United States Patent [19]

Wechter

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[45] **July 24, 1973**

[54] **WINDOW SWITCH ASSEMBLIES FOR BURGLAR ALARM**

[76] Inventor: **Allen Wechter,** 35-31 169th St., Flushing, N.Y. 11358

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[52] **U.S. Cl.** **200/61.74,** 340/274

[51] **Int. Cl.** **G08b 13/08,** H01h 3/16

[58] **Field of Search** 200/61.73, 61.74, 200/61.75; 340/274; 340/274

[56] **References Cited**

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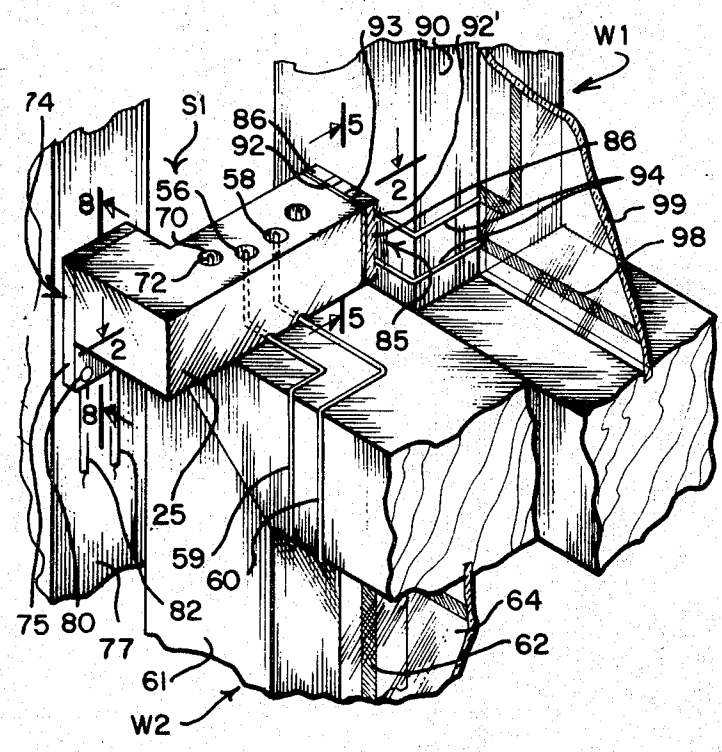
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Primary Examiner—Herman J. Hohauser
Assistant Examiner—William J. Smith
Attorney—William T. Hough et al.

[57] **ABSTRACT**

A switch assembly comprises an L-shaped insulative plastic casing mountable on the top of the frame of the lower window of double hung windows. First and second pairs of spring biased slidable contact elements are disposed respectively at opposite ends of the casing. Conductors in the casing connect the contact elements. On the casement enclosing the window is a first circuit member to which an external alarm circuit is connected. On the frame of the upper window is a second circuit element. Raising the lower window or lowering the upper window moves the contact elements with respect to the second circuit element to actuate the alarm circuit. Metallic loops can be provided on the windows connected respectively to the conductors and the first circuit member in a series circuit so that breaking either loop actuates the alarm circuit.

