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(54) SECURITY PERIPHERAL

(57) Provided is a security peripheral for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, comprising a housing provided with a tamper arrangement, the tamper arrangement including both (i) a tamper adhesive for adhesively retaining a tamper element of the tamper arrangement with respect to the mounting surface independently of a prin-

cipal adhesive attachment of the housing in the case of adhesive attachment; and (ii) a first screw fixing aperture in a part of the tamper arrangement for mechanically retaining the tamper element of the tamper arrangement with respect to the mounting surface independently of at least one other screw fixing aperture of the housing in the case of screw fixing.

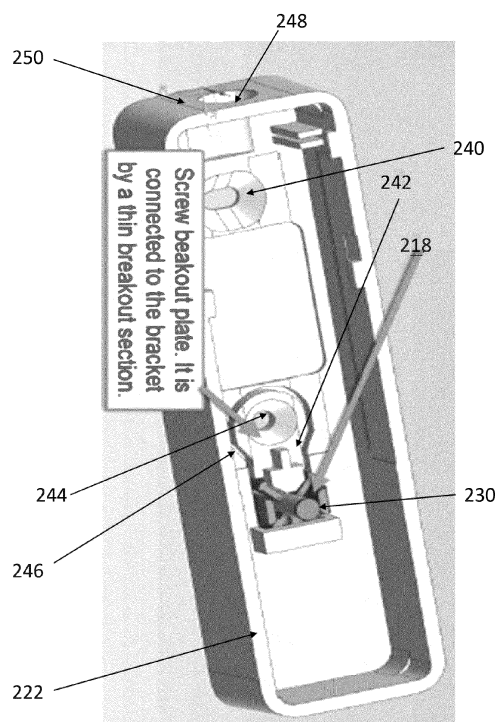


Fig.2

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Description

Technical field

[0001] The present invention relates to security peripherals having a tamper detection function, to installations and systems including such peripherals, and to related methods.

Background

[0002] Security installations that are or include security monitoring systems for monitoring premises, often referred to as burglar alarms, typically provide a means for detecting the presence and/or actions of people at the premises, and reacting to detected events. Commonly such systems include security peripherals in the form of: sensors to detect the opening and closing of doors and windows to provide a secure perimeter to the premises, creating one or more protected interior spaces; movement detectors to monitor spaces (both within and outside buildings) for signs of movement; microphones to detect sounds such as breaking glass; and image sensors to capture still or moving images of monitored zones. Such systems may be self-contained, with alarm indicators such as sirens and flashing lights that may be activated in the event of an alarm condition being detected. Such installations typically include a control unit (which may also be termed a central unit, and also regarded as a peripheral), generally mains powered, that is coupled to the sensors, detectors, cameras, etc. ("nodes"), and which processes received notifications and determines a response. The central unit may be linked to the various nodes by wires, but increasingly is instead linked wirelessly, rather than by wires, since this facilitates installation and may also provide some safeguards against sensors/detectors effectively being disabled by disconnecting them from the central unit. Similarly, for ease of installation and to improve security, the nodes of such systems typically include an autonomous power source, such as a battery power supply, rather than being mains powered.

[0003] As an alternative to self-contained systems, a security monitoring system may include an installation at a premises, domestic or commercial, that is linked to a remote Alarm Receiving Centre (ARC) or Central Monitoring Station (CMS) where, typically, human operators manage the responses required by different alarm and notification types. In such centrally monitored systems, the central unit at the premises installation typically processes notifications received from the nodes in the installation, and notifies the Central Monitoring Station of only some of these, depending upon the settings of the system and the nature of the detected events. In such a configuration, the central unit at the installation is effectively acting as a gateway between the nodes and the Central Monitoring Station. Again, in such installations the central unit may be linked by wires, or wirelessly, to

the various nodes of the installation, and these nodes will typically be battery rather than mains powered.

[0004] If the operator of a monitored security monitoring system wants to be able to summon police assistance as the result of an automated call to the ARC, the system must generally comply with certain standards or regulations designed to reduce the incidence of false alarms. For example, in Europe, EN standard 50136 on alarm transmission systems requires that security monitoring system peripherals must be tamper protected - meaning that the peripherals must report detected tamper events such as attempts to tamper with the peripheral's power supply, attempts to remove the peripheral from its mounting surface, attempts to obscure or shield motion detectors, etc.

[0005] As with other aspects of security monitoring systems, with tamper detection it is important to avoid false alarms because operators of such systems may be penalised by the police or by industry regulators if more than a given number or percentage of alarm events reported to the police are false alarms. Sanctions may include fines and/or the removal of the right to summon police assistance - which may result in such alarm systems losing the approval of insurance companies, which in turn may jeopardise the operator's business. Additionally, resources devoted to handling false alarms cannot simultaneously be devoted to servicing real alarm events - meaning that either response times for handling real alarm events increase, or that more resources (typically both system resource and head count) must be employed.

[0006] It is therefore important to reduce the incidence of false alarms consequent on detected tamper events. Tamper detection may also be a feature of elements of security installations that do not include alarm capabilities, for example peripherals such as keypads that operate locks, and it is likewise important to be able reliably to detect tamper attempts on such peripherals.

[0007] WO2019/115505A1 describe a tamper-protected peripheral which is designed to detect any attempt to remove the peripheral from the surface on which it is mounted, or to access a battery compartment of the peripheral. The peripheral comprises a tamper detection element and a housing arranged to be mounted on a surface such as a door or window frame, or a wall, and secured by screw mounting or by means of an adhesive element (such as a tape or pad with adhesive on its two main faces). The tamper detection element is biased towards a first position and arranged to be displaced away from the first position when the housing is mounted on the surface. The peripheral is arranged to generate an alarm signal in response to the detection of the movement of the tamper detection element towards the first position when the peripheral is removed from the surface.

[0008] With tamper-protected peripherals of this kind the speed of installation is often much greater if the peripheral is fixed to its mounting surface using an ad-

hesive rather than screw mounting. Speed of installation is an important consideration for the installers of such equipment and their employers. This means that frequently adhesive fixing is chosen over screw fixing for reasons of convenience or economy (of course, in some situations, it may either not be possible or not practical to use screw fixing), although not all surfaces may be suitable for adhesive attachment: dusty or greasy substrates, flaking paint or other friable surfaces, may prove to be unsuitable for adhesive attachment, so that screw attachment may be required.

[0009] The present inventors have appreciated that there therefore exists a need to improve security peripherals, in particular their tamper-protection capabilities, and security monitoring systems including such peripherals.

[0010] Such security monitoring systems contribute to the safety and wellbeing of occupants of the protected premises, as well as safeguarding articles within the protected perimeter - which may of course not simply be limited to a house or dwelling, but may also extend to the grounds of the house, protected by a boundary fence and gate, for example.

[0011] Embodiments of the present invention seek to provide enhanced security monitoring systems, and corresponding apps, methods and other implementations that improve the scope of security monitoring systems to address aspects of the problem of phantom tamper detection events, as well as providing new functionality and methods.

Summary

[0012] According to a first aspect there is provided a security peripheral for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, comprising a housing provided with a tamper arrangement, the tamper arrangement including both (i) a tamper adhesive for adhesively retaining a tamper element of the tamper arrangement with respect to the mounting surface independently of a principal adhesive attachment of the housing in the case of adhesive attachment; and (ii) a first screw fixing aperture in a part of the tamper arrangement for mechanically retaining the tamper element of the tamper arrangement with respect to the mounting surface independently of at least one other screw fixing aperture of the housing in the case of screw fixing.

[0013] Such a security peripheral has the advantage of being useable both in situations requiring screw attachment and in situations that require adhesive attachment.

[0014] In a security peripheral according to the first aspect the first screw fixing aperture may be provided in a break-away wall portion of the housing, the break-away wall portion being coupled to and/or an integral part of the housing so as to provide a point of attachment for the housing, in addition to said at least one other screw fixing aperture.

[0015] A security peripheral according to any variant of the first aspect the tamper element may be coupled to the housing by a limited movement coupling which permits limited movement of the tamper element with respect thereto. Permitting the tamper element to "float" with respect to the housing in this way may facilitate effective tamper detection in the event that the peripheral is adhesively secured to its support surface (rather than being attached via screws).

[0016] Optionally, the limited movement coupling may be configured to permit the tamper element to float with respect to the housing, in at least one direction of movement, in a captive manner, whereby in the case of adhesive attachment, the tamper element is pulled by adhesive attachment, relative to the housing, in the event of a tamper attempt.

[0017] In a security peripheral according to any variant of the first aspect, the first screw fixing aperture may be located in a part of the tamper arrangement that is (i) distinct from the tamper element, and/or (ii) configured to cooperate with the tamper element to anchor the tamper element when the security peripheral is mounted to the mounting surface by screw fixing.

[0018] According to a second aspect, optionally according to any variant of the first aspect, there is provided a security peripheral optionally according to the first aspect, the security peripheral configured for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, the security peripheral comprising a housing having a tamper arrangement, wherein the tamper arrangement is configured to operate with a first action of the tamper arrangement when the peripheral attached by adhesive to the mounting surface is removed from the mounting surface, and configured to operate with a second action of the tamper arrangement when the peripheral attached by screw fixing to the mounting surface is removed from the mounting surface, the second action being at least partly different from the first.

[0019] In a security peripheral according to any variant of the second aspect, the first and second actions may involve at least partly different actions of the same tamper element of the tamper arrangement.

[0020] In a security peripheral according to any variant of the second aspect, the first and second actions may involve respective actions of first and second different tamper elements.

[0021] In a security peripheral according to any variant of the second aspect, the first action may involve adhesively pulling a tamper element. Optionally, the tamper element is configured to be adhesively attached to the mounting surface, optionally at least partly independently of a main adhesive attachment of the housing.

[0022] In a security peripheral according to any variant of the second aspect, the second action may involve mechanically pulling the (or a) tamper element via a screw attachment to the mounting surface. Optionally, the housing includes a mechanical break-away portion of the housing wall configured to break away from the

remainder of housing when the housing attached by screw fixing is removed from the mounting surface. Optionally, the mechanical break-away portion is configured to cooperate with the tamper element so as to anchor the tamper element to the mounting surface when the housing is attached by screw fixing. Optionally, the tamper element is coupled to a housing of the peripheral by a limited movement coupling configured to permit the tamper element to float with respect to the housing, in at least one direction of movement, in a captive manner, whereby in the case of adhesive attachment, the tamper element may be pulled by adhesive attachment, relative to a wall of the housing.

[0023] A security peripheral according to any variant of the second aspect may be configured such that in the case that both mechanical and adhesive attachment are used together, (i) both the first and second actions occur, or (ii) only a single one of the first and second actions occurs, or (iii) a different third kind of action occurs.

In a security peripheral according to any variant of the second aspect the housing may be configured for screw fixing attachment from within an interior of the housing.

[0024] A security peripheral according to any variant of the second aspect may be configured such that the tamper arrangement has a first position relative to a body portion of the housing prior to installation on the mounting surface, a second position relative to the body portion of the housing after installation on the mounting surface, and a third position relative to the body portion of the housing when the housing is removed from the mounting surface. Optionally, the first position is slightly proud of a mounting face of the housing; and/or the second position is generally level/coplanar with the mounting face of the housing; and/or the third position is a position substantially proud beyond the first position, or removed completely.

[0025] In a security peripheral according to any variant of any aspect of the invention the or each screw fixing aperture may be blind.

