June 25, 1963 LE ROY A. HOKE 3,094,710

SWIMMING POOL SAFETY ENCLOSURE AND COVER

Filed Aug. 13, 1962 2 Sheets-Sheet 1

FIG. 1

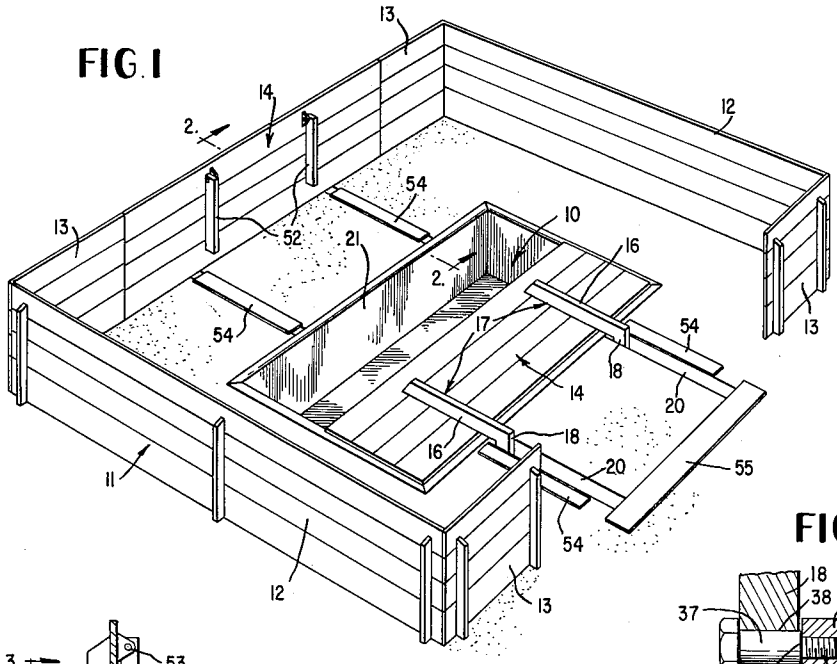


FIG. 7

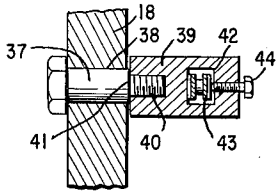


FIG. 2

FIG. 6

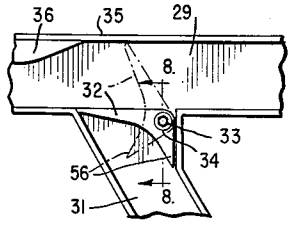
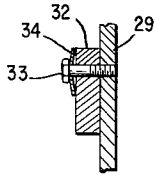


