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MAIL BOX ALARMS

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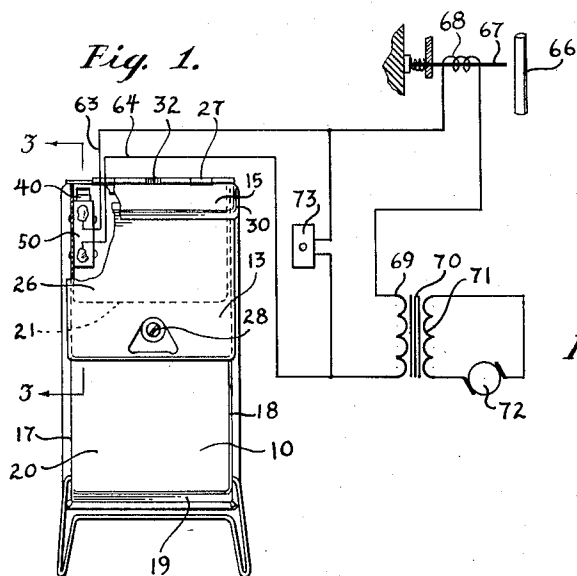


Fig. 2.

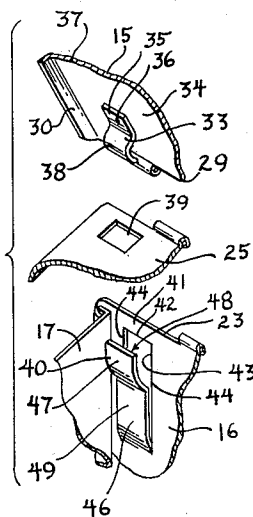


Fig. 3.

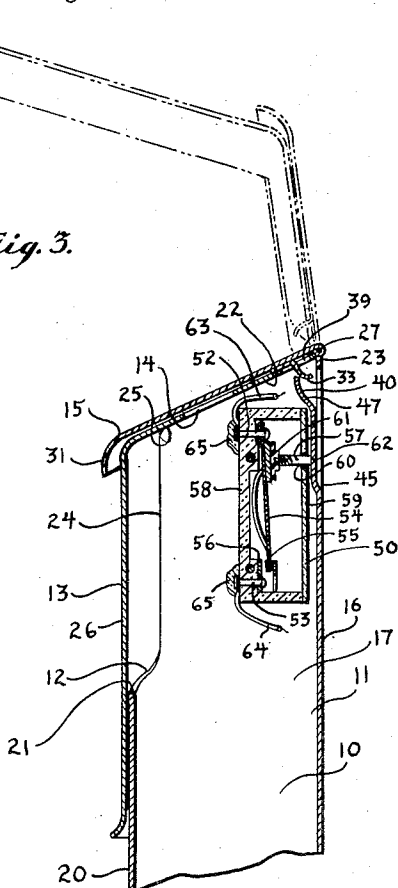
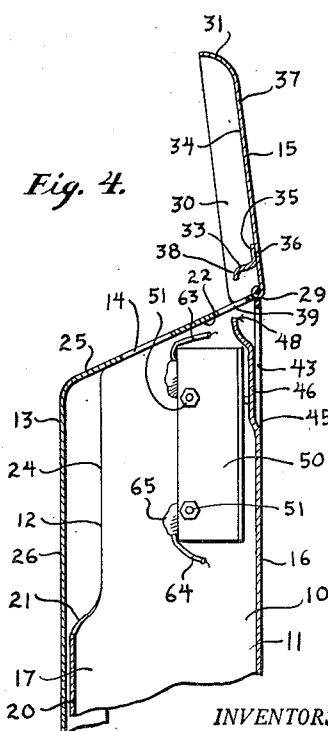


Fig. 4.



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1

2,759,057

MAIL BOX ALARMS

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Our invention relates to mail box alarms, and it relates more particularly to alarms which are set off by the operation of mail boxes during the insertion and removal of mail therefrom.

Mail boxes as at present constituted, are peculiarly susceptible to tampering in that they are generally located in the most public part of a house or of grounds surrounding a house, and as a general rule are disposed outside the locked front door of the household. Thus, not only may unauthorized persons seek to obtain access to the mail box, but the householder has no way of knowing when mail has been placed therein by the mailman. Hence, there is considerable uncertainty as to the time of actual arrival of the mail; and it has often been the experience of the householder to be required to make frequent trips to the mailbox, requiring the opening and closing of the front door in the process, in order to determine whether the mail has as yet arrived.

