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(54) Water circulating apparatus and method for a swimming pool

(57) A water circulating apparatus and method for using in a built swimming pool or a swimming pool during building. The apparatus includes: a container disposed in the swimming pool and the container has a water outlet and a water inlet respectively on a front end and a rear end, the water outlet and inlet are under the water level in the swimming pool, and a water circulation actuating mechanism provided on the front end of the container for pushing and lifting water from the front end of the container and controlling flow rate of water to flow out from the water outlet to the other end of the swimming pool, and to cause the water in the rear end of the swimming pool to flow into the container from the water inlet, and to flow toward the water outlet through the container, thus effecting water circulation in the swimming pool.

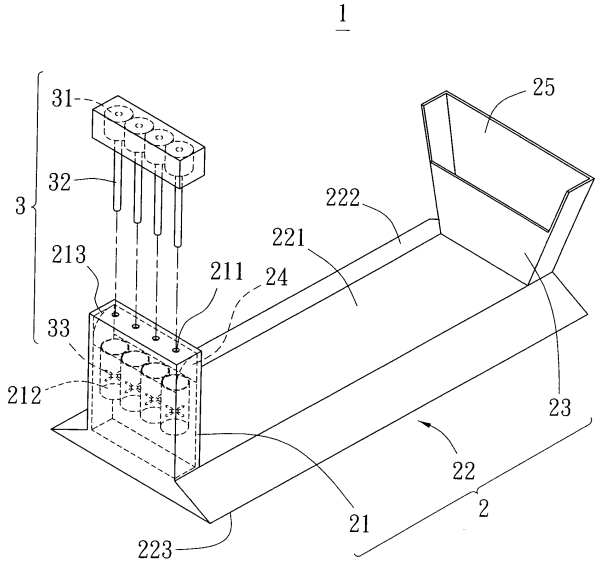

Fig. 2

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Description

BACKGROUND OF THE INVENTION

1. Field of the invention

[0001] The present invention relates to a water circulating system for a swimming pool, and more particularly to a water circulating apparatus and method for using in a built swimming pool or a swimming pool during building, so that a circulating water flow is actuated in the swimming pool for swimmers to swim in the certain fixed spot. The apparatus and the method are applicable to a small swimming pool.

2. Description of the prior art

[0002] Continuous type swimming pools have been existed for a long time. As shown in Fig. 12, a U.S. patent (No. 1,731,554) provided by M.I. Wheeler in 1927 has mainly a swimming pool apparatus A that is existed alone and is suitable for using in a small space, wherein water is driven by a water circulating system A1 installed on the bottom of the swimming pool apparatus A to cause water to circulate around in the swimming pool apparatus A, so that a swimmer can swim in the swimming pool apparatus A in a certain fixed spot. Besides, as shown in Fig. 13, a U.S. patent (No. 2,035,835) provided by H. Raber in 1934 is used for a small space as the U.S. patent of M.I. Wheeler, but the former structure is a simplified one so as to lower cost. The above two inventions are both existed alone so they are unable to be disposed in a built swimming pool.

[0003] As shown in Fig. 14, a German patent (No. 2,222,594) mainly utilizes the idea of water circulation in a swimming pool B, wherein a water circulating system B1 is installed integrally with the swimming pool B during building the swimming pool. Installation of the water circulating system B1 must be operated by professional technicians so as to prohibit the possible leakage of water or electricity, and it makes the cost of installation exorbitant. After installation, the water circulating system B1 is unable to be removed without any damage against the swimming pool. Thereby, the use of the water circulating system B1 is short of flexibility.

[0004] There are plenty of swimming pools nowadays where the exercise effect will be decreased if the length of the swimming pools is insufficient. Furthermore, the swimming pools will need to be rebuilt if they are installed with the above water circulating systems and it is not economic.

[0005] In view of the above defects, a water circulating system shall be improved not only to have an effect of water circulating, but also to be adapted for installation and use in any of swimming pools of different lengths. In addition, it can be installed and detached flexibly and cheaply.

SUMMARY OF THE INVENTION

[0006] The primary objective of the present invention is to provide a water circulating apparatus for using in a built swimming pool, wherein a container and a water circulation actuating mechanism are provided and a circulating water flow is actuated in the swimming pool for swimmers to swim.

[0007] The second objective of the present invention is to provide a water circulating apparatus for using in a built swimming pool, wherein a container and a water circulation actuating mechanism are detachably disposed in swimming pools of various forms and sizes and the water circulating apparatus thus can be installed and detached flexibly and cheaply.

[0008] Another objective of the present invention is to provide a water circulating apparatus for using in a swimming pool, wherein the rate of the water circulation is adjustable so that swimmers can obtain different exercise effects and achieve their goals.

[0009] In order to achieve the above objectives, a water circulating apparatus according to the present invention includes a container and a water circulation actuating mechanism. The container is disposed in the swimming pool and has a water outlet and a water inlet respectively on a front end and a rear end of the swimming pool, and the water outlet and the water inlet are under the water level of the swimming pool. The water circulation actuating mechanism is provided on the front end of the container for pushing and lifting water from the front end of the container and controlling flow rate of water to flow out from the water outlet to the other end of the swimming pool, and to cause the water in the rear end of the swimming pool to flow into the container from the water inlet, and to flow toward the water outlet through the container, thus effecting water circulation in the swimming pool.

[0010] The container can include a bottom case, a front case and a rear case extended upwards respectively from two ends of the bottom case, wherein the bottom case, front case and rear case are communicated with each other. The water outlet is formed on the top of the inner side of the front case, and the water inlet is formed on the top of the inner side of the rear case. The position of the water outlet of the front case is higher than that of the water inlet of the rear case, and the width of the water outlet of the front case is narrower than that of the water inlet of the rear case.

[0011] The above stated water circulation actuating mechanism can include at least one electric motor, a plurality of gearing members and a plurality of turbine vane sets for pushing and lifting water from the bottom case and discharging the water out of the water outlet. The electric motor can be disposed outside or inside the front case.

[0012] In practicing the present invention, the container can be attached to and circle the inner peripheries of the swimming pool. The water circulation actuating mechanism can be composed of an air blower and a plu-

rality of nozzles piped with the air blower.

[0013] Moreover, the present invention further provides with a detector in electric connection with the water circulation actuating mechanism to detect the speed of a swimmer and to relatively adjust the output power of the water-circulation actuating mechanism so as to control the flow rate of water in the swimming pool.

