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(54) Instant opening mechanism of facade claddings

(57) Instant opening mechanism (100) of facade claddings that is configured as a safety element in case of emergency to allow rapid evacuation, while at the same time the preceptive safety against intruders is not sacrificed without altering the aesthetic set of the same and comprising essentially an electromagnet (102), that moves horizontally along the axis perpendicular to the axis defined by the facade, releasing a latch (103) and this a guiding claw (104), such that the complete removal of the protection through a guide (101).

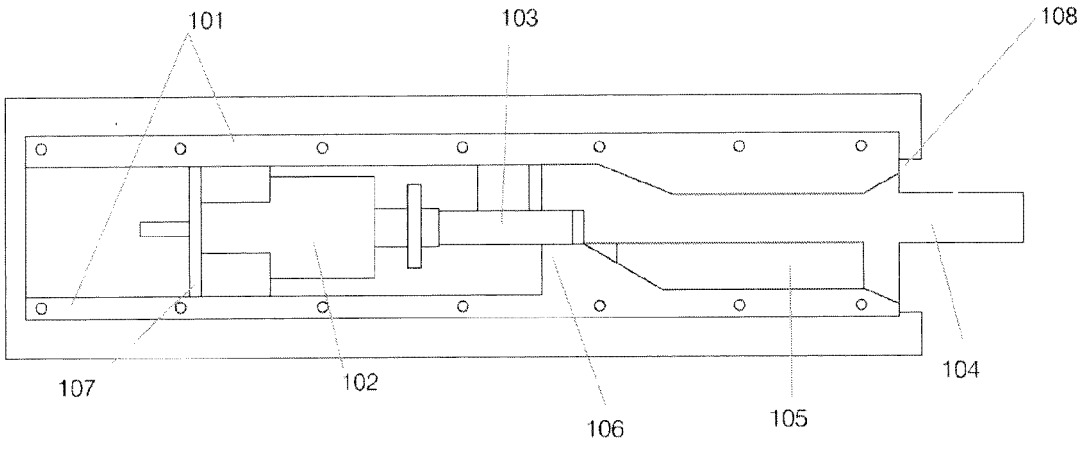

FIG. 3

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Description

[0001] The object of the present invention is an instant opening mechanism of facade claddings that are usually attached to said facade and more specifically to a mechanism dedicated to anchor gates, locksmiths, carpentry, safety guards or similar elements installed in facades of all kinds of buildings. Said element is configured as a safety element in case of emergency to allow rapid evacuation, while at the same time the preceptive safety against intruders is not sacrificed without altering the aesthetic set of the same.

State of the art

[0002] In the state of the art the facade claddings are well known, such as gates and other types of safety guards in all kinds of holes, not so much in shopping accesses as in window holes, both in residential and industrial buildings and offices. These claddings cover a broad spectrum of possibilities; for example, when referring to safety, two types of safety are mentioned: fire safety and anti-theft safety.

[0003] It is evident that the systems currently used, although they constitute an element of high degree of safety, on the other hand are unsafe elements in terms of what a fire inside that building could be.

[0004] The products known in the market, being similar, have a high degree of complexity in their manufacturing process, as well as installation, which would obviously represent a high cost of maintenance, as well as the difficulty of repair, even by the owner of the product. Generally, these systems work in versions with devices that, acting manually or electrically, block parts that when they are released, via a spring hit on a plunger which, in turn, releases the gate. However, this device does not allow dropping or completely detaching the closing element of the facade, which may limit their use in any type of location.

[0005] Another system, that is similar to the previous one, consists of unlocking not a specific closing point, but all the length of the profile, diminishing the safety of the assembly, since it makes it more unsafe and complex in an immediate response as the one required in this type of applications and which is a fundamental factor to be taken into account.

[0006] Other systems like the ones using jaws, and with a very high degree of difficulty in accessibility for maintenance are also known, making it too costly to maintain. Other systems, such as the ones that use keys, locks and padlocks are not practical for obvious reasons, given the handling difficulty, especially in critical emergency situations.

[0007] Within the state of the art documents WO2011067444, US6680669, US4127966 and US4452010 are known. All of them have drawbacks and problems that are described below.

