The present invention relates to a cover (10) intended for a pool system (1), the cover being lightweight and formed as a pool-covering structure and serving as a protection, where said cover (10) is adapted to cooperate in edge-related fashion with a guide arrangement (11) or similar means, said cover (10) being oriented by support means (112) at a predetermined distance from the upper surface of a body of liquid or body of water enclosed by the pool. Said cover is integrally formed with and/or adapted to support liquid-Tillable or liquid-filled channels (14, 14a) where said channels are adapted to be included in one or more thermal energy absorbing units (6a) included in one or more suntrap apparatuses (6). A liquid in these liquid-filled channels (14), heated by solar energy, is adapted to be heat exchanged with said body of liquid or body of water (2) enclosed by the pool.
COVER INTENDED FOR A POOL UNIT WITHIN A POOL SYSTEM

TECHNICAL FIELD

[0001] The present invention relates in general to a cover or a protection intended for a pool unit within a pool system, normally entitled a "pool cover", and more specifically to a lightly flexible cover or pool protection formed as a surface structure with a selected surface extent, intended for a pool or pool unit in such a pool system and serving as a mechanically covering protection, where said cover is adapted, to be able to assume a first end position, covering the pool or pool unit, and a second end position, exposing a pool or pool unit, and, where necessary, in addition any interjacent position.

[0002] In this description, the term "pool system" is taken to signify a system which displays a pool unit filled with a liquid or water which may advantageously display a pump unit adapted to circulate by pumping said liquid or water through one or more filter units, as well as one or more metering devices intended to supply to the water chemicals, such as chlorine, in order to keep the liquid or water accumulation clean and free of bacteria and algal growth.

[0003] More specifically, the present invention relates to such a cover intended for a pool system where the cover is adapted to be able, in relation to an edge, to cooperate with a guide arrangement or similar anchorage means, said cover being structured to be able to be oriented at a predetermined and recommended minimum distance, designated as a safety distance, from the upper surface of a liquid- or water body enclosed in the pool or pool unit.

[0004] For purposes of simplicity, the liquid- or water accumulation disclosed here will hereinbelow merely be designated as a body of water.

[0005] The present invention should be considered as a direct further development of the invention and embodiment disclosed and described in Swedish Patent Application number 04 02630-8, filed under the title "Pool protection with active temperature regulation", and the contents of this application are to be considered as a part of and embodied in the contents and text of this present application.

BACKGROUND ART

[0006] Methods, arrangements and constructions related to the above-disclosed technical field and nature are previously known in numerous embodiments.

[0007] As a first example mentioning the state of the art and the technical field to which the present invention relates of a cover intended for a pool system, the cover being lightly flexible, formed as a surface extending structure and serving as a protection. Said cover is adapted, in the fully extended state, to be able to assume an end position and wholly covering the pool or pool unit, and in a rolled-up or folded state to be able to assume an end position and exposing the pool or pool unit, and where such a cover is normally adapted to be capable, when needed, of assuming any interjacent position.

[0008] A cover of the type under consideration here may normally be cooperating in edge-related manner with a guide arrangement or similar fixing means, said cover per se and/or with the aid of separate supporting and/or lifting means, being adapted, in such instance, to be oriented at a predetermined distance, normally 180 mm or slightly more, from the upper surface of a body of water enclosed by the pool.

[0009] Pool covers and protectors of the type associated herewith have, in such instance, been designed to be self-supporting in order, in addition, to be able to absorb specifically active instantaneous outer forces and have thus not been designed and/or dimensioned to support additional point loadings or forces and/or surface-distributing weights or forces which could press down the pool protection in a direction towards the surface of the body of water and thereby reduce the above-disclosed safety distance to below the stipulated 180 mm.

[0010] Covers and pool protectors for pool systems with associated pool or pool unit have been produced with a view to being able to preclude and/or eliminate the following situations, however some are disclosed which are novel and associated with the present invention.


[0012] A cover of the associated type or a pool protection should per se be constructed and/or together with mechanical reinforcements, be constructed to be able to support point-active forces such as an adult. The adult in question should be able to move away from the pool protection without running the risk of drowning.

[0013] If a child were to get out on the pool protection, the pool protection may not sink down to and past the surface of the water because of the weight of the child.

