United States Patent [19]

Schonger

[11] **3,803,573**

[45] **Apr. 9, 1974**

[54] **POOL ALARM APPARATUS**

[76] Inventor: **John S. Schonger,** R.D. 1, Box 231A, West Hurley, N.Y. 12491

[22] Filed: **Sept. 21, 1971**

[21] Appl. No.: **182,485**

[52] **U.S. Cl.** ..... **340/261,** 200/84 C, 340/421

[51] **Int. Cl.** **G08b 21/00**

[58] **Field of Search** ..... 340/261, 244 A, 258 R, 340/421; 200/61.2, 84 C

[56] **References Cited**

UNITED STATES PATENTS

3,475,746	10/1969	Nelson et al.	340/261
3,204,232	8/1965	Meyer	340/261
3,633,193	1/1972	Milo	340/244 A

Primary Examiner—John W. Caldwell
Assistant Examiner—Glen R. Swann, III
Attorney, Agent, or Firm—Joseph J. Connerton

[57] **ABSTRACT**

An automatic pool alarm includes a floating assembly including a control assembly floating on the surface for affording relative stability in the water. The control assembly includes a reed switch and permanent magnet assembly, the reed switch being actuated or closed by the magnet. The magnet is attracted to a metallic plate of the reed switch assembly when movement of the magnet resulting from waves produced by an object falling into the water, causes the plate to move to a position within the magnetic influence of the magnet and the reed switch operation completes an electrical circuit to actuate an alarm. The reed switch assembly is encapsulated to prevent direct contact with the water.

