



(11) **EP 3 903 625 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
03.11.2021 Bulletin 2021/44

(51) Int Cl.:
A45B 25/14 (2006.01) **A45B 25/16** (2006.01)
A45B 19/04 (2006.01)

(21) Application number: **19907514.4**

(86) International application number:
PCT/CN2019/101228

(22) Date of filing: **17.08.2019**

(87) International publication number:
WO 2020/140439 (09.07.2020 Gazette 2020/28)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **CAI, Rongyong**
Quanzhou, Fujian 362000 (CN)
• **WU, Jinquan**
Chongqing 405447 (CN)

(30) Priority: **30.12.2018 CN 201811646820**

(74) Representative: **Sebastian, Jens**
Sebastian Patentanwalts-gesellschaft mbH
Geranienweg 7
42579 Heiligenhaus (DE)

(71) Applicant: **Fujian Shu Rain Umbrella Co., Ltd.**
Quanzhou, Fujian 362000 (CN)

(54) **TRI-FOLDED ELECTRIC UMBRELLA HAVING DOUBLE-FOLDED MIDDLE ROD**

(57) A tri-folded electric umbrella having a double-folded shaft comprises a rib (1), a shaft (2), a handle (3), and a control mechanism for opening and closing the umbrella; the shaft (2) comprises an outer tube (21) and an inner tube (22), the outer tube (21) is provided with an upper runner (4) at a top end thereof, and a lower runner (5) is slidingly arranged on the outer tube (21); the rib (1) is cooperatively connected with the upper runner (4) and the lower runner (5); the inner tube (22) is connected to an inner tube plug (221) at a top thereof, and connected to the handle (3) at a bottom thereof; the upper runner (4) is provided with an upper runner pulley seat (41); the lower runner (5) is provided with a lower runner slider (51) which is fixedly provided thereon with a lower runner puller seat (52), and a lower runner slider spring (53) is arranged above the lower runner slider (51); a bottom end of the lower runner slider spring (53) is connected to the lower runner slider (51), and a top end of the lower runner slider spring (53) is connected to the lower runner (5); and the control mechanism for opening and closing the umbrella comprises a pushing device (6), a pulling device (7) and a driving device (8). The umbrella has a simple structure, is convenient to operate, is easy to carry and has strong applicability; the rib strength of the umbrella is great when opened, and the volume of the umbrella ribs is small when folded.

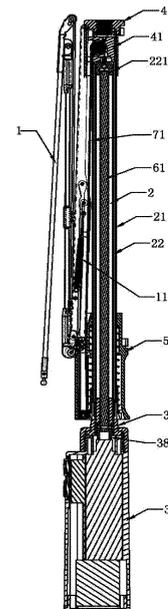


FIG. 1

EP 3 903 625 A1

DescriptionTECHNICAL FIELD

[0001] The invention relates to umbrellas, in particular to a tri-folded electric umbrella with a double-folded shaft.

BACKGROUND

[0002] As the most commonly used daily necessities, umbrellas are used to protect against wind, rain or sun. Folding umbrellas are popular among users because of their small sizes and convenient storage. However, early umbrellas needed umbrella ribs to be pushed up to a certain position by hand to open the umbrella. If it were to suddenly begin raining, it was often too late to open the umbrella and the user would get wet. Therefore, an umbrella with a button on the handle was designed. Pressing the button automatically opens the umbrella, however this functionality does not extend to closing the umbrella, which must still be done manually. Both hands will still be needed to fold the umbrella to get into the car when the user wants to take a ride, which will cause the user get wet by the rain for a short time. Moreover, a tri-folded umbrella generally has a tri-folded shaft which will shake and be unstable after the umbrella is opened, and the volume of the shaft is relatively large when folded, which will ultimately affect the strength and life span of the umbrella.

SUMMARY OF THE INVENTION

[0003] The purpose of the present invention is to overcome the above-mentioned shortcomings and provide a tri-folded electric umbrella with a double-folded shaft.

[0004] In order to achieve the above objective, a technical solution of the present invention is that: a tri-folded electric umbrella with a double-folded shaft comprises a rib, a shaft, a handle, and a control mechanism for opening and closing the umbrella. The shaft comprises an outer tube and an inner tube, an upper runner is fixedly arranged at a top end of the outer tube, and a lower runner is slidably arranged on the outer tube. The rib is cooperated and connected with the upper runner and the lower runner, the top of the inner tube is connected with an inner tube plug and the bottom of the inner tube is connected with the handle. An upper runner pulley seat is arranged in the upper runner, and a lower runner slider on which a lower runner pulley seat is fixedly arranged, is arranged in the lower runner. A lower runner slider spring is arranged above the lower runner slider, a bottom end of the lower runner slider spring is connected with the lower runner slider, a top end of the lower runner slider spring is connected with the lower runner. The control mechanism for opening and closing the umbrella comprises a pushing device, a pulling device, and a driving device. The pushing device comprises a lead screw arranged in the inner tube, a lead screw nut cooperated

with the lead screw and a nut connection wire connected with the lead screw nut, a top end of the nut connection wire is connected with the upper runner pulley seat, a bottom end of the lead screw is connected with the driving device. The pulling device comprises a pulling cord, an upper runner pulley, and a lower runner pulley. An upper runner pulley shaft runs through a middle portion of the upper runner pulley, and both ends of the upper runner pulley shaft are rotatably connected with the upper runner pulley seat. A lower runner pulley shaft runs through the middle portion of the lower runner pulley, and both ends of the lower runner pulley shaft are rotatably connected with the lower runner pulley seat. The upper runner pulley is a fixed pulley, and the lower runner pulley is a movable pulley. One end of the pulling cord is fixedly connected to the lower runner and the other end comes round the lower runner pulley and the upper runner pulley in turn, then penetrates into the outer tube to fixedly connect with the inner tube plug. The driving device is a forward and reverse driving device arranged in the handle.