10 Claims, 24 Drawing Figures



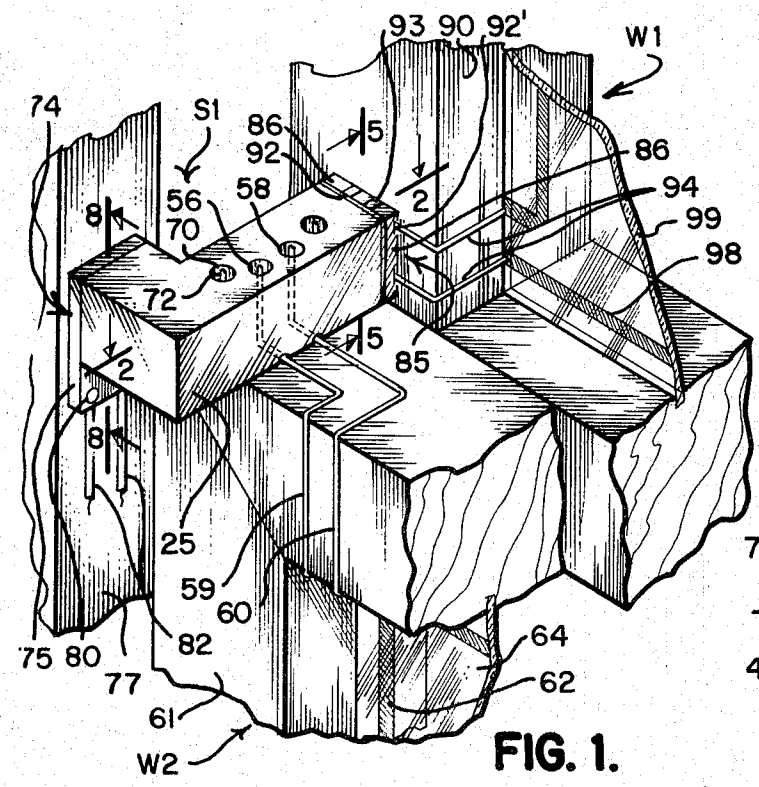


FIG. 1.

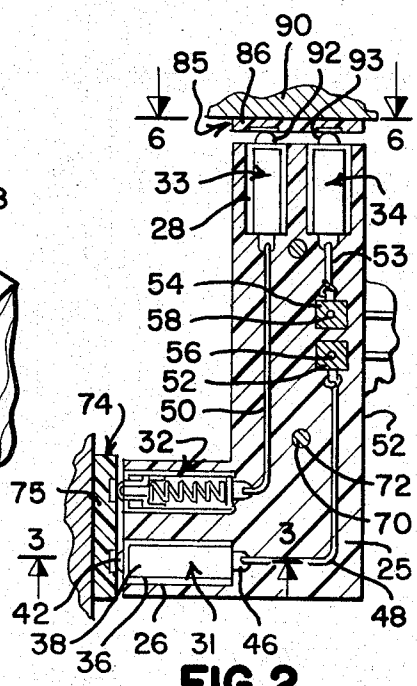


FIG. 2.

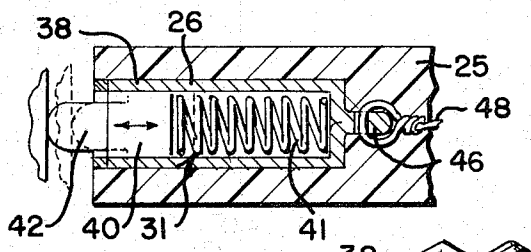


FIG. 3.

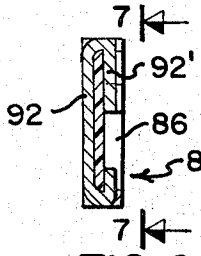


FIG. 6.

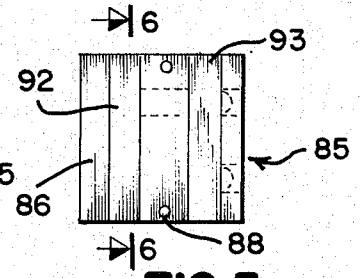


FIG. 5.

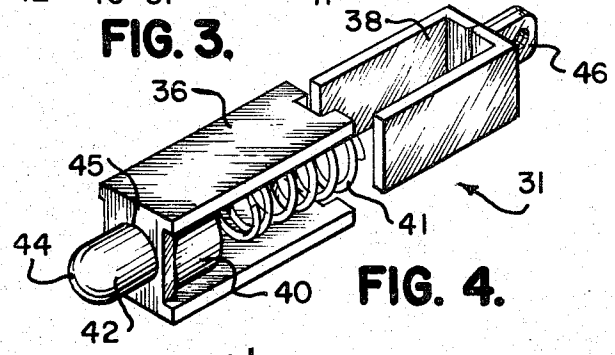


FIG. 4.

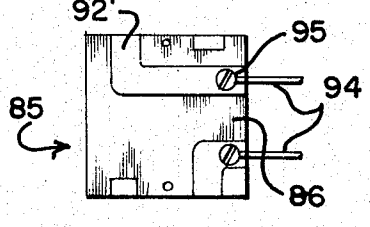


FIG. 7.

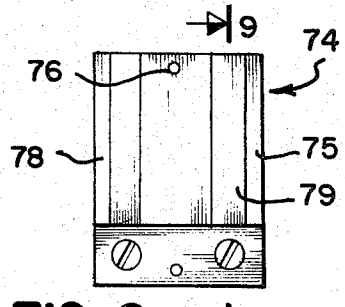


FIG. 8.

