the first guide hole depending on(or based on) rotation of the first housing, and the second protrusion may slide within the second guide hole depending on(or based on) rotation of the second housing.

[7] In certain example embodiments, the protrusion of the hinge structure accommodated in the guide hole of the housing may decrease movement of the housing, thereby reducing and/or preventing damage to a component due to the movement of the housing.

[8] In addition, the disclosure may provide various effects that are directly or indirectly recognized.

【Brief Description of Drawings】

[9] FIG. 1 is a view illustrating a flat state of an electronic device according to an example embodiment.

[10] FIG. 2 is a view illustrating a folded state of the electronic device according to an example embodiment.

[11] FIG. 3 illustrates the inside of the electronic device according to an example embodiment.

[12] FIG. 4 is an exploded perspective view of a hinge structure according to an example embodiment.

[13] FIG. 5 is a front perspective view illustrating a flat state of the hinge structure according to an example embodiment.

[14] FIG. 6 is a back perspective view illustrating a flat state of the hinge structure according to an example embodiment.

[15] FIG. 7 is a perspective view illustrating a folded state of the hinge structure according to an example embodiment.

[16] FIG. 8A is a perspective view of a first arm member according to an embodiment as viewed in one direction.

[17] FIG. 8B is a perspective view of the first arm member according to an example embodiment as viewed in one direction.

[18] FIG. 9 illustrates a first housing according to an example embodiment.

[19] FIG. 10 illustrates the hinge structure and the first housing according to an example embodiment.

[20] FIG. 11 illustrates the first arm member and the first housing according to an example embodiment.

[21] FIG. 12 illustrates the shapes of guide holes and first protrusions according to example embodiments.

[22] FIG. 13 is a view illustrating a rotation operation of rotation members of the hinge structure according to an example embodiment.

[23] FIG. 14 is a view illustrating a rotation operation and a sliding operation of arm members and rotation members of the hinge structure according to an example embodiment.

[24] FIG. 15 is a view illustrating a rotation operation and a sliding operation of the arm members of the hinge structure and plate structures according to an example embodiment.

[25] Fig. 16 is a block diagram illustrating an electronic device in a network environment 1600 according to various example embodiments.

[26] With regard to description of the drawings, identical or similar reference numerals may be used to refer to identical or similar components.

【Mode for Invention】

[27] Hereinafter, various embodiments of the disclosure will be described with reference to accompanying drawings. Accordingly, those of ordinary skill in the art will recognize that modification, equivalent, and/or alternative on the various embodiments described herein can be variously made without departing from the scope and spirit of the disclosure.

[28] FIG. 1 is a view illustrating a flat state of an electronic device according to an example embodiment.

[29] FIG. 2 is a view illustrating a folded state of the electronic device according to an example embodiment.

[30] Referring to FIGS. 1 and 2, the electronic device 1 according to an embodiment may include a foldable housing 50, a hinge cover 53 that covers a foldable portion of the foldable housing, and a flexible or foldable display 10 (hereinafter, abbreviated to the "display" 10) that is disposed in a space formed by the foldable housing 50. In this disclosure, a surface on which the display 10 is disposed is defined as a first surface or a front surface of the electronic device 1. A surface facing away from the front surface is defined as a second surface or a rear surface of the electronic device 1. A surface surrounding a space between the front surface and the rear surface is defined as a third surface or a side surface of the electronic device 1.

[31] In an embodiment, the foldable housing 50 may include a first housing 51 (or, a "first housing structure" 51), a second housing 52 (or, a "second housing structure" 52) including a sensor area 24, a first back cover 58, and a second back cover 59. The foldable housing 50 of the electronic device 1 is not limited to the form and coupling illustrated in FIGS. 1 and 2 and may be

the second hinge structure 300-2 may be folded or unfolded.

[57] FIG. 4 is an exploded perspective view of a hinge structure according to an embodiment. FIG. 5 is a front perspective view illustrating a flat state of the hinge structure according to an embodiment. FIG. 6 is a back perspective view illustrating a flat state of the hinge structure according to an embodiment. FIG. 7 is a perspective view illustrating a folded state of the hinge structure according to an embodiment.

[58] In FIGS. 4, 5, 6, and 7, an axial direction AX including a first direction ① and a second direction ② opposite to the first direction ① may be defined. The axial direction AX may be a direction substantially parallel to the direction in which the folding axis A of FIG. 3 extends. The axial direction AX may be a direction substantially parallel to the extension direction of the first rotational axis R1 and/or the second rotational axis R2 of FIG. 1. The axial direction AX may be a direction substantially parallel to the y-axis direction of FIG. 3. The first direction ① of the axial direction AX may be a direction toward the outside from a center inside the electronic device 1 of FIG. 3. The second direction ② of the axial direction AX may be a direction toward the center inside the electronic device 1 from outside the electronic device 1 of FIG. 3. The first direction ① of the axial direction AX may be a direction toward a hinge bracket 430 from a third support member 470 of the hinge structure 400, and the second direction ② of the axial direction AX may be a direction toward the third support member 470 from the hinge bracket 430 of the hinge structure 400.

