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(54) Floating pool construction

(57) Pool construction (1) adapted to float in a body of water (2), wherein the pool construction (1) comprises a frame (3) of floating elements (6) and a side barrier (4). The side barrier (4) is attached to the frame (3) of floating elements (6) and is adapted to enclose a surface area (5) defining a pool. Further, the side barrier (4) is adapted to extend from the floating elements (6), down in the body of water (2), whereby water on one side of the side barrier (4) is horizontally isolated from water on the other side of the side barrier (4).

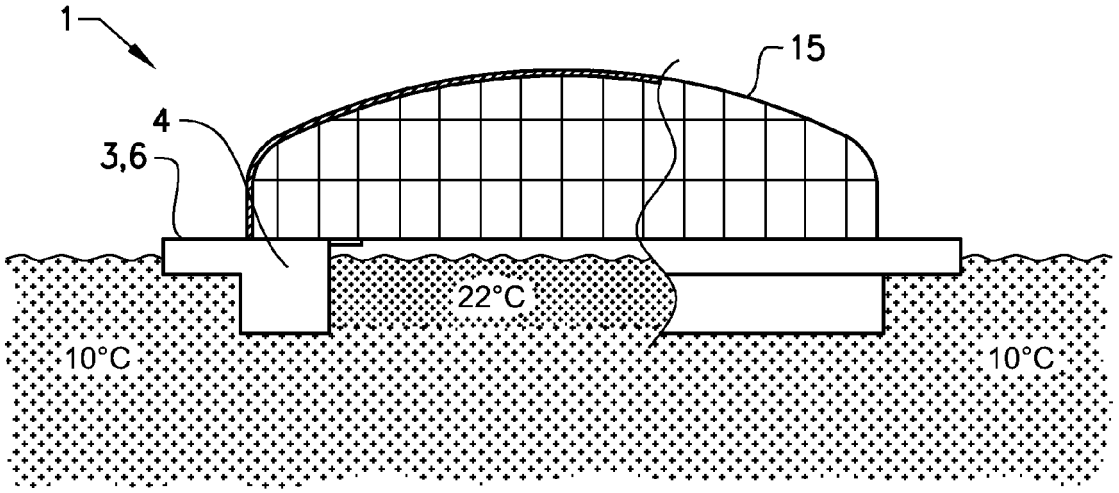

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a floating pool construction with an insulating side barrier.

BACKGROUND ART

[0002] Floating pool constructions are known. The main purpose for most floating pool constructions are, to create a safe zone to protect the swimmers from dangers occurring when swimming in open sea, or to assure hygienic and clean water.

[0003] An example of a pool floating in water is disclosed in US 2003/0228195 A1. This pool provides a deep-sea surrounding in the pool area by pumping up clean water from deep sea.

[0004] Many regions of the world have a short outdoor swimming season. Even during the summer season are, in these regions, both the water temperatures as well as the air temperature occasionally to cold for most people to enjoy a swim in the sea or a lake. The conditions can change very fast, just by change of wind direction can the warm surface water drift a way and taking a swim becomes an unpleasant experience.

[0005] The object of the invention is to suggest a pool construction that can facilitate a pleasant swimming environment in natural cold waters, and which is relative inexpensive in construction and maintenance.

SUMMARY OF THE INVENTION

[0006] The invention is based on the fact that as long as water has a temperature above 4°C, the density of the warmer water is lower than the density of the colder water, and further on the discovery that a very low temperature exchange appears between two horizontal layers of water with different temperatures.

[0007] According to the invention it is thereby suggested that a floating pool construction is provided with a side barrier comprising at least a side wall with at least a first thermal insulating layer.

DETAILED DESCRIPTION

[0008] Pool construction comprising a frame of floating elements and a side barrier, whereby the pool construction is adapted to float in water. The floating elements are dimensioned to keep the pool construction floating. The side barrier is attached to the frame of floating elements and is adapted to enclose a surface area defining a pool. The side barrier is adapted to extend from the floating elements, down in the water and thereby defining a depth of the pool. Said side barrier continues around the whole circumference of the surface area of the pool such that, water on one side of the first side barrier is horizontally isolated from water on the other side of the first side barrier.