[0005] Preferably, the nut connection wire is of "I" shape, the upper runner pulley seat is provided with a groove into which a top end of the nut connection wire places, so that the nut connection wire cannot move up and down in the groove.

[0006] Preferably, the outer tube is rotatably connected with the upper runner by means of upper runner nails arranged on the groove to strengthen the connection between the outer tube and the upper runner and further restrict the nut connection wire in the groove from moving up and down.

[0007] Preferably, the handle comprises a handle body, a handle upper cover threadedly connected to the top end of the handle body, and a handle lower cover snapped to the bottom end of the handle body. The handle is configured with a detachable structure, so that the driving device in the handle can be maintained and repaired at any time so as to avoid wasting, i.e., out of operation of the entire umbrella just due to breakdown of the driving device.

[0008] Preferably, an inner tube connecting sleeve is arranged in the handle, a lower end of the inner tube connecting sleeve is arranged with a boss cooperated with a concave hole arranged at an upper end of the handle. The inner tube connecting sleeve is connected to the handle by inserting the boss into the concave hole. A bottom end of the inner tube passes through the upper cover of the handle and is connected to the inner tube connecting sleeve by means of a T-shaped positioning pin, so that the inner tube and the handle are firmly connected to, thereby avoiding shaking and increasing the strength and life span of the umbrella.

[0009] Preferably, the driving device comprises a motor, a circuit board, a battery, and a button. The motor, battery, and button all electrically connect to the circuit board. A motor screw connector is arranged in the handle, by which the motor is connected to the lead screw. The handle is provided with a charging port and a dis-

charging port both electrically connected to the battery. The charging port can be used to charge the battery, and the discharging port can be used to charge mobile phones or other electrical appliances. The button is a waterproof silicone button having a forward button for driving the motor to rotate forward, thereby driving the lead screw to rotate forward, and further having a reverse button for driving the motor to rotate reversely, thereby driving the lead screw to rotate reversely. The circuit board is provided with a Bluetooth chip for communicating with a software in the mobile phone to prevent the umbrella from missing.

[0010] Preferably, the rib has a spring for closing the umbrella.

[0011] The working principle of the invention is that: pressing the forward button on the handle will drive the motor to rotate forward so as to drive the lead screw to rotate forward, the screw nut will move upward along the lead screw to drive the nut connection wire to rise. Then the upper runner will rise and cause the outer tube fixedly connected therewith to rise, then the shaft becomes longer. Under the action of the pull cord, the lower runner will move upward and the rib will open. Once the upper end of the lower runner touches the lower end of the upper runner, the lower runner will stop moving up and the lower runner slider will begin to press the lower runner slider spring upwardly, and then move upward under the action of the pull cord. The shaft will continue growing by double the length as the lower runner pulley is a movable pulley. When the lower runner slider moves upward and touches the lower runner, the shaft will stop getting longer. On the contrary, pressing the reversal button on the handle will drive the motor to rotate reversely to drive the lead screw to rotate reversely. The screw nut will move downward along the lead screw, thus driving the nut connection wire, the upper runner, and the outer tube to move downward together and the shaft will become shorter. Then the lower runner will move downward under the action of the spring and the rib will be folded to close the umbrella.

[0012] By adopting the above technical solutions, the beneficial effects of the present invention are that: a shaft of a tri-folded electric umbrella is set as double folds in the present invention. A lower runner slider and a lower runner slider spring are arranged in a lower runner. A bottom end of the lower runner slider spring is connected with the lower runner slider, while a top end of the lower runner slider spring is connected with the lower runner. The lower runner slider is fixedly provided with a lower runner pulley seat in which a lower runner pulley is installed, so that the lower runner pulley becomes a movable pulley. Even the lower runner cannot move upward, the lower runner slider can press the lower runner slider spring and move upward to touch the lower runner under the action of the pulling device, thus the shaft can continue getting longer, so that when the umbrella is opened, the length of the double-folded shaft can also extend to have a length of the tri-folded shaft. Thus, a double-folded