[0008] Document WO2011067444 is considered as the state of the art closest to the present invention, since it describes a mechanism for immediate opening of claddings comprising a plurality of electromagnets joined by caps to the anchoring elements, where said electromagnet is actuated from inside the house. However, the joint of the electromagnet with the gate is direct through the cited caps, which can lead to problems in terms of the force required for the leverage, since it is necessary a very powerful electromagnet, and also the closing element that could be attached to said electromagnet for the same reason would be limited, since the weight of the element would have to be proportional to the power of the electromagnet. In addition, this complicates the maintenance of the assembly.

[0009] Document US6680669 describes an anchoring system with respect to all the length of a cladding using tongue and groove activated by a solenoid and with a spring that allows holding both parts when they are separated. In addition to the presence of elements susceptible to breakage, as the springs, which must be checked with frequency, increasing the maintenance required for these elements. Furthermore, it should be taken into account that these mechanisms should have certain characteristics of reversibility, i.e., that the claddings can be assembled and disassembled easily for, e.g., cleaning, which is not possible with this system.

[0010] Document US4127966 describes a mechanism that is not linear, with a series of axes and moving parts that hinder its installation and maintenance. Finally, document US4452010 describes a trigger mechanism for gates, which is not really practical in facade elements, first because they are not reversible, and second because in an emergency, if the closing elements are propelled they could cause an accident, since this type of elements have a weight normally comprised above 50 kg.

[0011] In the present invention, fire safety should be taken in the broad sense, since the invention is not limited simply to its use in case of fire, but in any type of emergency, requiring the evacuation of the building.

Description of the invention

[0012] The technical problem solved by the present invention is to provide safety in case of emergency to facade claddings designed solely to prevent the access to the buildings. Thus, for example, the gates located in houses are locked to the wall to prevent being wrenched off and providing the proper anti-theft safety, but they do not have any kind of safety in case of emergency, especially in a case of fire, because, logically, they are useless for use as emergency or evacuation exit.

[0013] The present invention satisfactorily solves said problem, since it instantly releases the claddings, but keeping the control of the removal, since the removal is at will of a person, since the mechanism releases the cladding, but it does not expels it, preventing accidents. Moreover, this allows the action to be reversible, since even being released, it can be placed back in closed po-

sition, which enables other actions, such as the cleaning of the claddings or other maintenance actions.

[0014] More specifically, the mechanism object of the invention is configured as a safety element in case of fire to allow the rapid evacuation of the affected buildings. More specifically, the instant opening mechanism of claddings on building facades comprises an anchoring element activated by at least one electromagnet, such that when said electromagnet is activated, the protections of the facade are magnetically fastened, while otherwise, they are released.

[0015] The essential feature of the invention is a claw housed in a guide jointly attached to the cladding and where said guide made in thermoplastic material with high resistance to impacts and to tensile and shear stress is configured for

obtaining a minimum value of tensile strength of 200 Kg; and

obtaining a minimum value of shear resistance of 31 Kg; wherein said claw is connected by a first end to the facade cladding and by its second end with a metal latch integral with the axis of the electromagnet; wherein said claw, electromagnet and latch are aligned horizontally and housed inside said guide that is located at right angles to the axis defined by the facade; and wherein said mechanism is configured so that

by actuating the electromagnet, this moves horizontally by said axis perpendicular to the axis defined by the facade, releasing the latch and as a result the claw, such that elastic joints allow the claw to move towards the exterior of the facade, enabling the complete extraction of the protection through said perpendicular guide.

[0016] Thanks to the described mechanism the drawbacks mentioned above are completely solved, since the immediate opening is obtained once the electromagnet has been activated, with which, on one hand the minimum anti-theft characteristics are kept and on the other hand, it is possible that any facade hole can become, if necessary, in an emergency access. In addition, the structure of the mechanism makes it possible that it can be used and adapted to any known facade cladding.

[0017] Throughout the description and the claims the word "comprises" and its variants do not intend to exclude other technical features, additives, components or steps. For the persons skilled in the art, other objects, features and advantages of the invention will be derived in part from the description and in part from the practice of the invention. The following examples and drawings are provided by way of illustration, and are not intended to restrict the present invention. In addition, the present invention covers all the possible combinations of particular and preferred embodiments indicated here.

