

CLAIMS

What is claimed is:

1. A rollable display comprising:
 - a flexible display panel;
 - at least one BRC (Bistable Reeled Composite) member having a first end mechanically coupled to a first edge of the flexible display panel;
 - a roller assembly including a roller mechanically coupled to a second end of the BRC member, the second end being opposite from the first end, and a motor for rotating the roller, the roller assembly being movable to ascend with respect to the first edge of the flexible display panel while rolling the BRC member onto the roller when the motor is rotated in a first direction, and to descend with respect to the first edge of the flexible display panel while unrolling the BRC member from the roller when the motor is rotated in a second direction opposite to the first direction; and
 - a panel guide connected to the roller assembly and movable in conjunction with the roller assembly;wherein the flexible display panel is rolled onto the panel guide when the roller assembly and the panel guide ascend, and is unrolled from the panel guide when the roller assembly and the panel guide descend.
2. The rollable display of claim 1, comprising a plurality of BRC members, wherein at least one of the BRC members is spaced apart from at least one other of the BRC members.
3. The rollable display of claim 2, wherein each of the plurality of the BRC members is driven by the motor.
4. The rollable display of claim 1, wherein the second end of the BRC member is coupled to the roller in an unbent state along a width of the BRC member.

5. The rollable display of claim 4, further comprising an upper frame attached to the first edge of the flexible display panel,
wherein the upper frame mechanically couples the first end of the BRC member to the first edge of the flexible display panel, with the BRC member being in a bent state along the width of the BRC member.

6. The rollable display of claim 4, wherein the roller assembly includes a support member having a fixed curvature,
wherein the BRC member is bent to have the fixed curvature along the width of the BRC member while passing through the support member.

7. The rollable display of claim 1, wherein the roller assembly includes a sub-roller opposite to the roller, the BRC member is positioned between the roller and the sub-roller, and the sub-roller rotates in conjunction with the rolling and unrolling of the BRC member,
wherein a rotation axis of the sub-roller is parallel to a rotation axis of the roller.

8. The rollable display of claim 1, wherein the panel guide includes:
a guide rail that defines a spiral trajectory; and
a guide shaft having a shape extending in a direction of a central axis, the flexible display panel being rollable with respect to the central axis, the guide shaft movably fastened to the guide rail,
wherein the guide shaft is coupled to a second edge of the flexible display panel, the second edge being opposite from the first edge, and the guide shaft guides the flexible display panel along the spiral trajectory of the guide rail.

9. The rollable display of claim 8, wherein the flexible display panel includes a portion protruding outward beyond an edge of the guide shaft along the direction of the central axis,

wherein the panel guide includes a guide roller in contact with the protruding portion of the flexible display panel, and

wherein a rotation axis of the guide roller is parallel to the central axis.

10. The rollable display of claim 8, wherein the panel guide further includes bearings provided at respective ends of the guide shaft,

wherein the bearings are movably coupled to the guide rail along the spiral trajectory of the guide rail.

11. The rollable display of claim 1, further comprising a base member to which the roller assembly and the panel guide are fixed.

12. A rollable display comprising:

a flexible display panel;

at least one BRC member having a first end mechanically coupled to a first edge of the flexible display panel;

a roller assembly including a roller mechanically coupled to a second end of the BRC member, the second end being opposite from the first end, and a motor for rotating the roller; and

a panel guide connected to a second edge of the flexible display panel,

wherein the first edge of the flexible display panel descends with respect to the panel guide while rolling the BRC member onto the roller when the motor is rotated in a first direction and ascends with respect to the panel guide while unrolling the BRC member from the roller when the motor is rotated in a second direction opposite to the first direction, and

wherein the flexible display panel is rolled onto the panel guide while descending and is unrolled from the panel guide while ascending.

13. The rollable display of claim 12, comprising a plurality of BRC members, wherein at least one of the BRC members is spaced apart from at least one other of the BRC members.

14. The rollable display of claim 13, wherein each of the plurality of the BRC members is driven by the motor.

15. The rollable display of claim 12, wherein the second end of the BRC member is coupled to the roller in an unbent state along a width of the BRC member.

16. The rollable display of claim 15, further comprising an upper frame attached to the first edge of the flexible display panel,
wherein the upper frame mechanically couples the first end of the BRC member to the first edge of the flexible display panel, with the BRC member being in a bent state along the width of the BRC member.

17. The rollable display of claim 15, wherein the roller assembly includes a support member having a fixed curvature,
wherein the BRC member is bent to have the fixed curvature along the width of the BRC member while passing through the support member.

18. The rollable display of claim 12, wherein the roller assembly includes a sub-roller opposite to the roller, the BRC member is positioned between the roller and the sub-roller, and the roller rotates in conjunction with the rolling and unrolling of the BRC member,
wherein a rotation axis of the sub-roller is parallel to a rotation axis of the roller.

19. The rollable display of claim 12, wherein the panel guide includes:
a guide rail that defines a spiral trajectory; and

a guide shaft having a shape extending in a direction of a central axis, the flexible display panel being rollable with respect to the central axis, the guide shaft movably fastened to the guide rail,

wherein the guide shaft is coupled to the second edge of the flexible display panel, and guides the flexible display panel along the spiral trajectory of the guide rail.

20. The rollable display of claim 19, wherein the flexible display panel includes a portion protruding outward beyond an edge of the guide shaft along the direction of the central axis,

wherein the panel guide includes a guide roller in contact with the protruding portion of the flexible display panel, and

wherein a rotation axis of the guide roller is parallel to the central axis.

21. The rollable display of claim 19, wherein the panel guide further includes bearings provided at respective ends of the guide shaft,

wherein the bearings are movably coupled with the guide rail along the spiral trajectory of the guide rail.

22. The rollable display of claim 12, further comprising a base member to which the roller assembly and the panel guide are fixed.