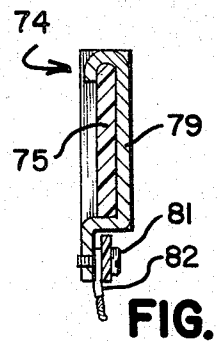


FIG. 9.

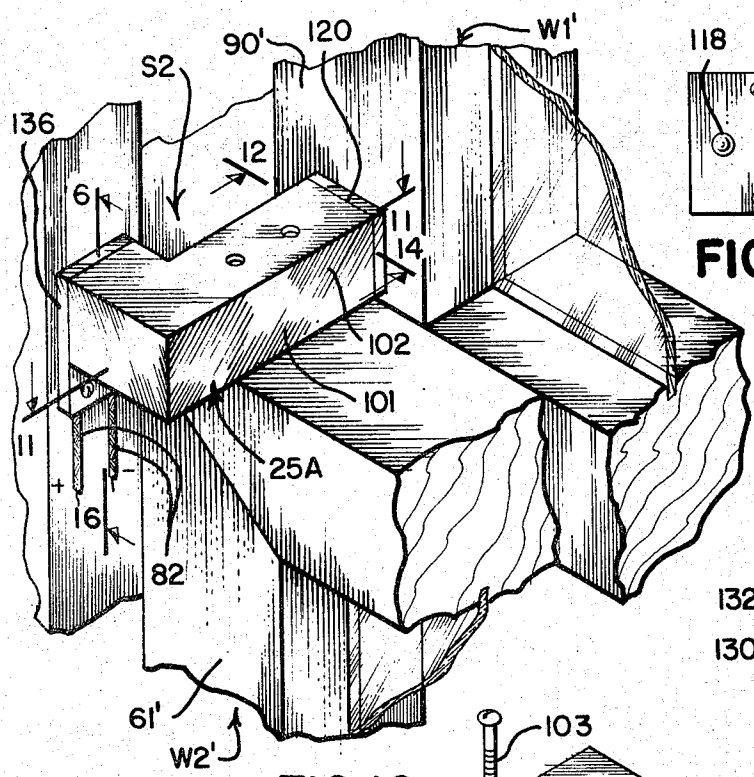


FIG. 10.

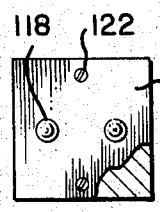


FIG. 14.

FIG. 11.

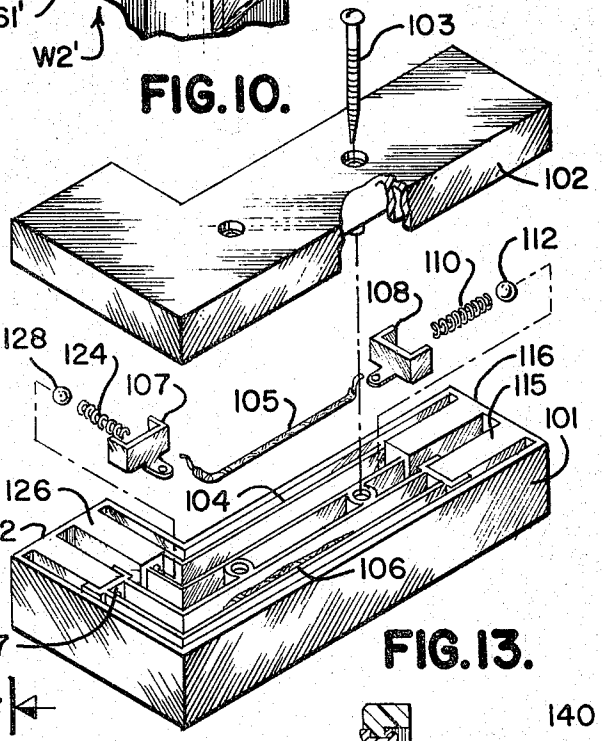


FIG. 13.

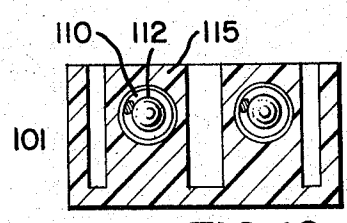


FIG. 12.