[0026] According to a third aspect there is provided a security peripheral having a housing, the housing having a mounting face for positioning against a mounting surface, and a tamper sensing element displaceable with respect to the housing, the tamper sensing element having a portion that is exposed via an opening in the mounting face, wherein the exposed portion of the tamper sensing element is provided with a first adhesive attachment element to attach the tamper sensing element to the mounting surface, the tamper sensing element being coupled to a tamper sensing circuit, and a tamper condition being detected as a result of the tamper sensing element being pulled outwardly with respect to the housing, and optionally the housing including a battery compartment, the battery compartment being accessible for battery replacement without removing the peripheral from the mounting surface.

[0027] According to a fourth aspect there is provided a security peripheral having a housing, the housing having

a mounting face for positioning against a mounting surface, and a tamper sensing element displaceable with respect to the housing, the tamper sensing element having a portion that is exposed via an opening in the mounting face, the housing including a battery compartment, the battery compartment being accessible for battery replacement without removing the peripheral from the mounting surface wherein the exposed portion of the tamper sensing element being provided with a first adhesive attachment element to attach the tamper sensing element to the mounting surface, and a second separate adhesive attachment element being provided to attach the mounting face of the alarm peripheral to the mounting surface.

[0028] According to a fifth aspect there is provided a security peripheral with a tamper arrangement, wherein a first adhesive attachment element is provided to attach a support surface of the peripheral to a mounting surface, and a second separate adhesive attachment element is provided to attach a tamper element of the tamper arrangement to the mounting surface, a first protective film being provided to protect an adhesive surface of the first adhesive attachment element, and a second separate protective film being provided to protect an adhesive surface of the second adhesive attachment element, part of the second protective film overlying part of the first protective film so that removing the first protective film also removes at least partly the second protective film.

[0029] A security peripheral according to the fifth aspect may be so configured that prior to installation of the peripheral to the support surface the second separate adhesive attachment element stands proud of the first adhesive attachment element, and optionally prior to installation of the peripheral to the support surface the second separate protective film stands proud of the first protective film.

[0030] A security peripheral according to the fifth aspect the support surface of the peripheral may include a breakout portion configured to receive a screw for securing the housing to the mounting surface. Optionally, the tamper sensing element and the housing adjacent the breakout portion include cooperating features so that, if the breakout portion is broken out from the housing the tamper sensing element will be displaced with respect to the housing. Further, the breakout portion may be so arranged that the tamper sensing element is pulled away from a no tamper position in the event that the peripheral, secured to the mounting surface by a screw through the breakout portion, is pulled from the mounting surface as the result of part of the breakout portion engaging with the tamper sensing element.

[0031] A security peripheral according to any variant of the fifth aspect may be so configured that the mounting face of the housing includes a recess by means of which the tamper sensing element can be installed in the housing.

[0032] A security peripheral according to any variant of the fifth aspect may be so configured that one or more

internal abutment surfaces are provided within the housing, for engagement with the tamper sensing element, to limit how far the tamper sensing element can be inserted into the housing.

[0033] A security peripheral according to any variant of the fifth aspect may be so configured that the tamper sensing element can be removed from the housing via the recess.

[0034] A security peripheral according to any variant of the fifth aspect may be so configured that the tamper sensing element includes a pair of protrusions to limit the extent to which the tamper sensing element can be displaced with respect to the housing without the break-out section having been broken out.

[0035] A security peripheral according to any variant of the fifth aspect may be so configured that the portion of the tamper sensing element that is exposed via the opening in the mounting face has a surface area of at least 25mm², or at least 30 mm², 35 mm², 36 mm², 40 mm², 45 mm², 50 mm², and optionally a surface area between 49 and 100 mm². Providing a tamper sensing element with such a large footprint makes the peripheral less sensitive to depressions, recesses or holes in the support surface - that might otherwise permit the tamper sensing element to protrude from the mounting face of the peripheral when mounted to the defective support surface, thereby rendering the peripheral effectively incapable of being armed for tamper detection. Importantly, such an enlarged footprint also reduces the risk of the intermittent false tamper alarms that can arise when a security peripheral is attached to a defective mounting surface.

[0036] A security peripheral according to any variant of the fifth aspect may be so configured that the tamper sensing element is displaceable with respect to the housing over a range of zero to 2mm, and optionally over a range of zero to 1.6mm.

[0037] According to a sixth aspect there is provided, optionally according to any variant of any of the first to fifth aspects, a security peripheral wherein the tamper element has a first position relative to a body portion of the housing prior to installation on the mounting surface, a second position relative to the body portion of the housing after installation on the mounting surface, and a third position relative to the body portion of the housing when the housing is removed from the mounting surface.

[0038] According to a seventh aspect there is provided a security monitoring installation at premises protected by the installation, the installation comprising a controller and a plurality of alarm peripherals configured to transmit event notifications to the controller, the controller being configured to report alarm events to a monitoring station remote from the premises, wherein at least one of the alarm peripherals is according to any variant of the first through sixth aspects, the controller having at least one operating mode in which it is programmed to report detected tamper events to the monitoring station.

[0039] According to an eighth aspect there is provided a

security monitoring installation at premises protected by the installation, the installation comprising a plurality of alarm peripherals configured to transmit event notifications to a monitoring station remote from the premises, wherein at least one of the alarm peripherals is as claimed in any one of claims 1 to 17, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.

[0040] According to a ninth aspect there is provided a system that comprises a security monitoring installation at premises protected by the installation and a monitoring station remote from the premises, the security monitoring installation having a controller and a plurality of alarm peripherals configured to transmit event notifications to the controller, the controller being configured to report alarm events to the monitoring station, wherein at least one of the alarm peripherals is according to any variant of the first through sixth aspects, the controller having at least one operating mode in which it is programmed to report detected tamper events to the monitoring station.

[0041] According to a tenth aspect there is provided a system that comprises a security monitoring installation at premises protected by the installation and a monitoring station remote from the premises, the security monitoring installation having a plurality of alarm peripherals configured to transmit event notifications to the monitoring station, wherein at least one of the alarm peripherals is according to any variant of the first through sixth aspects, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.

Brief description of Figures

[0042] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying Figures, in which:

Figure 1 shows, in partial cross-section, a tamper detecting device according to an aspect of the invention;

Figure 2 illustrates a housing and a tamper element of an alarm peripheral according to aspects of the invention;

Figure 3 shows the housing and tamper element of Figure 2 viewed from the mounting face of the housing, according to a first aspect of the invention;

Figure 4 shows the housing and tamper element before insertion of the tamper element into a recess in the mounting face of the housing;

Figure 5 shows in cross section the tamper element, after its installation into the housing, in a pre-installation state;

Figure 6 shows in cross section the tamper element, after its installation into the housing, in an installed non-tamper state;

Figure 7 shows details of the tamper element and a screw breakout portion of the housing;

Figure 8 corresponds generally to Figure 3, but

shows an arrangement of adhesive for securing the housing and the tamper element to a support or mounting surface;

Figure 9 corresponds to Figure 8, but shows an arrangement of protective layers over the adhesive shown in Figure 8; and

Figure 10 shows schematically a system comprising a security monitoring installation, at premises protected by the installation, and a monitoring station remote from the premises.

Specific description

[0043] Embodiments of the present invention provide improved tamper detection arrangements and methods for security peripherals. The new tamper detection arrangements may be applied to many kinds and styles of tamper-sensing devices.

[0044] Figure 1 shows, partially schematically, an electronic device 10, according to an aspect of the invention, prior to installation. The electronic device 10 comprises a housing 12, an electronic circuit 14 arranged within the housing 12, a power source 16 (typically a battery power source) for providing electrical power to the electronic circuit 14, and an anti-tampering arrangement 18. The electronic circuit 14 comprises a processor or microcontroller (not shown) and a printed circuit board, PCB 15. The housing 12 includes a first half 20 configured to support the electronic circuit 14 and the power source 16 thereon. The housing 12 also includes a second half 22 configured to support the anti-tampering arrangement 18 thereon. The anti-tampering arrangement 18 comprises a mechanical element 34 that is located within the housing 12 with part of the element 34 arranged to protrude through an aperture 38 when the device 10 is free of the support/mounting surface 24, under the action of a biasing force. Once the device is installed (e.g. mounted to a surface 24), the protruding part of the mechanical element is pushed into the device (typically closing a tamper switch, although it could be arranged to open rather than close a switch) ready to emerge from the body of the device, optionally under action of the bias, in the event that the device is removed from its mounting surface 24.

[0045] For example, the electronic device 10 may be a device typically mounted on a support surface 24 such as a wall, a door, a window frame, etc. For example, the electronic device 10 may be sensor device or control panel for an anti-burglary system, or a sensor device for a process indicator system such as a level indicator, or a device for private or public use such as smoke sensor, security camera, public phone and so forth. Electronic circuit 14 may comprise a radio unit for communicating, under the control of the processor or microcontroller, with a central unit of an alarm system such as a premises security monitoring system that may in turn report security events to a remote monitoring station. The electronic circuit may also include a vibration sensor, such as an

accelerometer, not shown, to sense vibration or shocks. The electronic circuit may also include a magnetic sensor such as a magnetometer or reed relay, for detecting the presence (and proximity) of a magnetic field - for example for use in detecting the position or state of a door or window.

[0046] The second half 22 of the housing 12 includes a surface 36 having an opening 38 configured to allow the portion 34 of the mechanical element 32 to protrude therethrough as just described. In an example, the second half 22 of the housing 12 may be a back panel of the housing 12 of electronic device 10 and includes the surface (or face) 36 habitually used for mounting the electronic device 10 on the support surface 24. Further, the first half 20 of the housing 12 may be an outer (or front) cover of the electronic device 10, and may be removable from the second half 22 in order to provide access to the electronic circuit 14 and the power source 16 (e.g. one or more batteries in a battery compartment). Moreover, the second half 22 may also include at least one hole 40 configured to receive at least one screw (not shown) for mounting the housing 12 on the support surface 24. Additionally or alternatively, the second half 22 may include an adhesive element (not shown) arranged on the surface 36 of the housing 12 to enable mounting on the support surface 24. In an example, the electronic device 10 may be screw mounted and require an adequate number of holes 40 to accommodate a sufficient number of screws for mounting. As an alternative, mounting may be done by using the adhesive element, such as a two-sided tape, or a layer of glue, arranged on the surface 36 of the housing 12.

[0047] Figure 2 is an internal view of a lower housing element 222, corresponding generally to the second half 22 of the housing 12 described with reference to Figure 1, within which is mounted a tamper sensing element 218. The tamper sensing element 218 may have at its upper end (or innermost end) an electrical element 230, corresponding to electrical element 30 of the device described with reference to Figure 1. Alternatively, the electrical element 30 may be dispensed with, the tamper sensing element 218 co-operating with a switch, for example mounted on a pcb of the device, so that the tamper sensing element merely serves to transfer a switching force to the switch.

[0048] As with the housing 12 of Figure 1, a screw hole 240 is provided in the base of the housing 222 for securing the housing 222 to a support or mounting surface. In addition, the tamper sensing element 218 is located adjacent a screw breakout plate 242, which includes a second hole 244 to receive a screw for securing the housing to a support surface (if screw fastening is to be used). The holes 240 and 244 may be through holes, or they may be "blind" with a thin skin covering each hole, the skin being readily pierceable by the point of a screw (or a tool such as a bradawl).

[0049] The screw breakout plate 242 is, as its name suggests, designed to readily break away from the rest of

the lower housing element 222 if the housing element is secured to a support surface by a screw through hole 244 and an attempt is made to prize the housing away from the support surface. To this end, the screw breakout plate may be bordered by a frangible breakout section 246. The frangible breakout section 246 should be strong enough to withstand the stresses and strains of normal use, but weak enough to fail under a tamper attempt. The breakout section 246 may be perforated, or may be continuous and unperforated - for example made thinner than the surrounding regions of the lower housing element. A further screw hole 248 is provided in an end face 250 of the lower housing element 222, by means of which the upper housing element can be secured to the lower housing element using a screw.

