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(54) **SAFETY DEVICE PARTICULARLY FOR THE CONTROL OF ACCESSES**

SICHERHEITSEINRICHTUNG INSBESONDERE ZUR KONTROLLE VON ZUGRIFFEN

DISPOSITIF DE SÉCURITÉ DESTINÉ PARTICULIÈREMENT AU CONTRÔLE DES ACCÈS

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(56) References cited:
**WO-A-2006/066213** **DE-A1- 3 230 556**
**US-B1- 6 346 889**

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## Description

### Field of the Invention

**[0001]** This invention concerns a safety device to be used in particular with powered closing systems, such as gates, automatic barriers, rolling shutters, sectional doors and the like and managed so as to avoid collisions with people, animals and objects when closing.

### State of the Technique

**[0002]** A protection device for the field of use taken into consideration comprises pairs of photoelectric cells connected to a management and control of the installation system in which from time to time it is inserted.

**[0003]** The photoelectric cells are electronic devices that use the infra- red rays technology and allow, in answer to an interuption of the infrared beam, an electric command to be activated and, through this, electromechanical systems. Every pair of photoelectric cells includes an infrared sender and a receiver placed either one in front of the other or both incorporated in a single unit and combined with a reflecting surface of the infrared beam. They are however connected electrically to an electric feed source, plus to the control centre, for example, of the closing system. This, of course, involves various types of work, digging, laying and covering, cable ducting, inserting and connecting cables. All operations that require the intervention of workers with different jobs that have to be coordinated, plus time and cost of considerable implementation, without what is more excluding implementation errors, risks of short circuits of the cables inside the gullies caused by water, insects, dirt, etc.

**[0004]** The documents WO 2006/066213 and US 6 346 889 are representative of the state of the technique, but both concern a system and a device for monitoring the state and position of a barrier or automatic door by means of the drive operator.

### Objective and Summary of the Invention

**[0005]** This invention refers instead to a protection device specifically designed for safety photoelectric cells associated with any powered closing system and designed to avoid the drawbacks of the known technique complained about above.

**[0006]** One of the objectives of the invention is in fact to propose a protection system with simple and easy to install photoelectric cells, which do not require either electric connections, or an external feed source, or control equipment, without however altering the functionality and reliability of the photoelectric cells.

**[0007]** If a protection device comprises a photoelectric cell transmitter with an infrared signal sender and a photoelectric receiver with a reception circuit of the infrared signal from the photoelectric cell transmitter, the objective of the invention is achieved by providing the photoelectric receiver also with a transmitter/receiver to communicate, by means of radiofrequency transmission, without wires (WI-FI), with an electronic management card associated with the general control centre of the system to be controlled and protected.

**[0008]** Where a protection device comprises a single unit that contains both a transmitter circuit of an infrared signal towards a remote reflecting surface and a receiver circuit of the infrared receiver signal from said reflecting surface, the aim of the invention is carried out by providing said unit of a transmitter/receiver circuit set up to communicate, by means of a wireless (WI/FI) radiofrequency transmission, with an electronic management card associated with the general control centre of the system to be controlled/protected.

**[0009]** According to another characteristic of the invention, both the photoelectric cell transmitter and the photoelectric cell receiver in one case, and the unit that contains at the same time an infrared transmitter and receiver in the other case, autonomously incorporate an electric feeder.

**[0010]** The invention therefore represents an important innovation in that it widens the use of the radiofrequency also in the communication between a control centre and a peripheral protection device, the photoelectric cells, in an ambit in which it has never been applied. Furthermore autonomous feed on board each photoelectric cell helps to eliminate at least the above mentioned expensive and complex electrical system work plus, thanks to the absence of connection cables, the risk of short circuits.

### Brief Description of the Drawings

**[0011]** The invention will however be illustrated in greater detail in the continuation of the present description made in reference to the attached indicative and not limiting drawings, in which:

Fig. 1 shows a block diagram of a pair of infrared photoelectric cells according to the invention with transmitter and receiver placed opposite; and
Fig. 2 shows a block diagram of a photoelectric cell with an infrared transmitter and receiver in a single unit and with a reflecting surface in front.

