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(54) **SMOOTHLY OPENABLE AND CLOSABLE DUAL-SHAFT HINGE**

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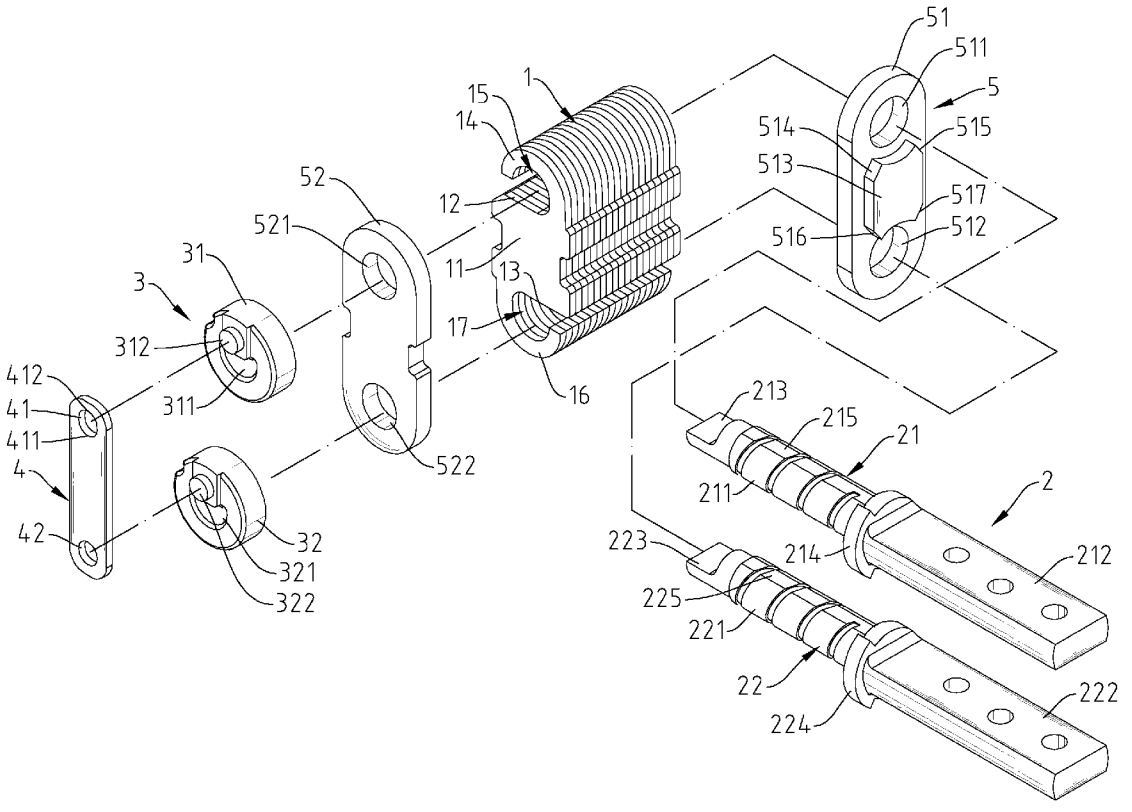
(57) **ABSTRACT**

A smoothly openable and closable dual-shaft hinge includes an axle housing, and a pivot shaft set including a first pivot shaft and a second pivot shaft respectively pivotally coupled to first and second pivot shaft chambers of the axle housing and respectively affixed to a cover member and a base member. When the cover member is turned between opposing top side and bottom side of the base member first pivot shaft, the friction resistance produced between the first pivot shaft and the axle housing is different from the friction resistance produced between the second pivot shaft and the axle housing.



