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(54) **An assembly of a detector and a wing or sash and a frame.**

(57) An assembly comprising a wing or sash (10) and a surrounding frame (11) and a detector (15,) comprising one of an impact sensor and a movement sensor, the impact sensor where provided being sensitive to an impact on the wing or sash (10) or frame (11) and the movement sensor where provided being sensitive to movement of the wing or sash (10) relative to its frame (11) at least a predetermined amount from a fully closed position, and the detector (15) comprising a casing (16) and the wing or sash (10) or the frame (11) providing a groove (60) in which the casing (16) is adapted to be received, the groove (60) being provided in a surface (61) of the wing or sash (10) or the frame (11) which faces the frame (11), or the wing or sash respectively (10) such that when the wing or sash (10) is in a fully closed position, the detector (15) is concealed.

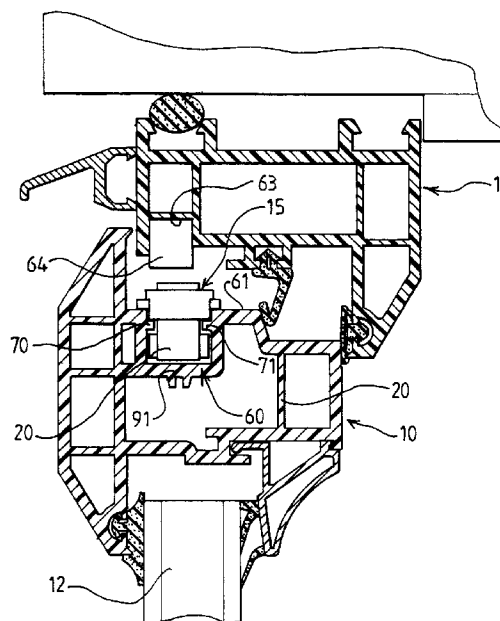


FIG. 1

This invention relates to an assembly of a detector and a wing or sash and a surrounding frame.

The object of the invention is to provide a new or improved assembly.

According to a first aspect of the invention we provide an assembly comprising a wing or sash and a surrounding frame and the detector comprising at least one of an impact sensor and a movement sensor, the impact sensor where provided being sensitive to an impact on the wing or sash, or the frame, the movement sensor where provided being sensitive to movement of the wing or sash relative to its frame at least a predetermined amount from a fully closed position, the detector comprising a casing and the wing or sash or the frame providing a groove in which the casing is adapted to be received, the groove being provided in a surface of the wing or sash, or the frame which faces the frame, or the wing or sash respectively, such that when the wing or sash is in its fully closed position, the detector is concealed.

The casing may be adapted to be secured in the groove which may be a so called "Eurogroove" provided on the wing or sash or the frame, the groove being re-entrant and having a pair of opposed lips which extend towards one another in the groove, the casing comprising at least one turnbuckle element having a first dimension smaller than the distance between the opposed lips such that the element can be received in the groove beyond the lips, and a second dimension greater than the distance between the lips, the turnbuckle element being rotatable from a first position in which the first dimension is presented across the groove so that the casing can be received in the groove to a second position in which the second dimension is presented across the groove so that the casing is retained relative to the groove.

The impact sensor, where provided, may comprise a piezzo-electric or other member which generates an electrical charge in response to physical distortion of the member caused as a result of an impact on the wing or sash or frame. The movement sensor, where provided, may conveniently comprise a reed or other switch which opens or closes in response to movement of a corresponding element such as a magnet, carried by a frame or wing or sash respectively, as the wing or sash is opened at least the predetermined amount from its closed position.

The detector may comprise a circuit board mounted in the casing containing all the necessary electronic components and the power supply. The interior of the casing preferably has receiving formations to receive and retain the circuit board in the casing, such as guide slots which engage with the periphery of the board.

The detector may comprise a component part of an alarm system comprising a controller including a receiver to receive an alarm signal transmitted from the detector, and an alarm generating device such as

an audible or visual signal emitter and/or a telecommunications device to communicate the alarm to a remote location via a radio link or the telephone network.

According to a second aspect of the invention we provide a detector for an assembly comprising a wing or sash and a surrounding frame, or a frame surrounding a panelled opening, comprising means to mount the detector in or on the wing or sash or frame, the detector comprising one of an impact sensor and a movement sensor, the impact sensor where provided being sensitive to an impact on the wing or sash or the frame and the movement sensor where provided being sensitive to movement of the wing or sash relative to its frame at least a predetermined amount from a fully closed position, and the detector further comprising a transmitter to transmit an alarm signal to a remote receiver when a respective impact or movement is sensed.

According to a third aspect of the invention we provide an assembly comprising a wing or sash and a surrounding frame, or a frame surrounding a panelled opening, and a detector according to the second aspect of the invention mounted in or on the wing or sash or frame.

According to a fourth aspect of the invention we provide a tamper resistant casing for a detector, the casing being adapted to be mounted in or on a wing, sash or a frame surrounding the wing or sash, or a frame surrounding a panelled opening, the casing comprising a base part and a lid, the base part and lid being adapted to be connected together in substantially gas tight manner such that once the lid is connected to the base part with the detector in the casing, any attempt to remove the lid causes a pressure differential between the interior and exterior of the casing which resists removal of the lid.

According to a fifth aspect of the invention we provide an alarm system having at least one assembly according to the first aspect of the invention and a controller including a receiver to receive the alarm signal transmitted from the detector, and an alarm generating device.

