

SOLAR ULTRAVIOLET DISINFECTION DEVICE AND DRAINAGE COVER PLATE

Cross-reference to Related Applications

[0001] The present application claims priority to Chinese Patent Application No. 202420599952.9, filed with the China Patent Office on March 26, 2024 and titled "SOLAR ULTRAVIOLET DISINFECTION DEVICE AND DRAINAGE COVER PLATE", the entire contents of which are incorporated by reference in the present application.

Technical Field

[0002] Embodiments of the present application relate to the technical field of drainage cover plates, in particular to a solar ultraviolet disinfection device and a drainage cover plate.

Background Art

[0003] With rapid development of cities, an urban coverage area is increasingly larger. Urban expansion means that more and more places are covered by concrete or asphalt, and the urban population is increasing. In order to reduce water accumulation on the ground and for the sake of human health, sunken drainage ditches are usually arranged on the ground for drainage. Meanwhile, in order to avoid falling into the drainage ditches, the drainage ditches are covered with drainage cover plates.

[0004] However, during implementation of the embodiments of the present application, the inventor has found that at present, garbage is rushed into the drainage ditches and accumulates to block the drainage ditches and form stagnant water, and before cleaning and maintenance, the stagnant water breeds bacteria, viruses, and harmful pathogens, etc., thereby affecting sanitation conditions.

Summary of the Invention

[0005] Technical problems mainly solved by the present application are to provide a solar ultraviolet disinfection device and a drainage ditch cover plate. By irradiating a drainage ditch with an ultraviolet sterilization lamp, the drainage ditch is sterilized, decontaminated, deodorized, and disinfected, thereby improving sanitation conditions.

[0006] To solve the above technical problems, one technical solution adopted in the present application is to provide a solar ultraviolet disinfection device, comprising a housing and a disinfection assembly, the housing is used for being supported at a drainage ditch, the disinfection assembly is provided in the housing, the disinfection assembly comprises several solar charging

power supplies and an ultraviolet sterilization lamp, the several solar charging power supplies are electrically connected to the sterilization lamp, and the sterilization lamp is used for irradiating the drainage ditch to sterilize and disinfect the drainage ditch.

[0007] Optionally, the disinfection assembly comprises a disinfection box, the disinfection box is fixed to the housing, the solar charging power supplies cover the disinfection box, and the ultraviolet sterilization lamp is provided in the disinfection box.

[0008] Optionally, the disinfection box comprises a box body and a fixing plate, the box body is fixed to the housing, the fixing plate is connected to the box body, the fixing plate is provided with an opening, and the ultraviolet sterilization lamp is fixed at the opening.

[0009] Optionally, the disinfection box comprises a locking member and a connecting member, two ends of the connecting member are respectively connected to the box body and the housing, and the locking member is connected to the fixing plate and the box body to enable the fixing plate to be detachably connected to the box body.

[0010] Optionally, the locking member comprises a bolt and a nut, the fixing plate is provided with a first through hole, the connecting member is provided with a second through hole, and the bolt is screwed to the nut after passing through the first through hole and the second through hole.

[0011] Optionally, the disinfection assembly further comprises a timer, the timer is provided on the solar charging power supplies, and the timer is used for switching on or switching off the ultraviolet sterilization lamp.

[0012] Optionally, the housing is provided with a filling shell, and another end of the connecting member is fixed to the filling shell; and

the solar ultraviolet disinfection device further comprises a filling member, and the filling member is fixed in the filling shell.

[0013] Optionally, the housing is provided with a drainage notch.

[0014] Optionally, the solar ultraviolet disinfection device further comprises a supporting member, the supporting member is fixed to the filling shell, and the supporting member is used for being supported at a groove bottom of a groove of the drainage ditch.

[0015] To solve the above technical problems, another technical solution adopted in the present application is to provide a drainage cover plate, comprising the above solar ultraviolet disinfection device.

[0016] In the embodiments of the present application, the solar ultraviolet disinfection device comprises the housing and the disinfection assembly, the housing is used for being supported at the drainage ditch, the disinfection assembly is provided in the housing, the disinfection assembly comprises the several solar charging power supplies and the ultraviolet sterilization lamp, the

several solar charging power supplies are electrically connected to the ultraviolet sterilization lamp, and the ultraviolet sterilization lamp is used for irradiating the drainage ditch to sterilize and disinfect the drainage ditch. By enabling the solar ultraviolet disinfection device to cover the drainage ditch, the solar charging power supplies provide power to enable the ultraviolet sterilization lamp to work, and the ultraviolet sterilization lamp irradiates the drainage ditch to perform sterilization, decontamination, deodorization, and disinfection on the drainage ditch, thereby improving sanitation conditions.

