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(54) **ELECTRONIC-DEVICE CASING AND ELECTRONIC APPARATUS**

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(57) **ABSTRACT**

The invention discloses a side plate of an electronic-device casing including a side plate assembled to a side portion of a casing. The side plate includes a plate member, a first engagement member, a second engagement member, a plurality of linkages, and an actuating member. The first and the second engagement members are moveably disposed on the plate member respectively along a first direction and a second direction. The linkages are pivotally engaged with the plate member and are moveably engaged with the first and the second engagement members. The actuating member is moveably engaged with the linkages. When the actuating member rotates, the actuating member drives the linkages to rotate so that the first and the second engagement members are driven to move relatively to the plate member respectively along the first direction and the second direction to be engaged with the side portion or disengaged from the side portion.

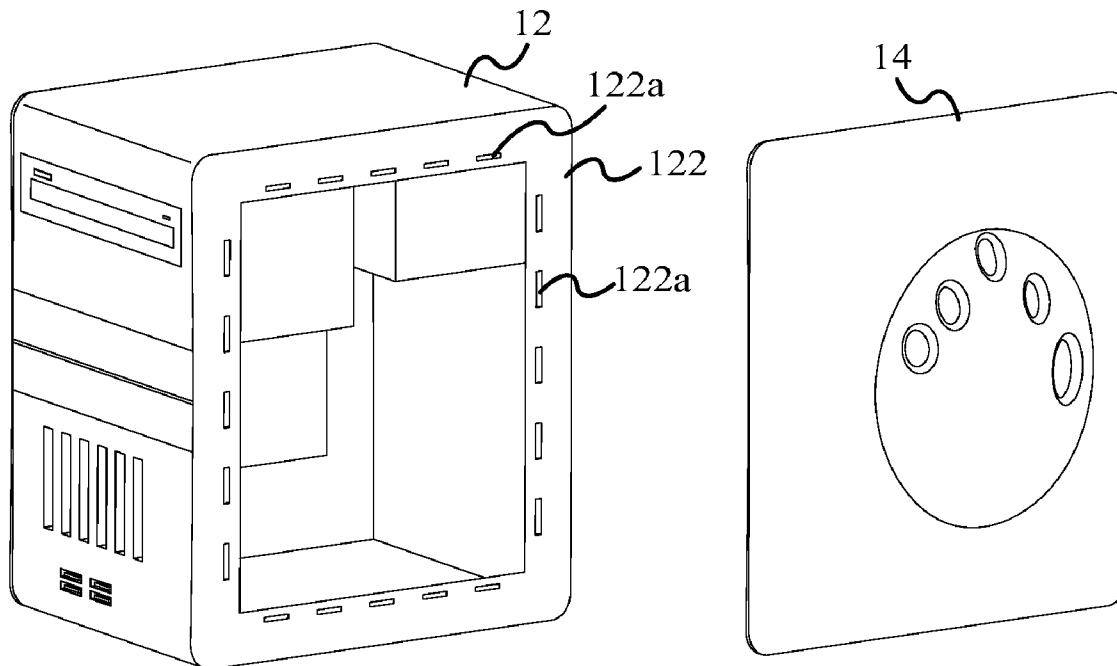
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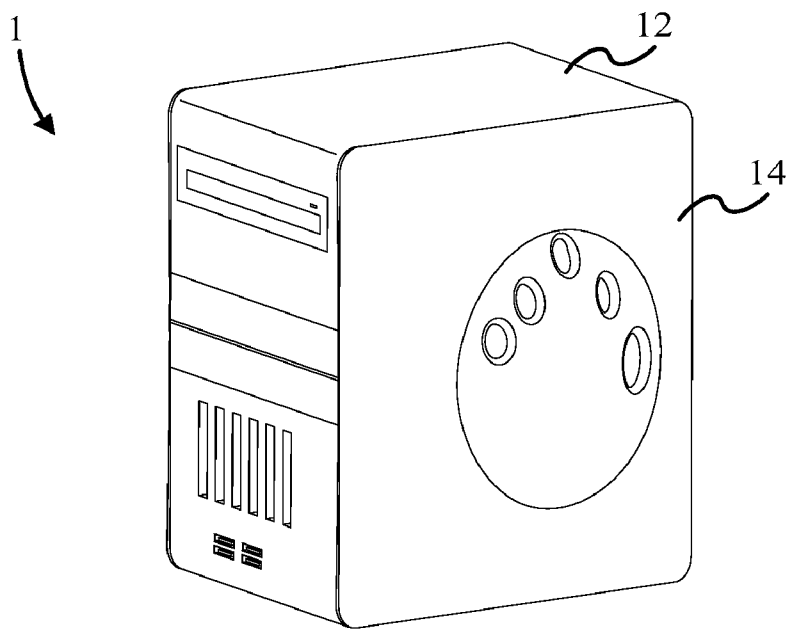


