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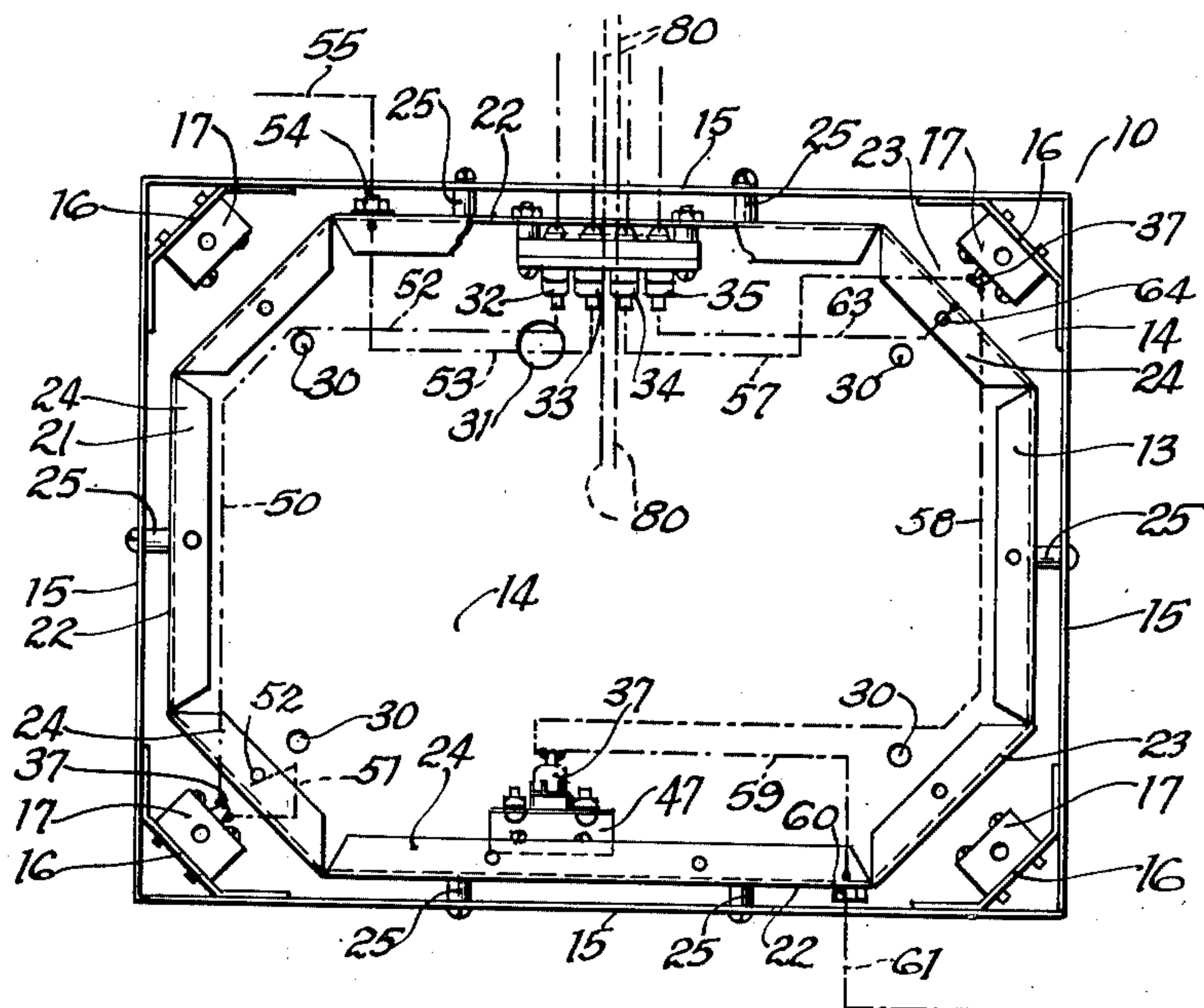
