SEARCH ROOM

OR 3,054,096

Sept. 11, 1962 S. PERITZ 3,054,096

EMERGENCY ALARM FOR SWIMMING POOLS AND THE LIKE

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FIG. 1

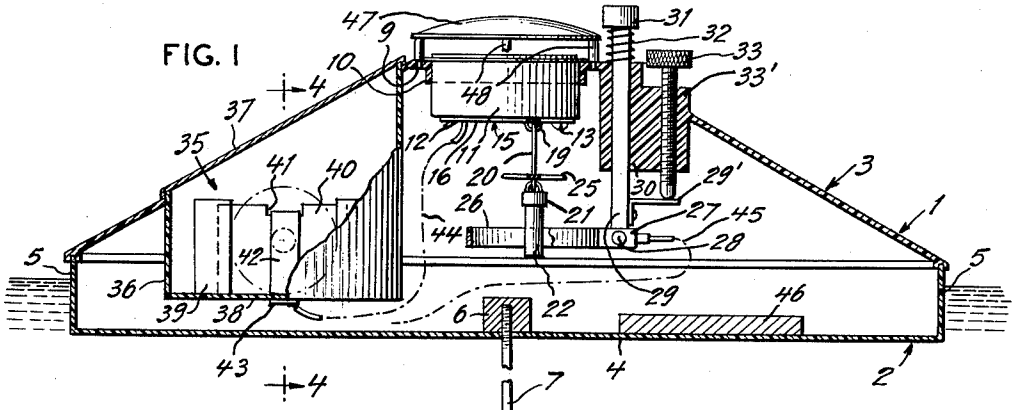


FIG. 9

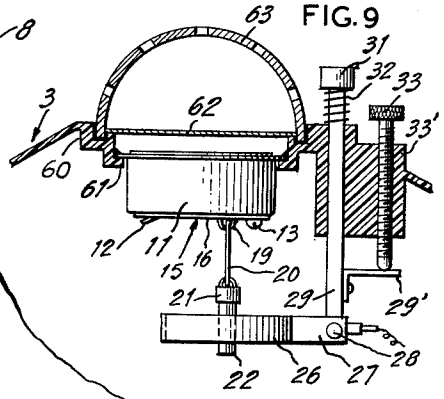


FIG. 2

FIG. 10

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FIG. 3

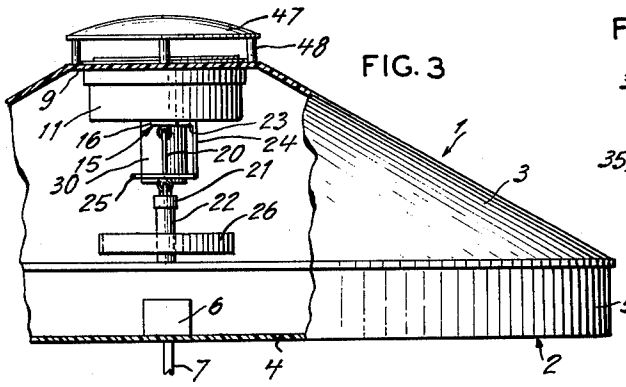


FIG. 4

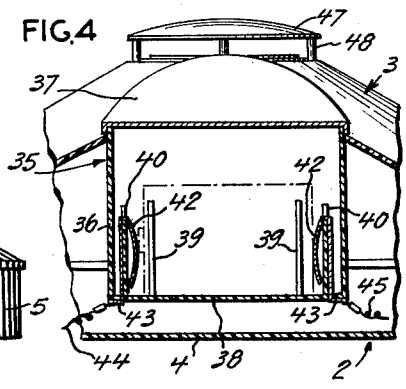


FIG. 5

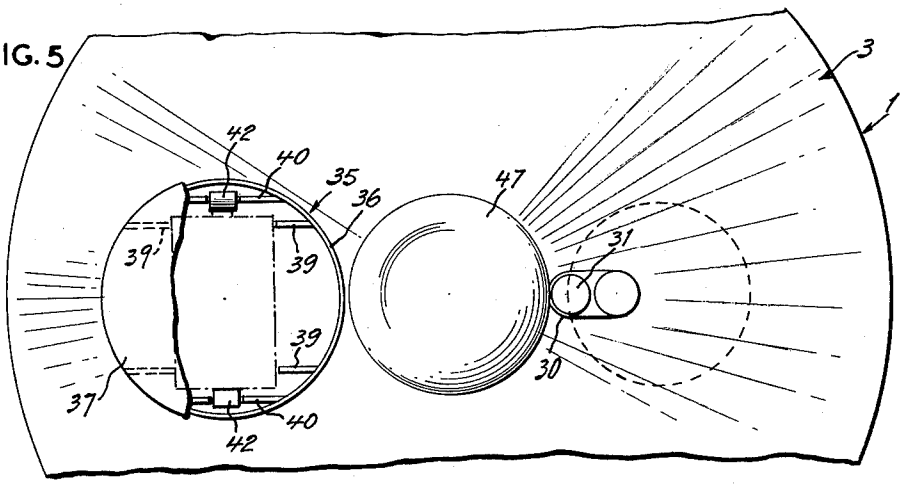


FIG. 6

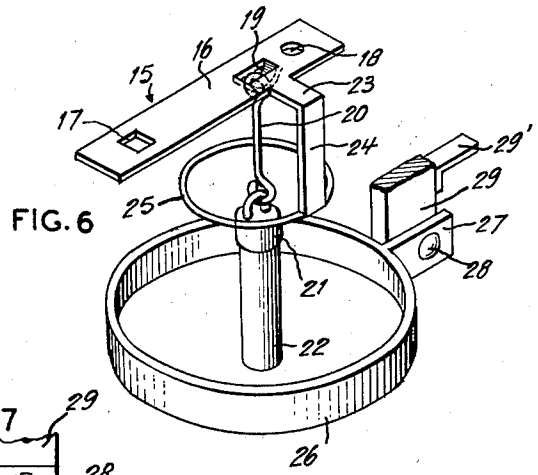


FIG. 7

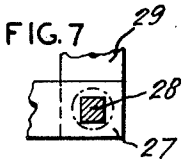
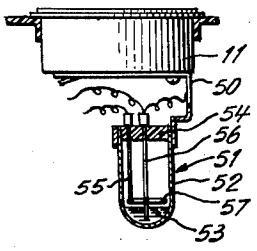


FIG. 8



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3,054,096

EMERGENCY ALARM FOR SWIMMING POOLS AND THE LIKE

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7 Claims. (Cl. 340—244)

This invention relates to an emergency alarm for use in swimming pools and other open tanks or small bodies of water, for signalling when a person or other object accidentally falls in.

The invention provides an emergency alarm particularly adaptable for use in swimming pools having a casing forming a float construction adapted to float on the surface of the water in a swimming pool or the like. The casing has a suitable alarm device such as an electric horn mounted on an upper portion, a battery mounted in the casing and electric contact members mounted in the casing. The contact members are connected by wires with the battery and alarm device. One of the contact members is movably mounted relative to the casing and arranged to engage the other contact member when the casing is tilted a predetermined amount. A self-contained alarm unit is provided by this construction arranged so that when the casing floats on the surface of the water in a swimming pool, the alarm will not sound until someone or some object falls in. When an object like a person, even a child, falls in the water, it will create waves of sufficient magnitude to rock or tilt the casing an amount sufficient to cause the movable contact to engage the stationary contact. This closes the circuit between the battery and alarm device carried by the casing, causing the alarm device to give a sound signal that may be heard some distance, for immediately summoning aid.

The invention provides a contact mechanism in which a movable magnetized contact member is suspended in a casing for swinging movement from a normal position of rest toward an arcuate contact member mounted in the casing so that rocking or tilting movement of the casing a predetermined amount will cause the movable contact member to engage the arcuate contact member and be retained in engagement therewith by magnetism.