FIG. 1

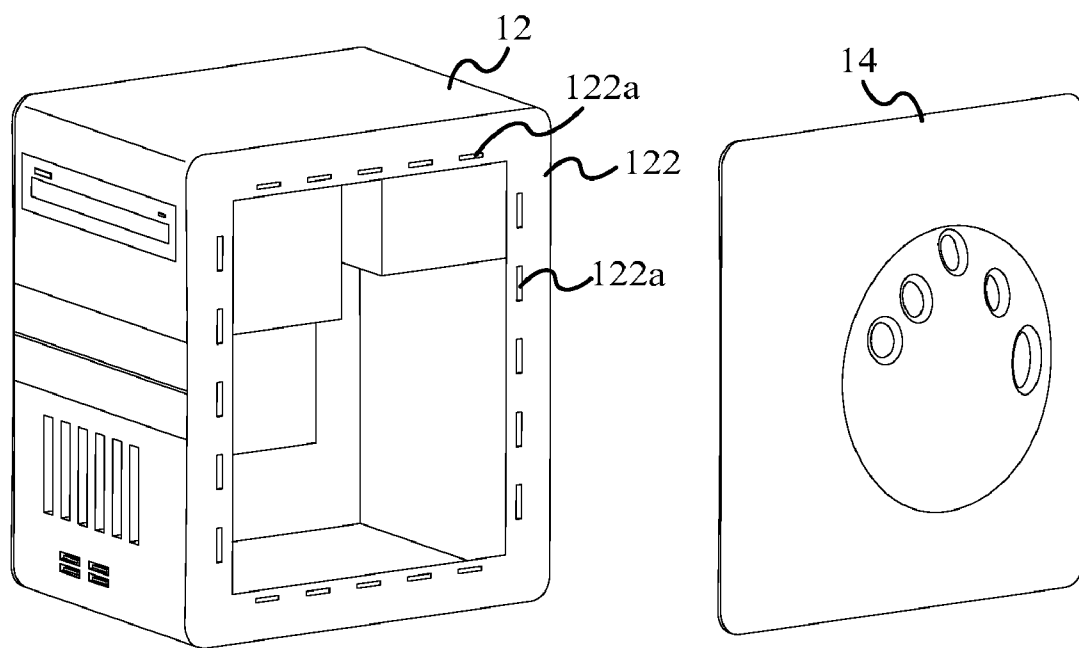


FIG. 2

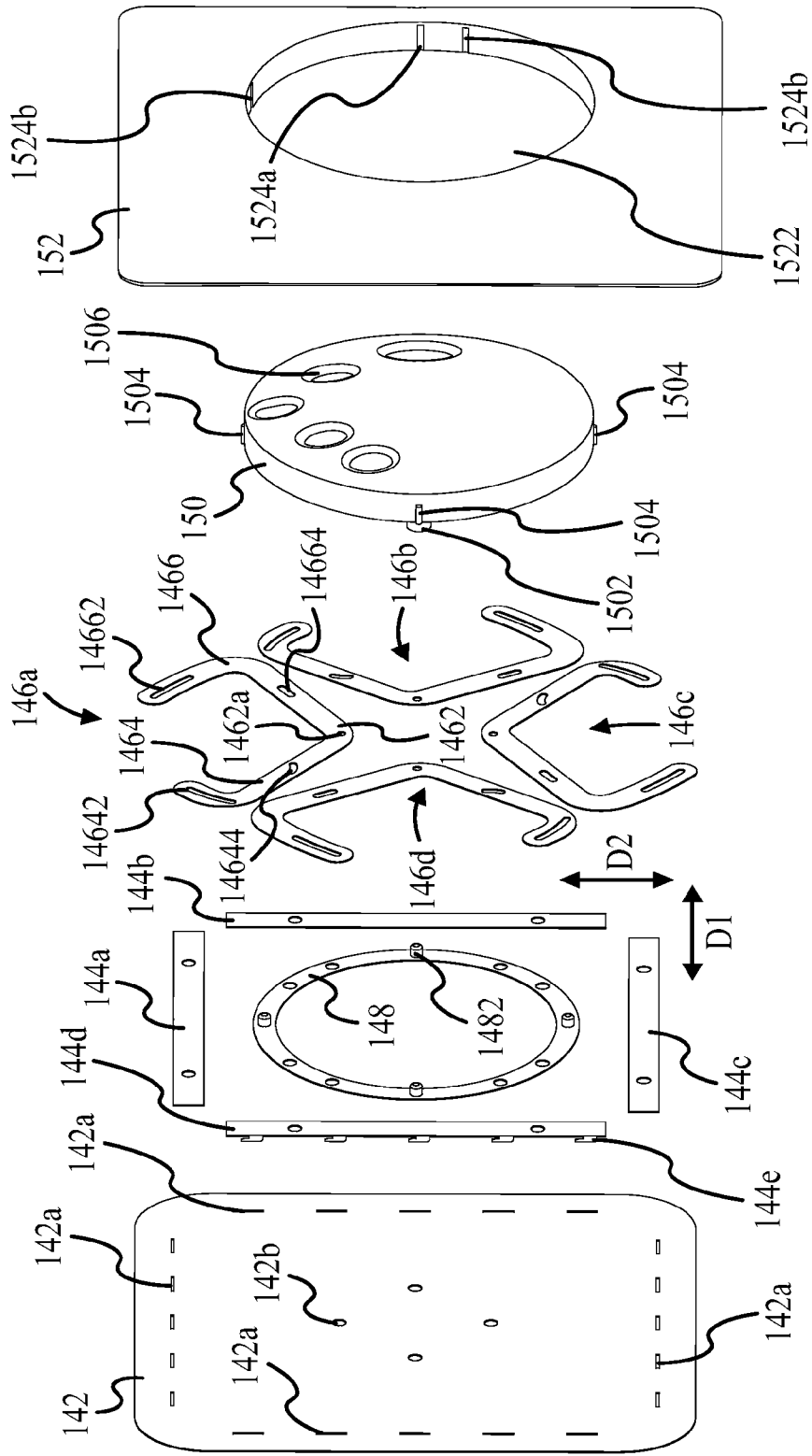


FIG. 3

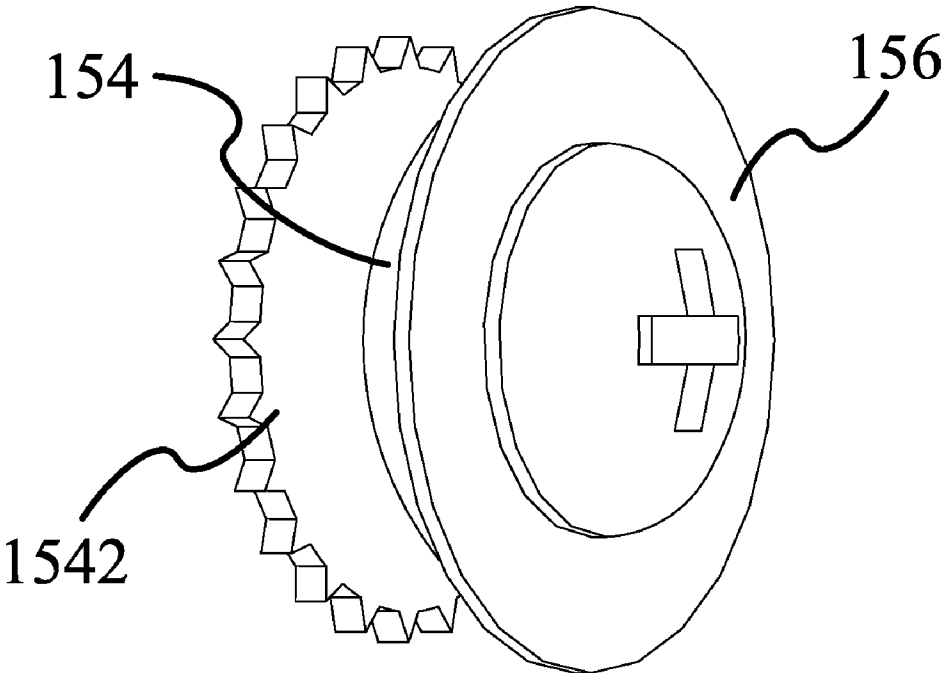


FIG. 4

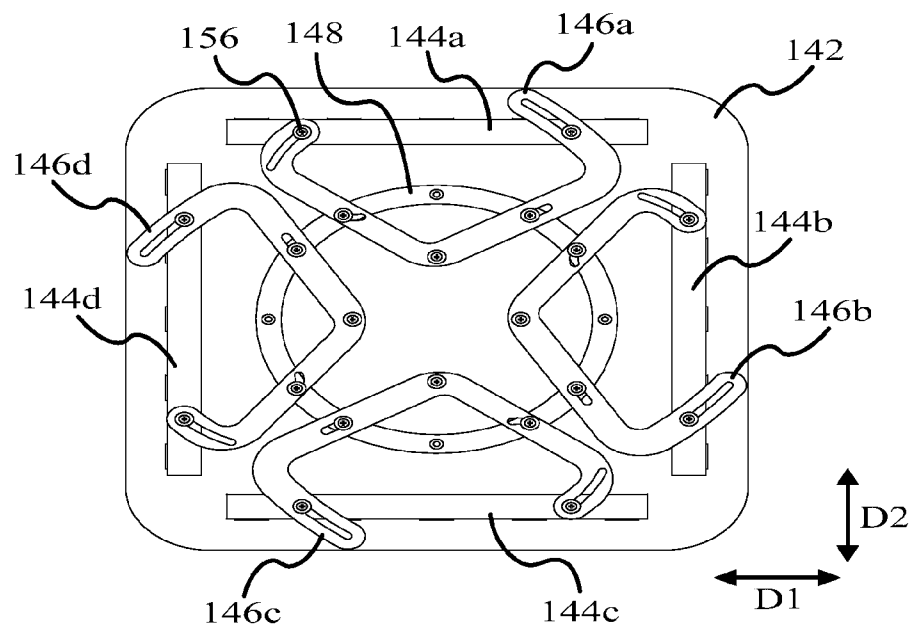


FIG. 5

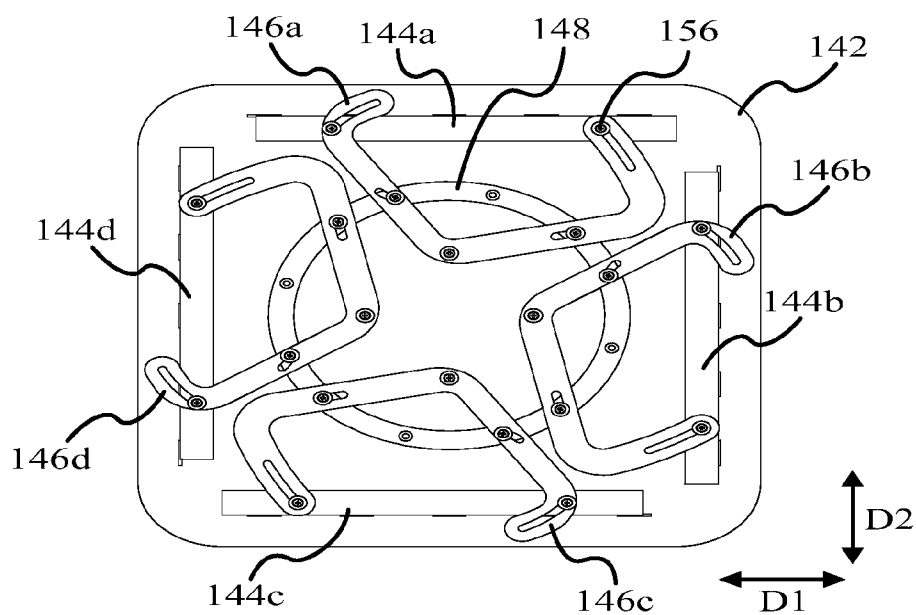


FIG. 6

ELECTRONIC-DEVICE CASING AND ELECTRONIC APPARATUS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to an electronic-device casing, and more particularly to an electronic-device casing which is assembled to a side portion of a casing by rotating a linkage mechanism.

[0003] 2. Description of the Prior Art

[0004] At present, there are still many electronic apparatuses utilizing a design of a casing to accommodate a plurality of electronic components or devices, such as desk-top computers or electrical boxes. For an example of a desk-top computer, the casing thereof is assembled by a frame and side plates which are attached to the frame. There are many electronic components and devices accommodated in the casing, such as a motherboard, a hard disk, a CD-ROM, a power supply, etc. Therein some of the side plates are fixed in the frame initially. Some of them are designed to be moveable and can be disassembled from the frame for users to check or exchange the electronic components or devices in the casing conveniently. At present, for most of desk-top computers, the moveable side plate still needs to be fixed by screwing. In particular, the fixing location is usually at the place which is vertical to the side plate (e.g. at the back side of the casing). In other words, it needs operation room at the two sides of the casing to perform the above operation, which is inconvenient. Additionally, the user needs to prepare a screwdriver therewith for the performance of the above operation.

[0005] For the above case of inconveniently operating, there are products which have guiding grooves to enhance the effect of both assembling and fixing of the moveable side plates and to decrease the area for screwing with screws; however, it still needs screws to fix the moveable side plates. There are also products whose moveable side plates are locked to the frame by pins after the moveable side plates are attached onto the frame. However, the pins act as the main loading support of the whole fixing structure. For the fixing for the side plate, the fixing effects of the side plate at the circumference thereof are different, and it is unfavorable to the usage durability and the fixing stability.