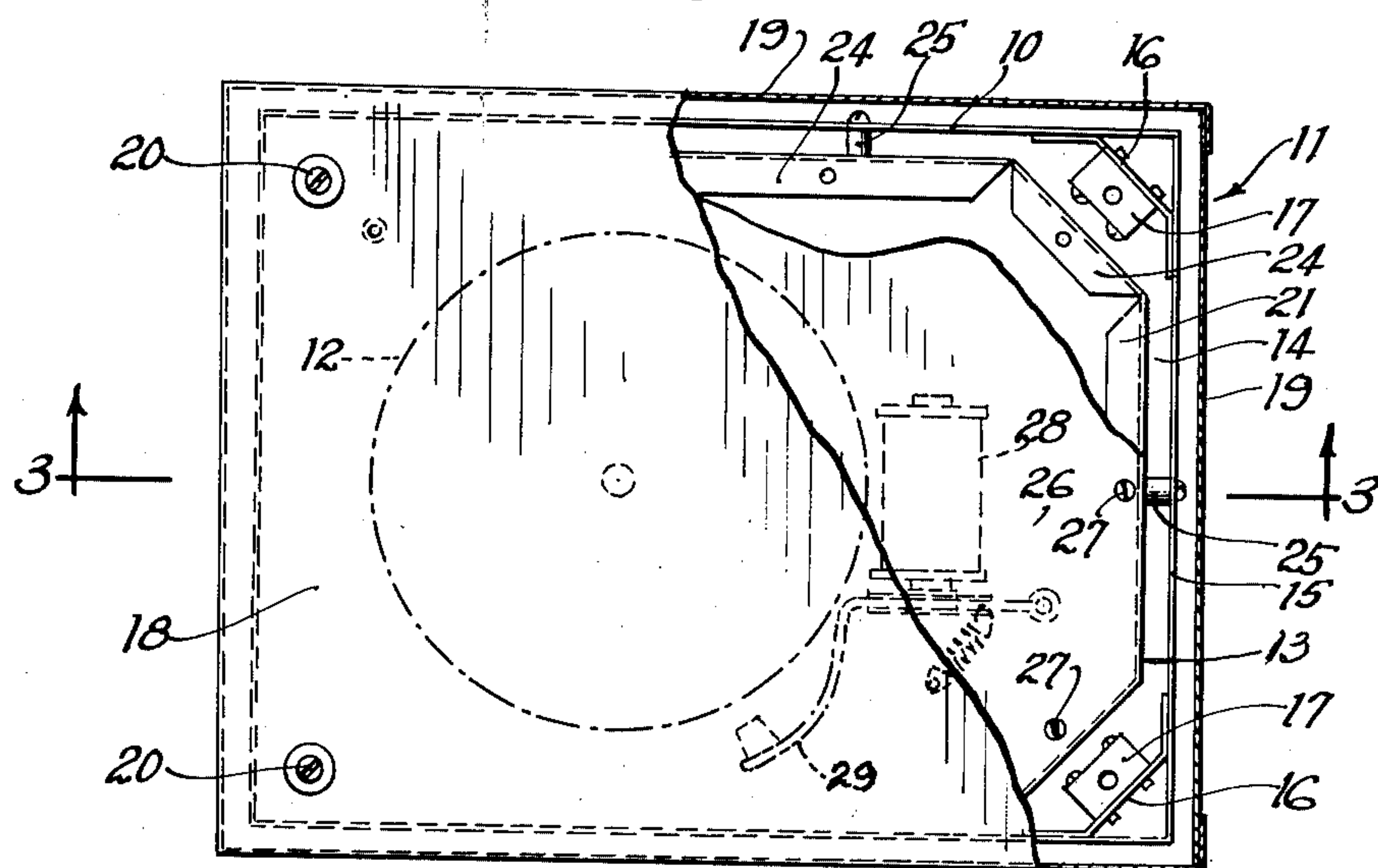
F. E. POULSON  
BURGLAR ALARM BOX

