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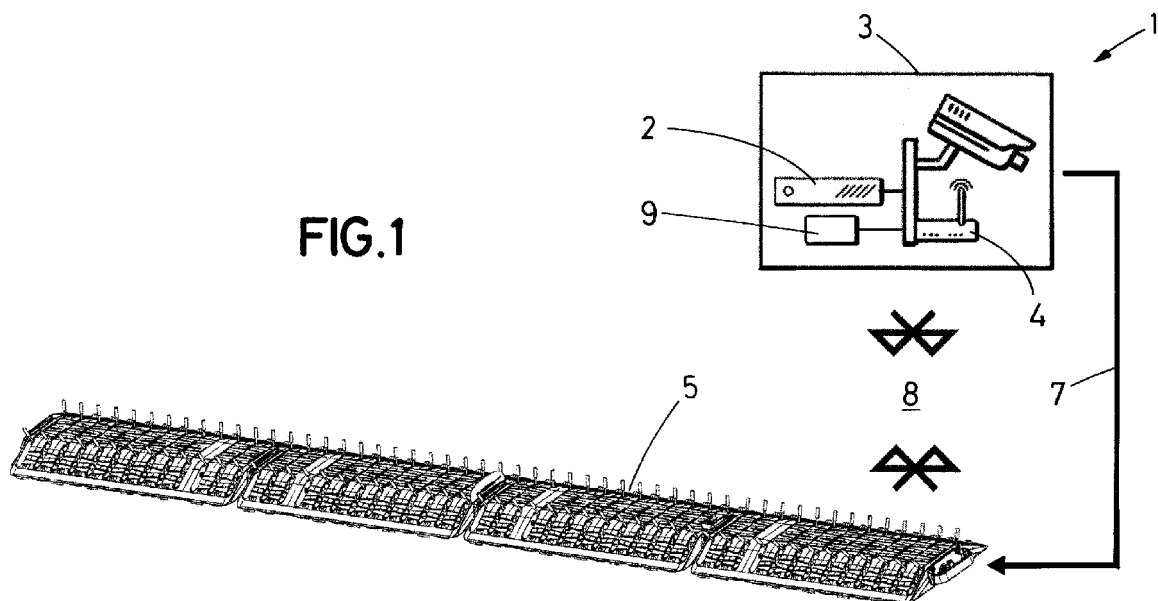
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(54) **SMART ACTIVATION SYSTEM FOR VEHICLE PASSAGE CONTROL BARRIERS**

(57) The invention discloses a smart activation system for vehicle passage control barriers. The system comprises: a smart image analyser configured for analysing real-time images of moving vehicles and generating an activation/deactivation signal; a vision camera connected to the smart image analyser sending real-time images of moving vehicles to the smart image analyser;

a barrier activator configured for sending the activation/deactivation signal to the vehicle passage control barrier for activating/deactivating same; communication means communicating the barrier activator with the vehicle passage control barrier. Optionally, the system may comprise a cloud server for housing the smart analyser and an image storage unit.

FIG.1



Description

Object of the invention

[0001] The present invention relates to a smart activation system for vehicle passage control barriers, also known as "speed bumps".

[0002] The system of the present invention is intended to be a complement to vehicle passage control barriers for carrying out a quick analysis of the situation and context of the place in which the vehicle passage control barrier is located for its potential activation in the event that the situation and context so require.

Technical problem to be solved and background of the invention

[0003] Vehicle passage control barriers used mainly by official security forces for stopping vehicles are known in the state of the art. Vehicle passage control barriers consist of a body located transversely with respect to the direction of traffic of a road. The body supports a casing inside which there are housed pointed elements which, when activated, emerge from above the casing, puncturing the tires of the vehicle when it goes over the casing.

[0004] An example of a vehicle passage control barrier is disclosed in Spanish utility model with publication number ES1202111U belonging to FEDERAL SIGNAL VAMA, S.A.U.

[0005] In the state of the art, vehicle passage control barriers are activated manually depending on an operator's decision to activate/deactivate the vehicle passage control barrier. However, the problem of this manual activation is that it depends on the operator's ability to react in order to analyse a potential risk situation and activate the vehicle passage control barrier. Furthermore, an operator is not capable of performing analysis tasks such as memorising a license plate blacklist in which vehicles which may have been stolen or belong to groups declared as dangerous are recorded.

