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(54) Weapon sight assembly and weapon system including same

(57) A weapon sight assembly, comprising: a platform for mounting the weapon sight assembly on a weapon; a weapon sight carried by said platform to facilitate orienting the weapon in alignment with a target in a field of view; a video camera carried by the platform for generating and outputting video signals corresponding to the viewed field; a video transmitter for transmitting the video signals; and a controller for controlling the video camera and the video transmitter.

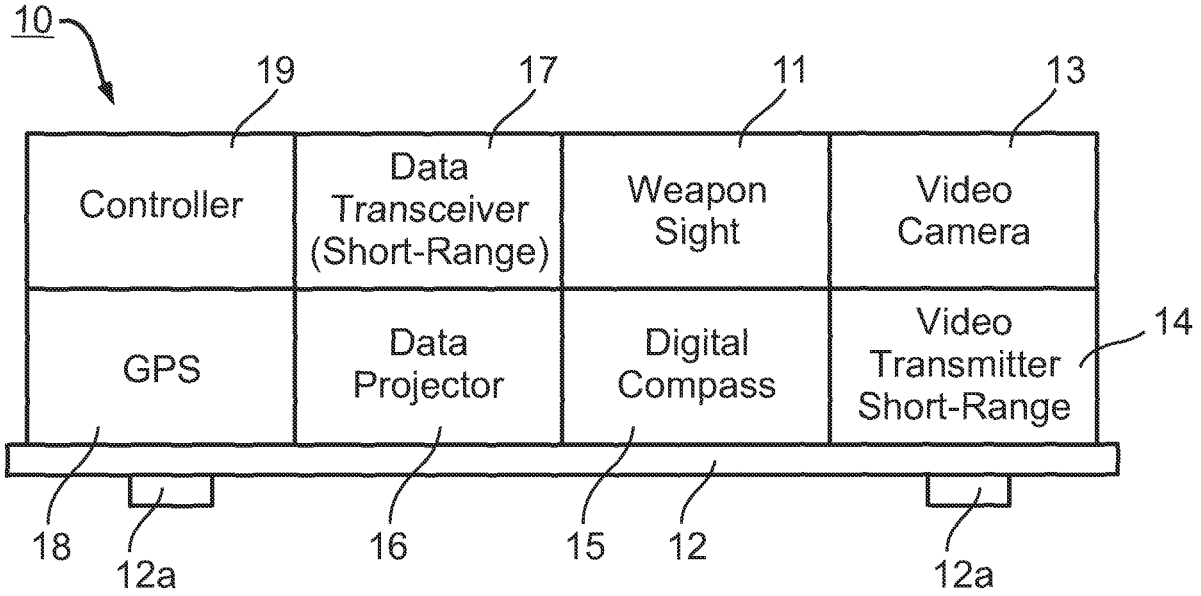

Fig. 2

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Description

FIELD AND BACKGROUND OF THE INVENTION

[0001] The present invention relates to weapon systems, and particularly to weapon sights used by such weapons to facilitate their orientation with respect to a target. The invention is particularly useful with respect to weapon sights for rifles and is therefore described below with respect to such an application, but it will be appreciated that the invention could be used with other types of weapons, such as grenade launchers, and the like.

[0002] A solider-combatant during a military operation may be confronted with the need to see around a corner or over an obstacle without personal exposure. Other serious problems involved during military operations include the need to communicate battlefield conditions in real time to commanders or to headquarters, and the need for the individual soldier-combatants to receive commands, instructions , or other information in real time from commanders or from headquarters.

[0003] An object of the present invention is to provide a weapon sight assembly, and also a weapon system including such a weapon site assembly, having advantages in one or more of the above respects.

BRIEF SUMMARY OF THE INVENTION

[0004] According to one aspect of the present invention, there is a provided a weapon sight assembly, comprising: a platform for mounting the weapon sight assembly on a weapon; a weapon sight carried by the platform to facilitate orienting the weapon in alignment with a target in a field of view; a video camera carried by the platform for generating and outputting video signals corresponding to the viewed field; a video transmitter for transmitting the video signals; and a controller for controlling the video camera and the video transmitter.

