Oct. 19, 1971 R. GRANDERATH 3,613,126

BUOYANT COVER FOR A SWIMMING POOL

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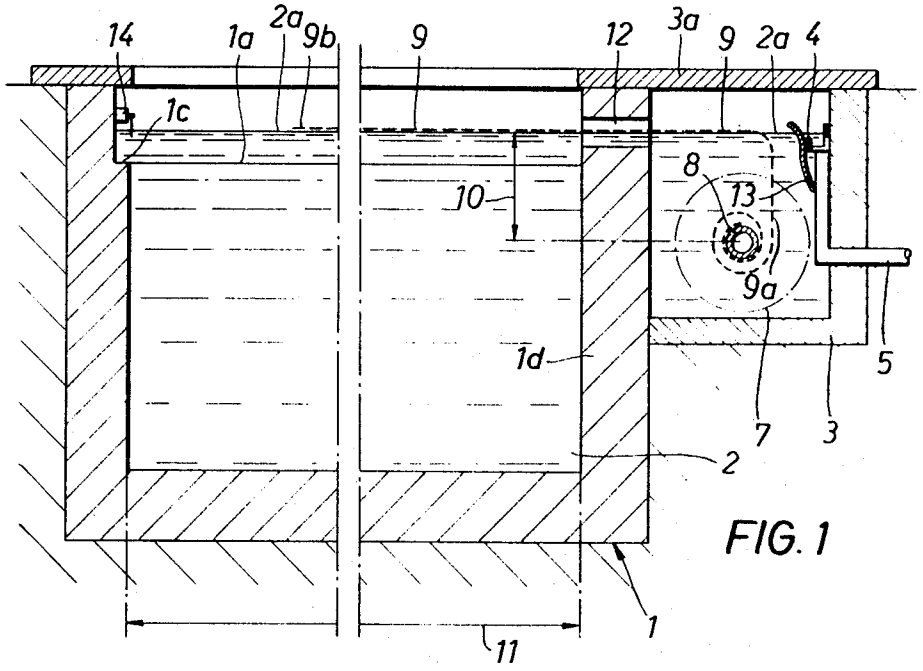


FIG. 1

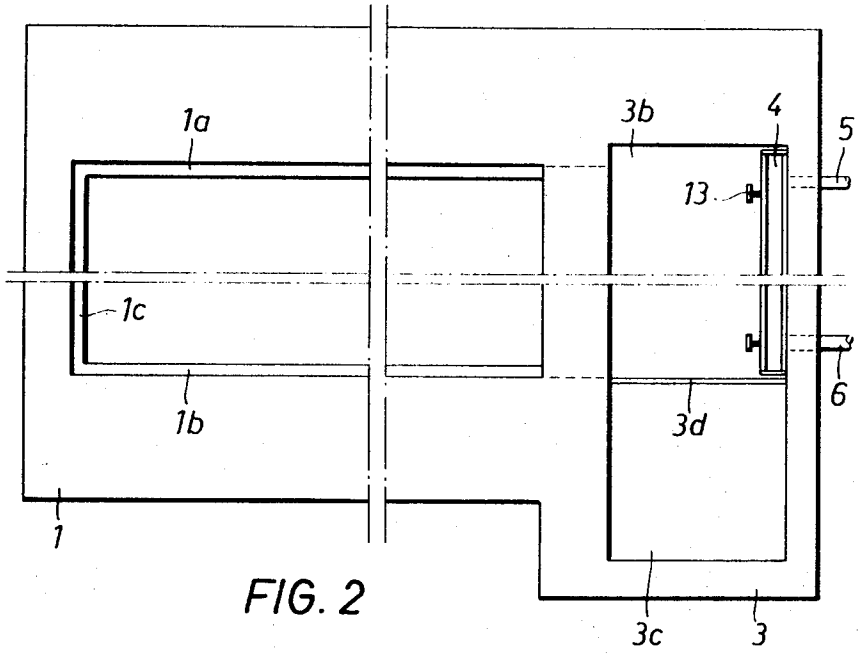


FIG. 2

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BUOYANT COVER FOR A SWIMMING POOL

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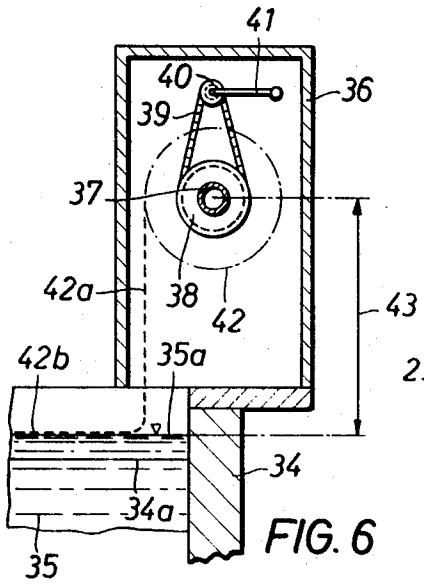


