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Pressure-resistant outdoor lamp structure

Abstract

A pressure-resistant outdoor lamp structure includes a solar lighting module installed between a base and a lamp cover, and a first pressure-resistant module with a plastic ring clamped and fixed between the base and the lamp cover, and a multiple of first plastic blocks extending outward from the plastic ring and the first plastic blocks are spaced from each other and arranged on an outer periphery wall of the base, such that a flexible plastic material can be set around the periphery of the outdoor lamp to enhance the ability of the outdoor lamp to resist and buffer external impact and compression.

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Background/Summary

FIELD OF THE DISCLOSURE

(1) The present disclosure relates to a pressure-resistant outdoor lamp structure, and more particularly to an outdoor disc solar lamp that can be plugged into an outdoor ground or fixed to any plane, especially the outdoor disc solar lamp with a flexible plastic material set on the outer periphery of the outdoor disc solar lamp to enhance the ability of resisting external impact and compression.

BACKGROUND OF THE DISCLOSURE

(2) In general, outdoor lamps are often used in gardens, homes, open-air restaurants or outdoor leisure venues to provide moderate lighting, and to create an atmosphere and decorate the surrounding environment. In addition, present existing outdoor lamps also have a solar panel that utilizes solar energy to provide power for the operation, which has the advantage of environmental protection and energy saving. The outdoor lamps of this sort are generally disc-shaped and buried in the ground, and capable of emitting light upward from the top of the outdoor lamps. For example, the U.S. Pat. Nos. 10,619,810, 10,995,918, and 11,333,333 previously filed by and granted to the present discloser are typical embodiments.

(3) The present inventor has considered that most of the aforementioned outdoor lamps are installed on the ground, and are susceptible to being stepped on by people, run over by vehicles, or collided with, resulting in distortion and deformation, rupture, damage, and other problems of the outer casing of the lamps, which adversely affects the service life of the lamps. In order to overcome these problems, the present discloser, based on the years of research and experiment on the function of the outdoor lamp products, and focused on the above existing outdoor lamps to enhance the pressure resistance and impact resistance of the outdoor lamps.

SUMMARY OF THE DISCLOSURE

(4) Specifically, the present disclosure provides a pressure-resistant outdoor lamp structure, including: a base, including an outer periphery wall, a fixed platform arranged on the base, a

compartment arranged at the center of the fixed platform, and a ring-shaped groove arranged between the perimeter of the fixed platform and the outer periphery wall of the base; a lamp cover, assembled to the top of the base, and comprising a translucent board covering the fixed platform of the base, a ring-shaped border extending downward from the perimeter of the translucent board, and a ring-shaped bottom edge formed at the bottom of the ring-shaped border and fixed to the ring-shaped groove; and a solar lighting module, including a circuit board, a solar panel, a plurality of LEDs and a batter electrically coupled to each other, the circuit board being stacked on the fixed platform, the battery being installed in the compartment, the solar panel and the plurality of LEDs being disposed on the circuit board and installed to the bottom of the translucent board; and a first pressure-resistant module, comprising a plastic ring, and a plurality of first plastic block extending outward from the plastic ring, the plastic ring being mounted around the ring-shaped groove of the base, and pressed and fixed by the ring-shaped bottom edge of the lamp cover, the plurality of first plastic blocks being arranged with a space from each other and around the outer periphery wall of the base, and extending downward along the outer periphery wall of the base to the bottom of the base to form a cushioning part that can be abutted in an external environment.

(5) Compared to the related art, the present disclosure uses a flexible plastic material (such as plastic, rubber, silicone, etc.) to manufacture the plurality of first plastic blocks, and arrange the plurality of first plastic blocks with a spacing from each other and around the outer periphery wall of the base of the outdoor lamp. Based on this structure, the pressure-resistant outdoor lamp is designed to enhance the ability of outdoor lamp to resist external impact and compression and the service life of the outdoor lamp.