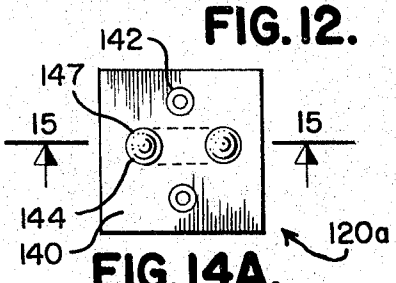


FIG. 14A.

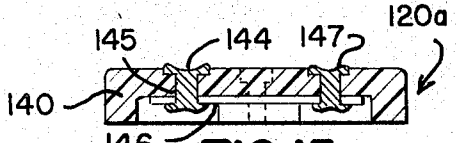


FIG. 15.

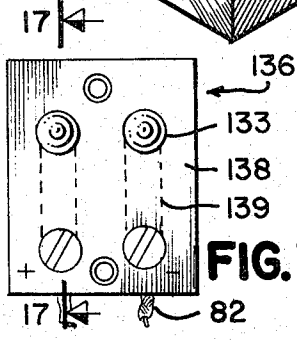


FIG. 16.

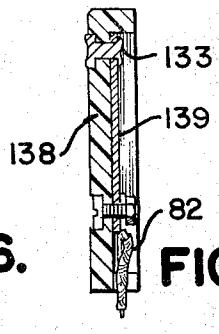


FIG. 17.

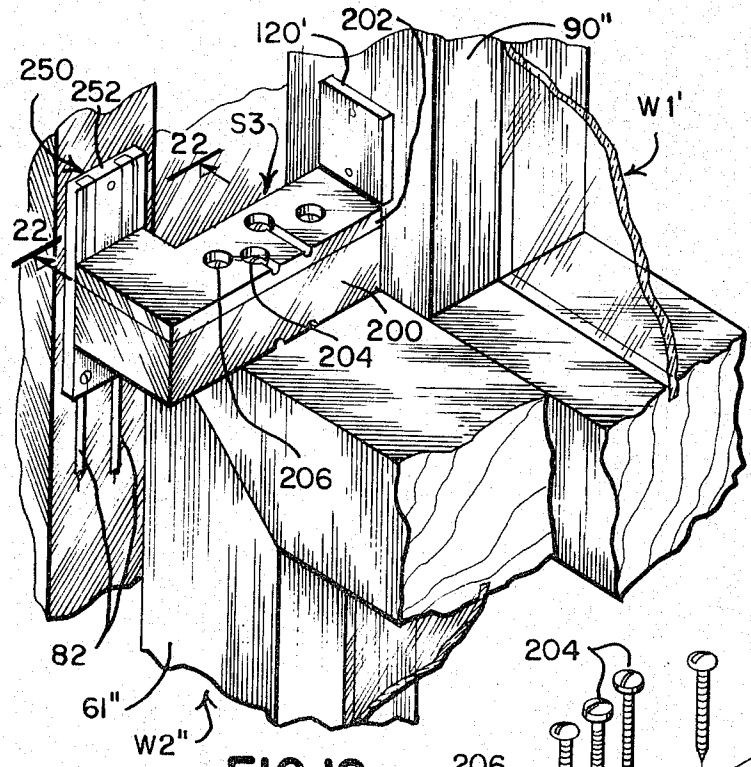


FIG. 18.

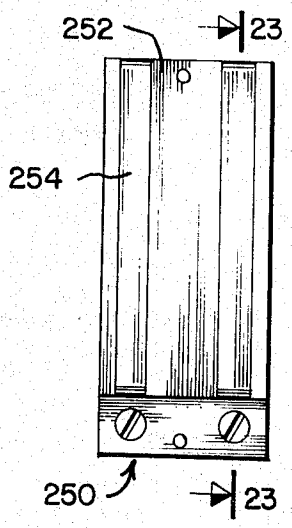


FIG. 22.