FIG. 6

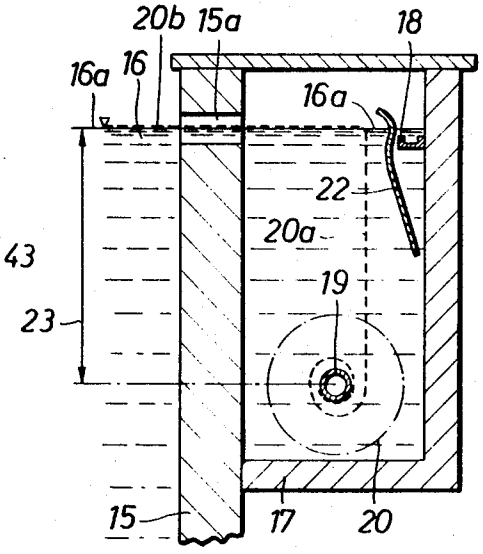


FIG. 3

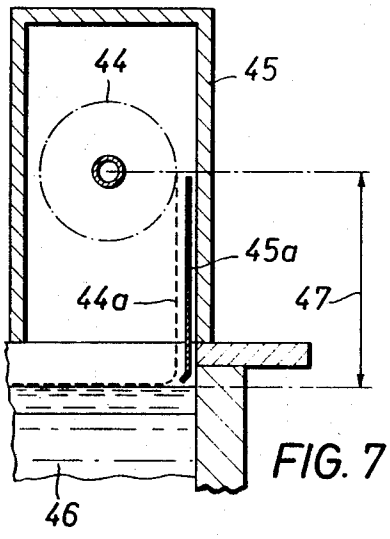


FIG. 7

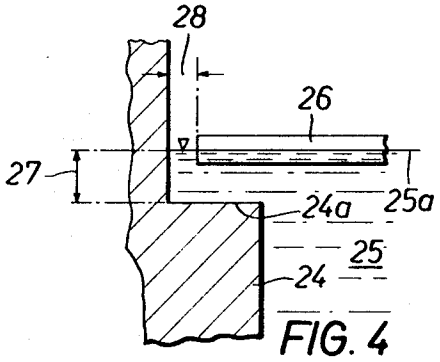


FIG. 4

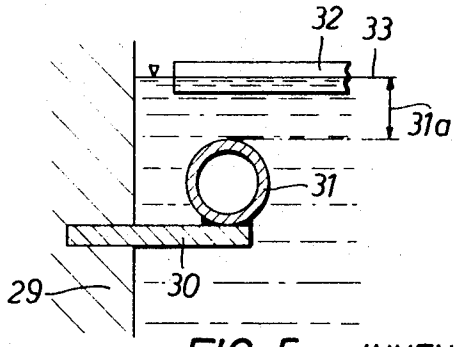


FIG. 5

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BUOYANT COVER FOR A SWIMMING POOL

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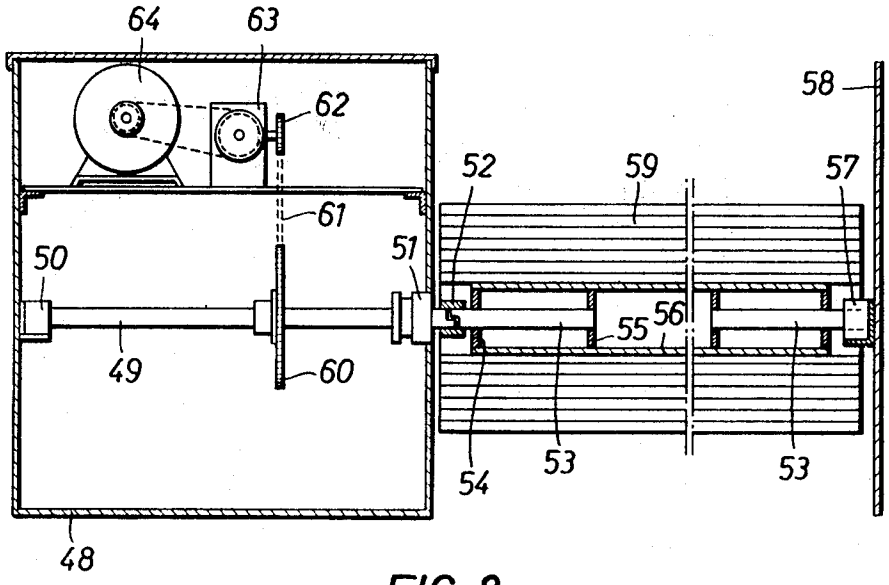


FIG. 8

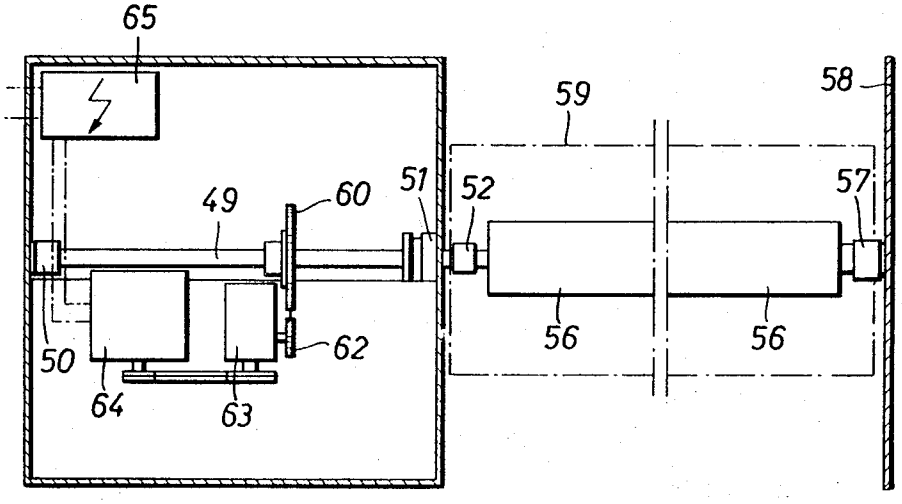


FIG. 9

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BUOYANT COVER FOR A SWIMMING POOL