[0014] The present invention will be apparent after reading the detailed description of the preferred embodiment thereof in reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is a flow chart of the method of water circulation of the present invention for using in a built swimming pool;

Fig. 2 is an exploded perspective view of the first preferred embodiment for the water circulation apparatus of the present invention;

Fig. 3 is a sectional view showing the first embodiment of the present invention installed in a built swimming pool;

Fig. 4 is a sectional view showing the first embodiment of the present invention installed in a swimming pool during building;

Fig. 5 is a sectional schematic view showing the actuation of water circulation in the first embodiment of the present invention;

Fig. 6 is a schematic top view showing the actuation of water circulation in the first embodiment of the present invention;

Fig. 7 is a schematic view showing the use of the first embodiment of the present invention;

Fig. 8 is a schematic view showing the use of the first embodiment of the present invention, wherein the water circulation actuating mechanism is of a jet air power type;

Fig. 9 is a partial sectional view showing that a plurality of guiding tubes in the first embodiment of the present invention are divided into a front guiding tube group and a rear guiding tube group;

Fig. 10 is a schematic top view showing that the guiding tubes of the first embodiment of the present invention are divided into the front guiding tube group and the rear guiding tube group;

Fig. 11 is a schematic top view showing the actuation of water circulation of the second embodiment of the present invention;

Fig. 12 is a sectional view of a U.S. invention with the patent No. 1,731,554;

Fig. 13 is a schematic view showing the use of a U.S. invention with the patent No. 2,035,835; and

Fig. 14 is a schematic view showing the use of a German invention with the patent No. 2,222,594.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Referring firstly to Fig. 1, there is showing a flow chart of a preferred embodiment of the method of water circulation of the present invention. The method can be used in a built swimming pool or a swimming pool during building. The method includes the following steps:

a. providing a container in a swimming pool, wherein the container has a water outlet and a water inlet respectively on its front end and rear end, and the water outlet and the inlet are under the water level of the swimming pool, and

b. providing a water circulation actuating mechanism on the front end of the container for pushing and lifting water from the front end of the container and controlling flow rate of water to flow out from the water outlet to the other end of the swimming pool, and to cause the water in the rear end of the swimming pool to flow into the container from the water inlet of the container, and to flow toward the water outlet through the container, thus effecting water circulation in the swimming pool.

[0017] Referring to Fig. 2 and 3, the first embodiment of a water circulation apparatus 1 of the present invention is for using in a built swimming pool 9 or a swimming pool during building (as shown in Fig. 4), and it includes a container 2 disposed in the swimming pool 9 and a water circulation actuating mechanism 3.

[0018] In the first embodiment, the container 2 is in the form of a U-shaped plate structure and includes a bottom case 22, a front case 21 and a rear case 23 extended upwards respectively from two ends of the bottom case 22, wherein the bottom case 22, front case 21 and rear case 23 are communicated with each other. On the top of the front case 21 is a panel having a plurality of through holes 211 extending vertically. The inner side of the front case 21 has a plurality of round guiding tubes 212 that are disposed thereon with a curved guiding plate 213 and the curved guiding plate 213 can be an inclined plane plate. On the top of the inner side of the front case 21 is an opening as a water outlet 24 and the opening is rectangular and faces to the opening of the rear case 23. Two lateral sides of a top surface 221 of the bottom case 22 incline and flare downwards to form two mutually opposite bevel surfaces 222 and a bottom surface 223 with a large area, so that the bottom case 22 can be stably disposed in the swimming pool 9. The rear case 23 is disposed on its top end and inner side with a notch facing upwards to the front case 21 as a water inlet 25. The water outlet 24 and the water inlet 25 can be a plurality of openings without limitation on their shapes. Furthermore, in a preferred embodiment, the position of the water outlet 24 of the front case 21 is higher than that of the water inlet 25 of the rear case 23, and the width of the water outlet 24 of the front case 21 is higher than that of

the water inlet 25 of the rear case 23.

[0019] The water circulation actuating mechanism 3 is provided on the front end of the container 2 and includes at least one electric motor 31, a plurality of gearing members 32 and a plurality of turbine vane sets 33. The electric motor 31 is adjustable to switch to different rotation rates. The gearing members 32 can include a rotation rod and the through holes 211 on the top panel of the front case 21 that are respectively linked up with the turbine vane sets 33. In this embodiment, the turbine vane sets 33 are disposed inside the front case 21, and the electric motor 31 is disposed on the top of the front case 21. When in practicing, the electric motor 31 can also be an immersed type that has a waterproof function, and installed together with the gearing members 32 and the turbine vane sets 33 in the front case 21.

[0020] Referring to Fig. 5 and 6, there are schematic views showing the state of water circulation of the first embodiment of the present invention, wherein when the container 2 of the present invention is provided in the built swimming pool 9, the water outlet 24 and the water inlet 25 of the container 2 are under the water level of the swimming pool, and the position of the water outlet 24 of the front case 21 is higher than that of the water inlet 25 of the rear case 23. When the electric motor 31 is linked up with the gearing members 32, it makes the turbine vane sets 33 at one end of the gearing members 32 start to rotate, and the water below the turbine vane sets 33 is driven and lifted. By the guidance of the round guiding tubes 212 enclosing the turbine vane sets 33 and the curved guiding plate 213 disposed inside of the front case 21, the water flows out from the water outlet 24 to the water inlet 25 horizontally. The flow rate of the water gradually reduces along the distance of flowing and water flows out in a sector shape and then into the water inlet 25 of the rear case 23. The water circulation is formed by the way of the inside flow passage 26 in the rear case 23 and the bottom case 22.

[0021] Referring to Fig. 6 and 7, when a swimmer swims in the swimming pool 9, the rotation rate of the electric motor 31 can be adjusted in accordance with the physical situation or the actual requirement of the swimmer to control the flow rate of the water so that the swimmer can swim nearly at the same spot and the exercise effect is equivalent to swimming in a large swimming pool by the way of the relative speed of the swimmer to the rate of the water circulation.

[0022] As to the adjustment of the flow rate of the water circulation in the swimming pool, the present invention can provide a certain water flow rate by setting any of different rotation rates of the electric motor 31 in advance or by means that, as shown in Fig. 6, the swimming pool 9 is installed on one of its lateral sides with a detector 4 and the detector 4 is electrically connected with the electric motor 31 of the water circulation actuating mechanism 3 to detect the speed of the swimmer relative to the water circulating rate. When the swimming speed of the swimmer is faster or slower than the flow rate of the water, the output power of the electric motor 31 is correspondingly adjusted so as to control the flow rate of the water in the swimming pool 9.

[0023] Referring to Fig. 8, there is a schematic view showing another use mode of the first embodiment of the present invention, wherein a water circulation actuating mechanism 5 includes an air blower 51 and a plurality of nozzles 52 piped with the air blower 51. The air blower 51 can be substituted by an air compressor or a pump able to actuate water flow with high rate. The nozzles 52 are disposed on an inner side of the front case 21 in the container 2 and the spraying mouths of the nozzles 52 face to the water inlet 25 of the rear case 23, thereby water in the front case 21 flows from the front case 21 to the rear case 23.

[0024] Referring further to Fig. 9 and 10, the round guiding tubes 212 disposed in the present invention can also be divided into a front guiding tube group 214 and a rear guiding tube group 215 and both are disposed thereon with the curved guiding plate 213, and the top end of the rear guiding tube group 215 is higher than that of the front guiding tube group 214. Thereby the circulating water flow forms two flowing paths and water flows into the two parallel flowing paths. Then water flows horizontally towards the water inlet 25 of the rear case 23 from the water outlet 24 of the front case 21.

