March 21, 1967 G. DAVID 3,310,795

PORTABLE SPACE FLOOD ALARM

Filed July 20, 1964 4 Sheets-Sheet 1

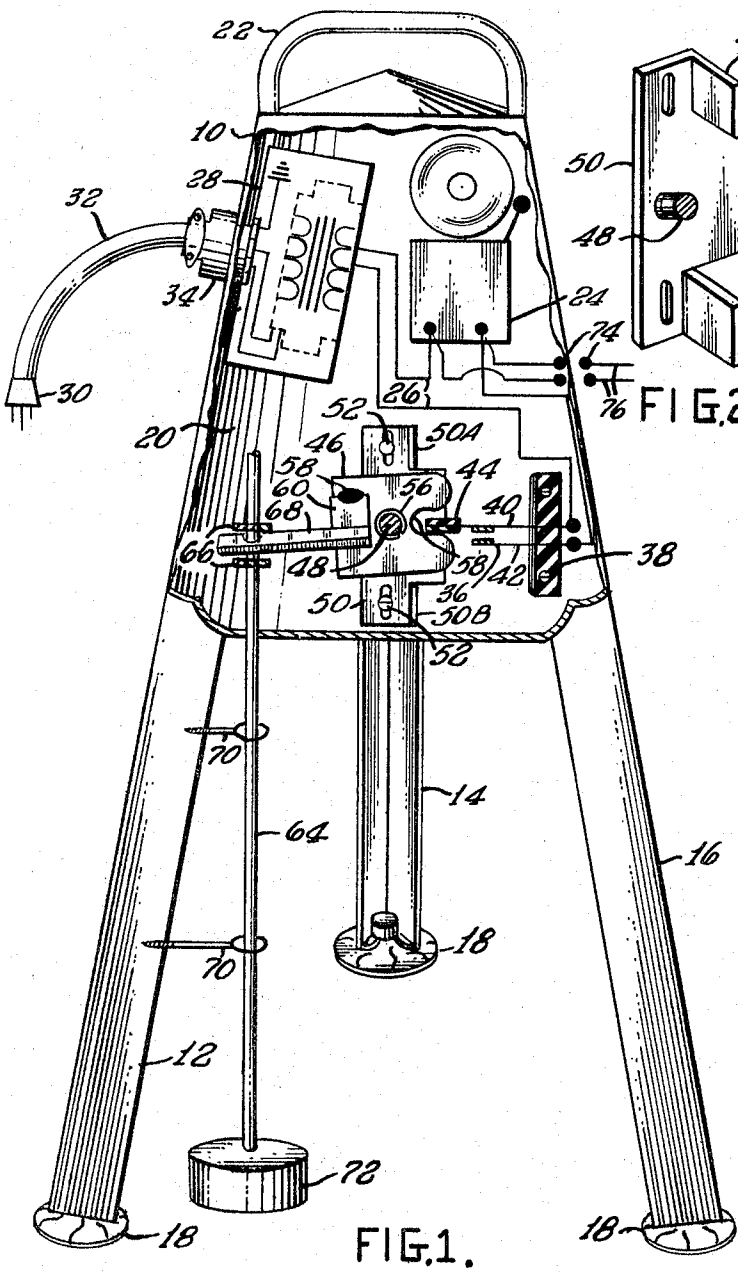


FIG.1.

FIG.2.

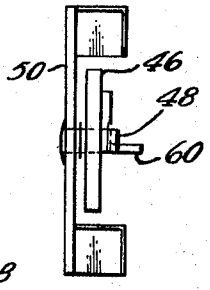


FIG.5.

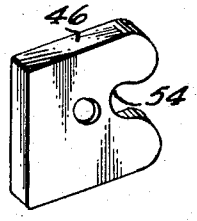


FIG.3.

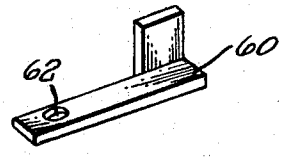


FIG.4.

