Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

RETRACTABLE SWIMMING POOL COVER

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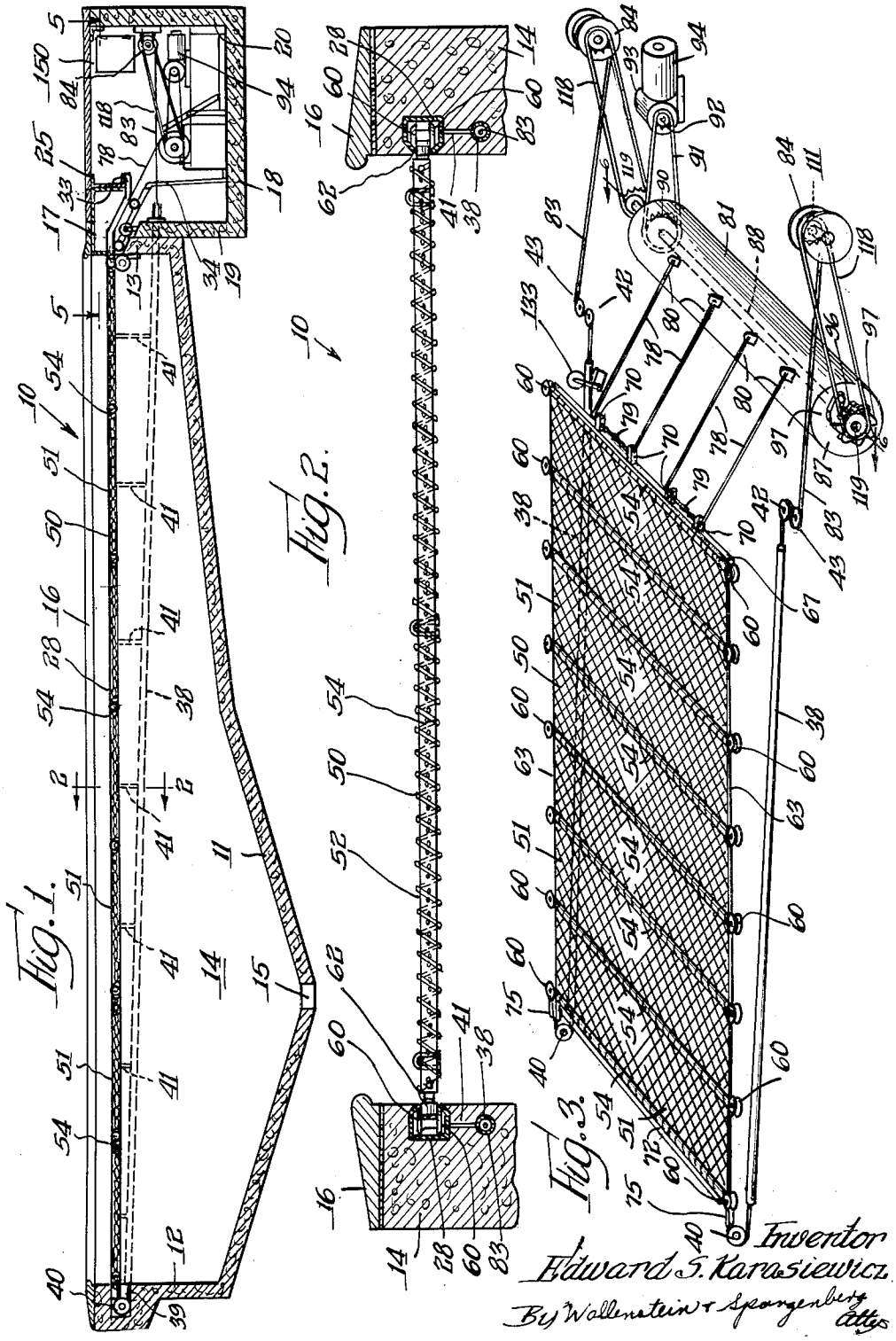


Fig. 1.

Fig. 2.

Fig. 3.

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Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

RETRACTABLE SWIMMING POOL COVER

Filed Sept. 29, 1958 7 Sheets-Sheet 2

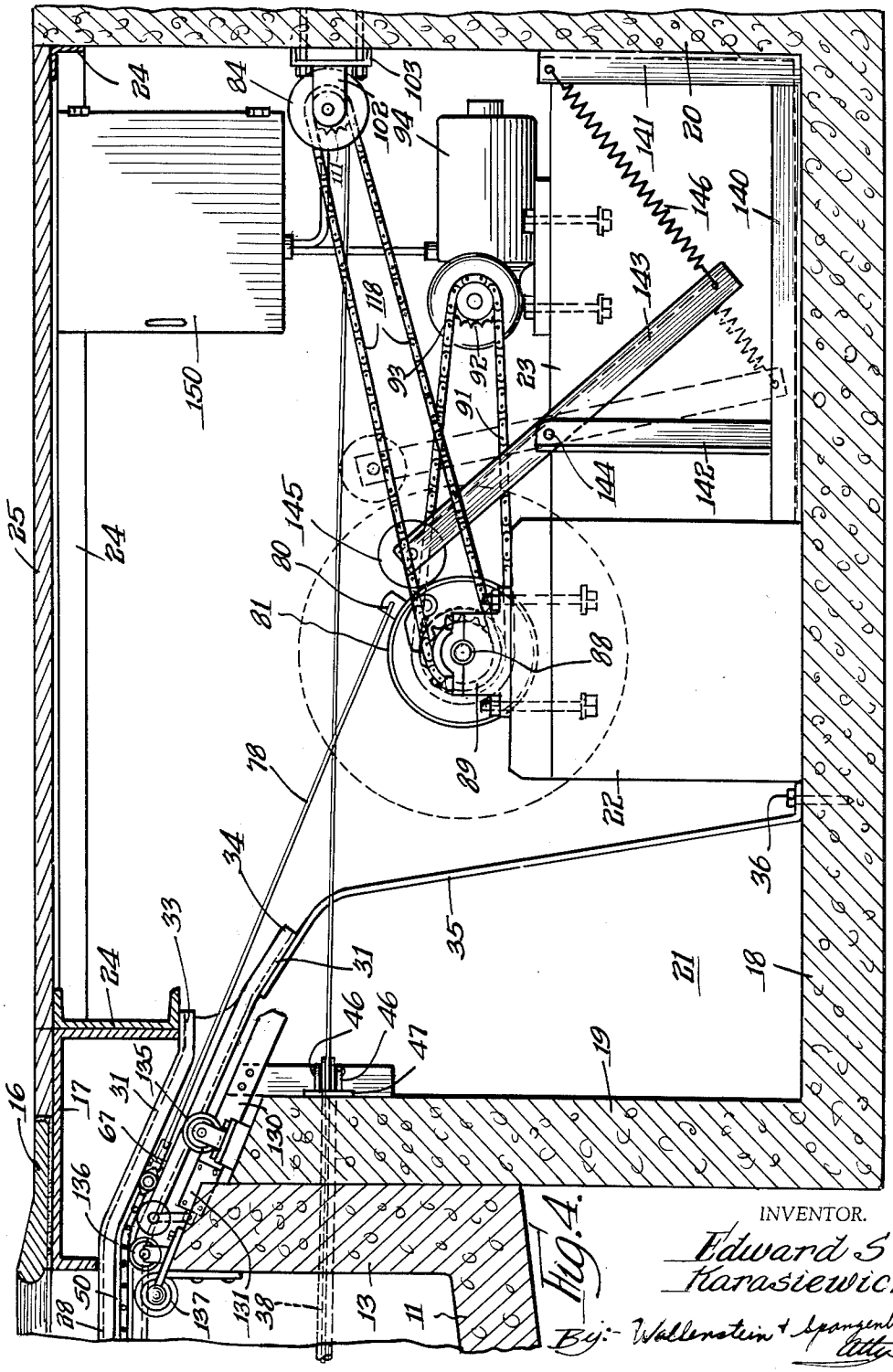


Fig. 4.

