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(54) **A door handle arrangement**

(57) The invention relates to a door handle arrangement (1'; 1'') for a door (3), comprising a handle grip (2'; 2'') arranged on said door (3) and a displaceable unlocking element (5'; 5'') which is associated with said handle grip (2'; 2'') and arranged for actuating a latch mechanism (7, 8, 9) during an opening stroke of said handle grip (2';

2''), for unlocking said door (3). According to the invention, said unlocking element (5'; 5'') and said latch mechanism (7, 8, 9) are connected via a resilient element (11; 11') arranged to be acted upon by said unlocking element (5'; 5'') during at least a part of said opening stroke before the actuation of said latch mechanism (7, 8, 9).

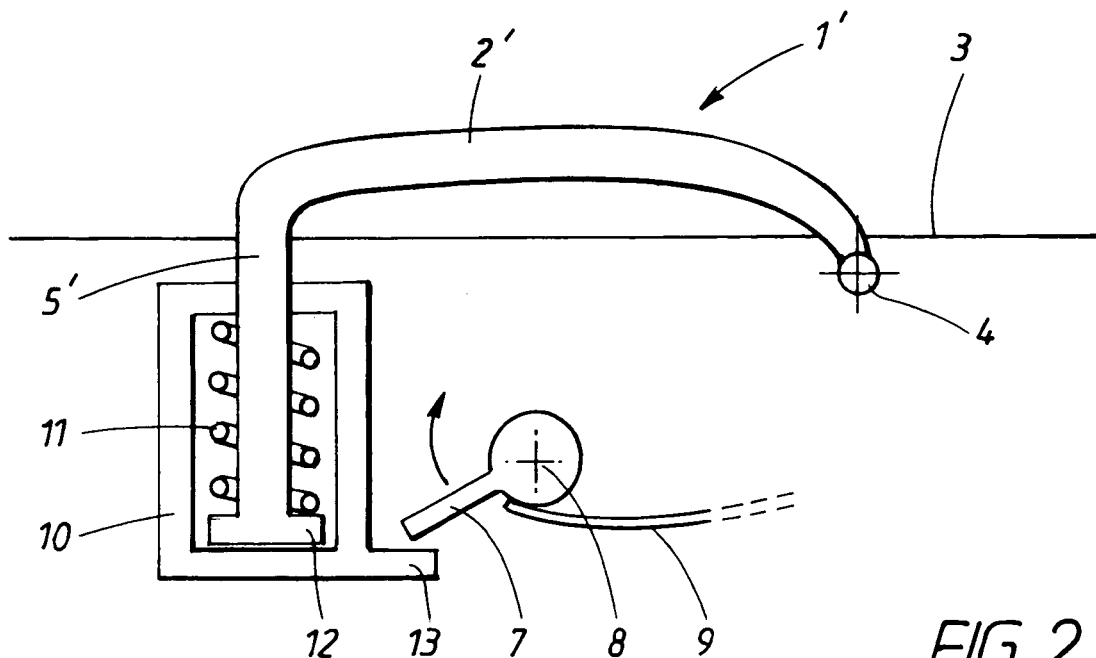


FIG. 2

Description

TECHNICAL FIELD:

[0001] The present invention relates to a door handle arrangement for a door, comprising a handle grip arranged on said door and a displaceable unlocking element which is associated with said handle grip and arranged for actuating a latch mechanism during an opening stroke of said handle grip, for unlocking said door.

BACKGROUND ART:

[0002] For many years, it has been normal practice to provide vehicles, such as cars, lorries, buses etc., with doors having a handle on the outside of the door. By operating such an outer handle, the door can be unlocked and opened so that the interior of the vehicle can be accessed.

[0003] Previously known outer handles for vehicle doors are normally arranged so that, by pulling a handle grip, a latch mechanism inside the door is actuated. In this manner, a door lock in the door is opened.

