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C. P. WILLSON  
PROTECTIVE SCREEN

3,051,935

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2 Sheets-Sheet 1

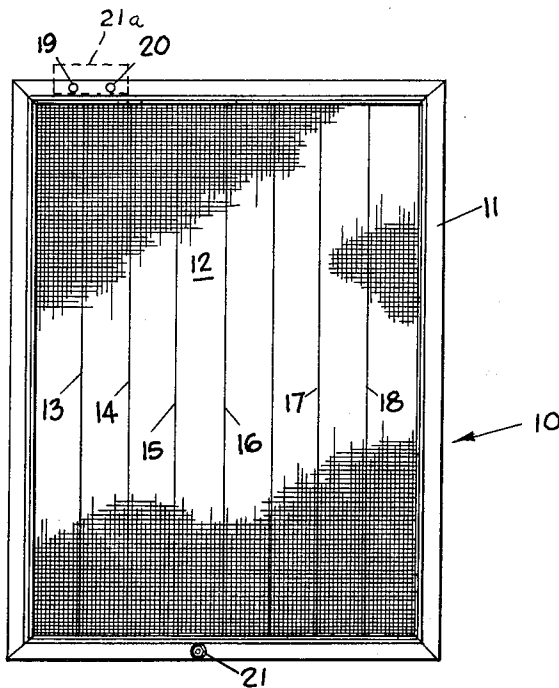


FIG. 1.

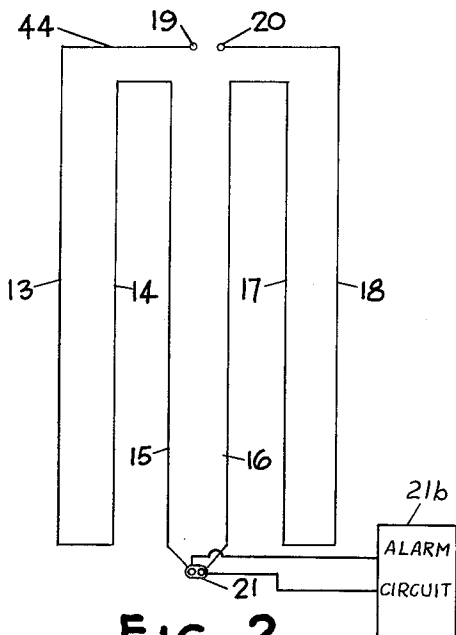


FIG. 2.

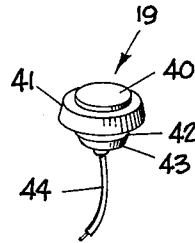


FIG. 4.

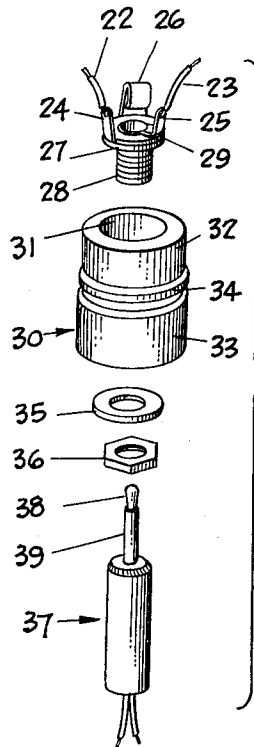


FIG. 3.

INVENTOR.  
CLARENCE P. WILLSON  
BY *Elliott & Pastoriza*  
ATTORNEYS.

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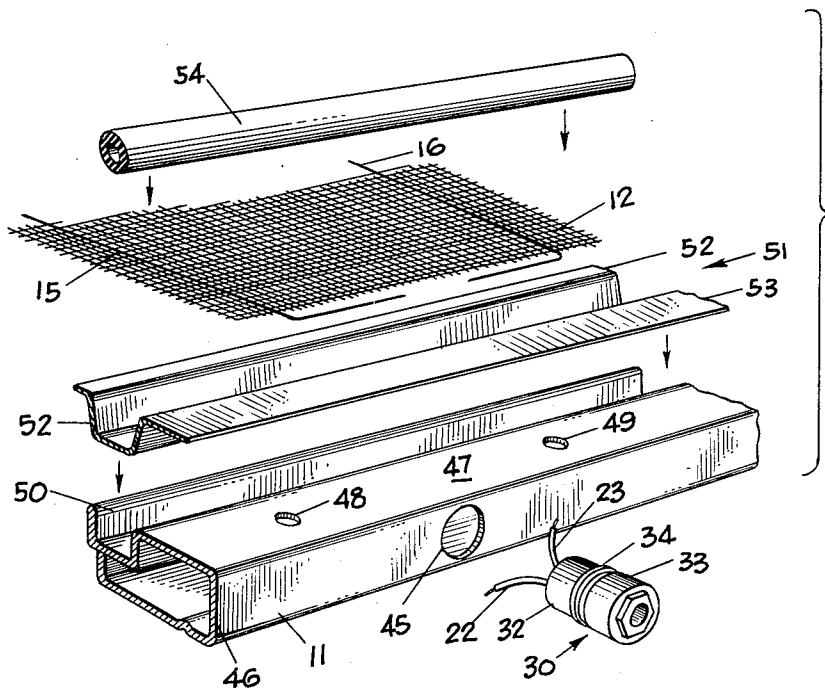


