

United States Patent

[11] 3,596,265

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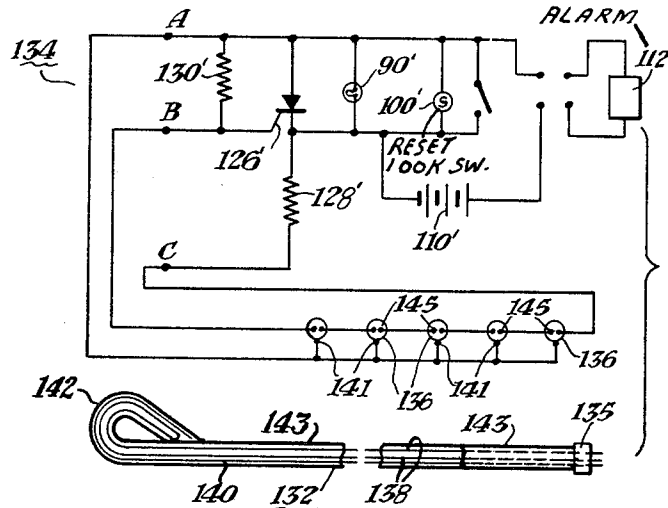
[54] **TAMPER-PROOF SHOPLIFTING ALARM**
10 Claims, 6 Drawing Figs.

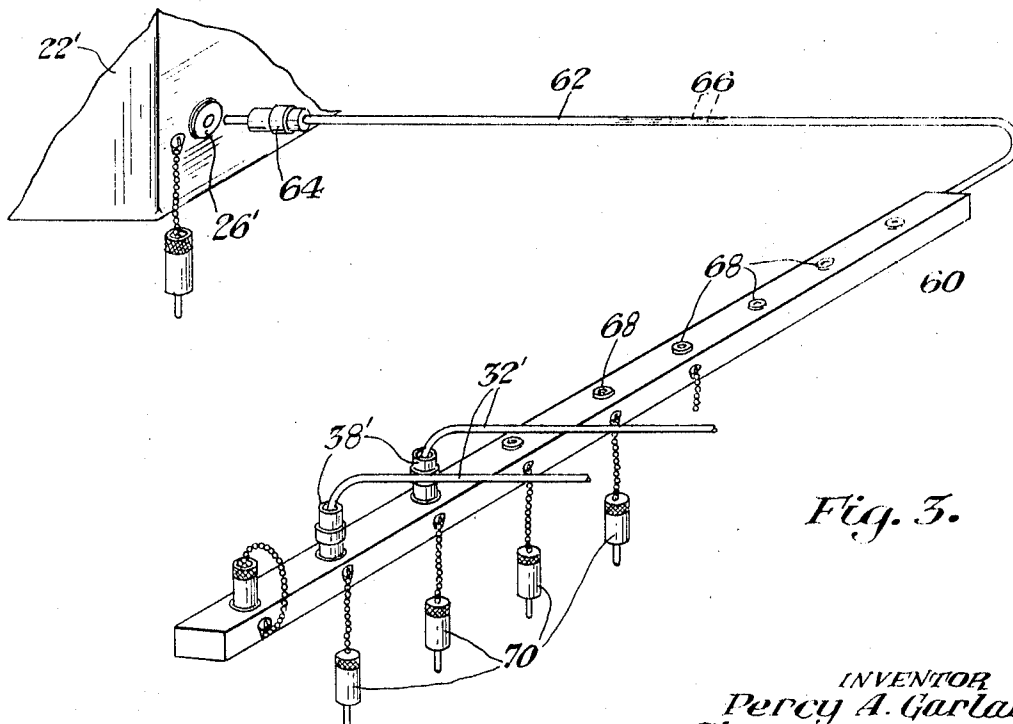
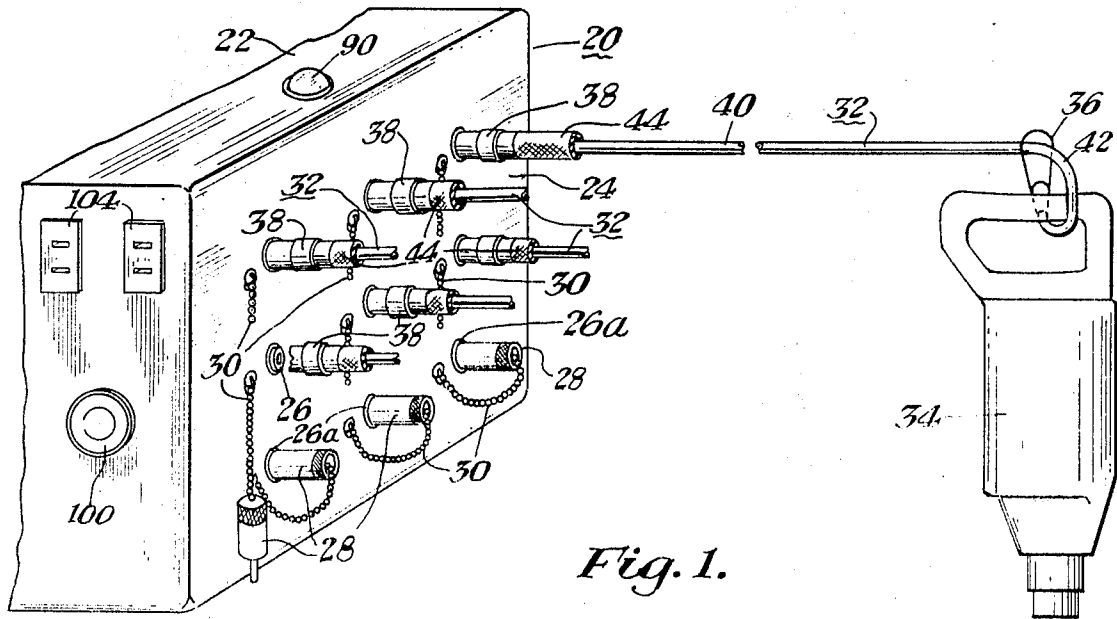
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[51] Int. Cl. **G08b 21/00**
[50] Field of Search **340/280,**
283, 256, 253; 339/36, 147

