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(54) **Protection Device of Battery for Photovoltaic Power Generation.**

(57) The invention discloses a protection device of battery for photovoltaic power generation, and the protection device of battery for photovoltaic power generation includes a protection box, wherein the outer wall at the upper end on the right side of the protection box is fixedly connected with a groove box; the front end of the protection box is provided with an air-tight door; a sloping plate is fixedly connected above the outer wall at the front end of the air-tight door. In the invention, the motor drives the blades to rotate, the cold air obtained by passing through the cooling pipe cools the battery effectively; the rain shelter blocks rainwater, and the silica-gel desiccant layer dries the water vapor, so as to protect the battery for photovoltaic power generation and prolong its service life, thus saving the cost and ensuring the safety.

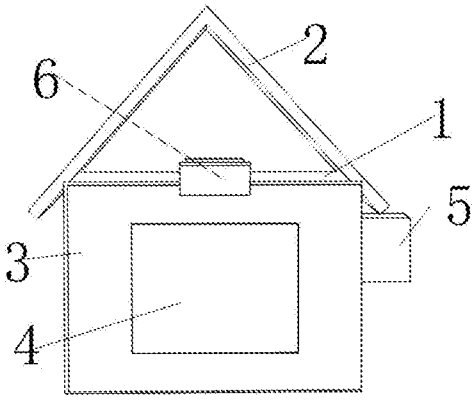

FIG. 1

Protection Device of Battery for Photovoltaic Power Generation

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Technical field

The invention relates to the technical field of battery for photovoltaic power generation, in particular to a protection device of battery for photovoltaic power generation.

Background technology

Photovoltaic power generation is a technology that directly converts light energy into electric energy by using photovoltaic effect of semiconductor interface. In the process of photovoltaic power generation, some electric energies are stored in the battery, wherein the battery is a device that directly converts chemical energy into electric energy, and realizes recharge through reversible chemical reaction, and the principle is as follows: use external electric energy to regenerate internal active substances to store the electric energy as chemical energy, and the chemical energy is converted into electric energy for output again when discharge is required. In the process of photovoltaic power generation, the battery is often used as an energy storage device because of its stability and reliability, and the battery for photovoltaic power generation is installed with a protection device.

When the existing photovoltaic power generation works, the external direct sunlight and other environmental factors affect the battery greatly, so that it is easy to accelerate the aging of the battery, shorten the service life of the battery and increase the cost of photovoltaic power generation; for the protection device installed on and sealing the battery, on one hand, it protects the battery but prevents the battery from cooling so that the battery continues being at a high temperature to affect service life; on the other hand, it is arranged outdoors, and its surface is damaged after long-term rain washing, so that it cannot protect the battery effectively.

Summary of the invention

The purpose of the invention is to solve the shortcomings in the prior art, and thus the invention provides a protection device of battery for photovoltaic power generation.

In order to achieve the above purpose, the invention adopts the following technical scheme: a protection device of battery for photovoltaic power generation, comprising a protection box, wherein the outer wall at the upper end on the right side of the protection box is fixedly connected with a groove box, the front end of the protection box is provided with an air-tight door, and a sloping plate is fixedly connected above the outer wall at the front end of the air-tight door; the outer wall above the front end of the protection box is fixedly connected with a fixed

block; the middle section of the inner wall at the upper end of the protection box is provided with a first cylinder; the middle section between the left and right sides of the protection box is fixedly connected with a fixed plate; the inner walls on the left and right sides at the upper and lower ends of the protection box are both provided with chutes; the interiors at the upper and lower ends of the protection box are provided with groove plates; the four sides of the inner wall of each groove plate are provide with electric push rods, the output end of each electric push rod is fixedly connected with a push plate, the outer wall of each push plate is fixedly connected with a rubber pad, and the interior of each groove plate is provided with a battery; the outer wall at the upper end on the right side of the protection box is provided with uniformly distributed through holes, the inner wall on the right side of each groove box is provided with a motor, and the left side of the motor is provided with a cooling pipe; the inner wall of the protection box is provided with a protective layer, the outer wall on the left side of the protective layer is provided with a high-temperature resistant layer, the outer wall on the left side of the high-temperature resistant layer is provided with a glass fiber layer, the outer wall on the left side of the glass fiber layer is provided with a silica-gel desiccant layer, the outer wall on the left side of the silica-gel desiccant layer is provided with a water-proof layer, and the outer wall on the left side of the water-proof layer is provided with a sponge layer.