FIG. 5.

INVENTOR.  
CLARENCE P. WILLSON  
BY *Elliott & Pastoriza*  
ATTORNEYS.

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3,051,935

**PROTECTIVE SCREEN**

Clarence P. Willson, 4102 W. 105th St., Inglewood, Calif.  
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 2 Claims. (Cl. 340-273)

This invention generally relates to a protective screen structure and more particularly concerns a burglarproof screen structure adapted to be mounted over a window or other opening in a building. The screen structure embodies electrical circuitry which, upon removal of the screen and/or a cutting or tearing thereof, will actuate an alarm circuit signaling an unauthorized breaking into of the building.

The prior art includes many different types of protective screens which embody various electrical means for, respectively, actuating an alarm circuit in response to a cutting of the screen or a removal of it from its conventional mounting over a window, door, or the like. Certain disadvantages, however, appear to be inherent in most conventional screen structures. For example, most present day protective screens of this type normally do not embody electrical circuitry which visually blends in with the overall screen material whereby the protective elements cannot be seen. Furthermore, such conventional protective screens oftentimes embody modifications to the normal screen structure which makes such screens uneconomical to produce relative to the potential market for their application. In addition, certain of the prior art protective screen structures embody protective elements which are subject to deterioration or corrosion from the elements and which may not dependably function properly under emergency conditions.

It is, therefore, an object of the present invention to provide a protective screen structure which embodies relatively simple protective elements for connection into an alarm circuit, and yet which is not susceptible of deterioration or failure despite long periods of time of non-use.

Another object of the present invention is to provide a protective screen for connection into an alarm circuit, which may be readily embodied in existing screen structures without substantial modification thereof, and yet which requires only a minimum number of parts.

Another object of the present invention is to provide a protective screen for connection into an alarm circuit, in which the protective elements or electrical circuitry thereof is indistinguishable from the screen material such that a burglar or other unauthorized person will not be able to see that the screen has protective elements or wiring embedded therein.

Another object of the present invention is to provide a protective screen for use in an alarm circuit, which is particularly advantageously employed with "Fiberglas" cloth screens formed of non-conductive material.

These and other objects and advantages of the present invention are generally achieved by providing a screen structure adapted for mounting on a building or other space enclosing structure, which has circuitry embodied therein for connection with a normally closed protective circuit, the latter having alarm means actuated in response to an opening of the circuit.

The screen structure as such preferably comprises a combination including a frame, which is adapted to be mounted on the building or other space enclosing structure. A sheet of non-conductive screen material has its marginal portions secured to the frame and includes, as a primary feature of the present invention, two spaced apart strands of conductive wire which are interwoven in the screen material with each of the strands having one end portion terminating adjacent the frame.

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Means are included for insulating said one end portions of the strands from the frame. In addition, means are employed for interconnecting said one end portions, respectively, to either side of the protective circuit.

Furthermore, means are provided for electrically interconnecting the other end portions of the strands.

With such a structure, a series circuit is formed through the strands interwoven in the screen material, whereby a severing of one of the strands will open the normally closed circuit to actuate conventional alarm means.

A better understanding of the present invention will be had by reference to the drawings, illustrating merely a preferred embodiment in which:

FIGURE 1 is a plan view of a protective screen according to the present invention;

FIGURE 2 is a schematic diagram of the electrical circuitry embodied in the protective screen of FIGURE 1;

FIGURE 3 is an enlarged exploded perspective view of means interconnecting the electrical circuitry of the protective screen of FIGURE 1 with a conventional normally closed alarm system; and,

FIGURE 4 is an enlarged perspective view of one form contact means employed in conjunction with the protective screen of FIGURE 1;

FIGURE 5 is an exploded partial view of the protective screen of FIGURE 1, and more particularly a portion of the frame thereof indicating the manner of attaching the screen material as well as forming a series connection to the electrical circuitry thereof.

