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(54) SECURITY SYSTEM FOR LAND VEHICLES

(57) The invention relates to a security system (8) for a land vehicle (1) used in transportation of valuable goods. The security system (8) comprises a camera system (2) installed on the land vehicle (1) for capturing images around the land vehicle (1). The security system (8) is characterized in that, it comprises a control center (5) allowing the land vehicle (1) to be tracked remotely and to intervene on the land vehicle (1) remotely, a communication unit (46) found on the land vehicle (1) and allowing two-way communication and information exchange with the control center (5) via wireless communication, a control unit (49) found on the land vehicle (1) for examining the captured images using image processing technique, deciding whether there is an emergency or not depending on the result of the examination, and transmitting the emergency information to the control center (5) by means of the communication unit (46) in case emergency decision is made.

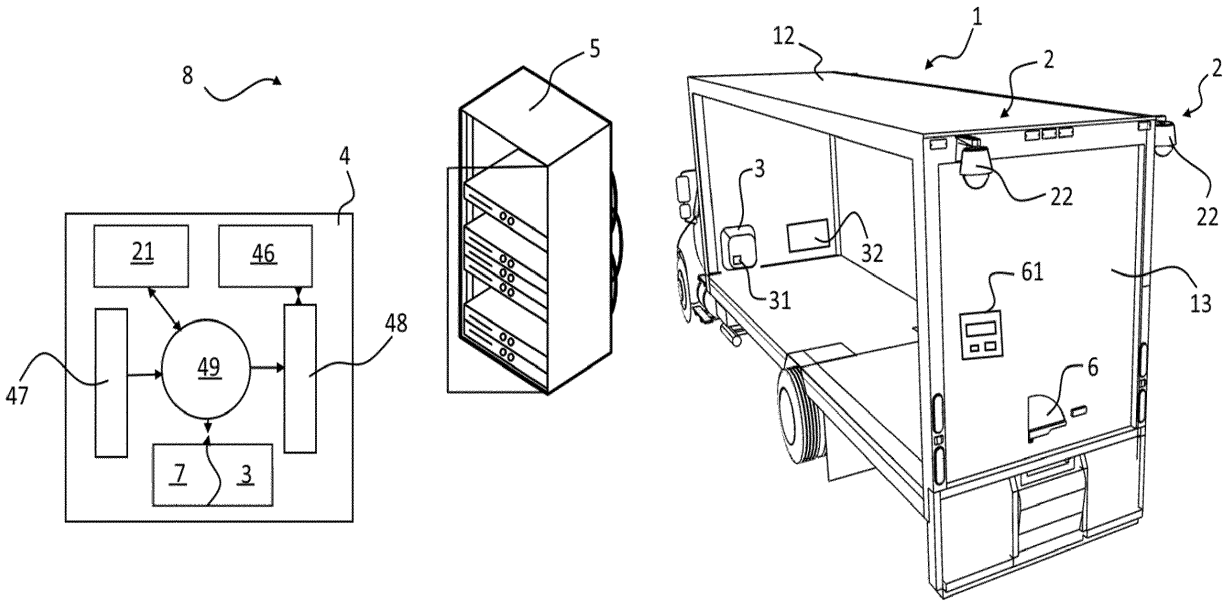

Figure 1

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Description

The Related Art

[0001] The invention relates to security systems installed on land vehicles, developed for improving reliability of land vehicles used in the logistic transportation sector in Turkey, Europe, and around the world, and prevents lost-stolen goods and sabotages in transportation of valuables.

The Prior Art

[0002] In order to avoid lost-stolen goods and sabotages in transportation of goods, security of land vehicles needs to be increased. For this purpose, land vehicles are equipped with security systems. In the prior art, the security systems used for the purpose of improving the security of land vehicles are as follows.

[0003] In an embodiment of the prior art, a rear view camera is found behind the land vehicle, which records the image behind the land vehicle. In another known prior art application, an additional padlock system is installed on the body of the land vehicle. One of the most significant problems of the world logistics sector is the fight against lost and stolen goods. The above-mentioned applications are not effective enough for preventing lost and stolen goods and sabotages.

[0004] As a result, the need for security for land vehicles and the inadequacy of the prior art solutions about the subject have necessitated an improvement in the related technical field.

Purpose of the Invention

[0005] The invention relates to a security system, which meets the above said requirements, eliminates all of the drawbacks, and brings some additional advantages.

[0006] The main purpose of the invention is to provide a security system which improves the security of land vehicles against loss, theft, and sabotages.

[0007] In order to achieve the above said purposes in the most general form, the most significant distinguishing characteristic of the security system according to the invention from the known status of the art is characterized in that; it comprises:

- a control center allowing the land vehicle to be tracked remotely and to intervene on the land vehicle remotely,
- a communication unit found on the land vehicle and allowing two-way communication and information exchange with the control center via wireless communication,
- a control unit found on the land vehicle for examining the captured images using image processing technique, deciding whether there is an emergency or not depending on the result of the examination, and transmitting the emergency information to the control center by means of the communication unit, in case emergency decision is made.

