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(71) Applicant: **Pladomin, S.A.**
39012 Santander (ES)

(72) Inventor: **Ariño Del Castillo, Norberto**
c/o Pladomin S.A.
39012 Santander (ES)

(74) Representative: **Carvajal y Urquijo, Isabel et al**
Clarke, Modet & Co.,
C/ Goya No. 11
28001 Madrid (ES)

(54) Latching mechanism for rotating adjustment controls

(57) The present invention relates to a concealment device for rotating adjustment controls comprising a first body (1), a second body (2) on which the adjustment control (3) is coupled, a spring (4) located between the first and second body, retaining means and guiding passages (6) for guiding the retaining means. The retaining means comprise a connecting rod (7) coupled to the second body with the possibility of rotation with respect to the latter according to an axis perpendicular to the axis of rotation of the adjustment control, said connecting rod (7) having a pivot (8) at its free end. The second body (2) has a circumferential arch-shaped notch (9) through which the pivot (8) passes, said pivot resting on the guiding passages (6) such that when the control is pushed a first time, the pivot is located in a retaining area (10) of the passages (6), and when it is pushed a second time the pivot is released from said area.

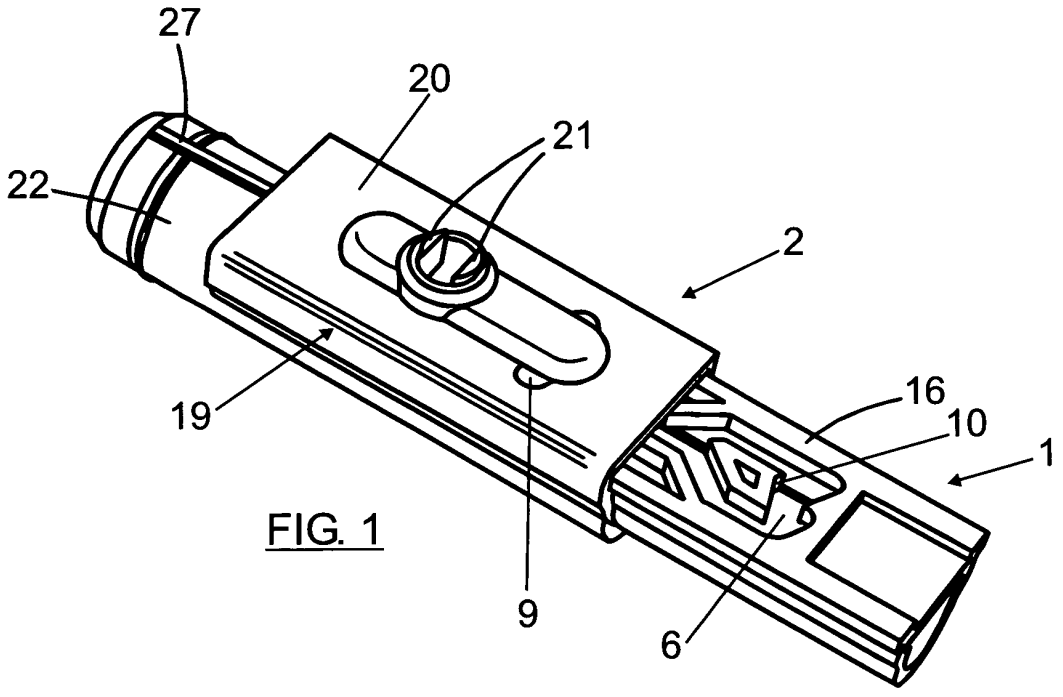

FIG. 1

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Description

FIELD AND OBJECT OF THE INVENTION

[0001] The invention is comprised within the field of adjustment controls used in household appliances, and more specifically it relates to a device achieving the concealment of rotating adjustment controls.

STATE OF THE ART

[0002] Most of the household appliances which are currently marketed have adjustment elements, mainly controls for controlling the different elements and functionalities thereof.

[0003] Rotating type controls in which the desired adjustment is achieved by means of a simple rotation thereof are known among said adjustment elements. For aesthetic purposes or simply for the sake of safety, for example to prevent children from operating said controls, it is sometimes necessary for the latter to have the possibility of being concealed, being flush with the main panel or console of the household appliance.

[0004] Different concealment mechanisms or devices are known which are mainly based on the existence of two bodies, an inner body and an end body, moving linearly with respect to one another and between which mobile retaining elements are arranged with respect to one of the bodies, normally the outer body, which elements achieve the alternative concealment and revealing of the control with the collaboration of guiding passages arranged in the inner body when the control is pressed.

