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(54) **OPERATOR FOR PIVOTING DOORS AND GATES AND METHOD FOR THE INSTALLATION OF THE SAME**

(57) It is a piston operator for pivoting doors and gates, of the type which provides that the operator (3) is bound to a fixed pillar (2) by means of a bracket (4) which is integral with said pillar, said bracket having a hole (8) at its end portion facing the bracket, a bottom (5) is provided in which a pin (7) is inserted penetrating into said hole (8). The invention also relates to a method for the installation of said operator. Said method is characterised in that the pin (7) is arranged within the holes (8, 12, 13), at its upper end there being provided a permanent magnet (11) which attracts it by ferromagnetic attraction, keeping it into position without integrality between said pin (7) and said magnet (11); the substantial contact between said pin (7) and said magnet (11) only takes place in the installed position.

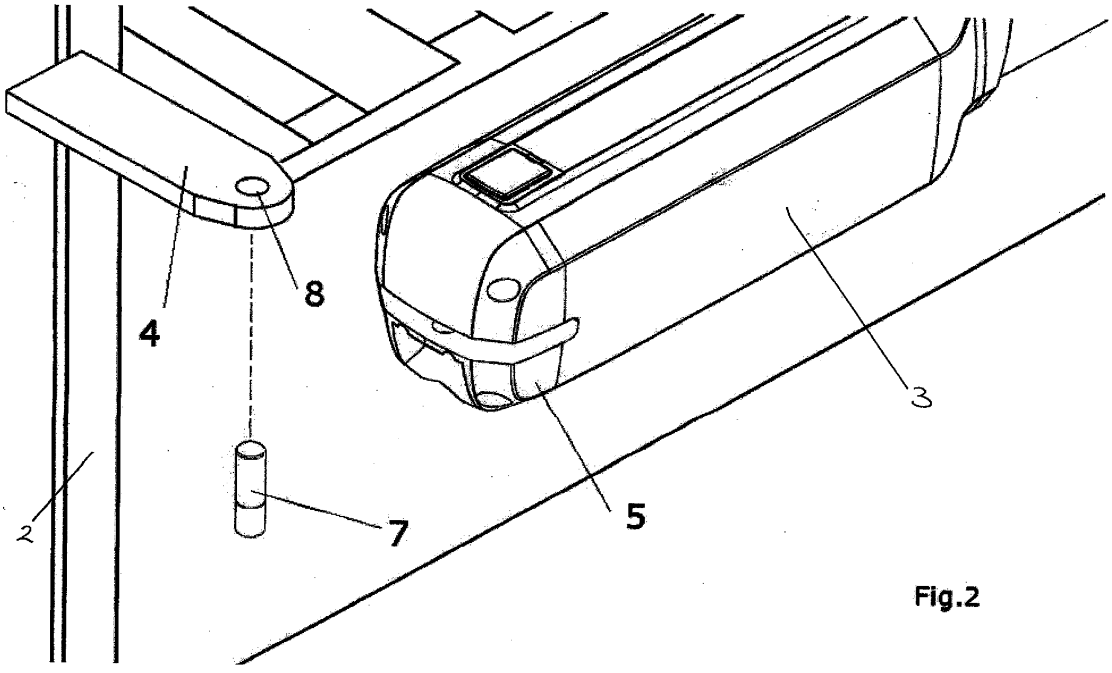

Fig.2

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Description

[0001] of the invention ENTITLED: "Piston operator for pivoting doors and gates and method for the installation of the same" on behalf of BFT S.p.A.

[0002] The present invention relates to a piston operator for pivoting doors and gates according to the general part of claim 1.

[0003] The invention also relates to a method for the installation of the same.

[0004] It is known that piston operators with electric or hydraulic drive are often used to use pivoting doors and gates. The motor is normally implemented at the site where the door or gate is installed.

[0005] In most cases, the operators consist of variable-length linear actuators. In particular, a back bottom of the actuator is provided, which actually consists of one of the ends of the enclosure of the piston operator, which is fastened to a side pillar which supports the gate door by means of a bracket. Opening/closing the gate door is made by changing the overall length of the operator, by varying the length of the arm that goes out of or returns into the central station of the operator. In this way, the overall length of the actuator is changed and a thrust or pulling force is exerted on a bracket, in turn bound to the other end of the door or gate. The geometry and configuration of the devices used may vary depending on the required opening area, on the door geometry and on the position of the side pillar. The complete extraction of the final section of the arm from the central section corresponds to the closed position of the door, while the return of the arm of the central section, to achieve the minimum length of its outer door with respect to the central section, corresponds to the open position of the door.