[0008] By means of the security system according to the invention, it is made possible to monitor the land vehicle from a control center by means of a communication unit, informing security and health units in case of fire, accident etc. emergency situations, and ensuring security by intervening in the land vehicle remotely, when required.

[0009] The structural and characteristic features of the invention and all of its advantages shall be understood better with the figures and the detailed description given below in reference to the figures, and therefore, the assessment should be made by taking into account the said figures and detailed explanations.

Figures for Better Understanding of the Invention

[0010] For better understanding of the embodiment of the present invention and its advantages with its additional components, it should be evaluated together with below described figures.

Figure - 1: is an exploded partial view of a land vehicle comprising the security system according to the invention.

Figure - 2: is a view of the driver's cabin in the land vehicle comprising the security system according to the invention.

Figure - 3: is a front view of the control panel found in the security system according to the invention.

Figure - 4: is a partial front view of the land vehicle comprising the security system according to the invention.

Figure - 5: is a partial perspective rear view of the land vehicle comprising the security system according to the invention.

Figure - 6: is a partial perspective side view of the land vehicle comprising the security system according to the invention.

[0011] Drawings do not have to be scaled and details not necessary for understanding the present invention may be neglected. Moreover, components which are at least widely equal or which have at least widely equal functions are shown with the same number.

Parts References

[0012]

1. Land vehicle

    11. Driver's cabin
    12. Body

13. Door

2. Camera system

21. Image/audio recording device
22. Camera

3. Black box

31. Power source
32. Fire extinguisher

4. Control panel

41. Emergency button
42. Camera display screen
43. Vehicle motion information screen
44. Microphone
46. Communication unit
47. Inlet port
48. Outlet port
49 Control unit

5. Control center
6. Combination lock

61. Keyboard

7. Global location determination unit
8. Security system

Detailed Description of the Invention

[0013] In this detailed description, the security system (8) according to the invention is only disclosed for better understanding of the subject without forming any limiting effect.

[0014] Figure 1 shows an exploded partial view of the land vehicle (1) equipped with the security system (8) in an embodiment of the invention. The security system (8) according to the invention comprises a control center (5) allowing the land vehicle (1) to be tracked remotely and to intervene on the land vehicle (1) remotely. The control center (5) can either be fixed or mobile. The camera system (2) of the security system (8) is installed on the land vehicle (1) and comprises more than one cameras (22). Cameras (22) are installed on the front part, front right side, rear right side, front left side, rear left side, rear part, within the driver's cabin (11), and within the body (12) of the land vehicle (1). By means of the camera system (2), both the images within the land vehicle (1) are captured and the images around the land vehicle (1) are captured. In this way, it could be understood whether or not any vehicle is following the land vehicle (1) carrying valuables. In this way, the licence plate images of the vehicles following the land vehicle (1), the images of people coming closer to the land vehicle (1), and the images of people entering the land vehicle (1) can be captured. The cameras (22) are high resolution cameras (22) with night vision characteristic.

[0015] Figure 2 shows a driver's cabin (11) in the land vehicle (1) equipped with the security system (8) in an embodiment of the invention. The security system (8) comprises a control panel (4) inserted in the driver's cabin (11). Figure 3 shows a front view of the control panel (4) in the driver's cabin (11) in an embodiment of the invention. A control unit (49) responsible from the security of the land vehicle (1) is found on the control panel (4). The control unit (49) has a two-way communication with the control center (5) via the outlet port (48) through the communication unit (46), and allows data exchange.

[0016] The images captured by the camera system (2) are transmitted to the control unit (49) through the inlet port (47). The security system (8) also comprises an image/audio recording device (21) connected to the control unit (49). While the land vehicle (1) is on the move, the images captured by the camera system (2) are continuously recorded in detail in the image/audio recording device (21). The security system (8) also comprises a microphone (44) connected to the control unit (49). The microphone (44) allows the voices/sounds in the driver's cabin (11) to be detected. While the land vehicle (1) is on the move, the audio captured by the microphone (44) is continuously recorded in the image/audio recording device (21). The control center (5) can reach the recordings in the image/audio recording device (21) via the communication unit (46) and can monitor the same in real time. Similarly, the driver can also watch the images captured by each camera (22) in the camera system (2) by means of the camera display screen (42) found on the control panel (4).

[0017] When the driver notices an emergency, he/she can manually trigger the emergency button (41) found on the control panel (4). The emergency button (41) is preferably touch-operated. When the emergency button (41) is triggered, emergency information is transmitted to the control center (5) through the communication unit (46), and the captured images and sounds/voices in the cabin are also transmitted to the control center (5). When the control center (5) received the emergency information, the images captured are monitored/watched. The control center (5) examines the captured images via image processing technique, and directly determines suspicious people and the license plate information of the cars following the vehicle, and records the images of the suspicious people and checks their information through security units. The control center (5) alerts security forces and/or health units in case of an emergency. The control center (5) controls especially the engine system of the land vehicle (1) by means of setting a speed limit to the land vehicle (1), when required. In this way, movement of the land vehicle (1) can be prevented completely. The security system (8) also comprises an announcement system installed in the land vehicle (1). Using the announcement system, the control center (5) can inform the driver in case of an emergency, and also warn sus-

picious people.

