FORM 2

THE PATENTS ACT, 1970
(39 of 1970)
AND
THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(See Section 10; rule 13)

TITLE OF THE INVENTION

"ELECTRONIC SAFETY DEVICE FOR A PROTECTION BARRIER"

APPLICANT

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The following specification particularly describes
the invention and the manner in which
it is to be performed

CLAIMS

1. An electronic safety device for a protection barrier, wherein the barrier comprises a fixed part and a movable part, which device comprises:

- a transponder (2) designed to be anchored to the movable part of the barrier and wherein an identification code (I_{ID}) is stored;

- a transceiver device (3) anchorable to the fixed part of the barrier and adapted to receive from said transponder (2) a return signal (S_{RX}) associated to said identification code (I_{ID});

- said transponder (2) being movable with respect said transceiver device (3) and adapted to be positioned to an current distance (d_i) with respect the same;

- at least one electric circuit (S, S') associated to the barrier and adapted to be switched when said current distance (d_i) is lower or higher to a predetermined reference distance (d_r);

- control and switching means (4) having a master electronic circuit (5) connected to said transceiver device (3) for processing said return signal (S_{RX}) and generating a first output signal (S_{OUT}) in response to said identification code (I_{ID}) for switching of said at least one electric circuit (S, S');

wherein said transceiver device (3) is adapted to process said return signal (S_{RX}) for generating a control signal (S_C) having an electric parameter (P) variable in function of the current distance (d_i);

characterized in that said control signal (S_C) is a periodic signal with predetermined repetition frequency (f_C), having a first frequency spectrum with a middle interval (F_1) centered with respect said repetition frequency (f_C) when said current distance (d_i) is lower o equal to said reference distance (d_r), and having respectively a second frequency spectrum with lateral intervals (F_2, F_3) shifted with respect said first middle interval (F_1) when said

current distance (d_i) is higher than said reference distance (d_r), said electric parameter (P) being associated to a frequency value comprised either into said middle interval (F_1) or into one of lateral intervals (F_2, F_3) to promote the switching of said at least one electric circuit (S, S').

2. Device as claimed in claim 1, characterized in that said control and switching means (4) comprise a slave electronic circuit (6) connected to said master electronic circuit (5) and adapted to varying said first output signal (S_{OUT}) in function of said control signal (S_C).

3. Device as claimed in claim 1 or 2, characterized in that said control signal (S_C) has a substantially constant repetition frequency (f_C).

4. Device as claimed in claim 2, characterized in that said slave electronic circuit (6) comprises a programmable area (19) adapted to define numerical filtering means for analyzing the frequency spectrum of said control signal (S_C) and generating said at least one variable electric parameter (P).

5. Device as claimed in claim 4, characterized in that said numerical filtering means have a fixed or variable bandwidth (W) substantially centered with respect of said repetition frequency (f_C) of said control signal (S_C).

6. Device as claimed in any preceding claim, characterized in that said transceiver device (3) is adapted to process said return signal (S_{RX}) for generating an identification signal (S_{ID}) comprising said identification code (I_{ID}) of said transponder (2).

7. Device as claimed in claim 6, characterized in that said master electronic circuit (5) has at least one first (11) and one second input (12) connected to said transceiver device (3) to receive respectively said control signal (S_C) and said identification signal (S_{ID}) and at least one first output (13) for said first output signal (S_{OUT}).

8. Device as claimed in any claim 2 to 7, characterized in that said slave electronic circuit (6) comprises at least one third input (16) connected to said transceiver device (3) to receive said control signal (S_C) and at least one second output (17) for a second output signal (S'_{OUT}).

9. Device as claimed in any preceding claim, characterized in that said master electronic circuit (5) comprises a memory area (14) for memorizing at least one reference code (I_{DREF}) and a first microprocessor processing unit (15) adapted to compare said identification code (I_{ID}) with said at least one reference code (I_{DREF}) and to detect said control signal (S_C) for generating a first activation signal (S_{1A}) to be sent to said slave electronic circuit (6).

10. Device as claimed in any claim 4 to 9, characterized in that said slave electronic circuit (6) is adapted to generate a second activation signal (S_{2A}) in function of said at least one electric parameter (P) and to send it to said master electronic circuit (5).

11. Device as claimed in claim 10, characterized in that said master electronic circuit (5) is adapted to generate said first output signal (S_{OUT}) in function of said second activation signal (S_{2A}) and said slave electronic circuit (6) is adapted to generate said second output signal (S'_{OUT}) in function of said first activation signal (S_{1A}).

12. Device as claimed in any claim 8 to 10, characterized in that said control and switching means (4) comprise a first (20) and a second semiconductor switch (21) connected respectively to said first (13) and said second output (17) of said electronic circuits (5, 6) for receiving respectively said first (S_{OUT}) and said second output signal (S'_{OUT}), said switches (20, 21) being connectable to one or more electric circuits (S, S') for switching thereof.

13. Device as claimed in claim 12, characterized in that said electronic circuits (5, 6) comprise respective feedback circuits (26, 27) associated to the corresponding semiconductor switch (20, 21) to control the operation thereof.

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