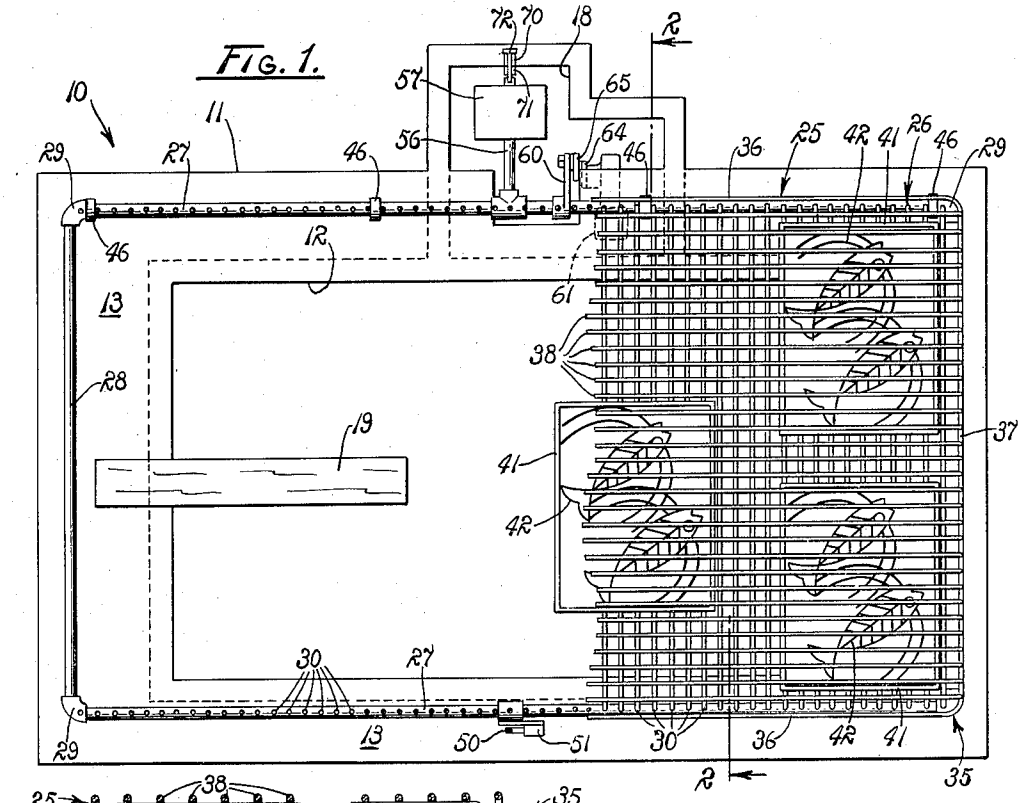
June 17, 1958 P. W. MATLOCK 2,838,767

SAFETY DEVICES FOR SWIMMING POOLS AND THE LIKE

Filed Aug. 19, 1955 3 Sheets-Sheet 1

FIG. 1.



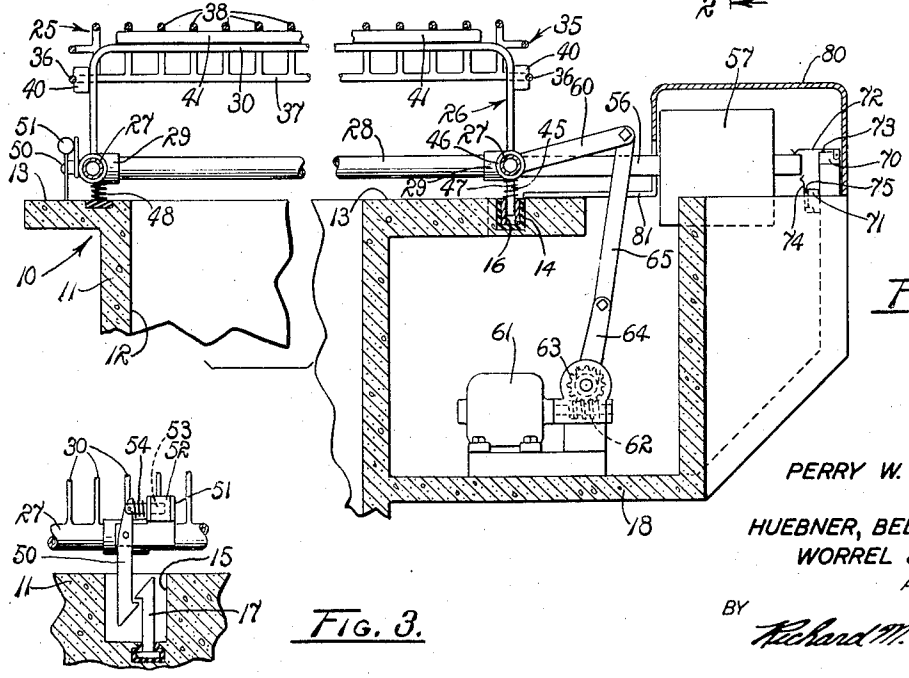


FIG. 2.

FIG. 3.

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SAFETY DEVICES FOR SWIMMING POOLS AND THE LIKE

Filed Aug. 19, 1955 3 Sheets-Sheet 2

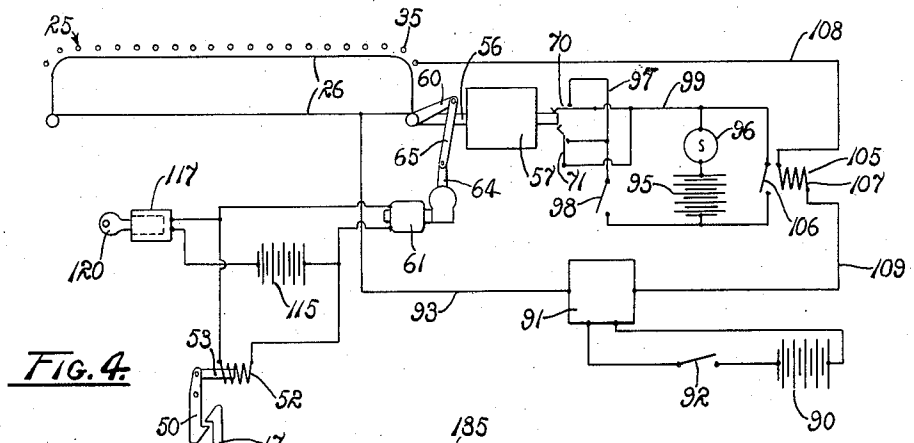


FIG. 4.

