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(72) Inventors:
• **Digirolamo, Pasquale Fabio**
20093 Cologno Monzese (Milano) (IT)
• **Digirolamo, Massimo**
20093 Cologno Monzese (Milano) (IT)

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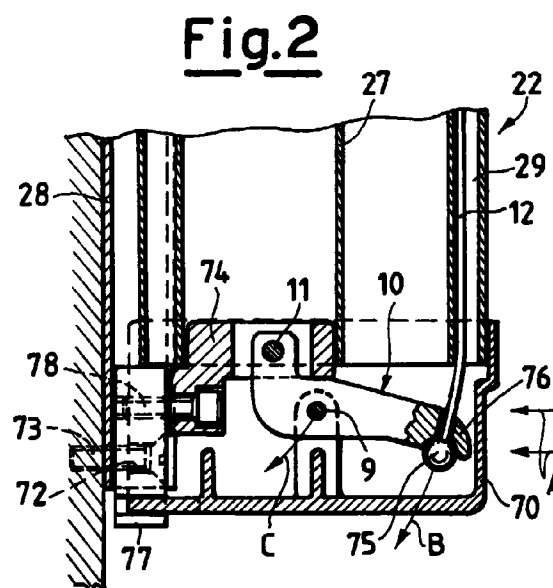
(74) Representative:
De Gregori, Antonella et al
Ing. Barzano & Zanardo Milano S.p.A.
Via Borgonuovo 10
20121 Milano (IT)

(71) Applicant:
D.F.M. Automazione S.n.c di Digirolamo P. Fabio
e Digirolamo Massimo
20040 Caponago (Milan) (IT)

(54) **Protection and safety device for automatic sliding gates**

(57) A protection and safety device for automatic sliding gates, comprising a mobile leverage (10) housed inside a shell (70), made of flexible material and mounted below the supporting section bars (28) of the protection ribs of sliding gates.

The leverage (10) is attached to a steel cable (12), connected at its opposite end to an electrical power shut-off device for the gate, designed to break off its motion in case of an impact occurring at the point of the shell (70).



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Description

[0001] This invention refers to protection and safety device for automatic gates of a sliding type.

[0002] Automatic sliding gates can actually turn into a source of serious problems for the user, due to the fact that because of the inherent configuration of their structures, they usually comprise moving parts fitted with edges very hazardous to the user's safety. This particularly applies where such structures are governed at a distance from fixed sites, by pushbuttons or remote controls, because the structure's motion cannot automatically be stopped at the instant of an impact by potential users or other objects against protruding portions of the mentioned structures, unless by manually interrupting the power feed to the systems at times subsequent to those actually needed.

[0003] It can therefore be imagined that some inevitable and occasionally dramatic consequences may ensue from the poor speed by which an action of this kind can be taken. For this purpose, the protection and safety systems commonly employed for such structures are essentially based on the use of pneumatic protection ribs, positioned opposite the most dangerous edges and made of some flexible material, capable of sending out a signal by the contact of an electronic transmitter, whenever its internal pressure is varied in case of an accidental contact or impact. The structure's operation is consequently deactivated, bringing the same to a stop at the position attained.

[0004] In case of automatic sliding gates, the protective rib is mounted, with the aid of a profiled steel section, on the advancing front surface of the gate itself, thus usually leaving a clearance just below the profiled steel section, so as to allow it be attached to the gate's structure; in this case, a clearance of usually 3-5 centimeters from the ground is left without the flexible material composing the protective rib, thus representing a serious hazard to a the user, especially to a child, at any instant and particularly at the time of first actuating the automatic gate.

[0005] The purpose of this invention is therefore to produce a protection and safety device for automatic sliding gates, capable of eliminating the mentioned drawback.

[0006] Another purpose of this invention is to indicate a protection and safety device for automatic sliding gates whose operation may in any situation turn out to be reliable, precise and correct, even in the case of accidental failures or malfunctions of the electrical control system.

[0007] Not the last purpose of the invention is to indicate a protection and safety device for automatic sliding gates capable of being produced easily and economically, using simple fabricating technologies and relatively inexpensive components. These purposes are attained by indicating a protection and safety device for automatic sliding gates according to claim 1, which is

being referred to for brevity.

