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(54) **Safe, strong room or the like with explosion-resistant device**

(57) A safe, strong room or the like with explosion-resistant device has a box-like body (2) provided with an access opening and a door (3) which is associated with the body (2) and is provided with a closure system; a movable member (3) is associated with the body (2) through an elastic means (8) and is adapted to obstruct an opening formed in the body (2), the movable member has at least one normal position, in which the movable member (3) completely obstructs the opening, and an active position, in which the movable member (3) partially clears the opening, because of pressure generated inside the body (2) by an explosion, and in contrast with the elastic means (8), allowing the escape of expanded gases generated by the explosion; the elastic means (8) return the movable member (3) substantially to the normal position, in such a manner as to prevent access to the inside of the body (2), when the action of the expanded gases on the movable member (3) ends.

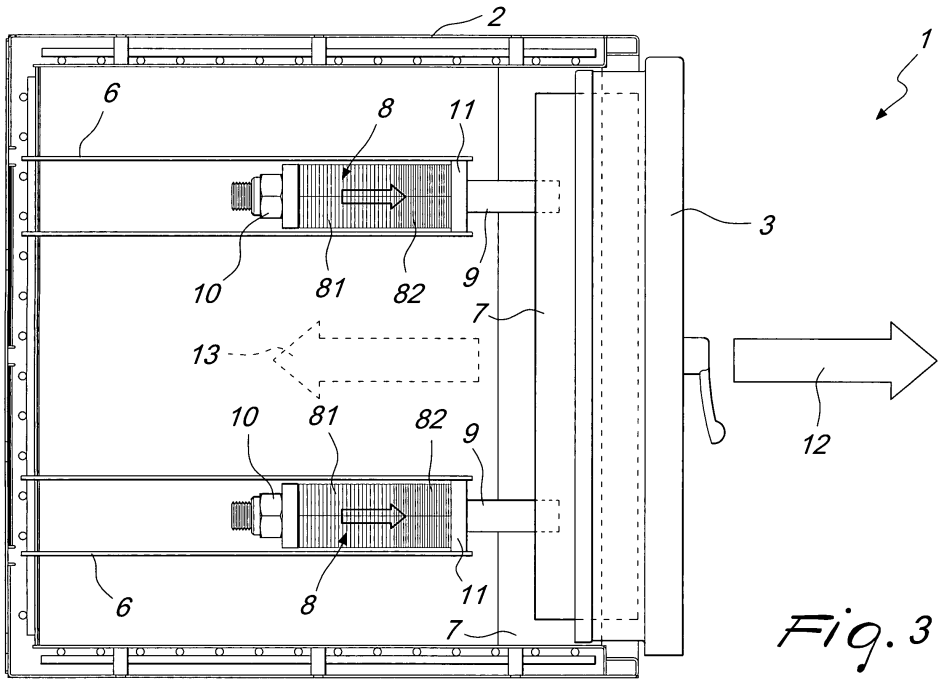

Fig. 3

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Description

[0001] The present invention relates to a safe, strong room or the like with explosion-resistant device.

[0002] One very common system for attacking strong boxes, such as ATMs, transfer safes, standard safes, etcetera, is the use of explosives.

[0003] The explosion, generated for example by introducing explosive gases in the strong box, opens the door or removes it completely.

[0004] A solution to the problem of preventing the explosion inside strong boxes is the use of anti-explosion devices based on the emission of inertizing gases.

[0005] An anti-explosion system with inertizing gas essentially includes gas sensors adapted to detect the presence of explosive gases inside the protected space in order to adjust the emission of the inertizing gas in such an amount as to prevent the explosion within the space.

[0006] If the safe does not have an inertizing gas device or, if any, the device is unable to prevent the explosion for various reasons, the partial or complete destruction of the door allows access to the inside of the safe and allows the removal of its contents.

[0007] The aim of the present invention is to provide a safe, strong room or the like, provided with a device that prevents the access to the inside of the strong box even when the explosion has occurred.