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ABSTRACT: I disclose a shoplifting alarm comprising a housing, a plurality of circuit jacks mounted on a wall of said housing, a number of loop segments attachable to said jacks for completing an alarm circuit including alarm means and being contained within said housing, means at the other end of each of said loops for securing said loops to articles of displayed merchandise, and means for preventing substantial separation of said loop segments from said housing.





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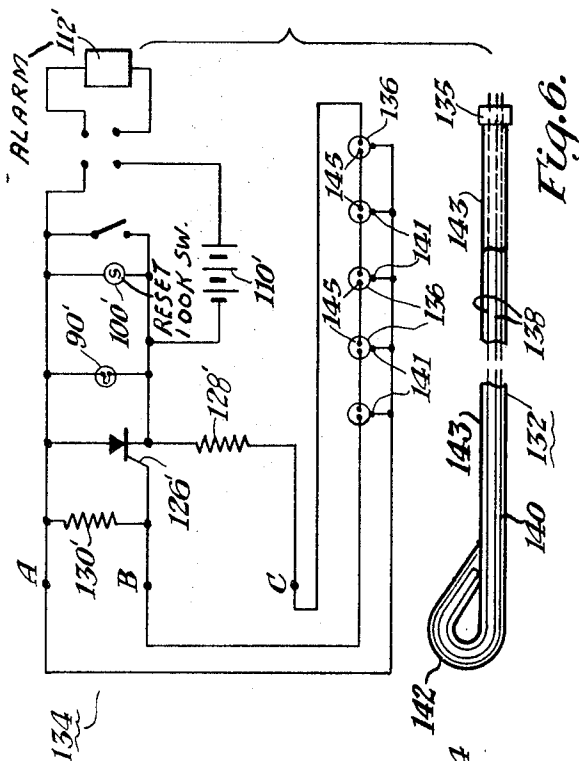


Fig. 4.