### Detailed Description of the Invention

**[0012]** In Fig. 1 are therefore represented a photoelectric cell transmitter 11 and a photoelectric cell receiver 12 in combination with an electronic management card 13 and a general control centre 14, for example, of a powered closing system (not shown). Each photoelectric cell 11, 12 can also be associated, in the usual way, with a relative sensitive protection board 15.

**[0013]** The photoelectric cell transmitter 11 includes a sender circuit 16, for the emission of an infrared signal according to the arrow 17 towards a circuit receiver 18

of the photoelectric cell receiver 12.

**[0014]** The latter photoelectric cell 12 incorporates a radio frequency transmitter/receiver circuit 19 without wires for bi-directional communication, according to the arrows 20 with the electronic management card 13 and, by means of this, with the general control centre 14 so as to allow the operation of the powered automatism, a closing system as it were, when the photoelectric cells communicate between themselves and stop the automatism as soon as for some reason the infrared beam is interrupted.

**[0015]** Furthermore, both the transmitter and receiver photoelectric cells are provided autonomously with their own power supply 21, 22, respectively, which can be made up of standard or rechargeable batteries, consequently without connections to an electric network. In the case of rechargeable batteries, these may also be set up to be connected to a photovoltaic module (not shown) which, what is more, could also be incorporated in the device. Everything so as to be autofed without wiring and in order to manage from time to time the system to be protected depending on the signals coming from the photoelectric cells, thanks to a communication via radio between the transmitter/receiver circuit 19 of the photoelectric cell receiver 12 and the electronic management card 13.

**[0016]** A radio frequency transmitter/receiver circuit 19 without wires for a bidirectional communication, according to the arrows 20, with an electronic management card 13 and, by this means, with a general control centre 14, and an autonomous electric feeder 22 are analogously applicable and with the same results also with a photoelectric cell unit 112 the signal sender 16 and receiver 18 of which are placed in one body 12 with a surface 111 opposite at a distance, reflecting the infrared signal according to the arrows shown in Fig.2.

## Claims

1. Protection device in particular for controlling an automatic closing system against the collision with people, animals and objects, where the automatic closing system is provided with a general control centre (14), said protection device comprising a photoelectric transmitter (11) with an infrared signal sender (16), a photoelectric receiver (12) with a reception circuit (18) of the infrared signal from the photoelectric cell transmitter, **characterized in that** the photoelectric cell receiver (12) incorporates a transmitter/receiver circuit (19) arranged to communicate, by means of a wireless radiofrequency transmission, with an electronic management card (13) associated with the general control centre (14) of the automatic closing system to be protected, in order to enable or put out of operation said automatic closing system in response to the state of the infrared beam between the photoelectric cells, wherein both the transmitter and receiver photoelectric cells are provided autonomously with rechargeable batteries connected to an integrated photovoltaic module.

2. Protection device according to claim 1, **characterized in that** both the photoelectric cell transmitter (11) and the photoelectric cell receiver (12) are autonomously provided with a power supply (21, 22).

3. Protection device according to claim 1 and 2, **characterized in that** the photoelectric cell transmitter (11) comprises an emitting circuit of an infrared signal towards the photoelectric cell receiver and a power supply, and the photoelectric cell receiver (12) comprises a receiver circuit of the infrared signal from the photoelectric cell transmitter, a transmitter/reciever circuit (19) for bidirectional communication with the electronic management card associated with the general control centre (14) of the automatic closing system to be protected, and an electric power supply.

4. Protection device according to any of the previous claims, **characterized in that** both the emitting and receiver photoelectric cell are associated with a sensitive protection board (15).

5. Protection device according to claim 1 **characterized in that** the automatic closing system is configured to be stopped as soon as the infrared signal is interrupted.

