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(54) **A MONITORING UNIT FOR A SURVEILLANCE SYSTEM AND A SURVEILLANCE SYSTEM COMPRISING SUCH A MONITORING UNIT**

(57) A monitoring unit (101) for a surveillance system, comprising a camera and a cover (115), the cover being movable in response to a camera activation signal, from a first position obscuring a lens (103) of the camera and preventing the camera from imaging a zone of interest to a second position not obscuring the camera lens,

the monitoring unit being further arranged such that the cover is movable from the second position to the first position only through manual intervention of a person. Disclosed is also a surveillance system comprising such a monitoring unit.

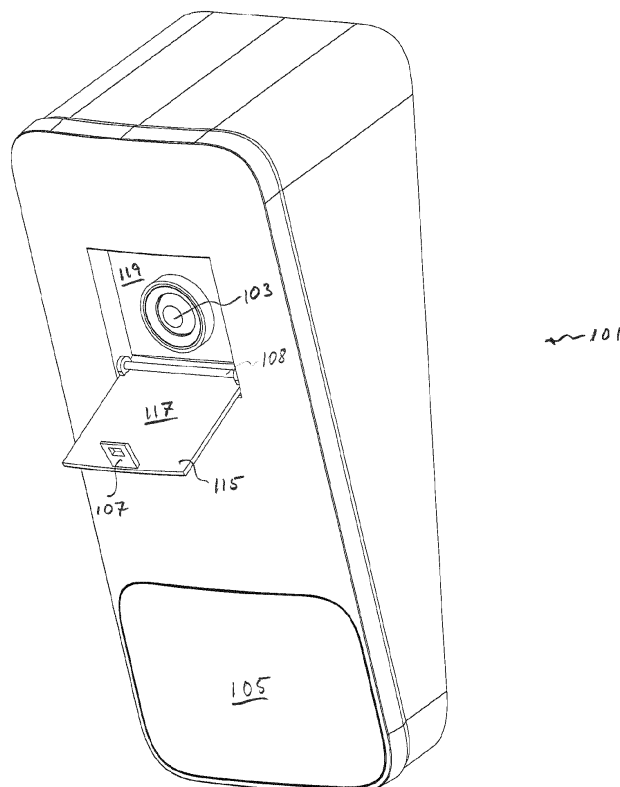


Fig. 1b.

EP 3 540 704 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a monitoring unit for a surveillance system. More specifically, the present invention relates to a monitoring unit for a surveillance system, comprising a camera for imaging a zone of interest in response to a camera activation signal. The present invention is also related to a surveillance system comprising such a monitoring unit. This type of surveillance systems is generally used within the field of home alarm systems comprising a still or video camera.

PRIOR ART

[0002] Home alarm systems of today may include a number of units, including one or more sensors and a central unit often called gateway. The gateway normally communicates wirelessly with the sensors. The sensors may include one or more cameras for still picture or video imaging. US8888385 discloses a device for monitoring a privacy sensitive area, the device includes an image receiving device, such as a camera, disposed inside a housing chassis. The image receiving device includes a camera lens. A moveable obstruction member configured to obstruct the lens is disposed on the device to selectively obstruct or expose the camera lens. The position of the moveable obstruction member is dependent upon a threat level received by the device.

SUMMARY OF THE INVENTION

[0003] In a first aspect of the invention there is provided a monitoring unit for a surveillance system, comprising a camera and a cover, the cover being movable, in response to a camera activation signal, from a first position obscuring a lens of the camera and preventing the camera from imaging a zone of interest, to a second position not obscuring the camera lens, the monitoring unit being further arranged such that the cover is movable from the second position to the first position only through manual intervention of a person. The invention makes it possible for a person in the zone of interest, such as in a home area, to detect, in a simple and reliable manner, if the camera is used or has been used. Hence, the invention makes it possible to convincingly show a person in the zone of interest that no unauthorized use of the camera has taken place. The inventors have discovered that costumers of home surveillance systems in this manner convincingly can be showed that no images are taken by the camera until a legitimate need, such as an alarm triggering event, has arisen. The invention provides the assurances that the costumer desires without disabling the camera or preventing imaging due to an alarm triggering event. The first position of the cover is also called closed position in this disclosure, wherein the second position is also called open position.

[0004] Preferably, the monitoring unit further comprises a sensor adapted to detect an alarm triggering event. The camera activation signal can be triggered in response to said detection. Hence, the cover can automatically be moved to the open position and the camera activated in response to an alarm triggering event detected by the sensor, which results in a reliable surveillance system.

[0005] Preferably, the monitoring unit further comprises a communications unit for receiving a remote camera activation signal, such as a manually triggered remote activation signal. Hence, the camera can be activated and the cover moved to the open position by the costumer or by an operator at a remote alarm center. However, as the cover is movable from the open position to the closed position only through physical manual manipulation of a person at the site of the monitoring unit the cover cannot be moved back to the closed position remotely and it can be visually detected by a person at the site of the camera that the camera has been activated.

[0006] Preferably, the monitoring unit includes a visual indicator, such as a contrasting colour on an inner surface of the cover or on a surface around the camera lens visible when the cover is in the open position, to clearly indicate to a person near the monitoring unit that the cover has been opened.

[0007] Preferably, the monitoring unit further comprises a releasable latching mechanism for holding the cover in the closed position. The latching mechanism can be released by the camera activation signal. The cover can be pivotably arranged around a horizontal hinge axis, and the cover can be moved to the open position by means of gravity or a spring when the latching mechanism has been released. Hence, a simple, reliable and cost-efficient mechanism for providing remote opening of the cover is achieved while remote controlled closing thereof is prevented.