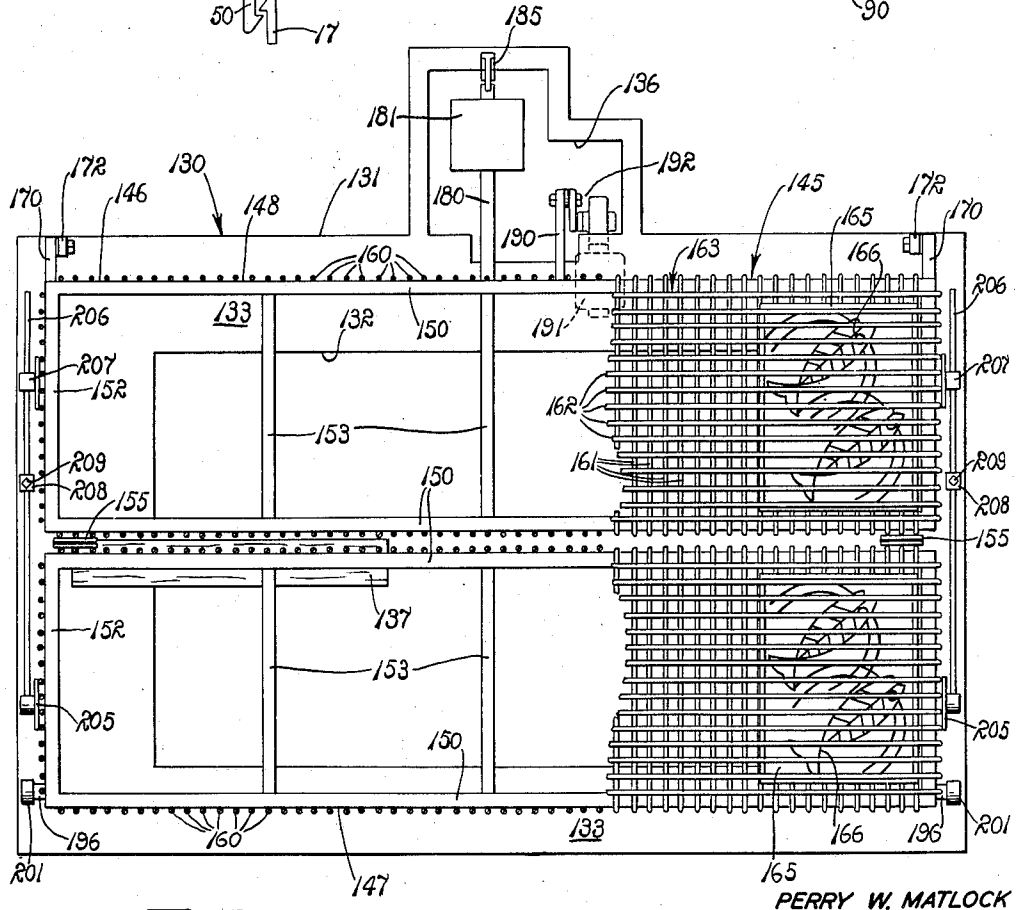


FIG. 5.

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SAFETY DEVICES FOR SWIMMING POOLS AND THE LIKE

Filed Aug. 19, 1955 3 Sheets-Sheet 3

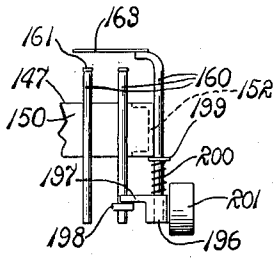


FIG. 7.

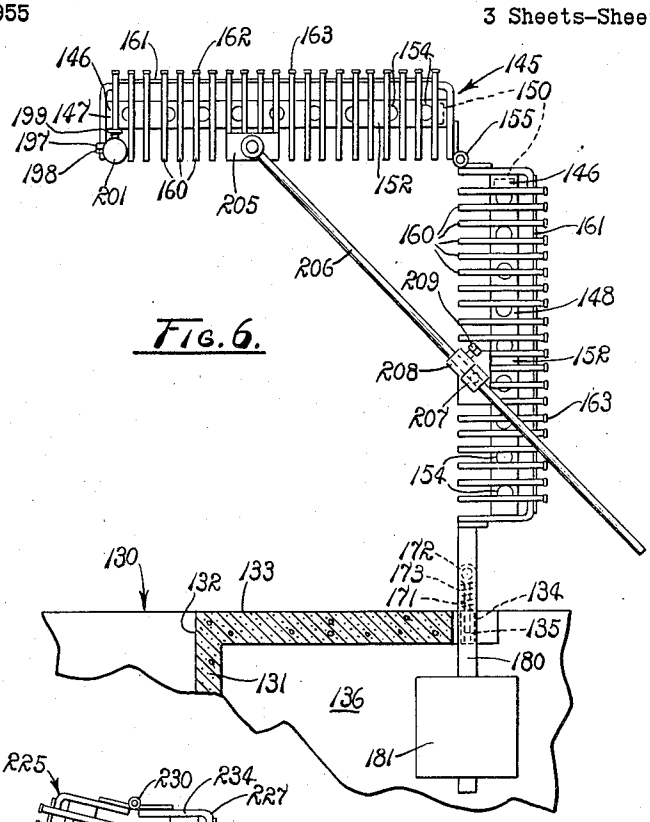


FIG. 6.

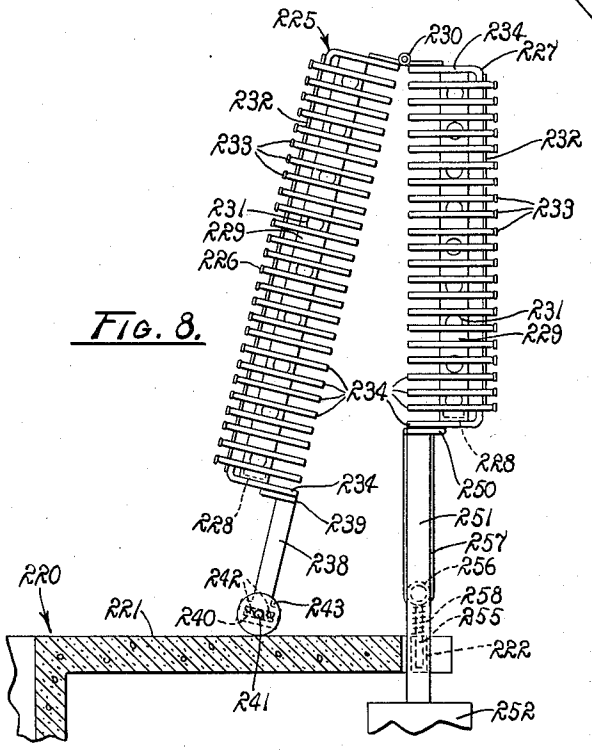


FIG. 8.

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2,838,767

SAFETY DEVICES FOR SWIMMING POOLS AND THE LIKE

Perry W. Matlock, Fresno, Calif.

Application August 19, 1955, Serial No. 529,440

28 Claims. (Cl. 4—172)

The present invention relates to safety devices for swimming pools and the like and more particularly to a cover and associated structure therefor.

The hazards of unattended swimming pools are so manifest as to require only brief reference to illustrate the utility of the present invention. Such hazards are particularly serious in urban areas where population densities create many opportunities for the inadvertent exposure to danger of wandering children, guests, trespassers, pets and the like. It is not practical in all instances to fence swimming pools and even where practical such fencing does not provide a full answer to the problem. Gates must be employed which, as a result of human error, are frequently left open. Children have been known to climb fences to gain access to unattended pools. It has been known to provide plastic and fabric pool covers but these too have not proved entirely satisfactory. They are so cumbersome to install and remove that they are usually not used during periods when the pools are most frequently employed. Of course, pools are the most inviting during swimming season and thus most hazardous. The failure to use previously known pool covers when the hazards are the greatest has seriously impaired the safety measure.

Accordingly, an object of the present invention is to provide improved safety devices for swimming pools and the like, adapted dependably to preclude unauthorized entrance thereto.

Another object is to provide a safety device not only intended to exclude people, pets, and the like from swimming pools but to make efforts to effect unauthorized entrance uncomfortable and to signal their presence near the pools.

