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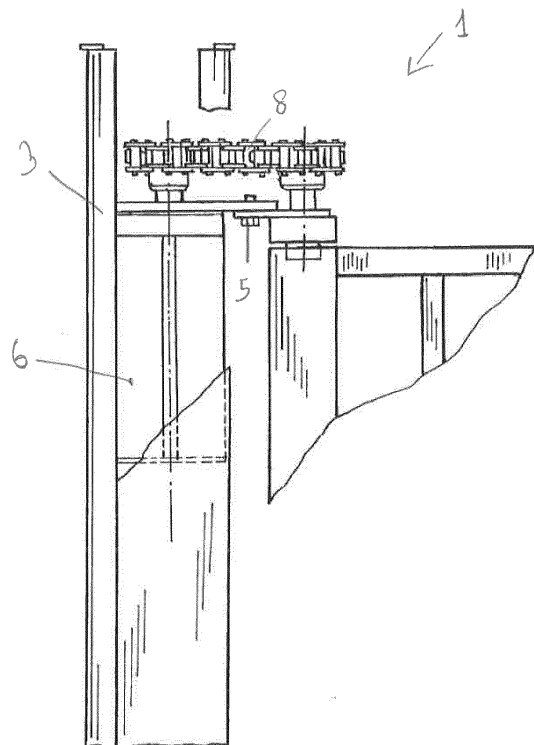
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(54) **A MOTORIZED DRIVING SYSTEM FOR SWING DOORS**

(57) A motorized driving system (1) for gates or doors with at least one swing door (2) and at least one pillar (3); said pillar being coupled to said swing door (2) by means of at least a joint (5), preferably a hinge (5'), wherein said system (1) comprises:

- a housing (4) obtained inside said pillar (3);
- a motor (6) connected to said swing door (2) by mechanical transmission means; said motor (6) being positioned in said housing (4), wherein said joint (5), preferably said hinge (5'), with respect to a lower joining hinge positioned at the floor 9, is positioned in axis with the latter and at the upper portion of the pillar 3 or swing door 2.



**FIG.2**

## Description

### Technical field of the invention

**[0001]** The present invention relates to a motorized driving system for gates or doors comprising one or more swing doors.

### Background

**[0002]** The automation for doors and gates started in Italy in the mid '60s.

**[0003]** Up to now the systems used for moving the doors are substantially of two types:

1) outer actuators with piston and stem with electro-mechanical or hydraulic technology,

2) hydraulic and electromechanical underground operators under floor included in formworks positioned in axis or out of axis with respect to the upper hinge of the gate to be moved.

**[0004]** The just described systems have a series of problems thereamong there are the ones reported herebelow.

**[0005]** In the first case, that is of outer actuators, what it is noted is substantially an alteration with respect to the original structure and aesthetics of the gate or the door thereto the need is added for mechanical interventions and/or mechanical and smithing activities to be implemented on the installation site indeed to allow a motion of the swing doors. On the contrary, in the second case, apart from the mechanical and smithing activities for adapting to the lower hinge, there are important activities of building type for fastening the formwork to the ground under the floor.

**[0006]** To the disadvantages indicated above the following ones are added:

a) considerable smithing and/or building activities to guarantee the automation of the opening/closing of the swing doors;

b) difficult aesthetical and structural maintenance of the gate carpentry;

c) impossibility of engineering the automation system during the phase of constructing the gate/door;

d) need for highly qualified personnel for the on-site installation with different specializations: building, smithing, mechanical and electronic;

e) possible encumbrances for the use of machines and devices to be applied leading to an increase in the original size of the gate/door with relative problems of environmental adaptation.

## Summary of the invention

**[0007]** The technical problem placed and solved by the present invention is then to provide a motorized driving system for gates or doors comprising one or more swing doors allowing to obviate the drawbacks mentioned above with reference to the known art.

**[0008]** In particular, the invention offers a single solution for the mechanization of doors and gates with swing doors, either existing or during construction, differently from known traditional system which necessarily have to provide a range of different actuators thereamong with the required competence the most suitable one to the use and the specific need has to be selected.

**[0009]** Such problem is solved by a system according to claim 1.

**[0010]** Preferred features of the present invention are subject of the depending claims.

**[0011]** In particular, the invention relates to a motorized driving system of the swing doors or of the swing door of a gate or door the driving section thereof is housed and flanged in a modular basket to be embedded in the pillars even if of different sections and sizes simply through the installation of peripheral extenders and connected to an upper joint of the gate/door through a final chain or belt transmission.

