(19) Europäisches Patentamt
European Patent Office
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(11) **EP 1 857 685 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.11.2007 Bulletin 2007/47

(51) Int Cl.:
F15B 15/06 *(2006.01)*

(21) Application number: **07009277.0**

(22) Date of filing: **09.05.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **15.05.2006 IT MI20060952**

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(54) **Fluid-operated actuator with improved structure**

(57) A fluid-operated actuator with improved structure, comprising an outer enclosure (2) for containing the mutually opposite pistons (3) provided with racks (4) for engagement with a pinion (5) formed on an actuation pivot (6) which can be accessed from the outside, the outer enclosure (2) being constituted by a central body (10) which is closed by two head blocks (11), the head blocks (11) defining at least partially the chambers (20) for the hermetic sliding of the pistons (3).

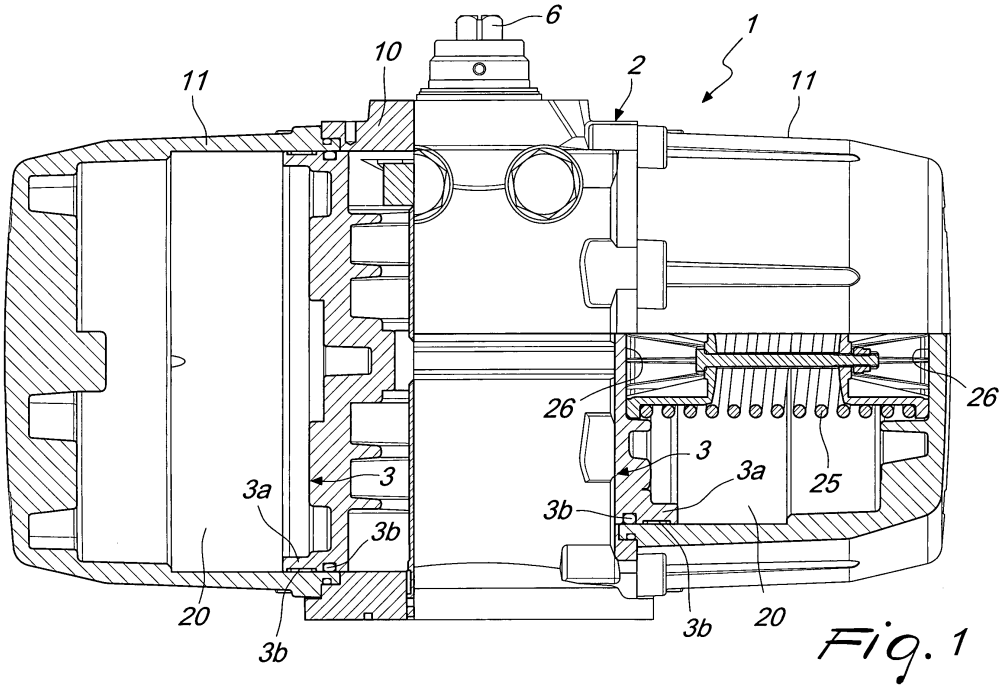

Fig. 1

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Description

[0001] The present invention relates to a fluid-operated actuator with improved structure.

[0002] As is known, fluid-operated actuators, typically of the pneumatic type, are provided with an outer enclosure which is formed by three parts and specifically a central body and two end head blocks, which in practice are designed to close the chambers defined inside the central body, in which two mutually opposite pistons can slide, such pistons having rack-like portions which engage a pinion defined on the central shaft or actuation pivot which can be accessed externally.

[0003] With this structural embodiment, the central part of the outer enclosure generally has considerable dimensions, especially if compared to the head blocks, which in practice are simply constituted by closure end plates.

[0004] With this type of structure, castings having greatly different dimensions are provided, and it is further necessary to perform machining on parts which have greatly different dimensions, in many cases requiring the resort to very complex equipment.