Suitable means is provided by the invention for disengaging the contact members so the movable contact will be restored to its position of rest. This resetting means may provide a movable mounting for the arcuate contact member, operable manually to disengage it from the movable contact member through movement into a position beyond the arc of swinging movement of the movable contact member. When the contact members are separated, the resetting means will normally return the arcuate contact member into position for subsequent engagement by the movable contact for closing an electric circuit causing an alarm on the casing to operate. A loop member is provided by the invention to limit swinging movement of the movable contact member for retaining it in position, even though the casing may be turned upside down so the movable contact member will be immediately restored to normal operative position, when the casing is returned to its normal upright position.

According to the invention, the casing forming a float containing the alarm device and a means for closing an electric circuit to cause the alarm to operate, provides a compartment for a battery opening outwardly so the battery may be replaced while the remaining portions of the casing may be sealed in liquid-tight relation. A suitable cover is applied to the open end of the battery compartment to independently seal the battery in the compartment in liquid-tight relation.

The invention includes an alarm device in which a casing forming a float and containing a battery, an alarm and a contact mechanism for closing the circuit between the battery and alarm, may have the contact mechanism provided by a suitable mercury switch in which a bulb partially filled with mercury, has a pair of contacts engaged by the mercury when the bulb is tilted a predetermined amount from a normal position of rest.

In the drawings:

FIG. 1 is a vertical transverse cross section through the alarm unit.

FIG. 2 is a bottom view of the alarm unit, with portions broken away to illustrate the contact mechanism and battery holder.

FIG. 3 is a side elevation of the alarm unit taken from a position at right angles to FIG. 1, with portions broken away and shown in cross section illustrating the signal device and contact mechanism.

FIG. 4 is a cross-section taken on line 4—4 of FIG. 1.

FIG. 5 is a fragmentary plan view with portions of the battery compartment cover broken away to illustrate the interior of the compartment.

FIG. 6 shows the contact members and mounting therefor in perspective.

FIG. 7 is a detail side elevation showing how the stationary contact member may be attached by a square rivet to the resetting member.

FIG. 8 is a detail view with portions in cross-section, illustrating a mercury contact mechanism mounted on the signal device.

FIG. 9 is an enlarged detail cross-section illustrating the top portion of the casing and showing how the top portion of the device illustrated in FIG. 1 may be modified to provide a sealing diaphragm over the alarm unit and a slightly different cover structure may be mounted on the top portion to cooperate in retaining and protecting the diaphragm in assembled relation.

FIG. 10 is a detail view showing a slightly different form of movable and stationary contact from that illustrated in FIGS. 1 and 6.

A hollow casing **1** forms a float and a frame structure or enclosure to provide a self-contained unit completely housing all the mechanism necessary to provide an alarm when the casing is tilted a predetermined amount. Casing **1** is formed of two parts, a bottom float portion **2** and a top portion **3**. The casing may be formed of a suitable material such as sheet metal, plastic or the like, which is of light weight, strong enough to retain its shape in use and in normal handling. Bottom float portion **2** is formed with a flat bottom wall **4** and an upstanding substantially cylindrical side wall **5**. An attaching block **6** is mounted in the central portion of bottom wall **4**. Block **6** and bottom wall **4** are formed with a threaded recess opening downwardly, for receiving the threaded upper end of a rod **7** carrying a weight **8** on the lower end. Weight **8** acts to hold the casing normally in an upright position when floating in water.

Top portion **3** of the casing has a frustro-conical shape with the outer edge formed to provide a pair of annular flanges spaced apart to receive the upper marginal portion of side wall **5** therein, for sealing the top portion to the bottom float portion in liquid-tight relation through the use of a suitable sealing or attaching means well known in the art, according to whether sheet metal or different types of plastic materials are used. The upper end **9** of top portion **3** consists of a flat portion formed with a depending annular flange or attaching portion **10** for slidably receiving and mounting an alarm device **11**. Alarm **11** may be a suitable type of electric magnetic vibratory diaphragm horn well known in the art. Alarm **11** has the casing formed on the bottom with a lug **12** on one side, and a screw **13** threaded therein on the opposite side as shown in FIG. 1. Alarm **11** has the casing sealed

in upper end 9 to flange 10 to rigidly mount the alarm in the top portion.