Another object is to provide a safety device for swimming pools adapted to signal the unauthorized presence of people, pets and the like.

Another object is to provide a safety device adapted to impart an electrical shock to anyone coming in contact therewith.

Another object is to provide a cover for a swimming pool movable between a position over the pool and a retracted position disposed for shading the pool and/or areas adjacent thereto.

Another object is to provide a protective cover adapted for manual or powered movement between a position spanning the pool and a retracted position.

These and other objects will become more fully apparent upon reference to the following description.

In the drawings:

Fig. 1 is a top plan view of a swimming pool and a safety device provided by the present invention, in spanning relation across the pool, portions of the device being broken away for illustrative convenience.

Fig. 2 is a somewhat enlarged fragmentary vertical section taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary view with portions in section showing a lock preferably employed with the present invention.

Fig. 4 is a schematic diagram of the protective cover of Fig. 1 and an electrical circuit for use in association with the cover.

Fig. 5 is a top plan view of a swimming pool employing another form of safety device embodying the invention.

Fig. 6 is a side elevation of the cover of Fig. 5, with the pool fragmentarily shown and partially in section. The figure illustrates the cover in upwardly retracted position with a section thereof overhanging the pool.

Fig. 7 is a somewhat enlarged fragmentary front view of a roller and mounting arrangement therefor as employed with the cover of Figs. 5 and 6.

Fig. 8 is a side elevation of a further form of cover of the present invention in retracted position and in association with a pool fragmentarily shown and partially in section.

Referring with greater particularity to the drawings:

A swimming pool constituting an illustrative environment for the structure of the present invention is generally indicated by the numeral **10** in Figs. 1 and 2. The pool provides a preferably concrete foundation **11** having a central open cavity **12** therein adapted to contain a quantity of water, not shown, for swimming, wading, and like purposes. The foundation includes a support surface or ledge **13** constituting a walk in circumscribing relation to the cavity having upwardly disposed sockets **14** longitudinally aligned at a rear side of a pool and a bore **15** at a front side of the pool, the latter being seen in Fig. 3. Bearing sleeves **16** are rigidly set in the socket and insulated from the foundation for a purpose subsequently to be described. An upwardly extended keeper member **17** is rigidly set in the concrete within the bore and likewise insulated from the foundation. A hollow open top vault **18** preferably also of concrete is extended laterally from the rear side of the pool. As is generally employed with a swimming pool, a diving board **19** is mounted in any convenient manner at an end of the pool on the walk in overhanging relation to the cavity.

A protective cover **25** embodying the principles of this invention includes an electrically conductive generally rectangular, substantially rigid lower frame **26** having front and rear longitudinal side members **27** and transverse end members **28** interconnecting the side members by elbows **29**. The lower frame includes a plurality of upwardly arched, longitudinally spaced, elongated, cylindrical, slightly flexible bars **30** transversely interconnecting the side members of the lower frame.

The cover **25** also includes an electrically conductive, generally rectangular, substantially rigid upper frame **35** likewise having longitudinal side members **36** and transverse end members **37**. The upper frame includes a plurality of upwardly and outwardly arched, transversely spaced, elongated, cylindrical, somewhat flexible bars **38** longitudinally interconnecting the end members of the upper frame. Both of the frames may be constructed of aluminum tubing, stainless steel or like conductive materials and therefore constitute electrically conductive mesh-like screens or grids. If desired, the grids may be of non-conductive material and be covered with a conductive material or have conductors imbedded therein. Further, if the warning and shocking features are not required, the conducting material can be dispensed with entirely.

With particular reference to Fig. 2, the upper frame **35** is positioned over the lower frame **26** with the side and end members **36** and **37**, respectively, circumscribing the lower frame and with the upper longitudinal bars **38** and transverse bars **30** right angularly arranged and located in spaced substantially parallel planes. A plurality of elongated insulating strips **40** are interposed the end and side members of the upper frame and the

transverse bars of the lower frame. In addition, a plurality of insulating plates 41 are preferably sandwiched between the longitudinal and transverse bars at convenient locations, as seen in Fig. 1. In order to enhance the appearance of the cover 25, the insulating plates may be provided with an attractive design 42 simulating marine life, or the like. The insulating strips and plates not only serve electrically to insulate the upper frame from the lower frame but also assist in supporting the upper frame in releasable dependable association on the lower frame.

A plurality of upwardly disposed pins 45 are slidably mounted in the sleeves 16 set on the walk 13 for longitudinal movement therein. The pins provide eyelets 46 integral therewith rotatably receiving the rear side member 27 of the lower frame 26. Coil springs 47 are fitted around the pins and are interposed the walk and the eyelets for cushioning the cover in rested position on the walk. For a similar purpose, a front spring 48 has an upper end welded, or otherwise rigidly secured, to the front side member 27 of the lower frame 26 and a lower end adapted to rest on the walk.

When mounted in this manner the frames 26 and 35 are adapted for pivotal movement as a unit between a lower substantially horizontal position in spanning or covering relation to the cavity 12, marginally overlapping the walk 13 of the pool 10 as shown in Figs. 1 and 2, and a retracted position upwardly extended at one side of the pool, as will be evident. When the frames are in their lower position, the front and rear springs 47 and 48, respectively, resiliently mount the frames for floating movement relative to the walk from a normal position of rest to limited positions above and below said position of rest.

A latch 50 is pivotally mounted on the front side member 27 of the lower frame 26 and provides ends upwardly and downwardly extended therefrom. A solenoid 51 is also mounted on such front side member having an actuating coil 52, as best seen in Fig. 4, and an armature 53 pivotally connected to the upwardly extended end of the latch. When the cover 25 is in lower position, the downwardly extended end of the latch is adapted to lock in engagement with the keeper member 17. A spring 54 around the armature normally biases the latch to keeper engaging position. The manner of releasing or unlocking the latch will be described below. The latch and keeper member together with their associated control elements therefore constitute a cover lock.

An elongated arm 56 provides an end rigidly secured to the rear side member 27 of the lower frame and rearwardly extended therefrom in a direction opposite to the extension of the bars 30 from the rear side member and in a plane substantially parallel to such bars. A counterweight 57 substantially balancing the weight of the cover 25 is rigidly mounted on the arm adjacent to the rearward end thereof. Thus, the rear side member rotatably mounted in the eyelets 46 constitutes a fulcrum about which the cover and counterweight pivot. The provision of the counterweight is primarily to enable convenient manual elevational control of the cover, if desired, and to prevent accidental descent of the cover when in retracted position, as will be seen.

A lever 60 is also rigidly connected to the rear side member 27 and provides an end rearwardly extended therefrom. An electric motor 61 is mounted in the vault 18 providing an output shaft connected to a worm gear 62 and having a worm wheel 63 in mesh therewith. A crank 64 is connected to the worm wheel and a link 65 pivotally interconnects the crank and the rearward end of the lever thereby connecting the lever in driven relation to the motor. The worm drive described is preferred for the purpose. While it constitutes an effective motivation of the cover by the motor it resists movement of the motor by the cover, thus serving dependably to hold the cover in selected position.