[0006] Whichever design above involves the problem that the effect of fixing the whole side plate is non-uniform. Moreover, the fixing could only be achieved by single-edge fixing, parallel-sides fixing, or tri-edges fixing, and several operation steps are still needed to be involved so as to complete the operation of the fixing or the disassembling. However, the user usually has no time or is tired of the complication operation, and the fixing effect of the fixing designs for the various moveable side plates mentioned above is hard to be realized in actual usage environments. Accordingly, there is a need to design a new moveable side plate so that a user could easily perform the fixing or the disassembling so as to solve the above problems.

SUMMARY OF THE INVENTION

[0007] An objective of the invention is to provide an electronic-device casing. The electronic-device casing is assembled to a side portion of a casing by rotating a linkage mechanism.

[0008] According to an embodiment, a side plate of the electronic-device casing of the invention is assembled to a

side portion of a casing. The side plate includes a plate member, a first engagement member, a second engagement member, a plurality of linkages and an actuating member. The first engagement member is moveably disposed on the plate member along a first direction. The second engagement member is disposed on the plate member along a second direction. The linkages are pivotally engaged with the plate member and moveably engaged with the first engagement member and the second engagement member. The actuating member is moveably engaged with the linkages.

[0009] The actuating member is suitable for rotating to drive the linkages so as to drive the first engagement member and the second engagement member to move along the first direction and the second direction relative to the plate member and to be engaged with or disengaged from the side portion. In other words, in the embodiment, when the actuating member rotates clockwise, the actuating member drives the linkages to rotate respectively, so as to drive the first engagement member to move along the first direction relative to the plate member and to be engaged with the side portion, and also to drive the second engagement member to move along the second direction relative to the plate member and to be engaged with the side portion. When the actuating member rotates counterclockwise, the actuating member drives the linkages to rotate respectively, so as to drive the first engagement member to move along the first direction relative to the plate member and to be disengaged from the side portion, and also to drive the second engagement member to move along the second direction relative to the plate member and to be disengaged from the side portion.

[0010] For further illustration, the electronic-device casing utilizes the leverages generated by the linkages respectively to transfer the rotation of the actuating member to the engagement of both the first engagement member and the second engagement member to the side portion. Thereby, a user can rotate the actuating member in a single operation, and then the side plate is fixed on at least two sides of the side portion simultaneously. It solves the problem of the complicated steps of fixing or disassembling in the prior art. Furthermore, an effective fixing could be achieved by designing properly the locations of the first engagement member and the second engagement member. It solves the problem of the unstable fixing generated by the limited fixing structure with only single-edge fixing, parallel-sides fixing, or tri-edges fixing in the prior art.

[0011] The advantage and spirit of the invention may be understood by the following recitations together with the appended drawings.

BRIEF DESCRIPTION OF THE APPENDED DRAWINGS

[0012] FIG. 1 is a schematic diagram of an electronic apparatus according to an embodiment of the invention.

[0013] FIG. 2 is a partial decomposed diagram of the electronic apparatus.

[0014] FIG. 3 is an exploded view of an electronic-device casing.

[0015] FIG. 4 is an assembly diagram of a round head screw and a guiding pin with a threaded hole.

[0016] FIG. 5 is a schematic diagram of the electronic-device casing as disengaged from the side portion.

[0017] FIG. 6 is a schematic diagram of the electronic-device casing as engaged with the side portion.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Please refer to FIG. 1 and FIG. 2. FIG. 1 is a schematic diagram of an electronic apparatus 1 according to an embodiment of the invention. FIG. 2 is a partial decomposed diagram of the electronic apparatus 1. The electronic apparatus 1, such as a computer, includes a casing 12 and an electronic-device casing 14. A side plate of the electronic-device casing 14 is assembled to the casing 12 through a side portion 122 of the casing 12. A plurality of engagement holes 122a are formed on the side portion 122 for engaging the electronic-device casing 14.

[0019] Please also refer to FIG. 3. FIG. 3 is an exploded view of the electronic-device casing 14. The side plate of the electronic-device casing 14 includes a plate member 142, four engagement members 144a, 144b, 144c and 144d, four linkages 146a, 146b, 146c and 146d (using an arrow as a label lead in favor of recognizing the characteristics of the components), and an actuating member 148. The electronic-device casing 14 also includes a turntable 150 and an outer shell 152. The engagement member 144a, 144b, 144c and 144d and the linkages 146a, 146b, 146c, and 146d are disposed correspondingly and symmetrical to (such as the circle) actuating member 148. Each of the engagement members 144a, 144b, 144c and 144d includes a plurality of engagement portions 144e, and the engagement portion 144e is L-shaped hook. A plurality of slots 142a are formed on the plate member 142. Each of the slots 142a corresponds to one of the engagement portions 144e of the engagement member 144a, 144b, 144c and 144d and extends along a first direction D1 or a second direction D2. The L-shaped hooks of the engagement members 144e could pass through the corresponding slots 142a to be engaged with the engagement holes 122a on the side portion 122. Thereby, the engagement members 144a and 144c can move relative to the plate member 142 along the first direction D1; the engagement members 144b and 144d can move along the second direction D2 relative to the plate member 142. In the embodiment, the first direction D1 is perpendicular to the second direction D2 such that the engagement members 144a, 144b, 144c, and 144d are disposed in a rectangle. However, the invention is not limited to this. The first direction D1 and the second direction D2 also can be performed an acute angle or an obtuse angle.