[0050] It will be noted that the screw through hole 244 is not simply in the tamper sensing element 218 itself, and this allows the screw through hole also to be used as one of the main points of fixation of the peripheral.

[0051] The lower housing element may conveniently be made of ABS, or ASA (acrylonitrile styrene-acrylate).

[0052] Figure 3 shows the lower housing element 222 from its lower (mounting face) side 300, together with the tamper sensing element 218 inserted into the lower face. Here we can see the head of the tamper sensing element 218, and in particular the exterior face of the head. It will be seen that the head of the tamper sensing element 218 is, in this example, generally square in shape (at least when viewed from the base of the lower housing element). One side of the head of the tamper sensing element 218 abuts against a mating edge of the screw breakout plate 242, while each of the two adjacent sides of the screw breakout plate 242 includes a flange whose lower end is marked as 301 and 302. The head of the tamper sensing element 218 may of course be provided in shapes other than generally square, e.g. hexagonal, octagonal, circular, or oval shapes. Unlike the exposed tip of portion 34 of the mechanical element 32 of commercially available devices of the type described in WO2019/115505A1, which typically has a surface area of about 7 mm², the exterior (outer) face of the head of the tamper sensing element 218 typically has an area of at least 25 mm², or at least 30 mm², 35 mm², 36 mm², 40 mm², 45 mm², 50 mm², and optionally a surface area between 49 and 100 mm². For example, being 5 mm by 5 mm, 5 mm by 6 mm, 6 mm by 6 mm, 7 mm by 7 mm, or 8 mm by 9 mm, or even up to 100 mm² (e.g., 10 mm by 10 mm) or more. Such a significant increase in surface area of the exterior face of the head of the tamper sensing element facilitates adhesively attaching the tamper sensing element 218 to the mounting surface upon which the device is secured. The relatively enlarged footprint of the tamper sensing element 218 also copes well with mounting surfaces that are less than perfectly flat (e.g., such as uneven plaster or textured tile surfaces).

[0053] Figure 4 shows the tamper sensing element 218 before insertion into a recess on the lower housing element 222. The upper (or innermost) surface of the head of

the tamper sensing element 218 is ribbed, with a rib 400 extending inwardly diagonally from each corner. At their inner ends the ribs end adjacent an elongate shaft 402 that supports at its upper end (the innermost end of the tamper sensing element) the electrical element 230 which in turn co-operates with one or more corresponding elements on a circuit board of the device. The shaft 402 may be made of a resilient material, such as a silicone rubber, and is preferably made slightly over-length so that when the peripheral is mounted on its support surface the shaft is under a compressive load. The shaft 402 may be cylindrical or any other convenient shape - for example with a square cross section.

[0054] It will be appreciated that, unlike the arrangement described in WO2019/115505A1 no bellows or other biasing arrangement needs to be incorporated into or associated with the tamper sensing element 218 to bias the tamper sensing element 218 away from the PCB (and hence into the tamper sensed position). Instead, the tamper sensing element may be attached to a mounting surface using screw fastening through screw hole 244, or using glue or adhesive (see, for example, figures 8 and 9), so that an attempt to remove the peripheral from its mounting surface will pull the tamper sensing element outwardly with respect to the housing.

[0055] Figure 5 shows in cross section the lower housing element 222 and the tamper sensing element 218 after insertion of the latter into the lower housing element 222, but with the element 218 protruding from the mounting surface 300 of the housing part 222 - as it does pre-installation (and as it may after a tamper attempt, as will be explained). Clearly shown are the pair of upstanding flanges, 500 and 501, on either side of the tamper sensing element 218, the bases of which were shown in Figure 3. Each of the flanges 500, 501, has a laterally extending projection or lug 502, 503. The flanges, and optionally also the lugs, are sufficiently flexible for the tamper sensing element 218 to be insertable into a recess formed in the base of the lower housing element 222. In Figure 5 the tamper sensing element 218 is shown in the protruding or extended position, with the lugs 502, 503, engaging on the inner surface of the lower housing element 222, and the base of the tamper sensing element 218 projecting beyond the outer support face of the lower housing element 222. In other words, Figure 5 shows the device in the unmounted condition, such as occurs before installation. It will be seen that in this pre-mounted state the electrical element 230 (or the upper end of the shaft, if no electrical element 930 is used) is spaced from the PCB 515. The lugs 502 and 503 limit the extent to which the tamper sensing element 218 can protrude, after insertion, from the face 300. The extent of protrusion may be set at no more than a few millimetres, for example no more than 2 or 3 millimetres, and optionally less than 2 millimetres, e.g. between 1 and 2 millimetres.

[0056] Conversely, Figure 6 shows the device in the installed condition (again in cross section), such as occurs after installation with the mounting face of the lower

housing element 222, and the exterior face of the head of the tamper sensing element resting against a support or mounting surface (such as a wall or door, window, or frame) It will be seen that in this installed state the electrical element 230 is in contact with the PCB 515 (or, as previously explained, in a non-tamper state, since other switching arrangements may not require actual contact), and the lugs 502, 503, are raised above and out of contact with the inner surface of the lower housing element 222. The electrical element may for example be an electrically conductive (e.g. carbon-loaded polymer) "pill" optionally of silicone, that is connected to the top of the shaft 402 (which itself may be made of a silicone or some other suitable resilient material). The shaft may be separate from the head of the tamper sensing element 218, for example received in a recess between the upstanding ribs 400. In an alternative embodiment the shaft 402 may be made of a substantially rigid material (e.g. a suitable engineering plastic) that co-operates with a (sprung) switch on the PCB. If a substantially rigid shaft 402 is used it may be integral with (e.g. bonded to) the head of the tamper sensing element 218 or it may be a separate component that may connect to the head by being received in a recess between the upstanding ribs 400.

[0057] Because the shaft 402 of the tamper sensing element 218 is preferably made slightly overlength, the exposed face of the head of the tamper sensing element 218 will stand slightly proud of the mounting face 300 of the lower housing element 222 until the peripheral is actually installed. Resilience in the tamper sensing element or its shaft (or possibly, in the case of a substantially rigid shaft, in the switch operated upon by the shaft) may mean that the "extra length" of the tamper sensing element is absorbed by resilience in the system, so that the exposed face of the head of the tamper sensing element 218 will lie essentially flush with the mounting face 300 of the lower housing element 222. This tendency for the exposed face of the head of the tamper sensing element 218 to stand proud of the mounting face 300 of the lower housing element 222 until the peripheral is actually installed is one reason for the disposition and arrangement of adhesives and overlays that will be described with reference to Figures 8 and 9, which also distinguishes over previously known approaches to attempts to provide adhesive-secured security peripherals.

[0058] Consequently there is provided a security peripheral for mounting to a mounting surface, with a housing having a tamper arrangement 218, the tamper arrangement 218 having a first position relative to a main (or body) portion 222 of the housing prior to installation on the mounting surface, a second position relative to a main (or body) portion of the housing after installation on the mounting surface, and a third position relative to a main (or body) portion of the housing when the housing is removed from the mounting surface.

[0059] The first position may be slightly proud of a mounting face 300 of the housing (e.g. corresponding

to slightly oversizing of the silicone post 302). The second position may be generally level/coplanar with mounting face 300 of the housing 222 (e.g. when pushed back, compressing the silicone post to maintain slight pressure on switch). The third position may be a position substantially proud beyond the first position, or removed completely. The third position may comprise a prouder position when adhesively attached, or a completely pulled out position when attached by fixing screws. (These two different versions of the third position could also be defined as third and fourth positions.)

[0060] Figure 7 shows in more detail co-operating features of the tamper sensing element 218, and of the screw breakout plate 242 and lower housing element 222. Integral with the screw breakout plate 242 is a bracket 700 with a free end having a lower surface 702 that engages with a cooperating upper surface 704 of the head of the tamper sensing element 218, between adjacent ribs 300. The cooperating surfaces of the bracket 700 and the head of the tamper sensing element 218 may each include cooperating enlarged end portions, as shown. These cooperating enlarged end portions help to prevent the tamper sensing element 218 being pushed further into the housing than the desired position flush with the surface 300, and also help to ensure that, if the housing is fastened to a support surface by a screw through hole 244, separating the screw breakout plate 242 from the housing results in the tamper sensing element 218 being pulled with the breakout plate away from the PCB 515 - and consequently a tamper event being signalled. A further bracket 706 is provided as part of the lower housing element 222, stepped to provide a laterally extending abutment surface against which two of the ribs 400 on the upper surface of the head of the tamper sensing element 218 rest when in the fully inserted position (with the electrical element 230, or the upper end of the shaft, in the untampered position with respect to the PCB 515).

[0061] It will be seen that the tamper arrangement is configured to operate with a first manipulation of the tamper arrangement when the peripheral attached by adhesive to the mounting surface is removed from the mounting surface, and configured to operate with a second manipulation of the tamper arrangement when the peripheral attached by screw fixing to the mounting surface is removed from the mounting surface, the second manipulation being at least partly different from the first. Providing different manipulations allows the tamper arrangement to be configured to operate in different ways adapted to the type of attachment, so that performance of the tamper arrangement is not compromised by trying to accommodate both types of attachment in a single way. The first manipulation may be adhesively pulling a tamper element. The tamper element may be configured to be adhesively attached to the mounting surface, e.g. at least partly independently of a main adhesive attachment of housing. The second manipulation may be mechanically pulling the (or a) tamper element via a screw attach-

ment to the mounting surface. The housing may include a mechanical break-away portion of the housing wall configured to break away from remainder of housing when housing is removed. The tamper element may be coupled to the break-away wall portion by a limited movement coupling which permits limited movement of the tamper element with respect to the break-away portion. Limited movement coupling may permit the tamper element to float with respect to the break-away portion, in at least one direction of movement, in a captive manner, so that in the case of adhesive attachment, the tamper element may be pulled by adhesive attachment, relative to a wall of the housing.

[0062] Screw attachment of the housing and/or break-away portion may be configured for screw fixing attachment from within an interior of the housing.

[0063] In the case that both mechanical and adhesive attachment are used together, either or both the first and second manipulations may occur, or only a single one of the first and second manipulations. Or a different third kind of manipulation may be applicable.

[0064] Figure 8 is a view of the underside (which provides the face which upon installation will bear against the support or mounting surface to which the device is attached) of the lower housing element 222 after the application of adhesive attachment portions 800 and 802. The exposed face of the head of the tamper sensing element 218 is provided with an adhesive attachment portion 800, while the exposed face of the underside of the lower housing element 222 is provided with a separate adhesive attachment portion 802, a gap separating the two adhesive attachment portions. Because the shaft 402 of the tamper sensing element 218 is preferably made slightly overlength, the exposed face of the head of the tamper sensing element 218 will stand slightly proud of the mounting face 300 of the lower housing element 222. Consequently, the adhesive attachment portion 800 will also stand slightly proud of the adhesive attachment portion 802.

[0065] The adhesive attachment portion 802 may be provided with a gap, or line of weakness (such as perforations or sequence of cuts), around the periphery of the screw breakout plate 242, although such precautions may be unnecessary if the adhesive attachment portion 802 has a low enough tensile strength. Alternatively, the adhesive attachment portion 802 may be so shaped as to leave uncovered the screw breakout plate 242: the resulting hole optionally being so sized and shaped as to accommodate both the attachment portion 800 and the screw breakout plate 242.