[0017] Furthermore, use of chemical agents for sterilization and disinfection of the drainage ditch can be avoided, thereby avoiding environmental pollution.

[0018] Furthermore, when a time calculated according to the timer is in a preset ultraviolet light irradiation time period, the timer is used for automatically switching on the ultraviolet sterilization lamp to reduce the interference of external light on the ultraviolet sterilization lamp, thereby affecting sterilization and disinfection effects.

Brief Description of the Drawings

[0019] In order to more clearly illustrate the technical solutions of the embodiments of the present application, drawings required for use in the embodiments of the present application are briefly introduced below. It is obvious that the drawings described below are only some embodiments of the present application. For those of ordinary skill in the art, other drawings can also be obtained based on the drawings without expending creative labor.

[0020] FIG. 1 is a top-view structural schematic diagram of a solar ultraviolet disinfection device provided in an embodiment of the present application;

[0021] FIG. 2 is a cross-sectional structural schematic diagram in FIG. 1; and

[0022] FIG. 3 is a schematic diagram of the connection of a controller with the solar charging power supplies, an ultraviolet sterilization lamp, and a timer of a disinfection assembly of the solar ultraviolet disinfection device provided in the embodiment of the present application.

Description of reference numerals:

100. solar ultraviolet disinfection device;

1. housing; 11. support frame; 12. filling shell; 13. drainage notch;

2. disinfection assembly; 21. disinfection box; 211. box body; 212. fixing plate; 2121. opening; 2122. first through hole; 213. connecting member; 2131. second through hole; 214. locking member; 2141. bolt; 2142. nut; 22. solar charging power supply; 23. ultraviolet sterilization lamp; 24. timer; 25. controller;

3. filling member;
4. supporting member.

Detailed Description of Embodiments

[0023] In order to facilitate an understanding of the present application, the present application is described in more detail below in conjunction with the drawings and specific embodiments. It should be noted that when an element is expressed as "locked to" another element, it may be directly on another element, or one or more centered elements may exist therebetween. When an element is expressed as "connected to" another element, it may be directly connected to another element, or one or more centered elements may exist therebetween. The terms "vertical", "horizontal", "left", "right", and similar expressions used in the specification are only for the purpose of illustration.

[0024] Unless otherwise defined, all technical and scientific terms used in the specification have same meanings as commonly understood by those skilled in the art to which the present application belongs. Terms used in the specification of the present application are only for the purpose of describing specific embodiments and are not intended to limit the present application. The term "and/or" used in the specification comprises any and all combinations of one or more related listed items.

[0025] Referring to FIG. 1 and FIG. 2, a solar ultraviolet disinfection device 100 comprises a housing 1, a disinfection assembly 2, a filling member 3, and a supporting member 4. The disinfection assembly 2 is provided in the housing 1 to enable the disinfection assembly 2 to cover a drainage ditch, so that the disinfection assembly 2 can irradiate the drainage ditch to sterilize, decontaminate, deodorize, and disinfect the drainage ditch, thereby improving sanitation conditions. The filling member 3 is provided in the housing 1, and the filling member 3 is used for increasing a weight of the solar ultraviolet disinfection device 100 to reduce a shaking or moving situation of the solar ultraviolet disinfection device 100 due to vibration. The supporting member 4 is provided in the housing 1, and the supporting member 4 is used for being supported at a groove bottom of a groove of the drainage ditch to play a support role on the solar ultraviolet disinfection device 100.

[0026] For the above housing 1, referring to FIG. 1 and FIG. 2, the housing 1 is provided with a support frame 11, a filling shell 12, and a drainage notch 13. The filling shell 12 is fixed to a side portion of the support frame 11, and the filling shell 12 is used for accommodating the filling member 3. The drainage notch 13 is located between the filling shell 12 and the support frame 11, the drainage notch 13 is formed by a notch between the filling shell 12 and the support frame 11,

and the drainage notch 13 is used for drainage, thereby reducing a situation of water accumulation on a surface of the solar ultraviolet disinfection device 100.

[0027] For the above disinfection assembly 2, referring to FIG. 2 and FIG. 3, the disinfection assembly 2 comprises a disinfection box 21, several solar charging power supplies 22, an ultraviolet sterilization lamp 23, and a timer 24.

[0028] The disinfection box 21 comprises a box body 211, a fixing plate 212, a connecting member 213, and a locking member 214. The box body 211 is connected to a middle portion of the support frame 11, and the box body 211 is in a hollow shape. The fixing plate 212 is connected to a lower portion of the box body 211, and the fixing plate 212 is provided with an opening 2121 and a first through hole 2122. One end of the connecting member 213 is connected to a side portion of the box body 211, another end of the connecting member 213 is connected to the filling shell 12, one end of the connecting member 213 bends and extends to another end, and the connecting member 213 is provided with a second through hole 2131. In some embodiments, another end of the connecting member 213 is connected to the support frame 11. The locking member 214 comprises a bolt 2141 and a nut 2142, and the bolt 2141 is screwed to the nut 2142 after passing through the first through hole 2122 and the second through hole 2131 to enable the fixing plate 212 to be detachably connected to the connecting member 213, so as to enable the fixing plate 212 to be detachably connected to the box body 211.