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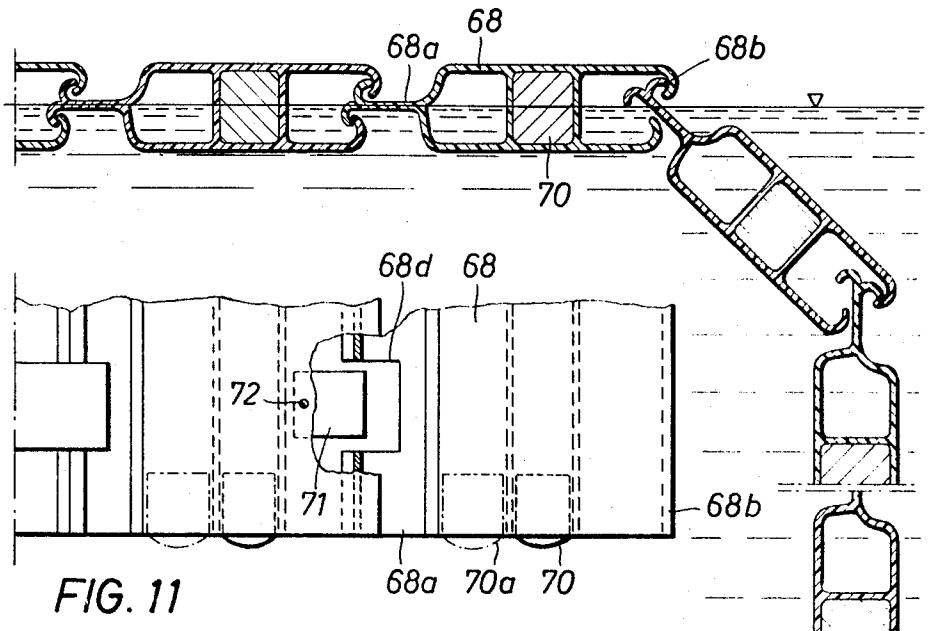