With particular reference to Figs. 2 and 4, upper and lower limit switches 70 and 71, respectively, are mounted on the vault 18 rearwardly of the arm 56 on which the counterweight 57 is mounted. The upper switch provides a pivoted actuating element 72 forwardly extended above the normal position of the arm with the cover 25 in lower position and a switch button 73 engageable by the actuating element. The lower switch provides a pivoted actuating element 74 disposed beneath the normal position of the arm and also has a switch button 75. Both of the switches have normally open positions but their actuating elements are positioned adjacent to the arm so that upon movement of the cover 25 above or below its normal position of rest when covering the cavity 12 the arms are adapted to engage one or the other of the actuating elements to move it into engagement with its respective button thereby to close its respective switch.

A lid 80 of sheet metal, plastic or the like, is releasably fitted on the vault 18 over the counterweight 57 and the electric motor 61 therein to prevent water and the like from entering the vault and damaging these members. The lid provides slots indicated at 81 which accommodate extension and movement of the arm 56 and lever 60.

In Fig. 4 an electrical circuit is shown for use in association with the cover 25. The circuit provides a main battery 90 connected in series with a power-pack 91 adapted to provide a high voltage, low current output somewhat similar to that employed in charging electrical fences and the like. A main control switch 92 is connected in series with the power-pack and the battery for energizing and de-energizing the power-pack. The power-pack is connected to the lower frame 26 of the cover by a lead 93.

The electrical circuit also includes an auxiliary battery 95 having an electrically energizable signaling device 96, such as an alarm, bell, light or the like, connected to one pole of the battery. An opposite pole of the auxiliary battery is connected by a lead 97 to an auxiliary control switch 98, the latter being further connected to one contact of both of the upper and lower switches 70 and 71. The signaling device is connected on the opposite side thereof from its connection to the auxiliary battery by lead 99 to contacts of the upper and lower switches opposite to the contacts connected to lead 97. Thus, the upper and lower switches are connected in parallel with each other and the combined parallel arrangement connected in series with the auxiliary control switch, the auxiliary battery and the signaling device.

A relay 105, or other suitable electromagnetic device provides contacts 106 connected in series with the auxiliary battery 95 and the signaling device 96. The relay also has an energizing coil 107 electrically connected by lead 108 to the upper frame 35 of the cover 25 and by lead 109 to an opposite pole of the power-pack 91 from the pole to which the lower frame 26 is connected.

In addition, the electrical circuit provides a motor control battery 115 connected in series with a switch lock 117 and the electric motor 61. A key 120 is releasably inserted in the switch lock for opening and closing the circuit thereby to energize and to de-energize the motor. The actuating coil 52 of the solenoid 51 is connected in parallel with the motor and is thus energized and de-energized upon turning the key in the switch lock to draw the latch 50 into keeper releasing position or to return it to locking position.

Operation of first form

The operation of the embodiment of the present invention shown in Figs. 1 to 4 is believed to be readily apparent and is briefly summarized at this point. With the cover 25 positioned in spanning relation over the pool 10, as shown in Figs. 1 and 2, the master control switch 92 and the auxiliary control switch 98 are closed.

Whenever a person touches both of the frames 26 and 35 he completes an electrical circuit and receives

a slight shock as a warning to stay away from the pool. In this regard it is to be noted that the shock is not designed to be harmful inasmuch as the power-pack **91** yields a high voltage but relatively little current. The shock desired is somewhat similar to that imparted by the well known forms of electrical fences, or less. It will be evident that both frames could be charged so that a person who is grounded would receive a shock upon touching either frame.

When a person, and in particular a child, or an animal, not shown, climbs or otherwise gets on the cover **25**, the weight causes the longitudinal bars **38** of the upper frame **35** to depress into engagement with the transverse bars **30** of the lower frame **26**. Contact between the upper and lower frames in this manner or in any other manner completes an electrical circuit from the lower frame through lead **93**, the power-pack **91**, the lead **109**, the relay coil **107**, the lead **108**, and back to the upper frame.

The effect of interconnection of the upper and lower frames **35** and **26** is to energize the coil **107** thereby to close the relay contacts **106**. This completes an electrical circuit through the signaling device **96** audibly or visually to warn the owners of the pool, attendants, or others, of the presence of unauthorized persons near the pool. Of course the sounding of an alarm of this nature might also be employed to frighten individuals on the cover **25**.

In the event that for some reason electrical interconnection of the frames **26** and **35** does not occur, an auxiliary warning device is provided. Thus, when weight is imposed on the cover **25**, such as by a person climbing thereover, the cover is depressed on either the forward or rearward springs **47** and **48**. For example, if weight is imposed on the front of the cover, the arm **56** bearing the counterweight **57** is raised to engage the actuating element **72** of the upper switch **70** thereby to close this switch. Assuming the auxiliary switch **98** to be closed, this completes a series circuit through the signaling device **96** energizing the same. If weight is imposed on the middle or the rear of the cover to lower the arm **56**, the actuating element **74** of the lower switch **71** is engaged to close the lower switch **71** and likewise to energize the signaling device. It is thus seen that any movement of the cover and consequently the arm from a normal position of rest causes actuation of the signaling device. It will be evident that all of the warning features of this invention may be brought into play at the same time or employed separately, as desired.

Even without any of the described warning features, the cover **25** of the present invention serves completely to bar unauthorized persons from access to the pool **10** by reason of its physical presence over the pool. This is further insured by provision of the lock including the latch **50** engaging the keeper **17** in the lower position of the cover. Only persons with a key **120** are able to open the lock and elevate the cover.

Thus, whenever it is desired to use the pool **10**, the key **120** is inserted in the switch lock **117** and turned as necessary to complete an electrical circuit from the motor control battery **115**, or other suitable source of electrical energy, to the motor **61** and the solenoid coil **52**. This releases the latch **50** and turns the worm gear **62** and worm wheel **63** to rotate the crank **64** thereby turning the lever **60** in a clockwise direction, as viewed in Figs. 2 and 4.

The cover **25** is thus elevated into a substantially vertical position at the rear side of the pool **10**. In this position the motor **61** is de-energized by turning the key **120** in the opposite direction. If desired, the master and auxiliary switches **92** and **98** may be left in closed position so that anyone tampering with, or climbing on, the cover will cause the warning device to operate and will also obtain the electrical shock. In this upper position, the cover also provides an artistic back drop to the pool.

It is to be noted that the counterweight **57** aids in the maintenance of the cover **25** in its upper position and thus prevents the cover from falling on persons in and around the pool **10**. The counterweight is also of aid when manually moving the cover between upper and lower positions. Of course, such manual movement is generally only done in the absence of the electrical control described.

SECOND FORM

The second form of the present invention provides a swimming pool **130** having a concrete foundation **131** in which is located a cavity **132** adapted to contain water for swimming. A walk **133** surrounds the cavity and provides upwardly disposed sockets **134** in which are mounted bearing sleeves **135** insulated from the foundation, as before. As with the first form of the invention, a vault **136** is laterally extended at one side of the pool, and a diving board **137** is mounted at one end of the pool.

The second form of the invention also employs a cover **145** having a lower frame or grid **146** including front and rear sections **147** and **148**, each providing longitudinal side frame members **150** and transverse end frame members **152** respectively interconnecting the longitudinal members in substantially rectangular relation. A plurality of intermediate transverse frame members **153** interconnect the longitudinal members of each frame. The longitudinal and transverse frame members are either of non-conducting material or the longitudinal members are insulated from the transverse members so that the grids or frames mounted thereon, soon to be discussed, can be oppositely charged.