## Patentansprüche

1. Schutzvorrichtung, insbesondere zur Steuerung eines automatischen Schließsystems gegen die Kollision mit Menschen, Tieren und Gegenständen, wobei das automatische Schließsystem mit einem allgemeinen Steuerungszentrum (14) ausgestattet ist und die Schutzvorrichtung Folgendes umfasst: einen fotoelektrischen Sender (11) mit einem Infrarotsignal-Sender (16), einen fotoelektrischen Empfänger (12) mit einem Empfangsschaltkreis (18) für das Infrarotsignal vom Fotozell-Sender, **dadurch gekennzeichnet, dass** der Fotozell-Empfänger (12) eine Sender/Empfänger-Schaltung (19) enthält, angeordnet, um über eine Funk-Radiofrequenzübertragung mit einer elektronischen Managementkarte (13) zu kommunizieren, die mit dem allgemeinen Steuerungszentrum (14) des automatischen zu schützenden Schließsystems verknüpft ist, um das automatische Schließsystem als Reaktion auf den Zustand des Infrarotstrahls zwischen den Fotozellen zu aktivieren oder zu deaktivieren, wobei sowohl die Sender- als auch die Empfänger-Fotozellen autonom mit wieder aufladbaren Batterien ausgestattet sind, die mit einem integrierten Fotovoltaikmodul

verbunden sind.

2. Schutzvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sowohl der Fotozell-Sender (11) als auch der Fotozell-Empfänger (12) autonom mit einer Stromversorgung (21, 22) ausgestattet sind.

3. Schutzvorrichtung gemäß Anspruch 1 und 2, **dadurch gekennzeichnet, dass** der Fotozell-Sender (11) einen Sendeschaltkreis für ein Infrarotsignal zum Fotozell-Empfänger und eine Stromversorgung umfasst, und der Fotozell-Empfänger (12) einen Empfängerschaltkreis für das Infrarotsignal vom Fotozell-Sender umfasst, eine Sender/Empfänger-Schaltung (19) für die bidirektionale Kommunikation mit der elektronischen Managementkarte, die mit dem allgemeinen Steuerungszentrum (14) des automatischen zu schützenden Schließsystems verknüpft ist, und eine elektrische Stromversorgung.

4. Schutzvorrichtung gemäß einem beliebigen der obigen Ansprüche, **dadurch gekennzeichnet, dass** sowohl die Sender- als auch die Empfänger-Fotozelle mit einer empfindlichen Schutzplatte (15) verbunden sind.

5. Schutzvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das automatische Schließsystem konfiguriert ist, um angehalten zu werden, sobald das Infrarotsignal unterbrochen wird.

**Revendications**

1. Dispositif de protection en particulier pour commander un système de fermeture automatique à l'encontre de la collision avec des personnes, des animaux et des objets, le système de fermeture automatique étant muni d'un centre de commande général (14), ledit dispositif de protection comprenant un émetteur photo-électrique (11) avec un dispositif d'envoi de signal infrarouge (16), un récepteur photo-électrique (12) avec un circuit de réception (18) du signal infrarouge provenant de l'émetteur à cellule photo-électrique, **caractérisé en ce que** le récepteur à cellule photo-électrique (12) incorpore un circuit d'émetteur/récepteur (19) agencé pour communiquer, au moyen d'une transmission à fréquence radio sans fil, avec une carte de gestion électronique (13) associée au centre de commande général (14) du système de fermeture automatique à protéger, de façon à activer ou à mettre hors de fonctionnement ledit système de fermeture automatique en réponse à l'état du faisceau infrarouge entre les cellules photo-électriques, dans lequel les cellules photo-électriques d'émetteur et de récepteur sont toutes deux munies de façon autonome de batteries rechargeables connectées à un module photovoltaïque intégré.

2. Dispositif de protection selon la revendication 1, **caractérisé en ce que** l'émetteur à cellule photo-électrique (11) et le récepteur à cellule photo-électrique (12) sont tous deux munis de façon autonome d'une alimentation (21, 22).

3. Dispositif de protection selon les revendications 1 et 2, **caractérisé en ce que** l'émetteur à cellule photo-électrique (11) comprend un circuit émetteur d'un signal infrarouge vers le récepteur à cellule photo-électrique et une alimentation, et **en ce que** le récepteur à cellule photo-électrique (12) comprend un circuit de récepteur du signal infrarouge venant de l'émetteur à cellule photo-électrique, un circuit d'émetteur/récepteur (19) pour une communication bidirectionnelle avec la carte de gestion électronique associée au centre de commande général (14) du système de fermeture automatique à protéger, et une alimentation électrique.