[0004] Although most outer handles in vehicle doors function in a satisfactory manner, it should be noted that a problem which may occur in previously known outer handles relates to a poor so-called "opening signature", wherein the term "opening signature" refers to the user's general perception and feeling associated with the unlocking operation. This results from the required pulling force and available stroke length of the outer handle when the user opens and unlatches the door by means of the outer handle. Consequently, if a user perceives the unlocking procedure of the outer handle as relatively stiff and uncomfortable, this is referred to as a poor "opening signature". Obviously, this constitutes a drawback from a comfort point of view.

[0005] The occurrence of a poor opening signature is normally due to the fact that a relatively limited space is available in the door for mounting the outer handle, which means that the handle has a relatively short opening stroke (i.e. a relatively short travelling length) during the opening procedure.

[0006] As regards previously known outer door handle arrangements, it can be noted that the patent document US 5961165 teaches an outer handle which uses a spring to ensure a minimum quantity of rotational stroke necessary for unlocking a car door. Furthermore, the document DE 10052640 teaches a door handle provided with a damping unit for dampening a return movement of the door handle.

SUMMARY OF THE INVENTION:

[0007] It is an object of the present invention to solve the above-mentioned problem and to provide an outer door handle with an improved "opening signature", i.e. so that a more comfortable subjective perception of the

unlocking operation of the handle is obtained.

[0008] This object is achieved by means of a outer door handle of the kind as mentioned initially, in which said unlocking element and said latch mechanism are connected via a resilient element arranged to be acted upon by said unlocking element during at least a part of said opening stroke before the actuation of said latch mechanism.

[0009] By having the unlocking element of the outer handle connected to a resilient element, for example a helical spring, the user will get an impression of a smooth resistance and a longer stroke during opening of the door lock. The main reason for this is that the opening stroke of the outer handle is prolonged while the resilient is acted upon. This means that the outer handle arrangement according to the invention provides a good opening signature, which is an advantage from a comfort point of view.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0010] In the following, the present invention will be described in detail with reference to the appended drawings, wherein:

Fig. 1 shows the general principle of a conventional outer vehicle door handle, i.e. according to prior art;

Fig. 2 shows the general principle of an outer handle in accordance with the present invention;

Fig. 3 is a diagram showing the force to be overcome when operating the outer handle according to the invention, as compared with conventional outer handles; and

Fig. 4 shows a preferred embodiment of an outer handle in accordance with the present invention.

PREFERRED EMBODIMENT:

[0011] In Fig. 1, the general principle of a conventional, previously known outer handle arrangement 1 for a vehicle is shown, as regarded in a view from above. As indicated in Fig. 1, the outer handle arrangement 1 according to prior art comprises a generally horizontally arranged handle grip 2 which is designed as a bar or lever extending essentially parallel to the outer side of a door 3 of the vehicle.

[0012] As indicated schematically in Fig. 1, the handle grip 2 is arranged to be pivoted about a pivotal axis 4 when gripped by a user and pulled in a direction outwardly from the door 3. Also, the handle grip 2 is shaped with an unlocking element in the form of an arm 5 which extends into the door 3 and which is provided with a hook-shaped element 6, preferably at its end portion. Said hook-shaped element 6 is arranged to cooperate with a latch mechanism comprising a turning lever 7 which in

turn is pivotably arranged about a second pivotal axis 8. When a pulling force is imposed on the handle grip 2 outwardly from the door 3, the hook-shaped element 6 acts upon the turning lever 7, which means that the turning lever 7 is rotated about the second pivotal axis 8 as indicated by means of an arrow in Fig. 1.

[0013] A cable 9 is connected to said second pivotal axis 8. A distal end (not shown) of the cable 9 is furthermore connected to a latch for unlocking a door lock mechanism. This is carried out in a conventional manner and for this reason, the actual unlocking operation is not described in detail here. When the handle grip 2 is gripped by a user and pulled out from the door 3 (in a direction as indicated by means of an arrow in Fig. 1), the turning lever 7 will be rotated. As a result, a pulling force is generated on the cable 9 so that the door latch opens the lock.

