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(72) Inventors:
• **BENINCA', Luigi**
36066 Sandrigo (VI) (IT)
• **VANIN, Daniele**
36066 Sandrigo (VI) (IT)

(74) Representative: **Burchielli, Riccardo et al**
Barzano & Zanardo Roma S.p.A.
Via Piemonte 26
00187 Roma (IT)

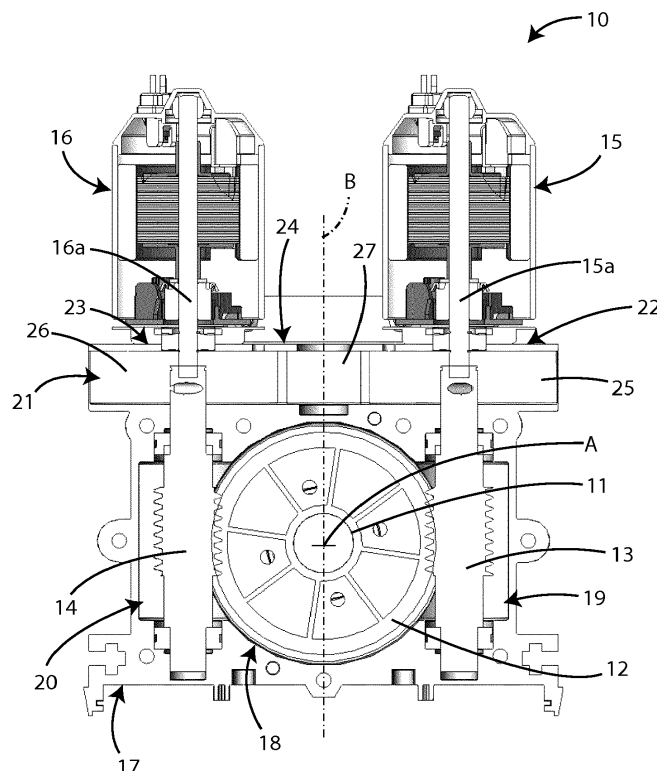
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(71) Applicant: **Automatismi Beninca' S.p.A.**
36066 Sandrigo (VI) (IT)

(54) APPARATUS FOR OPERATING GATES, DOORS AND THE LIKE

(57) Apparatus (10) for operating gates, doors and the like, comprising a hub (11) connectable to a movable member of a barrier opening and comprising
- a toothed wheel (12) fixed to the hub (11) and
- at least two toothed elements (13, 14) meshing with the

toothed wheel (12) into two portions thereof which are symmetrical to one another with respect to the rotation axis (A) of the toothed wheel (12);
- at least one motor (15, 16) connected to the toothed elements (13, 14) for operating them.



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Description

[0001] The present invention relates to a operating apparatus for gates, doors and the like.

[0002] In particular, the present invention relates to an apparatus for operating of at least a movable member of an openable barrier, such as for example the doors of a door or a gate.

[0003] Nowadays, the operating apparatuses of this type of barriers are equipped with a motor to whose shaft is associated to a pinion which meshes with a toothed wheel connected to the movable member.

[0004] This kind of operating apparatuses have the drawback to have a poor mechanical efficiency and tend to be particularly expensive in case they need to transmit high torque arises, in which case they are also bulky. The problem underlying the present invention is to increase the drive efficiency.

[0005] Main aim of the present invention is to provide a operating apparatus that provides for a solution to this problem by overcoming the drawbacks of traditional drives described above.

[0006] Within this aim, it is an aim of the present invention to propose an operating apparatus which, is more compact and more efficient than conventional apparatuses suitable for transmitting the same torque. Another task of the present invention is to provide a operating apparatus which mechanical efficiency is greater than that of conventional operating apparatuses.

[0007] Another task of the present invention consists in proposing an operating apparatus that provides for a greater balance of forces and stresses as compared with traditional operating apparatuses capable of transmitting the same torque.

