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Wu

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(54) **ANGLE ADJUSTER FOR ADJUSTING UMBRELLA SHAFT**

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USPC 16/324, 326; 248/514
See application file for complete search history.

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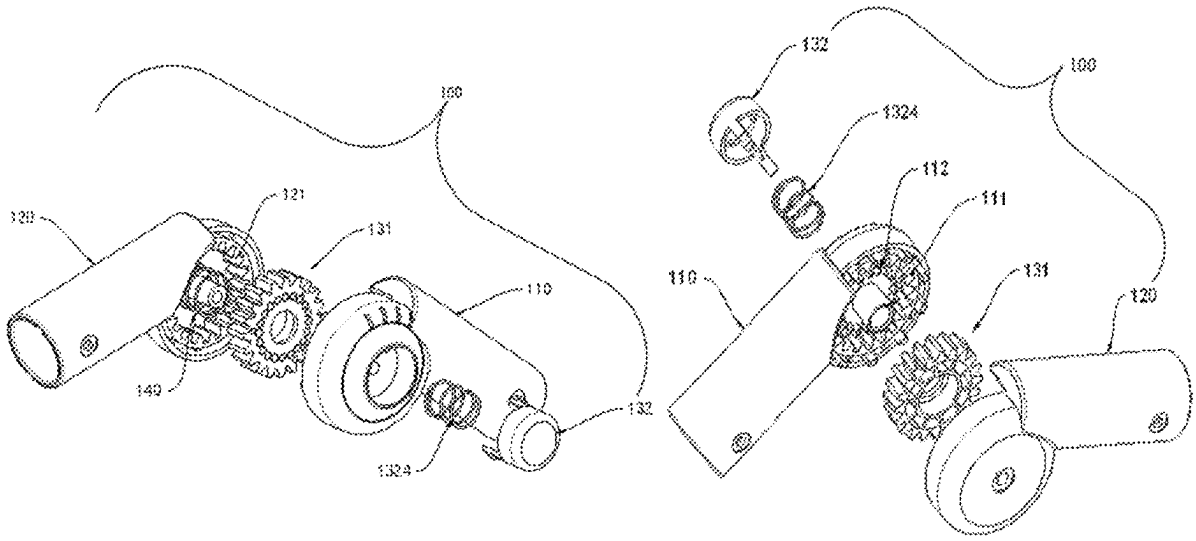
(57) **ABSTRACT**

The disclosure provides an angle adjuster for adjusting an umbrella shaft, the angle adjuster including a first connector, a second connector, and a locking assembly, where the first connector has one end configured to be connected to one section of an external umbrella shaft, the second connector has one end rotatably connected to the other end of the first connector, and the other end configured to be connected to the other section of the external umbrella shaft, and the locking assembly is movably connected to the first connector and the second connector and is configured to lock or unlock the first connector from the second connector.

13 Claims, 8 Drawing Sheets



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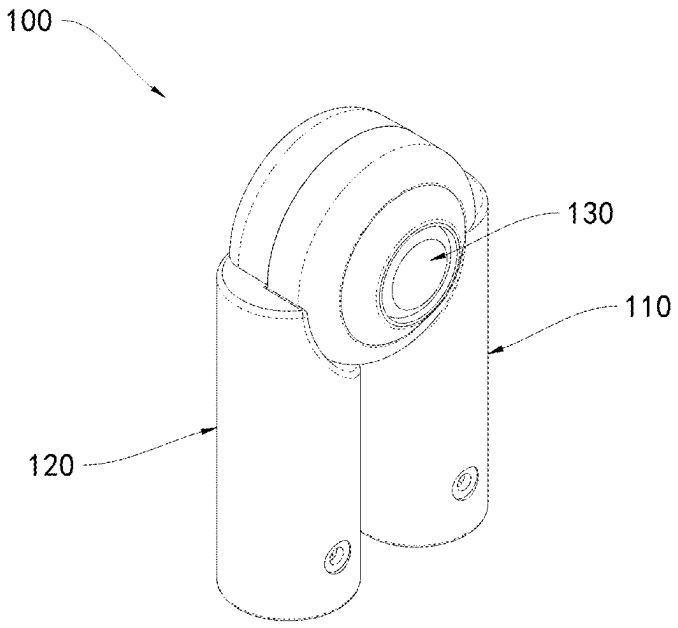