[0006] Currently, the constraint of the actuator to the pillar is obtained by means of a bracket bound to said pillar and provided with a hole at its end portion. In particular, a bottom is provided in the actuator at its end portion facing the bracket, in which said pin is inserted, which passes through a pair of superimposed and coaxial holes present in the so-called bottom. Said holes are arranged so that they match the hole in the bracket, so that when the pin is inserted in the holes, the insertion of the pin into the hole of the bracket occurs simultaneously. Of course, it is necessary to keep said pin into position within the bottom. One of the solutions used for this purpose is to use an outer stop ring, of the per se known type, of the so-called "Seeger" type, which is applied to the upper end portion of the pin. In order to apply the stop it is necessary to have special pliers available, also called "Seeger", so as to provide for an adequate opening in the bottom so that it may be inserted within the same.

[0007] Alternatively, the pin will be externally threaded (in other words, more than a pin it will actually be a bolt), which is coupled to a threaded nut inserted and held in position in an appropriate seat made inside the bottom. However, the seat of the threaded nut is subject to considerable stress, which can lead to its breakage and then to the exit of the nut from the seat or, therefore, to the lack of connection between bracket and bottom, which ultimately causes the impossibility to use the operator.

[0008] Examples of such operators can be found in documents EP 0713032A2 and FR 2827332A1.

[0009] The object of the present invention is to provide a method for the installation of a piston operator for pivoting doors and gates which is able to overcome the drawbacks described above.

[0010] A further object of the invention is to use a method for the installation of a piston operator which is quick and easy to implement.

[0011] Said piston operator should be simple from the constructive point of view, without giving rise to any complications regarding its operation.

[0012] This is achieved, according to invention, with the piston operator according to the characterising part of claim 1 and with the method according to the characterising part of claim 2.

[0013] These and other features of the invention will be described in detail hereinafter with reference to every particular embodiment thereof, made only by way of non-limiting example with the aid of the accompanying drawings, in which:

- fig. 1 shows a motorized swing door to which a piston operator according to the invention is applied;
- fig. 2 shows an assembly layout of the pin securing the actuator to the door;
- fig. 3 shows a vertical section view of the bottom present in the operator of the invention, with the various members present therein.

[0014] As is seen in particular in fig. 1, the piston operator for pivoting doors and gates of the invention, in this case applied to a door 1, is of the type that provides that operator 3 is bound to a fixed pillar 2 by means of a bracket 4, integral with said pillar. In particular, an arm 9 is provided, which exits from or enters into the central section, thereby changing the overall length of the operator and exerting a thrust or pulling force on a further bracket 6, bound to door 1. As is easy to understand, the complete extraction of the end section of arm 9 from the central section 10 corresponds to the closed position of the door, while the reduction to the minimum length of arm 9, due to its return into the central section 10, corresponds to the open position of door 1 which pivots, as will be better seen hereinafter, about a special connecting pin between the bottom and the bracket, thereby allowing the rotation of the arm with respect to bracket 4 bound to pillar 2.

[0015] As shown in fig. 2, in particular, pin 7 is inserted into hole 87 present in bracket 4, said pin 7 passing through bottom 5 and operator 3.

[0016] As shown in fig. 3, there is a pair of holes 12, 13 in bottom 5 which, in this particular embodiment of the invention, are made on a pair of plates 15 and 16, respectively. Said holes 12 and 13 are arranged in such

a way as to be mutually coaxial and overlapping during the actual operation of the operator.

[0017] According to the invention, it is provided for the pin 7 to be arranged within holes 12 and 13, making sure that also bracket 4 in which there is hole 4 is inserted into the bottom, so that holes 8, 12 and 13 are aligned; in particular, it is provided for the pin 7 to be made of ferromagnetic material and in order to keep said pin into position, a permanent magnet 11 is arranged at its upper end, advantageously inserted into a special seat 20, said magnet 11 having the function of keeping pin 7 into position but without integrality between pin 7 and magnet 11; in fact, the substantial contact between said magnet 11 and said pin 7 only occurs in the installed position.

[0018] The force exerted by the magnet on the pin still allows a possibility of mutual rotation between said two elements, mainly due to frictions generated on the pin due to the sliding on the inner surfaces of holes 12 and 13. Moreover, magnet 11 has the ability to make small vertical movements, due to the presence of axial loads and due to possible deformations of the holes in which the pin is inserted.

[0019] It is therefore seen that with the method of the invention, it is not necessary to apply any ring or locking pin, as it is not necessary to tighten the pin, since there is no type of threading.