[0020] Each of the linkages 146a, 146b, 146c, and 146d are performed with V-shaped structure. Taking the linkages 146a as an example, the linkages 146a includes a pivot portion 1462 and both a first arm 1464 and a second arm 1466 which are connected to the pivot portion 1462. The linkages 146a is pivotally connected to the plate member 142 through the pivot portion 1462. As the same, the above description is also applied to the other linkages 146b, 146c, 146d, so it will not be described in detail here.

[0021] Besides, still taking the linkages 146a as an example, an end portion of the first arm 1464 includes a guiding groove 14642, and the first arm 1464 is moveably connected through the guiding groove 14642 to the engagement member 144a. The first arm 1464 also includes a guiding groove 14644 at the middle portion of the first arm 1464 and is moveably connected through the guiding groove 14644 to the actuating member 148. Similarly, an end portion of the second arm 1466 includes a guiding groove 14662, and the second arm 1466 is moveably connected through the guiding

prove 14662 to the engagement member 144a. The second arm 1466 also includes a guiding groove 14664 at the middle portion of the second arm 1466 and is moveably connected through the guiding groove 14664 to the actuating member 148. As the same, the above description is also applied to the other linkages 146b, 146c, 146d, so it will not be described in detail here.

[0022] The actuating member 148 includes four protrusion pins 1482 for being inserted into protrusion pins 1502 with holes of the turntable 150 respectively so that the turntable 150 and the actuating member 148 move together. The outer shell 152 is connected to the plate member 142 to form an accommodating space (not shown in the figures) for accommodating the engagement members 144a, 144b, 144c, and 144d, the linkages 146a, 146b, 146c, and 146d, and the actuating member 148. The outer shell 152 also includes an opening 1522 which matches with the circumference of the turntable 150 such that the turntable 150 can be exposed out of the opening 1522. There are four sets of first concave portions 1524a and second concave portions 1524b formed on the side wall of the opening 1522 as first positioning portions; there are four protrusion portions 1504 formed on the circumference of the turntable 150 as second positioning portions. When the turntable 150 rotates, each of the protrusion portions 1504 is engaged with the first concave portion 1524a or the second concave portion 1524b selectively; that is, the first positioning portions and the second positioning portions constrain each other. In the embodiment, the turntable 150 further includes many concave holes 1506, and the user can easily rotate the turntable 150 by inserting fingers into the concave holes 1506.

[0023] Please refer to FIG. 3 and FIG. 4. FIG. 4 is an assembly diagram of a round head screw 156 and a guiding pin 154 with a threaded hole. It is notable that the pivotally connecting of the pivot portion 1462 and the plate member 142 could be achieved by inserting the guiding pin 154 with a threaded hole into the hole 142b of the plate member 142, then putting the linkage 146a on the guiding pin 154 through a hole 1462a formed at the pivot portion 1462, and finally screwing the round head screw 156 into the threaded hole of the guiding pin 154. Therein, the guiding pin 154 includes a tooth base 1542 in FIG. 4 for being embedded in the hole 142b of the plate member 142 to strengthen the connecting strength of the guiding pin 154 and the plate member 142. As the same, the above description could also be applied to the moveably connecting of the guiding grooves 14644 and 14664 and the engagement member 144a, and the moveably connecting to the guiding grooves 14644 and 14664 and the actuating member 148. Hereby, the guiding pins 154 are constrained to move in the actuating grooves 14642, 14662, 14644, and 14664 correspondingly. However, the invention is not limited to this. For example, the guiding pin 154 could also be formed by stamping the plate member 142, the actuating member 148, or the engagement members 144a, 144b, 144c, and 144d. Besides, the above description is also applied to the engagement of the other linkages 146b, 146c, and 146d with the engagement member 144b, 144c, and 144d, with the plate member 142, or with the actuating member 148, so it will not be described in detail here. In addition, to prevent the diagram from complication, the guiding pin 154 and the round screw 156 are not shown in FIG. 3.