As a further description of the above technical scheme:

the outer wall at the upper end of the protection box is provided with a rain shelter.

As a further description of the above technical scheme:

the interior of the middle section of the air-tight door is provided with transparent glass.

As a further description of the above technical scheme:

the outer wall at the front end of the fixed block is fixedly connected with a hydraulic cylinder, and the output end of the hydraulic cylinder is fixedly connected with a sloping plate.

As a further description of the above technical scheme:

the output end of the first cylinder is fixedly connected with a first rubber plate.

As a further description of the above technical scheme:

the middle section at the upper end of the fixed plate is provided with a third cylinder, the outer wall of the middle section at the lower end of the fixed plate is provided with a second cylinder, and the output end of the second cylinder is fixedly connected with a second rubber

plate.

As a further description of the above technical scheme:

the left and right sides of each groove plate are both fixedly connected with sliders and the sliders are slidably connected with the corresponding chutes.

As a further description of the above technical scheme:

the output end of the motor is fixedly connected with a rotating shaft, and the outer diameter of the rotating shaft is fixedly connected with blades.

The invention has the following beneficial effects.

1. In the invention, the motor runs to drive the rotating shaft to move, so that the blades at the outer diameter of the rotating shaft rotate, and cold air obtained by passing through the cooling pipe cools the battery in the protection box through the through holes; the high-temperature resistant layer and the protective layer protect the battery to avoid external exposure, thus effectively solving the problem of battery cooling.

2. In the invention, some sunlight and rainwater can be blocked by the rain shelter, and the rainwater can also be blocked by the sponge layer and water-proof layer inside the protection box, and if water vapor enters the protection box, the water vapor can be dried by the silica-gel desiccant layer to avoid entering inside the protection box, so as to protect the battery and prolong the service life of the battery for photovoltaic power generation, thus saving the cost and ensuring the safety.

Brief description of the drawings

FIG.1 is a front perspective view of the protection device of battery for photovoltaic power generation;

FIG.2 is a side perspective view of the protection device of battery for photovoltaic power generation;

FIG.3 is a schematic diagram for the interior of the protection box of the protection device of battery for photovoltaic power generation;

FIG.4 is a structural diagram for the chute of the protection device of battery for photovoltaic power generation;

FIG.5 is a structural diagram for the groove box of the protection device of battery for photovoltaic power generation;

FIG.6 is a structural diagram for the inner wall of the protection box of the protection

device of battery for photovoltaic power generation.

Among them:

1. Protection box; 2. Rain shelter; 3. Air-tight door; 4. Transparent glass; 5. Groove box; 6. Sloping plate; 7. Hydraulic cylinder; 8. Fixed block; 9. First cylinder; 10. First rubber plate; 11. Fixed plate; 12. Second rubber plate; 13. Second cylinder; 14. Third cylinder; 15. Chute; 16. Slider; 17. Groove plate; 18. Electric push rod; 19. Push plate; 20. Rubber pad; 21. Battery; 22. Cooling pipe; 23. Motor; 24. Rotating shaft; 25. Blade; 26. Water-proof layer; 27. Sponge layer; 28. Silica-gel desiccant layer; 29. Glass fiber layer; 30. High-temperature resistant layer; 31. Protective layer; 32. Through hole.

Detailed description

The technical scheme in the example of the invention will be clearly and completely described below with reference to the attached drawings. Obviously, the described example is only some example of the invention, but not the whole examples. Based on the example in the invention, all other examples obtained by ordinary technicians in the field without creative labor belong to the scope of protection of the invention.

In the description of the invention, it should be understood that the azimuth or positional relationship indicated by the terms “center”, "up", "down", “left”, “right”, “vertical”, “horizontal”, "inside" and "outside” is based on the azimuth or positional relationship shown in the attached drawings, and is only for the convenience of describing the invention and simplifying the description, and does not indicate or imply that the referred device or element must have a specific orientation, be constructed and operated in a specific orientation, so it cannot be understood as limiting the invention; the terms "first", "second” and “third” are only used for describing, and cannot be understood as indicating or implying relative importance; unless otherwise specified and limited, the terms "installation” and "connection" should be broadly understood, for example, they can be fixed connection, detachable connection or integrated; they can be mechanical connection or electrical connection; they can be direct connection, or indirect connection through an intermediary; they can be the internal connection of two elements. For those skilled in the art, the specific meanings of the above terms in the present disclosure can be understood according to specific situations.

