Dec. 3, 1968 N. J. ROSS 3,413,661

SWIMMING POOL AND COVER CONSTRUCTION

Filed Oct. 21, 1965 3 Sheets-Sheet 1

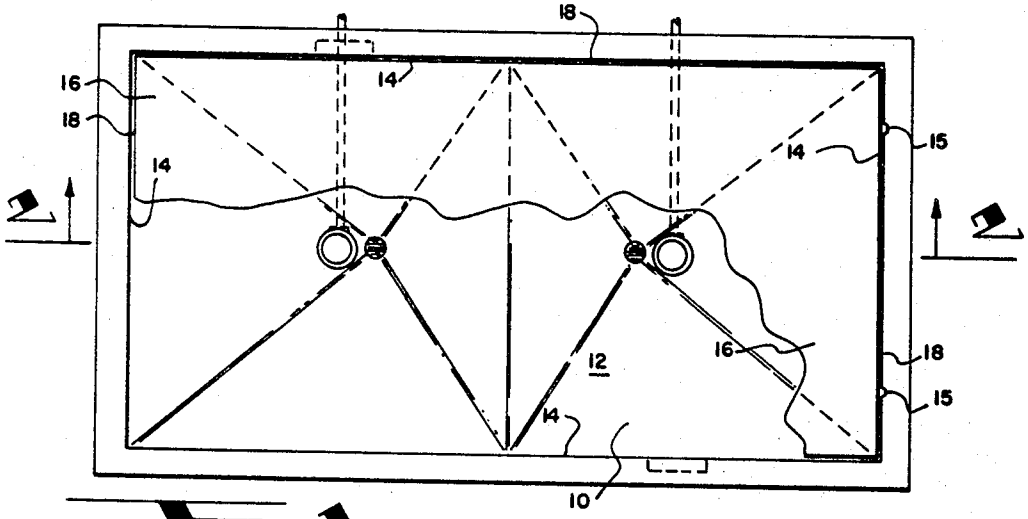


Fig. 1

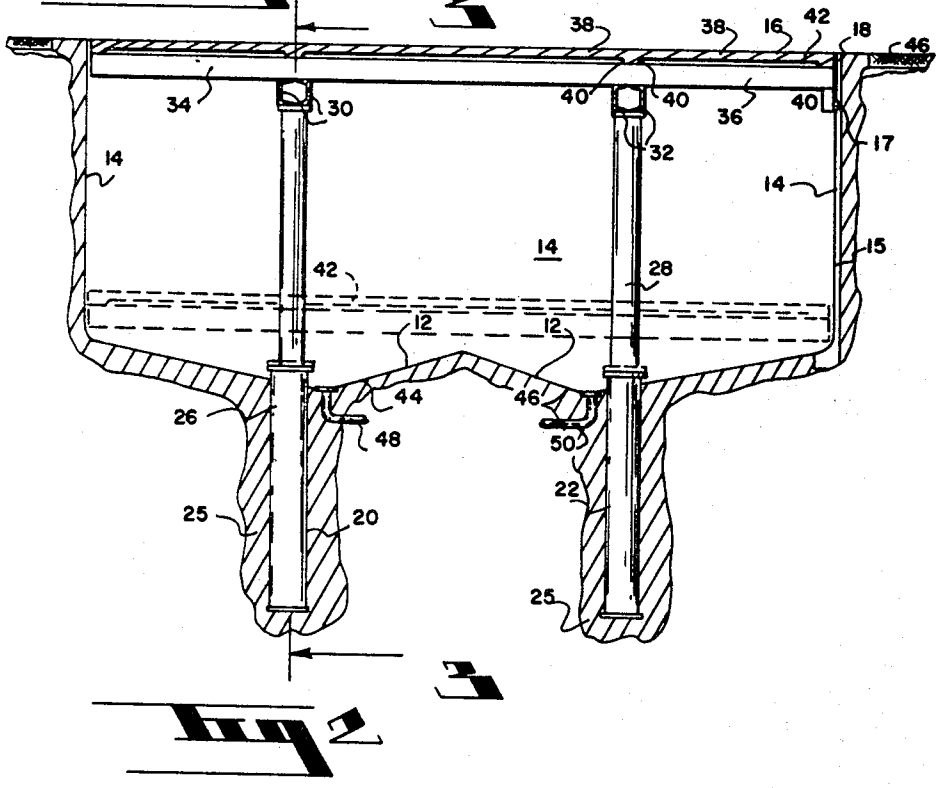


Fig. 2

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Dec. 3, 1968 N. J. ROSS 3,413,661