FIG. 8



INVENTOR.
LEROY AUSTIN HOKE
BY Rupert J. Brady
ATTORNEY

June 25, 1963 LE ROY A. HOKE 3,094,710

SWIMMING POOL SAFETY ENCLOSURE AND COVER

Filed Aug. 13, 1962 2 Sheets-Sheet 2

FIG. 3

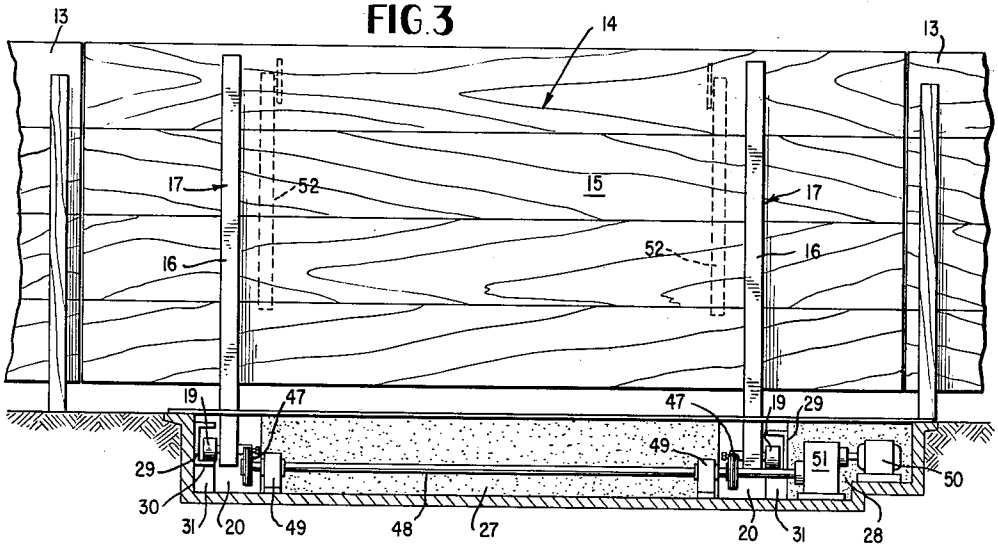


FIG. 4

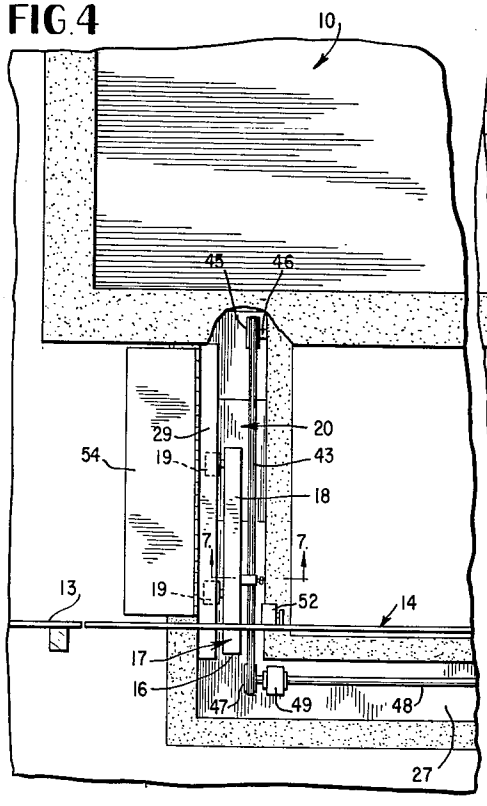
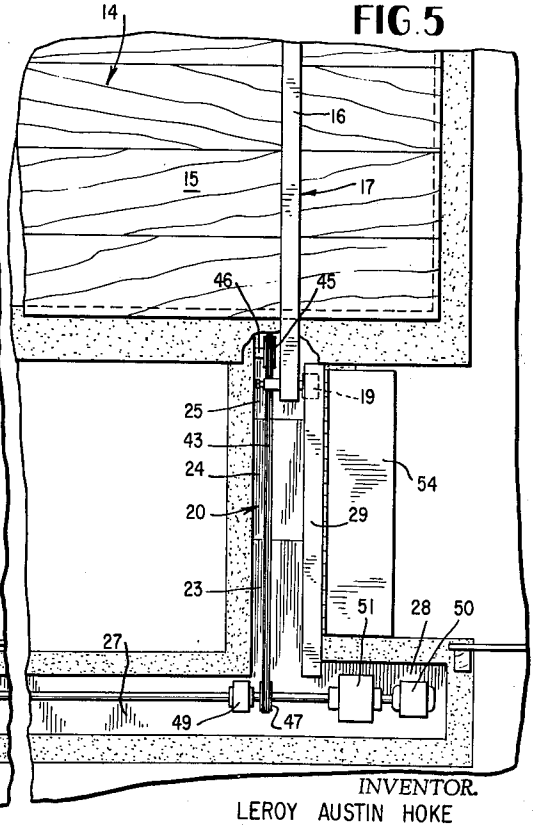


FIG. 5



INVENTOR.
LEROY AUSTIN HOKE
BY Rupert J. Brady
ATTORNEY

United States Patent Office 3,094,710 Patented June 25, 1963

3,094,710 SWIMMING POOL SAFETY ENCLOSURE AND COVER

Le Roy Austin Hoke, Rte. 5, Frederick, Md.