[0008] According to a second aspect a surveillance system, such as a home alarm system, including said monitoring unit is provided. For example, there is provided a surveillance system comprising a monitoring unit with a camera and a cover, the cover having a first position, which may be an initial position, obscuring a lens of the camera and preventing the camera from imaging a zone or object of interest, the cover being arranged to move to further position not obscuring the camera lens in response to a camera activation signal, the system being further arranged such the cover is arranged to return to the first position only through manual intervention of a person. The surveillance system can also include one or more sensors, a central unit, such as a gateway, and can optionally be connected to a remote alarm center. Hence, a surveillance system is provided that can assure the costumer in a reliable way that the camera has not been used. The sensor can be adapted to detect an alarm triggering event wherein the camera activation signal is triggered in response to the detection. The system can comprise a communications unit for receiving a

remote command from a remote monitoring center or a remotely located user of the surveillance system, the remote command corresponding to or giving rise to the camera activation signal.

[0009] There is provided an obscuring mechanism intended for such a security or surveillance camera. Such a camera is commonly part of the alarm system. The alarm system may be a consumer home alarm system intended to protect a home, or it may be an alarm system for the prosumer or professional market. Such alarm system may comprise a number of units including one or more sensors and a central unit often called a gateway. The gateway typically communicates wirelessly with the sensors. The gateway may be connected to a remote alarm center by wire or wirelessly. The sensors may include one or more cameras for still or video imaging. The camera(s) are usually not activated until there arises a need to capture a still or video image of the object or site the camera is arranged to watch over. This need may arise when another sensor of the alarm system indicates an event such as detection of motion by an infrared sensor, detection of smoke, detection of opening of a door or window by a contact sensor, or similar. The need to capture a still or video image may also arise as the user, from a remote location, randomly, or for a reason would like to take a look at the object or site the camera is arranged to watch over.

[0010] Thus, the camera may be automatically activated by another sensor, when this another sensor or sensors indicate that there is an alarm triggering event of any kind such as e.g. an intrusion, burglar or smoke or fire. The camera may also be remotely activated by the gateway or by an alarm operator at the remote alarm center, or by the user/customer of the camera or alarm system.

[0011] This remote activation is a useful function since alarm operators in this way can obtain picture or video information from the alarm site, and will be more likely to take a correct decision regarding the measures to be taken as a response to the alarm.

[0012] Initially, by default, the camera lens cover can be configured to be in the closed position. A transition from the closed position to the open position can be software controlled, while the unit is configured such that a transition from the open to the closed position is not software controlled, i.e., the unit is configured such that the position of the camera lens cover cannot be restored remotely to the closed position. Instead, the unit is configured such that the cover can only be restored to the closed position manually on site, so that the cover practically can be restored only by a person physically present in the vicinity of the unit.

[0013] This means that the customer is exclusively in control of the return movement of the cover; which in turn means that the customer knows with certainty if images have been taken. In the closed position, which normally corresponds to a resting or non-activated mode of the camera, the cover covers the camera lens and no mean-

ingful images can be produced, neither still nor video.

[0014] The unit is configured such that when the camera is activated the cover is moved to the open position, not obstructing the lens, and images can be produced.

The unit may be configured such that a person visually can determine if the cover is in the open position. For example, the cover is further configured such that a customer can easily determine if the cover is open or closed by a quick glance. For example, the inside of the cover is visible when the cover is open, wherein the inside of the cover is of a contrasting colour and/or brightness compared to the surrounding front surface of the monitoring unit. Alternatively, an area covered by the cover in the closed position and visible in the open position, such as an area around the lens or next to the lens, is of a contrasting colour compared to the surrounding surface.

[0015] Providing a mechanical cover over the camera lens until it is required to take images of the object or site the camera is arranged to watch over makes it easier for the customer to accept the presence of such as camera. When an image needs to be produced, the following functions can be performed:

1. Opening up an obstructed light path from the surroundings towards the camera lens. The opening can be software controlled, based on either local or remote sensor data, or based on remote initiation by an alarm operator, such as an alarm operator located in the remote monitoring center, or by a user, such as the customer, to make it possible to take a picture or video. Local sensor data may include alerts from sensors such as magnetic contacts, infrared detectors, smoke alarms etc.
2. Indicating, clearly, on the outside of the unit that it has been triggered so as to be able to produce images, by for example letting the mechanical cover assume a position where it exposes a contrasting colour.
3. Staying open; the device is configured to have no means to remotely close the cover again. This will provide a reliable indication to a user that the camera is, or has been active, and provide to the user an improved feeling of privacy, at least during periods when the cover is closed during which there is no legitimate security reason for taking images, when he or she can conclude that the camera lens cover is still closed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Non-limiting embodiments of the invention will now be described with reference to the figures in which:

Fig. 1a shows a front view of a monitoring unit comprising an infrared sensor and a camera with a mechanical cover shown in a closed position, wherein the cover is arranged in front of a lens of the camera.

Fig. 1b shows a perspective view of the monitoring unit of Fig. 1a, with the cover shown in an open position.

Fig. 1c shows a side view of the monitoring unit of Fig. 1b.

Fig. 2a shows a perspective view of a monitoring unit with the mechanical cover being hinged at its upper edge and being in the open position.

Fig. 2b shows a detail view of a camera and a cover having a cover mechanism, with the cover in a closed position.

Fig. 2c shows a detail view of a camera and a cover having a cover mechanism, with the cover in an open position.

Fig. 3a shows a front view of a monitoring unit having a camera with a camera cover hinged at its upper edge and being spring-loaded, the cover being in an open position.

Fig. 3b shows a detail view of the camera and spring-loaded cover of Fig. 3a, with the cover in a closed position.

Fig. 4 shows a flowchart of a method for securing privacy of an alarm system user, utilizing a monitoring unit according to one embodiment of the invention.

Fig. 5 shows a block diagram of a monitoring unit with a camera having a remotely openable camera lens cover.