shaft is used instead of a tri-folded shaft. In this way, the structure of the umbrella will be more stable and the strength and the life span of the umbrella will increase, while the volume of the ribs will decrease when the umbrella is folded. Moreover, a forward and reverse driving device arranged in the handle of the present invention can drive the lead screw to rotate forward and reversely so as to drive the screw nut to move upward and downward along the lead screw, thereby driving the nut connection wire, the upper runner and the outer tube to move upward and downward, while the pulling device starts to pull forward and reversely to drive the lower runner to move upward and downward, so as to realize the automatic expanding and folding of the umbrella. The invention achieves a simple structure, and is convenient to operate and easy to carry, which provides strong practicability. The umbrella according to the invention provides a high strength of the rib when opened and small volume when folded.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is an expanded view of the present invention; FIG. 2 is a folding view of the present invention; FIG. 3 is an exploded view of the present invention; FIG. 4 is a structural schematic diagram of the lower runner of the present invention; FIG. 5 is a structural schematic diagram of the connecting structure of the nut connection wire of the present invention; FIG. 6 is a structural schematic diagram of the connection structure of the pulling cord of the present invention when folded; FIG. 7 is a structural schematic diagram of the connection structure of the pulling cord of the present invention when expanded; FIG. 8 is a structural schematic diagram of the handle structure of the present invention; FIG. 9 is a connection diagram of the inner tube and the handle of the present invention; FIG. 10 is a working principle diagram of the driving device of the present invention.

Reference signs:

[0014]

1. rib;
11. spring for closing the umbrella;
2. shaft;
21. outer tube;
22. inner tube;
221. inner tube plug;
3. handle;
31. handle body;
32. handle upper cover;

- 33. handle bottom cover;
- 34. inner tube connecting sleeve;
- 35. boss;
- 36. concave hole;
- 37. T-shaped positioning pin;
- 38. motor lead screw connection;
- 4. upper runner;
- 41. upper runner pulley seat;
- 42. groove;
- 43. upper runner nail;
- 5. lower runner;
- 51. lower runner slider;
- 52. lower runner pulley seat;
- 53. lower runner slider spring;
- 6. pushing device
- 61. lead screw;
- 62. screw nut;
- 63. nut connection wire;
- 7. pulling device;
- 71. pulling cord;
- 72. upper runner pulley;
- 721. upper runner pulley shaft;
- 73. lower runner pulley;
- 731. lower runner pulley shaft;
- 8. driving device;
- 81. motor;
- 82. circuit board;
- 83. battery;
- 84. button.

DETAILED DESCRIPTION

[0015] The present invention will be further described below with reference to the drawings and specific embodiments.

[0016] The directional terms mentioned in the present invention, such as: upward, downward, inside, outside, etc., are only the directions with reference to FIG. 1 of the specification. Therefore, the directional terms are only intended for illustration but not for limiting the present invention.

[0017] As shown in FIGs. 1-4 and 6-7, a tri-folded electric umbrella with a double-folded shaft, comprises ribs 1, a shaft 2, a handle 3 and a control mechanism for opening and closing the umbrella. The shaft 2 comprises an outer tube 21 and an inner tube 22, the top end of the outer tube 21 is fixedly provided with an upper runner 4, the outer tube 21 is slidably provided with a lower runner 5. The ribs 1 are cooperated and connected with the upper runner 4 and the lower runner 5. An inner tube plug 221 is connected to the top of the inner tube 22, the handle 3 is connected to the bottom of the inner tube 22. An upper runner pulley seat 41 is arranged in the upper runner 4, a lower runner slider 51 is arranged in the lower runner 5, and the lower runner slider 51 is fixedly provided with a lower runner pulley seat 52. A lower runner slider spring 53 is arranged above the lower runner slider 51, the lower runner slider spring 53 is connected with the

lower runner slider 51 at the bottom end thereof and connected with the lower runner 5 at the top end thereof. The control mechanism for opening and closing the umbrella includes a pushing device 6, a pulling device 7, and a driving device 8. The pushing device 6 includes a lead screw 61 arranged in the inner tube 22, a screw nut 62 cooperated with the lead screw 61 and a nut connection wire 63 connected with the screw nut 62. The top end of the nut connection wire 63 is connected with the upper runner pulley seat 41, the bottom end of the lead screw 61 is connected with the driving device 8. The pulling device 7 includes a pulling cord 71, an upper runner pulley 72 and a lower runner pulley 73. An upper runner pulley shaft 721 runs through the middle portion of the upper runner pulley 72, both ends of the upper runner pulley shaft 721 are rotatably connected with the upper runner pulley seat 41. A lower runner pulley shaft 731 runs through the middle portion of the lower runner pulley 73, both ends of the lower runner pulley shaft 731 are rotatably connected with the lower runner pulley seat 52. The upper runner pulley 72 is a fixed pulley and the lower runner pulley 73 is a movable pulley. One end of the pulling cord 71 is fixedly connected with the lower runner 5, and the other end of the pulling cord 71 is fixedly connected to the inner tube plug 221 by coming round the lower runner pulley 73 and the upper runner pulley 72 in turn and penetrating into the outer tube 21. The driving device 8 is arranged in the handle 3 and is a forward and reverse driving device.

[0018] As shown in FIG. 5, the nut connection wire 63 is of "II" shape. The upper runner pulley seat 41 is provided with a groove 42 and the top end of the nut connection wire 63 is placed inside the groove 42 so that the nut connection wire 63 cannot move up and down in the groove 42.

