

(19)



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

(11)

N° de publication :

LU503432

(12)

BREVET D'INVENTION

B1

(21)

N° de dépôt: LU503432

(22)

Date de dépôt: 03/02/2023

(51)

Int. Cl.:

H01M 10/613, H01M 10/625, H01M 10/653, H01M
10/655, H01M 50/593, H01M 50/244, H01M 50/289,
H01M 50/262, H01M 50/267, H01M 50/249, H01M
50/271

(30)

Priorité:

04/07/2022 CN 202210776627.0

(72)

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Date de mise à disposition du public: 11/01/2024

(74)

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Date de délivrance: 11/01/2024

(73)

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Novel heavy current communication and discharge battery pack for golf cart.

(57)

The present invention relates to a novel heavy current communication and discharge battery pack for a golf cart. The battery pack includes a bottom shell, an upper cover, a battery pack main body and a limiting mechanism. The upper cover is installed at the top of the bottom shell, the battery pack main body is installed in the bottom shell, and the bottom shell is installed in the golf cart through the limiting mechanism. The battery pack main body includes several battery modules, and each battery module includes a forming bracket. Several battery cells are installed between the forming brackets. A combination mode of the battery cells is designed novelly to match with copper-nickel composite sheets, so that the battery cells are arranged more reasonably and the spatial size is applied more fully. Then the battery modules are placed in battery baffle plates and are insulated with forming epoxy plates.

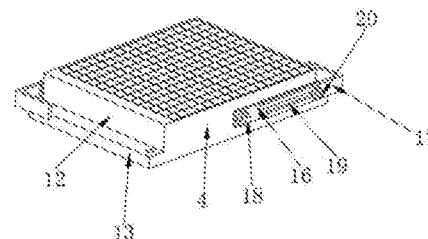


FIG. 1

NOVEL HEAVY CURRENT COMMUNICATION AND DISCHARGE BATTERY PACK FOR GOLF CART

TECHNICAL FIELD

[01] The present invention relates to the technical field of battery packs, and particularly relates to a novel heavy current communication and discharge battery pack for a golf cart.

BACKGROUND ART

[02] Conventional battery packs for golf carts cannot satisfy the demands of clients in many cases for its relatively low current output. Although some conventional battery packs discharge at heavy current, the safety cannot be guaranteed and heat dissipation is poor. Meanwhile, the steps of assembling or disassembling the battery packs with different specifications to or from the golf carts are relatively complicated.

SUMMARY

[03] The problem to be solved by the present invention is to provide a novel heavy current communication and discharge battery pack for a golf cart, which better utilizes the spatial size, so that the capacity of the battery pack is maximized as much as possible. The internal design can satisfy the demand of discharge at heavy current, so that diversified discharge modes can be additionally used by the battery pack, and a danger coefficient of the battery pack is reduced.

[04] In order to achieve the above-mentioned objective, the present invention adopts the following technical solution.

[05] a novel heavy current communication and discharge battery pack for a golf cart includes a bottom shell, an upper cover, a battery pack body and a limiting mechanism, where the upper cover is installed at the top of the bottom shell, the battery pack body is installed in the bottom shell, and the bottom shell is installed in the golf cart through the limiting mechanism; and

[06] the battery pack body includes several battery modules, and each battery module includes a forming bracket; several battery cells are installed between the forming brackets; several copper-nickel composite sheets are welded to the forming bracket, and the several battery modules are installed in the bottom shell.

[07] Preferably, a Battery Management System (BMS) fixing frame for fixing a BMS is installed in the bottom shell, a heavy current discharge terminal, an explosion-proof valve, a switch, a communication port and a display screen are installed on the outer side of the bottom shell, and a handle is installed at the top of the upper cover.

[08] Preferably, limiting plates are installed on two opposite sides on the exterior of each battery module, the limiting plates and the battery module are insulated through a forming epoxy plate, a screw is installed between the battery module and each limiting plate in a penetrating manner, a nut is installed on an end part of the screw, and the limiting plate is in bolted connection with a baffle plate fixing frame in the bottom shell.

[09] Preferably, the limiting mechanism includes a limiting base, a limiting groove

is formed in the top side of the limiting base, several limiting plates are installed in the limiting groove, a side plate is installed on the outer side of the limiting base, and an installing hole is formed in the side plate.