[0008] This aim, these tasks and others which will become apparent hereinafter are achieved by an operating apparatus according to the appended independent claim.

[0009] Detail features of the operating apparatus according to the invention are given in the corresponding dependent claims.

[0010] Further features and advantages of the invention will become apparent from the description of a preferred, but not exclusive embodiment of a operating apparatus according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, in which the figure shows a cross section of a operating apparatus according to the present invention.

[0011] With particular reference to the abovementioned figure, numeral 10 a operating apparatus for gates, doors and the like, comprising a hub 11 connectable to a movable member of an openable barrier and that in accordance with the present invention has a particular characteristic in the fact it comprises

- a toothed wheel 12 fixed to said hub 11 and
- at least two toothed elements 13, 14 meshing with the toothed wheel 12 into two portions thereof and which are symmetrical with respect to the rotation

axis A of the toothed wheel 12;

- at least one motor 15, 16 connected to the toothed elements 13, 14 to actuate them.

[0012] This configuration has an efficient balancing of stresses, with respect to the rotation axis A of the toothed wheel 12.

[0013] Also it turned out to allow effective recovery of the plays.

[0014] The cooperation of the two toothed elements 13 and 14 in transmitting a force to the gear wheel 12 can allow to reduce their size and allow to employ less expensive components compared to traditional solutions. This effect is particularly optimized in an embodiment of the operating apparatus 10, according to the present invention, in which the toothed elements 13, 14 are preferably constituted by helical screws meshing tangentially with the gear wheel 12, substantially by providing a worm gear.

[0015] To simplify the structure and allow the use of low power engines, preferably the operating apparatus 10 comprises two motors 15, 16 each having its own motor shaft 15a, 16a fixed to a corresponding one of the toothed elements 13, 14.

[0016] The motors 15, 16 in this case are mutually connected or controlled in a unified manner so as to actuate, in use, the toothed elements 13, 14 in a coordinated and preferably synchronous manner.

[0017] Preferably the motors 15, 16 are step motors.

[0018] Alternatively to the solution with two motors 15 and 16, may be provided a single motor, not shown, in which case, the operating apparatus 10 advantageously includes a transmission unit, not shown, connected to both toothed elements 13, 14 to determine a synchronous movement. Preferably, this transmission unit consists of a gear comprising two first toothed wheels fixed to the toothed elements 13 and 14 and at least a second gearwheel meshing with the first toothed wheels for synchronously transmit torque between them.

[0019] An enhanced constructional simplicity and structural solidity are both achieved by providing an operating apparatus that includes a casing 17 having:

- a first housing 18 for the toothed wheel 12, equipped with suitable media to support it in use allowing the rotation about its rotation axis A;
- second and third housings 19 and 20, placed on opposite sides of the first housing 18 and each equipped with media acting so as to support one of the toothed elements 13, 14 so as to hold in use the toothed elements 13, 14 at a preset distance from the rotation axis A of the toothed wheel 12, to make them effectively mesh with the latter. Particularly advantageous is the case in which the casing 17 includes contextually;
- an internal seat 21 for a mechanical transmission group suitable for transmitting motion, in a synchronous way, between the toothed elements 13, 14;

- at least three mounting seats 22, 23, 24 for motors 15 and 16 for driving the toothed elements 13, 14.

[0020] This solution allows maximum flexibility of installation allowing to predict in individual motor and the mechanical transmission, housed in the inner seat, or two motors 15, 16 directly connected to the toothed elements.

[0021] In a simple and effective version, the internal seat 21 comprises three compartments 25, 26, 27 for toothed wheels, positioned side by side.

[0022] A first 25 and a second 26 of the compartments 25, 26, 27 are configured to support two corresponding toothed wheels coaxially with respect to each of the toothed elements 13, 14.

[0023] The third 27 of the compartments 25, 26, 27 is placed between the first 25 and second compartment 26 and is configured to support a toothed wheel in a rotatable way about an operating axis B.

