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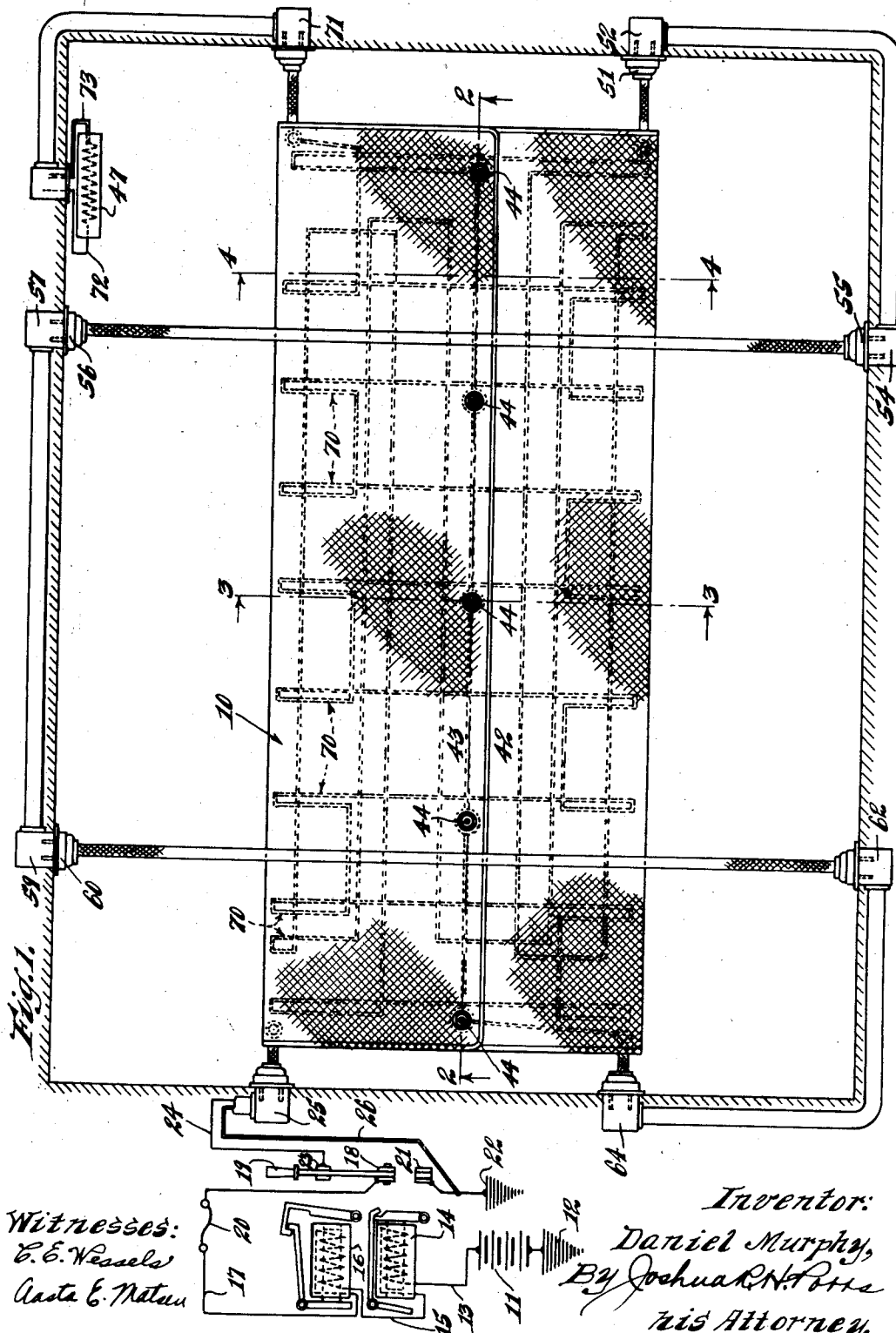
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2,092,178