[0005] In the described preferred embodiment, the video transmitter is a short-range space transmitter having a range in the order of two meters or less to enable communication with a proximally-located portable communication apparatus.

[0006] According to another aspect of the present invention, there is a provided a weapon system, comprising: a weapon sight assembly as set forth above for mounting on a weapon; and portable communication apparatus constructed for carrying by an individual operating the weapon and for communicating with the weapon sight assembly. In the described preferred embodiment, the portable communication apparatus comprises a short-range video receiver for receiving the video signals transmitted by the video transmitter of the weapon sight assembly; and a monitor for displaying the region viewed by the video camera as presented by the video signals transmitted by the video transmitter.

[0007] According to further fratures in the described preferred embodiment, the portable communication apparatus comprises a first unit including the short-range video receiver, and a second unit including the monitor. Preferably, the second unit is cable-connected to the first unit. In the described embodiment, the first unit is constructed so as to be attachable to the body of the individual operating the weapon for convenient carrying by such individual and the second unit is constructed so as to be attachable to the arm or other body part, or to be carried by the hand, of the individual operating the weapon for convenient viewing by such individual.

[0008] According to still further features in the described preferred embodiment, the portable communication apparatus further comprises a long-range video transmitter for transmitting the received video signals to a commander or headquarters at a distant location; a short-range data receiver for receiving data from the weapon sight assembly; and a long-range transmitter for transmitting the received data to the distant location.

[0009] In the described preferred embodiment, the weapon site assembly further comprises a digital compass for determining the direction of orientation of the weapon and for outputting data signals corresponding thereto; and a short-range data transmitter for transmitting the data signals to the data communication apparatus located a short distance from there, of the order two meters or less. In the described preferred embodiment, the weapon sight assembly further comprises a data receiver for receiving data signals transmitted through space; and a projector for optically projecting onto the field of view data from the digital compass and/or data received by the receiver.

[0010] Also included in the described preferred embodiment is a global positioning system (GPS) unit for geographically locating the weapon on which the weapon sight assembly is carried, and for outputting data signals corresponding thereto for transmission by the data transmitter to the commander or to headquarters. For purposes of example, the invention is described below wherein the platform is constructed for mounting on a rifle barrel, but it will be appreciated that the invention could also be used with other weapons, for example, grenade launchers and the like.

[0011] As will be described more particularly below, a weapon sight assembly constructed in accordance with the foregoing features provides a number of advantages which may be of critical importance during battlefield conditions. Thus, the forgoing features of the invention enable the soldier-combatant carrying the weapon to see around corners or over protective devices or obstacles without personal exposure to enemy gunfire. In addition, the invention enables the weapon also to serve also as an intelligence-gathering device for gathering information as to battlefield conditions and for communicating such information to commanders or to headquarters in real time. Further, the invention enables the soldier-combatant carrying the weapon to receive immediate commands, instructions or other information from a commander or from headquarters.

[0012] Further features and advantages of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The invention is described below, for purposes of example only, with reference to the accompanying drawings, wherein:

Fig. 1 diagrammatically illustrates one form of weapons system constructed in accordance with the present invention;

Fig. 2 diagrammatically illustrates the construction of the weapon sight assembly in the weapon system of Fig. 1; and

Fig. 3 diagrammatically illustrates the two units of the portable communication apparatus in the weapon system of Fig. 1.