[0024] The first 22 and second 23 of the mounting seats 22, 23, 24 are configured so as to support each of a corresponding motor 15, 16 in a position coaxial to a corresponding one of the toothed elements 13, 14. The third 24 of the fixing housings 22, 23, 24 is configured so as to support a corresponding motor in a coaxial position with respect to the operating axis B.

[0025] The mechanical transmission that can be housed in the internal seat 21 preferably is constituted by the gear described above.

[0026] The invention thus conceived is susceptible to numerous modifications and variants, all falling within the scope of the appended claims. Moreover, all the details may be replaced with other technically equivalent elements.

[0027] In practice, the materials employed, as well as the shapes and the dimensions, may be varied depending on the contingent requirements and of the state of the art.

[0028] Where the constructional features and techniques mentioned in the following claims are followed by reference signs or numbers, such signs and reference numbers have been applied with the sole purpose of increasing the intelligibility of the claims and consequently, they do not constitute in any way a limitation of the interpretation of each element identified, purely by way of example, by such signs and reference numbers.

Claims

1. Apparatus (10) for operating gates, doors and the like, comprising a hub (11) connectable to a movable member of a barrier opening and **characterized by** comprising

- a toothed wheel (12) fixed to said hub (11) and
- at least two toothed elements (13, 14) meshing with said toothed wheel (12) into two portions

thereof which are symmetrical to one another with respect to the rotation axis (A) of said toothed wheel (12);

- at least one motor (15, 16) connected to said toothed elements (13, 14) to actuating the latter.

2. Operating apparatus (10) according to claim 1, **characterized in that** said toothed elements (13, 14) are helical screws that mesh tangentially with said toothed wheel (12).

3. Operating apparatus (10) according to one of the preceding claims **characterized in that** it comprises two motors (15, 16) each having its own drive shaft (15a, 16a) fixed to a corresponding one of said toothed elements (13, 14); said motors (15, 16) being mutually connected or controlled so as to actuate, in use, said toothed elements (13, 14) in a coordinated manner and preferably synchronously.

4. Operating apparatus (10) according to one of the preceding claims **characterized in that** it comprises a transmission unit connected to both said toothed elements (13, 14) to cause a synchronous movement.

5. Operating apparatus (10) according to one of the preceding claims **characterized in that** it comprises a casing (17) having:

- a first housing (18) for said toothed wheel (12) equipped with means for supporting the latter, in use, and for allowing the rotation about its rotation axis (A);
- a second and a third housings (19, 20), placed on opposite sides of said first housing (18) and each fitted with supports adapted to support one of said toothed elements (13, 14) so as to retain said elements in use gears (13, 14) to a predefined distance from the rotation axis (A) of said toothed wheel (12).

6. Operating apparatus (10) according to claim 5 **characterized in that** said casing (17) comprises contextually;

- an internal seat (21) for housing a mechanical transmission group for transmitting motion, in a synchronous manner, between said toothed elements (13, 14);
- at least three fastening seats (22, 23, 24) for the motors (15, 16) for actuating said toothed elements (13, 14).

7. Operating apparatus (10) according to claim 6 **characterized in that** said internal seat (21) comprises three compartments (25, 26, 27) for toothed wheels,

positioned side by side each other; a first (25) and a second (26) of said compartments (25, 26, 27) being configured to support two toothed wheels in positions corresponding to each of said coaxial toothed elements (13, 14); the third (27) of said compartments (25, 26, 27) being positioned between said first compartment (25) and said second compartment (26) and configured to support a toothed wheel (12) rotatably above an operating axis (B); said first (22) and a second (23) of said fastening seats (22, 23, 24) are configured so as to support each a corresponding motor (15, 16) in a position coaxial to a corresponding one of said toothed elements (13, 14), a third (24) of said fastening seats (22, 23, 24) being configured so as to support a corresponding motor in a position coaxial with said operating axis (B).

