waterproof member 330a and/or the second waterproof member 340a may be made of an elastic material, such as polymer or injection-molded material, or strong material such as metal. The first elastic waterproof member 330a may be deformed along the shape of a wall surface of the first through-hole 380. The elastic second waterproof member 340a may be deformed along the shape of another wall surface of the first through-hole 380. The first waterproof member 330a may be in close contact between one surface (e.g., surfaces in the +X direction of FIG. 4A) of the flexible circuit board 370 and the first housing 356. The second waterproof member 340a may be separated from the first waterproof member 330a with the flexible circuit board 370 interposed therebetween. The second waterproof member 340a may be in close contact between other surface (e.g., surfaces in the -X direction of FIG. 4A) of the flexible circuit board 370 and the first housing 356. The third waterproof member 330b may be in close contact between one surface of the flexible circuit board 370 and the second housing 366. The fourth waterproof member 340b may be separated from the third waterproof member 330b with the flexible circuit board 370 interposed therebetween. The fourth waterproof member 340b may be in close contact between other surface of the flexible circuit board 370 and the second housing 366. The first waterproof member 330a and the second waterproof member 340a may be deformed to be attached to each other while the flexible circuit board 370 is interposed therebetween. The first waterproof member 330a and the second waterproof member 340a may block a space between the flexible circuit board 370 and the first housing 350 without having any apertures. Accordingly, fluids may be

prevented from penetrating between the flexible circuit board 370 disposed in the first through-hole 380 and the first housing 350. Materials of the first waterproof member 330a and the second waterproof member 340a according to an embodiment may be the same or different. For example, the first waterproof member 330a and/or the second waterproof member 340a may be made of materials of different elasticity degrees.

[0077] The first sealing member 310a may be inserted into (or filled in) the area between the first waterproof member 330a and the second waterproof member 340a, and the flexible circuit board 370. The first sealing member 310a may be inserted into (or filled in) the area between the first waterproof member 330a, the second waterproof member 340a, and the first housing 350. Alternatively, the first sealing member 310a may be inserted (or filled) between the first waterproof member 330a and the second waterproof member 340a. The first sealing member 310a may be formed by solidifying a material having a viscosity that is lower than those of the first waterproof member 330a and the second waterproof member 340a. According to an embodiment, the first sealing member 310a may be formed by applying a cured in-place gasket (CIPG) in liquid form to the first through-hole 380 and optically curing and solidifying it. According to an embodiment, the first sealing member 310a may be cured through thermal curing, through wet curing, or by applying a curing agent such as a releasing liquid. According to an embodiment, the first sealing member 310a may overlap the first waterproof member 330a and the second waterproof member 340a in the depth direction (e.g., the +Z direction) of the first through-hole

380. The third sealing member 310b may overlap the third waterproof member 330b and the fourth waterproof member 340b in the depth direction (e.g., the +Z direction) of the second through-hole 390.

[0078] According to an embodiment, during the process of applying the first sealing member 310a, the application area of the first sealing member 310a, which at the time is liquid, may be limited by the first waterproof member 330a and the second waterproof member 340a. Accordingly, the first sealing member 310a may be prevented from being applied to areas outside the first through-hole 380, or leakage of the first sealing member 310a to outside the first through-hole 380may be minimized.

[0079] According to an embodiment, a sub-display or a first rear cover 450, as illustrated in FIG. 4B of the first housing 350, may be disposed on the rear surface (e.g., the surface in the -Z direction of FIG. 3B), and the sub-display or a second rear cover 460 may be disposed on the rear surface of the second housing 360. The first rear cover 450 and the second rear cover 460 may cover the flexible circuit board 370 to prevent the flexible circuit board 370 from being exposed through the rear surface of the electronic device 300. A cover waterproofing member 470 may be disposed between a first hinge cover area 356 of the first housing 350 and the first rear cover 450, and between a second hinge cover area 366 of the second housing 360 and the second rear cover 460. The cover waterproofing member 470 may stably provide waterproofing by preventing fluids from being introduced toward the flexible circuit board 370.