[0018] There may also be situations where the driver does not notice the emergency. In order not to compromise the security of the land vehicle (1) in such cases, the control unit (49) continuously monitors the captured images, using the image processing technique. The control unit (49) decides on whether there is an emergency or not depending on the result of the examination, and when it is decided that there is an emergency, it transmits the emergency information to the control center (5) through the communication unit (46) without the need for pressing the emergency button (41), and also transmits, to the control center (5), the captured images and sounds within the cabin.

[0019] The control unit (49) can decide on whether there is an emergency or not, in a few different ways. For example, the control unit (49) examines the captured images using image processing technique, and decides on whether the vehicle is followed by another vehicle or person for more than a certain amount of time. Moreover, during said examination, it can read the licence plates of said vehicles. Said time period is a time period defined by the user and is preferably about 10 minutes. When the control unit (49) decides that the vehicle is being followed for a time period that is longer than said time period, it decides that there is an emergency and transmits the information of emergency, being followed, the licence plate information of the vehicle following, and the images of suspicious people, to the control center (5) via the communication unit (46), without the need for pressing the emergency button (41). The control unit (49) also informs the driver by image or audio, through the control panel (4), about whether there is a car following them or not.

[0020] On the emergency button (41), three different levels that can be triggered individually are found for three different emergency situations, which are robbery, fire, and accident, respectively. Each level of the emergency button (41) can also be triggered by the driver or by the control center (5) independent from the driver, in case of an emergency. When the first level is triggered, the control unit (49) locks all the doors (13) by means of the door locking system of the security system (8). When the second level is triggered, the control unit (49) cuts off the electricity of the land vehicle (1) by means of the electricity control system of the security system (8) and starts up the fire extinguishing system of the security system (8). When the third level is triggered, the control center (5) executes an action plan defined by the control unit (49) depending on the accident situation.

[0021] The security system (8) comprises a speed detection means for detecting the speed of the land vehicle (1) and also a global location determination unit (7) for determining the location of the land vehicle (1). Said speed detection means and global location determination unit (7) are positioned on the land vehicle (1). The control center (5) can access the speed and location information of the land vehicle (1) by means of the communication unit (46) and monitor the same in real time. The security system (8) also comprises at least one temperature sensor which measures the temperature within the body (12). The control center (5) can access the measured temperature values by means of the communication unit (46). Similarly, the driver can also monitor/watch, by means of the vehicle movement information screen (43) found on the control panel (4), the speed and location of the land vehicle (1), whether there is an emergency or not, or whether the vehicle is being followed or not, the temperature within the vehicle body (12), and whether the doors (13) are closed or not etc. information. The security system (8) also comprises at least one sensor placed on the land vehicle (1), which detects the stance angle of the land vehicle (1). In this way, the control unit (49) can determine the stance angle of the land vehicle (1) in accidents where the vehicle is overturned, or while the vehicle is climbing a ramp, and can transmit this information to the control center (5).

[0022] The security system (8) comprises a combination lock (6) attached on the door (13) that allows access into the body (12). In Figure 5, a view of the combination lock (6) found on the body (12) according to an embodiment of the invention is given. The combination lock (6) cannot be accessed manually from outside the land vehicle (1). In this way, the body (12) is prevented from being opened by force via external intervention by robbers. By means of the password transmitted by the control center (5), the combination lock (6) can be locked and opened. The combination lock (6) preferably works with a hydraulic system. The combination lock (6) preferably comprises an impact sensor. The door (13) allowing access into the body (12) is locked from the inner center and the corner via steel shafts. The steel shafts preferably have a diameter of 2 cm to 4 cm. The security system (8) also comprises a keyboard (61) mounted to the land vehicle (1). A high level authorized person can lock or open the combination lock (6) by using the transmitted password on the keyboard (61). The land vehicle (1) starts moving, after the door (13) that allows access to the body (12) is closed securely by means of a password transmitted from the control center (5). The route is transmitted from the control center (5) to the control panel (4). The land vehicle (1) starts to be monitored by the control center (5). When the land vehicle (1) reaches the unloading area, the control center (5) performs general controls. For example, it controls image/audio records and the location of the land vehicle (1). The control center (5) sends a password to the GSM No. that is previously defined in the security system (8). Said password is shared with a high level authorized person of the transportation company due to security reasons. It may not be shared directly with the driver. The password is preferably formed of 6 digits.

[0023] The security system (8) comprises a black box (3) that is durable against burning, impact, and water. Figure 1 shows a view of the black box (3) found within the body (12) in an embodiment of the invention. The black box (3) is placed at the rear inner part of the body

(12). The black box (3) is connected to the control unit (49). Images captured by the camera system (2), sounds in the driver's cabin (11), the speed and location of the land vehicle (1), licence plate information of the following vehicles, and all the information collected from all the sensors are recorded in the black box (3). In this way, it becomes possible to protect the records against fire and theft. The licence plate information is transmitted to the licence plate system in the black box (3) in short intervals such as once in every minute. Moreover, a power source (31) providing the energy required by the black box (3) is found.