(6) The objectives, technical characteristics and effects of the present invention will become apparent with the detailed description of preferred embodiments accompanied with the illustration of related drawings. It is intended that the embodiments and drawings disclosed herein are to be considered illustrative rather than restrictive.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

- (1) FIG. 1 is a perspective view of the present disclosure;
- (2) FIG. 2 is a top view of FIG. 1, showing a using status of the present disclosure;
- (3) FIG. 3 is an exploded view of FIG. 1;
- (4) FIG. 4 is an exploded view of a base and a first pressure-resistant module as depicted in FIG. 1;
- (5) FIG. 5 is an exploded view of FIG. 2;
- (6) FIG. 6 is an exploded view of the base and the first pressure-resistant module as depicted in FIG. 2;
- (7) FIG. 7 is an exploded view of a part of FIG. 1;
- (8) FIG. 8 is an exploded view of another part of FIG. 1;
- (9) FIG. 9 is a partial cross-sectional view of FIG. 1;
- (10) FIG. 10 is a side view of a using status as depicted in FIG. 1; and
- (11) FIG. 11 is a perspective view of another using status as depicted in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

(12) With reference to FIGS. 1 to 4 for a pressure-resistant outdoor lamp structure of the present disclosure, the pressure-resistant outdoor lamp structure is an assembly structure having a base 1, a lamp cover 2, a solar lighting module 3, a first pressure-resistant module 4 and a second pressure-resistant module 5. The base 1 is in the shape of a round disc with an outer periphery wall 11, a fixed platform 12 on the top of the base 1, and a concave compartment 13 at the center of the fixed platform 12.

(13) A ring-shaped groove 14 is formed between the periphery of the fixed platform 12 and the

outer periphery wall **11** of the base **1**. Specifically, periphery of the fixed platform **12** is provided with a ring-shaped rib **15**, such that the ring-shaped groove **14** is formed between the ring-shaped rib **15**, the fixed platform **12** and the outer periphery wall **11** of the base **1**.

(14) In the figures, the lamp cover **2** is in the shape of a cylinder, assembled to the top of the base **1** and the outer periphery wall **11** of the base **1**, the lamp cover **2** includes a translucent board **21** covering the top of the fixed platform **12** of the base **1**, a ring-shaped border **22** extending downward from the perimeter of the translucent board **21**, and the ring-shaped border **22** has a ring-shaped bottom edge **222** that can be abutted against and fixed to the ring-shaped groove **14**.

(15) In FIGS. **3**, **5** and **8**, the solar lighting module **3** includes a circuit board **31**, a solar panel **32**, plurality of LEDs **33** and a battery **34** electrically coupled to each other, the bottom of the circuit board **31** is stacked on the fixed platform **12**, and the battery **34** is installed in the compartment **13**. The solar panel **32** and the plurality of LEDs **33** are disposed on the circuit board **31** and configured to be under the translucent board **21**.

(16) Specifically, the center of the circuit board **31** is provided with an opening **311** corresponding to the compartment **13**, the battery **34** is installed in a battery box **35**, the battery box **35** is fixed into the opening **311** and the compartment **13**, the height of the battery box **35** is higher than the fixed platform **12**, the solar panel **32** is stacked on the top of the battery box **35**, the LEDs **33** are installed at the top side of the circuit board **31**, and the LEDs **33** are soldered directly onto the circuit at the top side of the circuit board **31** and spaced with each other and around the periphery of the solar panel **32**. The circuit board **31**, the solar panel **32** and the battery box **35** (battery **34**) are electrically coupled to each other by electric wires.

(17) With reference to FIGS. **4** and **6** for a preferred embodiment, the first pressure-resistant module **4** includes a plastic ring **41**, and a plurality of first plastic blocks **42** extending outward from the plastic ring **41**. As shown in FIGS. **7** to **9**, the plastic ring **41** is arranged around the ring-shaped groove **14** and pressed and fixed by the ring-shaped bottom edge **222** of the lamp cover **2**, such that the ring-shaped bottom edge **222** of the lamp cover **2** can be closed fitted with the fixed platform **12** to achieve the waterproof effect.

(18) The plurality of first plastic blocks **42** is spaced from each other and arranged around the outer periphery wall **11** of the base **1** and they extend downward along the outer periphery wall **11** of the base **1** to the bottom of the base **1** to form a cushioning part **420** that can be abutted in an external environment. In FIGS. **4** and **7**, in order to enhance the stability of fixing the first pressure-resistant module **4** onto the base **1**, the outer periphery wall **11** of the base **1** is provided with a groove **16** at a position corresponding to each first plastic block **42**, the inner side of each first plastic block **42** is provided with a protruding part **421** in contact with the outer periphery wall **11** of the base **1** and can be embedded in the corresponding groove **16**, the protruding part **421** is provided with a buckle slot **422**, the inside of the groove **16** is provided with a buckle part **161** that can connect the corresponding buckle slot **422**, such that each first plastic block **42** is stably fixed and positioned on the outer periphery wall **11** of the base **1**.