[0014] 2. Access to Air within the Safety Distance for any Person Remaining or Bathing Between the Surface of the Water and the Pool Protection.

[0015] When the pool protection or a taut cover covers a pool, there must be a safety distance and an air head space of at least 180 mm between the pool protection and the surface of the water so that there is a free access to air for one or more bathers entrapped by the cover.

[0016] 3. Prevent Small Animals, Such as Reptiles and Mice, from Getting Down into the Pool.

[0017] The securing of the pool protection or cover along the pool unit or pool must be capable of being made so tight that unwelcome small animals will not be able to creep in under the cover and gain access to the pool.


[0019] In this instance, the pool protection should be wholly covering and normally be oriented higher than the edge of the pool so that sand and leaves may be blown off the pool protection. Bird lime and branches landing on the pool protection can be washed off or removed in connection with the stowing away, by rolling up, of the pool protection.

[0020] 5. Prevent Evaporation of Utilised Pool Chemicals, Such as, for Example, Chlorine, Ozone Etc.

[0021] In order to maintain a high standard of hygiene in the pool water, it is important that the correct quantity of pool chemicals be in the water. The chemicals also constitute a considerable proportion of the running costs for the pool. The chemicals are quite volatile and will readily evaporate as soon as the pool is open.


[0023] Light in the pool will initiate photosynthesis and commence a growth of algae. When a dark pool protection covers the pool, the pool water is subject to black-out, for which reason the photosynthesis stops and growth of algae is reduced.
The largest temperature-reducing effect on the pool water is caused by the energy conversion which takes place when the pool water evaporates. A covering of the surface of the water reduces this evaporation and, as a result, a reduction in temperature.

Winds increase convection losses in the pool water and thereby reduce the temperature. A pool protection counteracts this in particular when there is a "stationary" air volume within the safety distance between the surface of the water and the pool protection.

Supply Heat Through the Thermal Absorption Unit of a Solar Power Apparatus and Via a Circulation Circuit.

In order to raise the temperature up to 25-28° within certain temperature zones, similar to that of Sweden, during the bathing season, the consumption for a normal family pool of 4x8 m is between 10,000 and 20,000 kWh, which is the largest operational cost for such a pool installation.

Prevents Overheating of the Pool Water.

Overheating of the pool water is a not inconsiderable problem in certain other climate zones such as southern Europe and in the desert regions. The thermal absorbing units of solar power apparatus can then be utilised as evaporation cooling by sprinkling a layer of water on these units, which is then allowed to evaporate and thereby cool the pool water circulating in the suntraps. In order to ensure a thin layer of water, a liquid-absorbing blanket may be placed on the suntrap units.

May be Rolled-Up or Folded so that the Pool Protection does not Restric the Surface of the Pool.

When the pool unit or pool is to be open and used, the pool protection should not cover any part of the pool but should be able to be rolled-up or folded up beside the pool, preferably along its short side.

Permeable for Rain Water so that the Pool Protection is not Weighed Down Towards and to the Surface of the Liquid in the Pool.

Thus, rain water may not be allowed to remain on and accumulated by the pool protection and thereby weigh it down or form local water accumulations. At manifest "low points" in the pool protection, there should therefore be specifically formed drainage holes, allowing the passage of rain water through the pool protection.

Excessively Large Spans for the Pool Protection.

A pool protection with free-bearing beams and/or rods will have a limitation in relation to its mechanical strength as a result of the size of its span.

Pontoons systems and similar systems which allow the introduction of supporting means such as sub- jacent pontoon-like carriers of the pool protection supporting on the surface of the water such as, in the Swedish Patent Application disclosed by way of introduction, reduce this limitation.

The following pool unit protection coverings or pool protectors, divided into the following groups are also part of the state of the art:

Protection with free-bearing beams or rods between the longitudinal sides of the pool unit with a reinforced plastic sheet taut between the rods.

Does not solve above-disclosed technical problems 3, 9, 10, 11 and 13.

Protection with slats floating on the body of water within the pool unit which are or may be linked to one another.

Does not solve above-disclosed technical problems 1, 3, 9 and 13.

Protection with pool protection floating on the body of water in the pool unit consisting of sheet material with an integrated suntrap apparatus.

Does not solve above-disclosed technical problems 1, 2, 3 and 10.