[0008] An object of the present invention is to provide a safe, strong room or the like provided with a device that is extremely reliable and capable of protecting the contents of the strong box regardless of the explosive power applied.

[0009] An object of the invention is to provide a safe, strong room or the like that by virtue of its particular constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

[0010] Another object of the present invention is to provide a safe, strong room or the like that has a structure that can be provided by using commonly commercially available elements and materials and is also competitive from an economic standpoint.

[0011] This aim and these and other objects which will become better apparent hereinafter are achieved by a safe, strong room or the like with explosion-resistant device, **characterized in that** it comprises a box-like body provided with an access opening and a door which is associated with said body and is provided with a closure system, **characterized in that** it comprises a movable member which is associated with said body through an elastic means and is adapted to obstruct an opening formed in said body, said movable member defining at least one normal position, in which said movable member completely obstructs said opening, and an active position, in which said movable member partially clears said opening, because of pressure generated inside said body by an explosion, and in contrast with said elastic means, allowing the escape of expanded gases generated by said explosion, said elastic means being adapted to return said movable member substantially to said normal position, in order to prevent access to the inside of said body, when the action of said expanded gases on said movable member ends.

[0012] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments of the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional plan view of a safe with an explosion-resistant device according to the present invention;

Figure 2 is a partially sectional side view of the safe of Figure 1, in the normal condition, with the door closed;

Figure 3 is a view, similar to the preceding one, of the safe in the condition of the initial phase of the explosion.

[0013] With reference to the cited figures, the safe according to the invention, generally designated by the reference numeral 1, comprises a body 2, having a door 3 which is associated with the body 2 by means of hinges 4. The door 3 is provided with a closure system which includes bolts 5 which enter corresponding recesses 7 and are actuated by a lock, in a per se known manner.

[0014] According to the present invention, the safe comprises a movable member, which is associated with the body 2 through an elastic means. In normal conditions the movable member is adapted to obstruct an opening formed in the body 2.

[0015] In case of explosion, the pressure generated inside the body 2 moves the movable member, in contrast with the elastic members, in such a manner as at least partially clear the opening from which the expanded gases exit.

[0016] When the pressure inside the body 2 decreases, the elastic members move back the movable member, which is now arranged substantially in the normal condition in which it obstructs the opening.

[0017] According to an embodiment of the invention, the movable member is constituted by the door 3, which in the condition in which the safe is closed is jointly connected to the recesses 7 by means of the bolts 5 inserted therein.

[0018] The recesses 7 are substantially constituted by bars which are provided with holes to accommodate the bolts in the condition in which the safe is closed. The recesses 7 are associated with guides 6, which are jointly connected to the body 2 and are adapted to accommodate elastic members 8. The elastic members 8 are constituted by a series of Belleville springs which are coaxial to respective tension members 9. One end of members 9 is fastened to the recesses 7.

[0019] The other end of each tension member 9 has a locking nut 10, which constitutes the movable abutment of the Belleville springs, while their fixed abutment is con-

stituted by the front wall 11 of the guide 6.

[0020] The Belleville springs 8 are preferably constituted by at least two series of springs with different moduli, designated by the reference numerals 81 and 82 respectively.

[0021] Normally, the safe is in the condition in which the door is closed, shown in Figures 1 and 2.

[0022] When an explosion occurs, the pressure inside the body 2 pushes the door 3 outwards, as indicated by the arrow 12 of Figure 3, and this causes the outward movement of the door itself, which causes the partial opening of the safe.

[0023] The expanding gases exit laterally, around the edges of the door 3, and when the pressure decreases the elastic members 8 return the door 3 to the initial closed position, as indicated schematically by the arrow 13 in Figure 3.

[0024] Despite being damaged, because the hinges 4 certainly will have failed, the door is nonetheless repositioned substantially in the closed condition and therefore it is impossible to access the inside of the safe and remove its contents.

