308. In some examples, the polymer seal 315 can be attached to the kickstand 308 via thermal bonding. In some examples, the polymer seal 315 can be attached to the kickstand 308 by co-molding.

[0056] Although the polymer seal 315 is described above as being located around the edge of the kickstand 308, examples of the disclosure are not so limited. In some examples, the polymer seal 315 may be located on the keyboard 310. In some example, the polymer seal 315 on the housing 302 around the cavity 304.

[0057] The polymer seal 315 can be a polymer material. For instance, the polymer seal 315 may be a rubber material, such as a rubber gasket (e.g., rubber gasket 528, as is further described in connection with FIG. 5). However, examples of the disclosure are not so limited. For example, the polymer seal 315 can be any other type of polymer material to provide a seal between the cavity 304 and the kickstand 308.

[0058] FIG. 4 a perspective view of an example of a computing device 400 with a stowable keyboard in a first open orientation consistent with the disclosure. As illustrated in FIG. 4, the computing device 400 can include housing 402 and a kickstand 408.

[0059] As illustrated in FIG. 4, the computing device 400 can be in the first open orientation. A user may utilize the computing device 400 in the first open orientation to view media, browse the Internet, etc., using the display device 420.

[0060] When the computing device 400 is in the first open orientation, the kickstand 408 can be rotated to a covered position such that the computing device 400 is in a closed orientation. The kickstand 408 can cover the cavity and the keyboard in the covered position, as is further described in connection with FIG. 5A.

[0061] FIG. 5A illustrates a partial side detail view of an example of a computing device 500 with a stowable keyboard in a closed orientation

consistent with the disclosure. As illustrated in FIG. 5, the computing device 500 can include a housing 502, a kickstand 508, a keyboard 510, a first hinge 516, and a second hinge 518. The housing 502 can include a cavity 504, a fan 522, an audio output device 524, and an I/O port 526. The kickstand 508 can include a gasket 528.

[0062] As illustrated in FIG. 5A, the computing device 500 is in the closed orientation. As used herein, the term “closed orientation” refers to an orientation in which the keyboard 510 is in a stowed position within the cavity 504 and the kickstand 508 is in a covered orientation to cover the keyboard 510 and the cavity 504 such that the computing device 500 is oriented in a tablet form factor. As used herein, the term “tablet form factor” refers to an orientation of a computing device in which the computing device is oriented on a surface and not supported by any other portions of the computing device. For example, the keyboard 510 can be in the stowed position within the cavity 504 and the kickstand 508 can be in a covered orientation to cover the keyboard 510 and the cavity 504. Accordingly, the computing device 500 can be oriented in a tablet form factor when the computing device 500 is in the closed orientation, as illustrated in FIG. 5A.

[0063] When in the tablet form factor, the computing device 500 can have a slim profile. For example, the housing 502 of the computing device 500 can be a same width along a height of the housing 502 when the computing device 500 is in the closed orientation (e.g., when the keyboard 510 is in the stowed position in the cavity 504 and the kickstand 508 is in the covered orientation to cover the cavity 504 and the keyboard 510).

[0064] In some examples, the computing device 500 can be powered off when in the closed orientation. The closed orientation of the computing device 500 can allow for the computing device 500 to be transported, stored, etc. For instance, the computing device 500 may be powered off, be put into a hibernation state, etc. such that a user may transport the computing device 500 from one location to another, store the computing device 500 for later use, etc.

[0065] In some examples, the computing device 500 can be powered on and utilized in the tablet form factor. For example, a user may utilize a display

device of the computing device 500 to view displayed information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device 500.

[0066] As illustrated in FIG. 5, the cavity 504 can include an I/O port 526. As used herein, the term “I/O port” refers to a hardware interface that connects a processor of a computing device to a peripheral device. The I/O port 526 can be a USB port (e.g., a USB Type-C port or any other type of USB port), serial port, parallel port, Small Computer Systems Interface (SCSI) port, IEEE (e.g., FireWire) port, PS/2 port, SPDIF audio port, Bluetooth port, Infrared port, among other types of I/O ports.

[0067] The computing device 500 can include a fan 522. The fan 522 can generate airflow between the housing 502 and the external environment around the computing device 500 via the vent 506. The fan 522 can be activated or deactivated based on the orientation of the computing device 500, as is further described herein.

[0068] In some examples, the fan 522 can be located substantially adjacent to a vent 506 located on a right side of the cavity 504 (e.g., as oriented in FIG. 5A). In some examples, the fan 522 may be located substantially adjacent to a vent 506 located on a top side of the cavity 504 (e.g., as oriented in FIG. 5A) as seen in FIG. 5A.

[0069] When the computing device 500 is in the closed orientation as illustrated in FIG. 5A, the fan 522 can be deactivated. For example, the computing device 500 can include a processor (e.g., not illustrated in FIG. 5A) that can determine the orientation of the computing device 500 utilizing a sensor. The sensor can be, for instance, a Hall effect sensor, a switch, or any other type of sensor that can determine whether the kickstand 508 is in the covered orientation or the deployed orientation. In response to the sensor determining the kickstand 508 is in the covered orientation, the processor can determine the computing device 500 is in the closed orientation and can cause the fan 522 to be deactivated.