SWIMMING POOL AND COVER CONSTRUCTION

Filed Oct. 21, 1965 3 Sheets-Sheet 2

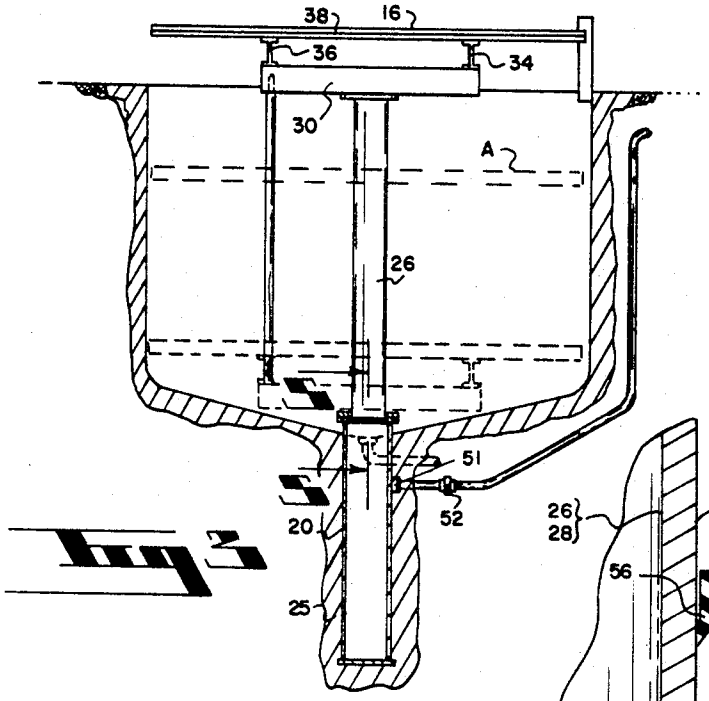


Fig 3

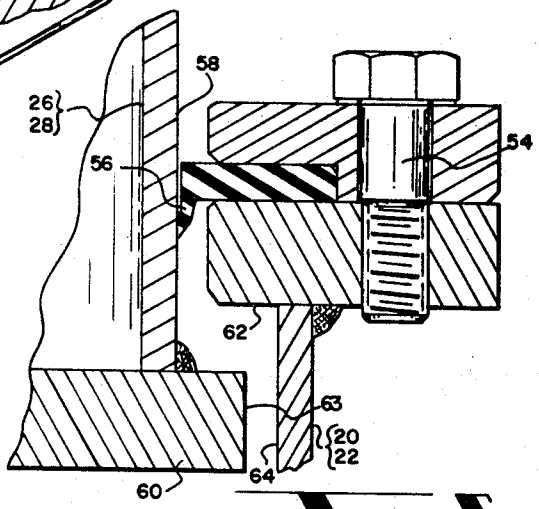


Fig 5

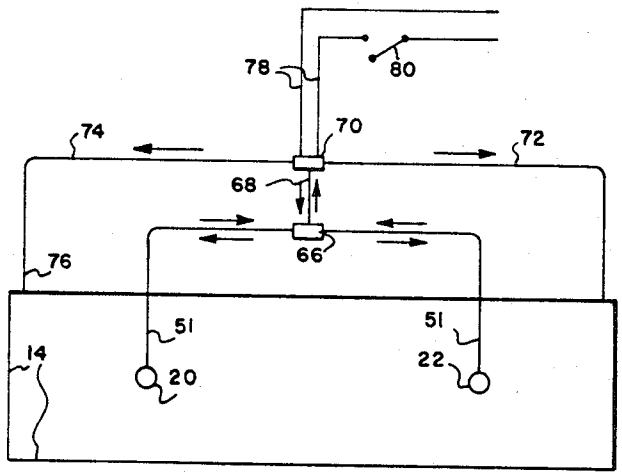


Fig 4

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SWIMMING