[0009] The shape of the pool is not limited; it can be rectangular, circular, oval, or arbitrary. In a standard construction both the floating elements and the pool have a rectangular shape. The floating elements can be any common used floating elements, however floating elements with a first material for structural support and a second light weight buoyancy material is preferred. The elements can be forced together with known means such as a wire connection. The floating elements can also be placed with a distance to each other, as long as the side barrier still extends continuously around the pool.

[0010] According to the invention said barrier comprises at least a first thermal insulating layer, which insulates the mass of water on a first side of the side barrier and the mass of water the other side of the side barrier such, that just an insignificant, or no temperature exchange, can take place between the two water masses.

[0011] The first side barrier is water impermeable, whereby the water within the first side barrier and the water outside it can not mix with each other and thereby can the temperature of the two bodies of water not been even out through blending. To further limit a heat transfer from the water inside the side barrier, the side barrier has the thermal insulating layer, which secures that there will be just an insignificant or none temperature exchange between the body of water inside the pool and the surrounding body of water. Thereby, the body of water in the floating pool can keep a higher water temperature than the surrounding body of water, without any significant energy losses.

[0012] It is further suggested, that said side barrier comprises at least a first and a second wall, wherein said first and second wall are located essentially parallel to one another and that a gap is located between the two walls. The walls comprise at least a first material adapted to structural support the wall. The gap is open at least at its lower end, wherein said gap is adapted to be filled with water, when the pool is floating in a body of water. The water filled gap thereby forms said first insulating layer. The water within the gap will have a temperature in between the temperature within the pool and the water temperature of the surrounding water body.

[0013] Alternatively, the first and the second wall can be formed such, that it is open just in its lower end and the gap can be filled with air, that than forms the first insulating layer.

[0014] An embodiments with at least two walls with a gap between as the first side barrier, has the advantage that no extra material have to be added to create the insulating layer. Thereby, the cost for production of such an embodiment of the floating pool construction is cut and it is light weight.

[0015] Said first and second wall according to the above described embodiments are adapted to horizontally isolate water on first respectively second walls one side from water on its second side. Hence, both the first and the second side wall is water impermeable. To min-

imize the heat transfer between the different bodies of water, it is important that there is no horizontally mix of the bodies of water with each other.

[0016] The side barrier is adapted to extend at least 1,5 and preferably 2,5 and even more preferably 4 meters down in the body of water. Obviously, the side barrier can extend even further down in the water if desired. Further, the side barrier can be extended with an extension wall without an insulating layer, this extension wall would than just be to isolate the body of water in the pool from the body of water outside the pool such that, any currents or disturbances in the body of water surrounding the pool does not disturb the body of water inside the pool and vice versa.

[0017] Due to the inventive pool construction the swimming season can be extended in areas with an otherwise short summer season and with unreliable weather conditions. The water inside the pool is can be heated and is kept in the pool, even by changed wind conditions. The insulating layer prevent an extensive heat transfer from the body of water inside the pool to the surrounding body of water, even when the surrounding body of water has become a lower temperature.

[0018] The floating pool construction can further be equipped with a deck for sunbathing, game areas, cafés and/or other recreational areas.

[0019] The floating pool construction is adapted to be anchored in the bottom of lake/sea, a boat/other floating construction, or anchored to the shore. Due to its modular construction, it can be manufactured on a production site and whereby the modules can be transported to the place where the pool construction is to be used. The pool can also be dragged in water to the wished location.

