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Electronic apparatus

Abstract

An electronic apparatus includes a hinge device that connects a first chassis member and a second chassis member to be relatively rotatable, a rear cover component that is disposed to fill a space between a first end portion of the first chassis member and a second end portion of the second chassis member separated from each other in a first posture, and a sheet member that has flexibility, is provided to straddle between the rear cover component and an inner surface of the first chassis member and an inner surface of the second chassis member, and covers a gap between the rear cover component and the first end portion and a gap between the rear cover component and the second end portion.

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Background/Summary

BACKGROUND OF THE INVENTION

Field of the Invention

(1) The present invention relates to an electronic apparatus in which chassis members are connected to each other by a hinge device.

Description of the Related Art

(2) In recent years, electronic apparatuses such as PCs and smartphones that have a touch panel type liquid crystal display and do not have a physical keyboard are rapidly spreading. As this type of electronic apparatuses, for example, a configuration has been proposed in which chassis can be folded by using a flexible display configured with organic electro luminescence (EL) or the like (see, for example, Japanese Unexamined Patent Application Publication No. 2021-015522).

SUMMARY OF THE INVENTION

(3) The electronic apparatus as described above includes a rear cover component that fills an opening between left and right chassis members that are greatly separated from each other in a state

in which the chassis are folded. The rear cover component is accommodated inside the chassis members when the chassis are opened. Therefore, it is necessary to avoid the rear cover component from interfering with the left and right chassis members during the rotation operation, and it is necessary to secure a certain amount of gap for interference prevention between the rear cover component and each chassis member even in a state in which the chassis are folded. As a result, it has been found that in such an electronic apparatus, an internal component, for example, electronic components of a metal hinge device, is visible through the gap and thus the appearance quality is deteriorated.

(4) The present invention has been made in consideration of the above problems of the related art, and an object of the present invention is to provide an electronic apparatus capable of suppressing deterioration in appearance quality.

(5) An electronic apparatus according to a first aspect of the present invention includes a first chassis member that has an inner surface, a second chassis member that has an inner surface and is adjacent to the first chassis member, a hinge device that connects the first chassis member and the second chassis member to be relatively rotatable between a first posture in which the first chassis member and the second chassis member are stacked to overlap each other in a surface normal direction and a second posture in which the first chassis member and the second chassis member are aligned in a direction perpendicular to the surface normal direction, a rear cover component that extends along a first end portion of the first chassis member adjacent to the second chassis member and a second end portion of the second chassis member adjacent to the first chassis member, is disposed to fill a space between the first end portion and the second end portion separated from each other in the first posture, and is disposed to straddle the first end portion and the second end portion in the second posture, and a sheet member that has flexibility, is provided to straddle between the rear cover component and an inner surface of the first chassis member and an inner surface of the second chassis member, and covers a gap between the rear cover component and the first end portion and a gap between the rear cover component and the second end portion.

(6) The above-described aspect of the present invention can suppress deterioration of appearance quality.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. **1** is a perspective view illustrating a state in which an electronic apparatus according to an embodiment is closed and in a 0-degree posture.

(2) FIG. **2** is a plan view schematically illustrating a state in which the electronic apparatus illustrated in FIG. **1** is opened and in a 180-degree posture.

(3) FIG. **3** is a plan view schematically illustrating an internal structure of the electronic apparatus illustrated in FIG. **2**.

(4) FIG. **4** is a schematic cross-sectional view taken along a line IV-IV in FIG. **3**.

(5) FIG. **5** is a schematic cross-sectional view illustrating a state in which the electronic apparatus illustrated in FIG. **4** is in the 0-degree posture.

(6) FIG. **6**A is a schematic plan view illustrating a state in which a sheet member is attached to an inner surface of a rear cover component.

(7) FIG. **6**B is a schematic cross-sectional view taken along a line B-B in FIG. **6**A.

DETAILED DESCRIPTION OF THE INVENTION

(8) An electronic apparatus according to the present invention will be described in detail below with preferred embodiments with reference to the accompanying drawings.