[0006] Based on the foregoing, there is therefore a need for a system which is capable of analysing the environment in which the vehicle passage control barrier is located and can be quickly activated if required.

Description of the invention

[0007] A new smart activation system for vehicle passage control barriers is provided in order to achieve the objectives and solve the drawbacks mentioned above.

[0008] The smart activation system for vehicle passage control barriers comprises:

- a smart image analyser configured to analyse real-time images of moving vehicles, generate an activation/deactivation signal and sent the activation/deactivation signal to a barrier activator;
- a vision camera connected to the smart image ana-

lyser configured to send real-time images of moving vehicles to the smart image analyser;

- the barrier activator configured to send the activation/deactivation signal coming from the smart image analyser, to the vehicle passage control barrier for activating/deactivating the vehicle passage control barrier;
- communication means configured to communicate the barrier activator with the vehicle passage control barrier.

[0009] In one embodiment of the invention, the smart image analyser and the barrier activator are comprised in the vision camera.

[0010] In another embodiment of the invention, the communication means are selected from a wired connection and a wireless connection. Among wireless connections, standard Bluetooth or standard Wi-Fi is preferably used.

[0011] In another embodiment of the invention, the system of the present invention further comprises a cloud server where the smart image analyser is located. Furthermore, the barrier activator is comprised in the vision camera, such that the vision camera is connected with the smart image analyser by means of a global communications network (Internet).

[0012] In another embodiment of the invention, the system of the present invention further comprises a cloud server where the smart image analyser is located, such that the vision camera is connected with the smart image analyser by means of a global communications network and the smart image analyser is connected with the barrier activator by means of said global communications network.

[0013] In another embodiment of the invention, the system of the present invention further comprises a storage unit connected to the smart image analyser in which the real-time images of moving vehicles are stored for subsequent analysis in the case of activation.

[0014] In another embodiment of the invention, the system of the present invention further comprises a siren providing a prior notification of the activation of the vehicle passage control barrier by way of sound.

[0015] In another embodiment of the invention, the system of the present invention further comprises a light indicator providing a prior notification of the activation of the vehicle passage control barrier by way of light.

[0016] In another embodiment of the invention, the system of the present invention further comprises a power supply selected from a power grid, batteries, and photovoltaic panels.

[0017] In another embodiment of the invention, the system of the present invention further comprises a vandal-proof cabinet in which at least the vision camera is located. Optionally, the vandal-proof cabinet comprises the rest of the elements of the system of the present invention.

[0018] In another embodiment of the invention, the

smart image analyser is configured to generate the activation/deactivation signal based on at least one criterion selected from: a vehicle circulating in the direction opposite the permitted order of travel and a vehicle the license plate of which is on a license plate blacklist.

Description of the figures

[0019] To complete the description and for the purpose of helping to better understand the invention, a set of figures is attached to this specification as an integral part thereof in which the following is depicted in an illustrative and nonlimiting manner:

Figure 1 is a view of the smart activation system for vehicle passage control barriers of the present invention in which the vision camera also has the smart image analyser, the barrier activator, and the storage unit.

Figure 2 is a view of the system of the present invention in which the smart image analyser and the storage unit are located in a cloud server and connected to the vision camera and to the barrier activator by means of the Internet.

Figure 3 is a view of the system of the present invention in which the smart image analyser and the storage unit are located in a cloud server and connected by means of the Internet with the vision camera having the barrier activator integrated therein.

Figure 4 is a schematic view of the system of the present invention deployed on a road in which the system is configured to detect a vehicle circulating in a direction opposite the permitted direction, activate the vehicle passage control barrier and activate the sound and light alarms.

Figure 5 is a schematic view of the system of the present invention deployed on a road in which the system is configured to detect a vehicle the license plate of which is on a blacklist, and to activate the vehicle passage control barrier.

Preferred embodiment of the invention

[0020] The invention is described below based on the aforementioned figures. List of references:

1. smart activation system for vehicle passage control barriers;
2. smart image analyser;
3. vision camera;
4. barrier activator;
5. vehicle passage control barrier (also known as "speed bump");
6. cloud server;
7. cable;
8. Bluetooth;
9. storage unit;
10. vehicle;

11. siren;
12. light indicator;
13. license plate of the vehicle.