[0014] In Fig. 2, a schematical view of an outer door handle arrangement 1' in accordance with the invention is shown, as regarded from above. Those components in Fig. 2 which are identical with those in Fig. 1 are provided with the same reference numerals. It should be noted that Fig. 2 is schematical, and that a more detailed description of a preferred embodiment of the invention will be provided below. However, in general terms, it can be noted that the present invention is based on the principle that it comprises a modified handle grip 2' associated with an unlocking element in the form of an arm 5' and which is also arranged to be pivoted about a pivoting axis 4.

[0015] In a manner similar to Fig. 1, the handle grip 2' is designed as a bar or lever extending essentially parallel to the outer side of a door 3 of the vehicle in question.

[0016] The arm 5' extends into a housing 10 which is located in the door 3. The housing 10 is provided with a resilient element, suitably in the form of a helical spring 11 which is arranged around the arm 5'. Furthermore, the arm 5' is provided with an end portion 12, suitably shaped as a flange, which is located inside the housing 10 and which serves as a stop element for one end of the spring 11. The other end of the spring 11 is confined by the inside of the housing 10.

[0017] The housing 10 is arranged to be displaced in generally the same direction as the displacement of the arm 5'. Also, the outside of the housing 10 is provided with a hook-shaped element 13 which - in a manner which corresponds to the hook-shaped element 6 shown in Fig. 1 - is adapted for forcing a turning lever 7 to rotate about a second pivotal axis 8. In this manner, the arm 5' acts as an unlocking element which serves to transmit a pulling force from the handle grip 2' to a cable 9. In the same manner as described with reference to Fig. 1, the cable 9 is connected to a latch (not shown) for unlocking the door 3. It should be noted that the turning lever 7, the second pivotal axis 8 and the cable 9 forms part of a latch mechanism which also comprises the (not shown) latch. In this manner, the door lock can be opened when the handle grip 2' is pulled outwardly from the door 3.

[0018] The general principle on which the invention is

based relates to the fact that the arm 5', i.e. serving as an unlocking element, and the turning lever 7 together with the other parts of the latch mechanism, are connected via said spring 11. More precisely, the spring 11 allows a displacement of the arm 5', while acting against a biasing force of the spring 11, without initially affecting the turning lever 7. During an initial phase of the unlocking operation, the spring 11 is consequently compressed. When the displacement of the arm 5' meets a certain force, which corresponds to the fact that the spring 11 has been compressed to a certain degree, the turning lever 7 will be rotated. In this manner, the door lock can be unlocked. A condition for this is that the force required for turning the turning lever 7 is higher than the force acting from the spring 11 during the initial displacement of the arm 5'.

[0019] Consequently, when the arm 5' is displaced outwardly, it will act upon the spring 11. Also, since the hook-shaped element 13 of the housing 10 acts on the turning lever 7, it will meet a certain resistance. Since the force which is required for compressing the spring 11 is lower than the force required for turning the turning lever 7, the arm 5' will initially move outwardly a certain distance while compressing the spring 11. When the arm 5' eventually meets a counterforce from the spring 11 which is higher than the force required for rotating the turning lever 7, said lever 7 will start to rotate about its axis 8. A continued displacement of the handle grip 2', and consequently also the arm 5', will result in continued rotation of the turning lever 7. This means that the cable 9 will also be acted upon, which eventually results in opening of the door latch.

[0020] The basic function and advantages of the invention will now be described with reference to Fig. 3, which is a diagram showing the force to be overcome when a user operates the outer handle arrangement 1' according to the invention, as compared with conventional outer handles. In Fig. 3, the x axis corresponds to the displacement of the above-mentioned arm 5', and the y axis corresponds to the force acting on the arm 5'. Fig. 3 contains a first graph 14 representing the force according to the present invention and a second graph 15 representing the force according to conventional outer handles.