DETAILED DESCRIPTION

[0017] Fig. 1a shows a monitoring unit 101 comprising a sensor, such as an infrared sensor 105, and a camera obscured behind a camera cover 115 arranged in front of the camera. The cover is shown in a closed position. The cover is preferably arranged flush with a monitoring unit front surface 110 of the monitoring unit. The monitoring unit 101 is arranged for monitoring a zone, such as a home area. For example, the monitoring unit 101 is included in a surveillance system, such as a home alarm system, including a central unit connected to the monitoring unit 101 and optionally further monitoring units or sensors for detecting an alarm triggering event, such as intrusion, smoke, etc. (not illustrated). For example, the surveillance system is connected to a remote alarm center. According to one embodiment, the monitoring unit 101 is configured such that the camera is activated when a sensor, such as the infrared sensor 105, indicate that there is an alarm triggering event. For example, the camera can also be remotely activated by the central unit or

by an alarm operator at the remote alarm center, or by the user of the monitoring unit 101 or the surveillance system. According to one embodiment, the monitoring unit 101 is provided with a communications unit for receiving a remote camera activation signal, such as a manual remote camera activation signal.

[0018] Fig. 1b shows an oblique side view of the monitoring unit 101 of fig. 1a, with the cover 115 in an open position, exposing a camera lens 103. The camera lens 103 is surrounded by surrounding surface 119, that preferably is of a different colour than the surface colour of the rest of the monitoring unit. For example, the surface directly surrounding the camera lens may be black or red, and the rest of the monitoring unit may be white. For example, an inner surface 117 of the camera cover 115 is provided in a colour as mentioned above, different from that of the rest of the unit, enabling a person to easily decide, by visual inspection at a glance, whether the camera cover is open or closed. Hence, the surrounding surface 119 and/or the inner surface 117 of the cover 115 is provided with a visual indicator, such as a differing colour, to indicate to a person in the monitored zone that the cover 115 is in the open position. The monitoring unit 101 comprises a lock 107 for holding the cover 115 in the closed position. In the illustrated embodiment, the cover 115 is pivotably arranged around a hinge axis 108. In the illustrated embodiment, the hinge axis 108 is horizontal and arranged at a bottom edge of the cover 115.

[0019] Fig. 1c shows a side view of the monitoring unit of Fig. 1b. A back surface 120 is arranged to be mounted at a wall of a room. The back surface is arranged at an angle α (alfa) in relation to the front surface 110 and thus the closed camera cover 115. This arrangement allows the camera cover 115 to fall open when the lock 107 is released, due to action of gravity, since the center of gravity of the camera cover falls outside of, i.e. in front of, the hinge axis 108. For example, the lock 107 is released by means of software, such as automatically in response to the camera activation signal. To restore the camera cover to the closed position, it is required to manually flip the cover to the closed position and press it such that the cover is locked in the closed position. Hence, the cover is movable from the open position to the closed position only by mechanical manual intervention on site.

[0020] Fig. 2a shows a perspective view of a monitoring unit where the mechanical cover 115 is hinged at its upper edge, above the camera lens 103. A latch lock mechanism 107, 109 keeps the camera cover in a closed position until released.

[0021] Fig. 2b shows a detail view of a camera with a cover 115 having a cover mechanism, with the cover in a closed position. The cover mechanism comprises one or more levers 127. Each lever being attached at a first end at the camera cover, preferably at or near hinge pivots 130. The other end of the lever being provided with a weight 125 or similar to allow the camera cover to swing open when latch lock mechanism 107, 109 is released

by activating linear actuator 111. The linear actuator may be realised as a solenoid or other means of producing a linear motion.

[0022] Fig. 2c shows a detail view of a camera with a camera cover 115 having a cover mechanism comprising the lever(s) 127 and weight(s) 125, and the latch lock mechanism 107, 109, 111 with the camera cover 115 in an open position. To restore the camera cover into the closed position, it is required to manually flip the cover to the closed position and press it such that the latch lock mechanism engages.

[0023] Fig. 3a shows a front view of a monitoring unit 101 having a camera with a camera lens 103 and a camera cover 115 hinged at its upper edge above the camera lens 103, and being spring-loaded, and with the cover 115 in an open position. The spring load is provided by a coil spring 140.

[0024] Fig. 3b shows a detail view of the camera with the camera lens 103 and spring-loaded cover 115 of Fig. 3a, with the cover in a closed position. The camera cover 115 will open when actuator 111 is activated to retract a latch bolt 109 of the latch lock mechanism, thereby releasing camera cover 115, that will open quickly, because of action of spring force. To restore the camera cover into the closed position, it is required to manually flip the cover to the closed position and press it such that the lock 107 engages the latch bolt 109.

[0025] As an alternative, a cover may be arranged to run in slits, and to be pushed by a solenoid to fall down the slits from a position obscuring the camera lens to a position below the camera lens. The slits are configured to make it possible for a user or installer of the monitoring unit to enable or disable the camera lens feature described above by completely removing the camera cover. This may preferably be achieved by arranging the slits to be open at top end.

[0026] The monitoring unit may further be provided with a camera cover position sensor making it possible to read a camera cover position, and configured to be able to transmit a warning or notification to the user or alarm center if the camera cover is still closed in spite of the camera latch lock being opened.

[0027] Fig. 4 shows a flowchart of a method for securing privacy of an alarm system user, utilizing a monitoring unit 101 with a camera lens cover 115. In Fig. 4 the cover 115 is called camera door. The method may include the following steps:

- activating 402 a sensor, which in Fig. 4 is called second sensor, that is not an image camera;
- opening 403 a camera cover 115 based on alert from the sensor, the camera cover being configured such that it is unable to be restored to its closed position without the aid of direct manual manipulation;
- informing 403 alarm center;
- activating 405 the image camera;

The method may also include the following steps:

- sensing 420 camera cover position;
- checking 440, 450 if alarm system is deactivated
- based on status of alarm and camera cover position, deactivate 445 camera.

[0028] Fig. 5 shows a block diagram of a monitoring unit with a camera having a camera lens cover, which lens cover is called camera door in Fig. 5, configured to be openable but not closable by remote control. The monitoring unit comprises an antenna 502 and a transceiving unit 505 for communicating wirelessly with a gateway. The Transceiver is connected to a processor or microcontroller 510. The microcontroller 510 is connected to and controls an IR sensor 515, an image camera 520, capable of producing still or video images, a camera cover latch actuator 525, and optionally a camera cover position sensor 530. The camera cover 535 is configured to obscure the camera lens in a closed position, and to not obscure the camera lens in an open position as also explained above. The camera cover 535 itself is not connected to the microcontroller 510 and cannot be closed by any action of the microcontroller 510.