[0021] Figure 1 depicts the "non-distributed" embodiment of the system of the present invention. In this embodiment, the smart activation system for vehicle passage control barriers of the present invention comprises the vision camera 3 which has integrated therein the smart image analyser 2, the barrier activator 4, and the storage unit 9. The smart image analyser 2 is configured to analyse real-time images of moving vehicles coming from the image capturing elements of the vision camera 3 itself and generating an activation/deactivation signal which it sends to the barrier activator 4. When the barrier activator 4 receives the activation signal from the smart image analyser 2, the barrier activator 4 sends said activation signal by means of a wired connection 7 or a wireless connection 8, for example, by means of standard Bluetooth, to the vehicle passage control barrier 5 for activating the vehicle passage control barrier 5. The system continuously stores real-time images of moving vehicles in the storage unit 9 for subsequent analysis. The incident causing the activation of the vehicle passage control barrier 5 can thereby be verified and possibly documented graphically.

[0022] Figure 2 depicts the "distributed" embodiment of the system of the present invention. In this embodiment, the smart activation system for vehicle passage control barriers of the present invention comprises the vision camera 3 connected via the Internet (global communications network) with the cloud server 6 where the smart image analyser 2 and the storage unit 9 are implemented. The real-time images of moving vehicles captured by the vision camera 3 are therefore sent to the cloud server 6 for storage in the storage unit 9 and analysis by the smart image analyser 2. If the result of the analysis performed by the smart image analyser 2 involves the activation of the vehicle passage control barrier, the activation signal is sent via the Internet to the barrier activator 4, which activates the vehicle passage control barrier 5 by means of a wired connection 7 or a wireless connection 8, for example, by means of standard Bluetooth.

[0023] Figure 3 depicts the "semi-distributed" embodiment of the system of the present invention with respect to the embodiments shown in Figures 1 and 2. In this embodiment, the system of the present invention comprises the barrier activator 4 integrated in the vision camera 3, which is connected via the Internet (global communications network) with the cloud server 6 where the smart image analyser 2 and the storage unit 9 are implemented. The real-time images of moving vehicles captured by the vision camera 3 are therefore sent to the cloud server 6 for storage in the storage unit 9 and analysis by the smart image analyser 2. If the result of the analysis performed by the smart image analyser 2 involves the activation of the vehicle passage control bar-

rier, the activation signal is sent via the Internet to the barrier activator 4, which activates the vehicle passage control barrier 5 by means of a wired connection 7 or a wireless connection 8, for example, by means of standard Bluetooth.

[0024] Figure 4 shows the system of the present invention deployed on a road for any of the embodiments shown in Figures 1 to 3. In this Figure 4, the smart activation system of the present invention further comprises the siren 11 and the light indicator 12 providing prior notifications of the activation of the vehicle passage control barrier 5 by way of sound and light. The system is deployed on a road in which the smart image analyser 2 detects a vehicle circulating in a direction opposite the permitted direction, activating the vehicle passage control barrier 5 by means of the wired connection 7 or by means of a wireless connection 8 such as, for example, by means of standard Bluetooth, and activating the siren 11 and the light indicator 12.

[0025] Figure 5 shows the system of the present invention deployed on another road for any of the embodiments shown in Figures 1 to 3. The system is deployed on a road in which the smart image analyser 2 detects a vehicle 10 the license plate 13 of which is on a blacklist, activating the vehicle passage control barrier 5 by means of the wired connection 7 or the wireless connection 8, for example, by means of standard Bluetooth.

Claims

1. A smart activation system (1) for vehicle passage control barriers, **characterised in that** it comprises:
 - a smart image analyser (2) configured to analyse real-time images of moving vehicles, generate an activation/deactivation signal and sent the activation/deactivation signal to a barrier activator(4);
 - a vision camera (3) connected to the smart image analyser (2) configured to sent real-time images of moving vehicles to the smart image analyser (2);
 - the barrier activator (4) configured to send the activation/deactivation signal to the vehicle passage control barrier (5);
 - communication means (7, 8) configured to communicate the barrier activator (4) with the vehicle passage control barrier (5).
2. The smart activation system for vehicle passage control barriers according to claim 1, wherein the smart image analyser (2) and the barrier activator (4) are comprised in the vision camera (3).
3. The smart activation system for vehicle passage control barriers according to claim 1, wherein the communication means (7, 8) are selected from a

wired connection (7) and a wireless connection (8).