[0020] In an embodiment of the invention, it is suggested that said side barrier consists of a first wall, wherein said first wall comprises just the insulating layer. The first wall can alternatively comprise at least two different materials, a first material adapted to structural support of the wall, and a second material adapted to have insulation properties better than the first material. The insulating layer is thereby mainly formed by the second material. The first material is supporting the wall such that it keeps it form and withstands outer influences on the structure. By providing the side barrier as a side wall which comprises two materials with different material properties, a structural durable construction with a high thermal insulation properties be achieved in an easy and inexpensive way.

[0021] An improved embodiment of the floating pool construction with a barrier with two side walls comprises a second insulating layer of a second material. The second material is adapted to have insulation properties better than the first material. Said second material is arranged on or at least in close contact with either the first or the second wall. With a second insulating layer - where the first is the gap between the two side walls - the insulating properties of the side barrier are improved. Thereby can the water temperature of the body of water inside the pool be even higher than water temperature of the surrounding body of water, without to high energy losses.

[0022] The first material, i.e. the material which brings the structural support to the first and/or second side wall is advantageously reinforced concrete or a flexible sheet material or a metallic sheet material or wooden material. These materials have different properties, and each can be chosen by the person skilled in the art, depending on the occasion.

[0023] In a preferred embodiment is reinforced concrete chosen as a support material. The reinforced concrete gives a rigid, durable structure which also is inexpensive to produce. A flexible sheet material of for example a polymer gives a flexible wall which takes less space during transport and is light weight, a flexible sheet material would also be inexpensive. A metallic material as the first material will offer a rigid and durable structure.

[0024] The second material, i.e. the material with the better insulation properties than the support material, advantageously comprises a cellular polymer, e.g. polystyrene foam, or a wooden material. Especially a cellular polymer has very good thermal insulating properties and adheres to the buoyancy of the construction.

[0025] To heat the body of water inside the floating pool construction is suggested that the pool construction is supplied with a heating device. Said heating device is adapted to heat the body of water within the pool. A suitable heating device is a heat pump or connection to a district central heating. By installing a heating device that can heat the body of water inside the pool, the season for using the pool can be extended considerably. By using heating devices such as the suggested the heating will be environmental friendly.

[0026] A further improvement that extends the season for using the pool is a top construction defining a roof and/or a wall to the floating pool construction. By providing the pool construction with a roof and/or wall the users can be protected against rain and/or wind, whereby the pool can be used during great variety of weather conditions. Further, a top construction keeping, air heated by the sun within the top construction, will prevent the cooling of the body of water in the pool during nights with low air temperatures.

[0027] Said top construction is preferably adapted to use the solar energy to heat the water within the first side barrier, thereby can the pool be heated by the sun energy during sunny days and/or by other heating devices when necessary.

[0028] The floating pool construction according to the present invention is not in need of a floor or bottom. It has been discovered, that the heat exchange between two layers of water with different temperature is negligible in comparison with the heat horizontal heat transfer and the heat lost to the atmosphere during colder days. However, if desired, the floating pool construction according to the invention can still be equipped with a floor or bottom, for example a wire netting to prevent fish and other water animals to swim into the pool.

[0029] To assure that the insulation properties of the barrier is sufficient for purpose of the invention, the side barrier shall have a heat transfer rate lower than 30 W/($m^{2*}K$), (watts per meter squared-Kelvin), preferably lower than 15 W/($m^{2*}K$) and even more preferably lower than 5 W/($m^{2*}K$). The heat transfer rate is calculated for the barrier when it is submerged in water, and shows the amount of heat in Joule that is transferred, from a warmer body of water on one side of the side barrier to a colder body of water, through one m^2 of the barrier per second, if the temperature difference between the two bodies of water is 1 Kelvin. A low heat transfer rate as presented above, would secure that the temperature of the water in the pool could be kept at a pleasant temperature, without high energy consumption and during a long time.

