Title: MOTOR APPARATUS FOR SLIDING GATES

Abstract: A motor apparatus for moving sliding gates comprises means (20) for guiding and supporting the moving portion of the gate (10) and a motor-reduction unit (17) suitable for moving said moving portion of the gate. The guiding and support means (20) and the motor-reduction unit (17) are carried by a box body (13) fixed to the top of one of the gate posts (11) and suitable for allowing the passage of the moving portion of the gate therein, the guiding and support means (20) and the motor-reduction unit (17) engaging the top edge of the moving portion of the gate (10) at opposed sides.
DESCRIPTION

"Motor apparatus for sliding gates"

[0001] The present invention relates to a motor apparatus for moving sliding gates of the type comprising a motor on whose shaft there is keyed a pinion suitable for engaging in a rack mounted on the gate moving portion.

[0002] Automatisms for moving sliding gates are already known and widely used. Such automatisms, however, are generally quite complex and expensive and thus, for their installation and maintenance, they require the presence of skilled technicians and several working hours.

[0003] Moreover, they are often cumbersome as they need their own support and/or adaptation structures to be installed in the proximity of the gate they are to be applied to.

[0004] Finally, each gate is usually associated to its own motor apparatus, so that even within the same manufacturing company, there exists a wide range of different automatisms, with obvious disadvantages for production costs, stock management, sale and servicing.

[0005] The object of the present invention is to provide a motor apparatus for moving sliding gates which should be simple and inexpensive to construct, consisting of a
reduced number of parts and easily and quickly installable even by non experts.

[0006] Another object of the invention is to provide a single, versatile motor apparatus, or easily adaptable to different types and sizes of gates, and which should be mountable also on existing manual gates without modifications or additions of cumbersome adaptation elements.

[0007] Such objects are achieved with a motor apparatus according to claim 1.

[0008] The features and advantages of the motor apparatus according to the present invention will appear more clearly from the following description of a preferred embodiment, made by way of an indicative non-limiting example with reference to the annexed figures, wherein:

[0009] - Figure 1 shows an exploded view of the motor apparatus according to the invention;

[0010] - Figure 2 shows a perspective view of the motor apparatus mounted on a post of a gate; and

[0011] - Figure 3 shows a side exploded view of the motor apparatus mounted on the post of the gate.
[0012] In said drawings, reference numeral 10 denotes a portion of the moving portion of a sliding gate. The gate further comprises at least one fixed vertical post 11 extending from the ground.

[0013] A rack 12 is fixed along the top edge of the moving portion 10 of the gate.

[0014] A support box body 13 open at the bottom and on the side is fixed to the vertical post 11 of the gate so as to allow sliding of the moving portion 10 of the gate therethrough. Said box body 13 is therefore fixed to post 11 at a height substantially equal to the height of the moving portion of the gate.

[0015] Preferably, the box body 13 comprises a top horizontal portion 30, below which the moving portion 10 of the gate slides, and a front portion 31 which extends at the bottom from said horizontal portion, substantially in a plane parallel to the sliding plane of the moving portion of the gate.

[0016] Advantageously, the box body 13 is shaped as an upturned U plate, also defining a vertical portion 32 parallel to the front portion 31 acting as anchoring element to post 11.
[0017] In a preferred embodiment, said box body 13 comprises a first plate 14, for example shaped as an upturned L, anchored to post 11, and a second plate 15, for example also shaped as an upturned L, constrained to the first one. In particular, said first and second plates are at least partly overlapped along the respective horizontal portions and are constrained to one another through said horizontal portions, for example by screws or bolts.

[0018] To this end and advantageously, the two plates 14 and 15 exhibit respective slots 14', 15' of elongated shape in a direction orthogonal to the sliding direction of the gate, so as to allow a wide adjustment of the distance between the front portion 31 and post 11. The same plates can thus be used for various types and sizes of the moving portion of the sliding gate provided with rack 12.

[0019] In the box body 13, for example in one of the two vertical portions 31, 32, there is obtained a seat 16 wherein there is at least partly seated an electrical motor 17 which is associated to an epicycloidal rpm reducer 17'.

[0020] Advantageously, said seat 16 is obtained in the
front portion 31 of the box body 13, so as to be easily accessible.

[0021] In accordance with a preferred exemplary embodiment, said seat 16 exhibits a semi-cylindrical shape with vertical axis, so that the motor-reduction unit 17-17' is locked in vertical position and facing inwards the box body 13, or towards the moving portion 10 of the gate.