[0005] The mechanism described in patent DE-A-3900737 can be included among the known mechanisms, and it describes a mechanism consisting of two bodies and in which the retaining element consists of a sheave having an upper pivot and a lower pivot, the upper pivot moving linearly on a straight groove made in the outer body, whereas the lower pivot runs along the guiding passages made in the inner body. When the control is pressed for the first time, the mentioned lower pivot follows a departure path defined in the guiding passages until its reaches a locking point in which it is retained, the concealment of the control occurring. After the control is pressed a second time, the pivot is released from the locking point, running along a return path until reaching the initial concealing position of the control. The departure path and return path are joined at a lower point and at an upper point of the guiding passages, being separated by a central island and causing an initial bifurcation which determines the path to be followed by the lower pivot, the departure path being determined on the right-hand side taking as a reference the direction of the movement of the sheave and the return path being determined on the left-hand side.

[0006] With this configuration and since the controls are rotating, the aforementioned device has a rather important drawback, consisting of the following: when the position of the concealment axis of the control is parallel to the floor and in certain positions of the rotation of the concealing device, the sheave tends to take the wrong path since it is normally made of metal and due to its own weight and the effect of gravity, i.e. it tends to take the return path in the aforementioned bifurcation instead of taking the departure path and therefore it is not possible for the concealment of the adjustment control to take place, causing an undesired operation of the concealment device and sometimes even the complete blocking of the mechanism, therefore it is necessary to apply a viscous substance such as grease or silicone serving as a retaining element for the sheave in the adverse positions of the concealment mechanism.

[0007] As a result of the foregoing, a need has been detected to provide a concealment device in which new retaining and locking elements thereof have been designed to solve the mentioned drawbacks.

[0008] This objective is achieved by means of the invention as it is defined in claim 1, and the dependent claims define preferred embodiments of the invention.

DESCRIPTION OF THE INVENTION

[0009] The present invention relates to a concealment device for rotating adjustment controls comprising a first body arranged inside a second body, on which the adjustment control is removably coupled with the possibility of relative movement between the first and second body according to a direction parallel to the axis of rotation of the adjustment control, a spring located inside the second body which exerts pressure against one of the ends of the first body, retaining means and guiding passages for guiding the retaining means, located in the first body, configured to allow the alternative concealment and revealing of the first body with respect to the second body due the effect of respectively pressing the adjustment control.

[0010] In a first aspect of the invention, the retaining means for retaining the concealment device will comprise a connecting rod coupled to the second body with the possibility of rotation with respect to the latter according to an axis perpendicular to the axis of rotation of the adjustment control, and the rotation point will be located in an intermediate position of the connecting rod, said connecting rod having a pivot at its free end.

[0011] The second body is further provided with a circumferential arch-shaped notch through which the pivot passes, said pivot resting on the guiding passages such that when the adjustment control is first pressed, the pivot is led through the guiding passages, swinging along the notch until it is located in a retaining area of the mentioned passages in which said pivot is retained due to the pushing effect of the spring, and when the adjustment control is pressed a second time, the pivot is released form the retaining area and is guided through the guiding passages to the initial position.

[0012] In another aspect of the invention, the guiding

passages can be divided into a departure path and a return path separated by a central island, both paths being limited by respective safety ramps with a sawtoothed section arranged according to a direction parallel to the axis of rotation of the adjustment control. A first safety ramp is first located in the direction of the departure run, such that the inclined face is located next to the departure path and the vertical face is located next to the return path, and a second ramp is located after the island in the direction of the departure run, such that the inclined face is located next to the return path and the vertical face is located next to the departure path.

[0013] With this configuration of the security ramps, the intention is to define anti-return means in the path followed by the pivot of the connecting rod, i.e. it is achieved that the pivot does not take the wrong path, the mechanism thus being able to operate correctly in any position in space, not being affected by the effect of gravity, following the departure path when the adjustment control is first pressed and the return path when the said control is pressed a second time.

[0014] In another aspect of the present invention, the first body of the device may comprise a first portion with a substantially semi-tubular configuration, said first portion having a planar face in which the guiding passages are located and a tubular second portion with a smaller diameter than the previous portion which is permanently introduced inside the second body for receiving one of the ends of the spring. The second body of the device may in turn comprise a first portion with a substantially semi-tubular configuration, said first portion having a planar face in which the notch is located and in which a clip is arranged for interlocking the connecting rod for the pivoting thereof in a plane parallel to the mentioned planar face of the second body, and a tubular second portion defining an inner contraction for retaining the other end of the spring.