[0070] When the computing device 500 is in an open orientation (e.g., the first open orientation, as previously described in connection with FIGS. 2-4 or

the second open orientation, as previously described in connection with FIG. 1), the fan 522 can be activated. For example, the processor (e.g., not illustrated in FIG. 5A) can determine the orientation of the computing device 500 utilizing a sensor. The sensor can determine whether the kickstand 508 is in the covered orientation or the deployed orientation. In response to the sensor determining the kickstand 508 is in the deployed orientation, the processor can determine the computing device 500 is in an open orientation and can cause the fan 522 to be activated. The fan 522 can, accordingly, provide airflow between the housing 502 and the external environment around the computing device 500 via the vent 506.

[0071] The computing device 500 can include an audio output device 524. As used herein, the term “audio output device” refers to a device capable of converting electrical signals to sound and/or pressure waves. For example, the computing device 500 may include the audio output device 524 to output instructions, alerts, voice, multimedia including video and/or music, and/or other types of sounds. For instance, a user may view a video via the computing device 500 and the audio output device 524 can emit music and/or other sounds associated with the video, among other examples.

[0072] The audio output device 524 can be covered by the kickstand 508 when the computing device 500 is in the closed orientation, as illustrated in FIG. 5A. The audio output device 524 can be exposed (e.g., to the external environment) when the computing device 500 is in the first open orientation or the second open orientation.

[0073] The kickstand 508 attached to the housing 502 can include a gasket 528. As used herein, the term “gasket” refers to an object to provide a mechanical seal between two or more mating surfaces. For example, the gasket 528 can provide a seal between the cavity 504 and the kickstand 508.

[0074] Accordingly, when the computing device 500 is in the closed orientation, the gasket 528 can shield the cavity 504 from liquids. For example, when the kickstand 508 is in the covered orientation, the kickstand 508 can compress the gasket 528 to shield the cavity 504, including the keyboard 510, vent 506, fan 522, audio output device 524, and/or the I/O port 526 from liquids.

As a result, when the computing device 500 is in the closed orientation, liquid may not interact with the cavity 504, which can prevent the computing device 500 (and any associated components) from being damaged by interaction with liquid.

[0075] As illustrated in FIG. 5A, the computing device 500 is in the closed orientation. The computing device 500 can be movable to a first open orientation from the closed orientation. For example, the kickstand 508 is rotatable from the covered orientation to a deployed orientation (e.g., as previously described in connection with FIGS. 2-4) about the second hinge 518. From the first open orientation, the computing device 500 can be movable to a second open orientation. For example, the keyboard 510 can be rotatable from the stowed position in the cavity 504 to the deployed position about the first hinge 516 such that the computing device 500 is in the second open orientation (e.g., as previously described in connection with FIG. 1).

[0076] FIG. 5B illustrates a top view of an example of a computing device with a stowable keyboard in a closed orientation consistent with the disclosure. As illustrated in FIG. 5B, the computing device 500 can include housing 502 and display device 520.

[0077] In the closed orientation illustrated in FIG. 5B, the computing device 500 can be oriented in a tablet form factor. For example, the keyboard 510 can be in the stowed position within the cavity 504 and the kickstand 508 can be in a covered orientation to cover the keyboard 510 and the cavity 504. Accordingly, the computing device 500 can be oriented in a tablet form factor when the computing device 500 is in the closed orientation.

[0078] The computing device 500 can be powered on and utilized in the tablet form factor. For example, a user may utilize display device 520 of the computing device 500 to view displayed information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device 500.

[0079] When the computing device 500 is in the closed orientation, in some examples, a processor (e.g., not illustrated in FIG. 5B) can cause the computing device 500 to operate in a low-power mode. As used herein, the

term “low-power mode” refers to a mode of operation of the computing device 500 in which an operating voltage of a computing device and/or a clock rate of a computing device is decreased relative to a high-power mode to decrease an operating speed of computing device components relative to the high-power mode. For example, the computing device 500 can be utilized for certain tasks which may ask for lower processing capabilities relative to the high-power mode. For instance, certain operations such as watching videos, presentations, browsing the Internet, word processing, and/or other processes may ask for a lower processing, video processing, and/or clock speed levels, among other criteria, which may in turn decrease power consumption and heat generation by the computing device 500 relative to a high-power mode. Accordingly, although when the computing device 500 is in the closed orientation, the vent can be covered by the kickstand which can restrict air flow between the external environment and the housing 502, the increased air flow through the vent does not have to be provided.

[0080] FIG. 6 illustrates a side view of an example of a computing device 600 in a plurality of orientations and form factors consistent with the disclosure. As illustrated in FIG. 6, the plurality of orientations and form factors can include a closed orientation 630, a tablet form factor 632, a media form factor 634, and a laptop form factor 636.

[0081] As illustrated in FIG. 6, the computing device 600 can be in a closed orientation 630. In the closed orientation 630, a keyboard can be in a stowed position in a cavity of the housing 602 and a kickstand can be in a covered orientation to cover the keyboard located in the cavity of the housing 602. In the closed orientation 630, the computing device 600 can be transported, stored, etc.

[0082] The computing device 600 can be in the closed orientation and in a tablet form factor 632. In the tablet form factor 632, a keyboard can be in a stowed position in a cavity of the housing 602 and a kickstand can be in a covered orientation to cover the keyboard located in the cavity of the housing 602. The computing device 600 can be powered on and utilized in the tablet form factor 632. For example, a user may utilize a display device of the

computing device 600 to view displayed information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device 600. Additionally, the user may utilize the display device to input information into the computing device 600.

