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(54) **UNMANNED AERIAL VEHICLE**

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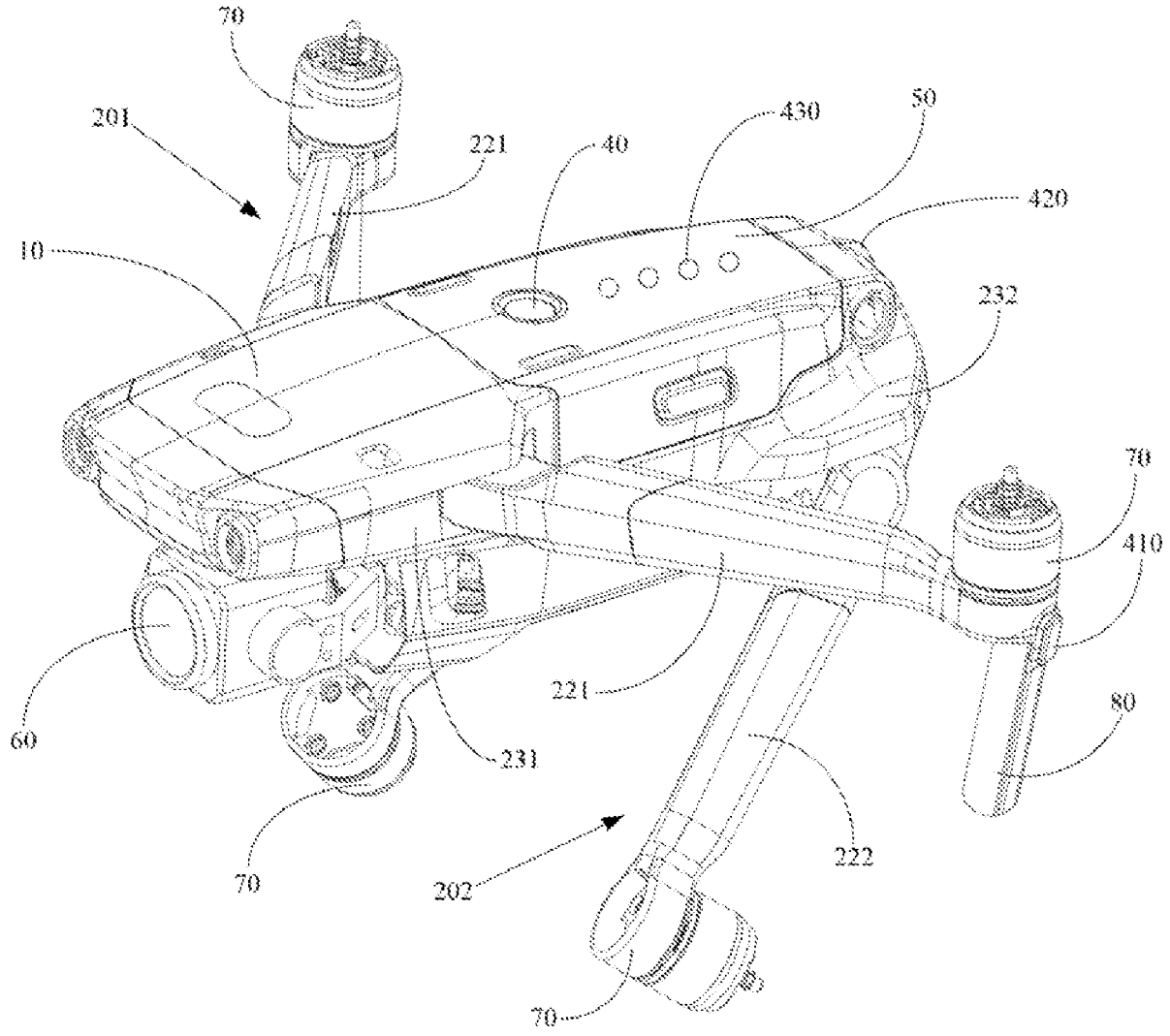
(57) **ABSTRACT**

An unmanned aerial vehicle includes a fuselage and a plurality of arm assemblies disposed at the fuselage. Each arm assembly includes an arm connected to the fuselage and a drive mechanism for driving the arm to rotate. The arm includes an unfolded state and a folded state. Each drive mechanism is configured to drive a corresponding arm to rotate relative to the fuselage and to enable a switching between the unfolded state and the folded state of the corresponding arm.