[0019] The outer tube 21 is rotatably connected with the upper runner 4 by means of an upper runner nail 43 arranged on the groove 42 to reinforce the connection between the outer tube 21 and the upper runner 4 and further restrict the nut connection wire 63 in the groove 42 from moving up and down.

[0020] As shown in FIG. 8, the handle 3 includes an handle body 31, a handle upper cover 32 and a handle lower cover 33. The handle upper cover 32 is threadedly connected to the top end of the handle body 31, the handle lower cover 33 is snapped to the bottom end of the handle body 31. The handle 3 is configured as a detachable structure, so that the driving device 8 in the handle 3 can be maintained and repaired at any time, thereby avoiding wasting in the case that the umbrella becomes out-of-service just because of breakdown of the driving device 8.

[0021] As shown in FIG. 9, an inner tube connecting sleeve 34 is arranged inside the handle 3, a boss 35 that is cooperated with a concave hole 36 arranged at the upper end of the handle 3 is arranged at the lower end of the inner tube connecting sleeve 34. The inner tube connecting sleeve 34 is connected with the handle 3 by

inserting the boss 35 into the concave hole 36. The bottom end of the inner tube 22 is configured to pass through the handle upper cover 32 and to be connected to the inner tube connecting sleeve 34 by means of a T-shaped positioning pin 37, so that the inner tube 22 and the handle 3 are firmly connected to each other, thereby avoiding shaking and increasing the strength and life span of the umbrella.

[0022] As shown in FIG. 10, the driving device 8 includes a motor 81, a circuit board 82, a battery 83, and a button 84. The motor 81, the battery 83 and the button 84 are all electrically connected with the circuit board 82. A motor screw connection 38 is arranged in the handle 3, the motor 81 is connected with the lead screw 61 by means of the motor screw connection 38. The handle 3 is provided with a charging port and a discharging port, both being electrically connected to the battery 83. The charging port can be used to charge the battery 83, and the discharging port can be used to charge mobile phones or other electrical appliances. The button 84 is a waterproof silicone button having a forward button for driving the motor 81 to rotate forward thereby driving the lead screw 61 to rotate forward and a reverse button for driving the motor 81 to rotate reversely, thereby driving the lead screw 61 to rotate reversely. The circuit board 82 is provided with a Bluetooth chip for communicating with an application software in the mobile phone to prevent the umbrella from missing.

[0023] The ribs 1 have a spring 11 for closing the umbrella.

[0024] The working principle of the invention is that: pressing the forward button of the button 84 on the handle 3 will drive the motor 81 to rotate forward so as to drive the lead screw 61 to rotate forward, and the screw nut 62 will move upward along the lead screw 61 to drive the nut connection wire 63 to rise. Then the upper runner 4 will rise and cause the outer tube 21 to rise as the outer tube 21 is fixedly connected with the upper runner 4, and the shaft 2 is getting longer accordingly. Under the action of the pulling cord 71, the lower runner 5 will move upward and the rib 1 will open. Once the upper end of the lower runner 5 touches the lower end of the upper runner 4, the lower runner 5 will stop moving upward, and the lower runner slider 51 will first begin to press the lower runner slider spring 53 upwardly, and then move upward under the action of the pulling cord 71. The shaft 2 will continue growing by double length as the lower runner pulley 73 is a movable pulley. When the lower runner slider 51 moves upward and touches the lower runner 5, the shaft 2 will stop getting longer. On the contrary, pressing the reversal button of the button 84 on the handle 3 will drive the motor 81 to rotate reversely so as to drive the lead screw 61 to rotate reversely. The screw nut 62 will move downward along the lead screw 61, thus driving the nut connection wire 63, the upper runner 4 and the outer tube 21 to move downward together and the shaft 2 will become shorter. Then the lower runner 5 will move downward under the action of the spring 11 and the rib 1 will

be folded to close the umbrella.

[0025] Descriptions above are only preferred embodiments of the present invention not intended for limiting the scope of implementation of the present invention. All equivalent changes and decorations made according to the scope of the patent application of the present invention should still fall within the scope of the present invention.

Claims

1. A tri-folded electric umbrella with a double-folded shaft, **characterized by** comprising a rib, a shaft, a handle, and a control mechanism for opening and closing the umbrella,

the shaft comprising an outer tube and an inner tube, an upper runner being fixedly arranged at a top end of the outer tube, a lower runner being slidably arranged on the outer tube, the rib being cooperated and connected with the upper runner and the lower runner, the inner tube being connected with an inner tube plug at a top thereof, and being connected with the handle at a bottom thereof,

an upper runner pulley seat being arranged in the upper runner, a lower runner slider on which a lower runner pulley seat is fixedly arranged being arranged in the lower runner, a lower runner slider spring being arranged above the lower runner slider, the lower runner slider spring being connected with the lower runner slider at a bottom end thereof and being connected with the lower runner at a top end thereof,

the control mechanism for opening and closing the umbrella comprising a pushing device, a pulling device, and a driving device, the pushing device comprising a lead screw arranged in the inner tube, a screw nut cooperated with the lead screw, and a nut connection wire connected with the screw nut, the nut connection wire being connected with the upper runner pulley seat at a top end thereof, the lead screw being connected with the driving device at a bottom end thereof,

the pulling device comprising a pulling cord, an upper runner pulley and a lower runner pulley, an upper runner pulley shaft running through a middle portion of the upper runner pulley, the lower runner pulley being rotatably connected with the upper runner pulley seat at both ends thereof, a lower runner pulley shaft running through a middle portion of the lower runner pulley, the lower runner pulley shaft being rotatably connected with the lower runner pulley seat at both ends thereof, one end of the pulling cord being fixedly connected with the lower runner