FIG. 11

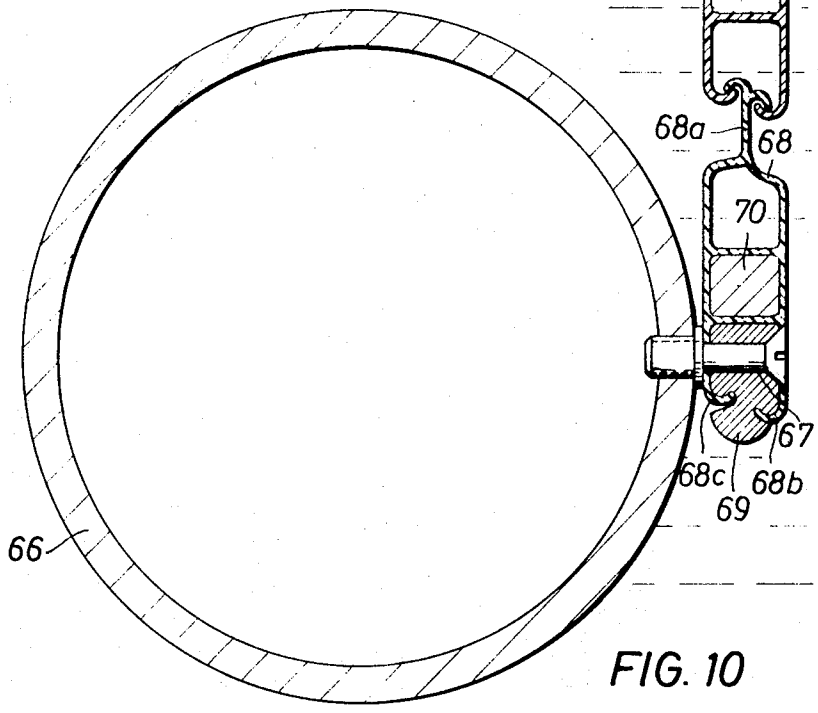


FIG. 10

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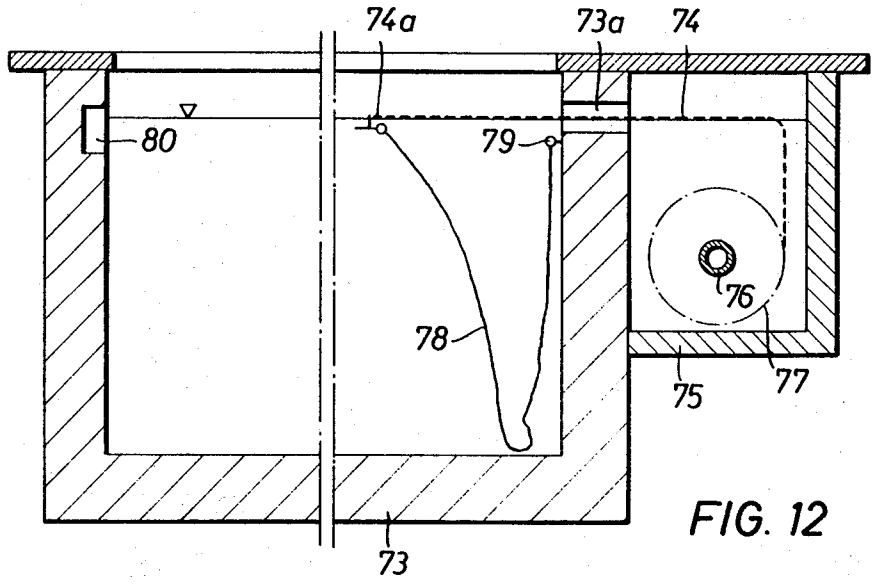


FIG. 12

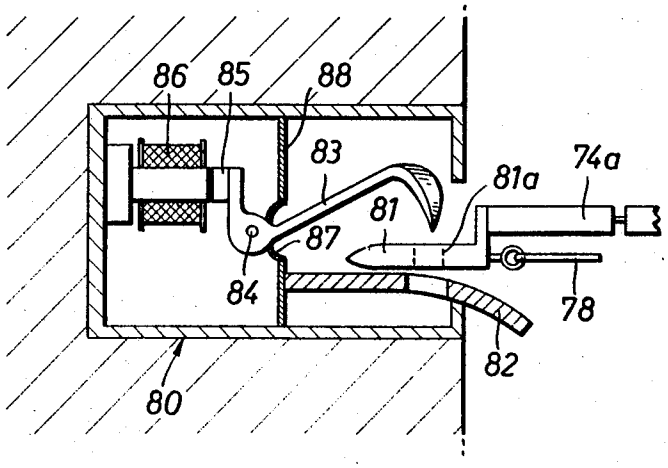


FIG. 13

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3,613,126

BUOYANT COVER FOR A SWIMMING POOL

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Int. Cl. E04h 3/16, 3/18
U.S. Cl. 4—172.14 19 Claims

ABSTRACT OF THE DISCLOSURE

A swimming pool has two opposite sides and is filled to a predetermined level with a body of water. A cover layer arrangement is provided in the form of a cover layer normally rolled in a coil on a shaft extending along and in parallelism with one of the sides of the pool. The cover layer is normally blocked from uncoiling but so arranged that in response to unblocking it can automatically deploy in a sense moving from the one side towards the opposite side of the swimming pool, covering the same and floating in the water near the upper level thereof. Supporting means is provided in the pool below the upper level of the water so spaced from the position which the cover layer assumes in deployed condition that it does not interfere with movement of the cover layer to the deployed condition but supports the cover layer when a weight is placed upon the same.

BACKGROUND OF THE INVENTION

The invention relates generally to a basin construction, and more particularly to a swimming pool construction.

In many instances it is desirable or necessary to cover liquid-filled basins against contaminants and, if the basin is large enough, to prevent persons—particularly children—from falling into the basin. Many communities have ordinances requiring swimming pools—which are considered "attractive nuisances"—to be fenced to provide the necessary protection against accidental drownings. Other communities, however, do not have such ordinances and in many cases fencing is resented by the owner because it detracts from the ornamental appearance of the pool, particularly if the latter is part of a coordinated landscaping scheme.

The provision of alternate protecting means has therefore long been considered desirable, but such alternate means have never been found to be practical because they have not been entirely safe, they have been complex and expensive, and they have been difficult to operate.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to provide a basin construction including a protective arrangement which covers the basin when not in use.

More particularly it is an object of the present invention to provide such a construction and such an arrangement which is quite simple and relatively inexpensive.

An additional object of the invention is to provide such a construction and arrangement which is easy to operate and which is highly reliable.

A concomitant object of the invention is to provide such a construction and arrangement wherein, when the cover moves from the closed to open position in which it exposes the pool surface, contaminants such as leaves and the like which have become deposited on the closed cover need neither be first removed from the cover nor will they fall into the water in the pool, but are instead carried along by the cover and deposited outside the pool for removal.

In pursuance of the above objects, and others which will become apparent hereafter, one feature of my invention resides in a basin construction, particularly in a swimming pool construction, which briefly stated comprises basin means having two opposite sides. A body of liquid fills the basin means to a predetermined level. Normally blocked cover layer means is provided mounted adjacent one of the sides of the basin means for deployment through the body of liquid in the region of the level thereof and in automatic response to unblocking. Supporting means in the basin means extends from one to the other of the sides thereof and is arranged below the level of the liquid by a predetermined spacing so as to be normally out of contact with the cover layer means in deployed condition of the latter, but for supporting the cover layer means when weight is placed upon the same.