(19) In FIGS. **1** to **5**, the second pressure-resistant module **5** includes a top frame **51** and a plurality of second plastic blocks **52** extending radially outward from the top frame **51**, the top frame **51** is fixed to the top of the translucent board **21** by an adhesion or snap-on method, the plurality of second plastic blocks **52** is spaced from each other and arranged around the periphery of the ring-shaped border **22**, each second plastic block **52** extends downward from the translucent board **21** to a position near the ring-shaped groove **14**, and the bottom of each second plastic block **52** and the top of the corresponding first plastic block **42** are engaged with each other by a contact, snap-on, or adhesion method.

(20) The center of the top frame **51** corresponding to the solar panel **32** is provided with a window **53**. In addition, the gap between every two adjacent second plastic blocks **52** is provided for the plurality of LEDs **33** to transmit light. In use, sunlight may pass through the lamp cover **2**, the translucent board **21** and the window **53** to illuminate the solar panel **32**, driving the solar panel **32**

to charge the battery **34**. In addition, the battery **34** supplies power to the circuit board **31** and the plurality of LEDs **33** to drive the plurality of LEDs **33** to emit lights upward through the lamp cover **2**, the translucent board **21** and the ring-shaped border **22**, causing the light to scatter upward and around.

(21) It can be understood that the present disclosure uses the flexible plastic material (such as plastic, rubber, silicone, etc.) to manufacture the plurality of first plastic blocks **42** and the second plastic block **52**. With the structural design of the plastic ring **41**, the groove **16** and the protruding part **421**, the plurality of first plastic blocks **42** can be stably spaced and fixed on the outer periphery wall **11** of the base **1**. With the structural design of top-bottom engagement of the top frame **51**, the plurality of first plastic blocks **42** and the plurality of second plastic blocks **52**, the plurality of second plastic blocks **52** can be stably spaced and fixed around the ring-shaped border **22**. In this way, the flexible plastic material is set around the whole housing assembly including the base **1** and the lamp cover **2** of the outdoor lamp to provide the pressure-resistant design of the outdoor lamp, so as to enhance the ability of the outdoor lamp to resist external impact and compression and to enhance the durability and service life of the outdoor lamp.

(22) Embodiments of each component is further described as follows:

(23) In FIGS. 2 to 5, the bottom of the base **1** is provided with a switch fixing port **17**, the switch fixing port **17** is communicated to the fixed platform **12**, the circuit board **31** is electrically connected to a switch **36**, and the switch **36** is fixed in the switch fixing port **17**, such that the switch **36** is exposed from the bottom of the base **1**. The switch **36** can be soldered directly to the bottom side of the circuit board **31**.

(24) The switch **36** is provided for users to press or switch in order to turn on/off the LED **33**, and switches the circuit board **31** to control the lighting effect of the plurality of LEDs **33**. For example, after the switch **36** is pressed or switched, the light can be switched to white light, or change the RGB colors, so as to provide users more options for the lighting effect.

(25) In a feasible embodiment, the plastic ring **41** extends towards the center of the fixed platform **12** to form a first waterstop sleeve **43** spaced between the switch fixing port **17** and the switch **36**. This prevents water from penetrating into the interior of the outdoor lamp through the switch fixing port **17**.

(26) In FIGS. 2 to 5, the bottom of the base **1** is provided with a plug-in port fixing port **18**, the plug-in port fixing port **18** is communicated to the fixed platform **12**, the circuit board **31** is electrically connected to a plug-in port **37** (such as USB Type-C port), and the plug-in port **37** is fixed in the plug-in port fixing port **18**, so that the plug-in port **37** is exposed from the base **1**. The plug-in port **37** can be soldered directly to the bottom side of the circuit board **31**. In use, an external power supply can be connected through the plug-in port **37** to supply power to the circuit board **31** in order to drive the LEDs **33** to emit light as well as charging the battery **34**.

(27) In addition, the plastic ring **41** extends towards the center of the fixed platform **12** to form a second waterstop sleeve **44** spaced between the plug-in port fixing port **18** and the plug-in port **37**. This prevents water from penetrating into the interior of the outdoor lamp through the plug-in port fixing port **18**.