- and the other end of the pulling cord coming round the lower runner pulley and the upper runner pulley in turn and penetrating into the outer tube to be fixedly connected with the inner tube plug, and
the driving device being arranged in the handle and being a forward and reverse driving device. 5
2. The tri-folded electric umbrella with double-folded shaft according to claim 1, wherein the nut connection wire is of a "II" shape, the upper runner pulley seat being provided with a groove into which a top end of the nut connection wire places. 10
3. The tri-folded electric umbrella with double-folded shaft according to claim 2, wherein the outer tube is rotatably connected with the upper runner by means of upper runner nails arranged on the groove. 15
4. The tri-folded electric umbrella with double-folded shaft according to claim 1, wherein the handle comprises a handle body, a handle upper cover being in threaded connection with the top end of the handle body, and a handle lower cover snapped to the bottom end of the handle body. 20
25
5. The tri-folded electric umbrella with double-folded shaft according to claim 1, wherein an inner tube connecting sleeve is arranged within the handle, a boss cooperated with a concave hole arranged on an upper end of the handle is arranged on a lower end of the inner tube connecting sleeve, the inner tube connecting sleeve is connected with the handle by inserting the boss into the concave hole, and a bottom end of the inner tube passing through the upper cover of the handle is connected with the inner tube connecting sleeve by means of a T-shaped positioning pin. 30
35
6. The tri-folded electric umbrella with double-folded shaft according to claim 1, wherein the driving device comprises a motor, a circuit board, a battery, and a button, the motor, the battery, and the button being connected to the circuit board, 40
45
- wherein a motor screw connector is arranged in the handle, by which the motor is connected to the lead screw,
wherein a charging port and a discharging port are arranged in the handle, both of which are electrically connected to the battery, 50
wherein the button comprises a forward button for driving the motor to rotate forward and a reverse button for driving the motor to rotate reversely, and 55
wherein the circuit board is provided with a Bluetooth chip.
7. The tri-folded electric umbrella with double-folded shaft according to claim 1, wherein the rib has a spring for closing the umbrella.