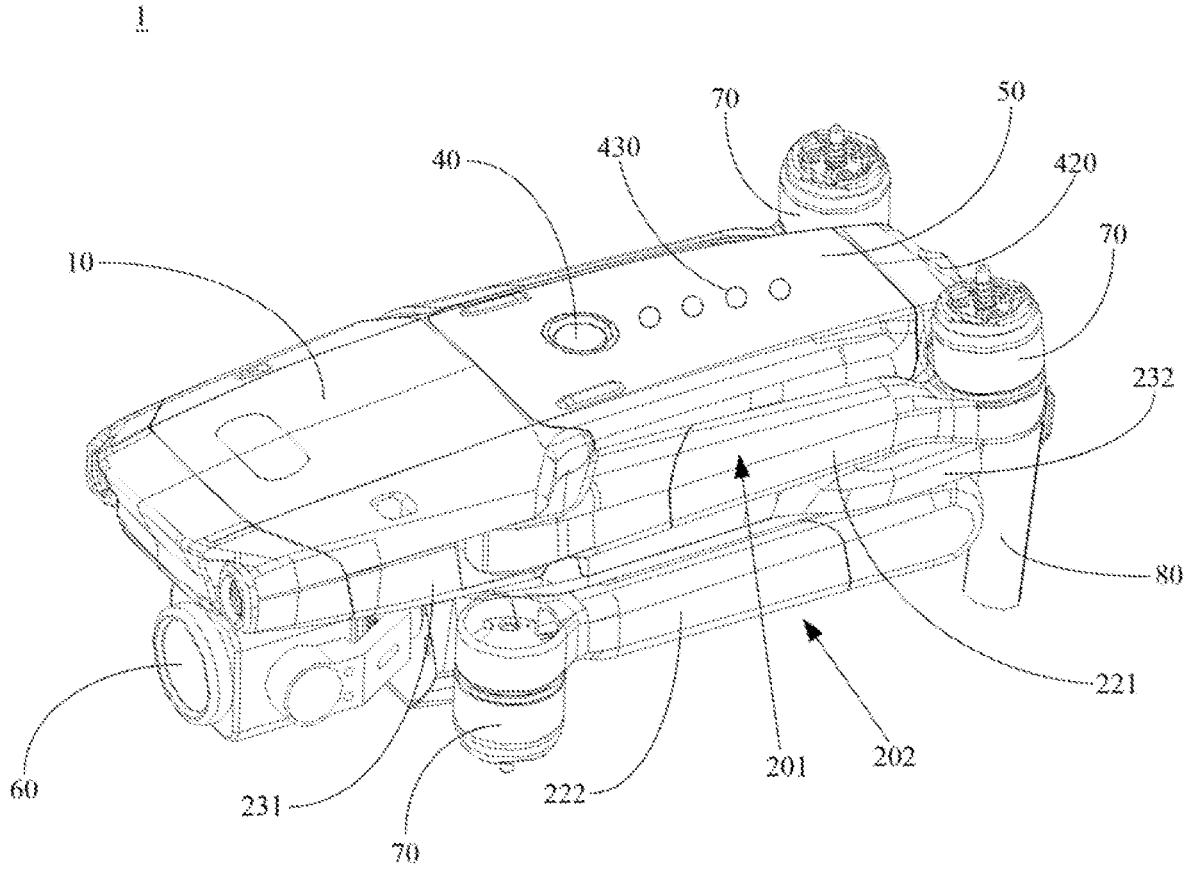


FIG. 1

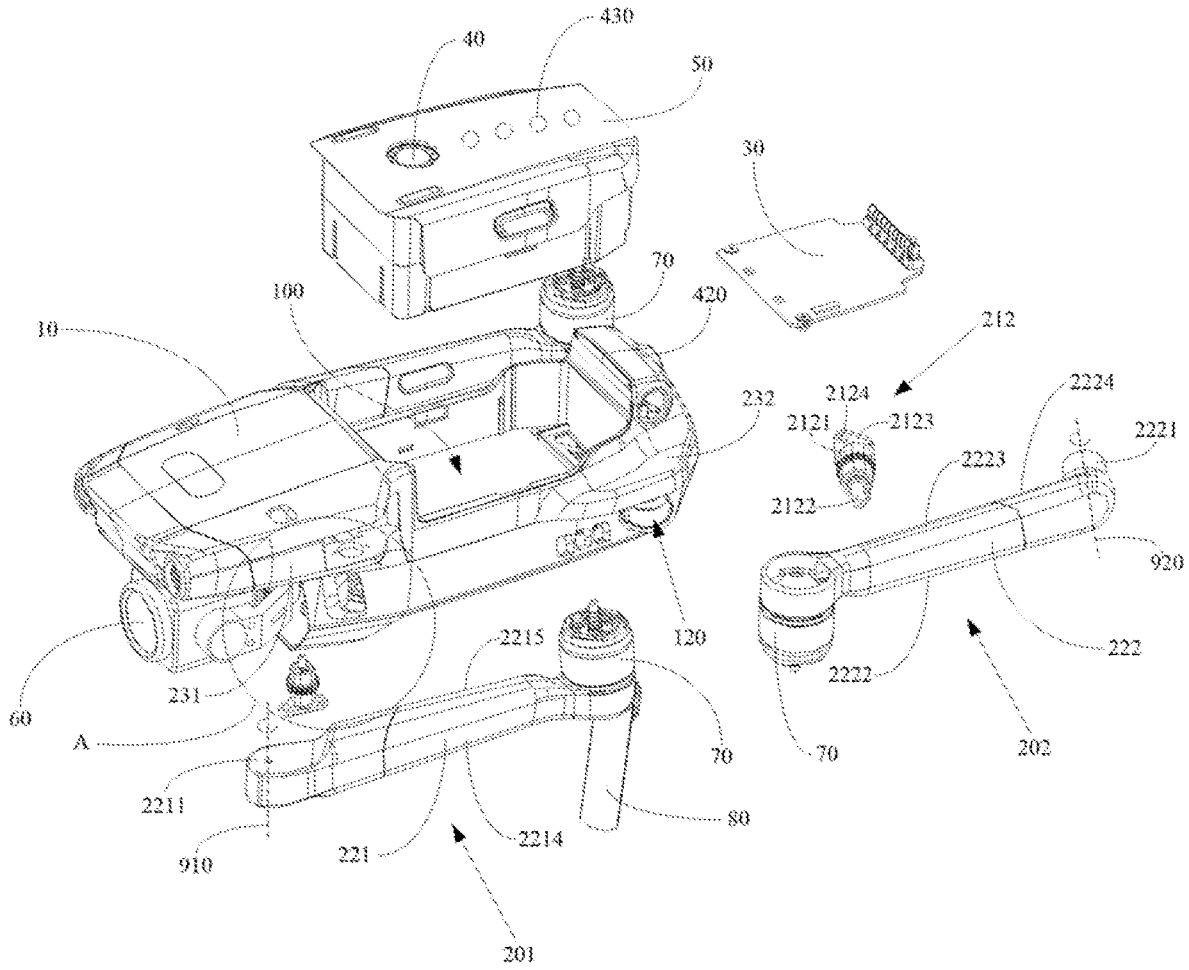

40
430
50
30
70
420
100
10
212
2124
2121
2123
2224
2221
2223
232
2122
920
120
222
2222
2215
231
60
A
70
202
2211
910
221
2214
80
201

FIG. 2

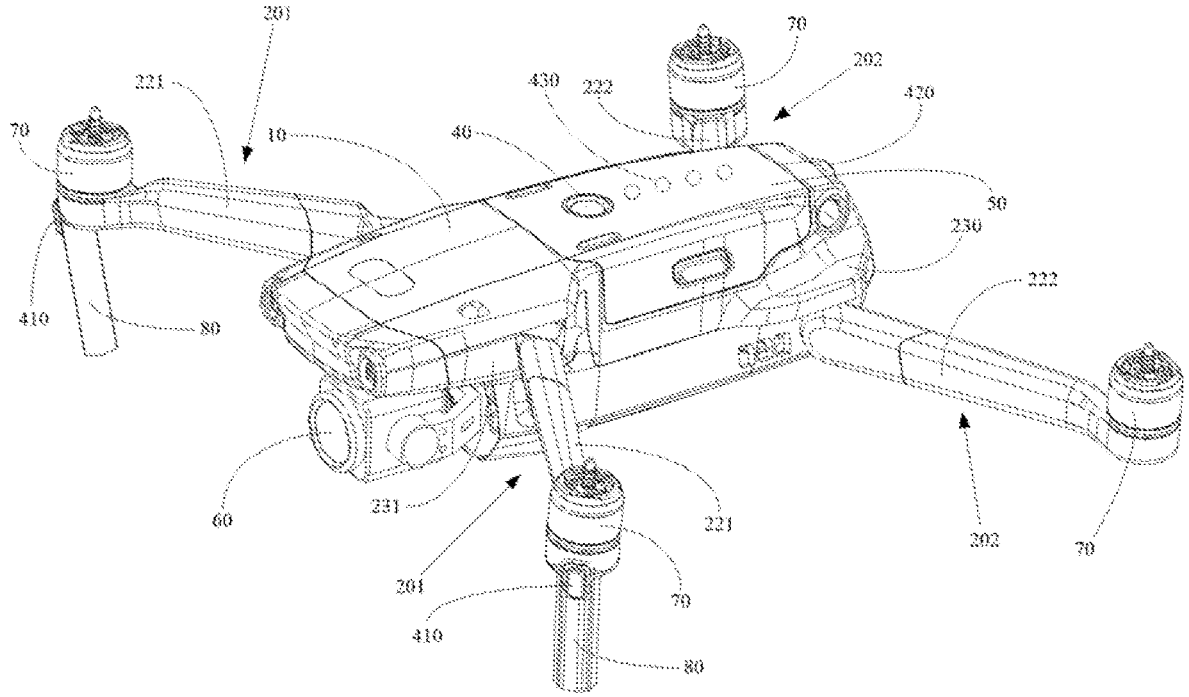

201
221
10
70
40
430
222
70
202
420
50
230
222
410
80
60
231
201
410
221
70
80
202
70