[0021] As indicated by the second graph 15, the operation of a conventional outer handle results in a relatively sharp peak in the force to be overcome when the various components in the latch mechanism is operated so as to be unlocked. This is the reason for the problem regarding a poor "opening signature", as discussed initially. On the other hand, when operating the outer handle 1' according to the invention, the user will initially, i.e. during an initial displacement of the arm 5', have to overcome a certain force F which is generally depending on the choice of spring 11 and its resilient properties. When the spring 11 is gradually being compressed, as discussed above, the force to be overcome will increase. In order to actually rotate the turning lever 7, an increase of the force to a

relatively high level is required (as shown in the graph 14 in Fig. 3), however without the sharp and sudden peak as is the case of conventional outer handles.

[0022] The graphs 14, 15 of Fig. 3 together with Fig. 2 indicate clearly that by means of the present invention, the displacement of the arm 5' during an initial opening stroke will be prolonged as compared with conventional outer handles. As a result, the peak of the force will be less noticeable and without any sudden sharp increase. This also means that to the user, the uncomfortable feeling of a stiff resistance in the case of known outer handles can be avoided. Instead of a sharp peak in the case of conventional outer handles, the force to be overcome will be more "spread out" as shown by the graph 14 in Fig. 3. The outer handle 1' according to the invention, with its arm 5', can be regarded as a "telescopic" device which serves to extend the stroke of the outer handle 1' i.e. when pivoting the handle grip 2' about its axis 4.

[0023] In contrast to the schematic drawing in Fig. 3, a preferred embodiment of an outer handle arrangement 1" intended to be used in a vehicle is shown in Fig. 4, in a view similar to Figs. 1 and 2. A handle grip 2" in Fig. 4 extends along the outside of a door 3 and comprises an unlocking element in the form of an arm 5", which also serves as a housing which accommodates a spring 11'. According to the embodiment, the spring 11' is a helical spring which is wound around a generally hook-shaped element 14 having a section extending into the integrated arm and housing 5". More precisely, the hook-shaped element 14 is provided with an end portion 15, suitably shaped as a flange, which is located inside the combined arm 5" and housing and which serves as a stop element for one end of the spring 11'. The other end of the spring 11' is confined by a flange 16 on the opposite side of the arm 5". This means that the hook-shaped element 14 can be displaced in relation to the arm 5" while the spring 11' exerts a biasing force on the hook-shaped element 14 so as to pull it towards the arm 5". Also, the hook-shaped element 14 comprises a collar 17 cooperating with the outside of the flange 16 and serving to limit the displacement of the hook-shaped element 14 in relation to the arm 5".

[0024] The operation of the handle grip 2" according to Fig. 4 is similar to what has been explained with reference to Figs. 2 and 3. In particular, it can be noted that when the handle grip 2" is pulled outwardly, the arm 5" will act upon the spring 11' while compressing said spring 11' (due to the fact that the hook-shaped element 14 is in contact with the turning lever 7). The spring 11' will allow a displacement of the arm 5" during an initial phase without affecting the turning lever 7. When the pulling of the arm 5" meets a certain resistance or counterforce, generally corresponding to the spring 11' having been compressed to a certain degree, the turning lever 7 will be rotated and a force will be exerted on the cable 9. In this manner, the door lock is eventually unlocked. A condition for this is that the force required for turning the turning lever 7 is higher than the force acting from the spring 11'

during the initial phase.

[0025] This means that the arm 5" has the function of a telescopic device having an elongated stroke during the opening phase, as compared with conventional outer door handles. Preferably, the arm 5" and the spring 11' are made with properties allowing the stroke of the handle grip 2" to be extended by approximately 3 mm in a normal application. However, the invention is obviously not limited to this, but can be varied in accordance with demands regarding the unlocking operation of the door handle. Consequently, the opening of the outer handle will have a smooth, even resistance and with a longer opening stroke as compared with previously known handles. The opening stroke will be perceived as highly comfortable.