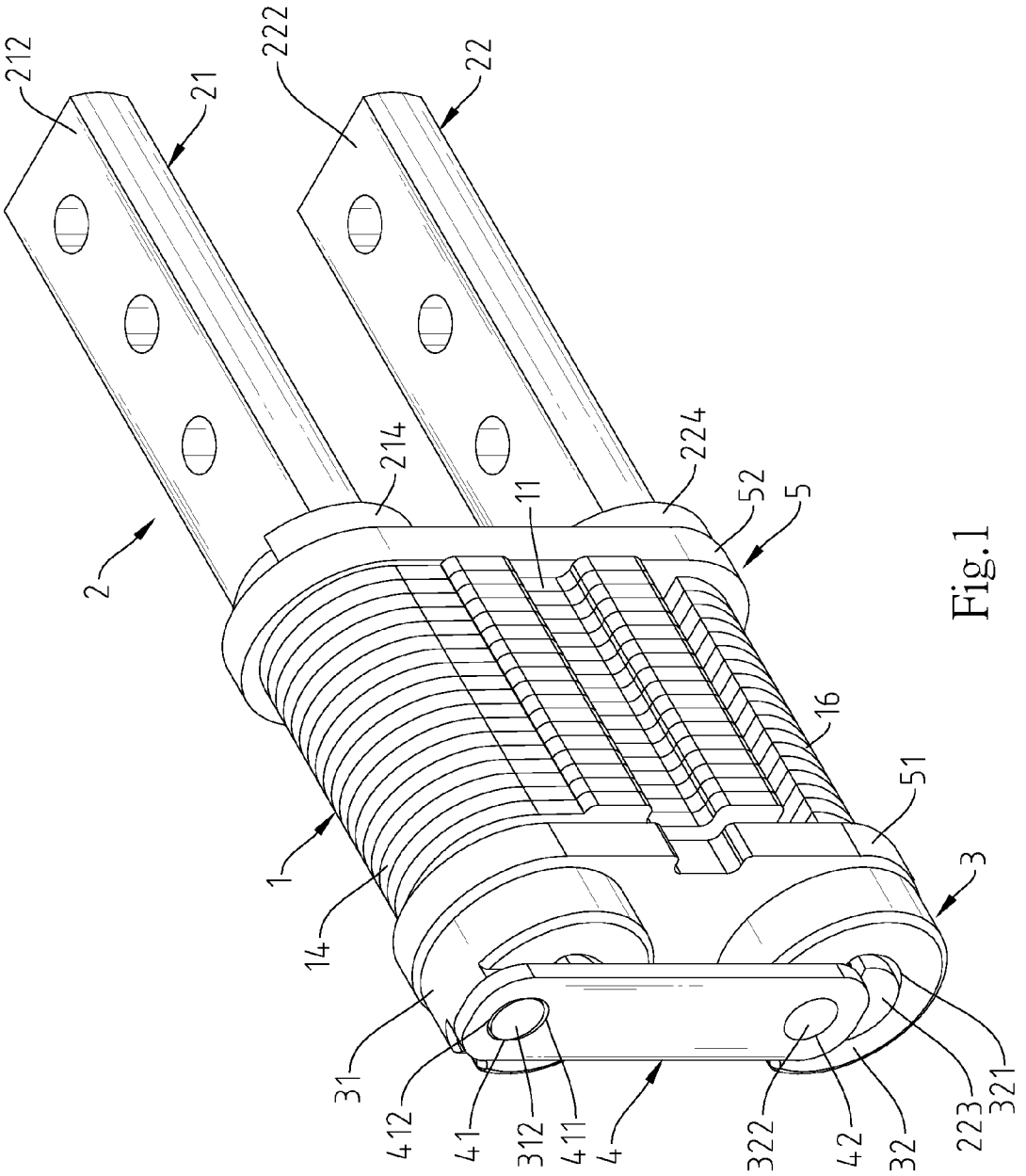

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Fig. 1

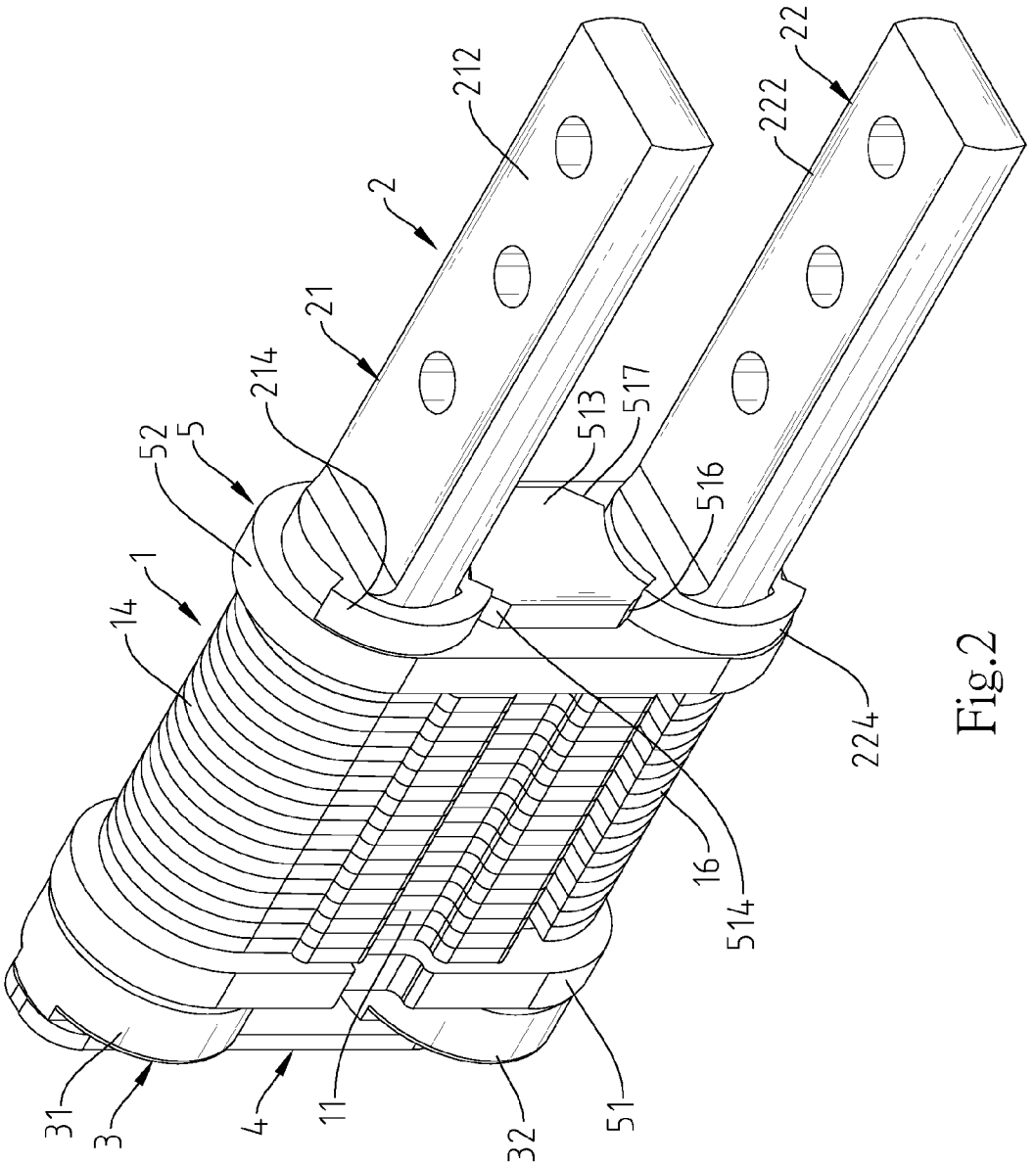

Fig.2

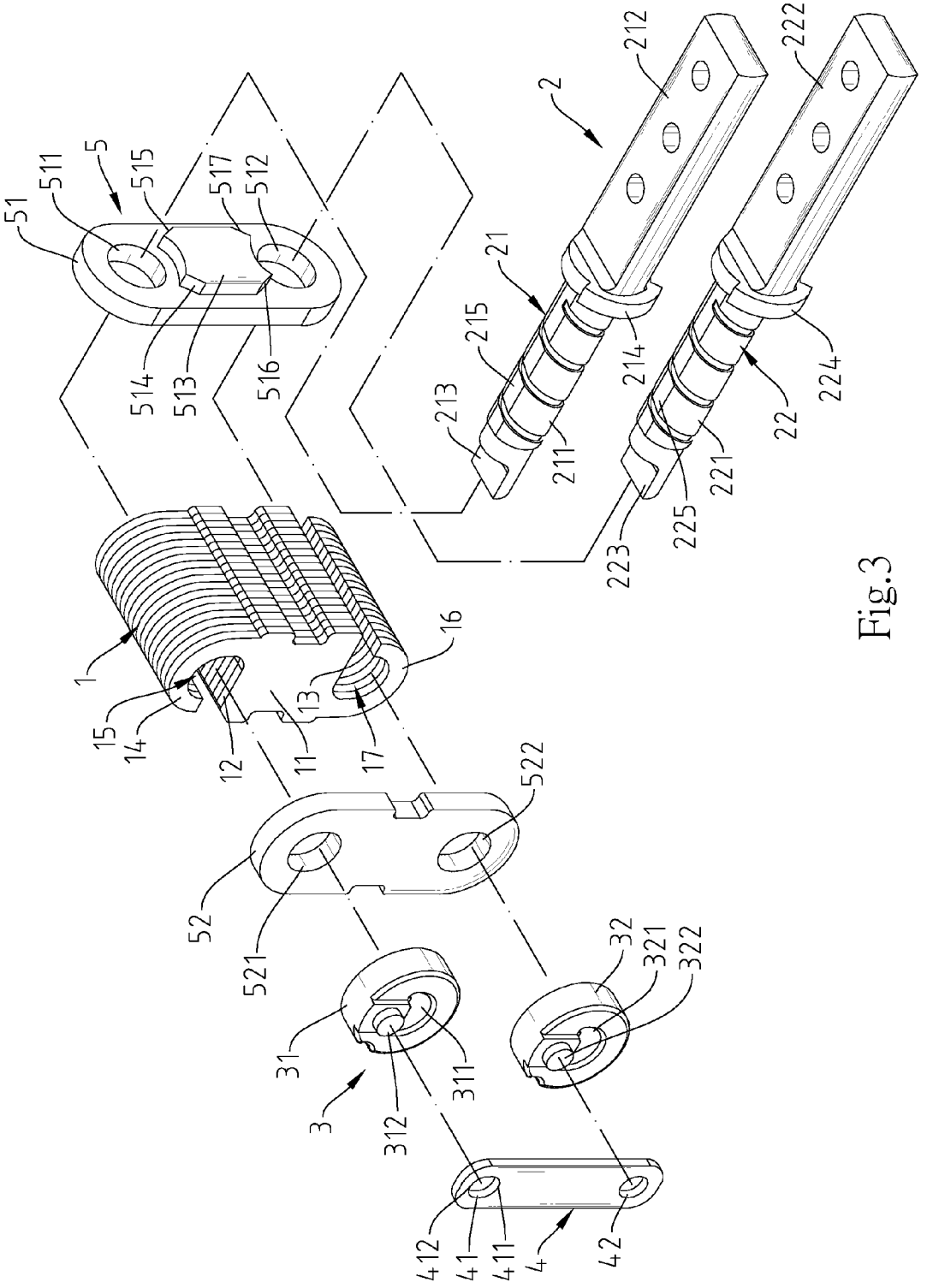
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Fig.3

