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Amended claims in accordance with Rule 137(2) EPC.

(54) HOOD CONTROL SYSTEM

(57) A vehicle hood control system (1) comprising: a hood latch mechanism (4) for keeping a vehicle hood (11) in a closed position; a hood stay mechanism (6) for keeping the vehicle hood (11) in an open position; and a handle mechanism (2) with a single handle (3) for controlling both the hood latch mechanism (4) and the hood stay mechanism (6), preferably via a first and second cable (8, 9). The hood stay mechanism (6) may comprise a hinge mechanism (5) with a movable pin (10).

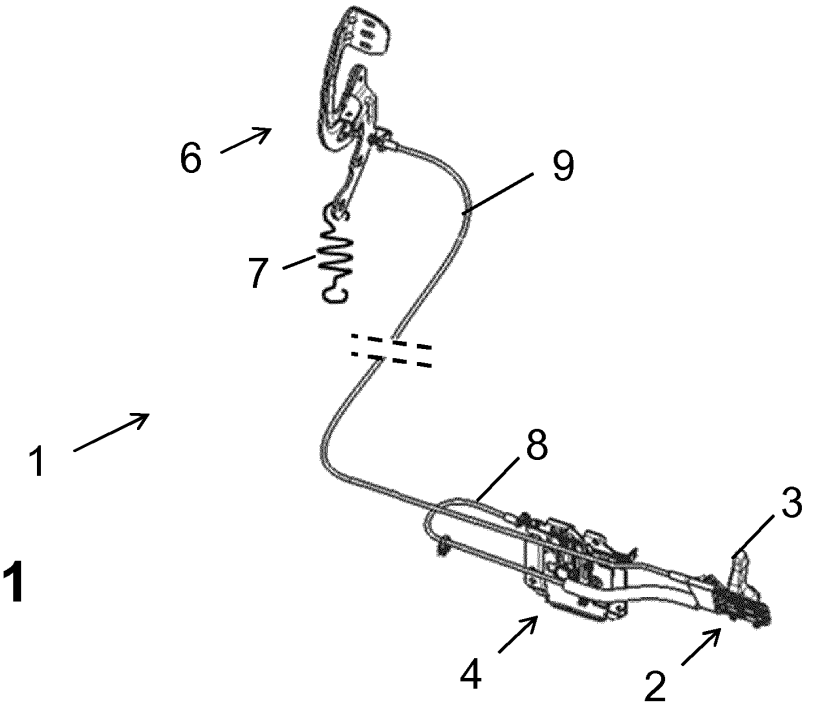


FIG. 1

EP 3 521 541 A1

Description

[0001] The present invention relates in general to a hood control system. The present invention relates more in particular to a hood control system for controlling a hood latch mechanism for keeping the hood in a closed position, and for controlling a hood stay mechanism for keeping the hood in an open position. Specifically, the present invention provides a vehicle hood control system, and a vehicle comprising such hood control system.

[0002] Motorized vehicles typically have a hood for covering an engine, also known as "bonnet" or "engine cover". The hood should be kept in a closed position when the vehicle is moving. To this end, usually a latch mechanism is provided. But the hood should also be capable of being opened, to provide access to the engine compartment, and should stay open when working on the engine. To this end, a hood stay mechanism is provided, which may typically be a metal rod which can be manually positioned in a lying position when the hood is closed, or in an upright position to keep the hood open.

[0003] US 5,048,154 A describes a hood hinge for a lawn-mowing vehicle. The hood has a latch and a stopper.

[0004] US 2,570,992 A describes an automobile hood hinge.

[0005] US 2,066,444 A describes another hood hinge for an automobile, comprising a pivotal interengagement.

[0006] US 6,003,204 A describes a garden tractor comprising a hood hinge mechanism with a pin member.

[0007] KR 100820391 B1 describes a hood stay and hood latch for a vehicle, each controlled via a handle and a cable.

[0008] DE 103 45 931 A1 describes an engine bonnet unit for a motor vehicle, comprising a pulling mechanism whose functioning end section is connected to the lock or hinge arrangement of the bonnet unit.

[0009] EP 1 961 899 A2 describes a device for hinging and supporting a vehicle bonnet.

[0010] US 7,926,603 B2 describes a hood tilt locking system with a hood lever and a pin slidable in a slot.

[0011] US 6,637,531 B2 describes a vehicle hood support and latch system comprising a lock lever and a handle and a pin assembly.

[0012] US 8,162,093 B2 describes a vehicle with a bonnet lock.

[0013] EP 1 536 991 B1 describes a motor vehicle and a hinge assembly for pivotally mounting a bonnet to a vehicle body.

[0014] There is always room for improvements and alternatives.

[0015] The present invention has the object to provide a vehicle hood control system with a hood latch mechanism to keep the hood in a closed position, and with a hood stay mechanism to keep the hood in an open position, and to a vehicle comprising such a hood control system.

[0016] It is a particular object of embodiments of the present invention to provide a vehicle hood control system that is easier to control.

[0017] It is a particular object of embodiments of the present invention to provide a vehicle hood control system that is more ergonomic.

[0018] It is a particular object of embodiments of the present invention to provide a vehicle hood control system, which does not require a classical rod, which needs to be positioned upright to keep the hood open.

