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(54) **BURIED SWIMMING POOL AND METHOD FOR INSTALLING THEREOF**

(57) Buried swimming pool, comprising a swimming pool body (10) and a device storage chamber (20), wherein the device storage chamber is fixedly connected to the swimming pool body; and a maintenance entrance (21) is arranged at a top end of the device storage chamber, and a maintenance door (30) is mounted at the maintenance entrance. By arranging a device storage chamber fixedly connected to a swimming pool body and providing a maintenance entrance on the device storage chamber, electrical components of the swimming pool can all be placed in the device storage chamber, such that when maintenance is needed, maintenance personnel can enter the device storage chamber from the maintenance entrance, which is convenient for maintenance.

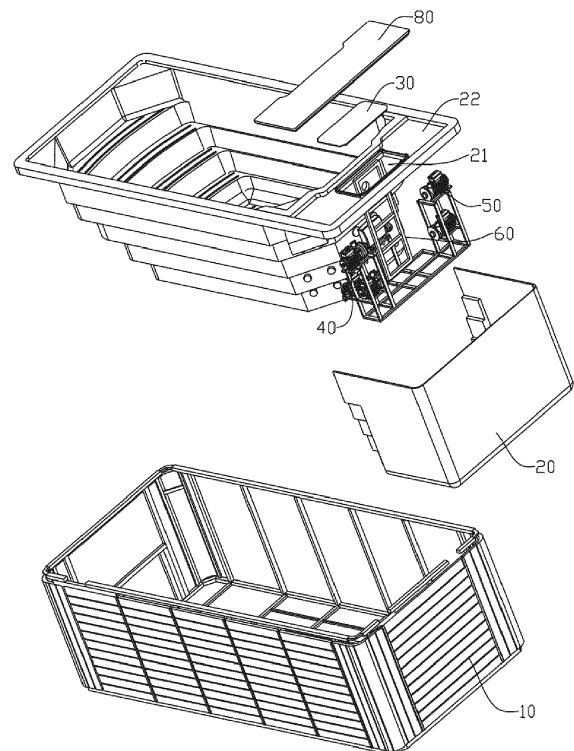


Fig. 2

EP 3 617 425 A1

Description

Technical Field

[0001] The present invention relates to a swimming pool, and in particular to a directly-buried movable swimming pool and a method for installing same.

Background Art

[0002] At present, traditional movable swimming pools usually use a ground-embedded installation method, that is, excavating a pit to complete the installation of the movable swimming pool. However, since none of the existing movable swimming pools is provided with a waterproof structure for waterproof protection of electrical components thereof, and the pit also serves as the waterproof structure of the electrical components at this time, this method leads to the following problems:

(1) there is a need to perform waterproofing and reinforcement operations on a pit wall of the pit after the completion of the excavation of the pit, and there is also a need to arrange a drainage groove in the pit, thereby resulting in complex program installation and high costs; and

(2) when the electrical components need to be maintained, maintenance can be performed only by chiselling out the pit and entering the pit, thereby making it inconvenient for maintenance.

Summary of the Invention

[0003] In order to overcome the deficiencies in the prior art, a first objective of the present invention is to provide a directly-buried movable swimming pool, which can achieve the storage and waterproofing of electrical components, simplify the installation steps and facilitate the maintenance of the electrical components.

[0004] A second objective of the present invention is to provide a method for installing a directly-buried movable swimming pool.

[0005] The first objective of the present invention is implemented using the following technical solution: a directly-buried movable swimming pool, comprising a swimming pool body and a device storage chamber, wherein the device storage chamber is fixedly connected to the swimming pool body; and a maintenance entrance is arranged at a top end of the device storage chamber, and a maintenance door is mounted at the maintenance entrance.

[0006] Further, a top wall of the device storage chamber is downwardly recessed to form a water reservoir; and the water reservoir is in communication with the swimming pool body.

[0007] Further, the directly-buried movable swimming pool further comprises a water circulation mechanism for causing a circulating flow of water inside the swimming

pool body.

[0008] Further, the water circulation mechanism comprises a first water pump, and the swimming pool body is provided with a water return port and a water injection port; and an input end of the first water pump is in communication with the water return port, and an output end of the first water pump is in communication with the water injection port.