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Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

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Filed Sept. 29, 1958 7 Sheets-Sheet 3

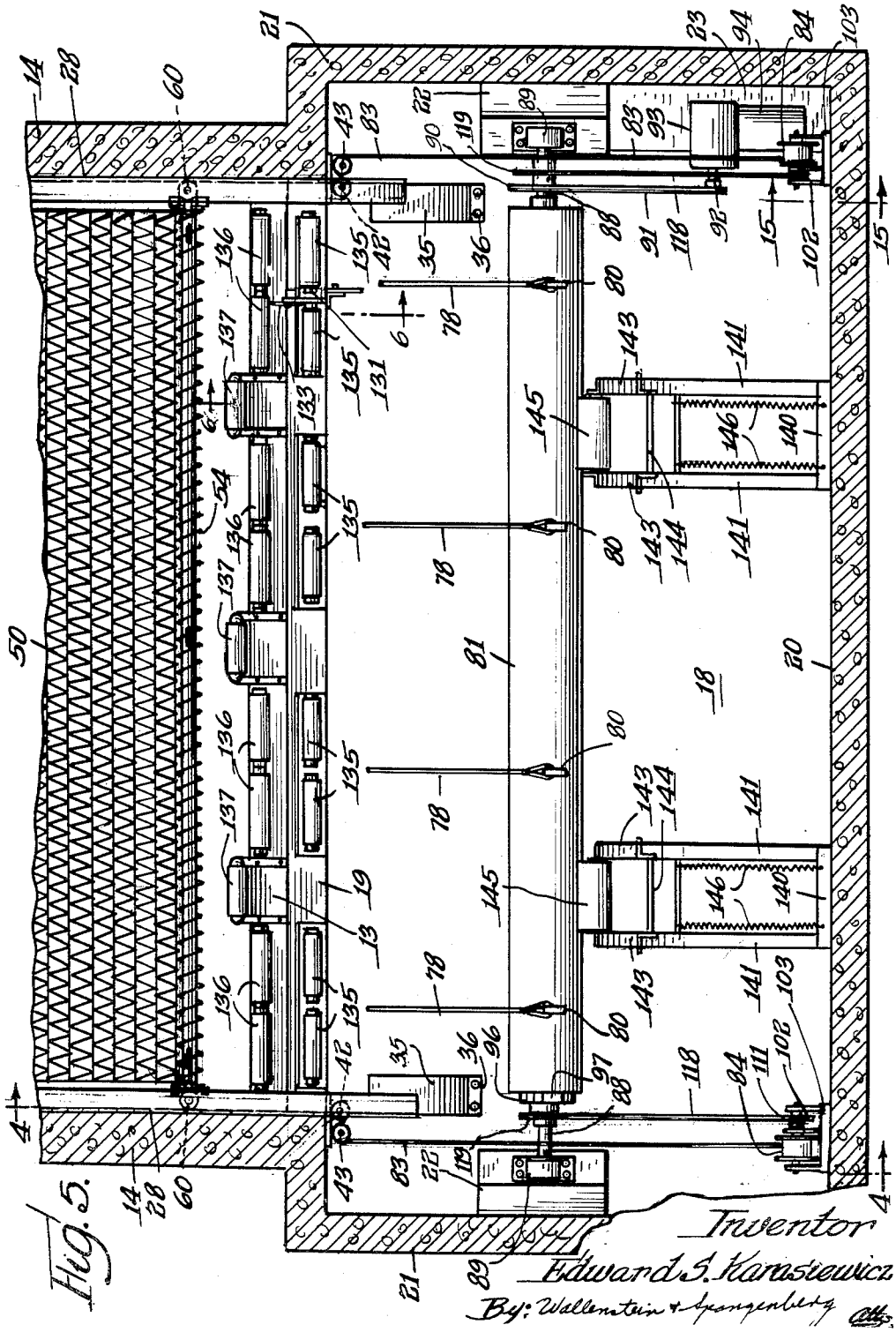


Fig. 5.

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Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

RETRACTABLE SWIMMING POOL COVER

Filed Sept. 29, 1958 7 Sheets-Sheet 4

Fig. 6.

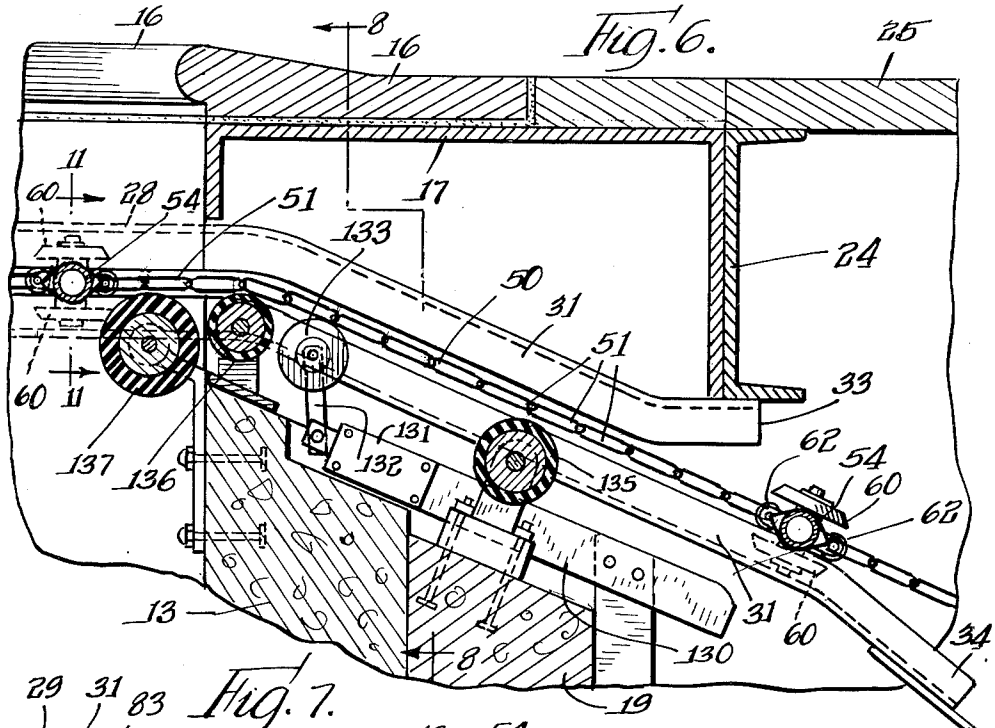


Fig. 7.

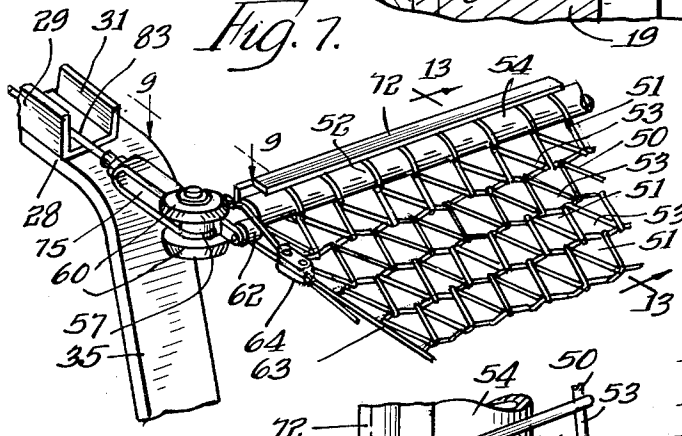


Fig. 8.