Attempts have been made in the past to provide means whereby the householder would learn when the mail box is opened or closed, as for instance when mail is being inserted therein, or perhaps being removed therefrom by an unauthorized person. Such attempts have been fruitless however, for they have relied in the main on electrifying movable portions of the mail box itself, which portions are exposed to the weather. The result has been that critical electrical connections have thereby been rendered subject to shorting, corrosion, and broken contacts, as well as other deleterious effects of weathering while forming part of an electrical circuit. It has been impossible therefore, for such devices to obtain the approval of insurance underwriters. Moreover, these devices have been complex and expensive to manufacture, cumbersome and uncertain in operation. As a result, such mail box alarm systems have not gained public favor and have proven utterly impractical in use.

One object of our invention therefore is to provide a mail box alarm device which is substantially incapable of being adversely affected by the weather, fool-proof and temper-proof in operation, and easy to install and operate.

Another object of our invention is to provide a mail box alarm device which will operate without the necessity of electrifying any part of the mail box structure.

A further object of our invention is to provide a mail box alarm device which is easily assembled, requires a minimum of changes to mail boxes of standard construction, is inexpensive and reliable in operation and construction.

Other objects will appear from the description of our invention which appears more fully hereinafter.

With the above and other objects in view, our invention consists of a combination of a mail box comprising a container having a wall and an entrance-way in proximity to said wall, a lid pivotally secured to said container and adapted when in one position to cover said entrance-way, and when in another position to uncover said entrance-

2

way; a cam projecting from said pivoted lid and extending into said container when said lid is in said first-mentioned condition; a spring formed on said wall and within the path of said cam operably to be yieldingly translated from one position to another when said cam is moved in each of the opening or closing operations of said lid; a micro-switch contain within a waterproof housing, and having an operating plunger projecting through said housing; said housing being disposed within said container and mounted thereon with said plunger extending into the path of said spring when said spring is being translated by said cam; and electrical contacts electrically extending from said micro-switch for connecting said micro-switch with an alarm circuit.

For the purpose of illustrating our invention, we have shown in the accompanying drawings one form thereof which is at present preferred by us, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which our invention consists can be variously arranged and organized and that our invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

Referring to the drawings in which like reference characters indicate like parts:

Figure 1 represents an elevational view, partly broken away, and partly diagrammatic, of a mail box alarm device embodying our invention.

Figure 2 represents a fragmentary, expanded view, showing the parts used in the cam and spring assembly in a mail box alarm device embodying our invention.

Figure 3 represents an enlarged, vertical sectional view taken generally along the lines 3—3 of Figure 1, and showing the mail box alternately with the lid and door in open, and in closed condition, and embodying our invention.

Figure 4 represents a vertical sectional view of a mail box with the lid open while the door is in closed condition, and embodying our invention.

In accordance with our invention a mail box of standard construction may be provided. For purposes of illustration only, I have shown in the accompanying drawings, one such mail box 10 having a container portion 11 with an entrance way 12, a door 13 covering said entrance way 12, a slot 14 formed through said door 13, and a lid 15 covering said slot 14.

The container 11 comprises a rear wall 16, side walls 17 and 18, a bottom wall 19 and a front wall 20. The front wall 20 extends upwardly from the bottom 19 a distance substantially shorter than the height of the rear wall 16, and terminates in an upper edge 21. The side walls 17 and 18 comprise upper edges 22 which are forwardly and downwardly inclined from the upper edge 23 of the rear wall 16. The upper edges 22 extend from said juncture 23 to vertical edges 24 which extend from said edges 22 to the upper edge 21 of the front wall 20. The edges 24 are preferably substantially parallel to the rear wall 16 and are preferably spaced therefrom a distance somewhat less than the distance between the front wall 20 and the rear wall 16. An entrance way 12 is thus defined by the upper edge 21 of the front wall 20, the forward edges 24 of the side walls 17 and 18, the upper edges 22 of said side walls, and the upper edge 23 of the rear wall 16.