[0024] The security system (8) also comprises an energy source positioned on the land vehicle (1), which ensures that the camera system (2), control panel (4) etc. keeps operating even when the land vehicle (1) isn't working. In this way, the security of the land vehicle (1) can be ensured even during breaks.

Claims

1. A security system (8) for capturing the images around a land vehicle (1) by means of a camera system (2) placed on the land vehicle (1), and it is **characterized in that**; it comprises:

   - a control center (5) allowing the land vehicle (1) to be tracked remotely and to intervene on the land vehicle (1) remotely,
   - a communication unit (46) found on the land vehicle (1) and allowing two-way communication and information exchange with the control center (5) via wireless communication,
   - a control unit (49) found on the land vehicle (1) for examining the captured images using image processing technique, deciding whether there is an emergency or not depending on the result of the examination, and transmitting the emergency information to the control center (5) by means of the communication unit (46) in case emergency decision is made.

2. The security system (8) according to Claim 1, **characterized in that**; it comprises a control unit (49), which:

   - examines the captured images using image processing technique, and decides on whether the vehicle is followed by another vehicle or person for more than a certain amount of time,
   - transmits the information of emergency situation including the information of being followed to the control center (5) by means of the communication unit (46), when it decides on an emergency situation based on the decision that the vehicle is being followed for a time period longer than said time period,
   - examines the captured images by means of image processing technique to read the licence plates of the following vehicles, and when it decides on an emergency, also transmits the read licence plate information to the control center (5) by means of the communication unit (46).

3. The security system (8) according to Claim 1, **characterized in that**; it comprises:

   - a microphone (44) found on the land vehicle (1) for allowing the sounds within the driver's cabin (11) to be detected,
   - a speed detection means found on the land vehicle (1) for allowing detection of the speed of the land vehicle (1),
   - a global location determination unit (7) found on the land vehicle (1) for allowing determination of the location of the land vehicle (1),
   - a communication unit (46) for transmitting, to the control center (5), the images captured by the camera system (2) and/or sounds in the driver's cabin (11) and/or the speed of the land vehicle (1) and/or the location of the land vehicle (1) in case of an emergency and/or upon the request of the control center (5), via wireless communication.

4. The security system (8) according to any one of claims 1 to 3, and it is **characterized in that**; it comprises:

   - a black box (3) that is durable against burning, impact, and water, for recording the images captured by the camera system (2) and/or sounds in the driver's cabin (11) and/or the speed of the land vehicle (1) and/or the location of the land vehicle (1) and/or the licence plate information of the following vehicles.

5. The security system (8) according to claim 4, **characterized in that**; it comprises:

   - the black box (3) is configured to be positioned at the rear inner part of the land vehicle (1) body (12) and a power source (31) for providing the energy required for operation of the black box (3).

6. The security system (8) according to Claim 1, **characterized in that**; it comprises:

   - a image/audio recording device (21) which continuously records the images captured by the camera system (2) and/or records the sounds in the driver's cabin (11) while the land vehicle (1) is in motion.

7. The security system (8) according to Claim 1, **characterized in that**; it comprises:

- an emergency button (41) found in the driver's cabin (11), which can be triggered by the driver, and when triggered, allows the emergency information to be transmitted to the control center (5) through the communication unit (46).

8. The security system (8) according to Claim 1, **characterized in that**; it comprises:

- a door locking system found on the land vehicle (1) for locking all the doors (13),
- a fire extinguishing system found on the land vehicle (1) for extinguishing fire,
- an electric control system found on the land vehicle (1) for cutting the electric feed of the electrical components of the land vehicle (1).

9. The security system (8) according to claim 7 or 8, and it is **characterized in that**; it comprises:

- three different levels found on the emergency button (41), which can be individually triggered for three different emergency situations, which include a robbery situation, a fire situation, and an accident situation.

10. The security system (8) according to claim 9, **characterized in that**; it comprises:

- an emergency button (41), each level of which can be triggered either by the driver or by the control center (5) independent from the driver, in case of an emergency,
- a first level which, when triggered, ensures that the control unit (49) locks all the doors (13) by means of the door locking system,
- a second level which, when triggered, ensures that the control unit (49) cuts off the electricity of the land vehicle (1) and activates the fire extinguishing system,
- a third level which, when triggered, ensures that the control unit (49) executes an action plan defined by the user in accordance with the accident situation.

11. The security system (8) according to Claim 1, **characterized in that**; it comprises:

- a control panel (4) comprising, in the driver's cabin (11), a camera display screen (42) that allows the images captured by the camera system (2) to be watched by the driver and/or a vehicle movement information screen (43) that displays the speed and/or location of the land vehicle (1).

12. The security system (8) according to claim 7 or 11, and it is **characterized in that**;

- the emergency button (41) is found on the control panel (4).

13. The security system (8) according to Claim 1, **characterized in that**; it comprises:

- a combination lock (6) which is mounted on the door (13) that allows access into the vehicle body (12), cannot be accessed from out of the land vehicle (1), can be intervened by the control center (5), and ensures locking and unlocking of the door (13) that allows access into the vehicle body (12) by means of the password transmitted by the control center (5).