[0083] The computing device 600 can be in a first open orientation and in a media form factor 634. In the media form factor 634, a keyboard can be in a stowed position in a cavity of the housing 602 and a kickstand 608 can be in a deployed orientation such that the kickstand 608 can prop up the housing 602. Similar to the tablet form factor 632, the computing device 600 can be powered on and utilized in the media form factor 634. For example, a user may utilize a display device of the computing device 600 to view displayed information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device 600. Additionally, the user may utilize the display device to input information into the computing device 600.

[0084] The computing device 600 can be in a second open orientation and in a laptop form factor 636. In the laptop form factor 636, a keyboard 610 can be in a deployed position and a kickstand 608 can be in a deployed orientation such that the kickstand 608 can prop up the housing 602. Similar to the tablet form factor 632 and the media form factor 634, the computing device 600 can be powered on and utilized in the laptop form factor 636. For example, a user may utilize a display device of the computing device 600 to view displayed information such as text, videos, and/or images, as a result of an electrical signal provided to the display from the computing device 600. Additionally, the user may utilize the keyboard 610 and/or the display device to input information into the computing device 600.

[0085] Computing devices with stowable keyboards according to the disclosure can provide a computing device with different form factors that can allow the computing device to be utilized in various ways by a user while optimizing space utilization within the computing device housing. Additionally, the various form factors can provide an easy to use platform having an optimized size and weight, as well as cost. Further, the kickstand can provide

liquid-proofing to allow the computing device to be liquid resistant when the computing device is in the closed orientation.

[0086] FIG. 7 is a diagram of an example computing device 700 with a stowable keyboard consistent with the disclosure. As described herein, the computing device 700 may perform functions related to computing devices with stowable keyboards. Although the following descriptions refer to a single processor 719 and a single memory resource 740, the descriptions may also apply to a system with multiple processors and multiple memory resources. In such examples, the computing device 700 may be distributed across multiple memory resources/machine-readable storage mediums and across multiple processors. Put another way, instructions executed by the computing device 700 may be stored across multiple memory resources/machine-readable storage mediums and executed across multiple processors, such as in a distributed or virtual computing environment.

[0087] The processor 719 may be a central processing unit (CPU), a semiconductor-based microprocessor, and/or other hardware devices suitable for retrieval and execution of non-transitory machine-readable instructions stored in a memory resource 740. The processor 719 may fetch, decode, and execute the stored instructions to perform actions related to computing devices with stowable keyboards. As an alternative or in addition to retrieving and executing the stored instructions, the processor 719 may include a plurality of electronic circuits that include electronic components for performing the functionality of the stored instructions to perform actions related to computing devices with hinge bars.

[0088] The memory resource 740 may be any electronic, magnetic, optical, or other physical storage device that stores the non-transitory machine-readable executable instructions and/or data. Thus, memory resource 740 may be, for example, Random Access Memory (RAM), an Electrically-Erasable Programmable Read-Only Memory (EEPROM), a storage drive, an optical disc, and the like. The memory resource 740 may be disposed within the computing device 700. Additionally, the memory resource 740 may be a portable, external or remote storage medium, for example, that causes the computing device 700 to download the instructions from the portable/external/remote storage medium.

[0089] The computing device 700 can include the display device 720. The display device 720 can present information to a user, such as text, videos, and/or images based on the computing device 700 being in the second open orientation/the laptop form factor as previously described in connection with FIG. 1, in the first open orientation/media form factor as previously described in connection with FIGS. 2-4, or in the closed orientation/tablet form factor as previously described in connection with FIGS. 5A and 5B.

[0090] The computing device 700 can include the keyboard 710. The keyboard 710 can be in a stowed position when the computing device 700 is in the closed orientation and the first open orientation. The keyboard 710 can be in a deployed position when the computing device 700 is in the second open orientation.

[0091] The computing device 700 can include sensor 714. The sensor 714 can be, for example, a sensor to determine a position of the keyboard or a sensor to determine an orientation of the kickstand. The sensor 714 can be, for example, a Hall effect sensor, a switch, etc.

[0092] In the foregoing detailed description of the disclosure, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration how examples of the disclosure may be practiced. These examples are described in sufficient detail to enable those of ordinary skill in the art to practice the examples of this disclosure, and it is to be understood that other examples may be utilized and that process, electrical, and/or structural changes may be made without departing from the scope of the disclosure.

[0093] The figures herein follow a numbering convention in which the first digit corresponds to the drawing figure number and the remaining digits identify an element or component in the drawing. Similar elements or components between different figures may be identified by the use of similar digits. For example, 102 may reference element "02" in FIG. 1, and a similar element may be referenced as 202 in FIG. 2.

[0094] Elements illustrated in the various figures herein can be added, exchanged, and/or eliminated so as to provide a plurality of additional examples

of the disclosure. In addition, the proportion and the relative scale of the elements provided in the figures are intended to illustrate the examples of the disclosure and should not be taken in a limiting sense. As used herein, "a plurality of" an element and/or feature can refer to more than one of such elements and/or features.