Additional prior art pool protecting coverings or pool protection are marketed and to be found in the following Patent Publications:

Pool-guard Inc. AB, Elverksvägen 13, Järfalla, Sweden with Swedish Type Approval Certificate Number 014/02.

A pool protection which consists of supporting beams or rods which are oriented transversely across the pool or pool unit between longitudinal side edges and locking each rod against parallel guides. The beams or rods are connected to a PVC sheet. When the pool protection is spread over the pool unit, the protective sheet is taut between the beams and the pool unit is covered, when the pool unit is open the rods are retracted to the one short side of the pool unit and the sheet lies in folds between the beams or rods.

The protection solves the above-listed technical problems numbers 1, 2, 4, 5, 6, 7, 8 and 12.


A floating flexible covering for outdoor pools, comprising a suntrap apparatus for the body of water of the pool unit with the aid of inflatable pontoons. The pool protection serves the purpose of only acting as a suntrap and a protection against evaporation.

This protection solves the above-indicated technical problems numbers 4, 5, 6, 7, 8, 9, 11, 12 and 13.

Savarese, U.S. Pat. No. 5,516,386.

A method of manufacturing floating, flexible pool covers with integrated suntraps.

The pool protection is provided with absorbers related to the suntrap equipment and consisting of two plastic films joined flat face to flat face so that channels may be formed therein between the plastic films. The absorbers may also be provided with integrated buoyant bodies.

The pool protection is merely a suntrap and offers protection against evaporation and thereby solves problems numbers 4, 5, 6, 7, 8, 9, 11, 12 and 13.

Paradis, U.S. Pat. No. 4,709,688.

Floating, flexible pool protection with integrated absorbers relating to suntrap equipment.

In this instance, the absorbers consist of two thin panels (flexible and roll-up) joined together face to face. The upper panel is planar and the lower panel has elevations. The entire absorber can float on the pool water because of the cavities provided. The whole of the absorber can be laid as a lid from a pool edge to an opposing pool edge. The pool protection is merely a suntrap and affords protection against evaporation and contamination.

The equipment solves problems numbers 4, 5, 6, 7, 8, 9, 11 and 12.

Macolgan and O'Brien, U.S. Pat. No. 4,082,081.

A foldable or roll-up pool cover or pool protection with absorbers relating to suntrap equipment.
The pool protection includes a floating sheet, for example a common bubble plastic coating, where a thin plastic film is secured above in the form of tubular channels of a diameter of, for example, 20 cm. The pool protection is merely a suntrap and affords protection against evaporation and contamination.

The equipment solves problems numbers 4, 5, 6, 7, 8, 9, 11 and 12.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the technical measures and considerations which will be required in order to cause the application, to the upper side, of a sheet layer formed for the cover, of said water-filled channels within one or more thermal energy absorbing units.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the technical measures and considerations which will be required in order to cause sheet-supporting and/or sheet bearing means to extend between guide arrangements or corresponding means and which are dimensioned in order further to be able to accommodate the load placed on the pool protection by water-filled channels.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the technical measures and considerations which will be required in order to cause a pump unit to be adapted, with the aid of short conduits, to act in cooperation with a heat exchanger, surrounded by a body of water enclosed in the pool, or with the aid of short conduits to supply each heated water portion directly to the body of water enclosed in the pool.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the technical measures and considerations which will be required in order to cause a selected number of carriages to be disposed to cooperate with parallel guides included in said guide arrangement, that each sheet-supporting and/or sheet carrying means in the form of a beam or a rod is adapted to cooperate each with a carriage related each to a guide and that said water-filled channels are wholly or partly oriented at right angles to said rods.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the constructive measures which will be required in order to cause said units and associated components of the pool protection to be structured with thermally absorbing surfaces facing upwards and thermally insulating surfaces facing downwards for the formation of the upper surface of the disclosed safety distance.

There resides a technical problem in being able to realise the importance of, the advantages associated with and/or the constructive measures which will be required in order to cause the utilised thermal energy absorbing units to be oriented such that they may absorb thermal radiation and/or sunlight substantially from above and that they do not need to absorb heat from the surface of the water by the intermediary of thermal conduction, as in prior art technology.