[0020] Therefore, the method of installation is particularly quick and fast and the overall cost of the piston operator according to the invention is certainly comparable with that of similar operators of the per se known type.

[0021] It is noted that the present invention may also take embodiments and aspects other than those illustrated and described above, without prejudice to its essential features, without departing from the scope of the patent.

Claims

1. PISTON OPERATOR (3) FOR PIVOTING DOORS AND GATES, of the type having a bottom (5), consisting of one of the ends of the enclosure of the piston operator, in which two superimposed and coaxial holes (12, 13) are made, between which a bracket (4) can be arranged integral to the door or gate support pillar, which has a hole (8) that can be aligned with the pair of holes (12, 13), a pin (7) being inserted in said holes (8, 12, 13) adapted to allow the fixing of the bottom (5) and thereby of the entire operator to the bracket (4), said that operator being **characterised in that** said pin (7) is made of ferromagnetic material and **in that** keeping the pin (7) into position is ensured by a magnet (11), placed at the upper end of said pin (7) without integrality between the pin (7) and the magnet (11), the substantial contact between said pin (7) and said magnet (11) occurring only in installed position.

2. METHOD FOR THE INSTALLATION OF A PISTON OPERATOR (3) FOR PIVOTING DOORS AND GATES, according to claim 1, of the type which provides that the operator is bound to a fixed pillar (2) by means of a bracket (4) which is integral with said pillar, said bracket having a hole (8) at its end portion facing the bracket, a bottom (5) being provided in which a pin (7) is inserted penetrating into said hole (8), passing through a pair of superimposed and coaxial holes (12, 13) present in said bottom, said holes (12, 13) being made to match the hole (8) of the bracket (4), the method being **characterised in that** it is provided the arrangement of the pin (7) within the holes (8, 12, 13), at the upper end of said pin, there being provided a permanent magnet (11) arranged within the bottom (5) and adapted to attract it by ferromagnetic attraction, keeping it into position without integrality between said pin (7) and said magnet (11), the substantial contact between the magnet (11) and the pin (7) occurring only in the installed position.