The alarm generating device may comprise an audible or visual signal emitter or alternatively, a telecommunications device to communicate the alarm to a remote location via a radio link or the telephone network.

Where the detector has both impact and movement sensors, the detector may be capable of issuing a first alarm signal in the event that the detector senses an impact, and a second different alarm signal in the event that the detector senses movement of the window or sash relative to its frame, and the receiver may be adapted to discriminate between the first and second alarm signals, and provide alternative responses to receipt of a first or second alarm signal.

The invention will now be described with reference to the accompanying drawings in which:

FIGURE 1 is an illustrative sectional view of a first embodiment of an assembly according to the first aspect of the invention.

FIGURE 2 is a side illustrative view of a detector for use in the assembly of figure 1.

FIGURE 3 is an illustrative view showing how the detector of the assembly of figures 1 and 2 is mounted in the wing.

FIGURE 4 is an illustrative sectional view of an assembly in accordance with the third aspect of the invention.

FIGURE 5 is an exploded view of a detector and casing.

FIGURE 6 is an illustrative view of an alarm system in accordance with the fifth aspect of the invention.

Referring now to figure 1, an embodiment of the first aspect of the invention is shown. The invention is applied to an arrangement comprising a wing 10 i.e. a window casement, hinged in a frame 11.

Both the casement 10 and the frame 11 comprise extruded UPVC or other plastic sections. However as is common with many window and door assembly arrangements, the casement 10 is provided with what is commonly referred to as a "Eurogroove" 60. The dimensions of the Eurogroove 60 have been standardised throughout the industry and the groove 60, which is provided in an edge surface 61 of the style of the casement 10, facing the frame 11, is normally used to accommodate hinges, an espagnolette or other window fittings, as is well known in the art, and extends longitudinally of the plastic section in which it is provided.

A detector 15 is mounted in the groove 60 and is concealed when the casement 10 is closed in the frame 11.

The detector 15 comprises a, preferably, single circuit board mounted within a casing 16, and this may operate identically to the detector 15' described with reference to figure 5, and may have impact and/or movement sensors and be arranged to issue an alarm signal upon sensing movement of the casement 10 relative to the frame 11, or upon sensing an impact on the casement 10, or frame 11 or on glazing panels 12. In this embodiment, the frame 11 has provided therein in a groove 63, which is immediately opposite to the Eurogroove 60 when the casement 10 is closed in its frame 11, a magnet 64 which co-operates with the movement sensor of the detector 15.

In this embodiment, the casement 10 can be opened slightly with respect to the frame 11, for example to a position where some ventilation into the room where the window is provided, is allowed, without the detector 15 moving so far away from the magnet 64 that movement is detected and an alarm signal issues. Thus where the movement sensor comprises

a reed switch or the like, the contacts would remain closed and the alarm signal would not issue. Of course, the assembly of casement 10 and frame 11 may have means to lock the casement 10 in the slightly open position.

In this embodiment, the detector 15 (and magnet 64) are provided at the side of the assembly where the casement 10 is hinged to the frame 11.

Referring now also to figures 2 and 3, the casing 16 comprises a base 17 and a lid 18, the base 17 having within it, slots or other means to enable the circuit board of the detector 15 to be mounted therein.

The casing 16 comprises a pair of turnbuckle elements 66,67 at each end of the casing 16. The elements 66,67, are identical in configuration and operation and so only turnbuckle element 66 will be described in detail.

The turnbuckle element 66 is provided beneath a mounting part 68 of the base 17, and has a first minimum dimension d1, and a second maximum dimension d2. The Eurogroove 60 is re-entrant, having a pair of mutually opposed lips 70,71 which extend towards one another across the groove 60.

The minimum dimension d1 of the turnbuckle element 66 is less than the dimension between the lips 70,71 of the groove 60 but the maximum dimension d2 is greater than the dimension between the lips 70,71. The width overall of a lower part L of the base 17' which lies in the groove 60 beneath the lips 70,71, is less overall than the spacing between the lips 70,71.

Hence with the turnbuckle elements 66,67, orientated as indicated at 80 in figure 6, with the minimum dimension d1 presented across the groove 60, the base 17, can be received in the Eurogroove 60, with the lower part L thereof beneath the level of the lips 70,71. A clamp screw 81 can be inserted through an opening 82 in the mounting part 68 into the respective turnbuckle element 66,67 and when the screw 81 is rotated, the respective turnbuckle element 66,67 is rotated through the positions indicated at 83 and 84, in figure 6, to a position 85 in which the maximum dimension d2 of the turnbuckle element 66,67 is presented across the groove 60, beneath the lips 70,71. Thus the base 17 is retained in the groove 60.

To add further security, each turnbuckle element 66,67 has a pair of cam surfaces 87,88, which, when the turnbuckle elements 66,67 are rotated to their locked positions as indicated at 85, jamb into engagement with respective inside surfaces 89,90 of the groove 60. If desired, the clamp screws 81 may engage in openings in the bottom 91 of the Eurogroove 60, where the clamp screws 81 are sufficiently long.

The lid 18 of the casing 16 can be secured to the base 17 simply as a push fit like lid 18' of casing 16' described with reference to figures 4 and 5 below, but if desired, the lid 18 may be secured to the base 17 by screws, three of which are indicated in figure 2

at 95.

The lid 18 preferably is secured in substantially gas-tight manner to the base 17, there being an appropriate sealing means between the lid 18 and base 17 to achieve this.