What is claimed:

1. A computing device, comprising:
a keyboard;
a housing, including a cavity, wherein the cavity includes a vent; and
a kickstand attached to the housing, wherein:
when the computing device is in a closed orientation, the keyboard is to be in a stowed position in the cavity and the kickstand is to cover the cavity and the keyboard; and
when the computing device is in an open orientation, the kickstand is to be in a deployed orientation such that the vent is exposed to provide airflow between the housing and an external environment.
2. The computing device of claim 1, wherein when the computing device is in the open orientation, the keyboard is in the stowed position in the cavity.
3. The computing device of claim 1, wherein:
when the computing device is in the open orientation, the keyboard is movable from the stowed position in the cavity to a deployed position; and
the keyboard is activated at the deployed position.
4. The computing device of claim 1, wherein:
the computing device further includes a fan; and
when the computing device is in the closed orientation, the fan is to be deactivated.
5. The computing device of claim 4, wherein when the computing device is in the open orientation, the fan is to be activated to provide the airflow between the housing and the external environment via the vent.

6. The computing device of claim 1, wherein the kickstand includes a gasket such that when the computing device is in the closed orientation, the gasket is to shield the cavity from liquids.

7. The computing device of claim 1, wherein the keyboard is a touchpad enabled keyboard.

8. A computing device, comprising:
a keyboard;
a housing, including a cavity, wherein the cavity includes an input/output (I/O) port;
a kickstand attached to the housing, the kickstand including a gasket,
wherein:

when the computing device is in a closed orientation, the keyboard is to be in a stowed position in the cavity and the kickstand is to cover the cavity and the keyboard such that the gasket is to shield the cavity from liquids; and

when the computing device is in a first open orientation, the kickstand is to be in a deployed orientation.

9. The computing device of claim 8, wherein when the computing device is in the closed orientation, the kickstand is rotatable to the deployed orientation about a friction hinge such that the computing device is in the first open orientation.

10. The computing device of claim 9, wherein when the computing device is in the first open orientation, the keyboard is rotatable from the stowed position in the cavity to a deployed position about a hinge such that the computing device is in a second open orientation.

11. The computing device of claim 8, wherein the cavity further includes an audio output device such that the audio output device is:

covered by the kickstand when the computing device is in the closed orientation; and

exposed when the computing device is in the first open orientation.

12. A computing device, comprising:

a keyboard;

a housing, including a cavity, wherein the cavity includes a vent;

a kickstand attached to the housing, wherein:

when the computing device is in a closed orientation, the keyboard is to be in a stowed position in the cavity and the kickstand is to cover the cavity and the keyboard; and

when the computing device is in a first open orientation, the kickstand is to be in a deployed orientation such that the vent is exposed to provide airflow between the housing and an external environment and the keyboard is to be in the stowed position in the cavity; and

when the computing device is in a second open orientation, the kickstand is to be in the deployed orientation and the keyboard is to be in a deployed position outside of the cavity; and

a processor to:

determine an orientation of the computing device via a sensor;

and

toggle the keyboard based on the determination.

13. The computing device of claim 12, wherein the processor is to toggle the keyboard by:

deactivating the keyboard in response to determining the computing device is in the closed orientation or the first open orientation; and

activating the keyboard in response to determining the computing device is in the second open orientation.

14. The computing device of claim 12, wherein the sensor is a Hall effect sensor or a switch.

15. The computing device of claim 12, wherein the processor is to:
- cause the computing device to operate in a low-power mode when the computing device is in the closed orientation; and
 - cause the computing device to operate in a high-power mode when the computing device is in the first open orientation or the second open orientation.