FIG. 1

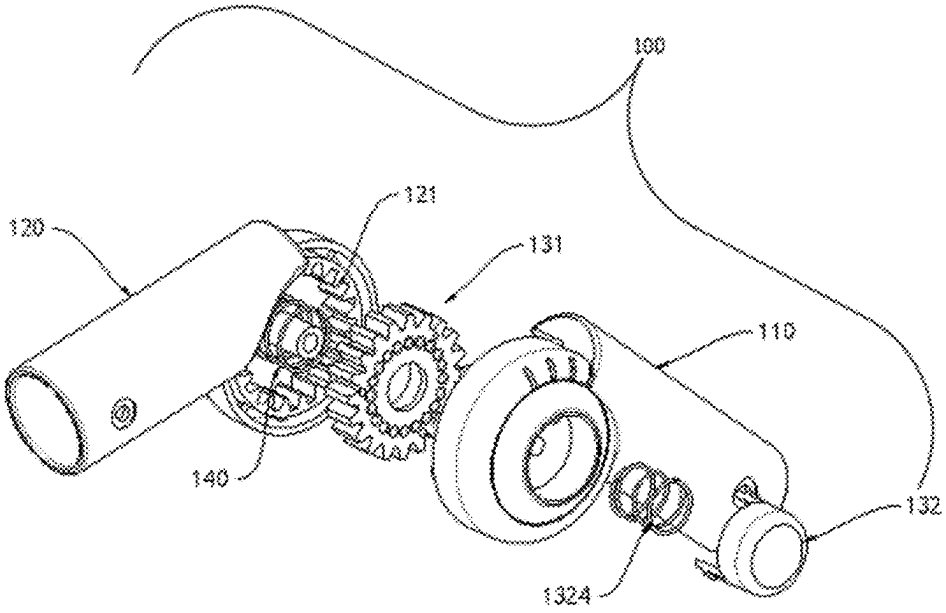

FIG. 2

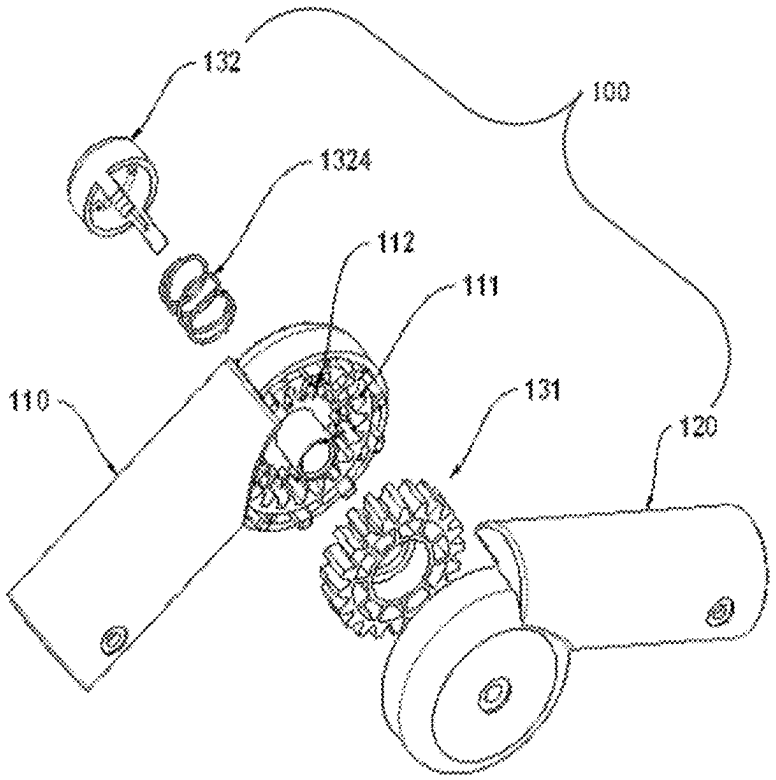

FIG. 3

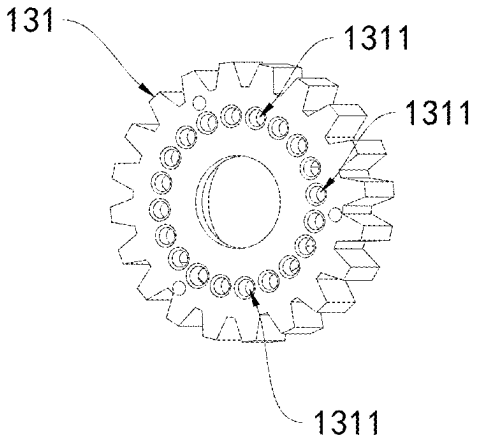

FIG. 4

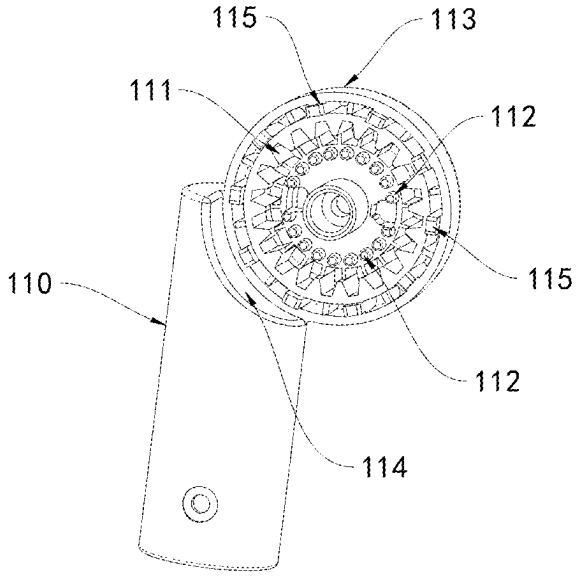

FIG. 5

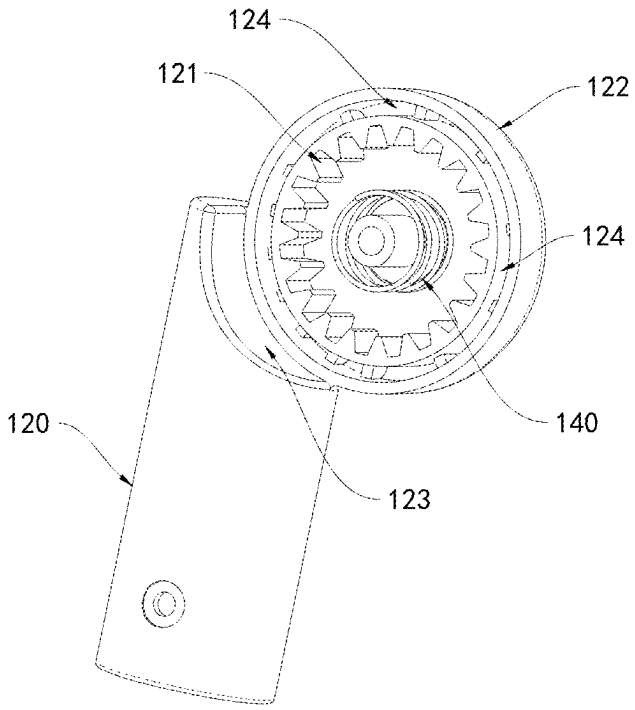

FIG. 6