The members are preferably lightened by cut-outs **154**, as shown in Fig. 6. The front and rear frame sections are interconnected by hinges **155** mounted on the inner adjacent longitudinal frame members **150** which provide for relative pivotal movement of the frame sections from coplanar relation into an upwardly disposed inverted V-shaped, or jack-knifed, position while preventing relative downward pivotal movement into an upright V-shape from said coplanar position.

As best seen in Figs. 6 and 7, a plurality of upwardly disposed electrically conductive posts **160** are secured in any suitable manner in substantially equally spaced relation exteriorly to the longitudinal and end frame members **150** and **152** of the lower frame **146**. A plurality of substantially flat transverse bands or bars **161** of electrically conductive material are tensioned between correspondingly opposed posts on the longitudinal frame members of each frame section **147** and **148** in a substantially common plane and a plurality of longitudinal bands **162** of electrically conductive material are tensioned between corresponding posts on the end frame members of each frame section lying in a plane substantially parallel to and above the plane of the transverse bands. As a matter of descriptive convenience, the longitudinal bands together with the posts to which they are connected are considered as an upper frame or grid **163**. It is believed apparent that the longitudinal bands and their mounting posts could be provided with separate frame members so as to be releasable from the lower frame, if desired.

As before, a plurality of insulating plates **154** are interposed the longitudinal and transverse bands **162** and **161** preferably providing an attractive design **166** thereon. The plates are adapted normally to prevent contact between the upper and lower bands except when weight imposed on the upper bands causes them to move into engagement with lower bands so that an electrical bridging of the bands is effected betwen the plates.

The cover is provided with a pair of rearwardly extended pivot arms **170** connected to the rear longitudinal frame member **150** of the rear section **148**. Pins **171** are slidably mounted in the sockets **134** and provide eyelets **172** pivotally connected to the pivot arms. Springs

173 are fitted around the pins interposed the walk 133 and the eyelets of the pins.

A mounting arm 180 is connected to the rear longitudinal frame member 150 and extended rearwardly over the vault 136. As before, a counterweight 181 is mounted on the rearwardly extended portion of the mounting arm. An upper limit switch 185 is mounted along a rear edge of the vault and is adapted to be closed upon movement of the mounting arm upwardly thereagainst. Although not shown, a lower limit switch is also provided. Inasmuch as these switches are identical in construction and operation to the upper and lower limit switches 70 and 71 of Figs. 1 to 4, no further description in this regard is believed necessary.

A lever 190 is also rearwardly extended from the rear frame member 150. An electric motor 191 is situated in the vault 136 and is connected by means of a drive mechanism, generally represented at 192 in driving relation to the lever. Thus, energization of the motor serves to pivot the cover 145 around a pivot axis defined by the eyelets 172 between a lower position, as shown in Fig. 5, spanning the pool 130 and an upper retracted position, as shown in Fig. 6.

Slide blocks 196 are individually mounted on posts 160 forwardly positioned on the end frame members 152 of the front frame section 147 for slidable movement thereon. The blocks provide bifurcated arms 197 outwardly extended on opposite sides of respectively adjacent posts and engageable with stop members 198 on such adjacent posts. A plate 199 is mounted upwardly on each of the posts which slidably mount the blocks and springs 200 are interposed the blocks and the plates to urge the arms 197 against the stop members. Insulated rollers 201 are rotatably mounted on the blocks for rotation about a substantially common axis disposed longitudinally of the cover.

Both the front and rear sections 147 and 148 of the cover 145 provide mounting plates 205 on several of the posts 160 along each end frame member 152. A pair of elongated braces 206 provide forward ends pivotally connected to the mounting plates on the front frame section and rearwardly extended ends. Sleeves 207 are rotatably mounted on the mounting plates on the rear frame sections and slidably receive the respective rearwardly extended ends of the braces. Collars 208 are slidably mounted on the braces and are adapted to be adjustably fixed thereon by bolts 209 extended through the collars for engagement with the braces.

Operation of second form

When the cover 145 is in lower position over the pool, the operation thereof is substantially the same as that previously described in relation to the first form of the invention. Thus, the cover precludes unauthorized access to the pool by reason of its physical presence thereover. Also when weight is imposed on the cover, the floating mounting provided by springs 173 and 200 enables movement of the cover upwardly and downwardly from a normal position thereby to enable closing of upper switch 185 and a lower switch, not shown, but similar to switch 71 in Fig. 4. An electrical circuit similar to that of Fig. 4 may be provided to sound an alarm.

Further, interconnection of the longitudinal and transverse bands 162 and 161, or other electrical interconnection of the upper and lower frames 163 and 146, whether by imposition of weight on the longitudinal bands or by bridging contact between the longitudinal and transverse bands or posts 160, is adapted to close an electrical circuit.

When it is desired to have access to the pool 130, the motor 191 is energized and the cover 145 elevated. As the cover raises the rollers 201 ride along the end portions of the walk 133. When the cover is fully retracted the braces 206 are adjusted by bolts 209 preferably to raise the front frame section 147 into substantially right angular relation with the rear frame section 148 in overhanging relation above the pool. This is especially desirable inasmuch as the overhanging front section acts as an excellent means for shading the pool area. Obviously, however, the front and rear sections may be positioned in any angular relationship by the braces from a substantially coplanar position, as with the cover 25 of Figs. 1 to 3, to a folded or jack-knifed position with the rollers 201 engaging the walk.

THIRD FORM

The third form of this invention is shown in Fig. 8 wherein a swimming pool 220 providing a surrounding walk 221 is fragmentarily illustrated. As before, the walk provides upwardly disposed sockets, as 222, along a rear side thereof.

A cover 225 is provided including front and rear sections 226 and 227 in some measures constructed similarly to the cover sections 147 and 148 of the second form of the invention. Thus, a plurality of longitudinal frame members 228 of insulating material are interconnected by transverse end frame members 229 of insulating material. Intermediate frame members, not shown, have electrically insulating characteristics and are extended between the longitudinal frame members in substantially parallel relation to the transverse members. Hinges 230 interconnect the front and rear sections as before for relative pivotal movement between a substantially coplanar relation and a jack-knifed folded position, the latter being shown in Fig. 8. Each of the frame members has openings 231 therein to reduce the weight thereof.

Longitudinally and transversely extended, vertically spaced electrically conductive bands 232 and 233 are tentioned between posts 234 of electrically conductive material rigidly mounted on the frame members 228 and 229. Inasmuch as the cover 225 is similar in this respect to the cover 145 no further explanation is believed necessary. It is only to be noted that the front cover section 226 is of slightly greater length than the rear section 227 for a purpose soon to be described.

A front arm 238 is connected to a plurality of the posts 234 at each end of the front frame member 228 of the front frame section 226 by means of a plate 239. Each front arm provides a forward enlargement in which is disposed a guide slot 240. A block 241 is captured for slidable movement in each slot and springs 242 yieldably maintain their respective blocks normally centrally positioned in their respective slots. Insulated rollers 243 are mounted as by stub axles, not shown, on the blocks for rotation around axes disposed longitudinally of the cover 225.

A plate is secured to a plurality of posts 234 along the rear frame member of the rear frame section 227 and a rear arm 251 is rearwardly extended therefrom having a counterweight 252 mounted thereon. A plurality of pins, as 255, are slidably mounted in the sockets 222, insulated from the foundation or walk 221, and provide eyelets, as 256, pivotally connected to pivot arms 257 rearwardly extended from the rear frame section. Again, spring, as 258, are fitted around the pins between the eyelets thereon and the walk 221.