[0025] Referring to Fig. 11, there shows the second embodiment of the present invention, wherein a container 6 is attached to and circle the inner peripheries of the swimming pool 9. The container 6 has a water outlet 61 and a water inlet 62 respectively on the front end and the rear end, and the water outlet 61 and the water inlet 62 are under the water level of the swimming pool 9. In this embodiment, the water circulation actuating mechanism 5 is preferably composed of an air blower 51 and a plurality of nozzles 52 piped with the air blower 51. The air blower 51 can be substituted by an air compressor or a pump that can actuate water flow with high rate so that the nozzles 52 can spray high pressure liquid to push and lift water from the front end of the container 6 and control flow rate of water to flow out from the water outlet 61 to the other end of the swimming pool 9, and to cause the water in the rear end of the swimming pool to flow into the container 6 from the water inlet 62, and to flow towards the water outlet 61 through the container, thus effecting water circulation in the swimming pool.

[0026] The present invention thereby has the following advantages:

1. The present invention is provided with a water circulation actuating mechanism with adjustable output power in accordance with the actual requirement of a swimmer to flexibly control the flow rate of the water.
2. The water circulation actuating mechanism and a container of the present invention can be directly installed in a built swimming pool and it is very simple and convenient for use.

3. The water circulation actuating mechanism and the container of the present invention can be detached without destroying the original structure of the swimming pool and it can largely save the cost of -detaching.
4. The present invention forms a circulating water flow between the water flowing channel in the container and the swimming pool. The power required is much less than that required by conventional large equipment for a continuous type swimming pool. Thus it is effective to save energy when swimming in the swimming pool of the present invention.

[0027] In conclusion, according to the description disclosed above, the present invention surely can achieve the expected objectives thereof to provide a water circulating apparatus and a method that can actuate water circulation and can be used in a built swimming pool with various lengths. Besides, the water circulating apparatus can be installed and detached flexibly and cheaply and is of industrial value.

Claims

1. A water circulating apparatus adapted for use in a small swimming pool, comprising:

a container, disposed in said swimming pool, having a water outlet and a water inlet respectively on its front end and its rear end, said water outlet and said water inlet being under the water level of said swimming pool; and
a water circulation actuating mechanism provided on a front end of said container for pushing and lifting water from the front end of said container and controlling flow rate of water to flow out from said water outlet to the other end of said swimming pool, and to cause the water in the rear end of the swimming pool to flow into said container from said water inlet of said container, and to flow toward said water outlet through the container, thus effecting water circulation in the swimming pool.

2. The water circulating apparatus as in claim 1, wherein said container includes a bottom case, a front case and a rear case extended upwards respectively from two ends of said bottom case, said bottom case, front case and rear case being communicated with each other, said water outlet being formed on the top of the inner side of said front case and said water inlet being formed on the top of the inner side of said rear case.

3. The water circulating apparatus as in claim 2, wherein the position of said water outlet of said front case is higher than that of said water inlet of said rear case.

4. The water circulating apparatus as in claim 2, wherein the width of said water outlet of said front case is narrower than that of said water inlet of said rear case.

5. The water circulating apparatus as in claim 2, wherein said water circulation actuating mechanism includes at least one electric motor, a plurality of gearing members and a plurality of turbine vane sets for pushing and lifting water from the front end of the bottom case and discharging said water out of said water outlet.

6. The water circulating apparatus as in claim 5, wherein said water circulation actuating mechanism further includes a plurality of guiding tubes, said guiding tubes enclose said turbine vane sets respectively.

7. The water circulating apparatus as in claim 6, wherein said guiding tubes are divided into a front guiding tube group and a rear guiding tube group, and the top end of said rear guiding tube group is higher than that of said front guiding tube group.

8. The water circulating apparatus as in claim 6, wherein said water circulation actuating mechanism further includes a guiding plate disposed on the top of said guiding tubes.

9. The water circulating apparatus as in claim 5, wherein said water circulation actuating mechanism is provided inside said front case.

10. The water circulating apparatus as in claim 5, wherein said turbine vane sets of said water circulation actuating mechanism are provided inside said front case, while said electric motor is disposed outside said front case.

11. The water circulating apparatus as in claim 1, wherein said container is attached to and circles the inner peripheries of said swimming pool.

12. The water circulating apparatus as in claim 1, wherein said water circulation actuating mechanism comprises an air blower and a plurality of nozzles piped with said air blower.

13. The water circulating apparatus as in claim 1, wherein said water circulating apparatus is provided with a detector in electric connection with said water circulation actuating mechanism to detect the speed of a swimmer for adjusting output power of said water circulation actuating mechanism to control flow rate of water in said swimming pool in response to the speed of the swimmer.

14. A water circulating method comprising the following

steps:

a. providing a container in a swimming pool, wherein said container has a water outlet and a water inlet respectively on the front end and the real end of the swimming pool, and said water outlet and said water inlet are under water level of said swimming pool; and

b. providing a water circulation actuating mechanism on the front end of said container for pushing and lifting water from the front end of said container and controlling flow rate of water to flow out from said water outlet to the other end of said swimming pool, and to cause the water in the rear end of the swimming pool to flow into said container from said water inlet of said container, and to flow toward said water outlet through the container, thus effecting water circulation in the swimming pool.