[0009] Further, a water pumping mechanism is arranged in the device storage chamber for pumping water from the device storage chamber.

[0010] Further, the water pumping mechanism comprises a second water pump, a water inlet end of the second water pump is in communication with a bottom end inside the device storage chamber, and a water outlet end of the second water pump is in communication with the outside.

[0011] Further, a water-level detection level is provided in the device storage chamber; and the directly-buried movable swimming pool further comprises a power-off protection apparatus which comprises a water-level detection probe, a controller, a first electronic switch, a second electronic switch, a warning light and a power supply unit, wherein the water-level detection probe is used for sending a signal to the controller when detecting that there is water at the water-level detection level; the controller is used for switching on the first electronic switch and switching off the second electronic switch when receiving the signal; the first electronic switch is used for controlling the connection and disconnection of the warning light to/from an external power source; the second electronic switch is used for controlling the connection and disconnection of the power supply unit to/from the external power source; and the power supply unit is used for supplying power to the water circulation mechanism.

[0012] Further, the water pumping mechanism is connected to the external power source via the warning light.

[0013] The second objective of the present invention is implemented using the following technical solution:

a method for installing a directly-buried movable swimming pool, comprising the steps of:

a pit excavation step: excavating a pit on the land, and making both the length and width of the pit greater than the length and width of the directly-buried movable swimming pool, respectively, and making the height of the pit less than that of the directly-buried movable swimming pool;

a directly-buried movable swimming pool placement step: placing the directly-buried movable swimming pool into the pit; and

a soil filling step: after the directly-buried movable swimming pool placement step, filling gaps between the pit and the directly-buried movable swimming pool with soil.

[0014] Further, fixing a plurality of horizontal piles in the pit prior to the directly-buried movable swimming pool placement step; and then, in the directly-buried movable swimming pool placement step, fixedly connecting the directly-buried movable swimming pool to the horizontal piles after the directly-buried movable swimming pool is placed into in the pit.

[0015] Compared with the prior art, the beneficial effects of the present invention lie in that:

In the present invention, by arranging a device storage chamber fixedly connected to a swimming pool body and providing a maintenance entrance on the device storage chamber, electrical components of the directly-buried movable swimming pool can all be placed in the device storage chamber, such that when maintenance is needed, maintenance personnel can enter the device storage chamber from the maintenance entrance, which is convenient for maintenance.

[0016] In addition, since the device storage chamber and the maintenance door are arranged to realize the waterproofing of the electrical components, during installation, this directly-buried movable swimming pool can be directly placed into the pit without needing waterproofing and reinforcement operations on the pit or without needing an operation of arranging a drainage groove, thereby simplifying the installation steps.

Brief Description of the Drawings

[0017]

Fig. 1 is a schematic structural diagram of a directly-buried movable swimming pool of the present invention;

Fig. 2 is an exploded view of the directly-buried movable swimming pool of the present invention; and

Fig. 3 is a schematic structural diagram of a circuit of a power-off protection apparatus of the present invention.

[0018] In the drawings: 10. Swimming pool body; 11. Side wall of swimming pool body; 20. Device storage chamber; 21. Maintenance entrance; 22. Water reservoir; 30. Maintenance door; 40. Water pumping mechanism; 50. Water circulation mechanism; 60. Ladder; 70. Frame; 80. Waterproof cover.

Detailed Description of Embodiments

[0019] The present invention will be further described below with reference to the accompanying drawings and specific embodiments. It should be noted that, on the premise of no conflict, new embodiments may be formed in any combination among the embodiments or among the technical features described below.

[0020] A directly-buried movable swimming pool, as shown in Figs. 1 and 2, comprises a swimming pool body 10 and a device storage chamber 20. The device storage

chamber 20 is fixed on the swimming pool body 10 by means of screwing, adhesion, etc., wherein the device storage chamber 20 may be a container with an inner cavity, the container may be a barrel, a tank, etc., and the device storage chamber 20 can prevent an external liquid from entering the container. A maintenance entrance 21 is arranged at a top end of the device storage chamber 20, and the maintenance entrance 21 is sized for allowing entry and exit of maintenance personnel. A maintenance door 30 is mounted at the maintenance entrance 21, such that the entry into the device storage chamber 20 can be achieved by opening the maintenance door 30, and the possibility of ingress of water into the device storage chamber 20 can be reduced by closing the maintenance door 30.