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PORTABLE SPACE FLOOD ALARM

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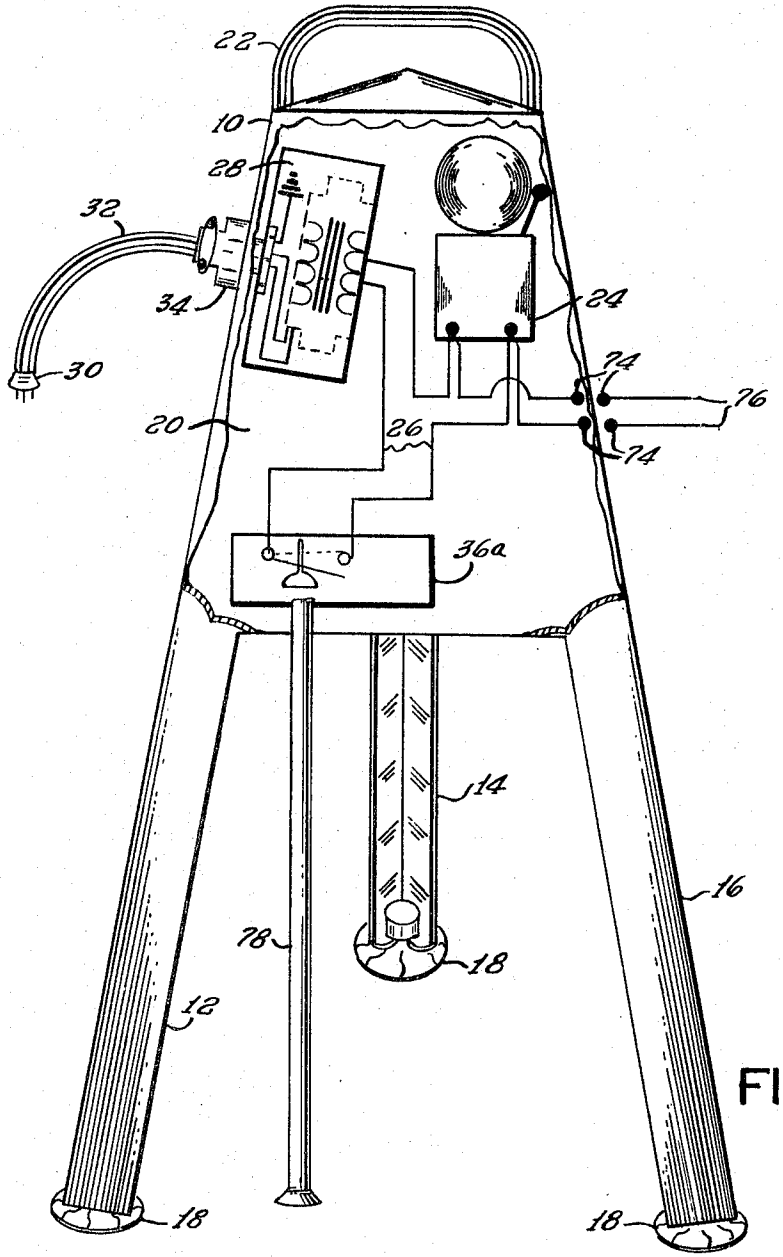