[0024] Please refer to FIG. 5 and FIG. 6. FIG. 5 is a schematic diagram of the electronic-device casing 14 as disengaged from the side portion 122. FIG. 6 is a schematic dia-

gram of the electronic-device casing **14** as engaged with the side portion **122**. Therein, the turntable **150** and the outer shell **152** are not shown in FIG. 5 and FIG. 6. When the actuating member **148** rotates forward (e.g. clockwise in the embodiment), in other words, the turntable **150** rotates forward, the actuating member **148** drives the linkages **146a**, **146b**, **146c**, and **146d** to rotate clockwise so as to drive the engagement member **144a** and **144c** to move along the first direction **D1** relative to the plate member **142** and to be engaged with the engagement hole **122a** of the side portion **122** and also to drive the engagement member **144b** and **144d** to move along the second direction **D2** relative to the plate member **142** and to be engaged with the engagement hole **122a** of the side portion **122**; thus the engagement of the electronic-device casing **14** and the casing **12** is accomplished. At this time, the protrusion portion **1504** of the turntable **150** is disengaged from the first concave portion **1524a** to be engaged with the second concave portion **1524b**. Therefore, the user can easily assemble the electronic-device casing **14** to the side portion **122** of the casing **12** in a single operation.

[0025] In the condition of having been engaged, when the actuating member **148** rotates reversely (e.g. counterclockwise in the embodiment), in other words, the turntable **150** rotates reversely, the actuating member **148** drives the linkages **146a**, **146b**, **146c**, and **146d** respectively to rotate counterclockwise so as to drive the engagement members **144a** and **144c** to move relative to the plate member **142** along the first direction **D1** to be disengaged from the engagement holes **122a** of the side portion **122** and also to drive the engagement members **144b** and **144d** to move relative to the plate member **142** along the second direction **D2** to be disengaged from the engagement holes **122a** of the side portion **122** simultaneously. At this time, the protrusion portion **1504** of the turntable **150** is disengaged from the second concave portion **1524b** to be engaged with the first concave portion **1524a**. Thus, the electronic-device casing **14** is disengaged from the casing **12**, and then the user can check, repair, etc. the interior of the electronic-device casing **14**.

[0026] Therein, in the process of the actuating member **148** rotating, the guiding grooves **14642**, **14644**, **14662**, and **14664** formed in a curve can not only make the engagement members **144a**, **144b**, **144c**, and **144d** move stably but also provide a function of limiting the rotatable angle of the actuating member **148** so that the engagement portions **144e** are not damaged due to overly collision with the slots **142a** of the plate member **142** or the engagement hole **122a** of the side portion **122**, even to influence the engagement function.

[0027] As shown in the above embodiment, the electronic-device casing **14** of the invention offers a simple and easy operation interface to the user. The user could even finish the operation of either engagement or disengagement of the electronic-device casing **14** and the casing **12** by one hand. Furthermore, the electronic-device casing **14** of the invention provides a whole and uniform engagement and a whole and uniform engagement force so as to enhance the firmness of the whole electronic apparatus **1** and the durability of the electronic-device casing **14**.

[0028] It is notable that although the above embodiment is based on the engagement members **144a**, **144b**, **144c**, and **144d** which are disposed symmetrically in a rectangle, the invention is not limited to this. The electronic-device casing **14** of the invention can use only two of the engagement members (such as the engagement members **144a** and **144b**) to achieve the purpose of being engaged with the casing **12**. At

this time, the first direction **D1** and the second direction **D2** can be set to be non-vertical or non-parallel so as to provide a two-dimensions positioning and fixing function and also to gain an allowable engagement force and the distribution thereof (such as disposing the engagement members **144a** and **144c** non-parallel). As the same, the engagement members used by the electronic-device casing **14** of the invention are not limited to two or four. Under the consideration to the design condition for the side portion **122** of the casing **12**, the electronic-device casing **14** also can use three or more engagement members. At this time, the side portion **122** of the casing **12** is designed to be matched correspondingly. In other words, if a current casing has an engagement structure capable of being engaged with the electronic-device casing **14** of the invention, the electronic-device casing **14** can replace the original one of the current casing.

[0029] Compared with the prior art, the electronic-device casing of the invention has the advantage of easily operating and stable engagement structure; moreover, the engagement of the engagement portions located at several locations is accomplished at a time in a single operation by use of the leverage principle and the linkage mechanism. Accordingly, the electronic-device casing of the invention has the advantages of convenient use, firm engagement, and engaging/disengaging durability, and solves the problems in the prior art.

[0030] With the example and explanations above, the features and spirits of the invention will be hopefully well described. Those skilled in the art will readily observe that numerous modifications and alterations of the device may be made while retaining the features and spirit of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

What is claimed is:

1. An electronic-device casing comprising a side plate, the side plate being assembled to a side portion of a casing, the side plate comprising:

- a plate member;
- a first engagement member, moveably disposed on the plate member along a first direction;
- a second engagement member, moveably disposed on the plate member along a second direction;
- a plurality of linkages, pivotally engaged with the plate member and moveably engaged with the first engagement member and the second engagement member; and
- an actuating member, moveably engaged with the linkages, the actuating member being suitable for rotating to drive the linkages so as to drive the first engagement member and the second engagement member to move along the first direction and the second direction relative to the plate member respectively and to be engaged with the side portion or disengaged from the side portion.

