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(54) **PROGRESSIVE BRAKING DEVICE FOR CLOSURES**

(57) The progressive braking device comprising a first shaft (1) whose rotation causes the movement of the closure, characterized in that it also comprises a second shaft (3) integral in rotation with the first shaft (1), and a movable element (6) along said second shaft (3) against the action of at least one spring (8), so that said at least

one spring (8) slows the rotation of said first and second shafts (1, 3).

It permits the movement of the closure by gravity at a controlled speed not using neither a motor nor its control panel for minimizing manufacturing costs.

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Description

[0001] The present invention relates to a progressive braking device, especially designed for use in fire protection systems, in particular, in closures with vertical displacement, for example, firewall curtains.

Background of the invention

[0002] In the field of security and fire protection is usual the use of closures use of vertical movement, for example, firewalls curtains, smoke curtains and the like.

[0003] The firewall curtains and smoke curtains have gear motors, with their control panel, to perform the function of winding and unwinding.

[0004] The use of these motors is that, in case of failure of energy supply, the closure or curtain can be closed at a controlled speed to avoid damages by impact to people or materials, which is known as safety system against gravity failures.

[0005] The control of the movement speed of the closure is performed by the gear motor itself, which involves higher costs in the manufacturing of such closures.

[0006] Therefore, an object of the present invention is to provide a progressive braking device designed to close the closure by gravity at a controlled speed not using neither a motor nor its corresponding control panel.

Disclosure of the invention

[0007] With progressive braking device said disadvantages are solved, presenting other advantages that will be described below.

[0008] The progressive braking device for closures according to the present invention comprises a first shaft whose rotation causes the movement of the closure, and it is characterized in that it also comprises a second shaft integral in rotation with the first shaft, and a movable element along said second shaft against the action of at least one spring, so that said at least one spring slows the rotation of said first and second shafts.

[0009] Advantageously, said second shaft is at least partially threaded, and said movable element comprises a threaded hole for its engagement to said second shafts, and between said first and second shafts a bearing is placed.

[0010] The progressive braking device according to the present invention also advantageously comprises a plurality of support rods between said movable element and said bearing, said movable element being displaceable also along said support rods.

[0011] According to a first embodiment, said at least one spring is a single spring and it is placed around said second shaft.

[0012] According to a second alternative embodiment, said at least one spring is a plurality of springs, each of which is disposed around each support rod, and each of said support rods comprises a stop element in contact

with one of the ends of each spring.

[0013] Thanks to these features, the movement of the enclosure can be made by gravity at a controlled speed not using neither a motor nor its control panel for minimizing manufacturing costs, and ensuring the closing of the curtain or closures according to an external order (fire signal, manual pushbutton, external peripherals, etc.).

Brief description of the drawings

[0014] For better understanding of what has been disclosed, some drawings in which, schematically and only by way of a non-limiting example, a practical case of embodiment is shown.

Figure 1 is a longitudinal sectional view of the device according to progressive braking according a first embodiment; and

Figure 2 is a longitudinal sectional view of the device according to progressive braking according a second embodiment.

Description of a preferred embodiment

[0015] As shown in Figure 1, the progressive brake device according to the present invention comprises a first shaft 1 that holds a curtain or closure (not shown in the figures) and whose rotation causes the movement of the curtain or closure.

[0016] The principle of the present invention is based on converting the rotational movement of the first shaft 1 that holds a curtain or closure with vertical movement into a rectilinear movement, in which an elastic mechanical strength is introduced, that as the curtain unwinds or lowers the closure, the gravitational acceleration decreases and controls its closing speed.

[0017] To this end, the progressive braking device according to the present invention comprises a socket 2 in one end of the first shaft 1, which is integral with a second shaft 3 concentric with said first shaft 1.

[0018] This second shaft 3 is connected to a fixed element 4, for example, a plate of the drawer where the curtain or closure is housed, which is provided with a bearing 5 for allowing the rotation of the socket 2 and the second shaft 3.

[0019] Said second shaft 3 is at least partially threaded and on said thread a movable element 6 provided with a threaded hole is screwed. This movable element 6 is displaced along the second shaft 3, as will be explained below.

[0020] This movable element 6 is attached to the bearing 5 by a plurality of support rods 7, and between the fixed element 4 and the movable element 6 a spring 8 is placed, which provides resistance to linear advancement of the movable element 6, obtaining a resistance to the rotation speed of the first shaft 1.

[0021] Thus, the spring 8 causes a braking effect on the movement of the closure or curtain, without using any

motor, with the corresponding savings on the costs of the braking device.

[0022] In figure 2 a second embodiment of the braking device according to the present invention is shown. For simplicity reasons, the same reference numbers are used to identify the same elements as in the previous embodiment.

