

[54] **WARNING DEVICE FOR SWIMMING POOLS OR THE LIKE**

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

[58] **Field of Search**..... 340/261, 224, 279, 340/421, 282, 65; 200/61.52, DIG. 8

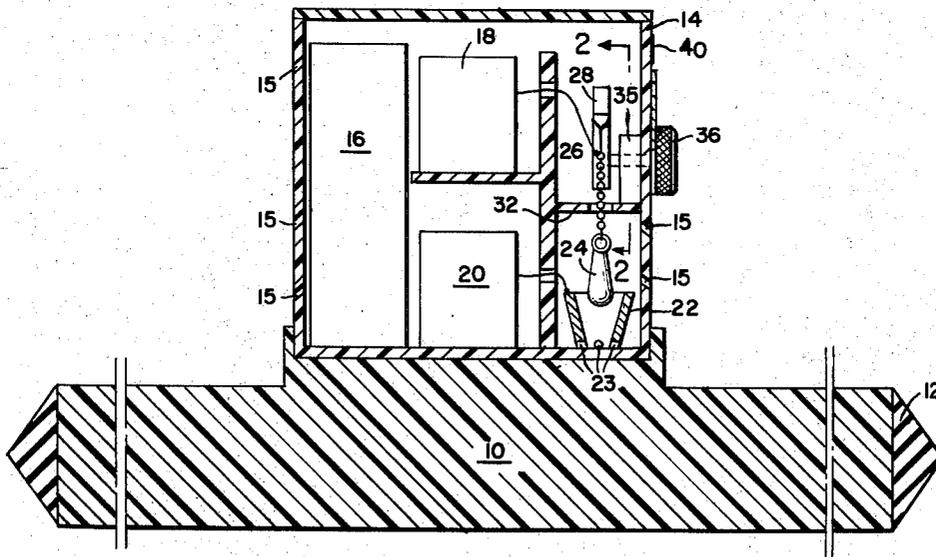
[57] **ABSTRACT**

A movement sensing means carried by a float in the pool is responsive to the movement of the float caused by the waves produced by the falling of an unauthorized object or person into the pool to actuate a wireless transmitter to send a signal to a receiver positioned at a remote location. The receiver, upon receiving the signal, actuates an alarm sounding means which provides a warning signal of the entry of the unauthorized person or object into the pool.

10 Claims, 5 Drawing Figures

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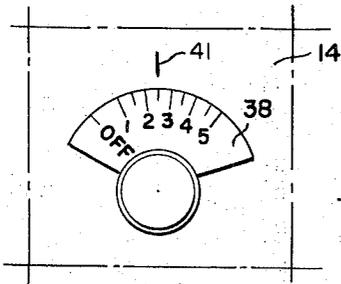
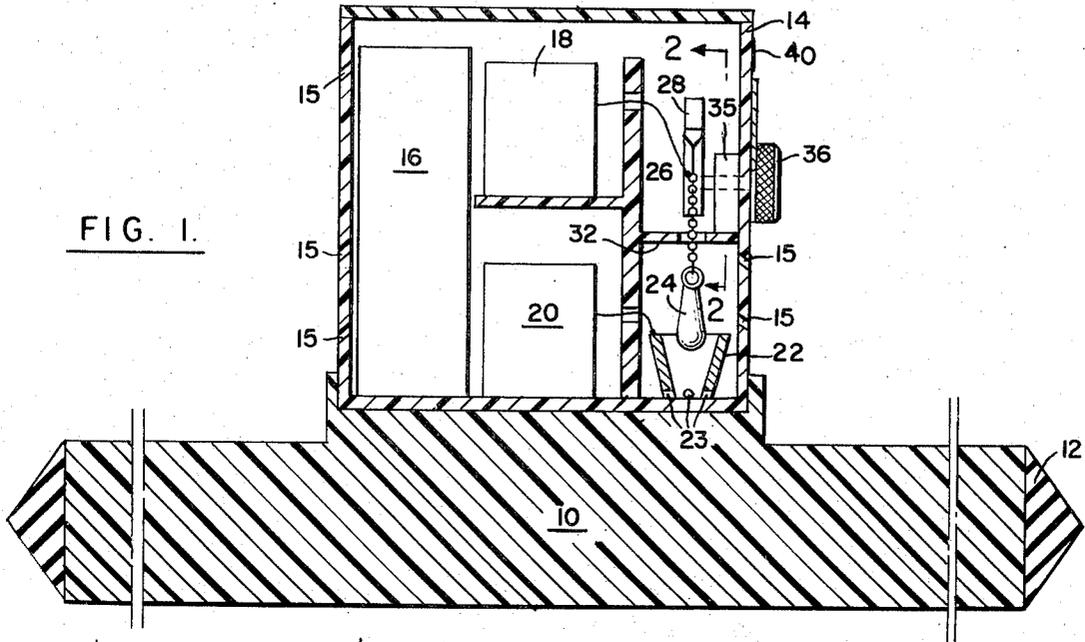