Preferably, a switch means is provided, such as a switch element which is resiliently biased to make contacts of the switch in the event that either the casing 16 is removed from the groove 60, and/or in the event that lid 18 is removed from the base 17. Two such switches, operating independently may be provided instead of a single switch, but in each case, when the contacts of the or one of the switches "make", the detector 15 is arranged to issue an alarm signal to a remote receiver.

The alarm signal may be sent to the remote receiver by cabling, but preferably the signal is transmitted, there being no physical connection between the detector 15 and receiver 30. An example of a suitable detector is described with reference to figure 5 below, although the physical configuration of detector 15' would need to be adapted for use in the aspects described with reference to figures 1 to 3.

Referring now to figure 4, a wing 10' comprising in this example a casement window, is hinged relative to a surrounding frame 11'. The wing 10' contains glazing panels 12'.

The frame 11' comprises an upstand 13' against which the wing 10' closes when moved to a closed position as shown in the drawing. The frame 11' comprises four extruded hollow uPVC sections which, in this example, provide a rectangular opening to receive the glazed wing 10'.

Within a hollow of each of the sections of the frame 11', there is provided metal reinforcement 14' comprising a length of rectangular section tubular metal.

A detector 15' comprising a single circuit board on which is mounted all the electronic components and the power supply being a battery 24, necessary for the detector to operate in a casing 16', is received within a side member of the frame 11' adjacent to the bottom of the frame.

Referring now also to figure 5, the circuit board of the detector 15' is mounted in a casing 16' which comprises a base 17' and a lid 18' as hereinafter described. It can be seen that due to the dimensions of the casing 16', it is necessary for an opening to be made in an interior wall surface 19' of the frame 11', and for various interior strengthening/separating ribs 20' to be cut away to accommodate the casing 16'. Also, in the example shown, it is necessary for an opening to be made in the metal reinforcement 14'. The base 17' of the casing 16' has an outwardly extending flange F which in use surrounds the opening in the interior wall of the frame 11' to provide a neat appearance.

The casing 16' is secured in position by virtue of

two screws 22 which engage with the metal reinforcement 14' and with a further rib 21' of the frame 11'.

The detector 15', like detector 15 of the figures 1-3 arrangement, comprises an impact sensor 25 which comprises in this example a piezzo-electric member which generates electrical charge when distorted, for example, by an impact on the frame 11,11' or on the wing 10,10' for example as a result of one or other of the glazing panels 12,12' of the wing 10,10' being broken. The detector 15' further comprises a movement sensor 26 being a reed switch in which a pair of contacts are normally held together by the presence of a magnet 27 mounted on the wing 10'. In the event that the wing 10' is moved from its closed position as shown in figure 1, the magnet 27 will no longer maintain the contacts of the reed switch closed together and thus they will spring apart thus breaking an electrical circuit to indicate that the wing 10' has been opened.

The detector 15' is arranged to respond to each of the impact sensor 25 and the movement sensor 26 by issuing an alarm signal comprising in this example a radio frequency electro-magnetic signal which is transmitted to a remote receiver 30 as indicated in figure 6.

Furthermore, the detector 15' has a resiliently biased (sprung) switch element 31 which, when the detector 15' is received in its casing 16', bears against a part of the casing 16' to maintain the switch element 31 against the force of spring 31a in an inoperative position. However, in the event that the detector 15' is withdrawn from the casing 16', the switch element 31 will be moved by its spring 31a, to an operative position and the detector 15' will again respond by issuing an alarm signal.

Preferably, the detector 15' is able to issue a first alarm signal in response to the impact sensor 25 sensing an impact, a second different alarm signal in response to the movement sensor 26 sensing opening of the wing 10,10' from its closed position, and a third kind of alarm signal in response to the switch element 31 being urged to its operative position if the detector 15' is tampered with by removing the circuit board of the detector 15' from its casing 16'.

The sensitivity of the impact sensor 25 is adjustable by means of a knurled thumb wheel 33 which is rotatable for adjustment with the detector 15' in position in its casing 16', but with lid 18' removed.

It can be seen that the screws 22 which hold the casing 16' in position, are accessible from inside the casing 16' via access openings 34 only when the detector 15' is removed from the casing 16'. The interior of the casing 16' has a pair of slot formations 35, at opposite sides of the casing 16' which each engage with an opposite edge 36,37, of a generally rectangular circuit board on which all of the components of the detector 15' are mounted, to receive and retain the detector 15' in position within the base part 17' of the

casing 16'.

The casing 16' is closable by the lid 18', the base part 17' and lid 18' being connectable together in substantially gas tight manner. This is achieved as the base part 17' is a very close fit with the lid 18' so that as the lid 18' is moved further into the front opening 29 of the base part 17', the periphery of the lid 18' will engage with the surrounding interior wall of the base part 17'.

The access openings 34 may in use be closed with a suitable sealant to improve the gas tightness of the casing 16'.

Hence any attempt to remove the lid 18' by an opposite movement outwardly of the opening 29, will cause a pressure differential between the exterior and interior of the casing 16 which will thus resist removal of the lid 18'.

Hence in practice, to remove the lid 18', it is necessary to provide an opening in the lid 18' and thus destroy its integrity, which would thereby require a new lid 18' to be fitted.

The electrical circuitry of the detector 15' preferably has a very low power consumption such that the battery 24 will last for a very long time such that frequent access to the circuit board of the detector 15' will not be required.