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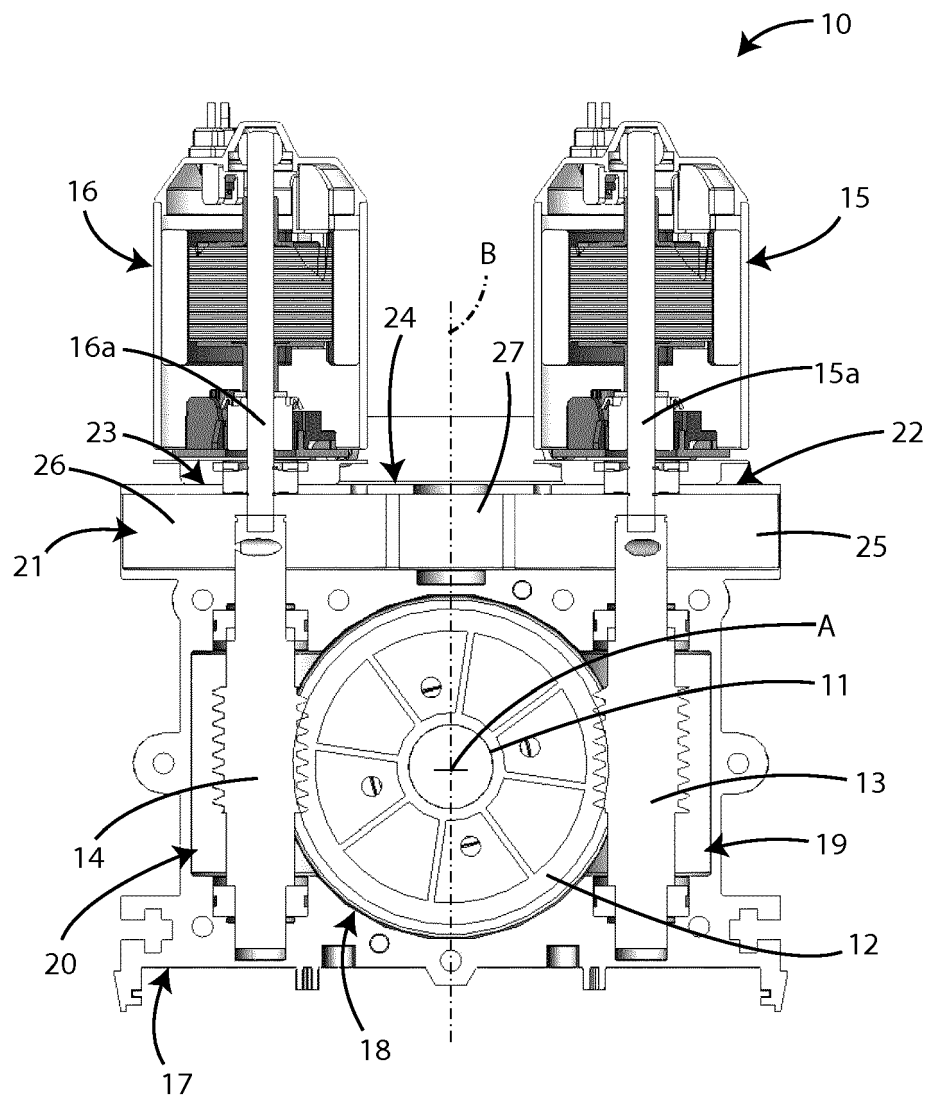
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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 6223

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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	DE 10 2006 059224 A1 (DORMA GMBH & CO KG [DE]) 19 June 2008 (2008-06-19)	1-5	INV.
A	* paragraphs [0105] - [0106]; figures 8A, 9A, 10A *	6,7	E05F15/611 E05F15/614 E05F15/603
X	DE 10 2006 059284 A1 (DORMA GMBH & CO KG [DE]) 19 June 2008 (2008-06-19) * paragraph [0009]; figures *	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 May 2016	Examiner Witasse-Moreau, C
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.**

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The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102006059224 A1	19-06-2008	NONE	

DE 102006059284 A1	19-06-2008	NONE	

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