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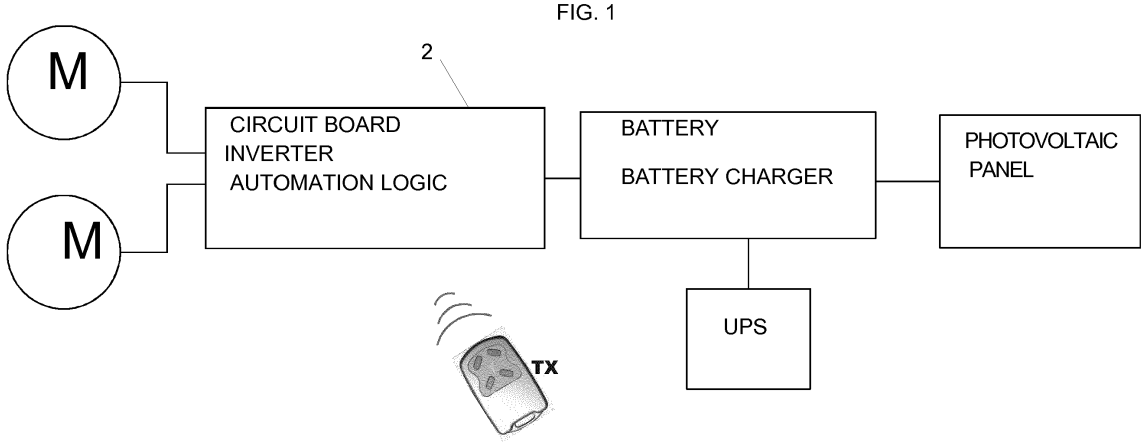
(54) AUTOMATIC GATE MOVEMENT METHOD AND SYSTEM

(57) Forming the object of the finding is an operating cycle for actuating gates, gates etc... with the possibility of activating one function, so-called "quick cycle", (activation obtained by means of transmitter, button or selector). Once the function is actuated, respective motorizations, connected to inverters, are controlled to vary the operative parameters, such as the actuation speed.

The aforesaid speed increase, activatable by the actuation of the gate, is a function present on the microcontroller of the inverter and is executed with the prolonged pressing of the transmitter, or with a dedicated button thereof.

In addition, it is provided to supply the circuit board through the electrical power supply as well as through a battery, a battery charger and even a card of UPS type for the maintenance of the automatic gate management operating cycle.

FIG. 1



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Description

FIELD OF APPLICATION OF THE INVENTION

[0001] The present finding is inserted in the field of systems for moving automatic gates.

[0002] In particular, the invention refers to a system for moving a gate at adjustable speed and remotely, i.e. which allows the speed increase during the steps of opening and/or closing.

STATE OF THE ART

[0003] The automatic gates for accessing private areas are usually actuated by users by means of transmitters, controls or keys for remote opening, which send a pulse via wire or via radio to an electronic control unit, which actuates a motorization, the latter connected by means of gears to the gate, actuating it in the desired direction.

[0004] Normally, especially in the case of remote transmissions via radio, after having controlled the opening of the gate, the subsequent reclosing of the same occurs by means of the sending of a new command by the user, i.e. it automatically occurs after a certain time period.

[0005] Such gates are moved by mans of electric motors connected to the normal electrical power supply.

[0006] There also automations provided with motorizations and "inverter" apparatuses which allow carrying out the acceleration and deceleration ramps.

EXPOSITION AND ADVANTAGES OF THE FINDING

[0007] The object of the present finding is to provide the art with an operative implementation and methodology applicable for the automatic movement of gates.

[0008] The finding provides for a gate actuation operating cycle with possibility of activation of a function, so-called with "quick cycle", in the transmitter.

[0009] The function can be activated by the actuation of the gate and controls the motor to vary the operating parameters, such as the frequency, and hence consequently the actuation speed, so as to reach very high values in a brief time period, even up to twice the standard parameters.

[0010] The function is present on the microcontroller of the inverter and can be activated in cases of need due to the prolonged pressing of the transmitter or with a dedicated button thereof.

[0011] Another object of the invention is to allow the gate actuation system the ability to operate even without power supply.

[0012] Normally, auxiliary battery motors are employed, or release keys for the primary motor are employed for the purpose of being able to manually operate the opening or closing of the gate.