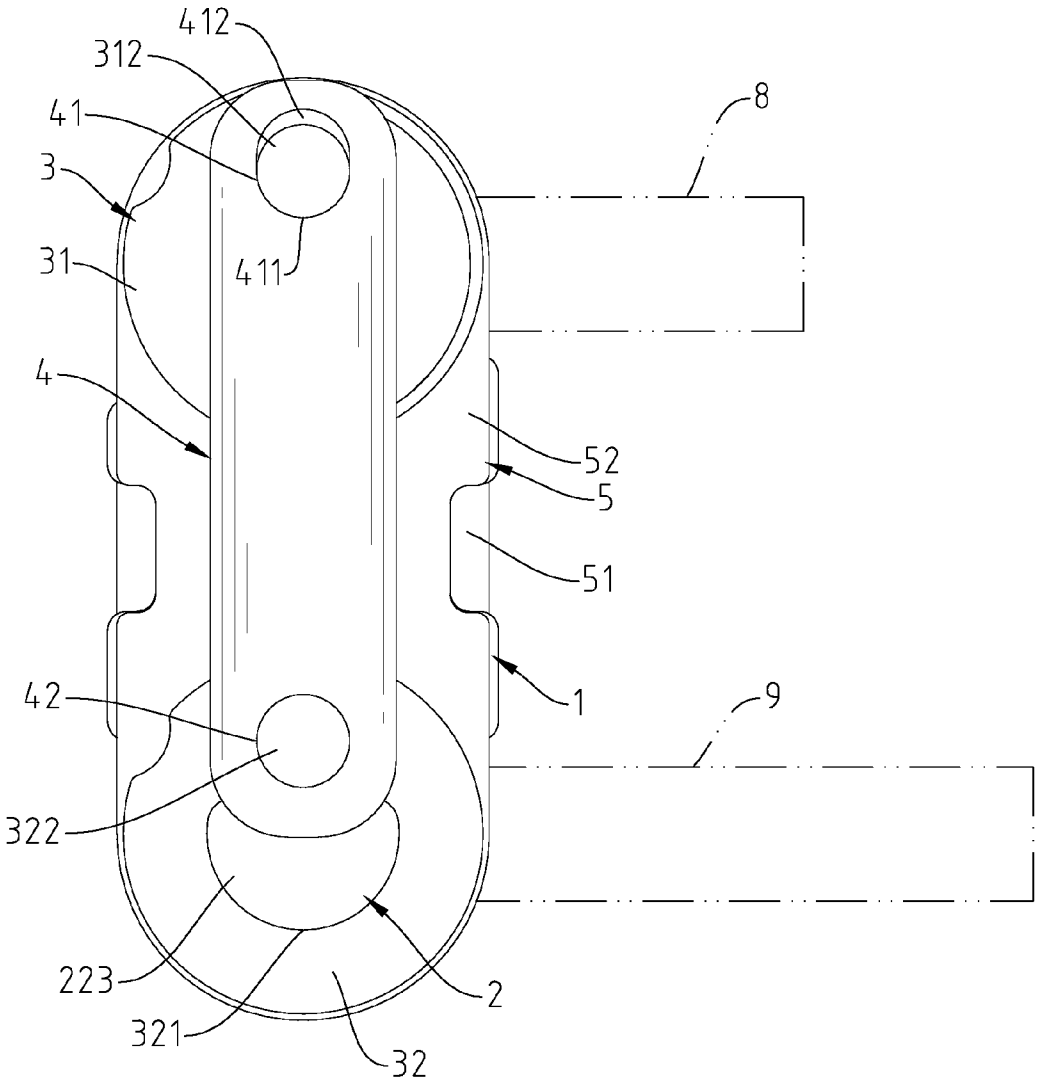


Fig.4

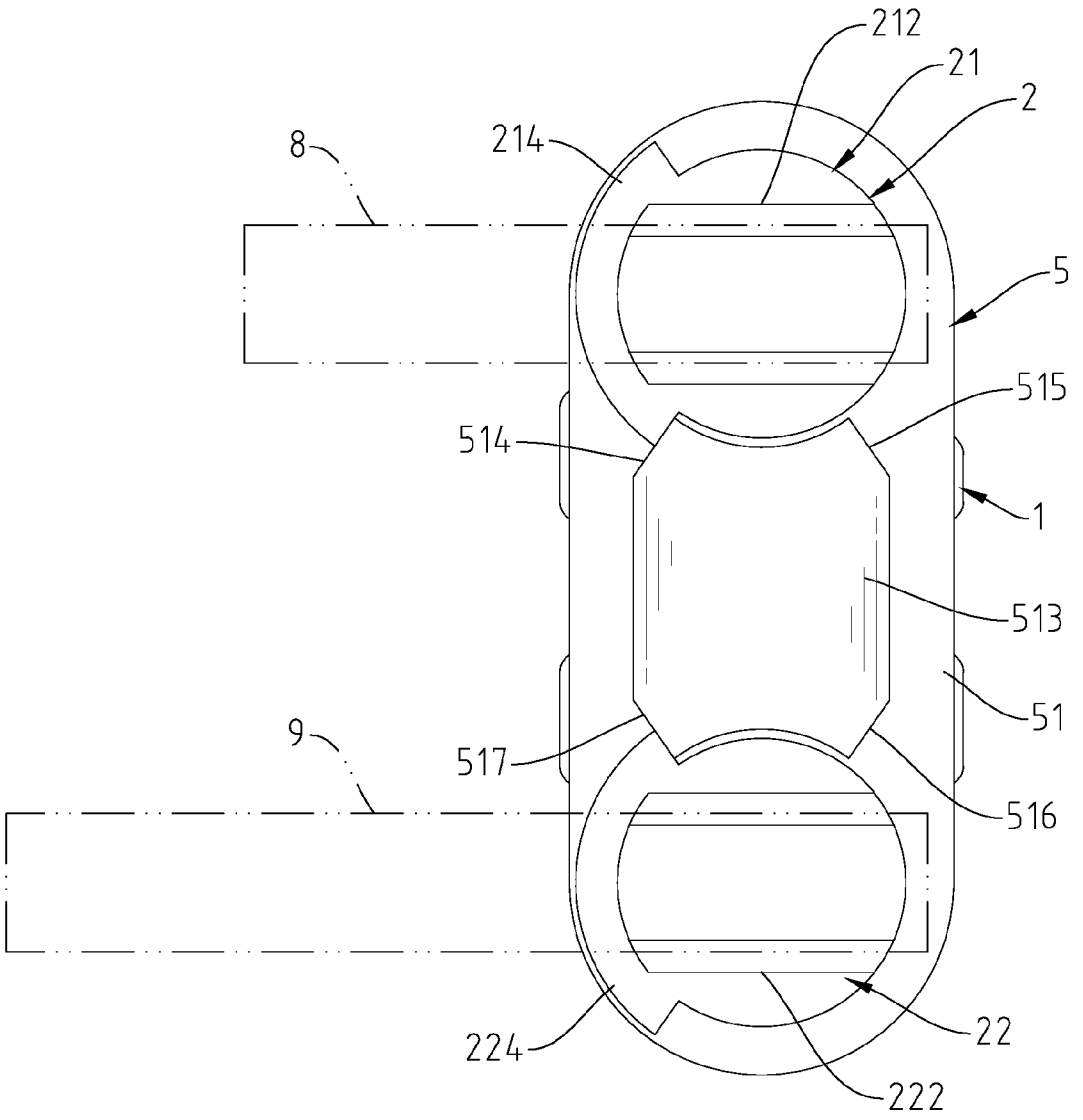


Fig.5

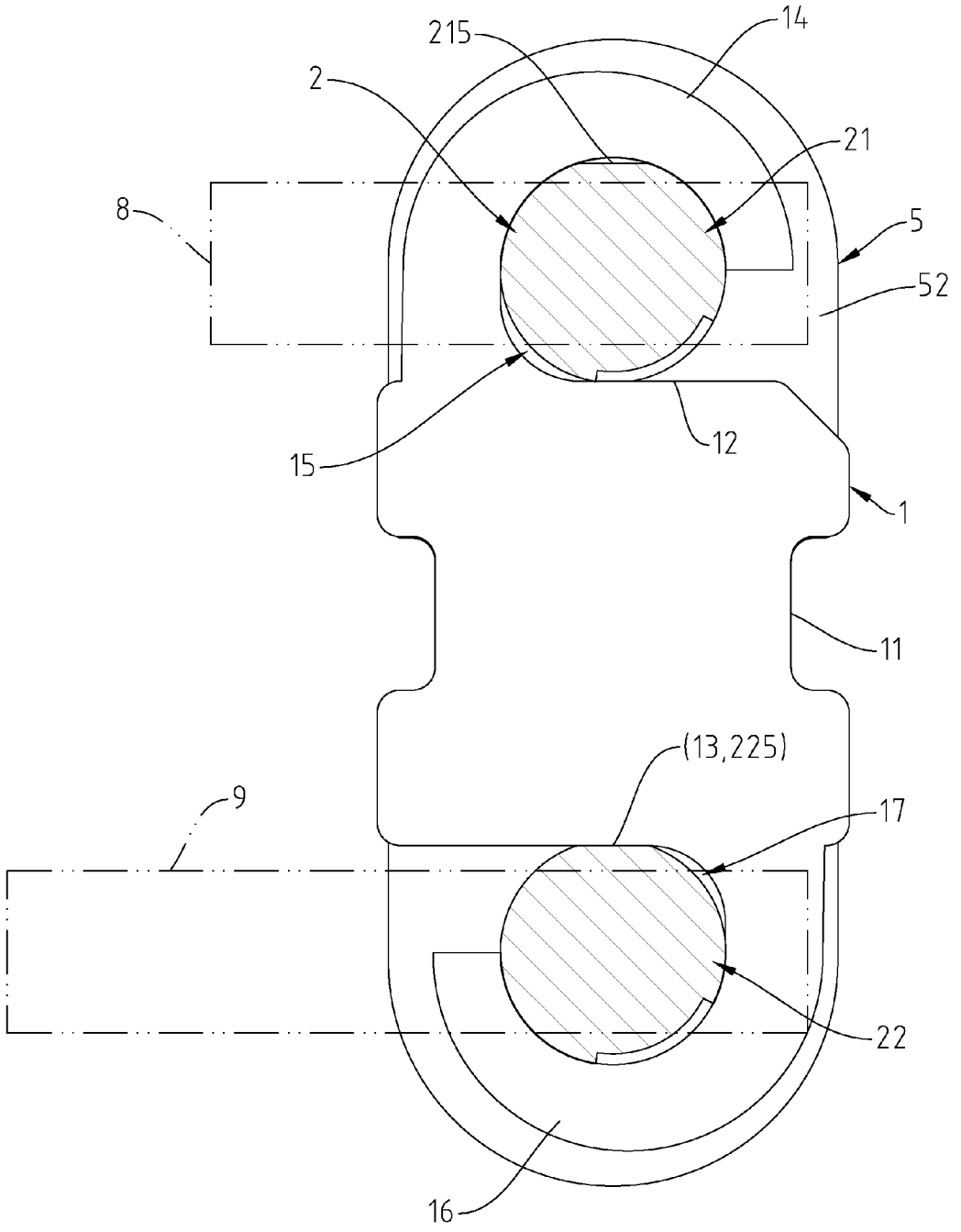


Fig.6

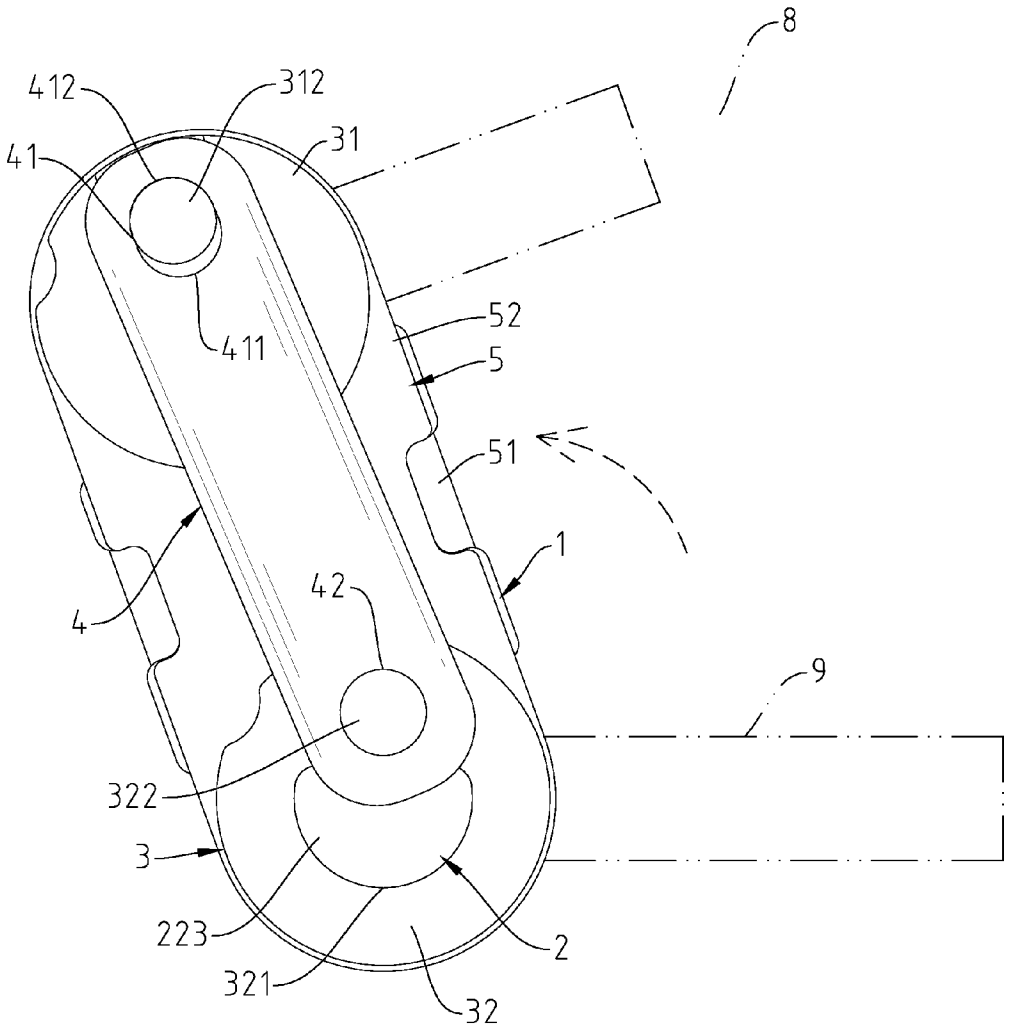
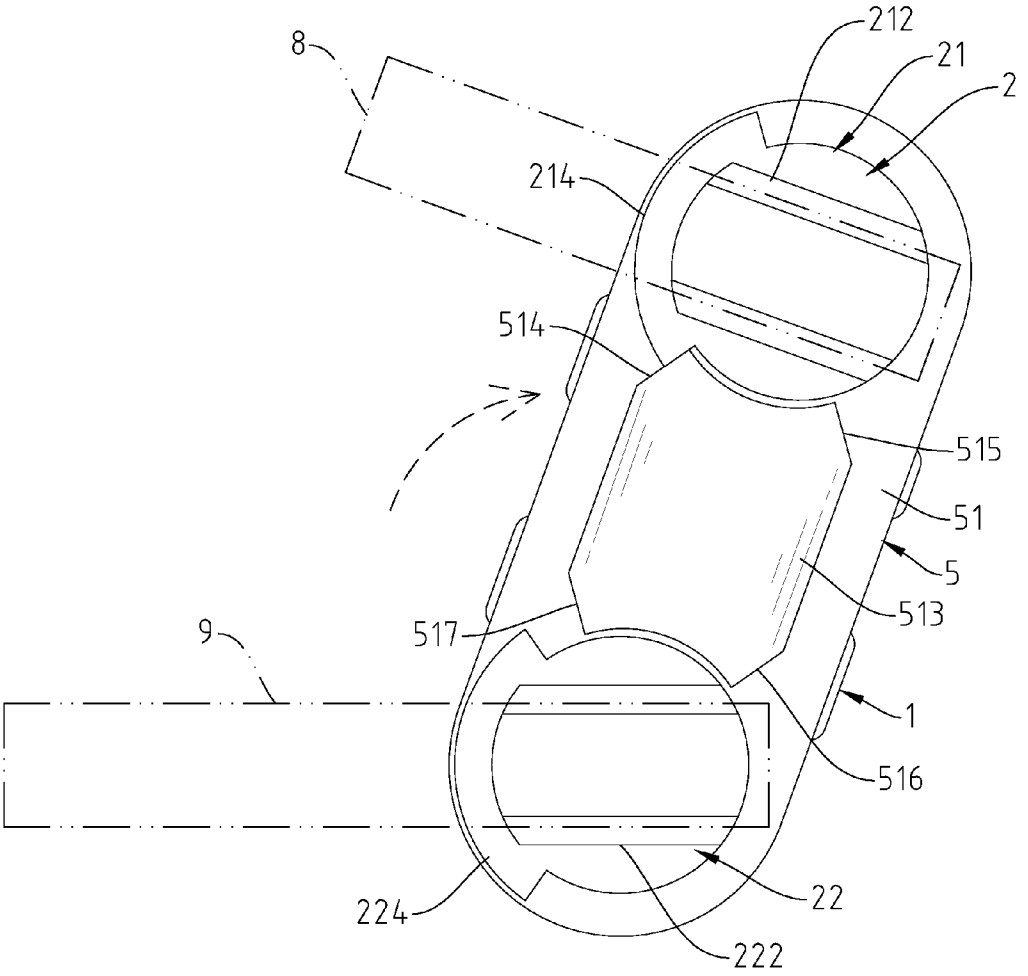


Fig.7



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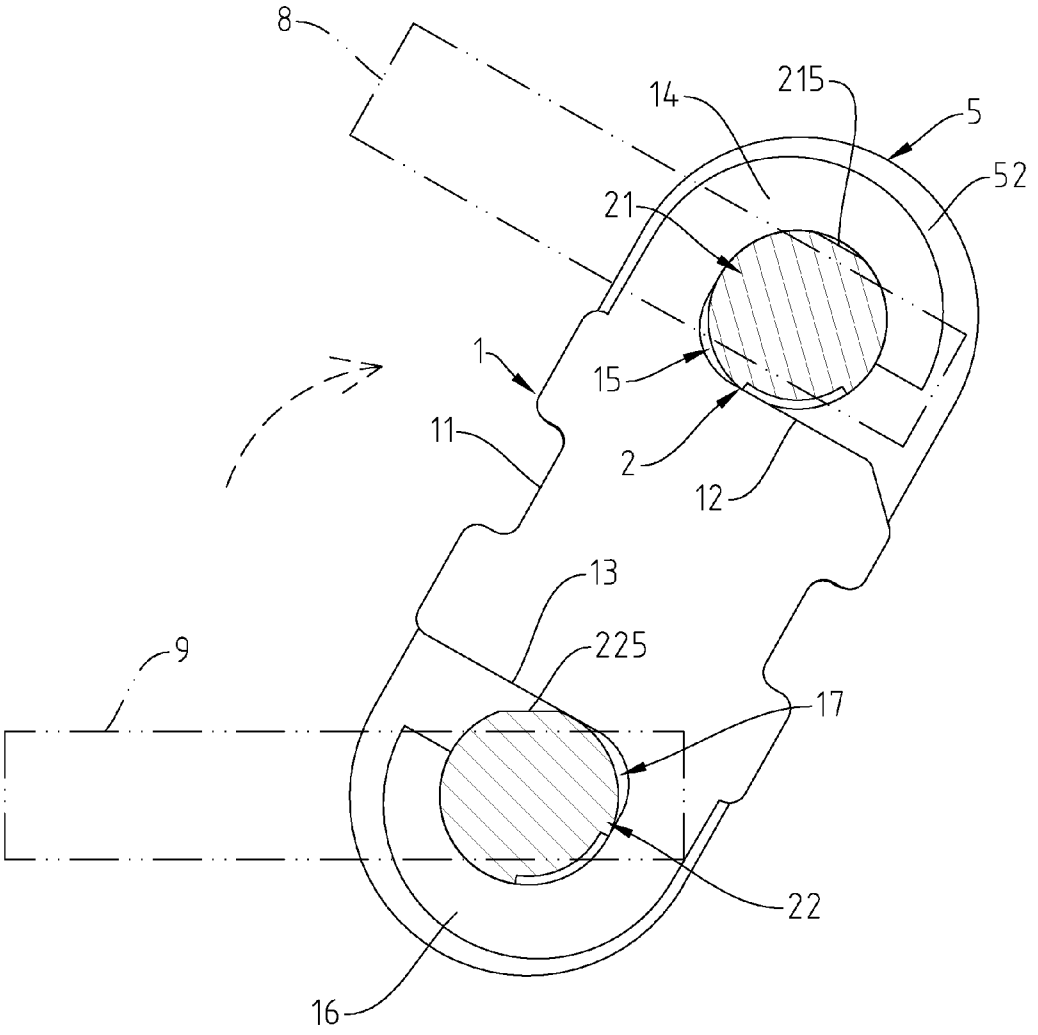