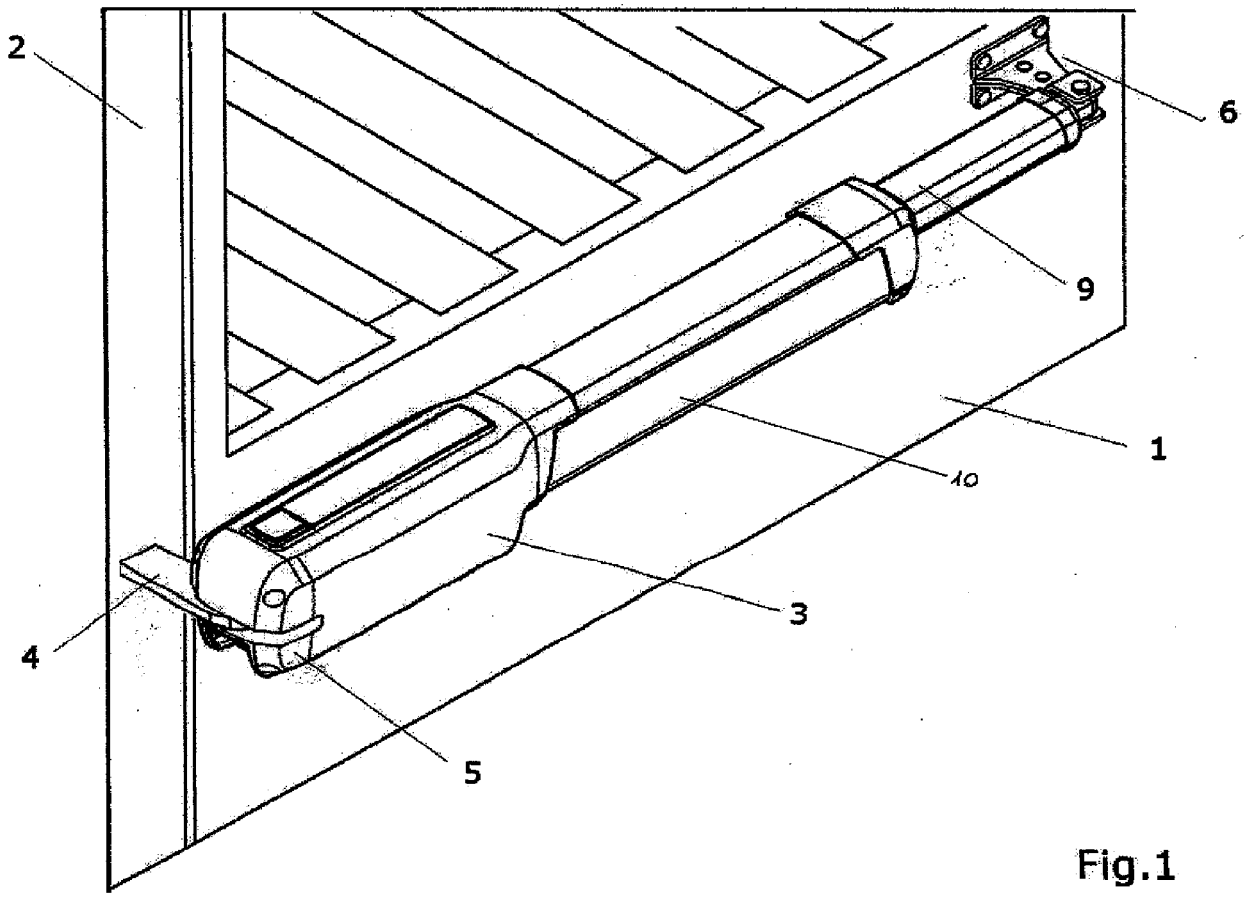

Fig.1

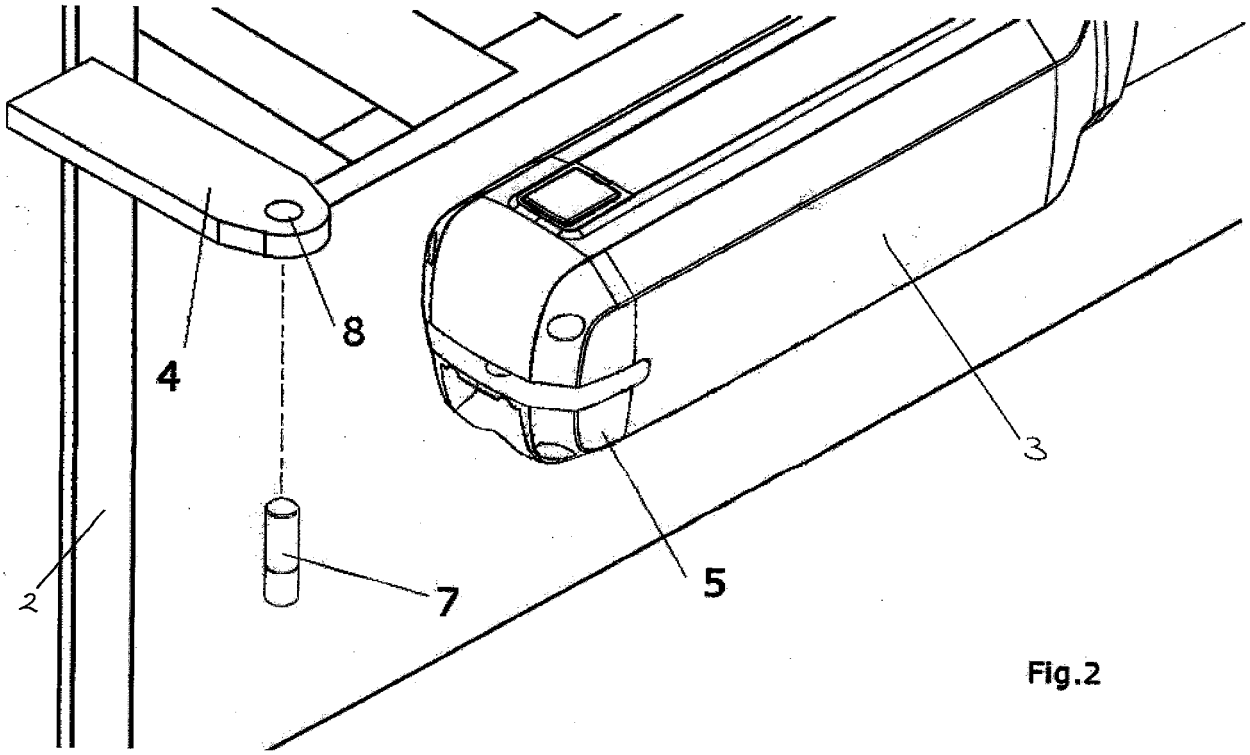

Fig.2

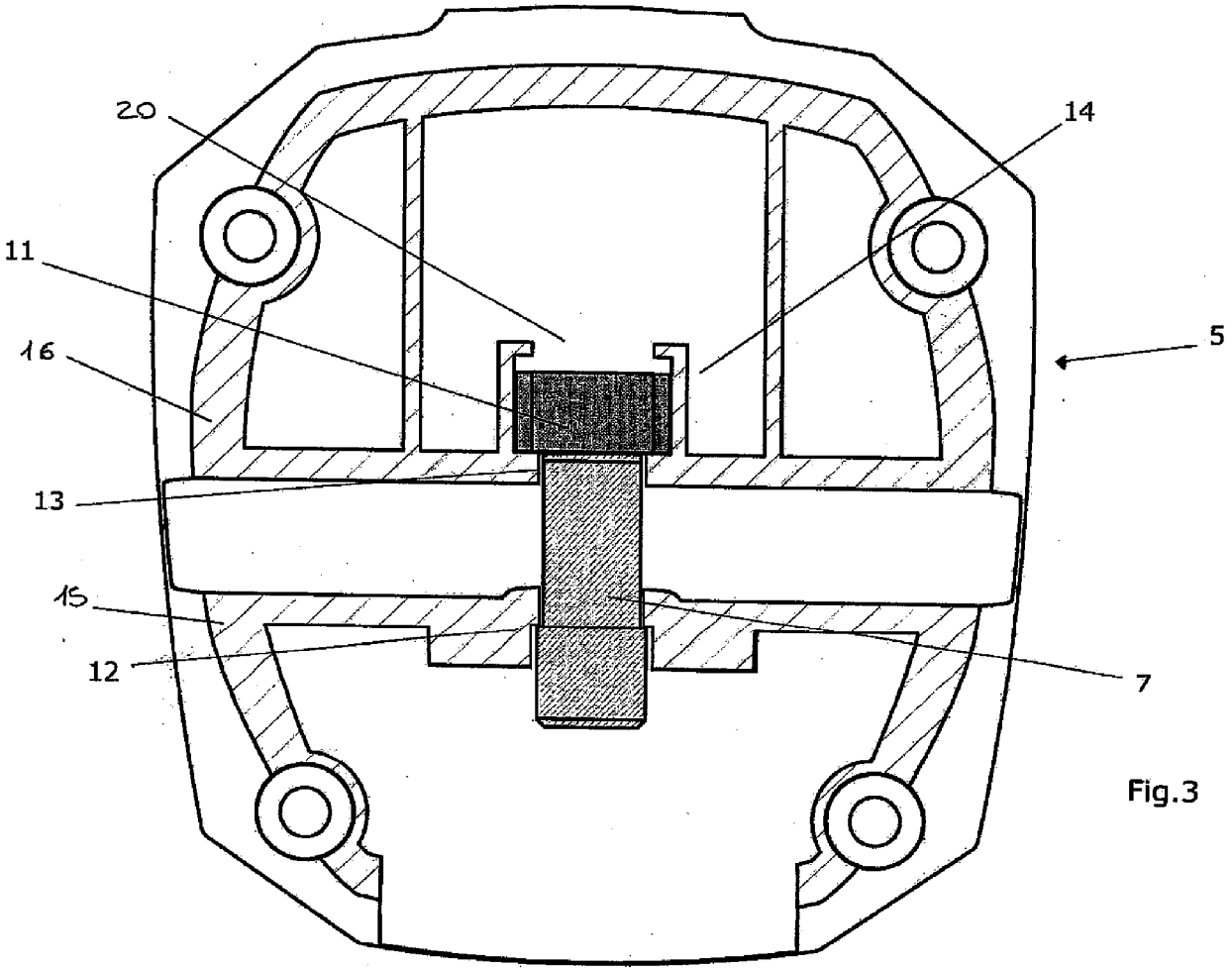

Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 6147

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 713 032 A2 (APRIMATIC SPA [IT]) 22 May 1996 (1996-05-22) * column 2, lines 48-55 * * figure 1 *	1,2	INV. E05F15/616 E05D5/12
A	FR 2 827 332 A1 (VIAL J J [FR]) 17 January 2003 (2003-01-17) * page 5, line 20 - page 6, line 21 * * figures 1-5 *	1,2	
A	US 8 522 400 B1 (JABLONSKI P [US]) 3 September 2013 (2013-09-03) * figure 2 * * column 2, line 50 - column 3, line 51 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC) E05F E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 August 2016	Mund, André

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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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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19-08-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0713032 A2	22-05-1996	EP 0713032 A2	22-05-1996
		IT BO940190 U1	15-05-1996
FR 2827332 A1	17-01-2003	FR 2827332 A1	17-01-2003
		IT MI20021515 A1	12-01-2004
US 8522400 B1	03-09-2013	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0713032 A2 **[0008]**
- FR 2827332 A1 **[0008]**