【CLAIMS】

【Claim 1】

A foldable electronic device comprising:

a foldable housing comprising a first housing, a second housing, and a hinge part configured to connect the first housing and the second housing;

a flexible display module comprising a third display area corresponding to the hinge part, a first display area extending from the third display area and disposed in the first housing, and a second display area extending from the third display area and disposed in the second housing; and

a flexible film between the foldable housing and the flexible display module,

wherein the hinge part comprises a center plate comprising a recess on one surface thereof, the one surface facing the third display area,

wherein a part or all of the flexible film is flat and supported by the center plate between the third display area and the center plate, and

wherein a part or all of the flexible film overlaps the recess.

【Claim 2】

The foldable electronic device of claim 1, wherein one surface of the center plate facing the third display area comprises a surface area providing the recess, and

wherein, in a state in which the foldable housing is in a folded state, the surface area comprises a curved-surface shape matching a part of a rear surface of the third display area disposed in a bent shape, the part of the rear surface of the third display area being aligned with the surface area.

【Claim 3】

The foldable electronic device of claim 1, wherein the hinge part comprises:

a hinge module comprising a first bracket fixed to the first housing, a second bracket fixed to the second housing, and a bracket connection part configured to connect the first bracket and the second bracket and comprising the center plate; and

a first plate and a second plate each coupled to the bracket connection part,

wherein in an unfolded state of the foldable housing, a first surface of the first plate is configured to support a first part of the third display area, and a second surface of the second plate is configured to support a second part of the third display area,

wherein in the unfolded state of the foldable housing, the flexible film is

configured to support a third part of the third display area, the third part corresponding to a portion between the first surface and the second surface, and

wherein in a folded state of the foldable housing, the first surface and the second surface face each other and are spaced apart from each other, and the third display area is disposed in a bent shape in a space between the first surface, the second surface, and the center plate.

【Claim 4】

The foldable electronic device of claim 3, wherein in the folded state of the foldable housing, the first surface and the second surface are parallel to each other.

【Claim 5】

The foldable electronic device of claim 3, wherein in the folded state of the foldable housing, the first surface and the second surface form an acute angle, and a wideness of a space between the first surface and the second surface increases in a direction toward the center plate.

【Claim 6】

The foldable electronic device of claim 3, wherein, when viewed from above the flexible display module in the unfolded state of the foldable housing, the center plate comprises a third surface between the first surface and the second surface,

wherein, when viewed from above the flexible display module in the unfolded state of the foldable housing, the third surface comprises a first surface area, a second surface area, and a third surface area between the first surface area and the second surface area and comprising the recess, and

wherein the flexible film comprises a first area attached to the first surface area, a second area attached to the second surface area, and a third area connecting the first area and the second area and overlapping the recess.

【Claim 7】

The foldable electronic device of claim 3, wherein when viewed from above the flexible display module in the unfolded state of the foldable housing, the center plate comprises a third surface between the first surface and the second surface and comprising the recess,

wherein when viewed from above the flexible display module in the unfolded

state of the foldable housing, the flexible film overlaps the first surface, the second surface, and the third surface,

wherein the foldable electronic device further comprises a fixation area between the flexible film and the foldable housing and comprising a bonding material or an adhesive material configured to couple the flexible film and the foldable housing, and

wherein the fixation area comprises a first fixation area in at least a first part of the fixation area between the flexible film and the first surface, and a second fixation area in at least a second part of the fixation area between the flexible film and the second surface.

【Claim 8】

The foldable electronic device of claim 3, wherein when viewed from above the flexible display module in the unfolded state of the foldable housing, the center plate comprises a third surface between the first surface and the second surface and comprising the recess,

wherein when viewed from above the flexible display module in the unfolded state of the foldable housing, the flexible film overlaps the first surface, the second surface, the third surface, a first support area of the first housing, and a second support area of the second housing, the first display area being in the first support area, and the second display area being in the second support area,

wherein the foldable electronic device further comprises a fixation area between the flexible film and the foldable housing and comprising a bonding material or an adhesive material configured to couple the flexible film and the foldable housing, and

wherein the fixation area comprises a first fixation area in at least a first part of the fixation area between the flexible film and the first support area, and a second fixation area positioned in at least a second part of the fixation area between the flexible film and the second support area.

【Claim 9】

The foldable electronic device of claim 1, wherein the hinge part comprises:

a center part comprising the center plate;

a first portion connected to the center part and rotatable around a first rotational axis;

a third portion connected to the center part and rotatable around a third rotational axis parallel to the first rotational axis;

a first bracket connected to the first portion and the third portion and fixed to the first housing;

a second portion connected to the center part and rotatable around a second rotational axis;

a fourth portion connected to the center part and rotatable around a fourth rotational axis parallel to the second rotational axis; and

a second bracket connected to the third portion and the fourth portion and fixed to the second housing,

wherein the first rotational axis and the second rotational axis are symmetric to each other with reference to the center part, and the first portion and the second portion are symmetric to each other with reference to the center part,

wherein the third rotational axis and the fourth rotational axis are symmetric to each other with reference to the center part, and the third portion and the fourth portion are symmetric to each other with reference to the center part,

wherein the first portion and the first bracket are connected and slidable relative to each other in a first straight line direction,

wherein the second portion and the second bracket are connected and slidable relative to each other in a second straight line direction symmetric to the first straight line direction with reference to the center part,

wherein the third portion and the first bracket are connected and rotatable relative to each other with reference to a fifth rotational axis parallel to the first rotational axis,

wherein the fourth portion and the second bracket are connected and rotatable relative to each other with reference a sixth rotational axis parallel to the second rotational axis, and

wherein the fifth rotational axis and the sixth rotational axis are symmetric to each other with reference to the center part.