(9) FIG. **1** is a perspective view illustrating a state in which an electronic apparatus **10** according to an embodiment is closed and in a 0-degree posture. FIG. **2** is a plan view schematically illustrating

a state in which the electronic apparatus **10** illustrated in FIG. **1** is opened and in a 180-degree posture. FIG. **3** is a plan view schematically illustrating an internal structure of the electronic apparatus **10** illustrated in FIG. **2**.

(10) As illustrated in FIGS. **1** to **3**, the electronic apparatus **10** includes a first chassis **12**A, a second chassis **12**B, a hinge device **14**, and a display **16**. The electronic apparatus **10** of the present embodiment exemplifies a tablet PC or a laptop PC that is capable of being folded like a book. The electronic apparatus **10** may be a smartphone, a portable game machine, or the like.

(11) Each of the chassis **12**A and **12**B is disposed adjacent to each other. The first chassis **12**A includes a first chassis member **17**A and a first cover member **18**A. The first chassis member **17**A is a rectangular frame-shaped member having standing walls formed on three sides other than a first end portion **17**Aa adjacent to the second chassis **12**B. The first cover member **18**A is a plate-shaped member that closes the rear opening of the first chassis member **17**A (see also FIG. **4**). Similarly, the second chassis **12**B includes a second chassis member **17**B that has standing walls formed on three sides other than a second end portion **17**Ba adjacent to the first chassis **12**A, and a second cover member **18**B that closes a rear opening of the second chassis member **17**B. The front openings of the chassis members **17**A and **17**B are closed with the display **16**.

(12) Each of the members **17**A, **17**B, **18**A, and **18**B is configured by, for example, a metal member such as stainless steel, magnesium, or aluminum, or a fiber-reinforced resin plate containing reinforcing fibers such as carbon fiber.

(13) The hinge device **14** connects the chassis **12**A and **12**B so that the chassis are relatively rotatable between the 0-degree posture and the 180-degree posture. The hinge device **14** also functions as a rear cover that hides the gap between the end portions **17**Aa and **17**Ba formed in the 0-degree posture illustrated in FIG. **1**. The display **16** extends over the chassis **12**A and **12**B.

(14) Hereinafter, the electronic apparatus **10** will be described while the direction in which the chassis **12**A and **12**B are aligned is called an X direction, the direction along the end portions **17**Aa and **17**Ba orthogonal to the X direction is called a Y direction, and the thickness direction of the chassis **12**A and **12**B is called a Z direction. Further, the angular posture between the chassis **12**A and **12**B will be described while a state in which the chassis **12**A and **12**B are stacked to overlap each other in the surface normal direction is called the 0-degree posture (see FIG. **1**), and a state in which the chassis **12**A and **12**B are aligned in a direction perpendicular to the surface normal direction (X direction) is called the 180-degree posture (see FIG. **2**). It is possible to call the posture between 0 and 180 degrees by appropriately carving the angle, and for example, a state in which the surface normal directions of the chassis **12**A and **12**B are orthogonal to each other is a 90-degree posture. These angles are for convenience of description, and the actual product may of course have angular positions slightly deviated from the exact angular positions indicated by angle numbers.

(15) As illustrated in FIG. **3**, a motherboard **20** is mounted on the first chassis **12**A. Electronic components, for example, a central processing unit (CPU) **20***a*, a communication module **20***b*, a solid state drive (SSD) **20***c*, or the like are mounted on the motherboard **20**. Various electronic components other than the motherboard **20** are mounted on the first chassis **12**A.

(16) A battery device **21**, a display board **22**, and a sub card **23** are mounted on the second chassis **12**B. The display board **22** is a control board of the display **16**. The sub card **23** is a board on which, for example, a power button, an external connector conforming to a universal serial bus (USB) standard, or the like is mounted. The battery device **21**, the display board **22**, and the sub card **23** are connected to the motherboard **20** by using respective flexible boards **26**, **27**, and **28**, which straddle the end portions **17**Aa and **17**Ba. Various electronic components other than the battery device **21** or the like are mounted on the second chassis **12**B.

(17) FIG. **4** is a schematic cross-sectional view taken along a line IV-IV in FIG. **3**. FIG. **5** is a schematic cross-sectional view illustrating a state in which the electronic apparatus **10** illustrated in FIG. **4** is in the 0-degree posture.