[10] Preferably, first bolt columns are arranged in the middle parts of two opposite sides of the limiting base, the first bolt columns are connected to one end of a rotating rod through nuts, second bolt columns are arranged on the outer side of the other end of the rotating rod, and the second bolt columns penetrate through a chute in an L-shaped slide bar and are connected to the nuts.

[11] Preferably, several bottom grooves are formed in the limiting base, a spring is installed in each bottom groove, the spring is connected to a movable rod, and the top end of the movable rod is connected to the limiting plate.

[12] Preferably, specific operations for the battery pack are as follows:

[13] installing the limiting mechanism in the golf cart through bolts by penetrating through the installing holes of the limiting plates, and at the time, placing the battery cells in the forming brackets; then welding the copper-nickel composite sheets to the forming brackets; placing the several battery modules together and insulating the battery modules with the forming epoxy plates; then placing the baffle plates; penetrating the battery modules and the baffle plates by the screws and performing connection with the nuts to tighten the battery modules; then placing the battery pack main body on the baffle plate fixing frame of the bottom shell of the battery pack and tightening the battery pack main body with bolts; then combining the battery modules with copper busbars connected in series, and covering the battery modules with the upper cover; at the time, placing the bottom shell in the limiting groove of the limiting base, where the bottom shell acts on the limiting plates below the bottom shell, and at the time, the movable rods connected to the limiting plates move downwards in the bottom grooves to compress the springs; preliminarily limiting the bottom shell by the limiting plates staying the same, and at the time, unscrewing the nuts on the rotating rod and the slide arm, rotating the rotating rod to a vertical state, then adjusting the position of the slide arm till the top of the slide arm compresses the upper cover; and at the time, tightening the nuts to limit and fix the bottom shell.

[14] The present invention has the beneficial effects: a combination mode of the battery cells is designed novelly to match with copper-nickel composite sheets, so that the battery cells are arranged more reasonably and the spatial size is applied more fully. Then the battery modules are placed in battery baffle plates and are insulated with forming epoxy plates. The battery baffle plates are fixed with screws, so that the battery modules fit together closely, and therefore, the discharge safety is improved and the fastness of the battery pack is improved. The battery pack cannot move at random, so that the stability of the battery pack is improved;

[15] the arrangement mode of the battery modules is optimized, so that performance and adaptability of the batteries are improved to a great extent; according to a principle of spatial distribution, the present invention has the advantages of high spatial utilizability, better stable performance, a higher safety coefficient, better heat dissipation, higher capacity and the like; and

[16] the bottom shell is placed in the limiting groove of the limiting base, the

bottom shell acts on the limiting plates below the bottom shell, and at the time, the movable rods connected to the limiting plates move downwards in the bottom grooves to compress the springs, the bottom shell is preliminarily limited by the limiting plates staying the same, and at the time, the nuts on the rotating rod and the slide arm are unscrewed, the rotating rod is rotated to the vertical state, then the position of the slide arm is adjusted until the top of the slide arm compresses the upper cover, and at the time, the nuts are tightened to limit and fix the bottom shell so as to further limit and fix the battery pack main bodies with different specifications quickly, and it is convenient to detach during subsequent maintenance and replacement.

BRIEF DESCRIPTION OF THE DRAWINGS

[17] FIG. 1 is an exploded view of a structure of the present invention.

[18] FIG. 2 is a schematic structural diagram of a battery module of the present invention.

[19] FIG. 3 is a section view of a limiting mechanism of the present invention.

[20] Description of the figures:

[21] 1. bottom shell; 2. upper cover; 3. battery pack body; 4. limiting mechanism; 5. forming bracket; 6. battery cell; 7. copper-nickel composite sheet; 8. forming epoxy plate; 9. baffle plate; 10. baffle plate fixing frame; 11. BMS fixing frame; 12. limiting base; 13. side plate; 14. limiting groove; 15. limiting plate; 16. rotating rod; 17. slide arm; 18. first bolt column; 19. chute; 20. second bolt column; 21. bottom groove; 22. spring; and 23. movable rod.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[22] The technical solutions in the embodiments of the present invention will be clearly and completely described below in combination with the accompanying drawings in the embodiments of the present invention. Apparently, the embodiments described are merely some rather than all of the embodiments of the present invention. On the basis of the embodiments in the present invention, all other embodiments obtained by those of ordinary skill in the art without creative efforts fall into the scope of protection of the present invention.