Referring now to the drawings, there is shown in FIGURE 1 a protective screen 10 according to the present invention. The protective screen generally includes screen material 12, preferably formed of "Fiberglas" wire cloth having its marginal portions secured to a frame 11. The frame 11 is preferably formed of aluminum members, although it may equally well be formed of other relatively rigid and light material.

According to a feature of the present invention, the screen 10 has interwoven in the screen material 12 a series of parallel wire strands 13, 14, 15, 16, 17, and 18 which are electrically conductive members and which partially form the protective elements of the screen 10. In a preferred construction, the screen material 12, assuming it is formed of "Fiberglas," is coated with a vinyl material. Similarly, in such a construction, the wire strands 13 through 18, are also covered with a vinyl material of similar coloring. In addition, it is desirable that the wire strands 13 through 18 have substantially the same external diameter as the vinyl coated "Fiberglas" strands making up the main body of the screen material 12. As a consequence, the protective strands 13 through 18 will be indistinguishable from the main body of the screen material 12, although for purposes of illustration the strands have been shown in darker lines in the drawing of FIGURE 1.

Referring now to the view of FIGURE 2, a schematic diagram is shown illustrating one form of electrical circuitry for connecting the strands 13 through 18 into a series circuit. In this regard, it will be noted that the strands 13 and 14 are connected to each other, the strands 14 and 15 connected to each other, the strands 16 and 17 connected to each other, and the strands 17 and 18 connect to each other. The free ends of strands 13 and 18 terminate at contact means 19 and 20, respectively. On the other hand, the free ends of strands 15 and 16 terminate in the connector 21. It will be appreciated that the number of strands employed will vary with the degree of protection desired as well as the size of the screen; however, a similar series circuit may be employed regardless of the number of strands.

With such a structure, the contact means 19 and 20 would actually comprise conducting buttons or the like as will be hereafter more fully described, which are adapted to be connected together through a conducting bar mounted on the window frame or other portion of the building structure, for example, as indicated schematically at 21a. In consequence, upon removal of the screen 10, the electrical connection between the contact means 19 and 20 would be severed to actuate an alarm circuit.

Referring now to FIGURE 3, there is shown a preferred structure for the connector 21, which has been schematically indicated in FIGURE 2. The connector 21 has leads 22 and 23 which are adapted to be connected to the strands 15 and 16. The lead 22 connects with a terminal 24 and the lead 23 connects with a terminal 25. One of the terminals is connected to a spring contact member 26, and the other of the terminals is connected to an inner sleeve contact 27. Of course, the terminals 24 and 25 are properly insulated from each other, as by insulating means 29. In addition, the connector includes a threaded member 28 extending from its lower end.

The connector 21 is adapted to be mounted in a support member 30 preferably formed of plastic, which defines therein a cup-shaped chamber 31 in an upper end portion 32. The member 30 includes a lower end portion 33 having a recess defining with the upper end portion 32, a flange 34. An inner flange may be formed between the upper end portion 32 and lower end portion 33 at the bottom of chamber 31 to retain the enlarged insulating means 29.

The threaded member 28 of the connector 21 extends through a bore, more clearly shown in the view of FIG. 5, provided in the lower end portion 33 to pass through a washer 35 and to be coupled to a nut 36, the latter holding the connector 21 in the support member 30.

With such a structure, a conventional jack 37 including conducting portions 38 and 39 may be received through the support member 30 to connect with the spring contact 36 and sleeve contact 37, respectively. Such jacks are well known in the art and do not form a part of the present invention.

In the view of FIGURE 4, there is shown one form of contact means 19 which might be employed in conjunction with the protective screen 10 in the electrical circuitry as illustrated in FIGURE 2. Thus, the contact means 19 may comprise a contact button 40, adapted for electrical contact with the conductor member 21a mounted on the window or other portion of the building structure, which is imbedded in an insulating means 41. The insulating means 41 is recessed as at 42 to define a lower flanged portion 43. A lead 44 is connected through the body of the insulating means 41 to connect with the contact button 40.

A better understanding of the actual assembly and structure of the protective screen 10 may be more clearly had by referring to FIGURE 5. FIGURE 5 illustrates a portion of the frame 11 at the point where the connector 21 is embodied therein. Towards this end, the frame 11 is provided with an opening 45 in its outer sidewall 46 to receive the support member 30, shown in FIGURE 4. Alternatively, the aperture 45 could be in the upper sidewall as in FIGURE 1. Thus, the flange or annular lip 34 is squeezed through the aperture 45 such that the recessed area between the lip 34 and the bottom portion 33 will be in the plane of the outer sidewall 46 with the lip 34 and bottom portion 33 pressing against opposing sides of the sidewall 46 to hold the support member 30 firmly mounted thereon.