[0025] The presence of springs with different moduli ensures correct behavior of the elastic members for explosions of different power.

[0026] In practice it has been found that the invention achieves the intended aim and objects, a safe having been provided which, in case of an internal explosion, allows the expanded gases to be expelled, preventing the final opening of the door.

[0027] According to a preferred embodiment of the invention, the safe door itself constitutes the movable member that is moved outward during the explosion, enough to make the gases exit, and is then returned to the substantially fully closed position by the elastic means in order to prevent access to its interior.

[0028] The safe according to the invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

[0029] The materials used, as well as the dimensions, may of course be any according to the requirements and the state of the art.

[0030] This application claims the priority of Italian Patent Application No. M12009A000085, filed on January 26, 2009, the subject matter of which is incorporated herein by reference.

Claims

1. A safe, strong room or the like with explosion-resistant device, **characterized in that** it comprises a box-like body provided with an access opening and a door which is associated with said body and is provided with a closure system, **characterized in that** it comprises a movable member which is associated with said body through an elastic means and is adapted to obstruct an opening formed in said body, said movable member defining at least one normal position, in which said movable member completely obstructs said opening, and an active position, in which said movable member partially clears said opening, because of pressure generated inside said body by an explosion, and in contrast with said elastic means, allowing the escape of expanded gases generated by said explosion, said elastic means being adapted to return said movable member substantially to said normal position, in order to prevent access to the inside of said body, when the action of said expanded gases on said movable member ends.

2. The safe according to claim 1, **characterized in that** said movable member is constituted by said door.

3. The safe according to claim 1 or 2, **characterized in that** said elastic members are constituted by springs which are interposed between a member that is jointly connected to said body and a member that is jointly connected to said movable member.

4. The safe according to one or more of the preceding claims, **characterized in that** it comprises a door which is associated with said body by means of hinges and is provided with a closure system which comprises bolts that enter corresponding recesses.

5. The safe according to one or more of the preceding claims, **characterized in that** said door is jointly connected to said recesses by means of said bolts inserted in them in the closed safe condition.

6. The safe according to one or more of the preceding claims, **characterized in that** said recesses are constituted by bars which are provided with holes in order to accommodate said bolts, in said closed condition, and are associated with guides which are jointly connected to said body and are adapted to accommodate said elastic members, which are constituted by a series of Belleville springs which are coaxial to respective tension members, which have one end fixed to said recesses.

7. The safe according to one or more of the preceding claims, **characterized in that** the other end of each one of said tension members has a locking nut which constitutes a movable abutment of said Belleville springs, while a front wall of said guide constitutes a fixed abutment of said springs.

8. The safe according to one or more of the preceding claims, **characterized in that** said springs comprise at least two series of springs with different moduli for each one of said elastic members.