ALARM APPARATUS

Filed Jan. 20, 1934

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

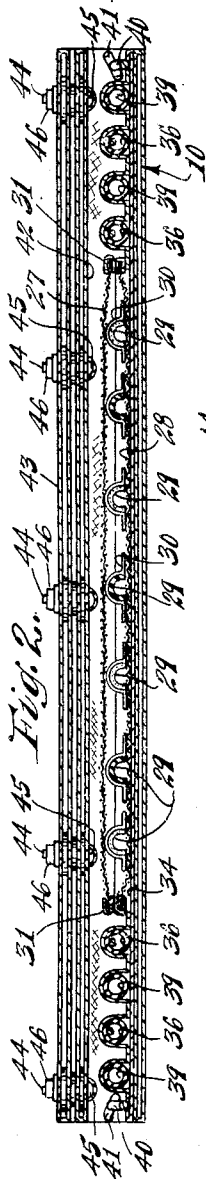


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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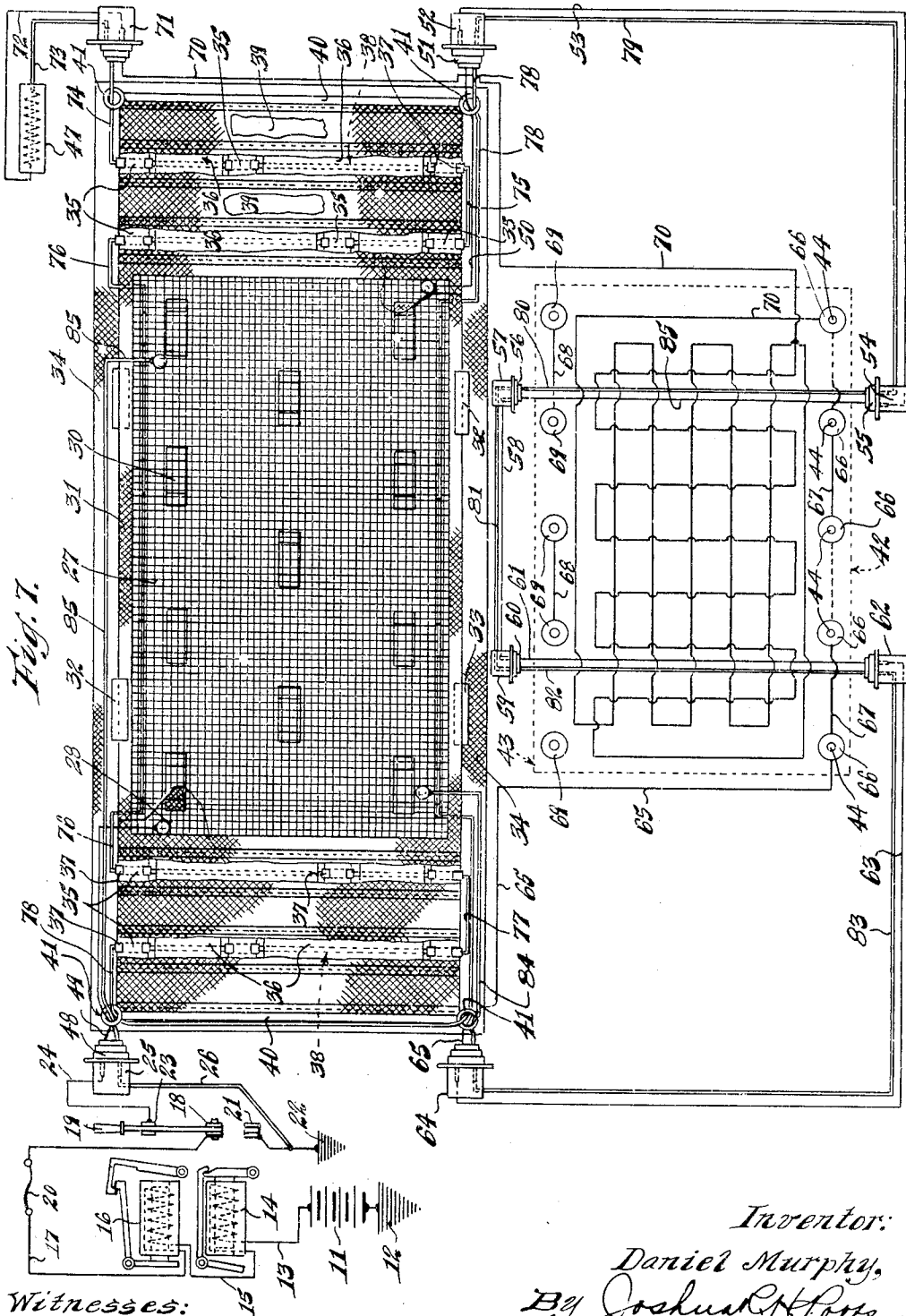
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ALARM APPARATUS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,092,178

