June 7, 1949. M. E. OUELLETTE 2,472,266

SWITCH MECHANISM FOR FIRE ALARMS

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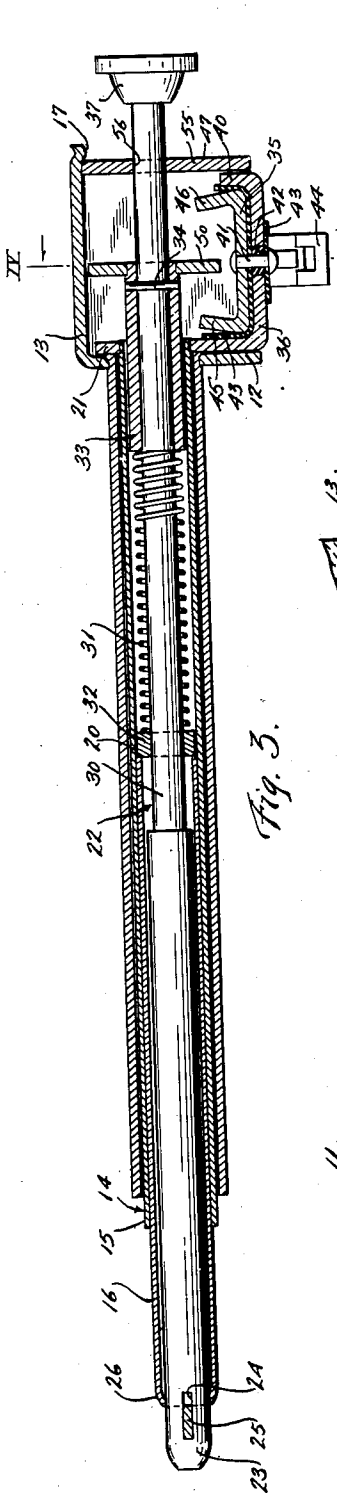

Fig. 3.

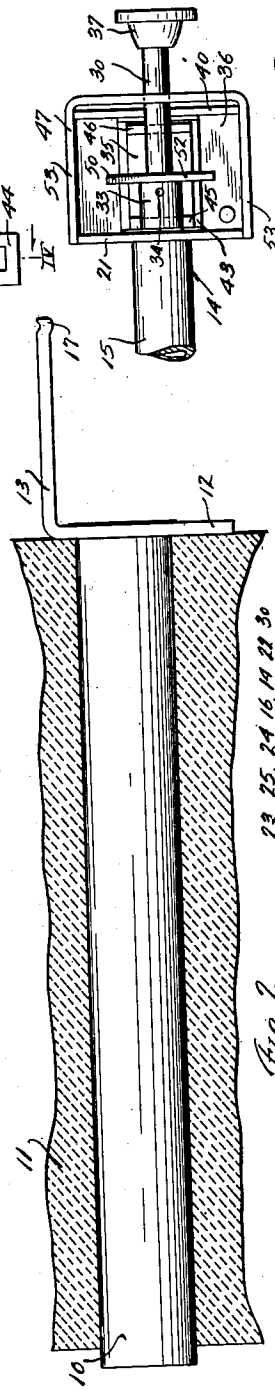

Fig. 2.

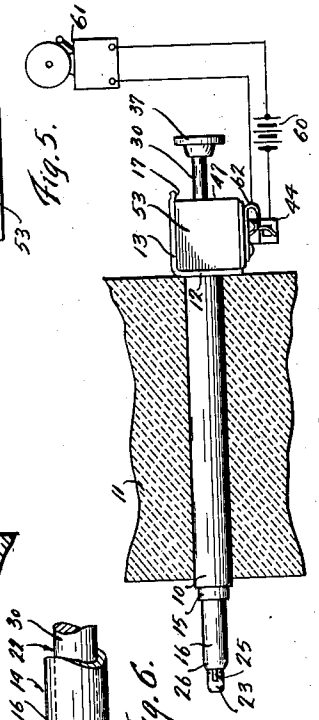

Fig. 5.

Fig. 1.

Fig. 6.