[0019] It is a particular object of embodiments of the present invention to provide a vehicle hood control system that requires fewer parts.

[0020] These objects are achieved by a vehicle hood control system having the features of claim 1, and by a vehicle having the features of claim 6. Further, particularly advantageous embodiments of the invention are disclosed in the dependent claims.

[0021] It should be noted that the individual features listed in the description below can be combined in any technically meaningful way with each other and show further embodiments of the invention. The description of the invention is additionally characterized and specified particularly in connection with the figures.

[0022] In an advantageous embodiment, the present invention discloses a vehicle hood control system comprising: a hood latch mechanism for maintaining a vehicle hood in a closed position; a hood stay mechanism for maintaining the vehicle hood in an open position; and a handle mechanism with a single handle adapted for controlling both the hood latch mechanism and the hood stay mechanism.

[0023] It is an advantage of this unique combination that it is both convenient and ergonomic. The hood control system allows the opening and closing of the vehicle hood to be controlled by means of a single handle, typically located in the passenger compartment of the vehicle.

[0024] It is a further advantage that the handle mechanism only needs to be operated once to open the hood and to enable the hood stay mechanism of going into locked mode when the hood is opened.

[0025] Likewise, it is a further advantage that the handle mechanism only needs to be operated once to close the hood and to enable the hood latch mechanism of going into locked mode when the hood is closed.

[0026] According to a further advantageous embodiment of the present invention, the vehicle hood control system further comprises a first cable and a second cable; wherein the single handle is adapted for controlling the hood latch mechanism via the first cable; and wherein the single handle is adapted for controlling the hood stay mechanism via the second cable.

[0027] It is an advantage that the first cable allows to remotely control the hood latch mechanism, and the second cable allows to remote control the hood stay mechanism from within the passenger compartment.

[0028] According to a further advantageous embodiment of the present invention, the hood stay mechanism

comprises a hinge mechanism connectable to the vehicle hood, and further comprises a hinge locking mechanism for locking the hinge to thereby maintain the hinge in an open position, the hinge locking mechanism being controlled by the second cable.

[0029] It is an advantage of using a hinge mechanism and to enable locking of the hinge mechanism, because this can be implemented with only few extra parts.

[0030] According to a further advantageous embodiment of the present invention, the hinge locking mechanism comprises a movable pin, and biasing means, for example in the form of a spring for biasing the pin into a locking position.

[0031] It is an advantage of using a pin, because this requires only minimal additional hardware, hence can be implemented in a relatively simple manner. Yet it is a highly robust mechanism.

[0032] According to a further advantageous embodiment of the present invention, the vehicle hood control system has two operational states:

* a first state wherein the single handle is in a first position, wherein the hood stay mechanism is released, and wherein the hood latch mechanism is capable of going into a locked state if not already in a locked state and once locked, to remain in the locked state;
* a second state wherein the single handle is in a second position, wherein the hood latch mechanism is released, and wherein the hood stay mechanism is capable of going into a locked state if not already in a locked state and once locked, to remain in the locked state.

[0033] It is an advantage that the hood control system has only two operational states. This is easy to remember to the user, and the risk of incorrect operation is minimal.

[0034] According to another advantageous embodiment of the present invention, the present invention discloses a vehicle comprising: a hood movable between a closed position and an open position; and a hood control system described above.

[0035] According to a further advantageous embodiment of the present invention, the vehicle further comprises a spring connected to the hinge mechanism for urging the hood to a partially open position.

[0036] Further features and advantages of the present invention will become apparent from the following description of a non-limiting embodiment of the invention which will be explained below with reference to the drawing, wherein:

FIG. 1 shows an example of a vehicle hood control system according to the present invention, comprising a hood latch mechanism, a hood stay mechanism, and a handle mechanism.

FIG. 2 shows the vehicle hood control system of FIG. 1 in a slightly different manner.

FIG. 3 is an enlarged view on an exemplary hood stay mechanism used in the system of FIG. 1.

FIG.4 is an enlarged view on an exemplary handle mechanism and an exemplary latch mechanism used in the system of FIG. 1.

FIG. 5 shows the handle mechanism with the control handle in a first position.

FIG. 6 shows the handle mechanism with the control handle in a second position.

FIG. 7(a,b) show how a hood can be moved from a closed state to an open state.

FIG. 8(a,b) show how a hood can be moved from an open state to a closed state.

[0037] In the various figures, equivalent elements with respect to their function are always provided with the same reference numerals so that these elements are usually described only once.

[0038] The present invention is related to a vehicle hood control system. More specifically, the present invention relates to a hood control system for controlling a hood latch mechanism for keeping the hood in a closed position, and for controlling a hood stay mechanism for keeping the hood in an open position, by means of a handle mechanism having a single handle adapted for controlling both the hood latch mechanism and the hood stay mechanism.

[0039] Only very few hood control systems are known having a hood latch mechanism which can be controlled remotely via a handle, and also a hood stay mechanism which can be controlled remotely by a handle, but in none of these systems the hood latch mechanism and the hood stay mechanism can be controlled by the same handle. In the present invention, however, that is exactly the case.

