Foldable Display Hinge Structure

This invention is to develop foldable linkage torque solution by 2-layer gears linkage synchronization in connection with display housing bracket and case housing bracket, and the 2-layers gears linkage can force the hinge structure to provide the retractable and torque function, which the fixed flexible display panel can be adjusted by the display displacement to achieve 2-layer gears through extending linkage torque engine synchronization and resolve the display broken issue as the display panel is rotated at 0~180 degrees.

Electronic devices may be manufactured to be thin, compact and portable. Electronic devices may have support structures, such as hinge assemblies or joints that allow a component of the electronic device, such as a display unit, to fold over another component of the electronic device, such as a base unit.

Mechanism and Product Drawing

Electronic devices, such as laptops, smartphones, tablet, personal digital assistants (PDAs), or the like, have several foldable components. An electronic device may have a display unit for rendering visual content and a base unit to hold a keyboard, memory, and other electronic circuitry. The display unit may be coupled to the base unit through a hinge assembly.

In Figure 1 to show the foldable display, 1st layer made by bracket, link and gear, the pins are connected in the series connection one by one. 2nd layer is located to the opposite side of the 1st layer. The gear of two layers be connected by links or chains. When device open/close, the upper gears spacing would be changed. When the device is closed, upper gear rotation along the pins will cause the gear spacing to become larger, and the lower gear linkage will be moved upwards and synchronized. When device open, upper gear spacing becomes smaller and lower gear will be moved downwards and synchronized. The distance between gears would be fixed due to the connection linkage by link or chain. When the gears are rotated, the linkage gears can be transmitted and synchronized. Device in 0° and 120° position is shown in Figure 2, and

![Diagram of Foldable Display Hinge Structure](image)

**Figure 1:** Extendable Hinge Mechanism with Synchronization
Figure 2: Device in 0° and 120° Position

The advantages of this disclosure are as follows:

1. Provide a 2-layer gears linkage solution through extending linkage torque engine synchronization on foldable hinge.
2. The foldable display can be retractable.
3. Offer a high reliable hinge solution for foldable display.
4. Provide free stop solution to support flexible display during 0~180 degrees.
5. Resolving the display broken issue.
6. Have the heavy torque during 90°~180° to resist touch force.
7. Offer a multi-angle hinge control solution.

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