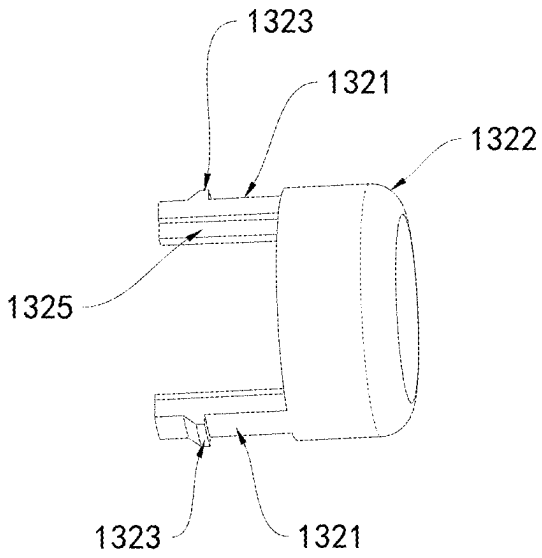

FIG. 7

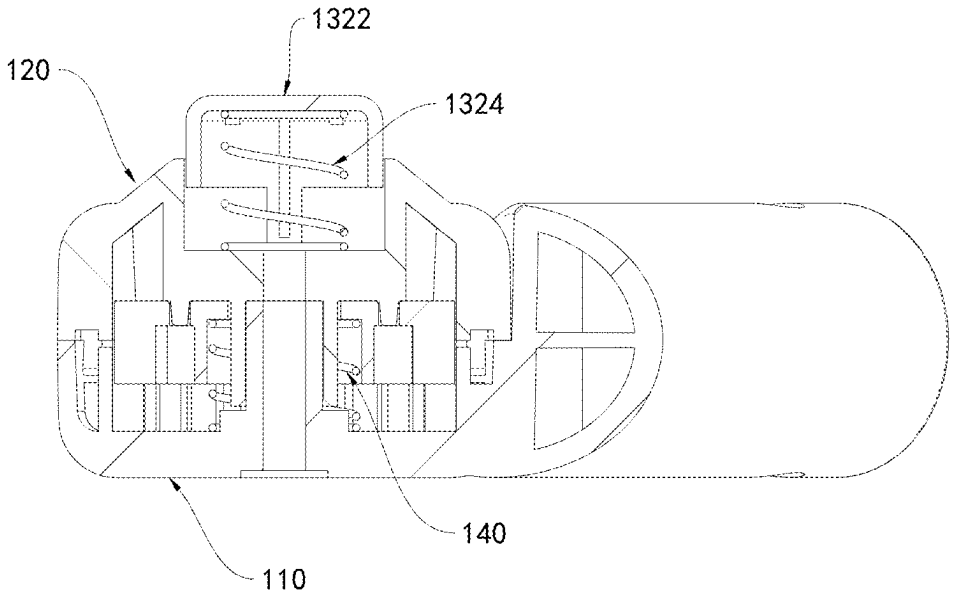

FIG. 8

ANGLE ADJUSTER FOR ADJUSTING UMBRELLA SHAFT

TECHNICAL FIELD

The disclosure relates to the field of articles for daily use, and in particular to an angle adjuster for adjusting an umbrella shaft.