Filed Aug. 13, 1962, Ser. No. 216,463
11 Claims. (Cl. 4—172)

This invention relates to a swimming pool safety enclosure and cover means.

One of the primary objects of this invention is to provide a swimming pool enclosure or fence having sections thereof constructed and arranged to form a cover for the pool while the latter is not being used.

Another important object of the invention is to provide a power-operated swimming pool cover means which is simplified in construction, reliable and efficient in operation, and relatively economical to manufacture and install with the operating mechanism for the cover means arranged below the ground level and substantially enclosed in a neat and attractive manner, so as not to interfere with the normal use of the swimming pool while the cover means is in the open position, constituting a part of the pool enclosure or fence.

Still another object of the invention is to provide a combined pool enclosure and cover means of the above-mentioned character to render the pool private and fully enclosed during the normal use thereof, and operable to completely cover the top of the pool and render it safe to children, pets and the like when the pool is not in use.

Other objects and advantages of the invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

FIGURE 1 is a perspective view of a swimming pool equipped with a combined fence and cover means according to the invention, one section of the cover means being shown open for constituting an integral section of the fence and the other section of the cover means being shown in a closed pool-covering position,

FIGURE 2 is an enlarged fragmentary vertical section taken substantially on line 2—2 of FIGURE 1, and showing one section of the pool cover means in the open position in full lines and in pool-covering position in broken lines,

FIGURE 3 is a fragmentary vertical section partly in elevation taken substantially on line 3—3 of FIGURE 2,

FIGURE 4 is a fragmentary plan view of the pool and one section of the cover means therefor, with the latter in the open position,

FIGURE 5 is a similar fragmentary plan view of the pool and cover means showing one section thereof in the closed or pool-covering position,

FIGURE 6 is an enlarged fragmentary side elevational view of a pivoted roller diverter element and associated parts,

FIGURE 7 is an enlarged fragmentary vertical section taken on line 7—7 of FIGURE 4, and

FIGURE 8 is a fragmentary vertical section taken on line 8—8 of FIGURE 6.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 10 designates somewhat diagrammatically a conventional rectangular swimming pool of any desired size, formed of concrete or the like and arranged below the level of the ground, with the open top of the pool substantially flush with ground level. The details of construction of the swimming pool proper form no part of the present invention, and therefore are not shown in the drawings, and need not be described herein.

Surrounding the pool 10 in suitably spaced relation thereto is an enclosure or fence 11 which, for the purpose of simplicity, has been illustrated as an ordinary board fence, although it is to be understood that any type of fence whatsoever may be utilized for the purposes of the invention as defined by the claims subjoined hereto. The fence 11 is preferably rectangular in its overall configuration, to conform to the shape of the pool 10 and includes a pair of immovable sides 12 and immovable short side sections 13 rigidly joined thereto in any suitable manner at the four corners of the enclosure or fence. The fence 11 further includes a pair of opposed parallel movable sections 14, which also constitute the companion cover sections for the pool 10, when the latter is not in use, and the sections 14 are preferably of a length and width to enable them together to completely cover the pool 10 when shifted by means to be described to pool-covering positions as shown particularly in FIGURES 1 and 5.

Each combined fence and pool cover section 14 is supported and powered by identical means which constitute an important part of the invention, and the power means for the two sections 14 may be linked together electrically to operate in unison, or they may be operated separately if preferred. Accordingly, a detailed description of the supporting and operating means for one cover section 14 will serve to describe the support and operation of both cover sections.

With continued reference to the drawings, each combined fence and cover section 14 comprises a rectangular panel body portion 15, composed of a plurality of boards in the illustrative structure depicted herein. The panel body portion 15 is bodily carried by and rigidly secured to the vertical arms 16 of a pair of sturdy L-shaped supports or carriages 17 having bottom horizontal arms 18, equipped upon their outer sides with longitudinally spaced rollers 19, journaled thereon for free rotation. The vertical arms 16 of the L-shaped carriages are somewhat longer than the horizontal arms 18, as shown.