[0013] The finding provides for associating a management card of UPS (Uninterruptible Power Supply) type, so as to allow at least one complete movement cycle.

[0014] Another object is to be able to allow the system to function with an auxiliary supply that can be generated by photovoltaic panel.

Advantages:

[0015] The main advantage of the finding is that of being able to allow the user to vary the actuation speed, such variation also being remotely controllable by means of transmitter to the electronic control unit connected to the inverter and motorization of the gate through dedicated automation logic.

[0016] Hence, during the actuation of the gate, the user can decide if he/she will activate the function present on the microcontroller and increase the speed of opening or closing by operating on the transmitter or on the button/selector.

[0017] The pressing of the control for a prolonged time induces the start of a quick cycle function, which controls the inverter motor to vary the frequency so as to be able to increase the drive speed of the mechanical transmission system and hence accelerate the opening and closing times and reduce the wait times in front of the gate.

[0018] All the above increases the safety of users who will not have to wait a long time outside the gate before entering their home, or wait a long time once they have exited.

[0019] Said objects and advantages are all achieved by the method and system for moving the automatic gate, object of the present finding, which is characterized with regard to that provided in the below-reported claims.

[0020] These and other characteristics will be clearer from the following description of several embodiments illustrated, merely by way of non-limiting example, in the enclosed drawings tables.

- Figure 1: illustrates a functioning scheme for the automation control circuit board with inverter, provided with quick opening and closing automation cycle, remotely controllable through at least one transmitter.
- Figure 2: illustrates the effect of the quick cycle on the frequency of the motor following activation.
- Figure 3: illustrates an operating variant in which the activation is executed by the user also during the normal opening or closing of the gate, in case of need or urgency for quick opening; the activation of the microcontroller is also possible with actuation already underway.

[0021] With particular reference to figure 1, reference M indicates the arrangements of two motorizations associable with relative wings or barriers of automatic gates, through the interposition of opening mechanisms of known type, not illustrated.

[0022] The motorization(s) M is/are connectable and controllable upstream from at least one circuit board, generically indicated with 2.

[0023] At least one inverter board with integrated automation management logic is associated with said one or more motors M.

[0024] The system thus constituted manages, through the implementation of algorithms/software, the automation of the opening and closing of the gate.

[0025] A radio control, TX, is associable with said circuit board with inverter.

[0026] A button is associable with said circuit board.

[0027] A selector is associable with said circuit board with inverter.

[0028] Also associated with the circuit board is a battery, a battery charger and even a card of UPS type for the maintenance of the automatic gate management operating cycle.

[0029] Finally, a photovoltaic panel is associable with the battery for recharging the same.

[0030] As figure 2 illustrates, the function implemented in the automatic gate opening and closing system provides for the possibility to carry out at least one gate actuation operating cycle with the possibility of activation of one function, with "quick cycle", in the transmitter.

[0031] The function (if activated) controls a variation of the operating parameters, such as the frequency of the inverter, and hence consequently the actuation speed of the motor M, so as to reduce the actuation times.

[0032] In particular, the frequency of the inverter can be increased up to a range comprised between 70-100Hz, approximately twice the standard parameters, and in a time range of 1-4 seconds.

[0033] The above-described function is implemented on a microcontroller that controls the inverter and can be activated, in cases of need, due to:

- the prolonged pressing of the transmitter TX or
- with a dedicated button of the same transmitter TX, or
- with a button /key selector/keyboard selector.

[0034] Since a UPS module is provided, another object of the invention is to allow the gate actuation system the ability to operate even without power supply. The management card of UPS (Uninterruptible Power Supply) type allows completing at least one complete movement cycle even without electrical power supply.

[0035] Figure 2 illustrates the possibility to activate the frequency increase as soon as the gate actuation is commanded, to open or close the gate, an instant identified with T0. After a time T1, 3 seconds in the example, the frequency range reaches 100HZ and the motor continues the actuation at a frequency and hence at a speed greater than the standard frequency and speed.

[0036] With reference to figure 3, an embodiment variant is illustrated, which can be controlled with said operating function.

[0037] From instant T0 to instant T2, the gate can be normally actuated; now, however, it is assumed that the user decides that he/she wishes to actuate the quick cycle function; at such point, with the prolonged pressing of the transmitter TX or with a dedicated button thereof, the frequency is increased to the values and times indicated above and the speed of the gate passes from the speed VS, standard speed, to the accelerated speed, VA, and the actuation continues at the speed VA.