[23] A specific embodiment is illustrated below.

[24] As shown in FIG. 1 to FIG. 3, a novel heavy current communication and discharge battery pack for a golf cart includes a bottom shell 1, an upper cover 2, a battery pack main body 3 and a limiting mechanism 4, where the upper cover 2 is installed at the top of the bottom shell 1, the battery pack main body 3 is installed in the bottom shell 1, the bottom shell 1 is installed in the golf cart through the limiting mechanism 4, a Battery Management System (BMS) fixing frame 11 for fixing a BMS is installed in the bottom shell 1, a heavy current discharge terminal, an explosion-proof valve, a switch, a communication port and a display screen are installed on the outer side of the bottom shell 1, and a handle is installed at the top of the upper cover 2. The heavy current discharge terminal, the communication port and the display screen are connected to the battery pack main body 3 to realize heavy current discharge and communication.

[25] The battery pack main body 3 includes several battery modules, and each battery module includes a forming bracket 5. Several battery cells 6 are installed between the forming brackets 5; several copper-nickel composite sheets 7 are welded to the forming bracket 5, and the several battery modules are installed in the bottom shell 1; limiting plates 15 are installed on two opposite sides on the exterior of each battery module, the limiting plates 15 and the battery module are insulated through a forming epoxy plate 8, a screw is installed between the battery module and each limiting plate 15 in a penetrating manner, a nut is installed on an end part of the screw, and the limiting plate 15 is in bolted connection with a baffle plate fixing frame 10 in the bottom shell 1, so that the battery pack main body 3 can be better protected more safely. The copper-nickel composite sheets 7 are used for charging and discharging, which can better improve the discharge efficiency of the battery pack, so that the battery pack can better dissipate heat internally and is safer, and therefore, the danger coefficient of the battery pack is improved. The components designed in the batteries can be separated, so that it is quite convenient and safe to assemble the battery pack, and the efficiency of an assembly line can be improved. The present invention has the advantages of high spatial utilizability, capability of satisfying the demands of most clients, better stable performance, higher safety coefficient, better heat dissipation, higher capacity and the like.

[26] The limiting mechanism 4 includes a limiting base 12, a limiting groove 14 is formed in the top side of the limiting base 12, several limiting plates 15 are installed in the limiting groove 14, a side plate 13 is installed on the outer side of the limiting base 12, and an installing hole is formed in the side plate 13. First bolt columns 18 are arranged in the middle parts of two opposite sides of the limiting base 12, the first bolt columns 18 are connected to one end of a rotating rod 16 through nuts, second bolt columns 20 are arranged on the outer side of the other end of the rotating rod 16, and the second bolt columns 20 penetrate through a chute 19 in an L-shaped slide bar 17 and are connected to the nuts. Several bottom grooves 21 are formed in the limiting base 12, a spring 22 is installed in each bottom groove 21, the spring 22 is connected to a movable rod 23, and the top end of the movable rod 23 is connected to the limiting plate 15. The bottom shell 1 is placed in the limiting groove 14 of the limiting base 12, the bottom shell 1 acts on the limiting plates 15 below the bottom shell 1, and at the time, the movable rods 23 connected to the limiting plates 15 move downwards in the bottom grooves 21 to compress the springs 22, the bottom shell 1 is preliminarily limited by the limiting plates 15 staying the same, and at the time, the nuts on the rotating rod 16 and the slide arm 17 are unscrewed, the rotating rod 16 is rotated to the vertical state, then the position of the slide arm 17 is adjusted till the top of the slide arm 17 compresses the upper cover 2, and at the time, the nuts are tightened to limit and fix the bottom shell 1.