BACKGROUND ART

At present, an umbrella shaft of a sun umbrella is generally a straight pole, and has a fixed angle. In practical applications, if a user needs to adjust an orientation angle of a cover of the sun umbrella, the sun umbrella needs to be relocated. However, as the angle of solar radiation on the user continuously changes, the user needs to relocate the umbrella frequently to maintain a desirable sunshading effect. The entire process will cause fatigue to the user and also cause symptoms of pain in a joint part of the user.

SUMMARY

An objective of the disclosure is to provide an angle adjuster for adjusting an umbrella shaft, the angle adjuster including: a first connector, a second connector, and a locking assembly, where the first connector has one end configured to be connected to one section of an external umbrella shaft, the second connector has one end rotatably connected to the other end of the first connector, and the other end configured to be connected to the other section of the external umbrella shaft, and the locking assembly is movably connected to the first connector and the second connector and is configured to lock or unlock the first connector from the second connector.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to describe the technical solutions of embodiments of the disclosure more clearly, the drawings required for the embodiments will be briefly introduced below. It should be understood that the following drawings only illustrate some embodiments of the disclosure, and therefore should not be construed as a limitation on the scope of the disclosure. For those of ordinary skill in the art, other relevant drawings can be obtained from these drawings without involving any inventive effort.

FIG. **1** is a schematic structural diagram of an angle adjuster according to an embodiment of the disclosure.

FIG. **2** is a schematic exploded view of an angle adjuster according to an embodiment of the disclosure from a first perspective.

FIG. **3** is a schematic exploded view of an angle adjuster according to an embodiment of the disclosure from a second perspective.

FIG. **4** is a schematic structural diagram of a gear disc according to an embodiment of the disclosure.

FIG. **5** is a schematic structural diagram of a first connector according to an embodiment of the disclosure.

FIG. **6** is a schematic structural diagram of a second connector according to an embodiment of the disclosure.

FIG. **7** is a partial schematic diagram of an adjusting member according to an embodiment of the disclosure.

FIG. **8** is a cross-sectional view of an angle adjuster according to an embodiment of the disclosure.

List of reference signs **100**—angle adjuster; **110**—first connector; **111**—first tooth receptacle; **112**—limiting protrusion; **113**—first housing; **114**—first avoidance recess; **115**—bump; **120**—second connector; **121**—second tooth receptacle; **122**—second housing; **123**—second avoidance recess; **124**—engagement groove; **130**—locking assembly; **131**—gear disc; **1311**—limiting hole; **132**—adjusting member; **1321**—connecting rod; **1322**—button; **1323**—limiting catch; **1324**—first spring; **1325**—reinforcing rib; **140**—second spring.

DETAILED DESCRIPTION OF EMBODIMENTS

In order to make the objectives, technical solutions and advantages of embodiments of the disclosure clearer, the technical solutions in the embodiments of the disclosure will be clearly and completely described below with reference to the drawings for the embodiments of the disclosure. Apparently, the described embodiments are some rather than all of the embodiments of the disclosure. In general, the components of the embodiments of the disclosure described and shown in the drawings herein can be arranged and designed in various configurations.

Thus, the following detailed description of the embodiments of the disclosure provided in the drawings is not intended to limit the scope of the disclosure as claimed, and is merely representative of the selected embodiments of the disclosure. Based on the embodiments of the disclosure, all other embodiments obtained by those of ordinary skill in the art without creative efforts fall within the scope of protection of the disclosure.

It should be noted that similar reference signs and letters refer to similar items in the following drawings. Therefore, once a specific item is defined in one of the drawings, it need not be further defined and explained in subsequent drawings.

In the description of the embodiments of the disclosure, it should be noted that the orientation or position relationships indicated by the terms such as "center", "upper", "lower", "left", "right", "vertical", "horizontal", "inner" and "outer" are based on the orientation or position relationships shown in the drawings or are the orientation or position relationships in which a product of the disclosure is customarily placed during use, and are only intended to facilitate descriptions of the disclosure and simplify the descriptions, rather than indicating or implying that the apparatus or element indicated must have a specific orientation or be configured and operated in the specific orientation, and therefore cannot be construed as limiting the disclosure. In addition, the terms "first", "second" and "third" are only intended to distinguish the descriptions and should not be construed as indicating or implying relative importance.

