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(54) **IMPROVED SAFETY DEVICE, PARTICULARLY FOR EQUIPMENT IN MOVEMENT SUCH AS AUTOMATIC GATES AND THE LIKE**

(57) Improved safety device (1), particularly for equipment in movement such as automatic gates (3) and the like, comprising a mobile element (2) provided with at least one sensitive edge (4) electrically connected to a control panel (5) by means of an electric circuit; said device being characterized in that said electric circuit comprises said mobile element (2) with conductor func-

tion. This device (1), unlike the devices of known type, allows the installation and the connection of safety edges without the use of spiral cables, festoon cables, cable-carrier chains, systems via radio and/or optical systems, such as infrared, with the consequent aid of batteries which in the short and long term lead to considerable problems of reliability, maintenance and quick wear.

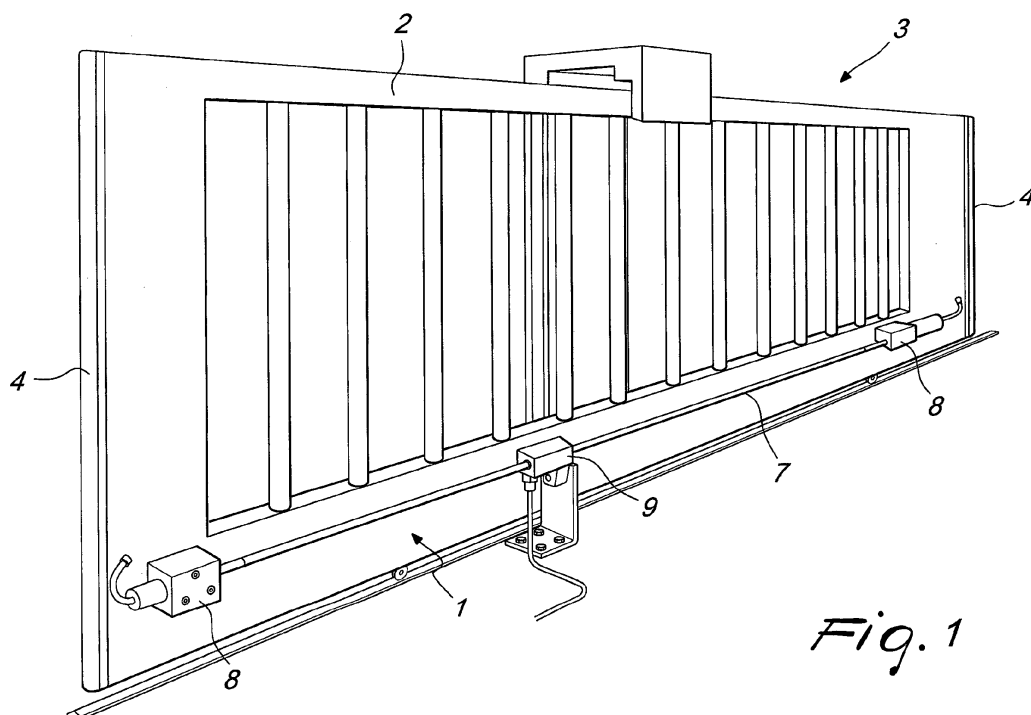


Fig. 1

Description

[0001] The present utility model refers to an improved safety device, particularly for equipment in movement such as automatic gates and the like.

[0002] As is known, equipment in movement, such as motorized gates, slidable doors and the like, must be equipped with accident prevention devices for reducing or eliminating the risk of accidents via impact, crushing, shearing, conveying etc. of people, animals or things.

[0003] Such devices are generally constituted by sensitive edges applied to the mobile elements and which are activated to detect a slight pressure or external deformation. In case of collision between the sensitive edge and an obstacle which is accidentally situated on the path, the system immediately stops all potentially dangerous movements due to the extremely limited intervention times.

[0004] Normally, the sensitive edges are connected to the control unit of the equipment by means of spiral cables, festoon cables, cable-carrier chains, systems via radio and/or optical systems, typically infrared, with the consequent aid of batteries, which in the short and long term lead to considerable problems of reliability, maintenance and quick wear.

[0005] The task of the present finding is to obtain a safety device, particularly for equipment in movement such as automatic gates and the like, which is improved with respect to the systems of the prior art.