[27] Specific operations for the battery pack are as follows:

[28] The limiting mechanism 4 is installed in the golf cart through bolts by penetrating through the installing holes of the limiting plates 15, and at the time, the battery cells are placed in the forming brackets 5; then the copper-nickel composite sheets 7 are welded to the forming brackets 5; the several battery modules are placed together and the battery modules are insulated with the forming epoxy plates 8; then the

baffle plates 9 are placed; the battery modules and the baffle plates 9 are penetrated by the screws and connection with the nuts is performed to tighten the battery modules; then the battery pack main body 3 is placed on the baffle plate fixing frame 10 of the bottom shell 1 of the battery pack and the battery pack main body is tightened with bolts; then the battery modules are combined with copper busbars connected in series, and the battery modules are covered with the upper cover 2; at the time, the bottom shell 1 is placed in the limiting groove 14 of the limiting base 12, where the bottom shell 1 acts on the limiting plates 15 below the bottom shell 1, and at the time, the movable rods 23 connected to the limiting plates 15 move downwards in the bottom grooves 21 to compress the springs 22; the bottom shell 1 is preliminarily limited by the limiting plates 15 staying the same, and at the time, the nuts on the rotating rod and the slide arm 17 are unscrewed, the rotating rod 16 is rotated to a vertical state, then the position of the slide arm 17 is adjusted till the top of the slide arm 17 compresses the upper cover 2; and at the time, the nuts are tightened to limit and fix the bottom shell 1.

[29] A combination mode of the battery cells 6 is designed novelly to match with copper-nickel composite sheets 7, so that the battery cells 6 are arranged more reasonably and the spatial size is applied more fully. Then the battery modules are placed in battery baffle plates 9 and are insulated with forming epoxy plates 8. The battery baffle plates 9 are fixed by screws, so that the battery modules fit together closely, and therefore, the discharge safety is improved and the fastness of the battery pack is improved. The battery pack cannot move at random, so that the stability of the battery pack is improved;

[30] the arrangement mode of the battery modules is optimized, so that performance and adaptability of the batteries are improved to a great extent; according to a principle of spatial distribution, the present invention has the advantages of high spatial utilizability, better stable performance, higher safety coefficient, better heat dissipation, higher capacity and the like;

[31] the bottom shell 1 is placed in the limiting groove 14 of the limiting base 12, the bottom shell 1 acts on the limiting plates 15 below the bottom shell 1, and at the time, the movable rods 23 connected to the limiting plates 15 move downwards in the bottom grooves 21 to compress the springs 22, the bottom shell 1 is preliminarily limited by the limiting plates 15 staying the same, and at the time, the nuts on the rotating rod 16 and the slide arm 17 are unscrewed, the rotating rod 16 is rotated to the vertical state, then the position of the slide arm 17 is adjusted till the top of the slide arm 17 compresses the upper cover 2, and at the time, the nuts are tightened to limit and fix the bottom shell 1 so as to further limit and fix the battery pack main bodies 3 with different specifications quickly, and it is convenient to detach during subsequent maintenance and replacement.

[32] The above is merely the preferred specific embodiment of the present invention but is not intended to limit the scope of protection of the present invention. Equivalent changes or modifications made by those skilled in the art within the technical scope of the present invention according to the technical solution and concepts thereof of the present invention shall fall within the scope of protection of the present invention.

CLAIMS:

1. A novel heavy current communication and discharge battery pack for a golf cart, comprising a bottom shell (1), an upper cover (2), a battery pack body (3) and a limiting mechanism (4), wherein the upper cover (2) is installed at the top of the bottom shell (1), the battery pack body (3) is installed in the bottom shell (1), and the bottom shell (1) is installed in the golf cart through the limiting mechanism (4); and

the battery pack body (3) comprises several battery modules, and each battery module comprises a forming bracket (5); several battery cells (6) are installed between the forming brackets (5); several copper-nickel composite sheets (7) are welded to the forming bracket (5), and the several battery modules are installed in the bottom shell (1).

2. The novel heavy current communication and discharge battery pack for a golf cart according to claim 1, wherein a Battery Management System (BMS) fixing frame (11) for fixing a BMS is installed in the bottom shell (1), a heavy current discharge terminal, an explosion-proof valve, a switch, a communication port and a display screen are installed on the outer side of the bottom shell (1), and a handle is installed at the top of the upper cover (2).

3. The novel heavy current communication and discharge battery pack for a golf cart according to claim 1, wherein limiting plates (15) are installed on two opposite sides on the exterior of each battery module, the limiting plates (15) and the battery module are insulated through a forming epoxy plate (8), a screw is installed between the battery module and each limiting plate (15) in a penetrating manner, a nut is installed on an end part of the screw, and the limiting plate (15) is in bolted connection with a baffle plate fixing frame (10) in the bottom shell (1).