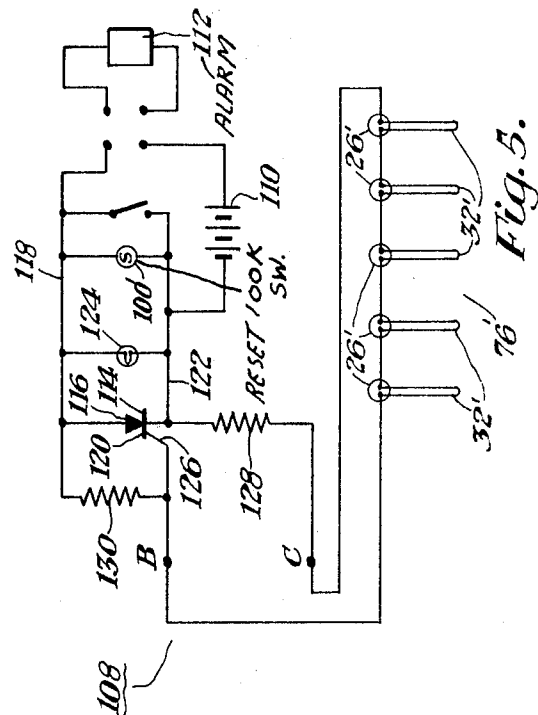
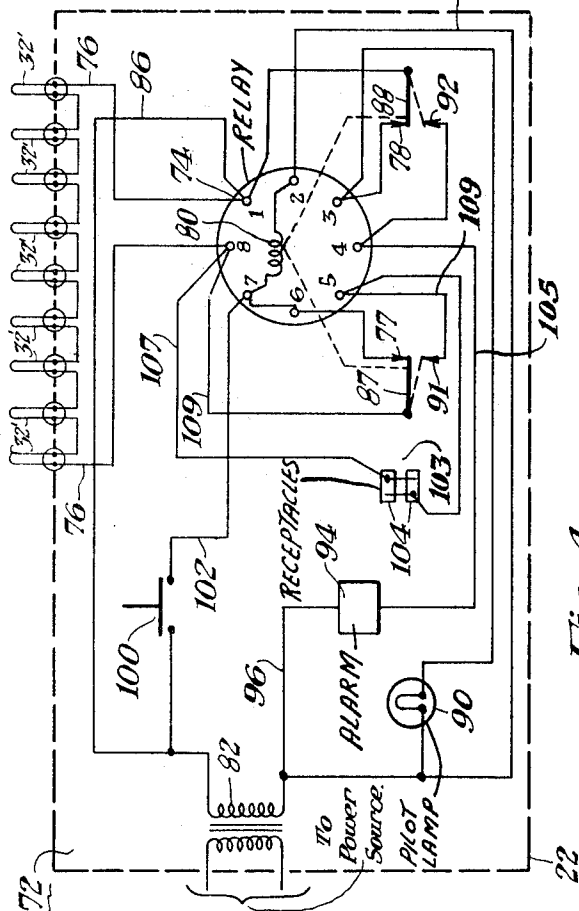


Fig. 5.



TAMPER-PROOF SHOPLIFTING ALARM

The present invention relates to a shoplifting alarm system and more particularly to an alarm system which is capable of indicating a specific criminal intent relative to a specific article of merchandise and which cannot be reset by the criminal or tampered with by an insider for purposes of extinguishing or deactivating the alarm.

It is well known that shoplifting, along with other types of crime, is increasing at geometric rates and many businesses have suffered tremendous losses from shoplifting. The total amount of merchandise stolen by shoplifters amounts to an estimated one to three billion dollars annually in this country. There may be as many as 150,000 shoplifting acts per week, with total business losses equal to 2-3 percent of nationwide gross sales.

Detection of shoplifting activities involves several serious legal as well as technical problems. The laws of many states require that the shoplifter be apprehended before he leaves the store and in many cases at the precise location of the crime, i.e., at the sales counter from which the merchandise was lifted. The use of an adequate alarm system at the sales or display counter would apply a substantial deterrent to this type of criminal. For these reasons it is extremely urgent that a suitable alarm or detection system be provided at each display or sales counter and be arranged that the tripping of the alarm shall indicate a specific intent on the part of the shoplifter to steal a specific item of merchandise, rather than a mere indication of removal of merchandise from some indefinite location on the display counter. Known alarm systems have not been capable of the requisite specific indication of criminal intent.

Shoplifting alarm systems of many varieties have been developed in the past. Many of these systems such as typified by U.S. Pat. Nos. 1,765,223 to C. C. Ferris and 1,105,504 to Gargon have found rather little demand for their use as the merchandise could not be handled by prospective customers of the store without setting off the burglar alarm. These systems involved the use of normally closed switches and the like which were held open by the weight of the merchandise on a display rack or the like. In addition to the obvious difficulties involved in prohibiting handling of the protected merchandise, these alarm systems obviously could not distinguish between inadvertent bumping or handling of the merchandise and a specific criminal intent to lift or steal specific items of merchandise.