[0026] The invention is not limited to the embodiments discussed above, but can be varied within the scope of the appended claims. For example, the invention is not limited to be used in outer handles for cars, but can also be used in other types of vehicles such as buses or vans. Generally, the invention is not limited to vehicles but can be used in other types of doors also.

[0027] The invention can be implemented with different types of resilient elements such as helical springs or other types of springs. As an alternative to the above-mentioned embodiment, in which a spring is arranged in a manner so as to be compressed during the opening phase, the invention may alternatively be implemented with a spring which is arranged to be expanded during said opening phase. This means that, according to this alternative embodiment, when the handle grip is pulled outwardly, the arm will act upon the spring so as to expand it. Preferably, such an alternative embodiment is suitably provided with a stop element arranged to limit the expansion of the spring to a predetermined degree, in order to prevent the spring from being deformed during said expansion.

Claims

1. A door handle arrangement (1'; 1") for a door (3), comprising a handle grip (2'; 2") arranged on said door (3) and a displaceable unlocking element (5'; 5") which is associated with said handle grip (2'; 2") and arranged for actuating a latch mechanism (7, 8, 9) during an opening stroke of said handle grip (2'; 2"), for unlocking said door (3), characterized in that said unlocking element (5'; 5") and said latch mechanism (7, 8, 9) are connected via a resilient element (11; 11') arranged to be acted upon by said unlocking element (5'; 5") during at least a part of said opening stroke before the actuation of said latch mechanism (7, 8, 9).
2. A door handle arrangement (1') according to claim 1, characterized in that said resilient element (11; 11') is arranged to be compressed as a result of interaction between said unlocking element (5';

5") and a further element (13; 14) adapted for actuating said latch mechanism (7, 8, 9).

3. A door handle arrangement (1') according to claim 2, characterized in that said resilient element (11') is constituted by a helical spring (11') which is accommodated in a housing (5") and extends around said further element (14). 5
4. A door handle arrangement (1') according to claim 3, characterized in that said housing (5") is integrated with said handle grip (2"). 10
5. A door handle arrangement (1') according to claim 2, characterized in that said resilient element (11) is constituted by a helical spring (11) which is accommodated in a housing (10) and extends around said unlocking element (5'). 15
6. A door handle arrangement (1') according to claim 5, characterized in that said housing (10) is integrated with said further element (13). 20
7. A door handle arrangement (1'; 1 ") according to any one of the preceding claims, characterized in that said handle grip (2'; 2") is arranged to be accessed from the outside of said door (3). 25
8. A door handle arrangement (1'; 1 ") according to any one of the preceding claims, characterized in that said resilient element (11; 11') is designed with a resiliency allowing said opening stroke of said handle grip (2'; 2") to be extended in a generally telescopic manner along a predetermined distance. 30
9. Vehicle comprising at least one door handle arrangement (1'; 1") in accordance with any one of the preceding claims. 35

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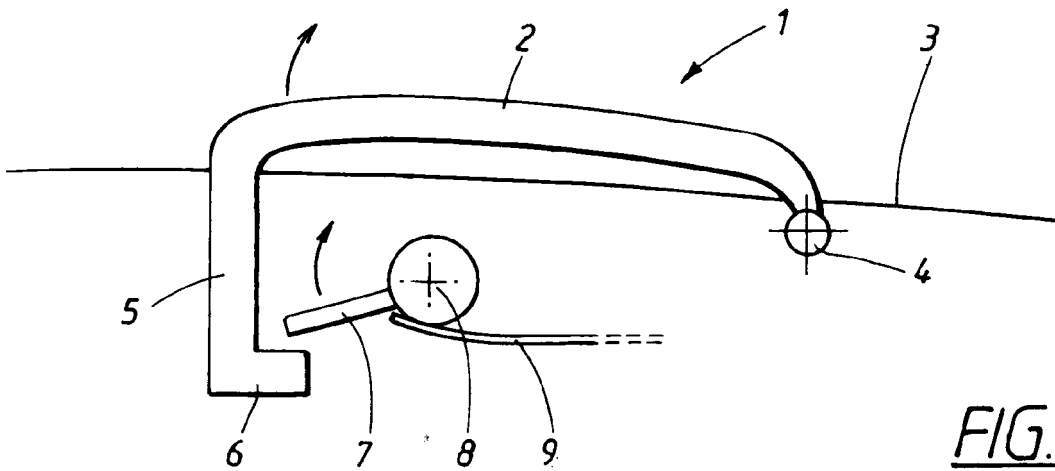