4. The novel heavy current communication and discharge battery pack for a golf cart according to claim 1, wherein the limiting mechanism (4) comprises a limiting base (12), a limiting groove (14) is formed in the top side of the limiting base (12), several limiting plates (15) are installed in the limiting groove (14), a side plate (13) is installed on the outer side of the limiting base (12), and an installing hole is formed in the side plate (13).

5. The novel heavy current communication and discharge battery pack for a golf cart according to claim 4, wherein first bolt columns (18) are arranged in the middle parts of two opposite sides of the limiting base (12), the first bolt columns (18) are connected to one end of a rotating rod (16) through nuts, second bolt columns (20) are arranged on the outer side of the other end of the rotating rod (16), and the second bolt columns (20) penetrate through a chute (19) in an L-shaped slide bar (17) and are connected to the nuts.

6. The novel heavy current communication and discharge battery pack for a golf cart according to claim 4, wherein several bottom grooves (21) are formed in the limiting base (12), a spring (22) is installed in each bottom groove (21), the spring (22) is connected to a movable rod (23), and the top end of the movable rod (23) is connected to the limiting plate (15).

7. The novel heavy current communication and discharge battery pack for a golf cart according to any one of claims 1-6, wherein specific operations for the battery pack are as follows:

installing the limiting mechanism (4) in the golf cart through bolts by penetrating through the installing holes of the limiting plates (15), and at the time, placing the battery cells (6) in the forming brackets (5); then welding the copper-nickel composite sheets (7) to the forming brackets (5); placing the several battery modules together and insulating the battery modules with the forming epoxy plates (8); then placing the baffle plates (9); penetrating the battery modules and the baffle plates (9) by the screws and performing connection with the nuts to tighten the battery modules; then placing the battery pack main body (3) on the baffle plate fixing frame (10) of the bottom shell (1) of the battery pack and tightening the battery pack main body with bolts; then combining the battery modules with copper busbars connected in series, and covering the battery modules with the upper cover (2); at the time, placing the bottom shell (1) in the limiting groove (14) of the limiting base (12), wherein the bottom shell (1) acts on the limiting plates (15) below the bottom shell (1), and at the time, the movable rods (23) connected to the limiting plates (15) move downwards in the bottom grooves (21) to compress the springs (22); preliminarily limiting the bottom shell (1) by the limiting plates (15) staying the same, and at the time, unscrewing the nuts on the rotating rod (16) and the slide arm (17), rotating the rotating rod (16) to a vertical state, then adjusting the position of the slide arm (17) until the top of the slide arm (17) compresses the upper cover (2); and at the time, tightening the nuts to limit and fix the bottom shell (1).

ANSPRÜCHE

1. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen, umfassend eine untere Schale (1), eine obere Abdeckung (2), einen Batteriesatzkörper (3) und einen Begrenzungsmechanismus (4), wobei die obere Abdeckung (2) oben an der unteren Schale (1) eingebaut ist, der Batteriesatzkörper (3) in der unteren Schale (1) eingebaut ist und die untere Schale (1) durch den Begrenzungsmechanismus (4) in dem Golfwagen eingebaut ist; und

der Batteriesatzkörper (3) mehrere Batteriemodule umfasst und jedes Batteriemodul eine Formklammer (5) umfasst; mehrere Batteriezellen (6) zwischen den Formklammern (5) eingebaut sind; mehrere Kupfer-Nickel-Verbundlagen (7) an die Formklammer (5) geschweißt sind und die mehreren Batteriemodule in der unteren Schale (1) eingebaut sind.

2. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach Anspruch 1, wobei ein Befestigungsrahmen (11) für ein Batterieverwaltungssystem (Battery Management System, BMS) zum Befestigen eines BMS in der unteren Schale (1) eingebaut ist, eine Starkstromentladeklemme, ein explosionsssicheres Ventil, ein Schalter, ein Kommunikationsanschluss und ein Anzeigebildschirm an der Außenseite der unteren Schale (1) eingebaut sind und ein Griff oben an der oberen Abdeckung (2) eingebaut ist.

3. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach Anspruch 1, wobei Begrenzungsplatten (15) an zwei gegenüberliegenden Seiten an der Außenseite eines jeden Batteriemoduls eingebaut sind, die Begrenzungsplatten (15) und das Batteriemodul durch eine Formepoxidplatte (8) isoliert sind, eine Schraube zwischen dem Batteriemodul und jeder Begrenzungsplatte (15) durchdringend eingebaut ist, eine Mutter an einem Endteil der Schraube eingebaut ist und die Begrenzungsplatte (15) in Schraubverbindung mit einem Befestigungsrahmen (10) für eine Ablenkplatte in der unteren Schale (1) steht.

4. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach Anspruch 1, wobei der Begrenzungsmechanismus (4) eine Begrenzungsbasis (12) umfasst, eine Begrenzungsnut (14) in der oberen Seite der Begrenzungsbasis (12) gebildet ist, mehrere Begrenzungsplatten (15) in der Begrenzungsnut (14) eingebaut sind, eine Seitenplatte (13) an der äußeren Seite der Begrenzungsbasis (12) eingebaut ist und ein Einbauloch in der Seitenplatte (13) gebildet ist.

5. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach Anspruch 4, wobei erste Bolzensäulen (18) in den mittleren Teilen von zwei gegenüberliegenden Seiten der Begrenzungsbasis (12) angeordnet sind, die ersten Bolzensäulen (18) durch Muttern mit einem Ende einer Drehstange (16) verbunden sind, zweite Bolzensäulen (20) an der äußeren Seite des anderen Endes der Drehstange (16) angeordnet sind und die zweiten Bolzensäulen (20) eine Schurre (19) in einer L-förmigen Führungsstange (17) durchdringen und mit den Muttern verbunden sind.

6. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach Anspruch 4, wobei mehrere untere Nuten (21) in der Begrenzungsbasis (12) gebildet sind, eine Feder (22) in jeder unteren Nut (21) eingebaut ist, die Feder (22) mit einer beweglichen Stange (23) verbunden ist und das obere Ende der beweglichen Stange (23) mit der Begrenzungsplatte (15) verbunden ist.

7. Neuartiger Starkstrom-Kommunikations- und Entladebatteriesatz für einen Golfwagen nach einem der Ansprüche 1 bis 6, wobei spezifische Operationen für den Batteriesatz die Folgenden sind:

Einbauen des Begrenzungsmechanismus (4) in den Golfwagen durch Bolzen durch Durchdringen der Einbaulöcher der Begrenzungsplatten (15) und zu dem Zeitpunkt Platzieren der Batteriezellen (6) in den Formklammern (5); dann Schweißen der Kupfer-Nickel-Verbundlagen (7) an die Formklammern (5); Platzieren der mehreren Batteriemodule zusammen und Isolieren der Batteriemodule mit den Formepoxidplatten (8); dann Platzieren der Ablenkplatten (9); Durchdringen der Batteriemodule und der Ablenkplatten (9) durch die

Schrauben und Herstellen einer Verbindung mit den Muttern, um die Batteriemodule anzuziehen; dann Platzieren des Batteriesatzhauptkörpers (3) auf dem Befestigungsrahmen (10) für die Ablenkplatte der unteren Schale (1) des Batteriesatzes und Anziehen des Batteriesatzhauptkörpers mit Bolzen; dann Kombinieren der Batteriemodule mit in Reihe geschalteten Kupfersammelschienen und Bedecken der Batteriemodule mit der oberen Abdeckung (2); zu dem Zeitpunkt Platzieren der unteren Schale (1) in der Begrenzungsnut (14) der Begrenzungsbasis (12), wobei die untere Schale (1) auf die Begrenzungsplatten (15) unterhalb der unteren Schale (1) wirkt, und sich zu dem Zeitpunkt die beweglichen Stangen (23), die mit den Begrenzungsplatten (15) verbunden sind, in den unteren Nuten (21) nach unten bewegen, um die Federn (22) zusammenzudrücken; vorläufig Begrenzen der unteren Schale (1) durch die Begrenzungsplatten (15) unter Abstützen von diesen und zu dem Zeitpunkt Aufschrauben der Muttern auf der Drehstange (16) und dem Führungsarm (17), Drehen der Drehstange (16) in einen vertikalen Zustand, dann Einstellen der Position des Führungsarms (17), bis der obere Teil des Führungsarms (17) die obere Abdeckung (2) zusammendrückt; und zu dem Zeitpunkt Anziehen der Muttern, um die untere Schale (1) zu begrenzen und zu fixieren.