2,627,065

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3 Sheets-Sheet 1

*Fig. 1*



*Fig. 2*

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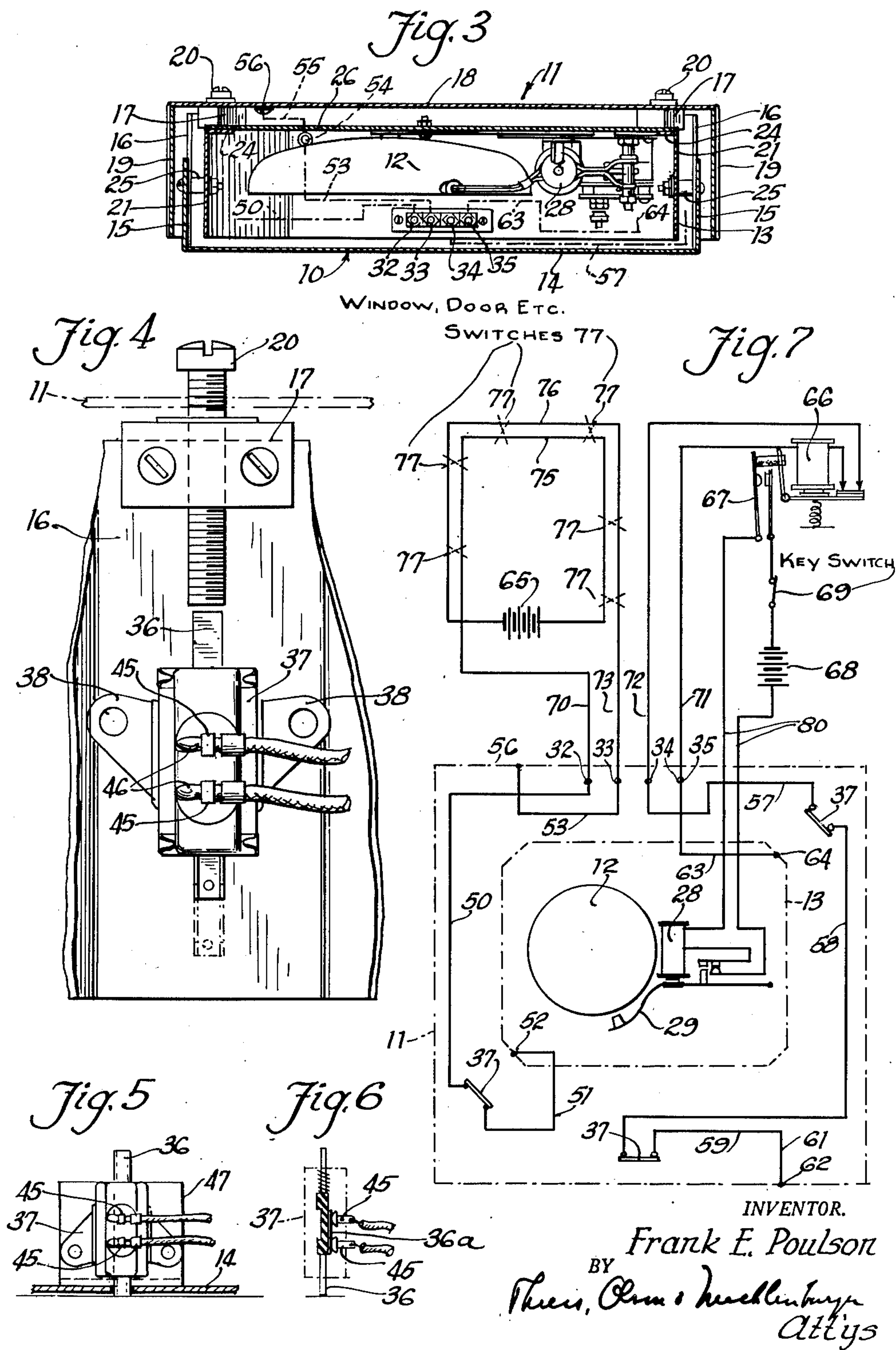