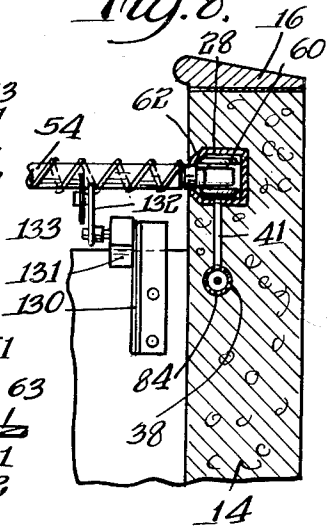
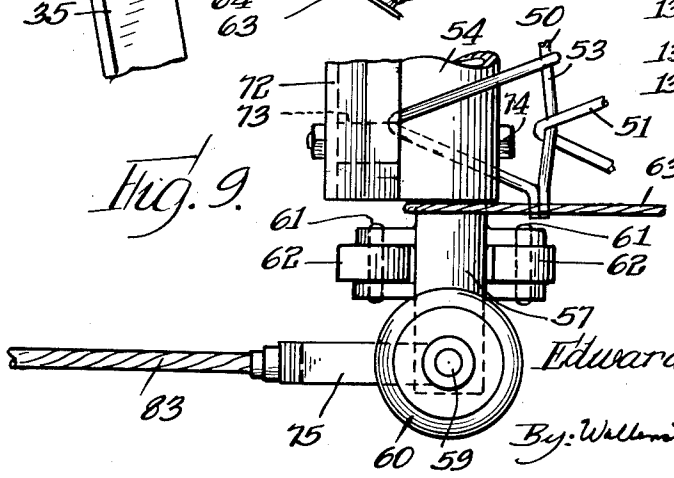


Fig. 9.



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Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

RETRACTABLE SWIMMING POOL COVER

Filed Sept. 29, 1958 7 Sheets-Sheet 5

Fig. 10.

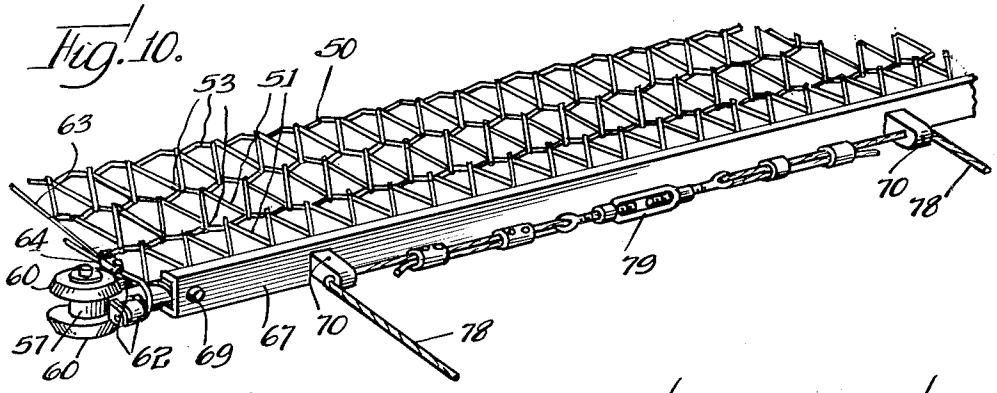


Fig. 11.

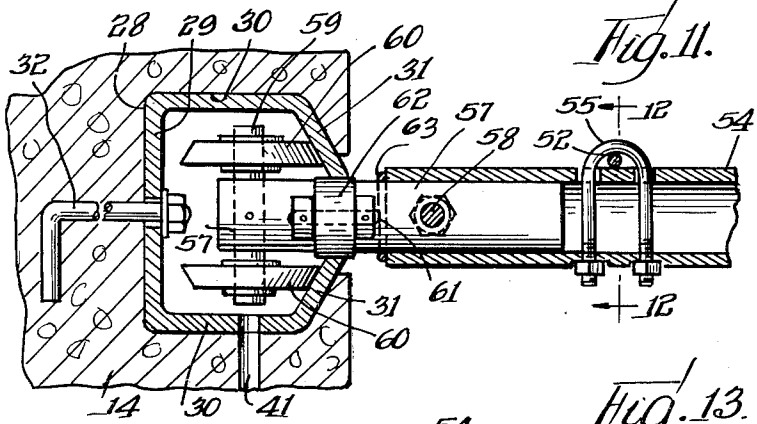


Fig. 12.

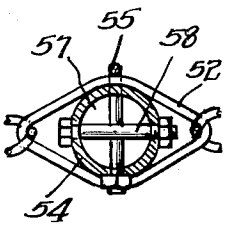


Fig. 13.

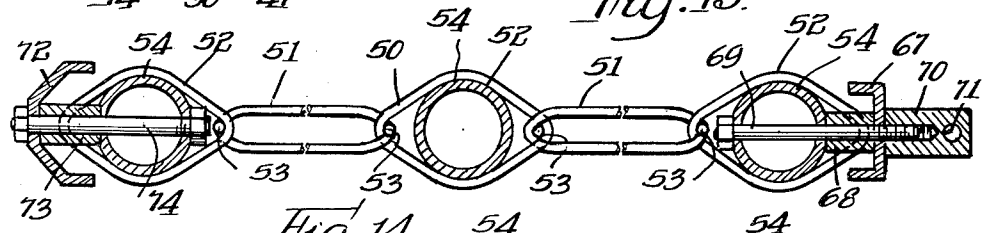
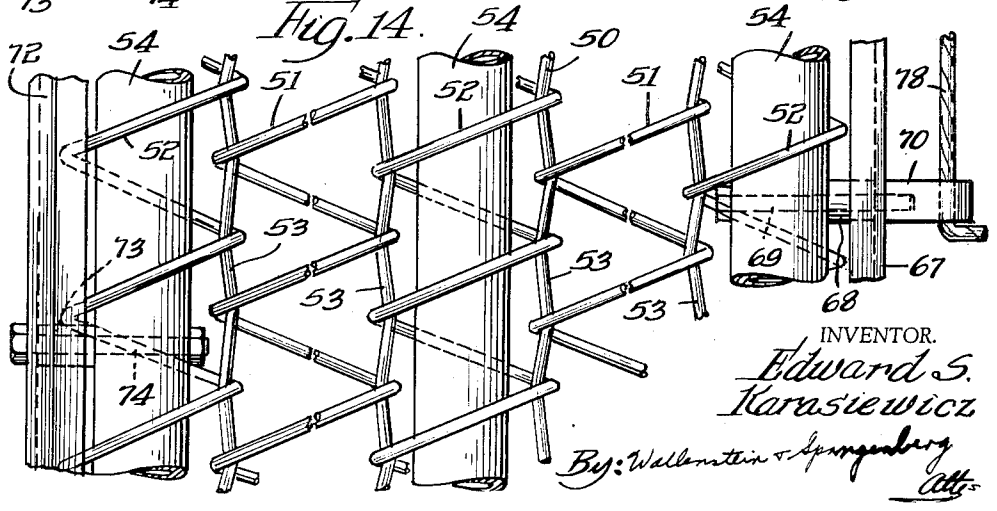


Fig. 14.



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Feb. 6, 1962 E. S. KARASIEWICZ 3,019,450

RETRACTABLE SWIMMING POOL COVER

Filed Sept. 29, 1958 7 Sheets-Sheet 6

Fig. 15.