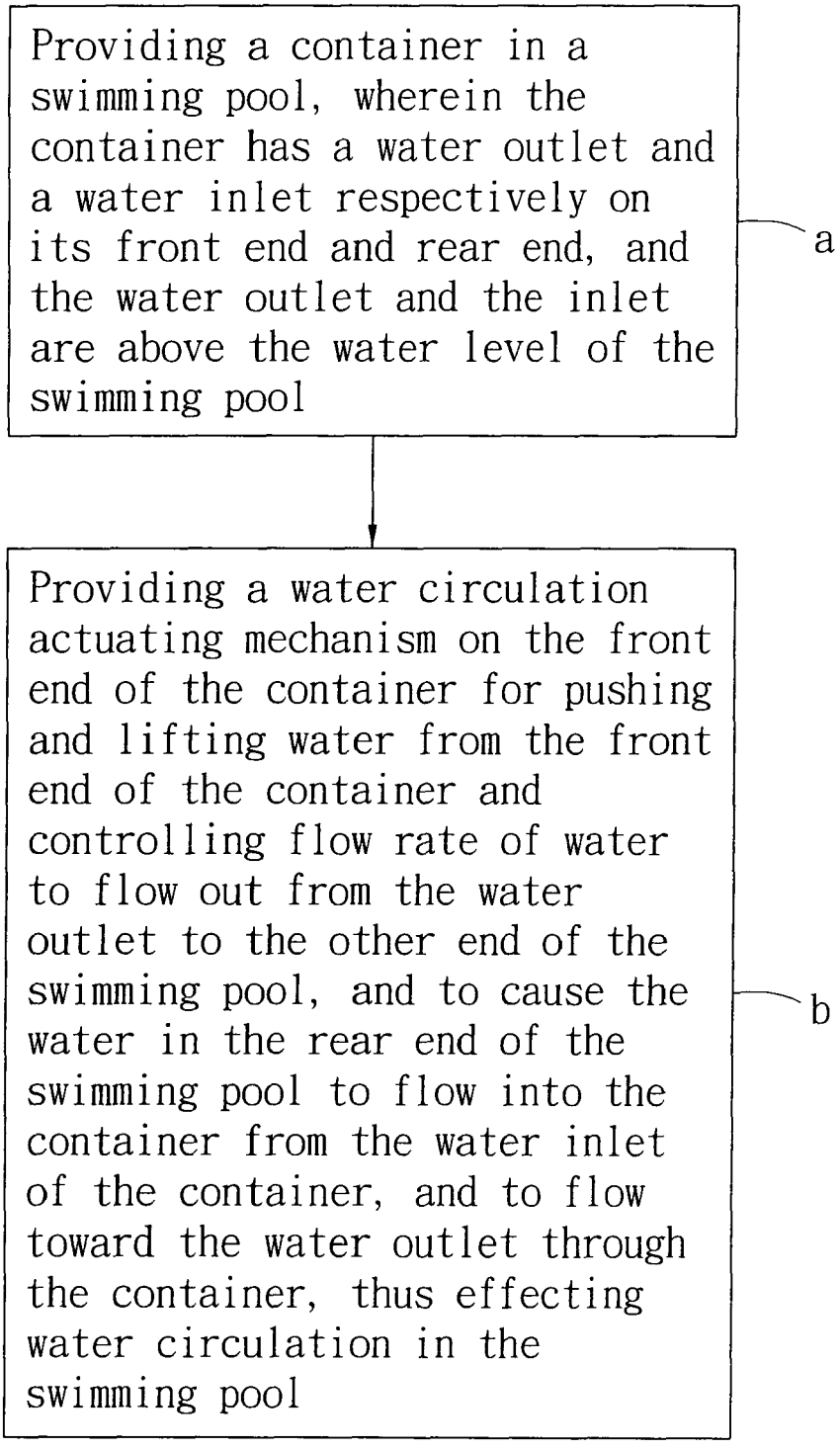

Providing a container in a swimming pool, wherein the container has a water outlet and a water inlet respectively on its front end and rear end, and the water outlet and the inlet are above the water level of the swimming pool
a
Providing a water circulation actuating mechanism on the front end of the container for pushing and lifting water from the front end of the container and controlling flow rate of water to flow out from the water outlet to the other end of the swimming pool, and to cause the water in the rear end of the swimming pool to flow into the container from the water inlet of the container, and to flow toward the water outlet through the container, thus effecting water circulation in the swimming pool
b

