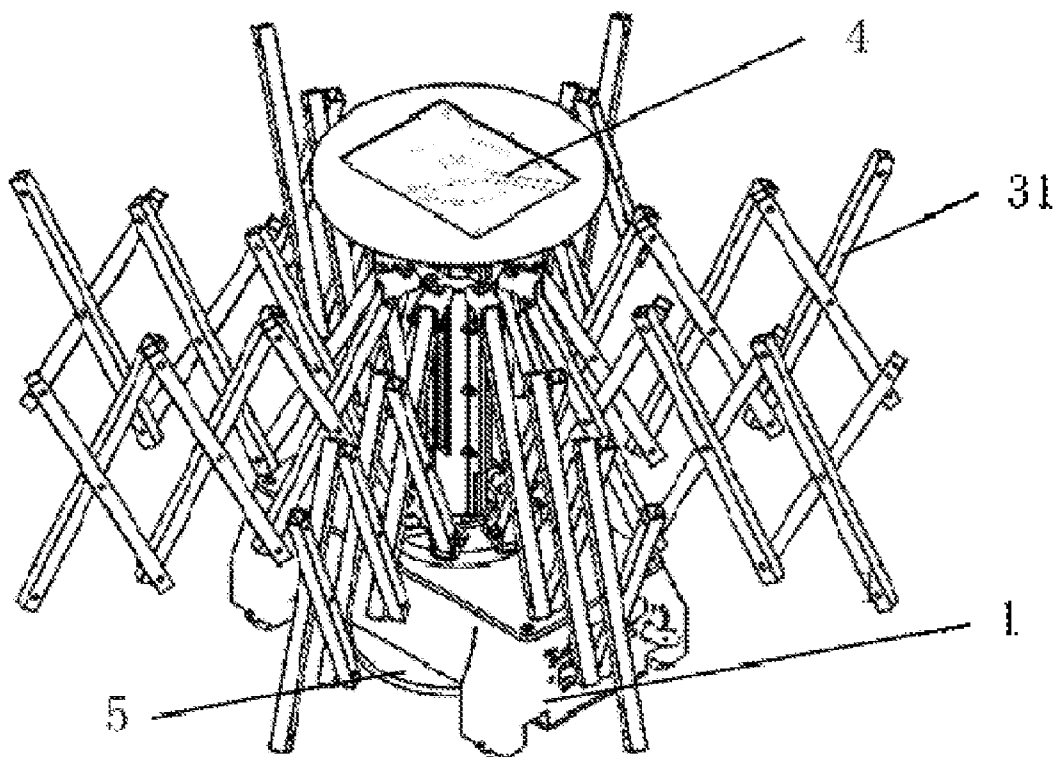




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(19) **United States**(12) **Patent Application Publication**
King(10) **Pub. No.: US 2014/0366922 A1**(43) **Pub. Date: Dec. 18, 2014**(54) **MULTI-FUNCTIONAL SUNSHADE**(71) Applicant: **Davy King**, Skyland, NC (US)(72) Inventor: **Davy King**, Skyland, NC (US)(73) Assignee: **H&J group L.L.C**(21) Appl. No.: **13/920,383**(22) Filed: **Jun. 18, 2013****Publication Classification**(51) **Int. Cl.**
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(2013.01); **E04H 15/48** (2013.01)USPC **135/96**; 135/143; 135/139(57) **ABSTRACT**

A multi-functional sunshade is provided, including housing (1), raising and lowering mechanism (2) and folding mechanism (3), in which raising and lowering mechanism (2) connects to housing (1), and raising and lowering mechanism (2) drives folding mechanism (3) for spreading and drawing in. Housing (1) comprises housing body (11), motor. Raising and lowering mechanism (2) comprises: raising and lowering rod (21), raising and lowering platform (22) and raising and lowering seat (23), in which: motor set up in housing body (11) drives raising and lowering platform (22) to move along the axial direction of raising and lowering rod (21), which is installed in housing body (11) via raising and lowering seat (23). In case of equipment failure, it can draw in the sunshade cloth through an emergency mechanism and uses a plug-in buckle to increase the assembly efficiency substantially. It has a broad market prospect.