(18) In the 0-degree posture illustrated in FIGS. **1** and **4**, the chassis **12**A and **12**B are in a state of being folded in half. The display **16** is a sheet-shaped flexible display having flexibility, and is constituted of, for example, an organic EL. In the 0-degree posture, the display **16** is disposed so that a region R**1** on the side of the first chassis **12**A and a region R**2** on the side of the second chassis **12**B illustrated in FIG. **2** face each other, and a bending region R**3** which is a boundary region between the regions R**1** and R**2** is bent in an arc shape. In the 180-degree posture illustrated in FIGS. **2** and **5**, the chassis **12**A and **12**B are disposed side by side with each other. At this time, the display **16** has the regions R**1** and R**2** and the bending region R**3** disposed side by side on a XY plane, and forms a flat plate shape as a single sheet.

(19) In the display **16**, the region R**1** is relatively fixed with respect to the first chassis **12**A, and the region R**2** is relatively fixed with respect to the second chassis **12**B. Specifically, the rear surface **16***a* of the region R**1** is fixed to the first chassis **12**A via a first plate **30**A, and the rear surface **16***a* of the region R**2** is fixed to the second chassis **12**B via a second plate **30**B. FIG. **3** illustrates a state in which the display **16** and the plates **30**A and **30**B are removed.

(20) As illustrated in FIGS. **4** and **5**, the plates **30**A and **30**B are disposed on the left and right with the hinge device **14** interposed therebetween, and support the rear surface **16***a* of the display **16** with respective front surfaces **30**Aa and **30**Ba. The rear surface **16***a* of the display **16** has the region R**1** adhesively fixed to the front surface **30**Aa of the first plate **30**A and the region R**2** adhesively fixed to the front surface **30**Ba of the second plate **30**B. The plates **30**A and **30**B have, for example, a configuration to include a carbon fiber reinforced resin plate in which carbon fibers are impregnated with a matrix resin such as epoxy resin, and a metal frame made of a magnesium alloy surrounding an outer periphery of the rear surface of the carbon fiber reinforced resin plate.

(21) The bending region R**3** of the display **16** is relatively movable with respect to the chassis **12**A and **12**B. In the 180-degree posture, the rear surface **16***a* of the bending region R**3** is supported by the hinge device **14** (see FIG. **4**). In the 0-degree posture, the bending region R**3** is bent in an arc shape, a portion of the rear surface **16***a* is supported by the hinge device **14**, and most of the rear surface **16***a* is separated from the hinge device **14** (see FIG. **5**).

(22) As illustrated in FIGS. **3** to **5**, the hinge device **14** of the present embodiment has a hinge base **31**, a first support plate **32**A, and a second support plate **32**B.

(23) The hinge base **31** is provided at a position straddling the end portions **17**Aa and **17**Ba, and extends over the substantially entire length in the Y direction along the end portions **17**Aa and **17**Ba. The hinge base **31** is a block-shaped component formed of a metal material such as aluminum. The hinge base **31** supports two hinge shafts **14**A and **14**B aligned in the X direction in the 180-degree posture.

(24) A first end portion of a first link arm **33**A is rotatably supported around an axis on the first hinge shaft **14**A (see FIG. **3**). A second end portion of the first link arm **33**A is connected to a first bracket **34**A by using a rotation shaft to be relatively rotatable. A first end portion of a first support arm **35**A is further rotatably supported around an axis on the first hinge shaft **14**A. A second end portion of the first support arm **35**A is connected to the first bracket **34**A by using a rotation shaft to be relatively rotatable. The first support arm **35**A is aligned with the first link arm **33**A in the Y direction. The first bracket **34**A is fixed to an inner surface **17**Ab of the first chassis member **17**A by screws or the like.

(25) A first end portion of a second link arm **33**B is rotatably supported around an axis on the second hinge shaft **14**B (see FIG. **3**). A second end portion of the second link arm **33**B is connected to a second bracket **34**B by using a rotation shaft to be relatively rotatable. A first end portion of a second support arm **35**B is further rotatably supported around an axis on the second hinge shaft **14**B. A second end portion of the second support arm **35**B is connected to the second bracket **34**B by using a rotation shaft to be relatively rotatable. The second support arm **35**B is aligned with the second link arm **33**B in the Y direction. The second bracket **34**B is fixed to an inner surface **17**Bb of the second chassis **12**B by screws or the like.