The frame member 11 is further provided in its upper sidewall 47 in this area with apertures 48 and 49 through which leads 22 and 23 may extend after passing into the interior of the frame 11. The frame 11 further defines a channel 50 along its inner peripheral edge.

The channel 50 co-functions to retain the screen ma-

terial 12, and more specifically the marginal portions of the screen material 12 in connection to the frame 11.

An insulating member 51, preferably of thin plastic material, is provided with an arcuate portion 52 adapted to be received in the channel 50. The insulating member 51 further includes marginal portions 52 and 53 adapted to overlie respectively the inner sidewall of the channel 50 and a portion of the upper sidewall 47.

After the insulating member 51 has been firmly fixed within the channel 50, the screen material 12 is drawn sufficiently thereover such that the screen material 12 may be forced down into the arcuate portion 52 of the insulating member and retained therein as by a plastic tubular retainer 54, the latter being well known in the art. As this assembly procedure is being accomplished, the conducting strands 15 and 16 are more particularly the free ends thereof are connected to the respective leads 22 and 23 which have been passed up through the apertures 48 and 49. These connections may be made by either merely twisting the bare wires together or by soldering or by other conventional electrical connecting means.

Thereafter in a preferred form the invention, the connections and entire exterior surface of the upper sidewall 47 are coated with an insulating epoxy to insulate and protect the connections from failure because of shipping, installation or the like, as well as deteriorations because of adverse weather conditions. Similar connections will be made between the members 13-14, 17-18, etc. on top of the marginal portion 53 along the lower end of the frame 11 of the protective screen 10.

The contact means 19 and 20, for example, in the form of contact buttons of the type shown in FIGURE 3 will be mounted, in a somewhat similar manner. Thus, the flange 43 will be forced under the upper sidewall of the frame 11 at its upper end into appropriate apertures provided therein. In addition, openings similar to apertures 48 and 49 could thus be drilled in the upper sidewall through which the lead 44, for example, could pass to connect with the free end of the wire strand 13, for example. Of course, the structure of employing an insulative member 51 interposed between the wire material 12 and the frame 11 would be employed both throughout the upper as well as the lower end of the frame 11 wherever electrical connections are being made in order to positively assure against the possibility of failure of the electrical connection or damage through weathering or other types of deteriorating action.

The operation of the protective screen will be apparent from the above description. In the event a burglar attempts to cut the screen or remove it, the electrical connection through the conducting strands 13 through 18 or the contacts 19-20, respectively, will be broken. In consequence the normally closed conventional alarm circuit (indicated at 21b) connected to the leads of jack 37 will be broken.

It will be appreciated that many modifications and changes may be made to the protective screen of the present invention without departing from the spirit and scope thereof as set forth in the following claims.

What is claimed is:

1. In a normally closed protective circuit for guarding a space enclosing structure and having alarm means actuated in response to an opening of said circuit, the combination comprising: a frame mounted on said space enclosing structure; a sheet of non-conductive screen material having its marginal portions secured to said frame; at least two spaced apart strands of conductive wire interwoven in said screen material, each of said strands having one end portion terminating adjacent said frame; means insulating said one end portions from said frame; means interconnecting said one end portions, respectively, to either side of said protective circuit; spaced part contacts connected to the other end portions of said strands; and, an electrical conductor secured to said space en-

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closing structure designed to electrically interconnect said other end portions by bridging said contacts, whereby removal of said frame from said space enclosing structure or severing of one of said strands will open said circuit.

2. In a normally closed protective circuit for guarding a space enclosing structure and having alarm means actuated in response to an opening of said circuit, the combination comprising: a rectangular frame mounted on said space enclosing structure; a sheet of "Fiberglas" screen material having its marginal portions secured to said frame; at least two spaced apart strands of conductive wire interwoven in said screen material and extending the length of said frame, each of said strands having one end portion terminating adjacent one end of said frame and its other end portion terminating adjacent the other end of said frame; means interconnecting said one

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end portions, respectively, to either side of said protective circuit; spaced apart contacts connected to the other end portions of said strands; and, an electrical conductor secured to said space enclosing structure designed to electrically interconnect said other end portions by bridging said contacts, whereby removal of said frame from said space enclosing structure or severing of one of said strands will open said circuit.

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