[0040] FIG. 1 shows a vehicle hood control system 1 (herein also referred to as "hood control system" or "control system") for controlling the opening and closing of a hood 11 (also known as "bonnet" or "engine cover") of a vehicle 12, in particular a motorised vehicle such as a car or a truck or a bus. The vehicle 12 and the hood 11 are not shown in FIG. 1, but see for example FIG. 7 and FIG. 8.

[0041] The hood control system 1 of FIG. 1 comprises a hood latch mechanism 4 for keeping the hood 11 of a vehicle 12 in a closed position after closing. Hood latch mechanisms which can be controlled remotely are known in the art, and hence need not be explained in more detail here.

[0042] The hood control system 1 of FIG. 1 further comprises a hood stay mechanism 6 for keeping the hood in an open position after opening. Hood stay mechanisms which can be controlled remotely are also known in the art, and hence need not be explained in more detail here.

[0043] The present invention will be described for a specific example wherein the hood stay mechanism 6 comprises a hinge mechanism 5 (e.g. FIG. 5) connecta-

ble to the hood 11, which hinge mechanism 5 may be biased by a spring 7 for urging the hood 11 towards a half open position, but the present invention is not limited thereto, and another suitable hood stay mechanism can also be used.

[0044] The hood control system 1 of FIG. 1 further comprises a handle mechanism 2 having a single handle 3 arranged for controlling both the hood latch mechanism 4 and the hood stay mechanism 6.

[0045] This unique combination is both convenient and ergonomic. The combination is not trivial, at least because in prior art systems, the hood latch mechanism is always or nearly always controlled from inside the passenger compartment of the vehicle, while the hood stay mechanism, is always or nearly always controlled from the engine compartment of the vehicle, if remotely controllable at all.

[0046] The present invention is partly based on the insight that the releasing of the latch mechanism can be performed at the same time as enabling the hood stay mechanism to go into locked mode when the hood is opened, even though the actual going into locked mode only occurs some time later (when the hood is actually opened), and is based on the insight that the releasing of the hood stay mechanism can be performed at the same time as enabling the hood latch mechanism to go into locked mode, even though the actual going into locked mode only occurs some time later (when the hood is actually closed).

[0047] In the mind of most people, this cannot be done at the same time, because for many decades, the act of releasing the latch occurs at a different time than the hood stay mechanism going into locked mode, and vice versa. They do not fully realize that there is a difference between enabling the mechanism of going into locked mode and actually going into locked mode, which may occur some time later.

[0048] The hood control system 1 of FIG. 1 further comprises a first cable 8 and a second cable 9, and the single handle 3 is adapted for controlling the hood latch mechanism 4 via the first cable 8, and for controlling the hood stay mechanism 6 via the second cable 9.

[0049] It is pointed out that a single handle can move both cables at the same time, which is very convenient. Such cables are highly robust, and can be located under the hood.

[0050] FIG. 2 shows the vehicle hood control system 1 of FIG. 1 arranged in a slightly different manner. It contains the same functional components: a handle mechanism 2 with a single handle 3, a hood latch mechanism 4 controlled via a first cable 8, and a hood stay mechanism 6 controlled via a second cable 9. The spring 7 is optional.

[0051] FIG. 3 is an enlarged view on the hood stay mechanism 6 used in the system of FIG. 1 and FIG. 2.

[0052] FIG. 3 shows a hinge mechanism 5 comprising a hinge locking mechanism as a particular example of a hood stay mechanism 6. The hinge locking mechanism is adapted for locking the hinge in a position so as to keep the hood 11 in an open position. In the specific example shown in FIG. 3, the hinge locking mechanism 6 comprises a movable pin 10 for locking the hinge mechanism 5 in a predefined position, and a spring (not explicitly shown) for biasing the pin 10 into the locking position.

[0053] Preferably the hinge locking mechanism is locked automatically, e.g. by a biasing force, for example exerted by a spring (not explicitly shown), when the hinge is brought in a predefined position, and provided that the control cable 9 is in a predefined position, e.g. retracted (as seen from the handle 3). Once locked, the hinge locking mechanism can be released by means of the second cable 9, e.g. by pushing the cable 9 so that the pin disengages from opening 13, e.g. by being pushed out of the opening 13. A typical sequence of the locking and unlocking operations of the hook latch mechanism 4 and the hook stay mechanism 6 will be described in more detail in FIG. 7 and FIG. 8.

[0054] FIG. 4 is an enlarged view on the handle mechanism 2 and the latch mechanism 4 used in the hood control system of FIG. 1. As can be appreciated, the handle mechanism 2 is connected to a first cable 8 for controlling the latch mechanism 4. The handle mechanism 2 is shown in more detail in FIG. 5 and FIG. 6. As mentioned above, the present invention is not limited to the specific latch mechanism shown in FIG. 4, but other suitable latch mechanisms can also be used.

[0055] FIG. 5 shows the handle mechanism 2 with a single control handle 3 in a first position. As can be seen, the control handle 3 is rotatably connected with respect to the handle mechanism 2. An L-shaped element 14 is fixedly connected to the control handle 3, and rotates along with the control handle 3. The handle and the L-shaped element 14 together form a U-shape. The L-shaped element has a first connection point 15 for connection of the first cable 8, and has a second connection point 16 for connection of the second cable 9.