Referring to FIGs.1-6, an example provided by the invention is as follows: a protection device of battery for photovoltaic power generation, comprising a protection box 1, wherein the

outer wall at the upper end on the right side of the protection box 1 is fixedly connected with a groove box 5, an air-tight door 3 is arranged at the front end of the protection box 1 to seal the protection box 1 to prevent rainwater or mosquitoes from entering and damaging the battery 21, wherein a sloping plate 6 is fixedly connected above the outer wall at the front end of the air-tight door 3; the outer wall above the front end of the protection box 1 is fixedly connected with a fixed block 8; the middle section of the inner wall at the upper end of the protection box 1 is provided with a first cylinder 9; the middle section between the left and right sides of the protection box 1 is fixedly connected with a fixed plate 11; the inner walls on the left and right sides at the upper and lower ends of the protection box 1 are both provided with chutes 15, wherein groove plates 17 are taken out through the sliders 16 and the chutes 15 to replace the battery 21; the interiors at the upper and lower ends of the protection box 1 are provided with groove plates 17, the four sides of the inner wall of each groove plate 17 are provide with electric push rods 18, the output end of each electric push rod 18 is fixedly connected with a push plate 19, and a rubber pad 20 is fixedly connected on the outer wall of each push plate 19 to fix the battery 21, wherein the interior of each groove plate 17 is provided with a battery 21; the outer wall at the upper end on the right side of the protection box 1 is provided with uniformly distributed through holes 32, when the motor 23 runs to drive the rotating shaft 24 to move, the blades 25 at the outer diameter of the rotating shaft 24 rotate, and cold air obtained by passing through the cooling pipe 22 cools the battery 21 in the protection box 1 through the through holes 32; the inner wall on the right side of each groove box 5 is provided with a motor 23, and the left side of the motor 23 is provided with a cooling pipe 22; the inner wall of the protection box 1 is provided with a protective layer 31, the outer wall on the left side of the protective layer 31 is provided with a high-temperature resistant layer 30, the outer wall on the left side of the high-temperature resistant layer 30 is provided with a glass fiber layer 29, the outer wall on the left side of the glass fiber layer 29 is provided with a silica-gel desiccant layer 28, the outer wall on the left side of the silica-gel desiccant layer 28 is provided with a water-proof layer 26, and the outer wall on the left side of the water-proof layer 26 is provided with a sponge layer 27, wherein the sponge layer 27 and water-proof layer 26 inside the protection box 1 can block the rainwater, and if water vapor enters the protection box 1, the water vapor can be dried by the silica-gel desiccant layer 28 to avoid entering inside the protection box 1, so as to protect the

battery 21.

The outer wall at the upper end of the protection box 1 is provided with a rain shelter 2, and some sunlight and rainwater can be blocked through the rain shelter 2; the interior of the middle section of the air-tight door 3 is provided with transparent glass 4 and the internal situation can be observed through the transparent glass 4; the outer wall at the front end of the fixed block 8 is fixedly connected with a hydraulic cylinder 7, the output end of the hydraulic cylinder 7 is fixedly connected with a sloping plate 6, the output end of the first cylinder 9 is fixedly connected with a first rubber plate 10, the middle section at the upper end of the fixed plate 11 is provided with a third cylinder 14, the outer wall of the middle section at the lower end of the fixed plate 11 is provided with a second cylinder 13, and the output end of the second cylinder 13 is fixedly connected with a second rubber plate 12, so as to fix the battery 21; the left and right sides of each groove plate 17 are both fixedly connected with sliders 16 and the sliders 16 are slidably connected with the corresponding chutes 15; the output end of the motor 23 is fixedly connected with a rotating shaft 24, and the outer diameter of the rotating shaft 24 is fixedly connected with blades 25 for cooling the battery 21.