[0080] According to an embodiment, the electronic device 300

may be classified into a waterproof area WPA and a non-waterproof area WA by the first waterproof structure 410a and the second waterproof structure 410b. For example, a dashed area in FIG. 4B may be the waterproof area WPA, and the remaining area may be the non-waterproof area WA.

[0081] The non-waterproof area WA may overlap the first cover area 356 and the second cover area 366 disposed between the first through-hole 380 and the second through-hole 390, and the waterproof area WPA may be the area outside the non-waterproof area WA. Because the waterproof area WPA may be enclosed without any aperture by the first waterproof structure 410a and the second waterproof structure 410b, stable waterproofing and dustproofing may be provided.

[0082] The electronic device 300 according to an embodiment may include the first support bracket 320a and the second support bracket 320b that support the flexible circuit board 370. The first support bracket 320a may be assembled to fit with the first waterproof member 330a, may be coupled to the first waterproof member 330a via a bonding layer 306, or may be integrally injection-molded with the first waterproof member 330a. Because the first support bracket 320a is made of a relatively strong material (e.g. metal), the first waterproof member 330a may be smoothly assembled when being

【CLAIMS】

1. An electronic device comprising:

a first housing including a first through-hole;

a second housing including a second through-hole;

at least one flexible circuit board passing via the first through-hole and the second through-hole;

a first support bracket disposed between the at least one flexible circuit board and a display to support the at least one flexible circuit board while covering the first through-hole;

a second support bracket disposed between the at least one flexible circuit board and the display to support the at least one flexible circuit board while covering the second through-hole;

a first waterproof member disposed to face a partial area of the first through-hole from the first support bracket and inserted into the partial area of the first through-hole;

a second waterproof member facing the first waterproof member while the at least one flexible circuit board is interposed therebetween, and inserted into remaining areas of the first through-hole;

a third waterproof member disposed to face a partial area of the second through-hole from the second support bracket and inserted into the partial area of the second

through-hole;

a fourth waterproof member facing the third waterproof member while the at least one flexible circuit board is interposed therebetween, and inserted into remaining areas of the second through-hole;

a first sealing member disposed on the first waterproof member and the second waterproof member; and

a second sealing member disposed on the third waterproof member and the fourth waterproof member.

2. The electronic device of claim 1, wherein the first waterproof member is integrally formed with the first support bracket or is assembled in the first support bracket, and

wherein the third waterproof member is integrally formed with the second support bracket or is assembled in the second support bracket.

3. The electronic device of claim 1, wherein portions of the first waterproof member and the second waterproof member face each other with the at least one flexible circuit board being interposed therebetween;

wherein remaining portions of the first waterproof member and the second waterproof member face each other while the at least one flexible circuit board is absent in the

remaining portions of the first waterproof member and the second waterproof member;

wherein portions of the third waterproof member and the fourth waterproof member face each other with the at least one flexible circuit board being interposed therebetween; and

wherein remaining portions of the third waterproof member and the fourth waterproof member face each other while the at least one flexible circuit board is absent in the remaining portions of the third waterproof member and the fourth waterproof member.

4. The electronic device of claim 3, wherein thicknesses of the portions of the first waterproof member and the second waterproof member are larger than thicknesses of the remaining portions of the first waterproof member and the second waterproof member, and

wherein thicknesses of areas of the portions of the third waterproof member and the fourth waterproof member are larger than thicknesses of the remaining portions of the third waterproof member and the fourth waterproof member.

5. The electronic device of claim 3, wherein the first sealing member is disposed on the remaining portions of the first waterproof member and the second waterproof member, and

wherein the second sealing member is disposed on the remaining portions of the third waterproof member and the fourth waterproof member.