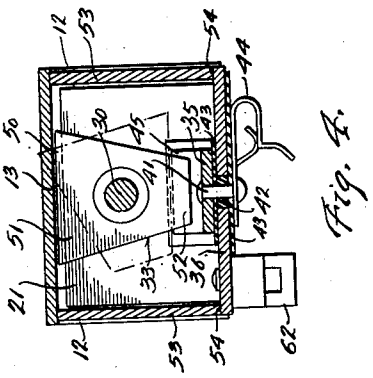

Fig. 4.

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SWITCH MECHANISM FOR FIRE ALARMS

Maxime E. Ouellette, Macwahoc, Maine

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11 Claims. (Cl. 200—142)

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My invention relates in general to a switch device for fire alarm systems, and particularly to an alarm device adapted to be installed in a chimney or like place to automatically detect and signal the presence of a fire or excessive temperature conditions, such as that shown and described in my co-pending application, Serial Number 703,441 filed October 15, 1946.

The principal object of my invention is to provide a switching device of such design that the working parts thereof may be easily and quickly removed for inspection and cleaning without having to disturb any of the electrical connections or having to use tools of any sort.

Another object is to provide a device having a stationary contact plate provided with two oppositely arranged contact elements.

Another object is to provide a device having a reciprocating rod carrying a movable contact member for engagement with either of the stationary contact elements.

A further object is to provide a movable contact member of unsymmetrical form which shall maintain the contact members in working positions, but which, upon rotation, will permit the alarm rod to be readily disassembled without the use of any tools.

A further object of my invention is to provide contacts of ample size for long wear, the stationary surfaces having edge formation thereby resulting is a self-cleaning action between the co-acting surfaces, and thus assuring long carefree service.

Furthermore, the control rod and the rod sheath with their contact members may be readily removed for inspection without energizing the alarm system, and such removability permits the insertion of a new fusion element and an inspection of the contacts before the rod and sheath are reinserted in place within the housing tube.

The above objects and advantages have been accomplished by the device shown in the accompanying drawings of which:

Fig. 1 is a sectional view of a chimney showing my device installed therein;

Fig. 2 is an enlarged sectional view of the housing tube in place within the chimney and with parts of the device removed therefrom;

Fig. 3 is an enlarged longitudinal sectional view of the assembled device;

Fig. 4 is a tranverse sectional view taken on line IV—IV of Fig. 3;

Fig. 5 is a fragmentary plan view of the front end of the alarm rod and rod sheath in assembled positions but removed from the housing tube; and,

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Fig. 6 is a fragmentary plan view of the inner end of the alarm rod and rod sheath, showing the fuse element in place.

My device comprises an annular housing tube 10 which is designed to extend through a chimney 11, as represented in Fig. 1 of the drawings. A housing flange 12 is secured to the outer end of the housing tube and is brought into contact with the outer face of the chimney thereby acting as a face plate to position the tube. This tube is permanently secured in place within the chimney by any suitable means and is not to be removed during inspection or when renewing a fuse element. The flange 12 is formed with an outwardly extending detent plate 13 which projects over the switch mechanism, to be hereinafter described.

Extending through the housing tube 10 is the rod sheath 14 of my device. This sheath comprises an outer member 15 which is loosely fitted into the housing tube, and an inner member 16 which extends into the outer member 15 from the inner end thereof. The inner member 16 is closely fitted into the outer member and is secured against relative axial movement therewith. The outer end of the inner member extends to a point substantially midway the length of the outer member, thereby providing a shoulder 20 which acts as a stop, to be hereinafter described. The outer member of the rod sheath has a sheath flange 21 permanently secured to the outer member thereof which serves as a stop for engagement with the housing flange 12 when the sheath is assembled with the housing tube.

An alarm rod 22 is slidably disposed within the rod sheath 14. This rod extends through the sheath having its front end 23 positioned beyond the front end of the inner member 16 of the rod sheath when it is set and made ready for operation. This end is provided with a fuse slot 24 with which a fuse element 25 is engaged. This fuse element, as shown in Fig. 6, extends beyond the outer contour of the rod and bears against the inner end 26 of the inner member 16 of the rod sheath, thereby keeping the end of the rod extended beyond the sheath under normal conditions. The rod is provided with an outer portion 30 of reduced diameter upon which is mounted a helical spring 31. A spring collar 32, is slidably disposed upon this portion of the rod, and it is so proportioned as to bear against the stop shoulder 20 formed at the outer end of the

inner member 16 where it is held by the spring when under compression. A movable contact member 33 is mounted upon the reduced portion 30 of the rod and is fixed against relative axial movement upon the rod by a pin 34 or other suitable means. This contact member is of substantially the same diameter as the spring collar 32 and loosely fits into the outer end of the outer member 15 of the rod sheath where it serves to support the outer end of the rod. This contact member serves as a stop for the outer end of the spring 31, thereby serving to keep the spring under compression when the contact member is held in place by the fuse element. A push button 37 is provided at the outer end of the alarm rod, whereby it may be manually actuated inwardly to test the device.