(26) As illustrated in FIG. **3**, the hinge device **14** has a plurality of first movable portions **14**C in which the one first link arm **33**A and the one first support arm **35**A are connected to the one first bracket **34**A. The first movable portions **14**C are disposed with a gap from each other along the Y direction, which is a longitudinal direction of the hinge base **31**. That is, the first movable portion **14**C is intermittently connected along the longitudinal direction of the hinge base **31**. The second bracket **34**B, the second link arm **33**B, and the second support arm **35**B also form a second movable portion **14**D that is the same as the first movable portion **14**C.
(27) As the first arm member that rotatably connects the hinge base **31** and the first bracket **34**A, only one of the first link arm **33**A and the first support arm **35**A may be used, or both may be used as in the present embodiment, or an arm member of the base may be added. Similarly, as the second arm member that rotatably connects the hinge base **31** and the second bracket **34**B, only one of the second link arm **33**B and the second support arm **35**B may be used, or both may be used as in the present embodiment, or an arm member of the base may be added.
(28) As a result, in the hinge device **14**, the brackets **34**A and **34**B are relatively rotatably connected via the hinge base **31**, that is, the chassis **12**A and **12**B are relatively rotatably connected. A gear mechanism for synchronizing the rotation operation between the chassis **12**A and **12**B, a torque mechanism for applying a predetermined rotational torque to the rotation operation between the chassis **12**A and **12**B, or the like are also provided inside the hinge base **31**.
(29) By the way, in the movable portions **14**C and **14**D, the link arms **33**A and **33**B and the support arms **35**A and **35**B rotate or slide with respect to the brackets **34**A and **34**B. Since the metal components slide together in this manner, a lubricant **38** such as grease is appropriately applied to portions of the movable portions **14**C and **14**D (see FIG. **4**). In the present embodiment, in particular, the support arms **35**A and **35**B rotate while metal shafts **35**Aa and **35**Ba slide in slider grooves **34**Aa and **34**Ba formed on the brackets **34**A and **34**B. Therefore, the lubricant **38** is essential for a sliding portion between the metal shafts **35**Aa and **35**Ba and the slider grooves **34**Aa and **34**Ba. The lubricant **38** in this portion also flows out and adheres to components around the portion, for example, the front surfaces of the support arms **35**A and **35**B or the like. Of course, the lubricant **38** is applied to various portions of the hinge device **14** in addition to each sliding portion of the link arms **33**A and **33**B.
(30) As illustrated in FIGS. **1**, **4**, and **5**, a rear cover component **36** is attached to the outer surface of the hinge base **31**. The rear cover component **36** is a plate having a substantially U-shaped cross section that matches the outer surface shape of the hinge base **31**. The rear cover component **36** is formed of a heat conductive material, for example, an aluminum alloy, stainless steel, or the like. The rear cover component **36** is a decorative cover to improve the outer surface quality. The flexible boards **26** to **28** pass between the hinge base **31** and the rear cover component **36** at a position straddling the end portions **17**Aa and **17**Ba.
(31) In the 180-degree posture illustrated in FIG. **4**, the hinge base **31** is accommodated in the chassis **12**A and **12**B, and straddles the end portions **17**Aa and **17**Ba close to each other in the X direction. In the 0-degree posture illustrated in FIG. **5**, the hinge base **31** is disposed to fill an opening formed between the end portions **17**Aa and **17**Ba that are greatly separated from each other. At this time, deterioration of an appearance design of the folded electronic apparatus **10** is prevented by disposing the rear cover component **36** to the outermost surface (see FIG. **1**). In addition to the 0-degree posture, the rear cover component **36** can cover the opening formed between the end portions **17**Aa and **17**Ba, for example, in the 90-degree posture or the like.
(32) For example, when the hinge base **31** is not configured to extend in the Y direction as illustrated in FIG. **3** but is configured with one or a plurality of small piece components, or the like, the rear cover component **36** may be supported by each of the chassis members **17**A and **17**B, separately from the hinge device **14**. That is, the rear cover component **36** may not necessarily be a constituent element of the hinge device **14**, and in short, when the opening formed between the end portions **17**Aa and **17**Ba can be covered, the configuration and mounting mode are not limited.