4. The smart activation system for vehicle passage control barriers according to claim 3, wherein the wireless connection (8) is selected from standard Bluetooth and standard Wi-Fi.
5. The smart activation system for vehicle passage control barriers according to claim 1, wherein the system further comprises a cloud server (6) where the smart image analyser (2) is located, and wherein the barrier activator (4) is comprised in the vision camera (3), such that the vision camera (3) is connected to the smart image analyser (2) by means of a global communications network.
6. The smart activation system for vehicle passage control barriers according to claim 1, wherein the system further comprises a cloud server (6) where the smart image analyser (2) is located, such that the vision camera (3) is connected to the smart image analyser (2) by means of a global communications network and the smart image analyser (2) is connected with the barrier activator (4) by means of said global communications network.
7. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the system further comprises a storage unit (9) connected to the smart image analyser (2) in which the real-time images of moving vehicles (10) are stored.
8. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the system further comprises a siren (11) providing a prior notification of the activation of the vehicle passage control barrier (5) by way of sound.
9. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the system further comprises a light indicator (12) providing a prior notification of the activation of the vehicle passage control barrier (5) by way of light.
10. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the system further comprises a power supply selected from a power grid, batteries, and photovoltaic panels.
11. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the system further comprises a vandal-proof cabinet in which at least the vision camera (3) is located.

12. The smart activation system for vehicle passage control barriers according to any one of the preceding claims, wherein the smart image analyser (2) is configured to generate the activation/deactivation signal based on at least one criterion selected from: 5
a vehicle circulating in the direction opposite the permitted order of travel and a vehicle the license plate of which is on a license plate blacklist.

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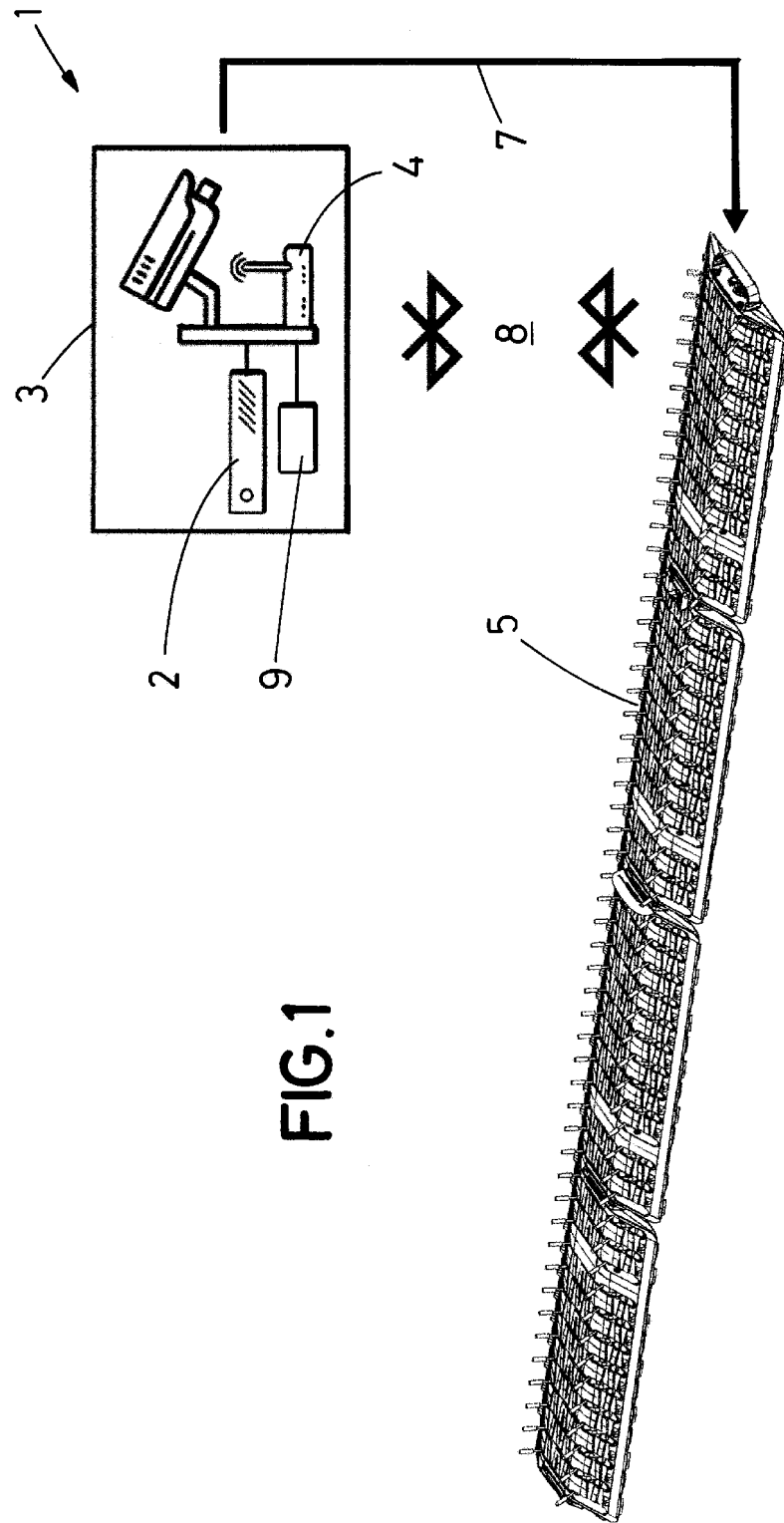