[1] Legend

[0029]

- 101 Monitoring unit
- 103 Camera lens
- 105 Infrared detector
- 107 Lock
- 108 Axis
- 109 Latch bolt
- 110 Monitoring unit front surface
- 111 Latch actuator
- 115 Camera cover
- 117 Camera cover inner surface
- 119 Camera lens surrounding surface
- 120 Monitoring unit back surface
- 125 Lever weight
- 127 Lever
- 130 Pivot
- 140 Coil spring

Claims

1. A monitoring unit (101) for a surveillance system, comprising a camera and a cover (115), the cover being movable, in response to a camera activation signal, from a first position obscuring a lens (103) of the camera and preventing the camera from imaging a zone of interest, to a second position not obscuring the camera lens, the monitoring unit being further arranged such that the cover is movable from the second position to the first position only through manual intervention of a person.

2. A monitoring unit according to claim 1, further comprising a sensor (105) adapted to detect an alarm triggering event wherein the camera activation signal is triggered in response to the detection. 5
3. A monitoring unit according to claim 1 or 2, further comprising a communications unit for receiving a remote camera activation signal.
4. A monitoring unit according to any of the preceding claims, further comprising a visual indicator for indicating that the cover (115) is in the second position. 10
5. A monitoring unit according to claim 4, wherein the indicator is provided by an inner surface (117) of the camera cover (115) being in a contrasting colour. 15
6. A monitoring unit according to claim 4 or 5, wherein the indicator is provided by a surface (117) around the camera lens (103) being in a contrasting colour. 20
7. A monitoring unit according to any of the preceding claims, further comprising a latching mechanism (107, 109) for holding the cover in the closed position and being releasable in response to the camera activation signal. 25
8. A monitoring unit according to any of the preceding claims, wherein the cover (115) is movable from the closed position to the second position with the aid of gravity. 30
9. A monitoring unit according to any of the preceding claims, wherein the cover (115) is movable from the closed position to the second position with the aid of a spring (140). 35
10. A monitoring unit according to any of the preceding claims, wherein the cover is pivotably arranged around a horizontal hinge axis (108). 40
11. A surveillance system comprising a monitoring unit (101) according to any of the preceding claims.
12. A system according to claim 11, further comprising a sensor adapted to detect an alarm triggering event wherein the camera activation signal is triggered in response to the detection. 45
13. A system according to claim 11 or 12, further comprising a communications unit for receiving a remote camera activation signal from a remote monitoring center or a remotely located user of the surveillance system. 50
14. A surveillance system (101) comprising a camera having a lens (103) and a cover (115), the cover having a first position obscuring the camera lens and preventing the camera from imaging a zone or object of interest, the cover being arranged to move to a further position not obscuring the camera lens in response to a camera activation signal, the system being further arranged such the cover is arranged to return to the initial position only through manual intervention of a person. 55
15. A system according to claim 14, further comprising a sensor adapted to detect an alarm triggering event wherein the camera activation signal triggered in response to the detection.

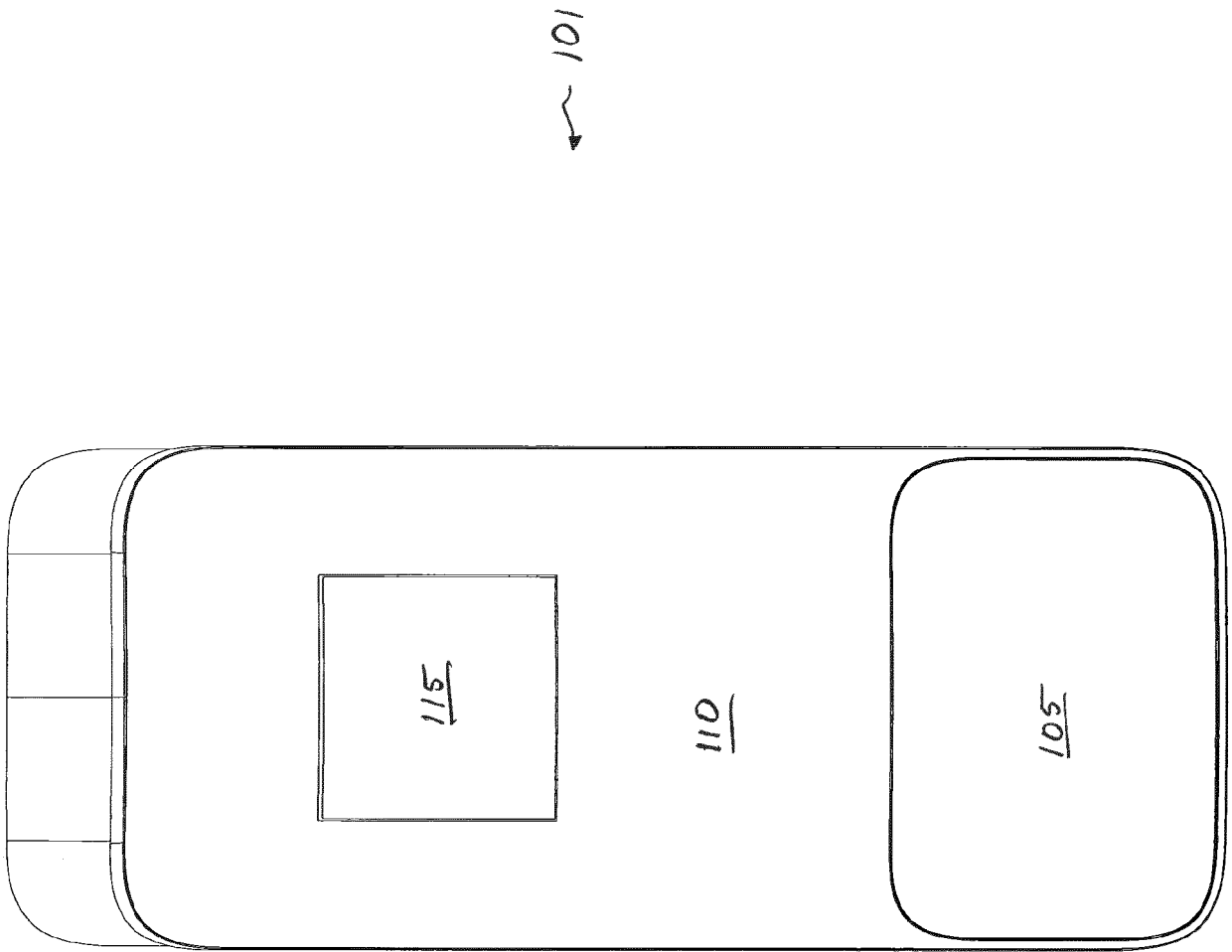


Fig. 1a.