According to the present invention the deployment of the cover layer means is effected either by constructing and arranging the latter in such a manner that its buoyancy causes the deployment, or else in another manner wherein gravitation effects the deployment.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic longitudinal sectional elevation through a basin construction according to the present invention;

FIG. 2 is a top-plan view of FIG. 1 with certain components omitted for clarity;

FIG. 3 is a fragmentary sectional elevational detailed view illustrating a further embodiment of the invention;

FIG. 4 is a fragmentary sectional elevational detail view illustrating a detail of an embodiment according to the present invention;

FIG. 5 is a view similar to FIG. 4 illustrating a detail according to another embodiment of the invention;

FIG. 6 is a view similar to FIG. 3 but illustrating an additional embodiment of the invention;

FIG. 7 is a view similar to FIG. 6 illustrating yet a further embodiment of the invention;

FIG. 8 is a longitudinal section through a cover layer means according to the present invention taken in direction transversely to the direction of deployment;

FIG. 9 is a top plan view of FIG. 8;

FIG. 10 is a diagrammatic cross-section in elevational view through a cover layer means according to the present invention in deployed condition;

FIG. 11 is a fragmentary top-plan view of two components of the cover layer means shown in FIG. 11;

FIG. 12 is a view similar to FIG. 1 but showing yet a further embodiment of the invention; and

FIG. 13 is a fragmentary detail view of FIG. 12 on an enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail, and firstly the embodiment illustrated in FIGS. 1 and 2 thereof, it will be seen that reference numeral **1** identifies a basin, here a swimming pool. The basin **1** may be outlined by wall means constructed in the usual manner, for instance a masonry wall or the like, but the particular type of wall means is immaterial. It is filled with liquid, in the case of a swimming pool with water **2** to a predetermined level which is identified with reference numeral **2***a*. In the illustrated embodiment the wall means of the basin **1** recedes outwardly in a predetermined spacing below

the level 2*a* along three sides of the basin as evident from FIG. 2, thereby forming support surfaces—which may also be thought as safety organs or means—1*a*, 1*b* and 1*c*, whose purpose will be explained subsequently.

Arranged adjacent one of two opposite sides of the basin 1, located exteriorly of the latter, is a housing 3 whose region 3*b* is also filled with water so that the level therein is the same as the level 2*a* in the basin 1, the position of the region 3*b* being evident from FIG. 2. A wall 1*b* separates the basin 1 from the housing 3, and an overflow trough 4 with outlet conduits 5 and 6 is provided at the level 2*a* on that side of the housing which is remote from the wall 1*d* (compare FIG. 2).

According to the present invention, cover layer means is arranged in the housing 3, and more particularly in the region 3*b* thereof. The cover layer means is in form of a cover layer 9 which is secured to a shaft 8 turnable about its own axis, and the cover layer 9 is normally rolled onto the shaft 8 to form a coil 7 thereon. In accordance with the present invention, and with this particular embodiment, the spacing 10 between the shaft 8 and the water level 2*a* is so selected that the buoyancy between the level 2*a* and the line at which the portion 9*a* of the cover layer 9 lifts off the coil 7, is large enough so that, when the shaft 8 is permitted to rotate freely without being blocked, the cover layer 9 will become deployed—that is unrolled from the coil 7—as a result of such buoyancy and without requiring drive means for effecting the deployment.

The cover layer 9 is composed of a plurality of substantially flat bar-shaped members 9*b* of which the leading one, that is the one which leads in the direction of deployment, will be located closely below the level 2*a* of liquid in the housing 3 when the basin is completely opened, that is when the cover layer 9 is coiled up to form the coils. Thus, water can freely flow to the overflow trough 4 and carry along any contaminants which may be floating in the water.

The members 9*b* have floatation capabilities, as will already have been inferred, and preferably they have a specific weight of between substantially 0.4 and 0.6, advantageously 0.5 so that their buoyancy in water is so strong that the torque it exerts upon the shaft 8 suffices to rotate the same—when the shaft 8 is unblocked—and thereby the coil 7 so that the cover layer 9 will float automatically to a position in which it closes and covers the basin 1, that is in which it extends transversely of the basin 1. According to the invention the distance 10 between the shaft 8 and the water level 2*a* is larger than half the diameter of the coil 7 when the cover layer 9 is completely coiled up, so that the coil 7 is completely immersed in the water in the housing 3. According to the invention an optimum deployment condition is created in having the distance 10 have a relation with reference to the length 11 of the basin 1—that is the distance through which the leading bar member 9*b* must move in order to arrive at the opposite side of the basin 1—have a relationship of 1:15 to 1:50, preferably 1:25.

The wall 1*b* is provided with a slot 12 whose length corresponds of course to somewhat more than the length of the bar members 9*b* and whose height is so selected that the lower edge bounding it is spaced below the level 2*a* whereas its upper edge is spaced above the level 2*a*. Thus, the individual bar members 9*b* which are of course articulately connected with one another, can float out through the slot 12 without coming in contact with any portions of the wall 1*b*.

To assure that the upwardly rising or upwardly floating bar members 9*b* will move towards the left in FIG. 1, that is to and out through the slot 12 rather than moving towards the right, guide means such as guide rail 13 may be provided which direct them to perform the desired movement.