Brief description of the figures

[0018] Next, a series of drawings that help to understand better the invention and which relate specifically with an embodiment of said invention that is presented as a non-limiting example of the same, will be described briefly.

FIG1. It shows an elevational view of the profiles that make up the anchoring structure of the mechanism object of the invention.

FIG2. It shows a view in detail of the mechanism housed in the anchoring structure.

FIG3. It shows a view in section of the instant opening mechanism of facade claddings, object of the invention, in closed position.

FIG4. It shows an isolated view of the claw which is part of the mechanism shown in figure 3.

FIG5. It shows an unlocking sequence of the mechanism from the position shown in figure 3 to total unlocking (release 5A; movement, fig.5b and extraction, fig.5c)

Explanation of a detailed embodiment of the invention

[0019] An anchoring set of a facade cladding comprises, as a general rule, four mechanisms 100 anchored to the structure 10 shown in figure 1. This anchoring structure 10 consists of a plurality of metal profiles 11, preferably made of aluminium, which may increase or decrease depending on the thickness of the wall where they are going to be located. These profiles 11, in turn, are combined with transverse parts, of the same material as the profiles 11 and that, previously attached to the same, serve to locate the mechanisms 100 object of the invention, with a dovetail 13 solution, to hold and guide the mechanism 100 in its position of use, as shown in figure 2.

[0020] The mechanisms 100 are fixed inside the profiles 11 forming the anchoring structure 10, hence the ideal number, without limitation, of mechanisms 100 to hold a facade element is four.

[0021] Both the assembly and the disassembly of the mechanisms 100 in the anchoring structure 10 is very practical and simple for anyone, this being a necessary requirement for safety applications, since in emergency situations, people must respond automatically to the emergency systems, whereby in this structure are also located all the auxiliary equipment enabling the operation of the same, basically the power supply of the electromagnet and its control device.

[0022] The anchoring structure 10 is detachable through a manhole cover 14 that is clipped over its entire length, such that by a slight actuation over the side of said cover 14 and exerting a slight force towards the interior it is possible to remove said cover 14 to access the mechanism 100 for inspection and maintenance, which is a basic factor in any emergency safety installation.

[0023] The mechanism 100 of instant opening of facade claddings consists of a guide 101 arranged horizontally and perpendicular to the vertical axis defined by the facade and that houses the other components of the mechanism, which is made of thermoplastic material with

high resistance to both impacts and tensile stresses with a minimum value of resistance of 200 kg or 2000N; and shear stresses with a minimum value of resistance of 31 kg or 310N; such that in an application as anti-theft safety in order to pull out the closing element from the hole a force of leverage greater than 200 kg must be exerted, being able to hang any constructive element with an average weight of 100 kg.

[0024] Hosted in said guide 101 there is a linear type electromagnet 102 of simple "pull and push" effect with an IP40 degree of protection, working at a voltage of 24V with low amperage, facilitating its use with batteries (in emergency situations when the power supply may be interrupted) and with an actuation time in milliseconds for a good unlocking effectiveness.

[0025] A locking latch 103 integral with the horizontal axis of the electromagnet, horizontally aligned with the same and also housed in the interior of the guide 101.

[0026] Finally, the mechanism 100 is completed with a guiding claw 104 which is jointly attached to the cladding by one of its ends, while the opposite end is attached to the locking latch 103. This guiding claw 104 is made preferably of metallic material, being also housed inside the guide 101 in closed position, while when it is released it can be extracted from the same simply by pulling the cladding.

[0027] Figure 3 shows in detail the elements that make up the mechanism 100.

[0028] The guiding claw 104 is an element that must be fixed to the cladding element, for example, a gate, and preferably there will be placed one at each corner of the same. The guiding claw 104 has a defined geometry as shown in figure 4. Said guiding claw 104 comprises
a first end 104a with a step 104b adapted to receive and house the latch 103 in closed position and the opposite end of which 104f is a rectangular body configured to be integrally joined to the cladding and that, in its closed position protrudes with respect to the guide 101;
a central body 104c substantially rectangular and elongated, separated from the end 104f by means of a first stop 104d with triangular profile and a second trapezoidal stop 104e; both stops being configured, in the closed position, as stop of the guiding claw 104 against the guide 101, and more specifically against the elastic joint 108 of the guide 101.