[0056] When the handle 3 is in its first position, as shown in FIG. 5, the hood control system 1 is in a first state wherein the hood latch mechanism 4 is allowed or enabled to go into a locked state if not already in the locked state, but once in the locked state, to stay in the locked state. And with the handle 3 in its first position, the hood stay mechanism 6, e.g. the hinge locking mechanism, is released, thus the hood 11 can be moved out of the open position, e.g. manually or by gravity force.

[0057] FIG. 6 shows the handle mechanism 2 with the control handle 3 in a second position, different from the first position.

[0058] When the handle 3 is in its second position, as shown in FIG. 6, the hood control system 1 is in a second state wherein the hood stay mechanism 6 is allowed or enabled to go into a locked state if not already in the locked state, but once in the locked state, to stay in the locked state. And with the handle 3 in its second position, the hood latch mechanism 4 is released, thus the hood

11 can be moved out of the closed position, e.g. manually or by a spring force.

[0059] Based on the above, the operations of FIG. 7 and FIG. 8 can now be understood.

[0060] FIG. 7(a) and FIG. 7(b) show how a hood 11 of a vehicle 12 can be moved from a fully closed position Pos1 with the hood latch mechanism 4 in a locked state to an open (e.g. fully open) position Pos3 with the hood stay mechanism 6 in a locked state:

- Initially, as shown in FIG. 7(a), the handle 3 is in its first position and thus the handle mechanism 2 is in its first state (as shown in FIG. 5), and the hood 11 is in its closed position Pos1 as indicated by the dotted line. The latch mechanism 4 is locked, and the stay mechanism 6 is unlocked. The hood is kept closed.
- Some time later, the handle 3 is moved towards its second position (as shown in FIG. 6), which causes the hood latch mechanism 4 to be released. The hood 11 can now be moved manually or is moved automatically (e.g. by a spring force) to a second position Pos2 (indicated in normal line). The second position Pos2 may be a predefined position, or may be an arbitrary intermediate position. The hood stay mechanism 6 is enabled of going into locked state, but that will not happen until the hood 11 is actually moved to its fully open position Pos3.
- Some time later, as shown in FIG. 7(b), the hood 11 is moved (e.g. manually) from its second position Pos2 (as indicated by the normal line) to its open position Pos3 (as indicated by the dotted line). When the hood stay mechanism 6 reaches a predefined condition, e.g. a predefined angular position, the hood stay mechanism 6 gets into locked mode, thereby keeping the hood 11 in its open position.

[0061] As can be appreciated from FIG. 7(a) and FIG. 7(b), only a single handle operation is required for opening the hood 11 and to enable the hood stay mechanism 6 of going into locked mode. Thus, if the handle mechanism 2 is located inside the passenger compartment, the user only needs to enter the car once, turn (e.g. pull) the handle 3, and then step out of the vehicle 12, and open the hood 11 which will automatically be locked when the hood 11 is moved to the open position Pos3.

[0062] FIG. 8(a) and FIG. 8(b) show how a hood 11 of the vehicle 12 can be moved from an open (e.g. fully open) position Pos3 with the hood stay mechanism 6 in a locked state to its closed position Pos1 with the hood latch mechanism 4 in a locked state:

- Initially, as shown in FIG. 8(a), the handle 3 is in its second position and thus the handle mechanism 2 is in its second state (as shown in FIG. 6), and the hood 11 is in its open position Pos3 as indicated by the dotted line. The hood stay mechanism 6 is locked, and the hood latch mechanism 4 is unlocked.
- Some time later, the handle 3 is moved towards its first position (as shown in FIG. 5), which causes the hood stay mechanism 6 to be released. The hood 11 can now be moved manually or is moved automatically (e.g. by gravity force) to a second position Pos2. The second position Pos2 may be a predefined position, or may be an arbitrary position between the open position Pos3 and the closed position Pos1. The hood latch mechanism 4 is capable of going into locked state, but that will not happen until the hood 11 is actually moved to its closed position Pos1.
- Some time later, as shown in FIG. 8(b), the hood 11 is moved (e.g. manually or by gravity) from its second position Pos2 (as indicated by the normal line) to the closed position Pos1 (as indicated by the dotted line). The hood latch mechanism 4 gets into locked mode, thereby maintaining the hood 11 in its closed position.

[0063] As can be appreciated from FIG. 8(a) and FIG. 8(b), only a single handle operation is required for releasing the hood stay mechanism 6 and to enable the hood latch mechanism 4 of going into locked mode. Thus, if the handle mechanism 2 is located inside the passenger compartment, the user only needs to enter the car once, turn (e.g. push) the handle 3, and then step out of the vehicle 12, and close the hood 11 which will automatically be locked when the hood 11 is moved to the closed position Pos1.

REFERENCE NUMERALS

[0064]

1	hood control system
2	handle mechanism,
3	single handle,
4	latch mechanism,
5	hinge mechanism,
6	hood stay mechanism (e.g. a hinge locking mechanism),
7	spring,
8	first cable,
9	second cable,
10	pin,
11	hood or bonnet,
12	vehicle,
13	opening,
14	L-shaped element,
15	first connection point,
16	second connection point.