FIG. 3

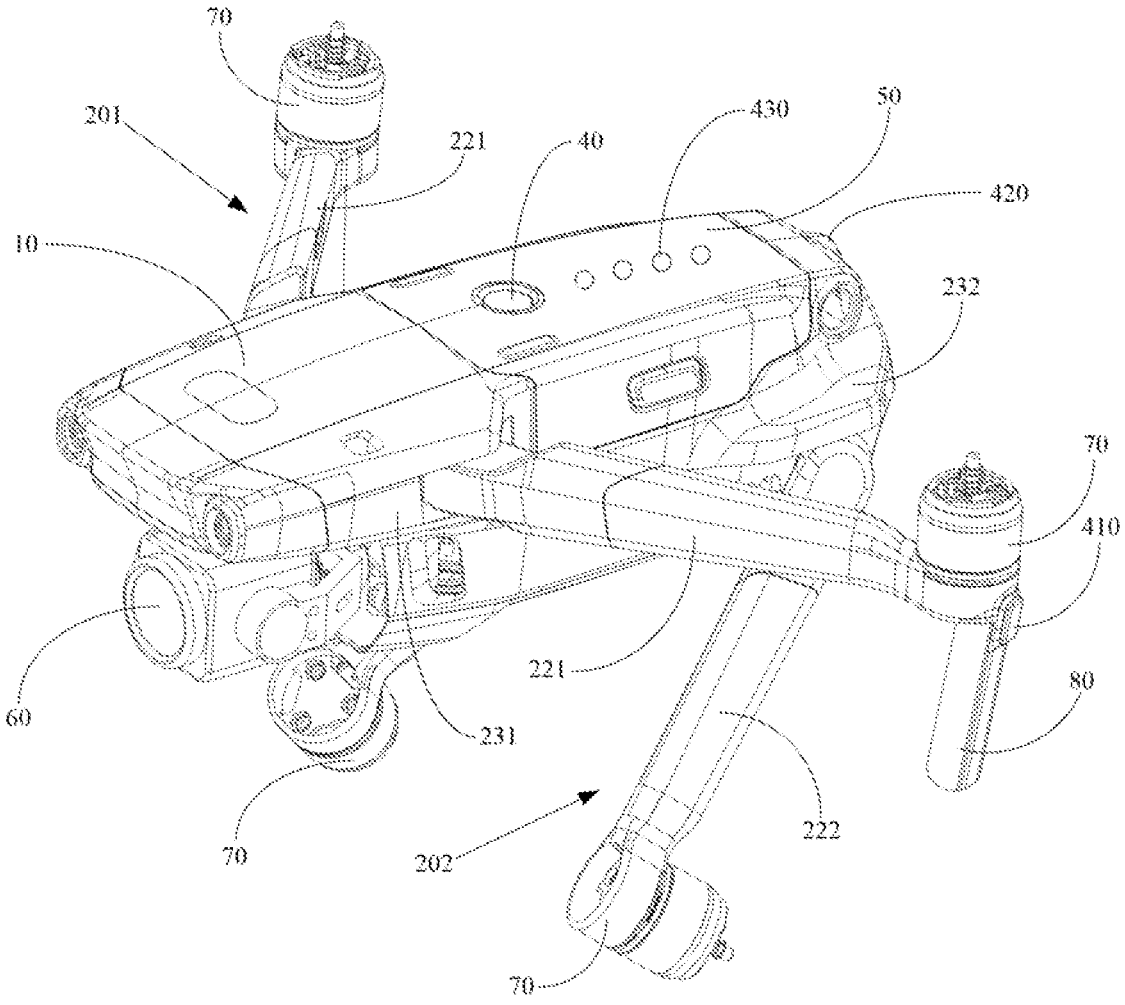


FIG. 4

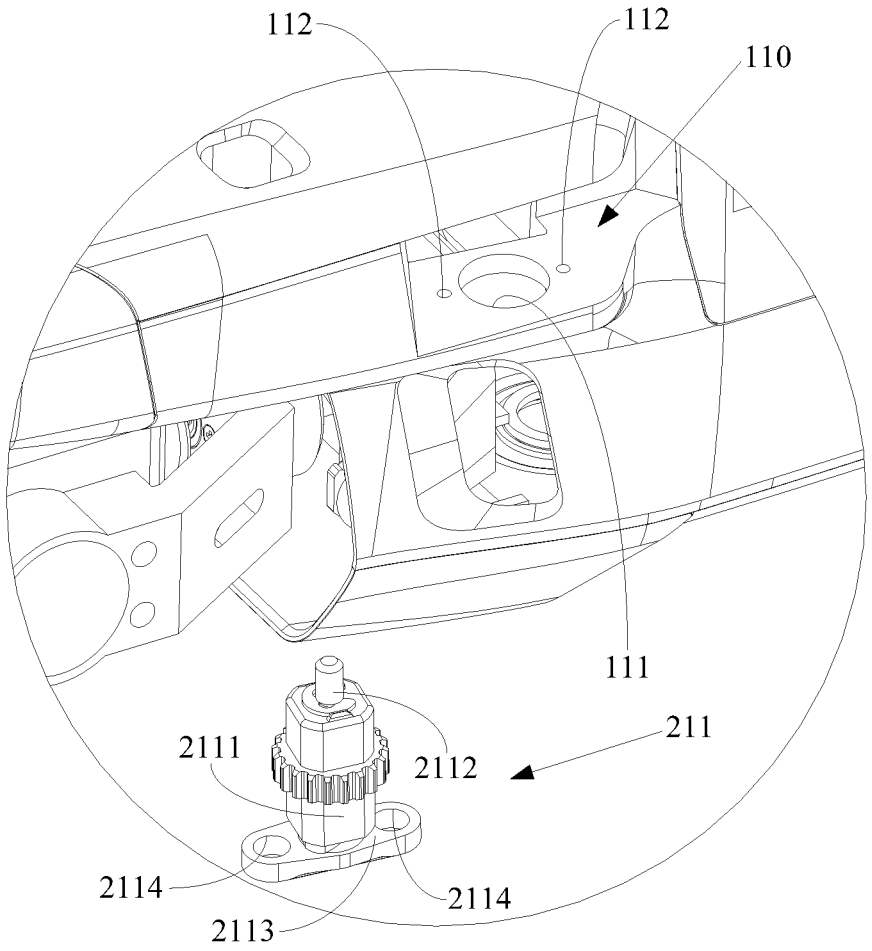


FIG. 5

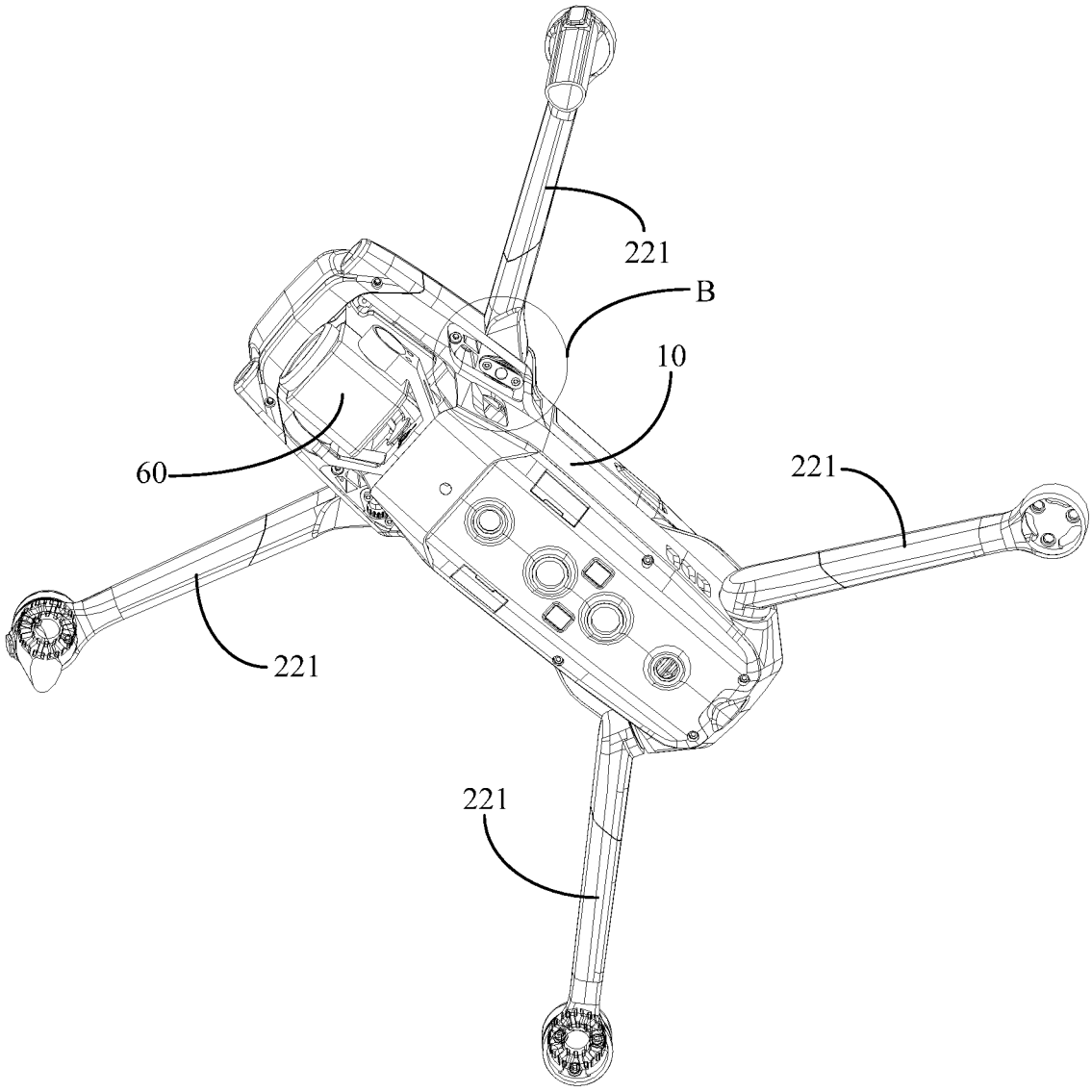


FIG. 6

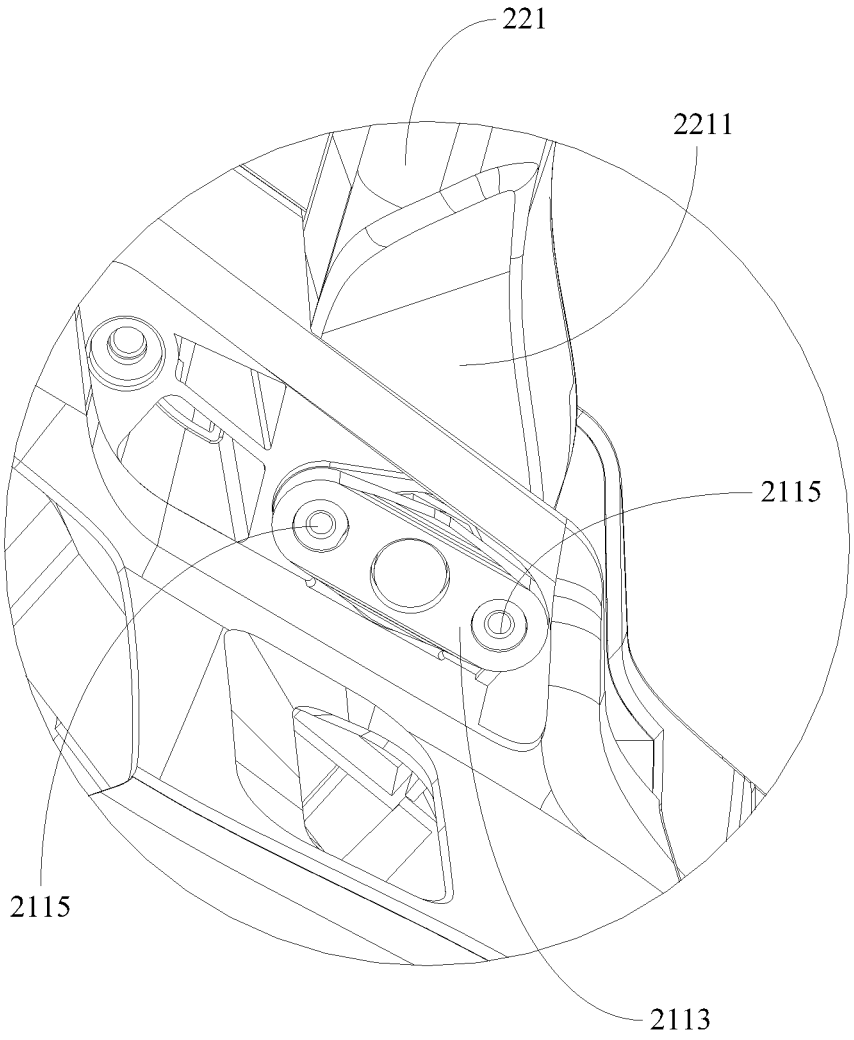


FIG. 7

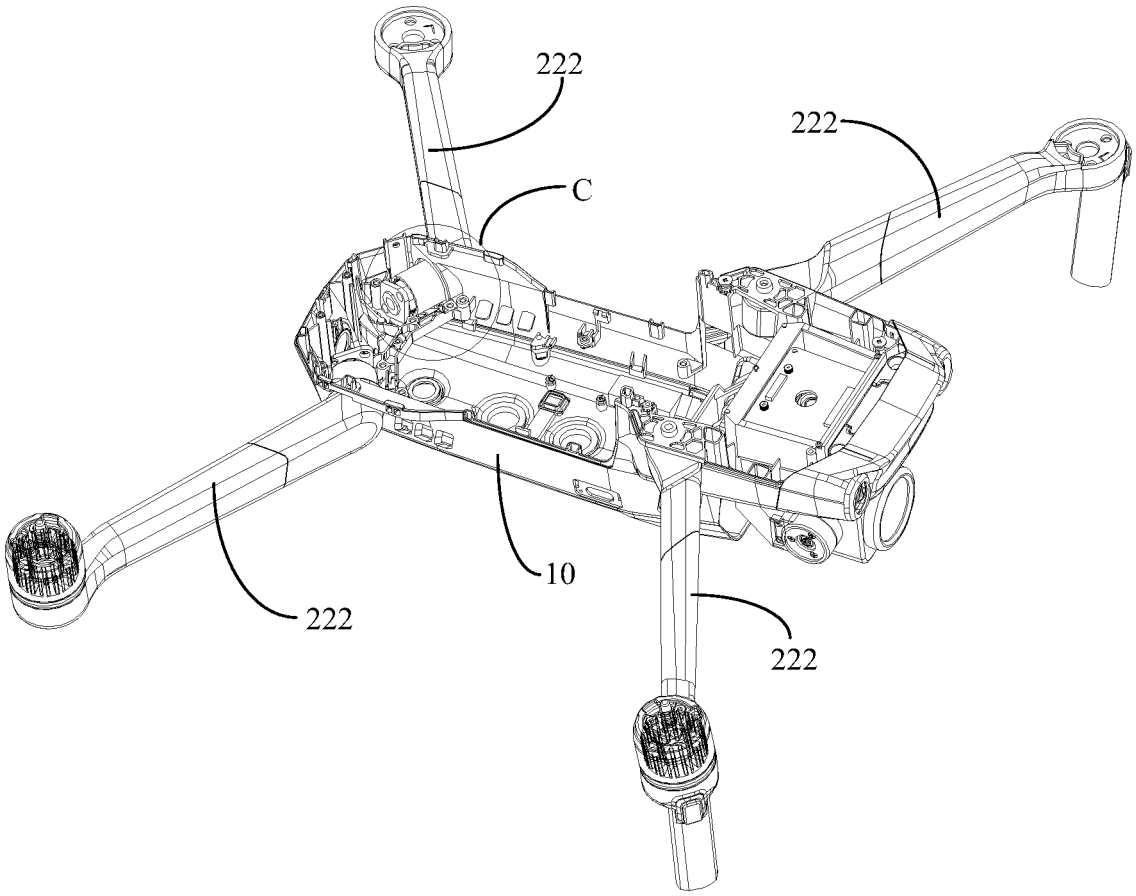


FIG. 8

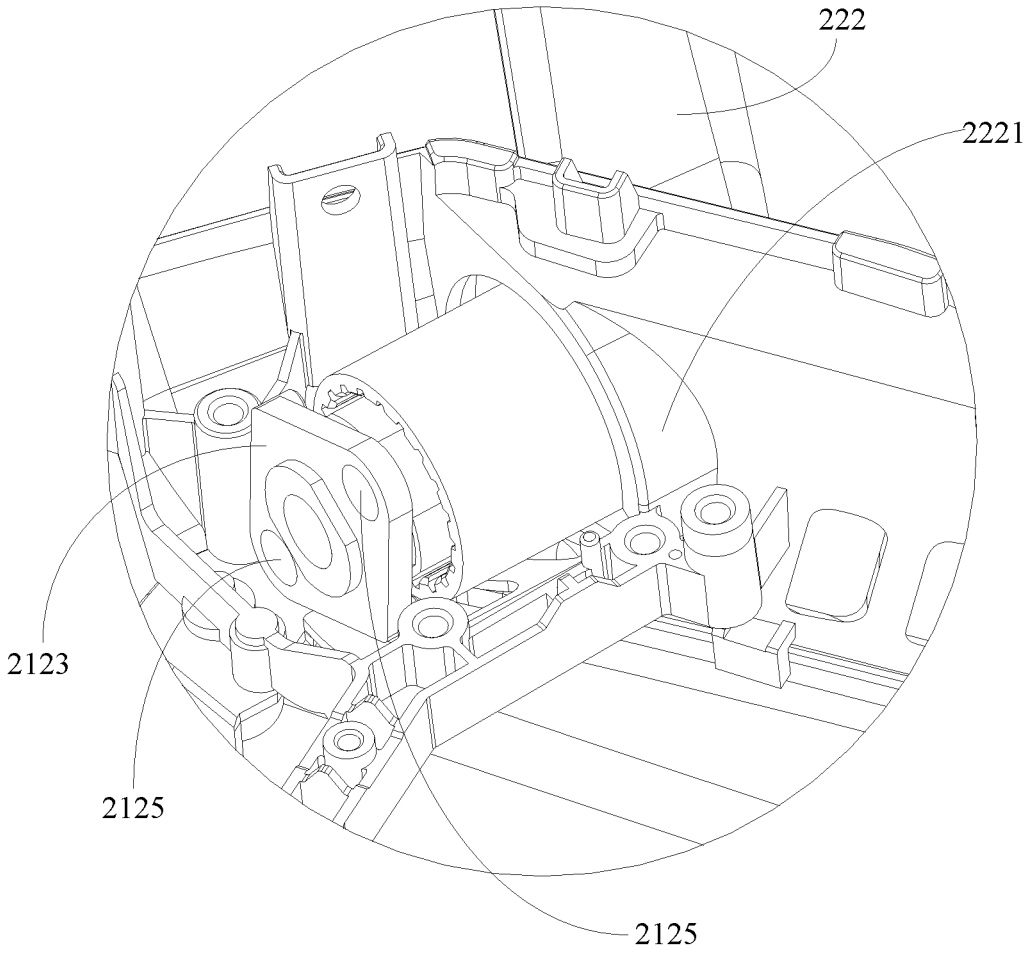


FIG. 9

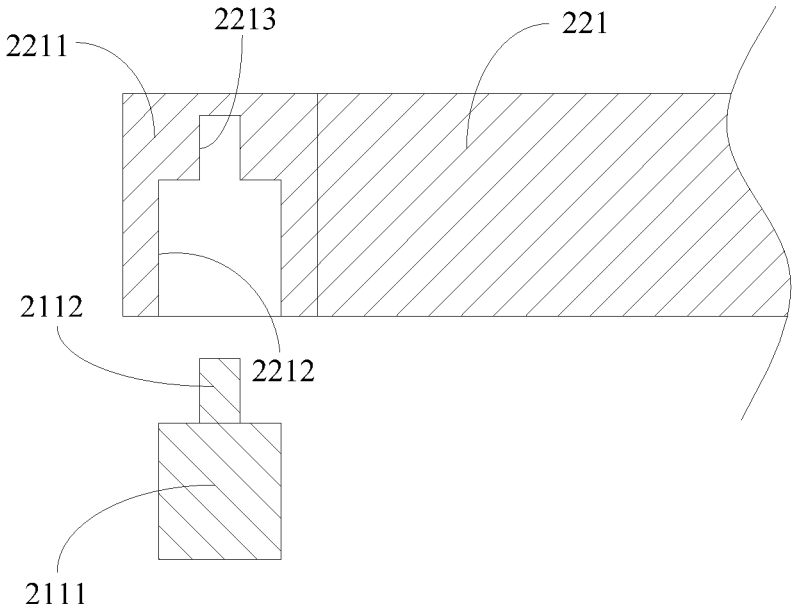


FIG. 10