ALARM APPARATUS

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Application January 20, 1934, Serial No. 707,489

6 Claims. (Cl. 177—314)

My invention broadly relates to an electric alarm apparatus which is economical and has for its object the provision of an automatic electric apparatus which is highly efficient for actuating alarms when the location in which the apparatus is used, is subject to hazards of various kinds.

I am familiar with the fact that various kinds of electric alarm apparatus have been devised heretofore for the protection of property, and an object of my invention is to eliminate some of the objectional features of electric automatic alarm apparatus. Some of these objections are high cost of complicated apparatus, necessity of extensive alterations or repairs in the location to be guarded, limited utility and much annoyance in its complicated operation.

Some of the more specific objects of my invention are the provision of apparatus which may be arranged easily in any building without extensive changes and also may be readily detached and stored away when not in use. Likewise, my apparatus may be shifted from a location which is subjected to less hazard than another location without any great amount of inconvenience, cost, or effort.

Another object is the provision of apparatus which may be placed on the floor of a building in a location which must be passed over by an intruder if he wishes to gain access to the storage place of valuable articles. Similarly, my apparatus will actuate an alarm in case the intruder enters the building and attempts to proceed farther into the same. Most alarm systems with which I am familiar are intended to actuate an alarm when the intruder attempts to make entrance into the building. However, the cost of installing equipment for the successful execution of such a plan, if needed for only a short period of operation, is prohibitive and also installation and rental cost is prohibitive for many persons needing such protection. My device is adapted to fill this particular need in addition to many others.

In addition to serving primarily as a burglar alarm my apparatus is designed to give warning of other hazards, one of which is fire. Some sprinkler systems are equipped to sound an alarm as well as free a quantity of water for extinguishing purposes at the point of need. My apparatus is designed to actuate an alarm when fire breaks out or when water is damaging or endangering the location or premises guarded so as to give warning of the danger that otherwise might be overlooked.

Many kinds of property are subject to being damaged by the presence of water coming from broken pipes, leaky roofs, and the like. My apparatus is designed to actuate an alarm so as to give warning of a dangerous condition on the premises where my apparatus is used.

A further object is the provision of apparatus which may be arranged to give warning of the three hazards specifically set forth or any one of them.

Another object is a provision to safeguard my apparatus from being tampered with by intruders so as to render the apparatus ineffective without at same time actuating an alarm.

Other objects will appear hereinafter.

My invention may be best understood by reference to the accompanying drawings, in which:

Fig. 1 is a somewhat diagrammatic view in top plan of a room having my alarm apparatus arranged for service;

Fig. 2 is a sectional view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is a detail view of the lower conductor screen preferably employed in my invention;

Fig. 6 is a detail view of the upper screen preferably employed; and

Fig. 7 is a diagrammatic view of the wiring circuits employed in connection with the novel parts of my invention and the parts which are well known in the art.

Referring now to Fig. 1, my device comprises generally a flexible protecting covering 10 which incases the major portion of my apparatus which is placed upon the floor of the room or location to be guarded. Electrical connections later to be described are operatively arranged with the apparatus so as to carry out its intended purposes. A battery 11 supplies current for operation and is grounded at 12. A wire 13 connects one terminal of the battery with an open relay 14 which is in turn connected by wire 15 with a closed relay 16. A wire 17 connects closed relay 16 with a terminal 18 of a switch 19 although a fuse 20 is interposed therebetween. A second terminal 21 is arranged for operation with switch 19 and is connected to a ground 22. The relays and switch herein shown and described are old in the art and it is well known how they may be utilized for the purpose of sounding a local alarm or communicating an alarm at a central station when that type of system is employed.