[0005] Another problem is related to the correct alignment of the pistons and of the movement of the springs which generally produce the return stroke of the pistons.

[0006] The aim of the invention is to provide a fluid-operated actuator with improved structure which allows to obtain the outer enclosure with components which substantially have equivalent dimensions, allowing to provide castings and machining on parts which have similar dimensions and space occupations.

[0007] Within this aim, an object of the invention is to provide a fluid-operated actuator in which the concentricity of the head blocks with respect to the pistons is improved, allowing to achieve an improved alignment on the horizontal axis, with a consequent improved movement of the springs, the seats whereof are more aligned.

[0008] Another object of the present invention is to provide a fluid-operated actuator which, thanks to its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

[0009] Still another object of the present invention is to provide a fluid-operated actuator which can be obtained easily starting from commonly commercially available elements and materials and is also competitive from a merely economical standpoint.

[0010] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a fluid-operated actuator with improved structure, according to the invention, comprising an outer enclosure for containing the mutually opposite pistons provided with racks for engagement with a pinion formed on an actuation pivot which can be accessed from the outside, said outer enclosure being constituted by a central body which is closed by two head blocks, characterized in that said head blocks define at least partially the chambers for the hermetic sliding of said pistons.

[0011] Further characteristics and advantages will become better apparent from the description of a preferred but not exclusive embodiment of a fluid-operated actuator with improved structure, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional view of the actuator according to the invention, illustrating its components;

Figures 2 and 3 are schematic sectional views of the actuator, taken along a diametrical plane, with the pistons in two different operating positions.

[0012] With reference to the figures, the fluid-operated actuator with improved structure according to the invention, generally designated by the reference numeral 1, comprises an outer enclosure 2, which contains mutually opposite pistons 3, of a per se known type, which are provided with respective racks 4, which mesh with a pinion 5 provided on a central shaft or actuation pivot 6, which protrudes from the outer enclosure.

[0013] The outer enclosure 2 is provided by means of a central body 10, which rotatably supports the pivot 6 and is closed at its ends by head blocks 11, both the central body 10 and the head blocks 11, having preferably similar dimensions.

[0014] The peculiarity of the invention consists in that the head blocks 11 define chambers 20, formed therein, as shown in Figure 2-3, for the hermetic sliding of the head 3a of the pistons 3, so that in practice the hermetic sliding of the pistons occurs exclusively within the head blocks, while the portion provided with the rack 4 is substantially accommodated within the central body 10.

[0015] For the movement of the pistons 3, ducts 21 are provided, as known in the art, which deliver air under pressure and which, in the case of a single-acting unit, allow the outflow of the air from the chambers 20 during the return stroke, which is performed by means of return springs 25 which are inserted within seats 26 defined respectively in the head 3a of the pistons and on the internal bottom or end part of the head blocks 11.

[0016] With the arrangement described above, therefore, the pistons, with the side portion of their heads 3a provided with the sealing gasket 3b, are preferably accommodated entirely within the head blocks 11, thus obtaining an overall structure of the actuator which is provided with three parts which have mutually substantially similar dimensions.

[0017] The provision of three parts which constitute the outer enclosure and are provided by means of elements having relatively similar weights and dimensions, as shown in Figure 1, makes it much easier to provide the castings and simplifies considerably the machining step, since it is possible to use machines and equipment which are not particularly large.

[0018] Moreover, accommodating the sliding head of the pistons completely within the head blocks allows to obtain a considerably improved alignment on the hori-

zontal axis with respect to other known systems in addition to having a better movement of the springs, whose seats are more aligned.

[0019] Moreover, the described arrangement allows to have an optimum symmetry of the outer enclosure for a more correct operation of the assembly.

[0020] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0021] All the details may further be replaced with other technically equivalent elements.

[0022] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements.

[0023] The disclosures in Italian Patent Application No. MI2006A000952 from which this application claims priority are incorporated herein by reference.