[0021] On the basis of the above-mentioned structure, by arranging the device storage chamber 20 and arranging the maintenance entrance 21 at the top end of the device storage chamber 20, electrical components of this directly-buried movable swimming pool can all be placed in the device storage chamber 20, such that when maintenance is needed, maintenance personnel entering the device storage chamber 20 from the maintenance entrance 21 only needs to open the maintenance door 30 so as to perform maintenance, without dismantling external components, thereby simplifying the operations, which is convenient for maintenance.

[0022] In addition, since the device storage chamber 20 and the maintenance door 30 are arranged to realize the waterproofing of the electrical components, during installation, this directly-buried movable swimming pool can be directly placed into the pit without needing waterproofing and reinforcement operations on the pit or without needing an operation of arranging a drainage groove, thereby simplifying the installation steps.

[0023] It should be noted here that "directly-buried" described above means that there is no need to perform reinforcement and other operations on the pit after the completion of pit excavation, and this directly-buried movable swimming pool can be directly placed into the pit.

[0024] Further, a top wall of the device storage chamber 20 is downwardly recessed to form a water reservoir 22, and the water reservoir 22 is in communication with the swimming pool body 10, such that during precipitation in the outside or when water is splashed from the swimming pool body 10, the water enters the interior of the water reservoir 22 and is contained in the water reservoir 22, which is horizontal relative to the top wall of the device storage chamber 20, the water can be prevented from sliding on the top wall of the device storage chamber 20 to enter the device storage chamber 20 through the maintenance entrance 21, and the water entering the water reservoir 22 can be drained into the swimming pool body 10, so as to realize immediate drainage, thereby preventing the accumulation of water in the water reservoir 22. It should be noted here that the water reservoir 22 and the swimming pool body 10 mentioned above can be in

communication with the swimming pool body 10 via a pipeline such as a metallic hose, a plastic tube, and a steel tube. If the metallic hose is used, two ends of the metallic hose are respectively inserted into the water reservoir 22 and the swimming pool body 10 to make same in communication with each other.

[0025] In order to facilitate the entry of the maintenance personnel into the device storage chamber 20, preferably, a ladder 60 is arranged in the device storage chamber 20, such that the maintenance personnel can enter the device storage chamber 20 from the maintenance entrance 21 via the ladder 60. The ladder 60 may be an existing vertical ladder, or may be an existing retractable and foldable ladder 60.

[0026] This directly-buried movable swimming pool further comprises a water circulation mechanism 50. The water circulation mechanism 50 is used for causing a circulating flow of water inside the swimming pool body 10, such that during the circulating flow of the water, a massaging effect is generated due to the gentle impact of power of the water flow on a human body. It should be noted here that the above-mentioned circulating flow means the alternation of positions between bodies of water inside the swimming pool body 10, such as the water being from the left side of the swimming pool to the right side of the swimming pool, or the water being from the bottom end of the swimming pool to the top end of the swimming pool.

[0027] The following embodiments can be used for the above-mentioned water circulation mechanism 50. Embodiment I: the water circulation mechanism 50 comprises a rotating motor and a stirring shaft, with an output end of the rotating motor being in transmission connection with the stirring shaft, and the stirring shaft penetrating, in a sealed manner, a side wall 11 of the swimming pool body to stretch into the swimming pool body 10, such that the stirring shaft stirs the water inside the swimming pool body 10 by means of the rotating motor driving the rotation of the stirring shaft, so as to realize water circulation. However, in this embodiment, the space available for people in the swimming pool body 10 is reduced due to the occupation of a certain space by the stirring shaft, and the stirring shaft is easily damaged by people accidentally. Embodiment II: the water circulation mechanism 50 comprises an air cylinder and a push plate, the push plate being arranged inside the swimming pool body 10; and a telescopic rod of the air cylinder penetrates, in a sealed manner, a side wall 11 of the swimming pool body and is in transmission connection with the telescopic rod, such that the water inside the swimming pool body 10 is pushed by means of the movement of the push plate driven by the telescoping of the telescopic rod of the air cylinder, so as to realize water circulation. However, this structure causes the components inside the device storage chamber 20 to be destroyed due to the easy entry of moisture on the telescopic rod of the air cylinder into the device storage chamber 20.