[0015] In this manner, the spring is arranged exerting a pressure between the first and second bodies, which pressure is necessary to achieve the fixing of the position of the pivot in the corresponding parts of the guiding passages, both in the concealing position and in the revealing position.

[0016] The guiding passages can additionally have an opening located next to the start of the departure path for coupling the first and second bodies by means of the introduction of the pivot of the connecting rod through the mentioned opening, a third safety ramp with a sawtoothed section being arranged with the inclined face directed towards the opening and the vertical face directed towards the start of the departure path.

[0017] The main function of the mentioned opening is to aid the coupling of the first and second bodies when the device is initially assembled.

[0018] On the other hand, the guiding passage may be provided at the start of the departure path with a retaining hook for fixing the position of the pivot with respect to the mentioned path when the device is in the non-concealed position.

[0019] A strip introduced in a prestressed manner in the first body may be provided at the free end of the first portion of said first body to retain the elements which are actuated by the adjustment control.

[0020] A rib parallel to the axis of rotation of the adjustment control and extending to the first portion of the second body is arranged in the second portion of said second body, said rib being configured for the retention against the rotation of said adjustment control with respect to the mentioned portion.

DESCRIPTION OF THE DRAWINGS

[0021] A series of drawings aiding in better understanding the invention and expressly related to several embodiments of said invention which are set forth as illustrative and non-limiting examples thereof are very briefly described below.

Figure 1 shows a perspective view of the concealment device object of the present invention in the revealing position.

Figure 2 shows a perspective view of the concealment device object of the present invention in the concealing position.

Figure 3 shows a partially sectioned perspective view in the revealing position of the device.

Figure 4 shows an exploded perspective view in which the different components of the concealment device object of the present invention as well as of the adjustment control are observed.

Figure 5 shows a perspective view of the first body forming part of the concealment device object of the present invention.

Figure 6 shows a perspective view of the concealment device in the revealing position to which an adjustment control has been coupled.

Figure 7 shows an upper plan view of the first body forming part of the concealment device object of the present invention.

Figure 8 shows a partially sectioned perspective view of the first body forming part of the concealment device, according to section plane I-I of Figure 7.

Figure 9 shows a partially sectioned perspective view of the first body forming part of the concealment device, according to section plane II-II of Figure 7.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0022] The concealment device for rotating adjustment controls object of the present invention has a first body 1 inserted in a second body 2; with the possibility of relative movement between both according to a direction parallel to the axis of rotation of the control 3. The device is additionally formed by a spring 4, the function of which is explained below, retaining means and guiding passag-

es 6 arranged on the first body 1. All the mentioned components are configured to allow the alternative concealment and revealing of the first body 1 with respect to the second body 2 by respectively pressing the adjustment control 3.

[0023] In the present embodiment, the retaining means are carried out as a connecting rod 7 which is coupled to the second body 2, with the possibility of rotation with respect to the latter according to an axis perpendicular to the axis of rotation of the control 3. The rotation point is located in an intermediate area of the connecting rod 7 and is carried out by a hole 30 made in said connecting rod 7, the connection with the second body 2 being made through clips 21 carried out as respective flanges separated by certain distance that is somewhat less than the diameter of the hole 30, the connecting rod being retained thanks to the ridges made in the upper ends of the mentioned flanges, the assembly being carried out by simple pressure of the connecting rod 7 against the clip 21.

[0024] The clip 21 is located on the planar face 20 forming part of a first portion 19 forming the second body 2. A notch 9 is made on said planar face 20, a pivot 8 located at one of the free ends of the connecting rod 7 running on such notch. Said notch has a circumferential arch shape to enable the rotation of the connecting rod 7 with respect to the second body 2, the pivot 8 moving on said notch 9 at all times.

[0025] The length of the pivot 8 will be greater than the thickness of the face 20 so that it can project from the lower part of said face.

[0026] The body 1 has a semicylindrical first portion 16 having a planar face or wall 17 in which the guiding passages 6 are defined, the position of said face 17 coinciding with the face or wall 20 of the first portion 19 of the second body which is also semicylindrical, to achieve a smooth relative sliding between the first body 1 and the second body 2, the coupling interaction being enough to allow said sliding.

[0027] With the described configuration, the end of the pivot 8 of the connecting rod 7 will be led by the guiding passages 6 as can be seen in the different figures.