10 Claims, 5 Drawing Figures

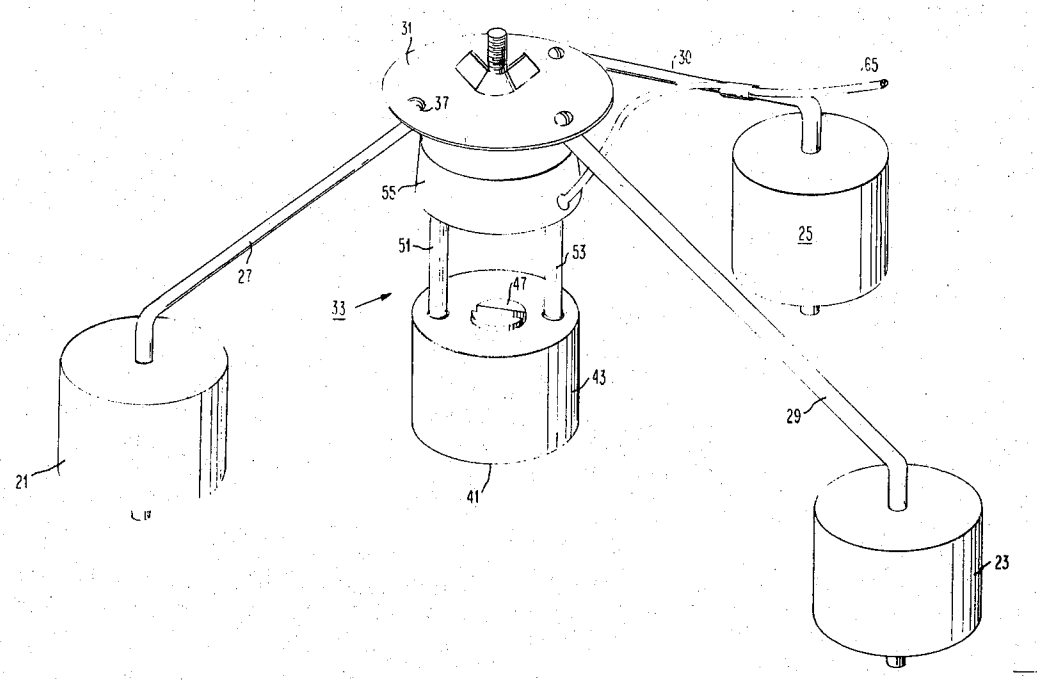
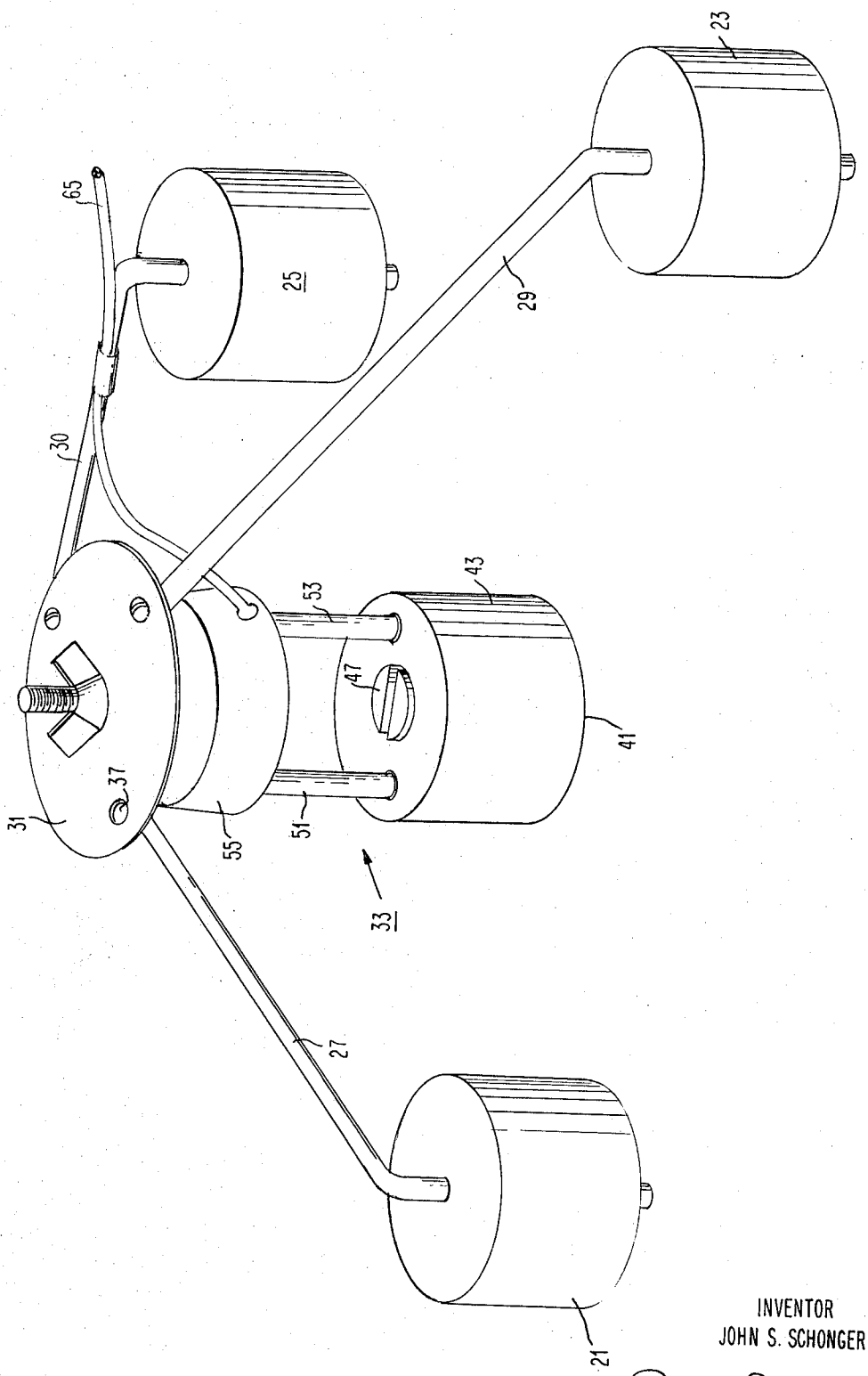