**[0012]** This configuration has a series of advantages.

**[0013]** For example, one of the main advantages is to allow the implementation of a gate/door with mechanically automatized opening/closing already in the planning stage. It follows that, differently from the known systems, after the gate/door installation it is not necessary to intervene with smithing or masonry work in order to guarantee the mechanical motion of the swing doors.

**[0014]** Furthermore, in a preferred embodiment the housing, the motor and the means for transmitting the driving force to the joint are implemented as single block with the purpose of allowing an easier and more immediate installation thereof even on pre-existing gates/doors.

**[0015]** Therefore, schematically the herein described system has as advantages:

- ease of application.
- simplicity of integration with new or even already installed structures;
- maintenance of aesthetics of the starting original structure;
- cutting installation and maintenance costs;
- standardization and engineering of the application system
- normalization of the application solutions.

**[0016]** Other advantages, features and use modes of the present invention will result evident from the following detailed description of some embodiments, shown by way of example and not for limitative purposes.

### Brief description of the figures

**[0017]** The figures of the enclosed drawings will be referred to, wherein:

- Figure 1 shows a gate wherein both swing doors are moved thanks to the presence, on each pillar, of motorized driving system according to an embodiment of the invention;
- Figure 2 shows an embodiment of the motorized driving system according to a preferred embodiment of the present invention;
- Figure 3 shows a possible scheme of transmitting the mechanical motion to the upper hinge of a gate or door.

### Detailed description of preferred embodiments

**[0018]** By referring to figure 1, a motorized driving system according to an embodiment of the invention is designated as a whole with 1.

**[0019]** In particular, the herein described motorized driving system 1 is a system allowing the motion of at least a swing door 2 associated to a gate or, more generally, to a door, a window, etc.

**[0020]** In the specific case, the gate or door comprises at least a pillar 3; preferably two pillars 3, 3', each one coupled to a swing door 2, 2'. The pillar, for example, can be a pillar made of steel with square or cylindrical section with sizes of 100-120-150-170-200 or diameter 102 and higher.

**[0021]** The coupling between pillar 3 and swing door 2 can be implemented with any connection means considered suitable by the person skilled in the art to this purpose. By way of example and not with limitative purpose, such coupling is implemented by means of at least a joint 5, preferably a hinge 5'. In particular, the joint/hinge is an integrating portion element of the driving system and it is equipped with an axis carrying an idle pinion thereto the door is coupled. In an embodiment of the invention, the joint 5 or the hinge 5', with respect to a lower joining hinge positioned at the floor 9, is positioned in axis with the latter and at the upper portion of the pillar 3 or door 2.

**[0022]** The driving system 1 even comprises a motor 6. In particular, the motor 6 is positioned inside a housing 4, for example a containment basket.

**[0023]** The self-containment/self-supporting basket 4 can be self-supporting and modular in order to determine a single block which can be extracted from the housing pillar wherein it is housed. The modularity of the self-

supporting basket is due to the possibility of applying adapting expanders for all types and sections of pillars, existing at the pillar 3. Such motor 6 is connected to the door 2 of the gate or door by mechanical transmission means, by way of example and not with limitative purposes, of elastic type (chains or belts) or stiff type (conical pairs, gearing cascade). In an embodiment of the invention, the mechanical transmission means comprises a reducer 7 and/or a transmission chain 8 apt to transmit the driving force from the motor or reducer 7 to the axis of the joint, having in inter-axis which can be adjusted and recorded by means of slotted holes of the plate with the possibility of providing the coupling motorized hinge-door with an adjustable mechanical torque limiter.

**[0024]** By referring to the self-supporting basket 4 for housing the motor 6, as it is shown in figure 1 preferably it is housed inside said pillar 3. Furthermore, the self-supporting basket 4 can comprise means for locking the motor 6 and/or the joint 5 in a preferred position inside thereof. Preferably said locking means comprises flanges equipped with mechanical stop elements adjustable from 0 to 270° which make external door-stopping detents to be superfluous. Such elements allow rotating the door both towards outside and inside by defining the direction and the opening maximum angle thereof. Said flange is further equipped with parachute system linking the mobile door 2 to the pillar 3 having fall-prevention function.

**[0025]** In an embodiment of the system 1 the self-supporting basket 4, the motor 6, the adjustable hinge and the transmission means are configured as single block, that is insertable and extractable from the housing pillar 3 as single body in order to ease the installation thereof as well as the maintenance.