[0024] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A fluid-operated actuator with improved structure, comprising an outer enclosure (2) for containing the mutually opposite pistons (3) provided with racks (4) for engagement with a pinion (5) formed on an actuation pivot (6) which can be accessed from the outside, said outer enclosure (2) being constituted by a central body (10) which is closed by two head blocks (11), **characterized in that** said head blocks (11) defined at least partially the chambers (20) for the hermetic sliding of said pistons (3).

2. The fluid-operated actuator according to claim 1, **characterized in that** the head (3a) of said pistons (3) is accommodated exclusively within said head blocks (11) and the portion provided with said rack (4) is accommodated substantially in said central body (10).

3. The actuator according to one or more of the preceding claims, **characterized in that** said central body (10) and said head blocks (11) have substantially similar dimensions and space occupations.

4. The actuator according to one or more of the preceding claims, **characterized in that** it comprises return springs (25) which are accommodated within seats (26) defined respectively in said head (3a) of the pistons (3) and in the internal bottom of said head blocks (11).

5. The actuator according to one or more of the preceding claims, **characterized in that** it comprises at least one sealing gasket (3b) which is accommodated at the head (3a) of said pistons (3).

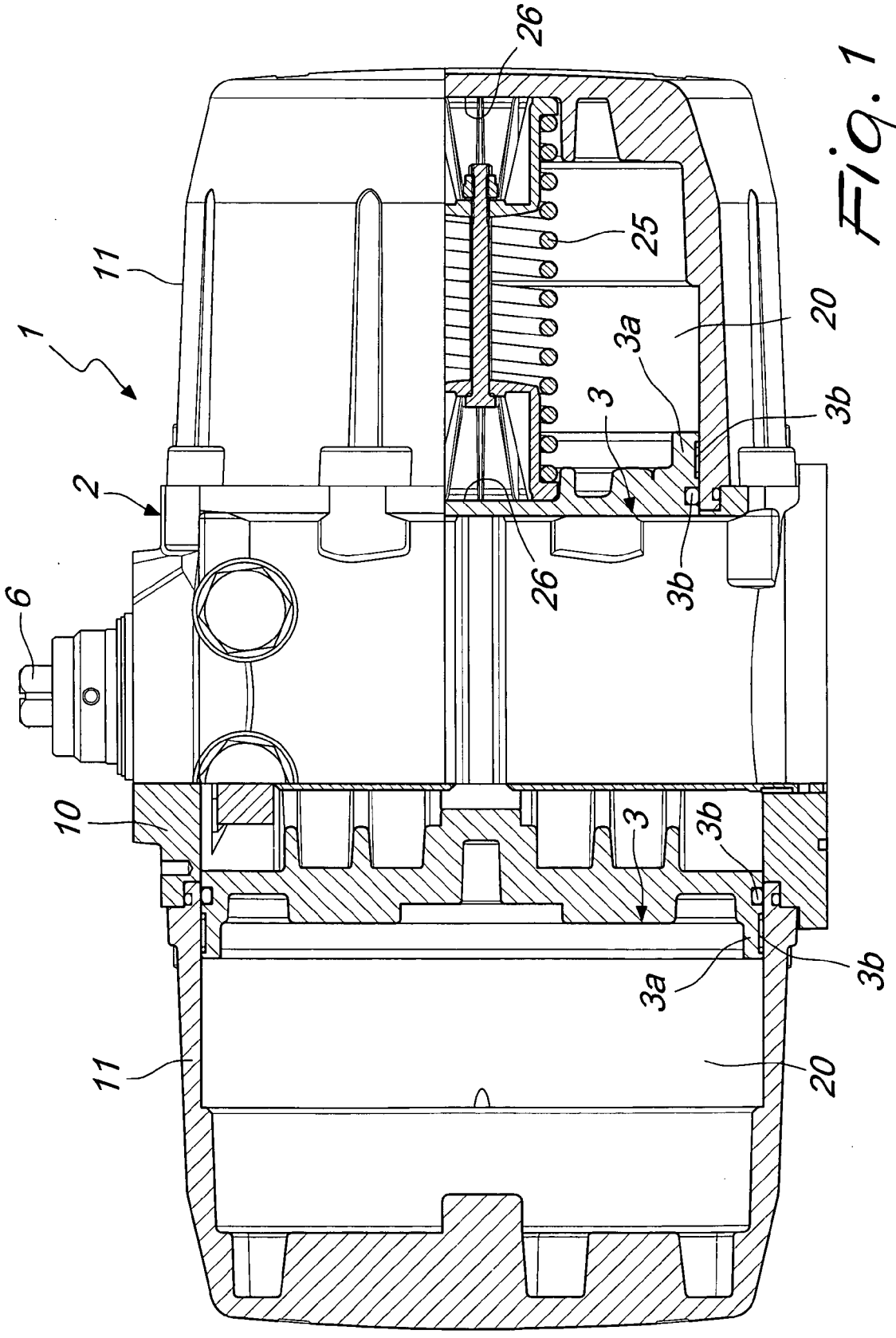

Fig. 1

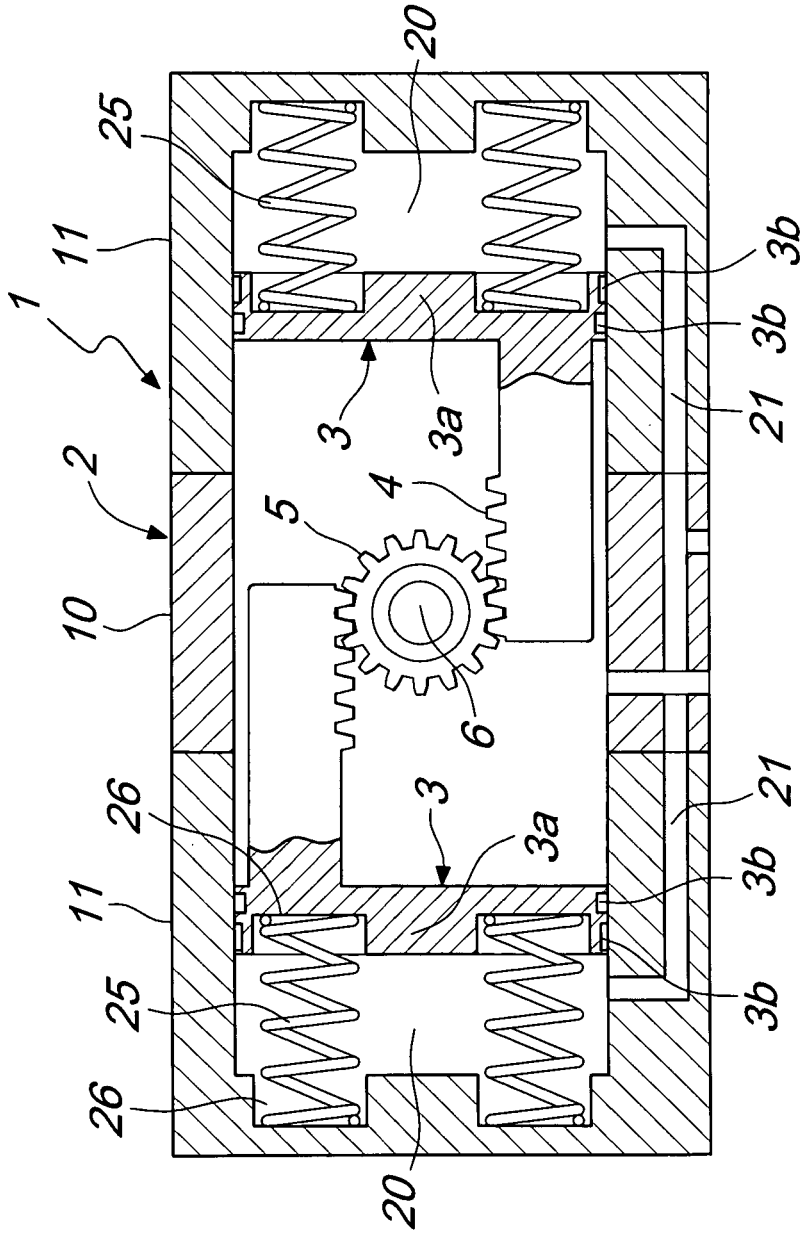

Fig. 2

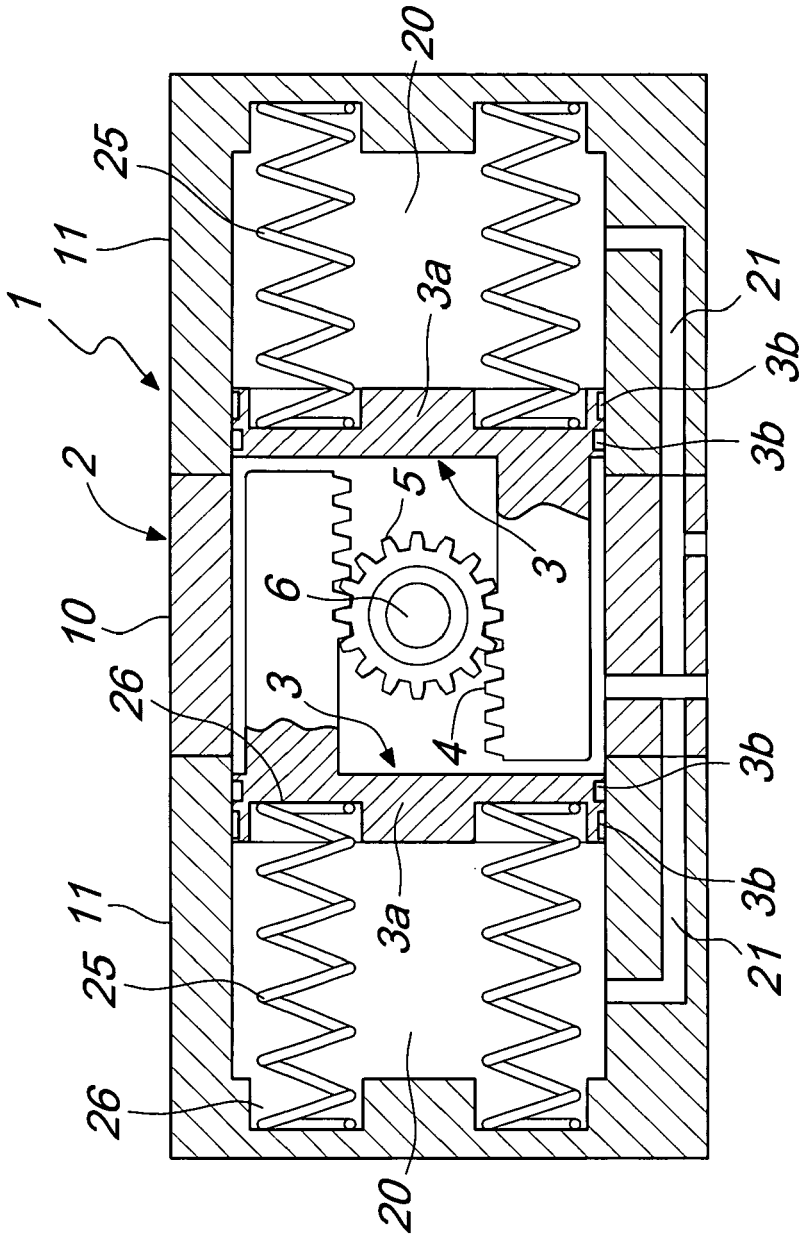

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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