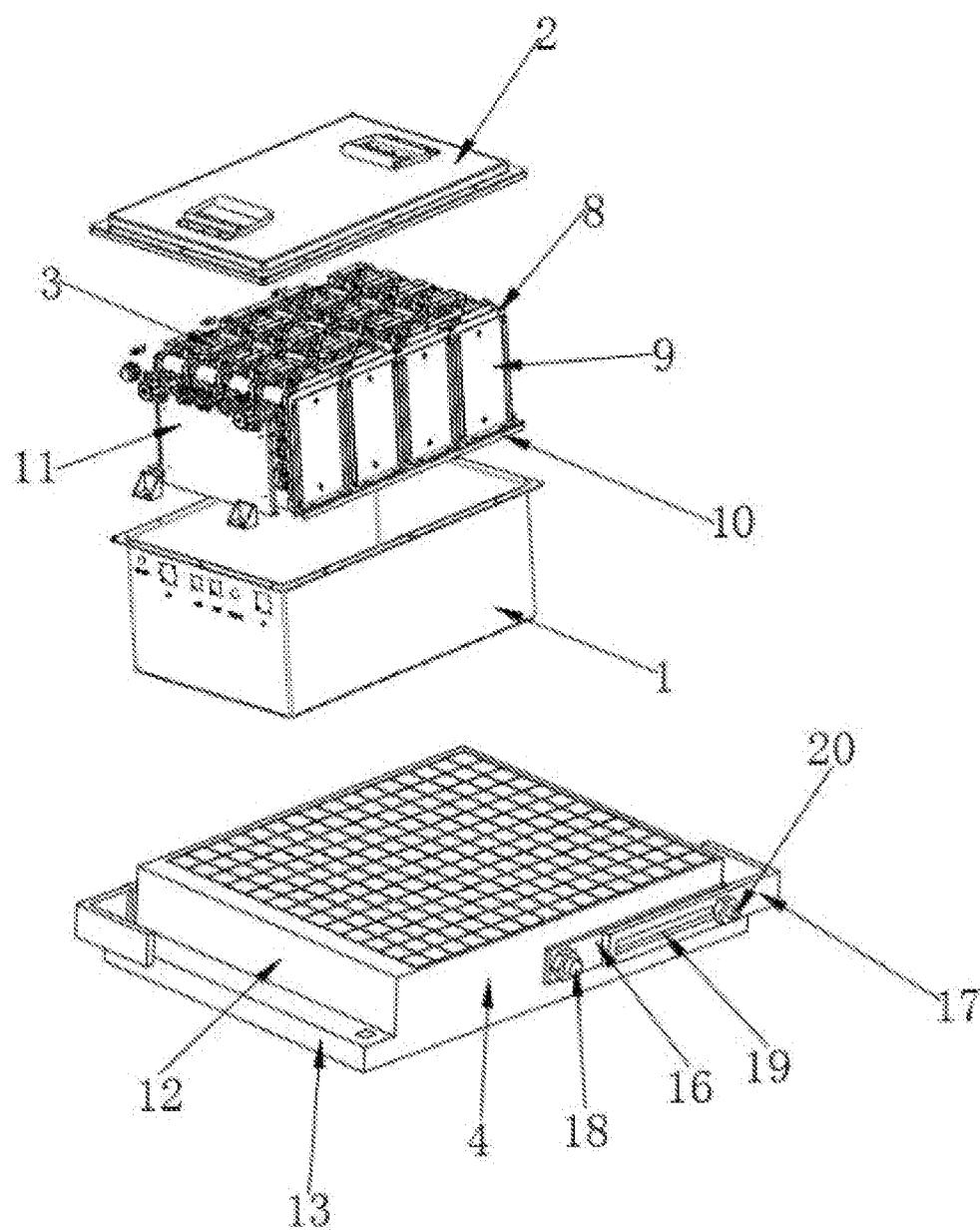


FIG. 1

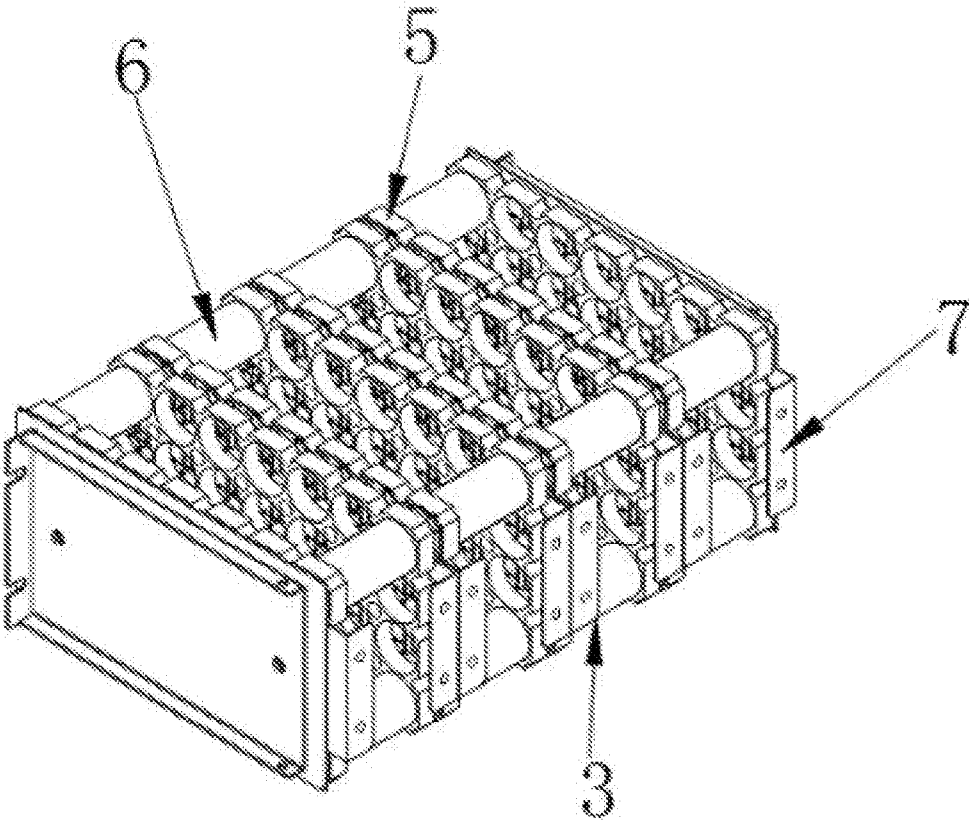