Fig.9

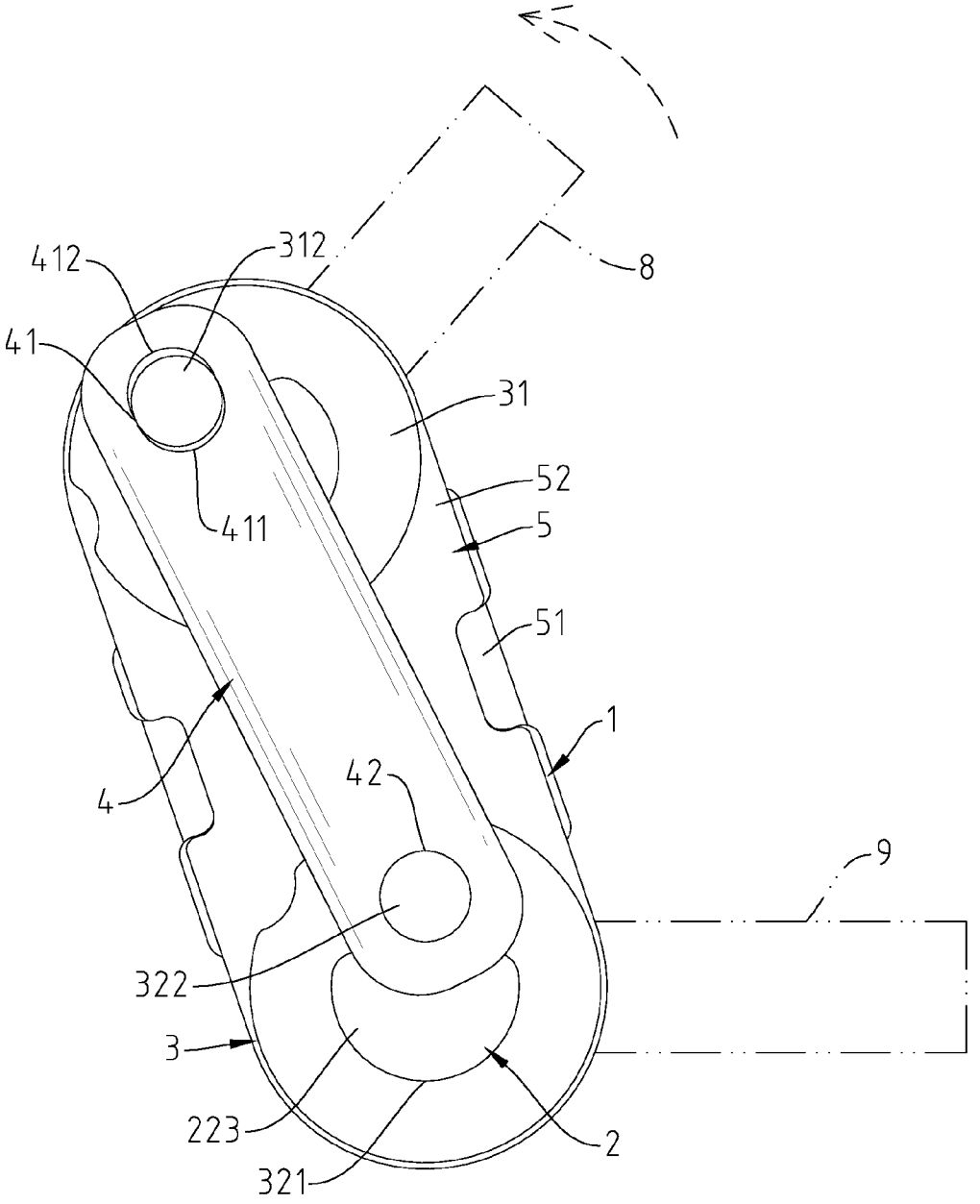
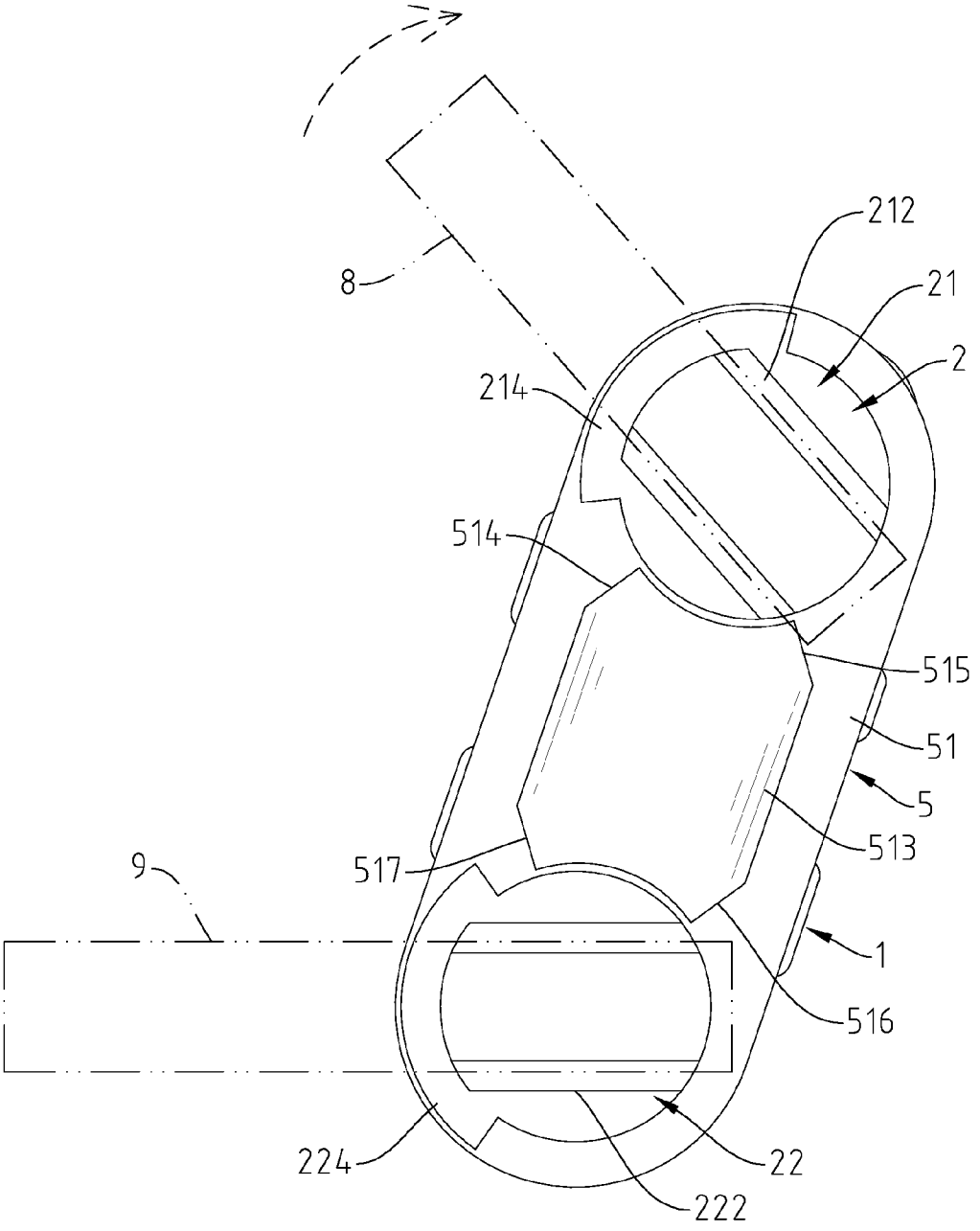


Fig.10



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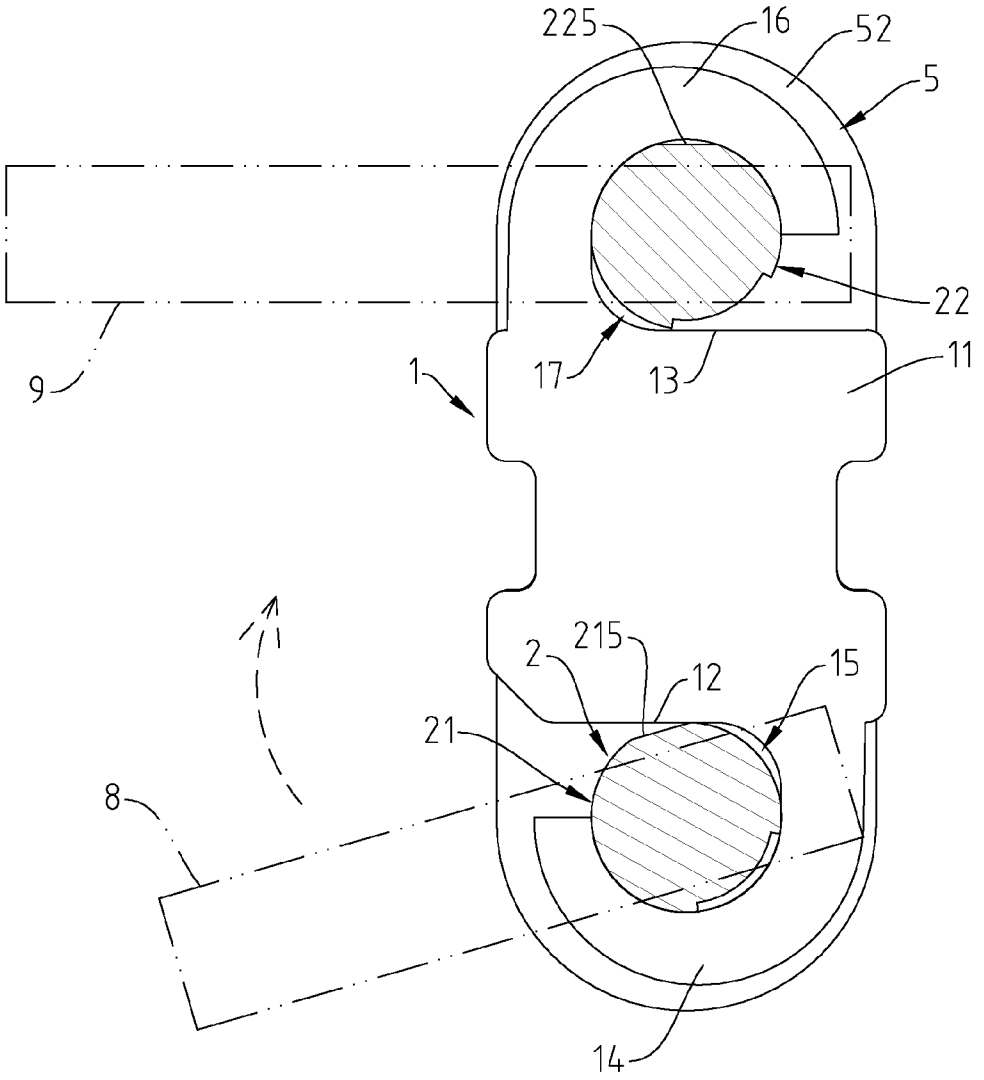