[0014] It is to be understood that the drawings, and the description below, are provided primarily for purposes of facilitating understand the conceptual aspects of the invention and various possible embodiments thereof, including what is presently considered to be a preferred embodiment. In the interests of clarity and brevity, no attempt is made to provide more details than necessary to enable one skilled in the art, using routine skill and design, to understand and practice the described invention. It is to be further understood that the embodiment described is for purposes of example only, and that the invention is capable of being embodied in other forms and applications than described herein.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0015] The weapon system illustrated in Fig. 1 comprises a weapon sight assembly, generally designated 10, mounted on a weapon, in this case a rifle; and portable communication apparatus, generally designated 20, constructed for carrying by an individual operating the weapon, namely a combatant-soldier, for establishing communication between the weapon sight assembly 10 and a commander 30 or headquarters 40 at a distant location. As will be more particularly described below with respect to Figs. 2 and 3, a two-way short-range communication loop is established between the weapon system sight assembly 10 and the portable communication apparatus 20; and a long-range two-way communication loop is established between the portable communication apparatus 20 and the distant location of the commander 30 or headquarters 40.

[0016] The weapon sight assembly 10 mounted on the rifle illustrated in Fig. 1 is more particularly shown in Fig. 2. It includes a weapon sight 11 of any desired type to facilitate orienting the weapon in alignment with a target in the field of view, and a platform 12 for mounting the weapon sight assembly on the rifle (or other weapon) e.g. via clamps 12a.

[0017] Weapon sight assembly 10 further includes a video camera 13 carried by platform 12 for generating and outputting video signals corresponding to the viewed field. It further includes a short-range video transmitter 14 for transmitting such video signals to the portable communication apparatus 20. The range of video transmitter 14 is very short, preferably in the order of one meter or less, only sufficient to communicate with the proximally-located portable communication apparatus 20.

[0018] Weapon sight assembly 10 further includes: a digital compass 15 of any known type for determining the direction of orientation of the weapon (rifle) and for outputting data signals corresponding to such determined orientation; a data projector 16 for optically projecting in the field of view data from the digital compass 15; and a short-range data transceiver (transmitter/receiver) 17 also in communication with the proximally-located portable communication apparatus 20.

[0019] As illustrated in Fig 2, the weapon sight assembly 10 may also include a global positioning system (GPS) unit 18 for geographically locating the respecting weapon and for outputting data signals corresponding to the geographical location. Such data may also be transmitted by the short-range data transceiver 17 to the proximally-located portable communication apparatus 20.

[0020] The control of all the foregoing components carried by the weapon sight assembly 10 is effected by a controller 19 also mounted on platform 12 of assembly 10.

[0021] The portable communication apparatus 20, as shown in Fig. 3. includes two separate units 21, 22, cable-connected together as shown at 23. Unit 21 is the larger of the two and is constructed so as to be attachable to the body of the individual (soldier-combatant) operating the weapon (rifle). For example, unit 21 may include clips 21a attachable to a protective vest worn by the individual. Unit 22, the smaller of the two units, is constructed so as to be attachable to the arm, or to be carried by the hand, of the individual operating the weapon for convenient reviews by the individual; for example, unit 22 could be strapped to this arm, or attached by a bracket to the protective vest of this individual.

[0022] Smaller unit 22 is used primarily as a monitor for viewing the video information generated by the video camera 13 in the weapon sight system 10, or for viewing commands, instructions or other information transmitted to the individual operating the weapon by his commander 30 or by headquarters 40. Accordingly, the smaller unit 22 may be similar in size and construction to a personal digital assistant (PDA) having a screen 24 for displaying the foregoing information.

[0023] As shown in Fig. 3, the larger portable communication unit 21 (e.g., constructed so as to be vest-worn by the individual) includes a short-range video receiver 25 and a short-range data transceiver 26 for communication with the short-range video transmitter 14 and the short-range data transceiver 17, respectively, of the weapon sight assembly illustrated in Fig. 2. Portable

communication unit 21 further includes a long-range video transmitter 27 and a long-range data transceiver 28, e.g., having a range of several hundred meters, sufficiently for communicating with the remotely-located commander 30 or headquarters 40 (Fig. 1). The foregoing components of the vest-worn portable communication unit 21 are all controlled by a controller 29 included within that unit.

[0024] It will be seen that weapon system, including a weapon sight assembly as illustrated in Fig. 2 and portable communication apparatus as illustrated in Fig. 3, provides a number of advantages which can be particularly important during combat conditions.