FIG. 2

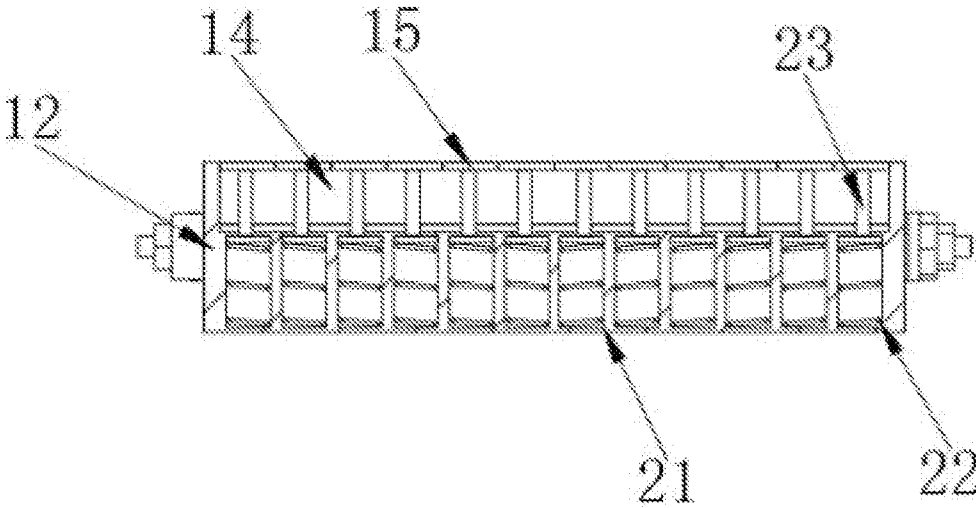


FIG. 3