FIG.1

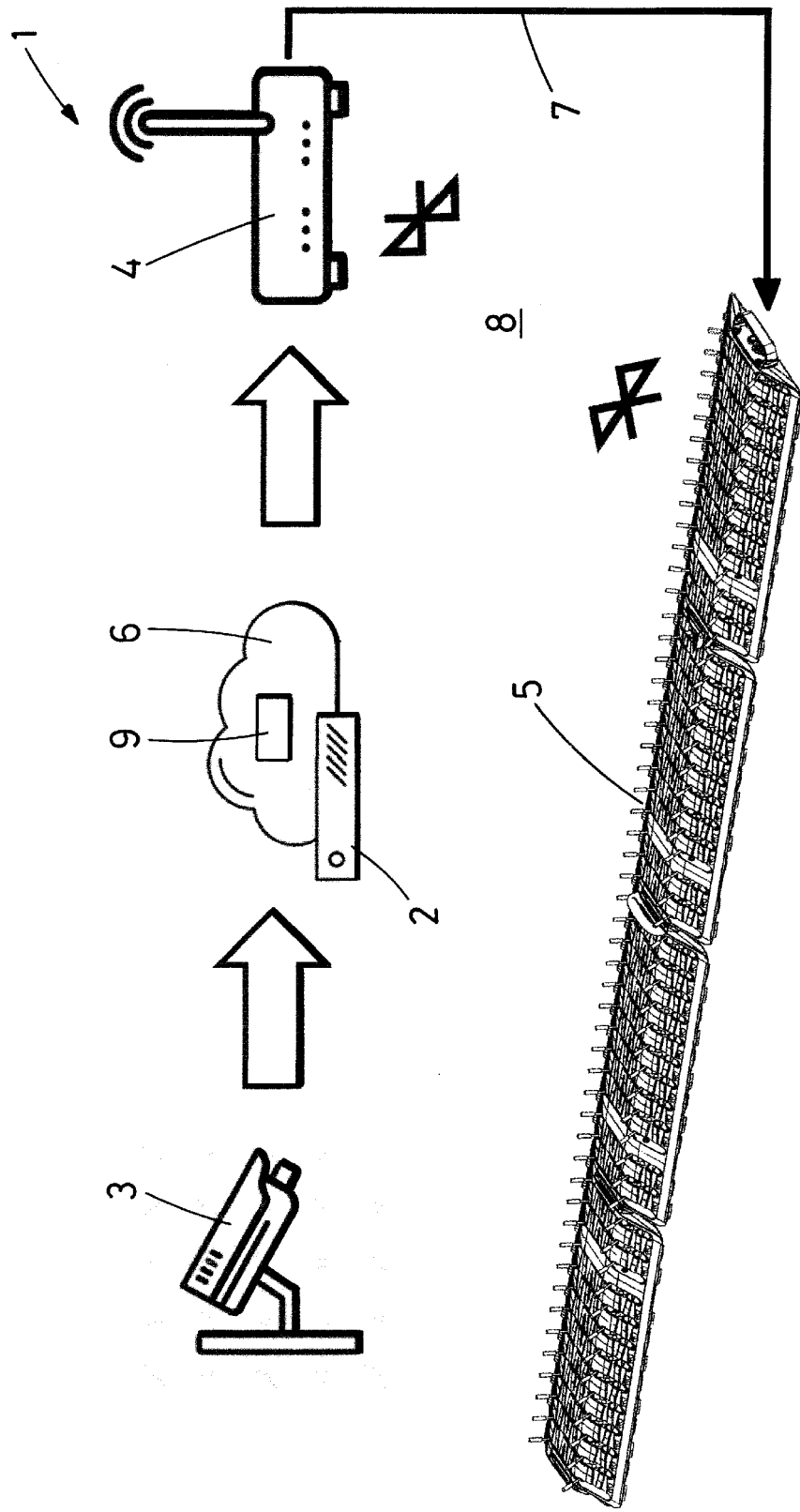


FIG.2

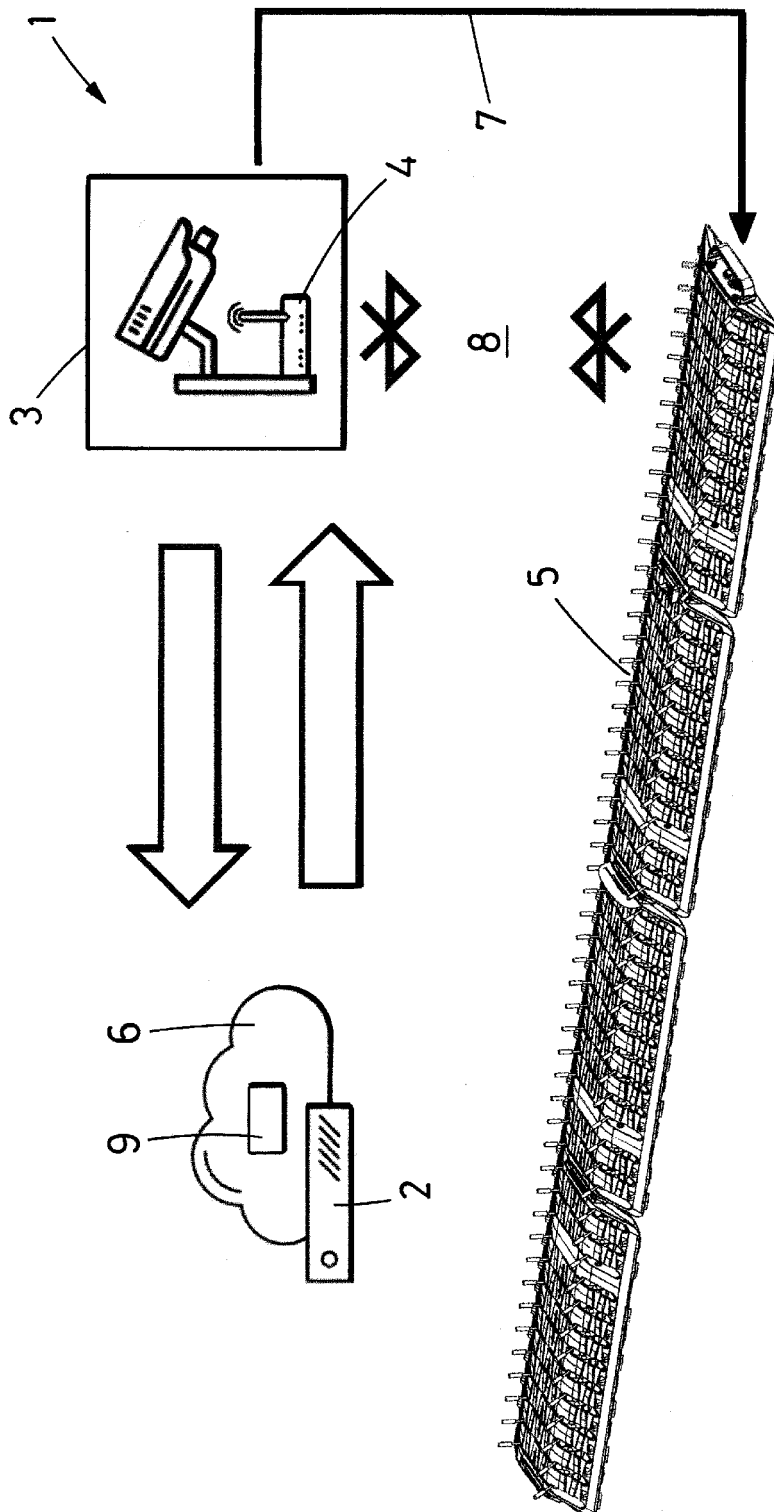