The door 13 comprises an upper wall 25 and a front wall 26. The upper wall 25 is pivotally secured to the upper edge 23 of the rear wall 16 by means of a hinge 27, and in the closed position of the door 13 the upper wall 25 is preferably inclined at the same angle as the upper edges 22 of the side walls 17 and 18. The front

wall 26 of the door 13 extends downwardly from the upper wall 25 a distance substantially greater than the length of the forward edges 24 of the side walls 17 and 18. The slot 14 is formed through the upper wall 25 and extends substantially horizontally through a major portion of the width of said wall 25. The slot 14 is of sufficient width to enable mail of ordinary thickness to be passed therethrough.

A suitable locking device 28 is formed on said door 13 and front wall 20, and is adapted releasably to lock said door 13 into closed condition with respect to the container 11 by holding the front wall 26 in juxtaposition to the front wall 20, thereby embracing and covering the entrance way 12. The lock 28 may be opened by any means exclusively available to the owner of the mail box 10.

The lid 15 comprises a panel 37 having a width and length somewhat greater than the width and length of the upper wall 25 of the door 13, and comprises a rearward edge 29, sideward overhanging edges 30 and a forward overhanging edge 31. The rearward edge 29 is pivotally secured to the upper edge 23 of the rear wall 16, and may if desired be mounted on the same hinge pin 27 as the door 13. A suitable spring device 32 may be mounted on the hinge 27 to bear against the rearward wall 16 and the lid 15, operably to urge said lid downwardly and over the slot 14 thereby normally covering said slot 14 from the elements.

A cam member 33 is mounted on the underface 34 of the lid 15, preferably in proximity to one overhanging side edge 30 thereof, and preferably in immediate proximity to the rearward edge 29. The cam member 33 may comprise a forwardly extending base portion 35 secured by any suitable means such as the weld 36 to the panel 37, and a rearwardly and downwardly projecting camming surface 38 preferably formed along a downwardly and rearwardly extending curve. A slot 39 may be formed in the upper wall 25 of the door 13 in that portion of the upper wall 25 which is opposite the cam member 33, and particularly the downwardly projecting portion thereof, when said lid panel 37 is in juxtaposition to the upper wall 25 of the door 13.

A spring-urged cam follower 40 is formed preferably on the rearward wall 16 of the container 10. If desired, the follower 40 may be struck out of the sheet metal rearward wall 16 itself. Thus, by suitable stamping or cutting, the follower 40 may be formed of a leaf cut from said rear wall 16 and preferably disposed a short distance below the upper edge 23 thereof, thereby leaving a sill or bridge 41 extending between said upper edge 23 and the upper edge 42 of the slot 43 formed by the stamping out of the cam follower 40. The slot 43 is defined by said upper edge 42, side edges 44, and the bottom 45 of the cam follower tongue 40. The tongue 40 comprising a preferably flat and substantially vertical leaf-spring portion 46 extending forwardly of, and upwardly from, said bottom 45, and a preferably forwardly extending upward projection 47 having an upper and rearward edge portion 48 adapted to engage the cam surface 38. The leaf spring portion 46 preferably comprises a forward bearing surface 49 intermediate the upper projection 47 and the bottom 45.

A micro-switch 50 is mounted preferably on the side wall 17, adjacent the rear wall 16, and in proximity to the follower tongue 40 by any suitable means such as the nut and bolt assemblies 51. The micro-switch 50 preferably comprises a waterproof housing 58 having a removable rear wall 59, a binding post 52 at the upper end of the housing, a binding post 53 at the lower end thereof, a balanced spring contact arm 54 mounted within the housing 58 and on the binding post 52 and an electrical contact therewith, a contact point 55 at the lower end of the spring 54, a contact point 56 electrically connected to the binding post 53 and disposed in the path of the contact point 55, a plunger 57 extending through

a suitable bearing 60 in the rear wall 59, a base 61 disposed between the plunger 57 and the spring contact arm 54. The rearward edge 62 of the plunger 57 bears against the forward bearing surface 49 of the leaf-spring 46 while permitting the spring contact arm 54 to remain in "open" condition. Suitable insulated wires 63 and 64 are electrically connected respectively to the binding posts 52 and 53 and extend through suitable orifices (not shown) preferably in the rear wall 16 to the balance of the electric alarm circuit. Suitable sealing insulation 65 covers the electrical contact between the wires 63 and 64 and the binding posts, thereby rendering the micro-switch 50, and all of its electrical contacts, waterproof and weatherproof.