[0025] Thus, the solider-combatant carrying the weapon (e.g. rifle) may use the weapon also to see around a corner or over an obstacle. This can be done without exposure to possible enemy fire by merely orienting the weapon carrying the sight assembly such that the video camera 13 on that assembly views the region of interest. The video signals outputted from the camera are transmitted via the short-range transmitter 14 to the proximally-located portable communication unit 21. The latter unit is cable-connected to the smaller monitor unit 22 such that the video signals received by the short-range video receiver 25 of portable communication unit 21 are displayed to the soldier - combatant on the screen 24 of the smaller arm-carried or hand-held unit 22.

[0026] Since the sight assembly 10 mounted on the weapon requires only short-range communication (e.g. of less than one meter) with the portable communication unit 21, the sight assembly may of relatively light weight so as to impose a minimum load on the weapon itself. Also, since the communication between the sight assembly 10 and the portable communication unit 21 is wireless, the communication with the portable communication unit 21 imposes no interference or awkwardness in the use of the weapon.

[0027] Further and as noted above, the portable communication unit 21, which includes not only the short-range communication equipment for communicating with the weapon sight assembly 10 but also the long-range communication equipment for communicating the commander 30 and/or headquarters 40, is constructed so as to be conveniently carried on the body of the individual soldier-combatant, e.g. by attachment to the combatant's vest. The communication unit therefore also imposes very little restriction on the movements of the individual combatant/soldier. In addition, since the actual field of view is displayed by the small monitor unit 22, which can also be conveniently carried and maneuvered by the individual (e.g., by being strapped to the individual's arm or carried by the individual's hand), the field viewed by the video camera 13 on the weapon sight assembly 10 may be conveniently seen by the soldiers - combatant whenever desired.

[0028] The weapon sight assembly 10, and the portable communication apparatus 20 communicating with it, also serve as an important intelligence gathering means for real- time gathering and transmitting, to a commander or to headquarters, information regarding battlefield conditions. Thus, the video information from video camera 13, digital compass information from digital compass 15, and/or geographical information from GPS unit 18, all on the weapon sight assembly 10, may be transmitted to the commander 30 and/or headquarters 40 via the portable communication unit 21. Further, the commander 30 and/or headquarters 40 may communicate commands, instructions or other information to the individual soldier/combatants via the long-range receivers in communication unit 21. Such commands, instructions or information may also be displayed on screen 24 of the small monitor unit 22 carried by the individual.

[0029] In addition, controller 19 carried by the weapon sight assembly 10 can be directly controlled by the remotely-located commander 30 and/or by headquarters 40 to initiate operation of the video camera 13 carried by the weapon sight assembly 10 whenever desired, or to terminate its operation, e.g. in order to display urgent information or an urgent command to the individual soldier/combatant on the small monitor unit 22.

[0030] While the invention has been described with respect to one preferred embodiment, it will be appreciated that many variations and other applications may be made. For example, the weapon sight assembly 10 could omit one or more of the above-described components, e.g., the GPS unit 18 or the digital compass unit 15. Alternatively, the weapon sight assembly could include additional components, e.g., a microphone to enable voice communication with the commander or headquarters.

[0031] Many other variations, modifications and applications of the invention will be apparent.

Claims

1. A weapon sight assembly, comprising:

a platform for mounting the weapon sight assembly on a weapon;
a weapon sight carried by said platform to facilitate orienting the weapon in alignment with a target in a field of view;
a video camera carried by said platform for generating and outputting video signals corresponding to the viewed field;
a video transmitter for transmitting said video signals;
and a controller for controlling said video camera and said video transmitter.

2. The weapon sight assembly according to Claim 1, wherein said video transmitter is a short-range space transmitter having a range in the order of two meters or less.

3. The weapon sight assembly according to Claim 2,

wherein said assembly further comprises:

a digital compass for determining the direction of orientation of the weapon and for outputting data signals corresponding thereto;
and a short-range data transmitter for transmitting said data signals a short distance of the order one meter or less.