[0029] It is understandable that in some embodiments, structures of the locking member 214 and the connecting member 213 are not limited to the above structures. The structures of the locking member 214 and the connecting member 213 may be another structures. For example, the locking member 214 comprises a clamp hook, the connecting member 213 is provided with a clamp groove, and the clamp hook is clamped to the clamp groove to enable the fixing plate 212 to be detachably connected and fixed to the connecting member 213. In order to facilitate removal of the clamp hook from the clamp groove by a user, the clamp hook is provided with a hook portion and a pressing portion, the hook portion is fixed to the pressing portion, and the hook portion is clamped to the clamp groove. When the user presses the hook portion, the hook portion is rotated to be removed from the clamp groove.

[0030] The solar charging power supplies 22 cover the box body 211. The solar charging power supplies 22 are supplemented with energy by self-charging of solar energy, so as to enable the solar charging power supplies 22 to be electrically connected to external solar charging power supplies 22 without wiring, thereby reducing construction difficulty and facilitating maintenance.

[0031] The ultraviolet sterilization lamp 23 is fixed at the opening 2121 to enable the ultraviolet sterilization lamp 23 to be provided at a lower portion of the box body 211. The ultraviolet

sterilization lamp 23 is partially inserted into the box body 211, and the ultraviolet sterilization lamp 23 is electrically connected to the solar charging power supplies 22. Through electric energy provided by the solar charging power supplies 22, the ultraviolet sterilization lamp 23 emits ultraviolet light to irradiate the drainage ditch, and the ultraviolet light is used for destroying organic molecules, inorganic molecules, bacteria, and viruses to sterilize, decontaminate, deodorize, and disinfect the drainage ditch without producing residual effects that are harmful to the human body or aquatic organisms. Use of chemical agents for sterilization and disinfection of the drainage ditch can also be avoided, thereby avoiding environmental pollution.

[0032] In some embodiments, the ultraviolet sterilization lamp 23 is an LED ultraviolet sterilization lamp 23, and the LED ultraviolet sterilization lamp 23 emits the ultraviolet light to sterilize, decontaminate, deodorize, and disinfect the drainage ditch, and effectively eliminate pollutants in the air, such as mold spores.

[0033] The timer 24 is provided on the solar charging power supplies 22, and the timer 24 is used for switching on or switching off the ultraviolet sterilization lamp 23. Specifically, when a time calculated according to the timer 24 is in a preset ultraviolet light irradiation time period, the timer 24 is used for automatically switching on the ultraviolet sterilization lamp 23 for emitting the ultraviolet light to irradiate the drainage ditch.

[0034] It should be noted that in the preset ultraviolet light irradiation time period, the outside world is in a dark environment to reduce the interference of external light on the ultraviolet sterilization lamp 23, thereby affecting sterilization and disinfection effects.

[0035] It should be noted that the preset ultraviolet light irradiation time period is not in a working period of a maintenance worker in the daytime, thereby avoiding the maintenance worker from being harmed by the ultraviolet light when maintaining the drainage ditch.

[0036] In some embodiments, the preset ultraviolet light irradiation time period may be from twenty o'clock to six o'clock on the second day, and the working period in the daytime may be from fix o'clock to twenty o'clock. In the present application, the preset ultraviolet light irradiation time period and the working period in the daytime are not specifically limited, as long as the preset ultraviolet light irradiation time period is not in the working period of the maintenance worker in the daytime, and during the preset ultraviolet light irradiation time period, the external environment is in a dark environment.

[0037] In some embodiments, referring to FIG. 3, the disinfection assembly 2 further comprises a controller 25, the controller 25 is provided in the box body 211, and the controller 25 is electrically connected to the solar charging power supplies 22, the ultraviolet sterilization lamp 23, and the timer 24, respectively. The controller 25 is used for receiving information from the

timer 24 and controlling the solar charging power supplies 22 and the ultraviolet sterilization lamp 23.

[0038] For the above filling member 3, referring to FIG. 2, the filling member 3 is fixed to the filling shell 12, thereby fixing the filling member 3 to the housing 1 to increase the weight of the solar ultraviolet disinfection device 100, so as to reduce a shaking or moving situation of the solar ultraviolet disinfection device 100 due to vibration.

[0039] In some embodiments, the filling member 3 may be granite matched with a pavement, and the filling member 3 may also be concrete.