Furthermore, the terms such as "horizontal", "vertical" and "pendulous" do not mean that a component is required to be absolutely horizontal or pendulous, and may be slightly inclined. For example, the term "horizontal" merely indicates that an orientation is more horizontal relative to "vertical", and does not mean that a structure must be completely horizontal, and may be slightly inclined.

In the descriptions of the embodiments of the disclosure, "a plurality of" represents at least 2.

An umbrella according to an embodiment of the disclosure may include an umbrella shaft, a frame connected to the umbrella shaft, and a cover covering the frame. The frame supports the cover, and an angle of the umbrella shaft can be adjusted. In practical applications, an orientation of the cover can be adjusted by adjusting the angle of the umbrella shaft. The umbrella shaft is described in detail below.

An angle adjuster **100** for adjusting an umbrella shaft includes a first connector **110**, a second connector **120**, and

a locking assembly **130**, where the first connector **110** has one end configured to be connected to one section of an external umbrella shaft, the second connector **120** has one end rotatably connected to the other end of the first connector **110**, the locking assembly **130** is movably connected to the first connector **110** and the second connector **120**, and the locking assembly **130** can lock or unlock the first connector **110** from the second connector **120** in different states to enable adjustment of an angle of the external umbrella shaft, and lock one section of the external umbrella shaft and the other section of the external umbrella shaft.

Specifically, when the angle of the umbrella shaft needs to be adjusted by a user, the locking assembly **130** can be operated to unlock the first connector **110** from the second connector **120**, such that the first connector **110** can rotate relative to the second connector **120** and an angle between the first connector **110** and the second connector **120** changes, and an angle between one section of the external umbrella shaft and the other section of the external umbrella shaft changes correspondingly, allowing the cover to have different orientations. When the angle between the first connector **110** and the second connector **120** is adjusted to an appropriate angle, the locking assembly **130** can be operated again to lock the first connector **110** and the second connector **120**, such that the cover can remain in a preferred sunshade position, and the user does not need to frequently relocate an umbrella during use, thereby alleviating symptoms of pain in a joint part of the user and relieving the fatigue of the user during use.

In an optional embodiment, the umbrella may include a rain umbrella or a sun umbrella.

In an optional embodiment, an angle of rotation between the first connector **110** and the second connector **120** ranges from 0° to 180°. In an example of FIG. **1**, in a state as shown in FIG. **1**, the angle between the first connector **110** and the second connector **120** is 0°.

In an optional embodiment, the first connector **110** and the second connector **120** are both of a pole-like structure, and an end of the first connector **110** is rotatably connected to an end of the second connector **120**, such that when the angle between the first connector **110** and the second connector **120** is 180°, a longer overall length is achieved, which is suitable for more use scenarios.

In an optional embodiment, the locking assembly **130** may be operated by means of pressing, pulling, rotating, etc.

As shown in FIGS. **2-6**, a first tooth receptacle **111** is provided at one end of the first connector **110**, and a second tooth receptacle **121** is provided at one end of the second connector **120**, where the first tooth receptacle **111** is arranged opposite the second tooth receptacle **121**. Correspondingly, the locking assembly **130** may include a gear disc **131**, and when the gear disc **131** fits with the first tooth receptacle **111** and the second tooth receptacle **121**, the gear disc **131** can lock the first connector **110** and the second connector **120** to allow the first connector **110** and the second connector **120** to remain at the current angle.

In practical applications, after the gear disc **131** is disengaged from the first tooth receptacle **111** and/or the second tooth receptacle **121**, the first connector **110** and the second connector **120** are unlocked from each other and can be rotated relative to each other. A minimum angle of rotation depends on the number of teeth of the gear disc **131**. If the gear disc **131** has more teeth, the angle between adjacent two teeth is smaller, and the minimum angle of rotation between the first connector **110** and the second connector **120** in the unlocked state is smaller. After the first connector **110** and the second connector **120** rotate to an appropriate angle, the gear disc **131** fits with both the first tooth receptacle **111** and the second tooth receptacle **121** again, such that the first connector **110** and the second connector **120** can be locked again.