(28) In FIGS. 3 to 5, the bottom of the base **1** is provided with a plurality of screw holes **19**, the screw holes **19** are communicated to the fixed platform **12**, the bottom of the ring-shaped border **22** is provided with a plurality of screw holes **223**, the screw holes **19** of the fixed platform **12** and the screw holes **223** of the ring-shaped border **22** are configured to be corresponsive to each other, so that a plurality of external screws can be passed from the screw holes **19** at the bottom of the base **1** and locked into the corresponding screw holes **223** of the ring-shaped border **22** in order to tightly clamp the plastic ring **41** between the ring-shaped bottom edge **222** of the ring-shaped border **22** and the periphery of the fixed platform **12**.

(29) The plastic ring **41** extends towards the center of the fixed platform **12** to form a plurality of third waterstop sleeves **45** sheathing on each screw hole **19**. This prevents water from penetrating

into the interior of the outdoor lamp through the screw holes **19** of the base **1**.

(30) The overall waterproof design of the aforementioned plastic ring **41**, first waterstop sleeve **43**, second waterstop sleeve **44** and third waterstop sleeve **45** effectively enhance the waterproof ability of the outdoor lamp.

(31) In FIGS. **3** to **7**, the plastic ring **41** extends towards the compartment **13** at the center of the fixed platform **12** to form a plurality of support blocks **46** that can support the battery **34** and the battery box **35**. Accordingly, the plastic ring **41**, first plastic block **42**, first waterstop sleeve **43**, second waterstop sleeve **44**, third waterstop sleeve **45** and support block **46** are integrally formed by a flexible plastic material, not only providing a simple and stable fixation of the plurality of first plastic blocks **42**, but also simplifying the production process of the waterstop structures of the outdoor lamp, thereby saving costs.

(32) In FIGS. **8** and **9**, a first through hole **423** is formed between the top and bottom of each first plastic block **42** to enhance of the elasticity for the expansion and contraction of the first plastic block **42**, a second through hole **523** is formed between the top and bottom of each second plastic block **52** to enhance of the elasticity for the expansion and contraction of the second plastic block **52**, and the first through hole **423** is communicated to the corresponding second through hole **523**.

(33) In FIGS. **2**, **5**, and **10**, the bottom of the base **1** is provided with a combining part **10**, the base **1** is detachably assembled with a plug **6** through the combining part **10**. The plug **6** is in a conical shape with a wide top and a narrow bottom, and having a mount **61** at the top, and a spike **62** at the bottom which is pluggable into the ground or other planes, and the mount **61** is detachably assembled to the combining part **10** of the base **1**. For example, the combining part **10** and the mount **61** can be assembled to each other by a concave-convex structure, so that the outdoor lamp can be fixed to the ground or other planes by the plug **6**.

(34) In FIG. **11**, the present disclosure further includes a waterproof charging wire **7**, the waterproof charging wire **7** can be laid on the ground or other planes, the waterproof charging wire **7** has a plurality of connectors **71** spaced from each other, the plug-in port **37** of the base **1** of the outdoor lamp and the connector **71** of the waterproof charging wire **7** are engaged with each other, so that the waterproof charging wire **7** can supply power to the plurality of plug-in ports **37** of the outdoor lamp through the connectors **71**, and a plurality of outdoor lamps can be connected through the waterproof charging wire **7** for use.

(35) While the present disclosure has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention as set forth in the claims.

Claims

1. A pressure-resistant outdoor lamp structure, comprising: a base, comprising an outer periphery wall, a fixed platform arranged on the base, a compartment arranged at the center of the fixed platform, and a ring-shaped groove arranged between the perimeter of the fixed platform and the outer periphery wall of the base; a lamp cover, assembled to the top of the base, and comprising a translucent board covering the fixed platform of the base, a ring-shaped border extending downward from the perimeter of the translucent board, and a ring-shaped bottom edge formed at the bottom of the ring-shaped border and fixed to the ring-shaped groove; and a solar lighting module, comprising a circuit board, a solar panel, a plurality of LEDs and a battery electrically coupled to each other, the circuit board being stacked on the fixed platform, the battery being installed in the compartment, the solar panel and the plurality of LEDs being disposed on the circuit board and installed to the bottom of the translucent board; and a first pressure-resistant module, comprising a plastic ring, and a plurality of first plastic block extending outward from the plastic ring, the plastic ring being mounted around the ring-shaped groove of the base, and pressed and fixed by the ring-shaped bottom edge of the lamp cover, the plurality of first plastic blocks

being arranged with a space from each other and around the outer periphery wall of the base, and extending downward along the outer periphery wall of the base to the bottom of the base to form a cushioning part that can be abutted in an external environment.