[0066] It will be appreciated that there is thus provided a security peripheral for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, with a housing having a tamper arrangement. The tamper arrangement including both (i) a tamper adhesive 800 for adhesively retaining a tamper element of the tamper arrangement with respect to the mounting surface independently of a principal adhesive attachment

802 of the housing in the case of adhesive attachment; and (ii) a first screw fixing aperture 244 for mechanically retaining the tamper element of the tamper arrangement with respect to the mounting surface independently of at least one other screw fixing aperture 240 of the housing in the case of screw fixing. Screw fixing apertures may be open or "blind" - e.g. with a breakout region or a thin skin that can be displaced or readily penetrated by the tip and end portion of a fixing screw.

[0067] The first screw fixing aperture 244 may be provided in a break-away wall portion 242 of the housing, the break-away wall portion 242 being coupled to (e.g. an integral part of) the housing 222 so as to provide a point of attachment for the housing, in addition to said at least one other screw fixing aperture 240.

[0068] Optionally, the tamper element 218 is coupled to the break-away wall portion 242 by a limited movement coupling which permits limited movement of the tamper element 218 with respect to the break-away portion 242. Limited movement coupling may permit the tamper element 218 to float with respect to the break-away portion 242, in at least one direction of movement, in a captive manner, so that in the case of adhesive attachment, the tamper element 218 may be pulled by adhesive attachment, relative to the housing wall 300.

[0069] Figure 9 corresponds to Figure 8 and is a view of the underside of the lower housing element 222 with separate protective layers 900 and 902 provided over the adhesive attachment portions 800 and 802. Protective layer 900 protects the adhesive attachment portion 800 on the tamper sensing element 218, while protective layer 902 protects the adhesive attachment portion 802 on the underside of the lower housing element 222. It will be noted that protective layer 900 is significantly larger than the underlying adhesive portion 800 (marked by the dotted line 904), so that the protective layer 900 overlaps adjacent portions of the protective layer 902. Protective layer 902 includes a lift-off tab 906 by means of which the protective layer 902 can be removed from adhesive layer 802. By virtue of the overlap between protective layer 900 and protective layer 902, removal of the latter also removes the former. No dedicated pull-off tab is provided for the protective layer 900 over the tamper sensing element 218, to avoid the risk that an installer may remove the protective layer 900 without also removing protective layer 902.

[0070] In practice, the adhesive layers, 800 and 802, may be attached to their respective substrates with their corresponding protective layers, 900 and 902, already attached to the respective adhesive layer. Thus, adhesive layer 802, carrying protective layer 902 may first be attached to the underside of the lower housing element 222, and then the adhesive layer 800, carrying protective layer 900 may be attached to the exposed face of the tamper sensing element 218.

[0071] It can be seen that there is provided a security peripheral for mounting to a mounting surface, with a housing having a tamper arrangement comprising a

tamper element 218 that is movable with respect to the housing 222 and provided with a tamper element adhesive 800 for adhesively attaching the tamper element to the mounting surface in a manner that causes the tamper element 218 to move with respect to the housing 222 when the housing 222 is separated from the mounting surface.

[0072] The housing may comprises a first part 20 that is movable with respect to a second part (2)22, to selectively open and close the housing without removing the entire housing from its fitted position.

[0073] The housing may comprise a battery compartment for a replaceable battery 16, accessible by moving the first housing part 20 with respect to the second (2)22, to allow battery replacement without detaching the entire housing from the mounting surface.

[0074] The tamper element 218 may be coupled to a portion of the housing by a limited movement coupling that permits limited movement between the tamper element 218 and the portion 222 of the housing to which it is coupled. Optionally, movement may be confined to be along a predetermined movement axis. Optionally, the limited movement may be out of a plane of a wall 300 of the housing 222.

[0075] The limited movement coupling may retain the tamper element 218 captive to portion of the housing wall 300 to which is coupled, while permitting limited movement relative thereto.

[0076] The housing may comprise at least one screw attachment aperture 240, optionally at least two, optionally at least three, for screw fixing the housing 222 to the mounting surface from within the interior of the housing 222. The housing wall may comprise a break-away portion 242 coupled to the tamper element 218 and having a said screw attachment aperture 244.

[0077] The break-away wall portion 242 may be coupled to the tamper element 218 by the (or a) limited movement coupling that permits limited relative movement between the tamper element 218 and the break-away portion 242.

[0078] The peripheral may further comprise a second adhesive region 802 distinct from tamper element adhesive 800, for adhesive fastening of peripheral to the mounting surface.

[0079] The peripheral may further comprise at least one removable protective sheet (e.g. a film) 900, 902, for covering at least the tamper element adhesive 800. Optionally the at least one sheet covers the main adhesive region 802. The sheet may be a single piece of sheet, or multiple pieces, e.g. at least first and second sheets. Preferably, in the case of first and second sheets, at least a portion of one sheet 900 overlaps a portion of the second sheet 902. Preferably the configuration is such that removal of one sheet 902 causes at least partial removal (optionally substantial, optionally entire) of the other sheet 900.

[0080] Bad actors may attempt to disable a security device by removing or tampering with the device's battery

(more generally, power supply) or by removing the device from its mounting surface. Security peripherals are often required to be battery powered and it is desirable for battery replacement to be achievable without having to demount the device from the mounting surface. It will be appreciated that the embodiments described with reference to Figures 3 to 9 all provide a tamper detection arrangement that responds to removal of the device from its mounting surface and also to the separation of the first part (the cover) 20 and the second part (that is screwed or glued to the mounting surface) - such as occurs when opening the device to change the battery (or batteries) 16 (the described devices are preferably all openable without being removed from their mounting surfaces). But in some situations, it may be necessary or at least desirable to provide two or more tamper detection arrangements to detect (attempted) removal and (attempted) opening of the device or access to or removal of a power supply. Optionally, more than one tamper detection arrangement may be provided to detect removal of the device from its mounting surface - for example, one tamper detection arrangement may be provided to detect removal in the event that the device is attached solely by means of adhesive, with a second tamper detection arrangement provided to detect removal in the event that the device is attached by means of screws.

[0081] Other general peripheral features, applicable to any variant of any of the previously disclosed aspects: The peripheral may comprise at least one transducer for sensing a security-related environmental parameter, e.g. at least one of: microphone, camera, accelerometer, magnetic-field responsive sensor (e.g. magnetometer, Hall effect sensor, or magnetic switch), infra-red detector, vibration detector, movement detector.

[0082] The peripheral may comprise at least one user input and/or output device, e.g. at least one of: mechanical or electrical keys, microphone, loudspeaker, visual display.

[0083] The peripheral may comprise one or more radio transceivers for wireless communication with another element of a security/alarm installation.

[0084] The peripheral may be configured to generate a tamper-alert signal within a time period of no more than 1000ms (optionally no more than 700ms) of a tamper condition sensed by the tamper arrangement (and optionally of a validated tamper signal).

[0085] The housing may be divided into first 222 and second 20 housing parts. The first part 222 may be configured to be attached to mounting surface, and the second part 20 may be configured to be movably/removably attached to first part. Electronic components/circuitry/ battery may be supported by the first part and/or by the second part. The parts may be secured together in a closed position by one or more snap-fitting parts, and/or by one or more rotary fasteners.

[0086] Figure 10 shows schematically a security monitoring installation 1000 at premises 1002 protected by the installation. The installation 1000 may comprise a

controller or central unit 1004, and a plurality of alarm peripherals that are configured to transmit event notifications to the controller 1004. Each of the peripherals, which may be battery powered, may include an RF transceiver (e.g. a transceiver configured to operate in one or more IMS wavebands) for communication with the central unit 1004. Typically, among the peripherals will be magnetic contact switches 1006 fitted to doors 1008 and windows 1010, these being configured to detect whether the associated door or window is open or closed and typically being arranged to report a change of state - or at least a transition from a closed state, to the central unit 1004. Other peripherals may be in the form of cameras, such as video cameras 1012, 1014 typically motion triggered video cameras. The cameras, which may detect motion using thermal sensors, such as PIR, radar, etc., may be configured to notify the controller 1004 in the event that their associated motion detector is triggered (as well as capturing an image(s) and/or video upon being triggered). Each room or significant rooms (e.g. those containing valuables) may have a peripheral in the form of a motion detector (e.g. thermal, microwave, or radar) 1016, the motion detector 1016 being arranged to signal the central unit 1004 in the event of being triggered. The security monitoring system may have a disarmed state and at least one armed state. Typically, there will be at least two armed states: an armed away state; and an armed at home state. The armed away state is intended for use when the home 1002 is unoccupied, in which state an alarm condition may exist if any of the internal sensors/peripherals is triggered, as well as in the event that any peripheral protecting the secure perimeter of the premises, such as the contact switches on doors and windows, is triggered. In the armed at home state an alarm event may be determined based on the triggering of any peripheral securing the perimeter of the premises 1002, and optionally also in the event that other external sensors/peripherals are triggered - e.g. a designated video camera 1014 overlooking the yard or garden of the premises 1002, but triggering of peripherals/sensors within the premises, such as triggering of internal video camera 1012, will typically not result in determination of an alarm event (although the triggering of peripherals in or associated with particular rooms or zones may result in determination of an alarm event even in an armed at home mode).

[0087] The controller 1004 may be configured to report alarm events to a monitoring station 1018 remote from the premises 1002, either via a cabled connection or via an RF connection, such as via a PLMN 1020. The controller 1004 may also be configured to report alarm events to a user device (e.g. a smart phone or so other WTRU) 1022, and/or the remote monitoring station 1018 or a network-based system back end may be arranged to report alarm events or selected alarm events to the user device 1022.

[0088] At least one of the alarm peripherals is according to any variant of the first through sixth aspects and

may be configured to report any detected tampering event to the controller 1004. The controller may have at least one operating mode in which it is programmed to report detected tamper events to the monitoring station 1018. The controller may be configured to report detected tamper events to the monitoring station 1018 in a disarmed mode as well as in armed modes.

[0089] Figure 10 can also be considered to show schematically a system that comprises a security monitoring installation (1000) at premises (1002) protected by the installation and a monitoring station (1018) remote from the premises, the security monitoring installation having a controller 1004 and a plurality of alarm peripherals (e.g. selected from the group 1006, 1012, 1014, 1016) configured to transmit event notifications to the controller (1004), the controller being configured to report alarm events to the monitoring station, wherein at least one of the alarm peripherals is as claimed in any variant of any of the first through sixth aspects, the controller having at least one operating mode in which it is programmed to report detected tamper events to the monitoring station.

[0090] It should also be noted that premises security monitoring installations that include one or more alarm peripherals according to any of the first through sixth aspects may include an on-premises controller which may act as a gateway between the peripherals and a remote monitoring centre 1018, but equally premises security monitoring installations that include one or more alarm peripherals according to any of the first through sixth aspects may be built without an on-premises controller - instead the alarm peripherals, or at least some of them, may be configured to communicate with a remote monitoring centre 1018 - for example using hardware/-functionality (e.g., an appropriate transceiver) to support LTE Cat M and/or NB-IoT (NarrowBand-Internet of Things) which are both cellular communication protocols, using (3GPP) licensed frequency spectrum, with potential ranges of up to 10km. These considerations apply equally to the various other aspects of the invention - and hence the other aspects may be used in security monitoring installations with or without the presence of a local controller, with or without on-device processing, and with the alarm peripherals optionally including any or all of the previously described communications technology to support "direct" communication with a remote monitoring station.

[0091] Thus, there is provided a security monitoring installation at premises protected by the installation, the installation comprising a plurality of alarm peripherals configured to transmit event notifications to a monitoring station remote from the premises, wherein at least one of the alarm peripherals is according to any variant of the first through sixth aspects, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.

