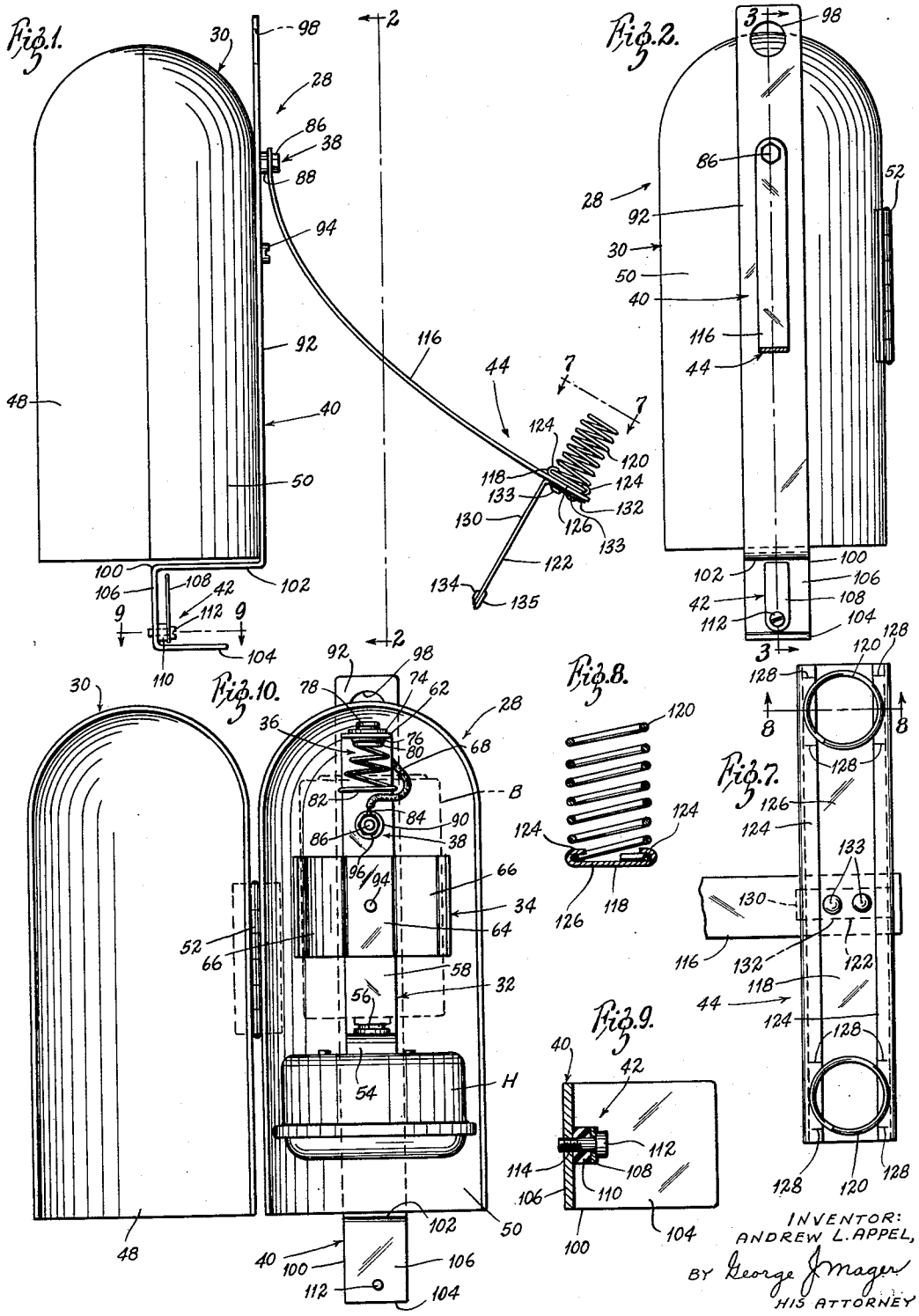
Oct. 10, 1961 A. L. APPEL 3,004,248

BURGLAR AND FIRE ALARM

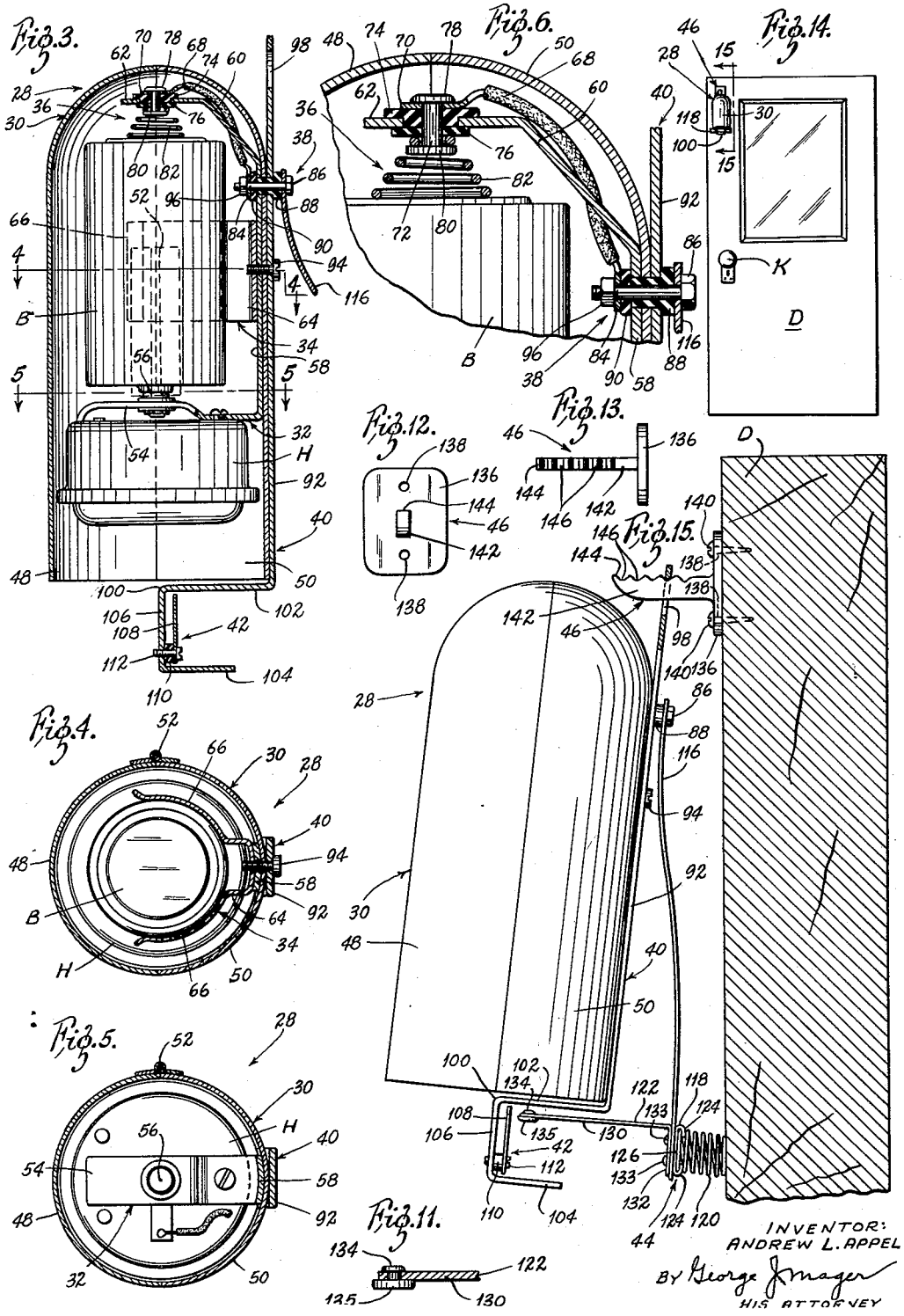
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BURGLAR AND FIRE ALARM