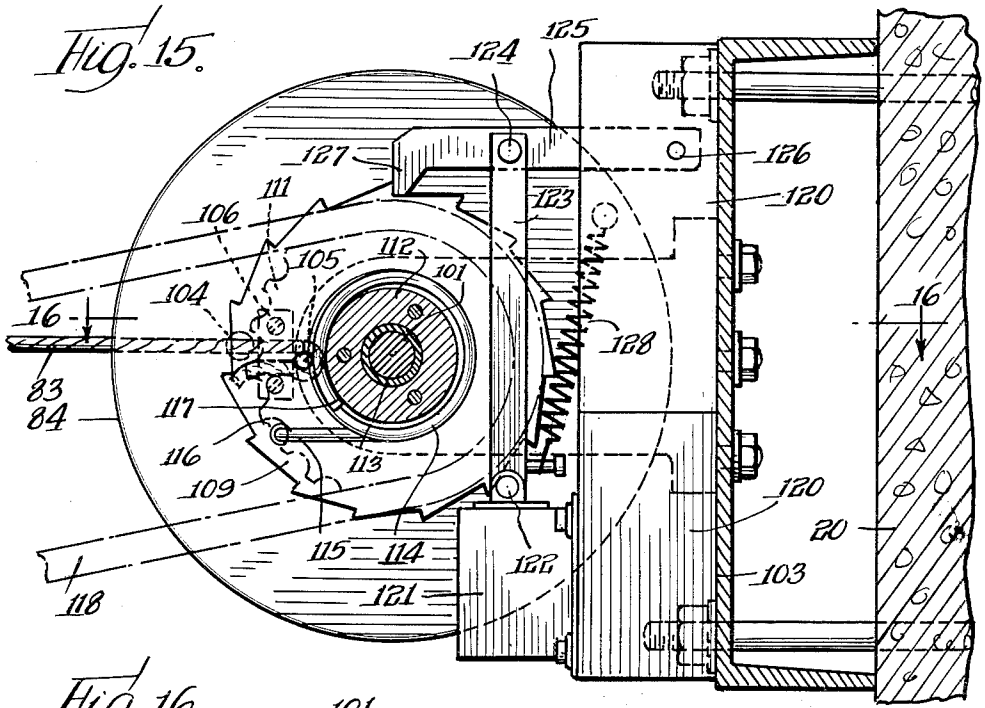
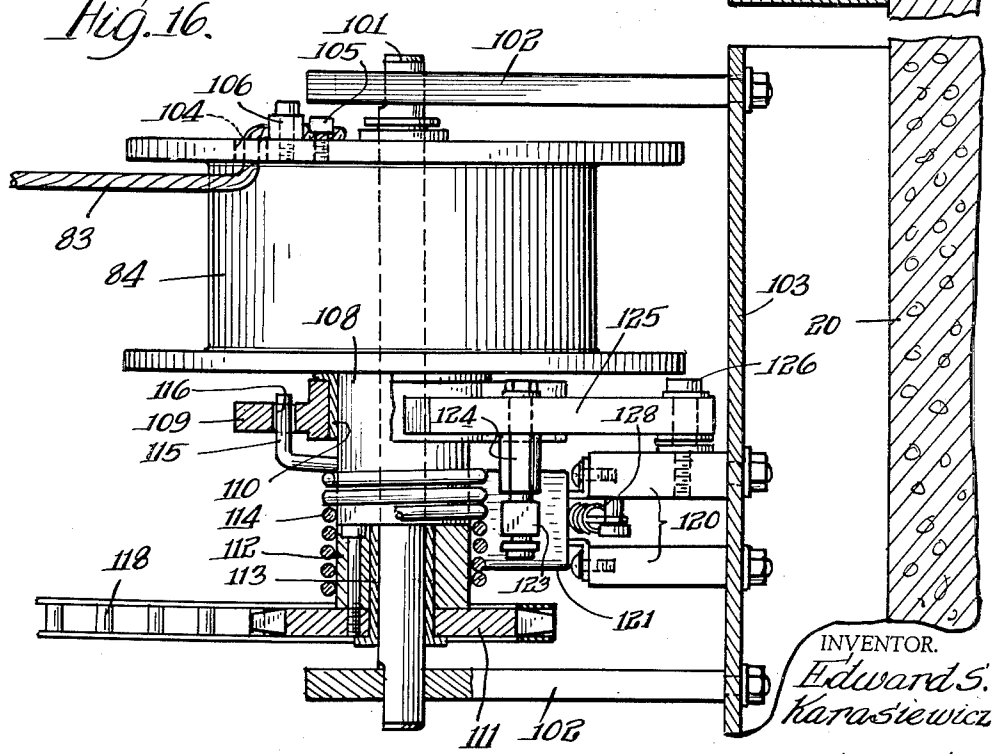


Fig. 16.



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RETRACTABLE SWIMMING POOL COVER

Filed Sept. 29, 1958 7 Sheets-Sheet 7

Fig. 17.

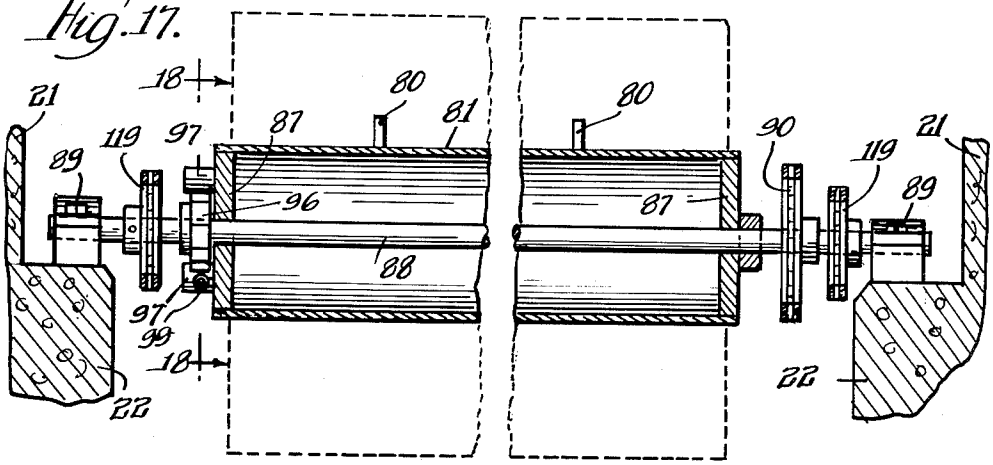


Fig. 18.

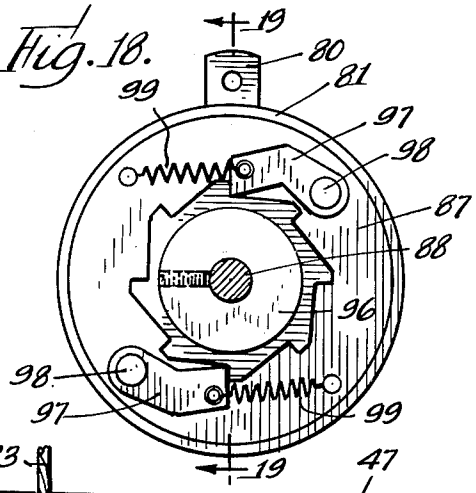
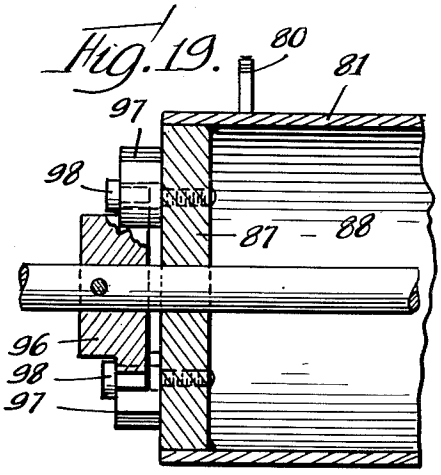


Fig. 19.