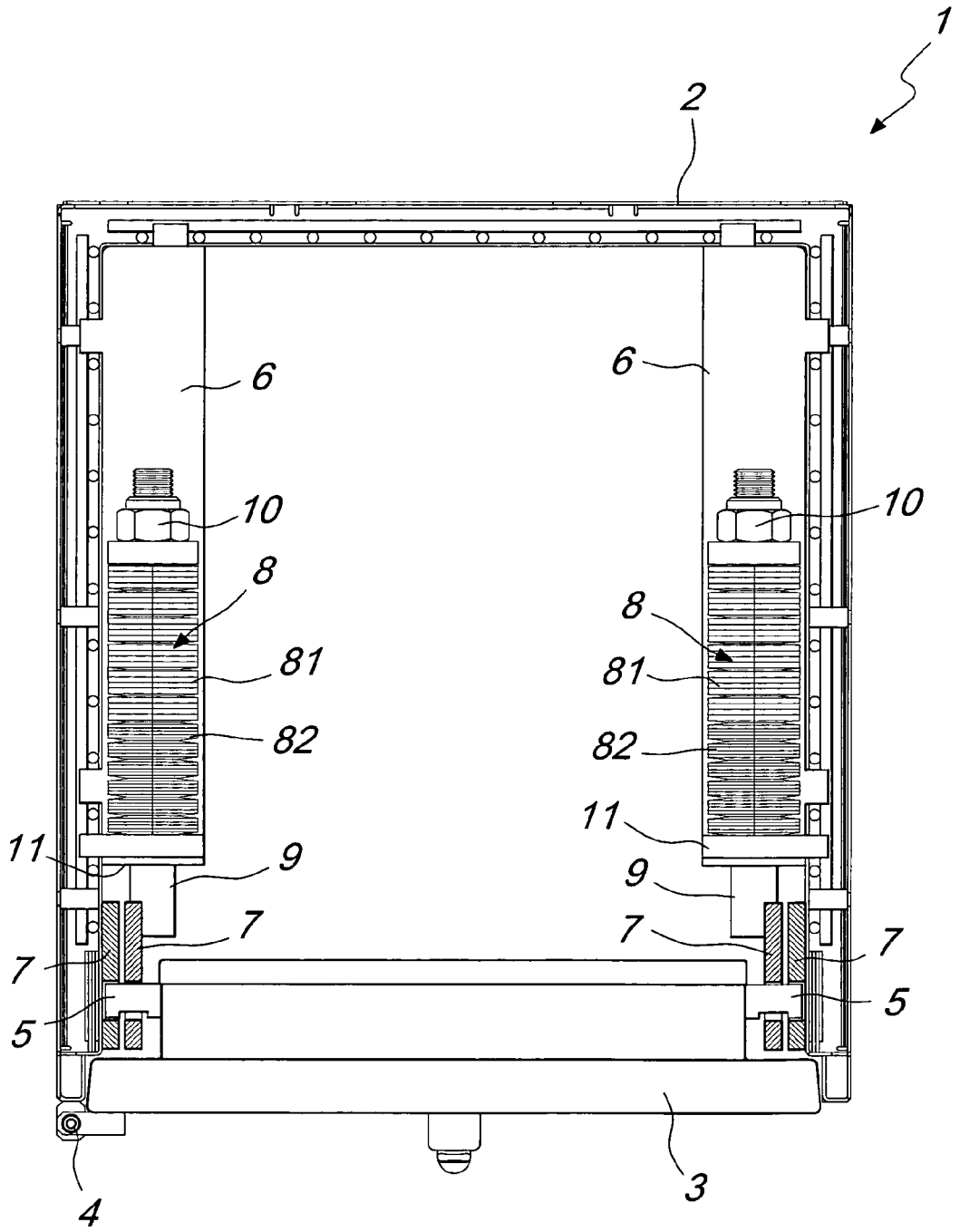

Fig. 1

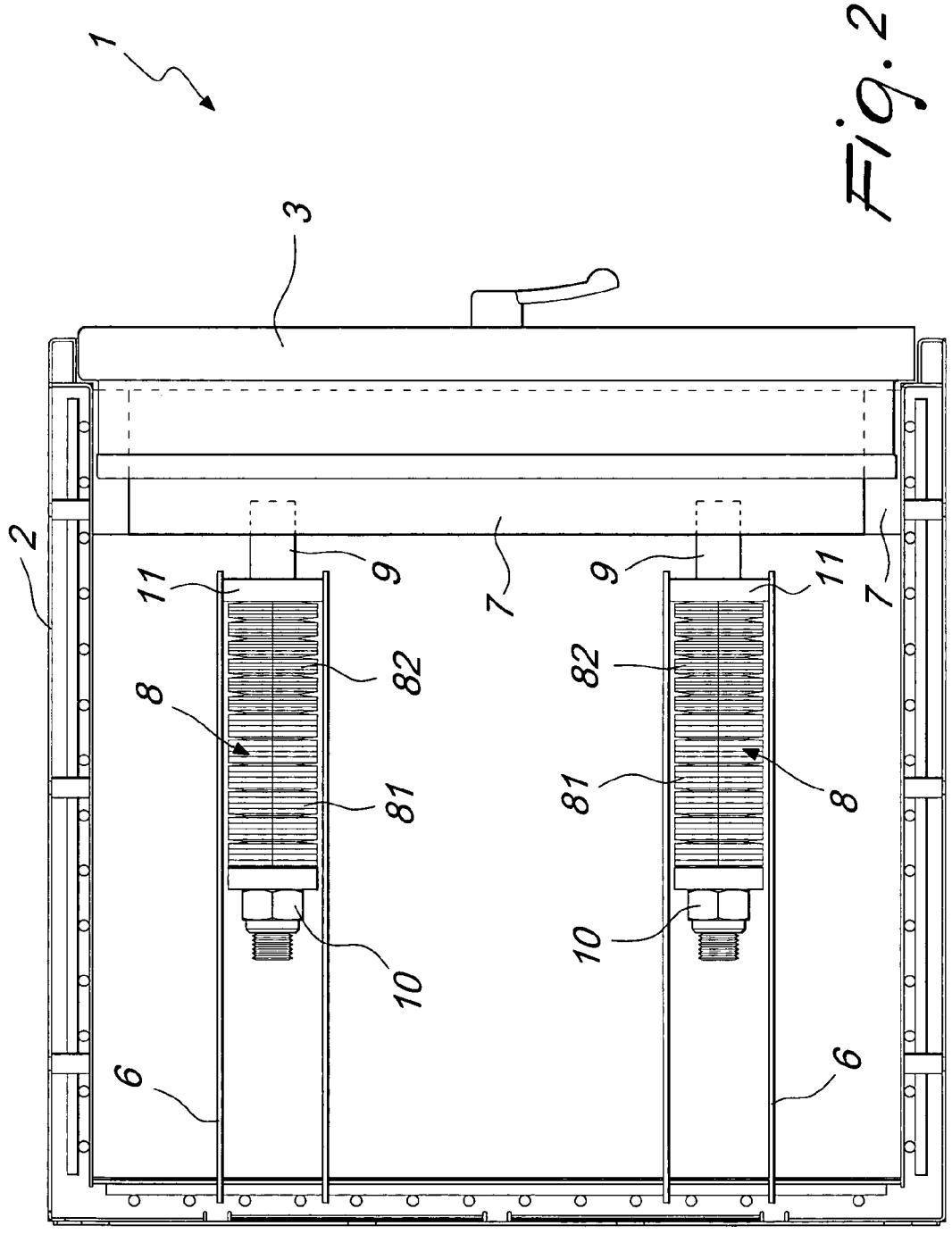

Fig. 2

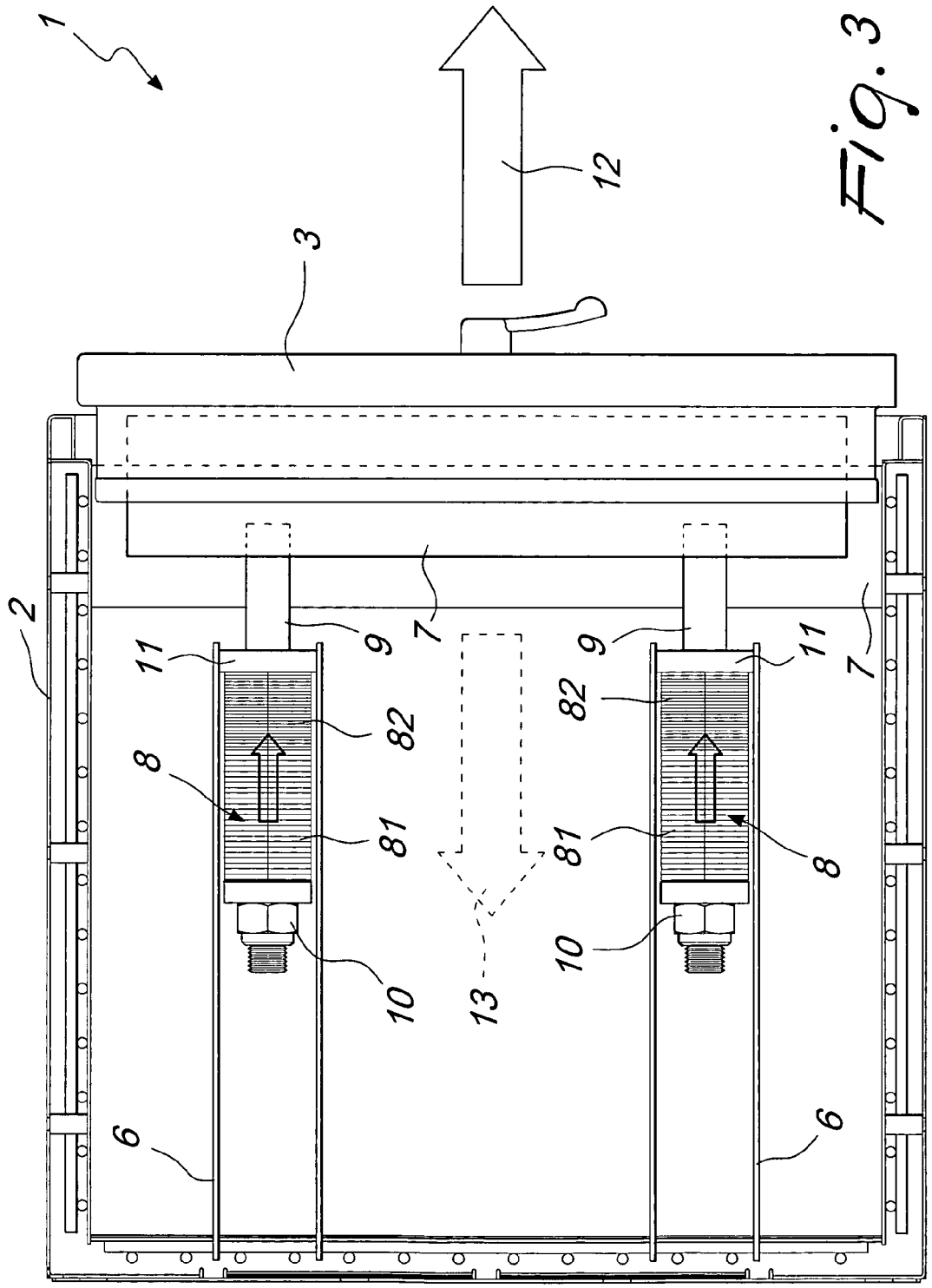

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 10 00 0205

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 44 15 985 C1 (BODE PANZER AG) 27 July 1995 (1995-07-27)	1-5	INV. E05G1/026
A	* abstract *	6-8	
X	US 1 516 531 A (HALTEMAN ET AL) 25 November 1924 (1924-11-25)	1	
A	* page 1, line 101 - page 2, line 3; figure 5 *	2-8	
X	EP 0 293 952 A1 (DEN BRINK) 7 December 1988 (1988-12-07)	1-7	
A	* figures *	8	
X	GB 1 181 808 A (ETABLISSEMENTS BAUCHE) 18 February 1970 (1970-02-18)	1	
A	* page 2, line 60 - line 115; figure 3 *	2-8	
X	EP 1 659 360 A1 (VID APS) 24 May 2006 (2006-05-24)	1	
A	* figure 3 *	2	
A	EP 1 870 542 A1 (GORTER BOUWPRODUKTEN BV) 26 December 2007 (2007-12-26) * figures *	1	TECHNICAL FIELDS SEARCHED (IPC) E05G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	26 May 2010	Van Beurden, Jason

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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D : document cited in the application
L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 00 0205

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

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