Solution

In such instance, the present invention takes as its point of departure or conception the prior art technology as disclosed by way of introduction for a cover or pool protection intended for a pool system, the protection being lightly flexible and formed as a surface extending structure covering...
a pool or pool unit and serving as a protection, where said protection is adapted to be able to assume a first end position covering the pool unit or pool and a second end position exposing the pool unit or pool, and, where necessary, every interjacent position, in that said cover or pool protection should be adapted to cooperate in edge-related fashion with a guide arrangement or similar means, said cover being oriented, by supporting means, at a predetermined distance from the upper surface of a body of liquid or water enclosed in the pool.

[0074] In order to be able to solve one or more of the above-disclosed technical problems, the present invention particularly discloses that the prior art technology be complemented in that said cover be integrally formed with and/or adapted to support liquid- or water-fillable channels, and where said channels are to be adapted to be included in one or more thermal energy absorbing units, included in one or more suntrap apparatuses, and that a water portion, heated by solar energy in water-filled channels is adapted, preferably by the intermediary of short conduits, to be heat exchanged with the body of water enclosed in said pool or pool unit.

[0075] As preferred embodiments falling within the scope of the basic concept of the present invention, it is further disclosed that said water-fillable channels be, within said thermal energy absorbing units, structurally integrated between two or more lightly flexible sheet layers.

[0076] It is further disclosed that said water-fillable channels be applied to the upper side of a sheet layer forming the cover within one or more thermal energy absorbing units.

[0077] The present invention further discloses that sheet-supporting and/or sheet carrying means may extend between the guide arrangements.

[0078] It is further disclosed that a pump unit be adapted, preferably by the intermediary of short pipe sections, to supply a water portion heated by solar energy to a heat exchanger, either surrounded by a body of water enclosed in the pool or pool unit or directly to the body of water enclosed in the pool or pool unit.

[0079] It also falls within the scope of protection of the present invention that a selected number of carriage be disposed to cooperate with parallel guides included in said guide arrangements, that each sheet supporting means in the form of a rod or a wire is adapted to be able to cooperate each with a carriage for its guide and that said water-fillable channels are to be wholly or partly oriented at right angles to said rods.

[0080] It is further disclosed according to the present invention that one or more thermal energy absorbing units, included in one or more suntrap apparatuses, being exposed to thermally insulating air strata oriented on each side of the pool protection and thereby being selected for an absorbing thermal radiation and/or sunlight only from an upper side thereof.

[0081] Said units and associated components for the pool protection are to be structured with thermally absorbing surfaces facing upwards and thermally insulating surfaces facing downwards, for the formation of the upper surface for the disclosed safety distance.

[0082] The utilised thermal energy absorbing units must thus be oriented such that they permit the absorption of thermal radiation and/or sunlight substantially from above and that they should not absorb heat from the surface of the water by thermal conductivity as in the prior art technology.

ADVANTAGES

[0083] Those advantages which may principally be considered as characteristic of the present invention and the specific significant characterising features disclosed thereby are that there have hereby been created preconditions in order, while maintaining a predetermined distance, a safety distance, from the upper surface of a body of water enclosed in a pool or pool unit to the underside of said cover, to create units related to a suntrap equipment, which are connected to or integrated with the cover, in that the cover is to be provided with water-fillable and water-filled channels related to heat absorbing units and where said channels are to be adapted, preferably by the intermediary of short conduits, to be included in a suntrap equipment, and that a water portion, heated by solar energy within these water-filled channels, is to be adapted to be heat exchanged with said body of water enclosed in the pool.

[0084] More specifically, the present invention discloses that said heat absorbing units are to be exposed to thermally insulating air strata oriented on each side of the pool protection.

[0085] That which may principally be deemed to be characteristic of the present invention is disclosed in the characterising clause of appended Claim 1.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0086] The prior art and one currently proposed embodiment, displaying the significative characterising features associated with the present invention, will now be described in greater detail hereinbelow for purposes of exemplification, with reference to the accompanying Drawings, in which:

[0087] FIG. 1 is a perspective presentation of a prior art pool system with a pool or a pool unit and where portions of the pool water are to be permitted to circulate through a roof applied suntrap apparatus and associated plurality of heat absorbing units in order thereby principally to progressively heat up portions of the body of water enclosed in the pool;

[0088] FIG. 2 is a perspective presentation of a cover of a pool protection intended for a pool system, according to FIG. 1, formed with a lightly flexible superficially extending structure, serving as protection and where said cover is adapted to be able to assume a first end position completely covering the pool unit and/or the pool and a second end position wholly exposing the pool unit and/or the pool and in addition, where necessary, each interjacent position;