However, in the present embodiment, the rear cover component **36** is a constituent component of the hinge device **14**, so that an individual configuration or mechanism to attach the rear cover component **36** to the chassis members **17**A and **17**B is unnecessary, and the configuration can be simplified.

(33) As illustrated in FIGS. **3** to **5**, the support plates **32**A and **32**B are plates formed of a metal material such as aluminum, and have bilaterally symmetrical shapes. The support plates **32**A and **32**B are provided on the sides of the inner surfaces **17**Ab and **17**Bb of the chassis members **17**A and **17**B, and extend over the substantially entire length in the Y direction along the end portions **17**Aa and **17**Ba.

(34) The first support plate **32**A is disposed between the first plate **30**A and the hinge base **31**. The first support plate **32**A has an edge portion on the side of the first plate **30**A, which is connected to the first bracket **31**A to be relatively rotatable via the rotation shaft. The first support plate **32**A has an edge portion on the side of the hinge base **31**, which is relatively movable with respect to the hinge base **31**. The configuration of the second support plate **32**B and the mounting structure or the like to the second plate **30**B and the hinge base **31** may be bilaterally symmetrical with the configuration and the mounting structure or the like of the first support plate **32**A.

(35) The support plates **32**A and **32**B swing according to the rotation operation of the chassis **12**A and **12**B. In the 180-degree posture, the support plates **32**A and **32**B support the rear surface **16***a* of the bending region R**3** of the display **16** by the front surfaces of the support plates **32**A and **32**B. In the angular postures other than 180 degrees, the support plates **32**A and **32**B come into contact with the display **16** in a state in which a gap is provided between the support plates **32**A and **32**B and the display **16** or with a slight force that does not deform the display **16** (see FIG. **5**).

(36) By the way, in the electronic apparatus **10**, it is necessary to avoid the rear cover component **36** from interfering with the chassis members **17**A and **17**B during the rotation operation between the chassis **12**A and **12**B.

(37) Therefore, for example, in the 0-degree posture illustrated in FIG. **5**, it is not possible for the rear cover component **36** to avoid the formation of slight gaps G**1** and G**2** with respect to the chassis members **17**A and **17**B, respectively. As a result, in the electronic apparatus **10**, the internal components are seen through each of the gaps G**1** and G**2** (see a viewpoint A in FIG. **5**), and the appearance quality is deteriorated. In particular, the link arms **33**A and **33**B, the support arms **35**A and **35**B, the brackets **34**A and **34**B, or the like constituting the hinge device **14** are all metal components formed of stainless steel or the like and have a metal gloss. Further, since all of these metal components are at positions facing the gaps G**1** and G**2** and reflect light that has passed through the gaps G**1** and G**2**, the metal components are more noticeable.

(38) Therefore, the electronic apparatus **10** of the present embodiment includes a sheet member **40** that functions as a blindfold member that prevents the internal components from being visually recognized from the gaps G**1** and G**2**. FIG. **6**A is a schematic plan view illustrating a state in which the sheet member **40** is attached to an inner surface **36***a* of the rear cover component **36**. FIG. **6**B is a schematic cross-sectional view taken along a line B-B in FIG. **6**A. In addition, in FIGS. **4** and **5**, the sheet member **40** is illustrated by a thick broken line to be clearly indicated and to be distinguished from the other components.

(39) As illustrated in FIGS. **4** to **6**B, the sheet member **40** is provided to straddle between the rear cover component **36**, and the inner surface **17**Ab of the first chassis member **17**A and the inner surface **17**Bb of the second chassis member **17**B, and covers the gaps G**1** and G**2**. The sheet member **40** of the present embodiment is formed of a single sheet, and extends from the inner surface **17**Ab of the first chassis member **17**A to the inner surface **17**Bb of the second chassis member **17**B by passing through the rear cover component **36**.