Claims

1. A vehicle hood control system (1) comprising:

- a hood latch mechanism (4) for keeping a vehicle hood (11) in a closed position;
- a hood stay mechanism (6) for keeping the vehicle hood (11) in an open position;
- a handle mechanism (2) with a single handle (3) adapted for controlling both the hood latch mechanism (4) and the hood stay mechanism (6).

2. A vehicle hood control system (1) according to claim 1,
further comprising a first cable (8) and a second cable (9);
wherein the single handle (3) is adapted for controlling the hood latch mechanism (4) via the first cable (8);
and wherein the single handle (3) is adapted for controlling the hood stay mechanism (6) via the second cable (9).

3. A vehicle hood control system (1) according to any of the previous claims,
wherein the hood stay mechanism (6) comprises a hinge mechanism (5) connectable to the vehicle hood (11), and further comprises a hinge locking mechanism for locking the hinge thereby maintaining the hinge in an open position, the hinge locking mechanism being controlled by the second cable (9).

4. A vehicle hood control system (1) according to claim 3,
wherein the hinge locking mechanism comprises a movable pin (10), and a biasing means for biasing the pin (10) into a locking position.

5. A vehicle hood control system (1) according to any of the previous claims having two operational states:

a first state wherein the single handle (3) is in a first position, wherein the hood stay mechanism (6) is released; and wherein the hood latch mechanism (4) is enabled of going into a locked state if not already in a locked state and once locked, to remain in the locked state;
a second state wherein the single handle (3) is in a second position, wherein the hood latch mechanism (4) is released, and wherein the hood stay mechanism (6) is enabled of going into a locked state if not already in a locked state and once locked, to remain in the locked state.

6. A vehicle (12) comprising:

- a hood (11) movable between a closed position (Pos1) and an open position (Pos3);
- a hood control system (1) according to any of the previous claims.

7. A vehicle (12) according to claim 6, and dependent on claim 3,
further comprising a spring (7) connected to the hinge mechanism (5) for urging the hood (11) to a partially open position.

Amended claims in accordance with Rule 137(2) EPC.

1. A vehicle hood control system (1) comprising:

- a hood latch mechanism (4) for keeping a vehicle hood (11) in a closed position;

characterized by

- a hood stay mechanism (6) for keeping the vehicle hood (11) in a fully open position;
- a handle mechanism (2) with a single handle (3) adapted for controlling both the hood latch mechanism (4) and the hood stay mechanism (6).

2. A vehicle hood control system (1) according to claim 1,
further comprising a first cable (8) and a second cable (9);
wherein the single handle (3) is adapted for controlling the hood latch mechanism (4) via the first cable (8);
and wherein the single handle (3) is adapted for controlling the hood stay mechanism (6) via the second cable (9).

3. A vehicle hood control system (1) according to any of the previous claims, wherein the hood stay mechanism (6) comprises a hinge mechanism (5) connectable to the vehicle hood (11), and further comprises a hinge locking mechanism for locking the hinge thereby maintaining the hinge in an open position, the hinge locking mechanism being controlled by the second cable (9).

4. A vehicle hood control system (1) according to claim 3,
wherein the hinge locking mechanism comprises a movable pin (10), and a biasing means for biasing the pin (10) into a locking position.

5. A vehicle hood control system (1) according to any of the previous claims having two operational states:

a first state wherein the single handle (3) is in a first position, wherein the hood stay mechanism (6) is released; and wherein the hood latch mechanism (4) is enabled of going into a locked state if not already in a locked state and once

locked, to remain in the locked state;
a second state wherein the single handle (3) is in a second position, wherein the hood latch mechanism (4) is released, and wherein the hood stay mechanism (6) is enabled of going into a locked state if not already in a locked state and once locked, to remain in the locked state.

6. A vehicle (12) comprising:

- a hood (11) movable between a closed position (Pos1) and an open position (Pos3);

characterized by

- a hood control system (1) according to any of the previous claims.

7. A vehicle (12) according to claim 6, and dependent on claim 3,
further comprising a spring (7) connected to the hinge mechanism (5) for urging the hood (11) to a partially open position.