POOL AND COVER CONSTRUCTION

Filed Oct. 21, 1965 3 Sheets-Sheet 3

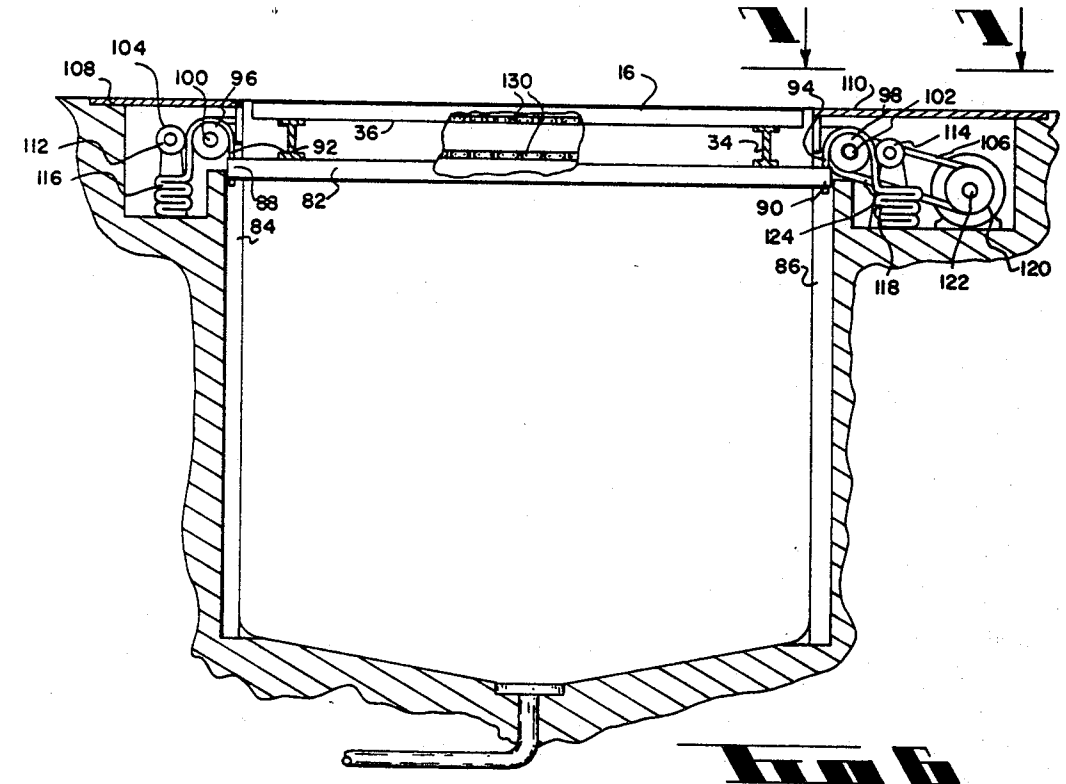


Fig 6

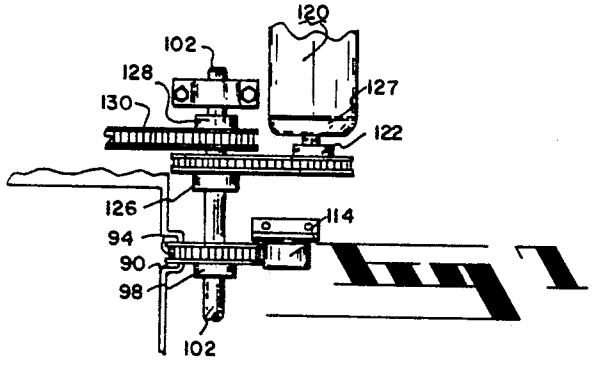


Fig 7

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SWIMMING POOL AND COVER CONSTRUCTION