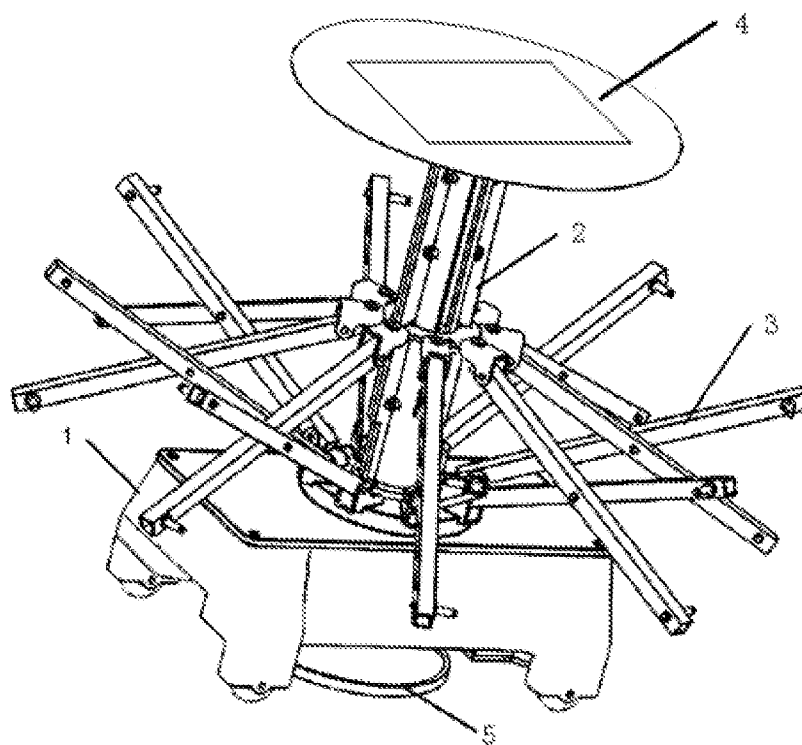


Fig. 1

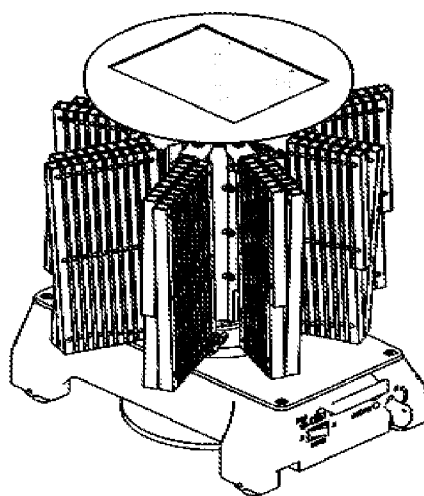


Fig. 2

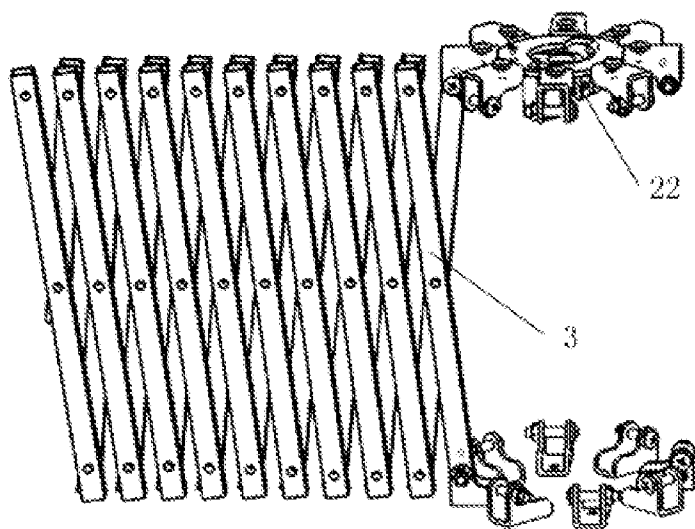


Fig. 3

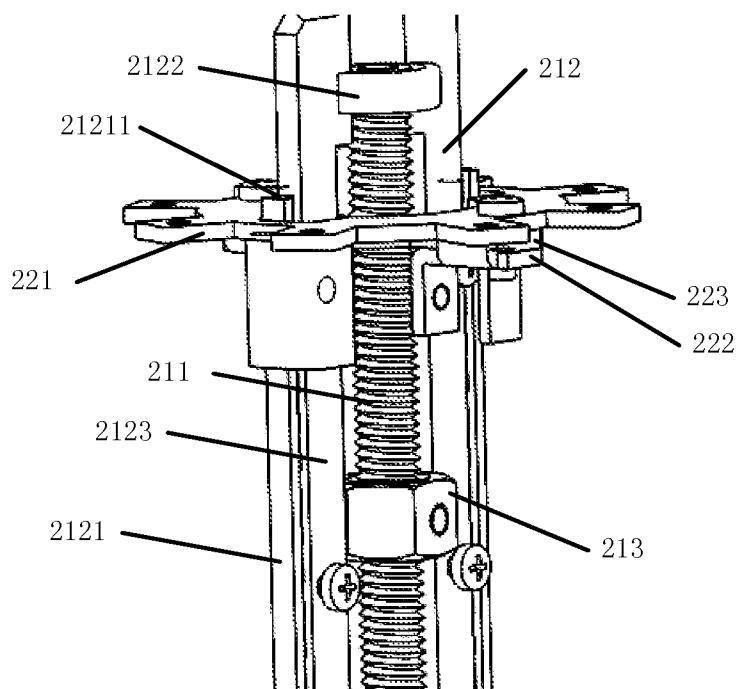


Fig. 4

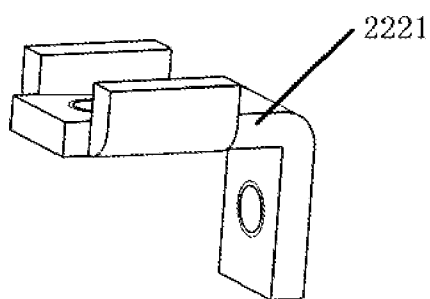


Fig. 5

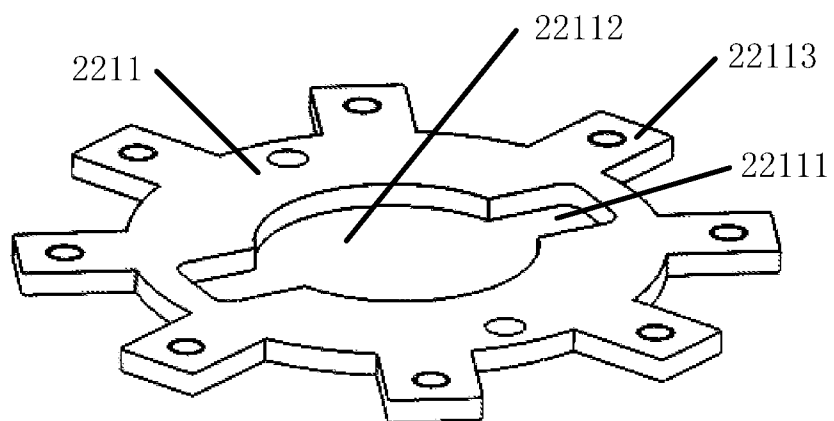


Fig. 6

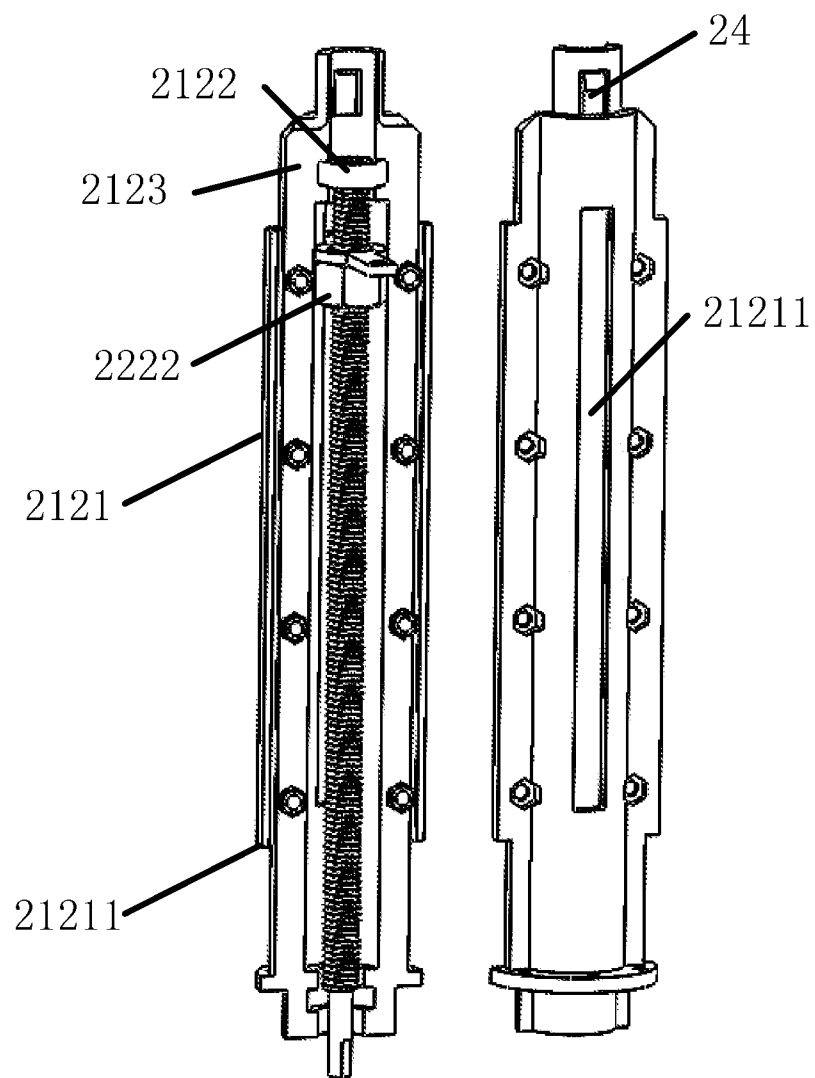


Fig. 7

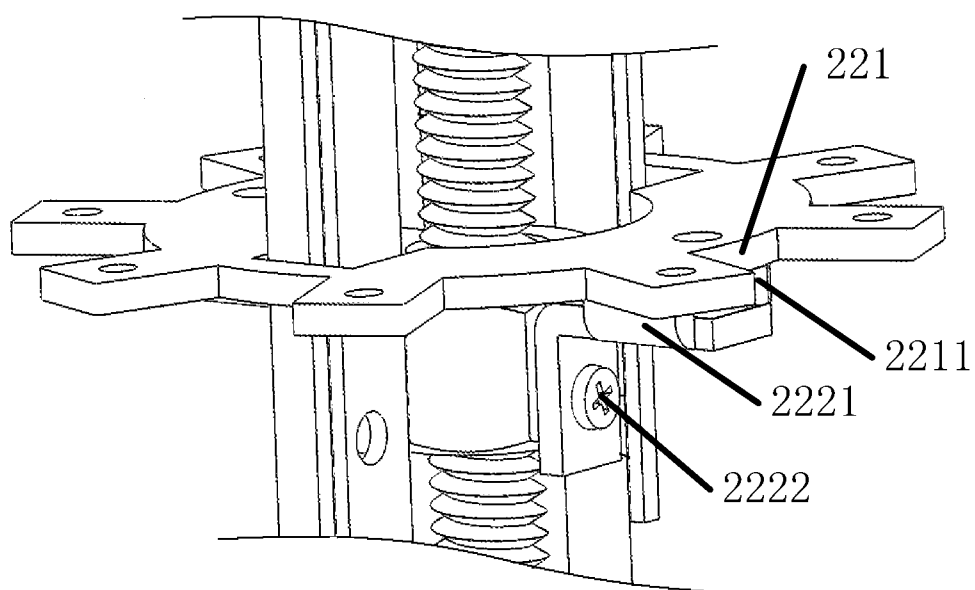


Fig. 8

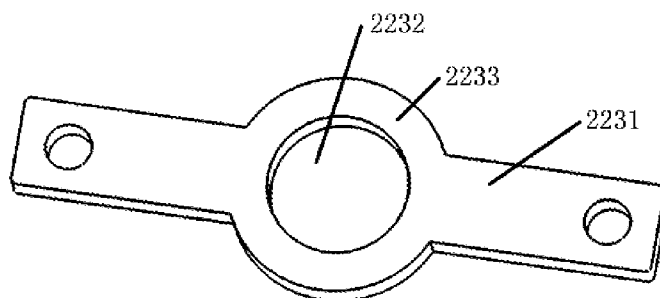


Fig. 9

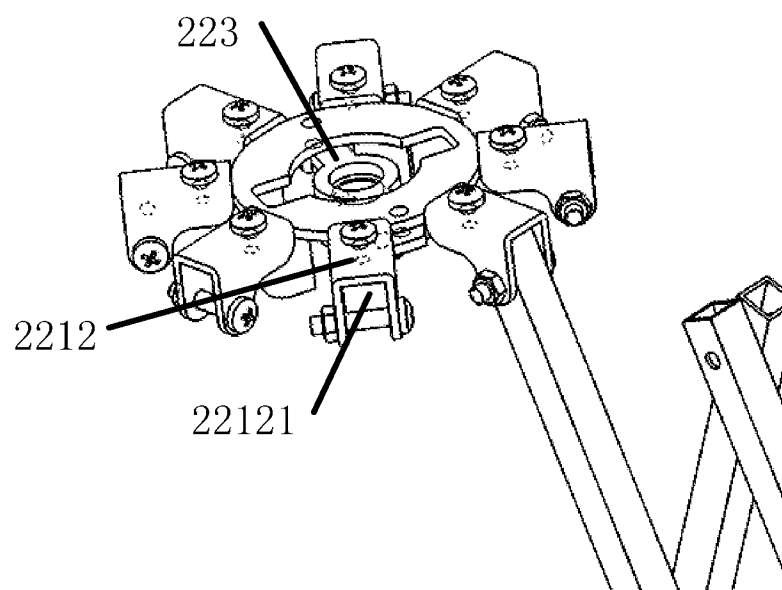


Fig. 10

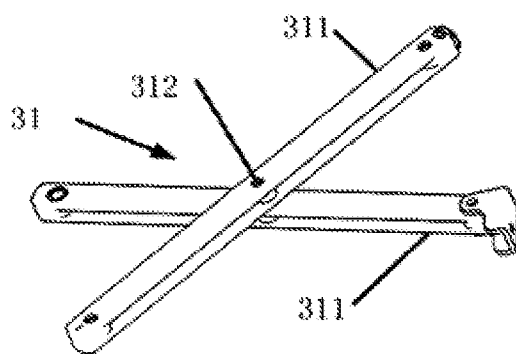


Fig. 11

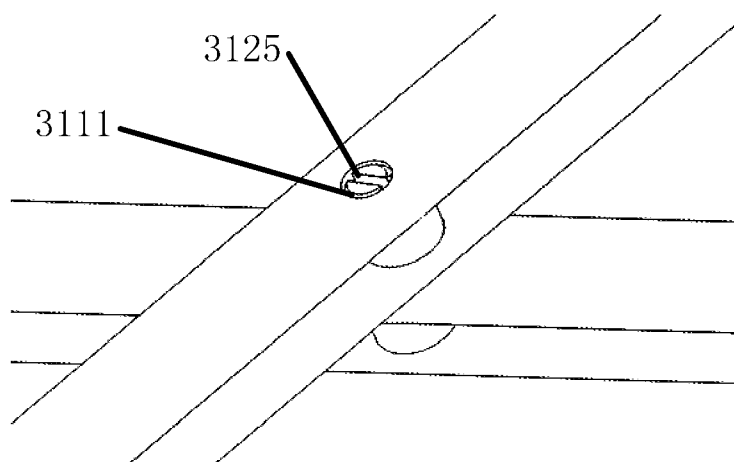


Fig. 12

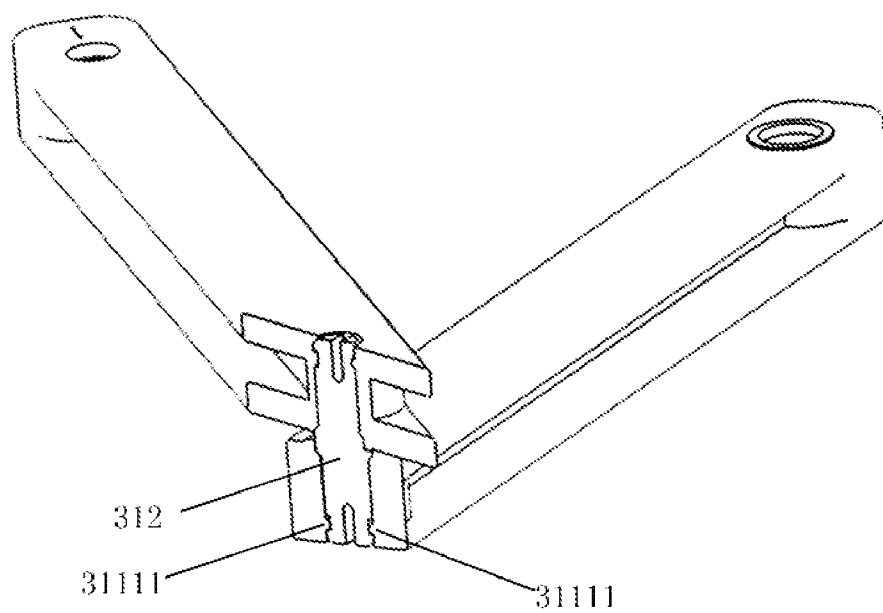


Fig. 13

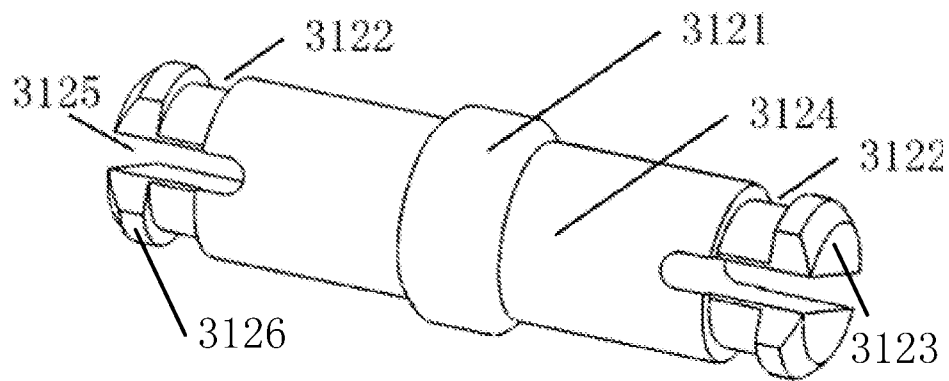


Fig. 14

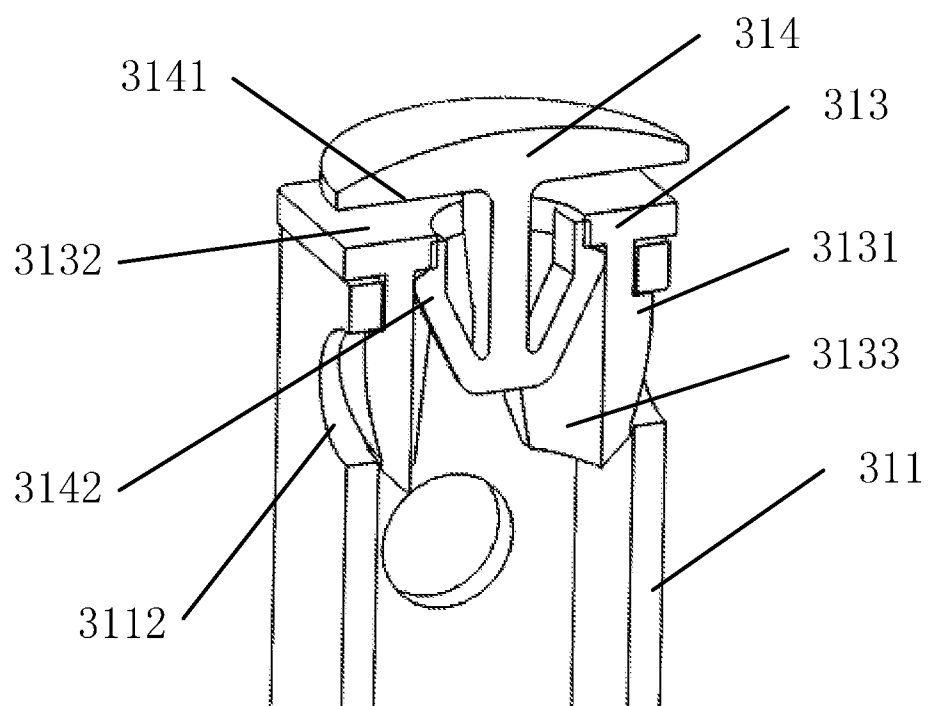


Fig. 15

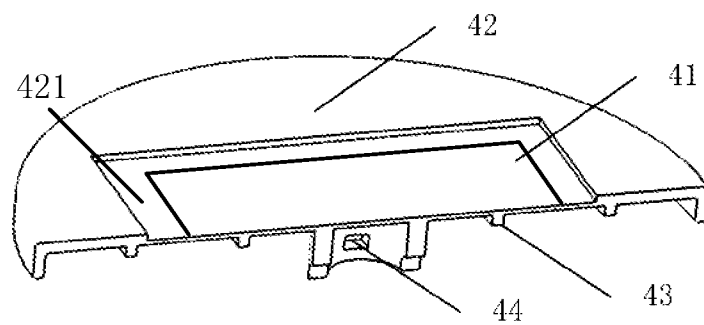


Fig. 16

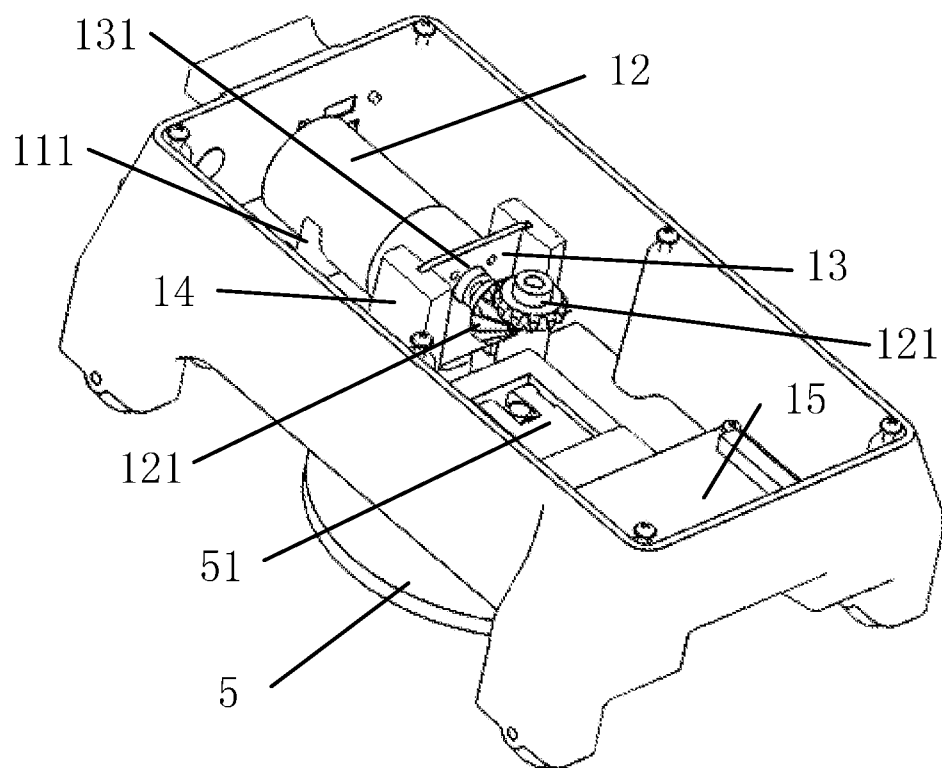


Fig. 17

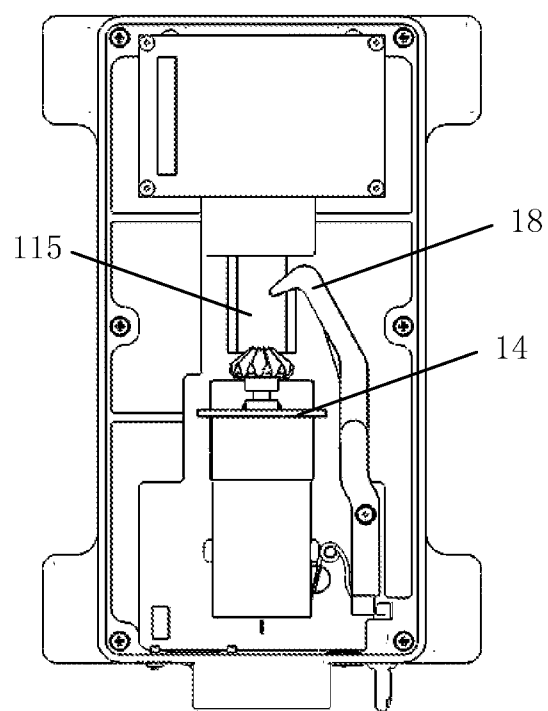


Fig. 18

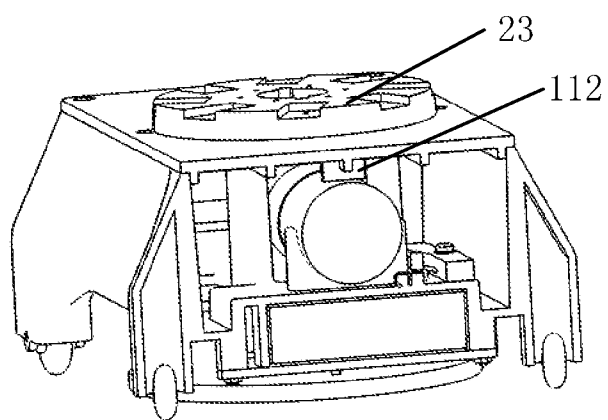


Fig. 19

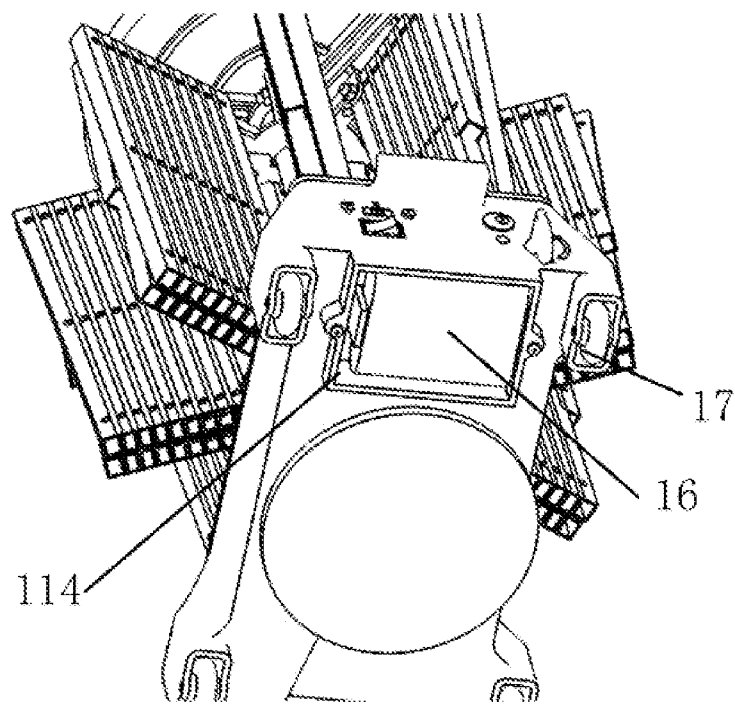


Fig. 20

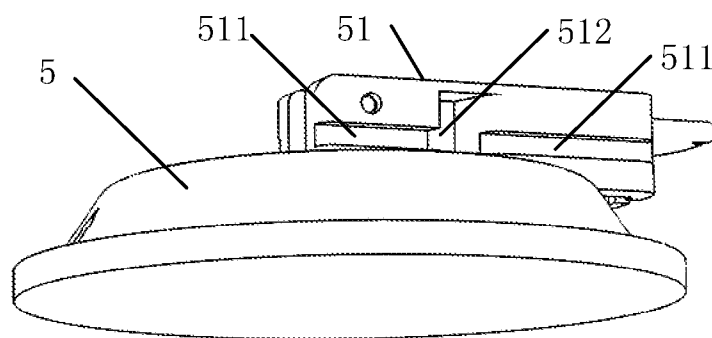


Fig. 21

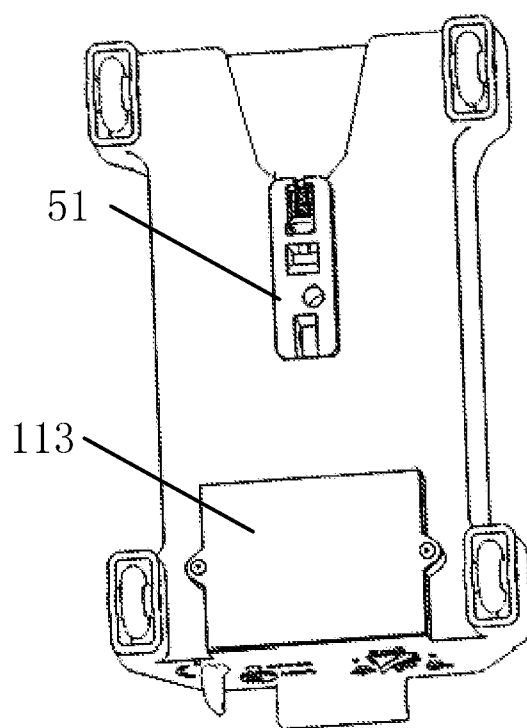


Fig. 22

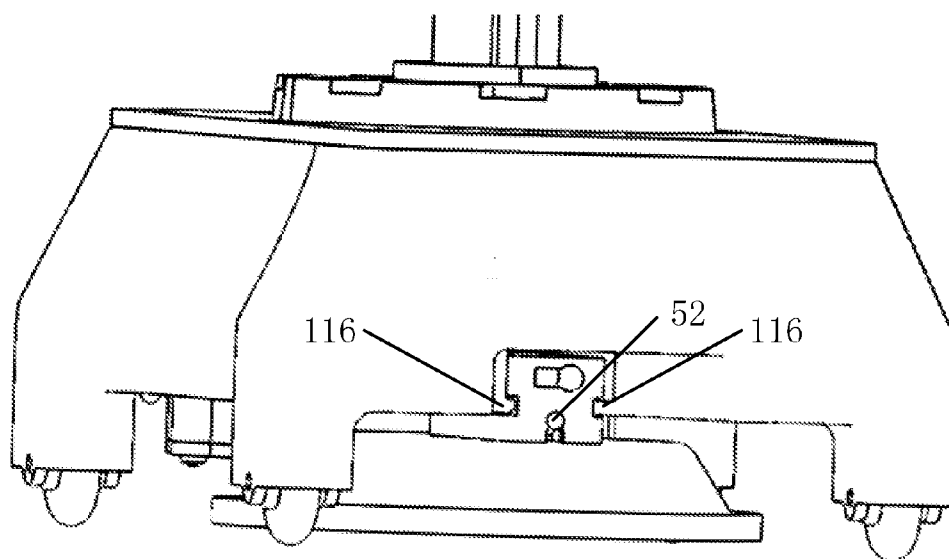


Fig. 23

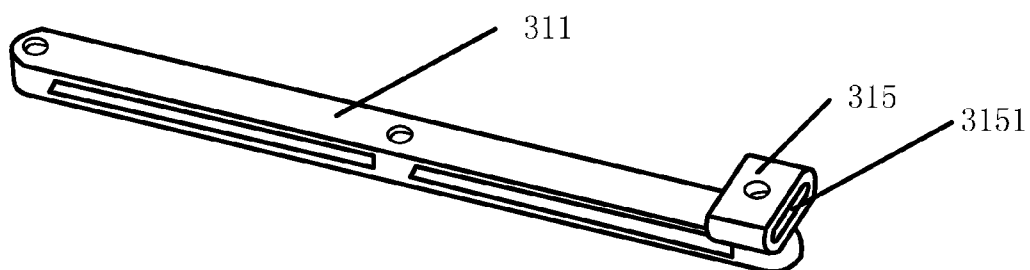


Fig. 24

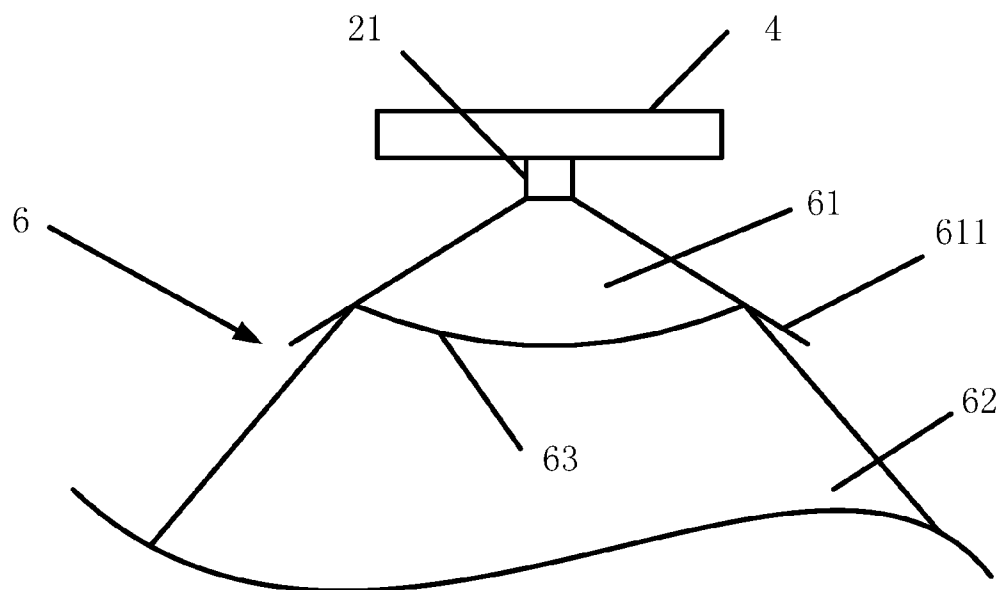


Fig. 25

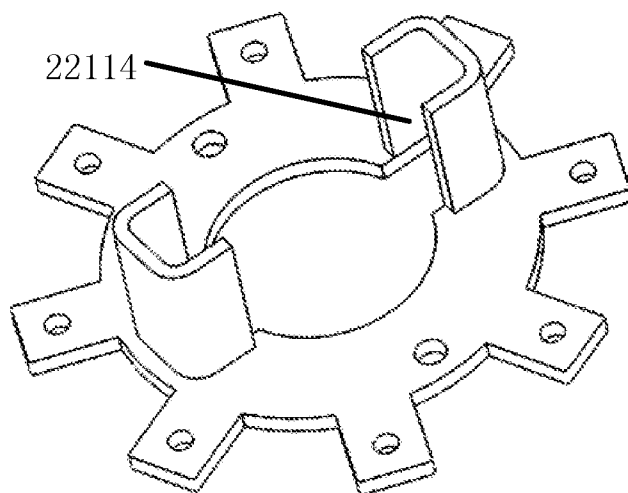


Fig. 26

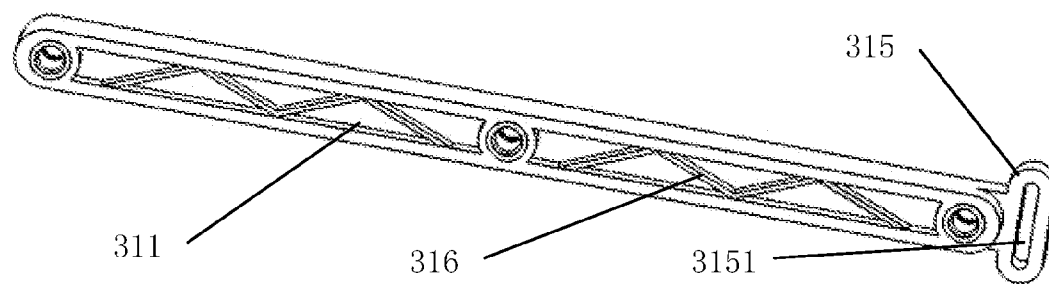


Fig. 27

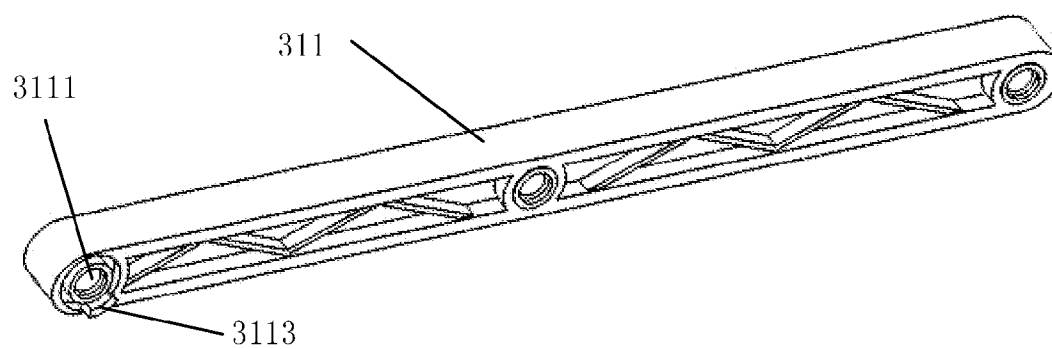


Fig. 28

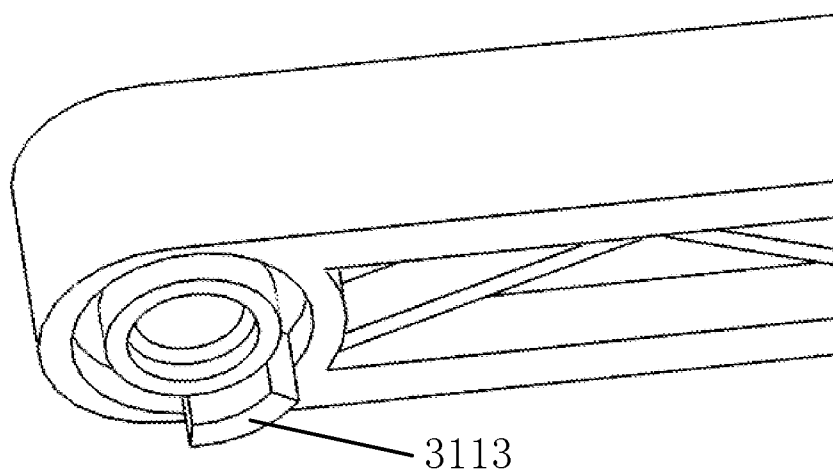


Fig. 29

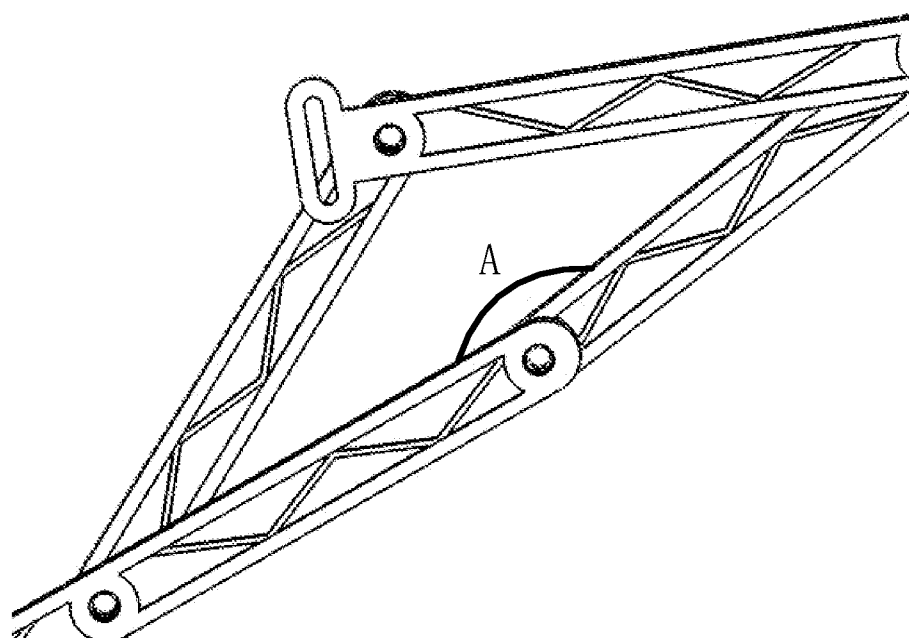


Fig. 30

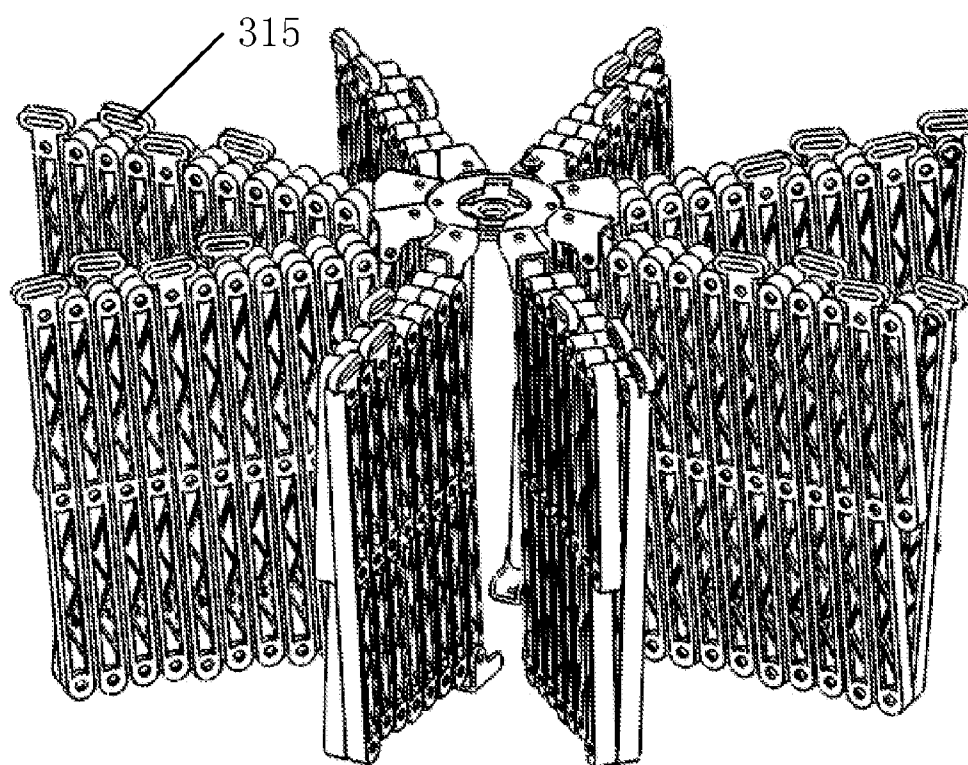


Fig. 31

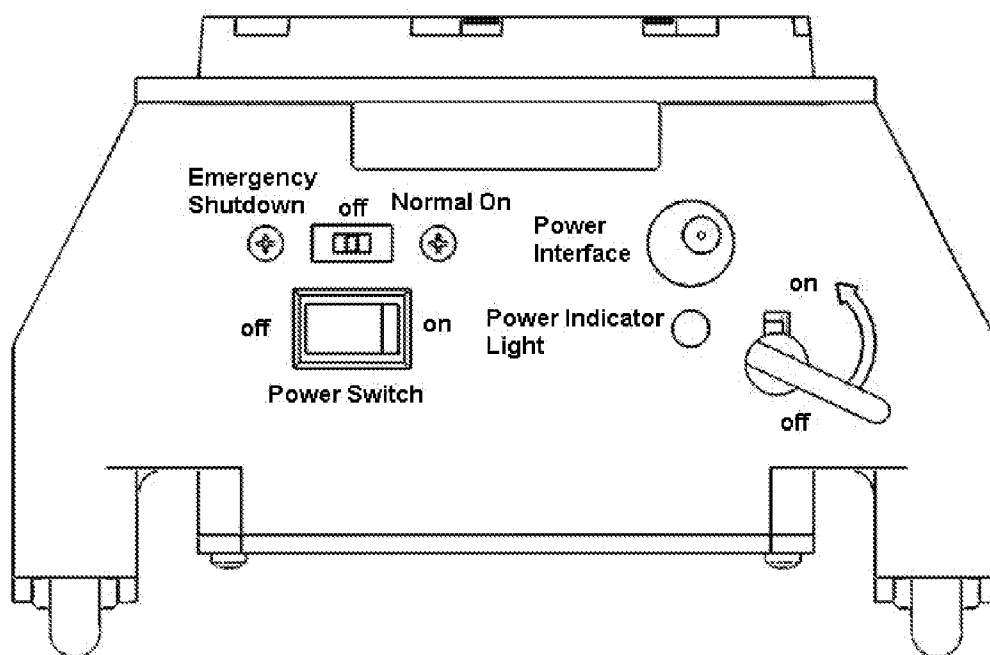


Fig. 32

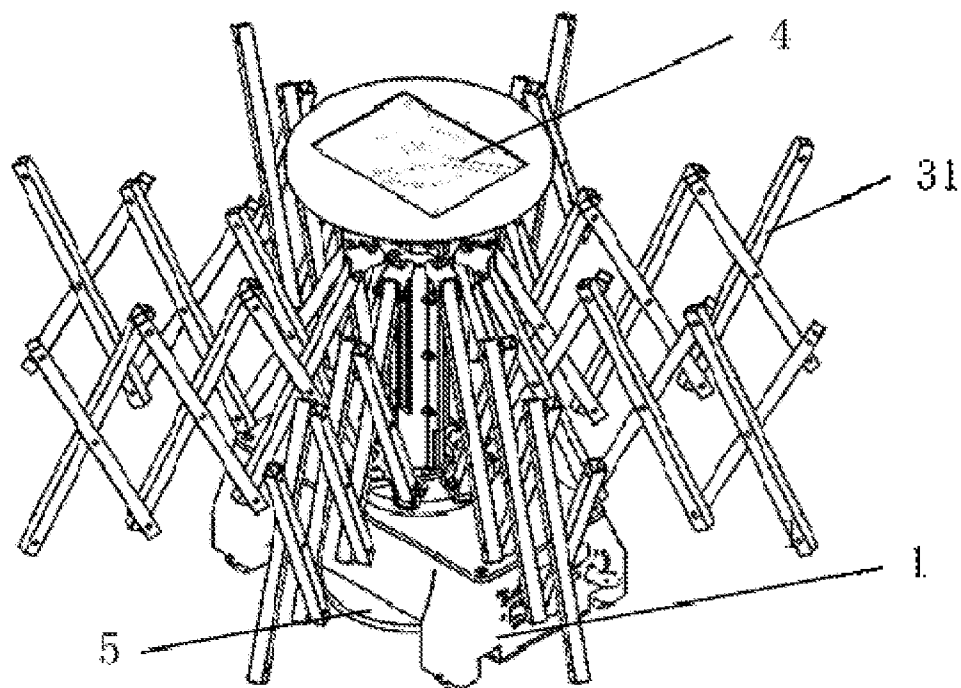


Fig. 33

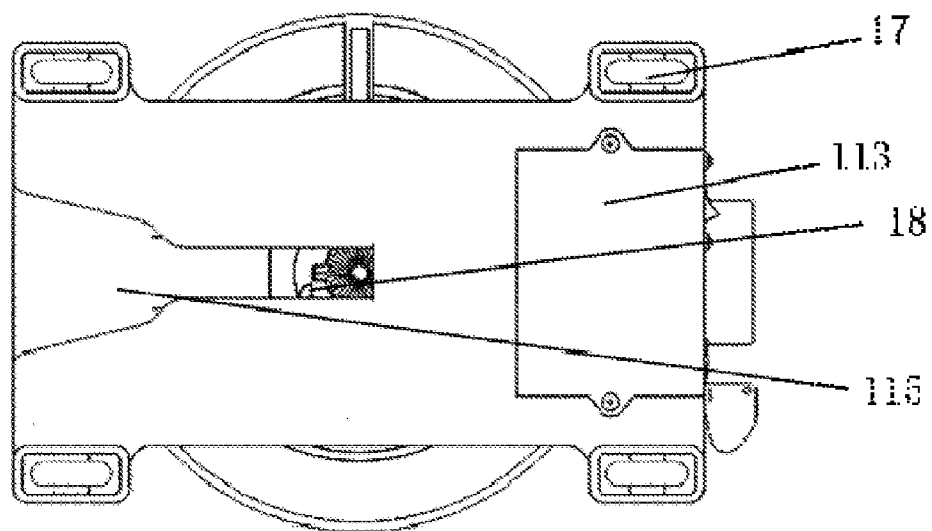


Fig. 34

MULTI-FUNCTIONAL SUNSHADE

BACKGROUND OF THE PRESENT INVENTION

[0001] 1. Field of Invention

[0002] This invention involves a sunshade device and more specifically, it involves a kind of multifunctional sunshade.

[0003] 2. Description of Related Arts

[0004] Solar energy is a type of clean energy which uses sunlight during daytime as energy and uses solar cell to charge batteries to convert solar energy into chemical energy and store it in batteries. Batteries serve as power supply to supply energy to loads in which the chemical energy in batteries is converted into energy of other forms.

[0005] In conventional arts, the remote control sunshade utilizing solar energy has such disadvantages such as irrational in structure, complicated to assemble, hard to repair and a short service life. Therefore, it is necessary to develop a multifunctional sunshade being rational in structural design and having humanized characteristics.

SUMMARY OF THE PRESENT INVENTION

[0006] Aimed at the inefficiency in existing technologies, this invention purports to provide a multifunctional sunshade.

[0007] According to the one aspect of this invention, a multi-functional sunshade is provided, comprising a housing 1, a raising and lowering mechanism 2 and a folding mechanism 3,

[0008] wherein the raising and lowering mechanism 2 connects to the housing 1, the raising and lowering mechanism 2 drives the folding mechanism 3 to spread and draw in,