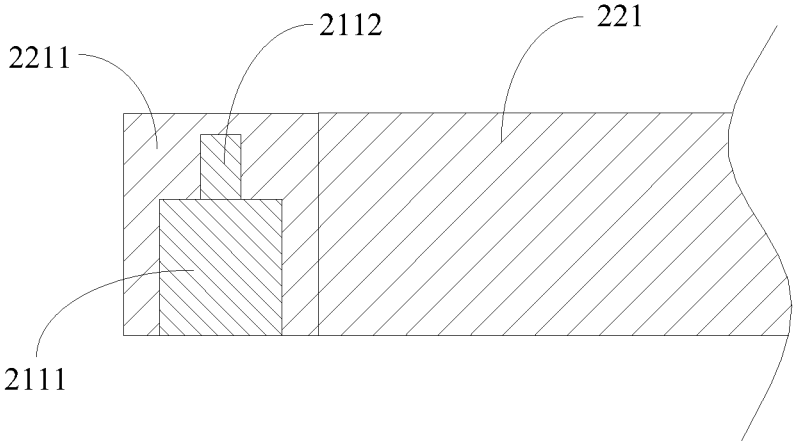


FIG. 11

UNMANNED AERIAL VEHICLE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation of International Application No. PCT/CN2017/099700, filed Aug. 30, 2017, the entire content of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of unmanned aerial vehicle technology and, more particularly, to a foldable unmanned aerial vehicle.