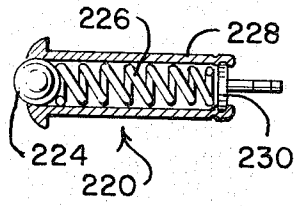
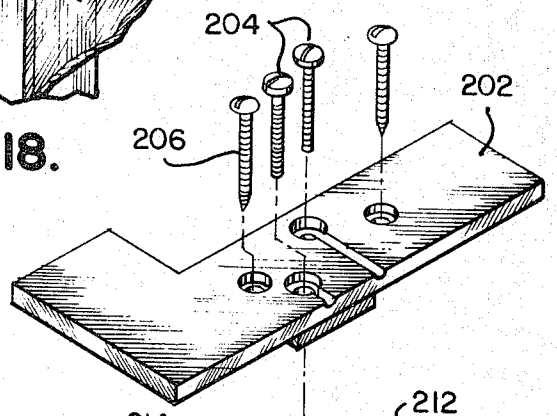


FIG. 20.



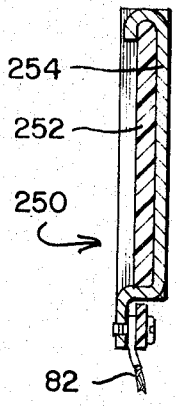


FIG. 23.

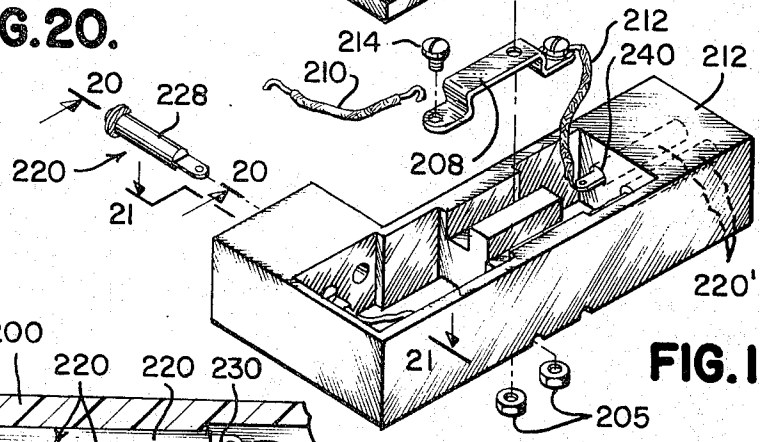


FIG. 19.

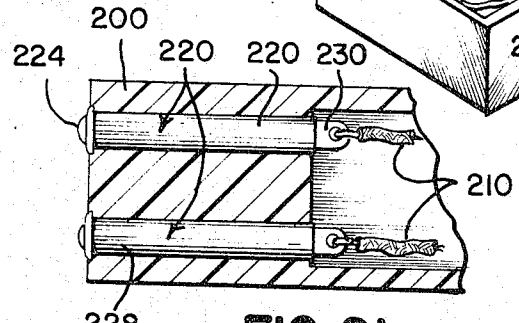


FIG. 21.

WINDOW SWITCH ASSEMBLIES FOR BURGLAR ALARM

This invention concerns a switch assembly mountable on double hung windows in an alarm circuit to actuate the alarm circuit if either window is opened.

Prior burglar alarm installations required separate switches on the individual windows. The present invention uses a single switch to serve both windows. This simplifies the time and effects savings in parts, material and labor in installing a burglar alarm system. In addition the switch assembly is adapted for optional use of metallic loops on the windows to actuate the alarm if either loop is broken.

Other and further features, objects and advantages of the invention will become apparent from the following detailed description taken together with the drawings, wherein:

FIG. 1 is a perspective view of a first switch assembly embodying the invention shown mounted on a double hung window for burglar alarm protection, with the switch providing closed conductive circuit paths when the window is closed.

FIG. 2 is an enlarged horizontal sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a further enlarged sectional view taken through a switch bearing on line 3—3 of FIG. 2.

FIG. 4 is an exploded perspective view of parts of the switch bearing of FIG. 3.

FIG. 5 is an enlarged front view of a switch contact plate taken on line 5—5 of FIG. 1.

FIG. 6 is a vertical sectional view taken on line 6—6 of FIG. 5.

FIG. 7 is a rear view of the switch contact plate taken on line 7—7 of FIG. 6.

FIG. 8 is a front view of another switch contact plate taken on line 8—8 of FIG. 1.

FIG. 9 is a vertical sectional view taken on line 9—9 of FIG. 8.

FIG. 10 is a perspective of a second switch assembly shown mounted on a double hung window with the switch providing closed circuit paths when the window is closed.