Other known alarm systems involve the use of the electric leads or cords of electrical appliances. The cords are inserted into plug receptacles to maintain the alarm system in its preset condition. Removal of the electric cord activates the alarm. This type of shoplifting alarm is illustrated by patents to Cremer 3,090,948; Lewin 3,127,597; Trayner 3,045,226 and Sliman 3,114,904 and 3,114,905. Although these alarm systems permit a limited customer inspection of the merchandise, there is no way to differentiate between inadvertent removal of the appliance plug from the alarm receptacle and an intent to steal a given article. Thus, it is virtually impossible to apprehend the criminal at the display counter or elsewhere within the store. A further drawback is the obvious fact that this type of alarm system is only useful for electrical appliances.

The alarm systems typified by Lee 2,913,712 and O'Conner 883,335 are somewhat more sophisticated in that a closed loop or continuity conductor is connected to an alarm circuit and is threaded through or looped around various types of merchandise. In the Lee alarm for example a number of single pole switches are connected in the loop at locations respectively adjacent the items of merchandise. These switches are frictionally maintained in their connected position, with the result that under normal inspection of the goods, it is likely that one or more of the switches may be inadvertently disconnected to actuate the alarm. Again, it is extremely difficult to distinguish between an inadvertent tripping of the alarm system and an actual criminal intent.

I overcome these disadvantages of the prior art by providing a shoplifting alarm system which is capable for use with all types of merchandise. Although a continuity circuit is employed the circuit is separated into discreet loop segments with each segment being secured individually to an article of merchandise. The loop segments are plugged into series-connected outlet jacks or other suitable terminal means, mounted on a housing or casing for the alarm circuit. A number of these outlet jacks desirably are provided together with means for short-circuiting or bypassing those which may be unused at any given time. Each loop segment is secured to the associated article of merchandise and to the alarm system such that considerable force is required to detach or remove the loop segment. Thus, a specific criminal intent is denoted by an easily recognizable act of violence such as breaking the loop segment, cutting the segment or pulling the same with such force to remove it from the alarm circuit casing. Thus, a would-be shoplifter is in a very poor position to claim inadvertence in setting off or tripping the shoplifting alarm.

The loop segments can be made in virtually any required length to permit handling of the merchandise for normal customer inspection without danger of inadvertently tripping the alarm system. In addition, the loop segments can be easily disguised either for aesthetic purposes or to conceal their function in an electrical alarm circuit.

I accomplish these desirable results by providing a shoplifting alarm comprising a housing, a plurality of circuit jacks mounted on a wall of said housing, a number of loop segments attachable to said jacks for completing an alarm circuit including alarm means and being contained within said housing, means at the other end of each of said loops for securing said loops to articles of displayed merchandise, and means for preventing substantial separation of said loop segments from said housing.

I also desirably provide a similar alarm system wherein said circuit includes alarm means mounted within said casing, and output terminal means coupled to said circuit and mounted in a wall of said casing for external access, said output terminal means being connected to said circuit generally in parallel with said alarm means for the actuation of external recording means upon energization of said alarm means.

I also desirably provide a similar alarm system wherein a shorting jack is secured to said casing adjacent each of said circuit jacks and engageable therewith for bypassing unused ones of said circuit jacks.

I also desirably provide a similar alarm system wherein at least one of said loop segments is connected to an auxiliary housing, an additional number of said circuit jacks are mounted on said housing and electrically connected to said one loop segment, and additional loop segments are provided for said auxiliary housing.

I also desirably provide a similar alarm system wherein said alarm circuit includes resettable circuit means for actuating said alarm means upon interrupting the continuity of one of said loop segments, electrically latchable means forming part of said circuit means for continuing the energization of said alarm means upon restoration of said continuity, and resetting means for unlatching said latchable means.

I also desirably provide a shoplifting alarm circuit including a controlled semiconductor having a triggering electrode, circuit means for connecting said semiconductor in series with alarm means and a source of electric potential so that said alarm means are energized in the conductive state of said semiconductor, a triggering circuit for connecting said triggering electrode to said source, and a shunting continuity circuit connected across at least a portion of said triggering circuit to prevent the application of source potential to said electrode, said continuity including at least one conductive loop segment shape for securance to an article of merchandise.

During the foregoing discussion, various objects, features and advantages of the invention have been set forth. These and other objects, features and advantages of the invention together with structural details thereof will be elaborated upon during the forthcoming description of certain presently

preferred embodiments of the invention and presently preferred methods of practicing the same.