Fig. 1

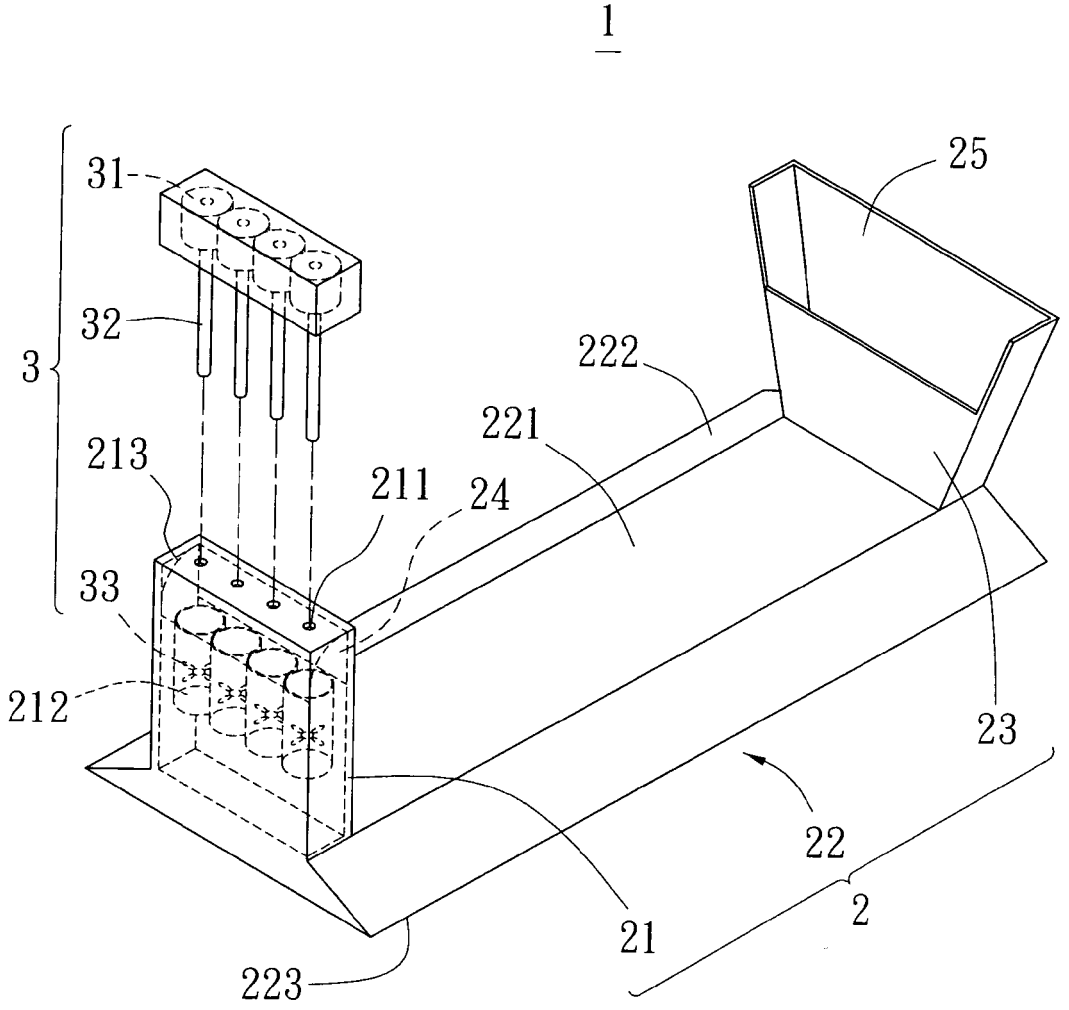


Fig. 2

Fig. 3

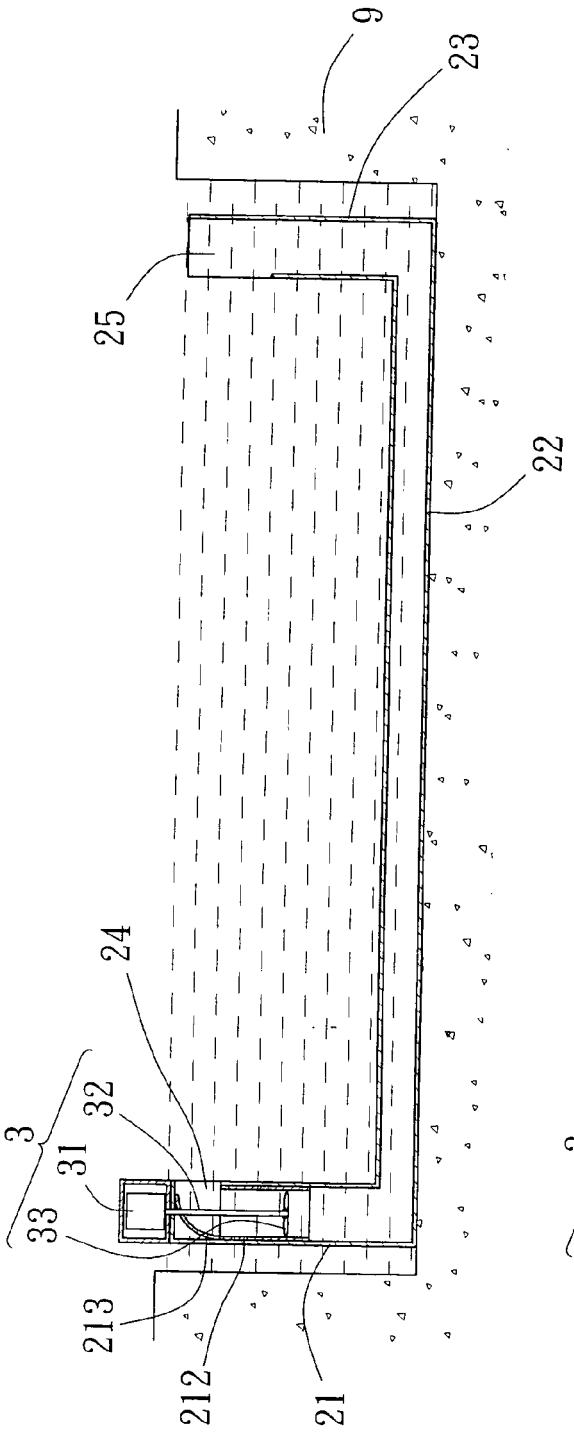
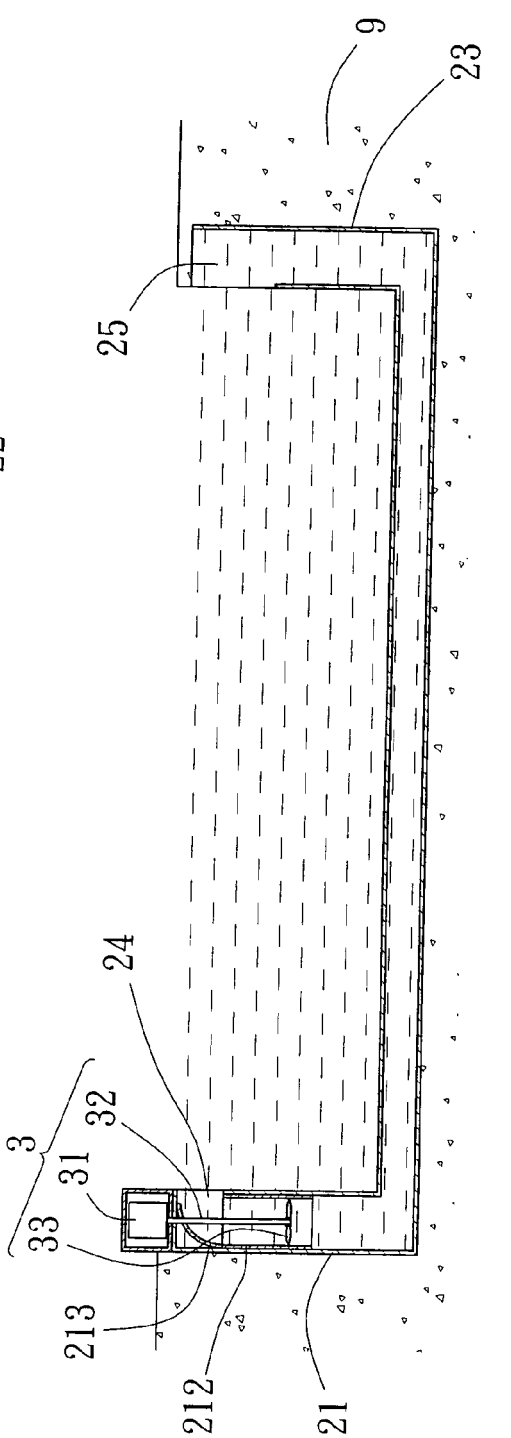


