Oct. 29, 1940. B. SCHENENDORF 2,219,337

SWITCHING DEVICE

Original Filed March 24, 1936

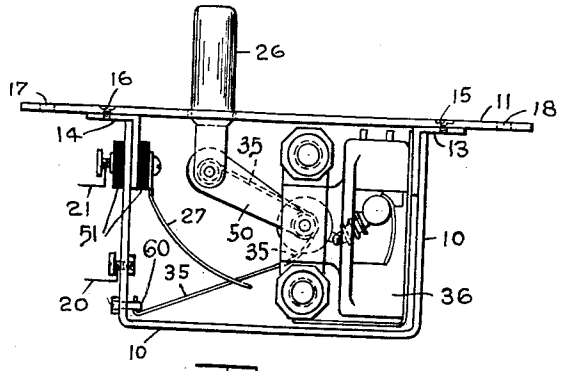


Fig-1

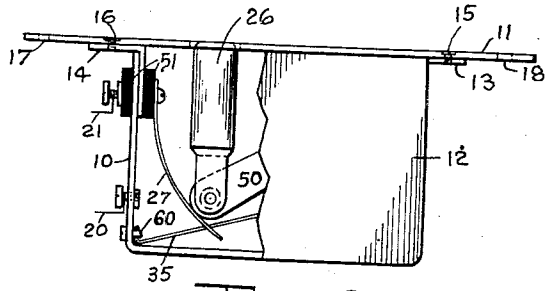


Fig-2

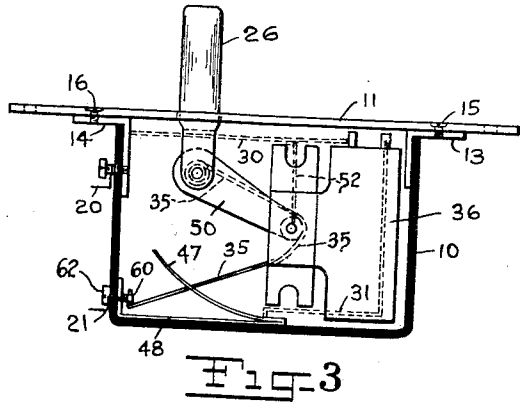


Fig-3

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Patented Oct. 29, 1940

2,219,337

UNITED STATES PATENT OFFICE

2,219,337

SWITCHING DEVICE

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Application March 24, 1936, Serial No. 70,630
Renewed January 25, 1940

3 Claims. (Cl. 200—159)

The invention relates to switching devices, and more particularly to combination switching devices adapted for use in a burglar alarm or signal system responsive to movement of a member such as an entrance door, in operative relation to which this device is installed to operate said alarm or signal, or for use in connection with any other electrical apparatus.

One of the principal objects of this invention is to provide a combination closed circuit burglar alarm switching device, which automatically sets a closed circuit alarm system and also disconnects said circuit long enough to set off a relay in the instrument box, upon movement of said entrance door or the like, which in turn makes contact in an auxiliary relay which shall insure the continued actuation of the signal once it has been set off.

Another object is to provide a device which shall be simple, inexpensive, and comprise a less number of parts to be installed than in switching devices heretofore used in such systems.

Another object is to enable the signal system to be conveniently set in readiness regardless of whether the door or other member in connection with which the switching device is installed, is open or closed.

Another object is to provide a device which is automatic, thus obviating the inconvenience of setting a switch at the door before closing the store or other premises for the night.

Another object is to provide a device which can be installed in a protected position and therefore will not get out of order and become inoperative from the effects of dampness, dirt, paint when redecorating the premises, or other causes, and thereby cause the signal to operate when not desired to or fail to operate when needed.

Another object is to provide a device which may be so installed as to be inaccessible to tampering.

Another object is to provide a device which is easily installed.

Another object is to provide a device which simplifies the system as a whole as hereinafter referred to.

Further objects and advantages of the invention will be in part set forth in the following specification, and in part will be obvious therefrom without being specifically pointed out, the same being realized and attained by means of the instrumentalities and structural characteristics and relative arrangements and combinations which will be hereinafter more fully described or which will be pointed out in the claims hereof.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, certain embodiments of the same being illustrated in the accompanying drawing and described in this specification.

In the accompanying drawing:

Fig. 1 illustrates a top view of a switching device constructed according to one embodiment of my invention, the same being shown with a part of the casing removed in order to show the parts more clearly;

Fig. 2 shows the same in a different position; and

Fig. 3 shows a modified form of the device.

In carrying my invention into effect in the embodiment shown in Figs. 1 and 2, it will be seen that a suitable casing is provided, comprising a box designated 10, having a cover 12 (shown partly broken away in Fig. 2), which may be secured in place by screws, not shown, or in any suitable manner, and an outer face member 11. The device, if used with a burglar alarm circuit, may be mounted in the door frame in such manner that the box 10 is entirely embedded or enclosed, and the plate 11 is exposed and lies flush with the surface of the frame, facing the door so that when the door is closed it will push in the plunger 26, hereinafter more fully referred to. Such mounting would preferably be in the portion of the frame which faces the edge of the door to which the hinges are attached, that is to say, it would be the edge of the door and not the face thereof which would operate the plunger on closing the door. It is therefore absolutely impossible to reach the device without opening the door.