[0092] Likewise, there is provided a system that comprises a security monitoring installation (1000) at premises (1002) protected by the installation and a monitor-

ing station (1018) remote from the premises (1002), the security monitoring installation (1000) having a plurality of alarm peripherals (e.g. selected from the group 1006, 1012, 1014, 1016) configured to transmit event notifications to the monitoring station (1018), wherein at least one of the alarm peripherals is according to any variant of the first through sixth aspects, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.

Claims

1. A security peripheral for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, comprising a housing provided with a tamper arrangement, the tamper arrangement including both (i) a tamper adhesive for adhesively retaining a tamper element of the tamper arrangement with respect to the mounting surface independently of a principal adhesive attachment of the housing in the case of adhesive attachment; and (ii) a first screw fixing aperture in a part of the tamper arrangement for mechanically retaining the tamper element of the tamper arrangement with respect to the mounting surface independently of at least one other screw fixing aperture of the housing in the case of screw fixing.
2. A security peripheral as claimed in claim 1, wherein the first screw fixing aperture is provided in a break-away wall portion of the housing, the break-away wall portion being coupled to and/or an integral part of the housing so as to provide a point of attachment for the housing, in addition to said at least one other screw fixing aperture.
3. A security peripheral as claimed in claim 1 or claim 2, wherein the tamper element is coupled to the housing by a limited movement coupling which permits limited movement of the tamper element with respect thereto.
4. A security peripheral as claimed in claim 3, wherein the limited movement coupling is configured to permit the tamper element to float with respect to the housing, in at least one direction of movement, in a captive manner, whereby in the case of adhesive attachment, the tamper element is pulled by adhesive attachment, relative to the housing in the event of a tamper attempt.
5. A security peripheral as claimed in any preceding claim, wherein the first screw fixing aperture is located in a part of the tamper arrangement that is (i) distinct from the tamper element, and/or (ii) configured to cooperate with the tamper element to anchor the tamper element when the security peripheral is mounted to the mounting surface by screw fixing.
6. A security peripheral optionally as claimed in any one of the preceding claims, the security peripheral configured for mounting to a mounting surface selectively by adhesive attachment and/or by screw fixing, the security peripheral comprising a housing having a tamper arrangement, wherein the tamper arrangement is configured to operate with a first action of the tamper arrangement when the peripheral attached by adhesive to the mounting surface is removed from the mounting surface, and configured to operate with a second action of the tamper arrangement when the peripheral attached by screw fixing to the mounting surface is removed from the mounting surface, the second action being at least partly different from the first action.
7. A security peripheral as claimed in claim 6, wherein the first and second actions involve at least partly different actions of the same tamper element of the tamper arrangement.
8. A security peripheral as claimed in claim 6 or claim 7, wherein the first and second actions involve respective actions of first and second different tamper elements.
9. A security peripheral as claimed in any one of claims 6 to 8, wherein the first action involves adhesively pulling a tamper element.
10. A security peripheral as claimed in claim 9, wherein the tamper element is configured to be adhesively attached to the mounting surface, optionally at least partly independently of a main adhesive attachment of the housing.
11. A security peripheral as claimed in any one of claims 6 to 10, wherein the second action involves mechanically pulling the (or a) tamper element via a screw attachment to the mounting surface.
12. A security peripheral as claimed in claim 11, wherein the housing includes a mechanical break-away portion of the housing wall configured to break away from the remainder of housing when the housing attached by screw fixing is removed from the mounting surface.
13. A security peripheral as claimed in claim 12, wherein mechanical break-away portion is configured to cooperate with the tamper element so as to anchor the tamper element to the mounting surface when the housing is attached by screw fixing.
14. A security peripheral as claimed in claim 11, wherein tamper element is coupled to a housing of the per-

ipheral by a limited movement coupling configured to permit the tamper element to float with respect to the housing, in at least one direction of movement, in a captive manner, whereby in the case of adhesive attachment, the tamper element may be pulled by adhesive attachment, relative to a wall of the housing.

15. A security peripheral as claimed in any one of claims 6 to 14, configured such that in the case that both mechanical and adhesive attachment are used together, (i) both the first and second actions occur, or (ii) only a single one of the first and second actions occurs, or (iii) a different third kind of action occurs.
16. A security peripheral as claimed in any one of the preceding claims wherein the tamper arrangement has a first position relative to a body portion of the housing prior to installation on the mounting surface, a second position relative to the body portion of the housing after installation on the mounting surface, and a third position relative to the body portion of the housing when the housing is removed from the mounting surface.
17. A security peripheral as claimed in claim 16, wherein:

the first position is slightly proud of a mounting face of the housing; and/or
the second position is generally level/coplanar with the mounting face of the housing; and/or
the third position is a position substantially proud beyond the first position, or removed completely.
18. A security monitoring installation at premises protected by the installation, the installation comprising a controller and a plurality of alarm peripherals configured to transmit event notifications to the controller, the controller being configured to report alarm events to a monitoring station remote from the premises, wherein at least one of the alarm peripherals is as claimed in any one of the preceding claims, the controller having at least one operating mode in which it is programmed to report detected tamper events to the monitoring station.
19. A security monitoring installation at premises protected by the installation, the installation comprising a plurality of alarm peripherals configured to transmit event notifications to a monitoring station remote from the premises, wherein at least one of the alarm peripherals is as claimed in any one of claims 1 to 17, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.
20. A system that comprises a security monitoring installation at premises protected by the installation

and a monitoring station remote from the premises, the security monitoring installation having a controller and a plurality of alarm peripherals configured to transmit event notifications to the controller, the controller being configured to report alarm events to the monitoring station, wherein at least one of the alarm peripherals is as claimed in any one of claims 1 to 17, the controller having at least one operating mode in which it is programmed to report detected tamper events to the monitoring station.

21. A system that comprises a security monitoring installation at premises protected by the installation and a monitoring station remote from the premises, the security monitoring installation having a plurality of alarm peripherals configured to transmit event notifications to the monitoring station, wherein at least one of the alarm peripherals is as claimed in any one of claims 1 to 17, said at least one alarm peripheral being programmed to report detected tamper events to the monitoring station.