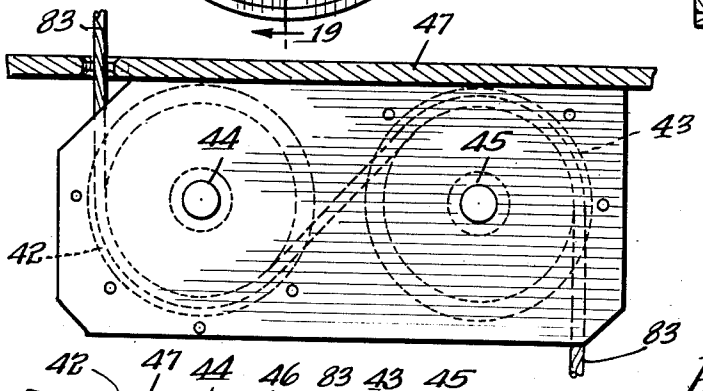


Fig. 20.

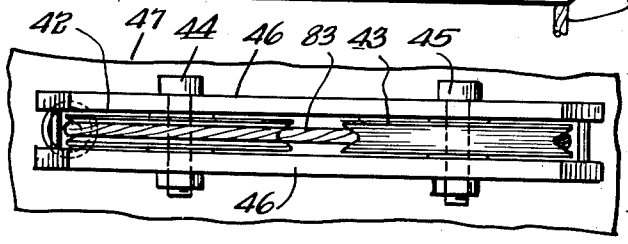


Fig. 21.

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United States Patent Office

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Patented Feb. 6, 1962

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RETRACTABLE SWIMMING POOL COVER

Edward S. Karasiewicz, Park Ridge, Ill., assignor to American Typesetting Corporation, Chicago, Ill., a corporation of Illinois

Filed Sept. 29, 1958, Ser. No. 763,971

9 Claims. (Cl. 4—172)

The principal object of this invention is to provide an improved safety cover for a swimming pool, which may be advanced over the water in the pool to prevent persons, especially children, from falling into the water when the pool is not in use or is unattended, and which may be retracted from over the water in the pool and hidden from sight when access to the pool is desired. The safety cover is also useful in decreasing the amount of debris that may tend to fall into the pool.

In accordance with this invention the safety cover includes a flexible screen which is adapted to extend horizontally over the water in the pool, and it is provided with a plurality of spaced transverse supports which are movably received in and supported by guide channels which extend along each side of the pool. A rotatable roll and rotatable cable drum means are located at one end of the pool. One end of the screen is connected, as by means of a plurality of cables or the like, to the roll, and the other end of the screen is connected by cable means to the cable drum means, preferably, there being two cable drums and two cables which extend along the sides of the pool. Driving means are provided for the roll and the cable drum means for rotating the same in opposite directions to wind the screen upon the roll to pull and retract the screen from over the water in the pool, and to wind the cable means on the cable drum means to pull and advance the screen over the water in the pool.

As the screen is so retracted and advanced, the number of turns of the screen on the roll and the number of turns of the cable means on the cable drum means will continuously vary, and since the screen is pulled from one end and the other as it is so retracted and advanced, the driving means for the roll and the cable drum means are so arranged, in accordance with this invention, that the roll and cable drum means may be rotated at respectively different speeds to compensate for these variations in said number of turns so that the screen may be freely retracted and advanced without binding and setting up stresses therein. Towards this end, the cable drum means is permitted to rotate substantially freely in the unwinding direction as the roll is being rotated in the winding direction to roll the screen thereon to retract the screen, and the roll is permitted to rotate substantially freely in the unwinding direction as the cable drum means is being rotated in the winding direction to wind the cable means thereon to advance the screen.

In the preferred embodiment of this invention there is provided a reversibly rotatable drive shaft which may be driven selectively in opposite directions by a reversible electric motor. Means including a one-way driving connection between the shaft and the roll rotates the roll in the winding direction, when the shaft is rotated in one direction, to wind the screen on the roll and retract the screen from over the water in the pool. Also, means including a one-way driving connection between the shaft and the cable drum means rotates the cable drum means in the winding direction, when the shaft is rotated in the opposite direction, to wind the cable means on the cable drum means to advance the screen over the water in the pool. One of said one-way driving connections, such as the one for the roll, is preferably a positive driving connection, while the other of said one-way driving connections, such as the one for the cable drum means, is preferably a friction or clutch type driving connection.

The cables for advancing the screen extend over pulleys at the opposite end of the pool and preferably extend through guide tubes arranged along each side of the pool. These cables are preferably adjustably secured to the cable drums. The plurality of cables which connect the screen to the roll are also preferably adjustable. By such adjustable means the screen may be properly and accurately positioned.

The flexible screen preferably consists of a plurality of transversely arranged wire helices which are pivotally hinged together throughout their lengths. This provides for maximum flexibility lengthwise of the screen and at the same time provides for maximum rigidity crosswise of the screen where sag must be eliminated. The plurality of spaced apart transverse supports, which are movably received in the guide channels and which guide and support the screen against sag, extend through certain of transversely arranged wire helices and are preferably anchored thereto to prevent relative movement therebetween.

The guide channels which extend along the sides of the pool have, in cross-sectional configuration, a vertical leg, a pair of horizontal legs and a pair of spaced apart vertical legs extending toward each other, a substantially C-shaped cross-sectional configuration. The ends of the supports of the screen carry fittings which extend into the guide channels. Each fitting includes a pair of horizontal rollers which engage the insides of the pair of spaced apart vertical legs of the guide channels. Each fitting also preferably includes a pair of vertical rollers which engage the facing edges of the pair of spaced apart vertical legs of the guide channels. These fittings effectively movably support the supports in the guide channels, minimize sagging of the screen and prevent twisting of the supports.

The guide channels are preferably embedded in the side walls of the pool and also embedded in the side walls below each guide channel is a cable guide pipe or tube for accommodating the cables which advance the cover over the water in the pool. Pipes are connected at intervals between the guide channels and the guide pipes or tubes so as to convey overflow entering the guide channels into the guide pipes or tubes which slant downwardly to discharge the overflow water to a convenient outlet.

A braking arrangement is also preferably provided for the screen roll to prevent too rapid free rotation of the screen roll in the unwinding direction as the cover is being advanced over the water in the pool. The swimming pool is also preferably provided with guide rollers where the retractable cover enters over the pool so as to compensate for sag and prevent scraping as the cover is being advanced or retracted.

These various features, and other features which will be described hereafter, all structurally and functionally cooperate with each other to provide a new and improved retractable swimming pool cover which is simple and rugged in construction, which is foolproof in operation, and which may be readily and inexpensively manufactured and installed.

Further objects and advantages of this invention will become apparent to those skilled in the art upon reference to the accompanying specification, claims and drawings in which:

FIG. 1 is a vertical sectional view through the swimming pool with the retractable swimming pool cover shown extended over the water in the pool.

FIG. 2 is a vertical sectional view through the swimming pool cover taken substantially along the line 2—2 of FIG. 1.

FIG. 3 is a perspective view of the swimming pool

cover showing the mechanisms for retracting and advancing the same.

FIG. 4 is an enlarged vertical view of the right hand portion of FIG. 1 and taken substantially along the line 4—4 of FIG. 5 and showing the operating mechanisms for the retractable cover.

FIG. 5 is a horizontal sectional view taken substantially along the line 5—5 of FIG. 1.

FIG. 6 is an enlarged vertical sectional view of a portion of FIG. 4 and taken substantially along the line 6—6 of FIG. 5.

FIG. 7 is a perspective view of a portion of the leading edge of the retractable cover.

FIG. 8 is a vertical sectional view taken substantially along the line 8—8 of FIG. 6.

FIG. 9 is a partial plan view of a portion of the leading edge of the retractable cover taken substantially along the line 9—9 of FIG. 7.

FIG. 10 is a perspective view of a portion of the trailing edge of the retractable cover.

FIG. 11 is a vertical sectional view taken substantially along the line 11—11 of FIG. 6.