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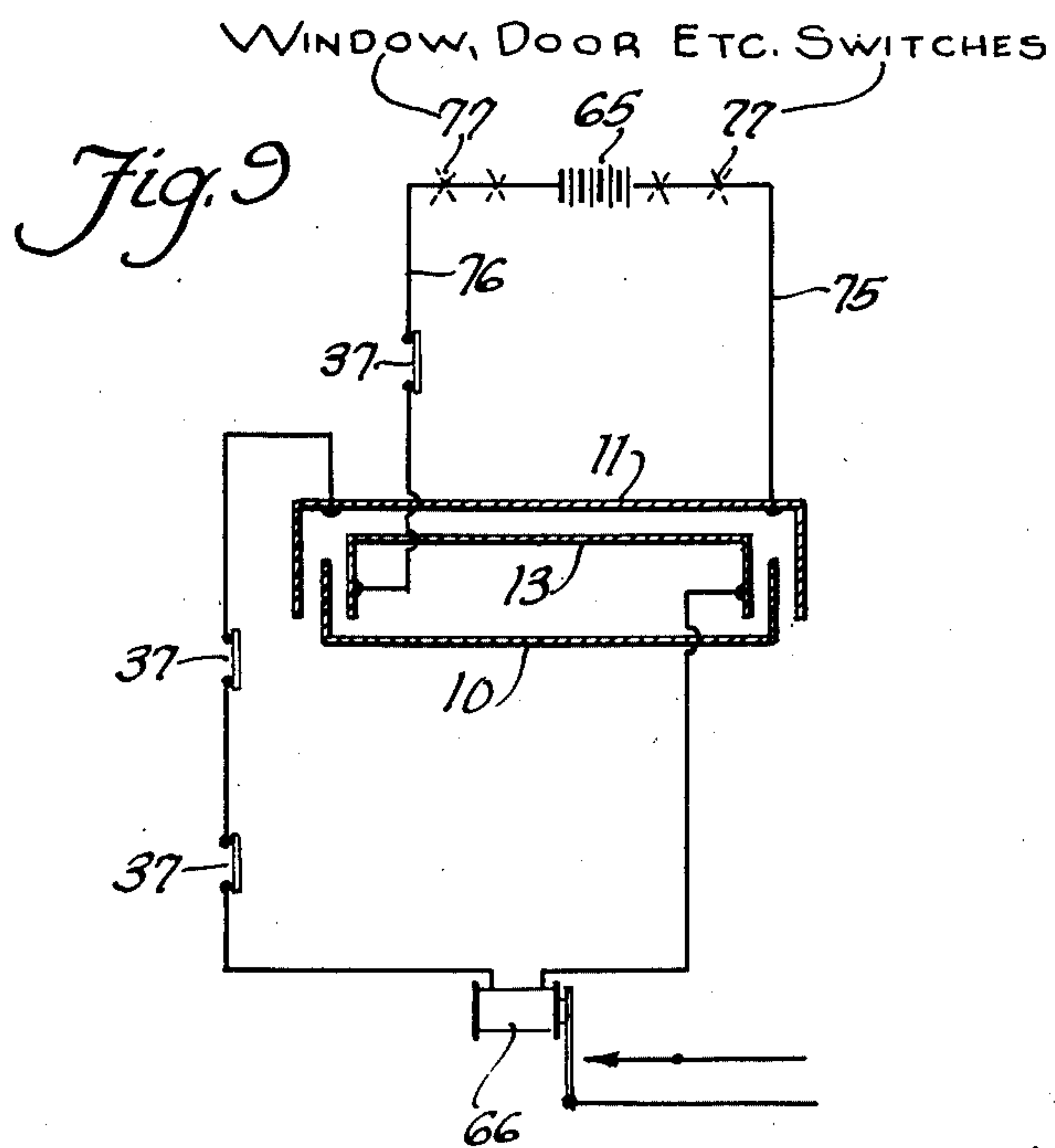
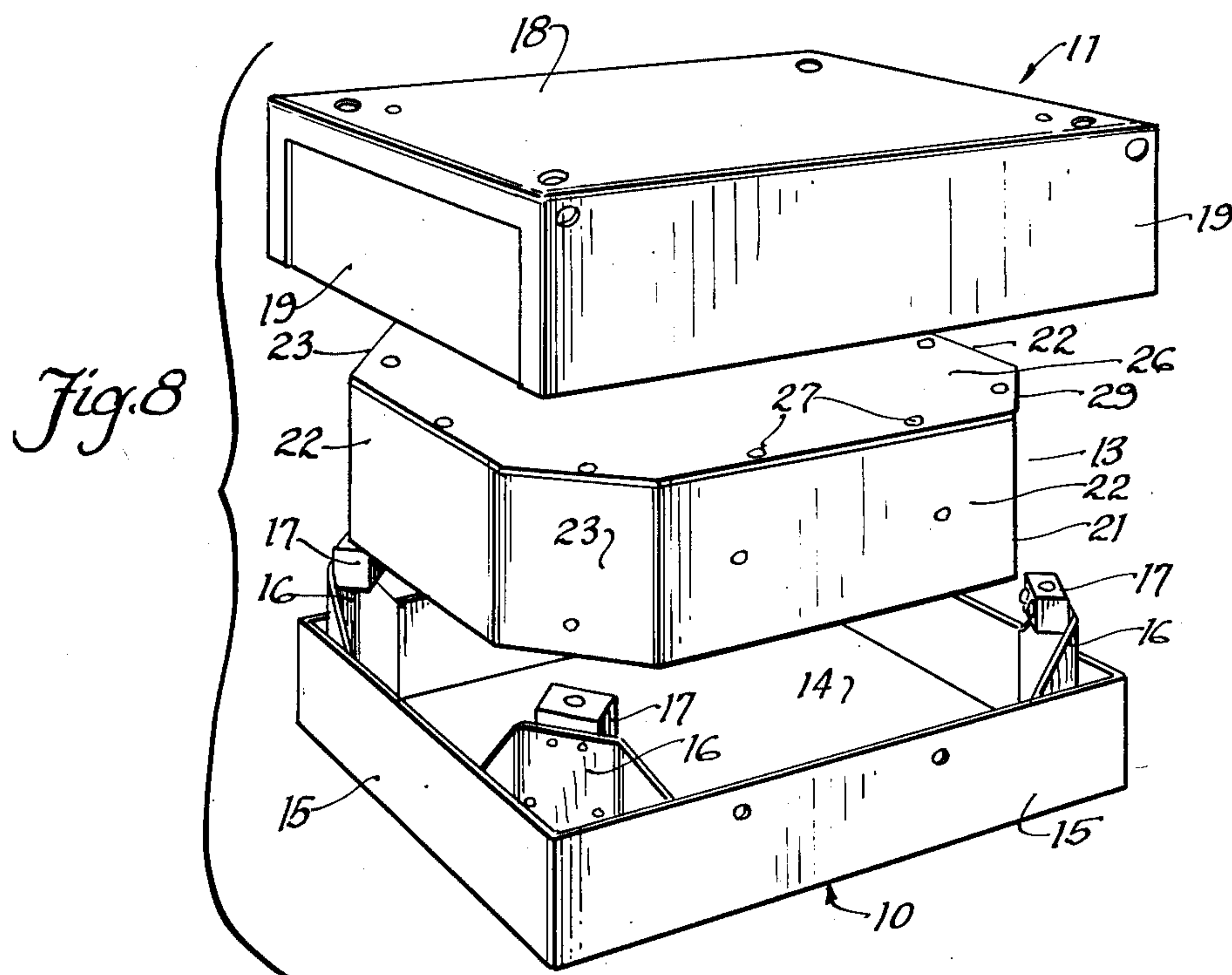
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## UNITED STATES PATENT OFFICE