[0009] wherein the housing 1 comprising a housing body 11 and a motor 12, the raising and lowering mechanism 2 comprising a raising and lowering rod 21, a raising and lowering platform 22 and a raising and lowering seat 23,

[0010] wherein the motor 12 set up in the housing body 11 drives the raising and lowering platform 22 to move along an axial direction of the raising and lowering rod 21, and the raising and lowering rod 21 is installed in the housing body 11 via the raising and lowering seat 23.

[0011] Optimally, the raising and lowering rod 21 comprises a screw 211, a guide post 212 and a drive nut 213, the guide post 212 comprises a raised guide strip 2121, the raising and lowering platform 22 comprises a raising and lowering tray 221 and an emergency release connecting part 222, wherein the drive nut 213 is installed on the screw 211, the screw 211 is installed on the guide post 212, the raising and lowering tray 221 has a first guide groove 2211 mating with the raised guide strip 2121 of the guide post 212 and a first screw accommodation through-hole 22112 having the screw 211 threading through, the raising and lowering tray 221 connects with the emergency release connecting part 222, the emergency release connecting part 222 connects to the drive nut 213 in a removable manner, a control end of the folding mechanism 3 connects to the raising and lowering tray 221.

[0012] Optimally, the emergency release connecting part 222 comprises an L-shape connecting part 2221 and an emergency bolt 2222, in which: one connecting arm of the L-shape connecting part 2221 connects to the raising and lowering tray 221, and the other connecting arm connects to the drive nut 213 in a removable manner through the emergency bolt 2222.

[0013] Optimally, the raising and lowering tray 221 comprises a central piece 2211 and a folding mechanism mount-

ing sleeve 2212, in which: the central piece 2211 has a first guide groove 22111 and a first screw accommodation through-hole 22112, the central piece 2211 has a protruding arm 22113 extending out from an outer edge thereof, the folding mechanism mounting sleeve 2212 has a limit groove 22121, an end of the protruding arm 22113 is set up in the limit groove 22121 and connects with the limit groove 22121 closely, the control end of the folding mechanism 3 is set up in the limit groove 22121 and hinged with a wall of limit groove 22121.

[0014] Optimally, the limit groove 22121 is of U-shape and the width between walls of the U-shape groove is equal to or slightly greater than the width of the protruding arm 22113 and the width between the walls of the U-shape groove is equal to or slightly greater than the control end of the folding mechanism 3.

[0015] Optimally, the raising and lowering platform 22 further comprises a guide part 223, the guide post 212 further comprises a bearing 2122 and a guide pipe sleeve 2123, in which: the screw 211 is located in the guide pipe sleeve 2123, two ends of the screw 211 connects to two ends of the guide pipe sleeve 2123 through the bearing 2122 respectively, the guide pipe sleeve 2123 is installed in the housing body 11 via the raising and lowering seat 23, the guide pipe sleeve 2123 has a second guide groove 21211 provided thereon, the guide part 223 comprises a ring piece 2233 and a slider 2231 extending out from the ring piece 2233, the ring piece 2233 has a second screw accommodation through-hole 2232 having the screw 211 threading through, the second guide groove 21211 fits with the slider 2231, the slider 2231 connects to the raising and lowering tray 221, a radius of the ring piece 2233 is slightly less than an inner diameter of the guide pipe sleeve 2123.