**[0026]** In a preferred embodiment, the gate or however the door comprises one or two swing doors 2, 2' each one coupled to a respective pillar 3, 3' inside thereof there is a self-supporting basket 4, 4' containing the respective motor 6, 6'.

**[0027]** By way of example, the motor can be a 24vdc 50W motor with epicyclic reducer having 4 stages with output slow shaft and flanged force pinion with final transmission by means of chain return 8 or toothed belt coupled to the rotation hinge 5, equipped with idle pinion. The system, in particular, can allow the automatized opening of doors of swing doors or gates with variable length and weight depending upon the final transmission ratio determined by the pinions adopted in the specific case (from 12 to 32 teeth) and maximum 270° rotation opening angle, both towards outside and towards inside the door application range from 0.50 mt up to 8mt of weight up to 800kg.

**[0028]** A subject of the present invention is even a gate or door with at least one swing door and one pillar comprising a motorized driving system as herein described.

**[0029]** The present invention has been sofar described with reference to preferred embodiments. It is to be meant that other embodiments belonging to the same inventive

core may exist, as defined by the protective scope of the herebelow reported claims.

## Claims

**1.** A motorized driving system (1) for gates or doors with at least one swing door (2) and at least one pillar (3); said pillar being coupled to said swing door (2) by means of a least one joint (5), preferably a hinge (5'), wherein said system (1) comprises:

- a housing (4) obtained inside said pillar (3);
- a motor (6) connected to said swing door (2) by mechanical transmission means; said motor (6) being positioned in said housing (4),

wherein said joint (5), preferably said hinge (5'), with respect to a lower joining hinge positioned at the floor 9, is positioned in axis with the latter and at the upper portion of the pillar 3 or swing door 2.

**2.** The system (1) according to claim 1, wherein said housing (4) comprises means for locking said motor (6) and/or said joint (5) within said housing (4).

**3.** The system according to claim 2, wherein said locking means is flanges equipped with mechanical stop elements adjustable from 0 to 270°.

**4.** The system (1) according to anyone of claims 1 to 3, wherein said mechanical transmission means comprises a reducer (7).

**5.** The system (1) according to claim 4, wherein said reducer (7) is epicyclical, preferably having 4 stages.

**6.** The system (1) according to anyone of claims 1 to 5, wherein said mechanical transmission means comprises a transmission chain or belt (8) apt to transmit the driving force from said motor (6) or reducer (7) to said joint (5).

**7.** The system (1) according to anyone of claims 1 to 5, wherein said mechanical transmission means comprises conical pairs or a gearing cascade apt to transmit the driving force from said motor (6) or reducer (7) to said joint (5).

**8.** The system (1) according to anyone of claims 1 to 7, wherein said gates or doors comprise two swing doors (2, 2') each one coupled to a respective pillar (3, 3'); said pillars comprising each one a housing (4, 4') and a respective motor (6, 6').

**10.** The system (1) according to anyone of claims 1 to 8 wherein said housing (4), said motor (6), said hinge (5) and said transmission means are config-

ured as single block, wherein said block is apt to be inserted or extracted from said pillar (3) as single body.

**11.** The system (1) according to anyone of claims 1 to 10, wherein said housing (4) is a self-supporting basket.

**12.** A gate or door with at least a swing door and a pillar comprising a motorized driving system according to anyone of claims 1 to 11.