BACKGROUND

[0003] Unmanned aerial vehicles are the most popular aerial photography and video tools, and more consumers choose the unmanned aerial vehicles for capturing photography and video. In order to meet user's portability requirements for the unmanned aerial vehicles, the unmanned aerial vehicles having foldable arms gradually emerge in the current market. The foldable unmanned aerial vehicles may have smaller sizes after the arms are retracted, which may occupy less space and be more portable for users.

[0004] However, in actual applications, existing unmanned aerial vehicles may require users to manually unfold or retract the arms to deploy or retrieve the unmanned aerial vehicles, which causes more complicated operation steps.

SUMMARY

[0005] In accordance with the disclosure, an unmanned aerial vehicle is provided in the present disclosure. The unmanned aerial vehicle includes a fuselage and a plurality of arm assemblies disposed at the fuselage. Each arm assembly includes an arm connected to the fuselage and a drive mechanism for driving the arm to rotate. The arm includes an unfolded state and a folded state. Each drive mechanism is configured to drive a corresponding arm to rotate relative to the fuselage and to enable a switching between the unfolded state and the folded state of the corresponding arm.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] In order to more clearly illustrate technical solutions in embodiments of the present disclosure, drawings required for describing the embodiments are briefly illustrated hereinafter. Obviously, the following drawings are merely examples for illustrative purposes according to various disclosed embodiments of the present disclosure and are not intended to limit the scope of the present disclosure. Those skilled in the art may obtain other drawings according to the drawings of the present disclosure without any creative efforts.

[0007] FIG. **1** illustrates a stereoscopic schematic of an unmanned aerial vehicle in a folded state according to various disclosed embodiments of the present disclosure;

[0008] FIG. **2** illustrates an exploded schematic of an unmanned aerial vehicle in FIG. **1**;

[0009] FIG. **3** illustrates a stereoscopic schematic of an unmanned aerial vehicle in an unfolded state according to various disclosed embodiments of the present disclosure;

[0010] FIG. **4** illustrates a stereoscopic schematic of an unmanned aerial vehicle in an unfolding/folding process according to various disclosed embodiments of the present disclosure;

[0011] FIG. **5** illustrates an enlarged schematic of a portion A in FIG. **2**;

[0012] FIG. **6** illustrates a bottom-view schematic of an unmanned aerial vehicle in FIG. **3**;

[0013] FIG. **7** illustrates an enlarged schematic of a portion B in FIG. **6**;

[0014] FIG. **8** illustrates an internal structural schematic of an unmanned aerial vehicle in FIG. **3**;

[0015] FIG. **9** illustrates an enlarged schematic of a portion C in FIG. **8**; and

[0016] FIGS. **10-11** illustrate connection schematics of an arm and a drive mechanism of an unmanned aerial vehicle according to various disclosed embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0017] The technical solutions in the embodiments of the present disclosure are clearly and completely described in the following with reference to the accompanying drawings in the embodiments of the present disclosure. It is obvious that the described embodiments are merely a part of the embodiments of the present disclosure, but not all embodiments. All other embodiments, based on the embodiments of the present disclosure, obtained by those skilled in the art without creative efforts are within the scope of the present disclosure.

[0018] Exemplary embodiments illustrated in the accompanying drawings are described in detail herein. When the accompanying drawings are described, same numerals in different drawings refer to same or similar elements unless otherwise indicated. The embodiment methods described in the following exemplary embodiments do not represent all embodiments consistent with the present disclosure. Instead, they are merely examples of devices and methods consistent with aspects of the disclosure as detailed in the appended claims.

[0019] The terminology used in the present disclosure is merely for the purpose of describing particular embodiments and is not intended to limit the disclosure. The singular forms "a", "said", and "the" used in the present disclosure and the appended claims may also include plural forms, unless the context clearly indicates other meanings. It should also be understood that the term "and/or" used in the present disclosure refers to and encompasses any and all possible combinations of one or more of associated listed items.

[0020] The present disclosure provides an unmanned aerial vehicle, which may include a fuselage and a plurality of arm assemblies disposed at the fuselage. For example, the plurality of arm assemblies may be disposed at an upper portion, a lower portion, a front portion, and/or a rear portion of a circumferential side of the fuselage. In some embodiments, the plurality of arm assemblies may be disposed on desired portion(s) of the circumferential side of the fuselage. Each arm assembly may include an arm connected to the fuselage and a drive mechanism for driving the arm to rotate. The arm may include an unfolded state and a folded state. The drive mechanism may drive a corresponding arm to rotate relative to the fuselage and enable the arm to switch between the unfolded state and the folded state. The

unmanned aerial vehicle of the present disclosure may drive the arm to be unfolded or folded by the drive mechanism, thereby implementing the automatic unfolding or folding of the arm of the unmanned aerial vehicle, which may simplify user operation steps and be convenient for users.

[0021] The unmanned aerial vehicle of the present disclosure may be described in detail with reference to the drawings hereinafter. In case of no conflict, following embodiments and features of the embodiments may be combined with each other.

[0022] Referring to FIGS. **1-2**, in one optional embodiment, an unmanned aerial vehicle **1** provided in the embodiments of the present disclosure may include a fuselage **10**, a plurality of arm assemblies **201** and **202**, a controller battery **50**, and a gimbal camera **60**. In one embodiment, the plurality of arm assemblies **201** and **202** may be disposed on a circumferential side of the fuselage **10**.

[0023] An accommodation trench **100** may be disposed on a top of the fuselage **10**. The battery **50** may be at least partially disposed in the accommodation trench **100**. For example, the battery **50** may be partially or wholly disposed in the accommodation trench **100**. The battery **50** may be electrically connected to a controller for supplying power to the controller. The controller may be disposed on a motor board **30**, and the motor board **30** may be disposed in the accommodation trench **100** and attached to a bottom of the battery **50**. A heat dissipation plate may be disposed at a bottom of the accommodation trench **100**. The heat dissipation plate may be attached to the motor board **30** to dissipate heat for the motor board **30**.

[0024] The gimbal camera **60** may be disposed at a front of the fuselage **10**. The gimbal camera **60** may include a gimbal bracket and a camera mounted on the gimbal bracket. Optionally, the gimbal bracket may be a three-axis gimbal bracket. The gimbal bracket may include a yaw axis assembly, a roll axis assembly movably connected to the yaw axis assembly, and a pitch axis assembly movably connected to the roll axis assembly. The camera may be mounted on the pitch axis assembly.

[0025] The arm assemblies **201** and **202** may include arms **221** and **222** connected to the fuselage **10**, drive mechanisms **211** and **212**, and propeller assemblies. The drive mechanisms **211** and **212** may be electrically connected to the controller and be capable of driving the corresponding arms **221** and **222** to rotate relative to the fuselage **10**, thereby implementing the portability of the foldable arms of the unmanned aerial vehicle **1**. The propeller assemblies may include motors **70** disposed at the arms **221** and **222**, and propellers (not shown) connected to the motors **70**, and the motors **70** may drive the propellers to rotate, thereby implementing the flight function of the unmanned aerial vehicle **1**. In one embodiment, the drive mechanisms **211** and **212** may be disposed at ends of arms **221** and **222**; the motors **70** of the propeller assemblies may be disposed at ends of the arms **221** and **222** away from the drive mechanisms **211** and **212**; and the arms **221** and **222** may be connected to the fuselage **10** through the corresponding drive mechanisms **211** and **212**.

[0026] Referring to FIGS. **1-3**, head indicator lights **410** configured for indicating a head direction of the unmanned aerial vehicle, status indicator lights **420** configured for indicating an unmanned aerial vehicle status, and battery level indicator lights **430** configured for indicating a level of the battery **50** may be disposed on the fuselage **10**. Optionally, the light-emitting diode (LED) indicator lights may be used for the head indicator lights **410**, the status indicator lights **420** and the battery level indicator lights **430**.