[0089] FIG. 3 is a top plan view of a cover of pool protection, in accordance with the disclosures of the present invention, covering a pool unit;

[0090] FIG. 4 is a longitudinal cross section of the pool protection, according to FIG. 3;

[0091] FIG. 5 is a schematic illustration of one embodiment of a pool protection-related anchorage related along the edge region of the pool unit;

[0092] FIG. 6 is a schematic illustration of one embodiment of a pool protection-related anchorage related along the one edge of the pool unit illustrated as a front edge;

[0093] FIG. 7 illustrates the preconditions associated with a completely folded pool protection, where the pool unit will be subjected to an exposed state; and
FIG. 8 shows the preconditions, associated with a fully extended pool protection, where the pool unit will be subjected to a completely covering position.

DESCRIPTION OF THE PRIOR ART ACCORDING TO FIG. 1

With reference to FIG. 1, there is thus shown in this figure a pool system 1 without a cover or pool protection, according to the present invention, intended for a pool unit or pool.

The pool system 1 includes a pool or pool unit 3 in which is enclosed a body of water supplied with chemicals, which, hereinbelow, will be designated a body of water 2. Portion by portion 2a of this body of water 2 is pumped, by the intermediary of a pump unit 4 and a chemicals metering apparatus included therein via a long pipe 5 to a number of series-connected heat absorbing units, designated 6a, 6b and 6c, entitled absorbers, where said proportion or proportions 2a of the body of water 2 will be subject to a progressive heating by the intermediary of absorbing heat and/solar rays, and pass through these units as a heated water portion 2b and where this portion, via a long tube section 7, is recycled to the body of water 2 in order there to add a contribution of heat.

There is nothing to prevent a circuit, comprising the parts 4, 5, 2a, 6a, 6b, 6c, 2b, 7 to consist of a separate circuit, where this separate circuit is to include a heat exchanger unit (not shown).

The series-connected heat absorbing units 6a, 6b, 6c are included in a suntrap apparatus 6 which, in a normal case, displays a specifically formed heat exchanger unit, here however illustrated as consisting of said body of water 2.

Further examples of the state of the art, in respect of the designs and constructions of a cover or pool protection 10 not shown in FIG. 1, relate to the list presented by way of introduction of prior art systems and arrangements.

It generally applies to the designs and constructions shown and described herein that they have been formed as heat-absorbing units, intended to rest floating on the surface 2' of the body of water 2.

Designs and constructions of the associated type will absorb and emit thermal energy by a direct conduction from and to the underlying water surface 2'.

DESCRIPTION OF CURRENTLY PROPOSED EMBODIMENT

By way of introduction, it should be emphasised that, in the following description of a currently proposed embodiment displaying the significative characterising features associated with the present invention and clarified by means of FIGS. 2 to 8 shown in the accompanying Drawings, we have selected terms and a specific terminology in the intention of, in such instance, principally clarifying the concept of the present invention.

However, in this context it should be born in mind that the terms and expressions selected here should not be seen as restrictive exclusively to the terms utilised and selected here, but it should be understood that every such selected term is to be interpreted so that, in addition, it encompasses all technical equivalents which function in the same or substantially the same manner in order thereby to be able to attain the same or substantially the same intention and/or technical effect.

With reference to the accompanying FIGS. 2 to 8, there are thus shown schematically and in detail the basic preconditions for the present invention and the significative properties associated with the present invention have been given concrete form in the embodiment now proposed and described in greater detail hereinbelow.

Thus, FIG. 2 is intended to illustrate in a perspective presentation a pool unit 3 with a mounted pool protection 10 displaying a cover or here designated pool protection 10 intended for a pool system 1, the pool protection being lightly flexible and formed as a structure covering a pool or pool unit and serving as a protection.

Said pool protection 10 is adapted to be able to assume a first end position, exposing the pool unit or pool, according to FIG. 7, and a second end position, covering the pool unit or pool, according to FIG. 8, and, where necessary, each interjacent position.

In this instance, the pool protection 10 is disposed to cooperate with an edge-related 10a, 10b guide arrangement 11 or similar anchorage and supporting means, said pool protection 10 being of a construction or being coordinated with support means 12 so as to be oriented at a predetermined distance 13, a safety distance, from the upper surface 2' of a body of water 2 enclosed by a pool or pool unit.