[0028] Further, a water pumping mechanism 40 is arranged in the device storage chamber 20, and the water pumping mechanism 40 is used for pumping water from the device storage chamber 20, so as to dry the interior of the device storage chamber 20, thereby preventing a water source from damaging the components in the device storage chamber 20. In addition, the cooperation of the device storage chamber 20, the maintenance door 30 and the water pumping mechanism 40 can make the electrical components waterproof, and thus implement the installation step of installing this directly-buried movable swimming pool, thereby saving on the cost.

[0029] On the basis of the multiple embodiments of the water circulation mechanism 50 above, in order to overcome the above-mentioned problems, the following preferred embodiment of the water circulation mechanism 50 in this embodiment is that the water circulation mechanism 50 comprises a first water pump, and the swimming pool body 10 is provided with a water return port and a water injection port; and an input end of the first water pump is in communication with the water return port, and an output end of the first water pump is in communication with the water injection port. As such, by turning on the first water pump, the first water pump pumps water from the swimming pool body 10 via the water return port, and re-injects the water into the swimming pool body 10 from the water injection port, so as to realize water circulation. With regard to the above-mentioned structure, there is a need to arrange a stirring shaft or a push plate in the swimming pool body 10, and the water inside the swimming pool body 10 can be prevented from being retained inside the device storage chamber 20. It should be noted here that the input end of the first water pump and the output end of the first water pump mentioned above may be respectively in communication with the water return port or the water injection port via a metallic hose, a plastic tube, a steel tube, etc. In addition, the first water pump is an existing component, and the circuit connection relationship and power source control mode thereof are both known to a person skilled in the art from common general knowledge, which will not be repeated here.

[0030] The following two embodiments can be used for the above-mentioned water pumping mechanism 40. Embodiment I: the water pumping mechanism 40 comprises a water storage barrel, a piston arranged in the water storage barrel, and an air cylinder for driving the piston to move up and down, wherein a bottom end of the water storage barrel is formed as a water injection port, and the water injection port is located at the bottom end of the device storage chamber 20. As such, the piston is pushed to the bottom end of the water storage barrel by using a telescopic rod of the air cylinder, and then the piston is driven to move upwards, such that the water can be pumped. However, with regard to the above-mentioned structure, there is a need to regularly drain water from the water storage barrel. Embodiment II: the water pumping mechanism 40 comprises a water storage bar-

rel, a piston arranged in the water storage barrel, and a linear motor for driving the piston to move up and down.

[0031] The following preferred embodiment of the water pumping mechanism 40 in this embodiment is that the water pumping mechanism 40 comprises a second water pump, a water inlet end of the second water pump is in communication with a bottom end inside the device storage chamber 20, and a water outlet end of the second water pump is in communication with the outside. As such, by starting the second water pump, the water is pumped from the device storage chamber 20 by means of the water inlet end of the second water pump, and is drained through the water outlet end of the second water pump, and only the second water pump needs to be arranged, such that the structure is simplified and regular water drainage is not needed.

[0032] In order to protect the swimming pool body 10 and the device storage chamber 20, preferably, this directly-buried movable swimming pool further comprises a frame 70, and the swimming pool body 10 and the device storage chamber 20 are both located in the frame 70. In addition, in order to simplify this easy-to-maintain swimming pool, an installation hole is arranged on the frame 70, and the installation is implemented only by means of a rod portion of an external screw passing through the installation hole and being fixed to the outside.

[0033] In order to facilitate the entry of people into the swimming pool body 10, preferably, a side wall 11 of the swimming pool body is step-shaped, and the step shape is not easy to deform with respect to a plane and is stronger.

[0034] Further, this directly-buried movable swimming pool further comprises a waterproof cover 80 for covering the top end of the device storage chamber 20 in a sealed manner, the waterproof cover 80 has a further waterproofing function, and the waterproof cover 80 may be a glass waterproof cover 80.