In the accompanying drawings I have shown certain presently preferred embodiments of the invention and have illustrated certain presently preferred methods of practicing the same, wherein:

FIG. 1 is a perspective and circuit schematic view of one form of shoplifting alarm system arranged in accordance with my invention;

FIG. 2 is a partial isometric view partly in section of a display counter illustrating one arrangement for mounting my novel shoplifting alarm thereon;

FIG. 3 is a partial, similar view showing another form of the system similar to that shown in FIG. 1;

FIG. 4 is a schematic diagram of one form of operating circuit for my shoplifting alarm system;

FIG. 5 is a schematic view of another form of operating circuit; and

FIG. 6 is a circuit schematic of still another form of my novel alarm circuit.

Referring now to FIGS. 1 and 2 of the drawings, my novel shoplifting alarm 20 includes a housing or casing 22 in which is mounted a suitable alarm circuit such as that shown in FIG. 4 or FIG. 5 and described in detail hereinafter. The housing 22 includes at least one panel 24 having a number of circuit or output terminals or jacks 26 mounted thereon. The jacks 26 are wired internally of the casing 22. In this arrangement the terminals 26 can be in the form of female jacks each of which is provided with a male bypassing or shorting plug or jack 28 conveniently chained or otherwise secured to the panel 24 as denoted by reference characters 30. Each bypassing plug 28 is internally wired to short circuit the associated jack 26 when the latter is not in use, as denoted by jack 26a.

A number of loop or continuity segments 32 are provided for securance to various articles of merchandise 34 respectively by means, for example, of cats paws 36 or other suitable mechanical connection means adjacent one end thereof. The loop segments 32 do not depend upon any internal electrical circuit or electrical leads characteristic of certain types of merchandise. The other ends of the loop segments 32 are connected to complementary jacks, for example, male jacks 38, which are engageable with the panel jacks 26. When each of the panel jacks 26 is engaged either with a loop segment 32 or a shorting jack 28 the load or continuity circuit for the alarm system 20 is completed. Irrespective of the number of loop segments 32 in actual use (whether equal to the total number of panel jacks 26 or to some lesser number) a continuous circuit is established by means of the loop segments 32, panel jacks 26, bypassing jacks 28 (if used) and the internal circuit of housing 20 as described more fully hereinafter. As each loop segment 32 is secured to only one item of merchandise, when a given loop segment 32 is broken or cut it is indisputable as to which article was attempted to be shoplifted.

Each loop segment 32 in this example includes an insulated conductor 40 the loop end or eyelet 42 of which can serve in preparing the cats paw 36 mentioned above. A plastic covering or insulation desirably is applied to the conductor 40 and simulates the appearance of a string or cord to disguise the function of the loop segment 32. In addition, an outer covering or sheath 44 can be provided for the insulated conductor 40 for protective purposes or to further disguise the function of the loop segment 32.

In the installation of the alarm system, as better shown in FIG. 2 the casing 22 can be mounted in an inobvious location such as on shelf 46 underneath display counter 48. The loop segments 32 desirably are passed through aperture means such as one or more openings 50 in the display counter 48 and thence to respective items of merchandise as shown. To provide a maximum indication of specific criminal intent, the casing 22 desirably is mounted with respect to the one or more counter openings or apertures 50 such that an application of pulling forces to any one of the loop segments 32 straightens the intervening portion 52 of the loop segments so that it is

disposed at substantially a right angle to the withdrawal direction of its jack 38. Thus, it is virtually impossible to dislodge the jack 38 from its associated panel jack 36, as the casing 22 is rigidly secured to shelf 46 for example by means of mounting brackets 54. The cable segment 32, then, together with the specific item of merchandise secured thereto can only be removed from the display counter 48 by breaking or cutting the loop segment 32 which of course trips the alarm circuit as detailed below. After the alarm circuit is tripped, it becomes electrically latched so that the alarm cannot be extinguished by any attempt of the shoplifter to reestablish the continuity of the loop segment, for example by twisting together the broken or cut ends of the loop segment 32.

In order to minimize tampering with the alarm system 20 by an insider, the electrical supply for the casing 22 is provided by means of a BX cable 56 or other suitably armored cable which is wired directly to the entrance or junction box (not shown) through the building structure for example wall 58.

Alternatively or in conjunction with the aforementioned angular disposition of the casing 22 relative to the apertures 50, the apertures can be sized to permit passage of the looped end 42 of the associated loop segment 32 but to retain the larger diameter loop segment jack 38 in the event that the latter does become dislodged from the casing panel 24.