FIG. 6

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PORTABLE SPACE FLOOD ALARM

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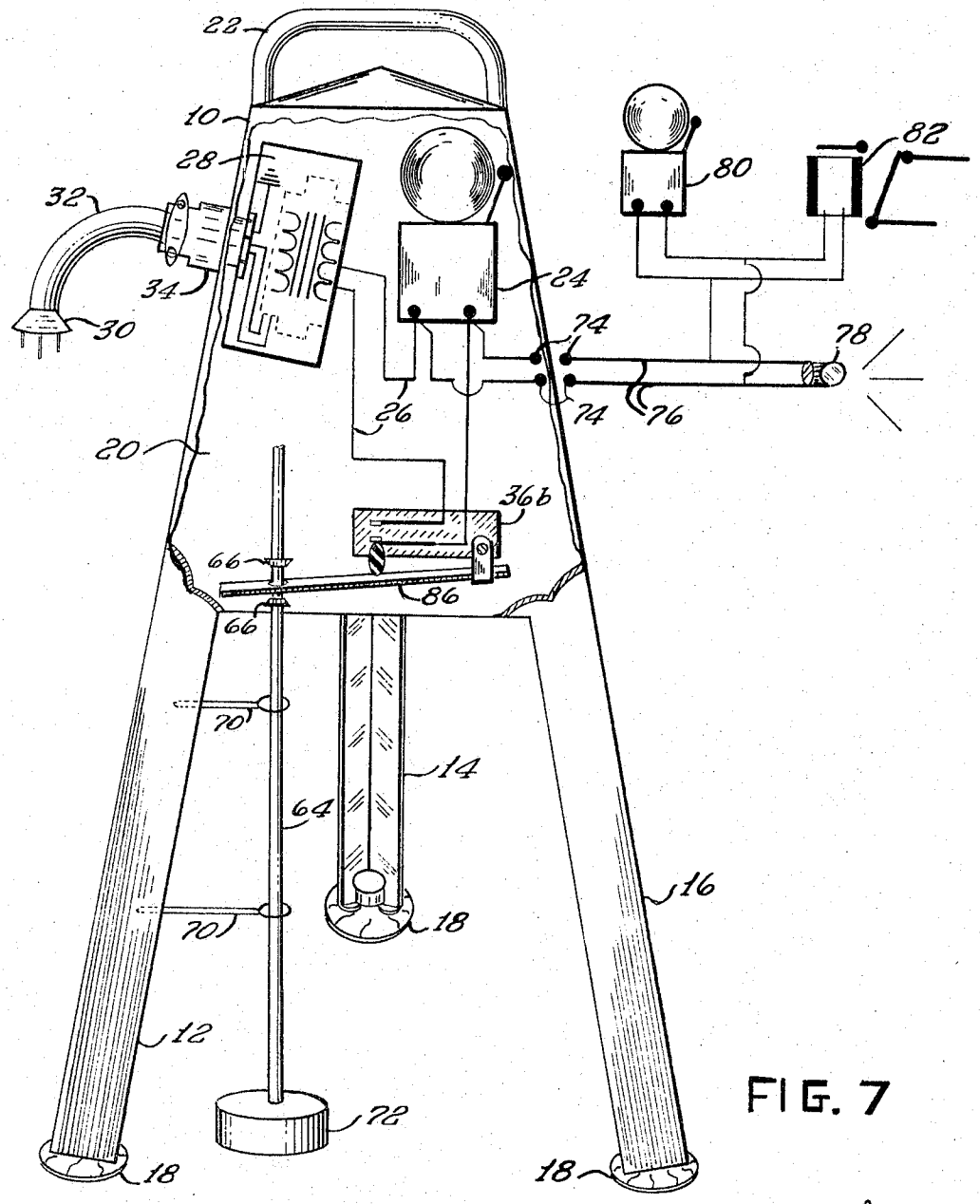


FIG. 7

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PORTABLE SPACE FLOOD ALARM

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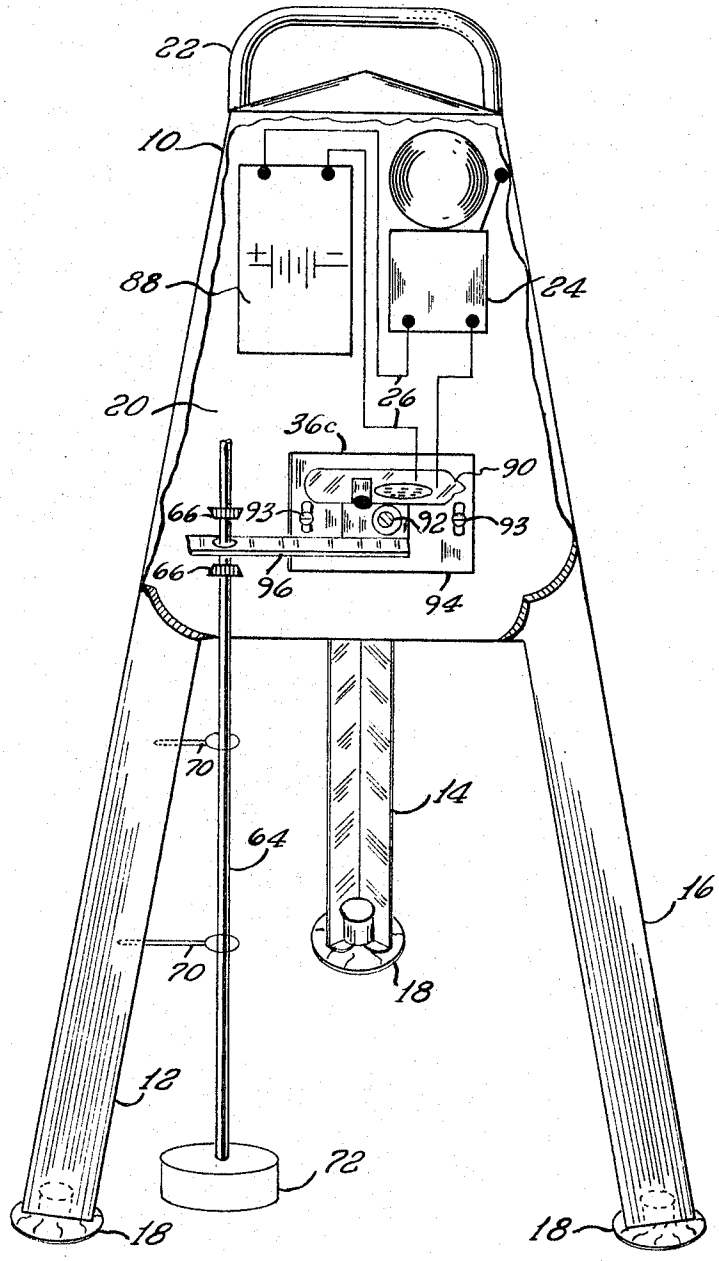