[0008] The device advantageously ensures the protection and safety required by any user present in the neighborhood of moving automatic sliding gates, even in case of a failure of the device to block the gate's advancing motion or of a breakdown of the mechanical device on the electrical assembly designed to break off the electric power supply to the drive motor.

[0009] Other purposes and advantages of this invention will become clear from the following description and its attached drawings, supplied for purely exemplifying and non-limiting purposes, in which:

- Figure 1 is a partial prospective view of a protective rib for automatic sliding gates of a known type;
- Figure 2 represents a sectionalized side view of a portion of a rib for automatic sliding gates, comprising a protection and safety device according to this invention;
- Figure 3 represents a partially sectionalized top view of a portion of the rib shown in Figure 2, according to this invention;
- Figure 4 represents a partially sectionalized bottom view of the rib shown in Figure 2, according to this invention;
- Figure 5 shows a partially sectionalized front view of a portion of the rib shown in Figure 2, according to this invention.

[0010] With reference to the mentioned figures, 22 generally indicates a protective rib for automatic sliding gates, comprising a profiled steel section 28, capable of being attached to an advancing front surface of the gate and a respective protection 27, shaped in form of a hood and made of rubber or any other flexible material, attached to the profiled section 28. The profiled section 28 of the rib 22 is usually mounted in front of the advancing surface of the automatic sliding gate. According to the known state of the art, the rubber protection 27 reaches a certain height of the rib 22, and is in particular, as clearly shown in Figure 1, inserted into a terminal 71 typically raised 3-5 centimeters from the ground, so as to leave a certain clearance in which the profiled section 28 remains visible so as to enable its installation on the surface of the gate by a fastening screw 73 to be inserted in a passing hole 72; a guiding base 29 fitted into the protection 27 houses a steel cable 12 connected to a triggering mechanism of a known type, designed to shut off the electrical power supply to a mechanism actuating the sliding gate in case of an impact against the rib 22 on the part of a user.

[0011] In effect, in case of an impact against the rib 22 on the part of a user, a condition of extreme risk for the risk of the unfortunate person would arise if the actuating mechanism continued to move the sliding gate in an opening or closing phase.

[0012] Moreover, at a point facing the lower portion of

the gate's advancing surface, provision has been made to insert a protective shell 70, preferably made of rubber or at any rate of a flexible material, housing in its interior a leverage 10, essentially contoured in the shape of an L and mounted on a first fixed fulcrum pin 11 connected to a support 74 of the protective surface 27 and to a second mobile fulcrum pin 9 attached to the shell 70.

[0013] Finally, the support 74 is attached to a sled 77 inserted inside the profiled section 28 opposite the hole 72 with the aid of a fulcrum pin 78, while an end 75 of the cable 12 is affixed to a terminal appendix 76 of the L-shaped part of the leverage 10 installed opposite the fulcrum pin 11.

[0014] The operation of the protection and safety device for automatic sliding gates according to this invention is essentially as follows.

[0015] In case an impact occurs at any general point of the moving rib 22, such as on the part of objects or people present in the path of access to a private area, the electrical power supply to the drive motor of the sliding gate is instantly cut off by the action of the electrical power shut-off mechanism, so as to automatically arrest the motion in both a closing or opening phase, thus preventing further harm. Other than what occurs when using any conventional ribs 22 of the type shown in Figure 1, even if an impact occurs next to a lower portion of the advancing surface of the sliding gate, meaning opposite the protective shell 70, the power supply cut-off mechanism takes action and instantly shuts off the gate, because the impact occurring next to the area indicated by A in Figure 2 is transmitted to the appendix 76 of the leverage 10 and then to the cable 12, due to the fact that the shell 70 is made of flexible material and intimately connected to the terminal portion of this leverage 10.

[0016] In effect, an impact occurring on the shell 70 along the area A provokes a rotation of the leverage 10 in the direction of the arrow B shown in Figure 2, around the fixed fulcrum pin 11, while the mobile fulcrum pin 9 shifts laterally in the direction of the arrow C shown in Figure 2. These rotations consequently cause a very slight motion of the cable 12, which is sufficient to actuate the triggering mechanism designed to shut off the electrical power supply located next to one of the cable endings 12 and thus to interrupt the electrical power supply to the sliding gate's drive motor, which instantly stops running even in this case. For the purpose of achieving a quick and effective action, the leverage 10 can advantageously be arranged at an inclined position, with respect to an imaginary vertical axis extending the longitudinal course of the rib 22; the size of the angle formed by the leverage 10 and the mentioned vertical axis is preferably taken in the range of 0 to 40 degrees, including its extremes.