14. The security system (8) according to Claim 13, **characterized in that**; it comprises:

- a keyboard (61) mounted on the land vehicle (1) for locking/unlocking the combination lock (6) by an authorized person using the transmitted password.

15. The security system (8) according to Claim 1, **characterized in that**;

- the camera system (2) comprises cameras (22) configured to be mounted on the front side and/or front right side and/or rear right side and/or front left side and/or rear left side and/or rear side and/or in the driver's cabin (11) and/or within the body (12) of the land vehicle (1) for capturing the images around the land vehicle (1), images of the following vehicle, images of people coming close to the land vehicle (1), and/or images within the land vehicle (1).

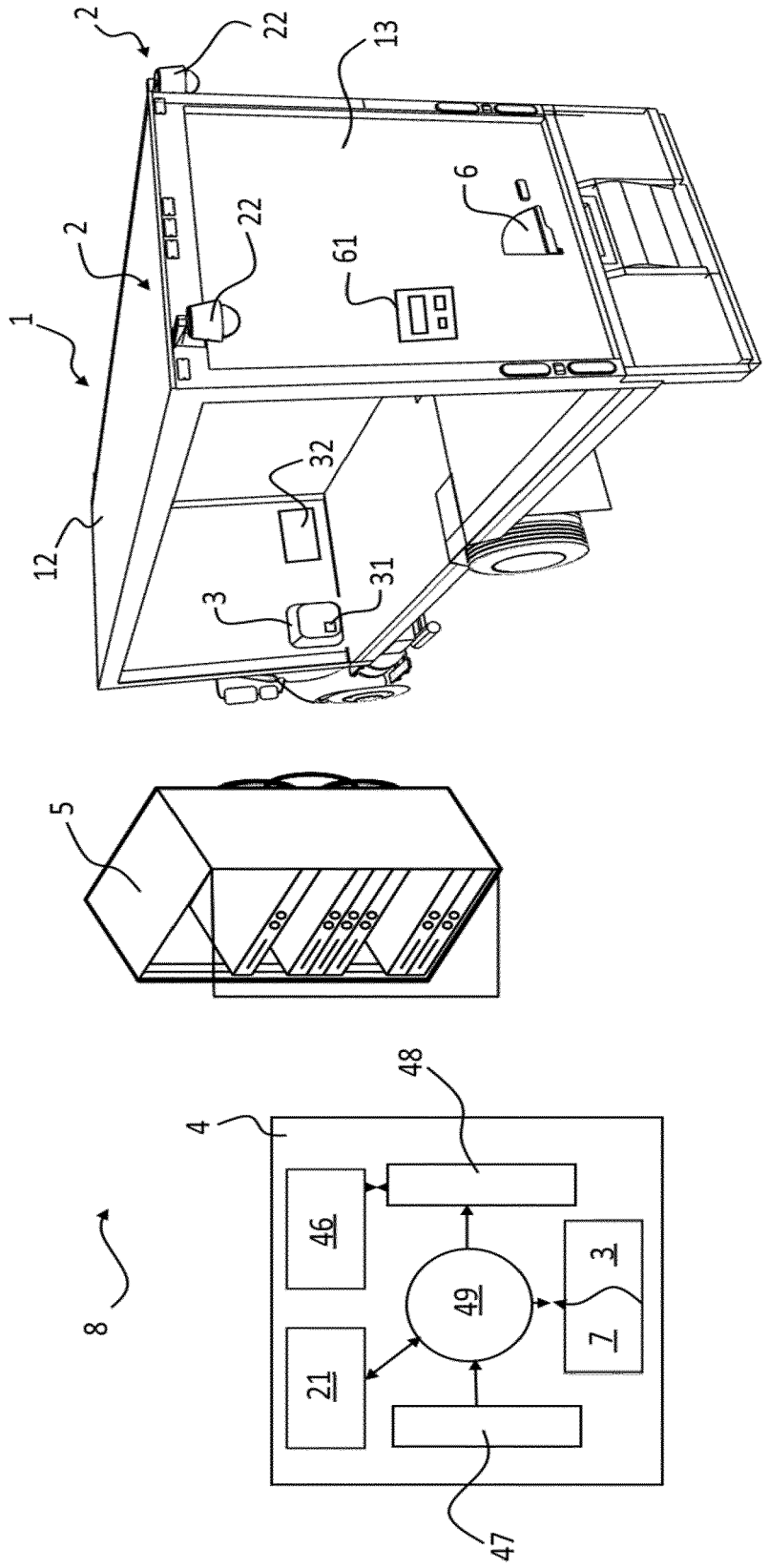

Figure 1

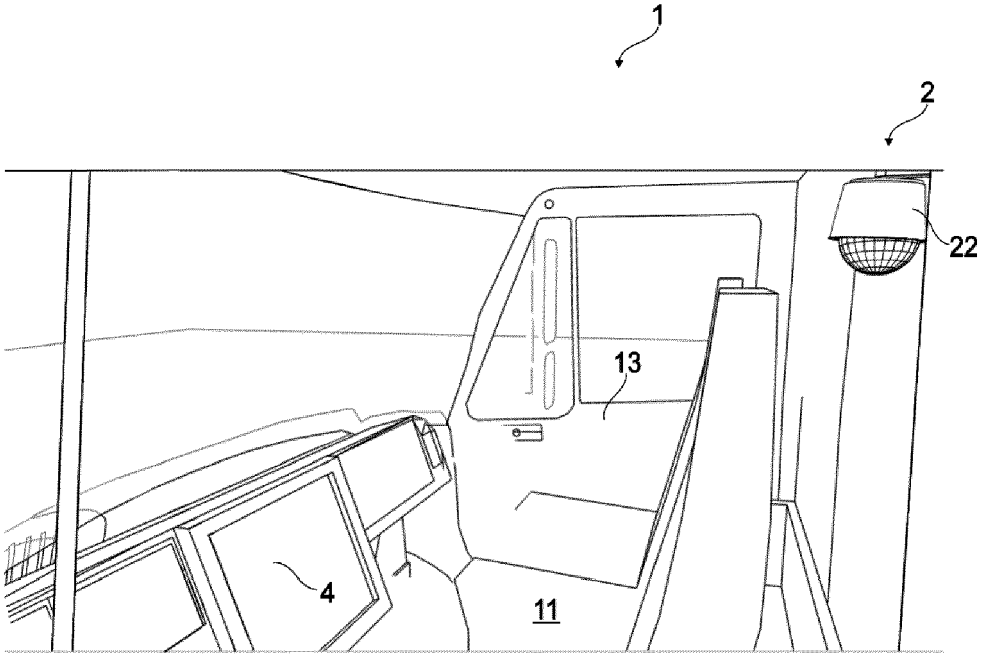

Figure 2

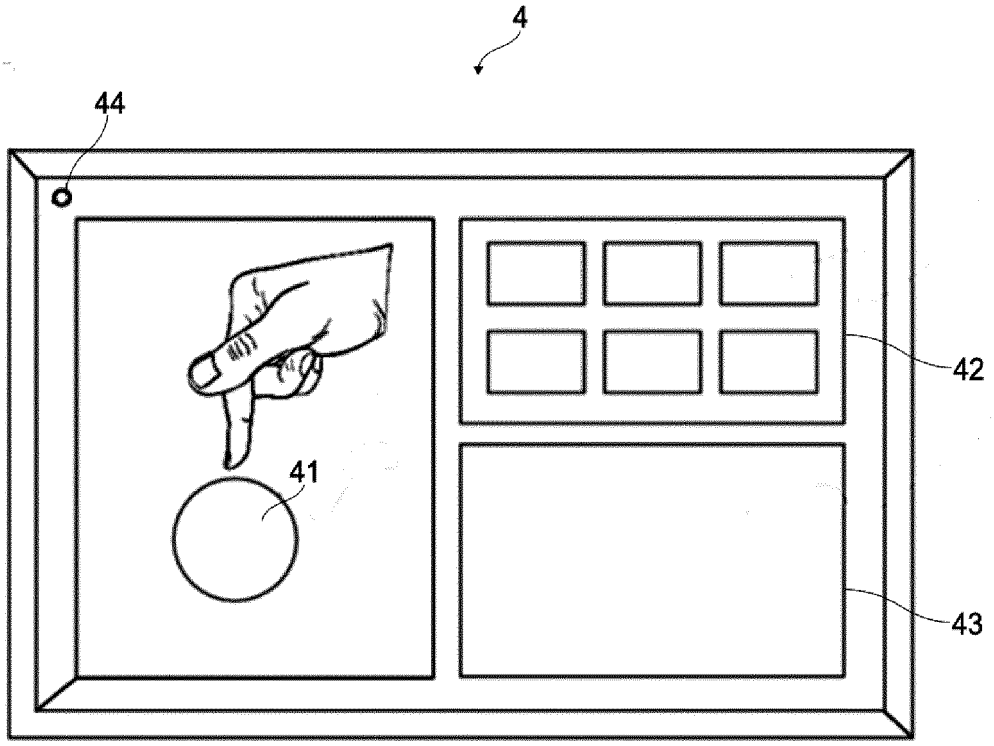

Figure 3

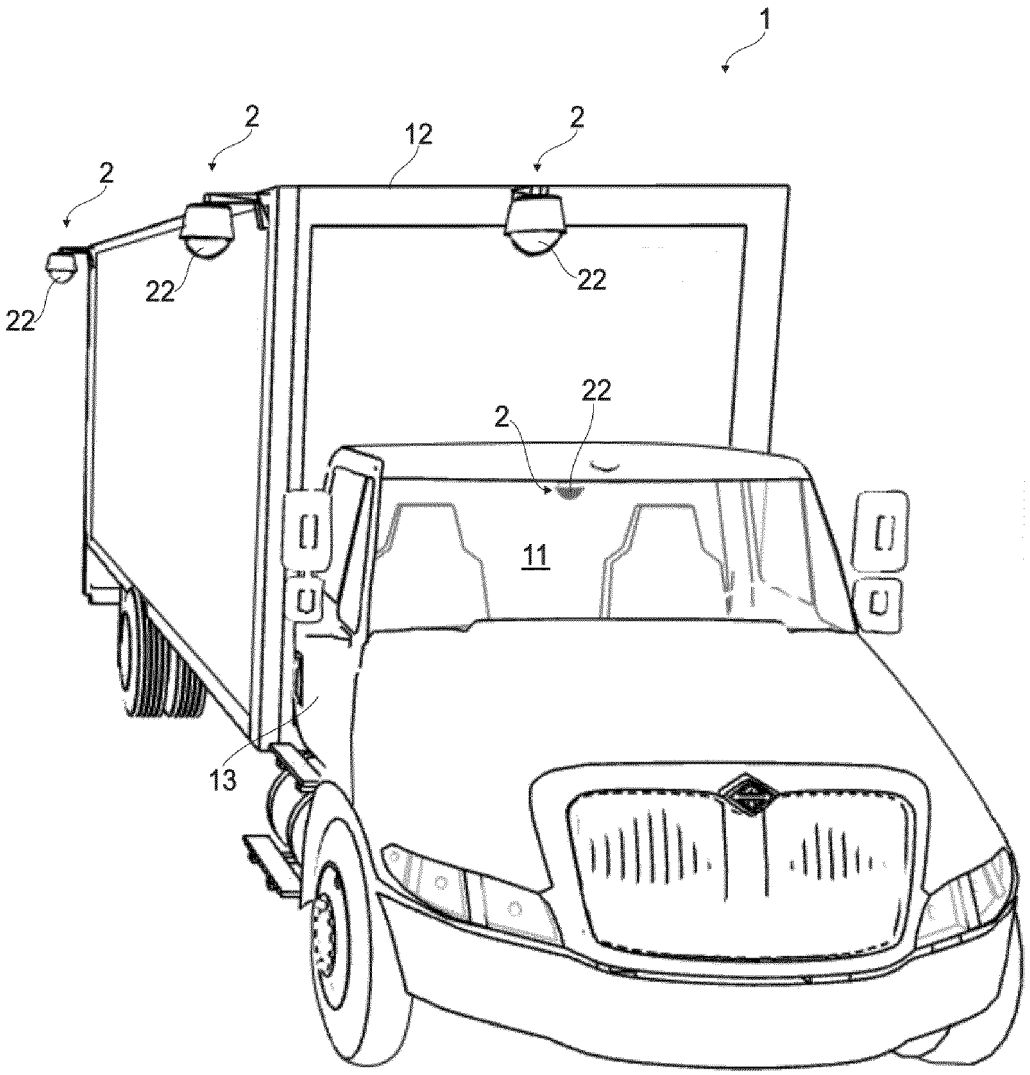

Figure 4

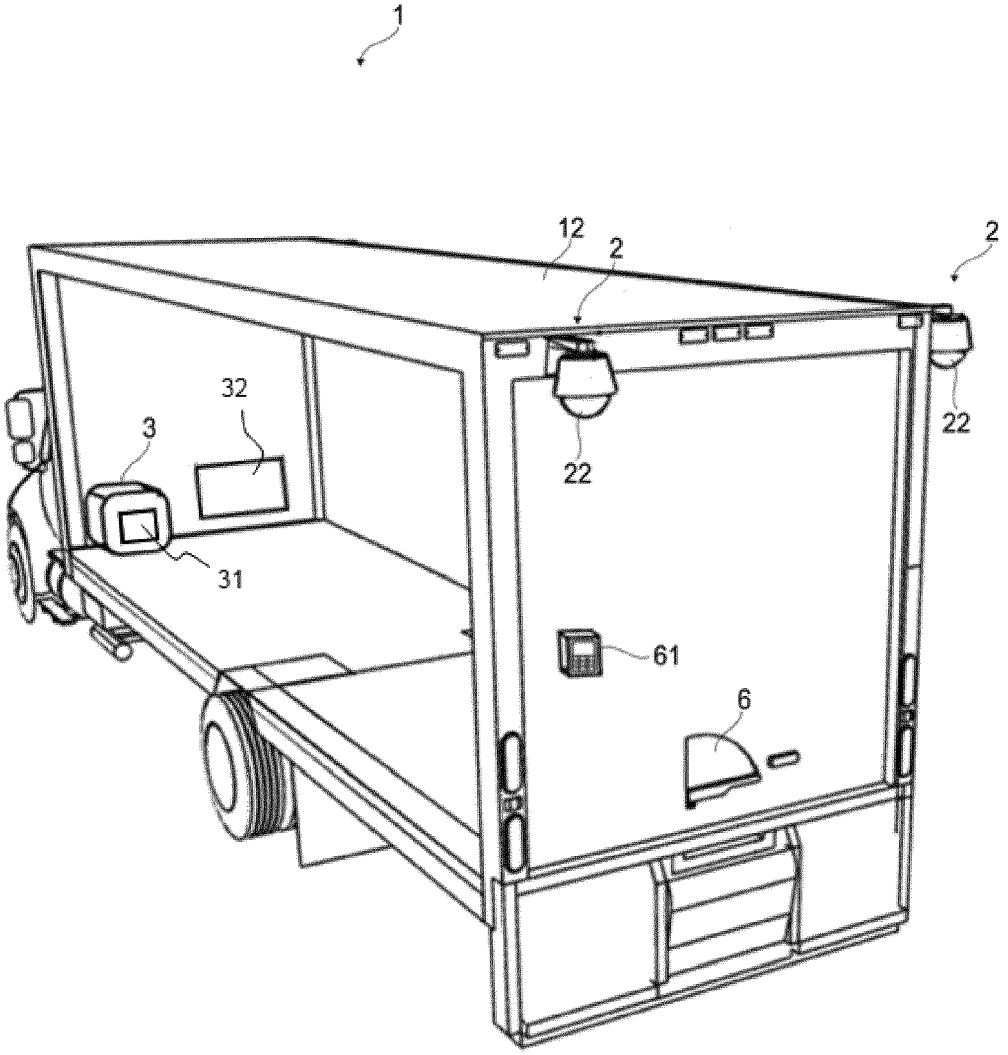

Figure 5

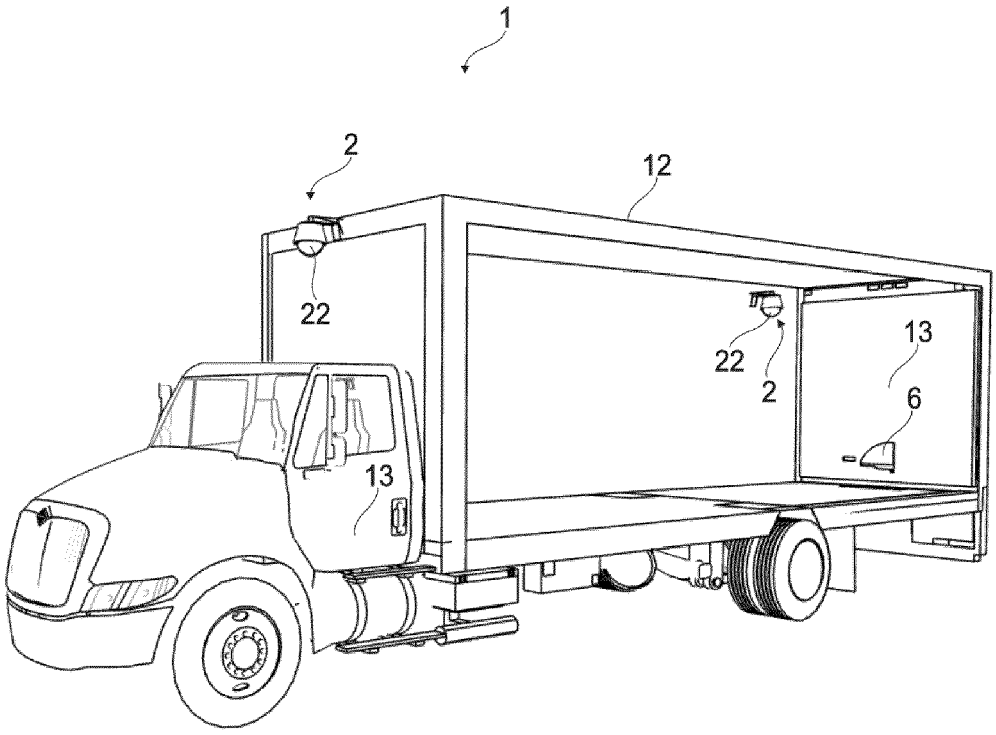

Figure 6

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 0565