Further, the present invention discloses that said pool protection 10 is to be integrally formed with and/or adapted to support narrow liquid-fillable or water-filled channels 14, 14a, where said channels are adapted to form part of one or more sets of thermal energy absorbing units, designated 6a, 6b, in FIG. 3, included in one or more suntrap apparatus 6, and that a water portion 2b from these water-filled channels 14, 14a substantially heated by solar energy is adapted to directly heat exchange with the body of water 2 enclosed in the pool or pool unit, in the manner which was illustrated in principle previously with reference to FIG. 1.

More particularly, the present invention discloses that these water-filled channels 14, 14a within the thermal energy absorbing units 6a, 6b, are integrally structured between two or more lightly flexible sheet strata.

As an alternative, it is disclosed that the sheet stratum forming the upper side of the pool protection 10 is to be applied with said water-fillable channels 14, 14a within mutually series-connected and/or parallel-connected thermal energy absorbing units 6a and 6b, respectively.

The embodiment, according to FIG. 2, further illustrates that, between guides 11a, 11b related to the guide arrangement, there exists a sheet supporting and/or sheet bearing means 12 dimensioned and adapted in order, from the viewpoint of safety, to be able to support the weight of a person, but also to be able to support the weight of utilised heat absorbing units 6a, 6b, included in the suntrap apparatus 6, as well as with channels 14, 14a filled with water portions, intended for heat exchange and heat supply.

A pump unit 4 is also illustrated in FIG. 2 and is adapted to supply a water portion 2b heated by solar energy to a heat exchanger, surrounded by a body of water enclosed in the pool or pool unit, or more preferably direct to the body of water 2 enclosed by the pool or pool unit.

A selected number of carriages 11c, 11d, associated with the guide arrangement are disposed to cooperate with parallel guides 11a, 11b included in said guide arrangement 11, that each sheet supporting or sheet bearing means, in the form of a rod or a wire 22, is adapted to cooperate with a carriage 11c, 11d for its guide 11a, 11b and that said water-
filled channels 14, 14a are wholly or partly oriented at right angles to said rods or wires 22.

[0114] It is particularly disclosed here that one or more thermal energy absorbing units, included in one or more suntrap apparatuses, are to be oriented in order to be exposed to thermally insulating air strata, one on each side of the pool protection, and thereby be able to be selected for an absorbing thermal radiation and/or sunlight only from the upper side.

[0115] To this end, it is disclosed that said units and associated components for the pool protection are to be structured with prepared thermal absorbing surfaces facing upwards and prepared thermal insulating surfaces facing downwards and for the formation of the upper surface of the disclosed safety distance.

[0116] The utilised thermal energy absorbing units are then to be oriented such that they may absorb thermal radiation and/or sunlight substantially from above and that they are not to absorb any appreciable heat from the surface of the water, by the intermediary of thermal conduction, as is the case in prior art technology.

[0117] The present invention discloses that the economically most advantageous method of heating the body of water of the pool unit is with the aid of suntrap apparatuses.

[0118] Since a pool protection 10 has the heating absorbing unit of the suntrap apparatus integrated, no free-standing roof or free land surfaces required for these units.

[0119] In view hereof, the length of the requisite conduits may be reduced considerably.

[0120] With a temperature-sensing control system and an adapted pump circulation 4, the energy conversion from utilised suntrap apparatuses may be rendered more efficient.

[0121] With reference to FIGS. 3 to 8, it is there illustrated how two parallel rows of units 6a are oriented at the left-hand side and how two parallel rows of units 6b are oriented to the right-hand side, with a freely interjae section 10c.

[0122] The unit 6a and the unit 6b are both formed each from a set of eight sections, a set 16a of four series-connected sections 25a, connected in parallel with a second set 16b of four series-connected sections 25a for the unit 6a.

[0123] In FIGS. 3 to 8, reference numerals 20, 20', and 21, 21' are intended to illustrate anchorages, each for a shroud line 22, 22'.

[0124] Reference numeral 23 relates to the pool edge, 24 to an end beam, 25 to an absorber unit or a section, 26 to drainage holes connected to the mains, 27 to a pool pocket, while reference numeral 28 illustrates a path and 29 a skirt arrangement.

