1. (US20190027703) FOLDABLE DISPLAY APPARATUS

Note: Text based on automatic Optical Character Recognition processes. Please use the PDF version for legal matters

Claims

1. A case assembly for a foldable display device, the case assembly comprising:

a first case;

a second case spaced apart from the first case;

a concave-convex type link member located between the first case and the second case; and

a sliding structure combined with the second case,

wherein the sliding structure is combined with the second case such that the sliding structure relatively moves with respect to the second case in a second direction opposite to a first direction in which the second case relatively moves with respect to the sliding structure,

wherein the second direction is towards the concave-convex type link member or away from the concave-convex type link member,

wherein the first case has a first side and a second side opposite to the first side, the concave-convex type link member has a third side and a fourth side opposite to the third side, and the second case has a fifth side and a sixth side opposite to the fifth side,

wherein, when the concave-convex type link member is unfolded, the first side of the first case, the third side of the concave-convex type link member, and the fifth side of the second case are at a same side and the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case are at a same side,

wherein the sliding structure comprises a first guiding part,

wherein the second case comprises a second guiding part,

wherein for the concave-convex type link member to be unfolded or folded, the first guiding part and the second guiding part are combined with each other such that the sliding structure and the second case guide each other and relatively move in opposite directions to each other,

wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, one of the first guiding part and the second guiding part is inserted in the other one of the first and second guiding parts,

wherein the sliding structure comprises a first portion expanding in parallel with the fifth side of the second case and a second portion connected to and expanding perpendicularly to the first portion; and

wherein the first guiding part is located at the second portion.

2. The case assembly of **claim 1**, wherein when the concave-convex type link member is unfolded, the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case are substantially planar.

3. The case assembly of **claim 1**, wherein the concave-convex type link member comprises a plurality of connectors connected to each other, and

wherein a width of each of plurality of the connectors increases in a direction from the third side of the concave-convex type link member to the fourth side of the concave-convex type link member.

4. The case assembly of **claim 3**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the concave-convex type link member has a substantially semicircular cross-section.

5. The case assembly of **claim 1**, wherein when the concave-convex type link member is unfolded, the fourth side of the concave-convex type link member is relatively planar compared to the third side of the concave-convex type link member.

6. The case assembly of **claim 1**, wherein at least a portion of the sliding structure is a rigid plate.

7. The case assembly of **claim 1**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the first guiding part is inserted in the second guiding part.

8. The case assembly of **claim 1**, wherein the concave-convex type link member comprises a metal.

9. (canceled)

10. The case assembly of **claim 1**, wherein when the concave-convex type link member is unfolded, the concave-convex type link member and the sliding structure overlap with each other.

11. The case assembly of **claim 10**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the concave-convex type link member and the sliding structure do not overlap with each other.

12. The case assembly of **claim 1**, wherein for the concave-convex type link member to be unfolded, the sliding structure is relatively moved with respect to the second case in the second direction towards the concave-convex type link member.

13. The case assembly of **claim 12**, wherein for the concave-convex type link member to be folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the sliding structure is relatively moved with respect to the second case in the second direction away from the concave-convex type link member.

14. The case assembly of **claim 1**, wherein the sliding structure is rotatably connected to the first case.

15. A foldable display device, comprising:

a first case;

a second case spaced apart from the first case;

a concave-convex type link member located between the first case and the second case; and

a sliding structure combined with the second case,

wherein the sliding structure is combined with the second case such that the sliding structure relatively moves with respect to the second case in a second direction opposite to a first direction in which the second case relatively moves with respect to the sliding structure,

wherein the second direction is towards the concave-convex type link member or away from the concave-convex type link member,

wherein the first case has a first side and a second side opposite to the first side, the concave-convex type link member has a third side and a fourth side opposite to the third side, and the second case has a fifth side and a sixth side opposite to the fifth side,

wherein when the concave-convex type link member is unfolded, the first side of the first case, the third side of the concave-convex type link member, and the fifth side of the second case are on a same side and the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case are on same side,

wherein the sliding structure comprises a first guiding part,

wherein the second case comprises a second guiding part,

wherein for the concave-convex type link member to be unfolded or folded, the first guiding part and the second guiding part are combined with each other such that the sliding structure and the second case guide each other and relatively move in opposite directions to each other,

wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, one of the first guiding part and the second guiding part is inserted in the other one of the first and second guiding parts,

wherein a flexible display panel is continuously located on the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case, the flexible display panel having a seventh side facing the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case, and an eighth side opposite to the seventh side,

wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, a portion of the eighth side of the flexible display panel corresponding to the concave-convex type link member has a tensile force,

wherein the sliding structure comprises a first portion expanding in parallel with the fifth side of the second case and a second portion connected to and expanding perpendicularly to the first portion, and

wherein the first guiding part is located at the second portion.

16. The foldable display device of **claim 15**, wherein when the concave-convex type link member is unfolded, the second side of the first case, the fourth side of the concave-convex type link member, and the sixth side of the second case are substantially planar.

17. The foldable display device of **claim 15**, wherein the concave-convex type link member comprises a plurality of connectors connected to each other, and

wherein a width of each of the plurality of connectors increases in a direction from the third side of the concave-convex type link member to the fourth side of the concave-convex type link member.

18. The foldable display device of **claim 17**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the concave-convex type link member has a substantially semicircular cross-section.

19. The foldable display device of **claim 15**, wherein when the concave-convex type link member is unfolded, the fourth side of the concave-convex type link member is relatively more planar than the third side of the concave-convex type link member.

20. The foldable display device of **claim 15**, wherein at least a portion of the sliding structure is a rigid plate.

21. The foldable display device of **claim 15**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the first guiding part is inserted in the second guiding part.

22. The foldable display device of **claim 15**, wherein the concave-convex type link member comprises a metal.

23. (canceled)

24. The foldable display device of **claim 15**, wherein when the concave-convex type link member is unfolded, the concave-convex type link member and the sliding structure overlap with each other.

25. The foldable display device of **claim 24**, wherein when the concave-convex type link member is folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the concave-convex type link member and the sliding structure do not overlap each other.

26. The foldable display device of **claim 15**, wherein for the concave-convex type link member to be unfolded, the sliding structure is relatively moved in the second direction towards the concave-convex type link member.

27. The foldable display device of **claim 26**, wherein for the concave-convex type link member to be folded such that the second side of the first case and the sixth side of the second case are opposite to each other and the first side of the first case and the fifth side of the second case face each other, the sliding structure is relatively moved with respect to the second case in the second direction away from the concave-convex type link member.

28. The foldable display device of **claim 15**, wherein the sliding structure is rotatably connected to the first case.

29. A case assembly for a foldable display device, the case assembly comprising:

a first case;

a second case spaced apart from the first case;

a concave-convex type link member between the first case and the second case; and

a sliding structure combined with the second case such that the sliding structure is slidable with respect to the second case,

wherein the sliding structure comprises a first guiding part,

wherein the second case comprises a second guiding part, and

wherein when the concave-convex type link member is unfolded or folded, the first guiding part and the second guiding part are combined with each other such that the sliding structure and the second case guide each other and relatively move in opposite directions to each other,

wherein the sliding structure comprises a first portion expanding in parallel with a side of the second case and a second portion connected

to and expanding perpendicularly to the first portion; and

wherein the first guiding part is located at the second portion.