FIG. 12 is a vertical sectional view taken substantially along the line 12—12 of FIG. 11.

FIG. 13 is a vertical sectional view of the retractable cover taken substantially along the line 13—13 of FIG. 7.

FIG. 14 is a plan view, with parts broken away, of the retractable cover illustrated in FIG. 13.

FIG. 15 is a sectional view through the cable drum means for advancing the retractable cover and taken substantially along the line 15—15 of FIG. 5.

FIG. 16 is a sectional view through the cable drum means and taken substantially along the line 16—16 of FIG. 15.

FIG. 17 is a vertical sectional view, with parts broken away, through the roll upon which the retractable cover is rolled.

FIG. 18 is a vertical sectional view taken substantially along the line 18—18 of FIG. 17.

FIG. 19 is a vertical sectional view taken substantially along the line 19—19 of FIG. 18.

FIG. 20 is a plan view partly in section of the guide pulleys for the cables which advance the retractable cover.

FIG. 21 is an elevational view of the guide pulleys illustrated in FIG. 20.

Referring first to FIGS. 1, 2, 4 and 5, a swimming pool is generally designated at 10 and it includes a bottom wall 11, end walls 12 and 13 and side walls 14. The bottom wall 11 is contoured as desired and includes a drain outlet 15. The tops of the end walls 12 and 13 and the side walls 14 are provided with a suitable coping 16. The end wall 13 terminates short of the coping 16, there being provided a suitable beam structure 17 for supporting the coping 16 above the end wall 13. There is thus provided an opening between the top of the end wall 13 and the coping 16 and beam structure 17 through which the cover for the swimming pool may be retracted and advanced over the water in the pool. The walls of the pool may be suitably tiled if this is desired. Adjacent the end wall 13 of the pool 10 is a pit having a bottom wall 18, end walls 19 and 20 and side walls 21. The pit is provided with supports 22 and 23 for supporting the mechanisms which advance and retract the swimming pool cover. The tops of the walls of the pit are provided with supports 24 for supporting a suitable cover 25 for covering the pit.

As shown in FIGS. 1, 2, 4, 5, 6, 8 and 11, a guide channel 28 extends along each side of the swimming pool, this guide channel being embedded in the side walls 14 of the swimming pool. The guide channels are substantially C-shaped in cross-sectional configuration and have a vertical leg 29, upper and lower horzontal legs 30 and substantially vertical legs 31 extending toward each other. Preferably, these legs 31 diverge outwardly as they extend toward each other. The guide channels may be securely anchored in the side walls 14 by means of anchoring fittings 32. The far ends of the guide channels 28 terminate in cavities 39 in the end wall 12 of the swimming pool. The near ends of the guide channels 28 extend into the pit at the near end of the swimming pool, the guide channels 28 extending dowardly as they enter the pit. The horizontal legs 30 of the guide channels 28 and the legs 31 depending therefrom diverge as they enter the pit as illustrated at 33 and 34 in FIGS. 4 and 6. Guide strips 35 extend from the ends 34 of the guide channels 28 to the floor 18 of the pit, they being secured to the floor 18 by suitable means indicated at 36.

Also extending along each side of the swimming pool is a cable guide pipe 38, the pipes 38 being embedded in the side walls 14 of the swimming pool. The far ends of these cable guides 38 communicate with the cavity 39 in the end wall 12 of the swimming pool and the near ends communicate with the interior of the pit. The cable guide pipes 38 slant downwardly toward the pit 18 and the cable guide pipes 38 are connected at intervals by pipes 41 communicating with the interior of the channel guides 28. Thus, any overflow of water in the swimming pool which enters the channel guides 28 is directed through the pipes 41 into the cable guide pipes 38, the overflow water emptying into the pit 18 where it is suitably conveyed away by drains in the bottom wall 18 of the pit.

The cavities 39 in the end wall 12 are provided with suitable pulleys 40. A pair of guide pulleys 42 and 43 are carried by the wall 19 of the pit adjacent to the point where the cable guide pipes 38 enter the pit, the construction of the guide pulleys being illustrated in more detail in FIGS. 20 and 21. The guide pulleys 42 and 43 are rotatably carried by pins 44 and 45, respectively, which in turn are carried by plates 46 secured to a plate 47 which in turn is attached to the wall 19 of the pit.

The retractable cover for the swimming pool includes a screen 50 which is made up of a plurality of wire helices 51 and 52 which extend transversely across the pool and which are pivotally connected together by transverse wires 53, as shown more clearly in FIGS. 7 and 9 to 14. This screen 50, so formed, is extremely flexible in the lengthwise direction but is relatively rigid in the crosswise direction so as to minimize sag. The wire helices 51 and 52 are preferably formed from aluminum or other light weight metal so as to keep the weight of the screen as low as possible. The aluminum wire helices may be anodize in desired colors so as to enhance the appearance of the cover. The screen 50 is transversely supported by a plurality of supports 54, these supports extending through the wire helices 52. The number of the transverse supports 54 utilized depends upon the dimensions of the swimming pool to be covered. The wire helices 51 which do not contain the transverse supports 54 are preferably flattened so as to have less thickness than the wire helices 52 through which the supports 54 extend. The supports 54 are preferably made from tubes of light weight metal such as aluminum or the like and they are secured to the wire helices 52 by means of U-bolts 55 as illustrated in FIGS. 11 and 12. The U-bolts 55 operate to prevent relative displacement and movement of the supports 54 and the wire helices 52.

Each end of each tubular support 54 is provided with a fitting 57, the fitting 57 being received in the end of the tubular support 54 and being held in place therein by bolts 58. Each fitting 57 carries a vertical pin 59 upon which are rotatably mounted a pair of horizontal rollers 60, the rollers 60 engaging the sides of the depending legs 31 of the guide channels 28. Each fitting also carries a pair of horizontal pins 61 which in turn rotatably carries a pair of vertically arranged rollers 62 which engage the facing edges of the legs 31 of the channel guide 28. The rollers 60 and 62 operate in conjunction with the guide channel 28 to movably support and

guide the supports 54 of the screen 50. The horizontal rollers 60 absorb the horizontal stresses caused by the weight of the screen on the supports 54 and greatly minimize the amount of sag in the screen 50. The vertical rollers 62 operate principally to guide the supports 54 and to prevent turning thereof so as to maintain the rollers 60 in proper position with respect to the channel guides 28. The various supports 54 are preferably tied together by means of longitudinally extending cables 63 secured by clamps 64 so as to maintain relatively fixed spacing between the supports 54 and to compensate considerably for the resiliency of the screen 50.

A channel 67, as illustrated more clearly in FIGS. 3, 10 and 14, is secured by spacers 68 and bolts 69 to the support 54 forming the trailing edge of the retractable cover, that is the edge nearest to the pit. This channel 67 operates to reinforce this end support 54. The channel 67 carries a plurality of lugs 70, four lugs being shown for purposes of illustration, the lugs 70 each having a hole 71. The other end of the screen, that is the leading end remote from the pit, is also provided with a channel 72. The channel 72 is preferably semi-octagonal in cross-sectional configuration so as to provide maximum rigidity. The channel 72 is secured by spacers 73 and bolts 74 to the end support 54, this construction being illustrated in more detail in FIGS. 3, 7, 9, 13 and 14. The vertical pins 59 which carry the rollers 60 of the leading end support 54 are each provided with a yoke 75.

A plurality of cables 78, as shown in FIGS. 3, 10, 13 and 14 extend through the holes 71 in the lugs 70 on the channel 67 and they are adjustably secured together by turn buckles 79. These cables 78 extend to and are secured to lugs 80 carried by a roll 81 arranged within the pit. As the roll 81 is rotated in a winding direction, the cables 78 pull the screen 50 and wind the same on the roll 81 and, in this way, the screen 50 is retracted from over the water in the pool.