[0027] In the embodiments shown in FIGS. **1-3**, the head indicator lights **410** may be disposed on the arms **221** and **222** at the front of the fuselage **10** for indicating the head direction of the unmanned aerial vehicle, and may display a solid red when the unmanned aerial vehicle is turned on, which is convenient for the user to identify the unmanned aerial vehicle. The battery level indicator lights **430** may be disposed on the battery **50** and a quantity of the battery level indicator lights **430** is four. The more the quantity of turned-on battery level indicator lights **410** is, the higher the battery level of the battery **50** is.

[0028] The status indicator **420** may be disposed at a rear portion of the fuselage **10** to indicate a current status of the unmanned aerial vehicle. The unmanned aerial vehicle may be used with a remote control. A GPS positioning system, a vision system, an alarm system, a sensor, a compass and the like may be disposed inside the unmanned aerial vehicle. The status indicator lights **420** may flash different colors to indicate different statuses of the unmanned aerial vehicle. For example, when the status indicator lights **420** flash red, green and yellow continuously, it may indicate self-diagnostic testing; when the status indicator lights **420** flash alternating yellow and green, it may indicate warming up; when the status indicator lights **420** flash green slowly, it may indicate using the GPS positioning; when the status indicator lights **420** have two green flashing, it may indicate using the vision system; when the status indicator lights **420** flash yellow slowly, it may indicate no GPS and no vision system; when the status indicator lights **420** flash green fast, it may indicate braking; when the status indicator lights **420** flash yellow fast, it may indicate remote controller signal lost; when the status indicator lights **420** flash red slowly, it may indicate low battery warning; when the status indicator lights **420** flash red fast, it may indicate critical low battery warning; when the status indicator lights **420** flash alternating red, it may indicate uneven placement or large sensor error; when the status indicator lights **420** flash solid red, it may indicate critical error; and when the status indicator lights **420** flash alternating red and yellow, it may indicate compass calibration required.

[0029] Referring to FIGS. **1-3**, the arms **221** and **222** may include the unfolded state and the folded state. When the unmanned aerial vehicle is not in operation, the arms **221** and **222** may be in the folded state, and each of the arms **221** and **222** may be folded and attached to a circumferential side of the fuselage **10**, as shown in FIG. **1**. When the unmanned aerial vehicle is in operation, the arms **221** and **222** may be in the unfolded state, and each of the arms **221** and **222** may be fully unfolded relative to the fuselage **10**, as shown in FIG. **3**. The controller may be configured to transmit control signals to the drive mechanisms **211** and **212** to drive the corresponding arms **221** and **222** to rotate relative to the fuselage, thereby implementing the switching of the arms **221** and **222** between the unfolded state and the folded state. Referring to FIG. **4**, when the arms **221** and **222** are rotated from the folded state to the unfolded state, each of the arms **221** and **222** may first be rotated from the position where each arm is folded and attached to the circumferential side of the fuselage **10** shown in FIG. **1** to an intermediate position shown in FIG. **4** along a direction away from the fuselage **10**, and then be rotated gradually to the fully

unfolded position relative to the fuselage **10** shown in FIG. **3**. When the arms **221** and **222** are rotated from the unfolded state to the folded state, each of the arms **221** and **222** may first be rotated from the fully unfolded position relative to the fuselage **10** shown in FIG. **3** to the intermediate position shown in FIG. **4** along a direction close to the fuselage **10**, and then be rotated gradually to the position where each arm is folded and attached to the circumferential side of the fuselage **10** shown in FIG. **1**.

[0030] It can be seen from the above-mentioned embodiments that the unmanned aerial vehicle **1** of the present disclosure may transmit control signals to the drive mechanisms **211** and **212** through the controller, and the corresponding arms **221** and **222** may be driven to be unfolded or folded by the drive mechanisms **211** and **212**, thereby implementing the automatic unfolding and folding of the arms **221** and **222** of the unmanned aerial vehicle **1**. In such way, the enjoyment and intelligence level of using products may be increased; the user operation steps may be simplified; and the user operation may be more convenient, thereby improving the user experience and the product market competitiveness.

[0031] In an optional embodiment, the control signals transmitted by the controller to the drive mechanisms **211** and **212** may include a first signal for controlling the drive mechanisms **211** and **212** to rotate along a first direction, thereby driving the corresponding arms **221** and **222** to rotate along the first direction by the drive mechanisms **211** and **212**. In one embodiment, the rotation of the arms **221** and **222** along the first direction driven by the drive mechanisms **211** and **212** may refer to that the arms **221** and **222** are rotated from the folded state to the unfolded state, that is, the drive mechanisms **211** and **212** may drive the arms **221** and **222** to rotate along the direction away from the fuselage **10**. After the user turns on the unmanned aerial vehicle **1** and completes the aircraft detection successfully, the controller may synchronously transmit the first signal to the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202**, so the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202** may drive the corresponding arms **221** and **222** to synchronously rotate relative to the fuselage to the unfolded state.

[0032] In an optional embodiment, the control signals transmitted by the controller to the drive mechanisms **211** and **212** may include a second signal for controlling the drive mechanisms **211** and **212** to rotate along a second direction, thereby driving the corresponding arms **221** and **222** to rotate along the second direction by the drive mechanisms **211** and **212**, where the second direction may be opposite to the first direction. In one embodiment, the rotation of the arms **221** and **222** along the second direction driven by the drive mechanisms **211** and **212** may refer to that the arms **221** and **222** are rotated from the unfolded state to the folded state, that is, the drive mechanisms **211** and **212** may drive the arms **221** and **222** to rotate along the direction close to the fuselage **10**. After the user turns off the unmanned aerial vehicle **1** and completes the aircraft detection successfully, the controller may synchronously transmit the second signal to the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202**, so the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202** may drive the corresponding arms **221** and **222** to synchronously rotate relative to the fuselage to the folded state.

[0033] In an optional embodiment, the unmanned aerial vehicle **1** may further include a power button **40**. The power button **40** may be disposed on the battery **50** and electrically connected to the controller. When the user presses the power button **40** to turn on the unmanned aerial vehicle **1**, and the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202** may drive the corresponding arms **211** and **212** to be unfolded till rotating to the unfolded state. When the user presses the power button **40** to turn off the unmanned aerial vehicle **1**, and the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202** may drive the corresponding arms **211** and **212** to be folded till rotating to the folded state.

[0034] In an optional embodiment, the arm assemblies **201** and **202** may further include stopping portions **231** and **232**. The stopping portions **231** and **232** may be disposed at the fuselage **10** along a rotation direction of the arms **221** and **222**. In some embodiments, the stopping portions **231** and **232** may be disposed on the fuselage **10**. The rotation direction may refer to a direction of the arms **221** and **222** from the folded state to the unfolded state. When the arms **221** and **222** rotate from the folded state to the unfolded state, the arms **221** and **222** may abut against the stopping portions **231** and **232**, and the stopping portions **231** and **232** may limit positions of the arms **221** and **222**. When the arms **221** and **222** rotate from the unfolded state to the folded state, the arms **221** and **222** may attach to the fuselage **10**.

[0035] Furthermore, the control signals transmitted by the controller to the drive mechanisms **211** and **212** may include a third signal for controlling the drive mechanisms **211** and **212** to continuously rotate along the first direction, so the drive mechanisms **211** and **212** may drive the corresponding arms **221** and **222** to continuously rotate along the first direction. When the arms **221** and **222** are in the unfolded state, the controller may transmit the third signal to the respective drive mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202**, so the mechanisms **211** and **212** of the plurality of arm assemblies **201** and **202** may drive the corresponding arms **221** and **222** to abut against the stopping portions **231** and **232** with a continuous drive force. That is, after the arms **221** and **222** are rotated to the unfolded state, the arms **221** and **222** may be stopped by the stopping portions **231** and **232**, but the battery **50** may continue to supply power to the drive mechanisms **211** and **212** to provide a certain torque to maintain the unfolding torque of the arms **221** and **222**. In such way, the situation that folding the arms **221** and **222** of the unmanned aerial vehicle **1** during flight or being hit may be avoided; and until the user presses the power button **40** to turn off the unmanned aerial vehicle **1**, the controller may transmit the second signal to the drive mechanisms **211** and **212**, thereby driving the corresponding arms **221** and **222** to be folded by the drive mechanisms **211** and **212**.

[0036] In an optional embodiment, the unmanned aerial vehicle **1** may be a multiple propeller unmanned aerial vehicle. The plurality of arm assemblies **201** and **202** may include at least two first arm assemblies **201** and at least two second arm assemblies **202**. The at least two first arm assemblies **201** may be disposed at the front portion of the fuselage **10**, and the at least two second arm assemblies **202** may be disposed at the rear portion of the fuselage **10**.