A supporting frame or bracket 15 has a strip member 16 formed with opening 17, FIG. 6, in one end, receiving lug 12 and an opening 18 in the opposite end receiving screw 13 form firmly attaching bracket 15 to the bottom of alarm 11 with strip 16 engaging the bottom wall thereof. A loop 19 is formed to project from an intermediate portion of strip 16 for receiving the looped end of suspension link 20. The lower end of link 20 is formed with a looped end engaged through a U-shaped strap portion formed on cap 21 mounting movable contact member 22, made of a suitable magnetized ferrous metal. Link 20 suspends movable contact member 22 from loop 19 of bracket 15 for free swinging movement in all directions. Bracket 15 has strip 16 formed with an extension 23 projecting outwardly from one side as shown in FIG. 6. The outer end of extension 23 carries a downwardly extending strip portion 24, carrying ring 25 on the lower end in a horizontal plane about the lower looped end of link 20. Ring 25 is mounted so link 20 will be centered therein in its normal position of rest as shown in the drawings.

A stationary contact member 26 of circular strip form has an ear 27 projecting outwardly from an outer portion thereof. Ear 27 is rigidly attached by the use of a square rivet or other suitable means, indicated at 28 in FIGS. 6 and 7, to a resetting member or shaft 29. Member 26 is supported in a horizontal position aligned with the central portion of movable contact member 22, as shown in FIG. 1. Resetting member 29 is slidably mounted in upright relation in guide sleeve 30 formed in vertically extending relation in the upper portion of top portion 3 adjacent upper end 9, as shown in FIG. 1. The upper end of resetting member 29 projects outwardly above the top of the casing and has knob 31 mounted on the upper end. A compression spring 32 is mounted around the upper outer end of resetting member or shaft 29 and engages between the upper end of guide sleeve 30 and the lower end of knob 31, for normally moving shaft 29 upwardly to hold stationary contact member 26 in operative position. A set screw 33 threaded in the enlarged portion 33' on the top portion of said casing has the upper outer end provided with a knob for manual engagement to adjust the screw. The lower end of screw 33 engages bracket 29' on shaft 29 and limits or fixes the position of the stationary contact member relative to the movable contact member.

A battery compartment is provided in the casing as generally indicated at 35. The compartment is formed by a cylindrical casing member 36 having the upper end secured to the top portion 3 of the casing. The upper extremity of casing member 36 extends outwardly a slight distance beyond the outer surface of top portion 3 to provide a lip lying in a plane parallel to the outer surface of top portion 3. A battery compartment cover 37 detachably engages over the upper end of cylindrical casing member 36 in liquid-tight relation to prevent moisture or liquid from getting into the battery compartment. A flat bottom 38 is mounted on the lower end of cylindrical casing member 36, as shown in FIG. 1. Cylindrical casing member 36 and bottom 38 are formed with vertical guide and spacing flanges 39 arranged in spaced pairs to guide and hold a dry cell in transversely extending relation on the upper face of bottom 38, as shown in dotted lines in FIGS. 1, 4 and 5. A pair of contact supporting plates 40 are mounted in spaced parallel relation within cylindrical casing member 36 and spaced outwardly beyond guide and spacing flanges 39. The upper edge of each plate 40 is notched as indicated at 41 in FIG. 1, for receiving and holding spring contact members 42 in position, one on each plate 40. Spring contact members 42 are substantially U-shaped in side view as shown in FIG. 4 with an inner leg extending adjacent the inner face of plates 40 in spaced relation and the outer leg lying against the outer face of plates 40. The free end of each outer leg of each contact member 42 extends through an opening in bottom 38 and is formed with an outwardly extending terminal 43.