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2 Claims. (Cl. 4—172)

ABSTRACT OF THE DISCLOSURE

A swimming pool cover construction wherein a swimming pool bowl is provided with means for raising and lowering a deck-like cover downwardly into the bottom of the pool and upwardly relative to the upper portion of the pool so that the cover may alternately be used as a swimming pool floor and a deck in flush relation with pool coping and the surrounding areas; said cover being supported on plungers of a pair of hydraulic cylinders recessed in the bottom of the pool, and wherein a fluid pressure supply means is adapted to deliver water into the cylinders, such that the cylinders are operable by water under pressure, and which is compatible with water in the pool should leakage occur from the cylinders into the pool.

This invention relates to a swimming pool and cover constructed, and more particularly to a swimming pool and cover construction wherein a swimming pool bowl is provided with means for raising and lowering a deck-like cover downwardly into the bottom of the pool and upwardly relative to the upper open portion of the pool, so that the cover may be alternately used as a swimming pool floor and as a deck in flush relation with pool coping and the surrounding area, as desired.

Many problems have been encountered in the maintenance and safety of swimming pools. While covers have been provided for swimming pools, most of these covers are inconvenient to use and to secure in place over the pool, such as to protect small children from falling in the pool and drowning. Many covers consist of flexible materials anchored at the periphery, in overlapping relation with the periphery of the pool and the anchoring of such covers has been a problem and usually so inconvenient that the cover is not consistently in place when needed, so as to protect small children from falling in the pool. Additionally, such flexible covers are not useful as a patio deck, when the pool is not in use. These flexible covers deflect considerably with a small amount of weight thereon, and consequently, serve only as a partial protection against the immersion of any object which may be disposed in the pool area and on such a flexible cover.

Conventional flexible pool covers, due to their deflection and flexibility, serve as dust and trash collectors when wind causes the deposition of foreign matter in the area of the pool, but the removal of the dust and trash from the flexible cover is a distinct problem, since it cannot be swept from the cover or removed conveniently and, in many instances, when the cover is removed from the pool, deflection of the cover into the water causes the trash on the cover to be deposited in the pool. Additionally, most flexible covers are subject to deterioration, due to bright sunshine and other elements. Consequently, many of these covers become weathered and fragile and, therefore, dangerous and inoperative. Such conditions are not always apparent, and therefore, the conventional flexible pool cover, at sometime or another, may be quite unreliable, due to a weathered and weakened condition.

Accordingly, it is an object of the present invention to provide a substantially rigid deck-like pool cover and pool construction, wherein the rigid and durable deck structure is movable upwardly and downwardly, within the pool,

from a position near the bottom of the pool to a position flush with the top of the pool, so that when the cover is down in its lowermost position, diving and swimming may be enjoyed in the pool; and when the deck is placed in an intermediate level, it provides a floor with a shallow water layer thereabove, so that small children may safely play or swim in the pool; and when the deck is raised completely to a position flush with the top of the pool, this deck may be used as a utility patio deck. It, also, may afford considerable protection for the pool, at the same time.

Another object of the invention is to provide a substantially rigid deck-like pool cover and pool construction, whereby the rigid deck, when in an upper flush position with the top of a pool, serves to collect dust and trash which may be blown into the pool area and which may permit conventional sweeping or vacuum cleaning of the deck before it is lowered into the pool, to thereby prevent loss of foreign matter from the deck into the pool water, when the deck is lowered.