FIG. 8

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3,310,795

PORTABLE SPACE FLOOD ALARM

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Filed July 20, 1964, Ser. No. 383,780
14 Claims. (Cl. 340—244)

This invention relates to a small, portable lightweight flood warning device, which may also be used to control power to machinery or the like in the space where the device is being employed.

In the past, sump pumps and the like have been employed to remove water from household basements, utility rooms, and business places in an effort to prevent damage to goods or equipment of any nature that is subject to harm by rising water. Frequently, sump pumps become inoperative for one reason or another, for example because of debris that causes the float in the sump to become inoperative, and then there are the situations where water backs up from a sewer or the like due to heavy rains, which gives rise to potential damages.

It is an important object of this invention to provide a portable flood warning device that may be placed in machine rooms, utility rooms, basements, etc. as desired. Its portability makes it handy for any room that is subject to rising water that may be injurious not only to equipment or goods therein, but to the health and welfare of the public. The device of this invention warns the occupants of the room or building or in a further remote place, of the danger of rising water before any equipment or goods is submerged in a flood, thereby saving thousands of dollars in furniture and machine and goods damaged besides eliminating unhealthy sewer odors and the like.

Other objects and advantages of the invention will become apparent upon reading the appended claims in conjunction with the following detailed description of several embodiments of the invention, and the attached drawings, in which:

FIGURE 1 is a vertical cross-sectional view, partially diagrammatic of one embodiment of this invention;

FIGURES 2–4 are perspective views of respective elements of the FIGURE 1 embodiment;

FIGURE 5 is an elevational side view of the assembly of the FIGURES 2–4 elements for use in the FIGURE 1 embodiment;

FIGURE 6 is a vertical cross-sectional view, partially diagrammatic of a second embodiment of this invention;

FIGURE 7 is a vertical cross-sectional view, partially diagrammatic of a third embodiment of this invention;

FIGURE 8 is a vertical cross-sectional view, partially diagrammatic of a fourth embodiment of this invention.

In FIGURE 1, the warning device mainly consists of a tripod type stand **10** made of light gauge metal, though it may be made of plastic if desired. The three legs **12**, **14** and **16** are preferably of angle steel or V-shaped, and each has secured to its lower end a rubber suction cup **18**. With such suction cups, the tripod stand may be firmly held to the floor or ground as the case may be.

In its upper portion, tripod **10** includes a waterproof compartment **20** in which the various electrical and mechanical controls and the like are disposed. At its upper end, the tripod has a handle **22** by which it may be carried from place to place, with ease.

Any sort of alarm may be employed inside compartment **20**, for example the bell type alarm **24** illustrated. This bell, as is conventional, is operative on low voltage, for example 6 or 12 volts, and therefore the pair of lines **26** is caused to carry such low voltage. In the present embodiment, this low voltage is obtained by converting a relatively high voltage by transformer **28** inside the waterproof compartment. The input to this transformer is normally 115 volts, and is obtainable via a regular three-wire household circuit by male plug **30** and cord **32**, which passes through a nipple **34** and into transformer **28**.