The switch mechanism of my device comprises a stationary contact plate 35 which is carried by the bottom wall 36 of the sheath flange 21. This wall is provided with an upwardly extended end wall 40. The contact plate is secured in place to the bottom wall by means of a suitable fastening device such as a rivet 41. A suitable insulating bushing 42 being placed around the rivet where it passes through the bottom wall, and suitable sheets of insulating material 43 being placed on both sides of the bottom wall so as to completely insulate the contact plate and the rivet from the wall. Any suitable type of electrical terminal such as the clip 44 is secured to the bottom wall by means of the rivet 41. The contact plate 35 is provided with a contact element 45 at one end thereof and with a contact element 46 at the other end thereof. Each of these elements is formed by an upwardly extending end of the contact plate and the ends are bent inwardly toward each other, as clearly shown in the drawings, whereby edge contact surfaces are provided. Engageable with these spaced contact elements is a movable contact plate 50 carried by the movable contact member 33. This plate may be brought into engagement with the contact element 45 for testing purposes when the rod is manually pushed inwardly, and is brought into contact with the element 46 when the fuse element releases the alarm rod. When the alarm rod is released, the spring 31 causes the movable plate to be quickly and forceably brought into contact with the contact element 46 which quick action will bring the contact surfaces together in such a manner that any accumulation of foreign matter on such surfaces will be removed. This action is facilitated by the inward inclination of the ends of the contact plates thereby providing the relatively sharp edge contact surfaces hereinbefore described.

As shown in Fig. 4, the movable contact plate 50 is of unsymmetrical design and is provided with a relatively wide upper end 51 which is relatively close to the detent plate 13 of the housing tube, whereby any tendency of the alarm rod to rotate will be restrained. The lower end 52 of the contact plate serves as a contact member for engagement with the contact elements 45 and 46 of the stationary plate. By making the movable contact plate unsymmetrical in shape, it is possible by rotation of the plate through substantially 90° (as shown in dot and dash lines in Fig. 4) to cause it to clear the contact element 46, thereby permitting the disassembling of the alarm rod from the rod sheath.

So as to enclose and protect the switch mechanism of my device, I provide a casing hood 47 having side walls 53 and an end wall 55. The side walls are so designed as to rest upon ridges

54 provided by the side edges of the bottom wall 36 of the sheath flange and at each side of the front wall 40 thereof.

The inner edges of these side walls contact with the sheath flange 21 and the upper edge of the end wall contacts the detent plate 13 when the hood is in position. The outer wall is formed with an aperture 56 for the reception of the reduced portion 30 of the alarm rod. When the alarm rod and rod sheath are in assembled positions, as shown in Fig. 3, the upper edge of the outer wall 55 of the casing hood will rest behind the detent ridge 17 of the detent flange and thereby be held in position. When assembling the parts there is sufficient resiliency in the detent plate to permit the wall 55 to pass under the ridge.

As shown in Fig. 1, my device may be connected up in any suitable circuit which may comprise a battery 60 and a suitable audible alarm 61. The alarm, battery, and switch device are connected in well known manner by suitable wiring, as shown. In order to provide a ground connection for the circuit, a terminal clip 62 is secured to and in contact with the bottom wall 36 of the sheath flange.

When the device is to be set and made ready for operation, as shown in Fig. 3, the alarm rod is first inserted into the rod sheath, the movable contact plate 50 being positioned on its side for passage over the contact element 46, and the rod is then pushed into the sheath against the compression of the spring by pressure exerted upon the push button until the slot 24 is exposed at the inner end of the sheath, whereupon a fuse element is inserted within the slot and the manual pressure upon the bottom is released. The fuse element will thereupon be tightly held between the wall of the slot and the inner end of the sheath by the compressive action of the spring. The alarm rod is then rotated within the rod sheath until the end 52 of the contact plate is in registrable position with the contact elements 45 and 46. The assembled rod and rod sheath are then inserted into the stationary housing tube 10 and the casing rod 47 is sprung under and beyond the detent ridge 17 thereby holding the device in assembled position.