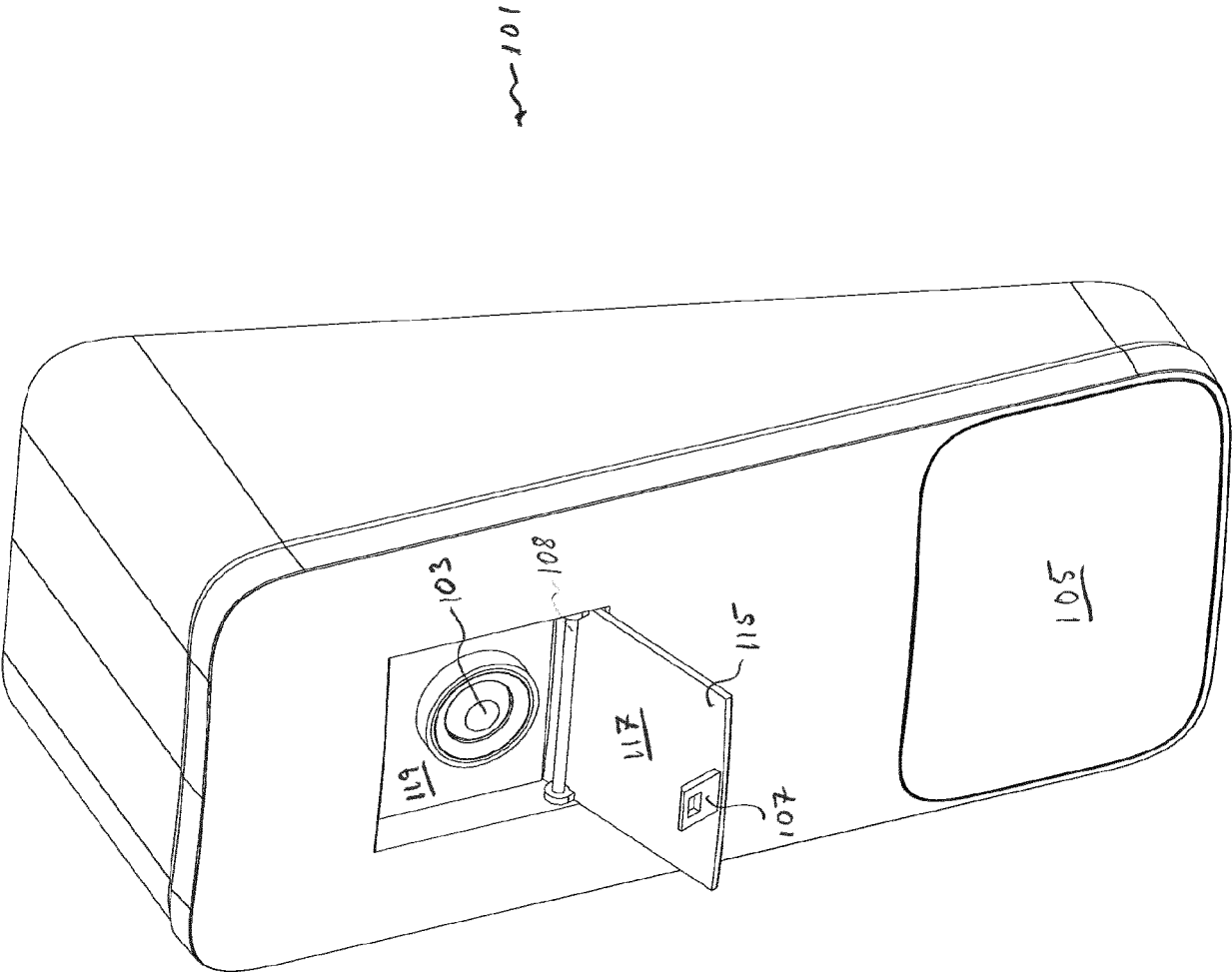


Fig. 1b.