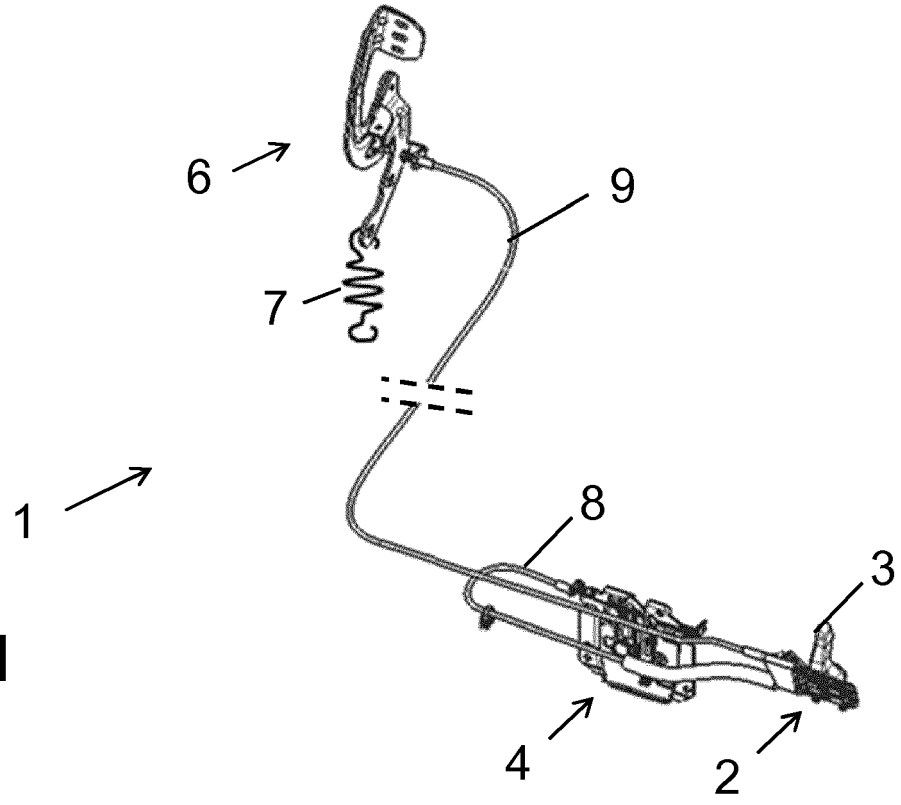


FIG. 1

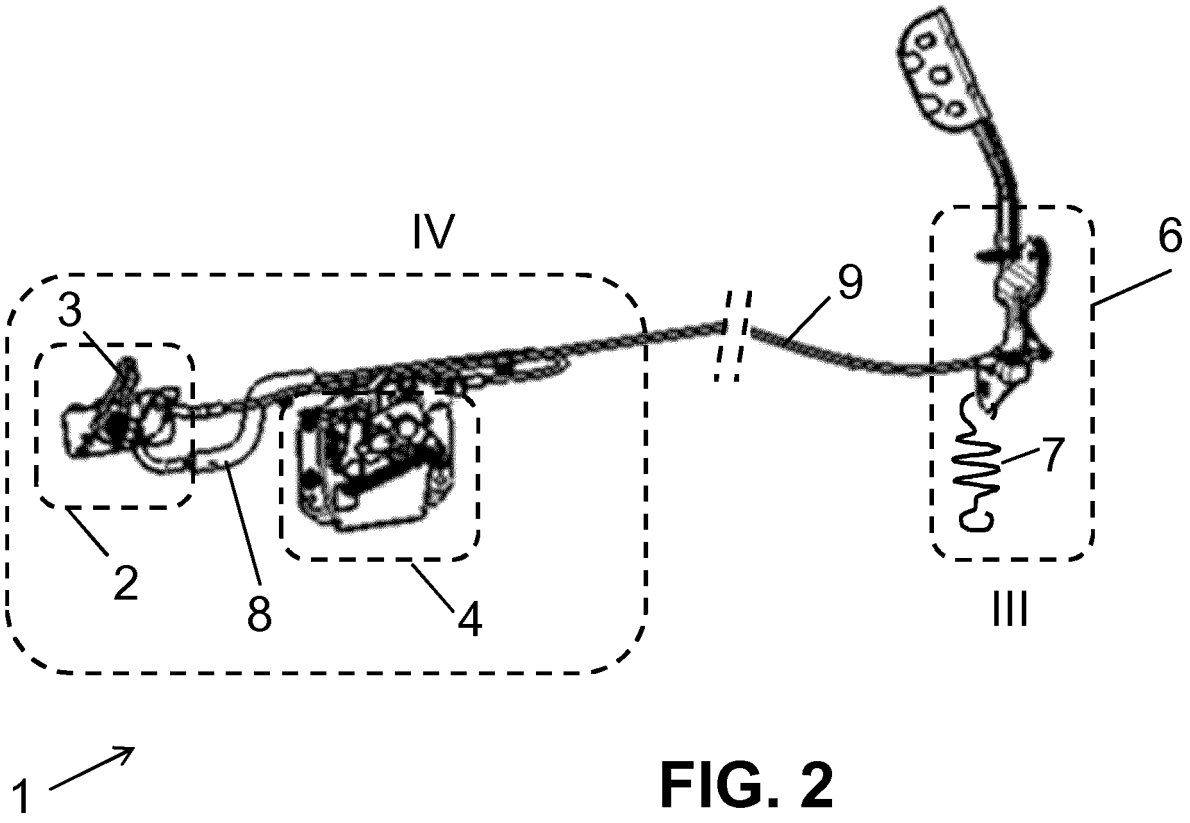


FIG. 2