[0035] For the sake of usage safety, as shown in Fig. 3, preferably, a water-level detection level is provided in the device storage chamber 20; and this directly-buried movable swimming pool further comprises a power-off protection apparatus, which comprises a water-level detection probe, a controller, a first electronic switch, a second electronic switch, a warning light and a power supply unit, wherein the water-level detection probe is used for sending a signal to the controller when detecting that there is water at the water-level detection level; the controller is used for switching on the first electronic switch and switching off the second electronic switch when receiving the signal; the first electronic switch is used for controlling the connection and disconnection of the warning light to/from an external power source; the second electronic switch is used for controlling the connection and disconnection of the power supply unit to/from the external power source; and the power supply unit is used for supplying power for the water circulation mechanism 50.

[0036] On the basis of the above-mentioned structure, in a normal usage state, that is to say, when water is not detected by the water-level detection probe, the first electronic switch is switched off and the warning light is disconnected from the external power source, and at this time, the warning light is unlit; at the same time, the second electronic switch is switched on, the power supply unit is connected to the external power source, the power supply unit supplies power to the water circulation mechanism 50, and the water circulation mechanism 50 operates normally. However, when water enters the device storage chamber 20, and the water rises to the water-level detection level, the water-level detection probe sends a signal to the controller when detecting the water; the controller switches on the first electronic switch when receiving the signal, at this time, the warning light is connected to the external power source, and the warning light is lit, so as to inform people of a risk here; and at the same time, the controller switches off the second electronic switch, the power supply unit is disconnected from the external power source, the power supply unit stops supplying power to the water circulation mechanism 50, and the water circulation mechanism 50 stops operating, so as to protect the water circulation mechanism 50, etc., and people.

[0037] Furthermore, the water pumping mechanism 40 is connected to the external power source via the warning light, such that when the warning light is lit, that is to say, the warning light is connected to the external power source, the water pumping mechanism 40 is connected to the external power source via the warning light, and the water pumping mechanism 40 is started to pump water from the device storage chamber 20, so as to realize automation.

[0038] The water-level detection probe, the controller, the first electronic switch, the second electronic switch, the warning light and the power supply unit mentioned above are all the existing components, wherein the controller mentioned above may be a small-sized intelligent water-level detection controller, a working power supply and the consumed power thereof are respectively AC 220V and 2W, and a usage environment thereof is at -10°C- 50°C. A current capacity of an output contact has a resistive load of 6A and an inductive load of 1A.

[0039] In addition, the first electronic switch may be an existing relay, the relay comprising a coil, and a normally open switch and a normally closed switch respectively mated with the coil, wherein the coil is connected to the controller, and the warning light is connected to the normally open switch; and the second electronic switch may also be an existing relay, the relay comprising a coil, and a normally open switch and a normally closed switch respectively mated with the coil, wherein the coil is connected to the controller, and the power supply unit is connected to the normally closed switch.

[0040] The present invention further discloses a method for installing the directly-buried movable swimming pool mentioned above, the method comprising:

a pit excavation step: excavating a pit on the land, and making both the length and width of the pit greater than the length and width of the directly-buried movable swimming pool, respectively, and making the height of the pit less than that of the directly-buried movable swimming pool;
 a directly-buried movable swimming pool placement step: placing the directly-buried movable swimming pool into the pit;
 a soil filling step: after the directly-buried movable swimming pool placement step, filling gaps between the pit and the directly-buried movable swimming pool with soil.

[0041] In the above-mentioned installation method, since the directly-buried movable swimming pool is provided with the device storage chamber 20 dedicated to store the electrical components of the directly-buried movable swimming pool and a maintenance door 30 to constitute a waterproof structure for the electrical components, with respect to the existing installation methods, there is no need to perform reinforcement and waterproofing operations on a pit wall of the pit, such that the installation process is simplified, and the installation cost is reduced.