[0040] For the above supporting member 4, referring to FIG. 2, the supporting member 4 is provided at a side portion of the filling shell 12 or the support frame 11, and the supporting member 4 is used for being supported at the groove bottom of the groove of the drainage ditch to play a support role on the solar ultraviolet disinfection device 100.

[0041] In the embodiments of the present application, the solar ultraviolet disinfection device 100 comprises the housing 1 and the disinfection assembly 2, the housing 1 is used for being supported at the drainage ditch, the disinfection assembly 2 is provided in the housing 1, the disinfection assembly 2 comprises the several solar charging power supplies 22 and the ultraviolet sterilization lamp 23, the several solar charging power supplies 22 are electrically connected to the ultraviolet sterilization lamp 23, and the ultraviolet sterilization lamp 23 is used for irradiating the drainage ditch to sterilize and disinfect the drainage ditch. By enabling the solar ultraviolet disinfection device 100 to cover the drainage ditch, the solar charging power supplies 22 provide power to enable the ultraviolet sterilization lamp 23 to work, and the ultraviolet sterilization lamp 23 irradiates the drainage ditch to perform sterilization, decontamination, deodorization, and disinfection on the drainage ditch, thereby improving sanitation conditions. Furthermore, use of chemical agents for sterilization and disinfection of the drainage ditch can be avoided, thereby avoiding environmental pollution.

[0042] The present application also provides an embodiment of a drainage cover plate, the drainage cover plate comprises the above solar ultraviolet disinfection device 100, and the structure and functions of the solar ultraviolet disinfection device 100 may refer to the above embodiments and are not described repeatedly herein one by one.

[0043] It should be noted that the preferred embodiments of the present application are given in the specification and drawings of the present application, but the present application may be implemented in many different forms and is not limited to the embodiments described in the specification. These embodiments are not intended to be additional limitations to the contents of the present application, and these embodiments are provided for the purpose of providing a more

thorough and comprehensive understanding of the disclosed contents of the present application. Furthermore, the above technical features continue to be combined with each other to form various embodiments not listed above, which are regarded as the scope described in the specification of the present application. Further, for those of ordinary skill in the art, improvements or alternations may be made according to the above description, and all these improvements and alternations should fall within the scope of protection of the appended claims of the present application.

Claims

1. A solar ultraviolet disinfection device, comprising:
a housing, used for being supported at a drainage ditch; and
a disinfection assembly, provided in the housing, wherein the disinfection assembly comprises several solar charging power supplies and an sterilization lamp, the several solar charging power supplies are electrically connected to the ultraviolet sterilization lamp, and the ultraviolet sterilization lamp is used for irradiating the drainage ditch to sterilize and disinfect the drainage ditch.
2. The solar ultraviolet disinfection device according to claim 1, wherein
the disinfection assembly comprises a disinfection box, the disinfection box is fixed to the housing, the solar charging power supplies are covered on the disinfection box, and the sterilization lamp is provided in the disinfection box.
3. The solar ultraviolet disinfection device according to claim 2, wherein
the disinfection box comprises a box body and a fixing plate, the box body is connected to the housing, the fixing plate is connected to the box body, the fixing plate is provided with an opening, and the sterilization lamp is fixed at the opening.
4. The solar ultraviolet disinfection device according to claim 3, wherein
the disinfection box comprises a locking member and a connecting member, two ends of the connecting member are respectively connected to the box body and the housing, and the locking member is connected to the fixing plate and the box body to enable the fixing plate to be detachably connected to the box body.
5. The solar ultraviolet disinfection device according to claim 4, wherein
the locking member comprises a bolt and a nut, the fixing plate is provided with a first through hole, the connecting member is provided with a second through hole, and the bolt is screwed to the nut after passing through the first through hole and the second through hole.
6. The solar ultraviolet disinfection device according to any one of claims 1-5, wherein
the disinfection assembly further comprises a timer, the timer is provided on the solar charging power supplies, and the timer is used for switching on or switching off the ultraviolet sterilization lamp.
7. The solar ultraviolet disinfection device according to claim 4, wherein
the housing is provided with a filling shell, and another end of the connecting member is fixed to the filling shell; and
the solar ultraviolet disinfection device further comprises a filling member, and the filling

member is fixed in the filling shell.

8. The solar ultraviolet disinfection device according to any one of claims 1-5, wherein the housing is provided with a drainage notch.

9. The solar ultraviolet disinfection device according to claim 7, wherein the solar ultraviolet disinfection device further comprises a supporting member, the supporting member is fixed to the filling shell, and the supporting member is used for being supported at a groove bottom of a groove of the drainage ditch.

10. A drainage cover plate, comprising the solar ultraviolet disinfection device according to any one of claims 1-9.