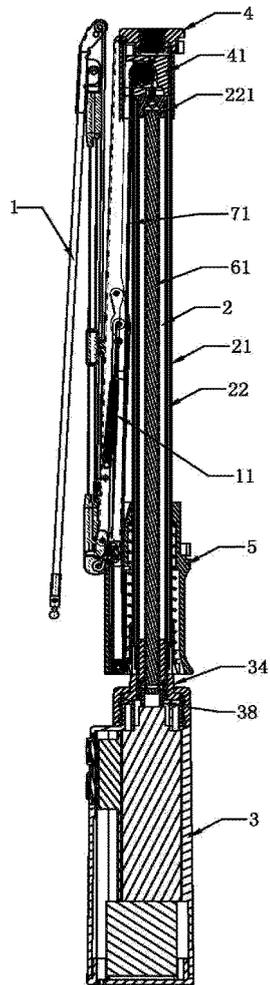


FIG. 1

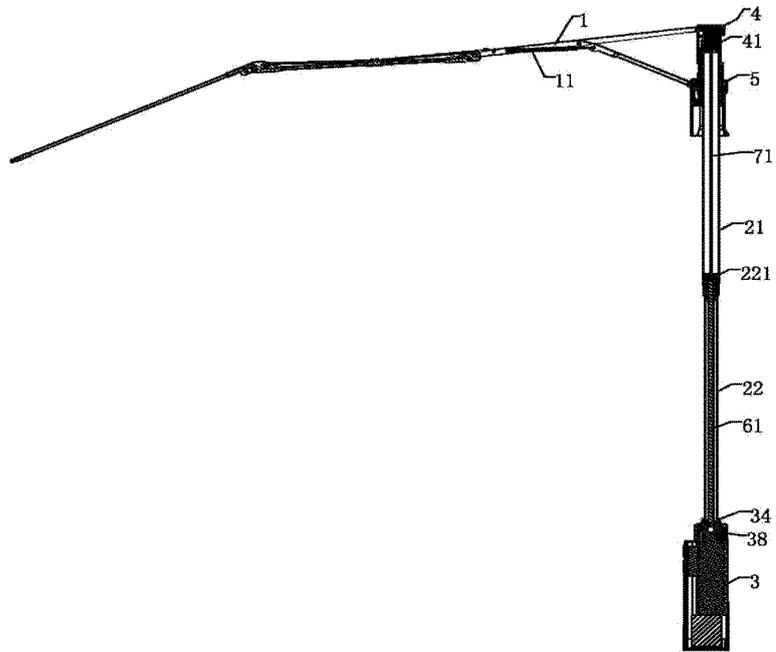


FIG. 2

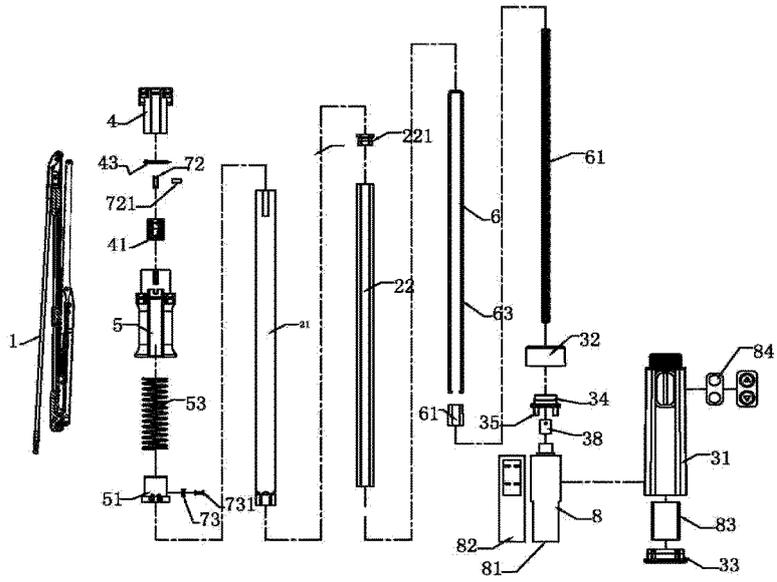


FIG. 3

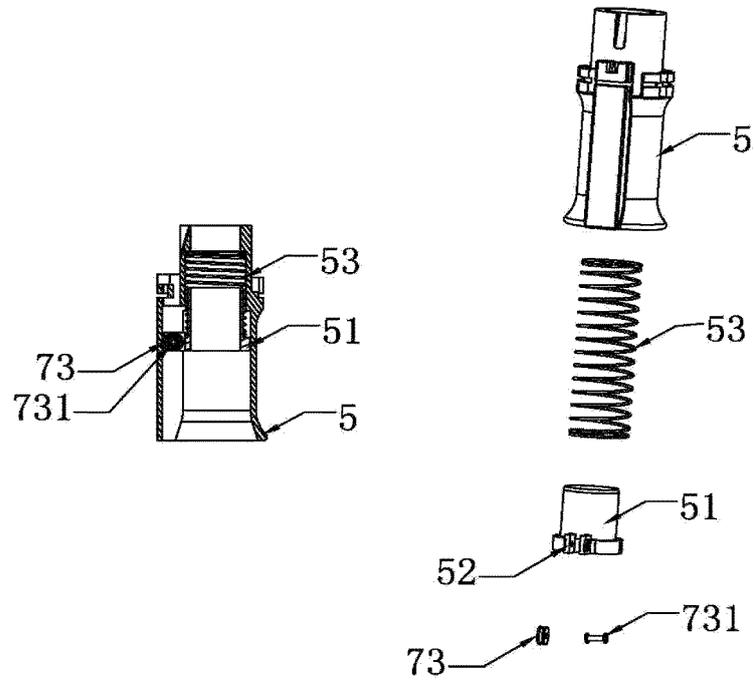


FIG. 4

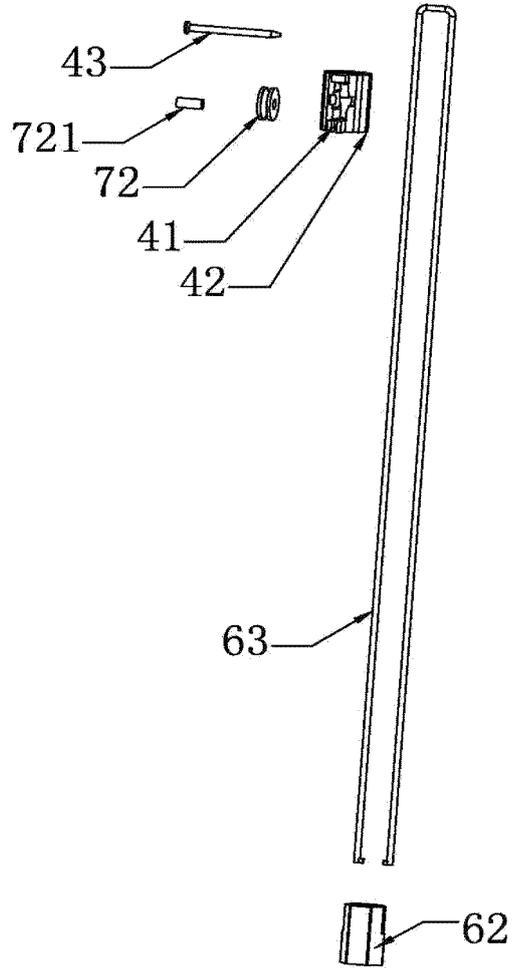


FIG. 5

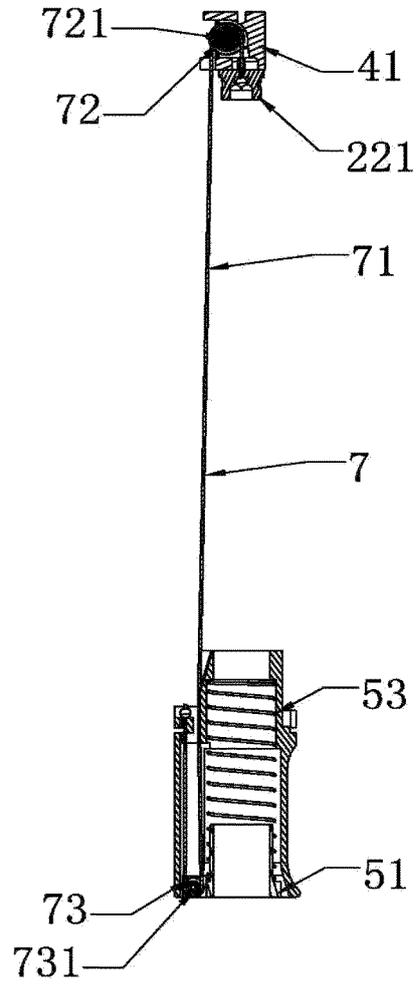


FIG. 6

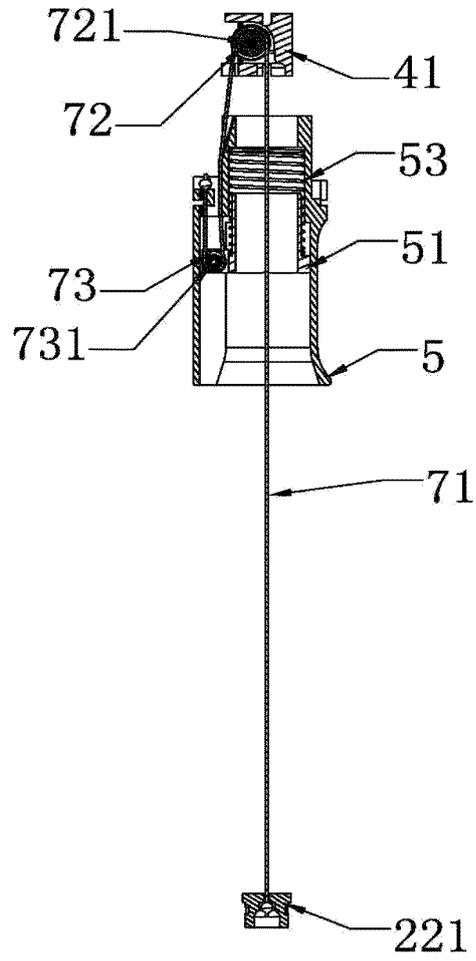


FIG. 7

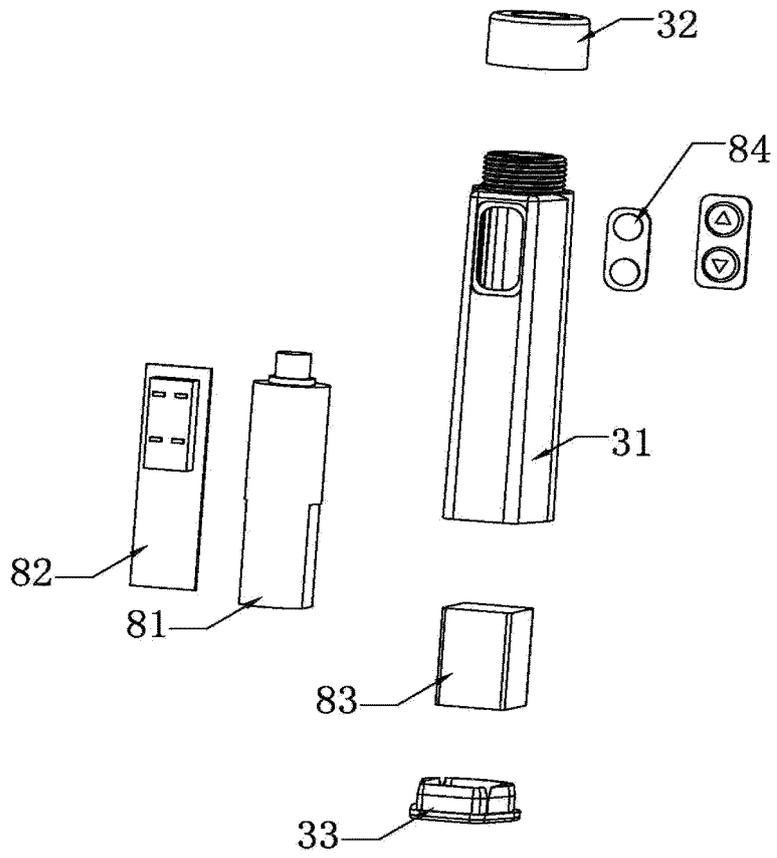


FIG. 8

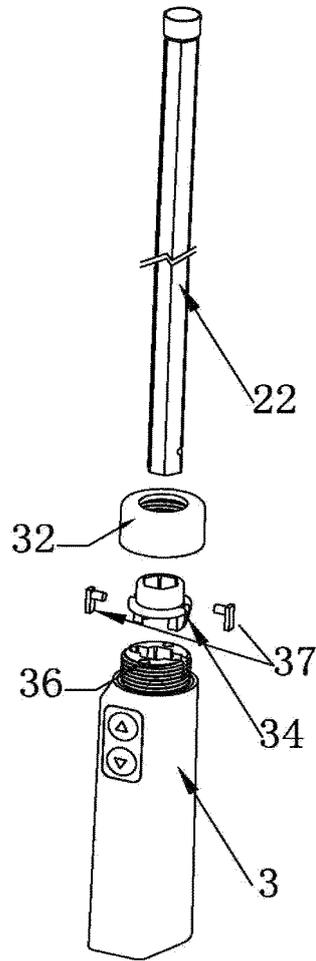


FIG. 9

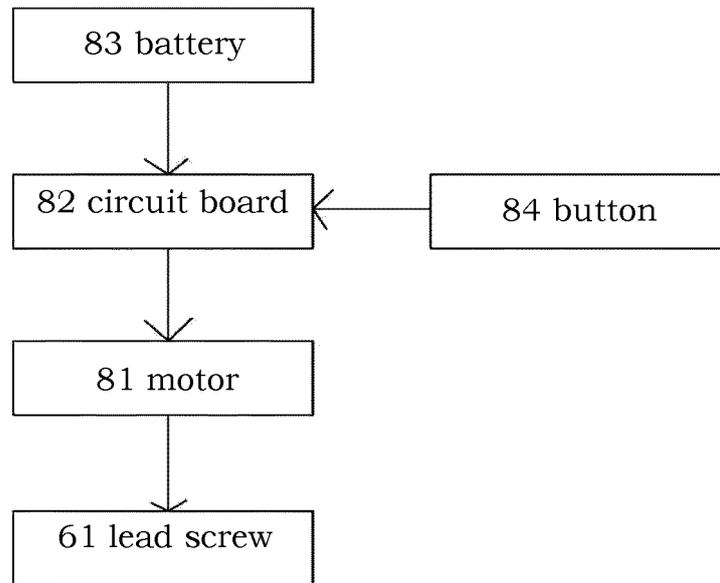


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/101228

5

A. CLASSIFICATION OF SUBJECT MATTER

A45B 25/14(2006.01)i; A45B 25/16(2006.01)i; A45B 19/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

10

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A45B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

15

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

VEN; CNABS: 动, 滑轮, 螺丝, 伞, 弹簧, 电, 马达, 自动, mov+, pulley, screw?, umbrella?, spring?, electri+, motor+, auto+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

20