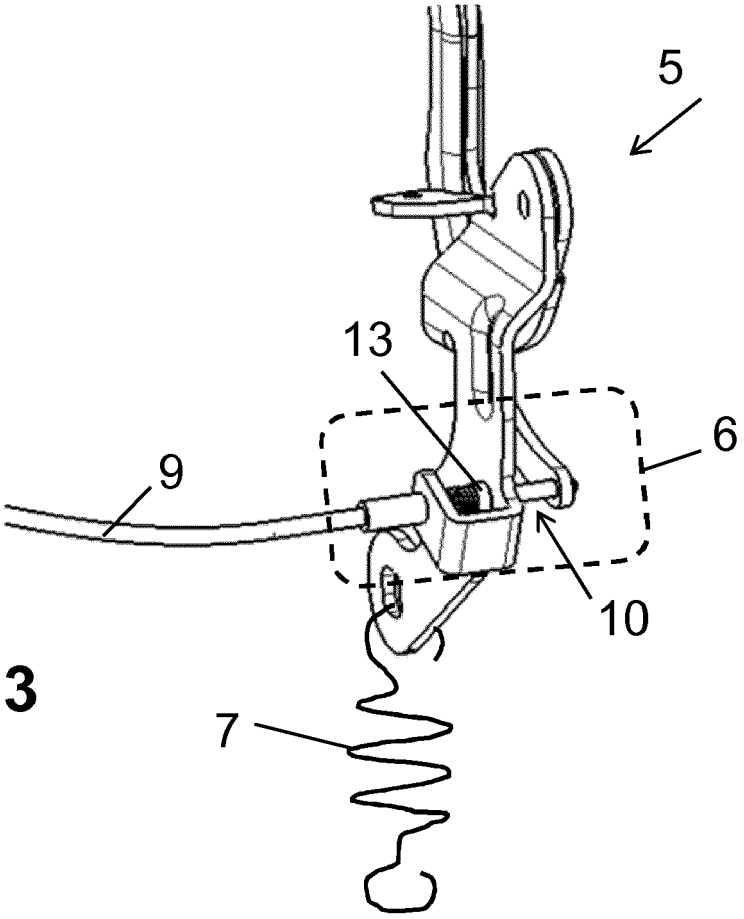


FIG. 3

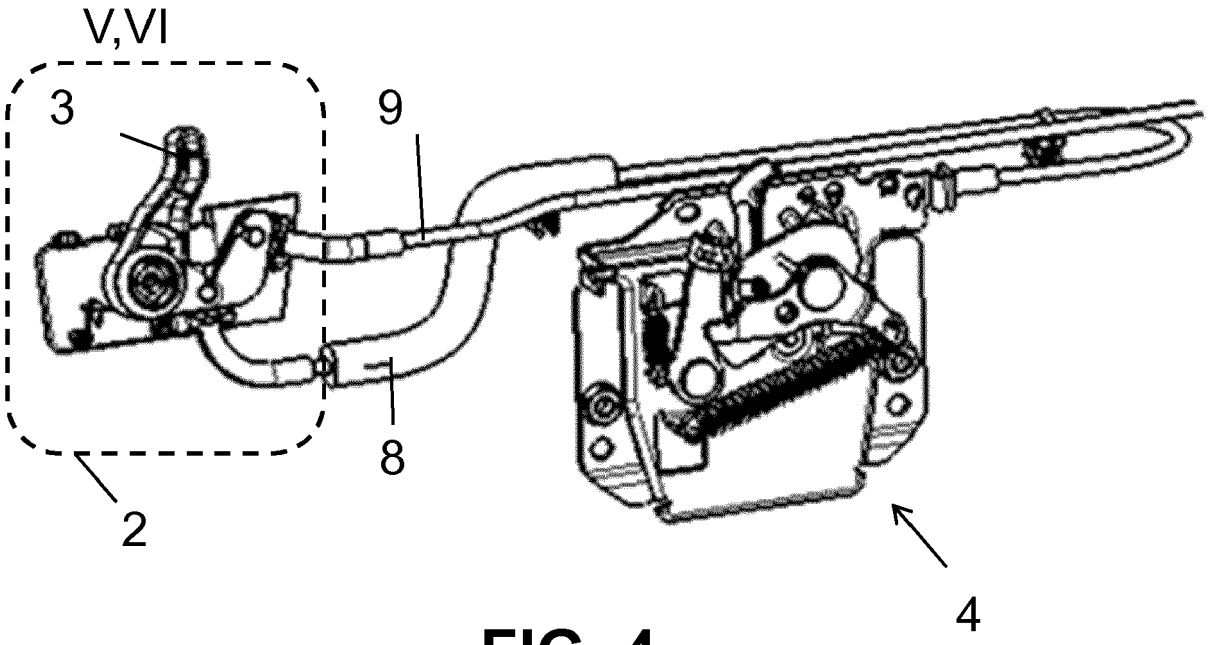


FIG. 4

FIG. 5