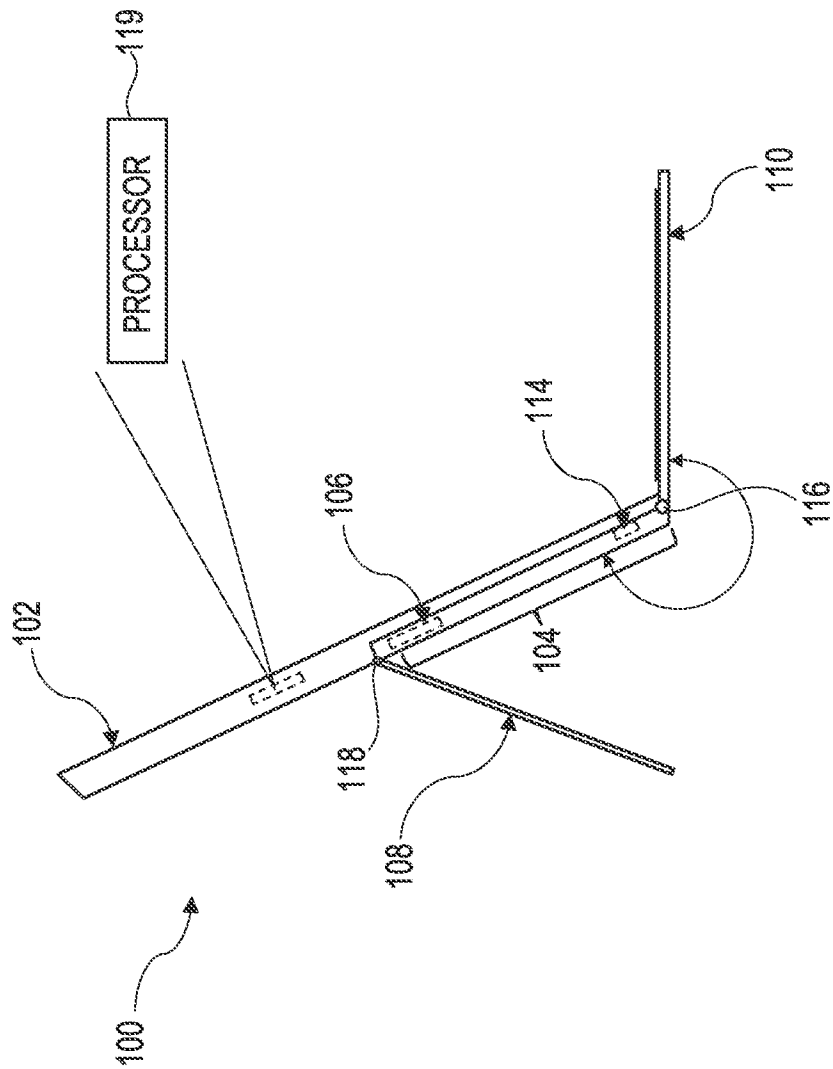
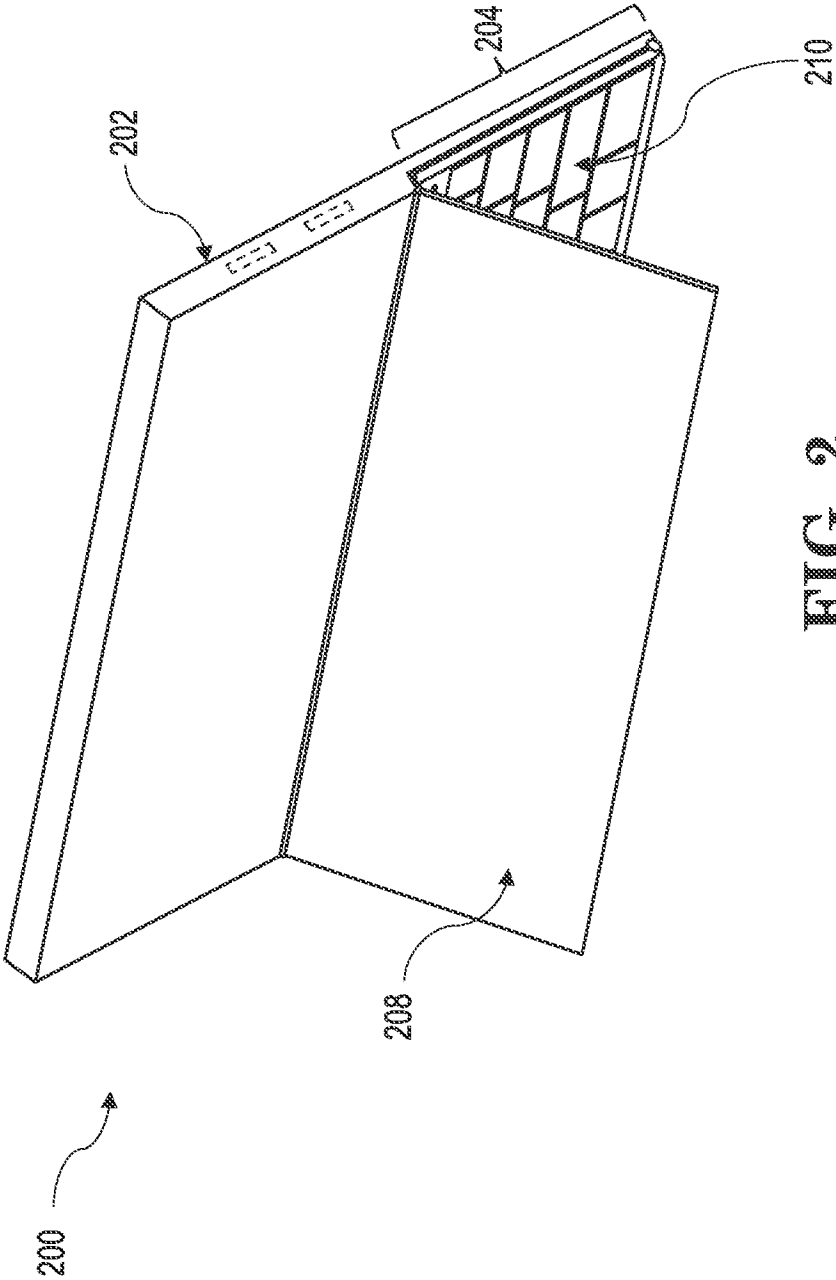