FIG. 3.

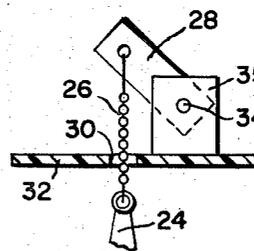


FIG. 2.

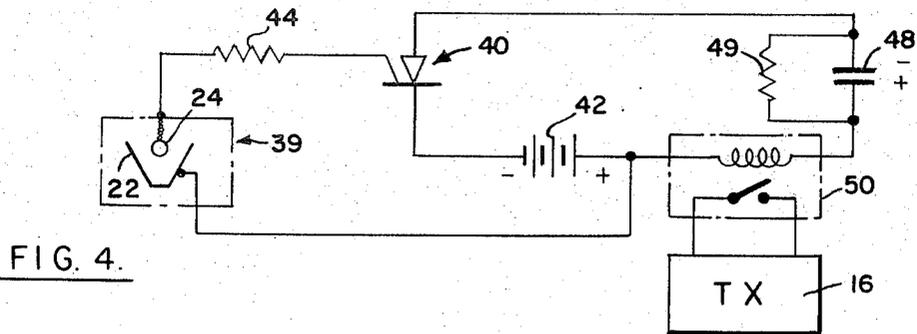


FIG. 4.

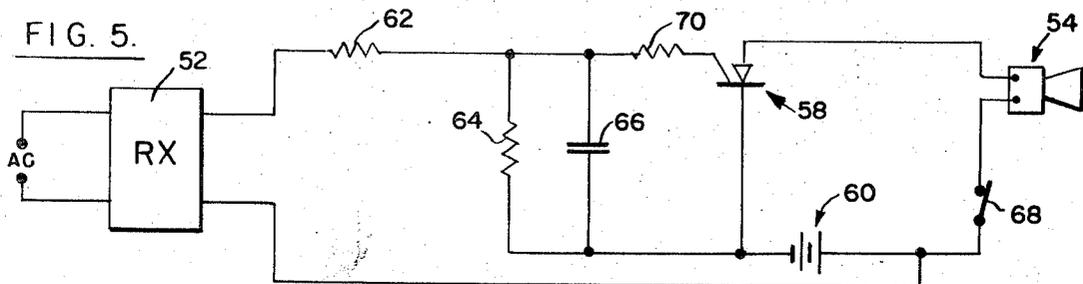


FIG. 5.

WARNING DEVICE FOR SWIMMING POOLS OR THE LIKE

BACKGROUND OF THE INVENTION

This invention relates generally to warning devices for swimming pools or the like, which devices serve to give a warning signal of some unauthorized event such as if someone or some object should fall into an unguarded swimming pool.

While there have been provided various devices of the indicated type, these prior art devices generally involve either an alarm sounding device mounted on a float in the pool or one which has some physical connection between a poolside alarm sounding device and the float. These devices have drawbacks since they limit the location of the alarm sounding means and often require complicated interconnections between the float and the alarm sounding mechanism.

SUMMARY OF THE INVENTION

It is the general object of this invention to provide a warning device for swimming pools or the like for providing an alarm of some unauthorized event such as the entry of someone or some object into an unguarded swimming pool or other unprotected location, which device is constructed and arranged so that the alarm can be located at any desired location. Accordingly, the warning device in accordance with the invention can be operated with the alarm means located at the optimum location for providing the most effective warning signal. Moreover, the warning device in accordance with the invention permits the transporting of the alarm means to various locations as the person who would hear the alarm may move from place to place.