A terminal 23 is arranged for operation with switch 19 and has a wire 24 electrically connected thereto for the purpose of connection with an extension box 25. The wire 26 of the ground wire loop circuit connects the other contact member of extension box 25 with ground 22. Further details of the electrical circuits involved will be given after the following description of my circuit closing and opening apparatus for being acted upon by the various kinds of hazards.

Referring now to Fig. 3, for the detection of the presence of persons within the room in which my apparatus is employed I preferably utilize a pair of spaced, superposed copper screens 27 and 28 and separate them by resilient and compressible members or rubber tube sections 29. The tube sections 29 are preferably anchored to the lower screen 28 by textile attaching strips 30. I preferably secure the edges of the superposed screens with binding strips 31 of either rubber or other material so as to prevent raveling of the screens. Along the outer edges of the screens I place resilient insulating spacing clips 32 and 33 on screens 27 and 28 respectively. The resilient spacing members interposed between screens 27 and 28 are adapted to permit various portions of the screens to come in contact with each other when a weight is resting upon the upper screen. It can be seen that by the connecting of these screens, which are the conductors of the electric power, and pressing the screens into contact the current will be made to flow across through both screens. In my particular apparatus I prefer to effect a short circuit in this manner for a purpose later to be described. The screen 27 is shown in detail Fig. 6 and screen 28 is shown in detail Fig. 5, with both of the screens in top plan. The lower screen 28 is preferably secured to a base or supporting member 34 made of a strip of flexible non-conductor material. Preferably arranged adjacent the perimeters of screens 27 and 28 and secured to base member 34 are resilient members or tubes 35 and 36 which carry electrical conductor strips for the purpose of forming a closed circuit. The tube members 35 and 36 are preferably formed of rubber, made of varying lengths, and placed in staggered relation to each other so that a weight placed upon one of said tube sections will break the electrical circuit formed between the conductor strips carried by said tubes and accomplish this without regard to where the weight is placed upon the tube members. These tube members are shown in detail in Fig. 4 and contact strips 37 are secured to the short tube sections 35 and contact members 38 are secured to the longer tube sections or members 36. Every second or alternate rubber tube 39 although made of like material shall be continuous in length but without any metallic strips or wire connections. The sole use of these tubes is to give an even and uniform elasticity to entire section. In Fig. 4 the contact strips are in position to form a closed circuit but it can be seen that a weight placed above tube members 36 would depress contact strips 38 so that the circuit would no longer be closed between the ends of strip 38 and the contact strips 37. The tube members 35 and 36 are preferably secured to the base member 34 by textile material sleeves 39 which are shown particularly in Figs. 2 and 4. Lying parallel to the tube sections 35 and 36 and secured to base member 34 are stiffening rods 40 having eyes 41 at their opposite ends as can be seen clearly from an inspection of Fig. 7. Since many parts of the apparatus heretofore described

are extremely flexible and the apparatus is portable, the stiffening rods 40 are employed for the purpose of facilitating transportation and hold wires and flexible parts rigid. The eyes 41 form efficient guides for the electric wires later to be described. The protecting covering 10 heretofore mentioned incases the screens and various tube sections mentioned, and the overlapping edges 42 and 43 of the covering 10 shown in Fig. 3 are held together preferably by electrical conductor bolts 44 having enlarged heads 45 and nuts 46 arranged on the ends opposite the enlarged heads. Appropriate apertures in the lapping edges of the casing receive the bolts 44, and wires later to be described which are carried by the protective covering 10 complete a circuit between said bolts.

A resistance coil 47 of a desired number of ohms resistance shown in Figs. 1 and 7 may be placed in some location not easily accessible.