Referring now also to figure 5, there is shown an alarm system 40 comprising a controller 30, at least one sensing device 41 such as a passive infrared sensor which is physically connected via a lead 42 to the controller 30, and receives power from the controller 30 and provides a signal to the controller 30 in the event that an intruder is detected within a protected area.

The alarm system further comprises a plurality of perimeter security devices each comprising a detector like detector 15 or 15' as previously described.

One detector 15a which may be of the type described in figures 1 to 3 or figures 4 and 5, is provided in a style of a window frame as described with reference to figure 1 or figure 4 and is arranged to detect impact in the event that an intruder attempts to break the glazing panels 12,12' or forcibly open the casement 10,10'. Another perimeter security device i.e. detector 15b is mounted in a style 50 of a door frame 51 in which a door 52 is mounted. The detector 15b is adapted to sense a forced entry through the door 52 by sensing impact, and/or movement of the door 52 achieved by the forced entry.

A further perimeter security device i.e. detector 15c is provided in a window frame which has no opening casement, but has only an impact sensor to detect if glazing panels 12c of the window frame 13c are broken.

The detectors 15a,15b and 15c and the infrared sensor 41, are each operative to provide an alarm signal to the controller 30. In this example, the controller 30 has four indicators 53 to 56. In the event that de-

tector 15a detects an impact or movement of the window casement 10,10' relative to its frame 11,11' the controller 30 will cause indicator light 53 to be lit. In the event that detector 15b senses impact or movement, indicator light 54 will be caused to be lit. In the event that detector 15c detects an impact, light 55 will be lit and in the event of sensor 41 detecting an intruder, light 56 will be lit, so that a user of the alarm system 40 readily can see which device 15a-15c or 41 has issued an alarm signal. In response to any alarm signal, the controller 30 may cause an alarm device A to operate by issuing an audible and/or visual alarm and/or the controller 30 may be arranged to operate a telecommunication device 56 which may for example be connected to the public telephone network to communicate an alarm to a remote location such as a police station.

Various modifications may be made without departing from the scope of the invention.

An impact sensor may be provided by any alternative member to the piezzo-electric member 25 described, and the movement sensor need not comprise a reed switch 26 actuated by a magnet, but any other suitable switching device to sense relative movement of an element, being carried on or comprising the movable window, door, or its frame, may be used.

The detector 15,15' need not comprise a casing 16,16' as described, but may be mounted directly in or on the window, door or frame directly, for example, in an integrally formed groove or opening in the window casement, door, or frame.

The invention is applicable not only to uPVC doors and windows, but to windows and doors made from other materials such as metal, timber, or another plastic.

The alarm system described with reference to figure 5, is only an example of an alarm system with which the invention may be used. Any number of perimeter security devices i.e. detectors, like detectors 15a 15b or 15c and internal security sensors like sensor 41 may be provided and the controller 30 may be programmed to respond in different ways to different alarm signals issuing from each or different sensors.

For example, where detector 15a is capable of producing a first alarm signal when an impact is sensed, and a second alarm signal when opening of the casement 10,10' is sensed, and a third alarm signal when tampering with the detector is sensed, the controller 30 may light different indicators to indicate which alarm signal has been transmitted. The controller 30 may be arranged to operate both alarm generator 55 and the telecommunications device 56 in some circumstances, but only generator 55 or device 56 in other circumstances. The controller 30 is preferably intelligent and programmable to achieve desired functions.

The lids 18,18' and bases 17,17' of casings 16,16' are preferably made as plastic mouldings, but

could otherwise be fabricated as desired.

The detector 15' of figures 4 to 6 may be used in addition to or in place of either of the detectors 15a, 15b of the alarm system 40 of figure 6, or in place of detector 15c where a frame 11c surrounding a panel opening, has a Eurogroove or other suitable groove therein able to accommodate the detector 15'.

The features disclosed in the foregoing description the following claims or the accompanying drawings or the following claims, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or composition, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. An assembly comprising a wing or sash (10), and a surrounding frame (11), and a detector (15) comprising at least one of an impact sensor (25) and a movement sensor (26), the impact sensor (25) where provided being sensitive to an impact on the wing or sash (10) or the frame (11), and the movement sensor (26) where provided, being sensitive to movement of the wing or sash (10) relative to its frame (11) at least a predetermined amount from a fully closed position, the detector (15) comprising a casing (16) and the wing or sash (10), or the frame (11), providing a groove (60) in which the casing (16) is adapted to be received, the groove (60) being provided in a surface (61) of the wing or sash (10), or the frame (11) which faces the frame (11), or the wing or sash (10) respectively, such that when the wing or sash (10) is in its fully closed position, the detector (15) is concealed.
2. An assembly according to claim 1 characterised in that the casing (16) is adapted to be secured in the groove (60) provided in the wing or sash (10) or the frame, the groove (60) being re-entrant and having a pair of opposed lips (70,71) which extend towards one another in the groove (60), the casing (16) comprising at least one turnbuckle element (66,67) having a first dimension (d1) smaller than the distance between the opposed lips (70,71) such that the element (66,67) can be received in the groove (60) beyond the lips (70,71) and a second dimension (d2) greater than the distance between the lips (70,71), the turnbuckle element (66,67) being rotatable from a first position in which the first dimension (d1) is presented across the groove (60) so that the casing (16) can be received in the groove and a second position in which the second dimension (d1)

is presented across the groove (60) so the casing (16) is retained relative to the groove (60).