4. The weapon sight assembly according to Claim 3, wherein said assembly further comprises:

a data receiver for receiving data signals transmitted through space;
and a projector for optically projecting onto the field of view data from said digital compass and /or data received by said receiver.

5. The weapon sight assembly according to Claim 4, wherein said assembly further comprises:

a global positioning system (GPS) unit for geographically locating the weapon on which the weapon sight assembly is carried, and for outputting data signals corresponding thereto for transmission by said data transmitter.

6. The weapon sight assembly according to any one of Claims 1-5, wherein said platform is constructed for mounting on a rifle barrel.

7. A weapon system, comprising:

a weapon sight assembly according to Claim 2 for mounting on a weapon;
and portable communication apparatus constructed for carrying by an individual operating the weapon and for communicating with with said weapon sight assembly.

8. The weapon system according to Claim 7, wherein said portable communication apparatus comprises:

a short-range video receiver for receiving the video signals transmitted by the video transmitter of said weapon sight assembly;
and a monitor for displaying the region viewed by said video camera as preseuted by the video signals transmitted by said video transmitter.

9. The weapon system according to Claim 8, wherein said portable communication apparatus comprises; a first unit including said short-range video receiver, and a second unit including said monitor.

10. The weapon system according to Claim 9, wherein said second unit of the portable communication apparatus is cable-connected to said first unit of the portable communication apparatus.

11. The weapon system according to Claim 9, wherein said first unit of the portable communication apparatus is constructed so as to be attachable to the body of the individual operating the weapon for convenient carrying by said individual;
and said second unit of the portable communication apparatus is constructed so as to be attachable to the arm or other part of the body, or to be carried by the hand, of the individual operating the weapon for convenient viewing by said individual.

12. The weapon system according to any one of Claims 8-11, wherein said portable communication apparatus further comprises a long-range video transmitter for transmitting the received video signals to a more distant location with respect to that of the weapon.

13. The weapon system according to Claim 12, wherein said portable communication apparatus further comprises:

a short-range data receiver for receiving data from said weapon sight assembly;
and a long-range data transmitter for transmitting the received data to said distant location.

14. A weapon sight assembly according to any one of Claims 1-6 substantially as described with reference to and as illustrated in the accompanying drawings.

15. A weapon system according to any of Claims 7-13 substantially as described with reference to and as illustrated in the accompanying drawings.