Depending upon size limitations, the jack panel 24 of casing 22 obviously can be enlarged to allow space for additional panel jacks 26 and additional loop segments 32. However, for use with a given casing 22' as shown in FIG. 3, auxiliary housing means can be provided for increasing the number of loop segments 32 which can be electrically connected to a specified casing 22'. The auxiliary housing means can afford shoplifting protection for adjacent display counter or for additional merchandise on the counter 48. One form of such auxiliary housing means includes a trough or wire-mold structure denoted generally by reference character 60 connectable by means of loop segment 62 and jack 64 to any one of the panel jacks 26'. The loop segment 62 and jack 64 thus can be inserted in place of one of the loop segments 32 or one of the bypassing jacks 28 of FIG. 1.

The loop segment 62 includes a pair of conductors 66 which extend substantially the length of the trough 60 and are wired in parallel to a number of trough jacks 68 each of which desirably is similar to the panel jacks 26 or 26'. At each trough jack 68 a shorting plug 70 is secured to the trough structure 60. The bypassing or shorting jack 70 can be used in the same manner as that described in connection with the bypassing jacks 28 of FIG. 1. The trough structure 60 therefore supplies additional connection points for additional loop segments 32' including their jacks 38'. The alarm circuit, then, can be extended to include additional items of protected merchandise.

The trough structures or auxiliary housings 60, for example, can be mounted upon or beneath nearby display counters so that a number of such counters can be controlled with my novel shoplifting alarm system using a single casing 22 or 22'. Desirably, the trough structure 60 is installed, in accordance with the teachings set forth in connection with FIG. 2, so that the loop segments 32 must be pulled substantially at right angles to their connection jacks 38'.

Referring now to FIG. 4 of the drawings, an exemplary alarm circuit 72 is controlled by the circuit continuity through loop segments 32' and, in this example, is generally supported within the casing 22. As explained previously the loop segments are electrically secured to a number of series connected jacks 26' coupled to relay 74. The continuity circuit 76 thus formed is connected in series with normally open relay contacts 77 and relay coil 80. This series circuit is connected to transformer secondary 82 through conductors 84 and 86. A pilot lamp 90 is connected to the other normally closed, stationary relay contact 78. While the relay coil 80 is energized the movable relay contacts 87, 88 are held against a first pair of stationary relay contacts 77, 78. The pilot lamp 90 and the relay coil 80 therefore are electrically latched in the set or untripped condition of the relay 74 as denoted by the solid outlines of the movable contacts 87, 88 in FIG. 4.

When a break occurs in one of the loop segments 32' the electric circuit through the conductors 84, 86, the continuity circuit 76 and the relay coil 80 is interrupted. This trips the relay 74 and allows the movable contacts 87, 88 to contact the other normally closed pair of stationary contacts 91, 92. An attempt to reestablish the continuity of the broken loop segments 32' fails to reset the alarm circuit 72, as it is now impossible to establish a circuit through the normally open relay contacts 77—87. Upon deenergization of the relay coil 80 and the closure of relay contacts a buzzer or other suitable alarm 94 is energized through conductors 96 and 86 and relay contacts 88—92. At the same time separation of relay contacts 96 and 86 extinguishes the pilot lamp 90. Separation of relay contacts 77 and 87 on the other hand prevents relay coil 80 from being reenergized if the shoplifter attempts to reestablish the broken connection in loop 32'.

In order to reset the alarm circuit 72 when desired, a normally open lock switch 100 is coupled in bypassing relation to conductor 86 and continuity circuit 76 directly to the relay coil 80 through conductor 102. After the broken loop segment or segments 32' have been repaired momentary closure of the lock switch 100 resets the relay 74, as the coil 80 closes contacts 77—87 and 78—88 to reestablish a preset circuit path through the relay coil 80 and continuity loop 76. The pilot lamp 90 and the lock switch 100 can be mounted on the casing, as shown in FIG. 1 of the drawings.

When the alarm circuit 72 is tripped a shunting switch circuit 103 including a pair of plug receptacles 104, relay contacts 87, 91, and conductors 105, 107, are shunted by relay contacts 87, 91 and conductor 109 when relay coil 80 is open-circuited by a break in the continuity circuit 76. For convenient access, the receptacles 104 can be mounted on the casing 22 as better shown in FIG. 1 and can be used to connect a recorder surveillance camera, or both to suitable power sources, when relay contacts 87, 91 are thus closed.