FIG.3

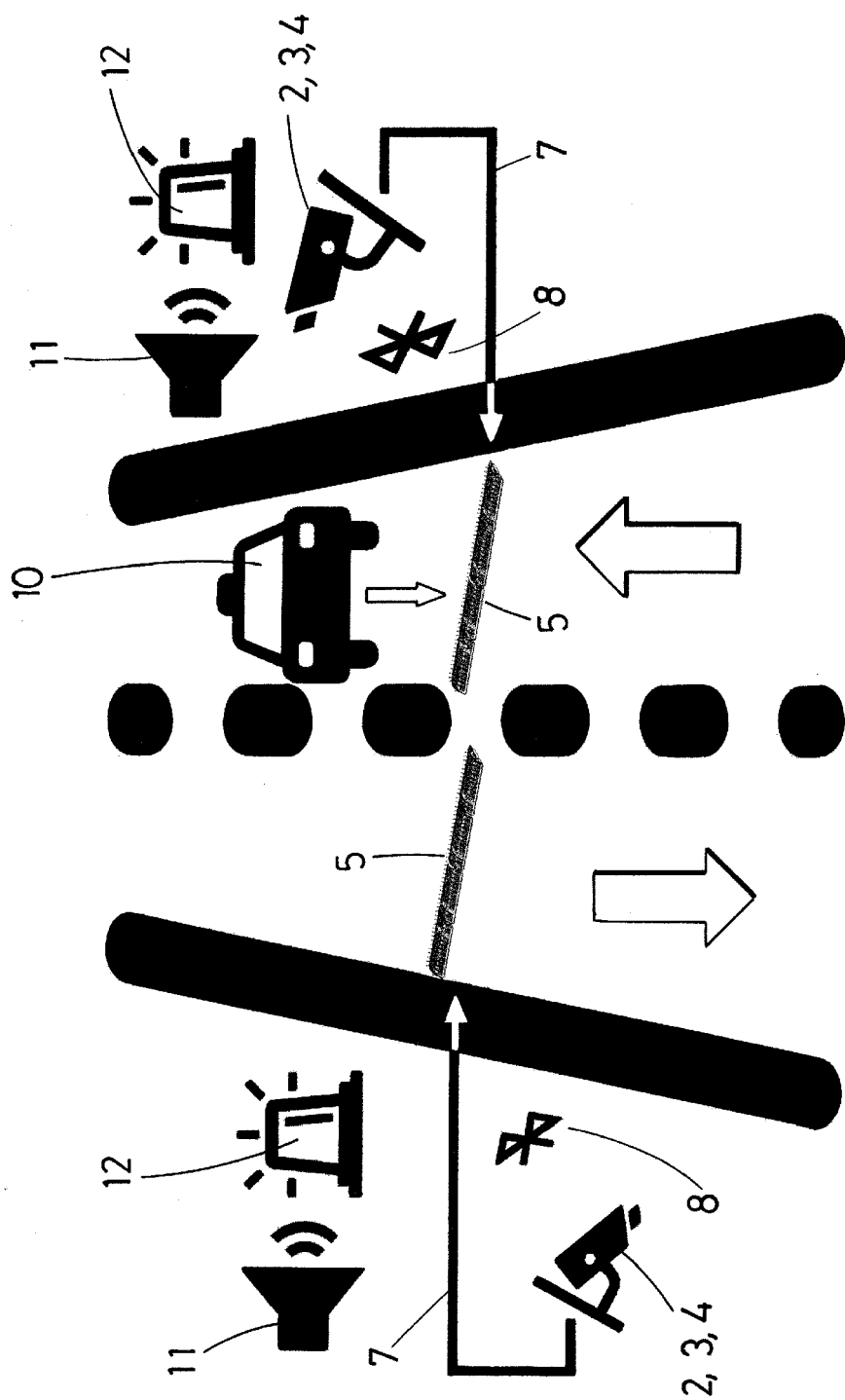


FIG. 4