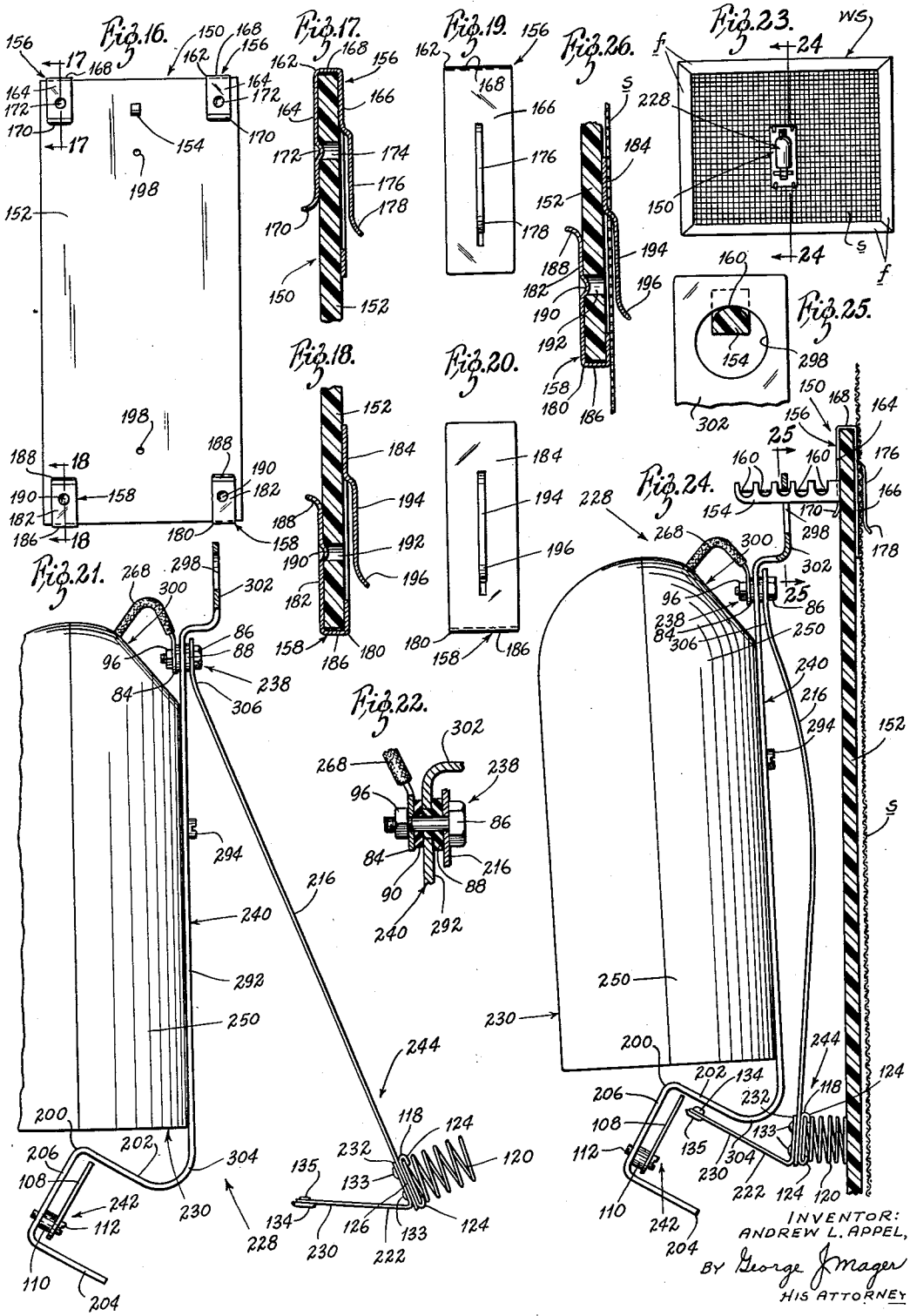
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BURGLAR AND FIRE ALARM

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BURGLAR AND FIRE ALARM

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9 Claims. (Cl. 340—227)

The present invention relates generally to warning signal devices, and more particularly, is concerned with the provision of a novel burglar and fire alarm that is compact and relatively simple in construction, yet achieves its objectives in a highly efficient manner.

Primarily, but not exclusively, the invention is designed for use in the home. It comprises a portable signal device that may readily be applied to any perpendicular or approximately perpendicular surface inside the home by being suspended from hanger means that may be affixed or removably attached to such surface.

The primary objective of the invention is to provide a single device and complemental hanger means therefor that will serve in the dual capacity of a burglar alarm and a fire alarm. Ordinarily but not necessarily, the alarm of this invention would be suspended from hanger means permanently secured to a door, or from hanger means removably secured to a window screen. When hanging on a door in proper position, any tampering with said door will set the device in alarm sounding operation. Similarly, when hanging on the wire screening of a window screen, any tampering with said screen will set the device in alarm sounding operation, as will appear.

The hanger means are so designed that the alarm mechanism of the invention may be suspended in selected disposition of sensitivity to applied motion. Thus, the alarm may be so hung that the warning signals will be responsive to the slightest tampering with the door or screen whereonto it is applied. Two hanger means are provided, one particularly designed for a door installation, the other particularly designed for a screen installation. Each hanger includes a base plate having an arm projecting normal thereto from one face thereof. For cooperation with the hanger arm, the casing wherein the alarm mechanism is supported has affixed thereto a strap member that is provided in its upper end portion with a circular opening. The upper edge of both said arms is provided with a plurality of notches or serrations, each successively farther removed from the base plate, and consequently from the vertical surface of the door or screen to which the base plate is attached.