[0042] In order to prevent the directly-buried movable swimming pool from tilting, etc., due to the loosening of soil in the pit during the entry of water into the pit, further driving a plurality of horizontal piles into the pit prior to the directly-buried movable swimming pool placement step; and then, in the directly-buried movable swimming pool placement step, fixedly connecting the directly-buried movable swimming pool to the horizontal piles after the directly-buried movable swimming pool is placed into the pit. As such, by deeply driving the horizontal piles into the land, because of a limited permeability of water, moisture cannot penetrate into a too deep position in the land during the entry of water into the pit, so as to ensure the fastness of the horizontal piles; in addition, the fixing of the directly-buried movable swimming pool on the horizontal piles can prevent this directly-buried movable swimming pool from tilting, etc.

[0043] The above-mentioned embodiments are merely preferred embodiments of the present invention and may not be used to limit the scope of protection of the present invention, and all the non-substantive changes and substitutions made by a person skilled in the art on the basis of the present invention fall within the scope of protection of the present invention.

Claims

1. A directly-buried movable swimming pool, **characterized by** comprising a swimming pool body and a device storage chamber, wherein the device storage chamber is fixedly connected to the swimming pool body; and a maintenance entrance is arranged at a

top end of the device storage chamber, and a maintenance door is mounted at the maintenance entrance.

2. The directly-buried movable swimming pool of claim 1, **characterized in that** a top wall of the device storage chamber is downwardly recessed to form a water reservoir; and the water reservoir is in communication with the swimming pool body.
3. The directly-buried movable swimming pool of claim 1, **characterized in that** the directly-buried movable swimming pool further comprises a water circulation mechanism for causing a circulating flow of water inside the swimming pool body.
4. The directly-buried movable swimming pool of claim 3, **characterized in that** the water circulation mechanism comprises a first water pump, and the swimming pool body is provided with a water return port and a water injection port; and an input end of the first water pump is in communication with the water return port, and an output end of the first water pump is in communication with the water injection port.
5. The directly-buried movable swimming pool of claim 3, **characterized in that** a water pumping mechanism is arranged in the device storage chamber for pumping water from the device storage chamber.
6. The directly-buried movable swimming pool of claim 5, **characterized in that** the water pumping mechanism comprises a second water pump, a water inlet end of the second water pump is in communication with a bottom end inside the device storage chamber, and a water outlet end of the second water pump is in communication with the outside.
7. The directly-buried movable swimming pool of claim 5, **characterized in that** a water-level detection level is provided in the device storage chamber; and the directly-buried movable swimming pool further comprises a power-down protection apparatus which comprises a water-level detection probe, a controller, a first electronic switch, a second electronic switch, a warning light and a power supply unit, wherein the water-level detection probe is used for sending a signal to the controller when detecting that there is water at the water-level detection level; the controller is used for switching on the first electronic switch and switching off the second electronic switch when receiving the signal; the first electronic switch is used for controlling the connection and disconnection of the warning light to/from an external power source; the second electronic switch is used for controlling the connection and disconnection of the power supply unit to/from the external power source; and the power supply unit is used for supplying power to

the water circulation mechanism.

8. The directly-buried movable swimming pool of claim 7, **characterized in that** the water pumping mechanism is connected to the external power source via the warning light. 5

9. A method for installing a directly-buried movable swimming pool, **characterized by** comprising: 10
 - a pit excavation step: excavating a pit on the land, and making both the length and width of the pit greater than the length and width of the directly-buried movable swimming pool, respectively, and making the height of the pit less than that of the directly-buried movable swimming pool; 15
 - a directly-buried movable swimming pool placement step: placing the directly-buried movable swimming pool into the pit; and 20
 - a soil filling step: after the directly-buried movable swimming pool placement step, filling gaps between the pit and the directly-buried movable swimming pool with soil. 25

10. The method for installing a directly-buried movable swimming pool of claim 9, **characterized in that** driving a plurality of horizontal piles into the pit prior to the directly-buried movable swimming pool placement step; and then, in the directly-buried movable swimming pool placement step, fixedly connecting the directly-buried movable swimming pool to the horizontal piles after the directly-buried movable swimming pool is placed into in the pit. 30 35