The electric alarm circuit may be of any desired form, and for illustrative purposes only are shown, consisting of an alarm device such as a door chime 66 actuated by a plunger 67 energized by a coil 68 electrically connected at one end with the wire 63, and at the other end with one end of the secondary coil 69 of the transformer 70. The other end of the secondary coil 69 is electrically connected with the wire 63. The primary coil 71 of the transformer 70 may be connected to the house current to any other suitable source of electrical supply 72. If desired, a door bell push bottom switch 73 may also be connected to the wires 63 and 64.

In operation, the cam member 33 is normally disposed behind the follower 40, when the lid 15 is in its normal, downward position covering the slot 14 while the door 13 is in closed position covering the entrance-way 12. Lifting the door 13 simultaneously results in lifting the lid 15 about its pivot 27. Moreover, the lid 15 is independently liftable about its pivot 27. In either event, i. e. when the lid 15 is lifted to uncover the slot 14, or when the door 13 is lifted to uncover the entrance-way 12, the cam member 33 is swung about an arc whose center is the center of the pivot 27. In so doing, it contacts the follower 40 and bears forwardly against the rearward edge portion 48 thereof operably to urge the follower 40 forwardly and thus advance the plunger 57 into the housing 58 and against the spring contact arm 54 until the contact point 55 disposed at the end of said arm is snapped into engagement with the contact point 56, thereby closing the electrical circuit and sounding the alarm 66. This contact is effected during the initial rotation of the cam member 33 about the pivot 27 when the lid 15 is in proximity to the beginning of its lifting stroke. As the lid 15 is continued to be lifted, the cam member 33 is swung out of engagement with the follower 40, and said follower 40 is spring-urged backwardly to its initial position. In so doing, it permits the plunger 57 to be retracted rearwardly by the spring action of the contact arm 54, said action carrying with the movement of the contact arm, the contact point 55, thereby breaking the electrical connection and ceasing the operation of the alarm. When the lid 15 is again lowered, as when it is returned to covering relation to the slot 14, or when the door 13 is again closed about the entrance-way 12, the cam member 33 again engages the follower 40, camming it forwardly until the plunger 57 carries the contact arm 54 into circuit-closing engagement, and the alarm 66 is again sounded. As the lid 15 is continued in its lowering operation, to the position it will have when the door 13 is substantially closed and the slot 14 is substantially covered, the cam member 33 releases the follower 40, and the plunger 57 is permitted to be retracted and the electrical circuit opened, thereby ceasing the operation of the alarm 66.

It will be found that by this construction, a large mechanical advantage is set up between the door 13 or lid 15 and the cam member 33, whereby the operation of the member 33 becomes sure and positive, and the mechanical advantages of the follower 40, and spring contact arm 54 are such that the movement of the follower 40 is reduced to such movement as is

5

necessary to operate a micro-switch, and said movement is increased to make a clean make-and-break of the contact points 55 and 56 thereby preventing arcing while assuring instant operation whenever the lid 15 is moved upwardly or downwardly past its critical points.

It will thus be found that we have provided an alarm device for mail boxes, which is waterproof, tamper-proof and fool-proof, which will not deteriorate with weathering or age, and which can always be depended upon to act. Moreover, the alarm device of our invention provides a signal whenever the mail box is being opened or closed, and the timing of the signal will indicate to the householder whether the opening of the mail box is a legitimate one, as for the insertion of mail, or illegitimate, as for tampering with the box or its contents, said latter opening requiring a greater time interval between the soundings of the alarm.

We are aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and we therefore desire the present embodiments to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described our invention, what we claim as new and desire to obtain by Letters Patent, is:

1. A mail box comprising a container having an interior wall, an entrance-way and a cover for said entrance-way; a micro-switch having a substantially waterproof housing comprising a wall portion disposed adjacent and substantially parallel to said interior wall, and an operating plunger extending through said wall portion and intermediate said wall portion and said interior wall; a cam member carried by said cover and projecting therefrom interiorly of said container when said cover is in entrance-way closing condition; a cam follower disposed in the interior of said container and extending between said cam member and said plunger when said cover member is in "closed" condition, said cam follower being positioned in the path of movement of said cam member when said member is moved to "open" condition, operably to be intercepted by said cam member during the movement thereof, and to be translated thereby into plunger-actuating movement operably to close an electrical circuit to which said micro-switch is adapted to be electrically connected.