Working principle: the sloping plate 6 is moved by the hydraulic cylinder 7, the air-tight door 3 moves with the sloping plate 6, then the the sliders 16 on both sides of the groove plate 17 slide into the chutes 15, and the battery 21 is fixed with the rubber pad 20 by the electric push rod 18 and the push plate 19 in the groove plate 17, wherein the rubber pad 20 is used for preventing slipping when the battery 21 is fixed; the lower end of the groove plate 17 is fixed by the first cylinder 9 and the first rubber plate 10 on the inner wall at the upper end of the protection box 1, and by the third cylinder 14 at the upper end of the fixed plate 11, so as to prevent the battery 21 from moving; the motor 23 runs to drive the rotating shaft 24 to move, the blades 25 at the outer diameter of the rotating shaft 24 rotate, and cold air obtained by passing through the cooling pipe 22 cools the battery 21 in the protection box 1 through the through holes 32; the high-temperature resistant layer 30 and the protective layer 31 protect the battery 21 to avoid external exposure, thus effectively solving the problem of battery 21 cooling; some sunlight and rainwater can be blocked by the rain shelter 2, and the rainwater can also be blocked by the sponge layer 27 and water-proof layer 26 inside the protection box 1, and if water vapor enters the protection box 1, the water vapor can be dried by the silica-gel desiccant layer 28 to

avoid entering inside the protection box 1, so as to protect the battery 21 and prolong the service life of the battery 21 for photovoltaic power generation, thus saving the cost and ensuring the safety.

Finally, it should be explained that the above is only the preferred example of the invention, and it is not used to limit the invention. Although the invention has been described in detail with reference to the foregoing example, it is still possible for the skilled in the art to modify the technical scheme described in the foregoing example or to replace some technical features by equivalents. Any modification, equivalent replacement, improvement, etc. made within the spirit and principle of the invention should be included in the protection of the invention.

CLAIMS

1. A protection device of battery for photovoltaic power generation, comprising a protection box (1), wherein the outer wall at the upper end on the right side of the protection box (1) is fixedly connected with a groove box (5), the front end of the protection box (1) is provided with an air-tight door (3), and a sloping plate (6) is fixedly connected above the outer wall at the front end of the air-tight door (3); the outer wall above the front end of the protection box (1) is fixedly connected with a fixed block (8); the middle section of the inner wall at the upper end of the protection box (1) is provided with a first cylinder (9); the middle section between the left and right sides of the protection box (1) is fixedly connected with a fixed plate (11); the inner walls on the left and right sides at the upper and lower ends of the protection box (1) are both provided with chutes (15); the interiors at the upper and lower ends of the protection box (1) are provided with groove plates (17); the four sides of the inner wall of each groove plate (17) are provide with electric push rods (18), the output end of each electric push rod (18) is fixedly connected with a push plate (19), the outer wall of each push plate (19) is fixedly connected with a rubber pad (20), and the interior of each groove plate (17) is provided with a battery (21); the outer wall at the upper end on the right side of the protection box (1) is provided with uniformly distributed through holes (32), the inner wall on the right side of each groove box (5) is provided with a motor (23), and the left side of the motor (23) is provided with a cooling pipe (22); the inner wall of the protection box (1) is provided with a protective layer (31), the outer wall on the left side of the protective layer (31) is provided with a high-temperature resistant layer (30), the outer wall on the left side of the high-temperature resistant layer (30) is provided with a glass fiber layer (29), the outer wall on the left side of the glass fiber layer (29) is provided with a silica-gel desiccant layer, the outer wall on the left side of the silica-gel desiccant layer (28) is provided with a water-proof layer (26), and the outer wall on the left side of the water-proof layer (26) is provided with a sponge layer (27).

2. The protection device of battery for photovoltaic power generation according to claim 1, wherein the outer wall at the upper end of the protection box (1) is provided with a rain shelter (2).

3. The protection device of battery for photovoltaic power generation according to claim 1,

wherein the interior of the middle section of the air-tight door (3) is provided with transparent glass (4).

4. The protection device of battery for photovoltaic power generation according to claim 1, wherein the outer wall at the front end of the fixed block (8) is fixedly connected with a hydraulic cylinder (7), and the output end of the hydraulic cylinder (7) is fixedly connected with a sloping plate (6).