2,627,065

## BURGLAR ALARM BOX

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Application December 28, 1949, Serial No. 135,413

9 Claims. (Cl. 340—276)

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This invention relates to improvements in burglar-alarm bell boxes such as are related to or used in connection with protective circuits of premises, whereby to sound an alarm if the building or the alarm system or the box itself be tampered with in an effort to effect entrance to the premises.

Such boxes are ordinarily securely mounted with their bottom faces flatwise against the wall and most often up against the ceiling or special ceiling in the door entry of the store or premises to be protected.

The alarm bell itself includes preferably a large gong and operating magnet mounted in the interior of the box and is capable when operated of making a loud sound. The box being mounted outside the door, the sound carries still further. However, such exposed position makes the bell and box especially vulnerable to burglar attack. Accordingly, it is an object of this invention to provide a burglar-alarm box so constructed, arranged and installed that it is difficult to prevent its alarm operation when subject to attack.

Another object of the invention is the provision of an alarm box in which the base member is insulated from the other parts thereof and from the protective circuit or branches thereof which pass through the box, whereby the base member is not grounded or if grounded does not affect the operation of the alarm.

Another object of the invention is the provision of an alarm box having a base member and a cover member fitting thereover, the edges of the cover member being closely related to the corner edges of the base member but slightly spaced therefrom when the cover is so fitted and secured in position, whereby in any attempt to pry the box loose from its mounting by a tool, the latter is most apt to engage the edge of the cover and to loosen the same and thereby to set the alarm bell into operation.

A further object of the invention is the provision of a three-part alarm box comprising base and cover members and an inner suspended bell-carrying frame member, the said three parts being secured together but insulated from each other, the cover member being connected to one side of the protective circuit with which the box is related and the said frame member being connected to the other side of said protective circuit, whereby any drilling into or otherwise tampering with the box from the outside electrically connects the top and frame members, short-circuits the relay and sets off the alarm.

Further features, advantages and objects will

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appear from the description and claims to follow, in connection with the accompanying drawings which illustrate, by way of example but not of limitation, a burglar-alarm box embodying the invention, and in which—

Fig. 1 is a plan view of the improved burglar alarm bell box, part of the cover being broken away to show parts beneath;

Fig. 2 is a similar view with the cover and bell plate removed;

Fig. 3 is a sectional elevation of the box on the plane indicated by the line 3—3 of Fig. 1;

Fig. 4 is a detail view of one of the alarm switches in the box;

Figs. 5 and 6 are front and edge views of the switch of Fig. 4, but reversed in position;

Fig. 7 is a diagram of the circuits involved;

Fig. 8 is an exploded view of three main parts of the box, showing them in perspective; and

Fig. 9 is a simplified diagram of the circuit.

As shown, the box comprises a shallow rectangular heavy sheet-metal bottom portion, generally indicated by 10, a similar cover portion 11 adapted to be placed thereover with their edge portions in free, non-touching, telescoping and insulated relation, and a bell 12 and bell-carrying frame 13 inside the box and insulatingly supported thereby. By thus insulating the bell frame from the surrounding box structure and the cover also, and suitably arranging the circuits and apparatus as will be explained, many of the efforts and tricks of burglars to put the alarm bell out of commission are not only thwarted but result in operating the bell and sounding the alarm if attempted.

The bottom portion 10 of the box includes the bottom plate 14 with its edges bent up to form the sides 15. Sheet-metal corner pieces 16 may be bent, fitted and welded into the corners of the bottom box member 10. They extend above the sides 15 of the box and at their upper ends carry blocks 17 of suitable electrical insulating material which may be bolted or secured by screws thereto, as indicated.

The cover 11 by its flat top 18 and depending side edges 19 overlapped and welded together at the corners rests on their insulating blocks 17 and is secured thereto, as indicated, by the screws 20, one in each corner, in which position the cover of the box is electrically insulated from the lower part 10 thereof.

The bell-carrying frame 13 comprises a sheet-metal strip 21 bent and suitably welded together to form a continuous frame of the form indicated in plan view in Fig. 2, that is, with rectan-



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gular sides 22 and diagonal corners 23, each with an internal flange 24 at the upper edge.

This frame is carried by insulating supports 25 from the adjacent side edges 15 of the box base member and are also spaced thereby from the box, which supports may be in any desired number, but two along the sides and one at the ends, as indicated, have been found satisfactory. These insulators may be of any desired type. Bolts passing through shouldered insulating sleeves as spacers and insulators with insulating washers and nuts inside are sufficient. This frame is thus supported above and out of contact with the bottom 14 of the box 10.

A bell plate 26 of a size to rest and fit on the flanges 24 of the insulated frame 13 is secured thereto around its periphery by suitable screws 27 or otherwise.

This plate on its under side carries the alarm bell gong 12 and its operating magnet 28, armature, striker 29, circuit breaker, etc.

In this arrangement, therefore, the bell and its frame and the cover are insulated from each other and from the box.