Specifically, FIG. **7** is a partial schematic diagram of an adjusting member according to an embodiment of the disclosure. As shown in FIGS. **2**, **3** and **7**, the locking assembly **130** may further include an adjusting member **132**. A portion of the adjusting member **132** is located outside the first connector **110**, and the rest of the adjusting member **132** passes through the first connector **110** and is connected to the gear disc **131**. In this way, when the angle of the umbrella shaft needs to be adjusted by the user, the portion of the adjusting member **132** outside the first connector **110** can be operated, and the adjusting member **132** can cause the gear disc **131** to be disengaged from the first tooth receptacle **111** and the second tooth receptacle **121**, so as to unlock the first connector **110** from the second connector **120**. Similarly, when the angle between the first connector **110** and the second connector **120** is adjusted to an appropriate angle, the portion of the adjusting member **132** outside the first connector **110** can be adjusted by the user again (or the adjusting member **132** is automatically reset, as will be described hereinafter), and the adjusting member can cause the gear disc **131** to fit with the first tooth receptacle **111** and the second tooth receptacle **121**, so as to lock the first connector **110** and the second connector **120**.

It should be understood that a portion of the adjusting member **132** being located outside the first connector **110** can facilitate operation of the user, improving the efficiency of adjustment of the angle between the first connector **110** and the second connector **120**.

As shown in FIG. **7**, the adjusting member **132** may include a connecting rod **1321** and a button **1322**. One end of the connecting rod **1321** passes through the first connector **110** and is connected to the gear disc **131**. The button **1322** is connected to an end of the connecting rod **1321** away from the gear disc **131**, and the button **1322** is located outside the first connector **110**. It should be understood that the button **1322** can be conveniently pressed by an operator, thereby achieving an easy and quick operation.

As shown in FIG. **7**, an end of the connecting rod **1321** away from the button **1322** is of a flat-tip structure, such that a contact surface of abutment between the connecting rod **1321** and the gear disc **131** can be increased, thereby improving the stability of abutment.

As shown in FIG. **7**, a reinforcing rib **1325** is further provided on an inner side of the connecting rod **1321**, and the reinforcing rib **1325** can enhance the structural strength of the connecting rod **1321** and reduce the possibility of the connecting rod **1321** being bent or broken.

In an optional embodiment, an end of the reinforcing rib **1325** away from the button **1322** is flush with the end of the connecting rod **1321** away from the button **1322**, such that the reinforcing rib **1325** can enhance the structural strength of the connecting rod **1321** over the entire length of the connecting rod **1321**, thereby allowing different parts of the connecting rod **1321** to be less likely to be bent or broken.

FIG. **8** is a cross-sectional view of an angle adjuster according to an embodiment of the disclosure. As shown in FIGS. **2**, **3** and **8**, the adjusting member **132** may further include a first spring **1324**, where the first spring **1324** is arranged between the button **1322** and the first connector **110**, and the first spring **1324** has two opposite ends connected to the button **1322** and the first connector **110**, respectively.

In practical applications, when the button **1322** is pressed by the user, the button **1322** pushes, via the connecting rod **1321**, the gear disc **131** to be disengaged from the first tooth receptacle **111**, such that the first connector **110** can rotate relative to the second connector **120**, and the first spring **1324** is in a compressed state. After the first connector **110** is rotated to an appropriate angle relative to the second connector **120**, the button **1322** is released by the user, the first spring **1324**, under the action of a restoring force, causes the connecting rod **1321** to reset, and the connecting rod **1321** pulls the gear disc **131** to re-fit with the first tooth receptacle **111**. In this case, the gear disc **131** fits with both the first tooth receptacle **111** and the second tooth receptacle **121** again, such that the first connector **110** and the second connector **120** are in a locked state.

It should be understood that the structure of the first spring **1324**, the button **1322** and the connecting rod **1321** used in the embodiment of the disclosure has a simpler overall structure, requires less parts, may be manufactured and maintained at low costs, and has an improved overall stability while facilitating the user quickly locking and unlocking the first connector **110** from the second connector **120**.

As shown in FIGS. **2**, **3**, **6** and **8**, the angle adjuster **100** may further include a second spring **140**, where the second spring **140** is nested inside the second connector **120**, one end of the second spring **140** abuts against an inner wall of the second connector **120**, and the other end of the second spring **140** abuts against the gear disc **131**.

In practical applications, when the button **1322** is pressed by the user, the button **1322** pushes, via the connecting rod **1321**, the gear disc **131** to be disengaged from the first tooth receptacle **111**, such that the first connector **110** can rotate relative to the second connector **120**, and the first spring **1324** is in a compressed state. In this case, the gear disc **131** applies a pressure on the second spring **140**, and the second spring **140** is also in a compressed state. After the first connector **110** is rotated to an appropriate angle relative to the second connector **120**, the button **1322** is released by the user, the first spring **1324**, under the action of a restoring force, causes the connecting rod **1321** to reset, and the connecting rod **1321** pulls the gear disc **131** to re-fit with the first tooth receptacle **111**. During this process, the second spring **140**, under the action of a restoring force, can provide an ejection effect on the gear disc **131**, such that the second spring **140** can assist the connecting rod **1321** to eject the gear disc **131** into the first tooth receptacle **111**. In this case, the gear disc **131** fits with both the first tooth receptacle **111** and the second tooth receptacle **121** again, such that the first connector **110** and the second connector **120** are in a locked state.