If preferred, however, the device may be, as a whole, mounted in a block of wood or other material to give a neat appearance, which may then (instead of being embedded) be screwed to the frame of the door in such position that a plate attached to the door will strike the plunger and push it in when the door is closed. In such mounting, the operating plate would naturally be attached to a block secured to the door, in order to set the plate out a sufficient distance to agree with the size of the block in which the switch is mounted.

If mounted in the first-described manner, the plate 11 would of course be vertical and not as shown in the drawing, the end shown at the left being preferably mounted at the top. If mounted in the second manner, the casing 10

would be in a horizontal plane, the cover 12 being preferably at the top.

Within the casing there is a switch at the right hand as shown, which is of any suitable construction for the purpose, being of the type which does not change from off to on position or vice versa until nearly the end of its movement in either direction. The particular form of this switch forms no part of my present invention, so long as it serves the purpose intended, and therefore it is not thought necessary to describe the same in detail, as its construction in the embodiment shown will be obvious from an inspection of the drawing. This switch as a whole is designated 36. In Fig. 1 it is shown in normal position, and in Fig. 2 the plunger hereinafter referred to is shown in the position it occupies when pushed in by a door or the like.

Wires 20 and 21 are connected to the outside of the casing 10. Since the casing 10 may be of metal, insulating bushings 51 may be provided for the wire 21. These wires are a part of the alarm system, and as long as the circuit therethrough remains unbroken, the alarm does not ring. The switch 36 above referred to, is electrically connected with this circuit by wires which, for the sake of simplifying the drawing, are not illustrated, but which will be well understood by referring to the wires 30, 31 and 52 of the form shown in Fig. 3 (which differs mechanically but not electrically from the form shown in Figs. 1 and 2), in such manner that as long as the parts remain in the position shown in Fig. 1, the circuit remains closed and the alarm will not ring.

The arm 50 is also electrically connected with the connection between the wire 20 and the switch 36, in a manner which will be well understood.

If the door is closed, the plunger 26 which operates the switch 36, is pushed in, and thereby opens said switch 36 at the end of such movement, that is, just as the door is about to become tightly closed. The circuit nevertheless remains unbroken, as about to be explained.

At the left of the drawing is shown a resilient contact member 27, mounted in the casing 10 and electrically connected with the wire 21. By an examination of the drawing it will be seen that the arm 50 of the switch 36, which is operated by the plunger 26, comes in contact with this resilient member just before the switch 36 snaps into open position. As the movement continues, the parts come into the position shown in Fig. 2.

It will thus be seen that the circuit remains continuously closed during the closing of the door, because just before the switch 36 snaps into its open position, the circuit is closed through the resilient contact member 27 and arm 50 (with the connected wires not shown), so that current may pass through the wires 20 and 21 as before.

Upon the door being opened again, however, after having once been closed, the reverse action does not take place. A slight actual opening of the door allows the plunger to leave the contact member 27 (although the latter will follow the plunger for a short distance, sufficient to avoid false alarms due to vibration of the door for any reason), thus breaking the circuit, because the switch 36 will not snap back into its normal position until the plunger has reached almost or quite to the position shown in Fig. 1. Consequently the circuit is broken for a short but sufficient time, and the alarm therefore rings.

The structure of the alarm mechanism itself is such that having once been started, the reclosing of the circuit which originally prevented its ringing, will not stop it thereafter, and consequently the mere momentary breaking of the circuit in the interval between the plunger leaving the member 27 and the snapping of the switch 36, is sufficient, and nothing can be done by an intruder to avert the continued ringing of the alarm, whether by reclosing the door or by allowing it to remain ajar or open, or even by taking away the switch itself.

A spring 35 is shown, which tends to keep the plunger 26 always in its outward position when so permitted by the door. This spring engages the arm 50 at the attachment of the plunger 26, passes along the side of the arm furthest from the observer, in the form illustrated in the drawing, is given one or two turns around the pin or other mounting means for said arm 50, and then passes down adjacent the side of the casing 10 furthest from the observer, to the point of attachment indicated at 60 in the lower left-hand corner of each figure of the drawing. This may be double if desired, that is to say, in addition to the wire shown, a similar wire on the nearer side of the arm may be provided, which then passes down close to the cover of the casing.

If desired, the plunger 26, or some part thereof, may be made of insulating material. Ordinarily, however, it is more satisfactory, in an alarm or signal system such as here referred to, to provide insulation if needed (as for instance in case of operation of the device by a metal door) by making the plate upon the door, which bears against the plunger, of insulating material.