Adjacent each carriage 17 of each cover section 14 there is provided a below ground level well 20 or trough of relatively narrow width and shallow depth and extending at right angles to the adjacent pool side wall 21, and suitably anchored thereto if desired. Each well 20 has its top open and includes parallel vertical side walls 22, a horizontal bottom wall portion 23, and sloping bottom wall portions 24 and 25 and a lowermost bottom wall portion 26, as best shown in FIGURE 2. The two wells 20 for each cover section 14 and associated elements are interconnected at their outer ends by a shallow longitudinal trough 27 having a bottom wall at the same elevation as the bottom wall portions 23 and continuous therewith as shown in FIGURES 4 and 5. Each longitudinal trough 27 has an end extension 28 to house the electric motor and speed reducer to be described for one of the cover sections 14. It may now be seen that the two wells 20 and their interconnecting trough 27 at each side of the swimming pool constitute a generally U-shaped below ground level housing or enclosure for the carriage arms 18 and associated elements and the power operating means therefor to be described.

Within each well 20 adjacent to the outer side wall thereof is a rigid horizontal channel track 29, suitably rigidly anchored and having a lower track flange 30 upon which the rollers 19 rest movably. Each track 29 is substantially coextensive lengthwise with the well 20, FIGURES 2, 4 and 5, and the forward end of each track 29 terminates just short of the interconnecting trough 27 between the two wells 20. Each track 29 includes near its inner end a depending integral inclined channel track extension 31, preferably arranged at 60 degrees to the

horizontal, and having its lower end resting within a socket recess 32 of bottom wall portion 26, as shown in FIGURE 2. The channel track extension 31 communicates at its top with the horizontal channel track 29, so that the innermost roller 19 may enter the track extension 31 during movement of the cover section 14 from the upright to the lowered or pool covering position.

At the juncture of track extension 31 and track 29, a generally triangular roller diverter or switch element 32, FIGURES 2 and 6, is pivotally connected with the vertical wall of the channel track structure, by means of a pivot screw 33 having a suitable spring washer 34 beneath the head thereof, bearing constantly upon the switch element 32 to maintain the latter in constant frictional engagement with the vertical wall of the track structure, whereby the switch element will tend to remain by friction in any pivoted or adjusted position during the operation of the invention. As will become apparent, the switch element 32 is automatically operated by the carriage rollers 19 during movement of the carriage 17 with the cover section 14 toward and away from the pool covering position.

Each channel track 29 is further provided upon its top horizontal flange 35, near and slightly forwardly of the top of inclined track extension 31 with an integral depending hold-down cam or guide lug 36, adapted to engage the roller 19 adjacent to it, and preventing elevation of such roller or tilting of the cover section 14 when the latter is upright as shown in full lines in FIGURE 2.

Each horizontal carriage arm 18 carries intermediate its ends a swivel bolt 37, FIGURE 7, freely rotatable within a transverse opening 38 of the arm 18. A connector element 39 on the inner side of carriage arm 18 has screw-threaded engagement at 40 with the swivel bolt 37 and is tightly clamped against a shoulder 41 thereof. The connector 39 has a transverse through opening 42, receiving therethrough a horizontal endless sprocket chain 43, fixedly secured therein by an adjustable set screw 44. Each sprocket chain 43 engages about an idler sprocket gear 45, suitably supported and journaled for free rotation near the inner end of the well 20 and adjacent the rear end of the horizontal track 29 and spaced laterally thereof as shown in FIGURES 3, 4 and 5. The sprocket gear 45 is journaled upon a shaft 46, suitably anchored in the adjacent side wall of the well 20. At its forward end, each sprocket chain 43 engages another sprocket gear 47, secured to a horizontal drive shaft 48, extending longitudinally within the connecting trough 27, at right angles to the sprocket chains 43, tracks and associated elements. The drive shaft 48 is rotatably supported within the trough 27 upon suitable fixed bearings 49. An electric motor 50, fixedly secured in trough extension 28, operates a suitable speed reducer 51, directly connected with and driving the shaft 48 as clearly shown in FIGURES 3 and 5. An operating switch for the motor 50, not shown herein, may be located above ground and at a convenient point remote from the motor and inside of the enclosure or fence 11. If preferred, this switch may be located directly upon the motor 50 within the trough extension 28. It is now apparent that when the motor 50 is energized for driving the shaft 48 at tthe desired speed, both sprocket chains 43 and both carriages 17 connected therewith will be driven in unison for moving the associated cover section 14 toward or away from covering relation with the swimming pool. The other pool cover section 14 for the opposite side of the pool has an identical motor, carriages, sprocket chains and associated elements as described above for the one cover section 14. The two motors may be electrically connected for operation in unison or in synchronism, and if preferred, the two motors may have separate switches, above ground or below ground, and they may be operated independently for independently operating the two pool cover sections 14, as should be obvious to anyone skilled in the art.