Operation of the third form

No additional discussion is believed necessary in describing the protective features of the third form of the invention inasmuch as it is identical in this respect to the second form.

However, during elevation of the cover 225, the rollers 243 ride on end portions of the walk 221 so that when the rear section 227 of the cover is in upwardly retracted position, the forward cover section 226 is in a slightly forwardly acute angular relation relative to the rear section. This has been referred to as a folded or jack-knifed relation and is represented in Fig. 8. It is particularly advantageously employed in areas having

high wind velocities and the like. Thus when the cover is in such a jack-knifed position, it does not offer as much of an obstruction to the wind as the first form.

The first form of the invention has no difficulty in clearing the diving board **19** when moving to retracted position. The second form may or may not clear a diving board situated in the usual location, dependent upon the relative position of the collars **208** on the braces **206**. By mounting the rollers **243** on the extended arms **238**, the third form of the invention is able readily to clear the diving boards because of the elevation imparted to the cover by the inclination of the arms.

When lowering the cover **225**, the rollers are in position to guide the front and rear cover sections **226** and **227** into coplanar relationship in spanning position over the pool **220**. This is of course automatically effected inasmuch as the longer front section insures the positioning of such section in a slightly forwardly inclined position when the cover is retracted.

It is to be understood that the features of the second and third forms of the invention may be incorporated into a single cover so that, for example, the cover sections of Fig. 8 may be adjusted into a variety of angular positions relative to each other. Also, the cylindrical bars, as **30** and **38**, of the first form of the invention are interchangeable with the bands, as **161**, **162**, **232**, **233**, of the second and third forms of the invention.

It is also intended to include within the scope of the present invention the use of plastic, glass or other non-conductive covers for the pool with the provision of electrically conductive paint, such as painted bands or lines in substantially parallel spaced relation in the manner of printed circuits. The equivalence of such an arrangement is believed recognized.

Further, although the covers of the various forms of the invention have been shown as substantially rectangular, it is to be understood that any shape or contour of cover could be used.

In view of the foregoing, it will be apparent that a protective device for swimming pools and the like has been provided which includes means for warning of presence at the pool and which includes devices adapted to signal and/or warn both unauthorized persons around the pool and owners of the pool. The cover enables convenient access for cleaning and swimming purposes, is adapted to shade the pool, and also minimize the collection of leaves and other debris in the pool. It will therefore be evident that the devices of the present invention are highly effective in accomplishing the purposes intended.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiments, it is recognized that departure may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a foundation providing an open cavity therein, a cover for the cavity comprising a frame circumscribing the cavity, a lower grid including a plurality of elongated members located in a substantially horizontal plane in substantially parallel relation mounted on the frame and spanning the cavity, and an upper grid including a plurality of elongated members located in a substantially horizontal plane parallel and above the plane of the lower grid mounted on the frame in spanning relation to the cavity in substantially parallel relation transversely of the elongated members of the lower grid, the elongated members of the upper grid being flexible into engagement with the elongated members of the lower grid upon the imposition of a weight thereon.

2. In combination with a foundation providing an open cavity therein, a cover mounted on the foundation for movement between a position covering the cavity and a position retracted therefrom, the cover including a pair of electrically conductive elements insulated from each other, and an electrical circuit including a source of voltage connected across the electrically conductive elements whereby electrical interconnection of the conductive elements completes the electrical circuit.

3. In a swimming pool, a foundation having a cavity for containing water, a substantially rigid cover including a circumscribing frame, means connected to the frame pivotally mounting the cover for movement between a position over the pool and a position retracted therefrom, and a counterweight substantially counterbalancing the cover outwardly extended from the cover on the opposite side thereof from the pivotal mounting means.

4. In combination with a foundation providing an open cavity, a cover for preventing unauthorized use of and accidental falls into the cavity comprising an open frame mounted over the cavity, a first grid mounted on the frame including a plurality of elongated electrical members mounted on the frame in spanning relation to the opening thereof and disposed in a common plane, a second grid mounted on the frame including a plurality of elongated electrical conducting members mounted on the frame in spanning relation to the opening thereof and in a plane in spaced relation to the plane of the elongated members of the first grid, means insulating the elongated members of the second grid from the elongated members of the first grid, said members being flexible for movement into engagement with each other, and an electrical circuit including an electrical signaling means and the elongated members of the grid adapted to complete an electrical circuit through the signaling means upon engagement of a member of one grid with a member of the other grid.

5. A safety device for swimming pools and the like comprising a substantially rigid pool cover, means pivotally mounting the cover at a side of the pool for movement between a substantially horizontal position in covering relation to the pool and a pivotally retracted position, a counterbalance connected to the cover, and powered means having driving connection to the cover for selectively moving the cover between covering and retracted positions.

6. A safety device for swimming pools and the like comprising a substantially rigid pool cover, means pivotally mounting the cover at a side of the pool for movement between a substantially horizontal position in covering relation to the pool and a pivotally retracted position, means insulating the cover from the swimming pool and the ground, a counterbalance connected to the cover, powered means having driving connection to the cover for selectively moving the cover between covering and retracted positions, and electrical means imparting an electrical charge to the cover.

7. A safety device for swimming pools and the like comprising a cover including a pair of spaced grids of electrical conducting material insulated from each other but adapted to have an electrical path established therebetween, hinge means pivotally mounting the cover for movement between a position in covering relation to a pool and an upwardly pivoted retracted position, a counterbalance connected to the cover, powered means connected to the cover for moving the cover selectively to covering and retracted positions, electrically motivated signaling means, and an electrical circuit including a source of electrical energy connecting the signaling means and the grids in series whereby the signaling means is energized whenever an electrical path is established between the grids.

8. In combination with a foundation having an open cavity, a cover for the cavity comprising a lower grid of elongated substantially rigid elements of electrical conducting material mounted in spanning relation to the cavity, an upper grid of elongated substantially rigid elements of electrical conducting material mounted in spanning relation to the cavity in upwardly adjacent spaced relation to the lower grid and insulated therefrom, the elongated elements of the upper grid being of sufficient flexibility to engage the elongated elements of the lower grid when a predetermined weight is imposed thereon, and an electrical circuit including a source of electrical energy and an electrically motivated signaling device connected in series between the grids.

9. In association with a swimming pool having a walk adjacent thereto, a substantially rigid cover pivotally mounted on the walk for movement between a lower rest position covering the pool and an upwardly retracted position permitting access to the pool, resilient means interposed the cover and the walk enabling limited elevational movement of the cover in its lower position, a signaling means, a switch having an actuating element operably associated with the cover for closing the switch incident to elevational movement of the cover from rest position, and an electrical circuit including a source of electrical energy connecting the switch to the signaling means.