The sound producing mechanism of the invention is enclosed within a casing comprised of two hingedly connected half sections, and includes a conventional signal device, a conventional battery, and means for supporting these elements in operative relationship. The strap member aforesaid is rigid with one of the casing half sections, and has the aforesaid circular opening formed in the upper end portion thereof, so that the casing may be pivotally suspended from a hanger arm in variable disposition relatively to the surface whereonto the base plate of the hanger is secured. The circular opening is considerably greater in diameter than the cross-sectional area of the arm, so that with the upper edge of said opening positioned in any one of the notches or serrations of said arm, the casing would be free to oscillate away from and toward the surface whereonto the hanger is secured, as will appear.

The lower end portion of the strap member is of U-shaped configuration and supports a resilient switch blade that is adapted to energize the sound producing means whenever struck by the free end of a bimetallic contact element controlled by a compound spring assembly of ingenious design, as will appear. This spring assembly

includes a leaf element of clock spring material anchored at its top end to one of the casing half sections, a pair of transversely spaced light compression springs mounted on the opposite ends of a crossbar affixed to the free lower end portion of said leaf spring, and the bimetallic contact element aforesaid.

The bimetallic contact element is preferably of L-shaped configuration, and includes a first leg segment that is affixed to the leaf spring and the crossbar, and a second leg segment that incorporates a contact of highly conductive material. Each time that the contact momentarily strikes the switch blade aforesaid, a signal will be diffused by the sound producing mechanism, as will be explained. In consequence of such repeated contactings, said mechanism would diffuse intermittent signals. When the invention is functioning in a fire alarm capacity however, the bimetallic contact element will warp into a position adapted to produce and diffuse a constant or continuous warning sound whenever the ambient temperature rises to a critical abnormal degree.

Accordingly, it is an object of the present invention to provide a novel warning signal device and complemental hanger means therefor, said device being adapted to function in either a burglar alarm or in a fire alarm capacity.

It is another object of the invention to provide a novel warning signal device adapted to function in either a burglar alarm or in a fire alarm capacity, wherein the signals produced and diffused will audibly indicate to persons within hearing distance that said device is functioning in one or the other of its dual capacities.

Another object of the invention is to provide a combined burglar and fire alarm that is compact in design, and may be easily manipulated into its most advantageous position relatively to the hanger means. Other objects and features of the invention not specifically noted hereinabove, will be mentioned hereinbelow.

The invention is illustrated on three sheets of drawings that accompany this specification and form part thereof. A more comprehensive understanding of the invention may be had from the detailed description thereof that follows with reference to said drawings, wherein:

FIGURE 1 is a right side elevational view of a combined burglar and fire alarm device incorporating the principles and elements of the present invention;

FIGURE 2 is a rear elevational view thereof, taken as indicated on the line 2—2 of FIGURE 1;

FIGURE 3 is a vertical sectional view taken along the line 3—3 of FIGURE 2, an included conventional flashlight battery and horn assembly being shown in elevation;

FIGURE 4 is a horizontal sectional plan view, taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a horizontal sectional plan view taken on the line 5—5 of FIGURE 3;

FIGURE 6 is a reproduction on an enlarged scale, of a fragmentary portion of FIGURE 3;

FIGURE 7 is an enlarged plan view of the crossbar and elements associated therewith, the view being taken as indicated by the line 7—7 in FIGURE 1;

FIGURE 8 is a vertical sectional view taken on the line 8—8 of FIGURE 7;

FIGURE 9 is a sectional plan view on an enlarged scale, taken on the line 9—9 of FIGURE 1;

FIGURE 10 is a front elevational view of the alarm with the casing thereof open and the battery removed, the normal position of said battery however being suggested in broken lines;

FIGURE 11 is an enlarged detail view partly in section, of the free end portion of the bimetallic contact element of the invention;

FIGURE 12 is a front elevational view of a hanger bracket;

FIGURE 13 is a top plan view of the hanger bracket shown in FIGURE 12;

FIGURE 14 is an inside view of a door illustrating the present invention installed thereon in what is considered a most favorable location;

FIGURE 15 is an enlarged view taken on the line 15—15 of FIGURE 14;

FIGURE 16 is a front elevational view of a hanger assembly particularly effective in suspending the signal device from the wire screening of a window screen;

FIGURE 17 is an enlarged vertical sectional view taken on the line 17—17 of FIGURE 16;

FIGURE 18 is an enlarged vertical sectional view taken on the line 18—18 of FIGURE 16;

FIGURE 19 is an enlarged rear elevational view of one of a pair of upper clips included in the FIGURE 16 hanger assembly;

FIGURE 20 is an enlarged rear elevational view of one of a pair of lower clips included in the FIGURE 16 hanger assembly;

FIGURE 21 is a fragmentary right side elevational view similar to FIGURE 1, illustrating a modified embodiment of the combined burglar and fire alarm device of this invention;

FIGURE 22 is a reproduction on an enlarged scale, of a fragmentary portion of FIGURE 21, most of the included components however being shown in vertical section;

FIGURE 23 is an inside view of a window screen illustrating the FIGURE 21 alarm embodiment mounted thereon in association with the FIGURE 16 hanger means;

FIGURE 24 is a fragmentary vertical sectional view taken on the line 24—24 of FIGURE 23;

FIGURE 25 is an enlarged view, partly in section, taken on the line 25—25 of FIGURE 24; and

FIGURE 26 is a vertical sectional view similar to FIGURE 18, with a fragmentary portion of wire screening being added to demonstrate the releasable disposition thereon of the FIGURE 16 assembly by means of the hanger clips associated therewith.

With reference to FIGURES 1 through 15, a combined burglar and fire alarm constructed in accordance with the concepts of the present invention is indicated as a whole by the numeral 28. It includes: a casing generally designated 30; a signal mechanism in the form of a horn designated H; a supporting bracket for the horn generally designated 32; a bracket 34 for releasably supporting a conventional flashlight battery B centrally within the casing 30; a first terminal and compression spring assembly generally designated 36 that is mounted in the upper end portion of the bracket 32; a second terminal assembly generally designated 38; a strap member 40 that supports a fixed contact assembly 42; a sensitively resilient compound spring assembly 44; and other elements and parts either integral with or associated with the above-designated components, as will appear.

As should be apparent from the drawings, the alarm 28 per se will not function unless it is suspended in operative position. Numeral 46 designates generally a hanger bracket of preferred configuration wherefrom said alarm mechanism may be suspended in the most advantageous status thereof.