FIG. 11 is an enlarged horizontal sectional view taken on line 11—11 of FIG. 10.

FIG. 12 is a vertical sectional view taken on line 12—12 of FIG. 11.

FIG. 13 is an exploded perspective view of parts of the second switch assembly.

FIG. 14 is a front view of a switch contact plate taken on line 14—14 of FIG. 10.

FIG. 14A is a front view similar to FIG. 14 of another switch contact plate.

FIG. 15 is an enlarged cross sectional view taken on line 15—15 of FIG. 14A.

FIG. 16 is an enlarged front view of a switch contact plate taken on line 16—16 of FIG. 10.

FIG. 17 is a further enlarged vertical sectional view taken on line 17—17 of FIG. 16.

FIG. 18 is a perspective view of a third switch assembly shown mounted on a double hung window and providing open circuit paths when the window is closed.

FIG. 19 is an exploded perspective view of parts of the third switch assembly.

FIG. 20 is an enlarged central sectional view through a switch contact assembly taken on line 20—20 of FIG. 19.

FIG. 21 is an enlarged fragmentary cross sectional view taken on line 21—21 of FIG. 19.

FIG. 22 is an enlarged front view of a contact plate taken on line 22—22 of FIG. 18.

FIG. 23 is a vertical sectional view taken on line 23—23 of FIG. 22.

Referring first to FIGS. 1–9, there is shown a first switch assembly S1 on double hung windows W1, W2. This switch assembly comprises an L-shaped casing 25 made of plastic material and at opposite ends of the casing are open ended pairs of bores 26, 28. Set in each of the bores is a switch contact assembly 31–34. Each of the four switch contact assemblies is identical in construction. As best shown in FIGS. 2, 3 and 4, each switch contact assembly is formed by two interfitted rectangular U-shaped metal frame members 36, 38 defining a box-like structure in which is a coil spring bearing against a movable cylindrical contact element 40 terminating in cylindrical pin 42 of reduced diameter and having a rounded tip 44. The pin extends through a hole 45 in the front or outer side of frame member 36. Spring 41 bears against the contact element 40 inside frame members 36, 38. The contact element 40 is urged outwardly by spring 41. Eye 46 at the opposite end of the switch contact assembly is disposed in an extension of bore 26 or 28. One end of a wire 48 is attached to the eye at the inner end of switch contact assembly 31. Another wire 50 is attached to the eye at the inner end of switch contact assembly 32. These wires are disposed in the same horizontal plane and are spaced apart as clearly shown in FIG. 2. Two small spaced metal plates 52, 54 are embedded in casing 25. Wire 48 is connected to metal plates 52. Another wire 53 connected to plate 54 is embedded in casing 25. Screws 56 and 58 extend through the casing 25 and through plates 52, 54 respectively and make contact with wires 59 and 60 on lower window frame 61. Connected to wires 60, 61 is a metal strip loop 62 on lower window pane 64 so that plates 52, 54 wires 48, 53 and switch contact assembly 31 are connected in direct electric circuit with each other via wires 60, 61 and metal strip loop 62.

Wires 50 and 53 are connected to eyes at inner ends of switch contact assemblies 33, 34 at the other end of the switch casing 25; see FIG. 2. Screws 70 inserted through holes 72 in casing 25 secure the switch casing to the top of window frame 62.

Pins 42 at the forward or front switch contact assemblies 31, 32 make contact with a switch contact assembly 74. This includes a plastic, insulative plate 75 secured by nails 76 on the inner side of casement 77; see FIGS. 1, 8 and 9. On plate 75 are secured laterally spaced metal strips 78, 79 held by screws 80, 81. These strips are contacted by pins 42 of switch contact assemblies 31 and 32 when the lower window W2 is in the closed position shown in FIG. 1. Wires 82 are connected to screws 80, 81 respectively and terminate at a remote alarm which is actuated when the upper window or lower window is moved to break the normally closed alarm circuit.