4. Dispositif de protection selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les cellules photo-électriques d'émetteur et de récepteur sont toutes deux associées à une plaque de protection sensitive (15).

5. Dispositif de protection selon la revendication 1, **caractérisé en ce que** le système de fermeture automatique est configuré pour être arrêté dès que le signal infrarouge est interrompu.

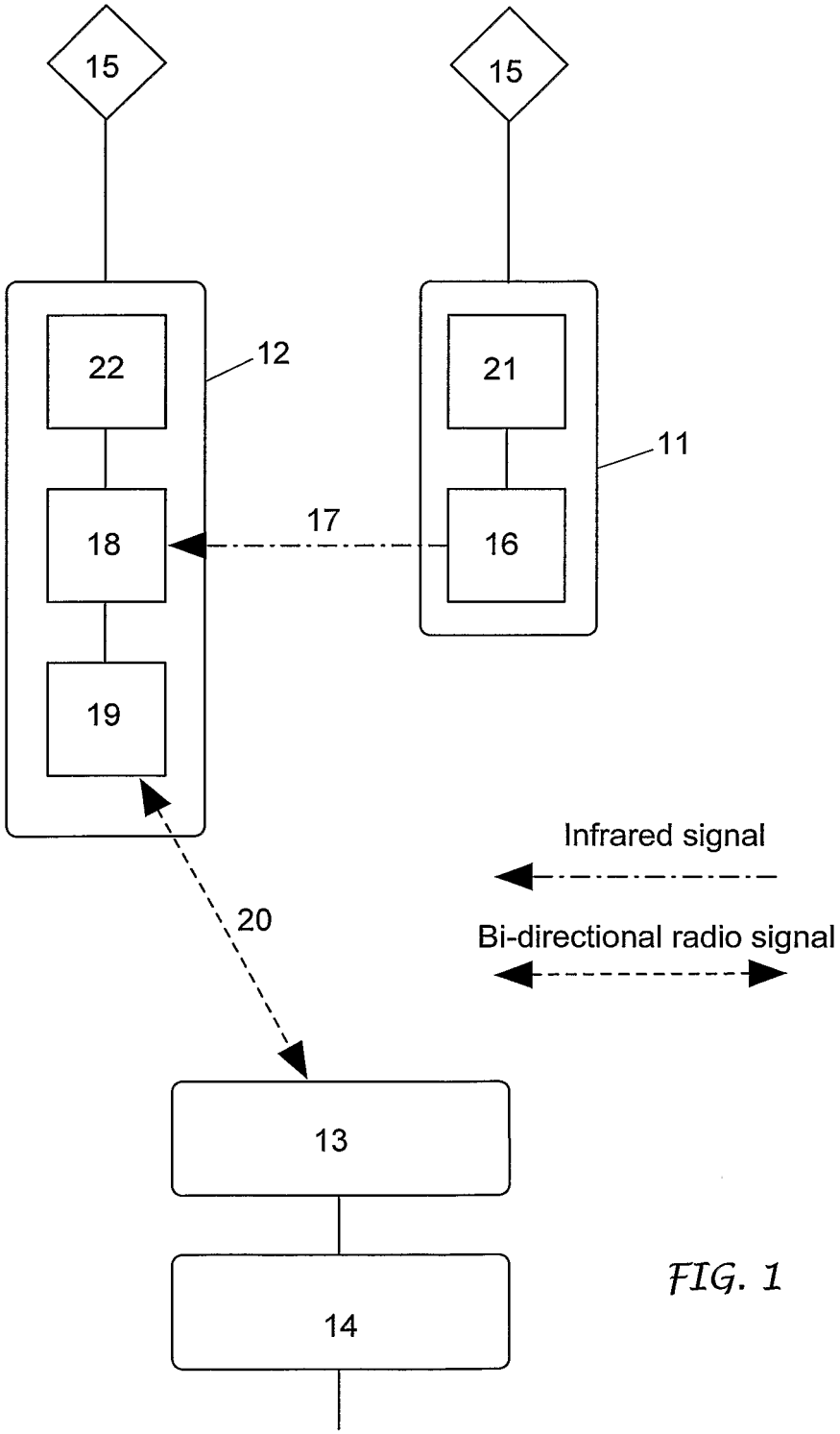

15
15
22
12
21
11
18
17
16
19
Infrared signal
20
Bi-directional radio signal
13
14