3. An assembly according to claim 2 characterised in that the turnbuckle element (66,67) has at least one cam surface (87,88) which when the turnbuckle element (66,67) is in the second position, engages with an inside surface (89,90) of the groove (60) further to secure the casing (16) relative to the groove (60).
4. An assembly according to any one of claims 1 to 3 characterised in that the detector (15) is provided in the groove (60) of the wing or sash (10) or the frame (11) at a hinged side of the assembly, such as a style of the wing or sash (10) or the frame (11).
5. An assembly according to any one of the preceding claims characterised in that the detector (15) is a self contained unit comprising all the electrical circuitry and the power supply necessary to function, the detector comprising an impact sensor (25) of the kind which includes a member which generates an electrical charge in response to physical distortion of the member caused as a result of an impact on the wing or sash (10) or the frame (11) and/or the detector comprising a movement sensor (26) which includes a switch which opens or closes in response to movement of a corresponding element such as a magnet (24,63) carried by a frame (11) or wing or sash (10) respectively, as the wing or sash (10) is opened at least the predetermined amount from its closed position.
6. An assembly according to any one of the preceding claims characterised in that the detector (15) comprises a transmitter to transmit an alarm signal to a remote receiver (30) when a respective impact or movement is sensed.
7. An assembly according to any one of the preceding claims characterised in that the casing (16) comprises a base part (13) and a lid (18) and at least one tamper sensor is provided which causes the detector (15) to transmit an alarm signal in the event that the lid (18) is removed from the base part (17), or the casing is removed from the groove (60).
8. An assembly detector according to any one of the preceding claims characterised in that the detector (15) is interactive so as to be responsive to a signal from a controller (30) or interrogator remotely to activate or deactivate the detector (15) and/or to test the power supply (battery) (24) without requiring physical access to the detector

(15).

9. A detector (15,15') for an assembly comprising a wing or sash (10,10') and a surrounding frame (11,11'), or a frame surrounding a panelled opening, comprising means to mount the detector (15,15') in or on the wing or sash (10,10') or frame (11,11'), the detector (15,15') comprising one of an impact sensor (25) and a movement sensor (26), the impact sensor (25) where provided being sensitive to an impact on the wing or sash (10,10') or the frame (11,11') and the movement sensor (26) where provided being sensitive to movement of the wing or sash (10,10') relative to its frame (11,11') at least a predetermined amount from a fully closed position, and the detector (15,15') further comprising a transmitter to transmit an alarm signal to a remote receiver (30) when a respective impact or movement is sensed.

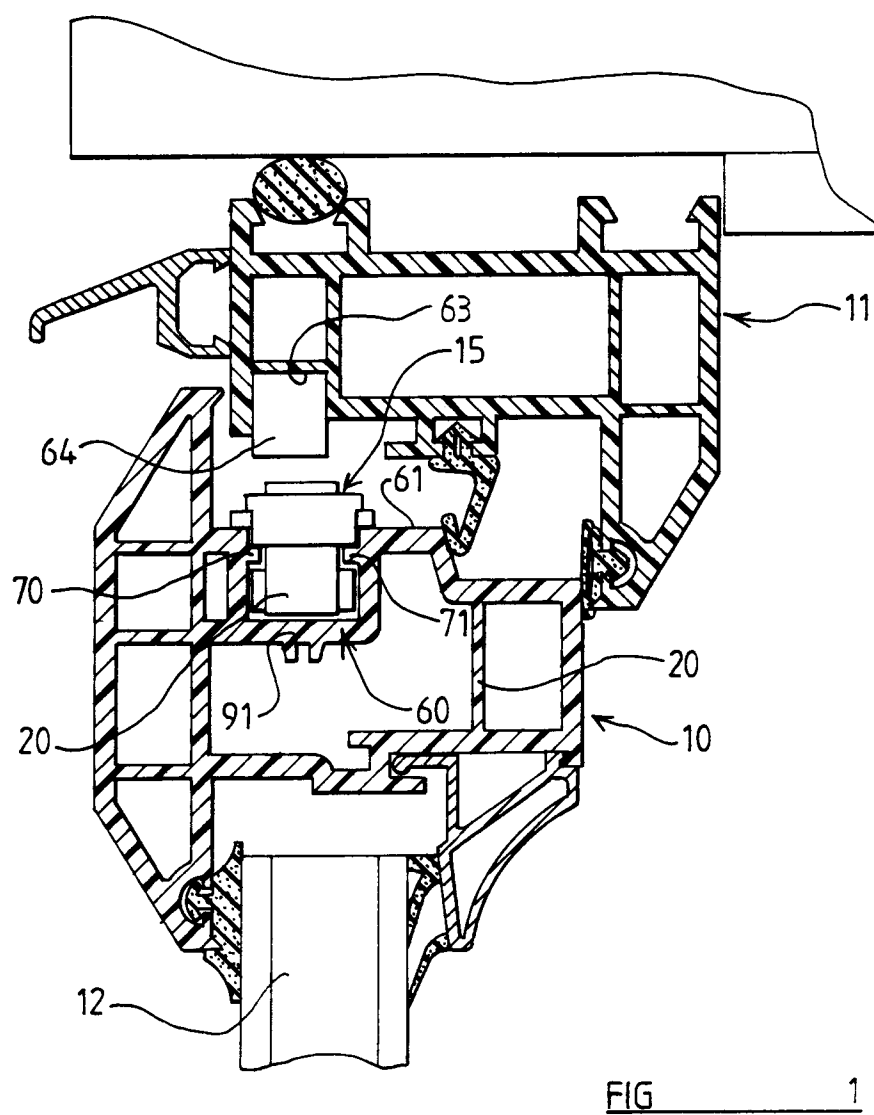
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10. An assembly comprising a wing or sash (10,10') and a surrounding frame (11,11'), or a frame surrounding a panelled opening, and a detector (15,15') according to claim 9.