[0022] Advantageously, the motor shaft of the motor-reduction unit 17-17' faces upwards.

[0023] On the motor shaft there is keyed a pinion 18 suitable for engaging in the teeth of rack 12 for transforming the rotatory motion of the motor shaft into a translatory motion of the moving portion of the sliding gate.

[0024] According to a preferred embodiment, the motor-reduction unit 17-17' is fixed to seat 16 into the box body by at least one dowel or screw 19 screwed into a corresponding threaded hole obtained into seat 16 so as to radially engage into the body of the motor-reduction unit.

[0025] A roll 20 with vertical axis, acting as guiding and support means for the sliding of the moving portion 10 of
the gate is further fixed to the box body 13. Preferably, said roll 20 extends downwards from the top horizontal portion of the box body 13, adjacent to post 11, so as to face the side of the moving portion of the gate opposite rack 12. For example, roll 20 rotates about a fixed pin 20' inserted at the top into one of the pair of overlapped slots 14'-15' for a screwing thereof to the box body 13.

[0026] In other words, pinion 18 on the one side and the guiding roll 20 on the other side support and guide the moving portion of the gate.

[0027] The electrical motor 17 is commanded and controlled by an electronic control unit, not shown. In accordance with a preferred embodiment, said electronic control unit is suitable for receiving control pulses from a radio control.

[0028] Advantageously, said electronic control board is seated into a waterproof casing 21 fixed to the top horizontal portion 30 of the box body 13 and facing outwards. Said casing 21 can for example exhibit at least one transparent or semi-transparent portion suitable for transmitting the light of a light signaller associated to the electronic control unit.
[0029] Advantageously, the electrical motor 17 is selected so as to work at low voltage, for example 12 Volts. The electronic control unit receives the power supply from the mains voltage at 220 Volts and transforms it into direct voltage, stabilising it, suitable for operating the motor.

[0030] Preferably, the electronic control unit draws the mains voltage from an electrical cable seated into post 11. In turn, a cable 22 for supplying motor 17 comes out of the control unit.

[0031] Advantageously, along said power supply cable 22 there is provided a selector device 23, for example fixed on the front portion 31 of the box body 13, suitable for allowing the motor rotation in both directions for a manual movement of the gate.

[0032] Moreover, the electronic control unit can be advantageously provided with motor stopping devices when current absorption exceeds a fixed threshold and with devices for self-learning said current absorption when the closing device is at the travel end. To this end, the motor apparatus can further comprise, where needed, mechanical stops.

[0033] Advantageously, the electronic control unit is
associated to a travel end 24, for example of the electro-mechanical type. Said travel end 24 comprises a mechanical actuation member 24' suitable for being stressed by a cam element 25 provided on the edge of the moving portion 10 of the gate.

[0034] It should be noted that the dowels constraining the motor-reduction unit 17-17' to the box body 13, besides the locking function, also serve as mechanical friction and as emergency release means. In fact, in the event of locking of the motor shaft, it is sufficient to loosen the dowel to allow manual rotation of the entire motor-reduction unit and thus move the sliding gate.

[0035] From the description above it is evident that the installation of the motor apparatus is very quick and easy and can be carried out also by a non expert.

[0036] First, there is no need of arranging a seat into the ground for arranging the motor apparatus therein. In fact, the box body, which exhibits a significantly compact and light structure, simply needs to be fixed to the gate post.

[0037] The installation of the small and light motor-reduction unit is quick and easy as well.
[0038] After connecting the electronic control unit to the motor and powering the control unit, the motor apparatus is ready to operate.

[0039] Advantageously, the motor apparatus proposed herein consists of a reduced number of components easy to assemble and usable for various types and sizes of gates. The motor apparatus is further suitable for being mounted on existing manual gates, by simply fixing a rack to the top edge of the gate.

[0040] It should be noted that at present, the operation of fixing a plate for supporting gate guiding means on the top portion of a post is already carried out. Innovatively, the invention allows motorising the gate without carrying out any further operations since, along with the guiding plate fixing, in this case consisting of the box body, also the motor apparatus and the relevant control means are mounted.

[0041] In other words, in the light of these considerations, the invention can also be aimed at proposing a motorised guiding plate for sliding gates, that is, at providing a single device which at the same time acts as automated guiding, support and movement means for a sliding gate.