[0038] There follows a reduction of the times T3, less than that T4 necessary for standard actuation.

[0039] Possible acceleration and deceleration steps (A and D in the scheme) can be provided.

[0040] In summary, forming the object of the finding is a method for opening and closing gates, gates, barriers etc..., supplied by electrical power supply and having at least one management circuit board with integrated inverter, at least one motorization for controlling the gate through intermediation of movement mechanisms. The method provides for increasing the speed of opening / closing the gate by means of activation of a function remotely controllable by the associated TX transmitter or by the button/selector, controlling the respective one or more motorizations to vary the operating parameters, such as the actuation speed; said variation being obtained by the inverter implemented in the associated control card.

[0041] It is provided to increase the speed of opening / closing the gate even up to twice the standard parameters, in a range comprised between 1 and 4 seconds, and increasing the frequency between the 70HZ and 100HZ.

[0042] The aforesaid speed increase can be activated by the actuation of the gate, it is a function present on the microcontroller of the inverter and can be activated:

a. with the prolonged pressing of the transmitter,
b. with the prolonged pressing del button/selector, or
c. with a dedicated button thereof.

[0043] It is provided to supply the circuit board with the electrical power supply as well as through a battery, a battery charger and even a card of UPS type for the maintenance of the automatic gate management operating cycle.

[0044] The auxiliary supply is provided through energy obtainable from an associated photovoltaic panel.

[0045] Also forming the object is a gate, of the type comprising one or more leaves for opening and closing entries, and passages, of the type comprising one or more motorizations (M), motion transmission and conversion systems, so as to allow its movement, a circuit board (2) with associated automation logic and integrated inverter device, a remote transmitter (TX); the gate comprises a circuit board with integrated inverter and can be activated, in cases of need, due to the prolonged pressing of the transmitter TX or with a dedicated button of the same transmitter TX or with button and selector; following said activation, the speed of the motorizations (M) increases.

[0046] The inverter and microcontroller are integrated in the same board.

Claims

1. Method for opening and closing gates, said gates being of the type supplied by electrical power supply and having at least one automation logic management circuit board with integrated inverter, at least one motorization for controlling the gate through the intermediation of movement mechanisms, **characterized in that** it provides for increasing the speed of opening / closing the gate by activating a function remotely controllable by the associated TX transmitter or by button/selector; controlling the respective one or more motorizations to vary the operating parameters, such as the actuation speed; said variation being obtained by the associated inverter.

2. Method according to claim 1, **characterized in that** it provides for increasing the speed of opening / closing the gate even up to twice the standard parameters.

3. Method according to claim 1, **characterized in that** it provides for increasing the speed of opening / closing the gate in a range comprised between 1 and 4 seconds, and increasing the frequency between the 70HZ and 100HZ.

4. Method according to claim 1, **characterized in that** the aforesaid speed increase can be activated by the actuation of the gate, it is a function present on the microcontroller of the inverter and can be activated:

    a. with the prolonged pressing of the transmitter, or
    b. with a dedicated button thereof, or
    c. with a button/key selector.

5. Method according to claim 1, **characterized in that** it provides for supplying the circuit board through the electrical power supply as well as through a battery, a battery charger and even a card of UPS type for the maintenance of the automatic gate management operating cycle.

6. Method according to claim 1, **characterized in that** it provides the auxiliary power supply through energy obtainable by the associated photovoltaic panel.

7. Gate, of the type comprising one or more leaves for opening and closing entries, and passages, of the type comprising one or more motorizations (M), motion transmission and conversion systems, so as to allow the movement thereof, a circuit board (2) with associated automation logic and integrated inverter device, a remote transmitter (TX); the gate being **characterized in that** it comprises a circuit board with microcontroller and integrated inverter which allows the activation of the function, in cases of need, due to the prolonged pressing of the transmitter TX or with a dedicated button of the same transmitter TX or with a button / selector; following said activation, the speed of the motorizations (M) increases.

8. Gate according to claim 7 **characterized in that** it additionally comprises a battery, a battery charger and also a card of UPS type for the maintenance of the automatic gate management operating cycle.

9. Gate according to claim 7 **characterized in that** it comprises an associated photovoltaic panel for an auxiliary supply.