10. In combination with a swimming pool having a foundation providing a cavity for containing a quantity of water and a horizontally disposed walk circumscribing the cavity and providing upwardly disposed sockets therein in substantial alignment at a side of the pool; electrically conductive rectangular upper and lower frames having longitudinal side members and transverse end members, the lower frame having a plurality of longitudinally spaced bars transversely interconnecting the side members of the lower frame, the upper frame having a plurality of transversely spaced bars longitudinally interconnecting the end members of the upper frame; insulating members supporting the upper frame on the lower frame, the longitudinal bars of the upper frame and the transverse bars of the lower frame being arranged in substantially parallel planes; a high voltage-low current source of electrical energy having a terminal of one polarity connected to the lower frame and a terminal of the opposite polarity connected to the upper frame; pins slidably mounted in the sockets in the walk having eyelets pivotally receiving one of the side members of the lower frame; springs around the pins interposed the lower frame and the walk permitting floating movement of the frame above and below a position of rest; a lever rigidly connected to the side member of the lower frame which is received by the eyelets; an electric motor having driving connection to the lever to pivot the frames between a substantially horizontal covering position over the cavity in marginal overlapping relation to the walk and a substantially vertical retracted position at one side of the cavity; a resilient cushion mounted on the side member of the lower frame opposite to the side member received by the eyelets adapted to rest on the walk in the horizontal position of the frames; an arm extended outwardly from the lower frame in a plane substantially parallel to the plane of the bars; a counterweight mounted on the arm having a weight substantially equal to the combined weight of the frames; an auxiliary source of electrical energy; a signaling device connected to the auxiliary source of energy; upper and lower switches individually connected in series with the auxiliary source and the signaling device having normally open positions and actuating elements extended above and below the arm and adjacent thereto adapted upon movement of the frames from said position of rest to be engaged by the arm to close their respective switches thereby to energize the signaling device; and an electrical relay including a coil connected in series with the frames and the high voltage-low current source and including normally open contacts connected in series with the signaling device and auxiliary source adapted to energize the signaling device when electrical interconnection of the frames causes energization of the relay.

11. A protective apparatus for a swimming pool having a walk therearound comprising a cover having a lower grid of spaced elongated substantially rigid bars of electrically conductive material mounted on the walk in spanning relation to the pool, an upper grid of spaced elongated substantially rigid bars of electrically conductive material mounted in spanning relation to the pool in adjacent spaced relation above the lower grid and insulated therefrom, the bars of the upper grid being transversely disposed relative to the bars of the lower grid and being of sufficient flexibility to engage the bars of the lower grid when a predetermined weight is placed thereon; means interposed the lower grid and the walk around the pool mounting the lower grid for resilient floating movement above and below a predetermined normal position of rest; means connected to the lower grid unitarily mounting the grids for pivotal movement between their positions spanning the pool and positions upwardly retracted therefrom; a counterweight connected to the lower grid and extended outwardly therefrom; powered means connected in driving relation to the lower grid for moving the grids between spanning and retracted positions; an electrical circuit including a source of electrical energy and an electrically actuated signaling means connected in series and having opposite terminals connected to the upper and lower grids; and switches electrically connected to the signaling means having actuating members operatively associated with the lower grid adapted to be engaged upon movement of the lower grid from said normal position of rest to actuate their respective switches.

12. In combination with a swimming pool having a foundation providing a cavity adapted to contain a quantity of water; electrically conductive upper and lower frames having longitudinal side members and transverse end members, the lower frame having a plurality of longitudinally spaced bars transversely interconnecting the side members of the lower frame, the upper frame having a plurality of transversely spaced bars longitudinally interconnecting the end members of the upper frame, the upper frame being supported on the lower frame with the bars of the respective frames being located in substantially parallel planes; means insulating the upper frame from the lower frame; a high voltage-low current source of electrical energy having a terminal of one polarity connected to the lower frame and a terminal of the opposite polarity connected to the upper frame; means pivotally mounting the lower frame on the foundation of movement of the frames between a lower position in covering relation to the cavity and an upper retracted position; resilient means interposed the lower frame and the foundation to permit limited elevational movement of the frames from a normal position of rest when covering the cavity; an auxiliary source of electrical energy; an electrically energizable signaling device connected to the auxiliary source of energy; switches connected in parallel with each other and individually connected in series with the auxiliary source and the signaling device having normally open positions and actuating elements extended therefrom; means connected to the lower frame positioned between the actuating elements when the frames are in rest position and engageable with the actuating elements of the switches incident to elevational movement of the frames from said rest position to close their respective switches thereby to energize the signaling device; and an electrical relay including a coil connected in series with the frames and the high voltage-low current source and including normally open switch contacts connected in series with

the signaling device and auxiliary source adapted to energize the signaling device when electrical contact between the upper and lower frames energizes the coil.

13. In combination with a swimming pool having a foundation providing an open cavity adapted to contain a quantity of water, a cover for the cavity including a frame adapted to span the cavity having a pair of pivotally interconnected substantially rectangular frame sections adapted for movement relative to each other between a substantially coplanar position and a jack-knifed position, and means interconnecting one of the sections of the frame and the foundation pivotally mounting the frame for movement between a position with the frame sections in said coplanar position and spanning the cavity and a position upwardly retracted therefrom with said frame sections in said jack-knifed position.

14. In combination, a foundation providing an open cavity adapted to contain a quantity of water, a cover for the cavity including a frame adapted to span the cavity having a pair of pivotally interconnected substantially rectangular frame sections providing longitudinal and transverse frame members and adapted for movement relative to each other between a substantially coplanar position and a jack-knifed position, a plurality of elongated somewhat flexible longitudinally and transversely extended electrically conductive elements insulated from each other having opposite ends connected respectively to the transverse and longitudinal frame members, the longitudinal conductive elements lying in adjacent spaced relation to the transverse conductive elements, means interconnecting one of the sections of the frame and the foundation pivotally mounting the frame for movement between a position spanning the cavity and a position upwardly retracted therefrom, and a source of voltage having terminals connected to the longitudinally and to the transverely extended conductive elements.

15. In combination with a swimming pool having a foundation defining an open cavity, a cover for the cavity including a frame adapted to span the cavity having front and rear pivotally interconnected sections, means interconnecting the rear section of the frame and the foundation pivotally mounting the frame for movement between a position spanning the cavity and a position upwardly retracted therefrom, the front section of the frame being pivotal relative to the rear section when the frame is in retracted position into positions angularly related to the rear section including a position folded downwardly adjacent to the rear section and a position angularly outwardly extended from the rear section in spaced relation and in substantially horizontal position above the cavity so as to shade the pool area, and means adjustably interconnecting the front and rear sections of the frame for holding the front sections in any of its positions with respect to the rear section.

16. In combination, a foundation providing an open cavity for containing a quantity of water for swimming and the like and a walk surrounding the cavity, a substantially rectangular frame adapted to overlie the cavity having front and rear pivotally interconnected sections each providing longitudinal and transvere frame members connected in substantially rectangular relation, the front section having a transvere dimension slightly greater than the transverse dimension of the rear section, walk engaging rollers rotatably mounted on the outermost transverse frame members of the front section of the frame for rotation in engagement with the walk around a substantially common axis disposed longitudinally of the frame, and means connected to the rear section of the frame pivotally mounting the rear section on the foundation for movement between a position over the cavity and a position upwardly retracted therefrom with the front section drawn theretoward with the rollers rested on the walk.

17. In combination with a swimming pool including foundation providing an open cavity therein and an upper substantially horizontal surface circumscribing the cavity, a cover for the cavity, and means pivotally mounting the cover on said upper surface of the foundation for movement between a substantially horizontal covering position in spanning relation to the cavity and a retracted position at a side of the cavity permitting access to the cavity for swimming purposes, and powered means having driving connection to the cover operable to move the cover selectively between covering and retracted positions.

18. In combination with a swimming pool, a safety device for preventing unauthorized use of the pool comprising an electrically conductive protective member mounted in shielding relation to the pool and in insulated spaced relation thereto, electrical means imparting an electrical charge to the protective member, and ground means mounted adjacent to the protective member, the electrical means and the ground means being disposed for simultaneous engagement thereof by a trespasser making unauthorized approach to the pool.