[0016] Optimally, the slider 2231 is connected between the L-shape connecting part 2221 and the raising and lowering tray 221.

[0017] Optimally, the raised guide strip 2121 has a wire routing hole 21211 provided thereon.

[0018] Optimally, the raising and lowering tray 221 is an axially symmetrical component, and the raising and lowering seat 23 and the housing body 11 are an integral part.

[0019] Optimally, the folding mechanism 3 comprises a plurality of folding arm units 31 connecting in proper order, in which control ends of the folding arm unit 31 in a most inner side connects to the raising and lowering platform 22 and the raising and lowering seat 23 respectively, for adjacent the folding arm units 31, the output end of the folding arm unit 31 on an inner side is hinged to the control end of the folding arm unit 31 on an outer side.

[0020] Optimally, the folding arm units 31 comprises a connecting shaft 312 and at least two connecting arms 311, each of the connecting arms 311 has a mounting hole 3111 mating with the connecting shaft 312 in the center, a middle of the two connecting arms 311 of one folding arm unit 31 are hinged with the connecting shaft 312 through the mounting hole 3111.

[0021] Optimally, the height between the connecting shafts 312 located in the middle of the connecting arms 311 for the folding arm units 31 of one folding mechanism 3 is the same.

[0022] Optimally, a middle part of a shaft body 3124 of the connecting shaft 312 extends out from a washer body 3121, each of two ends of the connecting shaft 312 has a ring slot 3122 provided thereon, the mounting hole 3111 has a retainer ring 31111 mating with the ring slot 3122 on the wall.

[0023] Optimally, a cross section of the washer body 3121 is an echelon, and a length for which the echelon connects to a bottom side of the shaft body 3124 is greater than that for which the echelon connects to a top side of the same.

[0024] Optimally, an end face 3123 and a side face 3126 of the connecting shaft 312 is connected smoothly, and a radius of an end face 3123 of the connecting shaft 312 is smaller than thereof the shaft body 3124 of the connecting shaft 312.

[0025] Optimally, the two ends of the connecting shaft 312 have a removing groove 3125, the removing groove 3125 extends from an end face 3123 of the connecting shaft 312 along an axial direction of the connecting shaft 312 toward an internal of the connecting shaft 312.

[0026] Optimally, a gap exists between an end side face of the connecting shaft 312 and a wall of the mounting hole 3111.

[0027] Optimally, the connecting arm 311 has an I-shape cross section.