Terminal 43 of one contact 42 is connected by a wire 44 to one terminal of electric horn or alarm 11. The other terminal of alarm 11 is connected through screw 13 to strip 16 and to movable contact 22, through link 20. This provides an electric circuit from the battery through alarm 11 to movable contact 22. Terminal 43 of the other contact 42 is connected by wire 45 to ear 27 for establishing an electric circuit from the battery to stationary contact member 26. See FIGS. 1 and 2. With this circuit arrangement it will be understood that whenever movable contact member 22 swings a sufficient amount to engage stationary contact member 26 at any point, the circuit between the battery and alarm 11 will be closed and the alarm will operate to produce a sound signal.

A weight 46 is mounted on the inside of bottom portion 4 of the casing by any well known means in a position on the opposite side of the center of the casing from battery compartment 15 for counter-balancing the weight in casing 1, so it will normally float in a level position, as shown in FIG. 1. A cover or rainshield 47 is mounted in spaced relation above the outer upper portion of alarm 11, on supporting legs 48 secured at their lower ends to upper end portion 9, as illustrated in FIGS. 1, 3 and 4. The outer edge of shield 47 extends outwardly beyond alarm 11, sufficiently to normally prevent rain and splashing water from wetting the diaphragm forming the upper end of alarm 11. The shield is arranged so that it will not affect the sound signal produced by alarm 11 to an appreciable extent.

The alarm contact members and circuit connections with contacts 42 are all completely assembled in top portion 3 and bottom portion 2, then assembled and sealed on top portion 3 to form a water-tight casing or float unit. With cover 37 removed from the battery compartment, a dry cell of conventional form is manually inserted into the position shown in dotted lines in the drawing. Guide flanges 39 locate the battery in its compartment. The space between the battery and the cylindrical casing member 36 and flanges 39, enables one's fingers to be accommodated in the battery compartment for convenience in inserting and removing the battery from engagement between contacts 42. After insertion of the battery into compartment 35, cover 37 is applied to the outer end to seal thte compartment in liquid-tight or water-tight relation. Application of weight 8 by threading the upper end of rod 7 into block 6 completes assembly of the alarm unit, ready for use.

The alarm unit is placed in a swimming pool or small pond or lake so as to float on the water in the position shown in FIG. 1, when the pool, etc., is not being used for bathing etc. Wind ripples on the surface of the water in the pool or lake will not cause the casing to rock because the transverse dimension of the casing is sufficient to cover the distance between more than two crests of the ripples and will therefore, not rock sufficiently to cause movable contact 22 to engage stationary contact 26.

Whenever a person, such as a small child falls into the pool or lake, waves of sufficient size are generated so the distance between wave crests will be greater than the diameter of casing 1. As a result, casing or float 1 will rock sufficiently to cause movable contact member 22 to engage stationary contact member 26 and close the electric circuit between the battery and alarm 11 causing the alarm to produce an emergency signal for summoning aid. Where movable contact member 22 is magnetized it will stick to stationary contact member 26 and cause alarm 11 to operate continuously.

The alarm may be stopped by holding the casing in a

horizontal position, as shown in FIG. 1 and pressing downwardly on knob 31 and moving resetting member 29 downwardly an amount sufficient to disengage contact member 26 from contact member 22 which opens the circuit. Movable contact member 22 will then return to its position of rest, as shown in FIG. 1, ready for subsequent use. If movable contact member 22 is not magnetized, intermittent sounding of the alarm will result from swinging movement back and forth with waves rocking the casing to alternately engage stationary contact member 26 at opposite sides. Limiting ring 25 provides for sufficient swinging movement of movable contact member 22 to engage stationary contact member 26, but prevents excessive swinging movement beyond contact members 26. If the casing should be turned upside down or even on edge, ring 25 will prevent link 20 and contact 22 from moving into an inoperative position where contact 22, when magnetized material is used, could engage the casing of alarm 11 and stick to it to render the unit inoperative.