FIG. 2 shows that the housing 3 is separated by a watertight partition wall 3 into the regions 3*b*—filled with water—and the region 3*c* wherein a drive arrangement is provided. A removable cover 3*a* may be provided for covering the housing 3. A limit switch or end switch 14 may be provided at the wall or side of the basin 1 which is remote from the housing 3 so that the switch 14 can control operation of the drive.

Coming to the embodiment in FIG. 3 it will be seen that this corresponds largely to that of FIG. 1. The wall separating the basin and the housing is here identified with reference numeral 15 and provided with the slot 15*a*. The housing is identified with reference numeral 17 and the water 16 has an upper level 16*a*. The overflow trough is identified with reference numeral 18 and a guide arrangement for the cover layer with reference numeral 22.

FIG. 3 differs from FIGS. 1 and 2 primarily in that the shaft 19 carrying the coil 20 constituted by the cover layer 20*b* is arranged below the level 16*a* with such a relatively large spacing 23 that a large portion 20*a* of the cover layer 20*b* extends upwardly from the coil 20 to the level 16*a* so that correspondingly larger buoyancy is provided and the torque transmitted to the shaft 19 is also larger than in FIGS. 1 and 2. This embodiment is therefore particularly well suited for very long pools or basins having a length of 20 to 30 meters and more.

FIG. 4 illustrates the operation of a support surface or safety organ which cooperates with the cover layer. In this embodiment the wall 24 of the basin is recessed at a distance 27 below the water level 25*a* of the body of water 25, thereby forming a support surface 24*a* along three sides of the basin (see FIG. 2). The support surface 24*a* cooperates with the marginal portions of the cover layer 26 but only if the latter is weighted from above, for instance if a person such as a child or even an adult inadvertently places weight upon the cover layer 26. Then, the latter will be deflected downwardly until its marginal portions rest on the separate surfaces 24*a* and prevent further downward displacement, thereby preventing the person or other weight on the support surface 26 from immersion in the body of water 25 and, if a person is involved, from drowning. The end faces of the individual members making up the cover layer 26 are spaced from the wall 24 by a distance 28 which is large enough so as to assure that no interference develops with the floatation and downward displacement of the layer 26.

In the embodiment of FIG. 5 another safety organ is provided, here in form of supports 30 which are secured to or in the wall 29 bounding the basin and which carry conventional handrails 31 such as may be provided for the convenience of swimmers utilizing the pool. The spacing between the handrails 31 and the level 33 of the water is such that in normal operation—that is when no downwardly directed deflecting force is applied—the cover layer 32 will not come into contact with the rails 31 but will rest upon the same when downwardly deflected in the same manner as discussed above with respect to FIG. 4. The spacing between the cover layer 32 and the handrails 31 is identified with reference numeral 31*a*.

I have found it to be particularly advantageous if the spacing 27 in FIG. 4 or 31*a* in FIG. 5 is a multiple of the thickness of the cover layer 26 or 32, respectively, and preferably corresponds to triple the thickness thereof.

The view in FIG. 6 corresponds to that of FIG. 3, but FIG. 6 illustrates a further embodiment of the invention. Here, reference numeral 34 identifies one end wall of a pool containing a body of water 35 whose upper level is identified with reference numeral 35*a*. Reference numeral 34*a* identifies supporting surfaces as discussed before.

Unlike the preceding embodiments, however, a housing 36 is provided adjacent the end wall 34 but above the level 35*a*. Mounted in the housing 36 is a shaft 37 for turning movement about its own axis, and this is connected via a sprocket wheel 38 and a sprocket chain 39 with a drive, illustrated as a manual drive shown in simplified form as a crank drive including the components

40 and 41. It is advantageous to provide intermediate the crank 41 and the sprocket 40 a self-locking drive, for instance a self-locking worm drive.

The distance between the water level 35*a* and the shaft 37—on which latter the cover layer 42*b* may be coiled to form a coil 42—is identified with reference numeral 43 and the portion 42*a* of the cover layer 42*b* which extends from the coil 42 to the water level 35*a* has such a weight that under the influence of gravitational force it exerts on the shaft 37 a torque sufficient to unroll the entire cover layer 42*b* from the coil 42 when the shaft 37 is permitted to rotate without requiring a drive for this purpose. If a self-locking gear drive is interposed, then turning of the member 1 overcomes only the self-locking force of the drive. Such a drive is advantageous to prevent excessively fast deployment or uncoiling of the cover layer 42*b*.

The embodiment illustrated in FIG. 7 is somewhat analogous to that of FIG. 6. Reference numeral 45 identifies the housing and reference numeral 46 the body of water in the basin. Reference numeral 44 identifies the coiled cover layer which, in this embodiment, uncoils at a side of the coil 44 which faces away from the direction of deployment, rather than towards it as in FIG. 6. The length of the portion 44*a* extending from the coil 44 to the level of the body of liquid 46 corresponds to the distance 47 between the liquid level and the shaft. This embodiment is particularly advantageous if the individual elements making up the cover layer 44 are so connected with one another that their freedom of articulate movement relative to one another permits only deployment in the sense illustrated in FIG. 7. Reference numeral 45 identifies a guide for directing the deploying cover layer.