One of the low voltage lines is broken by a switch **36**, which includes an insulated terminal bar **38** and contact blades **40** and **42**. The upper contact blade **40** extends inwardly and carries on its outer end an insulated block **44**, which is operated by a pivoted contact actuator plate **46**. Plate **46** is pivoted at a shaft **48** which is secured on a stationary bracket **50**. This bracket, in turn, is secured by screws **52** which pass through respective slots in the bracket, making the bracket thereby vertically adjustable. Plate **46** is transversely held in place by two C-washers or split rings **56** secured in grooves around shaft **48** on opposite sides of the plate. On its right hand end, actuator plate **46** is cut away to form a recess **54** which receives insulated block **44**, with the recess being taller than the block. Opposite sides of the recess pivot against the block to cause the upper contact blade **40** to move against and away from the lower contact blade **42**. Plate **46** is limited in its clockwise and counter-clockwise movements by its right angle tabs **50***a* and **50***b*.

At its left-hand end, actuator plate **46** is welded or otherwise secured, as at point **58**, to an L-shaped extended bracket **60** that has an arm **68**. The outer end of this arm has an aperture **62** through which passes a float rod **64**. Stops or limits **66** are adjustably or non-adjustably, as desired, secured to float rod **64** to determine the upward and downward limits of movement of the arm **68** of bracket **60**. Float rod **64** extends downward through two eyelets **70**, which are threaded or otherwise secured into leg **12**, to a float **72**. This float is of cork or any desired buoyant material, and its lower side is positioned adjacent the level of the floor close enough to effect the desired sensitivity required. With the adjustable controls for operating the switch, it is possible to sense a mere wetting of a floor whereby 1/32 inch of water will operate the alarm. Besides the adjustability possible by stops **66** on the float rod **64**, bracket **50** may be adjusted upwardly or downwardly to regulate the amount of movement necessary to close or open switch **36**. When switch **36** closes, the electrical circuit to bell **24** is completed, thereby energizing the bell and sounding an alarm, which is audible at a considerable distance from the tripod.

As indicated by terminals **74** and lines **76**, closure of the switch may be effective to cause any desired external circuit to be operated also, as more fully explained in other embodiments of this invention.

In FIGURE 6 an arrangement similar to that shown in FIGURE 1 is illustrated, but with use of a different type switch and sensing means. Switch **36***a* in FIGURE 6 is a diaphragm type of air switch that is actuated from a normal off position to an on position by the rising of water from the floor or ground into an extruded rigid plastic tube **78**. The switch arm is tripped by the pressure differential effected by the rising water. This closes the circuit to the internal alarm **24** as well as to external circuit including lines **76**. These lines may extend to a remote warning light **78** (FIGURE 7) and to a remote warning bell **80**. Additionally, lines **76** may connect to a relay **82** for connecting or disconnecting any other desired circuit through its switch arm **84**.

Still another embodiment of this invention is illustrated in FIGURE 7. Again, the main difference in this embodiment and those in FIGURES 1 and 6 is the type of switch. In FIGURE 7, a microswitch **36***b* is employed along with an elongated lever arm **86** pivoted to the body of the switch at one end, and having an aperture at its other end through which the float rod **64** extends between limit stops **66**. Rise of water will elevate float **72**

and microswitch 36*b* will be turned on as soon as the lower stop **66** contacts lever arm **86** and pivots it upwardly an amount sufficient to make the switch close the circuit to the various alarms to sound the desired warning.

In FIGURE 8 the embodiment is completely self-contained in that it employs an internal battery **88** instead of requiring an external A.C. source as in the previous embodiments. Additionally, switch **36***c* is of a type different from the previous embodiments. It is a mercury switch having a mercury bulb **90** mounted to pivot about axis **92** on a stationary bracket **94** secured by screws **93** which pass through respective slots in the bracket, making the bracket thereby vertically adjustable. Connected to move up and down with float rod **64**, in accordance with limit stops **66**, is a lever **96**, which causes the mercury bulb to pivot accordingly about axis **92** thereby making and breaking the circuit to the bell **24**.

While the construction of the tripod structure in each of the foregoing embodiments may be of metal or plastic, the latter is preferably from the standpoint of weight and also because of its insulative characteristics. It should be noted than an arrangement according to this invention has many further advantages including the fact that it is completely portable and self-supportable. The controls are fully enclosed and only need to be plugged into a conventional outlet, or in the case of the battery operated equipment, not even that is required. When there is no rising water to actuate the alarm, the internal switch is then off, meaning that the equipment consumes no power except when an alarm condition exists.