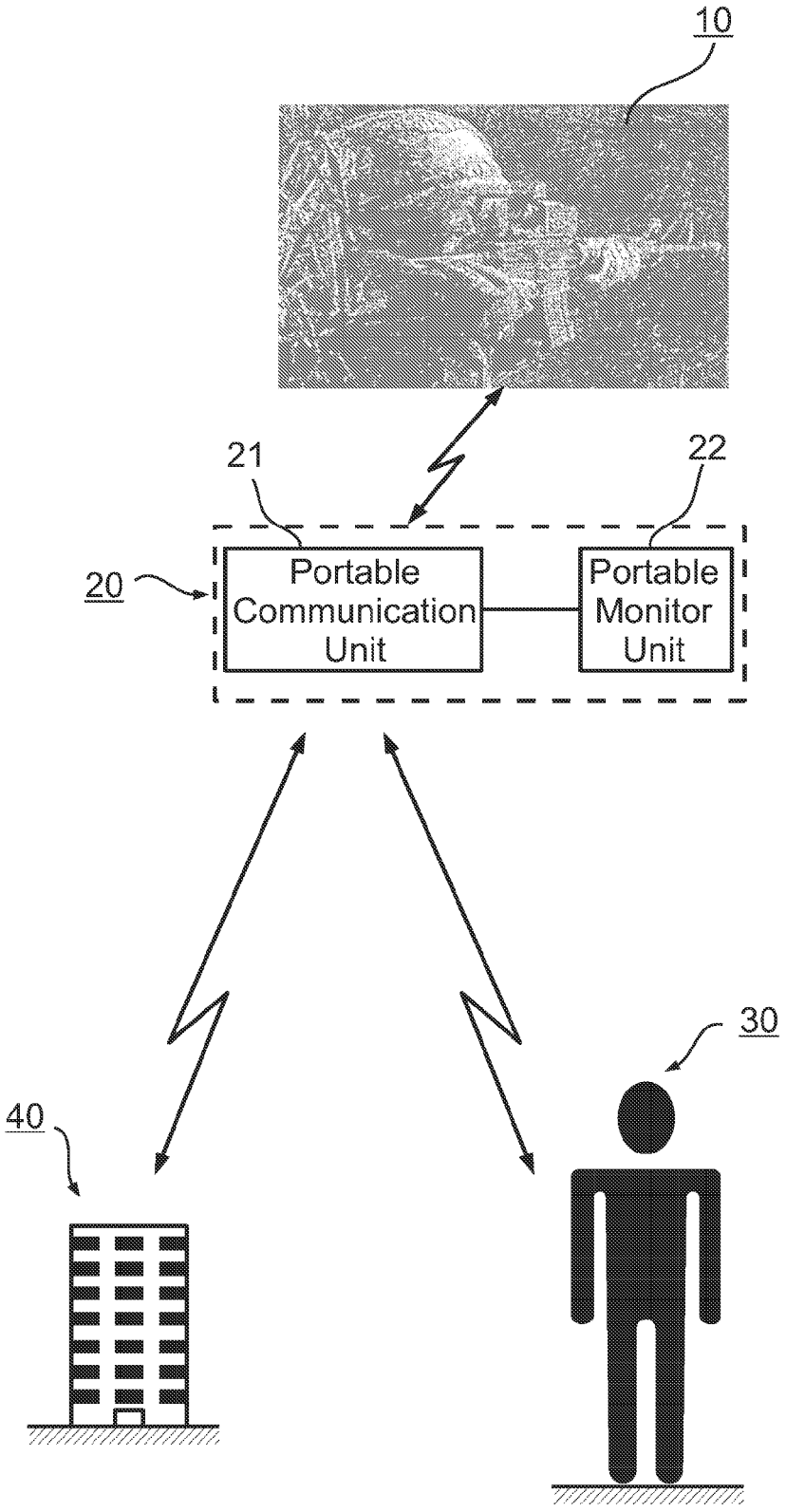
10
21
22
20
Portable Communication Unit
Portable Monitor Unit
30
40

Fig. 1

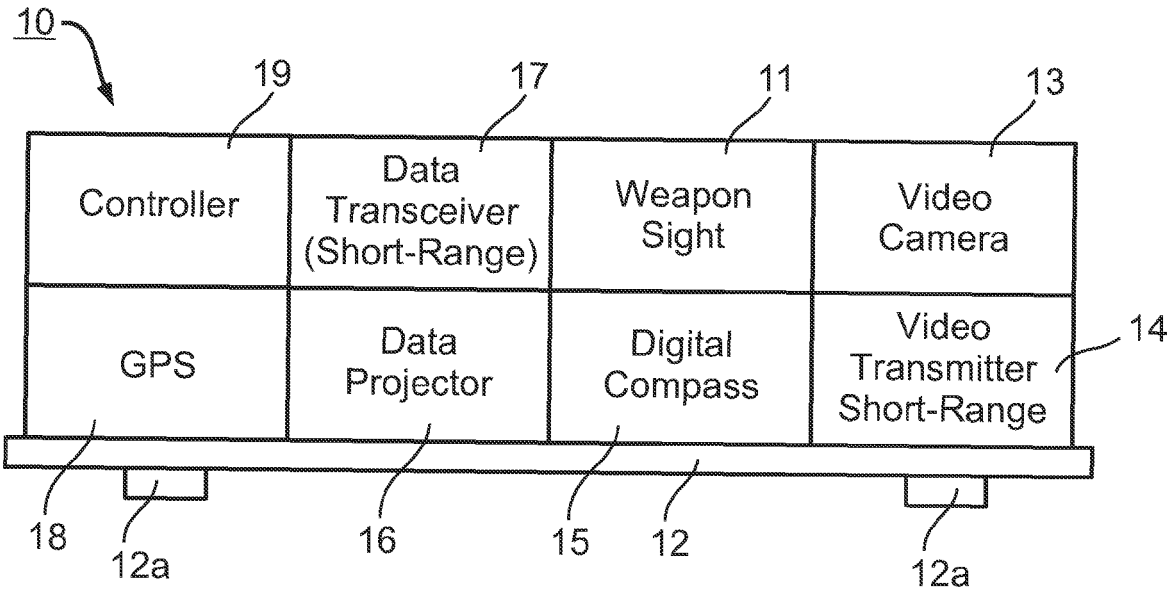
10
19
17
11
13
Controller
Data Transceiver (Short-Range)
Weapon Sight
Video Camera
GPS
Data Projector
Digital Compass
Video Transmitter Short-Range
14
18
12a
16
15
12
12a