Another object of the invention is to provide a swimming pool and cover construction, wherein a substantially rigid deck is vertically movable upwardly and downwardly in a pool, and whereby the deck, when in its uppermost position, covers the pool and thereby permits the pool to be drained in off seasons, without the hazard of sunshine heating the pool structure and causing differential thermal cracking tendencies.

Another object of the invention is to provide a swimming pool and cover construction, wherein a substantially rigid deck-like cover may be disposed in the bottom of the pool or at the top thereof, and when disposed at the top of the pool, protects the pool from ultraviolet rays, thereby saving a considerable amount of chlorine, such that the pool may be left unattended during vacation times with the assurance that sufficient chlorine will remain in the pool to avoid the growth of algae or other foreign matters.

Another object of the invention is to provide a substantially rigid deck-like cover having very good thermal insulating characteristics, which maintains efficiency of a pool in which the water is heated, whereby the expense of maintaining a heated pool, during the winter, is greatly reduced.

Another object of the invention is to provide a swimming pool and cover construction in which a substantially rigid deck-like cover, when in an upper flush position relative to the top of the pool, serves as a patio deck and greatly extends the usable living area in a pool yard, and further, assures safety for persons in the pool yard, during such patio use thereof.

Another object of the invention is to provide a swimming pool and cover construction having a substantially rigid deck-like cover vertically movable in the pool to positions near the bottom of the pool and to positions flush with the top thereof, and to various intermediate vertical positions; all of said positions being remotely controllable by a simple solenoid valve switch, or which may be automatically operable by a wave responsive switch, in order to insure very convenient and simple movement of the deck to safety positions, such that a person maintaining the pool may, with very little effort, attain safe conditions of the pool, as well as minimized maintenance conditions of the pool.

Further objects and advantages of the present invention may be apparent from the following specification, appended claims and accompanying drawings, in which:

FIG. 1 is a top or plan view of a swimming pool and cover construction, in accordance with the present invention, showing portions broken away to amplify the illustration;

FIG. 2 is a fragmentary sectional view taken from the line 2—2 of FIG. 1, showing portions broken away and in elevation to amplify the illustration;

FIG. 3 is a fragmentary sectional view taken from the line 3—3 of FIG. 2, showing the pool cover and deck structure raised slightly above the upper open top of the pool to permit access for cleaning below the deck and in the bottom of the pool;

FIG. 4 is a diagrammatic view of the fluid pressure actuating system for raising and lowering the rigid deck-like cover of the pool construction of the invention;

FIG. 5 is an enlarged fragmentary sectional view taken from the line 5—5 of FIG. 3;

FIG. 6 is a view similar to FIG. 3 showing a modified means for raising and lowering the substantially rigid deck-like cover of the invention; and

FIG. 7 is a fragmentary plan view taken from the line 7—7 of FIG. 6 and showing a deck cover of the invention removed to expose the motor and actuating mechanism operable to raise and lower the substantially rigid deck-like cover of the invention relative to the interior of the pool.

As shown in FIG. 1 of the drawings, the swimming pool and cover construction of the invention comprises a swimming pool bowl **10** having a bottom **12** and surrounding side wall structures **14**, all preferably of concrete and all preferably integral and generally of reinforced steel construction.

A substantially rigid deck-like cover **16**, shown fragmentarily in FIG. 1, is provided with a perimeter portion **18** surrounded by the side wall structures **14** of the pool, all as shown best in FIGS. 1 and 2 of the drawings.

As shown in FIG. 2 of the drawings, a pair of hydraulic cylinders **20** and **22** are recessed in concrete **24** below the bottom **12** of the pool, and disposed in these cylinders **20** and **22** are plungers **26** and **28**, which are hydraulically powered up and down in the cylinders **20** and **22**, as will be hereinafter described in detail.