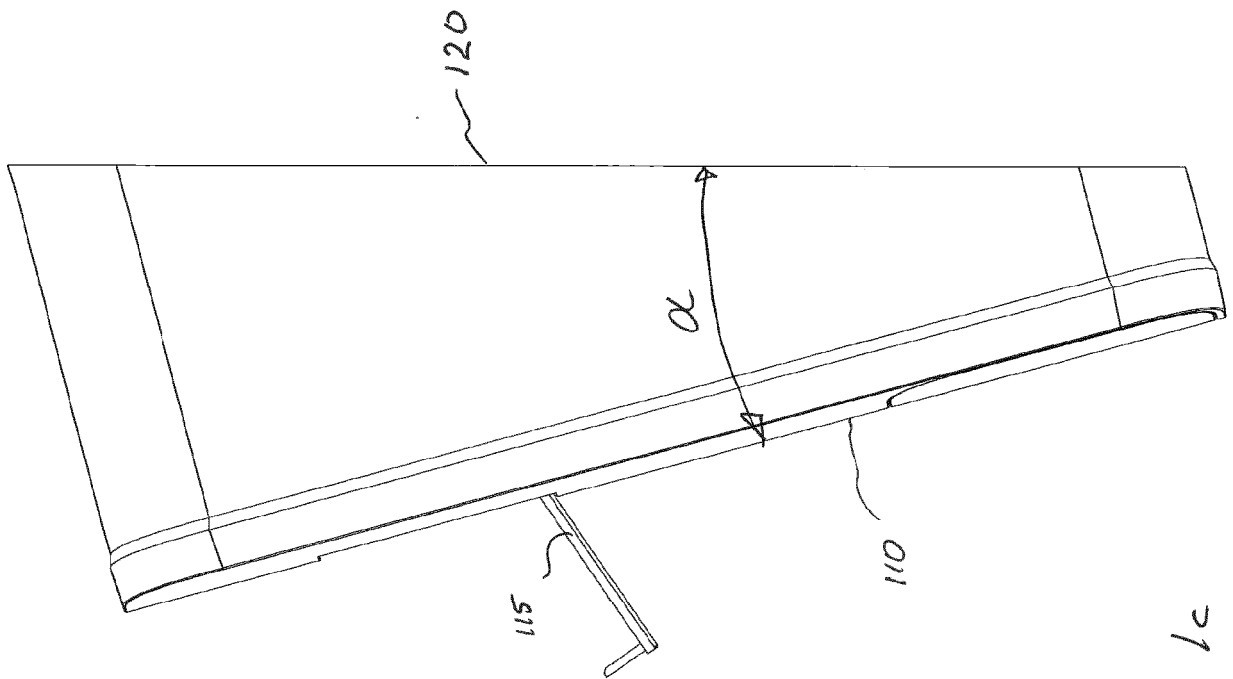


Fig. 1c

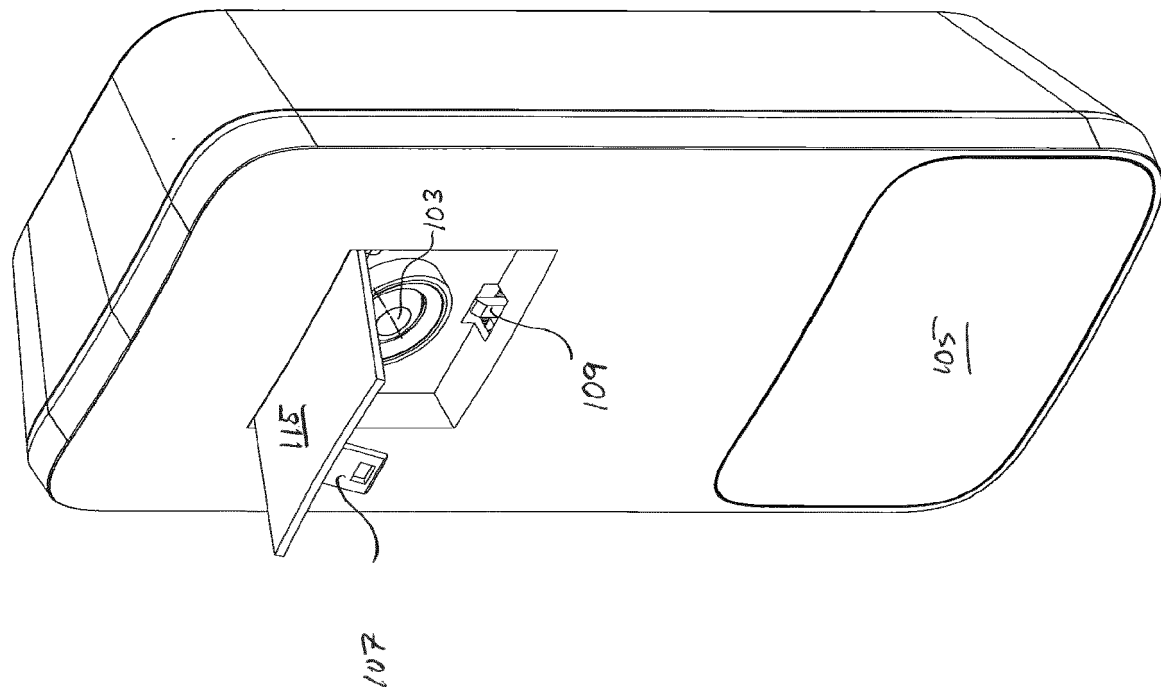


Fig. 2a.

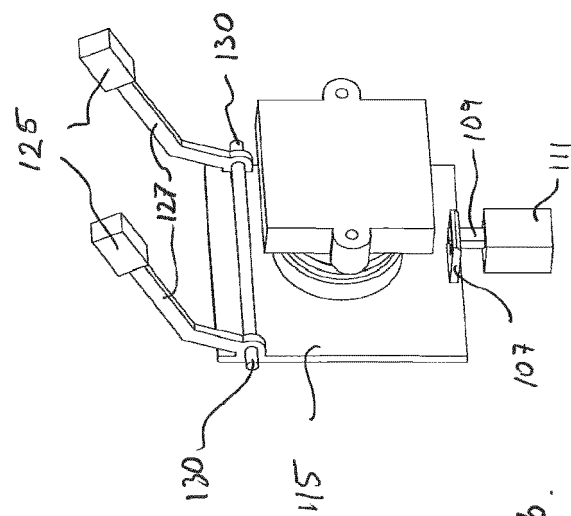


Fig. 26.

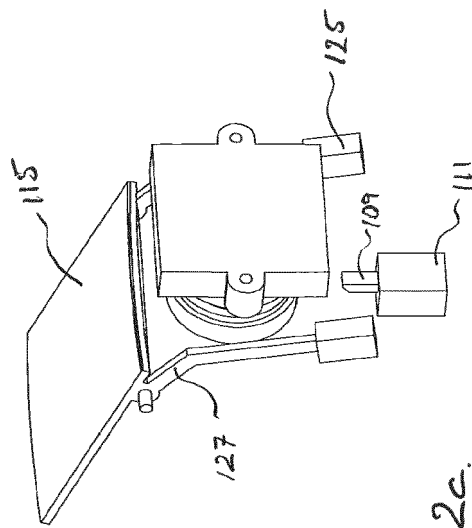


Fig. 2c.