[0028] The guiding passages 6 will be divided into a departure path 11 and a return path 12 through a central island 13 logically determining two connection points for both paths, a first connection point located first, taking as a reference the direction of the departure run, and a second connection point located after the first connection point, taking as a reference the direction of the return run. Respective safety ramps are arranged according to a direction parallel to the axis of rotation of the control 3 in order to delimit both paths. A first safety ramp 14 located on the first connection point, the cross-section of which is sawtoothed such that the inclined face is located next to the departure path 11 and the vertical face is located next to the return path 11, and a second safety ramp 15 located on the second connection point, the cross-section of which is sawtoothed such that the inclined face is located next to the return path 12 and the vertical face is located next to the departure path 11.

[0029] The guiding passage 6 has an opening 23 located next to the start of the departure path 11, said opening being useful for the coupling between the first body 1 and second body 2 by means of the introduction of the pivot 8 of the connecting rod 7 through the mentioned opening 23, a third safety ramp 24 with a sawtoothed section being arranged with the inclined face directed towards the opening 23 and the vertical face directed towards the start of the departure path 11.

[0030] The first body 1 has a tubular second portion 18 with a smaller diameter than the first portion 16 which is introduced in one of the ends of the spring 4, which spring is completely introduced inside the first portion 19 of the second body, said second body having a tubular second portion 22 defining an inner contraction for retaining the other end of the spring 4.

[0031] The guiding passage 6 is further provided at the start of the departure path 11 with a retaining hook 25 for fixing the position of the pivot 8 with respect to the mentioned path when the device is in the non-concealed position.

[0032] With the described configuration and interconnection of the different components of the device, the operation of the device will be explained below. The position in which the control 3 is revealed, i.e. the first body 1 is projecting from the second body 2 and the spring 4 is creating a push between both, is the initial and start position, in said position the hook 25 retains the pivot 8, preventing the latter .from moving and therefore preventing the connecting rod 7 from rotating with respect to the first and second bodies. After first pressing the control 3, the relative sliding between both bodies makes the pivot 8 of the connecting rod 7 follow the departure path 11, the particular configuration of the safety ramp 14 preventing the pivot from taking the wrong path (the return path) when it reaches the initial bifurcation determined by the island 13, the pivot 8 moving towards the part where the departure path is through the notch 9, when said pivot is close to reaching the end of the run of the departure path 11, the pivot collides against the curvature 31 defined in the upper part of the guiding passage 6 (see Figure 7), which together with the projection 32 forces it to be placed on a point of the island 13 determining the retaining area 10, the device being at that moment in a concealing position and the relative movement between both bodies 1 and 2 being retained.

[0033] By pressing the control 3 a second time, the pivot 8 is released from the area 10 and thanks to the curvature 33 defined after the projection 32, said pivot is directed towards the return path 12, rotating the connecting rod 7 towards said return path, running along said path until the passing the first connection point and moving downwards towards the retaining hook 25, both the pivot 8 and the connecting rod 7 being in their initial position and the device returning to its revealing position. The arrows shown in Figure 1

[0034] A strip 26 introduced in a prestressed manner in the first body 1 is arranged at the free end of the first portion 16 of said first body to retain the elements which are actuated by the adjustment control 3, such as for example a valve, a potentiometer, etc. Said strip 26 is planar and is inserted in the first portion 16 gracias thanks to a lateral double groove made inside said portion.

[0035] Finally, a rib 27 parallel to the axis of rotation of the adjustment control and extending to the first portion 19 of the second body 2 is arranged in the second portion 22 of said second body, said rib being configured for the retention against the rotation of said adjustment control 3 with respect to portion 22.

Claims

1. A concealment device for rotating adjustment controls comprising:

   a first body (1), which is arranged inside
   a second body (2) on which the adjustment control (3) is removably coupled with the possibility of relative movement between the first and second bodies according to a direction parallel to the axis of rotation of the adjustment control,
   a spring (4) located inside the second body exerting pressure against one of the ends of the first body (1),
   retaining means and
   guiding passages (6) for guiding the retaining means, located in the first body, configured to allow the alternative concealing and revealing of the first body with respect to the second body by respectively pressing the adjustment control (3), **characterized in that** the retaining means comprise a connecting rod (7) coupled to the second body with the possibility of rotation with respect to the latter according to an axis perpendicular to the axis of rotation of the adjustment control, said connecting rod (7) having a pivot (8) at its free end, **in that** the second body (2) has a circumferential arch-shaped notch (9) through which the pivot (8) passes, said pivot resting on the guiding passages (6) such,that the first time the adjustment control is pressed, the pivot is led through the guiding passages (6), swinging along the notch (9) until being located in a retaining area (10) of the mentioned passages, in which said pivot is retained by the pushing effect of the spring (4), and when the adjustment control is pushed a second time, the pivot is released from the retaining area (10) and is led through the guiding passages (6) to the initial position.