It will of course be understood that the system is controlled at the alarm box or elsewhere so that when the day connections are set up the alarm will not ring upon every opening of the door, but on the other hand that no adjustment or setting whatever is required at the switch itself in order to change from day to night arrangements or vice versa. In devices heretofore known, it has been necessary to set a switch or otherwise adjust the door devices, which, being often at the top of the frame, might mean climbing upon a chair or box and reaching up to adjust the switch. This is entirely obviated in my automatic device, and all that is needed is the setting of the alarm box or the like. This is important, not only as a matter of convenience, but also to avoid the danger of falling when setting the device for the night.

In Fig. 3 I have shown a slightly modified form of the device. This is similar to the first-described form in most respects, the principal difference being that the resilient contact member (here designated 47) is of different form and position, though having the same function. It will be seen that the member 47, instead of extending downwardly from near the top of the casing as shown in Fig. 1, is attached to or integral with the L-member 48 at the bottom of the box as shown in Fig. 3, to which member 48 and resilient member 47 is connected the wire 31.

It will be understood that in Fig. 3 the securing means 60 for the spring 35, is separate and distinct from the securing means 62 of the wire 21 and member 48. The means 60 is further from the observer, near the back of the

casing, whereas the member **48** is necessarily mounted about midway of the distance between the cover and the back, in order to contact the arm **50**. The depth of the casing is sufficient so that these parts and their securing means do not touch each other. As shown in Fig. 3, the means **60** is behind and partially concealed by the member **48**, but the same are physically and electrically separate.

It will be noted that the wires **20** and **21** are in relatively reversed position in this modification, that is, the wire **21** is at the bottom, that being the wire which is connected with the resilient member, and the wire **20** which is electrically connected with the arm **50**, is at the top. The connecting wiring inside the casing is also shown in Fig. 3, in a somewhat diagrammatic way, it being understood of course that in actual practice the same would be so placed as to be conveniently out of the way of other parts of the device, connecting screws, etc. One pole of the switch **36** is connected with the outside wire **20** by means of the wire **30** (and member **14**), and the wire **30** is also in turn connected by the wire **52** with the arm **50**; while the other pole of the switch **36** is connected through the wire **31** and thence through the member **48** with the outside wire **21**. This wiring could if preferred be partly outside the casing if that should be more convenient in making the connections.

A secondary modification indicated in this figure, is the fact that the casing **10** is formed of Bakelite or similar material. This eliminates the necessity of insulating the contacts and connections from the casing, and thereby simplifies the devices. This feature could of course be used equally well in the first-described form of the invention.

The L-shaped pieces **13** and **14** would, however, in either form be of metal, the member **14** in the modification serving not only its purpose as a means of attaching together the casing **10** and plate **11**, but also as an electrical connection between wires **30** and **20**.

It is believed that the operation of both these forms of the invention will be well understood from what has been above said, and that the same need not be recapitulated here.

Certain of the advantages of the invention have also been referred to, and other advantages will be readily seen by those skilled in the art to which such devices refer.

I do not limit myself to the particular details of construction set forth in the foregoing specification and illustrated in the accompanying drawing, as the same refer to and set forth only certain embodiments of the invention and it is obvious that the same may be modified, within the scope of the appended claims, without departing from the spirit and scope of the invention, and also that the same may be used for other purposes than those specifically referred to, as will be well understood by those skilled in the art.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. A contact device adapted for use in a closed-circuit alarm or signal system, comprising a switch, a swinging arm adapted to operate said switch and electrically connected with one pole of said circuit, a plunger adapted to operate said arm to open said switch, a spring tending to operate said arm to close said switch, and a resilient contact tongue electrically connected with the other pole of said circuit, against the face of which an end of said arm bears swingingly when said arm nears its switch-opening position, said circuit being thereby closed through said arm and said tongue when said arm nears its switch-opening position and before said switch is opened, and when said plunger is released said arm and said tongue being separated and said circuit being broken therethrough and thereafter closed through said switch.

2. A contact device adapted for a closed circuit, comprising a switch, a swinging arm adapted to operate said switch and electrically connected with one pole of said circuit, means adapted to operate said arm to open said switch, means adapted to operate said arm to close said switch when the action of said last-named means is released, and a contact tongue electrically connected with the other pole of said circuit, the face of which bears resiliently against said arm and against the face of which said arm bears swingingly when said arm nears its switch-opening position, said switch being thereby closed through said arm and said tongue when said arm nears its switch-opening position and before said switch is opened, said arm and said tongue being out of contact when said arm substantially departs from said position and said circuit being broken therethrough, said circuit being thereafter closed through said switch.

3. A device as set forth in claim 2, in which the contact tongue is a resilient strip secured at one portion and having a free portion lying in the path of the operating arm near the end of its switch-opening movement, said tongue moving resiliently with relation to said arm in substantially the plane of the movement of said arm.

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