Mounted on upper ends of the plungers **26** and **28** are beams **30** and **32**, which carry second beams **34** and **36** at right angles thereto. Supported on these beams **34** and **36** are transverse reinforced concrete slabs **38** which form top portions of the cover **16**. These slabs **38** are provided with pairs of downwardly directed flanges **40**, rendering them substantially of inverted channel-shaped cross-sections. These slabs **38** may be of steel reinforced concrete or other suitable structure to form a substantially rigid patio deck having an upper surface **42**, which may be substantially flush with a horizontal patio decking **46** surrounding the pool structure of the invention and the upper surface **42** may be lowered downwardly into the pool adjacent the bottom **12** to form a floor for persons swimming in the pool, all as indicated by solid and broken lines, respectively, in FIG. 2 of the drawings.

Vertical guide tracks **15** are recessed in the side wall structure **14** of the pool bowl. Guide followers **17**, carried by the ends of the beams **34** and **36**, guide the cover **16** centrally relative to the surrounding side wall structure **14** with which the perimeter **18** of the cover is slightly spaced.

The bottom of the pool is provided with a pair of recessed portions **44** and **46** adjacent the respective cylinders **20** and **22** and a pair of respective drains **48** and **50** are provided in these recesses **44** and **46** at their lowermost portions.

Each cylinder **20** and **22** is provided with a fluid pressure supply conduit **51** connected to the side wall thereof at **52**. The upper end of each cylinder **20** and **22** is arranged as shown in FIG. 5 of the drawings, wherein flange structure **54** holds a peripheral seal **56** around the periphery **58** of a respective plunger **26** or **28**, each plunger at its lower portion, having a peripheral flange **60** adapted to abut a corresponding flange **62**, at the uppermost position of the deck **16**, as illustrated in FIG. 3 of the drawings. A peripheral portion of the flange **60**, being designated **63**, and spaced peripherally from an inner annular side wall surface **64** of a respective cylinder **20** or **22**, such that pressure fluid admitted through the conduit **51** and fitting **52** may communicate directly with an end at each respective plunger **26** or **28** in all vertical positions within its respective cylinder **20** or **22**.

As shown in FIG. 4 of the drawings, the cylinders **20** and **22** are coupled to the conduits **51** communicating with a balance valve **66** receiving pressure fluid through a conduit **68** connected to a solenoid valve **70**, which receives water from a fluid pressure conduit **72** which may be either a public utility water supply conduit or any other suitable conduit having a pressure fluid pump connected therewith, as desired. Accordingly, water which may leak from the cylinders **20** and **22** around the respective plungers **26** and **28** does not contaminate the water in the pool bowl **14** in the event the water from the cylinders leaks into the pool bowl. Extending from the solenoid valve **70**, is another conduit **74** entering the pool side wall structure **14** at **76** to supply water to the pool for makeup purposes.

Coupled to the solenoid valve are a pair of conductors **78** having a switch **80**, in connection therewith. This switch **80** may be operable to actuate the plungers **26** and **28** to move the cover deck **16** to any desired position from the uppermost position, as shown in FIG. 3, to the lowermost position shown in FIG. 2, or to intermediate positions vertically in the pool, as desired. The lowermost position, as shown in FIG. 2, may be attained for the purpose of adult swimming and diving, while an intermediate position, as indicated by broken lines A in FIG. 3 of the drawings, may be attained for the purpose of providing a very shallow water layer above the deck, so that small children may play and swim in the pool in a very safe manner.

It will be understood that the solenoid valve **70** may be controlled by a wave responsive switch, or other device, which will automatically raise the deck to the uppermost position, as shown in FIG. 2 of the drawings, to cover the pool, automatically, as soon as ripples in the pool subside, following the evacuation of the pool by swimmers.

As shown in the modification illustrated in FIGS. 6 and 7 of the drawings, the cover **16** is similar to that illustrated in FIGS. 1 and 2, and beams **82**, similar to the beams **30** and **32** hereinbefore described, are extended to run up and down vertically in vertical recess guide tracks **84** and **86** in opposite sides of the pool. These guide tracks **84** and **86** are similar to the guide tracks **15** hereinbefore described. Opposite ends **88** and **90** of the beams **82**, being vertically movable in these guide tracks **84** and **86**, and secured to these ends **88** and **90** are chains **92** and **94** engaging respective sprockets **96** and **98** on shafts **100** and **102** disposed in recesses **104** and **106** below the pool decking. Removable cover plates **108** and **110** may be removed to expose the respective mechanism as shown.