[59] Referring to FIGS. 4, 5, 6, and 7, the hinge structure 400 according to an embodiment (e.g., the first hinge structure 300-1 or the second hinge structure 300-2 of FIG. 3) may include the hinge bracket 430, a first shaft member 441,

[68] In an embodiment, the hinge bracket 433, the first support member 435, a first part 461 of a second arm member 460, the first cam member 480, a third elastic member 433, the second support member 475, a second part 462 of the second arm member 460, the second cam member 490, a fourth elastic member 434, the third support member 470, a second stopping member 4482, and the second fixing ring 4492 may be coupled to the second shaft member 442 in the order of the second direction ②.

[69] In an embodiment, the gear structure may include a first gear 443, a second gear 444, and connecting gears 445. In an embodiment, the first gear 443 may be formed on an outer circumferential surface of one end portion (e.g., the end portion facing in the first direction ①) of the first shaft member 441. In an embodiment, the second gear 444 may be formed on an outer circumferential surface of one end portion (e.g., the end portion facing in the first direction ①) of the second shaft member 442. In an embodiment, the first gear 443 and the second gear 444 may at least partially face each other. In an embodiment, the connecting gears 445 may be located between the first gear 443 and the second gear 444 and may be engaged with the first gear 443 and the second gear 444. In an embodiment, the connecting gears 445 may be connected to the hinge bracket 430 and the first support member 435 so as to be rotatable. For example, end portions of rotary shafts of the connecting gears 445 in the first direction ① may be rotatably seated on the hinge bracket 430, and end portions of the rotary shafts of the connecting gears 445 in the second direction ② may be rotatably accommodated in holes formed in the first support member 435. In an embodiment, rotation of the first shaft member 441 and rotation of the second shaft member 442 may be interlocked with each other through the gear structure.

462 of the second arm member 460 are penetrated by the second shaft member 442. In an embodiment, the second arm member 460 may be constrained to rotation of the second shaft member 442 and may rotate together with the second shaft member 442.

[83] In an embodiment, the second arm member 460 may be coupled to the second rotation member 420 so as to slide relative to the second rotation member 420. For example, the second arm member 460 may include the second sliding pin 465 that passes through a third part 463 and that is fixedly coupled to the second arm member 460. An end portion of the second sliding pin 465 in the first direction ① may be accommodated in the second sliding groove 425 of the second rotation member 420, and an end portion of the second sliding pin 465 in the second direction ② may protrude outward (e.g., in the second direction ②) from the third part 463 of the second arm member 460. A fixing ring 4651 may be coupled to the end portion of the second sliding pin 465 that faces in the second direction ② and may prevent or reduce separation of the second sliding pin 465. In an embodiment, the second arm member 460 and the second rotation member 420 may slide relative to each other through the second sliding pin 465 fixedly coupled to the second arm member 460 and connected to the second rotation member 420 so as to move in the second sliding groove 425. For example, when the second rotation member 420 rotates about the second rotational axis R2, the second arm member 460 may rotate about the second shaft member 442 and may simultaneously slide relative to the second rotation member 420 in the state in which the second sliding pin 465 is accommodated in the second sliding groove 425.

[84] In an embodiment, the hinge structure 400 may include a torque structure

surface corresponding to the first guide holes 930-3 and 930-4 such that the first protrusion is accommodated in the first guide holes 930-3 and 930-4 and movable in the first guide holes 930-3 and 930-4.

[126] Referring to reference numeral 1207 of FIG. 12, a first guide hole 930-5 may include portions extending substantially perpendicular to the axial direction AX and portions obliquely extending based on the axial direction AX. For example, a fifth edge 9305 and a sixth edge 9306 of the first guide hole 930-5 may extend substantially perpendicular to the axial direction AX, and a third edge 9303 and a fourth edge 9304 of the first guide hole 930-5 may obliquely extend based on the axial direction AX. In an embodiment, the third edge 9303 and the fourth edge 9304 may become closer to each other as the distance from a first edge 9301 increases. The fifth edge 9305 and the sixth edge 9306 may be substantially parallel to each other. In an embodiment, the length of the fifth edge 9305 and/or the length of the sixth edge 9306 may be substantially the same as, or greater than, the radius R of a first protrusion 850-5 accommodated in the first guide hole 930-5.

[127] The shapes of the first guide hole 930 and the first protrusion 850 described above are not limited by the illustrated embodiments, and various design changes may be possible. For example, non-illustrated embodiments applicable by those skilled in the art or combinations of the illustrated embodiments may be possible.