FIG. 1



INVENTOR
JOHN S. SCHONGER

BY

ATTORNEY

FIG. 2

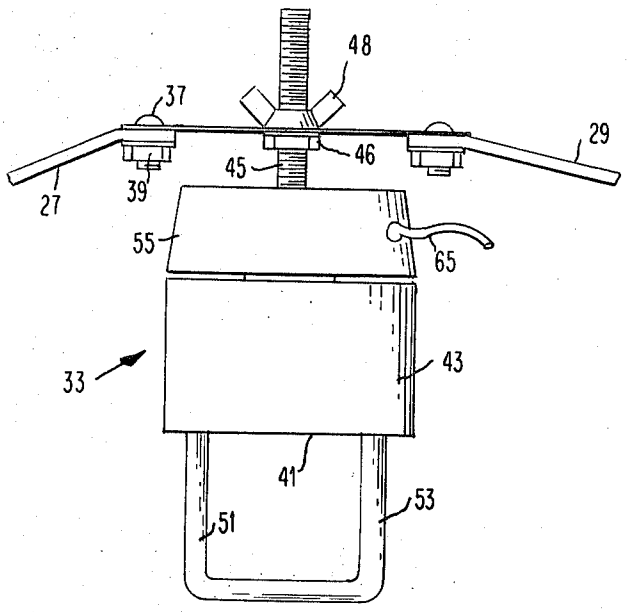


FIG. 4

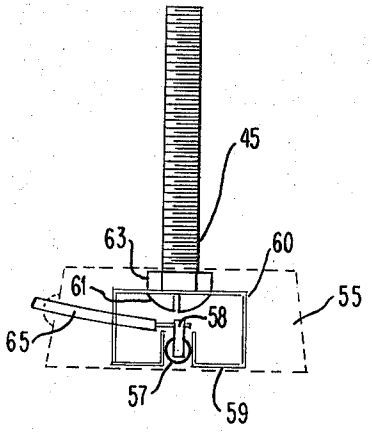


FIG. 3

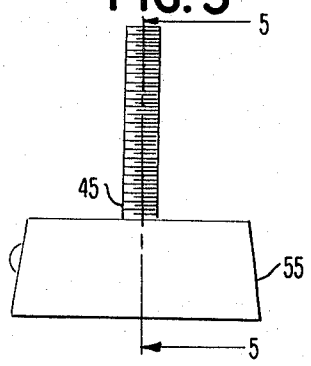
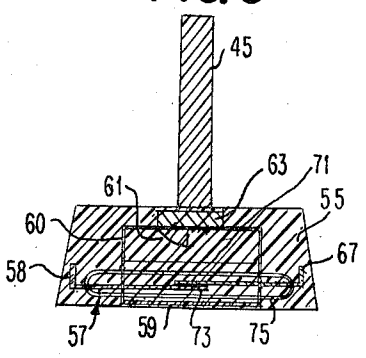


FIG. 5



POOL ALARM APPARATUS

BACKGROUND OF THE INVENTION

Swimming pools including privately owned residential pools have long been recognized to present a hazard when left unattended and a liability to pool owners even for unauthorized use of the pool. This problem is aggravated by the increasing popularity of pools which are classified as ground levels, above ground levels and below ground levels. Children in the vicinity of such pools constitute a special hazard, since their falling into a pool, particularly when unattended, might go undetected. Policing or controlling the use of such pools is therefore a matter of concern, and municipalities and individuals have attempted to apply various formulas and regulations to eliminate or minimize the problem. While such regulations might relate to direct control of the pool through use of fences, locks and guards, alarms are also employed for detecting disturbances in the water resulting from a person or object falling into the pool.

Pool alarms of the prior art have used various devices and circuitry to detect waves formed in the swimming pool as a result of objects falling into the water. Such systems generally require permanent mounting in or on the edge of the pool, and the sensitivity to distinguish between objects falling into the pool or waves produced by wind, etc. may be difficult to adjust.

SUMMARY OF THE INVENTION

The instant invention, in contrast to the prior art, is relatively simple, weather resistant, adapted to float in the pool when unattended and the alarm circuit is designed so that no current is drawn until the alarm is actuated. The invention utilizes an encapsulated reed switch assembly mounted in a metallic package as the control element, which reed switch in turn is controlled by an embedded permanent magnet positioned in axial sliding relationship thereto. In response to waves caused by an object falling into the pool, the magnet in the center assembly, normally floating on the surface, is caused to thereby rise coming under the influence of the metal plate of the reed switch housing assembly. This resulting magnetic attraction maintains the magnet assembly in contact with the metal plate until released. The magnet causes the encapsulated reed switch to close, thus completing the alarm circuit which in the preferred embodiment comprises a battery operated audible alarm. The device is adjustable for sensitivity to avoid alarms caused by wind, rain, etc.