The casing 30 is comprised of two half sections 48 and 50 that are connected by a piano or similar type hinge 52, as best seen in FIGURES 4, 5, and 10. In the interest of clarity for descriptive purposes, the half section 48 will hereinafter be termed the cover section, whereas the half section 50 will be termed the sound productive mechanism supporting section.

With the cover section 48 swung to open position as portrayed in FIGURE 10, ready access to any and all mechanism located within the section 50 may be had. With the cover section 48 in closed position, the casing 30 presents an elongated housing open to atmosphere at the bottom but not at the top, as clearly shown in FIGURE 3. Preferably but not necessarily, the upper end portion of the casing 30 in the closed or normal position thereof is of semicircular configuration as clearly shown.

The sound producing means illustrated comprises a horn designated H. The horn H is conventional and available in the open market, wherefore it per se forms no part of the present invention. In the embodiment of the invention shown, the horn H is rigidly supported dependingly from the horizontal leg 54 of said bracket 32, this leg being provided with a contact button 56 that extends thereabove as shown.

The vertical leg 58 of the bracket 32 extends upwardly along the inner surface of the casing half section 50 to a point above the assembly 38, and thence, as indicated at 60 in FIGURE 3, further angularly upwardly and forwardly to terminate in a horizontally disposed extremity 62 that supports the aforesaid assembly 36.

The bracket member 34, as seen to best advantage in FIGURES 4 and 10, includes a U-shaped base portion 64 integral with a pair of arcuate wing portions 66 that are resilient, whereby to releasably retain the battery B, as should be apparent.

As illustrated on an enlarged scale in FIGURE 6, the assemblies 36 and 38 are interconnected by an insulated wire designated 68. At its upper end, the wire 68 has a terminal portion 70 through which a rivet 72 extends, said rivet also extending through central openings in a pair of insulative washers 74 and 76 as shown. The rivet 72 is peened to provide an upper head portion 78 contiguous to said terminal portion 70 of the wire 68, and a lower head portion 80 that is spaced from the under surface of the washer 76.

Retained between said washer 76 and the rivet head portion 80 is the uppermost convolution of a compression spring 82. As illustrated in FIGURE 10, the lowermost convolution of said spring would lie suspended in a plane below the upper end surface of the battery B, assuming that said battery were removed.

At its lower end, the wire 68 has a terminal portion 84 through which the threaded shank of a bolt 86 extends, said bolt shank also extending through central openings in a pair of insulative washers 88 and 90, as shown. It is to be observed at this point, that the washers 88—90, and the washer 74—76 arrangements are such as to insure an isolated current flow between the bolt 86 and the rivet 72, and vice versa.

The main body 92 of the strap member 40 is flat, and lies along the peripheral surface of the mechanism supporting half section 50 of the casing. As best seen in FIGURES 3 and 4, a screw 94 engages aligned threaded circular openings provided therefor in the base portion 64 of the bracket member 34, in the wall of the half section 50 of the casing, and in the main body 92 of said strap member 40. It should be apparent therefore, that the screw 94 serves to maintain the components mentioned rigidly in place. The strap member main body 92 is additionally maintained in place by means of the bolt 86, and the thereto applied nut 96 as should be manifest. Preferably but not necessarily, that portion of the strap member main body 92 that extends below the screw 94 may be spot-welded to the casing section 50 in order to insure a rigid construction.

At the top, the main body 92 extends a short distance above the casing 30, and has formed therein a circular opening 98. At the bottom, said main body terminates in a U-shaped portion 100 that includes an upper leg segment 102, a lower leg segment 104, and a connecting or web segment 106.

The fixed contact assembly 42 is rigidly secured to the web segment 106 as best seen in FIGURE 9. It includes a resilient switch blade 108 preferably of brass material, a collar or spacer 110, and a retaining screw 112 that engages a threaded circular opening 114 provided therefor in said web segment. As illustrated, the screw 112 extends through the lower extremity of the switch blade

108, so that the major portion of said blade is free, as best seen in FIGURES 1 and 3. The lower leg segment 104 serves as a guard to obviate injury to the blade 108.

The assembly 44 includes a main spring 116, a crossbar 118, a pair of transversely spaced light compression springs 120, and an angular contact element 122. The main spring 116 is relatively narrow as best seen in FIGURE 2. It is preferably fashioned of clock-spring material to the configuration thereof illustrated in FIGURE 1, and is anchored at its upper end by means of the bolt 86, as clearly shown for example in FIGURES 3 and 6. It will be appreciated therefore, that said main spring 116 is inherently highly resilient, and would automatically revert to the normal or not-in-use status thereof shown in FIGURE 1 following its release subsequent to a change in the position thereof. It should also be appreciated however, that upon release of the spring 116 following for example a manual depression thereof, its unattached major portion would fluctuate repeatedly, and so to speak flutter to rest in its normal position.

The crossbar 118 as seen to best advantage in FIGURES 7 and 8, comprises an elongated plate of thin material provided with inturned flanges 124 along its longitudinal margins. The flanges 124 are spaced from the main body 118 of the crossbar a distance equal to the diameter of the coils of the compression springs 120, one of which is anchored at each end of said crossbar. The arrangement is such that the lowermost convolution of each spring 120 is secured in place in consequence of the application of blunt chisel blows to the upper surfaces of the flanges 124 as indicated at points 128 in FIGURE 7. From the foregoing, it will be manifest that whereas the lowermost convolution of each compression spring 120 is thus anchored in a simple manner to the crossbar, the remaining coils are free.

The contact element 122 is fashioned of bimetallic material, and constitutes a most important component of the invention in that as will appear, it functions in a dual capacity. It is L-shaped as shown, and includes a relatively long leg segment 130 integral with and normal to a shorter leg segment 132. A pair of spaced rivets 133 extend through aligned circular openings provided therefor in the crossbar main body 126, in the lower extremity of the main spring 116, and in the leg segment 132 of the contact element 122. With this spaced rivet arrangement as should be apparent, the relationship of the three components involved remains constant.

Preferably, as shown on an enlarged scale in FIGURE 11, the free forward extremity of the bimetallic leg segment 130 is provided with a contact 134 of highly conductive material. This contact as shown, is in the form of a rivet and includes a lower head segment 135 of such diameter that the forward portion of its periphery extends beyond the forward edge of said leg segment.

With attention directed to FIGURES 12 through 15, the hanger bracket 46 is seen to comprise a base plate 136 provided with holes 138, so that said hanger may be secured to a flat surface by means of screws or nails. Thus for example in FIGURE 15, screws 140 are shown extending through the holes 138 and into the upper portion of a door designated D that also appears in FIGURE 14. It will of course be understood that the hanger bracket may be permanently cemented in place if desired.