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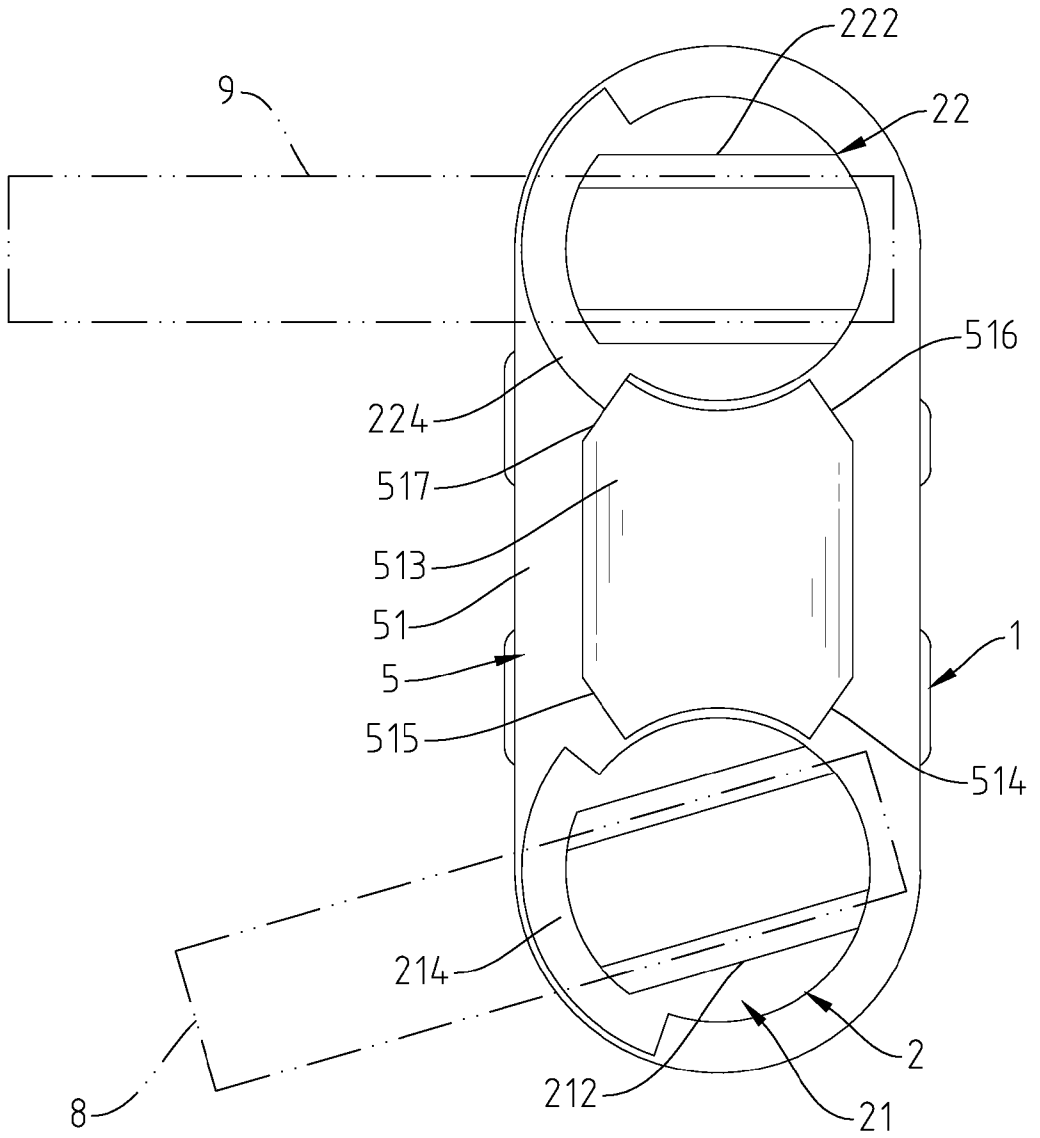