A pair of cables 83 are connected to the yokes 75 carried by the leading edge of the screen 50. These cables 83 extend over the pulleys 40 in the cavities 39 in the end wall 12 of the swimming pool and extend through the cable guide tubes 38 and over the guide pulleys 42 and 43 to a pair of cable drums 84 arranged within the pit. As the cable drums 84 are rotated in a winding direction, the cables 83 operate to pull the screen 50 and advance the same over the water in the pool. When the cable drums 84 are rotated in a winding direction to advance the screen over the pool, the screen roll 81 is allowed to rotate substantially freely in order that the screen may be advanced without stressing or binding. Conversely, when the screen roll 81 is rotated in a winding direction to retract the screen from over the water in the pool, the cable drums 84 are allowed to rotate substantially freely so as to prevent stressing and binding as the screen is being retracted.

Referring now to FIGS. 3 to 5 and 17 to 19, the screen roll 81 is provided with bearing members 87 for rotatably mounting the same upon a shaft 88 which in turn is rotatably mounted in bearings 89 carried by the supports 22 in the pit. A sprocket wheel 90 is secured to the shaft 88 and is connected by a chain 91 to a sprocket wheel 92 driven by a gear reducer 93 which in turn is driven by an electric motor 94 mounted on the support 23 in the pit. The electric motor 94 is a reversible motor and when it is operated in one direction, the shaft 88 is rotated in one direction and when it is operated in the opposite direction, the shaft 88 is rotated in the opposite direction. As the shaft 88 is thus rotated in one direction or the other, the screen 50 is retracted from or advanced over the water in the swimming pool.

A ratchet wheel 96 is secured to the shaft 88 and is rotated in one direction or the other thereby. One of the bearing members 87 of the screen roll 81 has a pair of pawls 97 pivotally secured thereto by pins 98. Springs 99 extending between the pawls 97 and the bearing member 87 operate to resiliently engage the pawls 97 with the ratchet wheel 96. When the shaft 88, as illustrated in FIGS. 3, 4 and 18 is rotated in a clockwise direction, the ratchet wheel 96 which is positively engaged by the pawls 97, operates to rotate the screen roll 81 in a clockwise or winding direction to roll the screen 50 upon the screen roll 81. When, however, the shaft 88 and the ratchet wheel 96 are rotated in a counter-clockwise direction, the ratchet wheel 96 slips past the spring pressed pawls 97 and does not impart any rotation to the screen roll 81. When this occurs, the screen roll 81 is allowed to rotate substantially freely in the unwinding direction so long as its rotation in that direction does not exceed the speed of rotation of the shaft 88 in the counter-clockwise direction. A positive one way driving connection is, therefore, provided between the shaft 88 and the screen roll 81, it operating to positively roll the screen on the roll 81 when operating in a winding direction but permitting substantially free rotation of the roll in the unwinding direction when unwinding of the screen from the roll is desired.

Referring more particularly to FIGS. 3, 4, 5, 15 and 16, the pair of cable drums 84 for winding the cables 83 are rotatably mounted on stationary shafts 101 which are carried by brackets 102 secured to supports 103 which in turn are secured to the wall 20 of the pit. The shafts 101 are held against rotation by the brackets 102. The cables 83 extend through holes 104 in flanges on the cable drums 84 and extend over pins 105 on the cable drums and are adjustably clamped in position by means of clamps 106 secured to the cable drums. In this way, the cables 83 are adjustably secured to the cable drums 84.

Each rotatable cable drum 84 is provided with a cylindrical extension 108 and a ratchet wheel 109 is rotatably mounted on the cylindrical extension 108 by a suitable bearing 110. Thus, the ratchet wheel 109 is rotatably mounted with respect to the cable drum 84 and the cable drum 84 is rotatably mounted on the stationary shaft 101. A sprocket wheel 111 having a cylindrical extension 112 is rotatably mounted on the stationary shaft 101 by a bearing 113. The cylindrical extension 112 of the sprocket wheel 111 is coaxial with the cylindrical extension 108 of the cable drum 84, these two cylindrical extensions 112 and 108 being rotatable with respect to each other. A helical spring 114 is arranged around the cylindrical extensions 112 and 108 and it has one end 115 extending into a hole 116 in the rotatably mounted sprocket wheel 109. The other end of the coil spring 114, as indicated at 117 in FIG. 15, is formed to press against the cylindrical extension 112 of the sprocket wheel 111. As the sprocket wheel 111 and its cylindrical extension 112 are rotated in a counter-clockwise direction, as illustrated in FIG. 15, the coil spring 114 winds upon the cylindrical extensions 112 and 108 to couple these extensions together so as to rotate the cylindrical extension 108 and the cable drum 84 in a counter-clockwise direction. When this occurs, the ratchet wheel 109 rotates with the cable drum 84, it being rotated by the spring 114. When, however, the sprocket wheel 111 and its cylindrical extension 112 are rotated in a clockwise direction and the ratchet wheel 109 is held against rotation in that direction, the coil spring 114 unwinds so as to disengage the coupling between the cylindrical extensions 112 and 108 so that the cylindrical extension 108 and the cable drum 84 are allowed to freely rotate. The coupling for the cable drums is, therefore, a friction or clutch type of coupling.

The sprocket wheels 111 of the cable drum means are connected by chains 118 to sprocket wheels 119 secured to the shaft 88. Thus, as the shaft 88 is rotated in a counter-clockwise direction so as to free the screen roll 81 for rotation in the unwinding direction, the cable drums 84 are driven in counter-clockwise or winding direction to advance the screen over the water in the pool. When the

shaft 88 is rotated in a clockwise direction, the cable drums 84 are freed for substantially free rotation in the unwinding direction and the screen roll 81 is rotated in the winding direction to retract the screen from over the water in the pool.

Each support 103 for the cable drum means is provided with a pair of brackets 120 upon which is mounted a solenoid 121. The armature of the solenoid 121 is connected at 122 to one end of a link 123 which is connected at its other end at 124 to a pawl 125 pivoted to the support 120 at 126. The pawl 125 is provided with a shoulder 127 which is adapted to engage the ratchet wheel 109. A spring 128 connected between the link 123 and the bracket 120 normally disengages the pawl 127 from the ratchet wheel 109 but when the solenoid 121 is energized, the shoulder 127 of the pawl is brought into engagement with the ratchet wheel 109. When the reversible electric motor 94 is energized to locate the screen roll 81 in the winding direction to retract the screen, the solenoids 121 are energized to cause the pawls 125 to engage the ratchet wheels 109 so as to insure the breaking of the coupling between the cylindrical extensions 112 and 108 so as to allow the cable drums 84 to rotate freely during the retracting operation.

As shown more clearly in FIGS. 4, 6 and 8, a bracket 130 is secured to the top of the wall 19 of the pit and the bracket 130 carries a limit switch 131 which is operated by a pivoted lever 132 having a roller 133. The roller 133 engages the underside of the screen 50 and is held depressed by the screen. When the roller 133 is depressed by the screen, the limit switch 131 is closed. When the screen 50 is completely advanced over the water in the pool to a point beyond the roller 133, the roller swings upwardly to open the limit switch. Likewise, when the screen 50 is retracted from over the water in the pool to a point beyond the roller 133, it also swings upwardly to open the limit switch 131. The limit switch 131 is included in the electrical control circuits for the reversible electric motor and when the switch is opened as a result of the screen being fully advanced or retracted, the operation of the electric motor 94 is automatically stopped.

Because there is some tendency for the retractable cover for the swimming pool to sag, the tops of the walls 19 and 13 are provided with a plurality of supporting rollers 135, 136 and 137 for supporting and guiding the screen as it passes over the tops of the walls 19 and 13 below the coping 16 and beam structure 17. These rollers in so supporting the screen, as it is moving, allows the screen to pass through the relatively narrow opening below the coping 16.