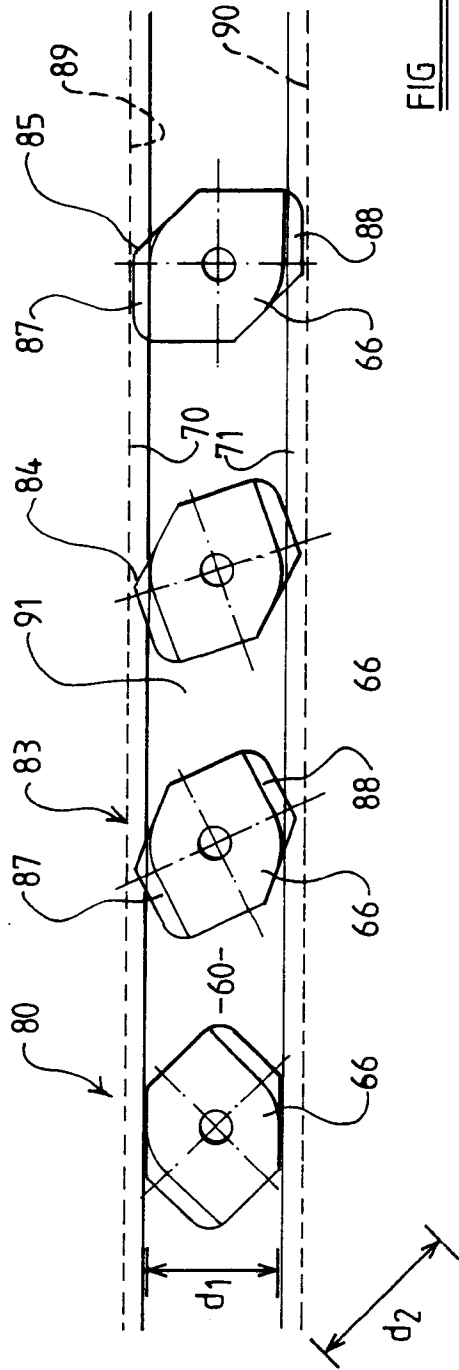
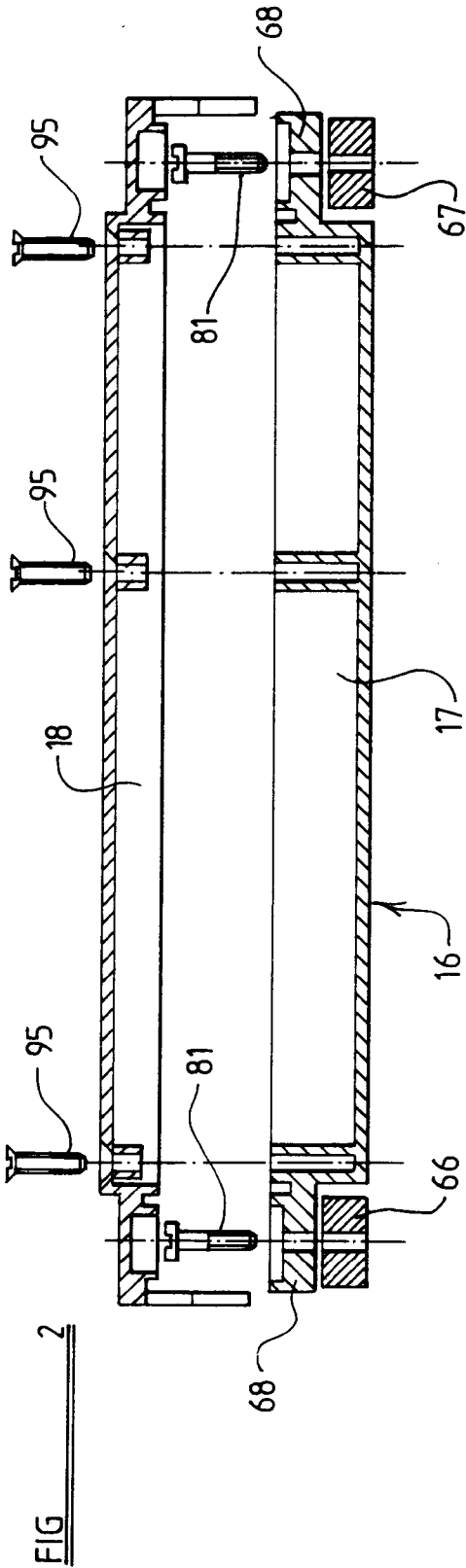
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11. An alarm system (40) having at least one assembly according to any one of claims 1 to 8 or claim 10 and a controller (30) including a receiver to receive the alarm signal transmitted from the detector (15,15'), and an alarm generating device (A), the alarm generating device (A) comprising an audible or visual signal emitter or a telecommunication device (56) to communicate the alarm to a remote location via a radio link or the telephone network.