[0028] Optimally, the folding arm units 31 further comprises a protecting plug 313 installed at a top of the connecting arm 311, the protecting plug 313 comprises a protecting plug buckle 3131, a protecting surface 3132 and a sunshade cloth mounting slot 3133, in which the protecting surface 3132 has a thickness, the protecting plug buckle 3131 is connected at a lower side of the protecting surface 3132, an inner side of the protecting plug buckle 3131 forms the sunshade cloth mounting slot 3133, through-holes on the sunshade cloth mounting slot 3133 and the protecting surface 3132 are connected with each other, and the connecting arm 311 has a protecting plug mounting slot 3112 mating with the protecting plug buckle 3131 on the top.

[0029] Optimally, the folding arm units 31 further comprise a sunshade cloth buckle parts 314 installed on the protecting plug 313, in which the sunshade cloth buckle parts 314 comprises a sunshade cloth buckle surface 3141 and a sunshade cloth buckles 3142, the sunshade cloth buckle surface 3141 has a thickness, the sunshade cloth buckles 3142 are provided at a lower side of the sunshade cloth buckle surface 3141, and the sunshade cloth mounting slot 3133 and the sunshade cloth buckles 3142 are matched.

[0030] Optimally, a sunshade cloth is further included, wherein the sunshade cloth is connected to a top of the folding mechanism 3.

[0031] Optimally, the sunshade cloth has through-holes, and the sunshade cloth buckles 3142 of the sunshade cloth buckle parts 314 threads through the through-holes to install in the sunshade cloth mounting slot 3133.

[0032] Optimally, magic buttons are further included, in which hook and loop tapes are further included, which are located at a location of a sunshade cloth corresponding to a vehicle rear view mirror and/or a handle.

[0033] Optimally, a bottom of the housing body 11 extends upward out from the motor support groove 111, and a groove surface of the motor support groove 111 matches with a bottom shape of the motor 12.

[0034] Optimally, a cover of the housing body 11 extends downward out from an upper pressure groove 112 of the motor 12, and a groove edge of the upper pressure groove 112 of the motor matches with a top shape of the motor 12.

[0035] Optimally, the housing 1 further comprises a motor attachment plate 13 and a motor attachment plate mounting groove 14, in which an enclosure of the motor 12 is caught in a motor mounting hole 131 of the motor attachment plate 13.

[0036] Optimally, the motor 12 drives the screw 211 via two bevel gears 121 axially perpendicular to each other.

[0037] Optimally, the housing 1 further comprises a controller 15, and the housing 1 further comprises one or more devices selected from the group consisting of the following devices connecting with controller 15:

[0038] an indicator lamp;

[0039] a display screen;

[0040] a power switch; and

[0041] a remote communication device.

[0042] Optimally, the housing 1 further comprises a power supply 16, the housing body 11 comprises a power cover plate 113, the housing body 11 has a power supply storage space 114 on a bottom of the power cover plate 113, the power supply 16 is installed in the power supply storage space 114 to supply power to the housing 1, and the power supply 16 comprises a municipal electric power charging interface and/or a solar charging interface.

[0043] Optimally, a solar panel 4 is further included, in which the solar panel 4 is installed at a top of the raising and lowering mechanism 2.