As the screen is unrolled from the screen roll 81, the fittings at the ends of the supports thereof are guided into the guide channels 28 by the guide strips 35 and the flared mouths 33 and 34 of the guide channels 28 and, as a result, fool proof operation without binding is brought about. Since the screen roll 81 is freed for rotation as the screen is being advanced over the water in the pool, braking mechanisms are provided to prevent the screen from unrolling too rapidly due to inertia of the rotating mass. The braking mechanisms are arranged in the pit adjacent the screen roll and each braking mechanism, as illustrated more clearly in FIGS. 4 and 5, includes a base 140 and uprights 141 and 142. An arm 143 is pivoted intermediate its ends at 144 to the upright 142. The outer end of the arm 143 carries a roller 145 which engages the screen 50 on the screen roll 81 and which is urged into engagement with the screen by springs 146 extending between the other end of the arm 143 and the upright 141. The spring pressed roll 145 places sufficient drag upon the rolled screen as it is being unrolled from the screen roll 81 to prevent too rapid unrolling thereof which might cause piling up of the screen on the floor of the pit.

The various electrical controls for the electric motor 94 and the solenoids 121 of the cable drum means may be located in a control box 150 arranged within the pit. The controls in the control box are controlled by the limit switch 131 and by suitable manually operated switches for controlling the advancing and retracting of the screen. The control circuits are conventional and are not illustrated herein.

I claim as my invention:

1. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and having spaced transverse supports movably received in and supported by the guide channels, a rotatable roll and rotatable cable drum means located at one end of the pool, means connecting one end of the screen to the roll, cable means connecting the other end of the screen to the cable drum means, a reversibly rotatable drive shaft, means including a one-way driving connection between the shaft and the roll for rotating the roll in the winding direction when the shaft is rotated in one direction to wind the screen on the roll and retract the screen from over the water in the pool, and means including a one-way driving connection between the shaft and the cable drum means for rotating the cable drum means in the winding direction when the shaft is rotated in the opposite direction to wind the cable means on the cable drum means and advance the screen over the water in the pool.

2. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and having spaced transverse supports movably received in and supported by the guide channels, a rotatable roll and rotatable cable drum means located at one end of the pool, means connecting one end of the screen to the roll, cable means connecting the other end of the screen to the cable drum means, a reversibly rotatable drive shaft, means including a one-way driving connection between the shaft and the roll for rotating the roll in the winding direction when the shaft is rotated in one direction to wind the screen on the roll and retract the screen from over the water in the pool, and means including a one-way driving connection between the shaft and the cable drum means for rotating the cable drum means in the winding direction when the shaft is rotated in the opposite direction to wind the cable means on the cable drum means and advance the screen over the water in the pool, one of said one-way driving connections being a positive driving connection, and the other of said one-way driving connections being a friction driving connection.

3. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and having spaced transverse supports movably received in and supported by the guide channels, a rotatable roll and a pair of cable drums located at one end of the pool, a pair of pulleys located at the other end of the pool, cables connecting one end of the screen to the roll, a pair of cables extending over the pair of pulleys and connecting the other end of the screen to the pair of cable drums, a reversibly rotatable drive shaft, means including a one way drive connection between the shaft and the roll for rotating the roll in the winding direction when the shaft is rotated in one direction to wind the screen on the roll to pull the screen from over the water in the pool, and means including one-way drive connections between the shaft and the pair of cable drums for rotating the cable drums in the winding direction when the shaft is rotated in the opposite direction to wind the pair of cables on the cable drums and pull the screen over the water in the pool.

4. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and consisting of a plurality of transversely arranged wires and a plurality of transversely

arranged wire helices pivotally hinged together throughout their lengths by the wires, and a plurality of spaced transverse supports extending through certain of the transversely arranged wire helices and with the ends of each of them movably received in and supported by the guide channels.

5. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and consisting of a plurality of transversely arranged wires and a plurality of transversely arranged wire helices pivotally hinged together throughout their lengths by the wires, a plurality of spaced transverse supports extending through certain of the transversely arranged wire helices and with the ends of each of them movably received in and supported by the guide channels, and means for anchoring the transverse supports to their respective transversely arranged wire helices.

6. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and having spaced transverse supports movably received in and supported by the guide channels, a rotatable roll and rotatable cable drum means located at one end of the pool, means connecting one end of the screen to the roll, cable means connecting the other end of the screen to the cable drum means, a reversibly rotatable drive shaft, means for connecting the roll to the shaft when the shaft is rotated in one direction for rotating the roll only in the winding direction to wind the screen on the roll and pull the screen from over the water in the pool, and means for connecting the cable drum means to the shaft when the shaft is rotated in the opposite direction only to wind the cable means on the cable drum means and pull the screen over the water in the pool.

7. A retractable cover for a swimming pool comprising a guide channel extending along each side of the pool, a flexible screen adapted to extend horizontally over the water in the pool and having spaced transverse supports movably received in and supported by the guide channels, a rotatable roll and a pair of cable drums located at one end of the pool, a pair of pulleys located at the other end of the pool, cables connecting one end of the screen to the roll, a pair of cables extending over the pair of pulleys and connecting the other end of the screen to the pair of cable drums, a reversibly rotatable drive shaft, means including a one way drive connection between the shaft and the roll for rotating the roll in the winding direction when the shaft is rotated in one direction to wind the screen on the roll to pull the screen from over the water in the pool, and means including one way drive connections between the shaft and the pair of cable drums for rotating the cable drums in the winding direction when the shaft is rotated in the opposite direction to wind the pair of cables on the cable drums and pull the screen over the water in the pool, and means for retarding rotation of the roll in the unwinding direction.

8. In a retractable cover for a swimming pool, having a flexible screen adapted to extend horizontally over the water in the pool, and means for advancing and retracting

the screen over the water in the pool, said means comprising a drum for moving the screen, a cylindrical extension on the drum, a power driven cylindrical extension concentric with the cylindrical extension on the drum, means for rotating the power driven cylindrical extension in one direction or the opposite direction, a helical spring encompassing the cylindrical extension on the drum and the power driven cylindrical extension for coupling the cylindrical extension on the drum to the power driven cylindrical extension when the power driven cylindrical extension is rotated in one direction for rotating the drum in said one direction and for decoupling the cylindrical extension of the drum from the power driven cylindrical extension when the power driven cylindrical extension is rotated in the opposite direction to allow substantially free rotation of the cylindrical extension of the drum in said opposite direction.

9. In a retractable cover for a swimming pool, having a flexible screen adapted to extend horizontally over the water in the pool, and means for advancing and retracting the screen over the water in the pool, said means comprising a drum for moving the screen, a cylindrical extension on the drum, a power driven cylindrical extension concentric with the cylindrical extension on the drum, means for rotating the power driven cylindrical extension in one direction or the opposite direction, a helical spring encompassing the cylindrical extension on the drum and the power driven cylindrical extension for coupling the cylindrical extension on the drum to the power driven cylindrical extension when the power driven cylindrical extension is rotated in one direction for rotating the drum in said one direction and for decoupling the cylindrical extension of the drum from the power driven cylindrical extension when the power driven cylindrical extension is rotated in the opposite direction to allow substantially free rotation of the cylindrical extension of the drum in said opposite direction, a rotatably mounted wheel connected to one end of the helical spring and rotatable in said one direction when the power driven cylindrical extension is rotated in said one direction, and means for locking said wheel against rotation in said opposite direction when the power driven cylindrical extension is rotated in said opposite direction to insure uncoupling of said cylindrical extension of the drum from the power driven cylindrical extension.

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