A static alarm circuit, likewise arranged in accordance with my invention, is illustrated in FIG. 5 of the drawings. In this arrangement, a source of electrical potential such as battery 110 is connected in electrical series with a buzzer or other suitable alarm 112 and a controlled semiconductor such as SCR (silicon controlled rectifier) 114. In this example, the SCR cathode 116 is connected to buzzer 112 through conductor 118 while the SCR anode 120 is connected to the negative terminal of source 110 through conductor 122. With the arrangement thus far described the alarm 112 obviously will be energized when the controlled semiconductor 114 is in its conductive state. The conductive state or tripping of the circuit 108 can further be indicated by pilot lamp 124 connected in parallel with the anode-cathode circuit of the conductor 114. The lamp 124 is effectively removed from the circuit when the SCR becomes conductive.

In this arrangement of the invention the output or panel jacks 26' are connected in electrical series between gate or triggering electrode 126 of the SCR 114 and its anode 120. A gate bias resistance 128 is coupled in series with the continuity circuit 76. A gate locking resistance 130 is connected between the SCR gate electrode 126 and cathode 116. The aforementioned loop segments 32' are connected to the jacks 26' and to display merchandise in the manner described above with reference to FIGS. 1—3 of the drawings. The jacks 26' likewise can be mounted on a housing or casing such as that shown in FIG. 1.

As long as circuit continuity exists through the series-connected loops 32', the opposing voltage developed across resistances 128, 130 prevents the application of triggering a potential to SCR gate 126. The SCR 114 remains, therefore, in its nonconductive state. However, when one of the loop segments 32' is cut, broken or removed the resulting open circuit effectively disconnects gate bias resistance 128 and permits a triggering potential, developed across gate locking resistance 130, to be applied to the gate 126. As a result the SCR 114 fires and energizes the buzzer or other alarm 112. When the SCR thus becomes conductive the pilot lamp 124 coupled in parallel therewith is extinguished, as noted previously.

As is well known, once an SCR is gated, it is maintained or electrically latched in its conductive state by an adequate flow of anode-cathode current. In consequence, the alarm 112 continues to sound irrespective of any impromptu repairs attempted upon the continuity circuit 76' by the shoplifter or an "insider." The circuits of FIGS. 4—6 with the exception of the loop segments 32' can be mounted in suitable casings such as that shown in FIGS. 1—3 of the drawings.

To reset the alarm circuit 108, lock switch 100' is connected across conductors 118, 122 in electrical parallel with the anode-cathode circuit of the SCR 114. By momentarily closing the lock switch 100' (as with a key entrusted to a reliable employee) the SCR anode-cathode circuit is shorted out and the SCR is returned or reset to its nonconductive state. The lock switch 100', of course, is actuated only after restoration of continuity through the loop circuit 76'.

A similar static alarm circuit is shown in FIG. 6 of the drawings. In this arrangement a number of loop segments 132 are connected in electrical parallel to static alarm circuit 134. The loop segments 132 for example can be connected to three element male jacks 135 which in turn are insertable into panel female jacks 136. The jacks 136 can be mounted on a suitable casing or housing in the manner of the panel jacks 26 of FIG. 1.

In this arrangement of my invention each loop segment 132 includes a loop conductor 138 and a conductive shield wire 140 or the like extending the length of the loop segment 132 and around cats paw loop 142 formed at the outward end thereof. The loop segment can be furnished with a suitable covering 143 to conceal the components thereof. The panel jacks 136 are wired as shown so that the shields 140 of the loop segments are connected in electrical parallel by jack contacts 141 to one side of the gate locking resistance 130'. The remaining terminals 145 of the panel jacks 136 connect the loop conductors 138 and the gate bias resistance 128' to the other side of the gate lock resistance 130'.

With this arrangement the interaction of the gate biasing and locking resistances 128', 130' prevents the application of triggering voltage to SCR gate 126'. The gate locking resistance 130', however, is shunted when the shield 140 of any one of the loop segments 132 is shorted to the loop conductor 138, as when an attempt is made to cut the loop segment 132. At such time the voltage drop across bias resistance 128 is no longer opposed by that across locking resistance, and the SCR is triggered to its conductive state to energize the alarm 112'. The circuit 134 on the other hand functions in much the same manner as the circuit 108 of FIG. 5 when one of the loop conductors 138 is broken to disconnect or open-circuit the gate bias resistance 128'. The circuit of FIG. 6 can be reset by means of lock switch 100'. The circuit of FIG. 6 not only actuates a burglar alarm when one of the loop segments is completely severed or broken, but also when an unsuccessful attempt is made to cut one of the loop segments 132 with a knife or the like. To ensure detection of attempted cutting in every direction, the shield wire 140 can be spiraled around the loop conductor 138 of each segment 132 or can be replaced by a braided shield, for example.