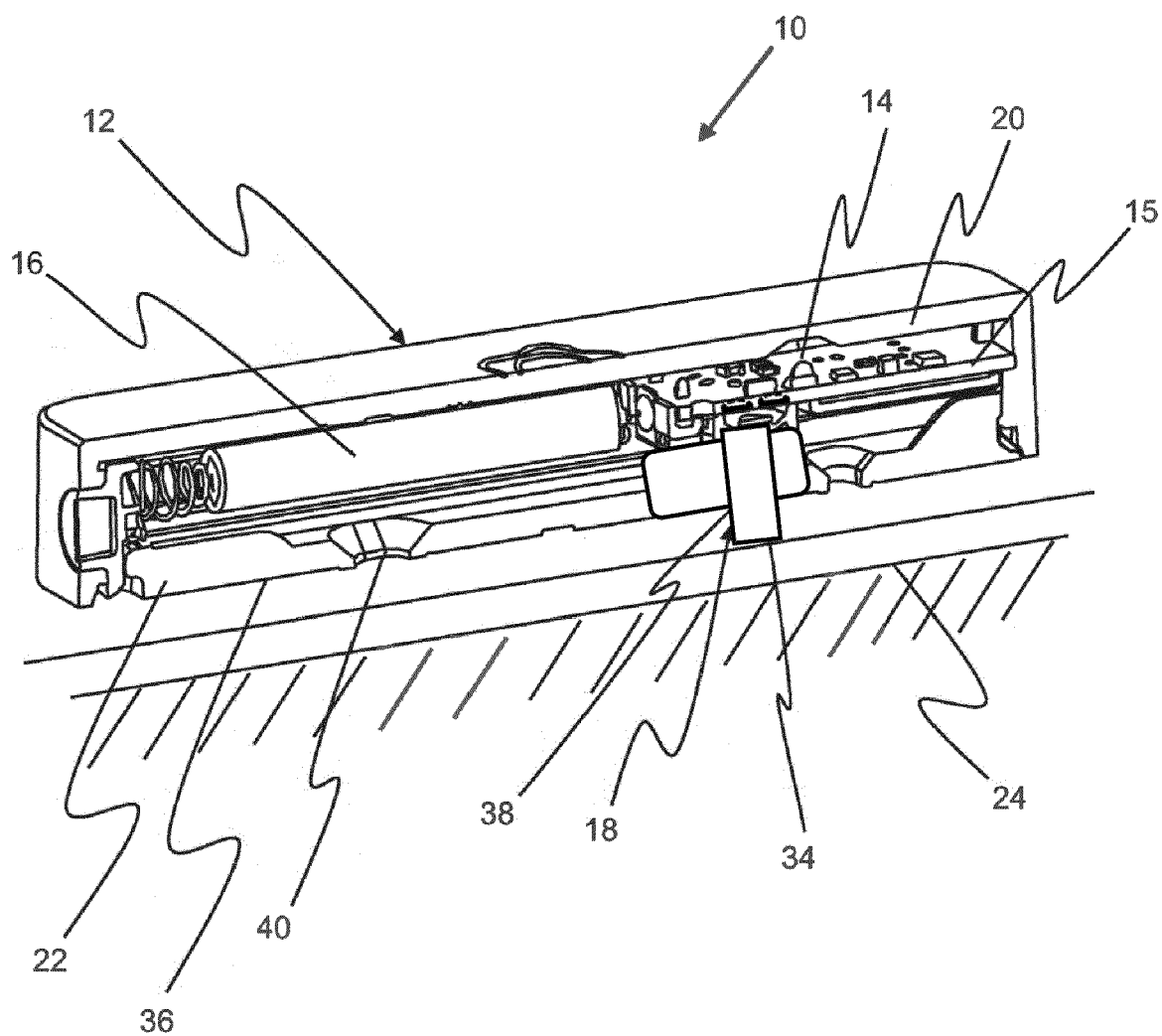


Fig. 1

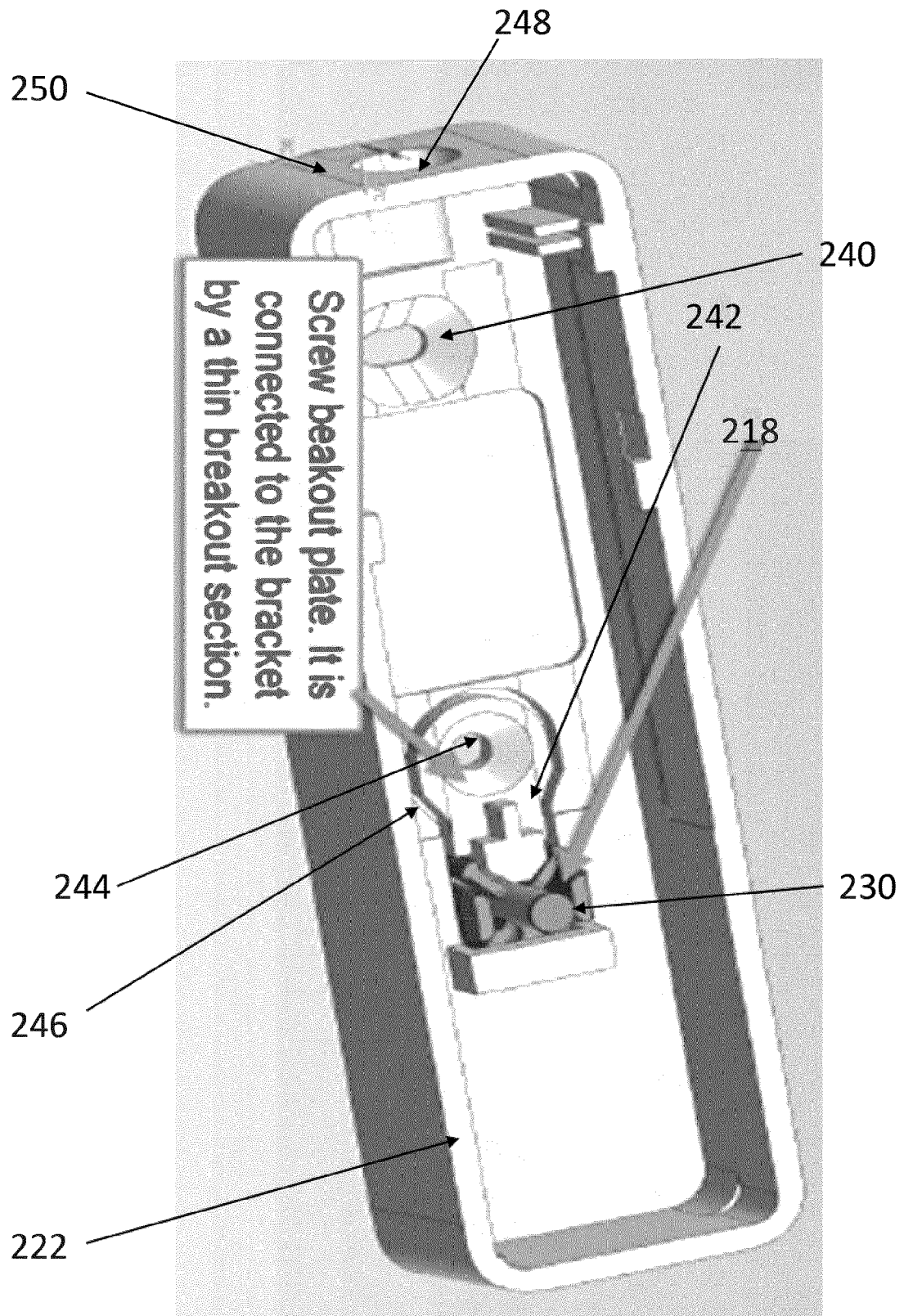


Fig.2

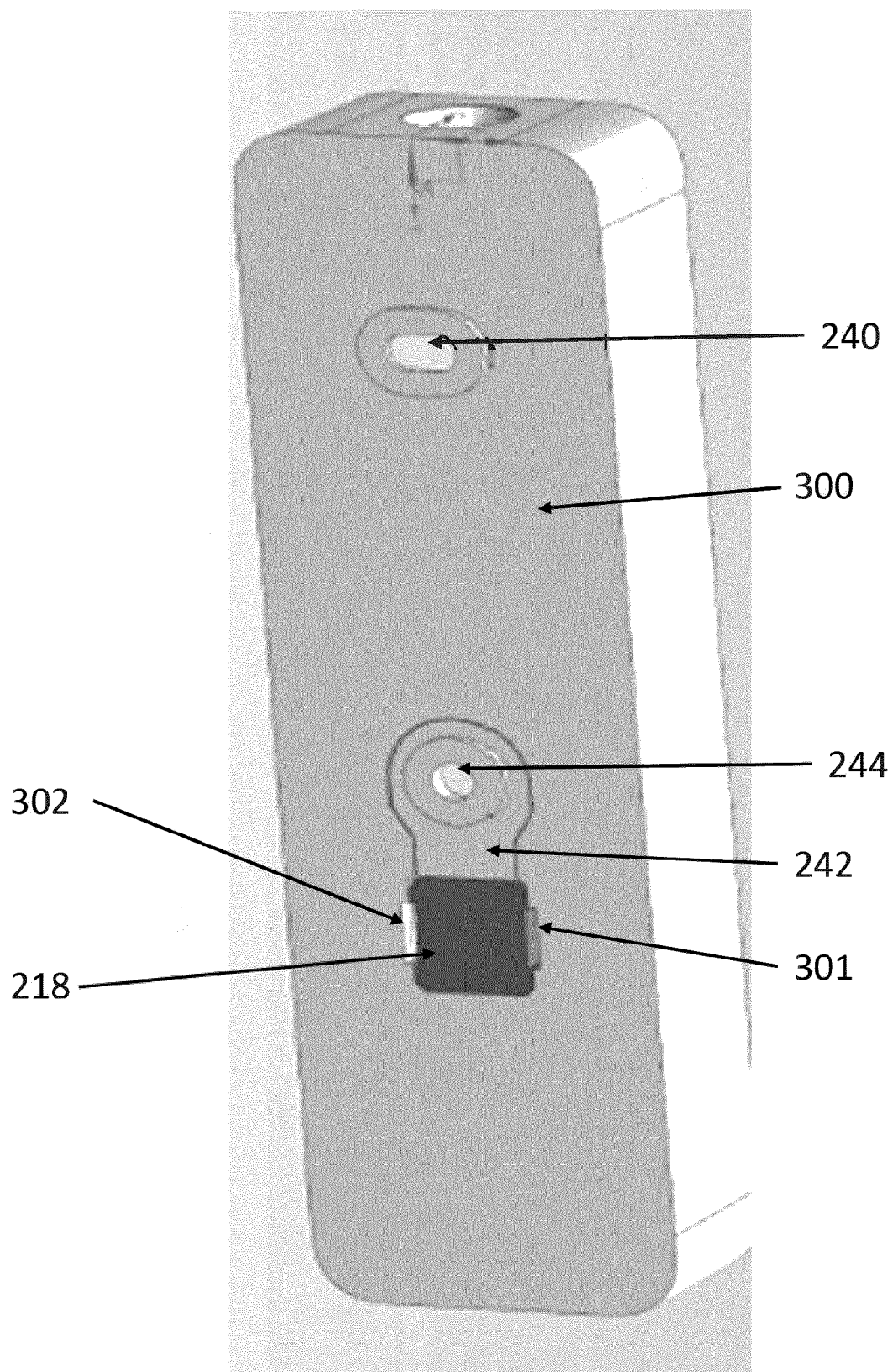


Fig.3

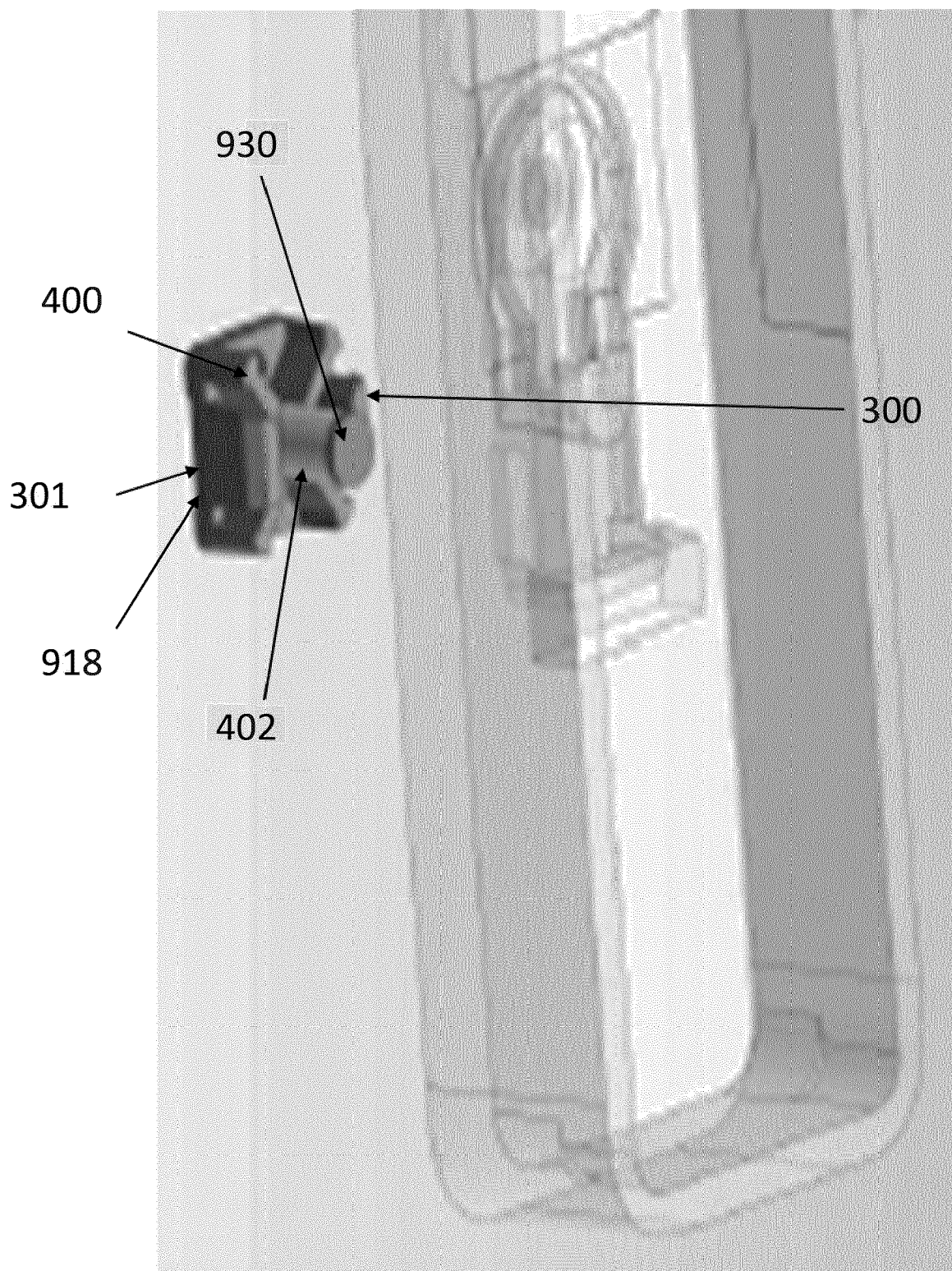


Fig.4

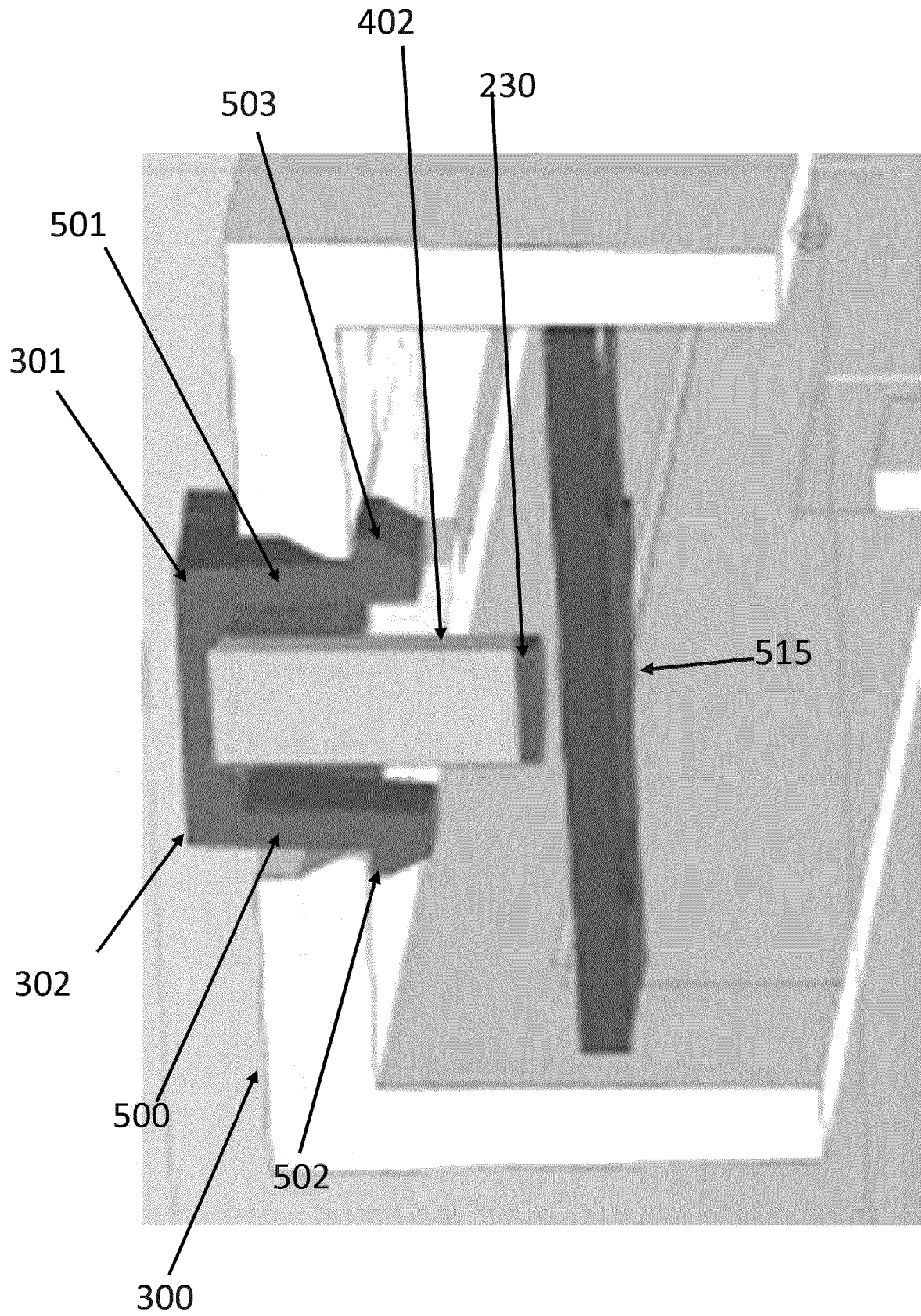


Fig.5

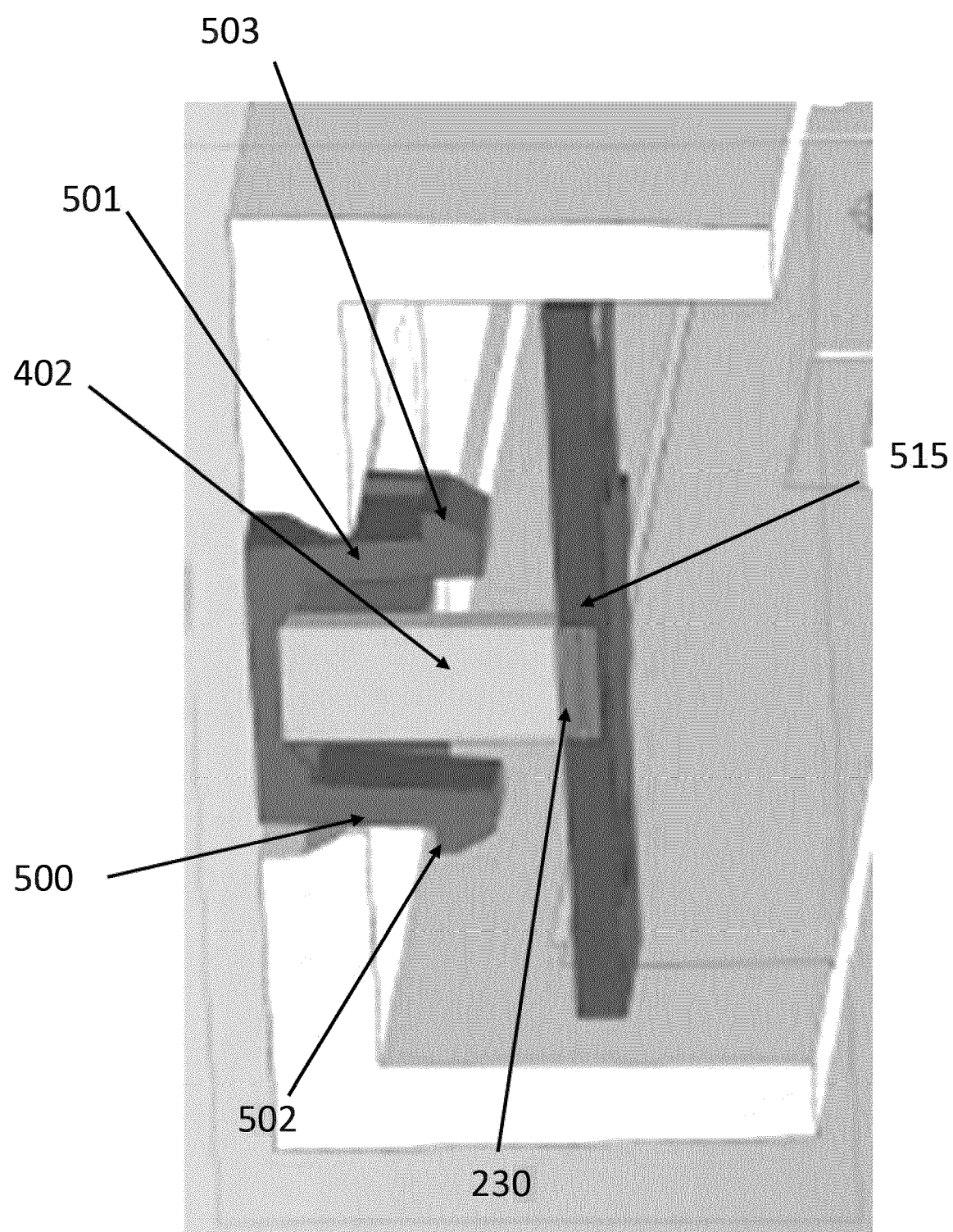


Fig.6

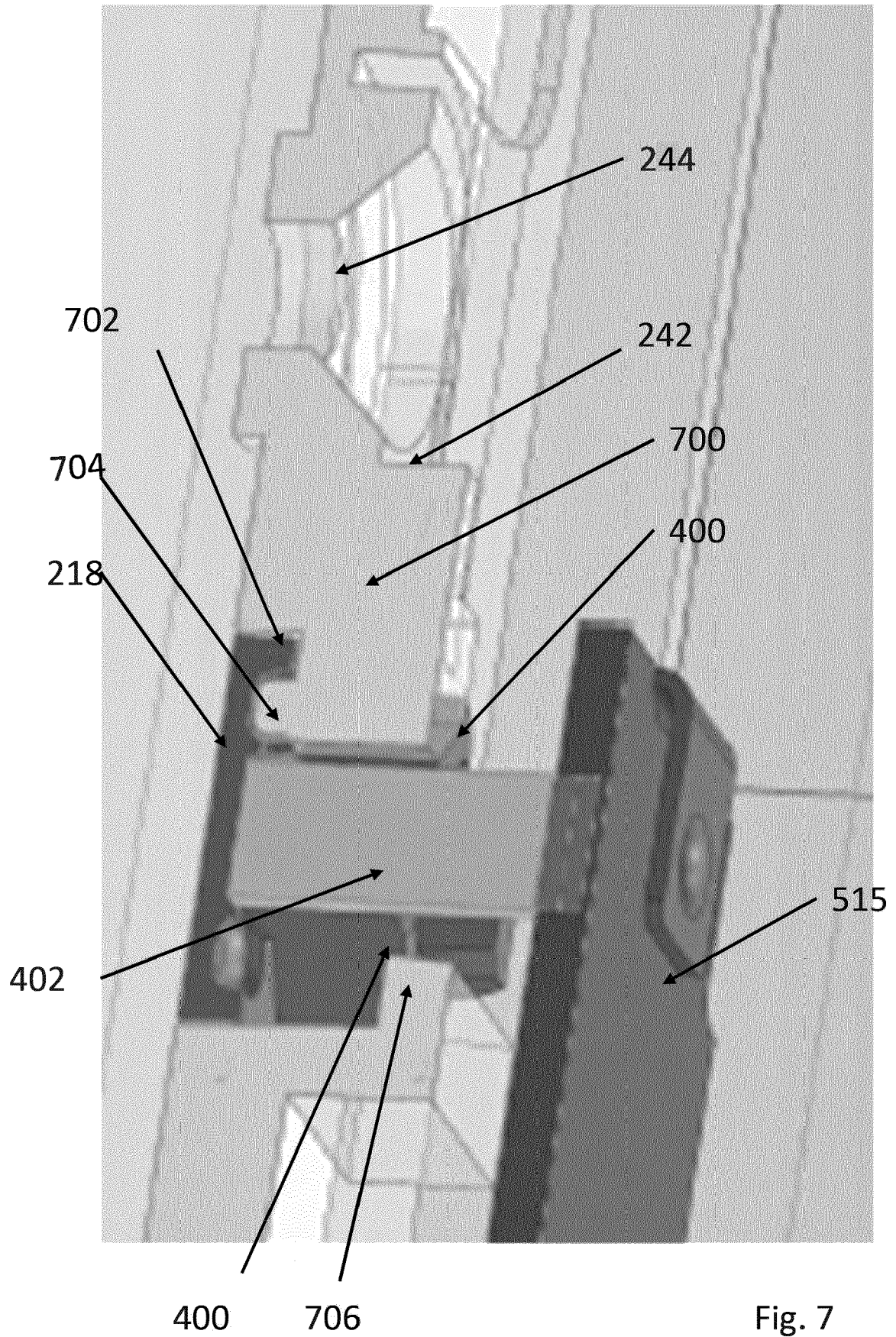


Fig. 7

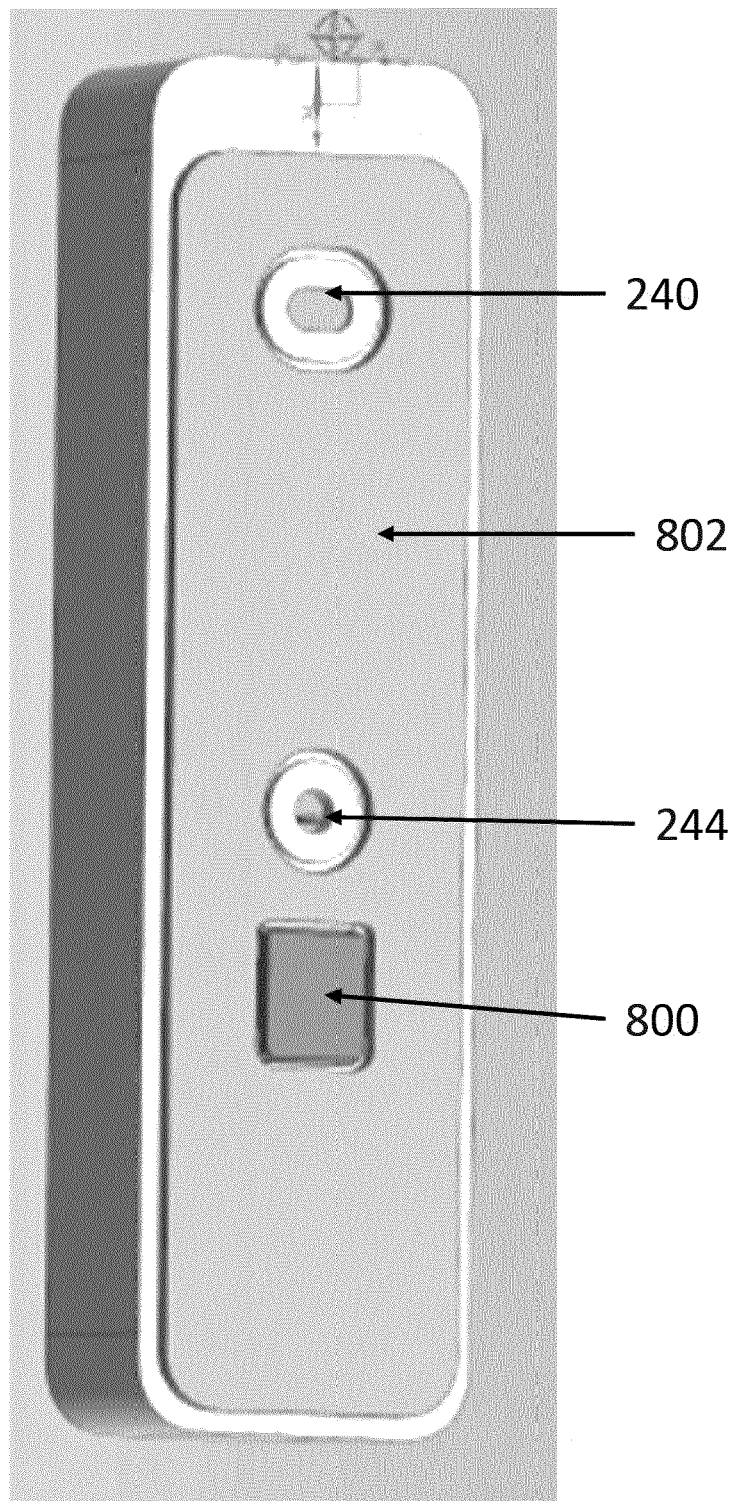


Fig. 8

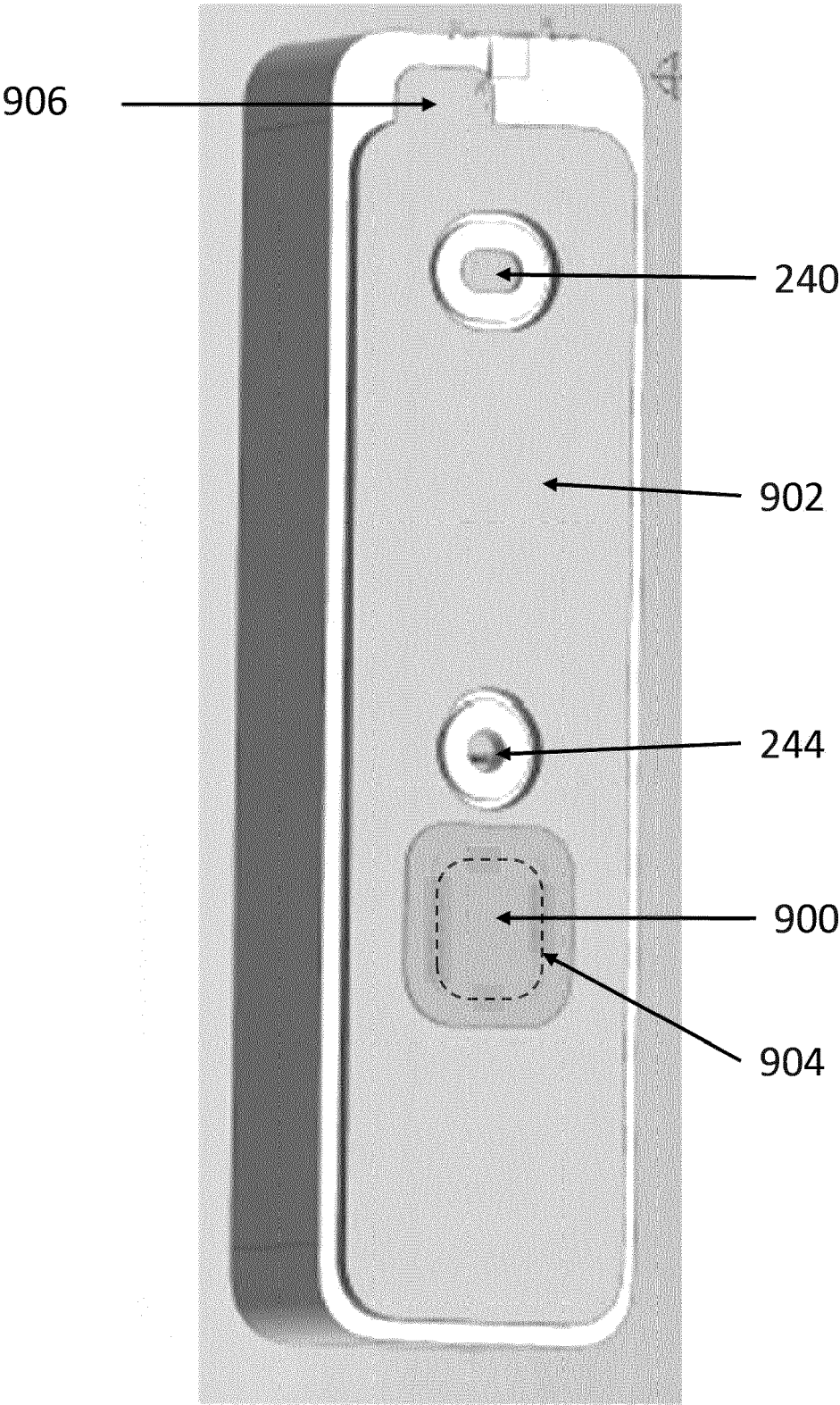


Fig. 9

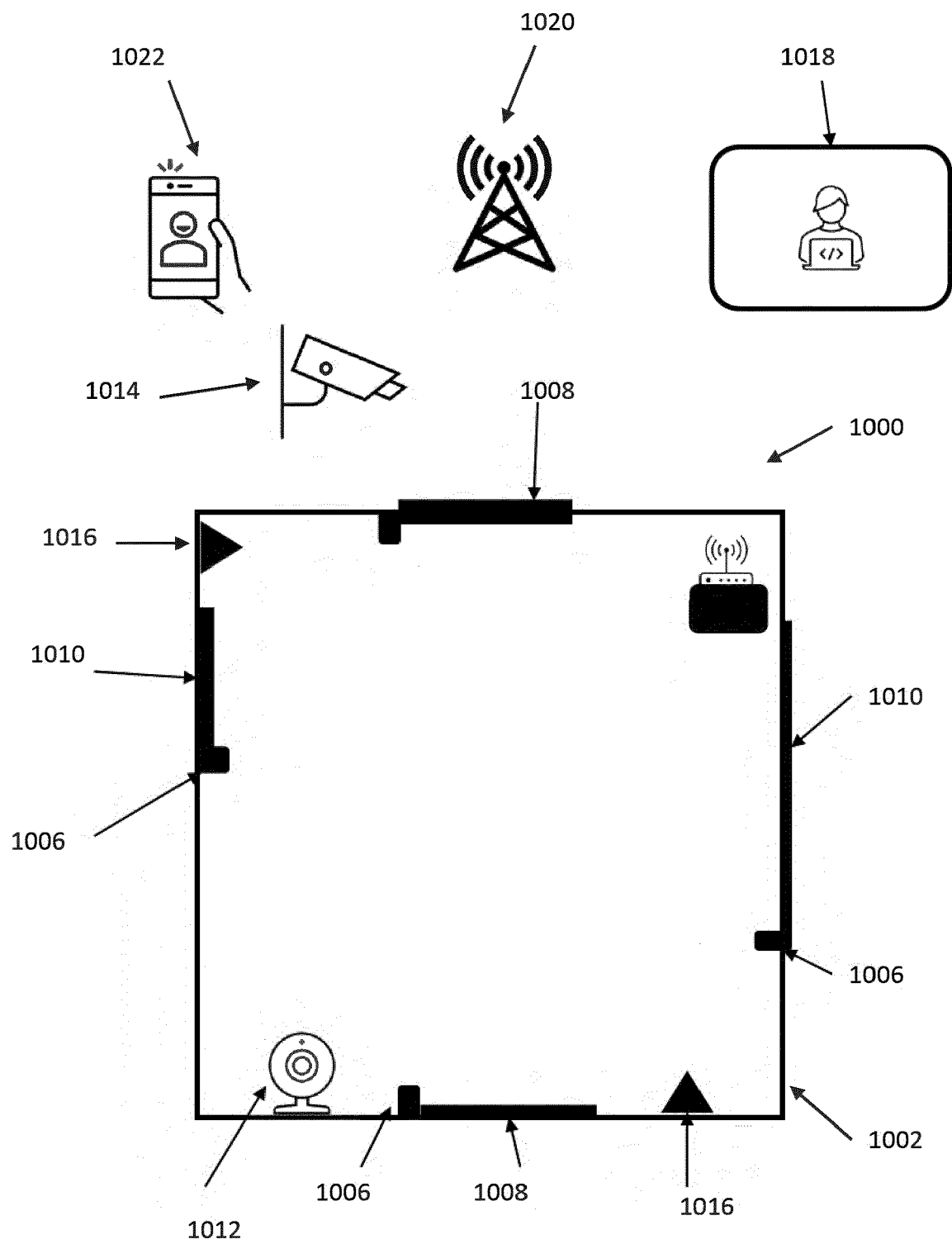


Fig. 10



EUROPEAN SEARCH REPORT

Application Number

EP 23 20 7371

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/150523 A1 (KELSCH CHRISTOPHER A [US] ET AL) 5 August 2004 (2004-08-05) * abstract * * paragraph [0016] - paragraph [0017]; figures 1-4 * * paragraph [0030] - paragraph [0031]; figures 10-11 * -----	1,3,4, 6-10, 14-17	INV. G08B13/06 ADD. G08B29/04
X	US 2016/210828 A1 (GRANT JEFFREY A [US] ET AL) 21 July 2016 (2016-07-21) * abstract * * paragraph [0021] - paragraph [0023]; figure 6 * -----	1,3,4,6, 9,10,16, 17	