FIG. 8 shows the alarm 11 with a bracket 50 mounted on the bottom of the alarm by screw 13. Bracket 50 supports a mercury contact member 51 on the lower end. Mercury contact member 51 has a glass casing 52 containing a movable mercury contact 53 in the lower end. An insulating disk 54 closes the upper end of casing 52 and has wire contacts 55 and 56 mounted therein. Wire contact 55 has a loop 57 on the lower end extending around the inside of casing 52 above the surface of the mercury 53 while wire contact 55 has the lower end extending into the mercury. With contact wire members 55 and 56 connected in circuit with the battery and alarm 11 in place of contact members 22 and 26, it will be understood that the mercury 53 will engage loop 57 when casing 52 is tilted a predetermined amount to close the circuit between the wire contact members 55 and 56. The alarm will be operated intermittently as a result of the rocking motion of the casing by the waves in the pool or the like, created by falling in as above described.

The alarm 11 is an electric horn of conventional form for operation on a low voltage dry cell battery. A horn of this type is being made and sold at the present time by Delco Manufacturing Company, of Marion, Indiana. Horns of this type are somewhat difficult to seal in a water-tight relation in the casing. As a result, a slight modification of the upper end 9 of the top portion of the casing as shown in FIG. 9, enables complete and more efficient sealing of alarm 11 in the casing. The structure as shown in FIG. 1 for example has upper end 9 formed with a U-shaped seat portion 60. The inner margin of seat portion 60 is formed with a depending portion carrying an inwardly extending flange 61 formed to receive the marginal supporting flange on alarm 11 for mounting the alarm in the top portion. Alarm 11 is sealed on flange 61 in rigid relation so the top portion is below the upper edge of U-shaped seat portion 60. A sealing diaphragm 62 of flexible sheet metal or other suitable thin sheet material is mounted on the upper inner edge of U-shaped seat portion 60 to close the opening in upper end 9 of the top portion of the casing in spaced relation above alarm 11. The margin of diaphragm 62 is formed to extend downwardly in U-shaped seat portion 60 where suitable adhesive or other sealing compound secures the diaphragm to the top portion in liquid-tight relation. The diaphragm is protected by cover 63 having a marginal portion formed of a shape and size to slidably fit in U-shaped seat portion 60 where it is rigidly sealed in position on the top portion. The margin of cover 63 cooperates in retaining the margin of diaphragm 62 sealed in the seat portion. The remaining structure of the unit will be the same as disclosed and described above in connection with FIGS. 1 to 7.

Diaphragm 62 and the diaphragm of alarm 11 are substantially parallel. The air is trapped between these diaphragms so that whenever the horn operates to produce a sound signal it will vibrate diaphragm 62 to produce a signal of equal volume to the horn. Cover 63 has a plurality of apertures formed therein sufficient to avoid interference with sound propagation while at the same time effectively protecting diaphragm 62.

FIG. 10 illustrates a movable and stationary contact structure of the same type shown in FIGS. 1 and 6 where the movable contact member is formed of a resilient flexible wire 65 having a loop on the upper end to suspend it from loop 19 in position to swing in any direction. The lower end of wire 65 has a block or weight member 66 rigidly mounted thereon. The stationary contact member 67 is of smaller size than that shown in FIG. 1 and is operatively positioned to be engaged by wire 65 above member 66. When the movable contact swings due to tilting of the casing member 66 it will cause wire 65 to flex or bend as shown in dot and dash lines in FIG. 10 so as to maintain engagement between the movable and stationary contacts for a slightly longer period of time. This structure may replace the contact members shown in FIG. 1. Alarm 11 will be operated intermittently when contact member 65 is engaged with contact member 67. Stationary contact member 67 may be mounted on shaft 29 as shown in FIG. 1 and have its position adjusted for varying the operation of the alarm in the same manner as provided by the construction shown in FIG. 1. The adjustment of the stationary contact member downwardly in FIGS. 1 and 10 reduces the degree of tilt required to have the movable contact member engage the stationary contact member. Raising the position of the stationary contact member provides for a greater amount of tilting of the casing before the contact members engage.