Fig.13

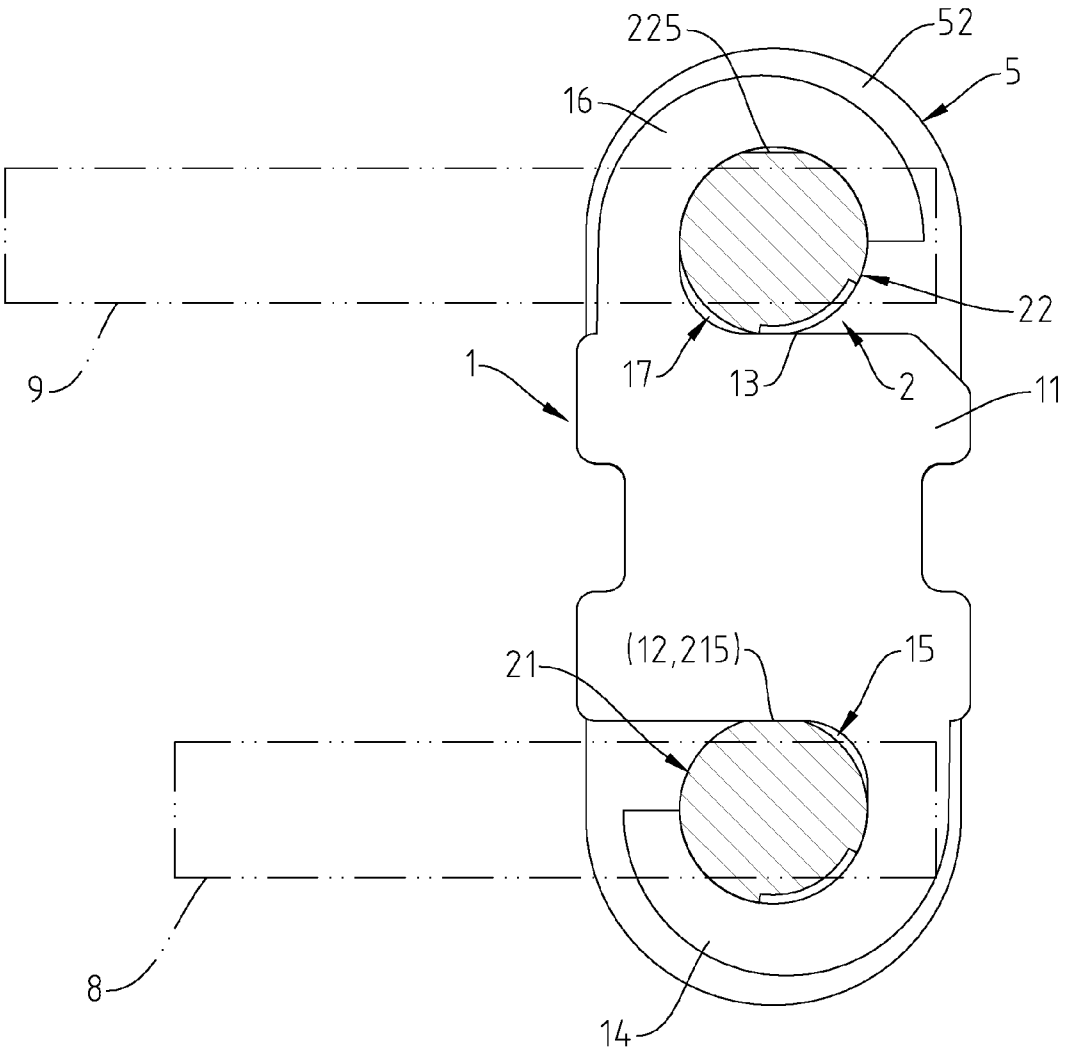

Fig.14

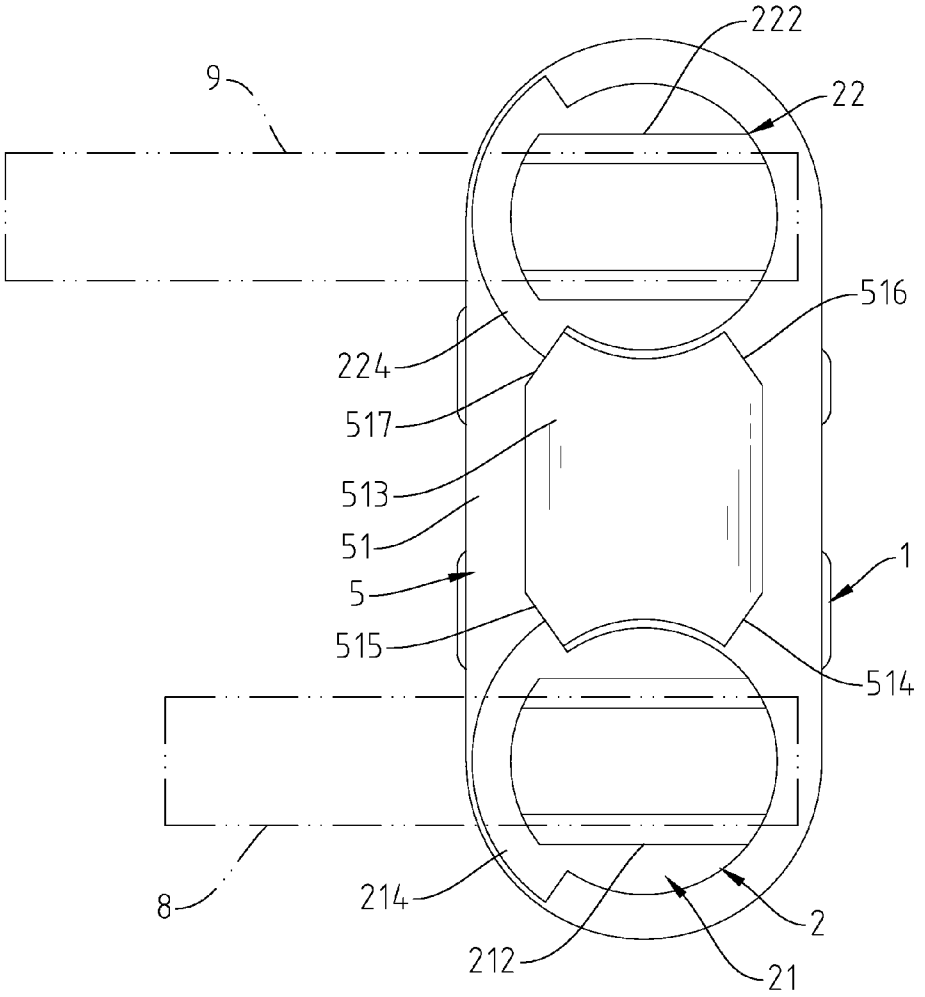

Fig.15

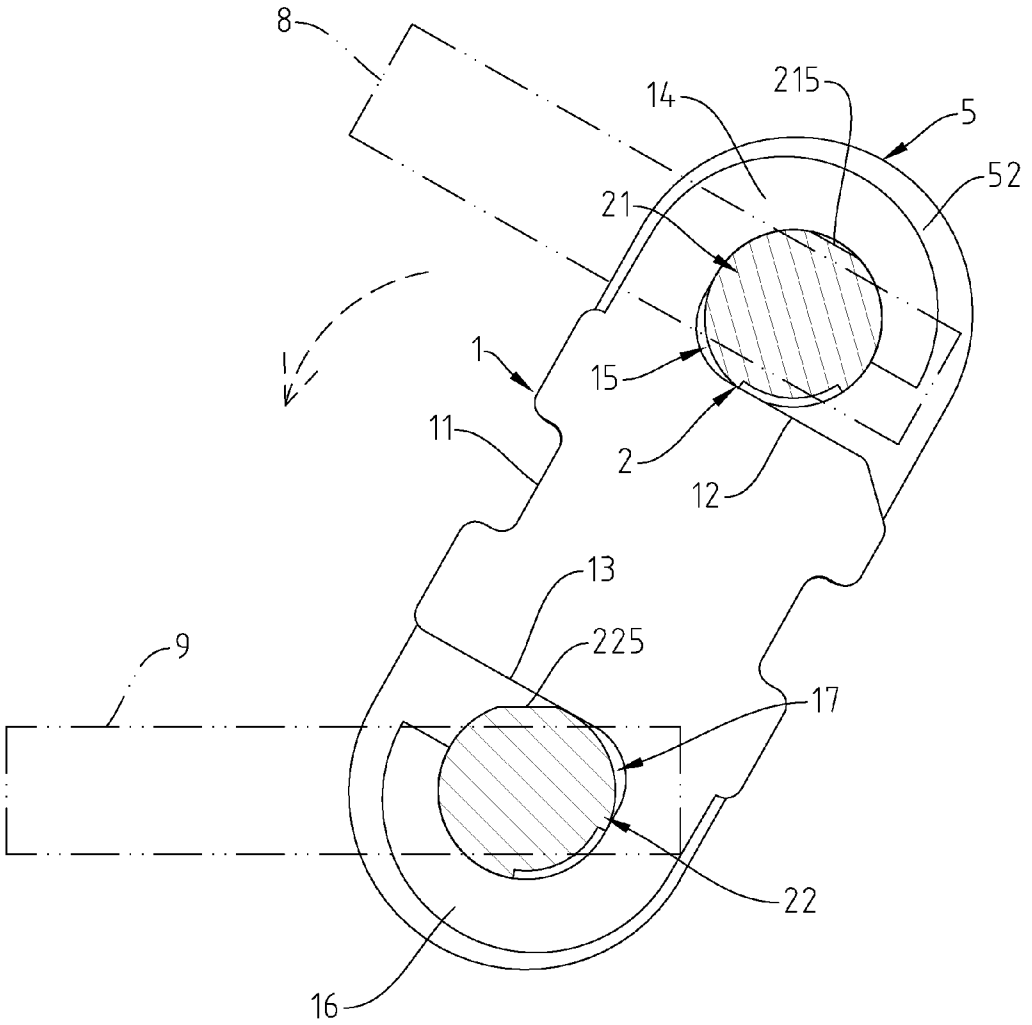

Fig.16

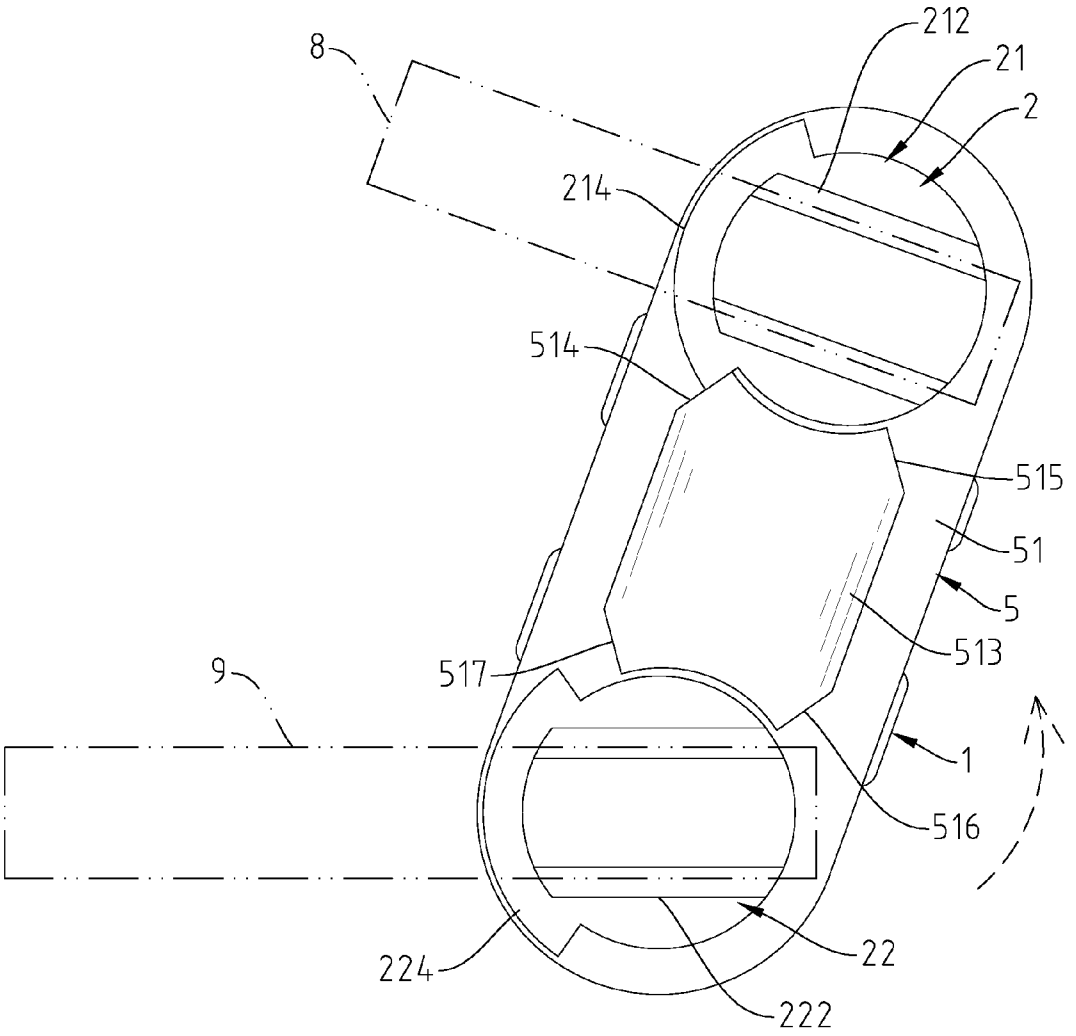

Fig.17

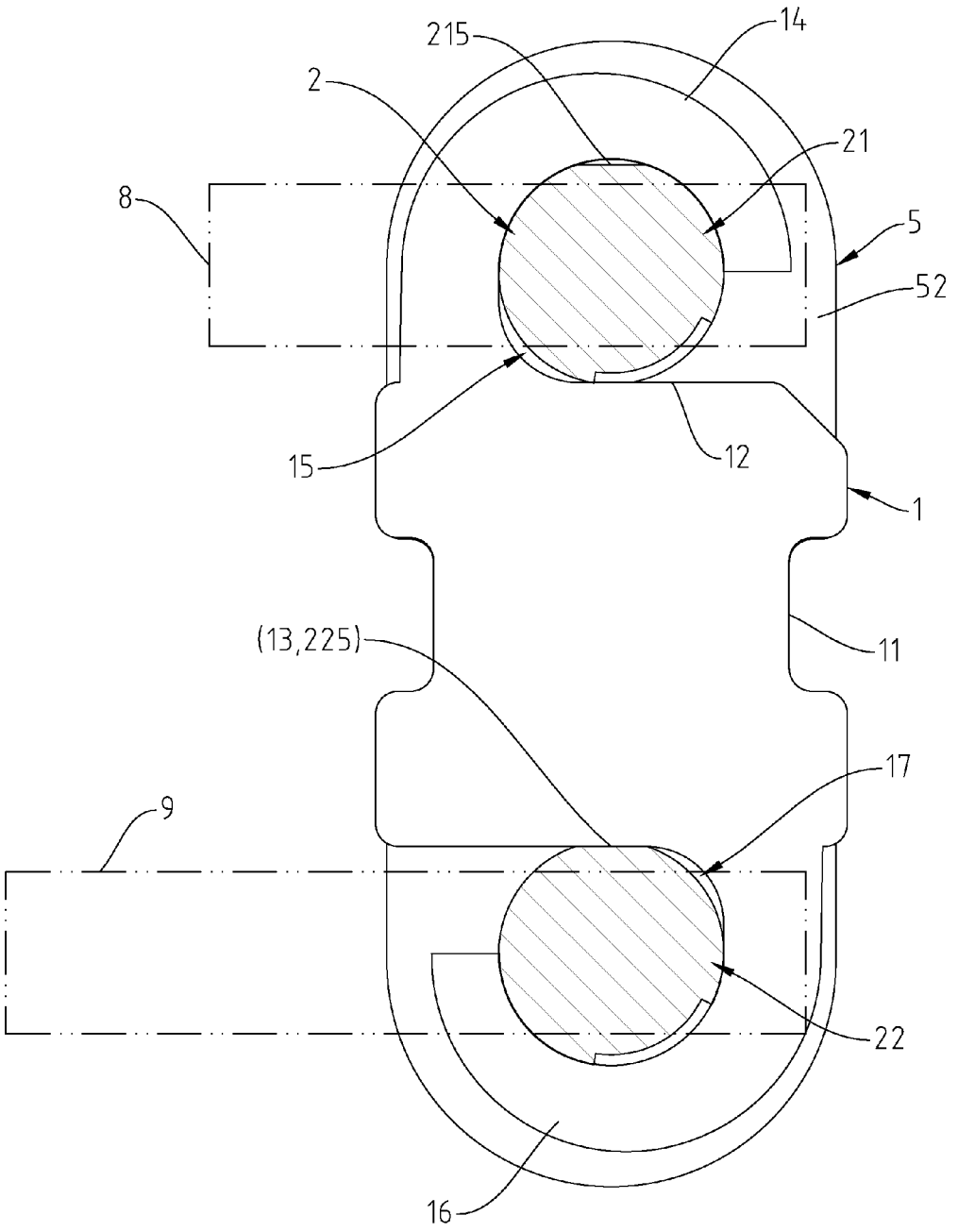

Fig.18

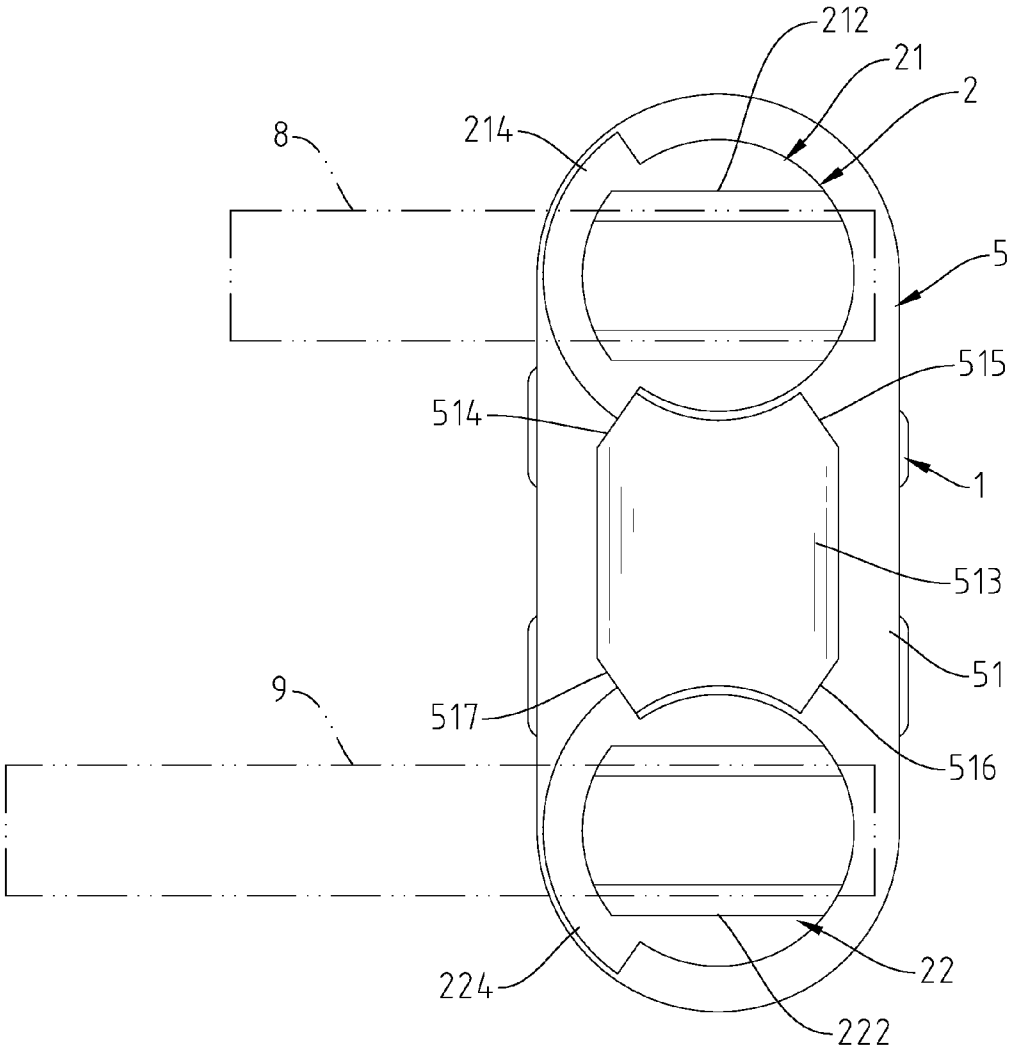

Fig.19

SMOOTHLY OPENABLE AND CLOSABLE DUAL-SHAFT HINGE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to hinge technology and more particularly, to a smoothly openable and closable dual-shaft hinge, which is practical for use in a dual leaf electronic device, allowing the cover member of the dual leaf electronic device to be opened from to the base member thereof or closed on it smoothly.