2. A concealment device according to claim 1, **characterized in that** the guiding passages (6) are divided into a departure path (11) and a return path (12) separated by a central island, both paths being limited by respective safety ramps with a sawtoothed section arranged according to a direction parallel to the axis of rotation of the adjustment control (3), a first ramp (14) located first in the direction of the departure run, such that the inclined face is located next to the departure path and the vertical face is located next to the return path, and a second ramp (15) located after the island in the direction of the departure run, such that the inclined face is located next to the return path and the vertical face is located next to the departure path.

3. A concealment device according to any of the previous claims, **characterized in that** the first body (1) has a first portion (16) with a substantially semi-tubular configuration, said first portion having a planar face (17) in which the guiding passages (6) are located and a tubular second portion (18) with a smaller diameter than the previous portion which is permanently introduced inside the second body (2) for receiving one of the ends of the spring (4), and **in that** the second body (2) has a first portion (19) with a substantially semi-tubular configuration, said first portion having a planar face (20) in which the notch (9) is located and in which a clip (21) is arranged for interlocking the connecting rod (7) for the pivoting thereof in a plane parallel to the mentioned planar face (20) of the second body (2), and a tubular second portion (22) defining an inner contraction for retaining the other end of the spring (4).

4. A concealment device according to any of the previous claims, **characterized in that** the guiding passages (6) have an opening (23) located next to the start of the departure path (11) for the coupling of the first and second bodies by means of the introduction of the pivot (8) of the connecting rod (7) through the mentioned opening (23), a third safety ramp (24) with a sawtoothed section being arranged with the inclined face directed towards the opening (23) and the vertical face directed towards the start of the departure path (11).

5. A concealment device according to any of the previous claims, **characterized in that** the guiding passage (6) has at the start of the departure path (11) a retaining hook (25) for fixing the position of the pivot (8) with respect to the mentioned path when the device is in the non-concealed position.

6. A concealment device according to any of the previous claims, **characterized in that** a strip (26) introduced in a prestressed manner in the first body (1) is arranged at the free end of the first portion (16) of said first body for retaining the elements which are actuated by the adjustment control (3).

7. A concealment device according to any of the previous claims, **characterized in that** a rib (27) parallel to the axis of rotation of the adjustment control and extending to the first portion (19) of the second body (2) is arranged in the second portion (22) of said second body, said rib being configured for the retention against the rotation of said adjustment control (3) with respect to the mentioned portion (22).