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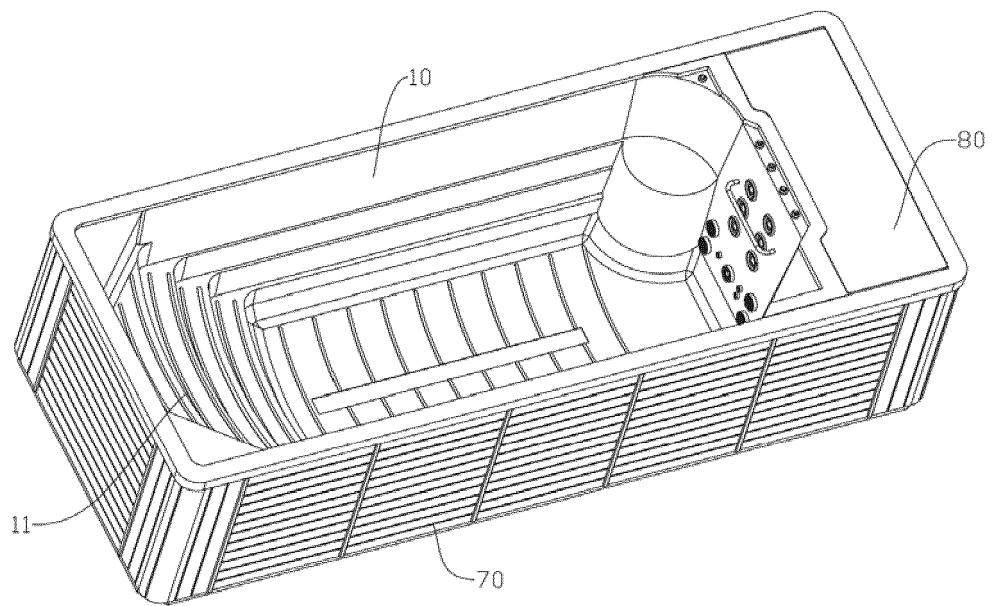