The box itself is adapted to be secured to a wall, ceiling or suitable support by four screws, bolts or the like inserted through holes 30, Fig. 2, in the bottom 14 thereof. It is frequently located in the entry to the store or premises, on the ceiling up over the door. The battery for operating the bell and control relay and the relay itself in a suitable switch box may be located inside the premises in some more protected position and are connected with the alarm box by wires in a suitable armored cable or conduit which may connect with the alarm box through aperture 31, Fig. 2, in the bottom thereof. The wires themselves or some of them are connected to suitable terminal posts 32, 33, 34 and 35 which are insulatingly mounted on the inner face of one side 22 of the frame 13 and internally connected with other parts of the apparatus of the alarm box, as will be explained. Two other wires 80 of the cable enter the box and go directly to the bell. These permanent wires in the box are ordinary insulatingly covered wires and are indicated by dotted lines in Fig. 2 rather than confuse the drawings by attempting to show them in full. They are also indicated in the diagram of Fig. 7.

The external circuits and apparatus may be of the usual type and are here included to illustrate the operation of the alarm box.

The alarm switch shown in Figs. 4, 5 and 6 is shown used in three different locations in the alarm box, as will appear. In two of the locations the switch is suitably mounted on the inner face of the diagonal member 16, as seen in the lower left and upper right corners of the box 10, Fig. 2, and beneath the insulating block 17 with its upwardly spring-pressed operating plunger 36 in line with the screw 20 which is used to secure the top or cover member 11 in place on the base member of the box. When, therefore, the cover is applied to the base member and the screws 20 are tightened, the plunger 36 of the switch, which latter may as a whole be designated 37, is depressed and the switch is operated to close the circuit it controls at that point. Whenever either of the two screws 20 is loosened, therefore, surreptitiously or otherwise, the plunger 36 rises under the influence of its springs to open the circuit and cause the alarm bell to operate.

The switch itself may be of any desired or usual construction, but as shown in Fig. 4 com-

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prises the plunger 36 extending longitudinally through the casing and projecting therefrom at the lower end, the casing having the laterally projecting ears 38 by which it is secured by screws or otherwise to the base 16, a layer of insulation being provided thereunder. A suitable spring within the casing constantly urges the plunger upwardly or toward the open position. A sliding contact 36a, Fig. 6, insulatingly carried by the plunger 36 bridges the two contacts of the switch on the inside of the casing when the plunger is in its lowermost position and separates or disconnects them electrically when the plunger is raised. These two switch contacts are connected with or form a part of terminal posts 45 on the exterior of the casing, which may be apertured for the reception of pins 46 on the ends of their respective conductors or wires. These terminal pins may be of the type known as banana pins or plugs, that is, with split ends normally spread apart slightly at their outer ends and tensioned outwardly so that the pins may be pressed through or into the apertures in the posts and the spring fingers will hold the plugs therein and in good electrical contact. Any other desired form of connection may, of course, be used.

Another of these switches 37 is placed upside down from the position of the other two on the inside face of one of the side members of the insulated frame 13, as indicated at the lower side of Fig. 2. It is insulatingly secured to and carried on a suitable raised bracket 47 from the floor 14 of the base box member 10, with the end of its plunger 36 projecting through an enlarged aperture in said floor under its spring pressure and below the bottom face of the floor or bottom 14 of the box 10, whereby when the box is mounted on its support the end of the plunger 36 strikes the said support and is pushed up against its spring tension, to close the circuit through its contacts. When, however, the box is pried or raised up from the support, the said plunger 36 is released and pushes outwardly and thereby opens its circuit through the contacts 45 and causes the sounding of the alarm.

The internal wiring of the alarm box, Figs. 2 and 3, is indicated by the broken lines which represent the insulated wires used singly or in twisted pairs and suitably secured in position within the box. Thus, the terminal post 32 is connected by conductor 50 with one terminal of switch 37 in the lower left corner of Fig. 2. The other terminal of that switch is connected by conductor 51 with the insulated bell frame 13 at the point 52. The binding post 33 is connected by wire 53 with a plug socket 54 insulatingly carried on the wall of the frame 13 above the level of the upper edge of box base member 10, as indicated in Fig. 3. This socket 54 is adapted to receive a banana plug, such as referred to above, on a conducting cord 55 which, as seen in Fig. 3, is attached mechanically and conductively to the cover member 11 at 56. The terminal post 34 is connected by wire 57 with the other corner switch 37 and thence by wire 58 with the upside-down switch 37 before referred to. A wire 59 connects this switch to a plug socket 60, like socket 54 before described. A flexible cord 61 having a banana plug may connect the socket 60 with the cover 11 at another convenient point, designated 62 in the diagram of Fig. 7 but not shown in Fig. 3. Binding post 35 is connected by conductor 63 directly with the frame 13 at a point designated 64, shown on the side wall thereof in Fig. 3.

The conductors in the conduit coming into the



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bottom of the alarm box through the aperture 31 are for the sake of clearness shown in Fig. 2 as separated broken lines, those from the battery and from the relay being connected directly to the binding terminals or posts 32 to 35, as hereinafter explained, and the bell conductors leading directly to the bell without being connected to such posts or terminals.

In the diagram of Fig. 7 the outlines of the cover 11 and of the inner insulated frame 13 are shown in broken lines. Here the bell 12 is also shown and its operating magnet 28, which, as indicated, is of the make-and-break type. The current used in such apparatus is usually direct current from a set or sets of dry batteries and may be of about 6 volts potential. Accordingly, the bell in operation makes and breaks its own circuit in the well-known manner.