6. The electronic device of claim 5, wherein the first sealing member is disposed on a first contact point area between an interface of the first waterproof member and the second waterproof member, and a side surface of the at least one flexible circuit board,

wherein the first sealing member is disposed on a second contact point area between the interface of the first waterproof member and the second waterproof member, and the first housing,

wherein the second sealing member is disposed on a third contact point area between an interface of the third waterproof member and the fourth waterproof member, and a side surface of the at least one flexible circuit board, and

wherein the second sealing member is disposed on a fourth contact point area between the interface of the third waterproof member and the fourth waterproof member, and the second housing.

7. The electronic device of claim 1, wherein, in a viewing direction of the display,

each of the first waterproof member and the third waterproof member has a “U” shape to cover a partial area of the at least one flexible circuit board,

at least a partial area of the second waterproof member is disposed in the “U” shape of the first waterproof member to be covered by the at least one flexible circuit board, and

at least a partial area of the fourth waterproof member is disposed in the “U” shape of the third waterproof member to be covered by the at least one flexible circuit board.

8. The electronic device of claim 1, wherein the first waterproof member is in close contact between one surface of the flexible circuit board and the first housing,

wherein the second waterproof member is in close contact between other surface of the flexible circuit board and the first housing,

wherein the third waterproof member is in close contact between one surface of the flexible circuit board and the second housing,

wherein the fourth waterproof member 340b is in close contact between other surface of the flexible circuit board and the second housing,

wherein the first sealing member overlaps the first waterproof member and the second waterproof member in the

depth direction of the first through-hole, and

wherein the third sealing member overlaps the third waterproof member and the fourth waterproof member in the depth direction of the second through-hole.

9. The electronic device of claim 1, further comprising:

a hinge housing disposed between the first housing and the second housing,

wherein the first support bracket and/or the second support bracket overlaps a hinge groove in the hinge housing.

10. The electronic device of claim 1, wherein the first waterproof member and/or the third waterproof member includes:

a plurality of first bosses; and

first insertion grooves at least one of which is disposed between the plurality of first bosses,

wherein the second waterproof member and/or the fourth waterproof member includes:

a plurality of second bosses facing the first bosses; and

second insertion grooves facing the first insertion grooves and at least one of which is disposed between the second bosses, and

wherein the at least one flexible circuit board is disposed in the first and second insertion grooves.

11. The electronic device of claim 1, wherein the first through-hole includes:

a first opening area, in which the first waterproof member is inserted; and

a second opening area, in which the second waterproof member is inserted,

wherein the second through-hole includes:

a third opening area, in which the third waterproof member is inserted; and

a fourth opening area, in which the fourth waterproof member is inserted,

wherein the first waterproof member is disposed between the first support bracket and the at least one flexible circuit board,

wherein the third waterproof member is disposed between the second support bracket and the at least one flexible circuit board, and

wherein the at least one flexible circuit board is disposed between the second waterproof member and the first support bracket, and between the fourth waterproof member and the second support bracket.

12. The electronic device of claim 11, further comprising:

a separation preventing recess disposed in the second opening area and/or the fourth opening area and open to the second opening area and/or the fourth opening area,

wherein the second waterproof member and/or the fourth waterproof member is inserted into the separation preventing recess.

13. The electronic device of claim 1, further comprising:

at least one slot, into which the first sealing member and/or the second sealing member is inserted,

wherein the at least one slot is disposed in the first waterproof member, the second waterproof member, the third waterproof member, the fourth waterproof member, the first housing, and/or the second housing, and is open to the first through-hole and/or the second through-hole.

14. The electronic device of claim 1, wherein the at least one flexible circuit board includes a first flexible area and a second flexible area of different thicknesses, and

wherein a thicker one of the first flexible area and

the second flexible area is disposed between the first waterproof member and the second waterproof member, and disposed between the third waterproof member and the fourth waterproof member.

15. The electronic device of claim 1, wherein the at least one flexible circuit board includes a plurality of flexible films with bonding layers being interposed therebetween, and

wherein the bonding layers are disposed between the first waterproof member and the second waterproof member, and between the third waterproof member and the fourth waterproof member.