FIG. 1
PRIOR ART

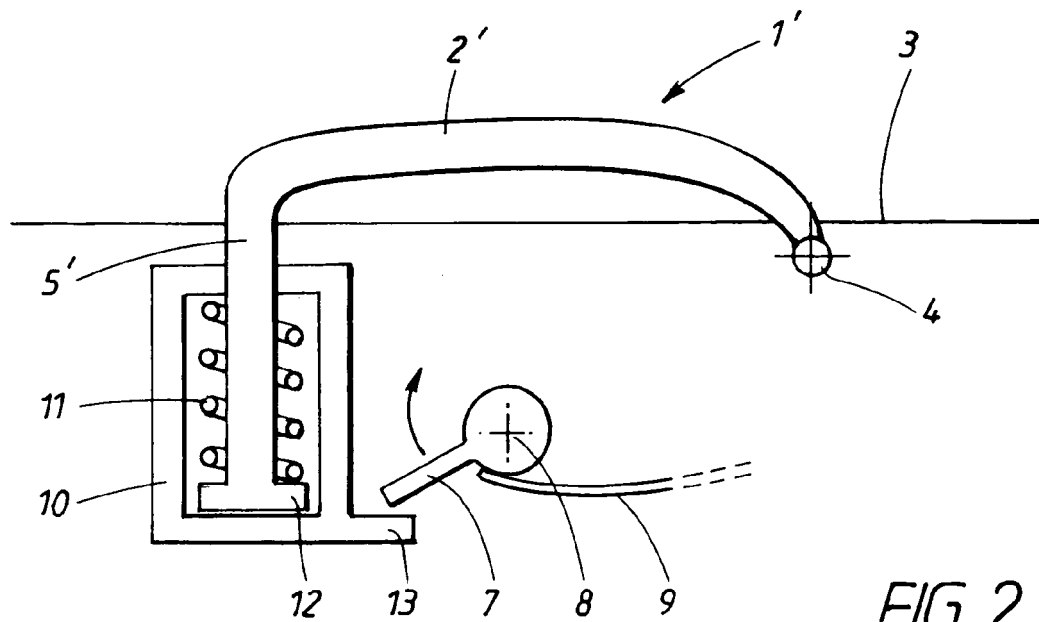


FIG. 2

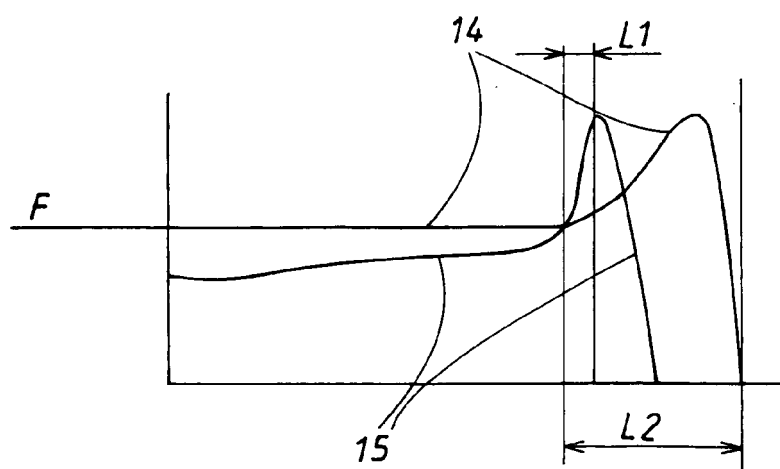
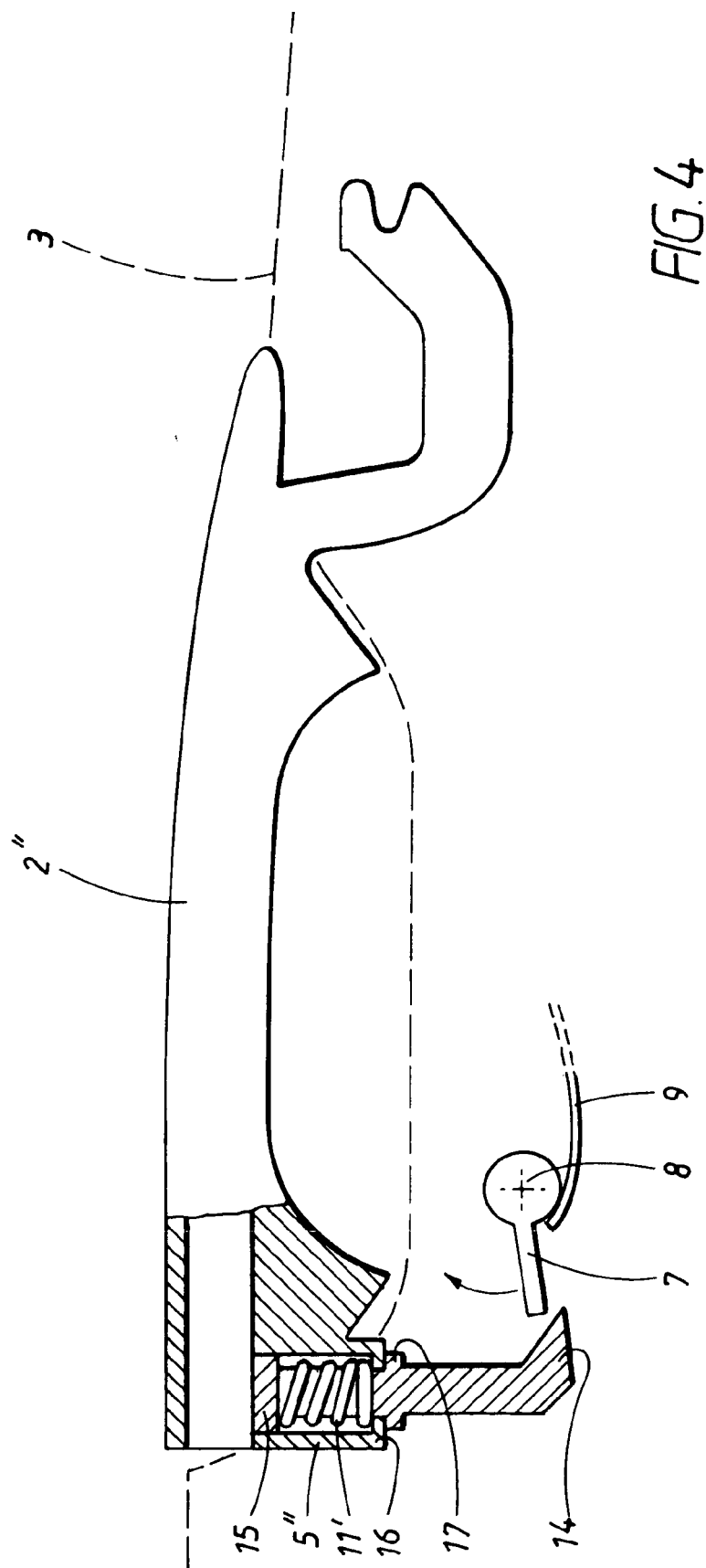


FIG. 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 2463

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A	DE 102 22 289 A1 (VALEO SICUREZZA ABITACOLO S.P.A., SANTENA) 27 November 2003 (2003-11-27) * column 4, line 10 - line 28 * * figures 1,4 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 August 2005	Examiner Bitton, A
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	

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EPO FORM 1503 03.82 (P04C01)

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