It will be noted that the base member 10 of the box is not connected with the circuit, but that both the insulated frame 13 inside and the insulated cover member 11 outside are connected with the circuit; also, that as between the battery and the relay the insulated cover is in one side of the circuit and the insulated frame in the other, so that any attempt to drill through the two or to press or bend them so that they touch results in short-circuiting the relay and causes it to close the alarm bell circuit.

Referring to Fig. 7, a simplified diagram of external circuits and apparatus with which the alarm box may be used or related is indicated. These include a suitable battery or source 65 in the protective alarm circuit for operating the relay 66 which is normally energized and holds open the contacts 67 in the independent bell circuit, which includes a battery or source of current 68 as well as a normally closed switch 69, commonly referred to as a key switch because operable only by keys in the possession of authorized persons.

The relay 66 is of that type which when once opened or de-energized cannot move its armature to closed position until it has been reset, manually or otherwise. Thus, the bell, once started, keeps ringing until purposely stopped. This operation of the relay 66 is diagrammatically indicated by its armature closed contacts in its circuit, but other constructions may be used. As here diagrammatically shown, it would be necessary manually to move the armature to closed position to again set the relay 66 in position to operate, but in practice it is found convenient to provide the key switch 69 with contacts suitably connected to bridge the said armature contacts of the relay, or provide an extra coil on the relay, so that in turning the key of switch 69 the relay 66 is operated and thereafter maintains itself in operated position through its said armature contacts.

Now tracing the relay circuit from the battery 65, conductor 70 after passing first through its protective loop 75 which passes through such places as windows, doors, etc., indicated by the numeral 77, leads to the terminal post 32 of the alarm box, and thence by conductor 50, closed switch 37 and conductor 51 to the inner insulated frame 13 at the point 52. From this frame at the point 64, diagonally opposite, the path for current proceeds by way of conductor 63 and terminal post 35, where it leaves the alarm box by conductor 71 to the relay 66. On the other side of the relay 66 the return path includes conductor 72 to the terminal post 34 on the alarm box, and in the box via wire 57, closed switch 37,

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wire 58, upside-down switch 37, and conductors 59 and 61 to the cover 11, where it is attached at 62. The current path is then through the material of the cover to the point 56 at the opposite side, where the conductor 53 takes it to the binding post 33. From here the path proceeds by external conductor 73 through protective loop 76 to the other pole of battery 65. Thus the inside frame 13 in the box is in one side of the circuit or connected with one pole of the battery, and the cover 11 is in the other side of the circuit or connected to the other pole of the battery. Any attempt to drill therethrough to short-circuit the battery on the relay to keep it energized and the bell quiet, so that the protective circuit elsewhere, as at the loop referred to, might be broken with impunity without sounding the alarm, is prevented because any such short-circuiting would effectually cut out the relay, short-circuit it, and cause the relay to de-energize and thus to operate the bell. Likewise, if the cover were bent or crushed inwardly so that it touched the inner frame, the relay would be short-circuited and operate the bell. And, of course, as pointed out, any attempt to remove the two screws of the cover or the vertical separation of the box base from its support would result in the opening of the circuit of the relay at switch or switches 37 and the ringing of the bell.

In this connection it will be noted that the base member 10 of the alarm box is firmly secured to its support, the wall or ceiling, by bolts or the like, through the corner holes 30 in the bottom thereof. The cover member 11, however, is secured to the base member by the corner bolts 20 threading into the blocks 17 of insulating material, which is of softer material. This latter connection is therefore weaker to an outward pull on the cover than the connection of the box base to its support, so that any effort made to pry the box loose from its support by working along its edges or otherwise will cause the cover to give way first and thereby release the switch or switches 37 to thereby open the protective circuit and ring the bell. And in furtherance of this feature, the slight outward spacing of the cover edge from the base member and the termination of its extreme lower edge slightly above the bottom of the box member, as indicated in Fig. 3, tends to cause any such prying effect on the box to be exerted against the top member rather than the base member and therefore the more certain to lift the cover from the base and thereby operate the switch or switches 37.

Likewise, if the base member of the box is pried loose or raised slightly from its support, the switch 37 (Figs. 2, 5 and 6) in the protective circuit opens the same and sounds the alarm.

The circuit relation of the alarm box to the protective circuit is intended to be more clearly shown in the simplified diagram of Fig. 9, wherein the several members 10, 11 and 13 of the alarm box are indicated in section, the battery 65 in one end of the protective circuit and the normally energized relay 66 in the other. From this it is clear that the cover 11 is in one side of the circuit and the inner bell frame 13 is in the other side; also, that the base member 10 of the box is not in the protective circuit at all, and that any grounding of the base member of the box would not affect the operation of the alarm box.