It should be noted that compared with the solution in which only the first spring **1324** is provided, the solution in which both the first spring **1324** and the second spring **140** which cooperate with each other are used can reduce the occurrence of the button **1322** getting stuck and failing to pop out.

As shown in FIG. **7**, two connecting rods **1321** are provided, and the two connecting rods **1321** are symmetrically arranged with respect to an axis of rotation of the first connector **110** and the second connector **120**. In this way, after the button **1322** is pressed by the user, the two connecting rods **1321** can both push the gear disc **131** to be disengaged from the first engagement groove, such that the gear disc **131** is less likely to tilt and get stuck during the pushing process, thereby improving the overall structural stability.

As shown in FIG. **7**, a limiting catch **1323** is provided on the connecting rod **1321**, and after the connecting rod **1321** passes through the first connector **110**, the limiting catch **1323** can reversely abut against the first connector **110** to limiting the connecting rod **1321** from disengagement from the first connector **110**.

As shown in FIGS. **3** and **4**, a limiting protrusion **112** is provided on the first tooth receptacle **111**, a limiting hole **1311** is provided in the gear disc **131**, and when the first connector **110** and the second connector **120** are in the locked state, the limiting protrusion **112** fits with the limiting hole **1311**, which enables the gear disc **131** to be fixed in the first tooth receptacle **111** and be less likely to be disengaged from the first tooth receptacle **111**, and which can assist the gear disc **131** to provide an improved locking effect, such that the first connector **110** and the second connector **120** are less likely to swing from side to side, thereby achieving a more stable overall structure.

It should be understood that during the unlocking process, the adjusting member **132** causes the gear disc **131** to be disengaged from the first engagement groove, and the limiting protrusion **112** is then disengaged from the limiting hole **1311**, which causes the limiting protrusion **112** no longer limits the gear disc **131**, such that the first connector **110** and the second connector **120** are in the unlocked state, thereby facilitating rotating the first connector **110** to adjust the angle between the first connector **110** and the second connector **120**.

As shown in FIGS. **3** and **4**, a plurality of limiting protrusions **112** are provided. The plurality of limiting protrusions **112** are distributed at intervals in a circumferential direction of the first tooth receptacle **111**. Correspondingly, a plurality of limiting holes **1311** are provided, and the plurality of limiting holes **1311** are distributed at intervals in a circumferential direction of the gear disc **131**. It should be understood that the plurality of limiting protrusions **112** and the plurality of limiting holes **1311** fit with each other, such that the stability of assembly of the gear disc **131** in the first tooth receptacle **111** can be improved, and it is less likely for the gear disc **131** to be disengaged from the first tooth receptacle **111** in the locked state.

In an optional embodiment, some of the limiting holes **1311** fit with the limiting protrusions **112**, and the rest of the limiting holes **1311** may be configured for passage of the connecting rod **1321** described above.

As shown in FIGS. **1-6**, a first housing **113** and a first avoidance recess **114** are provided at one end of the first connector **110**, the first tooth receptacle **111** described above is arranged in the first housing **113**, a second housing **122** and a second avoidance recess **123** are provided at one end of the second connector **120**, and the second tooth receptacle **121** described above is arranged in the second housing **122**.

In practical applications, the first housing **113** matches the second housing **122**, such that an inner cavity for receiving the gear disc **131** can be formed. The connecting rod **1321** described above passes through the first housing **113**, enters the inner cavity, and is then connected to the gear disc **131**.

It should be noted that when the first housing **113** matches the second housing **122**, the first housing **113** is received in the second avoidance recess **123**, and the second housing **122** is received in the first avoidance recess **114**. In this way, the space occupied by the first housing **113** and the second housing **122** in a radial direction of the umbrella shaft can be reduced, thereby improving the utilization rate of the radial space of the umbrella shaft.

In an optional embodiment, the first housing **113** and the second housing **122** are detachably connected to each other

by means of a snap-fit structure, such that the gear disc **131** can be easily replaced and maintained.

As shown in FIGS. **5** and **6**, a bump **115** is provided between an inner wall of the first housing **113** and an outer wall of the first tooth receptacle **111**, an engagement groove **124** is provided between an inner wall of the second housing **122** and an outer wall of the second tooth receptacle **121**, and the bump **115** is engaged with the engagement groove **124**, such that the first housing **113** and the second housing **122** can be better joined, thereby improving the tightness of the two, and achieving a greater bearing capacity of the first housing **113** and the second housing **122**.