Projecting from the base plate 136 is an arm 142 having a notched or serrated upper edge 144. The arm 142 shown in the drawings, has its upper edge 144 provided with five notches or serrations 146, but it will be understood that any precise number of them is not critical. The thickness of the arm 142 is less than the diameter of the opening 98, and the width of said arm is also less than said diameter as a comparison of FIGURES 2, 12, and 15 will demonstrate.

Although the hanger bracket 46 has been illustrated and described with respect to a door it will be understood that it may likewise be mounted on a window or other closure member to which access may be had from the outside.

It may also be desirable, for example when a person intends to sleep on a screened-in-porch or in a room having a screened window opening, for such person to enjoy the protection afforded by the instant alarm. Generally, the frames of porch and window screens are too narrow for suspending the alarm thereon by means of a hanger such as the bracket 46. Wherefore it is an object of the present invention to provide hanger means specifically designed for use on screens, although as will appear, the main component thereof could also be employed in a door or window hanger capacity.

The hanger means for screens, designated as a whole by the numeral 150, appears in FIGURE 16, where it is seen to include: a base plate 152; a hanger arm 154 integral therewith and projecting forwardly from said base plate; a pair of transversely spaced upper clips each generally designated 156; and a pair of transversely spaced lower clips each generally designated 158.

As best seen in FIGURES 24 and 25, the upper edge of the arm 154 has formed therein a series of spaced notches or serrations 160 of novel design. That is to say, the bottom portions thereof are arcuately contoured transversely of said arm so that as will be more fully explained, when an alarm device contemplated by the present invention is suspended from any selected one of said serrations, said device will be highly sensitive to any movement of the base plate 152. The arm 154 shown in FIGURE 24, similarly to the arm 142 of the hanger means 46 shown in FIGURE 15, is provided with five of the serrations 160, but it will be understood that any precise number of them is not critical.

The upper clips 156 are formed of thin resilient spring material, and as illustrated particularly in FIGURES 17 and 19, each includes: a U-shaped main body portion 162; a front leg portion 164; a rear leg portion 166; and a connecting web portion 168. The clips 156 are manually applicable to and removable from the base plate 152. To facilitate these operations, the front leg portion 164 terminates in an arcuate tab extremity 170. Intermediate the tab extremity 170 and its mergence into the web portion 168, each front leg portion 164 has formed therein a circular depression 172, said depression being adapted, when a clip 156 is properly applied to the base plate 152, to engage in a horizontal circular opening 174 provided therefor in said base plate.

As illustrated, there are two transversely spaced openings 174 provided in the upper portion of the base plate, each opening being appropriately located so as to have the depression 172 snap thereinto when a clip 156 is positioned. From the foregoing, it is believed to be apparent how the clips 156 may be applied to the base plate, retained thereon, and removed therefrom.

Struck from the rear leg portion 166 of each clip 156 and extending parallel therewith in rearwardly spaced relationship thereto, is a narrow prong segment 176 that terminates at its lower end in an arcuate extremity 178 for a purpose to appear. The width of the prong segment 176, as shown on an enlarged scale in FIGURE 19, is narrow enough to facilitate entry thereof into interstices between the wires or ordinary window screening.

The lower clips 158 are likewise formed of thin resilient material, and as illustrated particularly in FIGURES 18 and 20, each includes: a U-shaped main body portion 180; a front leg portion 182; a rear leg portion 184; and a connecting web portion 186. The clips 158 are likewise manually applicable to and removable from the base plate 152. To facilitate these operations, the front leg portion 182 terminates in arcuate tab extremity 188. Intermediate the tab extremity 188 and its mergence into the web portion 186, each front leg portion 182 has formed therein a circular depression 190 adapted, when a clip 158 is properly applied to the base plate 152, to

engage in a horizontal circular opening 192 provided therefor in said base plate.

As should be manifest, there are two transversely spaced openings 192 provided in the base plate, each opening being appropriately located so as to have one of the depressions 190 snap thereinto when a clip 158 is positioned. From the foregoing it is believed to be apparent how the clips 158 may be applied to the base plate, retained thereon, and removed therefrom.

Struck from the rear leg portion 184 of each clip 158 and extending parallel and in rearwardly spaced relationship thereto, is a narrow prong segment 194 that terminates at its lower end in an arcuate extremity 196 for a purpose to appear. The width of the prong segment 196 as shown on an enlarged scale in FIGURE 20, is narrow enough to facilitate entry thereof into interstices between the wires of ordinary window screening.

Although the assembled hanger means 150 is particularly designed for use on screening, it will be observed that with the clips 156 and 158 removed, the base plate 152 with its forwardly projecting arm 154 may also serve as the hanger means for a door or a window installation. To this end, the base plate 152 is provided with spaced circular openings 198 for the reception of nails or screws whereby said base plate may be affixed in a manner similar to that wherein the hanger 46 is affixed (FIGURE 15).

An alternative embodiment of the alarm device of the present invention is illustrated in FIGURES 21 through 24 and designated as a whole by the numeral 228. The casing 230 of this device is similar to the casing 30, except that a portion of the upper end of the half section 250 is flattened as indicated at 300. The signal mechanism enclosed within the casing 230 is identical with that shown for example in FIGURE 3, except that the second terminal assembly 238 is located exteriorly of said casing, whereas the corresponding terminal assembly 38 of the FIGURE 3 embodiment extends partly into the casing 30. The wires 268 of the alternative embodiment corresponds to the wire 68, and extending through a suitable opening provided therefor, interconnects the second terminal assembly 238 with the first terminal assembly 36 as should be clear even though not illustrated.

The alternative embodiment 228 of this invention operates in every respect similarly to the embodiment designated 28. As will be apparent however, the alarm 228 is more sensitive because of the modifications provided in certain components to be described, all of said components being mounted exteriorly of the casing 230.

Thus, the main body 292 of the strap member 240 lies along the peripheral surface of the mechanism supporting half section 250 of the casing 230, being maintained in place by a screw 294 that is a counterpart of the screw 94, and by spot-welding applied to that portion of said strap main body that extends below the screw 294.

At the top however, the main body 292 terminates in a rearwardly offset but parallel upper end portion 302 wherein a circular opening 298 that corresponds to the opening 98 is formed. At the bottom, the main body 292 terminates in a U-shaped portion 200 that includes an upper leg segment 202, a lower leg segment 204, and a connecting or web segment 206.

It will be observed however, that in the embodiment presently under consideration, the U-shaped portion 200 is angularly disposed relatively to the main body 292 of the strap member, and is integrated therewith by an arcuate segment designated by the numeral 304.

The fixed contact assembly 242 is identical with the corresponding assembly 42, and similarly includes a resilient blade 108, a collar or spacer 110, and a retaining screw 112.