[0006] In the scope of this task, one object of the finding is to obtain a safety device capable of making the connection between sensitive safety edges, installed on moving wings of slidable gates, and the relative fixed control panels easier, quicker and more reliable.

[0007] Another object is to obtain a device that, for its particular characteristics, is capable of ensuring the greatest possible reliability and safety in use.

[0008] A further object of the present finding is to provide a device which is easily obtainable by using elements and materials that can be commonly found on the market and which is also competitive from an economical standpoint.

[0009] This task, and others which will clearer hereinbelow, are attained by an improved safety device, particularly for equipment in movement such as automatic gates and the like, comprising a mobile element provided with at least one sensitive edge electrically connected to a control panel by means of an electric circuit; said device being **characterized in that** said electric circuit comprises said mobile element with conductor function.

[0010] Further characteristics and advantages will be clearer from the description of the structure according to the finding illustrated as a non-limiting example in the set of drawings, in which:

Figure 1 is a perspective view of an automatic gate of the safety device, object of the present finding;
Figure 2 is a functional scheme of the device, object

of the present finding.

[0011] With reference to the abovementioned figures, the safety device according to the finding, indicated with the reference number 1 in its entirety, comprises a slidable wing 2, of an automatic gate 3, provided with sensitive edges 4.

[0012] The sensitive edges 4 can be of per se known type, for example constituted by a rubber or plastic profile in which a safety sensor is inserted that is formed by conductor lamina, which come into contact in case of profile crushing.

[0013] Also known are conductive sensitive edges formed by a profile made of thermoplastic material; co-extruded inside such profile are two parts made of conductive plastic material and two copper wires with the function of stabilizing the resistive contact value over the entire length of the edge.

[0014] Mechanical ribs with wire, which have greater diffusion on the market, have a pretensioned wire therein connected to micro-switches.

[0015] According to the present finding, the sensitive edges 4 are connected to a control panel 5 by means of an electric circuit that comprises the mobile wing 2 with conductor function.

[0016] Unlike the conventional electric circuits, in which the electric connection between the sensitive edges and the control panel is obtained by means of an electric cable, according to the present finding the wing 2, or another mobile element on which the sensitive edge 4 is applied, is used as a conductor connected by means of suitable electric resistors 6 to the ends of the sensitive edges 4, while the other end of the edges is connected to a steel cable 7, insulated from the gate/door.

[0017] The cable 7 is mounted on the mobile wing 2 by means of insulated terminations 8 and slides in a sliding block 9 installed on the fixed part of the gate/door.

[0018] The sliding block 9 draws the electrical signal and sends it to the control panel 5, which, through the continuous control of the resistive termination 6 mounted on the sensitive edges, is capable of detecting the interventions thereof, as well as the irregularities thereof such as the breakage/interruption of the connection circuit (breakage of the steel cable - sliding contact) and the short-circuit of the connection or the steel cable with the gate/door.

[0019] Upon each variation, the control panel activates the relay corresponding to the event, which will be suitably connected to the automation management center.

[0020] It has in practice been established that the finding attains the pre-established task and objects.

[0021] The control system, by means of the sensitive edges, assures a total and complete accident protection, along the entire path of the wing and for the entire height.

[0022] This device, unlike the devices of known type, allows the installation and connection of safety edges without the use of spiral cables, festoon cables, cable-carrier chains, systems via radio and/or optical systems,

such as infrared, with the consequent aid of batteries, which in the short and long term lead to considerable problems of reliability, maintenance and quick wear.

[0023] The communication between the edges in movement and the fixed control panel makes use of the structural element of the gate/door, i.e. the gate, provided that it is made of metal or in any case made of conductive material, with the addition of a steel cable and a sliding block. 5

[0024] Due to the resistive principle of the circuit, it is possible to constantly monitor the functionality of the system, through the continuous control of the resistive termination mounted on the sensitive edge, detecting, distinguishing and signaling the interventions of the edges, as well as the integrity of the device and possible irregularities, such as the interruption or short circuit. 10 15

[0025] This system is therefore in accordance with the essential requirements and provisions established by the following directives and with the applicable parts of the reference laws listed below: 20

Electromagnetic Compatibility Directive	
89/336/EEC - 93/31/EEC	
Low Voltage Directive 73/23/EEC - 93/68/EEC	
Machinery Directive 98/37/EEC	25
EN 61000-6-2 EN 61000-6-3 EN 12978	
EN 60529 EN 954-1	