It may be noted here that during operation of the invention, the swivel bolt 37, connector 39 and associated elements travel back and forth with the upper horizontal run of each endless chain 43, but these elements never pass around the sprocket wheels 45 and 47 and never travel to the lower run of the associated sprocket chain. This renders the operation of the device very simple and most reliable. If preferred, instead of the sprocket chains and sprocket gears described herein, the carriages 17 may be similarly connected with endless drive cables or the like, having two or more turns thereof wrapped about suitable grooved pulleys which take the place of the sprocket gears 45 and 47. While either form of drive works satisfactorily, and either may be employed, the preferred form of drive shown herein includes the sprocket chains 43 and sprocket gears.

Each cover section 14 is provided with a pair of laterally spaced gravity-operated legs or braces 52, freely pivotally secured at their tops to the panel body portion 15 by a suitable pivot pin 53. Each leg 52 lies vertically upon the inner face of the adjacent panel body portion 15 when the cover section 14 is upright, FIGURES 1 and 2. When such cover section is shifted to the horizontal pool-covering position shown in FIGURE 5 and in broken lines in FIGURE 2, the legs 52 gravitate automatically to vertical positions and engage the bottom of the pool 10 to support and stabilize the cover sections. When the cover sections are raised or returned to their upright positions constituting integral sections of the fence 11, the pivotal legs 52 return automatically to their positions shown in FIGURE 1 and in full lines in FIGURE 2.

As an added refinement for the invention and as a further safety feature, the wells 20 and connecting troughs 27 are equipped with hinged cover plates 54 and 55, which are laid open, as shown in FIGURES 4 and 5, during the operation of the cover sections and while the latter are in pool-covering positions. The cover plates 55 may remain closed at all times if preferred. When the cover sections 14 are in the upright position for constituting parts of the fence 11, FIGURE 1, all of the cover plates 54 and 55 may be closed for covering the open tops of the wells 20 and connecting troughs 27. This renders it possible for users of the pool to walk about freely without danger of placing a foot in one of the wells or troughs.

The operation of the invention is quite simplified and is briefly as follows:

As depicted in FIGURE 1, the pool cover sections 14 are arranged to operate separately or independently; that is, their drive motors are not linked together by a common switch to operate in unison. This may be done if preferred, as previously stated.

Assuming that one cover section 14 is upright to form an integral section of the fence 11 as shown in FIGURES 1 and 2, the carriage arms 16 for this cover section are vertical and the arms 18 are horizontal and both rollers 19 are engaging the horizontal track flanges 30. The swivel connector 39 attaching the upper run of chain 43 to each carriage 17 is located as shown near the forward end of the horizontal well 20.