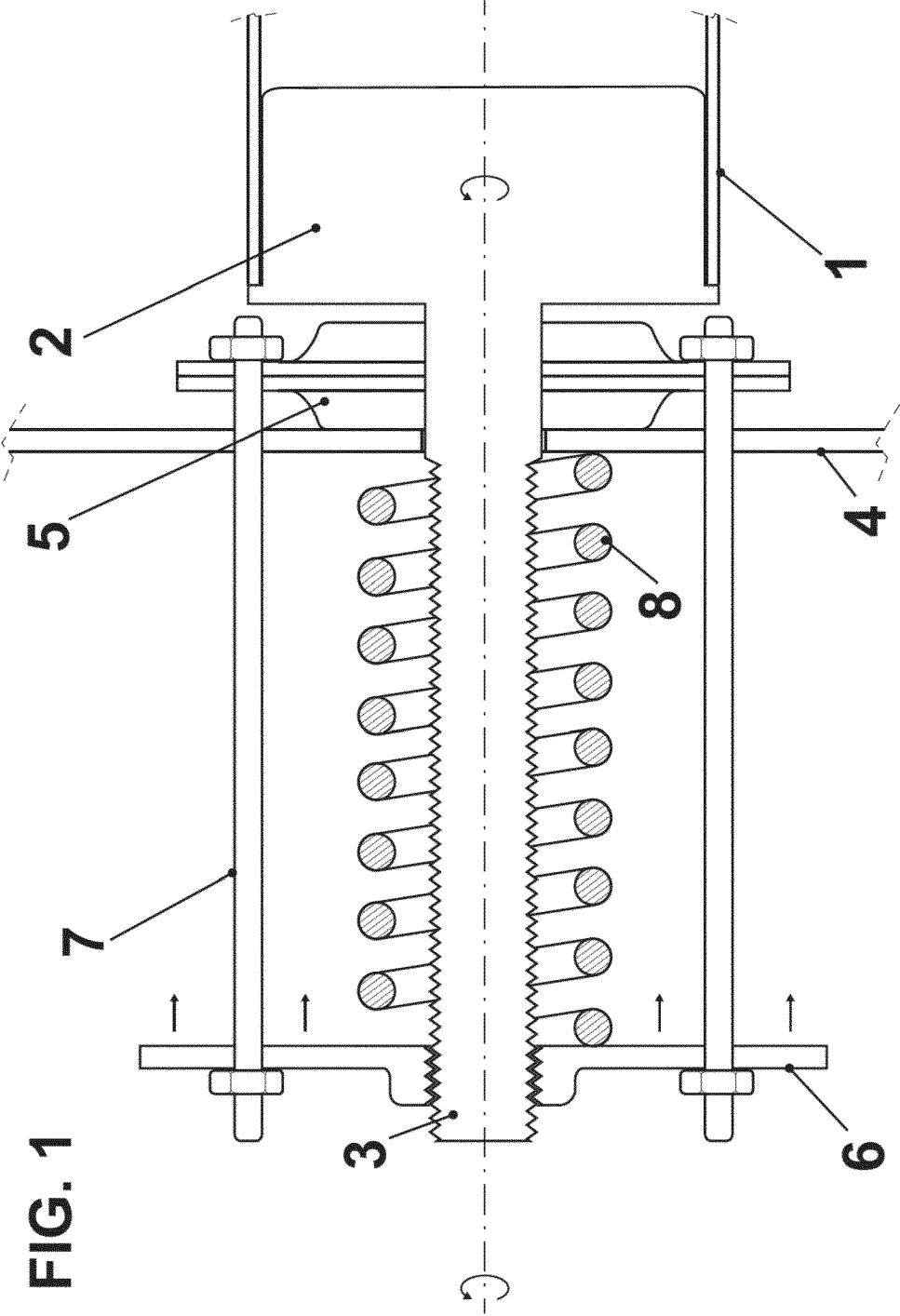
[0023] The main difference of this second embodiment from the previous embodiment is that more than one spring 8 is disposed around at least some of the rods 7. To this end, the ends of each spring 8 are in contact with the movable element 6 and a stop 9 placed at the end of the rod 7 farthest from the fixed element 4.