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 110074528 A (FUJIAN SHUYU UMBRELLA CO., LTD.) 02 August 2019 (2019-08-02) entire document	1-7
A	CN 205866238 U (CHEN, Chuanyang) 11 January 2017 (2017-01-11) entire document	1-7
A	CN 202664509 U (XIAMEN MINGHE INDUSTRIAL CO., LTD.) 16 January 2013 (2013-01-16) entire document	1-7
A	CN 206822174 U (XIAMEN MINGHE INDUSTRIAL CO., LTD.) 02 January 2018 (2018-01-02) entire document	1-7
A	CN 203182188 U (XIAMEN MINGHE INDUSTRIAL CO., LTD.) 11 September 2013 (2013-09-11) entire document	1-7
A	CN 204812464 U (CHEN, Junqi) 02 December 2015 (2015-12-02) entire document	1-7
A	CN 205624853 U (XIE, Yihe et al.) 12 October 2016 (2016-10-12) entire document	1-7

35

 Further documents are listed in the continuation of Box C.
 See patent family annex.

40

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

45

Date of the actual completion of the international search

25 December 2019

Date of mailing of the international search report

30 December 2019

50

Name and mailing address of the ISA/CN

China National Intellectual Property Administration
No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing
100088
China

Authorized officer

55

Facsimile No. (86-10)62019451

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/101228

5
 10
 15
 20
 25
 30
 35
 40
 45
 50
 55

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 105815900 A (SUN CITY (XIAMEN) OUTDOOR TECHNOLOGY CO., LTD.) 03 August 2016 (2016-08-03) entire document	1-7
A	US 2007017561 A1 (KUO, Shihshin) 25 January 2007 (2007-01-25) entire document	1-7
A	US 2007199585 A1 (KUO, Shihshin) 30 August 2007 (2007-08-30) entire document	1-7

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/101228

5
 10
 15
 20
 25
 30
 35
 40
 45
 50
 55

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 110074528 A	02 August 2019	None	
CN 205866238 U	11 January 2017	None	
CN 202664509 U	16 January 2013	None	
CN 206822174 U	02 January 2018	None	
CN 203182188 U	11 September 2013	None	
CN 204812464 U	02 December 2015	None	
CN 205624853 U	12 October 2016	None	
CN 105815900 A	03 August 2016	CN 105815900 B	19 January 2018
US 2007017561 A1	25 January 2007	None	
US 2007199585 A1	30 August 2007	US 7401615 B2	22 July 2008

Form PCT/ISA/210 (patent family annex) (January 2015)