(40) Hereinafter, with respect to the portion of the sheet member **40**, a description is made such that a portion that is provided to straddle between the rear cover component **36** and the inner surface **17**Ab of the first chassis member **17**A and covers the gap G**1** is referred to as a first sheet portion

40A, and a portion that is provided to straddle between the rear cover component **36** and the inner surface **17**Bb of the second chassis member **17**B and covers the gap G**2** is referred to as a second sheet portion **40**B. The sheet member **40** may be configured such that each of the first sheet portion **40**A and the second sheet portion **40**B is a separate sheet. However, the sheet member **40** is easier to be positioned and fixed to the rear cover component **36** in a case of being formed of a single sheet structure than in a case of forming the sheet portions **40**A and **40**B as separate sheets, so that there is an advantage that the manufacturing efficiency is better.

(41) As illustrated in FIGS. **4** and **5**, the central portion of the sheet member **40** in the X direction is fixed to the inner surface **36***a* of the rear cover component **36**, the end thereof on the side of the first chassis member **17**A is interposed and held between the first bracket **34**A and the inner surface **17**Ab of the first chassis member **17**A, and the end thereof on the side of the second chassis member **17**B is interposed and held between the second bracket **34**B and the inner surface **17**Bb of the second chassis member **17**B.

(42) The sheet member **40** has flexibility, and the width dimension in the X direction is set to have a dimension having a certain margin (sag). As a result, the sheet member **40** does not interfere with the rotation operation between the chassis members **17**A and **17**B and covers the gaps G**1** and G**2** while following the corresponding rotation operation and being deformed.

(43) The material of the sheet member **40** is not limited as long as the sheet member **40** can cover the gaps G**1** and G**2** and has flexibility. Examples of the material of the sheet member **40** can include nonwoven fabric, woven fabric, knitted fabric, resin sheet, resin film, or the like. However, the sheet member **40** slides with the surrounding components in accordance with the rotation operation between the chassis members **17**A and **17**B. In consideration of the generation of abnormal noise such as a rustling noise that occurs during the sliding, durability, or the like, the sheet member **40** of the present embodiment uses, for example, a nonwoven fabric formed of PET resin or PP resin and having a thickness of 0.15 mm. The sheet member **40** is preferably colored in a dark color such as black so that the sheet member **40** does not stand out behind the gaps G**1** and G**2**.

(44) As illustrated in FIGS. **6**A and **6**B, the sheet member **40** is fixed to the inner surface **36***a* of the rear cover component **36**, for example, with an adhesive, double-sided tape, or the like, and both side portions thereof in the X direction protrude to the left and right in the shape of blades, respectively. In a case where the first sheet portion **40**A and the second sheet portion **40**B are formed of separate sheets, each of the sheet portions **40**A and **40**B may be fixed to the inner surface **36***a*.

(45) As illustrated in FIGS. **3** and **6**B, the sheet member **40** may be configured to be divided into two or more in a longitudinal direction (Y direction) of the rear cover component **36**. As a result, the Y dimension for a single sheet of the sheet member **40** can be shortened, and the efficiency of the fixing work to the rear cover component **36** is improved.

(46) At this time, the sheet member **40** is preferably provided in the longitudinal direction of the rear cover component **36** in a range in which at least the flexible boards **26** to **28** are not disposed. That is, the flexible boards **26** to **28** can be formed in black, for example, and can cover the gaps G**1** and G**2** in the same manner as the sheet member **40**. Therefore, for example, as illustrated in FIG. **3**, the sheet member **40** may have a two-sheet structure arranged in the Y direction, and may be configured such that a gap between the two sheet members **40** and **40** is complemented by the flexible board **27**. Then, since the usage amount of the sheet member **40** can be reduced, the cost can be reduced, and since the Y dimension of the sheet member **40** can be shortened, the fixing work to the rear cover component **36** also becomes easier.

(47) Therefore, the electronic apparatus **10** can cover the gaps G**1** and G**2** between the rear cover component **36** and the chassis members **17**A and **17**B by the sheet member **40**. Therefore, the electronic apparatus **10** can prevent the internal components from being exposed through the gaps G**1** and G**2**, and can suppress deterioration in appearance quality.