The motor 50 for the particular cover section 14 is started in one direction and the top run of each chain 43, FIGURE 2, moves to the right or toward the pool 10, drawing the associated carriage 17 and the cover section 14 with it. The roller diverter elements 32 are in the elevated position shown in full lines in FIGURE 2, having been set in this position during the previous return of the carriages 17 to the upright position shown in full lines in FIGURE 2. As each carriage 17 moves horizontally toward the pool 10, the leading roller 19 thereof after passing from beneath the hold-down cam 36 engages the elevated diverter element 32 and is directed downwardly into the inclined track extension 31. When each leading roller 19 passes and engages the trailing point 56 or corner of the pivoted element 32, the latter is returned automatically to the level position shown in

broken lines in FIGURE 2, and consequently the trailing roller **19** of each carriage **17** will pass over the element **32** and will not be diverted into the track extension **31**. As shown in broken lines in FIGURE 2, the trailing roller **19** will move beyond the element **32** and track extension **31** and will travel to a point adjacent the inner end of the horizontal track **29**, at which time, the leading roller **19** is at the bottom of the track extension **31**, FIGURE 2, and each carriage arm **18** is vertically disposed while the arm **16** is horizontally disposed over the top of the pool. At this time, the gravity-operated leg **52** is positioned to engage the bottom of the pool **10** and stabilize the cover section **14** in the closed or pool-covering position.

To return each cover section **14** to the upright position, the motor **50**, which is a reversible motor, is operated in the reverse direction and the chain **43** moves in a reverse direction for returning each carriage **17** to the full line position shown in FIGURE 2. When this is done, each trailing roller **19** which is now uppermost as shown in broken lines in FIGURE 2 passes horizontally over the diverter element **32** and the leading roller **19** rolls up the inclined track extension **31** and engages the diverter element **32** and elevates the same to the original full line position in FIGURE 2 where the latter will remain by friction induced by the spring washer **34**. The leading roller **19** now passes onto the horizontal track **29** and is restrained from shifting upwardly by the cam **36** and the cover section **14** is returned to the upright position wherein it forms a part of the fence **11**. The motor **50** may, if desired, be equipped with a time delay switch of a type well-known in the art to operate the motor in either direction after pushing a button or the like for exactly the proper time to move the carriages **17** through the proper extent of travel. If preferred, the motor may be controlled manually and started and turned off or jogged in any desired manner.

The apparatus is rugged and durable in construction, reliable in operation, and the working or moving parts are housed below ground in a compact manner as shown. The mechanism is only operated occasionally, such as once or twice a day, and it is not necessary to move the pool cover sections at high speed and continuously, and therefore the working parts need not be closely machined and highly accurate in construction and readily available materials of inexpensive nature may be employed satisfactorily.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

Having thus described my invention, I claim:

1. A swimming pool safety enclosure and cover means comprising a cover section adapted when upright to form an integral part of a fence surrounding said pool and when lowered to cover at least a portion of the pool, a generally L-shaped carriage secured to and carrying the cover section including an arm which is substantially vertical and a second arm which is substantially horizontal when the cover section is upright, below ground well means adjacent one side of the pool receiving the second arm, a track mounted within the well means including a horizontal portion and a depending inclined portion, roller means on the second arm of the carriage engaging the track, a substantially horizontal endless flexible drive element attached to the second arm for propelling the carriage in opposite directions upon the track, power-operated means connected with said flexible drive element to operate the same in opposite directions, and a roller diverter element pivoted to the track adjacent the juncture of the horizontal and inclined track portions and frictionally engaging the track and adapted to remain by friction in either of two adjusted positions, said roller means engageable with said diverter element during movement of the carriage in one direction for causing the roller means to enter the inclined track portion and said roller means again engaging the diverter element during reverse movement of the carriage to reset the diverter element to an original position thereof, said cover section swinging downwardly into covering relation with the pool and being substantially horizontal when the roller means is near the bottom of the inclined track portion.