The compound spring assembly 244 of the alternative embodiment is generally similar to the corresponding assembly 44 shown in FIGURES 1, 7 and 8. However, as illustrated in FIGURE 21, the main spring 216 is flat throughout its length except at the top, where it has formed therein a slightly arcuate segment 306 adjacent its anchored end. The crossbar and compression spring arrangement secured to the free lower end of the main spring 216 is identical with that hereinbefore described, and the same reference numerals have been applied to parts that appear in FIGURES 21 and 24.

The bimetallic contact element 222 also secured to the free lower end of the main spring 216, is V-shaped as shown, and includes a relatively long leg segment 230 and a shorter leg segment 232 anchored by the rivets 133. The free forward end of the bimetallic leg segment 230 is provided with the FIGURE 11 contact arrangement, as indicated by corresponding reference numerals.

It is not considered necessary to describe the terminal assembly 238 in detail, inasmuch as it is similar to the terminal assembly 38, as a comparison of FIGURES 22 and 6 will demonstrate. Like reference numerals have been applied to corresponding parts in the drawings. The flattened surface 300 provides space for those elements of the assembly 238 that project forwardly of the strap main body 292.

In FIGURES 23 and 24, the hanger assembly 150 is illustrated in attached position on the wire screening *s* of a typical window screen WS, with the alarm 228 suspended in operative position from the arm 154. It will of course be manifest that the installation could also be made on the wire screening of a screen door if desired. Preferably as illustrated, the hanger assembly 150 would be attached substantially equidistant from the frame member *f*, so that tampering with any portion of the window screen would result in activating the alarm.

Prior to describing the operation of the invention, some general observations will be given. Thus, it will be understood that the casings 30 and 230 would seldom be opened except to replace a worn-out battery. To remove a battery, it would only be necessary to swing the cover section to open position about the hinge 42, thereupon grasp the battery between thumb and forefinger, and thereafter pull it forwardly out of the resilient arcuate wing portions 66 of the bracket 34. To insert a battery, it would merely be necessary to place one end thereof against the lowermost convolution of the spring 82, elevate the battery to compress said spring, and thereupon push the battery into position within the bracket 24 with its opposite end engaging the contact button 56. It will be noted that thus a twofold safeguard is provided against displacement of the battery B, during the vibratory and simultaneous fluctuating actions of the device that would occur under circumstances to be described. It is not deemed necessary to illustrate nor to describe the horn assembly H, inasmuch as it is of conventional design, being of the type generally employed in bicycle horns and similar devices.

With respect first to the alarm embodiments 28 and 228, it will be understood that although each is illustrated in association with a particular hanger means, either of them may be operatively suspended from a hanger bracket 46, or from a hanger assembly 150. With the clips 156 and 158 not applied to the base plate 152, it may be fastened to any approximately perpendicular surface by means of screws and the like, or it may be adhesively secured to such a surface.

Of the two alarm embodiments, that designated 228 is the most sensitive, wherefore it is particularly effective when installed on a screen, and in association with the hanger assembly 150. The higher sensitivity of the alarm embodiment 228 stems from three main factors, these being the arcuate bottoms of the serrations 160 in the arm 154, the rearwardly offset upper end portion 302 of the strap main body 292, and the greater resiliency inherent in the main spring 216 as compared to that inherent in the main spring 116.

With attention directed to FIGURES 15 and 24, it should be evident that the serrations 146 and 160 there appearing respectively in the arms 142 and 154, provide for a wide range of adjustments to compensate for de-

viations of surfaces from the perpendicular. When either the alarm **28** or the alarm **228** is employed on a door such as D, the hanger plate **136** or the plate **152** as the case may be, would preferably be attached near the upper corner of such door above the door knob K, and of course on the inside surface of the door.

Each embodiment of the invention will obviously function in a fire alarm capacity irrespective of its location, whenever the ambient temperature rises to a highly abnormal degree, for example above 160 degrees Fahrenheit.

Operation

In the description of the operation that follows immediately, the kitchen of an ordinary dwelling will be considered as an exemplary room, and attention will be focused on the embodiment of the invention that is designated **28** and illustrated in FIGURES 1 through 15. Thus, assuming that the illustrated door D typifies a rear entrance kitchen door, and that a hanger **46** had been secured thereto as illustrated, the alarm would be hung from said hanger with the upper edge of the circular opening **98** resting in any one of the serrations **146**. When so hung, the weight of the casing **30** and its contents will deform the main spring **116** and simultaneously compress the transversely spaced springs **120** to a degree that would obviously vary, depending on which of the serrations **146** is being engaged by the opening **98**.

In other words, the serrated arrangement provides for a very fine adjustment, depending on the stability of the door when locked, and depending also on whether the door is plumb or not. As is well known, some doors are less tightly fitted than others, wherefore the adjustment selected would vary so that for example, an ordinary wind striking the door would not activate the alarm, as should be understood. At the same time however, the adjustment should be such that any shaking or rattling of the door would initiate vibratory and oscillatory action. Consequently, a succession of horn blasts in staccato fashion would be diffused throughout the house, so that an inmate or inmates would immediately be alerted to the fact that someone is tampering with the door. Furthermore, these blasts would continue for some time after the tampering had ceased.

As should be clearly manifest from FIGURE 15, the position of the contact element **134** will vary slightly with repect to the resilient switch blade **108**, depending on which serration **146** is engaged by the slot **98**. Irrespective however of which adjustment had been decided upon, once the door has been tampered with sufficiently to set the alarm in vibratory action, the main spring **116**, the compression springs **120**, and the backlash of the resilient blade **108** combine to prolong the oscillations of the casing **20** and thus the continuity of the intermittent engagements between the contact element **134** and the blade **108**.

Attention is directed to the provision of the two light compression springs **120**, and the crossbar **118**, each end of which supports one of said springs. This arrangement is provided to guard against displacement of the device irrespective of how violently the door should be shaken. These springs also function to increase the sensitivity of the device. In other words, although the main spring **116** is highly resilient, it will be noted that when the device is suspended from a pivotal engagement of the circular opening **98** and arm serration **146**, the major portion of the weight of the casing **20** and its contents will be borne by said main spring. Wherefore, without the springs **120**, stealthy tampering with the door lock or gentle manipulations of the knob K could fail to actuate the device. However, the interposition of the springs **120** obviates such happening, and renders the compound spring assembly **44** highly resilient and sensitive. It will be appreciated that once the oscillatory movements have been initiated, the spring action will continue for sometime, until gravity brings the device to rest as is understood.