2. The pressure-resistant outdoor lamp structure according to claim 1, wherein the outer periphery wall of the base is provided with a groove configured to be corresponsive to each first plastic block, the inner side of each first plastic block is provided with a protruding part configured to be in contact with the outer periphery wall of the base and embeddable into the corresponding groove, the protruding part is provided with a buckle slot, and a buckle part installed in the corresponding groove and connectable to the buckle slot.

3. The pressure-resistant outdoor lamp structure according to claim 1, further comprising a second pressure-resistant module, the second pressure-resistant module comprising a top frame, and a plurality of second plastic blocks extending outward from the top frame, the top frame being mounted to the top of the translucent board of the lamp cover, and the plurality of second plastic blocks being spaced from each other, arranged around the ring-shaped border of the lamp cover, and extending downward from the periphery of the ring-shaped border at a position near the translucent board to a position near the ring-shaped groove, and the bottom of each second plastic block being engaged with the top of the corresponding first plastic block.

4. The pressure-resistant outdoor lamp structure according to claim 3, wherein the center of the top frame of the second pressure-resistant module is provided with a window configured to be corresponsive to the solar panel, and the spacing between every two adjacent second plastic blocks is provided for the plurality of LEDs to transmit light.

5. The pressure-resistant outdoor lamp structure according to claim 3, wherein the center of the circuit board is provided with an opening corresponding to the compartment, the battery is installed in a battery box, the battery box is fixed in the opening and the compartment, the height of the battery box is higher than the fixed platform, the solar panel is stacked on the top of the battery box, and the plurality of LEDs is arranged on the circuit board and spaced from each other around the periphery of the solar panel.

6. The pressure-resistant outdoor lamp structure according to claim 5, wherein the bottom of the base is provided with a switch fixing port, the switch fixing port is communicated to the fixed platform, the circuit board is electrically coupled to a switch, the switch is fixed in the switch fixing port, and the plastic ring is provided with a first waterstop sleeve extending towards the center of the fixed platform to be spaced between the switch fixing port and the switch.

7. The pressure-resistant outdoor lamp structure according to claim 5, wherein the bottom of the base is provided with a plug-in port fixing port, the plug-in port fixing port is communicated to the fixed platform, the circuit board is electrically coupled to a plug-in port, the plug-in port is fixed in the plug-in port fixing port, the plastic ring of the first pressure-resistant module extends towards the center of the fixed platform to form a second waterstop sleeve spaced between the plug-in port fixing port and the plug-in port.

8. The pressure-resistant outdoor lamp structure according to claim 5, wherein the bottom of the base is provided with a plurality of screw holes, the screw holes are communicated to the fixed platform, the plastic ring of first pressure-resistant module extends towards the center of the fixed platform to form a plurality of third waterstop sleeves sheathing on the screw holes respectively.

9. The pressure-resistant outdoor lamp structure according to claim 5, wherein the plastic ring of the first pressure-resistant module extends towards the inside of the compartment at the center of the fixed platform to form a plurality of support blocks capable of supporting the battery box.

10. The pressure-resistant outdoor lamp structure according to claim 5, wherein each first plastic block of the first pressure-resistant module is provided with a first through hole, each second plastic block of the second pressure-resistant module is provided with a second through hole, and the first through hole is communicated to the corresponding second through hole.

11. The pressure-resistant outdoor lamp structure according to claim 5, wherein the bottom of the

base is provided with a combining part, and the base is detachably assembled with a plug by the combining part.

12. The pressure-resistant outdoor lamp structure according to claim 5, further comprising a waterproof charging wire, a plurality of connectors spaced from each other and arranged on the waterproof charging wire, and the plug-in port of the base and the connector of the waterproof charging wire are engaged with each other.

13. The pressure-resistant outdoor lamp structure according to claim 5, wherein the perimeter of the fixed platform is provided with a ring-shaped rib, and the ring-shaped groove is formed between the ring-shaped rib, the fixed platform and the outer periphery wall of the base.