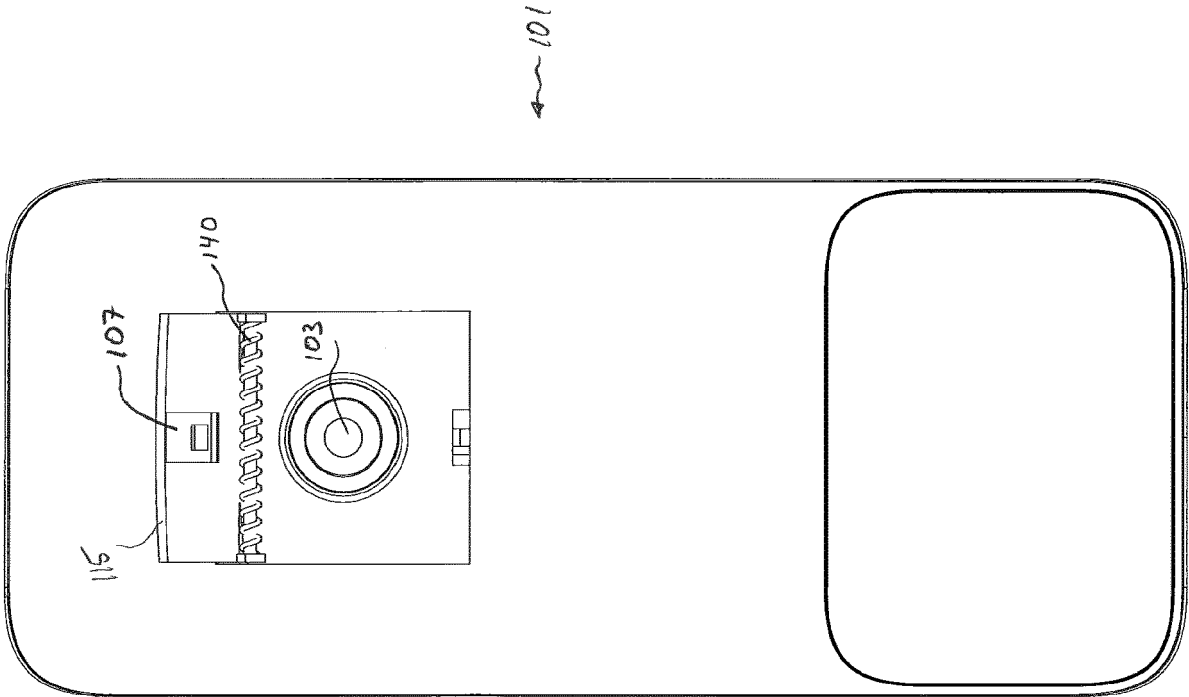


Fig. 3a

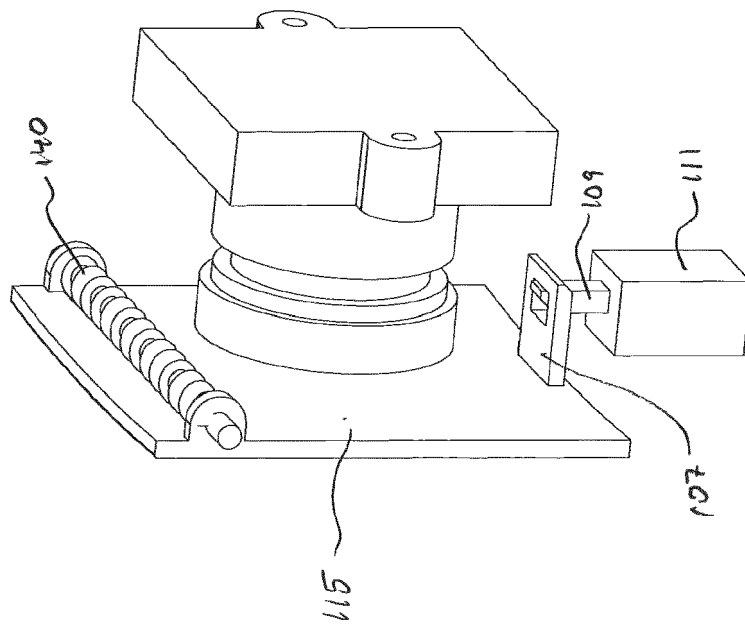
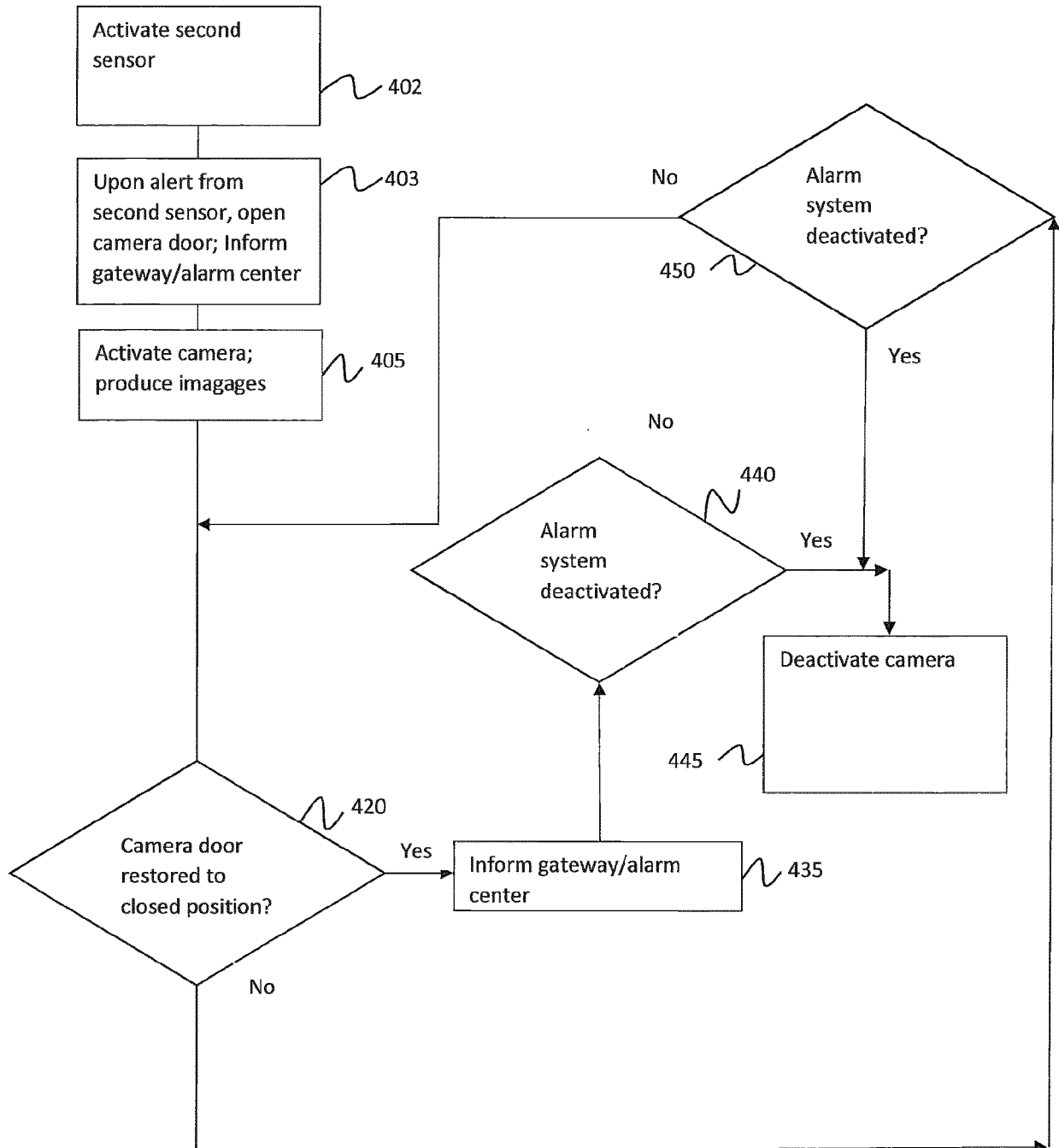