[0044] Optimally, the solar panel 4 comprises a solar cell 41, a battery mounting board 42, a reinforcing strip 43 and a battery mounting board slot 44, the raising and lowering mechanism 2 has a battery mounting board buckle 24 mating with the battery mounting board slot 44 at a top thereof, the solar cell 41 is installed in a solar cell jar 421 on an upper surface of the battery mounting board 42, and the reinforcing strip 43 is connected between the battery mounting board slot 44 and a bottom surface of the battery mounting board 42.

[0045] Optimally, the battery mounting board slot 44 has a wire slot provided on a wall thereof.

[0046] Optimally, the housing 1 further comprises a wheel 17, in which the wheel 17 is provided at a bottom of the housing body 11.

[0047] Optimally, the multi-functional sunshade further comprising a base 5, in which the housing 1 is installed on the base 5 in a removable manner.

[0048] Optimally, the base 5 is of a suction disc type, and has a suction disc control handle 51 and a handle locking mechanism 52 provided thereon, the suction disc control handle controls the suction disc type base to connect and release, and the handle locking mechanism is used to lock a position of the suction disc control handle.

[0049] Optimally, the suction disc control handle 51 has a base connecting groove 511, the housing body 11 has a suction disc control handle accommodation tank 115 at a bottom thereof and the suction disc control handle accommodation tank 115 has a base connecting retainer strip 116 matching with the base connecting groove 511, and the suction disc control handle 51 is provided in the suction disc control handle accommodation tank 115 through installation of the base connecting groove 511 and the base connecting retainer strip 116.

[0050] Optimally, the housing 1 further comprises a base locking mechanism 18, a locking tongue of the base locking mechanism 18 cooperates with a locking tongue groove 512 provided on the suction disc control handle 51 to lock the housing 1 and the base 5 in a connecting condition.

[0051] Optimally, the folding arm units 31 further comprises a tie ring 315, in which the tie ring 315 is connected at one end of the connecting arm 311, the tie ring 315 has a tie hole 3151, the sunshade cloth 6 has a tie rope, and the sun-

shade cloth 6 connects with the folding arm units 31 through the tie rope threaded in the tie hole 3151.

[0052] Optimally, the sunshade cloth 6 comprises a sunshade top 61 and a sunshade skirt 62, in which an upper end of the sunshade top 61 is connected to a top of the raising and lowering mechanism 2 and the sunshade skirt 62 is connected to a lower edge of the sunshade top 61 in a removable manner.

[0053] Optimally, at least one folding arm unit 31 further comprises a folding arm unit spreading angle limit block 3113, which limits a maximum spreading angle between the connected connecting arm ends below 180 degrees.

[0054] Optimally, a position of the folding arm unit spreading angle limit block 3113 on the folding arm unit 31 is adjacent to the mounting hole 3111 located at an end of the folding arm unit 31.

[0055] Comparing to the conventional technologies, this invention has the following beneficial effects:

[0056] 1. The emergency mechanism can draw in the sunshade cloth for users in case of equipment failure to completely eliminate the disadvantage of being unable to draw in sunshade cloth in case of power failure;

[0057] 2. Plug-in buckle is used to connect sunshade cloth and folding mechanism, resulting in increased assembly efficiency;

[0058] 3. The solar panel has a high structural strength with buckle and wire routing slot provided to facilitate replacement and extend wire life and be good for environmental protection;

[0059] 4. By using hook and loop tape, the sunshade cloth can be connected to the vehicle handle and side view mirrors conveniently to improve the wind-resisting capability thereof;

[0060] 5. Rechargeable batteries are provided at the bottom of housing, which can be quickly replaced by opening the battery lid;

[0061] 6. The motor is installed in a stable manner with a low noise, which can be conveniently maintained and repaired;

[0062] 7. The display screen can display the remaining charge left of power supply and remind users to recharge unit;

[0063] 8. There are wheels at the bottom of housing body for users to easily center on car root by pulling or pushing, which saves effort;

[0064] 9. The base has a strong suction action, and base and housing are installed in a firm and solid connecting manner;

[0065] 10. The raising and lowering rod is properly structured to ensure a long service.

[0066] These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0067] By reading and referring to the following figures describing in detail the non-limiting embodiment example, other characteristics, purposes and advantages of this invention will become more obvious:

[0068] FIG. 1 is a schematic diagram of a general structure of this invention;

[0069] FIG. 2 is a schematic diagram for a condition when a folding mechanism draws in;

[0070] FIG. 3 is a schematic diagram showing the connecting relations between the folding mechanism and a raising and lowering mechanism;

[0071] FIG. 4 is a schematic diagram for the condition when a raising and lowering tray and a screw are detached in case of emergency;

[0072] FIG. 5 is a schematic diagram for the structure of an L-shape connecting part;

[0073] FIG. 6 is a schematic diagram for the structure of the raising and lowering tray;

[0074] FIG. 7 is a schematic diagram for the structure of a raising and lowering rod;

[0075] FIG. 8 is a schematic diagram for the condition when the raising and lowering tray and the screw are normally connected;

[0076] FIG. 9 is a schematic diagram for the structure of a guide part;

[0077] FIG. 10 is a schematic diagram for the location relation between the raising and lowering tray and the guide part;

[0078] FIG. 11 is a schematic diagram for the structure of a folding arm unit;

[0079] FIG. 12 is a detail view of a connecting shaft;

[0080] FIG. 13 is a schematic diagram for the cross sectional structure of the folding arm unit;

[0081] FIG. 14 is a schematic diagram for a three-dimensional structure of the connecting shaft;

[0082] FIG. 15 is a schematic diagram for connecting relations between a protecting plug and sunshade cloth buckle parts;

[0083] FIG. 16 is a schematic diagram for a cross section structure of a solar panel;

[0084] FIG. 17 is a schematic diagram for an internal three-dimensional structure of a housing;

[0085] FIG. 18 is an internal top view of the housing;

[0086] FIG. 19 is a structural schematic diagram for motor installation;

[0087] FIG. 20 is a structural schematic diagram for power supply installation;

[0088] FIG. 21 is a schematic diagram for a structure of a base;

[0089] FIG. 22 is a schematic diagram for a connecting relationship between the base and the housing;

[0090] FIG. 23 is a schematic diagram for a connecting relationship between the base and the housing;

[0091] FIG. 24 is a schematic diagram for a structure of a tie ring;

[0092] FIG. 25 is a schematic diagram for a connecting relationship between a sunshade top and a sunshade skirt.

[0093] FIG. 26 is a structural schematic diagram of a guide piece;

[0094] FIG. 27 is a structural schematic diagram of a connecting arm and the tie ring;

[0095] FIG. 28 is a structural schematic diagram of a folding arm unit spreading angle limit block of the connecting arm;

[0096] FIG. 29 is a structural schematic diagram of the folding arm unit spreading angle limit block and a mounting hole;

[0097] FIG. 30 shows a maximum angle that the folding arm unit can spread under limitation of the folding arm unit spreading angle limit block;

[0098] FIG. 31 is a structural schematic diagram for the folding arm unit drawing in;

[0099] FIG. 32 is a structural schematic diagram of a housing control panel;

[0100] FIG. 33 is a schematic diagram for a general structure of this invention, in which 8 folding arm units are shown;

[0101] FIG. 34 is a schematic diagram for a bottom surface of the housing.

[0102] In the figures:

1-housing	2-raising and lowering mechanism
11-housing body	21-raising and lowering rod
111-motor support groove	211-screw
112-motor upper pressure groove	212-guide post
113-power cover plate	2121-raised guide strip
114-power supply storage space	21211-wire routing hole
115-suction disc control handle accommodation tank	2122-bearing
116-base connecting retainer strip	2123-guide pipe sleeve
12-motor	21211-second guide groove
121-bevel gear	213-drive nut
13-motor attachment plate	22-raising and lowering platform
131-motor mounting hole	221-raising and lowering tray
14-motor attachment plate mounting groove	2211-central piece
15-controller	22111-first guide groove
16-power supply	22112-first screw accommodation through-hole
17-wheel	22113-protruding arm
18-base locking mechanism	22114-guide piece
3-folding mechanism	2212-folding mechanism
31-folding arm units	mounting sleeve
311-connecting arm	22121-limit groove
3111-mounting hole	222-emergency release connecting part
31111-retainer ring	2221-L-shape connecting part
3112-protecting plug mounting slot	2222-emergency bolt
3113-folding arm unit spreading angle limit block	223-guide part
312-connecting shaft	2231-slider
3121-washer body	2232-second screw
3122-ring slot	accommodation through-hole
3123-end face	2233-ring piece
3124-shaft body	23-raising and lowering seat
3125-removing groove	24-battery mounting board buckle
3126-side face	4-solar panel
313-protecting plug	41-solar cell
3131-protecting plug buckle	42-battery mounting board
3132-protecting surface	43-reinforcing strip
3133-sunshade cloth mounting slot	44-battery mounting board slot
314-sunshade cloth buckle parts	5-base
3141-sunshade cloth buckle surface	51-suction disc control handle
3142-sunshade cloth buckles	511-base connecting groove
315-tie ring	512-locking tongue groove
3151-tie hole	52-handle locking mechanism
316-connecting arm reinforcing strip	6-sunshade cloth
	61-sunshade top
	611-sunshade extension
	62-sunshade skirt
	63-zipper

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0103] In the following, a specific embodiment example will be combined to explain in detail this invention. The following embodiment example will help technical people in this field to further understand this invention, however, it does not limit this invention in any way. It should be pointed out that ordinary technical people in this field can make variations and improvements under the prerequisite of not alienating themselves from the conception of this invention. These belong to the protection scope for this invention.

[0104] As shown in FIG. 1 and FIG. 2, the multifunctional sunshade as provided by this invention comprises a housing 1, a raising and lowering mechanism 2, a folding mechanism 3, a solar panel 4, a base 5 and a sunshade cloth. More specifically, the raising and lowering mechanism 2 connects to the housing 1, the raising and lowering mechanism 2 drives the

folding mechanism 3 to spread and draw in, the housing 1 comprises a housing body 11 and a motor 12, the raising and lowering mechanism 2 includes: a raising and lowering rod 21, a raising and lowering platform 22 and a raising and a lowering seat 23, in which: the motor 12 set up in the housing body 11 drives the raising and lowering platform 22 to move along an axial direction of the raising and lowering rod 21, the raising and lowering rod 21 is installed in the housing body 11 via the raising and lowering seat 23, the sunshade cloth connects to a top of the folding mechanism 3, the solar panel 4 is installed at a top of the raising and lowering mechanism 2 and the housing 1 is installed at the base 5 in a removable manner.

[0105] In this embodiment example, the raising and lowering platform 22 is located above the raising and lowering seat 23, when the raising and lowering platform 22 moves from bottom to top, the raising and lowering platform 22 drives the folding mechanism 3 to draw in gradually, when the raising and lowering platform 22 moves from bottom to top, the folding mechanism 3 spreads gradually being driven by the raising and lowering platform 22, accordingly, the sunshade cloth connecting to the folding mechanism 3 also draws in and spreads with it. In a variation example, the raising and lowering platform 22 can be located under the raising and lowering seat 23, the folding mechanism 3 can draw in and spread similarly being driven by the raising and lowering platform 22. Further, the sunshade cloth has loop and hook fasteners, the sunshade cloth can be secured by loop and hook fasteners to the locations of outside rear view mirror and handle to improve the wind-resisting capability of the sunshade cloth.

[0106] More specifically, a specific structure of raising and lowering mechanism 2 is described in detail in the following.

[0107] The raising and lowering rod 21 comprises a screw 211, a guide post 212 and a drive nut 213, the guide post 212 comprises raised guide strip 2121, the raising and lowering platform 22 comprises a raising and lowering tray 221 and an emergency release connecting part 222, in which: the drive nut 213 is installed on the screw 211, the screw 211 is installed on the guide post 212, the raising and lowering tray 221 has a first guide groove 22111 mating with the raised guide strip 2121 of the guide post 212 and a first screw accommodation through-hole 22112 with the screw 211 threading through, the raising and lowering tray 221 connects the emergency release connecting part 222, the emergency release connecting part 222 connects drive nut 213 in a removable manner and the control end of folding mechanism 3 connects raising and lowering tray 221. The emergency release connecting part 222 comprises an L-shape connecting part 2221 and an emergency bolt 2222, in which: one connecting arm of the L-shape connecting part 2221 connects to the raising and lowering tray 221 and the other connecting arm connects to the drive nut 213 in a removable manner via the emergency bolt 2222.

[0108] As shown in FIG. 8, when the multifunctional sunshade operates normally, the raising and lowering tray 221 connects with the drive nut 213 via the emergency release connecting part 222, as a result, the raising and lowering tray 221 can move up or down accordingly being driven by the nut 213. And if the multifunctional sunshade has a failure leading to the screw 211 stopping rotation, the sunshade cloth can not draw in if the raising and lowering tray 221 continues to maintain a connection with the drive nut 213. So the emergency bolt 2222 can be removed from the drive nut 213 to have the raising and lowering tray 221 and the drive nut 213

separate with each other, as shown in FIG. 4, as a result, under an manual force, the raising and lowering tray 221 can still be raised to draw in the sunshade cloth. Optimally, the emergency bolt 2222 is an inside hex bolt.