[0003] 2. Description of the Related Art

[0004] Flip-up mobile electronic devices, such as notebooks, smart phones, generally comprise a base member and a cover member. Some flip-up mobile electronic devices allow the cover member to be turned to the bottom side of the base member, allowing the flip-up mobile electronic device to be used as a tablet computer. A folding tablet computer is also known comprised of dual leaf touchscreen. When using the folding tablet computer, the user needs to extend out the dual leaf touchscreen. A flip-up mobile electronic device generally uses a dual-shaft hinge to connect the base member and the cover member, allowing the cover member to be turned between the top surface of the base member and the bottom side thereof. A dual-shaft hinge for this application purpose generally comprises an axle housing, and a first pivot shaft and a second pivot shaft respectively pivotally coupled to the axle housing and respectively affixed to the cover member and the base member, and thus, the cover member can be turned from the top side of the base member to the bottom side thereof, or turned from the bottom side of the base member to the top side of the base member and then closed on the top side of the base member.

[0005] According to conventional designs, rotation between the first pivot shaft and the axle housing can be achieved through a screw transmission mechanism, a linkage, or a gear transmission mechanism. In any transmission design, rotation of the first pivot shaft can cause the axle housing to be turned about the second pivot shaft, i.e., the rotation of the first pivot shaft and the turning action of the axle housing about the second pivot shaft occur at the same time. The rotation of the first pivot shaft and the turning action of the axle housing about the second pivot shaft occur simultaneously due to that the designer cannot control the sequence and angle of the action of the first pivot shaft and the action of the axle housing. Forcing the first pivot shaft to rotate on its own axis and the axle housing to turn about the second pivot shaft causes the first pivot shaft and the second pivot shaft to bear a large stress, and thus, the first pivot shaft and the second pivot shaft can be broken easily during operation. The stress can be produced heavily at the initial stage the dual-shaft hinge is turned. Further, because the first and second pivot shafts are rotated at the same time, an angular deviation produced between the first and second pivot shafts can cause a jam, leading to hinge damage.

SUMMARY OF THE INVENTION

[0006] The present invention has been accomplished under the circumstances in view. It is therefore the main object of the present invention to provide a smoothly openable and closable dual-shaft hinge, which has the axle housing so designed that when the cover member is turned in direction from the top side of the base member toward the bottom side thereof, the friction resistance between the first pivot shaft of the pivot shaft set and the axle housing is smaller than the friction resistance between the second pivot shaft of the pivot shaft set and the axle housing, and, when the cover member is turned in direction from the bottom side of the base member toward the top side thereof, friction resistance between the first pivot shaft and the axle housing is larger than the friction resistance between the second pivot shaft and the axle housing, and thus, the actuation sequence and angle of the rotation of the first pivot shaft in the axle housing and the turning of the axle housing about the second pivot shaft can be smoothly controlled.

[0007] To achieve this and other objects of the present invention, a smoothly openable and closable dual-shaft hinge comprises an axle housing and a pivot shaft set. The axle housing comprises a base defining a first surface at a top side thereof and a second surface at an opposing bottom side thereof, a first bearing portion smoothly curved from one lateral side of the first surface of the base in direction toward an opposite lateral side of the first surface, a first pivot shaft chamber defined between the first bearing portion and the first surface, a second bearing portion smoothly curved from one lateral side of the second surface of the base in direction toward an opposite lateral side of the second surface, and a second pivot shaft chamber defined between the second bearing portion and the second surface. The first bearing portion and the second bearing portion extend in reversed directions. The pivot shaft set comprises a first pivot shaft, and a second pivot shaft. The first pivot shaft comprises a first shaft body located at one end thereof, and a first connection bar located at an opposite end thereof. The first shaft body is pivotally coupled to the first pivot shaft chamber of the axle housing. The first connection bar is disposed outside the axle housing, and connected to a cover member. The second pivot shaft comprises a second shaft body located at one end thereof, and a second connection bar located at an opposite end thereof. The second shaft body is pivotally coupled to the second pivot shaft chamber of the axle housing. The second connection bar is disposed outside the axle housing, and connected to a base member. When turning the cover member toward a bottom side of the base member, the first pivot shaft is rotated with the cover member in the first pivot shaft chamber and the axle housing is turned about the second pivot shaft in accordance with the turning direction of the cover member, and at this time, the rotating direction of the first pivot shaft is reversed to the extending direction of the first bearing portion from the first surface, and the turning direction of the axle housing is reversed to the extending direction of the second bearing portion from the second surface, and thus, the friction resistance produced between the first shaft body of the first pivot shaft and the first bearing portion is smaller than the friction resistance produced between the second shaft body of the second pivot shaft and the second bearing portion. When turning the cover member toward an opposing top side of the base member, the first pivot shaft is rotated with the cover member in the first pivot shaft chamber in accordance with the turning direction of the cover member, and the axle housing is turned about the second pivot shaft in accordance with the turning direction of the cover member, and at this time, the rotating direction of the first pivot shaft is same as the extending direction of the first bearing portion from the first surface and the turning direction of the axle housing is same as the extending direction of the second bearing portion from the second surface, and thus, the friction resistance produced

between the first shaft body of the first pivot shaft and the first bearing portion is larger than the friction resistance produced between the second shaft body of the second pivot shaft and the second bearing portion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1** is an elevational view of a smoothly openable and closable dual-shaft hinge in accordance with the present invention.

[0009] FIG. **2** corresponds to FIG. **1** when viewed from another angle.

[0010] FIG. **3** is an exploded view of the smoothly openable and closable dual-shaft hinge in accordance with the present invention.

[0011] FIG. **4** is a schematic front view of the present invention illustrating the cover member closed on the top side of the base member.

[0012] FIG. **5** is a schematic rear view of the present invention illustrating the cover member closed on the top side of the base member.

[0013] FIG. **6** is a schematic sectional view of the present invention illustrating the cover member closed on the top side of the base member.

[0014] FIG. **7** is a schematic front view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the axle housing turned about the second pivot shaft.

[0015] FIG. **8** is a schematic rear view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the axle housing turned about the second pivot shaft.

[0016] FIG. **9** is a schematic sectional view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the axle housing turned about the second pivot shaft.

[0017] FIG. **10** is a schematic front view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the first pivot shaft rotated in the axle housing.

[0018] FIG. **11** is a schematic rear view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the first pivot shaft rotated in the axle housing.

[0019] FIG. **12** is a schematic sectional view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the first pivot shaft stopped in position inside the axle housing.

[0020] FIG. **13** is a schematic rear view of the present invention, illustrating the cover member turned in direction from the top side of the base member toward the bottom side thereof and the first pivot shaft stopped in position inside the axle housing.

[0021] FIG. **14** is a schematic sectional view of the present invention, illustrating the cover member closed on the bottom side of the base member.

[0022] FIG. **15** is a schematic rear view of the present invention, illustrating the cover member closed on the bottom side of the base member.

[0023] FIG. **16** is a schematic sectional view of the present invention, illustrating the cover member turned in direction from the bottom side of the base member toward the top side thereof and the first pivot shaft stopped in position inside the axle housing.

[0024] FIG. **17** is a schematic rear view of the present invention, illustrating the cover member turned in direction from the bottom side of the base member toward the top side thereof and the first pivot shaft stopped in position inside the axle housing.

[0025] FIG. **18** is a schematic sectional view of the present invention, illustrating the cover member closed on the bottom side of the base member.

[0026] FIG. **19** is a schematic rear view of the present invention, illustrating the cover member closed on the top side of the base member.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0027] Referring to FIGS. **1-6**, a smoothly openable and closable dual-shaft hinge in accordance with a first embodiment of the present invention is shown. The smoothly openable and closable dual-shaft hinge comprises an axle housing **1**, a pivot shaft set **2**, a transmission mechanism **3**, a link **4** and a positioning device set **5**.

[0028] The axle housing **1** comprises a base **11** having a flat first surface **12** located at a top side thereof and a second surface **13** located at a bottom side thereof in parallel to the first surface **12**, a first bearing portion **14** smoothly curved from one lateral side, namely the right lateral side of the first surface **12** of the base **11** in direction toward an opposite lateral side, namely, the left lateral side of the first surface **12** of the base **11**, a first pivot shaft chamber **15** defined between the first surface **12** of the base **11** and the first bearing portion **14**, a second bearing portion **16** smoothly curved from one lateral side, namely, the left lateral side of the second surface **13** of the base **11** in direction toward an opposite lateral side, namely, the right lateral side of the second surface **13** of the base **11**, and second pivot shaft chamber **17** defined between the second surface **13** of the base **11** and the second bearing portion **15**. The first bearing portion **14** and the second bearing portion **16** extend in reversed directions.

[0029] The pivot shaft set **2** comprises a first pivot shaft **21** and a second pivot shaft **22**. The first pivot shaft **21** comprises a first shaft body **211**, a first connection bar **212** axially extended from one end of the first shaft body **211**, a first positioning tip **213** axially extended from an opposite end of the first shaft body **211**, a first position-limit flange **214** extended around the periphery of the first shaft body **211** adjacent to the first connection bar **212**, and a first positioning plane **215** axially located on the periphery of the first shaft body **211**. The second pivot shaft **22** comprises a second shaft body **221**, a second connection bar **222** axially extended from one end of the second shaft body **221**, a second positioning tip **223** axially extended from an opposite end of the second shaft body **221**, a second position-limit flange **224** extended around the periphery of the second shaft body **221** adjacent to the second connection bar **222**, and a second positioning plane **225** axially located on the periphery of the second shaft body **221**. Further, the first shaft body **211** of the first pivot shaft **21** is pivotally coupled to the first pivot shaft chamber **15** of the axle housing **1**; the first connection bar **212** is disposed outside the axle housing **1** and connected to a cover member **8** (of a mobile dual leaf electronic device); the second shaft body **221** of the second pivot shaft **22** is pivotally coupled to the second pivot shaft chamber **17** of the axle housing **1**; the

second connection bar **222** is disposed outside the axle housing **1** and connected to a base member **9** (of the mobile dual leaf electronic device).

[0030] The transmission mechanism **3** comprises a first transmission member **31** and a second transmission member **32**. The first transmission member **31** comprises a first connection hole **311** cut through opposing front and back sides thereof at the center, and a first position-limit rod **312** located at the front side adjacent to the first connection hole **311**. The second transmission member **32** comprises a second connection hole **321** cut through opposing front and back sides thereof at the center, and a second position-limit rod **322** located at the front side adjacent to the second connection hole **321**. The first connection hole **311** of the first transmission member **31** is fixedly connected to the first positioning tip **213** of the pivot shaft set **2**; the second connection hole **321** of the second transmission member **32** is fixedly connected to the second positioning tip **223** of the pivot shaft set **2**.

[0031] The link **4** comprises a first position-limit hole **41** and a second position-limit hole **42**. The first position-limit rod **312** and second position-limit rod **322** of the transmission mechanism **3** are respectively coupled to the first position-limit hole **41** and second position-limit hole **42** of the link **4**. The first position-limit hole **41** defines a first abutment portion **411** at one side near the second position-limit hole **42**, and a second abutment portion **412** at an opposite side remote from the second position-limit hole **42**. Further, the distance between the first abutment portion **411** and the second abutment portion **412** is larger than the outer diameter of the first position-limit rod **312**.

[0032] The positioning device set **5** comprises a first positioning member **51** and a second positioning member **52**. The first positioning member **51** and the second positioning member **52** are respectively disposed at opposing front and back sides of the axle housing **1**. Further, the second positioning member **52** is set between the axle housing **1** and the transmission mechanism **3**. The first positioning member **51** comprises a first positioning hole **511** and a second positioning hole **512** respectively disposed near two distal ends thereof. The second positioning member **52** comprises a third positioning hole **521** and a fourth positioning hole **522** respectively disposed near two distal ends thereof. The first positioning hole **511** and the third positioning hole **521** are respectively pivotally connected to two opposite ends of the first shaft body **211** of the pivot shaft set **2**. The second positioning hole **512** and the fourth positioning hole **522** are respectively pivotally connected to two opposite ends of the second shaft body **221** of the pivot shaft set **2**. The first positioning member **51** further comprises a stop block **513** located at one side thereof between the first positioning hole **511** and the second positioning hole **512**. The stop block **513** comprises a first abutment surface **514** and a second abutment surface **515** bilaterally disposed adjacent to the first positioning hole **511**, and a third abutment surface **516** and a fourth abutment surface **517** bilaterally disposed adjacent to the second positioning hole **512**. Further, the first position-limit flange **214** of the first pivot shaft **21** of the pivot shaft set **2** and the second position-limit flange **224** of the second pivot shaft **22** of the pivot shaft set **2** are respectively disposed at the opposing top and bottom sides of the stop block **513**.