[0037] A quad-propeller unmanned aerial vehicle may be used as an example of the unmanned aerial vehicle **1** to describe the unmanned aerial vehicle **1** of the present disclosure in detail hereinafter. The quantity of the first arm assemblies **201** may be two, and the first arm assemblies **201** may be disposed on two sides of the front portion of the fuselage **10**. The quantity of the second arm assemblies **202** may be two, and the second arm assemblies **202** may be disposed on two sides of the rear portion of the fuselage **10**.

[0038] The first arm assembly **201** may include a first drive mechanism **211** disposed at the front portion of the fuselage **10**, a first arm **221** connected to the first drive mechanism **211**, and a first stopping portion **231** disposed at the fuselage **10** (e.g., disposed on the fuselage **10**) along the rotation direction of the first arm **221**. The first drive mechanism **211** may be connected to the controller, and the controller may transmit the control signals to the first drive mechanism **211** to drive the first arm **221** to rotate relative to the fuselage **10** by the first drive mechanism **211**. In one embodiment, for the first arm assembly **201**, the first drive mechanism **221** may be perpendicularly connected to the first arm **211**, and the controller may control the first drive mechanism **211** of the first arm assembly **201** to rotate along a vertical direction **910**, thereby driving the first arm **221** to rotate along the vertical direction **910** relative to the fuselage **10** by the first drive mechanism **211**, that is, the first drive mechanism **211** may drive the first arm **221** to be folded back and forth relative to the fuselage **10**.

[0039] The second arm assembly **202** may include a second drive mechanism **212** disposed at the rear portion of the fuselage **10**, a second arm **222** connected to the second drive mechanism **212**, and a second stopping portion **232** disposed at the fuselage **10** (e.g., disposed on the fuselage **10**) along the rotation direction of the second arm **222**. The second drive mechanism **212** may be connected to the controller, and the controller may transmit the control signals to the second drive mechanism **212** to drive the second arm **222** to rotate relative to the fuselage **10** by the second drive mechanism **212**. In one embodiment, for the second arm assembly **202**, the second drive mechanism **222** and the second arm **212** may be connected in a tilted direction (e.g., a non-vertical direction or a non-horizontal direction), and the controller may control the second drive mechanism **212** of the second arm assembly **202** to rotate along a horizontal direction **920**, thereby driving the second arm **222** to rotate along the horizontal direction **920** relative to the fuselage **10** by the second drive mechanism **212**, that is, the second drive mechanism **212** may drive the second arm **222** to be folded up and down relative to the fuselage **10**.

[0040] Furthermore, a stand **80**, used for take-off and landing of the unmanned aerial vehicle **1**, may be disposed at the bottom of one end of the first arm **221** of the first arm assembly **201** having the motor. In order to prevent the first arm **221** and the second arm **222** from being unable to be unfolded or folded normally during the unfolding or folding process due to the impact of the stand **80**, the controller may transmit control signals to the first drive mechanism **211** and the second drive mechanism **212** according to a specified sequence, so the first arm **221** and the second arm **222** may be sequentially unfolded or folded according to the specified sequence.

[0041] After the user turns on the unmanned aerial vehicle **1** and completes the aircraft detection successfully, the controller may sequentially transmit the first signal to the first drive mechanism **211** and the second drive mechanism **212** according a first sequence, so the first arm **221** and the second arm **222** may be sequentially rotated to the unfolded state. In one embodiment, the first sequence may refer to that the controller first transmits the control signal to the first drive mechanism **211** and then transmits the control signal to the second drive mechanism **212**. That is, the controller may first transmit the first signal to the first drive mechanism **211** and then transmit the first signal to the second drive mechanism **212**, so the first drive mechanism **211** may first drive the first arm **221** to be unfolded, and then the second drive mechanism **212** may drive the second arm **222** to be unfolded. In such way, the situation that the first arm **221** may not be unfolded normally because the stand **80** is blocked by the second arm **222** after the second arm **222** is unfolded before the first arm **221** may be prevented.

[0042] After the user turns off the unmanned aerial vehicle **1** and completes the aircraft detection successfully, the controller may sequentially transmit the second signal to the first drive mechanism **211** and the second drive mechanism **212** according a second sequence, so the first arm **221** and the second arm **222** may be sequentially rotated to the folded state, where the second sequence may be opposite to the first sequence. In one embodiment, the second sequence may refer to that the controller first transmits the control signal to the second drive mechanism **212** and then transmits the control signal to the first drive mechanism **211**. That is, the controller may first transmit the second signal to the second drive mechanism **212** and then transmit the second signal to the first drive mechanism **211**, so the second drive mechanism **212** may first drive the second arm **222** to be unfolded, and then the first drive mechanism **211** may drive the first arm **221** to be unfolded. In such way, the situation that the first arm **221** may not be folded normally because the stand **80** is blocked by the second arm **222** after the first arm **221** is folded before the second arm **222** may be prevented.

[0043] In an optional embodiment, referring to FIG. **5**, a first accommodation portion **110** may be disposed at a front side portion of the fuselage **10**. The first drive mechanism **211** of the first arm assembly **201** may be at least partially disposed in the first accommodation portion **100** along the vertical direction **910**. The first stopping portion **231** of the first arm assembly **201** may be formed by a portion of the fuselage **10** which may be located in the front of the first accommodation portion **110** and be adjoined to the first accommodation portion **110**. Referring to FIG. **2**, a second accommodation portion **120** may be disposed at a rear side portion of the fuselage **10**. The second drive mechanism **212** of the second arm assembly **202** may be at least partially disposed in the second accommodation portion **120** along the horizontal direction. The second stopping portion **232** of the second arm assembly **202** may be formed by outwardly extending a portion of the fuselage above the second accommodation portion **120**.

[0044] Furthermore, the first arm **221** may include a first sidewall and a second sidewall, configured opposite to each other. A first abutting portion **2214** may be disposed at the first sidewall of the first arm **221**, and a first attaching portion **2215** may be disposed at the second sidewall of the first arm **221**. When the first arm **221** is rotated to the unfolded state, the first abutting portion **2214** may abut against the first stopping portion **231**. When the first arm **221** is rotated to the folded state, the first attaching portion **2215** may attach to the fuselage **10**. The second arm **222** may include a first

sidewall and a second sidewall, configured opposite to each other. A second abutting portion **2222** may be disposed at the first sidewall of the second arm **222**, and a third abutting portion **2223** may be disposed at the second sidewall of the second arm **222**. A second attaching portion **2224** may be disposed at a third sidewall which is between the first sidewall and the second sidewall of the second arm **222** and adjacent to the fuselage **10**. When the second arm **222** is rotated to the unfolded state, the second abutting portion **2222** may abut against the second stopping portion **232**. When the second arm **222** is rotated to the folded state, the third abutting portion **2223** may abut against the second stopping portion **232**, and the second attaching portion **2224** may attach to the fuselage **10**.

[0045] In an optional embodiment, referring to FIG. **2**, the first drive mechanism **211** may be a drive motor; a first mounting portion **2211** may be disposed at the end of the first arm **221**; and the first mounting portion **2211** may be at least partially disposed in the first accommodation portion **110** and connected to the first drive mechanism **211**. Further, referring to FIG. **5**, the first drive mechanism **211** may include a first motor main body **2111**, and a first drive axle **2112** and a first mounting plate **2113** disposed at two ends of the first motor main body **2111**; the first mounting plate **2113** may be fixed to the sidewall of the first accommodation portion **110**; and the first drive axle **2112** may extend along the vertical direction **910** and be fixed to the first mounting portion **2211**. A first through hole **111** and first mounting holes **112** may be disposed at the sidewall of the first accommodation portion **110**. First connecting holes **2114** corresponding to the first mounting holes **112** may be disposed on the first mounting plate **2113**. Referring to FIGS. **6-7**, the first motor main body **2111** may be disposed through the first through hole **111**, and the first mounting plate **2113** may be fixed to the sidewall of the first accommodation portion **110** through a first fastener **2115** (e.g., a bold) which is disposed through the first connecting hole **2114** and the first mounting hole **112**. Of course, the first through hole **111** may not be disposed at the sidewall of the first accommodation portion **110**, and the first motor main body **2111** may be fixed to the sidewall of the first accommodation portion **110** through the first fastener **2115**.

[0046] Referring to FIG. **2**, the second drive mechanism **212** may be a drive motor; a second mounting portion **2221** may be disposed at the end of the second arm **222**; and the second mounting portion **2221** may be at least partially disposed in the second accommodation portion **120** and connected to the second drive mechanism **212**. Further, the second drive mechanism **212** may include a second motor main body **2121** and a second drive axle **2122** and a second mounting plate **2123** disposed at two ends of the second motor main body **2121**; the second mounting plate **2123** may be fixed to the bottom wall of the second accommodation portion **120**; and the second drive axle **2122** may extend along the horizontal direction **920** and be fixed to the second mounting portion **2221**. A second through hole **121** and second mounting holes **122** may be disposed at the sidewall of the second accommodation portion **120**. Second connecting holes **2124** corresponding to the second mounting holes **122** may be disposed on the second mounting plate **2123**. Referring to FIGS. **8-9**, the second motor main body **2121** may be disposed through the second through hole **121**, and the second mounting plate **2123** may be fixed to the bottom wall of the second accommodation portion **120** through a second fastener **2125** (e.g., a bold) which is disposed through the second connecting hole **2124** and the second mounting hole **122**. Of course, the second through hole **121** may not be disposed at the bottom wall of the second accommodation portion **120**, and the second motor main body **2121** may be fixed to the bottom wall of the second accommodation portion **120** through the second fastener **2125**.