The wiring and various circuits will now be described in detail in connection with the diagrammatic view shown in Fig. 7. The extension box 25 may be placed in one corner of the room and as before stated receives battery wire 24. In extension box 25 the battery wire 24 is connected to a contact member. Likewise, the wire 26 of the ground wire loop circuit heretofore mentioned is electrically connected to another contact in the extension box 25, and insertable extension plug 48 carries a blade contact member to which a flexible battery wire 49 is attached. A circuit is thus completed between the positive terminal of the battery and battery wire 49. The battery wire may be passed through the eye 41 of rod 40 and then soldered to lower screen 28. Another battery wire 50 may be soldered to lower screen 28 at a point distant from the point where battery wire 49 is attached, and from said screen 28 wire 50 passes through eye 41 of a second stiffening rod 40 which is placed in spaced relation to the first mentioned stiffening rod. The wire 50 then passes to an extension plug 51 and is electrically connected to a contact blade therein. The contact blade completes a circuit to an appropriate contact in an extension box 52 and thence to a battery wire 53. The extension box 52 may preferably be arranged in a diagonally opposite corner of the room from extension box 25. From extension box 52 the wire 53 passes to an extension box 54 which is placed along the side wall of the room close to the extension box 52 where an appropriate contact connection is made. An extension plug 55 carries an appropriate contact member which completes a circuit between battery wire 53 and battery wire 56. Battery wire 56 then proceeds to the opposite wall of the room and through an appropriate extension plug 56 completes a circuit through extension box 57 to battery wire 58. From extension box 57 battery wire 58 proceeds toward the end of the room in which extension box 25 is located and is received by extension box 59. Appropriate contact members in extension box 59 and extension plug 60 complete a circuit to battery wire 61 which is crossed over to the opposite side of the room to an extension box 62 where appropriate connections complete a circuit to battery wire 63. Wire 63 then proceeds toward the end of the room in which extension box 25 is located and then proceeds toward the wall opposite extension box 62 to a point equidistant the side walls of the room where extension box 64 is located. The protective casing 10 is shown in Fig. 7 in an opened condition, that is, the lapped edges are separated and the casing is laid out flat so as to illustrate

the various wiring connections therein. Through appropriate contact connections a circuit is completed to battery wire 65 which is connected to a contact washer 66 which is secured to lapping edge 42. A series of said contact washers are arranged along the lapping edge 42 and bridging wires 67 are arranged between alternate pairs of said contact washers. When the lapping edge 43 is folded over edge 42 as shown in Figs. 3 and 4 the bridging wires 68 arranged between contact washers 69 secured to lapping edge 43 complete a circuit between contact washers 66 so that an electrical connection is made with a netted battery wire 70 which is arranged between the superposed folds of protective casing 10. This netted battery wire 70 covers substantially the entire extent of the protective casing and is designed to actuate the alarm by breaking a circuit and opening the closed relay if a person attempts to cut away the protective cover in order to disable the alarm apparatus. Likewise, the separation of the lapped and bolted edges would break the circuit because the presence of all the bolts is required for a complete circuit. After completing the formation of the netting for the protective casing the battery wire proceeds to an extension box 71 which is located at the same end of the room in which extension box 52 is located. Through appropriate contact connections a circuit is completed to battery wire 72 which in turn is connected to one terminal of the resistance coil 47. What will be termed hereafter as the ground loop of circuit is connected to the opposite terminal of the resistance coil 47 and thus said coil is the final terminus of the battery wire loops of circuit.