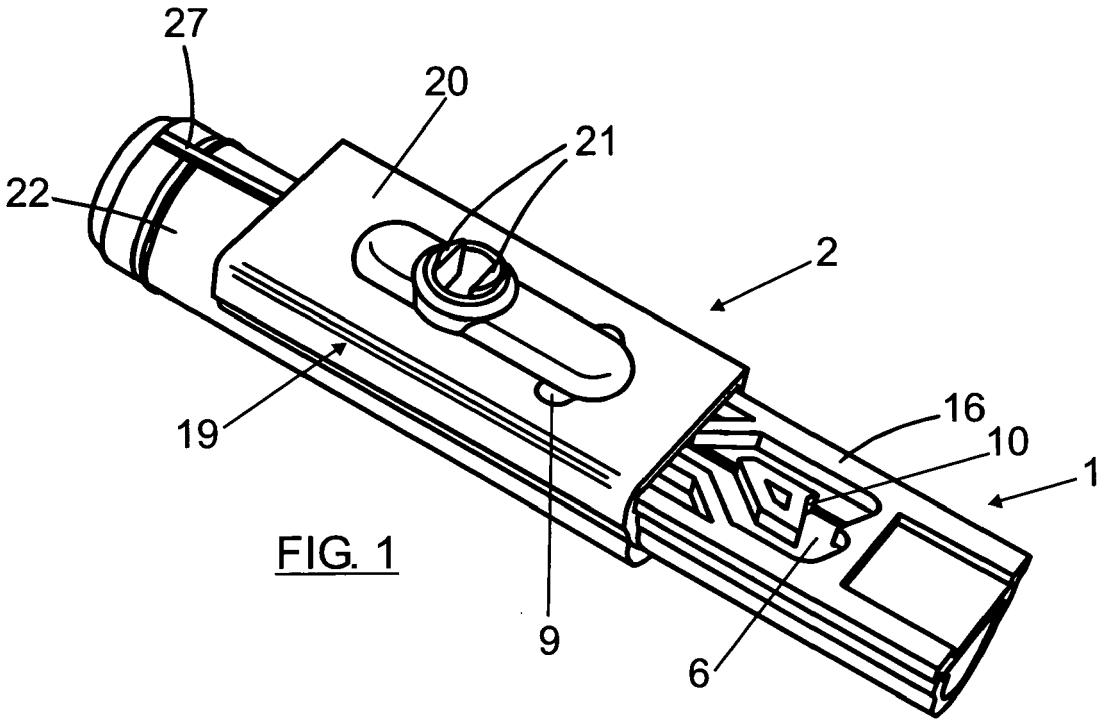

FIG. 1

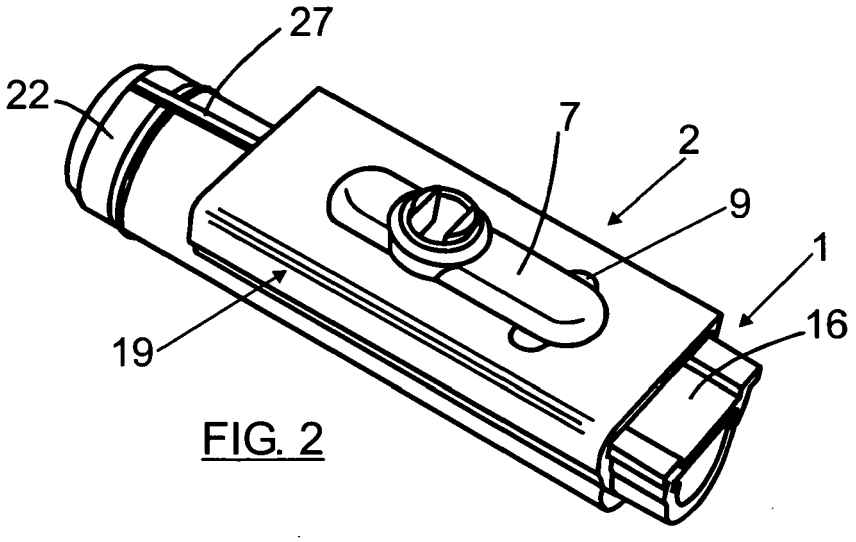

FIG. 2

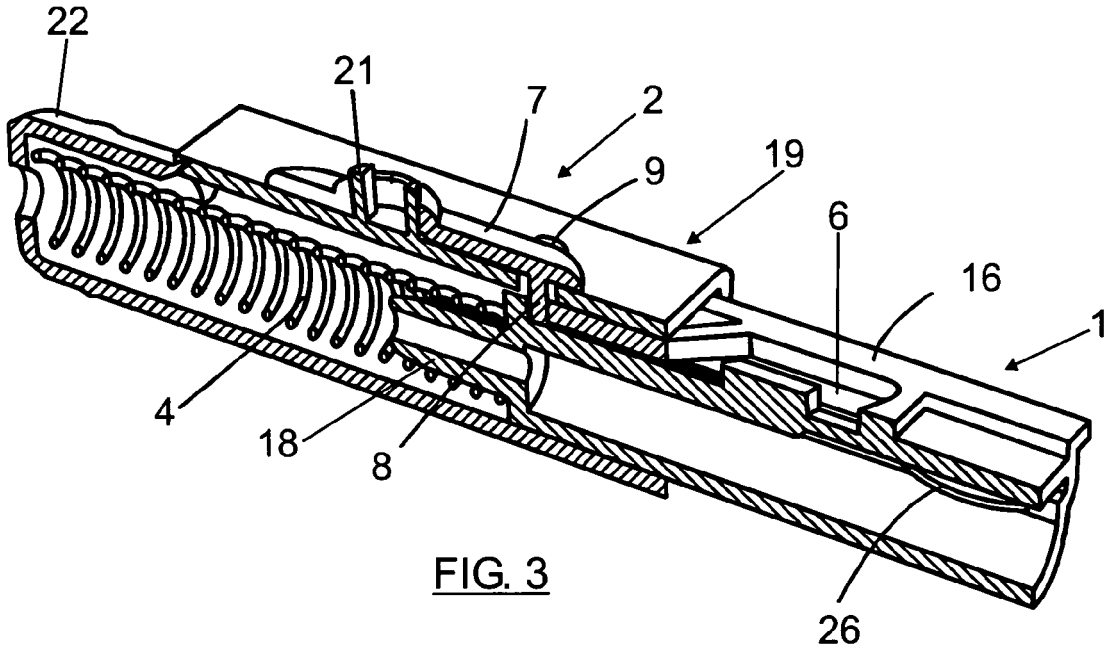

FIG. 3

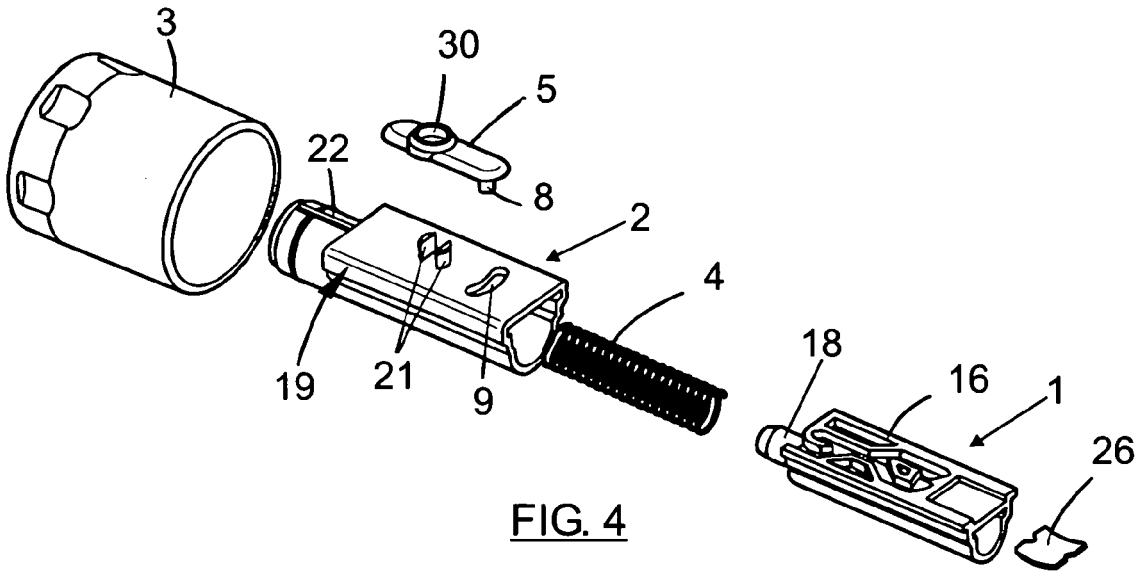

FIG. 4

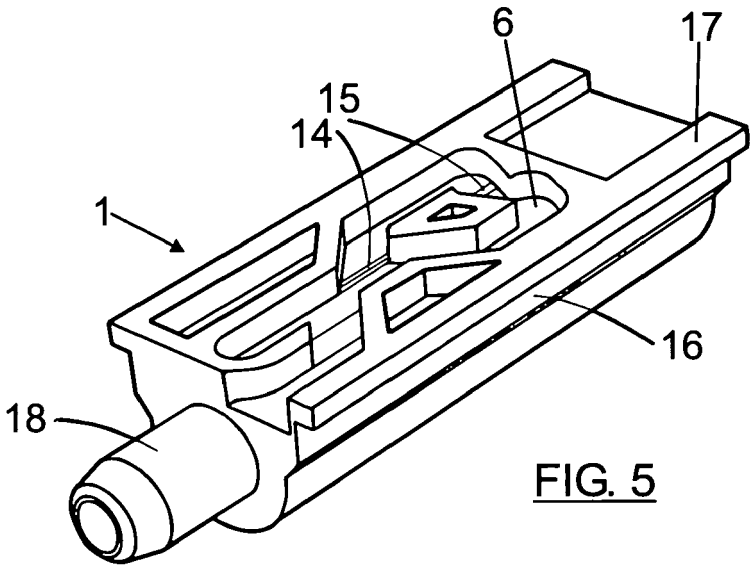

FIG. 5