From the foregoing it will be apparent that novel and efficient forms of tamper-proof shoplifting alarm systems have been disclosed herein. While I have shown and described presently preferred embodiments of the invention and have illustrated presently preferred methods of practicing the same it is to be distinctly understood that the invention is not limited thereto but may be variously embodied and practiced within the scope of the following claims.

I claim:

1. A shoplifting alarm comprising a housing, a plurality of circuit jacks mounted on a wall of said housing, a number of continuity loop segments attachable to said jacks for completing a continuity loop, an alarm circuit including alarm means and relay means, said alarm circuit being contained within said housing, means at the other end of said loops for securing said loops to articles of displayed merchandise, means for

preventing substantial separation of said loop segments from said housing, said continuity loop and said relay means being so coupled to said alarm means as to delay energization thereof until a break occurs in one of said loop segments, said relay means including a controlled semiconductor having a triggering electrode, circuit means for connecting said semiconductor in series with said alarm means and a source of electric potential so that said alarm means are energized in the conductive state of said semiconductor, a triggering circuit for connecting said triggering electrode to said source, and a shunting continuity circuit including said continuity loop segments connected across at least a portion of said triggering circuit to prevent the application of source potential to said electrode.

2. The combination according to claim 1 wherein said triggering circuit includes opposing resistance means coupled to said source and to said triggering electrode, and one of said resistance means being coupled in series with said continuity circuit.

3. The combination according to claim 2 wherein each of said loop segments includes electrical shield means extending along the length thereof, and the other of said resistance means are connected between said shield means and a loop conductor of each loop segment so that severing or removing one of said loop conductors or shorting said shield means thereto will trigger said controlled semiconductor.

4. The combination according to claim 1 wherein a normally open lock switch is coupled to said alarm circuit in parallel with said controlled semiconductor such that momentary closure of said normally open switch means resets said semiconductor to its nonconductive condition to deenergize said alarm means after said semiconductor has been triggered to energize said alarm means.

5. A shoplifting alarm circuit including a controlled rectifier having a gating electrode, circuit means for connecting said rectifier in series with alarm means and a source of electric potential so that said alarm means are energized in the conductive state of said rectifier, a triggering circuit for connecting said gating electrode to said source, and a shunting continuity circuit connected across at least a portion of said trig-

gering circuit to prevent the application of source potential to said gating electrode, said continuity circuit including a plurality of conductive loop segments shaped for securance to respective articles of merchandise, said alarm means being connected to the anode-cathode of said rectifier so that a break in one of said segments causes said rectifier and said source to energize said alarm means, said alarm means continuing to be energized through said anode-cathode although a circuit is reestablished through said one segment.

6. The combination according to claim 5 wherein said alarm circuit includes resettable circuit means for actuating said alarm means upon interrupting the continuity of one of said continuity loop segments, electrically latchable means forming part of said relay means for continuing the energization of said alarm means upon restoration of said continuity, and resetting means for unlatching said latchable means.

7. The combination according to claim 5 wherein said triggering circuit includes opposing resistance means coupled to said source and to said triggering electrode, and one of said resistance means being coupled in series with said continuity circuit.

8. The combination according to claim 7 wherein said loop segment includes electrical shield means extending along the length thereof, and the other of said resistance means are connected between said shield means and a loop conductor of each loop segment so that severing or removing said loop conductor or shorting said shield means thereto will trigger said controlled semiconductor.

9. The combination according to claim 5 wherein output terminal means are coupled to said circuit and are mounted in a wall of said housing for external access, said output terminal being connected to said circuit generally in parallel with said alarm means for the actuation of auxiliary external alarm means or recording apparatus connected to said terminal means upon energization of said alarm means.

10. The combination according to claim 5 wherein a plurality of shorting jacks each including a shorting continuity segment are secured to said housing respectively adjacent each of said circuit jacks and engageable therewith for bypassing unused ones of said circuit jacks.

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