[0017] In conclusion, the device thus described makes it possible to prevent an accident in case of impacts occurring opposite the terminal portion of a traditional rib 22 for sliding gates, which usually exhibits, or at a

clearance of about 3-5 centimeters above the ground, a rigid steel surface particularly dangerous to anyone moving around in the neighborhood; this portion is on the contrary covered by a flexible hood 70, so as in the first place dampen the possible impacts against objects or people and in the second place, as the protection 27, to make even this portion mobile, for the purpose of causing an instant stoppage of the sliding gate that happens to be in motion at the time of impact.

[0018] The above description clearly points out the characteristics as well as the advantages of the protection and safety device for automatic sliding gates, object of this invention.

[0019] It is an a priori clear that numerous other variants may be applied to the protection and safety device for automatic sliding gates object of this invention, without thereby abandoning the principles of novelty inherent in the inventive concept, and it is likewise clear that in the practical execution of the invention the materials, shapes and dimensions of the illustrated details may be of any kind depending on the requirements, and that the same may be replaced by other technical equivalents.

Claims

1. A protection and safety device for automatic sliding gates, comprising at least one protective rib (22) to be applied to a surface of said gate, constituted by a profiled steel section (28) connected to a protective element (27) containing at least one length of cable (12) in its interior, where said cable (12) is connected to a mechanism cutting off the electrical power supply to said gate at the instant in which a pressure is applied on said protective element (27), pursuant to an obstacle's impact against said rib (22), characterized in that at least one portion of said profiled steel section (28) opposite an area (A) below said rib (22) and said gate surface provides for the insertion of a shell (70) attached to said protective element (27) comprising in its interior a leverage (10) connected to said cable (12).
2. A protection and safety device according to claim 1, characterized in that said shell (70) is made of a flexible material, preferably of rubber.
3. A protection and safety device according to claim 1, characterized in that said leverage (10) is attached to at least one support (74, 77) of said profiled steel section (28).
4. A protection and safety device according to claim 1, characterized in that said leverage (10) is profiled essentially in the shape of an L and comprises at least one fixed fulcrum pin (11) and at least one mobile fulcrum pin (9).
5. A protection and safety device according to claims

1 and 4, characterized in that said leverage (10) comprises an extreme portion (76) attached to said cable (12) and positioned on a side facing that of said fixed fulcrum pin (11) and next to at least one internal wall of said shell (70).

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6. A protection and safety device according to claim 1, characterized in that said leverage (10) is positioned according to a predetermined angular direction with respect to a direction parallel to the development of said rib (22), and that said leverage (10) and said parallel direction form an angle whose value falls within a range of 0 to 40 degrees, including its extremes.

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7. A protection and safety device according to claims 1 and 4, characterized in that in case of an impact against at least one portion (A) of said shell (70), said mobile fulcrum pin (9) moves, according to a predetermined direction (C), around said fixed fulcrum pin (11), thus causing a motion of said cable (12) away from its resting position.

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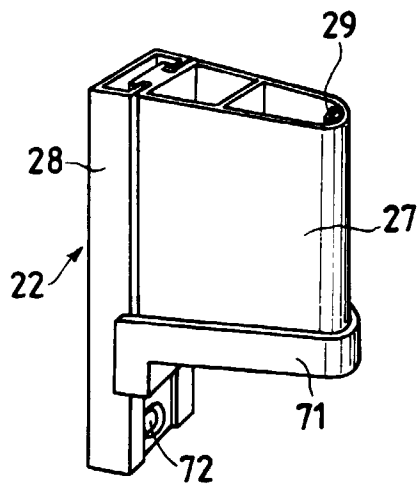


Fig.1
(PRIOR ART)