Accordingly, a primary object of the present invention is to provide an improved swimming pool alarm.

Another object of the present invention is to provide a magnetically operated swimming pool alarm using a reed switch assembly.

Another object of the present invention is to provide a relatively simple adjustable pool alarm using a magnetically controlled reed switch assembly controlling an audible alarm.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the pool alarm system.

FIG. 2 is a view of the control assembly.

FIG. 3 is a view of the encapsulated reed switch assembly.

FIG. 4 is a front view of the reed switch assembly showing details thereof.

FIG. 5 is a view of the reed switch assembly taken along the lines 5—5 of FIG. 3.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings and more particularly to FIG. 1 thereof, the pool alarm system of the instant invention is shown as comprising a floating assembly including three floating members **21, 23, 25** which extend from and are attached to the upper plate **31** of a center assembly **33** through associated arms comprising supporting rods **27, 29, 30.** For maximum stability in the water, which is required for operation of the present invention, a minimum of three floating members is necessary, and the individual members are normally positioned at approximately 120° with respect to each other. However, it is apparent that a greater number of floats positioned at different angular positions could be substituted. The floating members may be secured to the supporting rods by any conventional means such as a pressed fit between the supporting rods and their associated floating members.

The supporting rods have an eye-shaped ending at the end which attaches to the upper plate **31** of the center assembly, and the rods are maintained in position by associated bolts and nuts **37, 39** (FIG. 2). The floating members **21, 23, 25** are designed when floating in the pool to have approximately half their vertical dimension in the water, while the bottom surface **41** of the center assembly is designed to float on or near the surface of the water. The lower center support member **43,** like the floats **21, 23, 25,** may be composed of any water resistant floating material such as plastic wood, etc., one preferred material being Ethafoam (trademark of Dow Chemical Co.) and includes a permanent magnet **47** imbedded in the upper surface thereof. The center float **43** is adjustably movable in a vertical direction along tubular members **51, 53** which comprise a single U-shaped supporting element and guide for the center float **43** and is more clearly shown in FIG. **2.** The upper member **55** of the center assembly comprises a reed switch assembly which is encapsulated in a plastic mold composed of a polyester acrylic resin, epoxy resin or similar composition. As noted, the relative distance between the lower and upper portions **43** and **55** of the center assembly is adjustable by adjusting the vertical position of the upper assembly **55** as more fully described hereinafter.

Referring to FIGS. **3** and **4,** which illustrate an end view of the switch head assembly, a reed switch **57** is positioned within an opening of a metallic container **60** having a bottom surface **59** separated from the bottom of the molded assembly by a relatively thin layer of the plastic molding material. The end of the adjusting bolt **45** consisting of head **61** and nut **63** is encapsulated within the reed switch assembly **55,** while a two-wire cable **65** (FIG. 2), which connects the reed switch to the alarm device, is also included in the encapsulation. The layer of plastic between the bottom assembly **59** is sufficiently thin such that magnetic attraction between the magnet in the lower assembly and the bottom surface **59** of the reed switch housing in not inhibited. When the floating member **43** of the center assembly is caused to move vertically, via guide rods **51, 53,** the resulting magnetic attraction between permanent magnet **47** and the metallic surface **59** of the reed switch head assembly causes the lower member **43** to rise to

the position indicated in FIG. 2. The resulting magnetic attraction of permanent magnet 47 closes the contacts of the reed switch 57 thereby completing the circuit to an alarm.