Fig. 4



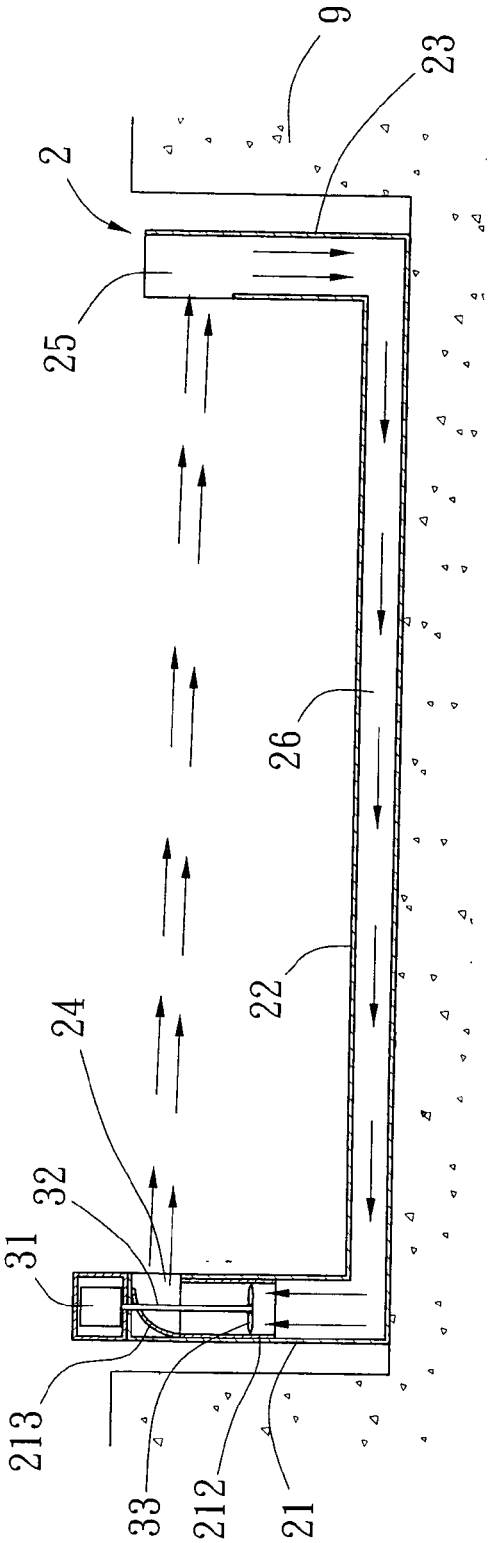


Fig. 5

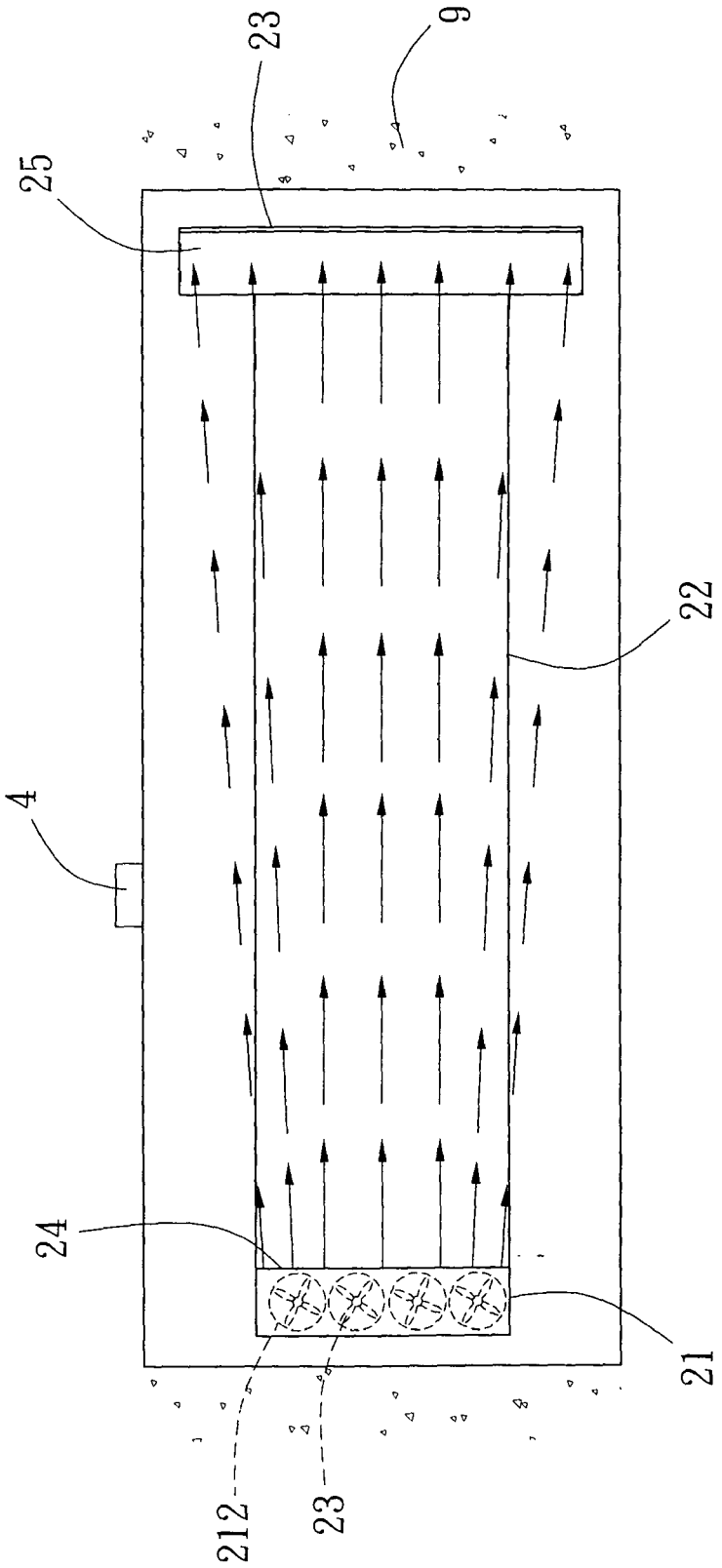


Fig. 6

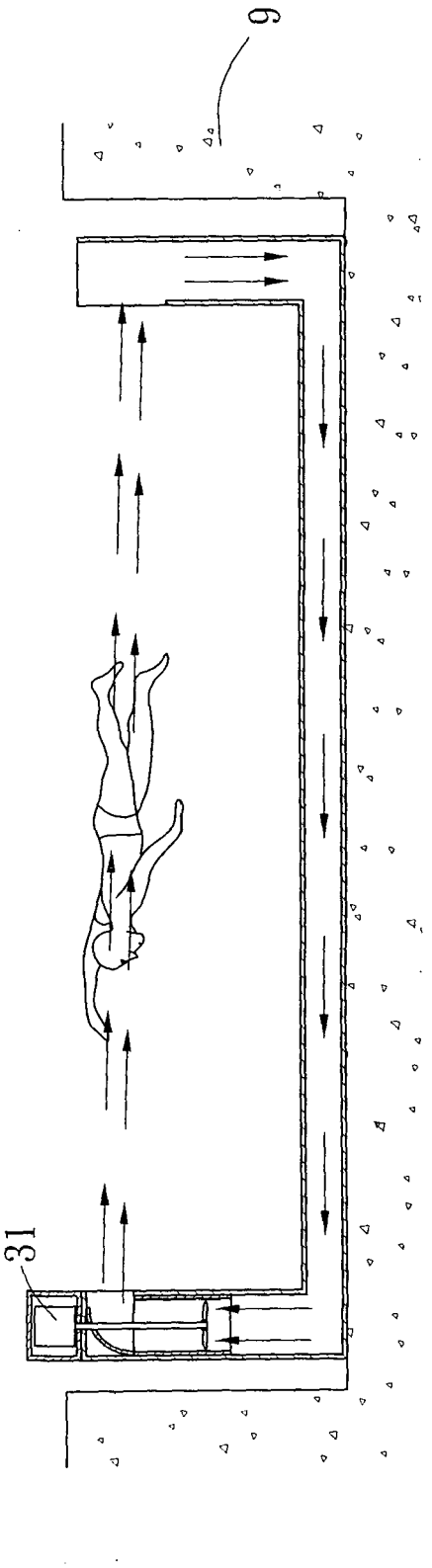


Fig. 7

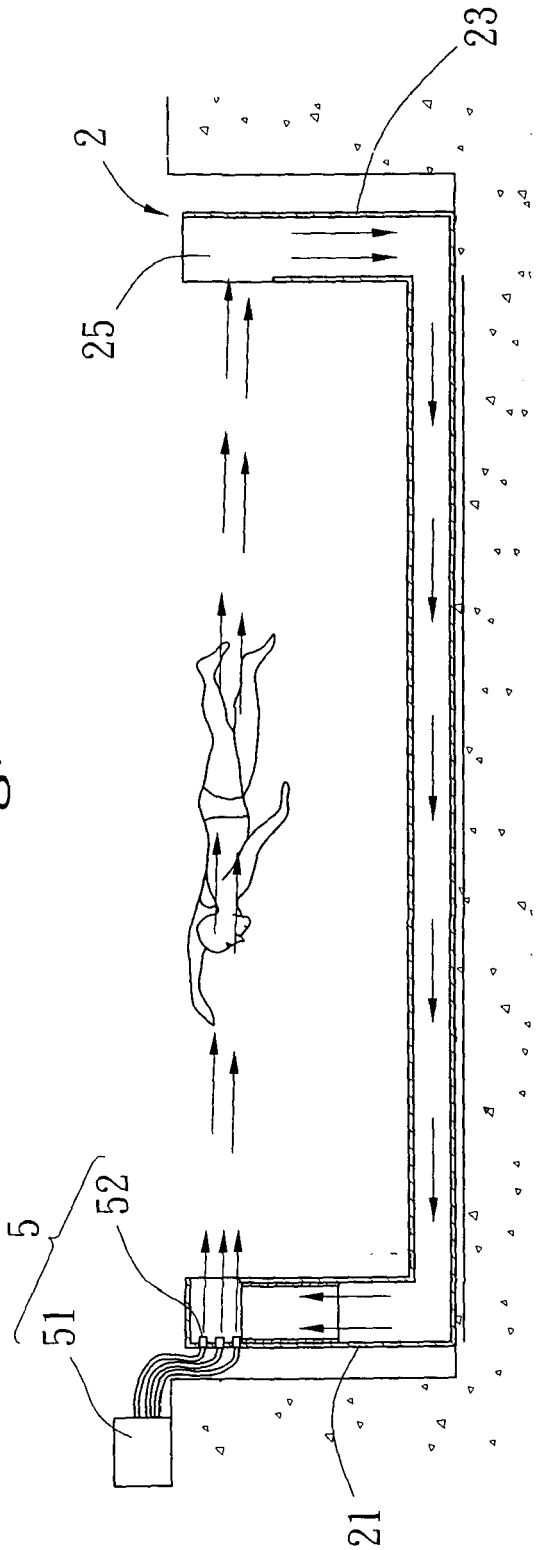


Fig. 8

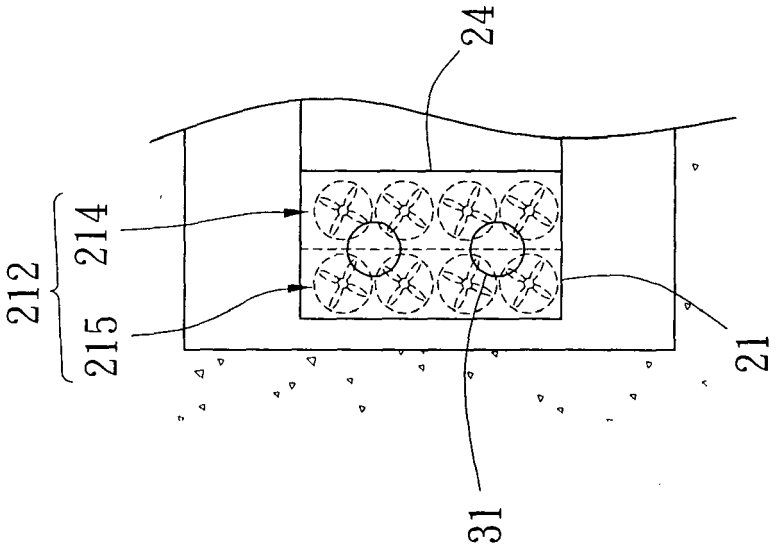


Fig. 10

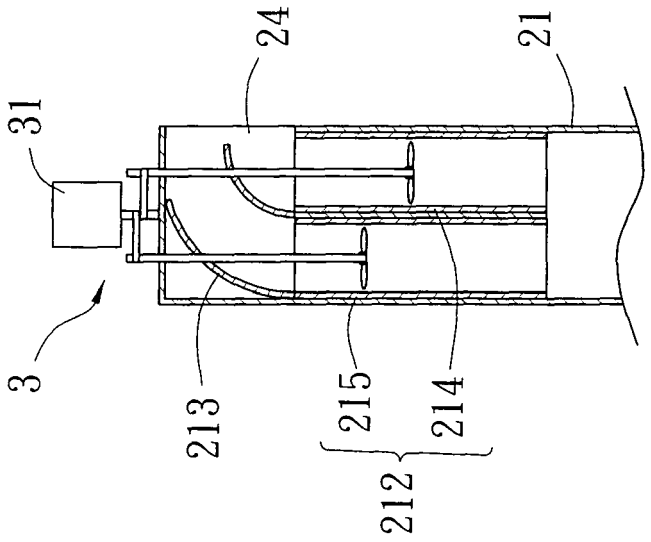


Fig. 9

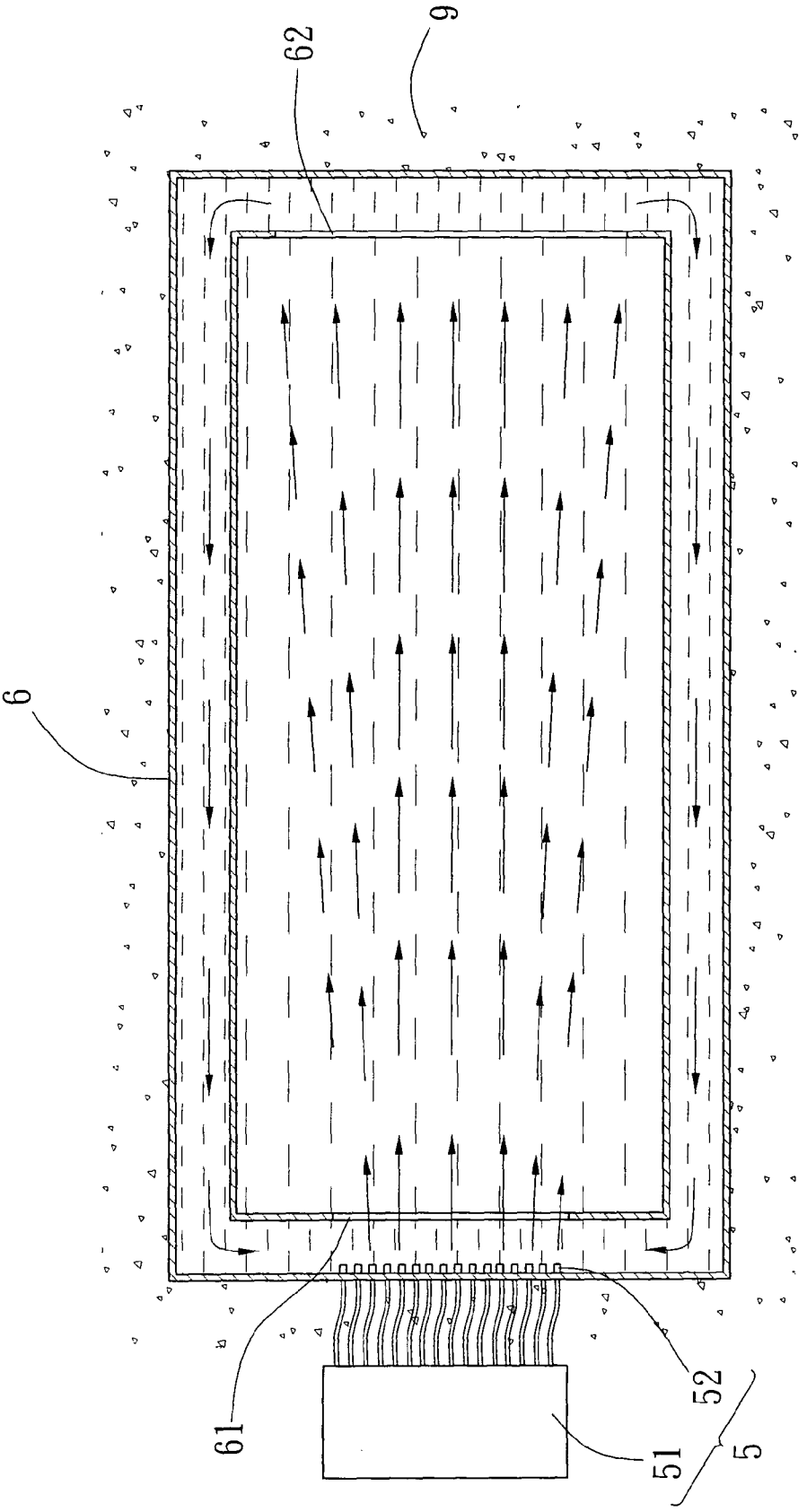


Fig. 11

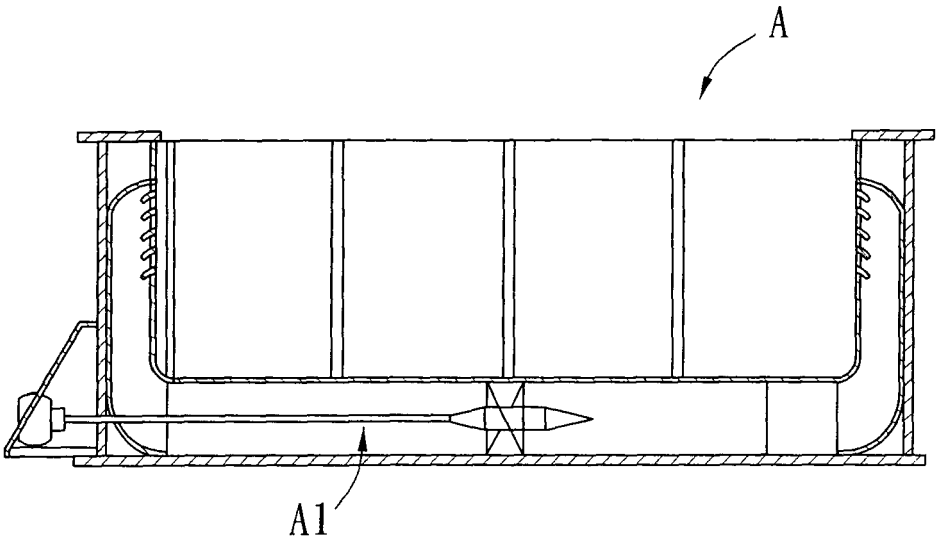


Fig. 12
(Prior Art)

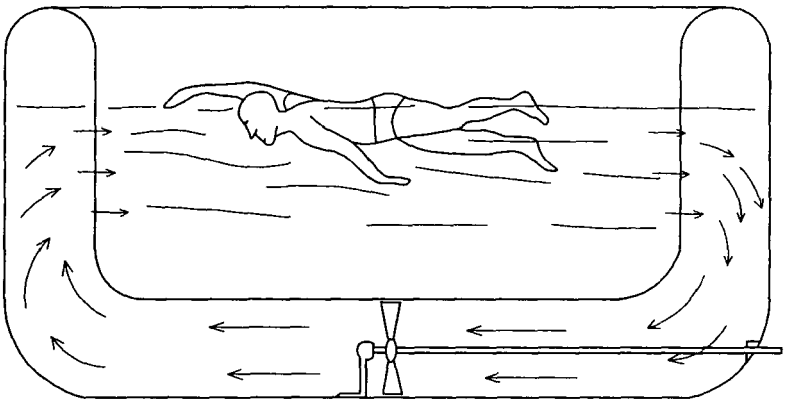


Fig. 13