The alarm circuit is further closed at the upper window via a switch contact assembly 85. This switch contact assembly includes a plastic insulative plate 86 secured by nails or screws 88 to window sash 90. Spaced metal strips 92 and 93 at the front of plate 86 are bent over around the top and bottom edges of plate 86 and terminate in vertically spaced end portions 92', 93' to

which wires 94 are connected by screws 95, as shown in FIGS. 5, 6 and 7. The wires 94 are mounted on window frame 90 and are connected in a closed circuit with conductive strip loop 98 on upper window pane 99. The pins 42 at the rear switch contact assemblies 33, 34 contact metal strips 92, 93 when upper and lower windows are closed. It will now be clear that a single closed series circuit exists between wires 82 via both strip loops 62 and 98 and contact assemblies 31–34.

If the upper window W1 is lowered to open the window contact pins 42 of the rear switch contact assemblies 33, 34 will separate from rear switch contact assembly 85 to open the alarm circuit. If the lower window W2 is raised the contact pins of the front switch contact assemblies 31, 32 will separate from the front switch contact assembly 74 to open the alarm circuit. Thus the alarm circuit operates if either window is opened or if either strip loop 62 or 98 is broken.

In FIG. 10 is shown another switch assembly S2 shown mounted on double hung windows W1′ and W2′. Parts corresponding to switch assembly S1 are identically numbered. Switch assembly S2 provides a normally closed circuit between wires 82 which are connected to a remote burglar alarm. The assembly is somewhat simplified as compared with assembly S1 since the metallic, conductive strip loops 62 and 98 used with switch assembly S1 are omitted from windows W1′ and W2′. Casing is L-shaped and is made of insulative plastic material in two similar parts 101, 102. These parts are held by screws 103 on window frame 61′. Partitions 104 in the casing define channels in which are laid wires 105 and 106 connected at opposite ends to metallic contact members 107, 108; see FIGS. 11, 12 and 13. At the rear end of the casing contact members abut coil spring 110 which engage conductive metal balls 112 in holes 114 at rear end wall 116 of the casing. The springs are disposed in box-like chamber 115 at the rear end of the casing. The exposed balls engage in recesses 118 formed in metal contact plate 120; see FIG. 14. This plate is secured to frame 90′ of window W1′ by screws 122. A direct electric circuit thus exists between wires 105 and 106 via plate 120.

The front contact members 107 abut spaced coil springs 124 set in box-like chambers 126. The springs bear against conductive metal balls 128 which project outwardly of holes 130 formed in end wall 132 of the casing. These balls contact spaced rivets 133 in contact assembly 136 mounted on casement 77′. Contact assembly 136 includes an insulative plastic plate 138 having a recess at the back where spaced metal strips 139 are connected between rivets 133 and wires 82. The wires 82 are connected to the remote burglar alarm.

It will be apparent that the external, remote burglar alarm is connected to a closed circuit including ball bearing contact members 112 and 128, wire 105, contact members 107, 108, springs 110 and 124, contact plate 120 and conductive strips 139. If the lower window W2′ is raised or if the upper window W1′ is lowered, the closed series circuit will be opened to actuate the alarm.

In FIGS. 14A and 15 is shown an alternate form of contact plate assembly 120*a* which can be substituted for plate 120. This assembly includes a plastic insulative plate 140 provided with holes 142 to receive screws for mounting on window frame 90′. Rivets 144 are set in spaced holes 145 and are joined by a conductive bar 146 at the back of the plate 140. Conductive balls 112 engage in recesses 147 formed at the front ends of the rivets to complete the circuit through bar 146.

In FIGS. 18–23 is shown another switch assembly S3 mounted on double hung windows W1″ and W2″. The assembly is arranged so the alarm circuit is normally open circuited. The switch assembly includes an L-shaped switch casing 200 having a cover plate 202. The casing and cover are made of insulative plastic material. The cover is secured to the plate by bolts 204 and nuts 205. The casing is mounted on the top of window frame 61″ by screws 206.

Inside the casing are two metal straps 208 to which wires 210, 212 are connected by screws 214. Two spring biased contact assemblies 220 are mounted in bores 222 at the front end of the casing. Each contact assembly includes a conductive metal ball 224 against which bears a spring 226 in a tubular holder 228. The spring bears against a rear lug 230 to which one of wires 210 is connected. Two other spring biased contact assemblies 220′ identical in structure to assemblies 220 are disposed in bores 240 at the rear of the casing. Wires 212 are connected to these contact assemblies. A metal plate 120′ is mounted on upper window frame 90″. This plate is normally located above the switch casing spaced from contact assemblies 220′.