19. In combination with a foundation providing an open cavity therein, a cover mounted on the foundation for movement between a position covering the cavity and a position retracted therefrom, the cover including an electrically conductive element, and an electrical circuit including a source of voltage connected to the electrically conductive element.

20. In combination with a swimming pool, a substantially rigid pool cover, means mounting the cover for movement between a substantially horizontal position in covering relation to the pool and a retracted position permitting access to the pool, means electrically insulating the cover from the swimming pool and the ground, and electrical means imparting an electrical charge to the cover.

21. A safety device for swimming pools and the like comprising a cover including a pair of spaced elements of electrically conductive material insulated from each other but adapted to have an electrical path established therebetween, means mounting the cover for movement between a position in covering relation to a pool and a retracted position permitting access to the pool, electrically motivated signaling means, and an electrical circuit including a source of electrical energy connecting the signaling means and the elements in series whereby the signaling means is energized whenever an electrical path is established between the elements.

22. In association with a swimming pool having a support surface adjacent thereto, a substantially rigid cover mounted on the support surface in covering relation to the pool, resilient means interposed the cover and the support surface enabling limited elevational movement of the cover, a signaling means, a switch having an actuating element operably associated with the cover for closing the switch incident to elevational movement of the cover from rest position, and an electrical circuit including a source of electrical energy connecting the switch to the signaling means.

23. In association with a swimming pool, a substantially rigid cover, means resiliently mounting the cover in substantially horizontal spanning relation to the pool for elevational movement from a predetermined rest position incident to imposition of weight on the cover, a signaling means, a switch having an actuating element operably associated with the cover for operating the switch incident to elevational movement of the cover from the rest position, and an electrical circuit including a source of electrical energy connecting the switch to the signaling means.

24. In combination with a swimming pool bounded by a peripheral edge and a support surface; the support surface providing upwardly disposed sockets in substantial alignment at a side of the pool; an open frame; a first grid mounted in the frame including a plurality of elongated electrically conductive members mounted in spanning

relation to the opening of the frame; a second grid mounted in the frame including a plurality of elongated electrically conductive members mounted in spanning relation to the opening of the frame in a plane in substantially parallel spaced relation to a plane containing the members of the first grid; means insulating the elongated members of the second grid from the elongated members of the first grid, said members being flexible for engagement with each other; a main source of electrical energy having terminals of opposite polarities connected to the members of the first and second grids, respectively; pins slidably mounted in the sockets having eyelets pivotally connected in coaxially spaced relation to the frame at one side of the pool; springs circumscribing the pins and interposed the frame and the support surface permitting floating movement of the frame above and below a position of rest; a lever rigidly connected to the frame and extended outwardly therefrom so that the frame extends in one direction from the pivot axis defined by the eyelets and the lever extends in the opposite direction from such axis; an electric motor having driving connection to the lever for pivoting the frame between a substantially horizontal position in marginally overlapping relation to the pool and a substantially vertical retracted position at one side of the pool; a resilient cushion mounted on the side of the frame opposite to the side connected to the eyelets adapted to rest on the support surface in the horizontal position of the frame; an arm extended outwardly from the frame in the same direction as the lever and in a plane substantially parallel to the plane of the electrically conductive members; a counterweight mounted on the arm having a weight substantially equal to the weight of the frame including the grids; an auxiliary source of electrical energy; a signaling device connected to the auxiliary source of energy; upper and lower switches individually connected in series with the auxiliary source and the signaling device having normally open positions and actuating elements extended above and below the arm and adjacent thereto, adapted upon movement of the frame from said position of rest to be engaged by the arm to close their respective switches thereby to energize the signaling device; and an electrical relay including a coil connected in series with the grids and the main source of electrical energy and including normally open contacts connected in series with the signaling device and the auxiliary source so as to energize the signaling device when electrical interconnection of the grids causes energization of the relay.

25. In combination with a swimming pool bounded by a peripheral edge and a support surface; an open frame; a first grid mounted in the frame including a plurality of elongated electrically conductive members mounted in spanning relation to the opening of the frame; a second grid mounted in the frame including a plurality of elongated electrically conductive members mounted in spanning relation to the opening of the frame in a plane in substantially parallel spaced relation to a plane containing the members of the first grid; means insulating the elongated members of the second grid from the elongated members of the first grid; a source of electrical energy having a terminal of one polarity connected to the members of the first grid and a terminal of opposite polarity connected to the members of the second grid; means mounting the frame for pivotal movement around a substantially horizontal axis between a covering position in marginally overlapping relation to the pool and an upwardly extended retracted position; means resiliently supporting the frame in the pool covering position thereof for elevational movement above and below a rest position; drive means connected to the frame for pivoting the frame between its pool covering and retracted positions; an arm connected to the frame and extended outwardly from the pivot axis of the frame in substantially normal relation to said axis; a counterweight mounted on the arm; an auxiliary source of electrical energy; a signaling device connected to the auxiliary source of energy; upper and lower switches individually connected in series with the auxiliary source and the signaling device having normally open positions and actuating elements extended above and below the arm adapted upon elevational movement of the frame while in said pool covering position above and below said position of rest to be engaged by the arm to close their respective switches and thereby to energize the signaling device; and an electrical relay including a coil connected in series with the grids and the main source of electrical energy and including normal open contacts connected in series with the signaling device and the auxiliary source so as to energize the signaling device when electrical interconnection of the grids causes energization of the relay.

26. In combination with a swimming pool having a foundation providing an open cavity adapted to contain a quantity of water, a cover for the cavity including a frame adapted to span the cavity having a pair of pivotally interconnected frame sections adapted for movement relative to each other between a substantially coplanar position and a jackknifed position, and means interconnecting one of the sections of the frame and the foundation pivotally mounting the frame for movement between a substantially horizontal position spanning the cavity and a position upwardly retracted therefrom at a side of the cavity.

27. In combination; a foundation providing an open cavity for containing a quantity of water for swimming and like purposes, and a walk surrounding the cavity; a frame adapted to overlie the cavity having front and rear pivotally interconnected sections, the front section having a front to rear dimension slightly greater than the front to rear dimension of the rear section; walk engaging rollers rotatably mounted on the front section of the frame for rotation in engagement with the walk around a substantially common axis disposed transversely of the front to rear dimensions of the frame sections; and means connected to the rear section of the frame pivotally mounting the rear section on the foundation for movement between a position over the cavity and a position upwardly retracted therefrom with the front section drawn toward the rear section and with the rollers rested on the walk.

28. In combination with a swimming pool having a foundation providing an open cavity, a frame adapted to overlie the cavity in marginal overlapping relation therewith and having front and rear pivotally interconnected sections, means connected to the rear section of the frame pivotally mounting the rear section on the foundation for movement around a substantially horizontal axis between a substantially horizontal position over the cavity and a position upwardly retracted at a side of the cavity, the front and rear sections being pivotal on an axis substantially parallel to the pivotal axis of the rear section on the foundation, foundation engaging rollers, and means rotatably mounting the rollers on the front section of the frame for rotation in engagement with the foundation around a substantially common axis substantially parallel to the pivot axis of the rear section of the frame on the foundation so that when the rear section is in said upwardly retracted position the front section is drawn toward the rear section with the rollers rested on the foundation.

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