The flood section is completely free of electrical wires, and therefore it requires no waterproofing. Yet, it is sensitive enough to sense water of 1/32 inch or more, thereby requiring no sump pit or the like and obviating clog that can occur with sump pumps. For places where equipment, furniture, appliances, motors, controls, storage, etc., are manufactured, used and/or set on low levels, the equipment according to this invention finds a special use, as in home basements and utility rooms, since it is possible to adjust the sensitivity to such a close level. The equipment is preferably small in height, with an overall height of approximately 18 inches, for example. This means that the equipment is extremely small, yet due to the suction cup legs, it cannot be easily washed away by rising water. No watchman is needed for the equipment, because it is reliable in operation, and will give a continuous alarm until it is disconnected or otherwise turned off, for example because of removal of the rising water. It is quite inexpensive to manufacture because parts are few in number and relatively little labor is required.

It is therefore apparent that this invention has provided for the objects and advantages herein set forth. Still further objects and advantages, and even other embodiments of the invention, will be apparent to those of ordinary skill in the art upon reading this disclosure. However, it is to be appreciated that this disclosure is intended as exemplary and not limitative, the invention being defined by the appended claims.

What is claimed is:

1. A small, portable, lightweight flood warning device for use in any desired ground or floor area where rising water may be a problem, comprising:

a tripod having a handle and an enclosed waterproof compartment elevated by three legs having respective suction means for securing the tripod to said area,

sensing means positioned adjacent the level of said area for sensing any water rising thereon and having a connection means extending upwardly into said compartment to convey thereinto any rising movement of the sensing means,

an alarm in and sensible outside of said compartment,

a pair of lines in said compartment for supplying a relatively low voltage to said alarm,

normally open switch means in one of said lines in said compartment, and

means operatively connected between said connection means and switch means for causing the switch means to close and operate said alarm upon a predetermined amount of said rising movement of said sensing means.

2. A flood warning device as in claim **1** wherein said sensing and connection means are respectively a float and a float rod, said rod being guided in its vertical movement by means secured to said tripod.

3. A flood warning device as in claim **2** wherein the said means that is operatively connected between the connection and switch means to operate the latter includes an arm having an aperture near one end through which said float rod extends inside said compartment, and means secured to said rod on opposite sides of said arm for determining the extent of movement of said arm when said float and rod move.

4. A flood warning device as in claim **3** wherein said switch means is of the microswitch type with said arm being pivotally connected thereto to operate the microswitch.

5. A flood warning device as in claim **3** wherein said switch means includes a mercury switch mounted for pivotal movement and connected to said arm to be operated thereby.

6. A flood warning device as in claim **3** wherein said switch means includes two contact blades one of which is extended and carries an insulated block, said means for causing the switch means to close further including a stationary bracket in said compartment adjustable in vertical position, a contact actuator plate pivotally mounted on said bracket, said arm being secured to one end of said plate, the other end being recessed with said insulated block being disposed in said recess, opposite sides of said recess being operative on said block to cause the said one contact blade to move toward and away from the other to effect opening and closing of the switch in conformance with movement of said arm as operated by said float rod.

7. A flood warning device as in claim **5** including a battery inside said compartment for providing the said low voltage of said lines.

8. A flood warning device as in claim **1** including means in said compartment for transforming a relatively high voltage from an external source to said relatively low voltage.

9. A flood warning device as in claim **1** including a battery inside said compartment for supplying said low voltage.

10. A flood warning device as in claim **1** and further including means for controlling power to machinery or the like setting on said floor and liable to be damaged by rising water.

11. A flood warning device as in claim **1** wherein said tripod is mostly of plastic structure.

12. A flood warning device as in claim **1** wherein said tripod is mostly of light gauge metal construction.

13. A flood warning device as in claim **1** wherein said switch means is a diaphragm type of air switch and said sensing and connection means includes a rigid tube having its lower end adjacent the level of the floor as aforesaid, whereby rising water may enter the tube and close the switch due to pressure differential.

14. A small, portable, lightweight flood warning device for use in any desired ground or floor area where rising water may be a problem, comprising:

a stand having a handle and an enclosed waterproof compartment elevated by several legs having respective suction means for securing the stand to said area,

sensing means positioned adjacent the level of said area for sensing any water rising thereon and having a connection means extending upwardly into said

compartment to convey thereinto any rising movement of the sensing means,

an alarm in and sensible outside of said compartment,

a pair of lines in said compartment for supplying a relatively low voltage to said alarm,

normally open switch means in one of said lines in said compartment, and

means operatively connected between said connection means and switch means for causing the switch means to close and operate said alarm upon a predetermined amount of said rising movement of said sensing means.

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