[0125] Reference numeral 30 is intended to indicate a suction conduit, reference numeral 31 a filter, 32 a thermostat valve, 33 a hose enclosed to one of the units 6a and 6b, 34 a pool temperature indicator, 35 a temperature indicator for a suntrap unit, 36 a rope and 37 differential thermostat.

[0126] More particularly, the present invention has for its object to offer a total solution to the problems existing in connection with pool protection 10 of pools 3.

[0127] The pool protection 10 consists of a reinforced polymer sheet which is dimensioned to cover the pool 3. It has high UV, elemental and temperature resistance and withstands all forms of chemicals which normally occur in swimming pools 3. The reinforcement renders it configurationally stable and so strong that it withstands both those pressure and point loadings which the sheet may normally be subjected to. On its longitudinal side, the sheet is anchored in carriage-formed anchorages 11c, 11d, with means 12 or sheet supporting shroud lines 112 disposed in parallel.

[0128] At the rear edge, the sheet is secured directly in the pool edge 23, and in the front edge in an end beam 24.

[0129] Beneath the sheet, there are disposed said means 12 or alternatively sheet supporting shroud lines 112 oriented in parallel.

[0130] When the pool is utilised for bathing of swimming, the pool protection 10 is folded up in a pool pocket 27. When the pool protection 10 is closed, there must be an air pocket 13 between the surface 2 of the water and the pool protection 10 so that a swimming remaining there can breathe.

[0131] The anchorage along the pool edge is more closely described with reference to FIG. 5.

[0132] The anchorage along the longitudinal sides is put into effect in that the sheet 10d is wedged fast in an opening on the anchorage 20. The carriages run in a path 28 along the edge of the pool 23. A folded skirt 29 seals between the pool edge 23 and the pool protection 10 so that sand and leaves etc. cannot blow down into the pool.

[0133] The anchorage in the front edge is shown in greater detail in FIG. 6.

[0134] A beam 24 may be secured in the front edge of the pool protection 10.

[0135] The beam 24 has been allocated a plurality of functions.

[0136] The first function is that it holds up and out the sheet 10d towards the longitudinal sides so that the anchorages 20 slide easily along the path 28 on the pool edge 23.

[0137] The second function is that, at the outer edges of the beam 24, a V-shaped rope 36 is secured, which is used to draw the pool protection 10 in and out.

[0138] The third function is that the beam 24 is anchored with straps or hooks in the pool edge 23 at the front edge of the pool.

[0139] A folded pool protection 10 is illustrated in greater detail in FIG. 7.

[0140] The suntraps 25, 25a in the form of absorbers are manufactured from reinforced polymer sheet fixed in parallel series on the pool protection 10. The suntraps 25 are flexible and may be folded over the transversely directed shroud lines 112 and pulled towards and to the pool pocket 27 so that the pool unit 3 will be open for bathing and swimming activities.

[0141] A simplified temperature regulation is illustrated in greater detail in FIG. 8.

[0142] Water portions 2a, 2b of the water 2 in the pool 3 become heat carriers by the intermediary of the suntrap units 6a, 6b.

[0143] The circulation pump 4 sucks up water within the heat carrier 2a (the pool water) through a suction conduit 30 from the pool unit 3 and forces it, through a filter 31, through a thermostat valve 32 via the suntrap hose 33, to the suntrap unit 6a and to an outlet 38 for the water 2b heated in the suntraps being recycled to the pool unit 3.

[0144] A control system, with differential thermostat 37 indicators or sensors, via an indicator 34, controls the temperature in the pool water 2 and, via an indicator or sensor 35, the temperature within the suntrap units 6a.

[0145] When the temperature of the suntrap indicator 35 is higher than that of the pool indicator 34, the thermostat valve 32 opens the circulation via the suntrap unit 6a, so that heat is delivered to the pool unit 3.
The heat system supplies thermal energy until any set temperature has been achieved. Thereafter, the valve 32 closes.

If the temperature in the pool unit 3 were to increase a further few degrees, when the pool protection 10 is mounted in position, the circulation pump 4 starts and a sprinkler (not shown) pours water on the pool protection 10. The evaporation which then starts takes its energy from the absorbers 25a and lowers the temperature of the heat carrier, which in turn cools the liquid in the pool unit.