(48) In particular, in the sheet member **40** of the present embodiment, one end side is fixed to the inner surface **36***a* of the rear cover component **36**, and the other end side is interposed and held between the brackets **34**A and **34**B and the inner surfaces **17**Ab and **17**Bb of the chassis members **17**A and **17**B. Therefore, the sheet member **40** can more reliably cover the metal components such as the brackets **34**A and **34**B and the arms **33**A, **33**B, **35**A, and **35**B connected to the brackets **34**A and **34**B. As a result, it is possible to prevent the metal gloss of the metal components from reflecting light that has passed through the gaps G**1** and G**2**, and deterioration in appearance quality can be further suppressed.
(49) The sheet member **40** of the present embodiment has a function other than the blindfold that covers the gaps G**1** and G**2**.
(50) As described above, the sheet member **40** is installed to straddle between the rear cover component **36** and the inner surfaces **17**Ab and **17**Bb. In other words, the first sheet portion **40**A covers the arms **33**A and **35**A, which are the first arm members, and the first bracket **34**A from the side of the inner surface **17**Ab (see FIGS. **4** and **5**). Similarly, the second sheet portion **40**B covers the arms **33**B and **35**B, which are the second arm members, and the second brackets **34**B from the side of the inner surface **17**Bb.
(51) That is, the sheet member **40** is interposed between the movable portions **14**C and **14**D of the hinge device **14** and the inner surfaces **17**Ab and **17**Bb of the chassis members **17**A and **17**B. Therefore, the sheet member **40** can prevent the lubricant **38** applied to the movable portions **14**C and **14**D from adhering to the inner surfaces **17**Ab and **17**Bb and adhering to an outer surface **36***b* of the rear cover component **36** in the 180-degree posture illustrated in FIG. **4**. As a result, the electronic apparatus **10** can prevent a case in which the lubricant **38** adheres to the outer surface **36***b* of the rear cover component **36** and this is exposed on the appearance in the 0-degree posture illustrated in FIG. **5** to deteriorate the appearance quality and give discomfort to a user who touches the rear cover component **36**.
(52) By the way, as described above, the sheet member **40** is configured with, for example, a nonwoven fabric. Therefore, the lubricant **38** permeates through fine hole portions formed in the nonwoven fabric, and there is a possibility that the lubricant **38** adheres to the outer surface **36***b* of the rear cover component **36**. Therefore, as illustrated in FIG. **6**B, in order to prevent the permeation of the lubricant **38** such as grease, the sheet member **40** is preferably provided with coatings **40***a* and **40***b*, which have oil-proof performance, on the front surface.
(53) The coatings **40***a* and **40***b* may be, for example, an oil-proof coating or a water-repellent coating, and may be any coatings that can suppress the permeation of the lubricant **38** in the sheet member **40**. For the coating, at least the coating **40***a* on a front surface of the hinge device **14** facing the side of the movable portions **14**C and **14**D may be provided. From the viewpoint of manufacturing efficiency, the coatings **40***a* and **40***b* of the present embodiment are applied to both surfaces of the sheet member **40** because, for example, the sheet member **40** is provided by immersing the sheet member **40** in a container containing a liquid coating agent.
(54) Reference numerals **42**A and **42**B in FIGS. **4** and **5** are heat conductive members provided on the inner surfaces **17**Ab and **17**Bb. The heat conductive members **42**A and **42**B are a heat conductive sheet such as a graphite sheet or a heat conductive cushion such as a heat transfer rubber. The heat conductive members **42**A and **42**B thermally connect the chassis members **17**A and **17**B on the left and right via the rear cover component **36** in the 180-degree posture, and moves the heat on the side of the first chassis **12**A that becomes high temperature due to the heat generated by the CPU **20***a* or the like, to the side of the second chassis **12**B. As described above, the electronic apparatus **10** of the present embodiment has a structure in which the lubricant **38** is more easily adhered to the outer surface **36***b* of the rear cover component **36** by the action of the heat conductive members **42**A and **42**B, and thus the anti-adhesion action of the lubricant **38** by the sheet member **40** becomes more effective. The heat conductive members **42**A and **42**B may be omitted.