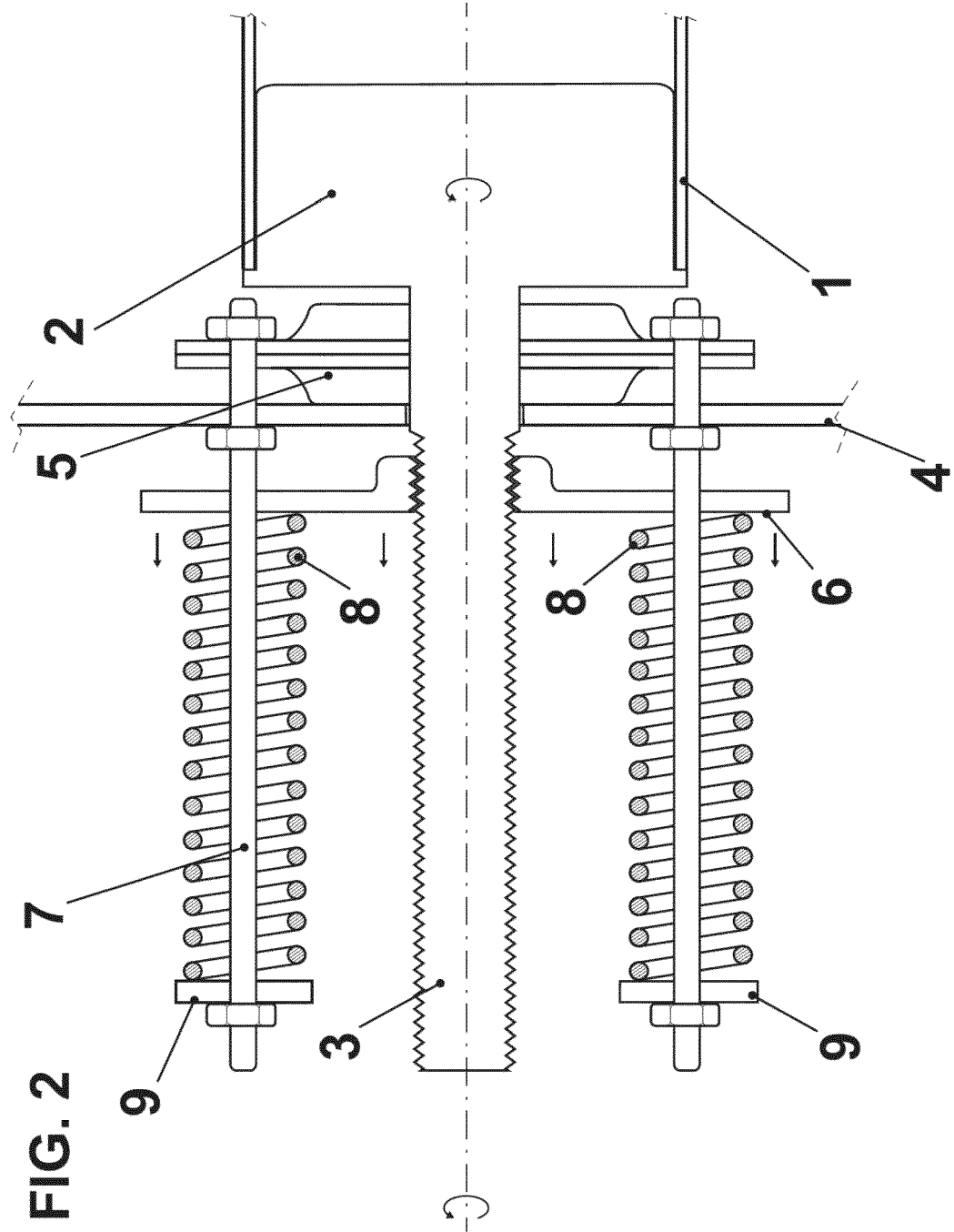
[0024] Furthermore, the movable element 6 performs a movement from the right to the left (according to figure 2) during the braking of the curtain or closure, unlike the reverse movement of the movable element 6 in the above embodiment.

[0025] Although reference has been made to specific embodiments of the invention, it is apparent to a person skilled in the art that the described progressive braking device is susceptible of numerous variations and modifications, and that all the details mentioned can be replaced by other technically equivalents, without departing from the scope of protection defined by the appended claims.

Claims

1. Progressive braking device for closures, comprising a first shaft (1) whose rotation causes the movement of the closure, **characterized in that** it also comprises a second shaft (3) integral in rotation with the first shaft (1), and a movable element (6) along said second shaft (3) against the action of at least one spring (8), so that said at least one spring (8) slows the rotation of said first and second shafts (1, 3).
2. Progressive braking device for closures according to claim 1, wherein said second shaft (3) is at least partially threaded, and said movable element (6) comprises a threaded hole its engagement to said second shaft (3).
3. Progressive braking device for closures according to claim 1, wherein between said first and second shafts (1, 3) a bearing (5) is placed.
4. Progressive braking device according to claim 1 and 3, comprising a plurality of support rods (7) between said movable element (6) and said bearing (5), said movable element (6) being displaceable also along said support rods (7).
5. Progressive braking device for closures according to claim 1, wherein said at least one spring (8) is a single spring and is placed around said second shaft (3).
6. Progressive braking device for closures according to claim 1 and 4, wherein said at least one spring (3) is a plurality of springs (3), each being placed around each support rod (7).
7. Progressive braking device for closures according to claim 6, wherein each of said support rods (7) comprises a stop element (9) in contact with one of the ends of each spring (3).







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A	WO 97/44562 A1 (SUNPROJECT SRL) 27 November 1997 (1997-11-27) * abstract; figures 1-4 *	1-7	
A	US 2010/242364 A1 (MAGRO SEBASTIAN [US]) 30 September 2010 (2010-09-30) * paragraph [0082]; claims 12,25 *	1-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 April 2017	Examiner Kofoed, Peter
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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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