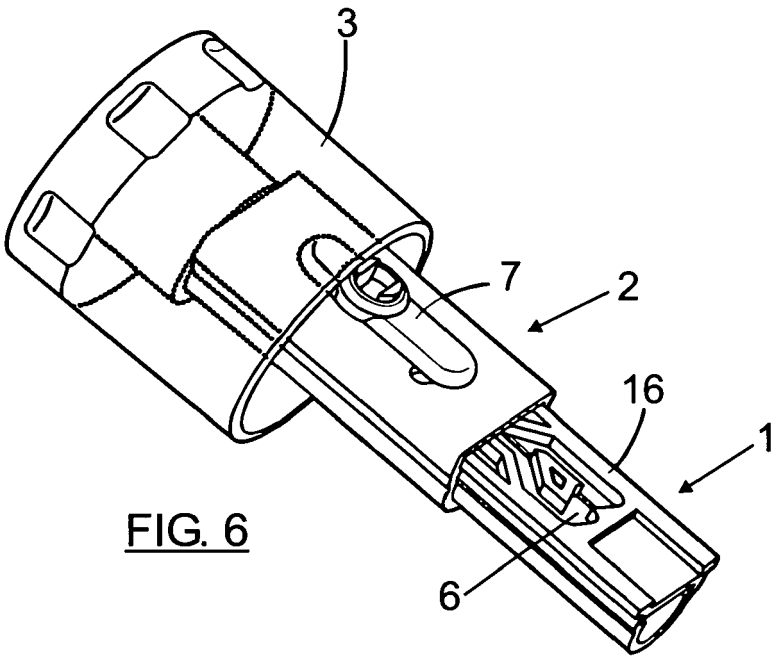

FIG. 6

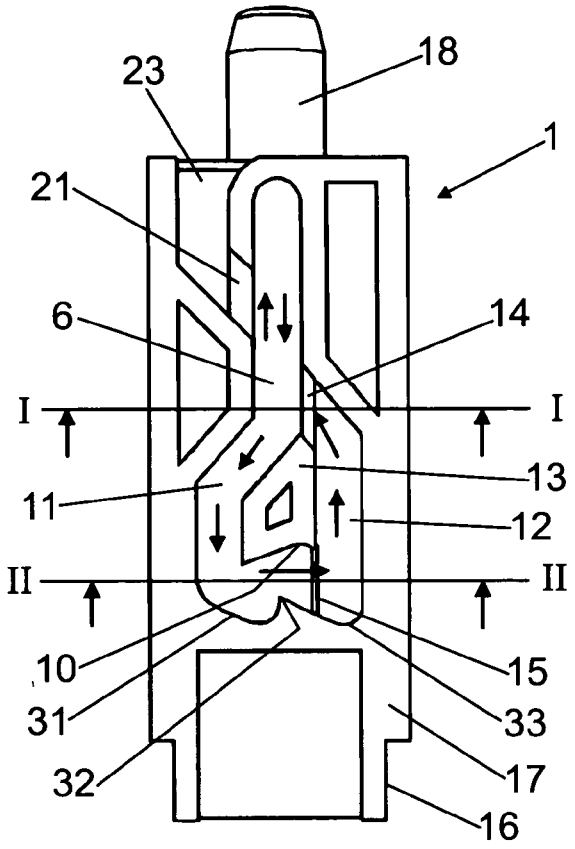

FIG. 7

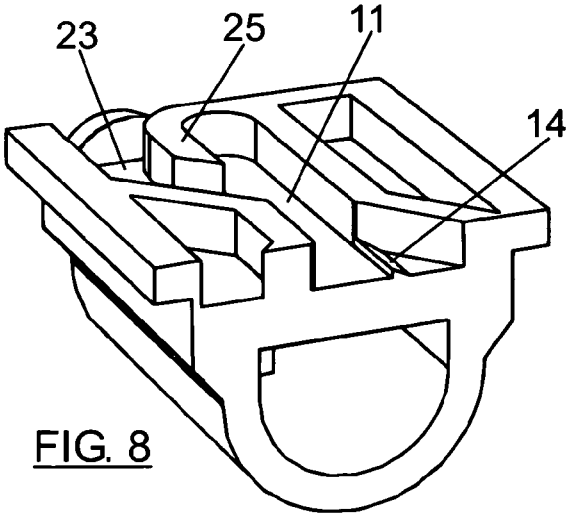

FIG. 8

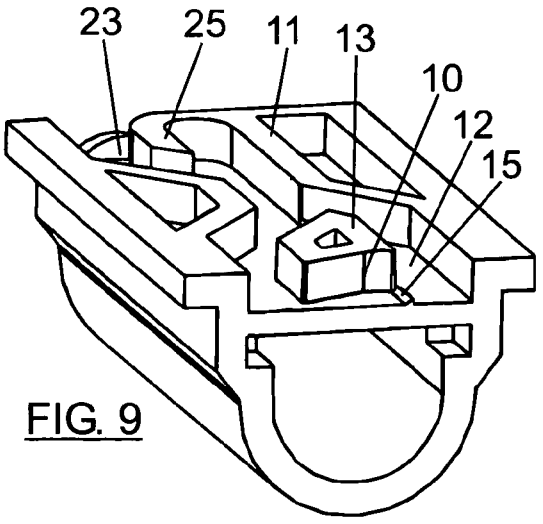

FIG. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 38 0335

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 August 2007	Popescu, Alexandru

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 38 0335

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REFERENCES CITED IN THE DESCRIPTION

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