Fig. 1

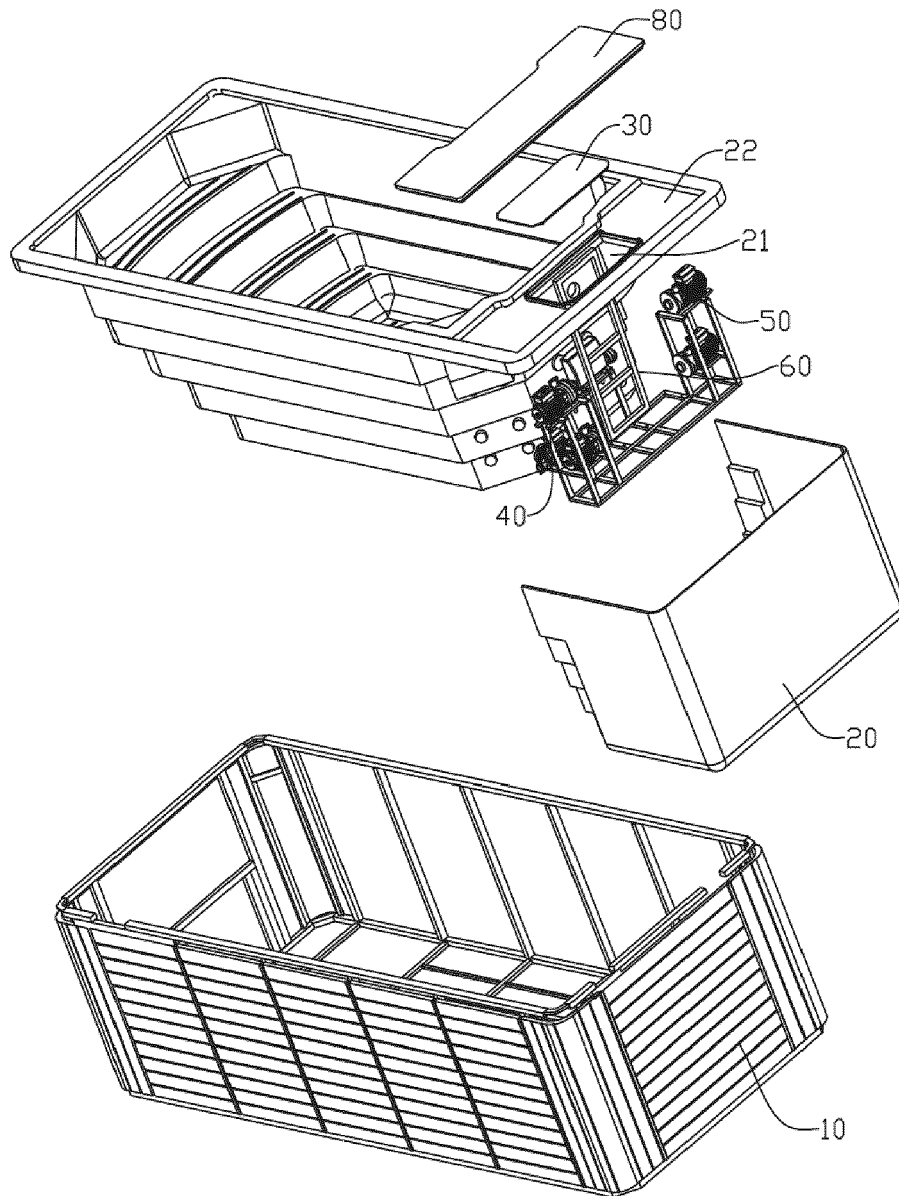


Fig. 2

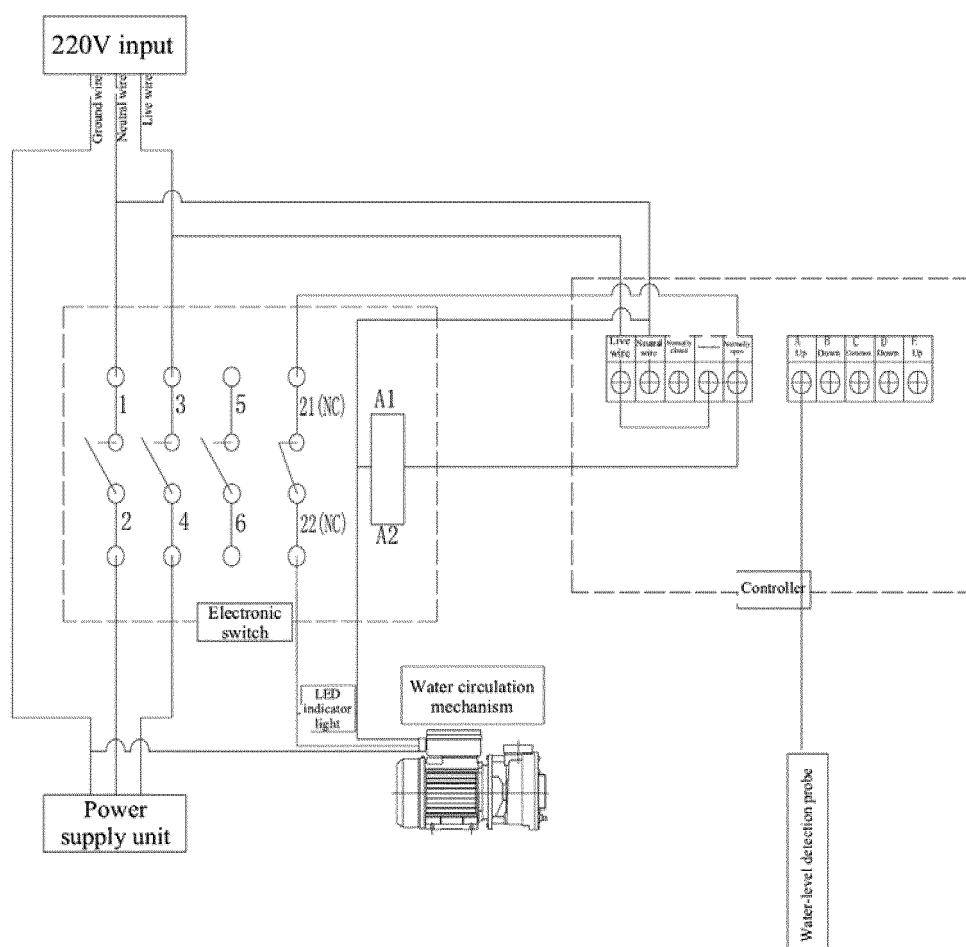


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 18 19 9244

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		8 April 2019	Decker, Robert
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 18 19 9244

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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