[0047] Referring to FIGS. **10-11**, a first accommodation cavity **2212** matching the first motor main body **2111** may be disposed in the first mounting portion **2211** of the first arm **221**, and a second accommodation cavity **2213** matching the first drive axle **2112** may be disposed at the bottom wall of the first accommodation cavity **2212**. The first motor main body **2111** may be accommodated in the first accommodation cavity **2212**, and the first drive axle **2112** may be accommodated in the second accommodation cavity **2213** and fixed to the first mounting portion **2211**. In such way, the appearance of the first drive mechanism **211** and the first arm **221** may be flat to save space. Similarly, a third accommodation cavity (not shown) matching the second motor main body **2121** may be disposed in the second mounting portion **2221** of the second arm **222**, and a fourth accommodation cavity (not shown) matching the second drive axle **2122** may be disposed at the bottom wall of the second accommodation cavity **2212**. The second motor main body **2121** may be accommodated in the third accommodation cavity, and the second drive axle **2122** may be accommodated in the fourth accommodation cavity and fixed to the second mounting portion **2221**. In such way, the appearance of the second drive mechanism **212** and the second arm **221** may be flat to save space.

[0048] It should be noted that, in the present disclosure, relationship terms such as first, second and the like are merely used to distinguish one entity or operation from another entity or operation, and do not necessarily require or imply any such relationship or sequence between the entities or operations. The terms "including", "comprising" or other variants thereof are intended to encompass non-exclusive inclusions, so a process, a method, an item or an device including a series of elements may include such elements, but also include other elements which are not explicitly listed, or include elements which are inherent to the process, the method, the item, or the device. Without additional restrictions, elements defined by the phrase "include a . . . " does not exclude the presence of additional same elements in the process, the method, the item, or the device including the series of elements.

[0049] The unmanned aerial vehicle provided by the embodiments of the present disclosure is described in detail above. The principles and embodiment methods of the present disclosure are described with reference to specific examples, and the description of the above-mentioned embodiments is merely for understanding the essential concept of the present disclosure. Meanwhile, the implementation manner and application scope may be changed by those skilled in the art according to the concept of the present disclosure. The contents of the specification should not be construed as limiting the scope of the disclosure.

What is claimed is:

1. An unmanned aerial vehicle, comprising:

a fuselage and a plurality of arm assemblies disposed at the fuselage, wherein:

each arm assembly includes an arm connected to the fuselage and a drive mechanism for driving the arm to rotate;

the arm includes an unfolded state and a folded state; and

each drive mechanism is configured to drive a corresponding arm to rotate relative to the fuselage and to enable a switching between the unfolded state and the folded state of the corresponding arm.

2. The unmanned aerial vehicle according to claim **1**, further including:

a controller connected to each drive mechanism, wherein the controller is configured to transmit control signals to the drive mechanism to drive the corresponding arm to rotate relative to the fuselage.

3. The unmanned aerial vehicle according to claim **2**, wherein:

the control signals include a first signal for controlling the drive mechanism to rotate along a first direction; and

when the unmanned aerial vehicle is turned on, the controller is configured to synchronously transmit the first signal to respective drive mechanisms of the plurality of arm assemblies to drive the respective arms of the plurality of arm assemblies to synchronously rotate to the unfolded state relative to the fuselage.

4. The unmanned aerial vehicle according to claim **3**, wherein:

the control signals include a second signal for controlling the drive mechanism to rotate along a second direction, wherein the second direction is opposite to the first direction; and

when the unmanned aerial vehicle is turned off, the controller is configured to synchronously transmit the second signal to respective drive mechanisms of the plurality of arm assemblies to drive the respective arms of the plurality of arm assemblies to synchronously rotate to the folded state relative to the fuselage.

5. The unmanned aerial vehicle according to claim **2**, wherein:

each arm assembly further includes a stopping portion, and the stopping portion is disposed at the fuselage along a rotation direction of the arm; and

when the arm is at the unfolded state, the arm is configured to abut against the stopping portion, and when the arm is at the folded state, the arm is configured to attach to the fuselage.

6. The unmanned aerial vehicle according to claim **5**, wherein:

the control signals include a third signal for controlling the drive mechanism to continuously rotate along a first direction; and

when the arm is at the unfolded state, the controller is configured to transmit the third signal to the drive mechanism to drive the arm to abut against the stopping portion with a continuous drive force.

7. The unmanned aerial vehicle according to claim **5**, wherein:

the plurality of arm assemblies includes at least two first arm assemblies and at least two second arm assemblies; and

the at least two first arm assemblies are disposed at a front portion of the fuselage and the at least two second arm assemblies are disposed at a rear portion of the fuselage.

8. The unmanned aerial vehicle according to claim **7**, wherein:

the control signals include a first signal for controlling the drive mechanism of the first arm assembly and the drive mechanism of the second assembly to rotate along a first direction; and

when the unmanned aerial vehicle is turned on, the controller is configured to sequentially transmit the first signal to the drive mechanism of the first arm assembly and the drive mechanism of the second assembly according to a first sequence to drive the arm of the first arm assembly and the arm of the second arm assembly to rotate sequentially to the unfolded state.

9. The unmanned aerial vehicle according to claim **8**, wherein:

the control signals include a second signal for controlling the drive mechanism of the first arm assembly and the drive mechanism of the second assembly to rotate along a second direction, wherein the second direction is opposite to the first direction; and

when the unmanned aerial vehicle is turned off, the controller is configured to sequentially transmit the second signal to the drive mechanism of the first arm assembly and the drive mechanism of the second assembly according to a second sequence to drive the arm of the first arm assembly and the arm of the second arm assembly to rotate sequentially to the folded state, wherein the second sequence is opposite to the first sequence.

10. The unmanned aerial vehicle according to claim **9**, wherein:

the first sequence refers to that the controller is configured to first transmit the control signals to the drive mechanism of the first arm assembly and then transmit the control signals to the drive mechanism of the second arm assembly; and

the second sequence refers to that the controller is configured to first transmit the control signals to the drive mechanism of the second arm assembly and then transmit the control signals to the drive mechanism of the first arm assembly.

11. The unmanned aerial vehicle according to claim **7**, wherein:

the drive mechanism and the arm of the first arm assembly are connected in a perpendicular direction, and the controller is configured to control the drive mechanism of the first arm assembly to rotate along a vertical direction; and

the drive mechanism and the arm of the second arm assembly are connected in a tilted direction, and the controller is configured to control the drive mechanism of the second arm assembly to rotate along a horizontal direction.

12. The unmanned aerial vehicle according to claim **11**, wherein:

a first accommodation portion is disposed at a front side portion of the fuselage; the drive mechanism of the first arm assembly is at least partially disposed in the first accommodation portion; and a stopping portion of the first arm assembly is formed by a portion of the fuselage which is located in a front of the first accommodation portion and is adjoined to the first accommodation portion; and

a second accommodation portion is disposed at a rear side portion of the fuselage; the drive mechanism of the second arm assembly is at least partially disposed in the second accommodation portion; and a stopping portion of the second arm assembly is formed by outwardly extending a portion of the fuselage above the second accommodation portion.

13. The unmanned aerial vehicle according to claim **2**, further including:

a battery for supplying power to the controller, wherein an accommodation trench is disposed at a top of the fuselage, and the battery is at least partially disposed in the accommodation trench and electrically connected to the controller.

14. The unmanned aerial vehicle according to claim **13**, further including:

a power button for turning on or off the unmanned aerial vehicle, wherein the power button is disposed on the battery and electrically connected to the controller.

15. The unmanned aerial vehicle according to claim **13**, wherein:

the controller is disposed at a motor board, and the motor board is attached to a bottom of the battery.

16. The unmanned aerial vehicle according to claim **15**, wherein:

a heat dissipation plate is disposed at a bottom of the accommodation trench, and the heat dissipation plate is attached to the motor board.

17. The unmanned aerial vehicle according to claim **13**, further including:

head indicator lights, configured for indicating a head direction of the unmanned aerial vehicle and disposed at a front portion of the fuselage.

18. The unmanned aerial vehicle according to claim **13**, further including:

battery level indicator lights, configured for indicating a battery level and disposed on the battery.

19. The unmanned aerial vehicle according to claim **13**, further including:

status indicator lights, configured for indicating a status of the unmanned aerial vehicle and disposed at a rear portion of the fuselage, wherein the status indicator lights flash different colors to indicate different statuses of the unmanned aerial vehicle.

20. The unmanned aerial vehicle according to claim **1**, wherein:

the plurality of arm assemblies is disposed at a circumferential side of the fuselage.

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