Several of the sprockets **96** and **98** may be disposed on the shafts **100** and **102** in relation to the number of beams **30** used to support the beams **34** and **36**.

Adjacent each sprocket **96** and **98** is a respective idler **112** and **114** to hold the respective chains **92** and **94** on the sprockets **96** and **98**. These chains may be contained in folded condition in recesses **116** and **118**, in the pool decking, as shown, when the deck **16** is in upward position and these chains may pass downwardly into the pool with the respective beams, when the deck is lowered.

A drive motor **120** operates a sprocket **122** carrying a drive chain **124** which drives a sprocket **126** on the shaft **102** and a sprocket **128** on the shaft **102** drives a chain **130** which is connected to another sprocket on the shaft **100**, similar to the sprocket **128** for concurrently driving both shafts **100** and **102**.

The motor **120** may, thus, be energized by a switch, such as a switch **80**. This motor may be reversible in order to raise and lower the cover **16** and may contain a one gear reduction gearbox **126** which will automatically

lock the elevating and lowering mechanism at a given level, as desired.

It will be appreciated by those skilled in the art that when the cover **16** is up, it provides a safe rigid deck, which will prevent children from falling in the pool. It will also save chemicals in the pool and collect dirt caused by wind storms to settle in the area of the pool. It will also be recognized that the upper surface of the deck may readily be brushed and cleaned or may be cleaned by a conventional vacuum cleaner, before the deck is lowered downwardly into the water of the pool. Further, it will be understood that when this decking is in its uppermost position, the pool may be maintained in drained condition without radiation heating the side walls of the pool and causing a tendency toward differential expansion and cracking of the side walls of the pool.

The deck, as hereinbefore pointed out, may be lowered to a shallow depth or near to the bottom of the pool for various purposes, including the swimming of small children or adult diving and swimming, as desired.

It will also be apparent to those skilled in the art that the swimming pool and the cover construction of the invention may be used as a conventional patio floor structure, and that the entire area over the pool may be useful in off seasons when the pool is in use or is not in use, or may be maintained in such condition for many years, while the pool is drained, and still maintain the high equity value of the pool in connection with the real estate, even though the pool is not in use.

It will be obvious to those skilled in the art that various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In a swimming pool and cover construction, the combination of: a swimming pool bowl structure having a bottom and surrounding side wall structure with an open top; a vertically movable cover above said bottom and having a perimeter disposed within an area surrounded by said side wall structure; and hydraulic fluid pressure operated cylinder means having a vertically movable plunger means supporting said cover and disposed to move said cover upwardly and downwardly between positions adjacent said top and said bottom of said bowl; said bowl elongated; said cylinder means comprising a plurality of cylinders and a plurality of respective plungers; hydraulic fluid pressure supply and balance valve means for supplying equal water pressure to each cylinder.

2. In a swimming pool and cover construction, the combination of: a swimming pool bowl structure having a bottom and surrounding side wall structure with an open top; a vertically movable cover above said bottom and having a perimeter disposed within an area surrounded by said side wall structure; and hydraulic fluid pressure operated cylinder means having a vertically movable plunger means supporting said cover and disposed to move said cover upwardly and downwardly between positions adjacent said top and said bottom of said bowl; said bowl elongated; said cylinder means comprising a plurality of cylinders and a plurality of respective plungers; hydraulic fluid pressure supply and balance valve means for supplying equal pressure fluid to each cylinder; said fluid pressure supply and balance valve means coupled to a conventional water pressure supply conduit whereby water surrounds said plungers and is disposed in said cylinders, such that the pressure fluid which may leak around said plungers from said cylinders will not contaminate the water in said swimming pool bowl.

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