FIG. 1



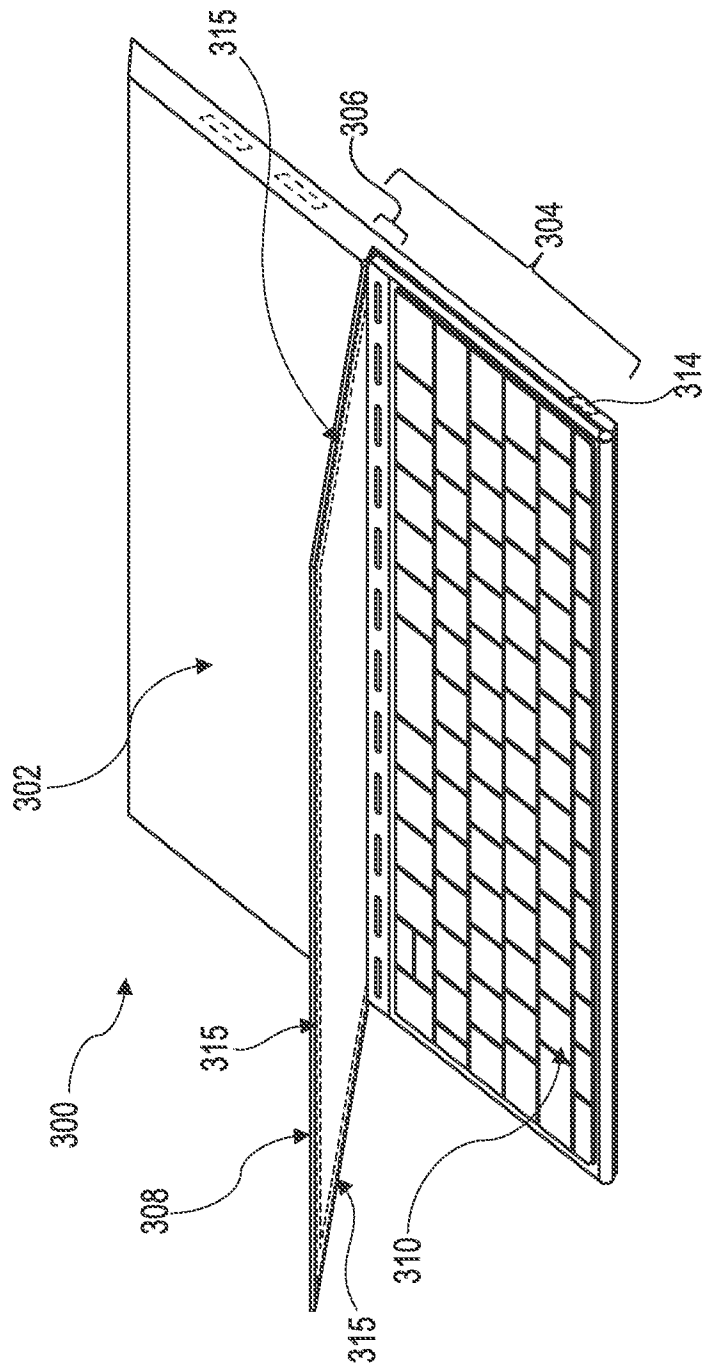


FIG. 3

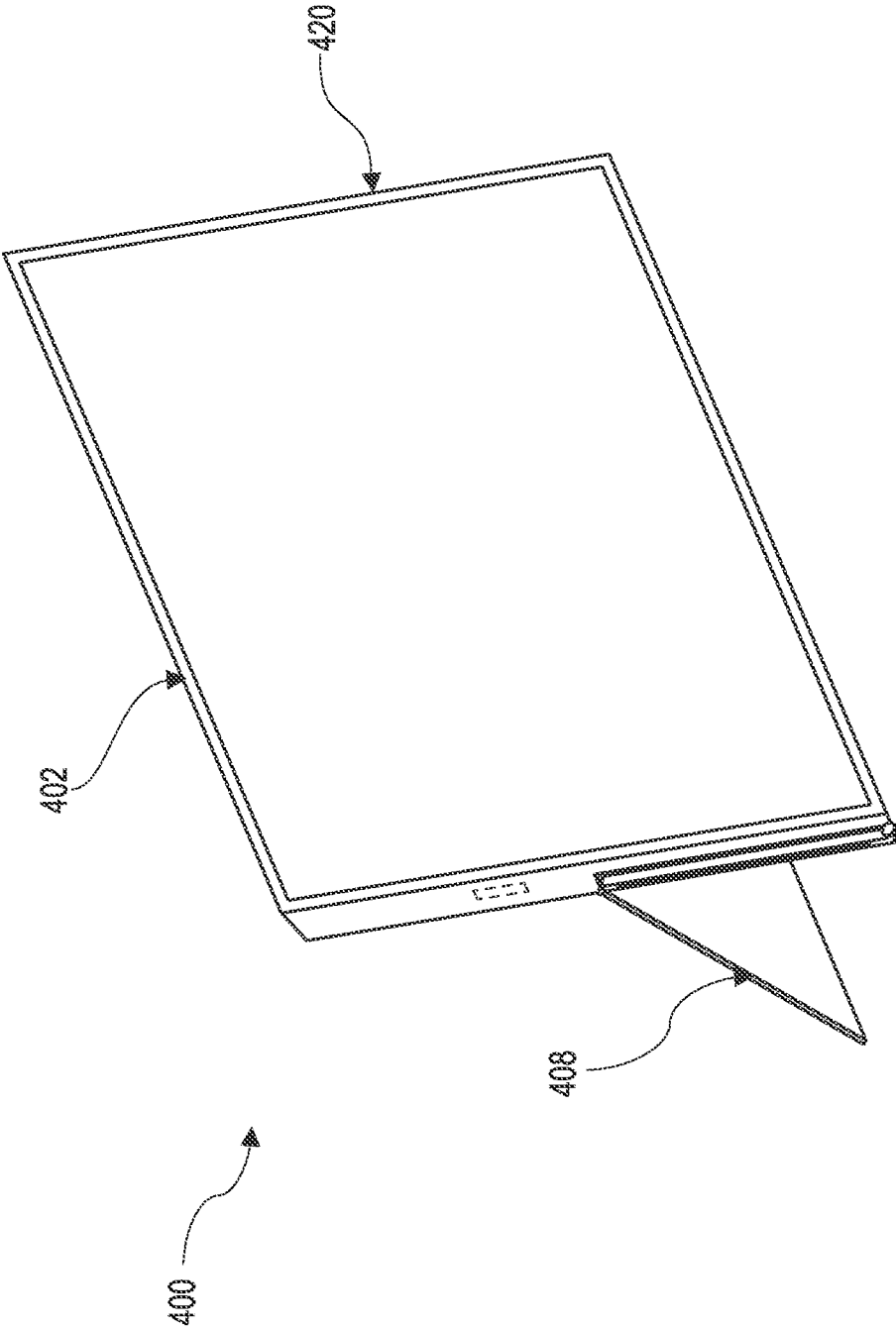


FIG. 4

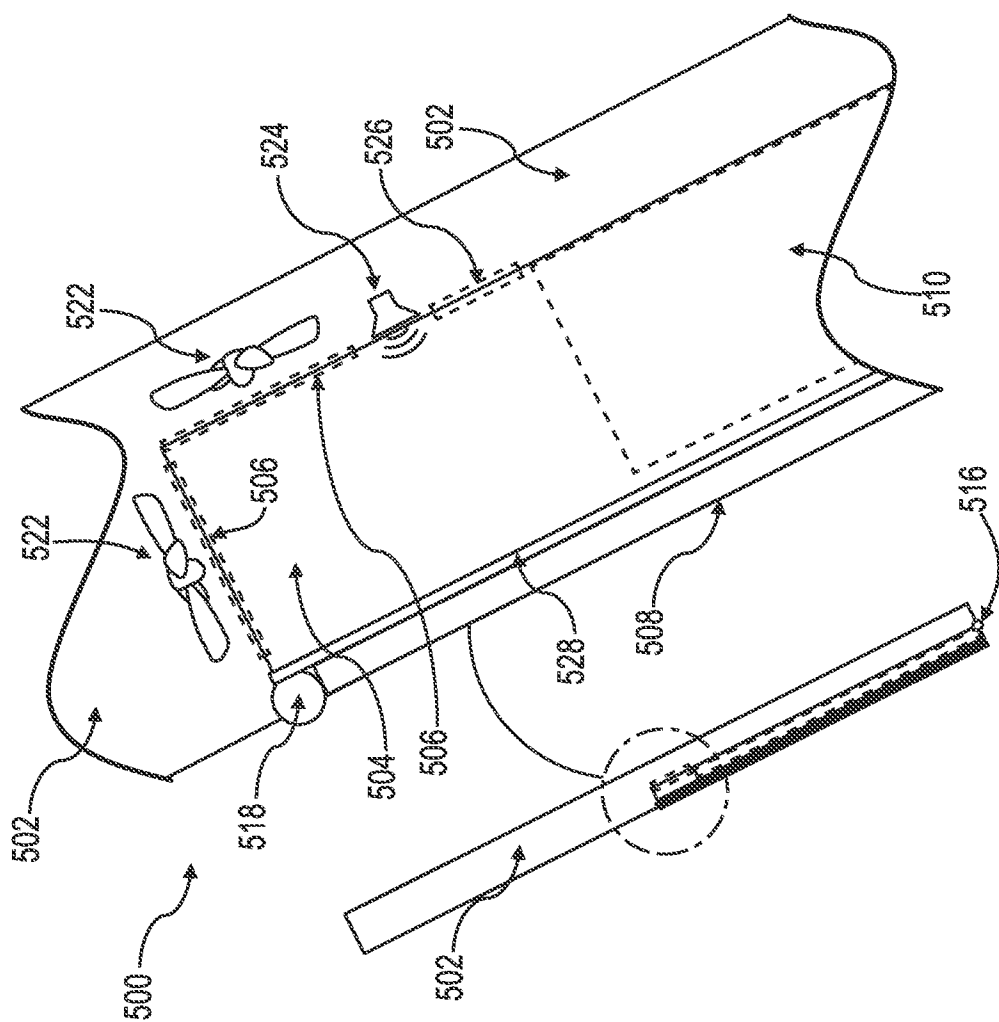


FIG. 5A

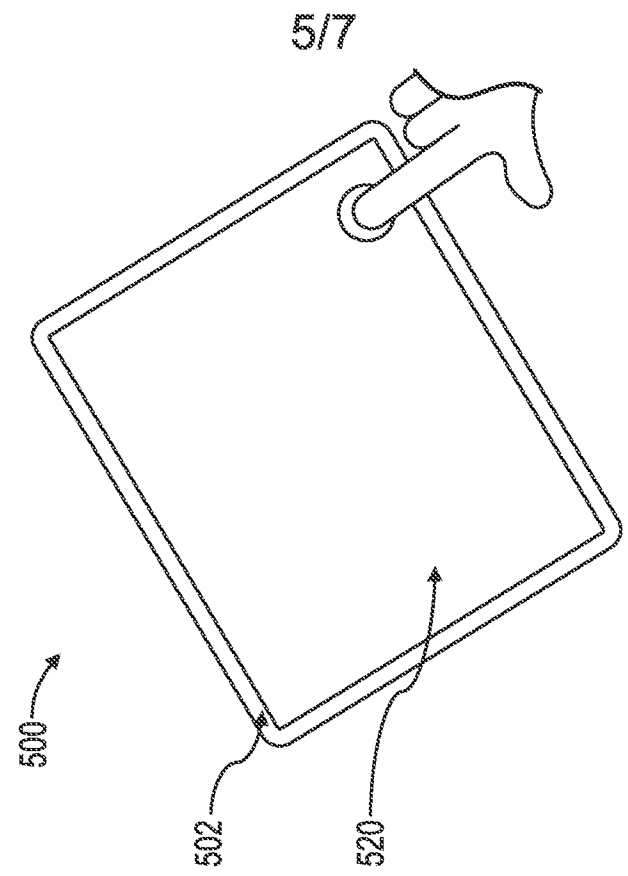


FIG. 5B

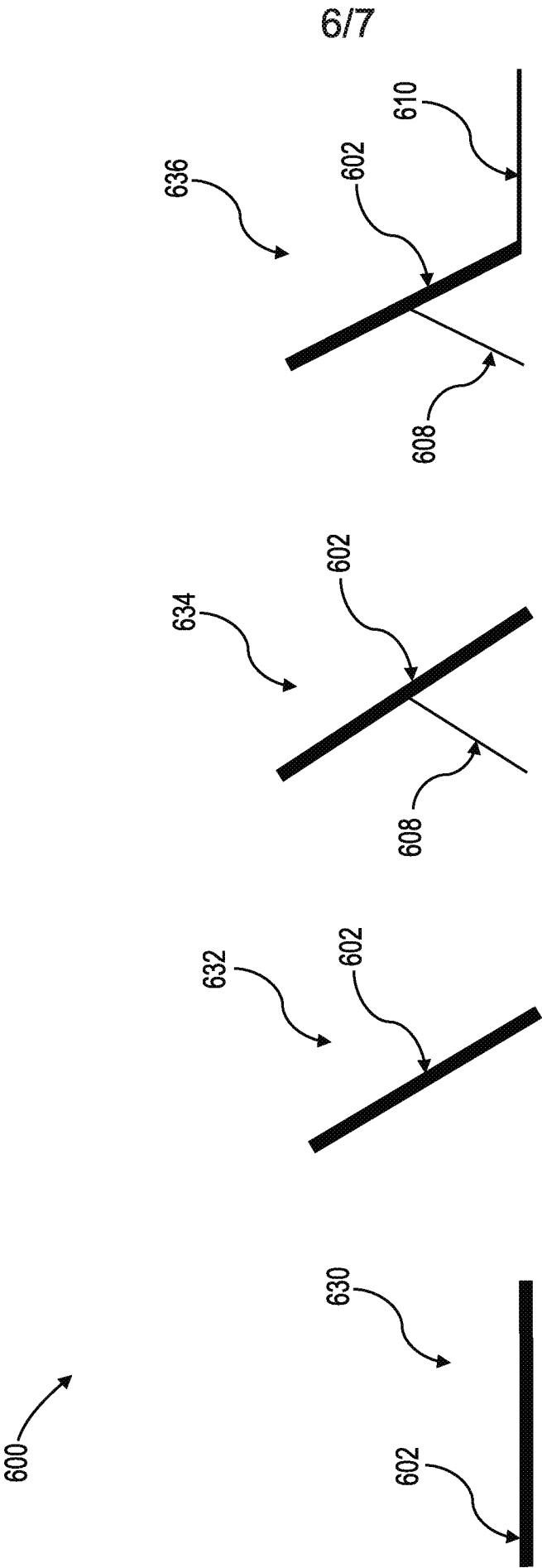


FIG. 6

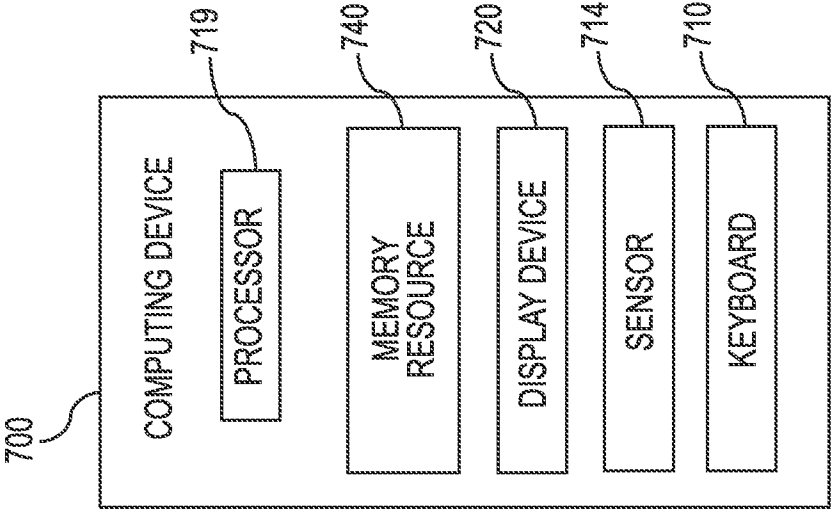


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2020/040241

A. CLASSIFICATION OF SUBJECT MATTER		
G06F 1/16 (2006.01)		
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)		
G06F 1/00, 1/16		
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, Espacenet, 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 Y	US 2015/0022961 A1 (MICROSOFT CORPORATION) 22.01.2015, paragraphs [0001], [0002], [0029], [0082], [0083], drawings 1-3, 5	1-3 4-15
Y	US 2019/0278324 A1 (SAMSUNG ELECTRONICS CO., LTD.) 12.09.2019, paragraphs [0061], [0062], [0063], [0064], [0093], [0095], drawings 4A, 4B, 6	4, 5, 9-15
Y	US 2016/0202734 A1 (RENATO L. SMITH et al.) 14.07.2016, paragraphs [0004], [0006], [0428], [0489], drawings 2, 117-126, 158	6-15
☐ 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 "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	
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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		
Date of the actual completion of the international search	Date of mailing of the international search report	
01 February 2021 (01.02.2021)	18 February 2021 (18.02.2021)	
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Authorized officer M. Koltsova Telephone No. 8(495)531-64-81	