[0030] For example, a pool with a side barrier of;

- a thin tarpaulin (thickness of about 3 mm) or other similar sheet material, would become a heat transfer rate of about 30 W/($m^{2*}K$),
- two thin tarpaulin (each with a thickness of about 3 mm), with a water filled insulating gap (about 100 mm wide) in between, would become a heat transfer rate of about 16 W/($m^{2*}K$), and
- a thin tarpaulin (thickness of about 3 mm) with a insulating layer of cellular plastic (thickness of about 20 mm) would become a heat transfer rate of about 1,6 W/($m^{2*}K$).

[0031] The above examples are obviously dependent on the material properties in the tarpaulin, and the cellular plastic, and should be seen as approximate values for these kinds of barrier materials.

DESCRIPTION OF THE FIGURES

[0032]

Fig. 1 shows a first embodiment of a floating pool construction from a side view

Fig. 2 shows a floating pool construction from above

Fig. 3 a-d shows a cut away figure of the floating elements and the side barrier of a floating pool construction.

[0033] First, all figures are schematically and second, the water temperatures shown in the figures are purely examples and they merely shows the principle of the invention which is not in anyway limited by these water temperatures.

[0034] In figure 1 is a side view of a floating pool construction 1 according to invention shown. The floating pool construction 1 is characterised by the inventive side barrier 4, which comprises at least one insulating layer 7. The side barrier 4 and different embodiments thereof are shown in figure 3a - 3b. The side barrier 4 assures that the heat transfer between the body of water 2 surrounding the pool construction and the body of water 2' inside the pool is kept to a minimum. The side barrier 4 can be made of one insulating material or of several materials, wherein at least one material has insulating properties.

[0035] Further in figure 1 the top construction 15 can be seen. The top construction 15 of this example has both a roof and side walls, whereby it protects the users of the pool from external forces, such as wind, rain and possibly hazardous radiation from the sun. Thereto, the top construction 15 allows a suitable air temperature within it. The air temperature within the top construction can thereby be held closer to, and preferably above, the temperature of the body of water 2' in the pool. Hence, with the top construction 15, there won't be an unnecessary heat transfer from the warm water within the pool to a possibly otherwise cool surrounding mass of air. This is especially advantageous in areas where not just the water is cold, but where there are great temperature differences during the day and night.

[0036] A view from above of a floating pool construction 1 with a frame 3 of floating elements 6 is shown in figure 2. In this example, the floating elements 6 are rectangular, just as the frame 6 they form. However, the invention is not dependent thereon; the floating elements 3 as well as the frame 3 can be constructed to have any other suitable shape. It is also possible that the floating elements 3 forms just a half circle or any other not closed shape, whereby the side barrier extends between the ends of the not closed shape and defines the surface area 5 of the pool. Nevertheless, a closed and rectangular shape will be used for reasons of simplicity of explanation.

[0037] The figures 3a - 3e, shows a cut out view of the floating pool construction 1 of figure 2, wherein each figure shows a different embodiment of the side barrier 4.

[0038] The side barrier in figure 3a is integrally formed with the floating elements 6, whereby a first side wall 8 extends downwards from the floating element 6 and thereby forms the side barrier 4. The wall 8 comprises a first and a second material 9, 10. The first material 9 is for structural support of the wall 8 and the second material 10 is attached to or at least in close contact with the first material 9 and forms the thermal insulating layer 7. The second material is according to the shown embodiment integrally formed with the floating material of the floating element 6.

[0039] In the embodiment shown in figure 3b is the side barrier 4 also formed as a first side wall 8, wherein in this embodiment is the side wall 8 a separate module which is attached to the floating element 6. Just as in the embodiment of figure 3a, the first wall 8 comprises a first and a second material 9, 10. The first material 9 is for contractual support of the wall 8 and the second material 10 is attached to or at least in close contact with the first material 9 and forms the thermal insulating layer 7.

[0040] In the embodiment of the floating pool construc-

tion 1 according to figure 3c, the side barrier 4 has a first and a second side wall 11, 12. The two side walls 11, 12 are parallel to each other and between them a gap 13 is formed. When the pool construction 1 is floating in water, the gap 13 is adapted to be filled with water, wherein the water within the gap 13 forms the insulating layer 14.