In order to stabilize the system, a water absorbing blanket (not shown) may be placed on the suntraps.

The present invention is naturally not restricted to the embodiment disclosed by way of introduction above, but may undergo modifications without departing from the scope of the inventive concept as disclosed in the appended claims.

In particular, it should be observed that every illustrated unit and/or circuit may be combined with every other illustrated unit and/or circuit within the scope of the present invention in order to achieve the desired technical function.

1-9. (canceled)

10. A cover arrangement intended for a pool system, being lightly flexible and formed as a structure, covering a pool and serving as a protection, where said cover is adapted to be able to assume a first end position, covering the pool or unit, and a second end position exposing the pool unit or pool, and where necessary every interjacent position, in that said cover is adapted to cooperate, in an edge-related fashion with a guide arrangement or similar means, said cover being oriented, by supporting means, at a predetermined distance from the upper surface of a body of liquid or body of water enclosed by the pool, characterized in that said cover is integrally formed with and/or adapted to support liquid-fillable or liquid-filled channels, that said channels are adapted to be included in one or more thermal energy absorbing or radiating units, included in one or more suntrap apparatuses, and that a liquid, heated by solar energy in liquid-filled channels, is adapted to be heat exchanged with said body of liquid or water enclosed in the pool.

11. A cover arrangement as claimed in claim 10, characterized in that said liquid-filled channels are, within a number of thermal energy absorbing units, integrally structured between two or more lightly flexible sheet strata.

12. A cover arrangement as claimed in claim 10, characterized in that said liquid-filled channels are applied to the upper side of a sheet stratum, forming the cover within thermal energy absorbing or radiating units.

13. A cover arrangement as claimed in claim 10, characterized in that sheet supporting or bearing means extend between guides associated with a guide arrangement.

14. The cover arrangement as claimed in claim 10, characterized in that a pump unit is adapted to supply a liquid, to a heat exchanger, surrounded by the body of liquid enclosed in the pool or direct to the body of liquid enclosed in the pool.

15. A cover arrangement as claimed in claim 10, characterized in that a selective number of carriages are disposed to cooperate with parallel guides included in said guide arrangement, that each sheet supporting means, in the form of a rod or a wire, is adapted to cooperate each with said guide arrangement.

16. A cover arrangement as claimed in claim 15, characterized in that said liquid-filled channels are wholly or partly oriented at right angles to said rods.

17. A cover arrangement as claimed in claim 10, characterized in that one or more thermal energy absorbing units, included in one or more suntrap apparatuses are exposed to thermal insulating air strata oriented on each side of the pool protection and will thereby be subjected substantially to an absorbing thermal radiation and/or sunlight directed towards an upper side.

18. A cover arrangement as claimed in claim 10, characterized in that said units and associated components for the pool protection are structured with heat absorbing surfaces facing upwards and with thermally insulating surfaces facing downwards, for the formation of an upper surface for a safety distance.

19. A cover arrangement as claimed in claim 10, characterized in that the utilized thermal energy absorbing units are oriented so that they may absorb thermal radiation and/or sunlight substantially from above and do not, or insignificantly, permit the absorption of heat from the water surface via thermal conduction.

20. A cover arrangement as stated in the preamble of claim 10, characterized in that said cover being supported along the periphery of said cover above the body of water and above the upper end portion of the pool.

21. A cover arrangement as stated in claim 20, characterized in that at least one energy absorbing unit, related to a suntrap arrangement, is attached to said cover.

22. A cover arrangement as stated in claim 20, characterized in that a cover is formed from a material subject to be rolled or folded up.

23. A cover arrangement as stated in claim 20, characterized in that said cover is supported by one or more pontoons.

24. A cover arrangement as stated in claim 23, characterized in that said pontoons are fillable by compressed gas, especially compressed air.

25. A cover arrangement as stated in claim 24, characterized in that said pontoons are distributed along the surface of water and are adapted to support any predetermined force acting on said cover.

26. A cover arrangement as stated in claim 20, characterized in that said energy absorbing units may be emptied or filled with heat carrier liquid, such as water, and that the process of emptying is to be activated by a rolling up or folding sequence.

27. A cover arrangement as stated in claim 10, characterized in that a reduction of the temperature within said channels is performed by spraying a thin layer of water over the cover to be subject to evaporation.

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