[0109] The raising and lowering platform 22 further comprises a guide part 223, the guide post 212 further comprises a bearing 2122 and a guide pipe sleeve 2123, in which: the screw 211 is located in the guide pipe sleeve 2123, two end of the screw 211 connect to the two ends of the guide pipe sleeve 2123 via the bearing 2122 respectively, the guide pipe sleeve 2123 is installed in the housing body 11 via the raising and lowering seat 23, the guide pipe sleeve 2123 has a second guide groove 21211, the guide part 223 comprises a ring piece 2233 and a slider 2231 extending out from the ring piece 2233, the ring piece 2233 has a second screw accommodation through-hole 2232 with the screw 211 threading through, the second guide groove 21211 mates with the slider 2231, the slider 2231 connects the raising and lowering tray 221, a radius of the ring piece 2233 is slightly smaller than an inner diameter of the guide pipe sleeve 2123. The slider 2231 is connected between the L-shape connecting part 2221 and the raising and lowering tray 221. The raised guide strip 2121 has a wire routing hole 21211. The raising and lowering tray 221 is an axially symmetrical component, and the raising and lowering seat 23 and the housing body 11 is integral.

[0110] The raising and lowering tray 221 comprises a central piece 2211 and a folding mechanism mounting sleeve 2212, in which: the central piece 2211 has a first guide groove 22111 and a first screw accommodation through-hole 22112, an outer edge of the central piece 2211 extends out from a protruding arm 22113, a bottom surface of the central piece 2211 extends out from a guide piece 22114 mating with the raised guide strip 2121, the folding mechanism mounting sleeve 2212 has a limit groove 22121, an end of protruding arm 22113 is set up in the limit groove 22121 and connects with the limit groove 22121 closely, a control end of the folding mechanism 3 is set up in the limit groove 22121 and hinged with a wall of the limit groove 22121. The limit groove 22121 is U-shape design, with a width between U-shape groove walls being equal to or slightly greater than that of the protruding arm 22113, and a width between the U-shape groove walls being equal to or slightly greater than the control end of the folding mechanism 3.

[0111] Next, a detailed description is illustrated to the specific construction of the folding structure 3.

[0112] The folding mechanism 3 comprises a plurality of folding arm units 31 connecting in proper order, in which control ends of the folding arm unit 31 on a innermost side connects to the raising and lowering platform 22 and the raising and lowering seat 23 respectively, and between adjacent folding arm units 31, an output end of the folding arm unit 31 on the inner side hinges a control end of the folding arm unit 31 located on outside. As shown in FIGS. 11 to 14, the folding arm units 31 comprises a connecting shaft 312 and at least two connecting arms 311, the connecting arm 311 has a mounting hole 3111 matching with the connecting shaft 312 in the center, the two connecting arms 311 of one folding arm unit 31 hinge with the connecting shaft 312 via the mounting hole 3111 in the center. The height between the connecting shafts 312 located in a middle of the connecting arms 311 for the folding arm units 31 of one folding mechanism 3 is the same, as shown in FIG. 2. A shaft body 3124 of the connecting shaft 312 extends out from a washer body 3121 in the center, two ends of the connecting shaft 312 have ring slots 3122

respectively, and the mounting hole 3111 has a retainer ring 31111 mating with the ring slot 3122 on a wall thereof.

[0113] A cross section of the washer body 3121 is an echelon, and a length for which the echelon connects to a bottom side of the shaft body 3124 is greater than that for which the echelon connects to a top side of the same. An end face 3123 and a side face 3126 of the connecting shaft 312 is connected smoothly, and a radius of an end face 3123 of the connecting shaft 312 is smaller than thereof the shaft body 3124 of the connecting shaft 312. The two ends of the connecting shaft 312 have a removing groove 3125, and the removing groove 3125 extends from an end face 3123 of the connecting shaft 312 along an axial direction of said connecting shaft 312 toward an internal of the connecting shaft 312. There is a gap between an end side face of the connecting shaft 312 and a wall of the mounting hole 3111. The a cross section of the connecting arm 311 is an I shape.

[0114] In existing technologies, the connection between the connecting arms 311 is usually achieved by using a nut, a bolt and a washer. As the nut, the bolt and the washer are three separate parts with fastening to be made by turning the nut, installation thereof is time-consuming and not easy. But in this invention, the connecting shaft has a plug-in installation mode, with assembly between two connecting arms to be achievable by exerting force slightly on two ends of the connecting shaft 312 respectively to insert into a mounting hole of the connecting arm 311. As a result, the assembly time and assembly efficiency is improved substantially.

[0115] Further, a detailed description is made to the specific mode of connection between the sunshade cloth and the folding arm units 31 in the following.

[0116] The folding arm units 31 further comprise a protecting plug 313 installed at a top of the connecting part 311 and the sunshade cloth buckle parts 314 installed on the protecting plug 313, the protecting plug 313 comprises a protecting plug buckle 3131, a protecting surface 3132 and a sunshade cloth mounting slot 3133, in which, the protecting surface 3132 has a thickness, the protecting plug buckle 3131 is connected at a lower side of the protecting surface 3132, an inner side of the protecting plug buckle 3131 forms the sunshade cloth mounting slot 3133, the through-holes in the sunshade cloth mounting slot 3133 and the protecting surface 3132 are connected with each other and the connecting arm 311 has a protecting plug mounting slot 3112 mating with the protecting plug buckle 3131 on the top end. The sunshade cloth buckle parts 314 comprises a sunshade cloth buckle surface 3141 and a sunshade cloth buckles 3142, the sunshade cloth buckle surface 3141 has a thickness, the sunshade cloth buckles 3142 are set up under the sunshade cloth buckle surface 3141, and the sunshade cloth mounting slot 3133 matches with the sunshade cloth buckles 3142. The sunshade cloth has through-holes, and the sunshade cloth buckles 3142 of the sunshade cloth buckle parts 314 are installed in the sunshade cloth mounting slot 3133 by threading through the through-holes in the sunshade cloth.

[0117] In an optimal example as shown in FIGS. 24, 27 and 30, the folding arm units 31 further comprise a tie ring 315, in which tie ring 315 is connected at one end of the connecting arm 311, the tie ring 315 has a tie hole 3151 provided thereon, a sunshade cloth 6 has a tie rope and the sunshade cloth 6 connects with the folding arm units 31 via the tie rope threaded in the tie hole 3151, in which, the tie rope is optimally a hook and loop fastener. Further, as shown in FIG. 25, the sunshade cloth 6 comprises a sunshade top 61 and a

sunshade skirt **62**, in which, an upper end of the sunshade top **61** connects to a top of the raising and lowering mechanism **2**, and sunshade skirt **62** connects to a lower edge of the sunshade top **61** in a removable manner. Further, the sunshade top **61** and the sunshade skirt **62** are connected via a zipper **63**, a lower edge of the sunshade top **61** extends out from a sunshade extension **611**, and the sunshade top extension **611** covers at an outer side of the sunshade skirt **62**.

[0118] Further optimally, as shown in FIGS. **28**, **29**, at least one folding arm unit **31** further includes a folding arm unit spreading angle limit block **3113**, with the position of the folding arm unit spreading angle limit block **3113** on the folding arm unit **31** being adjacent to the mounting hole **3111** located at an end of the folding arm unit **31**, and the folding arm unit spreading angle limit block **3113** limiting the maximum spreading angle between a connected connecting arm ends below 180 degrees, for example, as shown in FIG. **30**. An angle formed between connected connecting arm ends is A. A maximum value of angle A is kept below 180 degrees through the folding arm unit spreading angle limit block **3113** to prevent the folding arm unit **31** from overturning (going up or down). In which, the technical people in this field can adjust the amount of the folding arm unit spreading angle limit blocks **3113** according to the actual need, for example, in order for folding the arm unit **31** to spread to a maximum degree, no folding arm unit spreading angle limit block **3113** can be provided, in a case when the spreading angle of folding arm unit **31** has to be limited, at least one folding arm unit spreading angle limit block **3113** can be provided in the folding arm unit **31**.

[0119] Further, a detailed description will be made to the specific structure of the housing **1** in the following.

[0120] To have the motor rest stably, as shown in FIGS. **17**, **18** and **19**, a bottom of the housing body **11** extends upward out from a motor support groove **111** and a surface of the motor support groove **111** matches with a bottom shape of the motor **12**, a cover of the housing body **11** extends downward out from a motor upper pressure groove **112** and a groove edge of the motor upper pressure groove **112** matches with a top shape of motor **12**. The housing **1** further comprises a motor attachment plate **13** and motor attachment plate mounting groove **14**, in which an enclosure of the motor **12** is attached in a motor mounting hole **131** of the motor attachment plate **13**. Thus, when the motor **12** drives the screw **211** via two bevel gears **121** axially perpendicular to each other, the stability of the motor is substantially improved as compared with the existing technologies. The housing **1** further comprises a controller **15**, an indicator lamp, a display screen, a power switch, a remote communication device and a power supply **16**, and the controller **15** connects with the indicator lamp, the display screen, the power switch, the remote communication device and the power supply **16** respectively. The housing body **11** comprises a power cover plate **113**, the housing body **11** has a power supply storage space **114** in an inner side of the power cover plate **113**, the power supply **16** is installed in the power supply storage space **114** to supply power for the housing **1**, and the power supply **16** includes a municipal electric power charging interface and/or solar charging interface. The housing **1** further comprises wheels **17**, in which the wheels **17** are set up at a bottom of the housing body **11** to facilitate moving of the housing **1**.

[0121] Next, a detailed description will be made about solar panel **4**.

[0122] The solar panel **4** comprises a solar cell **41**, a battery mounting board **42**, a reinforcing strip **43** and a battery mounting board slot **44**, the raising and lowering mechanism **2** has a battery mounting board buckle **24** mating with the battery mounting board slot **44** on the top, the solar cell **41** is installed in a solar cell jar **421** on an upper surface of the battery mounting board **42**, and the reinforcing strip **43** is connected between the battery mounting board slot **44** and a bottom surface of the battery mounting board **42**. The battery mounting board slot **44** has a wire routing slot on a wall thereof, in such a manner that the leads of the solar cell **41** is capable of connecting a power supply **16** and a controller **15** in the housing **11** via that wire routing slot and the wire routing hole **21211**.

[0123] In the following, a detailed description will be made to the specific structure of base **5**.

[0124] In an optimal case of the embodiment example as shown in FIGS. **21** to **23**, the base **5** is a suction disc type base, which has a suction disc control handle **51** and a handle locking mechanism **52**, the suction disc control handle **51** controls the suction disc type base to attach and release from the sunshade, the handle locking mechanism **52** is used to lock the position of the suction disc control handle. The suction disc control handle **51** has a base connecting groove **511** provided thereon, the housing body **11** has a suction disc control handle accommodation tank **115** on the bottom, in the suction disc control handle accommodation tank **115** there is a base connecting retainer strip **116** matching with base connecting groove **511**, and the suction disc control handle **51** is set up in the suction disc control handle accommodation tank **115** through the installation of the base connecting groove **511** and base connecting retainer strip **116**. The housing **1** further comprises a base locking mechanism **18**, a locking tongue of the base locking mechanism **18** cooperates with the locking tongue groove **512** set up on the suction disc control handle **51** to lock the housing **1** and the base **5** in a connecting condition.

[0125] In an embodiment of this invention, multifunctional sunshade components including the base are placed in the vehicle trunk at the very beginning, after parking, a user attaches the base adsorbed on vehicle roof first by using the attached suction cup. Then send an instruction to the controller via a remote control, the controller starts the motor to operate according to this instruction, the motor outputs power to the screw to make it rotate, the rotation of the screw lowers the raising and lowering platform to drive the folding mechanism to spread, accordingly, the sunshade cloth also spreads at the same time, next, a user can use the hook and loop tape to connect the sunshade cloth to vehicle side view mirrors and handle. When it is necessary to drive the vehicle, use the remote control to control the raising and lowering platform to go up, the sunshade cloth draws in naturally, and finally, release the housing and base and put them in the trunk.

[0126] A description is made above to an embodiment example of this invention. It is necessary to understand that this invention is not limited to the above specific embodiment. Technical people in this field can make numerous variations and modifications within the range of claim, which will not influence the substantial content of this invention.