[0041] The water filled gap 13 will become a temperature in between the temperature of the body of water 2' within the pool and the surrounding body of water 2. For example as shown in the figures 15°C, if the temperature of the body of water 2' in the pool is 22°C and the body of water 2 surrounding the pool is 10°C.

[0042] In the embodiment of the floating pool construction 1 according to figure 3d, the side barrier 4 also has a first and a second side wall 11, 12, as in figure 3c. However, the first side wall 11 has both a first and a second material 9, 10. The first material 9 is for structural support of the wall 11 and the second material 10 is attached to, or at least in close contact with the first material 9 and forms the thermal insulating layer 7. The side barrier 4 becomes thereby two insulating layers 7, 14; the water filled gap 13 and the second material 10.

[0043] The embodiment of the floating pool construction 1 according to figure 3e, only differs from the embodiment in figure 3d in that it has a third insulating layer 16, in that both it walls 11, 12 are coated with the second material 10.

[0044] In the embodiments of the floating pool construction 1, shown in figure 3c-3e, the two walls 11, 12 of the side barrier 4 can be connected with a bottom (not shown) at their lower edge. By providing suitable water inlets in a side wall 11, 12 and/or the bottom, the gap is slowly filled with water as the side barrier 4 is launched in the water.

Claims

1. Pool construction (1) adapted to float in a body of water (2), wherein the pool construction (1) comprises a frame (3) of floating elements (6) and a side barrier (4) and whereby the side barrier (4) is attached to the frame (3) of floating elements (6) and is adapted to enclose a surface area (5) defining a pool, and wherein the side barrier (4) is adapted to extend from the floating elements (6), down in the body of water (2), whereby water on one side of the side barrier (4) is horizontally isolated from water on the other side of the side barrier (4), said pool construction is **characterised in, that** said side barrier (4) comprises at least a first thermal insulating layer (7, 14) such that, just an insignificant, or no heat transfer, can take place between the water on one side of the side barrier (4) and the water on the other side of the side barrier (4), wherein said side barrier (4) comprises at least a first and a second wall (11, 12), and said first and second wall (11, 12) are located essentially parallel to and with a gap (13) to one another and comprising at least a first material (9) adapted to structural support of the walls (11, 12), and said gap (13) thereby forms said first insulating layer (14), whereby said gap (13) is adapted to be filled with water.

2. Pool construction (1) according to claim 1, wherein said side barrier (4) comprises a first wall (11), which comprises at least two different materials (9, 10), a first material (9) adapted to structural support of the wall (8), and a second material (10) adapted to have insulation properties better than the first material (9) and thereby form a second insulating layer (7).

3. Pool construction (1) according to claim 1 or 2, wherein said first and second wall (11, 12) is adapted to horizontally isolate water on a first side of the first respectively second wall (11, 12), from water on said walls (11, 12) other side.

4. Pool construction (1) according to any of the preceding claims, wherein said side barrier (4) comprises a second thermal insulating layer (13) of a second material (10), which is adapted to have insulation properties better than the first material (9), and wherein said second material (10) is arranged on either the first or the second wall (11, 12).

5. Pool construction (1) according to any of the preceding claims, wherein said side barrier (4) is adapted to extend at least 1,5 and preferably 2,5 and even more preferably 4 meters down in the body of water (2).

6. Pool construction (1) according to any of the preceding claims, wherein the first material (9) of the said side barrier (4) comprises reinforced concrete or a flexible sheet material or a metallic sheet material or wooden material.

7. Pool construction (1) according to claim 2, 3 or 6 - 8, wherein the second material (10) comprises a cellular polymer or a wooden material.

8. Pool construction (1) according to any of the preceding claims, wherein the pool construction (1) is adapted with a heating device, which heats the water within the side barrier, wherein the heating device is a heat pump or connection to a district central heating.