Referring now to FIG. 5, which illustrates a view of the switch head assembly along a section 5—5 of FIG. 3, the reed switch assembly comprises a reed switch 57 having an upper contact 71 and lower contact 73 which are normally open. However, when the permanent magnet is in the closed position shown in FIG. 2, the resulting magnetic attraction closes the reed switch, thereby completing the alarm circuit through contacts 58, 67. The reed switch assembly, as shown in FIG. 5, is encapsulated within a glass container 75, while the conductors of cable 65, connected to contact terminals 67, 58 complete a circuit through a conventional battery and audible alarm, which have been omitted from the drawing in the interest of clarity.

In operation, the tripod float assembly is positioned within the pool with the center float assembly adjusted as described, i.e., the lower surface 41 of the center assembly floating on the surface of the water. When an object falls into the pool, the resulting ripples or waves cause the center float to rise on the tubular slides 51, 53 and when it reaches a predetermined level, the magnetic attraction between the permanent magnet 47 and the plate of the reed switch housing 59 causes the member 43 containing the permanent magnet to rise to the position shown in FIG. 2 where the resulting magnetic attraction causes it to be retained in this position until manually released. The sensitivity of the device can be adjusted by varying the position of the upper assembly member 55 via locking nut 46 and adjusting wing nut 48. Depending on the sensitivity selected, the movement of the center float resulting from the ripples or waves produced by the object falling into the pool closes the contact between the permanent magnet 47 and the switch head assembly 55, causing closure of the reed switch 57 and the resultant actuation of the pool alarm. Since the battery and alarm circuit are considered conventional, they have been omitted from the drawing in the interest of clarity. In one embodiment, the alarm comprises a 6 volt battery in series with a battery operated horn, which provides a high intensity audible alarm to alert the pool owner. Satisfactory operation using this arrangement has been provided where the alarm is positioned over 50 feet from the floating assembly. If desired, this distance could be increased by modifying the circuit such that operation of the reed switch would operate a relay, which in turn would actuate the audible alarm. Alternatively, other forms of audible or visible alarms could be substituted, while a conventional 60 cycle AC source with a low voltage transformer could be substituted for the power supply. In addition to use as an alarm for detecting objects falling into a pool, the instant invention could be attached to the side or floor and used to indicate when the level of the fluid exceeds a desired level. One such application in which the device could be attached would be in a basement where a sump pump could be turned on when the water exceeded a predetermined level. Other uses would suggest themselves to those skilled in the art.

While the invention has been described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that other changes in form and detail may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. Pool alarm apparatus comprising in combination an alarm control assembly,

said alarm control assembly comprising first and second alarm control elements positioned in a first position,

means for maintaining said first alarm control element within a predetermined distance of the surface of the water in a pool,

means responsive to the waves resulting from an object falling into the water of said pool for moving said first element into a second position,

means responsive to the relative positions of said first and second alarm control elements for energizing said pool alarm apparatus, and

magnetic circuit means to maintain said apparatus in said energized alarm condition.

2. Apparatus of the type claimed in claim 1 wherein said means for energizing said pool alarm apparatus is magnetic.

3. Apparatus of the type claimed in claim 2 wherein said first alarm control element includes a permanent magnet.

4. Apparatus of the type claimed in claim 3 wherein said permanent magnet is imbedded in a waterproof container.

5. Apparatus of the type claimed in claim 3 wherein said second alarm control elements include a reed switch assembly.

6. Apparatus of the type claimed in claim 5 wherein said reed switch assembly includes an encapsulated reed switch.

7. Apparatus of the type claimed in claim 6 wherein said means for maintaining said first alarm control element within a predetermined distance of the surface of the water in said pool comprises a plurality of floating devices to provide stability for said element near said surface of said water.

8. Apparatus of the type claimed in claim 7 wherein said plurality of floating devices are equally spaced from said alarm control elements.

9. Apparatus of the type claimed in claim 8 wherein said reed switch is controlled by said permanent magnet to complete an alarm circuit, and wherein said alarm circuit is maintained by the magnetic coupling between said reed switch assembly and said permanent magnet until manually disengaged.

10. Apparatus of the type claimed in claim 7 wherein said first control element is vertically movable with respect to said first control element and wherein the initial position of said first control element is adjustable to control the sensitivity of said pool alarm apparatus.

* * * * *