(Prior Art)

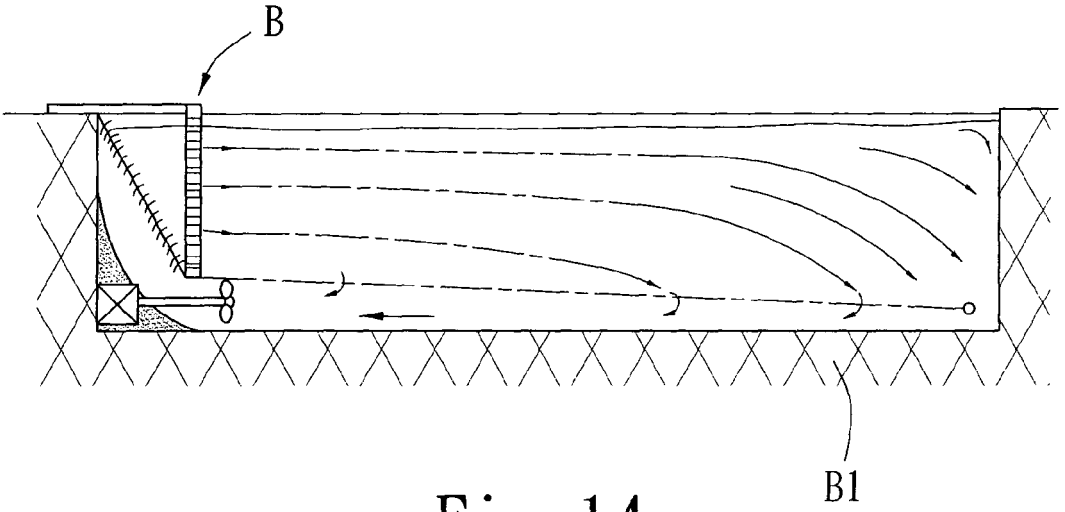


Fig. 14
(Prior Art)

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 4531

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	AT 311 618 B (LATSCHBACHER KAJETAN) 26 November 1973 (1973-11-26) * the whole document * -----	1-14	INV. A63B69/12
A	DE 83 11 105 U1 (LAING, KARSTEN, DIPL.-ING., 7148 REMSECK, DE) 8 November 1990 (1990-11-08) * page 1, line 1 - page 3, line 7; figures 1-3 * -----	1-14	
A	FR 2 822 183 A (SOLTANI PAUL [FR]) 20 September 2002 (2002-09-20) * abstract * -----	1-14	
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TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 December 2006	Jekabsons, Armands

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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07-12-2006

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REFERENCES CITED IN THE DESCRIPTION

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