FIG. 1

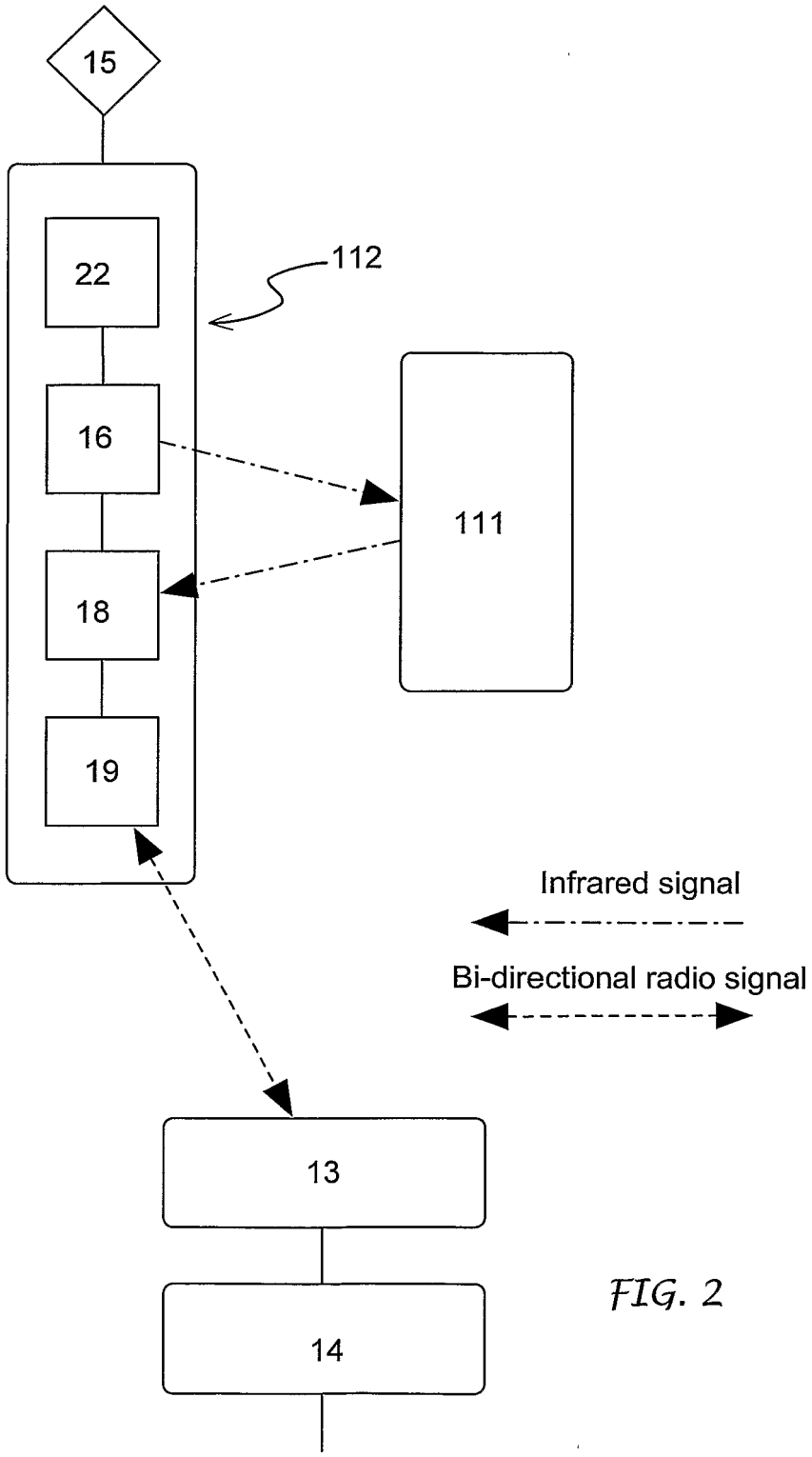

15
22
112
16
111
18
19
Infrared signal
Bi-directional radio signal
13
14

FIG. 2

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- WO 2006066213 A **[0004]**
- US 6346889 B **[0004]**