The front contact assemblies 220 normally contact a contact assembly 250 best shown in FIGS. 18, 22 and 23. This contact assembly includes an insulative plastic plate 252 on which are two spaced metal strips 254 to which wires 82 are connected. Plate 252 is longer than the height or thickness of casing 200. The balls 224 of contact assemblies 220 are normally in contact with strips 254. By this arrangement the remote burglar alarm circuit is normally open due to the open circuit condition at rear contact assemblies 220′. If either the lower window W2″ is raised or the upper window W1″ is lowered the circuit will be closed through conductive plate 120′ when contact assemblies 220′ are bridged by this plate. This will complete the burglar alarm circuit via plate 120′ and contact strips 254, to actuate the alarm.

It will be noted that the switch assemblies S2 and S3 do not require wiring the windows nor do they require application of metal tape or strips to the window panes. This simplifies the installation of the switch assemblies. If greater protection is required to sound an alarm in the event a window pane is broken, then switch assembly S1 which operates in conjunction with metal strip or tape loops may be used.

The several switch assemblies are characterized by their relatively simple construction so they can be manufactured at low cost. They can easily be installed. No particular skill or special tools are required.

While a limited number of embodiments of the invention have been described and illustrated, many modifications and variations are possible without departing from the invention.

What is claimed is:

1. A window switch assembly for operating a burglar alarm circuit, comprising a casing L-shaped in plan view and adapted for mounting on top of the window frame of the lower one of a pair of vertically slidable upper and lower framed double hung windows in a casement; a first circuit member on the frame of the upper one of the windows; a second circuit member on

the casement; means for connecting said alarm circuit to said second circuit member; a first pair of spring biased slidable contact elements at one end of said casing disposed to contact the first circuit member; a second pair of spring biased slidable contact elements at the other end of the casing disposed to contact the second circuit member; and conductors in said casing connecting said first and second contact elements so that lowering the upper window or raising the lower window changes the relative position of said first pair of contact elements with respect to said first circuit member to actuate said alarm circuit.

2. A window switch assembly as defined in claim **1**, wherein said first circuit element is a conductive member electrically bridging the first pair of spring biased contact elements when the upper window is raised and closed to define a series circuit between the contact elements of said second pair thereof, so that lowering the upper window or raising the lower window opens said series circuit to actuate said alarm circuit.

3. A window switch assembly as defined in claim **1**, wherein said first circuit element is a conductive member normally disposed out of contact with said first pair of spring biased contact elements when the upper window is raised and closed, whereby lowering the upper window or raising the lower window bridges the conductive member across the first pair of contacts to complete a series circuit between the contact elements of said second pair thereof for actuating said alarm circuit.

4. A window switch assembly as defined in claim **1**, wherein said first circuit member comprises a pair of spaced conductive elements; and further comprising a metallic loop on the upper window connected to said spaced conductive elements in a series circuit with the contact elements of said second pair thereof, whereby breaking said metallic loop breaks said series circuit to actuate said alarm circuit.

5. A window switch assembly as defined in claim **4**, further comprising another metallic loop on the lower window connected in series with said conductors, said conductive elements, the first named metallic loop, and said second pair of contact elements, whereby breaking said other metallic loop actuates said alarm circuit.

6. A window switch assembly as defined in claim **1**, wherein each one of said contact elements comprises means defining a chamber, a coil spring in the chamber, and a metallic ball at one end of the chamber, said spring bearing on said ball urging it outwardly of an end of said casing.

7. A window switch assembly as defined in claim **1**, wherein each one of said contact elements comprises means defining a chamber, a coil spring in the chamber, and an axially slidable cylindrical pin at one end of the chamber, said spring bearing on said pin and urging it outwardly at an end of said casing.

8. A window switch assembly as defined in claim **1**, wherein said casing is composed of insulative plastic material to prevent short circuiting the contact elements at opposite ends thereof.

9. A window switch assembly as defined in claim **1**, further comprising a metallic loop on the lower window connected to said conductors in the casing in a series circuit, so that breaking said loop breaks said series circuit to actuate said alarm circuit.

10. A window switch assembly as defined in claim **9**, further comprising another metallic loop on the upper window connected to said first circuit member in said series circuit with the first named loop, so that breaking said other metallic loop breaks said series circuit to actuate said alarm circuit.

* * * * *