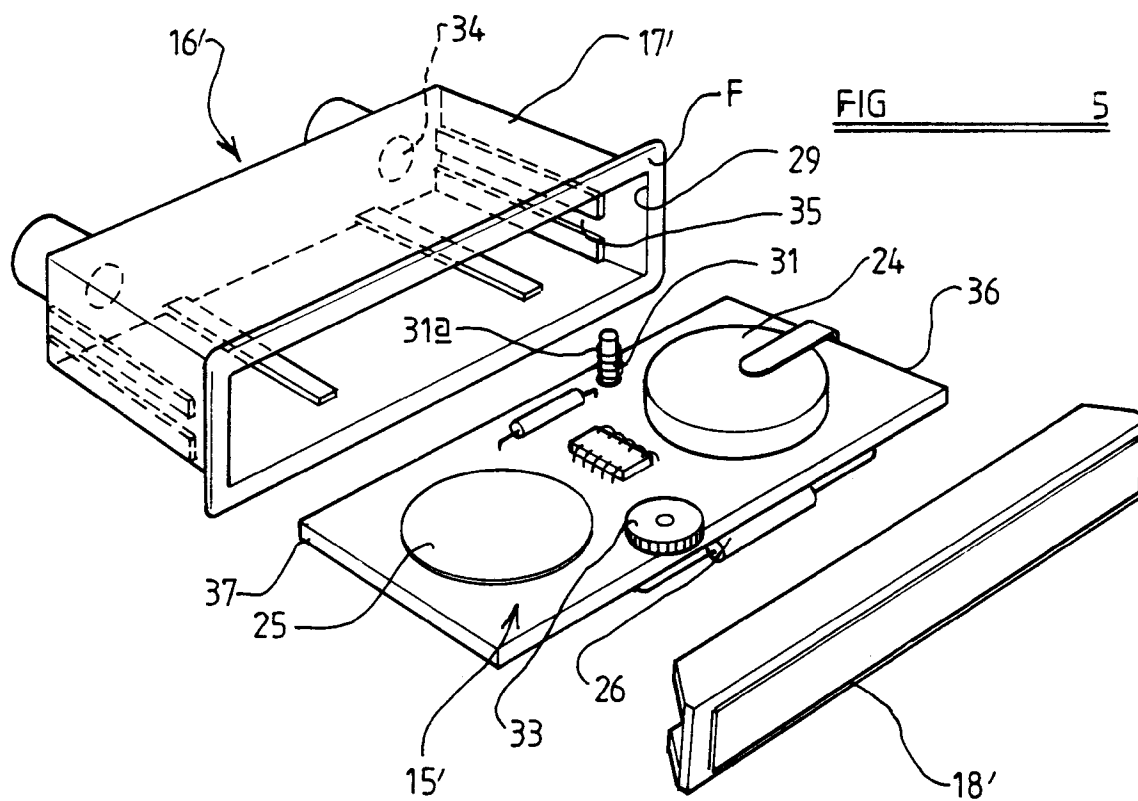
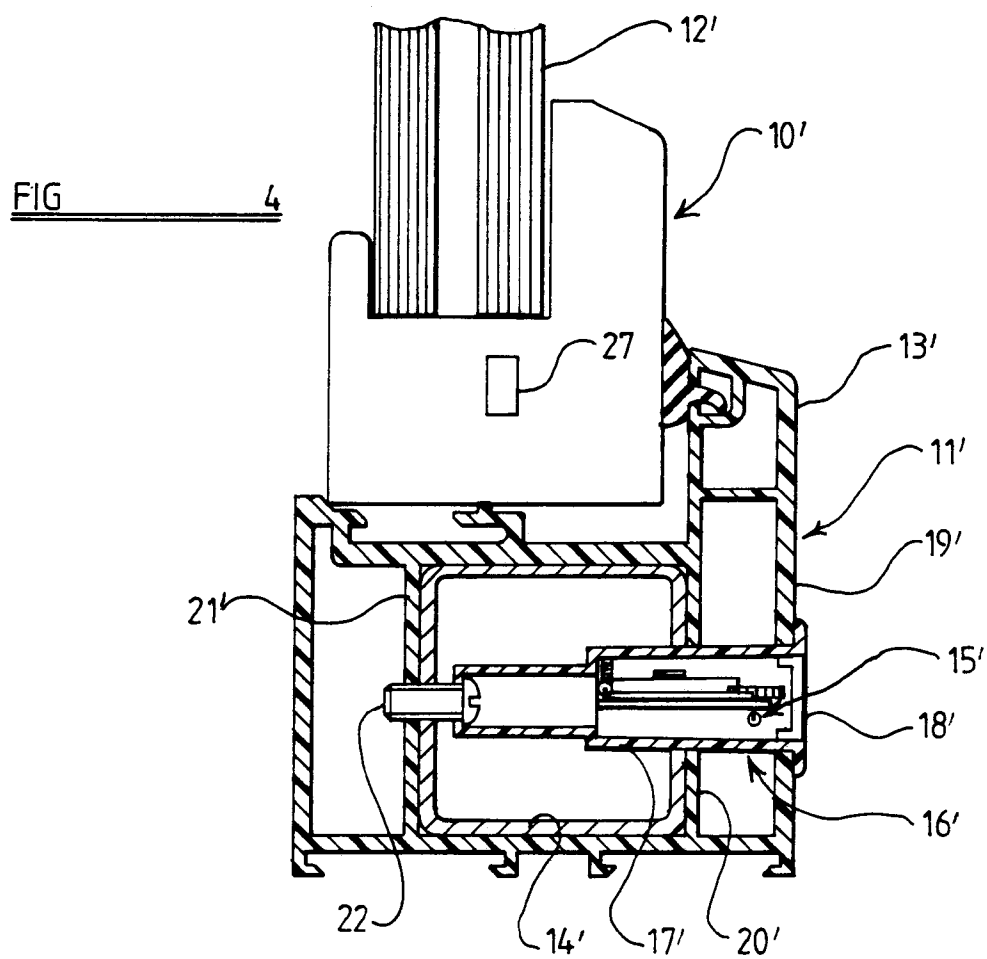
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12. A system according to claim 11 characterised in that the detector (15,15') has both impact (25) and movement (26) sensors, and the detector (15,15') is capable of issuing a first alarm signal in the event that the detector (15,15') senses an impact, and a second different alarm signal in the event that the detector (15,15') senses movement of the window or sash (10,10') relative to its frame (11,11'), and the receiver (30) being adapted to discriminate between the first and second alarm signals, and provide alternative responses to receipt of a first or second alarm signal.