[0042] It is evident that a man skilled in the art may make
several changes and adjustments to the motor apparatus according to the present invention in order to meet specific and incidental needs, all falling within the scope of protection of the invention as defined in the following claims.
Claims

1. A motor apparatus for moving sliding gates, where said gates comprise a moving portion and at least one fixed vertical post, the apparatus comprising means for guiding and supporting the moving portion of the gate, and a motor-reduction unit suitable for moving said moving portion of the gate, characterised in that said guiding and support means and said motor-reduction unit are carried by a support box body fixed to the top of said post of the gate and suitable for allowing the passage of the moving portion of the gate therein, the guiding and support means and the motor-reduction unit engaging the top edge of the moving portion of the gate at opposed sides.

2. A motor apparatus according to claim 1, wherein said box body is shaped as an upturned U defining a vertical portion for fixing to the post, a top horizontal portion and a front portion substantially parallel to the moving portion of the gate.

3. A motor apparatus according to claim 1 or 2, wherein in one of the two vertical portions of the box body there is obtained a seat of substantially cylindrical shape wherein the motor-reduction unit is at least partly seated.
4. A motor apparatus according to claim 3, wherein said seat is obtained in the front portion of the box body, and wherein the guiding and support means are arranged adjacent to the gate post.

5. An apparatus according to claim 4, wherein the motor-reduction unit is mounted in vertical position.

6. An apparatus according to claim 5, wherein the motor-reduction unit shaft is facing upwards.

7. A motor apparatus according to claim 6, wherein on the shaft of the motor-reduction unit there is keyed a pinion suitable for engaging in a rack provided along a side of the top edge of the moving portion of the gate.

8. A motor apparatus according to any one of the previous claims, wherein the guiding and support means comprise a roll.

9. A motor apparatus according to claim 8, wherein said roll is free to rotate about a pin fixed to the box body.

10. A motor apparatus according to any one of the previous claims, wherein the motor-reduction unit is fixed to the box body by at least one dowel or screw that screws in a threaded hole obtained into the seat of the motor-reduction unit for radially engaging into the body.
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thereof.

11. A motor apparatus according to claim 8, wherein said dowel or screw is suitable for being adjusted so as to keep the motor-reduction unit constrained to the box body but allowing an axial rotation thereof for a manual movement of the gate in case of power supply cut-off.

12. A motor apparatus according to any one of the previous claims, wherein said box body comprises a first plate for anchoring to the gate post, and a second plate constrained to the first one.

13. A motor apparatus according to claim 12, wherein said first and second plates are shaped as an upturned L and are at least partly overlapped along the respective horizontal portions.

14. A motor apparatus according to claim 13, wherein the horizontal portion of each plate exhibits at least one slot of elongated shape in a direction orthogonal to the sliding direction of the gate, the two plates being constrained by screws or bolts passing through the aligned slots of the plates.

15. A motor apparatus according to any one of the previous claims, wherein the electronic control unit is
suitable for receiving control pulses from a radio control.

16. A motor apparatus according to any one of the previous claims, wherein the electronic control unit is seated in a waterproof casing fixed to the support box body.

17. A motor apparatus according to claim 16, wherein said casing exhibits at least one transparent or semi-transparent portion suitable for transmitting the light of a light signaller associated to the electronic control unit.

18. A motor apparatus according to any one of the previous claims, wherein the electrical motor works at low voltage, for example 12 Volts.

19. A motor apparatus according to claim 18, wherein the electronic control unit receives the power supply from the mains voltage at 220 Volts and transforms it into direct voltage, stabilising it, suitable for operating the electrical motor.

20. A motor apparatus according to any one of the previous claims, comprising a selector device actuable by a user for allowing the motor rotation in both directions.
for a manual movement of the gate.

21. A motor apparatus according to any one of the previous claims, wherein the electronic control unit is associated to a travel end comprising a mechanical actuation member suitable for being stressed by a cam element provided on the edge of the moving portion 10 of the gate.

22. Sliding gate comprising a motor apparatus according to any one of the previous claims.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

- E05F 15/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E05F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>FR 2 831 199 A (MAURIN JEAN LOUIS) 25 April 2003 (2003-04-25) page 2, line 16 - page 3, line 3 figures</td>
<td>1, 2, 8, 9, 12, 13, 18, 22, 15-17</td>
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<td>Y</td>
<td>DE 35 03 106 A1 (KURZ, HUBERT) 31 July 1986 (1986-07-31) page 8, line 5 - line 10 page 10, line 11 - line 15 page 10, line 32 - line 33 figures</td>
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