From the foregoing, it should be manifest that the invention provides a highly efficient burglar alarm that not only warns the inmates of the dwelling, but also warns the burglar or anyone who tampers with the door that the inmates and anyone within hearing are being alerted.

When the invention functions in a fire detection and alarm capacity, the warning signal will be clearly recognized in that instead of an intermittent or staccato signal, the device will emit a continuous "wailing" sound, in similar fashion for example to that of a siren.

It will be understood of course, that the invention will function in its fire alarm capacity irrespective of the adjustment of its suspension. That is to say, no matter which of the serrations **146** is employed in hanging the alarm, the bimetallic contact element **122** will always lie in a plane that is close to the leg **102** of the U-shaped portion **100** of the strap member **92**. Consequently, whenever the ambient temperature rises abnormally, and particularly when it rises above 160 degrees Fahrenheit, the bimetallic element **122** will warp upwardly, thus bringing the contact **134** into engagement with said leg **102**, whereby to close the circuit and sound the horn H. As long as such abnormal temperature continues or increases, the circuit will remain closed, and the horn will continue to sound, as is well understood.

Reverting to use of the invention in burglar alarm capacity, after it had once been determined that a certain serration **146** provides the best adjustment and a mental or written note thereof had been made, the alarm may obviously be removed from the arm **142** and later replaced thereon in a few seconds. In other words, the invention could serve no burglar alarm purpose when the door is open, or is being repeatedly opened and closed. Consequently, the alarm would normally be placed in the selected operative status only when the door is closed and locked.

Conveniently, a second hanger **46** may be secured to another stationary vertical surface in the room, preferably more centrally located. Thus, except when the door is locked, the alarm may be removed from the door hanger, and hung onto the said secondary hanger, where it will serve only as a fire alarm.

With attention directed now to the embodiment of the invention that is designated **228** and illustrated in FIGURES 16 through 26, it is not deemed necessary to again describe the operational action of the alarm. The embodiment **228** is more sensitive as has been explained, but functions in both a burglar and fire alarm capacity similarly to the embodiment **28**. Because it is more sensitive however, the embodiment under present consideration is particularly effective when installed on screening.

Referring to FIGURE 23, it will be assumed that the screen WS there shown is exemplary of a bedroom window screen that is accessible from ground level. It will further be assumed that a sleeping occupant of the room had installed the alarm on the screen *s* of said window screen prior to retiring. In doing so, it had merely been necessary to place the hanger assembly **150** against said screening, then apply slight pressure thereto as the extremities **178** and **196** of the clips **156** and **158** respectively penetrate interstices of the screening, and thereupon slide the base plate **152** downwardly. The resulting dispositions of the upper portion of the plate **152** and one of the upper clips **156** relatively to the screening are clearly shown in FIGURE 15. The resulting dispositions of the lower portion of the plate **152** and one of the lower clips **158** relatively to the screening are clearly shown in FIGURE 26.

With the hanger assembly **150** thus maintained in position, the occupant had grasped the casing **230** and hung the alarm onto the arm **154** via the circular opening **298**. In doing so, he had selected the serration **160** that would provide the most sensitive installation which, it will be assumed, resulted in the installation illustrated in FIGURE 24.

Assuming now that a burglar, prowler, or other trespasser should tamper with the window screen even slightly, the alarm would at once initiate a succession of horn blasts. Assuming that a fire should break out in the vicinity thereof, the alarm would quickly initiate a continuous horn blast, as should now be understood.

The foregoing description together with the drawings are believed to present an adequate disclosure for a comprehensive understanding of the present invention. It is to be understood however, that the illustrated embodiments thereof are not limited to the precise details of structure shown, and may be modified within the scope of the claims hereunto appended.

What I claim is:

1. A burglar and fire alarm of the character disclosed including in assembly: a casing suspended angularly relatively to a flat perpendicular surface, said casing being closed at the top, open at the bottom, and comprised of a first half or cover section hingedly connected to a second half or signal-productive mechanism supporting section, said mechanism including a horn; a first bracket suspending the horn centrally within the casing near the lower end thereof and having a contact element incorporated therein; a first terminal and compression spring assembly mounted in the upper end portion of said bracket; a battery interposed between the contact element aforesaid and the compression spring of said first terminal assembly; a second bracket releasably retaining said battery in position; a strap member rigid with said second half section of the casing and having an upper end portion extending above the closed top portion thereof; a circular opening formed in said upper end of the strap member; a second terminal assembly; an insulated wire connecting said first and second terminal assemblies inside the casing; a U-shaped portion constituting the lower end of said strap member; a fixed contact assembly mounted on said U-shaped portion of the strap member; and a compound spring assembly, said assembly including a highly resilient relatively narrow main spring of generally arcuate configuration having its upper end secured to said second terminal assembly, a crossbar secured to the free lower end of the main spring, a pair of transversely spaced light compression springs each anchored in one end of the crossbar, an L-shaped bimetallic element including a relatively long leg segment integral with and normal to a shorter leg segment secured to the lower end of the main spring and centrally thereof to said crossbar, and a contact of highly conductive material mounted in the free extremity of said bimetallic long leg segment.

2. The structure set forth in claim 1 wherein the U-shaped portion constituting the lower end of the strap member includes an upper leg segment, a lower leg segment, and a connecting web segment; and wherein the fixed contact assembly is mounted on the web segment and comprises a resilient switch blade of highly conductive material, a retaining screw extending through one end thereof and engaging a threaded circular opening provided therefor in the web segment, and a collar interposed about the screw between said blade and said web segment whereby the major portion of said blade is free, said lower leg segment of the U-shaped portion aforesaid serving as a guard for obviating injury to said blade.

3. A burglar and fire alarm of the character disclosed including in assembly: a casing suspended angularly relatively to a flat perpendicular surface, said casing being closed at the top, open at the bottom, and comprised of a first half or cover section hingedly connected to a second half or signal-productive mechanism supporting section, said mechanism including a horn; a bracket suspending the horn centrally within the casing near the lower end thereof and including a contact element; a first terminal and compression spring assembly mounted in the upper end portion of said bracket; a battery interposed between the contact element aforesaid and the compression spring of said first terminal assembly; a bracket releasably retaining said battery in position; a strap member rigid with said second half section of the casing and extending above the closed top portion thereof and terminating in an offset but parallel upper end portion; a circular opening formed in said offset upper end portion of the strap member; a second terminal assembly mounted on said strap member immediately below said offset upper end portion thereof; an insulated wire passing through an opening in the closed end portion of the casing connecting said first and second terminal assemblies; a U-shaped portion constituting the lower end portion of said strap member, said U-shaped portion being angularly disposed relatively to the main body thereof and connected thereto by an arcuate segment integral therewith; a fixed contact assembly mounted on the web segment of said U-shaped portion; and a compound spring assembly, said assembly including a highly resilient flat main spring having its upper end secured to said second terminal assembly, a crossbar secured to the free lower end of the main spring, a pair of transversely spaced light compression springs each anchored in one end of the crossbar, a V-shaped bimetallic element including a relatively long leg segment integral with a shorter leg segment secured to the lower end of the main spring and centrally thereof to said crossbar, and a contact of highly conductive material mounted in the free extremity of said bimetallic long leg segment.