2. A mail box comprising a container having an interior wall, an entrance-way and a cover for said entrance-way; a micro-switch having a substantially waterproof housing comprising a wall portion disposed adjacent and substantially parallel to said interior wall, and an operating plunger extending through said wall portion and intermediate said wall portion and said interior wall; a cam member carried by said cover and projecting therefrom interiorly of said container when said cover is in entrance-way closing condition; a cam follower disposed in the interior of said container and extending between said cam member and said plunger when said cover member is in "closed" condition, the path of movement of said cam follower being intercepted by said plunger, and the path of movement of said plunger being substantially co-directional with said path of movement of said cam follower; said cam follower being positioned in the path of movement of said cam member when said member is moved to "open" condition, operably to be intercepted by said cam member during the movement thereof, and to be translated thereby into plunger-actuating movement operably to close an electrical circuit to which said micro-switch is adapted to be electrically connected.

3. A mail box comprising a container having an interior wall, an entrance-way and a cover for said entrance-way; a micro-switch having a substantially waterproof housing comprising a wall portion disposed adja-

6

cent and substantially parallel to said interior wall, and an operating plunger extending through said wall portion and intermediate said wall portion and said interior wall; a cam member carried by said cover and projecting therefrom interiorly of said container when said cover is in entrance-way closing condition; said cam traversing a path of movement in the opening and closing of said cover; a cam follower disposed in the interior of said container and extending between said cam member and said plunger when said cover member is in "closed" condition, said cam follower intercepting said path of movement of said cam member, operably to be intercepted by said cam member during the movement thereof, and to be translated thereby into plunger-actuating movement operably to close an electrical circuit to which said micro-switch is adapted to be electrically connected.

4. A mail box comprising a container having an interior wall, an entrance-way and a cover for said entrance-way; a micro-switch having a substantially waterproof housing comprising a wall portion disposed adjacent and substantially parallel to said interior wall, and an operating plunger extending through said wall portion and intermediate said wall portion and said interior wall; a cam member carried by said cover and projecting therefrom interiorly of said container when said cover is in entrance-way closing condition; said cam traversing a path of movement in the opening and closing of said cover; a cam follower disposed in the interior of said container and extending between said cam member and said plunger when said cover member is in "closed" condition, the path of movement of said cam follower being intercepted by said plunger and the path of movement of said plunger being substantially co-directional with said path of movement of said cam follower; said cam follower intercepting said path of movement of said cam member, operably to be intercepted by said cam member during the movement thereof, and to be translated thereby into plunger-actuating movement operably to close an electrical circuit to which said micro-switch is adapted to be electrically connected.

5. A mail-receiving member comprising a mail slot, and a movable slot cover mounted on said mail-receiving member; said alarm device comprising a micro-switch having a housing comprising a wall portion disposed adjacent and substantially parallel to a portion of said mail receiving member, and an operating plunger extending through said wall portion and intermediate said wall portion and said portion of said mail receiving member; a cam member carried by said cover, said cam traversing a path of movement in the opening and closing of said cover; a cam follower carried by said mail-receiving member and disposed between said cam member and said plunger when said cover is in "closed" condition, the path of movement of said cam follower being intercepted by said plunger, and the path of movement of said plunger being substantially co-directional with said path of movement of said cam follower, and said cam follower intercepting said path of movement of said cam member, operably to be intercepted by said cam member during the opening and closing of said cover, and to be translated thereby with plunger-actuating movement operably to close said micro-switch during a portion of each of said opening and closing movements.

6. A mail-receiving member comprising a mail slot, and a movable slot cover mounted on said mail-receiving member; said alarm device comprising a micro-switch having a housing comprising a wall portion disposed adjacent and substantially parallel to a portion of said mail receiving member, and an operating plunger extending through said wall portion and intermediate said wall portion and said portion of said mail receiving member; a cam member carried by said cover,

7

said cam traversing a path of movement in the opening and closing of said cover; a cam follower carried by said mail-receiving member and disposed between said cam member and said plunger when said cover is in "closed" condition, the path of movement of said cam follower being intercepted by said plunger, and the path of movement of said plunger being substantially co-directional with said path of movement of said cam follower, and said cam follower intercepting said path of movement of said cam member, operably to be intercepted by said cam member during the opening and closing of said cover, and to be translated thereby with plunger-actuating movement operably to close said micro-switch during a portion of each of said opening and closing movements, the mechanical advan-

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tage between said cam member and said plunger being such that the movement of the plunger is substantially less than the movement of said cam member.

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