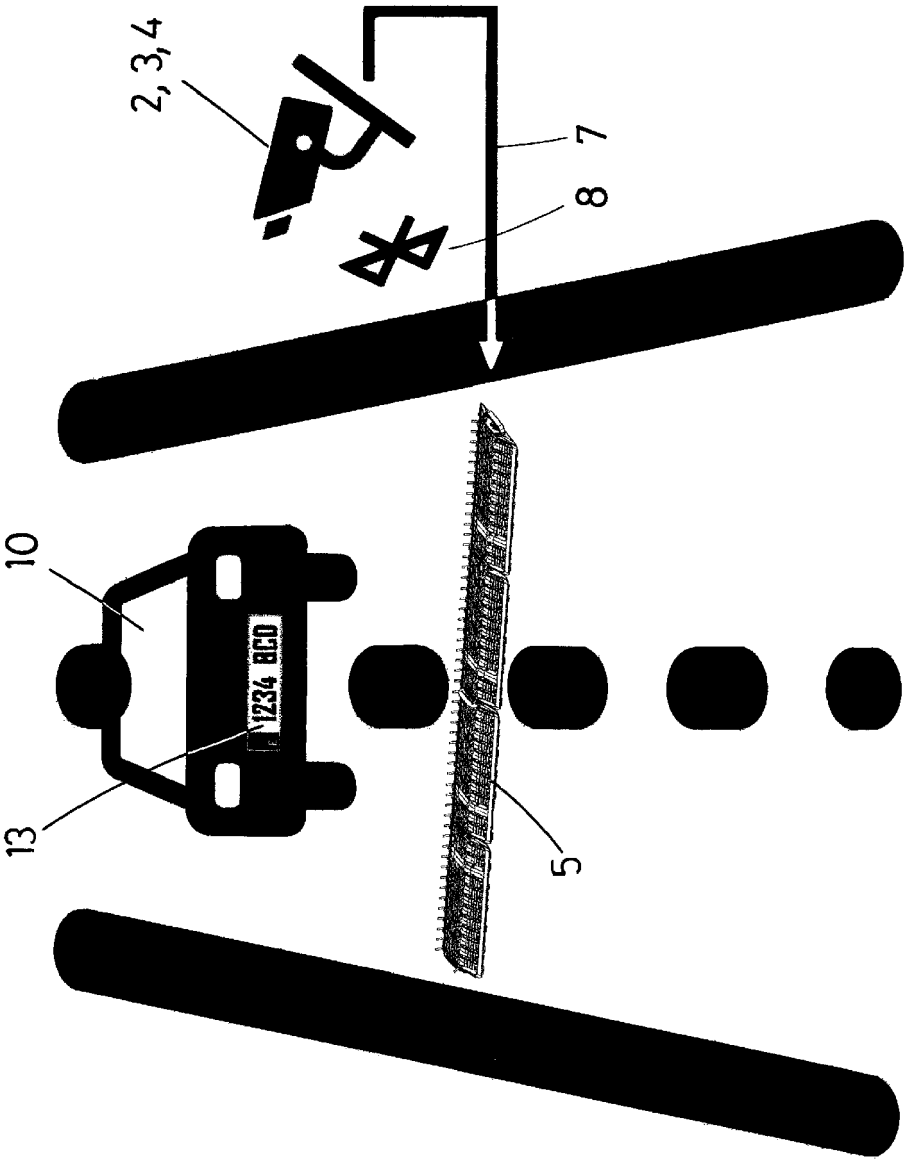


FIG.5



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Application Number

EP 21 19 1600

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