Since it is more convenient to do so, the wire 73 of the ground wire loop circuit will be traced from its connection with resistance coil 47 rather than the connection of wire 26 to ground 22. From the ground terminal of resistance coil 47 the wire 73 passes to a contact in extension box 71 and through appropriate connections forms a circuit to wire 74 of ground wire loop circuit which is looped through one eye of stiffening rod 40. A soldered connection is made to contact strip 37 secured to one of the shorter tube sections 35 and through contact with contact strips 33 and the various other contact strips are connected "in series"; thus a circuit is completed to the opposite end of the aligned tube sections. A short insulated wire connection 75 connects one of the contact strips 37 with a like contact strip 37 arranged in an adjacent tube section 35, and through various contact strips of various tubes a circuit is completed to the opposite end of the aligned tube and an insulated wire 76 is soldered to said opposite end. Wire 76 of ground wire loop circuit is a lightly insulated wire, the insulation of which has a low kindling point, and is laced through upper screen 27 and lower screen 28 as shown in Figs. 3 and 7. The wire 76 extends the entire length of the screen and is then soldered to one of the contact strips 37 at one end of a shorter tube section 35 which is located on an opposite side of the screens from the other tubes to which the other end of wire 76 is attached. A circuit is then completed "in series" through the various contact strips of the various lengths of tubes, and a short insulated wire connection 77 connects the contact strips of one tube with those of an adjacent tube. The opposite end of the adjacent aligned tube sections has a contact strip 35 to which the wire 78 of the ground wire loop circuit is attached, and from this connection the

wire 78 passes through one eye or loop of the stiffening rod 40, thence through the loop at the opposite end and then is laced through the screen in a manner similar to the lacing heretofore described. After leaving the screens wire 78 is connected to one contact of extension plug 51 and through appropriate contacts in extension box 52 a circuit is completed to wire 79 of ground wire loop circuit. Wire 79 is in turn connected to one contact of extension box 54 and through appropriate contact members is connected to cross wire 80 of ground wire loop circuit. A circuit is then formed through wire 89, extension plug 56, extension box 57, wire 81 of ground wire loop circuit, extension box 59, extension plug 60, wire 82 of ground wire loop circuit, and an extension plug to extension box 62. From extension box 62 a wire 83 of ground wire loop circuit completes a circuit to extension box 64, where through appropriate connections a circuit is completed to wire 84 of ground wire loop circuit. The wire 84 is soldered to the top screen 27. At a spaced point on screen 27 the wire 85 of ground wire loop circuit is soldered to said screen and completes a circuit from screen 27 to the ground loop contact in extension box 25. The ground loop contact in extension box 25 is electrically connected to wire 26 of ground wire loop circuit and thence to ground 22.

The operation of the apparatus will now be described in detail. If an intruder comes into the room and walks on the apparatus which occupies most of the vacant floor space of the room he will, if he steps upon the casing above top screen 27, depress said screen into contact with the lower screen 28. If he does this a short circuit will be formed which cuts out resistance coil 47 from the circuit. Since the resistance coil 47 is adapted to provide sufficient resistance to prevent the open relay from being closed, the freeing of the circuit from the resistance will cause a stronger current to be sent to the open relay and cause the closing of the same. Thus the alarm will be transmitted either to a central station apparatus annunciator or local apparatus annunciator of whichever service is employed. If the intruder should happen to step upon one of the elastic rubber tube sections 35 or 36 the circuit which is completed by the contact of contact strips 37 and 38 will be broken. The closed relay will then be cut off from a source of electrical power and will open. The opening will communicate the alarm to either central station or to the local alarm annunciator apparatus, whichever one is used.

Of course, the intruder may attempt to disable the apparatus from operation by the cutting of wires or the like, but if this happens the closed relay will be opened or the short circuit which might be effected will cause the closing of the open relay. However, if the intruder attempts to remove the protective casing from the apparatus by removing the nuts from contact bolts 44 the circuit will be broken and an alarm communicated. If the plugs which are connected with the extension boxes are removed or any one of them is removed the broken circuit will cause the opening of the closed relay to sound the alarm.

If the intruder should happen to attempt to crawl under the apparatus in order to reach the opposite side of the room or pass the apparatus he will, of course, have to raise the protective casing from the floor in order to provide

sufficient space. Since the wires 80 and 82 of ground wire loop circuit and battery wires 54 and 61 extend across the room and in close contact with the upper surface of protective casing 10, one of the extension plugs will have to be removed in order to permit the apparatus to be raised a sufficient distance. When this happens the circuit will be broken and the closed relay will open and communicate the alarm.

If fire should break out in a room protected by my apparatus and cause the destruction of the insulation on either of wires 76 or 78 of ground wire loop circuit a short circuit through the screens 27 and 28 will be completed to the open relay and because of the additional power cause the closing thereof. This will result in the communication of the alarm.