Fig. 3b.



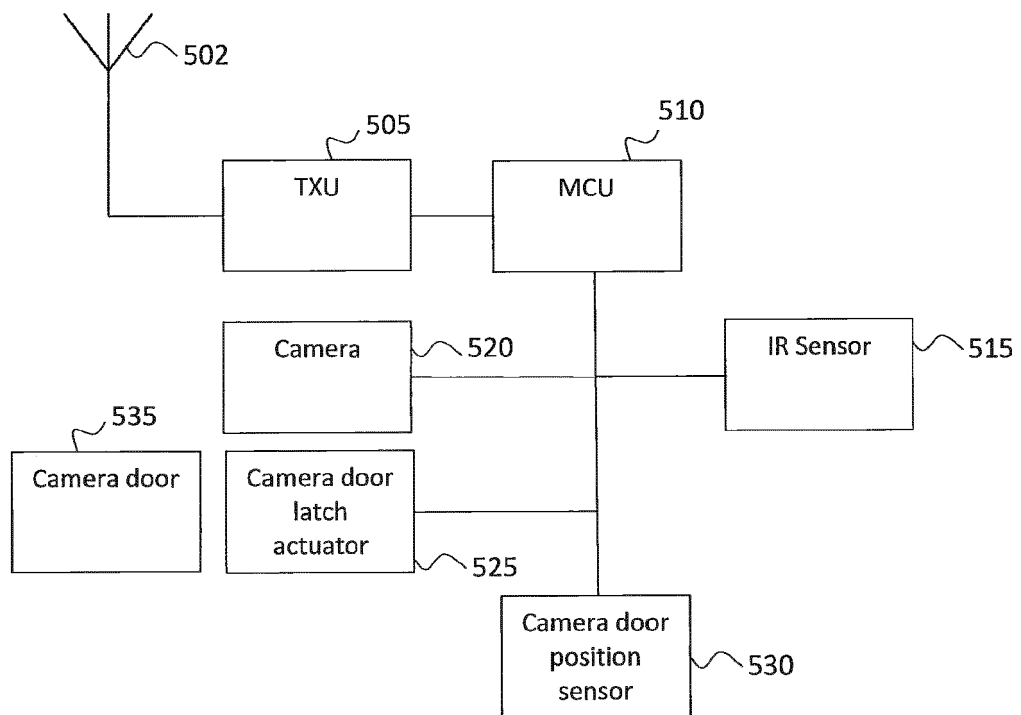


Fig. 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 18 16 1352

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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 2012/148227 A1 (SCHMIT THOMAS PAUL [US] ET AL) 14 June 2012 (2012-06-14) * abstract * * paragraph [0009] - paragraph [0018]; figures 1-3 *	1-15	INV. G08B13/196
X	US 2011/103786 A1 (CIRKER SETH [US]) 5 May 2011 (2011-05-05) * paragraph [0027] - paragraph [0043]; figures 4-8 *	1-7, 11-15	
X	US 2013/057694 A1 (PETRICOIN JR DENNIS M [US]) 7 March 2013 (2013-03-07) * abstract * * paragraph [0027] - paragraph [0030]; figures 1,2a,2b * * paragraph [0034] - paragraph [0035] * * paragraph [0037] * * paragraph [0039] * * paragraph [0042] * * paragraph [0061] - paragraph [0072]; figure 5 *	1-7, 11-15	
A	US 9 202 356 B1 (KOBAYASHI TAKAFUMI [JP]) 1 December 2015 (2015-12-01) * abstract * * column 3, line 5 - column 6, line 24; figures 1,2A-2D * * column 17, line 50 - column 21, line 21; figures 12-16 *	1-4, 11-15	TECHNICAL FIELDS SEARCHED (IPC) G08B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 June 2018	Examiner Heß, Rüdiger
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 18 16 1352

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