What is claimed is:

1. A multi-functional sunshade, comprising a housing (**1**), a raising and lowering mechanism (**2**) and a folding mechanism (**3**),

wherein said raising and lowering mechanism (2) connects to said housing (1), said raising and lowering mechanism (2) drives said folding mechanism (3) to spread and draw in,

wherein said housing (1) comprising a housing body (11) and a motor (12), said raising and lowering mechanism (2) comprising a raising and lowering rod (21), a raising and lowering platform (22) and a raising and lowering seat (23),

wherein said motor (12) set up in said housing body (11) drives said raising and lowering platform (22) to move along an axial direction of said raising and lowering rod (21), and said raising and lowering rod (21) is installed in said housing body (11) via said raising and lowering seat (23).

2. The multi-functional sunshade as described in claim 1, wherein said raising and lowering rod (21) comprises a screw (211), a guide post (212) and a drive nut (213), said guide post (212) comprises a raised guide strip (2121), said raising and lowering platform (22) comprises a raising and lowering tray (221) and an emergency release connecting part (222), wherein said drive nut (213) is installed on said screw (211), said screw (211) is installed on said guide post (212), said raising and lowering tray (221) has a first guide groove (22111) mating with said raised guide strip (2121) of said guide post (212) and a first screw accommodation through-hole (22112) having said screw (211) threading through, said raising and lowering tray (221) connects with said emergency release connecting part (222), said emergency release connecting part (222) connects to said drive nut (213) in a removable manner, a control end of said folding mechanism (3) connects to said raising and lowering tray (221).

3. The multi-functional sunshade as described in claim 2, wherein said emergency release connecting part (222) comprises an L-shape connecting part (2221) and an emergency bolt (2222), in which: one connecting arm of said L-shape connecting part (2221) connects to said raising and lowering tray (221), and the other connecting arm connects to said drive nut (213) in a removable manner through said emergency bolt (2222).

4. The multi-functional sunshade as described in claim 2, wherein said raising and lowering tray (221) comprises a central piece (2211) and a folding mechanism mounting sleeve (2212), in which: said central piece (2211) has a first guide groove (22111) and a first screw accommodation through-hole (22112), said central piece (2211) has a protruding arm (22113) extending out from an outer edge thereof, said folding mechanism mounting sleeve (2212) has a limit groove (22121), an end of said protruding arm (22113) is set up in said limit groove (22121) and connects with said limit groove (22121) closely, said control end of said folding mechanism (3) is set up in said limit groove (22121) and hinged with a wall of limit groove (22121).

5. The multi-functional sunshade as described in claim 4, wherein said limit groove (22121) is of U-shape and the width between walls of said U-shape groove is equal to or slightly greater than the width of said protruding arm (22113) and the width between said walls of said U-shape groove is equal to or slightly greater than said control end of said folding mechanism (3).

6. The multi-functional sunshade as described in claim wherein said raising and lowering platform (22) further comprises a guide part (223), said guide post (212) further comprises a bearing (2122) and a guide pipe sleeve (2123), in

which: said screw (211) is located in said guide pipe sleeve (2123), two ends of said screw (211) connects to two ends of said guide pipe sleeve (2123) through said bearing (2122) respectively, said guide pipe sleeve (2123) is installed in said housing body (11) via said raising and lowering seat (23), said guide pipe sleeve (2123) has a second guide groove (21211) provided thereon, said guide part (223) comprises a ring piece (2233) and a slider (2231) extending out from said ring piece (2233), said ring piece (2233) has a second screw accommodation through-hole (2232) having said screw (211) threading through, said second guide groove (21211) fits with said slider (2231), said slider (2231) connects to said raising and lowering tray (221), a radius of said ring piece (2233) is slightly less than an inner diameter of said guide pipe sleeve (2123).

7. The multi-functional sunshade as described in claim 6, wherein said slider (2231) is connected between said L-shape connecting part (2221) and said raising and lowering tray (221).

8. The multi-functional sunshade as described in claim 2, wherein said raised guide strip (2121) has a wire routing hole (21211) provided thereon.

9. The multi-functional sunshade as described in claim 2, wherein said raising and lowering tray (221) is an axially symmetrical component, and said raising and lowering seat (23) and said housing body (11) are an integral part.

10. The multi-functional sunshade as described in claim 1, wherein said folding mechanism (3) comprises a plurality of folding arm units (31) connecting in proper order, in which control ends of said folding arm unit (31) in a most inner side connects to said raising and lowering platform (22) and said raising and lowering seat (23) respectively, for adjacent said folding arm units (31), the output end of said folding arm unit (31) on an inner side is hinged to said control end of said folding arm unit (31) on an outer side.

11. The multi-functional sunshade as described in claim 10, wherein said folding arm units (31) comprises a connecting shaft (312) and at least two connecting arms (311), each of said connecting arms (311) has a mounting hole (3111) mating with said connecting shaft (312) in the center, a middle of said two connecting arms (311) of one folding arm unit (31) are hinged with said connecting shaft (312) through said mounting hole (3111).

12. The multi-functional sunshade as described in claim 11, wherein the height between said connecting shafts (312) located in said middle of said connecting arms (311) for said folding arm units (31) of one folding mechanism (3) is the same.

13. The multi-functional sunshade as described in claim 11, wherein a middle part of a shaft body (3124) of said connecting shaft (312) extends out from a washer body (3121), each of two ends of said connecting shaft (312) has a ring slot (3122) provided thereon, said mounting hole (3111) has a retainer ring (31111) mating with said ring slot (3122) on the wall.

14. The multi-functional sunshade as described in claim 13, wherein a cross section of said washer body (3121) is an echelon, and a length for which said echelon connects to a bottom side of said shaft body (3124) is greater than that for which said echelon connects to a top side of the same.

15. The multi-functional sunshade as described in claim 13, wherein an end face (3123) and a side face (3126) of said connecting shaft (312) is connected smoothly, and a radius of

an end face (3123) of said connecting shaft (312) is smaller than thereof said shaft body (3124) of said connecting shaft (312).

16. The multi-functional sunshade as described in claim 13, wherein said two ends of said connecting shaft (312) have a removing groove (3125), said removing groove (3125) extends from an end face (3123) of said connecting shaft (312) along an axial direction of said connecting shaft (312) toward an internal of said connecting shaft (312).

17. The multi-functional sunshade as described in claim 13, wherein a gap exists between an end side face of said connecting shaft (312) and a wall of said mounting hole (3111).

18. The multi-functional sunshade as described in claim 11, wherein said connecting arm (311) has an I-shape cross section.

19. The multi-functional sunshade as described in claim 11, wherein said folding arm units (31) further comprises a protecting plug (313) installed at a top of said connecting arm (311), said protecting plug (313) comprises a protecting plug buckle (3131), a protecting surface (3132) and a sunshade cloth mounting slot (3133), in which said protecting surface (3132) has a thickness, said protecting plug buckle (3131) is connected at a lower side of said protecting surface (3132), an inner side of said protecting plug buckle (3131) forms said sunshade cloth mounting slot (3133), through-holes on said sunshade cloth mounting slot (3133) and said protecting surface (3132) are connected with each other, and said connecting arm (311) has a protecting plug mounting slot (3112) mating with said protecting plug buckle (3131) on the top.

20. The multi-functional sunshade as described in claim 19, wherein said folding arm units (31) further comprise a sunshade cloth buckle parts (314) installed on said protecting plug (313), in which said sunshade cloth buckle parts (314) comprises a sunshade cloth buckle surface (3141) and a sunshade cloth buckles (3142), said sunshade cloth buckle surface (3141) has a thickness, said sunshade cloth buckles (3142) are provided at a lower side of said sunshade cloth buckle surface (3141), and said sunshade cloth mounting slot (3133) and said sunshade cloth buckles (3142) are matched.

21. The multi-functional sunshade as described in claim 1, wherein a sunshade cloth is further included, wherein said sunshade cloth is connected to a top of said folding mechanism (3).

22. The multi-functional sunshade as described in claim 21, wherein said sunshade cloth has through-holes, and said sunshade cloth buckles (3142) of said sunshade cloth buckle parts (314) threads through said through-holes to install in said sunshade cloth mounting slot (3133).

23. The multi-functional sunshade as described in claim 21, wherein magic buttons are further included, in which hook and loop tapes are further included, which are located at a location of a sunshade cloth corresponding to a vehicle rear view mirror and/or a handle.

24. The multi-functional sunshade as described in claim 1, wherein a bottom of said housing body (11) extends upward out from said motor support groove (111), and a groove surface of said motor support groove (111) matches with a bottom shape of said motor (12).

25. The multi-functional sunshade as described in claim 24, wherein a cover of said housing body (11) extends downward out from an upper pressure groove (112) of said motor (12), and a groove edge of said upper pressure groove (112) of said motor matches with a top shape of said motor (12).

26. The multi-functional sunshade as described in claim 1, wherein said housing (1) further comprises a motor attachment plate (13) and a motor attachment plate mounting groove (14), in which an enclosure of said motor (12) is caught in a motor mounting hole (131) of said motor attachment plate (13).

27. The multi-functional sunshade as described in claim 2, wherein said motor (12) drives said screw (211) via two bevel gears (121) axially perpendicular to each other.

28. The multi-functional sunshade as described in claim 21, wherein said housing (1) further comprises a controller (15), and said housing (1) further comprises one or more devices selected from the group consisting of the following devices connecting with controller (15):

- an indicator lamp;
- a display screen;
- a power switch; and
- a remote communication device.

29. The multi-functional sunshade as described in claim 21, wherein said housing (1) further comprises a power supply (16), said housing body (11) comprises a power cover plate (113), said housing body (11) has a power supply storage space (114) on a bottom of said power cover plate (113), said power supply (16) is installed in said power supply storage space (114) to supply power to said housing (1), and said power supply (16) comprises a municipal electric power charging interface and/or a solar charging interface.

30. The multi-functional sunshade as described in claim 29, wherein a solar panel (4) is further included, in which said solar panel (4) is installed at a top of said raising and lowering mechanism (2).

31. The multi-functional sunshade as described in claim 30, wherein said solar panel (4) comprises a solar cell (41), a battery mounting board (42), a reinforcing strip (43) and a battery mounting board slot (44), said raising and lowering mechanism (2) has a battery mounting board buckle (24) mating with said battery mounting board slot (44) at a top thereof, said solar cell (41) is installed in a solar cell jar (421) on an upper surface of said battery mounting board (42), and said reinforcing strip (43) is connected between said battery mounting board slot (44) and a bottom surface of said battery mounting board (42).

32. The multi-functional sunshade as described in claim 31, wherein said battery mounting board slot (44) has a wire slot provided on a wall thereof.

33. The multi-functional sunshade as described in claim 31, wherein said housing (1) further comprises a wheel (17), in which said wheel (17) is provided at a bottom of said housing body (11).

34. The multi-functional sunshade as described in claim 1, further comprising a base (5), in which said housing (1) is installed on said base (5) in a removable manner.

35. The multi-functional sunshade as described in claim 34, wherein said base (5) is of a suction disc type, and has a suction disc control handle (51) and a handle locking mechanism (52) provided thereon, said suction disc control handle controls said suction disc type base to connect and release, and said handle locking mechanism is used to lock a position of said suction disc control handle.

36. The multi-functional sunshade as described in claim 35, wherein said suction disc control handle (51) has a base connecting groove (511), said housing body (11) has a suction disc control handle accommodation tank (115) at a bottom thereof and said suction disc control handle accommo-

ation tank (115) has a base connecting retainer strip (116) matching with said base connecting groove (511), and said suction disc control handle (51) is provided in said suction disc control handle accommodation tank (115) through installation of said base connecting groove (511) and said base connecting retainer strip (116).

37. The multi-functional sunshade as described in claim 36, wherein said housing (1) further comprises a base locking mechanism (18), a locking tongue of said base locking mechanism (18) cooperates with a locking tongue groove (512) provided on said suction disc control handle (51) to lock said housing (1) and said base (5) in a connecting condition.

38. The multi-functional sunshade as described in claim 21, wherein said folding arm units (31) further comprises a tie ring (315), in which said tie ring (315) is connected at one end of said connecting arm (311), said tie ring (315) has a tie hole (3151), said sunshade cloth (6) has a tie rope, and said sunshade cloth (6) connects with said folding arm units (31) through said tie rope threaded in said tie hole (3151).

39. The multi-functional sunshade as described in claim 21, wherein said sunshade cloth (6) comprises a sunshade top (61) and a sunshade skirt (62), in which an upper end of said sunshade top (61) is connected to a top of said raising and lowering mechanism (2) and said sunshade skirt (62) is connected to a lower edge of said sunshade top (61) in a removable manner.

40. The multi-functional sunshade as described in claim 21, wherein at least one folding arm unit (31) further comprises a folding arm unit spreading angle limit block (3113), which limits a maximum spreading angle between the connected connecting arm ends below 180 degrees.

41. The multi-functional sunshade as described in claim 40, wherein a position of said folding arm unit spreading angle limit block (3113) on said folding arm unit (31) is adjacent to said mounting hole (3111) located at an end of said folding arm unit (31).

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