It will be obvious from the foregoing, that when abnormal conditions occur in the chimney, or other place of use, such as a fire or an abnormally high temperature, the fuse element 25 will melt, thus releasing the alarm rod and permitting it to be moved axially under the action of the spring 31 and to thereby bring the contact plate 50 forceably against the contact element 46, thereby closing the circuit shown in Fig. 1 and giving the alarm.

When it is desired to test the device to ascertain whether everything is in working order, it is only necessary to manually operate the push button 37 inwardly against the tension of the spring 31 until the end 52 of the contact plate 50 engages the contact element 45 of the stationary contact plate, whereupon the electric circuit will be closed and the signal 61 operated. Owing to the fact that the fuse slot 24 is normally in horizontal position there will be no tendency for the fuse element 25 to become disengaged from the slot.

It will be obvious from the foregoing, that the entire assembled switch mechanism may be removed from the housing by simply pulling the same outwardly against the yieldable engagement of the detent ridge 17 with the upper edge of the casing hood. This may be accomplished without the use of tools and without disturbing

any of the electrical contacts or wires extending thereto. After inspection, the entire assembly may be replaced in reverse manner. Should it be desired for any reason to remove the alarm rod **22** for its sheath **14**, it is only necessary to push inwardly upon the push button **37** to release the fuse element **25** which may then be easily removed from its engaged slot **24**, whereupon by rotation of the rod through substantially 90° to release the contact plate **50** from the contact element **46**, the entire rod may be withdrawn from the sheath.

Obviously, some modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims; and I do not, therefore, wish to be limited to the exact embodiment herein shown and described.

What is claimed is:

1. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a tubular rod sheath removably carried by said tube, oppositely spaced stationary electrical contact elements carried by and insulated from said sheath, a contact rod slidably carried by said sheath, a contact member fixed to and movable with said rod, said member being engageable with either of said opposed contact elements upon reciprocation of said rod, a spring mounted upon said rod for urging said contact member toward one of said elements, said spring permitting said member to be manually forced into contact with the opposite element, and a fusible element carried by said rod for maintaining said spring under tension, whereby said movable contact member will be automatically released under predetermined temperature conditions and forced against said first mentioned contact element.

2. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a tubular rod sheath removably carried by said tube, oppositely spaced stationary electrical contact elements carried by and insulated from said sheath, a contact rod slidably carried by said sheath and having its inner end extensible beyond the inner end of said sheath, a contact member fixed to and movable with said rod, said member being engageable with either of said opposed contact elements upon reciprocation of said rod, a spring mounted upon said rod for urging said contact member toward one of said elements when the inner end of said rod is extended beyond said sheath, said spring permitting said member to be manually forced into contact with the opposite element, and a fusible element carried by said rod for maintaining said rod in end-extending position, whereby said movable contact member will be automatically released under predetermined temperature conditions and forced against said first mentioned contact element.

3. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a tubular rod sheath removably carried by said tube, a stationary contact plate carried by and insulated from said sheath, said plate having its end bent to form oppositely arranged spaced contact elements, a contact rod slidably carried by said sheath, a contact member fixed to and movable with said rod, said member being engageable with either of said opposed contact elements upon reciprocation of said rod, a spring mounted upon said rod for urging said contact member toward one of said elements, said spring permitting said member to be manually forced into contact with the opposite element, and a fusible element carried by said rod for maintaining said spring under tension, whereby said movable contact member will be automatically released under predetermined temperature conditions and forced against said first mentioned contact element.

4. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a tubular rod sheath removably carried by said tube, a stationary contact plate carried by and insulated from said sheath, said plate having its end bent at an acute angle to the base to form oppositely arranged spaced contact elements, a contact rod slidably carried by said sheath, a contact member fixed to and movable with said rod, said member being engageable with either of said opposed contact elements upon reciprocation of said rod, a spring mounted upon said rod for urging said contact member toward one of said elements, said spring permitting said member to be manually forced into contact with the opposite element, and a fusible element carried by said rod for maintaining said spring under tension, whereby said movable contact member will be automatically released under predetermined temperature conditions and forced against said first mentioned contact element.

5. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom in a plate substantially parallel with the axis of said tube, a downwardly projecting detent ridge carried by said plate, a rod sheath removably carried by said tube and having a sheath flange arranged substantially perpendicularly to the axis of said rod sheath, a bottom wall extending outwardly from said sheath flange, a casing hood mounted upon said bottom wall and engageable with said detent plate when in assembled position, an alarm rod slidably mounted within said sheath, a fuse element carried by said rod, said fuse serving to hold said rod against axial movement under spring tension and co-acting switch contact elements carried by said rod and said sheath and engageable upon release of said rod by the melting of said fuse element under predetermined temperature conditions.

6. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a rod sheath removably carried by said tube and formed interiorily with a stop, oppositely spaced stationary electrical contact elements carried by and insulated from said sheath, a contact rod slidably carried by said sheath, a contact member fixed to and movable with said rod, said contact member being engageable with said contact elements upon reciprocation of said rod, a helical spring carried by said rod for urging the same axially, and a spring washer slidably mounted upon said rod and engageable with the stop of said sheath, said washer bearing against one end of said spring and said contact member bearing against the opposite end of said spring.

7. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom, a rod sheath removably carried by said tube and having a sheath flange, a bottom wall extending outwardly from said flange, a stationary contact

plate carried by and insulated from said bottom wall and formed with stationary contact means, an alarm rod slidably carried by said rod sheath, a movable contact plate carried by said rod, said contact plate being of tapered formation, the larger end surface of said plate being in normal non-rotative engagement with said detent plate and the smaller end thereof being in position for engagement with said stationary contact means, whereby when said larger end surface is withdrawn beyond the detent plate, said contact plate may be rotated substantially 90° to permit the disassembling of the device.

8. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom in a plane substantially parallel with the axis of said tube, and a switch mechanism removably carried by said tube, said mechanism comprising a rod sheath for insertion in said tube, latch means carried by said plate and said sheath to removably hold said switch mechanism within said tube, means for placing said switch mechanism under spring tension, and a fuse element for holding said switch mechanism in open position and for releasing the same under predetermined temperature conditions.

9. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom in a plane substantially parallel with the axis of said tube, and a switch mechanism removably carried by said tube, said mechanism comprising a rod sheath for insertion in said tube, a sheath flange carried by said sheath, a hood supported by said sheath flange and engageable with said detent flange when in assembled position, means for placing said switch mechanism under spring tension, and a fuse element for holding said switch mechanism in open position and for releasing the same under predetermined temperature conditions.

10. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom in a plane substantially parallel with the axis of

said tube, and a switch mechanism removably carried by said tube, said mechanism comprising a rod sheath for insertion in said tube, a sheath flange carried by said sheath, a hood supported by said sheath flange and engageable with said detent flange when in assembled position, an alarm rod slidably carried by said rod sheath and said hood, a stationary switch contact carried by said sheath flange, a movable switch contact carried by said rod and engageable with said stationary contact, a fuse carried by said rod to hold said contact in open position, and a spring engageable with said rod to force said contact together in circuit closing relation when said fuse melts.

11. A switch device for an electrically operated fire alarm system, comprising a stationarily arranged housing tube, a detent plate carried by said tube and extending outwardly therefrom in a plane substantially parallel with the axis of said tube, and a switch mechanism removably carried by said tube, said mechanism comprising a rod sheath for insertion in said tube, a sheath flange carried by said sheath, a hood supported by said sheath flange and engageable with said detent flange when in assembled position, an alarm rod slidably carried by said sheath, a stationary contact plate carried by said sheath and having two oppositely arranged spaced contact elements, a movable switch contact carried by said rod, said movable contact being disposed between the said stationary contact elements and engageable with either of them to close said switch mechanism, a fuse carried by said rod for normally holding said switch mechanism in open position, and a spring engageable with said rod to force said contacts together in circuit closing relation when said fuse melts.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,981,484	Werring	Nov. 20, 1934
2,023,377	Werring	Dec. 3, 1935

Certificate of Correction

Patent No. 2,472,266. June 7, 1949.

MAXIME E. OUELLETTE

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 6, line 35, claim 5, for the word "plate" read *plane*;

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of November, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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