Other objects of the invention relate to the provision of a warning device of the indicated type which involves a minimum of parts and a simple construction which is reliable in operation.

Briefly stated, the general object of the invention is achieved by the provision of a warning device which as applied to swimming pools, comprises a float means, means carried by the float means for transmitting a wireless signal in response to a predetermined wave actuated movement of said float means, and remotely located means for receiving the transmitted signal and providing an alarm signal in response to the reception of the transmitted signal.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a sectional view of the warning device in accordance with the invention;

FIG. 2 is a fragmentary sectional view taken generally on line 2—2 of FIG. 1;

FIG. 3 is a fragmentary view of a detail;

FIG. 4 is a circuit diagram of a transmitter circuit in accordance with the invention; and

FIG. 5 is a circuit diagram of a receiver circuit in accordance with the invention.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the warning device in accordance with the invention comprises a float 10 in the form of a generally circular platform. The float 10 is made of a buoyant material such as styrofoam. Located around the periphery of the circular platform is a ring of soft shock-absorbing material 12. This material 12

may be a soft foam rubber which is adapted to compress gradually when the float is moved against the side of the pool in such a manner as to absorb this impact for a purpose to be described more fully hereafter.

Mounted centrally on the platform 10 is a watertight container 14 which is adapted to be ventilated by means of a plurality of holes 15 in the side wall of container 14 as shown in FIG. 1. Positioned within the container 14 is a conventional wireless transmitter 16 and its associated control circuit means 18 and power supply 20 in the form of dry cell batteries. The transmitter 16 is a low power transmitter such as Model No. 11 manufactured by Linear Corporation, Los Angeles, California. Of course, various types of transmitters known in the art may be utilized.

Also positioned within the container 14 is means for sensing the condition of the float 10. Such means comprises a conical member 22 located in an inverted position at the bottom of the container 14, a bob 24 supported on the lower end of a vertically extending chain 26 which is supported at its upper end on an arm 28 as best shown in FIG. 2. The lower portion of bob 24 is generally round. The chain 26 extends through a guide hole 30 in a guide plate 32 mounted on the container 14 above conical member 22 and below the arm 28. The arm 28 is mounted on the end of a shaft 34 which is journaled in a support 35 secured adjacent the vertical side wall of the container 14, the shaft 34 projecting horizontally through the container 14 to the exterior thereof whereat a knob 36 is secured to the end of the shaft. Also mounted on the shaft 34 on the exterior of the container 14 is a dial 38 provided with calibrating indicia as shown in FIG. 3. As the shaft 34 is rotated, these indicia are adapted to move relative to a reference marking 41 on the container 14 to thereby serve as an indication of the angular position of the shaft 34.

Conical member 22 is provided with holes 23 at the lower end thereof to provide for the drainage of condensed water.

The guide hole 30 is located in alignment with the axis of the conical member 22 to thereby guide the chain 26 in alignment with this axis. The parts are constructed and arranged so that when the device is floating in a pool of water, the float 10, in addition to supporting the device as shown in FIG. 1, will assume a horizontal condition and the axis of the conical member 22 is perpendicular to the water level in this horizontal condition of the float. Thus, with the float 10 in this horizontal condition, the bob 24 and the portion of the chain 26 hanging beneath the guide hole 30 in guide plate 32 are guided to hang like a pendulum in alignment with the axis of the conical member 22. Moreover, it will be apparent that if the float 10 were moved to a position at an angle to the horizontal, the pendulum mounting of the chain 26 and bob 24 will continue to hang vertically whereby a bob will move closer to the internal wall of conical member 22. The distance the bob 24 must move from the horizontal condition to contact the conical member 22 is a measure of the sensitivity of the device. Moreover, it will be noted that the movement described above is that which would be produced by waves in the pool which cause the float 10 to rock or tilt relative to the horizontal condition.

The sensitivity of the means for sensing the condition of the float as described above is adjustable. This is

achieved simply by vertically lowering and raising the bob 24 by rotation of the shaft 34, it being apparent that the arm 28 is arranged to raise or lower the chain 26 as the shaft 34 is rotated. The lowering of the bob 24 will position the same closer to the internal wall of the conical member 22 and thereby make the sensing means more sensitive. Of course, the reverse is true in that as the bob 24 is set at higher positions, the device is less sensitive since the bob 24 is spaced farther away from the internal wall of the conical member 22 requiring a greater distance of movement of the bob 24 before it contacts the conical member 22.