In FIGS. 8 and 9 I have illustrated an embodiment of a drive utilizing an electromotor. Reference numeral 48 identifies a water-tight housing in which a drive shaft 49 is journalled in journals 50, 51, preferably antifriction bearings. Conventional and therefore well-known sealing means is provided where the drive shaft 49 penetrates the housing wall, and the drive shaft is connected via the coupling 52 with the mounting shaft for the cover layer, the mounting shaft being composed of two stub shafts 53, intermediate rings 54, 55 and a tubular element 56. The stub shaft 53 is journalled in a journal 57 on the housing wall 58. The cover layer may be rolled onto the mounting shaft in form of a coil 59.

A sprocket wheel 60 is mounted on the drive shaft 49 and connected via a sprocket chain 61 and a sprocket wheel 62 with a step-down reduction gear 63 of known construction which is advantageously a self-locking worm gear and which is driven by an electromotor 64.

A transformer 65 and known switching devices supplies electric current to the electromotor 64, preferably but not necessarily of 42 volt potential. The drive is so constructed that when the cover layer is to be withdrawn from the surface of the basin, that is when it is to be rolled in form of a coil on the mounting shaft, it overcomes the buoyancy of the cover layer or the weight and gravitational force acting upon the same, depending upon which of the preceding embodiments is involved. Of course, it further must overcome the internal frictional forces of the drive system, including those of the journals and the self-locking of the gear 63. When the cover layer is deployed, that is when it moves from the coil across the opening of the basin, the direction of rotation of the motor is reversed but the latter must overcome only the self-locking of the drive and the internal frictional forces of the drive system, whereas the force necessary for effecting deployment of the cover layer is provided either by buoyancy of the latter or by the weight and gravitational force acting upon it, as the case may be.

FIG. 10 is a longitudinal section showing a mounting shaft with the coil of cover layer. Reference numeral 66 identifies in simplified form the mounting shaft to which there is secured by means of screws 67 or analogous fastening elements a substantially flat bar-shaper member 68, a plurality of which together make up the cover layer. Each of the members 68 is a hollow profile of synthetic plastic material. Extending along one longitudinal edge is a double hook-shaped portion 68*a* whereas provided at the other longitudinal edge there are provided two hooks 68*b* and 68*c* which are so arranged that they interengage but permit articulated movement of the adjacent members 68 with reference to one another.

Each of the members 68 is provided with two internal chambers of which at least one but preferably both are provided at the respective end face of the members 68 with fluid-tight closures 70, 70*a* to prevent the escape of air and the entry of water. A filler member 69 may be provided for facilitating connection of the lowermost member 68 and may be introduced between the hook 68*b* and 68*c*, as illustrated.

To prevent difficulties in the deployment and subsequent coiling-up of the cover layer, longitudinal movement of the members 68 with reference to one another must be prevented. For this purpose a member 71 is introduced between each two adjacent members 68 from one end of the latter, and connected with pins 72 as shown in FIG. 11. The hook 68*a* of the adjacent member 68 is provided with a cutout 68*d* which makes it possible for the members 68 to move articulately with reference to one another, and to move toward and away from one another transversely to their elongation, as shown at the upper left-hand side of FIG. 10, but prevents relative shifting of the adjacent member 68 longitudinally of one another.

In FIG. 12 I have shown a further embodiment of the invention. Here, the basin is identified with reference numeral 73 and cover layer with reference numeral 74. The housing is identified with reference numeral 75 and the shaft, onto which the cover layer 74 can be rolled in form of a coil 77, is identified with reference numeral 76. In the embodiment of FIG. 12 the safety organs or supporting surfaces are in form of two flexible but non-extensible elongated members 78, such as ropes, tapes or the like, which are located below the cover layer 74 when the same is deployed and which have a length corresponding to the longitudinal extension of the basin 73. It is advantageous that the members 78 be connected, for instance via an eye 79 or the like, to the basin wall in the region below the slot 73*a* connecting the basin with the housing 73 and extend along the longitudinal edges of the deployed cover layer 74 below the latter. The opposite end of each of the elements 78 is anchored to the leading edge 74*a* of the cover layer 74 which is so constructed that it operates with a locking arrangement 80 provided at the basin wall remote from the housing 75 so that, when the leading edge 74*a* is locked by the arrangement 80 which occurs when the cover layer 74 is fully deployed, the elements 78 will be taut and provide the desired support against excessive downward deflection of the cover layer 74 when weight is placed upon the latter from above.

Coming, finally, to FIG. 13 it will be seen that in this figure I have illustrated a diagrammatic device 80, that is an illustration in principle. According to FIG. 13 each of the elements 78 may be provided at the leading edge 74*a* of the cover layer 74 with a hook-shaped projection 81 having a bore 81*a*. Arranged in a recess provided in the wall of the basin 73 is a guide member 82 onto which the projection 81 moves when the leading edge 74*a* of the cover layer 74 reaches the recess in response to complete deployment of the cover layer 74. When this take place, a hook 83 which is pivotably mounted on a shaft 84 and carries an armature 85 of an electromagnet 86, snaps into the bore 81*a*, thereby locking the cover layer in position. When it is desired to retract the cover layer, that is to coil it onto the shaft 76 to form the coil 77 thereon and make the water in the basin 73 excessible for swimming, the electromagnet is energized, attracting the armature 85 and lifting the hook 83 to the illustrated position, thereby permitting withdrawal of the leading edge 74.