The protective loops 75-76, Fig. 7, are, of course, such that severing either of the wires or both or short-circuiting them results in the de-energization of relay 66 and the operation of the



bell. The points marked 77 on the loop indicate the window, door or other contacts therein adapted to be opened to sound the alarm. While but a single loop 75—76 is indicated, it will be understood that the usual 12-hour and 24-hour service may be employed, such loops being usually controlled by a suitable key switch such as 69, whereby a portion of the protective loop may be cut out during the day and the remainder remain in operation, and at night both portions are cut in as one. This, however, need make no difference in the connection or operation of the box itself.

Without further elaboration, the foregoing will so fully explain the gist of the invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, without eliminating certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured by the following claims.

I claim:

1. In apparatus of the class described, a burglar-alarm bell box comprising a base member, a cover member and an inner member, all nested and secured together, said members being insulated from each other in the box, and an alarm bell in the box, a protective alarm circuit having a current source and a relay therein, the relay controlling said bell, the cover member of the box being connected to one side of the protective alarm circuit between the current source and the relay and the inner member being similarly connected with the other side of said circuit, the base member being insulated from both sides of the said circuit, whereby any tampering with the box which results in electrically connecting the cover and inner frame members short circuits the relay and operates the bell, and any grounding of the base member does not affect the relay.

2. In apparatus of the class described, a burglar-alarm bell box comprising an underground box-like base member, an outer inverted box-like cover member fitting over said bottom member and insulatively secured thereto, and an inner bell-carrying frame member insulatively supported in said base member, a bell carried by said frame, a protective alarm circuit having a current source and a relay therein, the relay controlling said bell, said cover member being connected to one side of the protective alarm circuit between the current source and relay and the said inner frame similarly connected to the other side of said circuit, the ungrounded and insulated base member forming no part of the said alarm circuit, whereby any tampering with the box which results in electrically connecting the cover and inner frame members short circuits the relay and operates the bell, and any grounding of the base member does not affect the relay.

3. In apparatus of the class described, a flat burglar-alarm box comprising a bottom member and a cover member, an inner bell-carrying member enclosed within the box, said members being secured together and insulated from each other, and the cover and the inner members being connected in the protective alarm circuit with which the box is related and between the battery and normally energized bell controlling relay usually provided in such circuit, and switches in the box in the said circuit holding the same in normal operative condition when the box is suitably mounted on its support and is closed but which are operated to cause the sounding of the

alarm when the box is unwarrantly sought to be opened or loosened from its mounting.

4. In apparatus of the class described, a burglar-alarm box comprising a shallow metal base member, an inner metal frame fitting within the base member in spaced relation therefrom, insulating supports for said frame from said base member, a removable plate peripherally secured to said frame, an alarm bell and an operating magnet therefor mounted on the lower side of said plate, and an outer enclosing cover member for the box fitting over the base and frame members and in spaced relation thereto, said cover member being insulatively secured to said base member.

5. In apparatus of the class described, a flat burglar-alarm box comprising a bottom member and a cover member, an inner bell-carrying member enclosed within the box, said members being secured together insulated from each other and the cover and the inner member being connected in the protective alarm circuit with which the box is related, fastening screws to secure the cover member to the base member, a switch in said circuit operated to maintain the said circuit in normal condition by one of said screws when inserted to fastening position, whereby on release of said screw the said switch is operated to cause the sounding of the alarm.

6. In apparatus of the class described, a flat burglar-alarm box comprising a bottom member and a cover member, an inner bell-carrying member enclosed within the box, said members being secured together insulated from each other and the cover and the inner member being connected in the protective alarm circuit with which the box is related, a switch in the base member having its operative plunger projecting through an aperture in the bottom thereof and normally closing said circuit when the box is secured to a support and the plunger is pushed thereby to its circuit-closing position, whereby if the box is removed or pried loose from the support the said switch is operated and the alarm sounded.

7. In apparatus of the class described, a burglar-alarm box comprising a base member having upstanding edge walls and a cover member with downwardly extending edge walls enclosing the base member, an alarm bell within the box and protected thereby, the edge walls of the cover extending outside and substantially spaced from the overlapped edge of the base member and in position to be first engageable by a prying tool in an attempt to pry the box loose from its mounting and a switch in the box operated by the raising of the cover from the base member to operate the alarm.

8. In apparatus of the class described, a burglar-alarm box comprising a base member and a cover member enclosing the base member, an alarm bell within the box and protected thereby, the cover being secured to the base member and the base member being secured to a support, the cover-securing means being weaker than the base-securing means, whereby an attempt to pry the box loose from its mountings is apt to result in loosening and raising the cover from the box, switch means in the box responsive to such raising of the cover to operate said alarm bell.

9. In apparatus of the class described, a burglar-alarm box comprising a base member and a cover member enclosing the base member, an alarm bell within the box and protected thereby, the cover being slightly larger than the base



with its edges spaced therefrom and slightly away from the surface of the box support, insulating blocks secured to the base member, screws securing the cover to the insulating blocks, bolts for securing the box to its mounting, the resistance of said screws to an outward force applied to the cover as by a prying tool applied at the edges being less than that of the base-securing bolts, and means set in operation for sounding the alarm bell when the cover is so pried from the base member.

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