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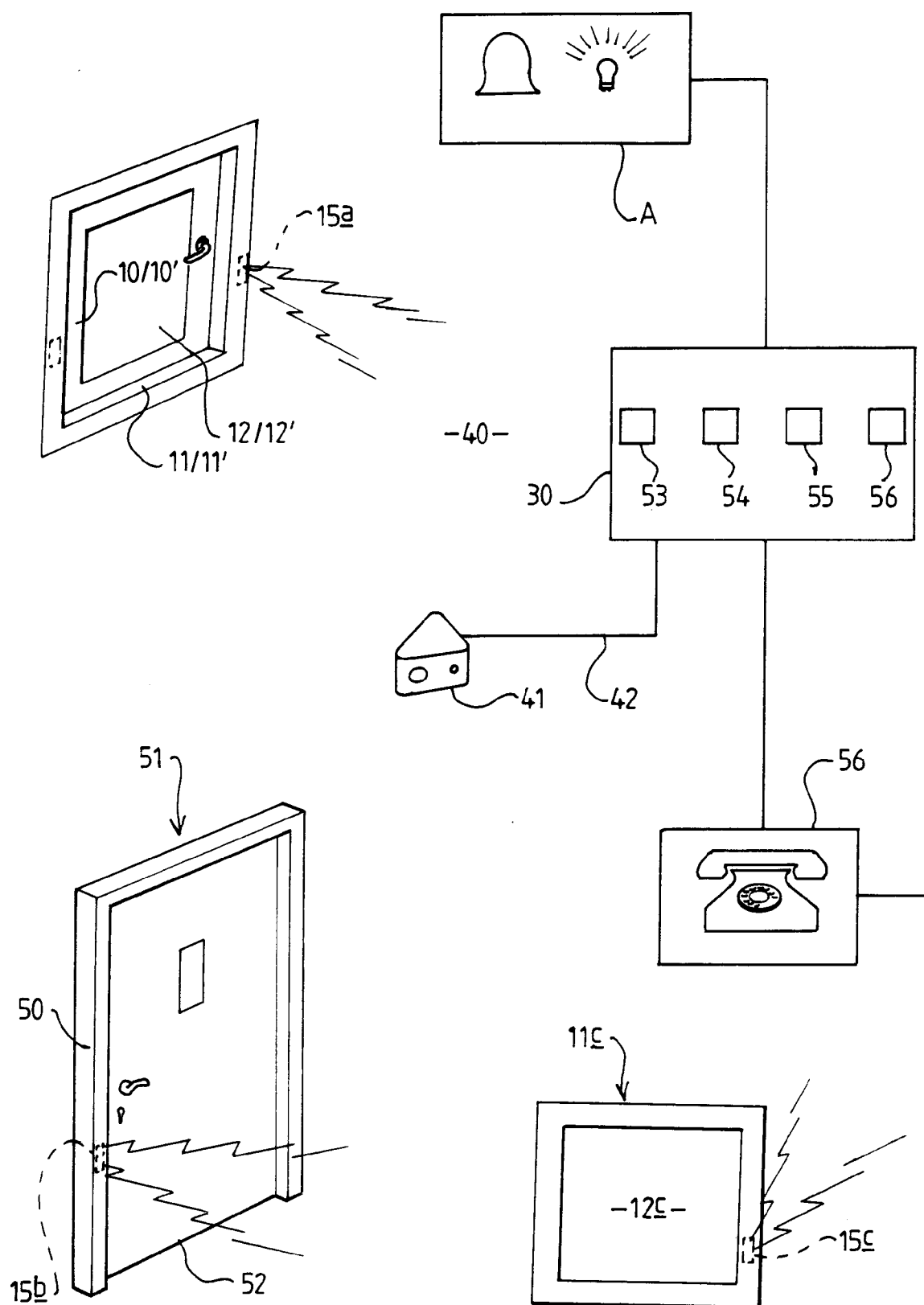


FIG 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 0659

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y	EP-A-0 147 923 (SECURISTYLE LIMITED) * page 1, line 1 - page 3, line 1 *	1	G08B13/08
A	---	2-6,9-11	
Y	EP-A-0 388 756 (DI DIO RUSSO V.) * column 2, line 18 - column 3, line 37; figure 1 *	1	
A	---	5,6,8,9, 11	
A	US-A-4 209 777 (R. MORRISON) * abstract *	7	
A	US-A-4 198 625 (I. MANDE) * abstract *	12	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			G08B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 May 1994	Examiner Sgura, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 01.92 (P04C01)