It will be apparent that since the bob is pendulum mounted, any movement of the float 10 away from the horizontal condition will cause the bob 24 to move toward contact with the conical member 22. The sensitivity of the device may be set so that this movement of the float 10 away from the horizontal condition occurs when waves are produced in the pool such as would be caused by the falling of an unauthorized person, such as a child, into the pool.

In accordance with the invention, the means carried on the float 10 within the container 14 are constructed and arranged to transmit a wireless signal in response to a predetermined wave actuated movement of the float means 10 such as would occur when an unauthorized person or object enters the pool. Typically, the sensitivity of the device is set so that the waves are the type which would be produced by a child falling into the pool. To this end, there is provided a circuit means such as is shown in FIG. 4 which circuit means includes a pendulum switch 39 comprising the conical member 22, the bob 24, and the chain 26, all of which are made of electrical conducting material. As will be seen in this figure, the chain supported bob 24 and the cone form a pendulum switch which is serially connected in the gate circuit of a silicon controlled rectifier (SCR) 40. This circuit also includes a battery 42 and a resistor 44. The anode and cathode of SCR 40 are connected in circuit which includes the battery 42, a reed switch 50 and a capacitor 48 which has a resistor 49 connected thereacross. As is apparent in FIG. 4, the reed switch 50 controls activation of the transmitter 16.

In the operation of the transmitter circuit shown in FIG. 4, a momentary closure of the pendulum switch 39 produces a positive gating signal which is delivered through resistor 44 to the gate of SCR 40 which conducts for a period of time determined by the parameters of capacitor 48 and the coil of reed switch 50. As soon as capacitor 48 reaches a charge such that the holding current of SCR 40 is no longer maintained, SCR 40 returns to its non-conductive state and reed switch 50 opens turning off the transmitter 16.

In the meanwhile, the transmitter 16 has been on for a sufficient period of time to allow the receiver to operate as will be described below. The receiver has its own latching circuit (which will be explained below) which produces a continuous operation of a buzzer or other alarm. The resistor 49 in FIG. 4 is needed to discharge the capacitor 48 after the SCR 40 reaches its non-conductive condition. Otherwise, capacitor 48 could retain a charge for a long period of time which would inhibit operation of the device. The transmitter circuit is designed to turn itself off automatically.

Means are provided for receiving the wireless signal transmitted from the transmitter 16 causing a warning signal to be produced. Such means is shown in FIG. 5

and comprises a conventional receiver 52 which is preferably of the 300 megacycle type used to operate garage doors, such as the Model No. 51 receiver manufactured by Linear Corporation of Los Angeles, California. Receiver 52 operates from A.C. line and is adapted to receive the signal from the transmitter 16. The warning signal producing means also comprises a horn 54 (a horn is normally used for outdoor use while a buzzer would be used indoors), and circuitry which is adapted to cause energization of the horn 54 in response to the reception of a signal by the receiver 52. This circuitry includes a silicon controlled rectifier (SCR) 58, a battery 60, resistors 62, 64 and 70 and a capacitor 66 connected in the circuit as shown in FIG. 5. There is also provided a manually operated switch 68.

In the operation of the receiver circuit, the output of the receiver 52, when a signal is received, is a D. C. pulse which charges capacitor 66 through resistor 62 and maintains a current in the gate of SCR 58 for a short period of time. SCR 58 conducts, completing the circuit for alarm 54 and remains in conduction operating the alarm 54 until switch 68 is manually opened. Resistor 64 maintains capacitor 66 normally discharged so that it will filter out transients passed through the receiver from the A. C. line. Resistor 70 is a current limiting resistor to protect the gate of SCR 58.