[0026] Naturally, the materials and size can vary, according to the requirements and the state of the art. 30

Claims

1. Improved safety device, particularly for equipment in movement such as automatic gates and the like, comprising a mobile element provided with at least one sensitive edge electrically connected to a control panel by means of an electric circuit; said device being **characterized in that** said electric circuit comprises said mobile element with conductor function. 35 40
2. Safety device, according to claim 1, **characterized in that** said electric circuit comprises a conductor cable, associated with said mobile element by means of insulated terminations, and connected to said sensitive edge; said cable sliding in a fixed sliding block, adapted to transmit an electrical signal, present on said cable, to said control panel. 45 50
3. Safety device, according to claim 1 or 2, **characterized in that** said at least one edge is connected to said mobile element by means of an electric resistor. 55

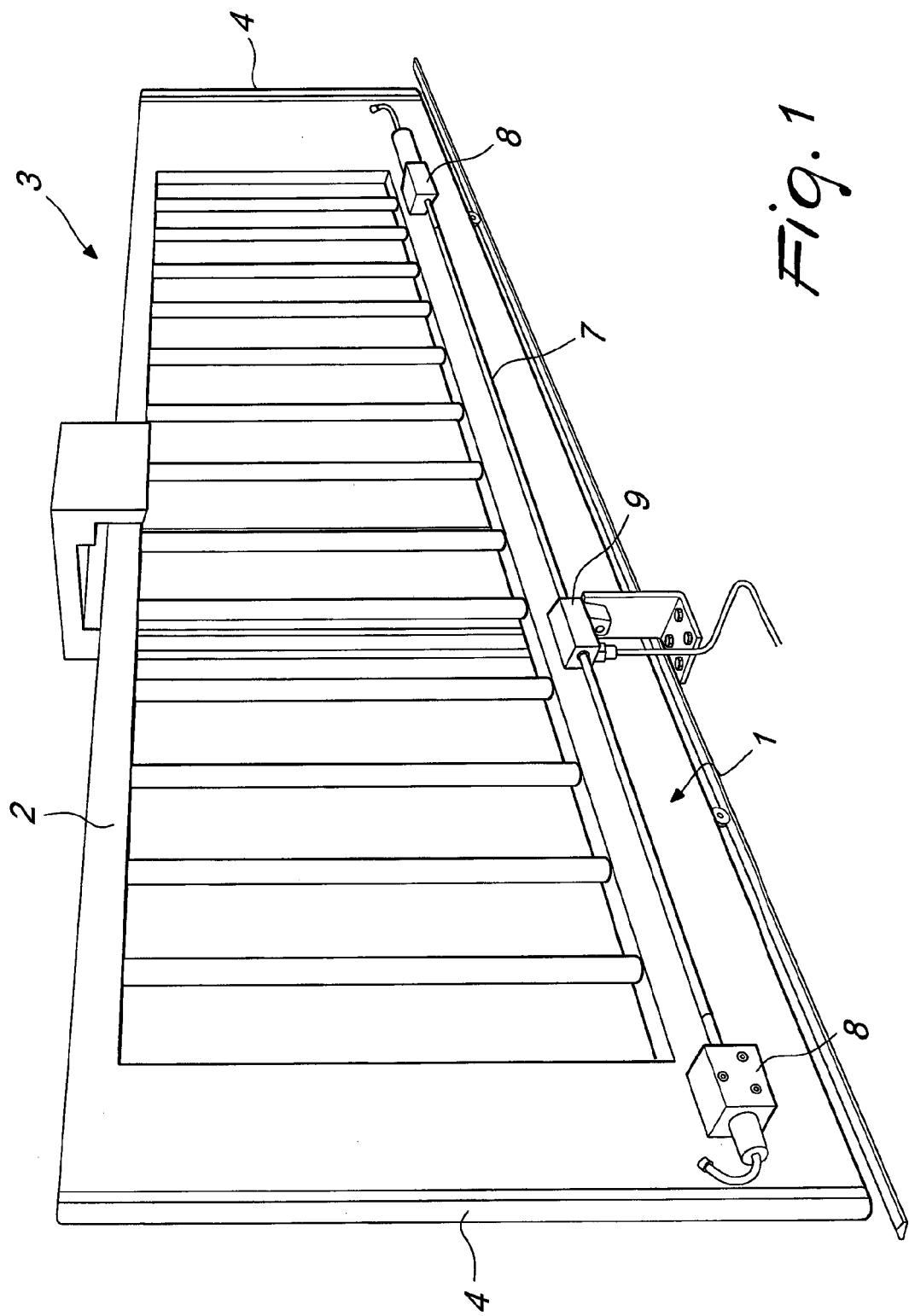


Fig. 1

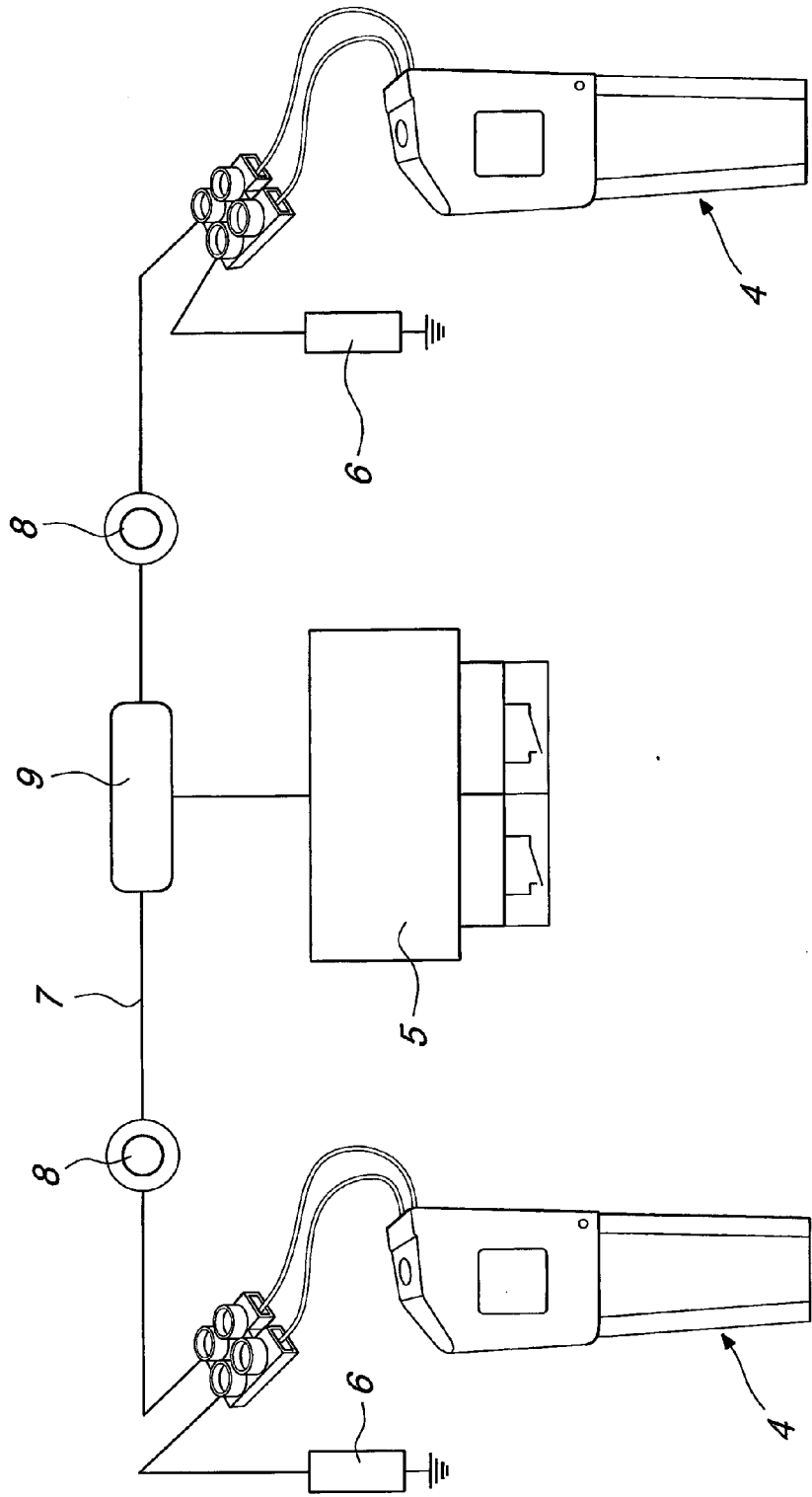


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 13 00 3391

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		30 October 2013	Kramer, Pieter Jan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 00 3391

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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