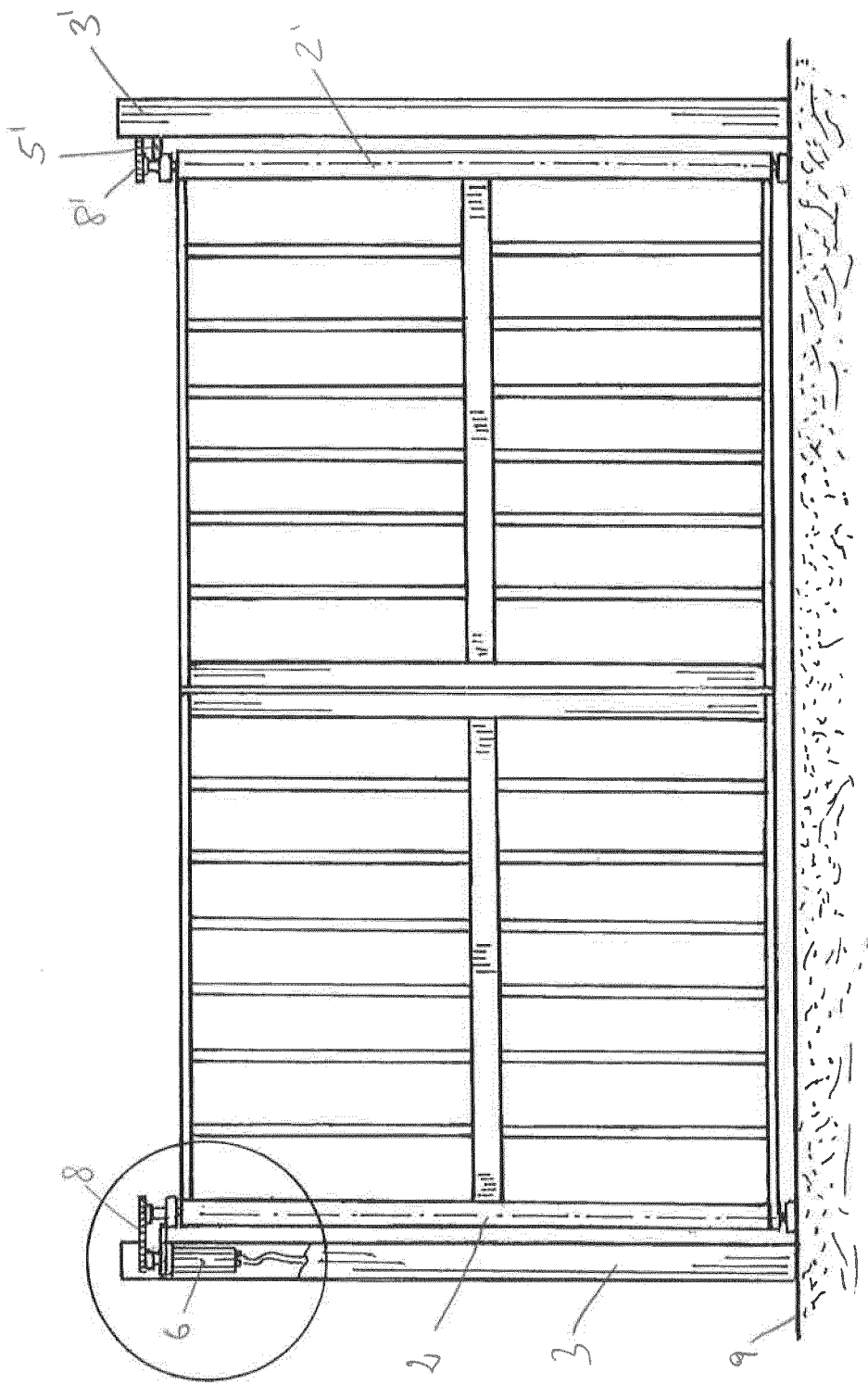
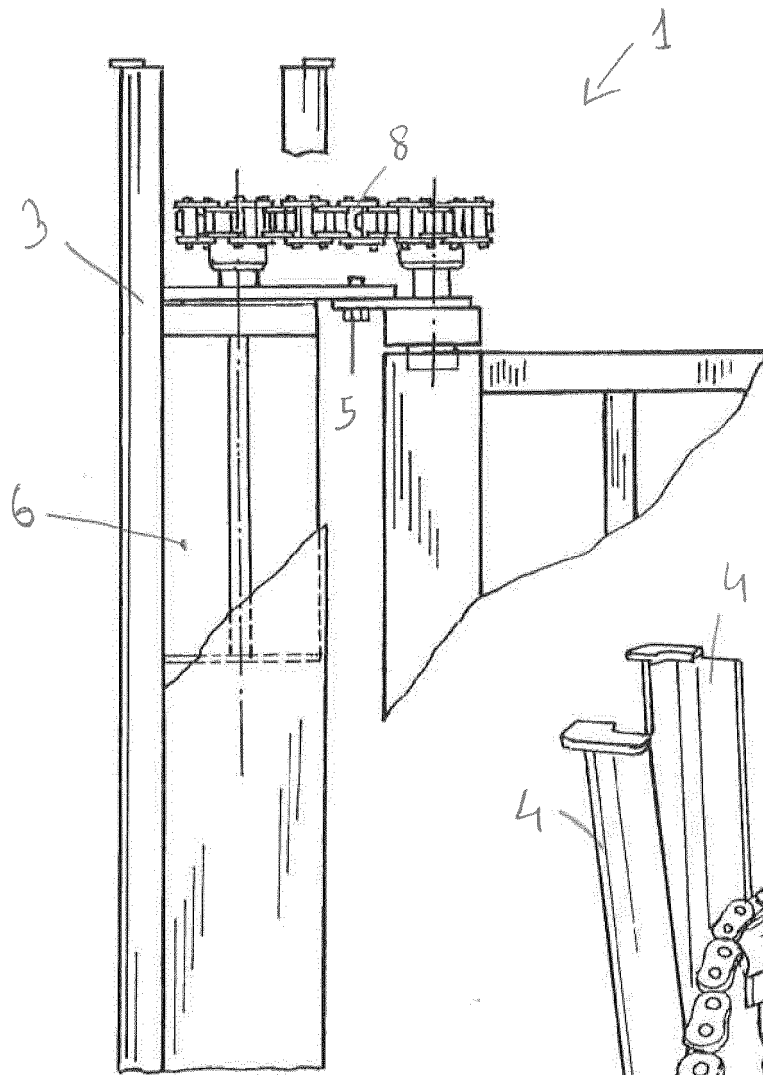
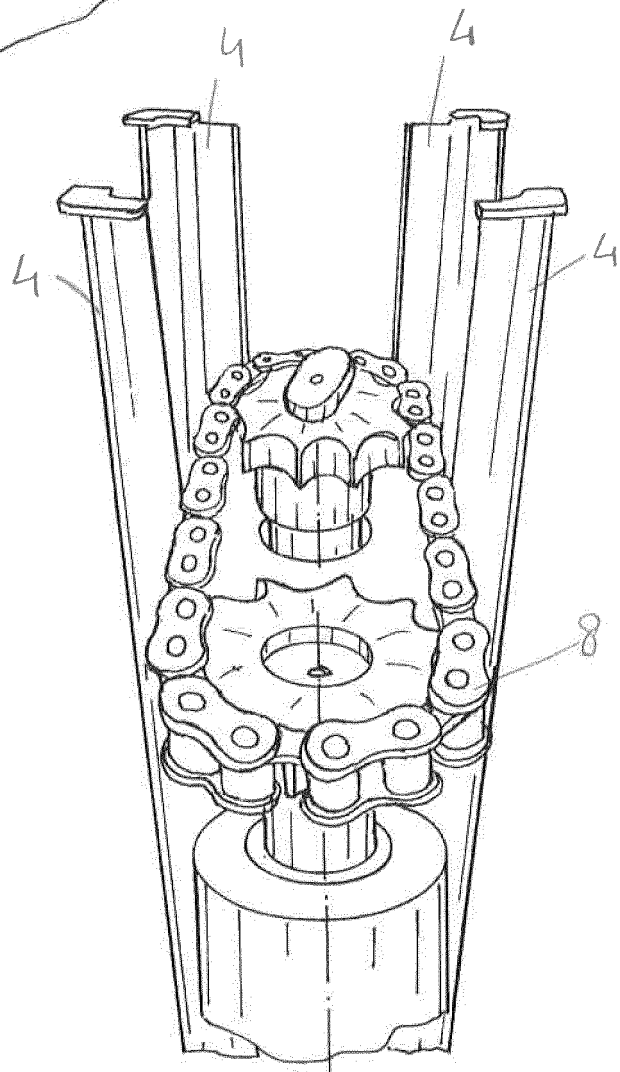


FIG.1



**FIG.2**



**FIG.3**



## EUROPEAN SEARCH REPORT

Application Number  
EP 15 17 5904

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 2 071 114 A2 (DORMA GMBH & CO KG [DE]) 17 June 2009 (2009-06-17)	1,2,4-7, 9-11	INV. E05F15/614 E05F15/627
Y	* column 4, line 56 - column 5, line 25 * * column 5, line 44 - line 52 * * paragraph [0026]; claims 1-3,5,6,14; figures 1-4 *	3	
X	FR 2 892 756 A1 (LIPPI LA CLOTURE SARL [FR]) 4 May 2007 (2007-05-04) * page 6, line 16 - page 8, line 14; figures 2,3 *	1,2,4, 6-11	
Y	WO 00/46476 A2 (KOWALCZYK THOMAS M [US]; HASS BRIAN D [US]) 10 August 2000 (2000-08-10) * page 37, line 13 - page 38, line 9; figure 15 *	3	
			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		4 December 2015	Guillaume, Geert
CATEGORY OF CITED DOCUMENTS			
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 15 17 5904

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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