[128] The description provided with reference to FIG. 12 may be substantially identically, similarly, or correspondingly applied to the second guide hole 940 formed in the second plate structure 522 and the second protrusion 860 formed on the second arm member 560.

[129] FIG. 13 is a view illustrating a rotation operation of rotation members of the hinge structure according to an embodiment. FIG. 13 may correspond to line A-A' of FIG. 6.

[130] FIG. 13 (a) is a view illustrating the hinge structure 400 in a flat state. FIG. 13 (b) is a view illustrating the hinge structure 400 in a folded state. FIG. 13 (c) is a view illustrating the hinge structure 400 in a fully folded state.

[131] In an embodiment, the first guide rail 4301 and the second guide rail 4302 may be formed on the hinge bracket 430. In an embodiment, the first guide rail 4301 may have a substantially arc shape. For example, the center of the arc of the first guide rail 4301 may coincide with the first rotational axis R1. That is, the first guide rail 4301 may guide the first rotation member 410 such that the first rotation member 410 rotates along a rotational path whose center coincides with the first rotational axis R1.

[132] In an embodiment, the second guide rail 4302 may have a substantially arc shape. For example, the center of the arc of the second guide rail 4302 may coincide with the second rotational axis R2. That is, the second guide rail 4302 may guide the second rotation member 420 such that the second rotation member 420 rotates along a rotational path whose center coincides with the second rotational axis R2.

[133] In an embodiment, the first rotation member 410 may include the first extending part 412 and the first guide part 411. The first guide part 411 may have a substantially cylindrical shape. For example, the cross-section of the first guide part 411 may have a substantially arc shape. In an embodiment, the first rotation member 410 may rotate about the first rotational axis R1 in the state in which the first guide part 411 is accommodated in the first guide rail 4301 of

the hinge bracket 430. For example, when the first extending part 412 is folded or unfolded together with the first housing 51, the first rotation member 410 may rotate along the rotational path having an arc shape whose center coincides with the first rotational axis R1.

[134] In an embodiment, the second rotation member 420 may include the second extending part 422 and the second guide part 421. The second guide part 421 may have a substantially cylindrical shape. For example, the cross-section of the second guide part 421 may have a substantially arc shape. In an embodiment, the second rotation member 420 may rotate about the second rotational axis R2 in the state in which the second guide part 421 is accommodated in the second guide rail 4302. For example, when the second extending part 422 is folded or unfolded together with the second housing 52, the second rotation member 420 may rotate along the rotational path having an arc shape whose center coincides with the second rotational axis R2.

[135] FIG. 14 is a view illustrating a rotation operation and a sliding operation of the arm members and the rotation members of the hinge structure according to an embodiment.

[136] FIG. 15 is a view illustrating a rotation operation and a sliding operation of the arm members of the hinge structure and the plate structures according to an embodiment.

[137] FIG. 14 (a) and FIG. 15 (a) are views illustrating the hinge structure 400 in a flat state. FIG. 14 (b) and FIG. 15 (b) are views illustrating the hinge structure 400 in a folded state. FIG. 14 (c) and FIG. 15 (c) are views illustrating the hinge structure 400 in a fully folded state. In FIG. 14, for convenience of description, protrusions (e.g., the protrusions 850 and 860 of FIG. 15) formed

on the arm members 450 and 460 are omitted.

[138] Referring to FIG. 14, when the hinge structure 400 is folded or unfolded, the rotation members 410 and 420 and the arm members 450 and 460 may rotate about different axes. For example, the rotation members 410 and 420 and the arm members 450 and 460 may rotate along different rotational paths. Due to the difference in the rotational path between the rotation members 410 and 420 and the arm members 450 and 460, the arm members 450 and 460 may slide when the hinge structure 400 is folded or unfolded.

[139] In an embodiment, the first rotation member 410 may rotate about the first rotational axis R1 in a first rotational direction. For example, in a folding operation, the first rotation member 410 may rotate in the clockwise direction. For example, based on the flat state, a point where the first sliding pin 455 is located in the first rotation member 410 may be defined as a first point A1. In folding and unfolding operations, the first point A1 of the first rotation member 410 may move along a first rotational path P1.

[140] In an embodiment, the first arm member 450 and the first sliding pin 455 may rotate about the first shaft member 441. For example, in a folding operation, the first arm member 450 and the first sliding pin 455 may rotate in the clockwise direction. For example, in the flat state, the first sliding pin 455 may be located at the first point A1, and in the folded state, the first sliding pin 455 may be located between the first point A1 and the hinge bracket 430. The first sliding pin 455 may move along a second rotational path P2 in folding and unfolding operations. In an embodiment, when a folding operation is performed in the flat state, the distance between the first sliding pin 455 and the first point A1 may increase. When an unfolding operation is performed in the fully folded