Fig. 2

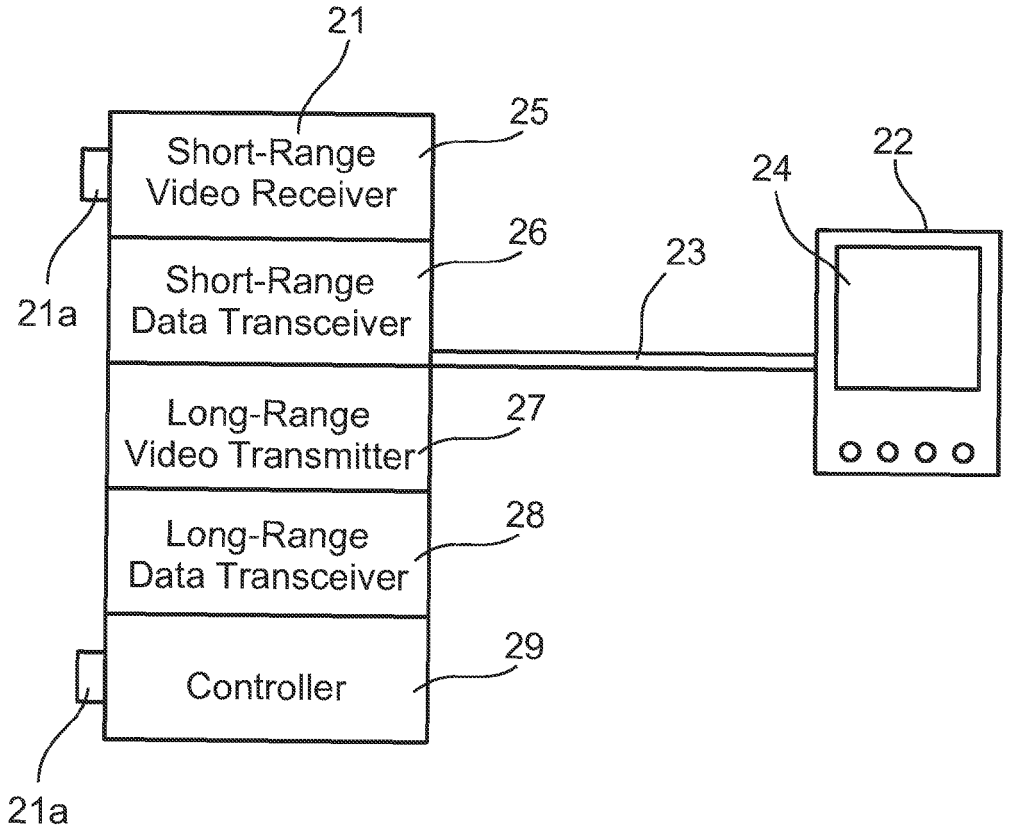
21
25
22
24
Short-Range Video Receiver
26
23
21a
Short-Range Data Transceiver
Long-Range Video Transmitter
27
28
Long-Range Data Transceiver
Controller
29
21a

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 05 11 1869

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 July 2006	Blondel, F

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EUROPEAN SEARCH REPORT

Application Number
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