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 A	EP 3 073 456 A2 (MAN TRUCK & BUS AG [DE]) 28 September 2016 (2016-09-28) * figures 1,2 * * paragraph [0004] * * sentence 4, paragraph 9 * * sentences 6,7, paragraph 10 * * sentence 1, paragraph 12 * * last sentence, paragraph 15 * * sentences 1-4, paragraph 24 * * paragraph [0025] * * last sentence, paragraph 31 * * sentence 4, paragraph 37 * * paragraph [0038] * * sentences 2,3, paragraph 44 * * paragraph [0047] *	1,3-15 2	INV. G08B13/196
A	US 2003/137426 A1 (ANTHONY ERIC [US] ET AL) 24 July 2003 (2003-07-24) * paragraph [0026] * * paragraph [0028] * * paragraph [0038] * * paragraph [0043] * * paragraphs [0080], [0081] * * paragraph [0095] * * figures 1,2 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) B60R G08B
A	EP 1 850 300 A1 (TN INT [FR]) 31 October 2007 (2007-10-31) * figures 1-4 * * paragraph [0002] * * paragraph [0008] * * paragraph [0012] * * paragraph [0036] *	1-15	
A	US 2007/115109 A1 (TURNEY DAVID L [US] ET AL) 24 May 2007 (2007-05-24) * abstract * * figures 1-3, 4a * * paragraph [0002] *	1-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 September 2018	Plathner, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 15 0565

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