2. In swimming pool safety apparatus, a depressed well structure adjacent one side of the pool, a track mounted within the well structure including a horizontal track portion and a depending inclined track portion intermediate the ends of the horizontal track portion and intersecting the latter, a pivoted roller diverter element at the intersection of the horizontal and inclined track portions adapted to remain by friction in pivotally adjusted positions, a carriage for movement upon the track including spaced rollers, a pool cover section on said carriage positioned upright when both spaced rollers are on the horizontal portion of the track, reversible power-operated means within the well structure and connected with the carriage to propel the carriage in opposite directions upon the track, the leading roller of said spaced rollers engaging said diverter element and entering the inclined track portion and causing automatic resetting of the diverter element to a horizontal position upon movement of the carriage in one direction, the trailing roller of the carriage then passing over the diverter element and moving on the horizontal track portion beyond the inclined track portion and thereby shifting the carriage to a substantially vertical position within the well structure and simultaneously shifting the pool cover section to a substantially horizontal position in covering relation to the swimming pool.

3. The invention as defined by claim 2, and a gravity-operated leg pivoted to said pool cover section and remaining substatnially vertical in all adjusted positions of the latter and engageable with the bottom of the pool to stabilize the cover section when the latter is in the horizontal pool-covering position.

4. The invention as defined by claim 2, and wherein said apparatus is a duplicate apparatus on opposite sides of the pool including a pair of cover sections each adapted to cover substantially one-half of the area of the pool when in the lowered substantially horizontal position.

5. In a swimming pool safety apparatus, a pair of wells arranged below ground in parallel spaced relation and extending from one side of the pool substantially at right angles thereto, a below ground trough interconnecting the outer ends of the wells, track means in said wells longitudinally thereof including intersecting horizontal and depending inclined track portions, carriage means movably engaging the track means in each well, a pool cover section bodily carried by the carriage means and being upright when the carriage means is entirely upon said horizontal track portion and being substantially horizontal in covering relation to the pool when the carriage means is engaging both the horizontal and inclined track portions, diverter means for the carriage means at the intersection of the horizontal and inclined track portions and operated and reset automatically by engagement with the carriage means, conveyer means for the carriage means in each well longitudinally thereof and secured to the carriage means, and driving connecting means for the conveyor means within said interconnecting trough and substantially at right angles to the conveyer means and track means.

6. The invention as defined by claim 5, and swivel couplings interconnecting the carriage and conveyer means to allow free pivotal movement of the carriage means relative to the conveyer means.

7. The invention as defined by claim 6, and wherein the conveyer means includes an endless flexible conveyer element in each well near the top thereof and near one side of the track means.

8. The invention as defined by claim 5, and cover plate

means for said wells and trough adapted to cover the latter when the pool cover section is upright.

9. The invention as defined by claim 7, and wherein said driving connecting means within said trough includes a drive shift common to the endless flexible conveyor elements in the wells and drivingly connected therewith, and power-operated means to turn said drive shaft in opposite directions.

10. In a swimming pool safety apparatus, a below ground well extending outwardly from one side of the pool and having a shallow portion remote from said side of the pool and a deep portion adjacent said side, a track within said well including a horizontal track portion in the shallow well portion and a depending inclined portion in the deep well portion, said inclined track portion intersecting the horizontal track portion intermediate the ends of the latter, an L-shaped carriage including a first arm adapted to extend vertically above the well and a relatively short second arm adapted to extend horizontally in the well, the second carriage arm movably engaging said track and adapted to travel on the horizontal track portion and to also enter the inclined track portion, a pool cover section secured to the first carriage arm

and movable therewith toward and away from a pool covering position, diverter means engageable with the second carriage arm to divert the same partly into the inclined track portion during movement of the cover section to said pool-covering position and automatically adjustable to a position allowing a trailing portion of the second carriage arm to pass beyond said inclined track portion and remain upon the horizontal track portion, and power-operated conveyer means for said carriage within said well and attached thereto.

11. The invention as defined by claim 10, and wherein said inclined track portion is at an angle of approximately 60 degrees to the horizontal with the lower end thereof socketed within the bottom of the deep well portion.

References Cited in the file of this patent

UNITED STATES PATENTS

3,002,195 Prudek ---------- Oct. 3, 1961

FOREIGN PATENTS

1,233,615 France ---------- May 9, 1960