9. Pool construction (1) according to any of the preceding claims, wherein the pool construction (1) comprises a top construction (15) defining a roof and/or a wall to the floating pool construction (1).

10. Pool construction (1) according to claim 11, wherein the top construction (15) is adapted to use the solar energy to heat the water within the side barrier (4).

11. Pool construction (1) according to any of the preceding claims, wherein the pool is bottom less.

12. Pool construction according to any of the preceding claims, wherein the side barrier (4) has a heat transfer rate lower than 30 W/(m^{2*}K), (watts per meter squared-Kelvin), preferably lower than 15 W/(m^{2*}K), and even more preferably lower than 5 W/(m^{2*}K), when the side barrier is sunk down in water.

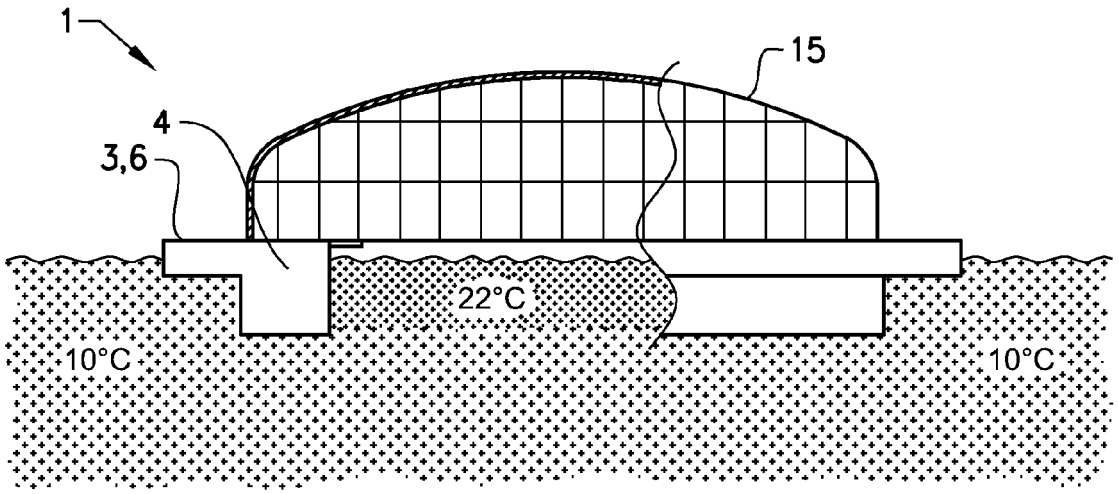

FIG. 1

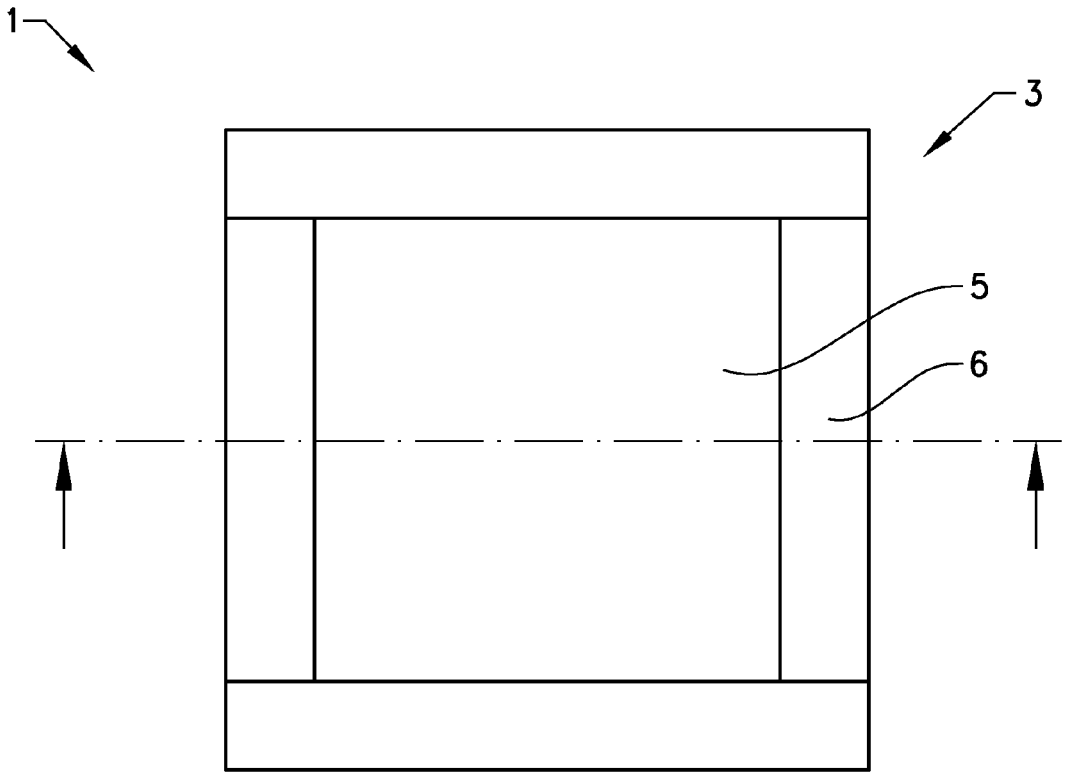

FIG. 2

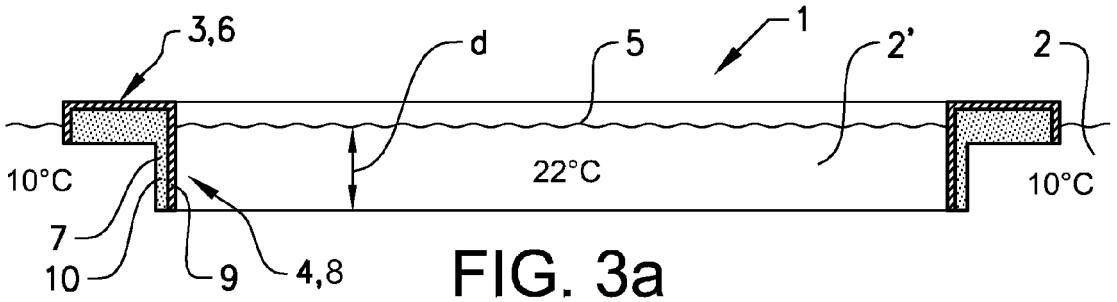

FIG. 3a

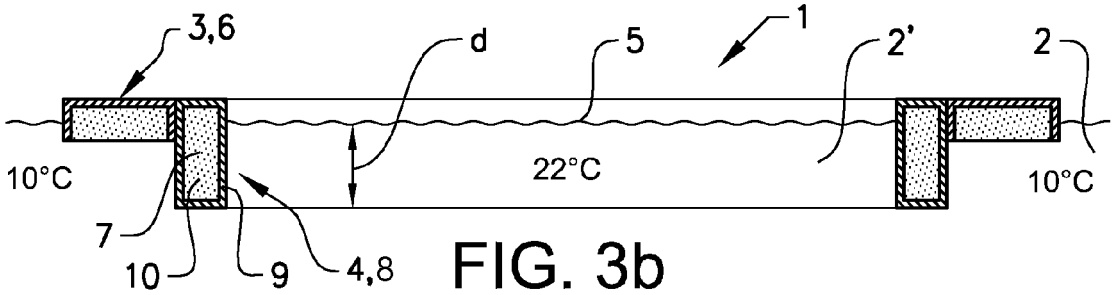

FIG. 3b