In an optional embodiment, a plurality of bumps **115** are provided, a plurality of engagement grooves **124** are provided, and the plurality of bumps **115** engage with the plurality of engagement grooves **124** in one-to-one correspondence. In this way, after the first housing **113** and the second housing **122** rotate relative to each other, the plurality of bumps **115** engage with the plurality of engagement grooves **124** in a one-to-one correspondence to ensure that assembly errors are less likely to occur after the rotation of the first housing **113** and the second housing **122**.

The above descriptions are merely preferred embodiments of the disclosure, and are not intended to limit the disclosure. For those skilled in the art, various modifications and variations may be made to the disclosure. Any modifications, equivalent substitutions, improvements, and the like made within the spirit and principle of the disclosure should fall within the scope of protection of the disclosure.

The invention claimed is:

1. An angle adjuster for adjusting an umbrella shaft, the angle adjuster comprising:

a first connector having a first end and a second end, the first end of the first connector is provided with a first tooth receptacle, and the first tooth receptacle is provided with a limiting protrusion, wherein the first end of the first connector is coupled to a first section of the umbrella shaft;

a second connector having a first end and a second end, the first end of the second connector is provided with a second tooth receptacle, wherein

the first end of the second connector is rotatably coupled to the second end of the first connector, and the second end of the second connector is connected to a second section of the umbrella shaft; and

a locking assembly movably connected to the first connector and second connector, wherein the locking assembly comprises a gear disc having a limiting hole, the gear disc is fitted with the first tooth receptacle and the second tooth receptacle to lock the first connector and the second connector, when the first connector and the second connector are in a locked state, the limiting protrusion fits with the limiting hole and when the first connector and the second connector are in an unlocked state, the limiting protrusion is disengaged from the limiting hole.

2. The angle adjuster according to claim **1**, wherein the locking assembly further comprises:

an adjusting member, a portion of the adjusting member being located outside the first connector, and the rest of the adjusting member passing through the first connector and being connected to the gear disc;

wherein the adjusting member is configured to cause the gear disc to be disengaged from the first tooth receptacle and the second tooth receptacle, so as to unlock the first connector from the second connector, and the adjusting member is configured to cause the gear disc to fit with the first receptacle and the second tooth receptacle, so as to lock the first connector and the second connector.

3. The angle adjuster according to claim **2**, wherein the adjusting member comprises:

a connecting rod, one end of the connecting rod passing through the first connector and being connected to the gear disc; and

a button connected to an end of the connecting rod away from the gear disc, the button being located outside the first connector.

4. The angle adjuster according to claim **3**, wherein the adjusting member further comprises:

a first spring arranged between the button and the first connector, the first spring having two opposite ends connected to the button and the first connector, respectively.

5. The angle adjuster according to claim **3**, wherein two connecting rods are provided, and the two connecting rods are symmetrically arranged with respect to an axis of rotation of the first connector and the second connector.

6. The angle adjuster according to claim **3**, wherein an end of the connecting rod away from the button is of a flat-tip structure.

7. The angle adjuster according to claim **3**, wherein a reinforcing rib is provided on an inner side of the connecting rod.

8. The angle adjuster according to claim **7**, wherein an end of the reinforcing rib away from the button is flush with an end of the connecting rod away from the button.

9. The angle adjuster according to claim **1**, wherein the angle adjuster further comprises:

a second spring nested inside the second connector, the second spring having one end abutting against an inner wall of the second connector, and the other end abutting against the gear disc.

10. The angle adjuster according to claim **1**, wherein a plurality of limiting protrusions are provided, the plurality of limiting protrusions being distributed at intervals in a circumferential direction of the first tooth receptacle, and a plurality of limiting holes are provided, the plurality of limiting holes being distributed at intervals in a circumferential direction of the gear disc.

11. The angle adjuster according to claim **1**, wherein a first housing and a first avoidance recess are provided at the first end of the first connector, the first tooth receptacle being arranged in the first housing, a second housing and a second avoidance recess are provided at the first end of the second connector, the second tooth receptacle being arranged in the second housing, wherein the first housing matches with the second housing to form an inner cavity for receiving the gear disc, the first housing is received in the second avoidance recess, and the second housing is received in the first avoidance recess.

12. The angle adjuster according to claim **11**, wherein a bump is provided between an inner wall of the first housing and an outer wall of the first tooth receptacle, an engagement groove is provided between an inner wall of the second housing and an outer wall of the second tooth receptacle, the bump engaging with the engagement groove.

13. The angle adjuster according to claim **12**, wherein a plurality of bumps are provided, a plurality of engagement grooves are provided, and the plurality of bumps engage with the plurality of engagement grooves in a one-to-one correspondence.

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