In the operation of the warning device in accordance with the invention, the float 10 will be placed in the swimming pool and allowed to float freely thereabout without any physical connection limiting its movement. The sensitivity adjustment is made in the manner described above by rotation of the shaft 34 to set the dial so that under normal calm conditions of the water in the pool, the bob 24 will not come into contact with the conical member 22. In addition, the shock-absorbent material 12 serves to prevent any false alarm from occurring should the float 10 be pushed against the side of the pool such as by a strong wind. However, if an unauthorized person, such as a child, should fall into the pool, the waves produced by this entry will cause the float 10 to be rocked and moved from its normal horizontal position an amount sufficient so that the bob 24 will make contact with the conical member 22 thereby momentarily closing the pendulum switch means 39 shown in the circuitry of FIG. 4. As was described above, this causes the reed switch 50 to be closed for an extended period of time, causing the transmitter 16 to send a wireless signal to the receiver 52, which may be located at any desired remote location that would provide the best alarm signal. The duration of the signal provided by the transmitter 16 is sufficient to permit the receiver 52 to activate SCR 58, which in turn causes an alarm sounding device in the form of a horn 54 to provide a continuous alarm signal indicating the unauthorized entry of the child into the pool. This audible signal, will, of course, warn anyone within its range of the dangerous condition existing so that necessary safety procedures can be taken. It will be noted that the transmitter circuit of FIG. 4 is designed to provide a transmitted signal or pulse of substantial duration in response to the momentary pulse provided by the pendulum switch and to allow the transmitter circuit to reset itself automatically.

It will be apparent that the parts are constructed and arranged to achieve the above-described mode of oper-

ation. Moreover, by reason of the sensitivity adjustment discussed above, the device can be set to avoid false alarms such as might occur due to winds or similar weather conditions. Once a desired setting is determined for a particular application, this will be indicated by the calibrated dial and it is a simple matter to quickly place the device in this condition of operation by merely setting the dial to the desired setting. When it is desired to turn the device to the "off" position, this is done by rotation of the knob 36 to raise the bob 24 out of the conical member 22. This position is also indicated on the dial by the designation "OFF."

The terms "wireless" transmitter and "wireless" signal as used herein are intended to cover various equivalent devices for transmitting signals other than through electrical conductors.

It will be apparent that various changes may be made in the construction and arrangement of parts without departing from the scope of the invention wherefor it is not desired to be limited except as required by the following claims.

We claim:

1. A warning device for swimming pools or the like comprising a float means adapted to float in a horizontal condition in a pool, means carried on said float means for transmitting a wireless signal in response to a predetermined amount of tilting movement of said float means from said horizontal condition, alarm means remotely located from said signal transmitting means for receiving said transmitted wireless signal and providing an alarm signal in response to the reception of said transmitted signal, and shock absorbing means around the periphery of said float means for cushioning the impact thereof against the side of the pool.

2. A warning device according to claim 1 wherein said signal transmitting means includes a wireless transmitter and circuit means for controlling operation of said transmitter so that when said float means is in said horizontal condition no signal is transmitted and when said float means is tilted said predetermined amount said transmitter is energized to transmit said wireless signal.

3. A warning device according to claim 2 wherein said circuit means includes a pendulum switch compris-

ing an inverted, vertically arranged conical member and a bob supported on a chain within said conical member.

4. A warning device according to claim 3 wherein said pendulum switch means includes a guide plate having a hole therein aligned with the vertical axis of said conical member, said chain being arranged to extend through said guide hole whereby said chain and said bob are guided to hang vertically along the axis of said conical member.

5. A warning device according to claim 4 wherein said circuit means includes a silicon controlled rectifier, said pendulum switch being connected in the gate circuit of said silicon controlled rectifier.

6. A warning device according to claim 5 wherein said circuit means includes a reed switch connected in the anode-cathode circuit of said silicon controlled rectifier.

7. A warning device according to claim 6 wherein said alarm means includes a wireless signal receiver, and a silicon controlled rectifier, said wireless receiver being connected in the gate circuit of said silicon controlled rectifier for controlling energization of the same.

8. A warning device according to claim 4 including means for adjusting the sensitivity of said pendulum switch comprising a rotatable shaft member, means for supporting said chain at its upper end on said shaft so that the rotation of said shaft causes said chain to move vertically to thereby raise and lower said bob along the axis of said conical member.

9. A warning device according to claim 8 wherein said means for adjusting the sensitivity of said pendulum switch includes dial means associated with said shaft for indicating the angular position thereof.

10. A warning device according to claim 7 wherein said alarm means includes a power source and a manual switch connected in series with the silicon controlled rectifier, said silicon controlled rectifier being operative when activated with the manual switch closed to maintain the alarm activated until the manual switch is opened.

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