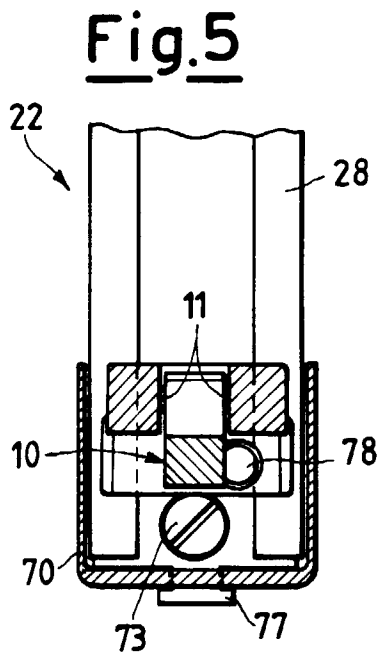


Fig.5

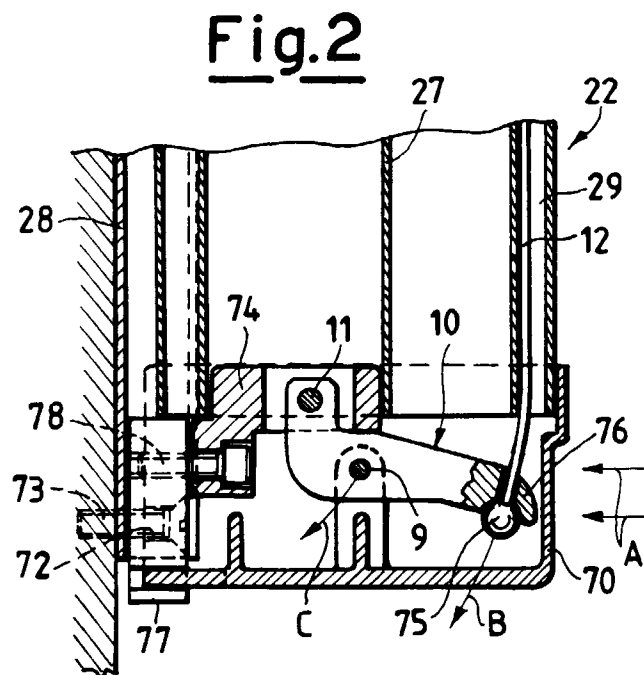


Fig.2

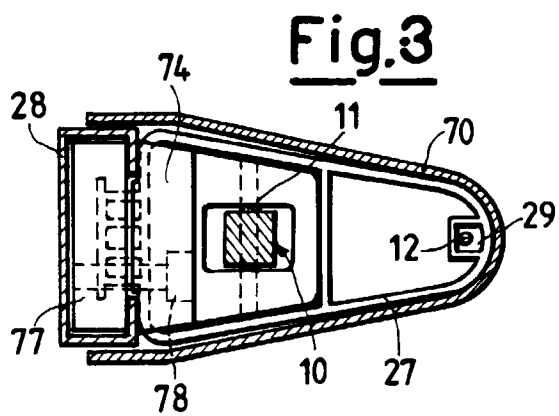


Fig.3

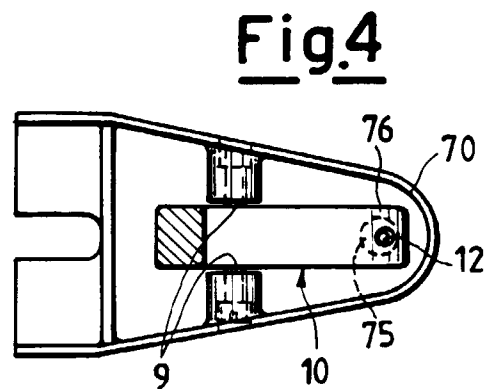


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 1343

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 330 923 A (BROCKMEYER ET AL.) 11 July 1967 (1967-07-11) * column 3, line 8 - column 3, line 66; figure 1 *	1-3	E05F15/00 E06B3/88
A	DE 622 891 C (NATIONAL PNEUMATIC COMP.) 21 November 1935 (1935-11-21) * the whole document *	1-3	
A	FR 1 112 243 A (VETRA) 9 March 1956 (1956-03-09) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05F E06B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 11 August 1999	Examiner Knerr, G
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 20 1343

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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11-08-1999

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