[0029] Returning to figure 3 and describing the components from left to right, there is the guide 101 that houses all the other components, including the electromagnet 102, which is anchored 107 by its base to the aforementioned guide 101. Aligned with the electromagnet 102 the latch 103 is located materialized in a metal tab that acts on the first end 104a of the guiding claw 104 up to a stop 106 defined in the guide itself 101, which defines and separates the area where the electromagnet is located 102 from the hole 105 for the guiding claw 104 of the cladding, and where in closed position, the stops (104d, 104e) of the guiding claw 104 are perfectly coupled to the mouth of the guide 104 through an elastic joint 108.

[0030] The operation of the electromagnet 102 manages to release the latch 103 in the presence of the electrical actuation of a commercial battery, which is easily substituted and replaced. The operation of the invention is shown in figure 5. More in detail, the operation starts with the actuation of a button that allows supplying electricity from the battery to the electromagnets 102. When actuated, the electromagnet 102 moves horizontally, releasing the latch 103, retracting and passing from the closed or locked position to the unlocked position (figure 5c).

[0031] Immediately after, and due to the action of the elastic joint 108 of the mouth of the guide 101, the guiding claw 104 moves a few millimetres towards the exterior of the facade, as shown in figure 5b, and the guiding claw stays in support and rest position.

[0032] Finally, the cladding can be removed (figure 5c) by pushing it, so that the guiding claws 104 move along the guide 101 towards the exterior.

[0033] It should be added, finally, that the mechanism described is detachable. All the mechanisms are recyclable and reusable, as stated by the existing regulations. On the other hand, it is expected that light signals will be included marking the charge and discharge of the battery, status display, remote control via Wi-Fi for external control in emergency critical situations and any other home automation connection or connection to emergency services.

Claims

1. Instant opening mechanism (100) of facade claddings that being installed in an anchoring structure (10) fixed on the wall that forms the facade and wherein said mechanism (100) comprises a guide (101) installed in the anchoring structure (10) and accessible through the same; and wherein said guide is configured for obtaining a minimum value of tensile strength of 200 Kg; and obtaining a minimum value of shear resistance of 31 Kg
characterized in that
it comprises a guiding claw (104) integrally attached by a first end (104f) to the facade cladding and by its opposite end (104a) with a latch (103) integral with the axis of an electromagnet (102); wherein said guiding claw (104), electromagnet (102) and latch (103) are aligned horizontally and housed inside said guide (101), which is installed in the anchoring structure (10) at right angles to the axis defined by the facade;
the mechanism (100) being also configured so that by actuating the electromagnet (102), this moves horizontally by said axis perpendicular to the axis defined by the facade, releasing the latch (103) and as a result the guiding claw (104), such that the guiding claw (104) moves towards the exterior of the facade, enabling the complete extraction of the pro-

tection through said perpendicular guide (101).

2. Mechanism (100) according to claim 1 wherein the guiding claw (104) comprises a first end (104a) with a step (104b) adapted to receive and house the latch (103) in closed position and the opposite end (104f) of which is a rectangular body configured to be integrally joined to the cladding and that, in its closed position protrudes with respect to the guide (101); and
a central body (104c) substantially rectangular and elongated, separated from the end (104f) by means of a first stop (104d) with triangular profile and a second trapezoidal stop (104e); both stops (104 d, 104e) being configured, in the closed position, as stop of the claw (104) against the guide (101), and more specifically against the elastic joint (108) of the guide (101).

3. Mechanism (100) according to any of claims 1 and 2 wherein the guide (101) houses the electromagnet (102), which is anchored (107) to the aforementioned guide (101); and wherein aligned with the electromagnet (102) the latch (103) is located materialized in a metal tab that acts on the first end (104a) of the guiding claw (104) up to a travel stop (106) defined in the guide (101) itself which defines and separates the area where the electromagnet (102) is located of the hole (105) for the guiding claw (104) of the cladding, and wherein in closed position, the stops (104d, 104e) of the guiding claw (104) are perfectly coupled to the mouth of the guiding claw (104) through an elastic joint (108).