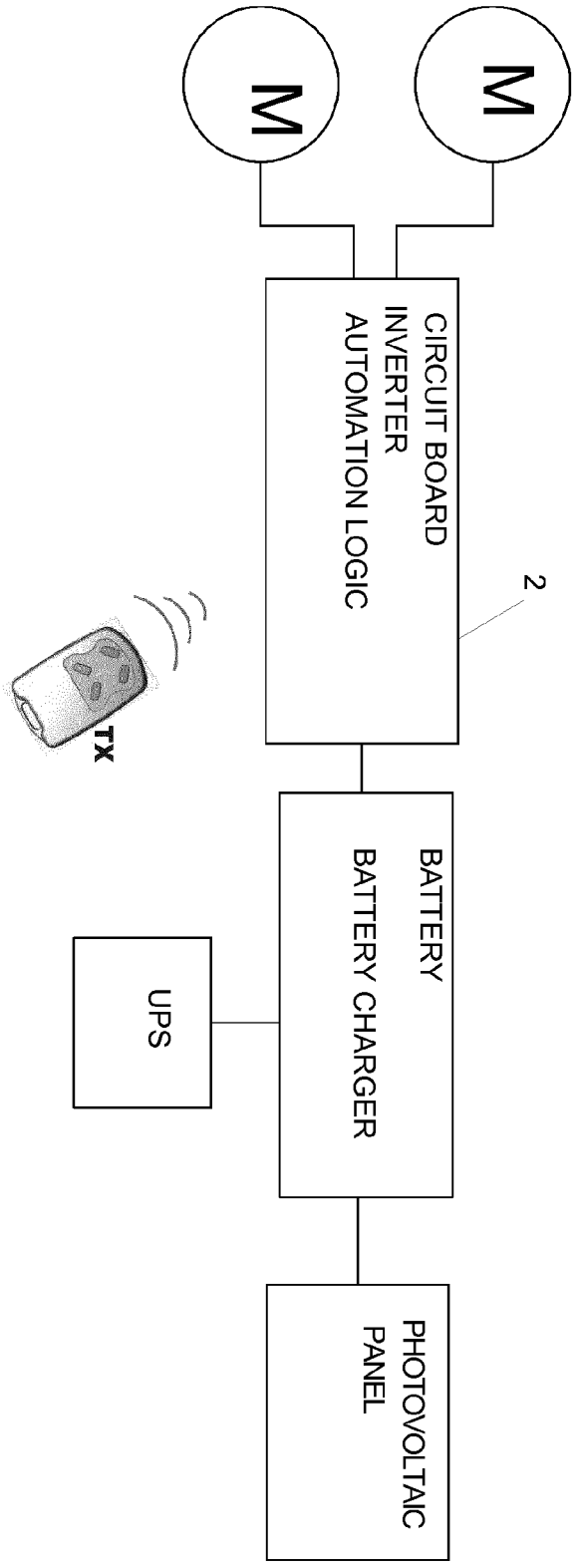
M
M
CIRCUIT BOARD
INVERTER
AUTOMATION LOGIC
2
TX
BATTERY
BATTERY CHARGER
UPS
PHOTOVOLTAIC
PANEL

FIG. 1

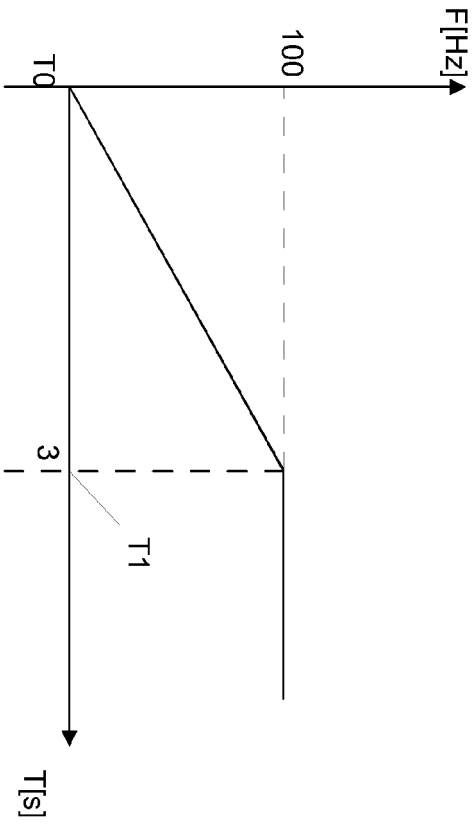
F[Hz]
100
T0
3
T1
T[s]