2. The electronic-device casing of claim 1, wherein the first engagement member and the second engagement member comprise a plurality of engagement portions, and the engagement portions pass through the plate member and are adapted to be engaged with the side portion.

3. The electronic-device casing of claim 2, wherein the plate member has a plurality of slots, and the engagement portions pass through the slots.

4. The electronic-device casing of claim 1, wherein each of the linkages comprises a first guiding groove, the linkages are moveably engaged with the first engagement member and the second engagement member via the first guiding grooves.

5. The electronic-device casing of claim 4, wherein each of the first engagement member and the second engagement member comprise a guiding pin moving in the corresponding first guiding groove.

6. The electronic-device casing of claim 4, wherein each of the linkages comprises a pivot portion, a first arm, and a second arm, the first arm and the second arm are connected to the pivot portion, each of the linkages is pivotally engaged with the plate member via the pivot portion, and an end of the first arm or the second arm away from the pivot portion is moveably engaged with the first engagement portion or the second engagement portion.

7. The electronic-device casing of claim 6, wherein each of the first arm and the second arm has a second guiding groove near the pivot portion, and the actuating member is moveably engaged with the second guiding grooves.

8. The electronic-device casing of claim 1, further comprising a outer shell and a turntable, the outer shell being connected to the plate member, the first engagement member, the second engagement member, the linkages, and the actuating member being accommodated between the outer shell and the plate member, the turntable being pivotally disposed on the outer shell and being connected to the actuating member.

9. The electronic-device casing of claim 8, wherein the outer shell comprises an opening, and the turntable is disposed in the opening.

10. The electronic-device casing of claim 9, wherein the turntable comprises a first positioning portion, the opening comprises a second positioning portion, and when the actuating member rotates so that the first engagement member and the second engagement member are engaged with the side portion, the first positioning portion and the second positioning portion restrain each other.

11. An electronic apparatus comprising:
a casing comprising a side portion; and
a side plate being assembled to the side portion, the side plate comprising:
a plate member;
a first engagement member, moveably disposed on the plate member along a first direction;
a second engagement member, moveably disposed on the plate member along a second direction;
a plurality of linkages, pivotally engaged with the plate member and moveably engaged with the first engagement member and the second engagement members; and
an actuating member, moveably engaged with the linkages, the actuating member is suitable for rotating to drive the linkages so as to drive the first engagement member and the second engagement member to move along the first

direction and the second direction relative to the plate member respectively and to be engaged with the side portion or disengaged from the side portion.

12. The electronic apparatus of claim 11, wherein the first engagement member and the second engagement member comprise a plurality of engagement portions, and the engagement portions pass through the plate member and are adapted to be engaged with the side portion.

13. The electronic apparatus of claim 12, wherein the plate member has a plurality of slots, and the engagement portions pass through the slots.

14. The electronic apparatus of claim 11, wherein each of the linkages comprises a first guiding groove, the linkages are moveably engaged with the first engagement member and the second engagement member via the first guiding groove.

15. The electronic apparatus of claim 14, wherein the first engagement member and the second engagement member comprise a guiding pin moving in the corresponding first guiding groove.

16. The electronic apparatus of claim 14, wherein each of the linkages comprises a pivot portion, a first arm, and a second arm, the first arm and the second arm are connected to the pivot portion, each of the linkages is pivotally engaged with the plate member via the pivot portion, and an end of the first arm and the second arm away from the pivot portion, is moveably engaged with the first engagement portion or the second engagement portion.

17. The electronic apparatus of claim 16, wherein the first arm and the second arm have a second guiding groove near of the pivot portion, and the actuating member is moveably engaged with the second guiding grooves.

18. The electronic apparatus of claim 11, further comprising an outer shell and a turntable, the outer shell being connected to the plate member, the first engagement member, the second engagement member, the linkages, and the actuating member being accommodated between the outer shell and the plate member, the turntable being pivotally disposed on the outer shell and being connected to the actuating member.

19. The electronic apparatus of claim 18, wherein the outer shell comprises an opening, and the turntable is disposed in the opening.

20. The electronic apparatus of claim 19, wherein the turntable comprises a first positioning portion, the opening comprises a second positioning portion, and when the actuating member rotates so that the first engagement member and the second engagement member are engaged with the side portion, the first positioning portion and the second positioning portion restrain each other.

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