【Claim 10】

The foldable electronic device of claim 9, wherein the hinge part comprises a first plate connecting the first bracket and the first portion, a second plate connecting the second bracket and the second portion, a first pin in the first portion, and a second pin in the second portion,

wherein the first plate is connected to the first bracket and rotatable around a seventh rotational axis parallel to the first rotational axis, and comprises a first pin rail corresponding to the first pin,

wherein the second plate is connected to the second bracket and rotatable around an eighth rotational axis symmetric to the seventh rotational axis with reference to the center part, and is symmetric to the first pin rail with reference to the center part, and comprises a second pin rail corresponding to the second pin,

wherein in an unfolded state of the foldable housing, a first surface of the first plate is configured to support a first part of the third display area, and a second surface of the second plate is configured to support a second part of the third display area,

wherein in the unfolded state of the foldable housing, the flexible film is configured to support a third part of the third display area, the third part corresponding to a portion between the first surface and the second surface, and

wherein in a folded state of the foldable housing, the first surface and the second surface face each other and are spaced apart from each other, and the third display area is disposed in a bent shape in a space between the first surface, the second surface, and the center plate.

【Claim 11】

The foldable electronic device of claim 1, wherein the hinge part comprises:

a center part comprising the center plate;

a first portion connected to the center part and rotatable around a first rotational axis;

a third portion connected to the center part and rotatable around a third rotational axis parallel to the first rotational axis;

a first bracket connected to the first portion and the third portion and fixed to the first housing;

a second portion connected to the center part and rotatable around a second rotational axis;

a fourth portion connected to the center part and rotatable around a fourth rotational axis parallel to the second rotational axis; and

a second bracket connected to the third portion and the fourth portion and fixed to the second housing,

wherein the first rotational axis and the second rotational axis are symmetric

to each other with reference to the center part, and the first portion and the second portion are symmetric to each other with reference to the center part,

wherein the third rotational axis and the fourth rotational axis are symmetric to each other with reference to the center part, and the third portion and the fourth portion are symmetric to each other with reference to the center part,

wherein the first portion and the first bracket are connected and slidable relative to each other in a first straight line direction,

wherein the second portion and the second bracket are connected and slidable relative to each other in a second straight line direction symmetric to the first straight line direction with reference to the center part,

wherein the third portion and the first bracket are connected and slidable relative to each other in a third straight line direction different from the first straight line direction, and

wherein the fourth portion and the second bracket are connected and slidable relative to each other in a fourth straight line direction symmetric to the third straight line direction with reference to the center part.

【Claim 12】

The foldable electronic device of claim 11, wherein the hinge part comprises a first plate coupled to the third portion and a second plate coupled to the fourth portion,

wherein in an unfolded state of the foldable housing, a first surface of the first plate is configured to support a first part of the third display area, and a second surface of the second plate is configured to support a second part of the third display area,

wherein in the unfolded state of the foldable housing, the flexible film is configured to support a third part of the third display area, the third part corresponding to a portion between the first surface and the second surface, and

wherein in a folded state of the foldable housing, the first surface and the second surface face each other and are spaced apart from each other, and the third display area is disposed in a bent shape in a space between the first surface, the second surface, and the center plate.

【Claim 13】

The foldable electronic device of claim 11, wherein the hinge part comprises

a first connection part connecting the first bracket and the third portion, a second connection part connecting the second bracket and the fourth portion, a first plate coupled to the first connection part, and a second plate coupled to the second connection part,

wherein the first connection part is connected to the first bracket and rotatable around a fifth rotational axis parallel to the first rotational axis, and comprises a first pin in a first pin rail in the third portion,

wherein the second connection part is connected to the second bracket and be rotatable around a sixth rotational axis symmetric to the fifth rotational axis with reference to the center part, and comprises a second pin positioned in a second pin rail in the fourth portion to be symmetric to the first pin rail with reference to the center part,

wherein in an unfolded state of the foldable housing, a first surface of the first plate is configured to support a first part of the third display area, and a second surface included of the second plate is configured to support a second part of the third display area,

wherein in the unfolded state of the foldable housing, the flexible film is configured to support a third part of the third display area, the third part corresponding to a portion between the first surface and the second surface, and

wherein in a folded state of the foldable housing, the first surface and the second surface face each other and are spaced apart from each other, and the third display area is disposed in a bent shape in a space between the first surface, the second surface, and the center plate.

【Claim 14】

The foldable electronic device of claim 1, wherein the flexible film comprises a lattice structure comprising a plurality of openings corresponding to the third display area.

【Claim 15】

The foldable electronic device of claim 1, wherein the flexible display module comprises a flexible display and a support sheet disposed on a rear surface of the flexible display, and

wherein the support sheet comprises a lattice structure comprising a plurality of openings corresponding to the third display area.