FIG. 2

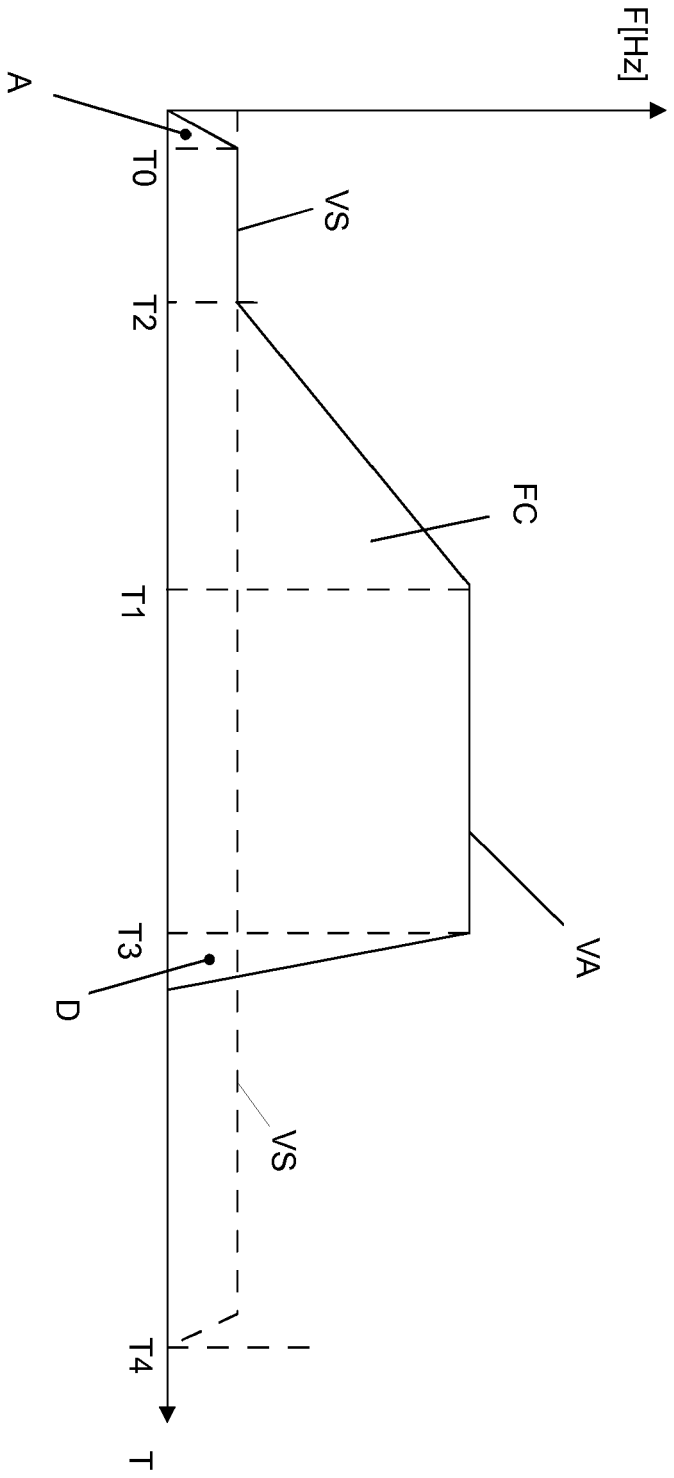

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 5329

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 304 442 A2 (WAYNE DALTON CORP [US]) 23 April 2003 (2003-04-23) * paragraph [0023]; figures 1,2,3,5 * * column 8, line 2 - line 7 * * column 8, line 36 - line 39 * * sentence 33, paragraph 9 - sentence 42 * * sentence 16, paragraph 10 - sentence 30; claims 1-3 *	1-9	INV. E05F15/70 E05F15/77 E05F15/60
X	US 2008/129233 A1 (RICHMOND THOMAS R [US] ET AL) 5 June 2008 (2008-06-05) * paragraph [0009]; figures 1,4 * * paragraph [0018] - paragraph [0019] * * paragraph [0021] - paragraph [0022] *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	1 February 2016	Berote, Marc

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 18 5329

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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01-02-2016

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82