5. The protection device of battery for photovoltaic power generation according to claim 1, wherein the output end of the first cylinder (9) is fixedly connected with a first rubber plate (10).

6. The protection device of battery for photovoltaic power generation according to claim 1, wherein the middle section at the upper end of the fixed plate (11) is provided with a third cylinder (14), the outer wall of the middle section at the lower end of the fixed plate (11) is provided with a second cylinder (13), and the output end of the second cylinder (13) is fixedly connected with a second rubber plate (12).

7. The protection device of battery for photovoltaic power generation according to claim 1, wherein the left and right sides of each groove plate (17) are both fixedly connected with sliders (16) and the sliders (16) are slidably connected with the corresponding chutes (15).

8. The protection device of battery for photovoltaic power generation according to claim 1, wherein the output end of the motor (23) is fixedly connected with a rotating shaft (24), and the outer diameter of the rotating shaft (24) is fixedly connected with blades (25).

Revendications

1. Dispositif de protection de batterie pour la production d'énergie photovoltaïque, comprenant une boîte de protection (1), dans laquelle la paroi extérieure à l'extrémité supérieure du côté droit de la boîte de protection (1) est reliée de manière fixe à une boîte à rainures (5), l'extrémité avant de la boîte de protection (1) est pourvue d'une porte étanche à l'air (3), et une plaque inclinée (6) est reliée de manière fixe au-dessus de la paroi extérieure à l'extrémité avant de la porte étanche à l'air (3) ; la paroi extérieure au-dessus de l'extrémité avant de la boîte de protection (1) est reliée de manière fixe à un bloc fixe (8) ; la partie centrale de la paroi intérieure à l'extrémité supérieure de la boîte de protection (1) est pourvue d'un premier cylindre (9) ; la partie centrale entre les côtés gauche et droit de la boîte de protection (1) est reliée de manière fixe à une plaque fixe (11) ; les parois intérieures sur les côtés gauche et droit aux extrémités supérieure et inférieure de la boîte de protection (1) sont toutes deux pourvues de goulottes (15) ; les intérieurs aux extrémités supérieure et inférieure de la boîte de protection (1) sont pourvus de plaques à rainures (17) ; les quatre côtés de la paroi intérieure de chaque plaque à rainures (17) sont pourvus de tiges de poussée électrique (18), l'extrémité de sortie de chaque tige de poussée électrique (18) est reliée de manière fixe à une plaque de poussée (19), la paroi extérieure de chaque plaque de poussée (19) est reliée de manière fixe à un tampon en caoutchouc (20), et l'intérieur de chaque plaque à rainures (17) est pourvu d'une batterie (21) ; la paroi extérieure à l'extrémité supérieure du côté droit de la boîte de protection (1) est pourvue de trous de passage uniformément répartis (32), la paroi intérieure du côté droit de chaque boîte à rainures (5) est pourvue d'un moteur (23), et le côté gauche du moteur (23) est pourvu d'un tuyau de refroidissement (22) ; la paroi intérieure de la boîte de protection (1) est pourvue d'une couche de protection (31), la paroi extérieure du côté gauche de la couche de protection (31) est pourvue d'une couche résistante aux hautes températures (30), la paroi extérieure du côté gauche de la couche résistante aux hautes températures (30) est pourvue d'une couche de fibre de verre (29), la paroi extérieure du côté gauche de la couche de fibre de verre (29) est pourvue d'une couche déshydratante de silicagel, la paroi extérieure du côté gauche de la couche déshydratante de silicagel (28) est pourvue d'une couche imperméable à l'eau (26), et la paroi extérieure du côté gauche de la couche imperméable à l'eau (26) est pourvue d'une couche d'éponge (27).

2. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel la paroi extérieure à l'extrémité supérieure de la boîte de protection (1) est pourvue d'un abri contre la pluie (2).

3. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel l'intérieur de la section centrale de la porte étanche à l'air (3) est pourvu d'un verre transparent (4).

4. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel la paroi extérieure à l'extrémité avant du bloc fixe (8) est reliée de manière fixe à un cylindre hydraulique (7), et l'extrémité de sortie du cylindre hydraulique (7) est reliée de manière fixe à une plaque inclinée (6).

5. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel l'extrémité de sortie du premier cylindre (9) est reliée de manière fixe à une première plaque de caoutchouc (10).

6. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel la section centrale à l'extrémité supérieure de la plaque fixe (11) est pourvue d'un troisième cylindre (14), la paroi extérieure de la section centrale à l'extrémité inférieure de la plaque fixe (11) est pourvue d'un deuxième cylindre (13), et l'extrémité de sortie du deuxième cylindre (13) est reliée de manière fixe à une deuxième plaque en caoutchouc (12).

7. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel les côtés gauche et droit de chaque plaque rainurée (17) sont tous deux reliés de manière fixe à des glissières (16) et les glissières (16) sont reliées de manière coulissante aux goulottes correspondantes (15).

8. Le dispositif de protection de la batterie pour la production d'énergie photovoltaïque selon la revendication 1, dans lequel l'extrémité de sortie du moteur (23) est reliée de manière fixe à un arbre rotatif (24), et le diamètre extérieur de l'arbre rotatif (24) est relié de manière fixe à des lames (25).

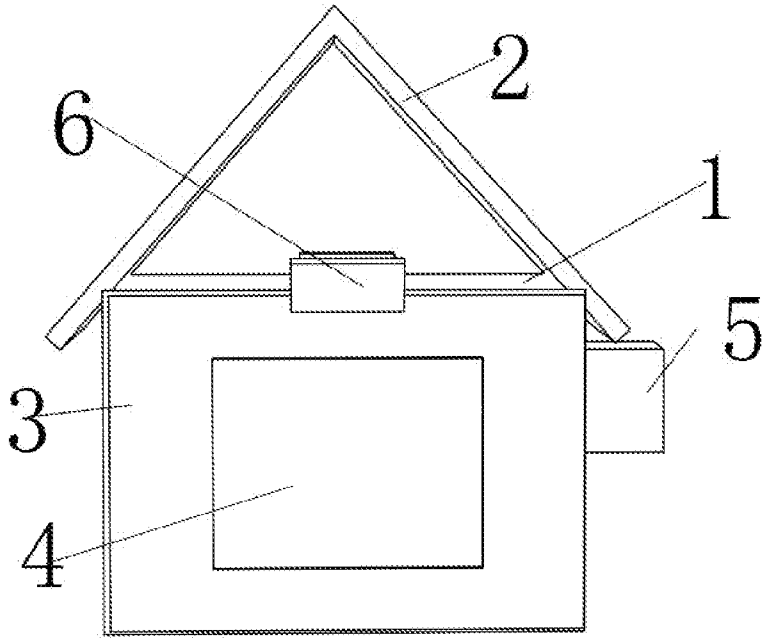

FIG. 1

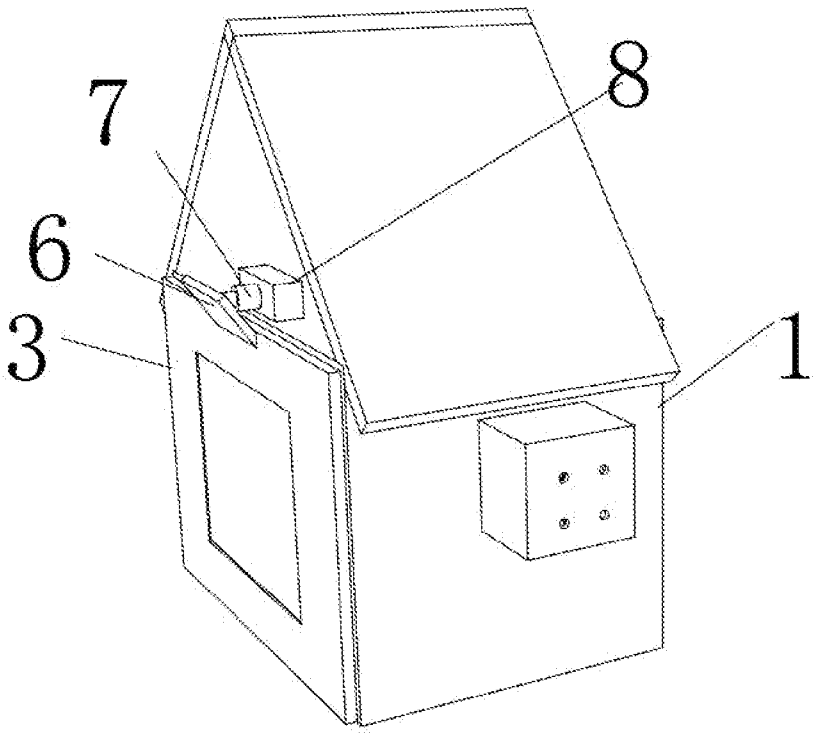

FIG. 2

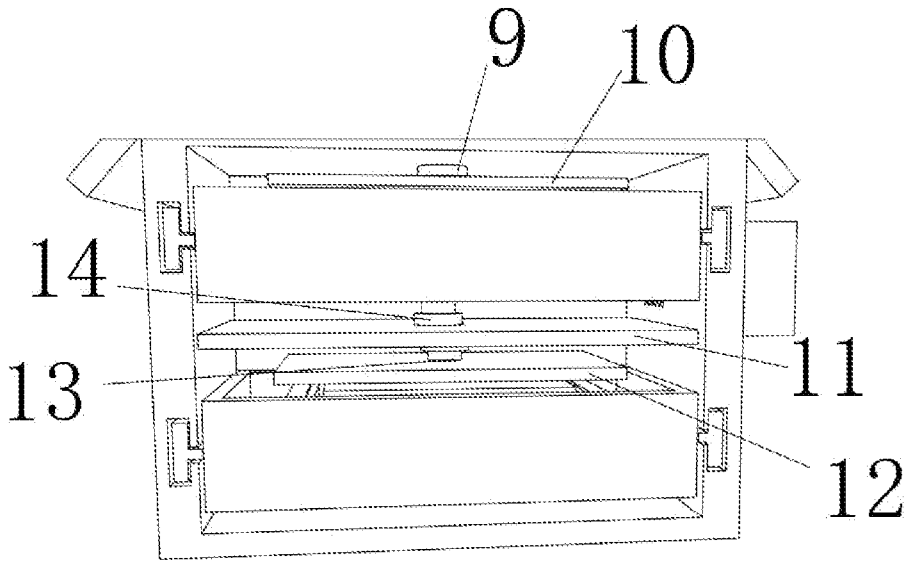

FIG. 3

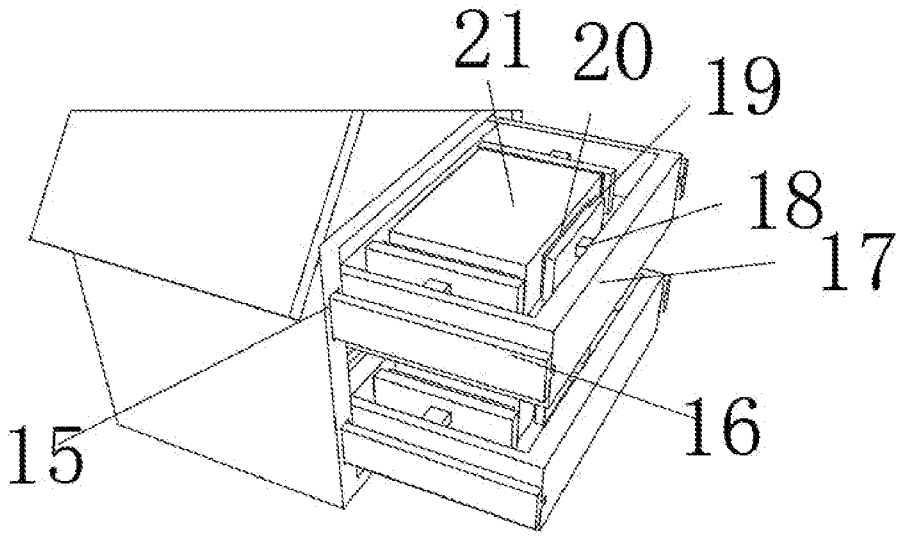

FIG. 4

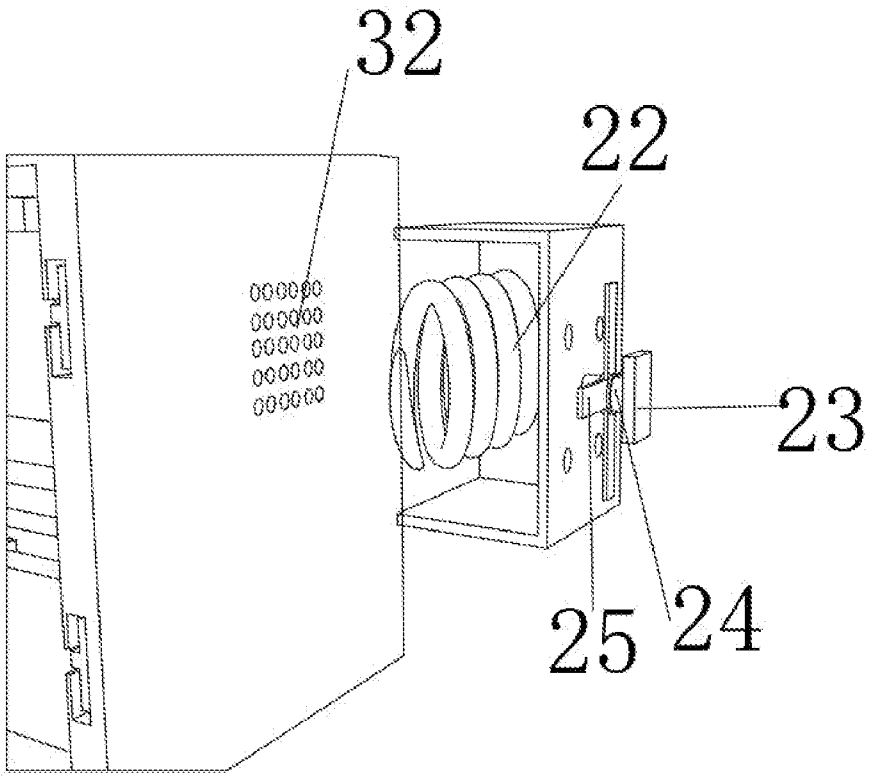

FIG. 5

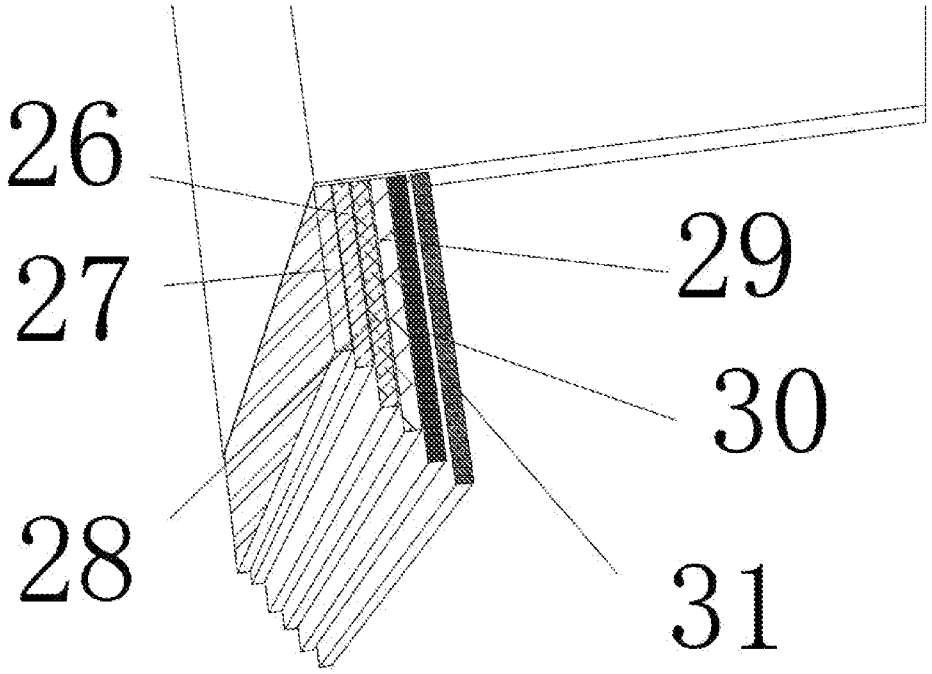

FIG. 6