[0033] The operation of the present invention is outlined hereinafter with reference to FIGS. **4-19**. As illustrated in FIGS. **4-6**, when the cover member **8** (of the mobile dual leaf electronic device) is closed on the base member base member **9**, the cover member **8** and the base member **9** are kept in parallel, the second positioning plane **225** of the pivot shaft set **2** and the second surface **13** of the axle housing **1** are closely abutted against each other; the first positioning plane **215** and the first surface **12** are disposed opposite to each other relative to the first pivot shaft **21**; the first position-limit flange **214** of the first pivot shaft **21** is abutted against the first abutment surface **514** of the positioning device set **5**; the second position-limit flange **224** of the second pivot shaft **22** is abutted against the fourth abutment surface **517** of the positioning device set **5**. Thus, the rotation of the first pivot shaft **21** in the axle housing **1** is limited to the range between the first abutment surface **514** and the second abutment surface **515**, i.e., the first pivot shaft **21** is rotatable within 180-degrees. When the axle housing **1** is turned about the second pivot shaft **22**, the rotation of the axle housing **1** is limited to the range between the third abutment surface **516** and the fourth abutment surface **517**, i.e., the axle housing **1** is rotatable within 180-degrees. Further, during rotation of the first pivot shaft **21**, the first position-limit rod **312** and second position-limit rod **322** of the transmission mechanism **3** are moved toward each other. When the axle housing **1** is turned about the second pivot shaft **22**, the first position-limit rod **312** and the second position-limit rod **322** are moved apart. Thus, as illustrated in FIGS. **4-9**, when the user turn the cover member **8** in direction toward the bottom side of the base member **9**, the first position-limit rod **312** is stopped at the first abutment portion **411** of the link **4**, and the first position-limit rod **312** and second position-limit rod **322** of the transmission mechanism **3** are prohibited from been moved toward each other, and therefore, the axle housing **1** is turned about the second pivot shaft **22**, and the second positioning plane **225** is disengaged from the second surface **13**, releasing the axle housing **1** and the second pivot shaft **22** from the constraint, and simultaneously moving the first position-limit rod **312** toward the second abutment portion **412** to increase the gap between the first position-limit rod **312** and the second position-limit rod **322**. As illustrated in FIGS. **7-12**, when the first position-limit rod **312** is abutted against the second abutment portion **412** of the first position-limit hole **41**, the gap between the first position-limit rod **312** and the second position-limit rod **322** cannot be increased further, and the axle housing **1** cannot be turned about the second pivot shaft **22** further. At this time, the first pivot shaft **21** is rotated in the first pivot shaft chamber **15** in accordance with the turning direction of the cover member **8**. During rotation of the second pivot shaft **22**, the distance between the first position-limit rod **312** and the second position-limit rod **322** reduces gradually, enabling the first position-limit rod **312** to be moved toward the first abutment portion **411**, and thus, the turning range of the axle housing **1** about second pivot shaft **22** and the rotating range of the first pivot shaft **21** are limited. As illustrated in FIGS. **12-15**, when the cover member **8** is turned toward the bottom side of the base member **9**, the rotating direction of the first pivot shaft **21** is reversed to the extending direction of the first bearing portion **14** from the first surface **12**, the friction resistance between the first pivot shaft **21** and the first bearing portion **14** is minimized, however, because the turning direction of the axle housing **1** is revered to the extending direction of the second bearing portion **16** from the second surface **13**, the friction resistance between the axle housing **1** and the first pivot shaft **21** is increased. Thus, the friction resistance between the first shaft body **211** of the first pivot shaft **21** and the first bearing portion

14 is smaller than the friction resistance between the second shaft body **221** of the second pivot shaft **22** and the second bearing portion **16**, i.e., during the process the cover member **8** is turned toward the bottom side of the base member **9** to any angle, the turning angle of the second pivot shaft **22** in the axle housing **1** will be larger than the turning angle of the first pivot shaft **21** in the axle housing **1**, thus, when the cover member **8** approaches the bottom side of the base member **9**, the fourth abutment surface **517** of the positioning device set **5** will be stopped against the second position-limit flange **224** of the second pivot shaft **22** at first, i.e., the turning angle of the second pivot shaft **22** in the axle housing **1** will reach 180-degrees at first, and the turning angle of the first pivot shaft **21** in the axle housing **1** will reach 180-degrees only after the axle housing **1** has been turned about the second pivot shaft **22** through 180-degrees, thus, the first positioning plane **215** of the first pivot shaft **21** will be abutted against the first surface **12** in the last stroke where the cover member **8** is turned to the bottom side of the base member **9** through 360-degrees, enabling the cover member **8** to be automatically closed on the bottom side of the base member **9** when it approaches the base member **9**. As illustrated in FIGS. **16-19**, on the contrary, when the cover member **8** is turned to the top side of the base member **9**, the rotating direction of the first pivot shaft **21** is same as the extending direction of the first bearing portion **14** from the first surface **12**, increasing the friction resistance between the first pivot shaft **21** and the first bearing portion **14**. At this time, the turning direction of the axle housing **1** is same as the extending direction of the second bearing portion **16** from the second surface **13**, and the friction resistance between the axle housing **1** and the first pivot shaft **21** is minimized. Thus, the friction resistance between the first shaft body **211** of the first pivot shaft **21** and the first bearing portion **14** is larger than the friction resistance between the second shaft body **221** of the second pivot shaft **22** and the second bearing portion **16**, i.e. during the process the cover member **8** is turned toward the top side of the base member **9** to any angle, the turning angle of the first pivot shaft **21** in the axle housing **1** will be larger than the turning angle of the second pivot shaft **22** in the axle housing **1**. Therefore, when the cover member **8** approaches the top side of the base member **9**, the first abutment surface **514** of the positioning device set **5** will be stopped against the first position-limit flange **214** of the first pivot shaft **21** at first, i.e., the turning angle of the first pivot shaft **21** will reach 180-degrees at first, and the turning angle of the axle housing **1** about the second pivot shaft **22** will reach 180-degrees only after the turning angle of the first pivot shaft **21** has reached 180 degrees, and thus, the second positioning plane **225** of the second pivot shaft **22** will be abutted against the second surface **13** in the last stroke where the cover member **8** is turned to the top side of the base member **9** through 360-degrees, enabling the cover member **8** to be automatically closed on the base member **9** when it approaches the base member **9**.

What the invention claimed is:

1. A smoothly openable and closable dual-shaft hinge, comprising:

an axle housing comprising a base defining a first surface at a top side thereof and a second surface at an opposing bottom side thereof, a first bearing portion smoothly curved from one lateral side of said first surface of said base in direction toward an opposite lateral side of said first surface, a first pivot shaft chamber defined between said first bearing portion and said first surface, a second bearing portion smoothly curved from one lateral side of said second surface of said base in direction toward an opposite lateral side of said second surface, a second pivot shaft chamber defined between said second bearing portion and said second surface, said first bearing portion and said second bearing portion extending in reversed directions; and

a pivot shaft set comprising a first pivot shaft and a second pivot shaft, said first pivot shaft comprising a first shaft body located at one end thereof and a first connection bar located at an opposite end thereof, said first shaft body being pivotally coupled to said first pivot shaft chamber of said axle housing, said first connection bar being disposed outside said axle housing and connected to a cover member, said second pivot shaft comprising a second shaft body located at one end thereof and a second connection bar located at an opposite end thereof, said second shaft body being pivotally coupled to said second pivot shaft chamber of said axle housing, said second connection bar being disposed outside said axle housing and connected to a base member;

wherein when turning said cover member toward a bottom side of said base member, said first pivot shaft is rotated with said cover member in said first pivot shaft chamber and said axle housing is turned about said second pivot shaft in accordance with the turning direction of said cover member, and at this time, the rotating direction of said first pivot shaft is reversed to the extending direction of said first bearing portion from said first surface and the turning direction of said axle housing is reversed to the extending direction of said second bearing portion from said second surface, and thus, the friction resistance produced between said first shaft body of said first pivot shaft and said first bearing portion is smaller than the friction resistance produced between said second shaft body of said second pivot shaft and said second bearing portion; when turning said cover member toward an opposing top side of said base member, said first pivot shaft is rotated with said cover member in said first pivot shaft chamber in accordance with the turning direction of said cover member and said axle housing is turned about said second pivot shaft in accordance with the turning direction of said cover member, and at this time, the rotating direction of said first pivot shaft is same as the extending direction of said first bearing portion from said first surface and the turning direction of said axle housing is same as the extending direction of said second bearing portion from said second surface, and thus, the friction resistance produced between said first shaft body of said first pivot shaft and said first bearing portion is larger than the friction resistance produced between said second shaft body of said second pivot shaft and said second bearing portion.

2. The smoothly openable and closable dual-shaft hinge as claimed in claim **1**, wherein said first surface and said second surface of said axle housing are planar surfaces; said first shaft body of said pivot shaft set comprises a first positioning plane located at the periphery thereof and extending along the length thereof; said second shaft body of said second pivot shaft set comprises a second positioning plane located at the periphery thereof and extending along the length thereof.

3. The smoothly openable and closable dual-shaft hinge as claimed in claim **1**, wherein said first pivot shaft further comprises a first positioning tip extended from a distal end of

said first shaft body opposite to said first connection bar; said second pivot shaft further comprises a second positioning tip extended from a distal end of said second shaft body opposite to said second connection bar; the dual shaft hinge further comprises a transmission mechanism and a link disposed at one side relative to said axle housing, said transmission mechanism comprising a first transmission member and a second transmission member, said first transmission member comprising a first connection hole located at the center thereof and fixedly connected to said first positioning tip and a first position-limit rod located at a front side adjacent to said first connection hole, said second transmission member comprising a second connection hole located at the center thereof and fixedly connected to said second positioning tip and a second position-limit rod located at a front side thereof adjacent to said second connection hole, said link comprising a first position-limit hole located at one end thereof and coupled to said first position-limit rod and a second position-limit hole located at an opposite end thereof and coupled to said second position-limit rod, said first position-limit hole defining a first abutment portion at one side near said second position-limit hole and a second abutment portion at an opposite side remote from said second position-limit hole, the distance between said first abutment portion and said second abutment portion being larger than the outer diameter of said first position-limit rod

4. The smoothly openable and closable dual-shaft hinge as claimed in claim **1**, further comprising a first positioning member and a second positioning member respectively disposed at opposing front and back sides of said axle housing, said first positioning member comprising a first positioning hole and a second positioning hole respectively disposed near two distal ends thereof, said second positioning member comprising a third positioning hole and a fourth positioning hole respectively disposed near two distal ends thereof, said first positioning hole and said third positioning hole being respectively pivotally connected to two opposite ends of said first shaft body of said e pivot shaft set, said second positioning hole and said fourth positioning hole being respectively pivotally connected to two opposite ends of said second shaft body of said pivot shaft set.

5. The smoothly openable and closable dual-shaft hinge as claimed in claim **1**, further comprising a first positioning member disposed at one side relative to said axle housing, said first positioning member comprising a first positioning hole and a second positioning hole respectively disposed near two distal ends thereof and respectively pivotally coupled with said first shaft body and said second shaft body of said pivot shaft set, and a stop block disposed between said first positioning hole and said second positioning hole, said stop block comprising a first abutment surface and a second abutment surface bilaterally disposed near said first positioning hole and a third abutment surface and a fourth abutment surfaces bilaterally disposed near said second positioning hole; said first pivot shaft further comprises a first position-limit flange extending around the periphery of said first shaft body and disposed adjacent to said first positioning member and stoppable by said first abutment surface and said second abutment surface to limit the range of rotation of said first shaft body; said second shaft body comprises a second position-limit flange extending around the periphery of said second shaft body and disposed adjacent to said second positioning member and stoppable by said third abutment surface and said fourth abutment surface to limit the turning range of axle housing about said second pivot shaft.

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