4. In an alarm of the character disclosed, the combination of: a normally open signal producing circuit; means for supporting the elements included in said circuit from an elongated casing closed at the top and open at the bottom; a strap member rigid with said casing and extending a short distance above the top of said casing, and having a circular opening formed in the thus extending upper end portion thereof; hangar means for suspending said casing in a selected position relatively to a substantially perpendicular flat surface of a non-stationary object, said hanger means including a base plate secured to said surface and an arm integral with said base plate, said arm having a plurality of notches or serrations contiguously formed in the upper marginal edge thereof for engagement therein of the upper edge of the strap member circular opening aforesaid; means included in said circuit for intermittently closing same responsive to movements of said object whereby to diffuse a succession of signals in staccato fashion; and means included in said circuit for closing same responsive to fire conditions that may arise in the vicinity of said alarm whereby to diffuse a continuous signal so long as the fire conditions exist, said last named means including a highly resilient compound spring assembly that consists of an elongated relatively narrow main spring having its upper end anchored to said casing, a crossbar and an angularly contoured bimetallic contact rigidly secured to the depending free lower end of said main spring, and a pair of light compression springs each having its lowermost convolution rigidly secured to said crossbar adjacent one end thereof.

5. Hanger means for suspending an alarm of the character disclosed from the wire screening of a window screen and the like comprising in assembly: a rectangular base plate; a hanger arm integral therewith and normal thereto projecting centrally from the upper portion of the base plate; a series of spaced serrations formed in the upper edge of said arm, the bottom portion of each serration being arcuately contoured transversely of said arm; a pair of transversely spaced U-shaped upper clips mounted on the top portion of said base plate; a pair of transversely spaced U-shaped lower clips mounted on the bottom portion of said base plate; a circular depression formed in each of said upper and lower clips engaging a horizontal circular opening provided therefor in the base plate; tab means on each clip facilitating the manual application thereof to and removal thereof from the base plate; and prong means on each clip adapted to first penetrate an interstice in the wire screening and then

lie parallel to said screening following the manual application of slight downward pressure to said base plate.

6. In a burglar and fire alarm as disclosed, the combination of: a casing of generally circular cross-sectional configuration closed at the top and open aa the bottom, said casing being comprised of two hingedly connected half sections including a first or sound productive mechanism supporting half section and a second or cover half section; a warning signal device and a battery for energizing said device mounted in the first half section; a strap member including a main body portion rigid with the first half section, a free upper end portion provided with a circular opening, and a free U-shaped lower end portion; a normally open circuit for energizing said warning signal either intermittently or continuously when closed, said circuit including a stationary resilient switch blade affixed at one end to the web segment of the U-shaped lower end portion of the strap member, a highly resilient compound spring assembly including a main spring anchored at its upper end to said casing and having a bimetallic contact element secured to its free lower end, and an electrical connection between said main spring and said battery; and hanger means for suspending the alarm in selected angular disposition relatively to a substantial surface, said hanger means comprising a base plate, an arm projecting therefrom, a plurality of contiguous notches or serrations incrementally farther removed from said base plate provided in the upper edge of said arm, the upper edge of the circular opening in the free upper end portion of the strap member engaging in one of said notches.

7. In combination: a hanger including a base plate secured to a substantially perpendicular surface and having an arm projecting forwardly therefrom; a plurality of notches or serrations contiguously formed in the upper marginal edge of said arm; an elongated casing closed at the top and open at the bottom; a strap member including a main body portion rigid with the casing and a free upper end portion provided with a circular opening, the upper edge of said opening engaging one of the notches in the upper marginal edge of the hanger arm aforesaid whereby to suspend the casing therefrom; a normally open circuit including a warning signal device, a battery, a resilient switch blade, and a highly resilient compound spring assembly having a bimetallic contact element secured to a free lower end portion thereof; and means on the casing supporting said components of the circuit; said compound spring assembly including a leaf spring and a pair of compression springs interposed between said casing and the perpendicular surface cooperating to maintain the suspended casing in angular disposition relatively to the said surface.

8. In combination: a hanger including a base plate secured to a substantially perpendicular surface and having an arm projecting forwardly therefrom; a plurality of notches or serrations contiguously formed in the upper marginal edge of said arm; an elongated casing of circular cross-sectional configuration closed at the top and open at the bottom, said casing being comprised of two hingedly connected half sections; a strap member including a main body portion rigid with one half section of the casing, a free upper end portion having a circular opening therein, and a free U-shaped lower end portion, the upper edge of said circular opening engaging in one of the notches in the upper marginal edge of the hanger arm aforesaid whereby to suspend the casing therefrom; a normally open circuit including a warning signal device, a battery, a resilient switch blade, and a highly resilient compound spring assembly having a bimetallic contact element secured to a free lower end portion thereof; and means on the casing supporting the components of said circuit; said switch blade being mounted on the free U-shaped lower end portion of the strap member aforesaid, said spring assembly including a leaf spring and a pair of compression springs interposed between said casing and the perpendicular surface cooperating to maintain the suspended casing in angular disposition relatively to said surface.

9. In a burglar and fire alarm of the character disclosed, the combination of: a warning signal device; a normally open circuit for energizing said device, said circuit including a battery, a resilient switch blade, and a resilient compound spring assembly having a bimetallic contact element secured thereto, said contact element being normally disposed in horizontally spaced status relatively to said switch blade; an elongated casing closed at the top and open at the bottom supporting the signal device and the components of said circuit; a strap member rigid with the casing having an upper end portion extending above the closed top of said casing; a circular opening in said upper end portion of the strap member; and hanger means comprising a base plate secured to a substantially perpendicular surface, a hanger arm integral therewith projecting horizontally from the base plate, and a plurality of contiguously formed notches or serrations in the upper marginal edge of said arm; said casing being suspended from said arm in consequence of the upper edge of the circular opening in the strap member engaging in one of said notches, said compound spring assembly being interposed between the casing and said perpendicular surface whereby to effect a selected angular disposition of said casing relatively to said surface, and to deform the spring components of said assembly into a status wherein the contact element thereof will strike against said resilient switch blade to intermittently close the circuit and thus energize the signal device to diffuse warning signals in staccato fashion responsive to movements of the hanger means.

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