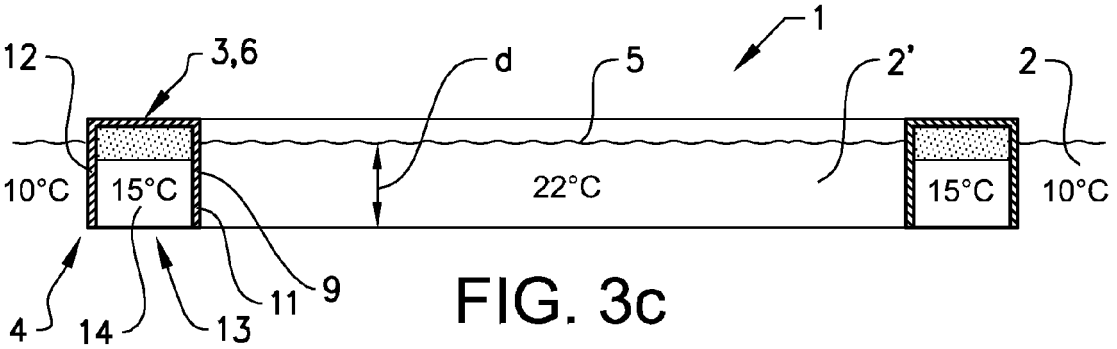

FIG. 3c

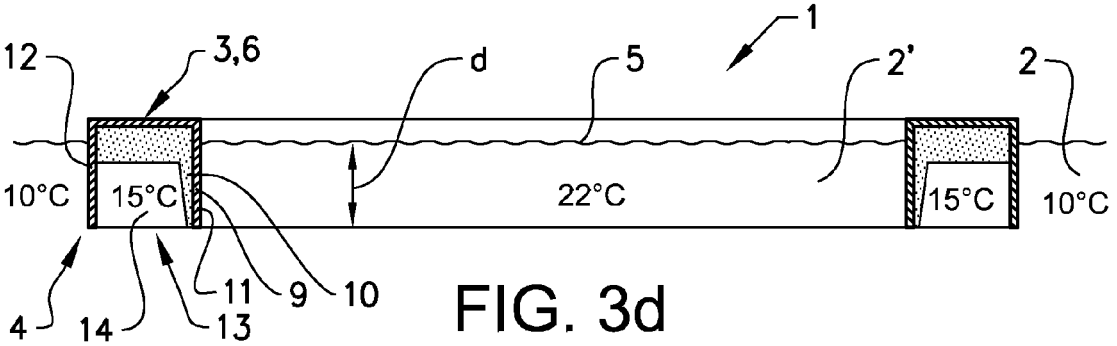

FIG. 3d

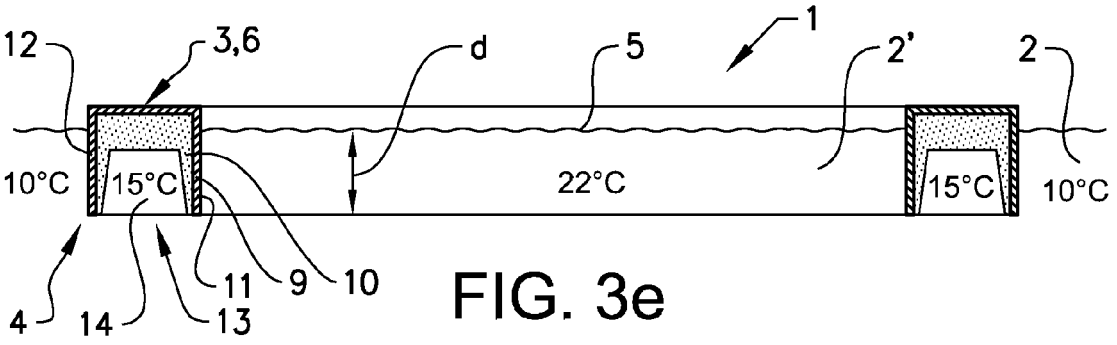

FIG. 3e

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EUROPEAN SEARCH REPORT

Application Number
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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	12 October 2011	Decker, Robert

CATEGORY OF CITED DOCUMENTS

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1

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