If a water pipe should break in the place guarded the attaching strips 39 will become saturated and cause a short circuit between top screen 27 and lower screen 23. This, too, will result in the sounding of an alarm by the closing of the open circuit relay.

It is, of course, obvious that my apparatus has a greater utility than merely that of sounding an alarm and units of my apparatus may be used for the purpose of accomplishing other desired work. For example, the screens may be placed in front of a door for the purpose of actuating a light switch to light the interior of a room or to give notification of entrance of a customer into the room.

When the apparatus is employed for the purpose of giving alarms or for any other purpose the switch 19 is made to bridge the gap between contacts 18 and 23. During the time when it is not desired to employ the alarm apparatus the switch 19 is made to come into contact with ground contact 21. Of course, when the switch 19 is moved from the position indicated in Fig. 1 so as to come in contact with contact 21 the closed relay will at first open and cause the sounding of an alarm and then when the switch arm comes in contact with contact 21 the open relay will be closed; this gives a double alarm at the central station. By this method testing can be accomplished at each time when the apparatus is taken out of operation; it will indicate that the line is in serviceable condition to switch 19 when the circuit is closed to ground 22.

Although drawings and specifications for floor covering, Figs. 1-4, are for an oblong shaped covering, this covering can be of any other design that will conform to the floor area to be guarded.

It can be readily seen that my apparatus may be used as an auxiliary to the use of a more complicated system and gives additional protection at a very slight increase in outlay. As an auxiliary apparatus it is particularly useful because it may be transported to a location which is subject to a greater hazard at a specific time. The operation, of course, is the same as that described herein.

While I have shown and described my preferred form of construction and preferred materials I do not wish to be limited to the precise details shown and described herein but wish to avail myself of all variations in construction and material coming within the scope of the appended claims.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent is:

1. Portable alarm apparatus comprising mat means adapted to be placed upon the floor and to be walked upon, including a covering having overlapping edges, a pair of superposed conductor screens within said covering and being adapted to be pressed together when a weight is placed thereon, a plurality of compressible spacing members normally separating a portion of said screens, said spacing members being of insulating material and a plurality of resilient tube sections arranged in parallel series and separating other portions of said screens, conductor members within said mat means including electrical conductor strips in said tube sections and adapted normally to contact those in adjacent sections to maintain a closed circuit, and adapted when a weight is placed on said members to open said circuit, means for indicating when said conductor screens are pressed together and means for indicating when said conductor contact members are separated.

2. In a device of the class described, upper and lower conductor screens forming part of a normally closed circuit, a plurality of spaced separators of insulating material arranged between said screens, in combination with a plurality of parallel series of circuit breakers forming part of said normally closed circuit, and each formed of a plurality of alternate long and short sections, the said long and short sections of alternate series being in staggered relation, substantially as described.

3. A device as set forth in claim 2 in which the circuit breakers include parallel series of rubber tubes each series formed of long and short sections, the long and short sections of adjacent tube series being in staggered relation and contact members fixed within the upper portion of each of the sections and having overlapping contacting ends, substantially as described.

4. In an alarm device of the character adapted to be placed upon the floor in position to be walked upon, a plurality of flexible tubes of insulating material arranged within the same, each of said tubes being formed of alternate long and short sections, conductor members arranged within the upper portions of each of said sections, those in the longer sections extending into the adjacent short sections and normally engaging the conductors therein to form a normally closed circuit, and means actuated by the separation of any of said conductor members to indicate the same, substantially as described.

5. A device as set forth in claim 4 in which the long and short sections of each alternate series of conductor members are arranged in staggered relation, substantially as described.

6. A device as set forth in claim 1 in which the said covering for the device is provided with a conductor arranged to be practically commensurate with the area thereof, said conductor including sections arranged alternately in said overlapping edges, and means connecting the adjacent ends of said sections, whereby the conductor within the said covering shall form a closed circuit in series with the circuit within the mat means when said conductor sections in said overlapping edges are in contact, substantially as described.

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