The invention claimed is:

1. A wave actuated alarm comprising a watertight casing having a broad base, said casing being formed to float on the surface of a body of water, an alarm mounted within said casing, said alarm including at least an audible signal, means for energizing said alarm, and condition sensitive switch means adapted to connect said energizing means to said alarm when said casing is rocked more than a predetermined amount, said condition sensitive switch means comprising a first contact freely suspended to swing as a pendulum, a second contact at least partially surrounding said first contact and being mounted in said casing to move therewith, at least one of said first and second contacts being permanently magnetized and the other of said contacts being formed of magnetic material, rocking of said casing causing relative motion between said first and second contacts to close said circuit when the rocking becomes sufficient to cause said first contact to swing sufficiently close to said second contact to come within the influence of said permanent magnet, said permanent magnet causing said contacts to lock together whenever they are engaged to maintain the circuit connection until purposely broken, and manually operable means for disengaging said engaged contacts.

2. The alarm defined in claim 1 wherein said disengaging means includes means for moving one contact away from the other to a point beyond the influence of said permanent magnet.

3. A wave actuated alarm comprising a water resistant buoyant casing having a broad base, an alarm mounted in said casing, said alarm including at least an audible signal, means for connecting said alarm to a source of energy, and wave-motion actuated switching means connected between said alarm and said means for connecting said alarm to a source of energy, said switching means comprising a first contact member mounted in said casing for free pendulum movement, a second contact at least partially surrounding said first contact and space therefrom, said second contact being mounted in said casing to move with said casing, at least one of said first and second contacts being a permanent magnet and the other being formed of magnetic material, said permanent magnet serving to cause said first and second

contacts to close when they come within a prescribed distance of each other and also to serve to maintain said contacts engaged until they are purposely disengaged, and means for manually disengaging said contacts, said disengaging means including means for moving one of said contacts out of engagement with the other and past the prescribed distance from said other contact.

4. The alarm defined in claim 3 further including means for selectively changing the sensitivity of said switching means, said sensitivity means including means for adjusting the spacing between the poles of said permanent magnet contact and said other contact, and means for maintaining said adjusted spacing whenever said switch is not operated.

5. A wave actuated alarm comprising a buoyant casing adapted to be floated on the surface of a body of water in which the production of waves is to be signalled, an alarm mounted within said casing, said alarm including at least an audible signal, means for energizing said alarm, and wave actuated switching means connected between said alarm and said energizing means, said switching means comprising a first contact mounted within said casing to freely swing as a pendulum which is maintained in a substantially vertical position by the action of gravity, a second contact mounted within said casing to move with said casing and at least partially surrounding said first contact, one of said first and second contacts being a permanent magnet and the other being formed of magnetic material so that the effect of the magnetized switch contacts is to cause positive engagement between said first and second contacts when they come within a prescribed distance of each other and to remain in engagement until positively withdrawn from engagement, means for positively withdrawing said first and second contacts from circuit-closing engagement with one another, said withdrawing means including means for moving one of said contacts away from the other of said contacts for a distance greater than said prescribed distance, and means for connecting said first and second contacts in series between said alarm and said energizing means whenever wave motion causes said contacts to approach each other and establish a circuit therebetween, energizing said alarm.

6. The wave alarm defined in claim 5 further including means mounted in said casing for adjusting the sensitivity of said wave actuated switch means, said adjusting means comprising mounting means for at least one of said contacts for modifying the distance between the poles of said permanent magnet contact and said other contact, thereby changing said prescribed distance.

7. A wave actuated alarm comprising a watertight casing having a broad base, said casing being formed to float on the surface of a body of water, an alarm mounted within said casing, said alarm including at least an audible signal, means for energizing said alarm, and condition sensitive switch means adapted to connect said energizing means to said alarm when said casing is rocked more than a predetermined amount, said condition sensitive switch means comprising a first contact freely suspended to swing as a pendulum, a second contact at least partially surrounding said first contact and being mounted in said casing to move therewith, rocking of said casing causing relative motion between said first and said second contacts to close said circuit when the relative motion becomes sufficient to cause said first contact to engage said second contact, means to maintain said circuit closed when said first and second contacts have become engaged, manually operable means for opening said circuit, and means for adjusting the sensitivity of said switch means by positioning said second contact longitudinally along said first contact to determine the length of swing necessary for said contacts to become engaged and close said circuit.

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