4. Mechanism (100) according to any of claims 1-3 wherein the power supply is by means of a battery.

5. Mechanism (100) according to any of claims 1-4 wherein the actuation occurs in local by means of a button.

6. Mechanism (100) according to any of claims 1-5 comprising means of wireless communication for remote actuation.

7. Mechanism (100) according to claim 6 that is connected with an emergency warning central.

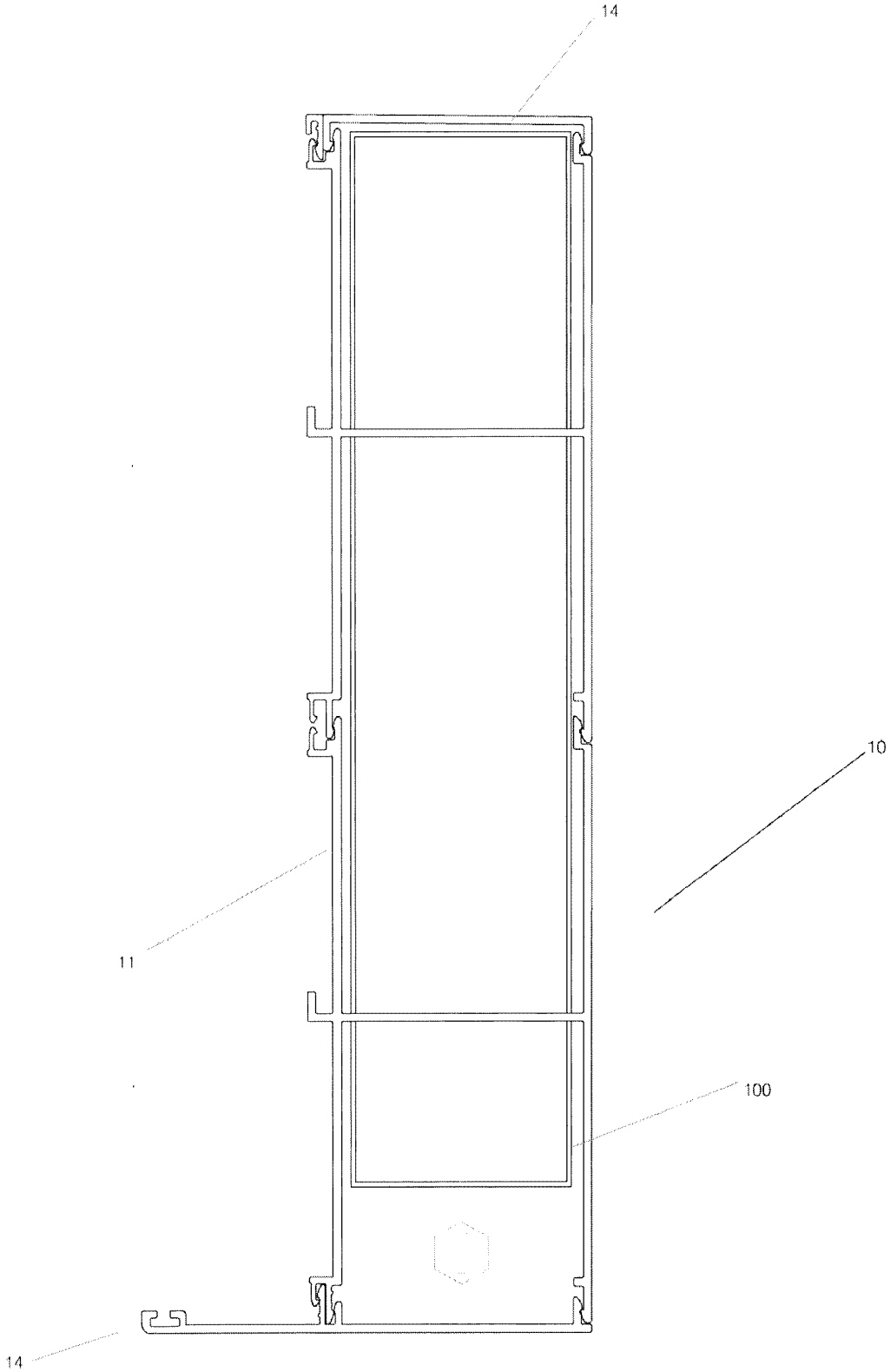

FIG. 1

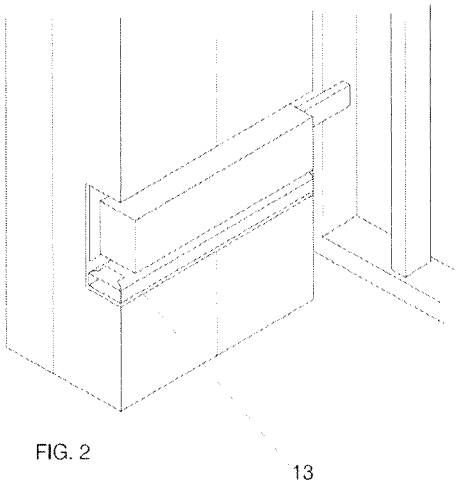

FIG. 2

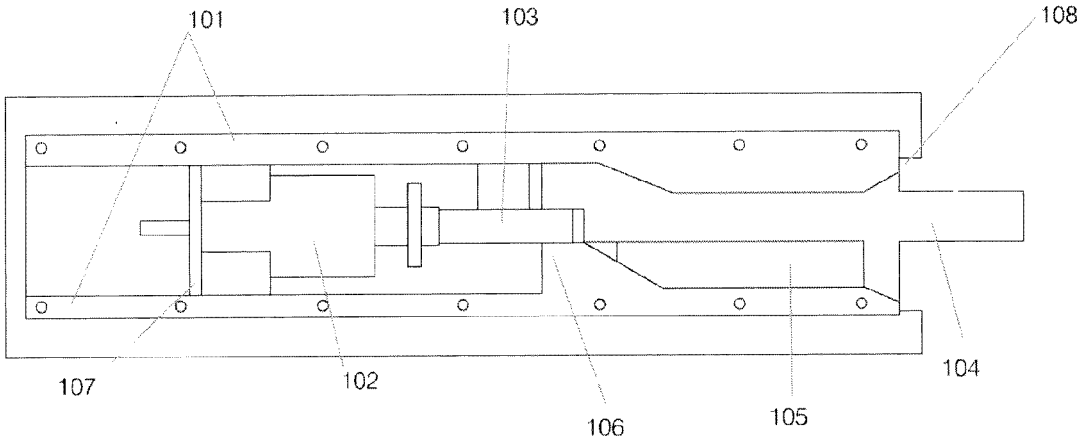