(55) The present invention is not limited to the above-described embodiments, and modification is freely possible without departing from the gist of the present invention.
(56) In the above, although the electronic apparatus **10** that is capable of being folded in half like a book is exemplified, the present invention can be applied to, in addition to a configuration of folding the same-shaped chassis in half, for example, various configurations, such as a double-door configuration in which small chassis are foldably connected to the left and right edge portions of a large chassis, respectively, an S-shaped folding configuration in which chassis with different folding directions are respectively connected to the left and right edge portions of one chassis, and a J-shaped folding configuration in which a small chassis is foldably connected to one of the left and right edge portions of a large chassis, and the number of chassis to be connected may be four or more.

Claims

1. An electronic apparatus comprising: a first chassis member that has an inner surface; a second chassis member that has another inner surface and is adjacent to the first chassis member; a hinge device that rotatably connects the first chassis member and the second chassis member for rotation between a first posture in which the first chassis member and the second chassis member are stacked to overlap each other in a surface normal direction and a second posture in which the first chassis member and the second chassis member are aligned in a direction perpendicular to the surface normal direction; a rear cover component that extends along a first end portion of the first chassis member adjacent to the second chassis member and that extends along a second end portion of the second chassis member adjacent to the first chassis member, wherein the rear cover component fills a space between the first end portion and the second end portion in the first posture, and straddles the first end portion and the second end portion in the second posture; and a sheet member that is flexible and is between the rear cover component and the inner surface of the first chassis member and the inner surface of the second chassis member, and covers a gap between the rear cover component and the first end portion and another gap between the rear cover component and the second end portion, wherein: the hinge device has: a first metal bracket fixed to the inner surface of the first chassis member, and a second metal bracket that is rotatable with respect to the first bracket and is fixed to the another inner surface of the second chassis member, and the sheet member is fixed to the rear cover component and has an end on a side of the first chassis member and is between the first bracket and the inner surface of the first chassis member and has another end on a side of the second chassis member and is between the second bracket and the another inner surface of the second chassis member.
2. The electronic apparatus according to claim 1, wherein the hinge device further has: a first movable portion on the inner surface side of the first chassis member and coated with a lubricant, and a second movable portion on the another inner surface side of the second chassis member and coated with the lubricant, and the sheet member is oil-proof and is between the first movable portion and the inner surface of the first chassis member and is between the second movable portion and the another inner surface of the second chassis member.
3. The electronic apparatus according to claim 2, further comprising: a display over the first chassis member and the second chassis member and has a bending region that is bent according to relative rotation of the first chassis member and the second chassis member, wherein: the hinge device further has: a hinge base that extends along the first end portion and the second end portion, that straddles the first end portion and the second end portion in the second posture, and supports a rear surface of the display, a first arm member that connects the hinge base and the first bracket, and a second arm member that connects the hinge base and the second bracket, and the sheet member is between the inner surface of the first chassis member and the first arm member and is between the another inner surface of the second chassis member and the second arm member.

4. The electronic apparatus according to claim 1, wherein the sheet member is a nonwoven fabric.
5. The electronic apparatus according to claim 1, wherein the sheet member has: a first sheet portion that is between the rear cover component and the inner surface of the first chassis member and covers the gap between the rear cover component and the first end portion, and a second sheet portion that is between the rear cover component and the another inner surface of the second chassis member and covers the another gap between the rear cover component and the second end portion, and the first sheet portion and the second sheet portion are formed of a single sheet and extend from the inner surface of the first chassis member to the another inner surface of the second chassis member by passing through the rear cover component.
6. The electronic apparatus according to claim 1, wherein the sheet member has: a first sheet portion that is between the rear cover component and the inner surface of the first chassis member and covers the gap between the rear cover component and the first end portion, and a second sheet portion that is formed separately from the first sheet portion, is between the rear cover component and the another inner surface of the second chassis member, and covers the another gap between the rear cover component and the second end portion.
7. The electronic apparatus according to claim 1, further comprising: a flexible board that straddles the first chassis member and the second chassis member by passing through the rear cover component, wherein: the sheet member is disposed in a longitudinal direction of the rear cover component and in an area in which at least the flexible board is not disposed.