X	US 2009/038019 A1 (TATAI TOSHIO [JP] ET AL) 5 February 2009 (2009-02-05) * paragraph [0038] - paragraph [0043]; figure 2 * * paragraph [0044] - paragraph [0057]; figure 3 * -----	1-6, 11-14, 16,17	TECHNICAL FIELDS SEARCHED (IPC) G08B
X	WO 2012/012831 A1 (GANINO ANGELO [AU]) 2 February 2012 (2012-02-02) * page 11, line 3 - page 12, line 6; figures 1d,1e * ----- - / - -	1-6, 11-14, 16,17	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 June 2024	Examiner Heß, Rüdiger
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	

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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 7371

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	WO 2019/115505 A1 (VERISURE SARL [CH]) 20 June 2019 (2019-06-20) * abstract * * page 7, line 6 - line 22; figure 1 * * page 8, line 12 - line 23; figures 6-8 * * page 9, line 7 - line 19; figure 6 * * page 9, line 27 - page 10, line 5; figure 7 * * page 10, line 12 - page 10, line 29; figure 8 *	1-5,16,17	
X	FR 2 673 747 A1 (FORS FRANCE SA [FR]) 11 September 1992 (1992-09-11) * abstract * * page 4, line 28 - line 36 * * page 5, line 10 - line 34; figures 1,2 *	18-21	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
Munich	12 June 2024	Heß, Rüdiger	
CATEGORY OF CITED DOCUMENTS		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	
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			

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EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-17

Security peripheral to be fixed to mounting surface by one or both of two mounting types (adhesive, screw), comprising a tamper arrangement of the corresponding type

2. claims: 18-21

A security monitoring installation comprising the plurality of alarm peripherals configured to transmit alarm events/event notifications to a controller or to a monitoring station remote from the premises, detected tamper events being reported to the monitoring station

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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