FIG. 3

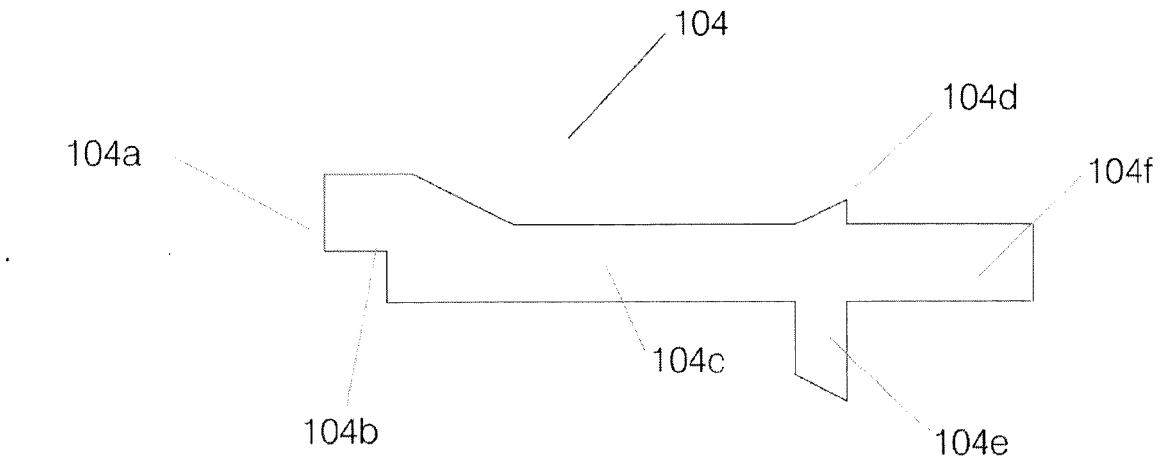

FIG. 4

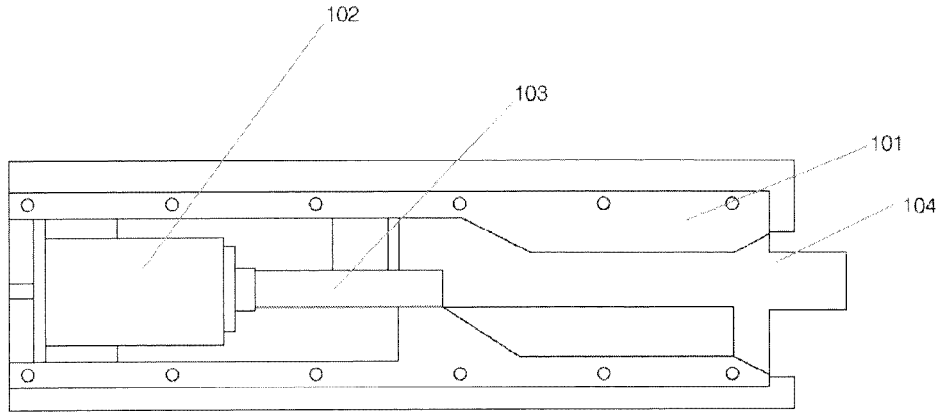

FIG. 5A

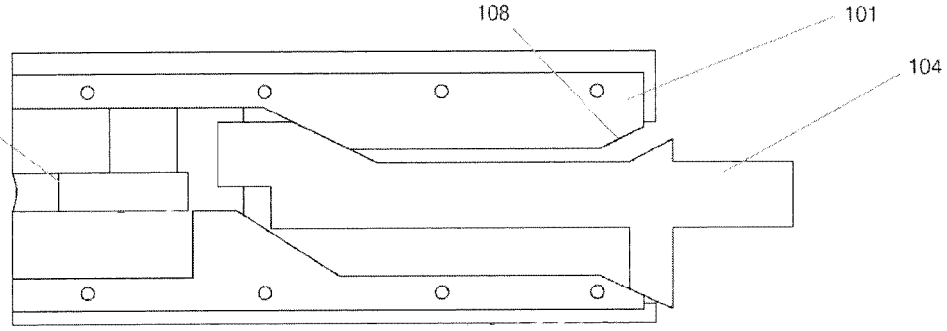

FIG. 5B

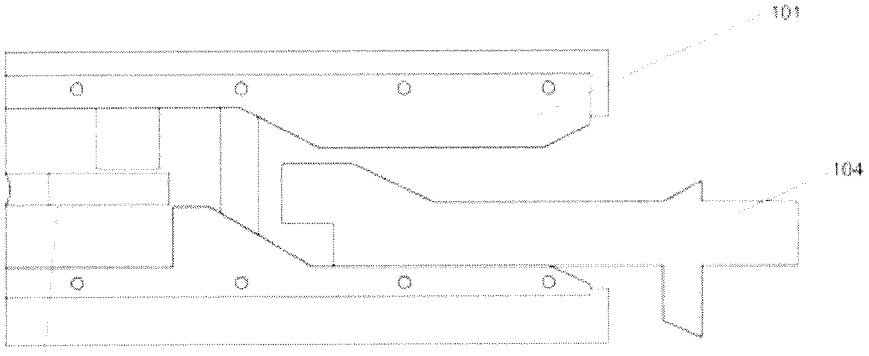

FIG. 5C

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EUROPEAN SEARCH REPORT

Application Number
EP 13 38 2052

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,D	US 6 680 669 B1 (TERRY DAN [US]) 20 January 2004 (2004-01-20) * the whole document *	1	INV. E05B65/10 E05B47/00 E06B9/01
A	NL 19 352 C (VERWEIJ ANTOON MICHAEL) 16 July 1928 (1928-07-16) * the whole document *	1	
A	US 4 384 428 A (COX ROY L) 24 May 1983 (1983-05-24) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (IPC)
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 August 2013	Westin, Kenneth

CATEGORY OF CITED DOCUMENTS

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15-08-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6680669 B1	20-01-2004	NONE	
NL 19352 C	16-07-1928	NONE	
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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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