Naturally, suitable and well known sealing means **87** are provided where the hook **83** passes through the wall **88**. When the arrangement is in engaged position, that is when the device **80** holds the leading edge **74***a* in position, the elements **78** are taut below the cover layer **74**, and thus serves the same function as the analogous means shown in FIGS. 4 and 5. It is emphasized that the construction of the device **80** and the associated portions provided on the leading edge of the cover layer **74** could of course be different from what has been illustrated without departing in any way from the scope and inventive concept of the present disclosure.

In fact, other modifications and changes are possible in the various embodiments disclosed herein without any such departure, and thus within the scope of the present invention. It is thus for instance possible to connect the cover layer not directly on the shaft, as illustrated in FIG. 10, but instead to provide two or more tapes, ribbons or the like on the shaft which have a length corresponding approximately to the distance of the shaft from the water level, and to connect the cover layer to these ribbons, tapes or the like. It is also possible to arrange the entire device so that it can be shifted in its height with reference to the water level in the basin, that is that the distance between the water level and the shaft can be varied in order to permit adjustment in dependence upon the water level which may of course fluctuate.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a construction, particularly a swimming pool construction, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. A basin construction, particularly a swimming pool construction, comprising in combination, basin means having two opposite sides; a body of liquid filling said basin means to a predetermined level; cover means comprising a turnable shaft mounted adjacent one of said sides and being normally blocked against turning movement, and a buoyant cover layer connected to and normally forming a coil on said shaft for unaided deployment through said body of liquid in the region of said level in direction towards the other of said sides and in automatic response to unblocking of said shaft; blocking means normally blocking said shaft against turning movement and operable for unblocking said shaft for initiating the automatic deployment of said cover layer; and supporting means in said basin means extending from one to the other of said sides and arranged below said level by a predetermined spacing so as to be normally out of contact with said cover layer in deployed condition of the latter, but for supporting said cover layer when weight is placed upon the same.

2. A basin construction as defined in claim **1**, wherein said cover layer is composed of a plurality of connected substantially bar-shaped flotation elements each extending in at least substantial parallelism with said shaft.

3. A basin construction as defined in claim **2**, wherein said shaft is located above said level and said predetermined spacing is so selected that the cover layer is deployed under the influence of gravity in automatic response to unblocking.

4. A basin construction as defined in claim **2**, wherein said shaft is located below said level and said predetermined spacing is so selected that said cover layer is deployed under the influence of buoyancy in automatic response to unblocking.

5. A basin construction as defined in claim **2**, wherein said spacing is greater than half the diameter of said coil and has a ratio of between 1:5 and 1:50 with reference to the distance between said sides.

6. A basin construction as defined in claim **5**, wherein said ratio is substantially 1:25.

7. A basin construction as defined in claim **2**; said blocking means comprising self-retarding step-down gear drive means associated with said shaft for turning the latter and thereby coiling said cover layer onto the same.

8. A basin construction as defined in claim **7**, said gear drive means being constructed and arranged so that during deployment of said cover layer the latter need overcome merely the inherent friction of said gear drive means.

9. A basin construction as defined in claim **4**; further comprising a housing adjacent to said one side of said basin means and accommodating said shaft, said housing being filled with said liquid to said level; and slot means connecting the interior of said housing with the interior of said basin means and constructed and arranged for permitting unobstructed deployment of said cover layer through said slot means into said basin means.

10. A basin construction as defined in claim **2**, said supporting means comprising supporting surfaces below said level.

11. A basin construction as defined in claim **10**, said basin having a boundary wall, and said supporting surfaces being constituted by shoulders in said boundary wall.

12. A basin construction as defined in claim **10**, said supporting surfaces being constituted by hand rails.

13. A basin construction as defined in claim **10**, said supporting surfaces being constituted by elongated flexible elements extending from one to the other of said sides; connecting means connecting said flexible elements to one of said sides; and releasable securing means for releasably securing said elements to the other of said sides.

14. A basin construction as defined in claim **13**, said releasable securing means comprising electromagnetic means operable for effecting release of said elements from said other side at least in response to turning movement of said shaft in a sense effecting coiling of said cover layer onto the same.

15. A basin construction as defined in claim **2**, wherein said flotation elements are hollow profiled elements of synthetic plastic material and articulately connected to one another.

16. A basin construction as defined in claim **15**, wherein said elements each have at least one internal sealed buoyancy chamber.

17. A basin construction as defined in claim **15**; and further comprising linking means linking said elements articulately but without freedom of relative longitudinal displacement.

18. A basin construction as defined in claim **10**, wherein said elements have a predetermined thickness, and wherein said supporting surfaces are spaced below said level by a distance corresponding to a multiple of said thickness.

19. A basin construction as defined in claim **18**, wherein said distance corresponds to triple said thickness.

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