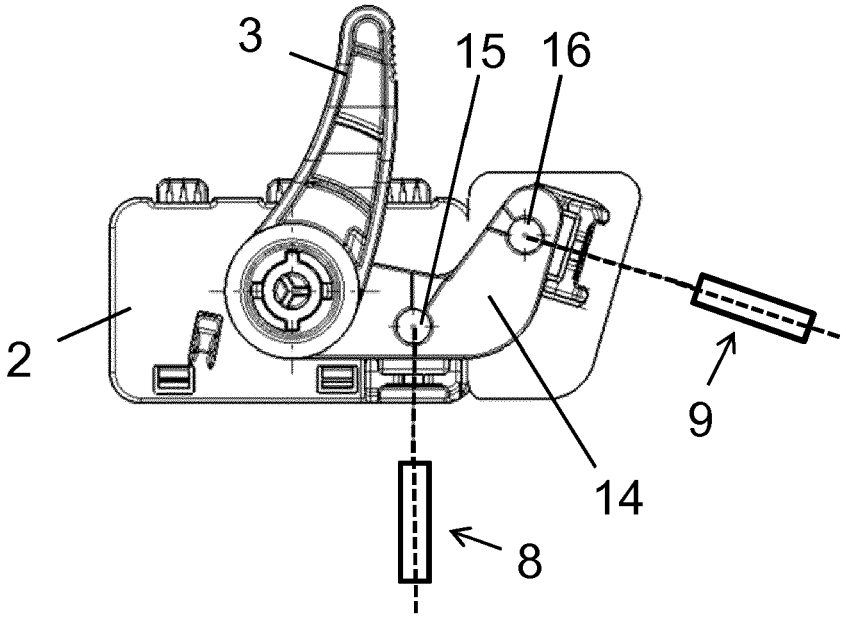
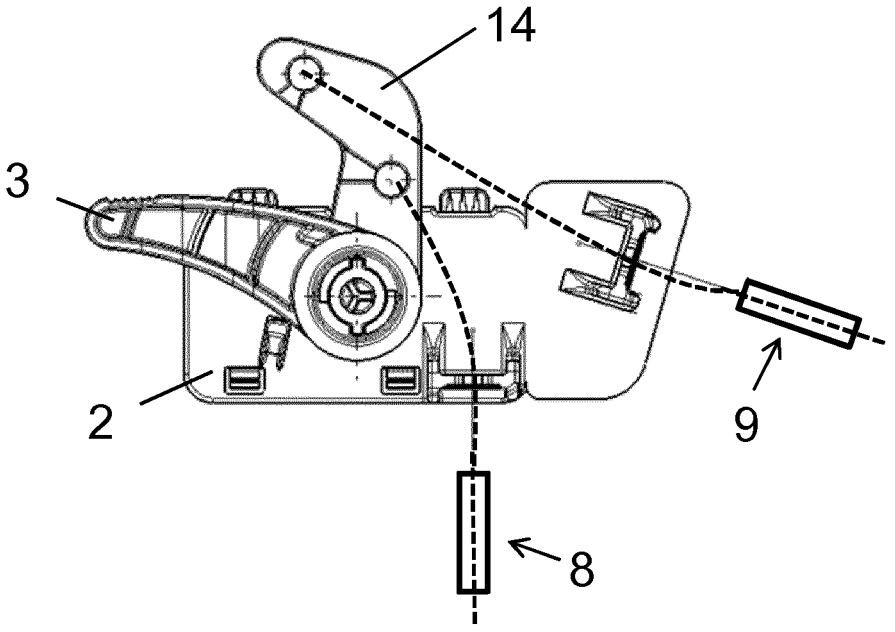
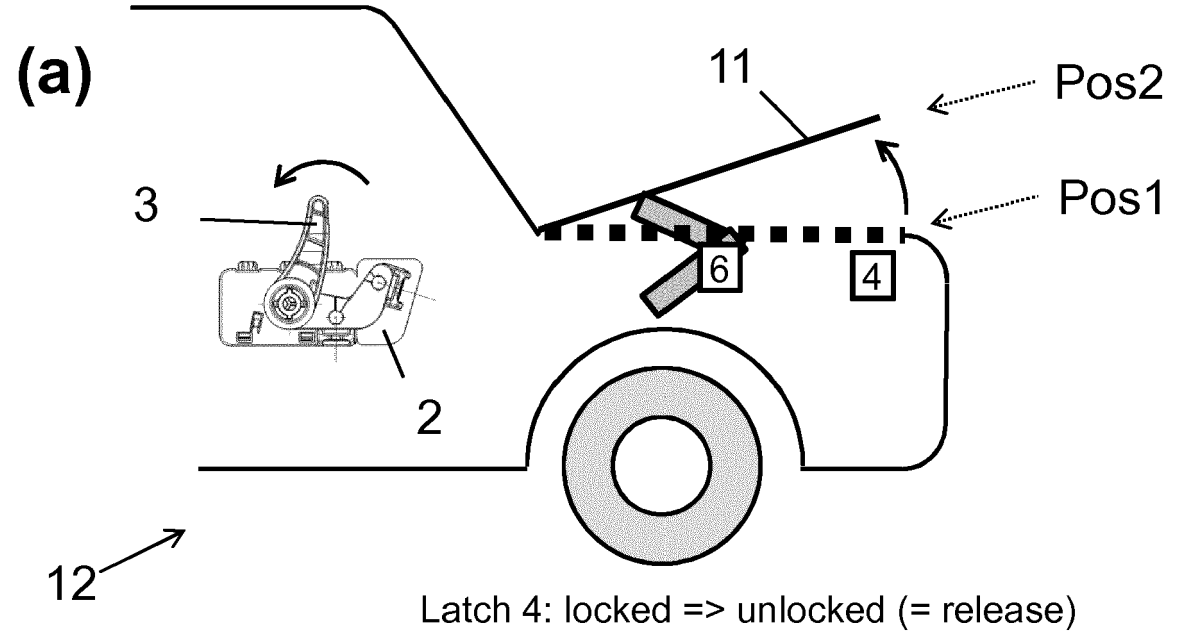
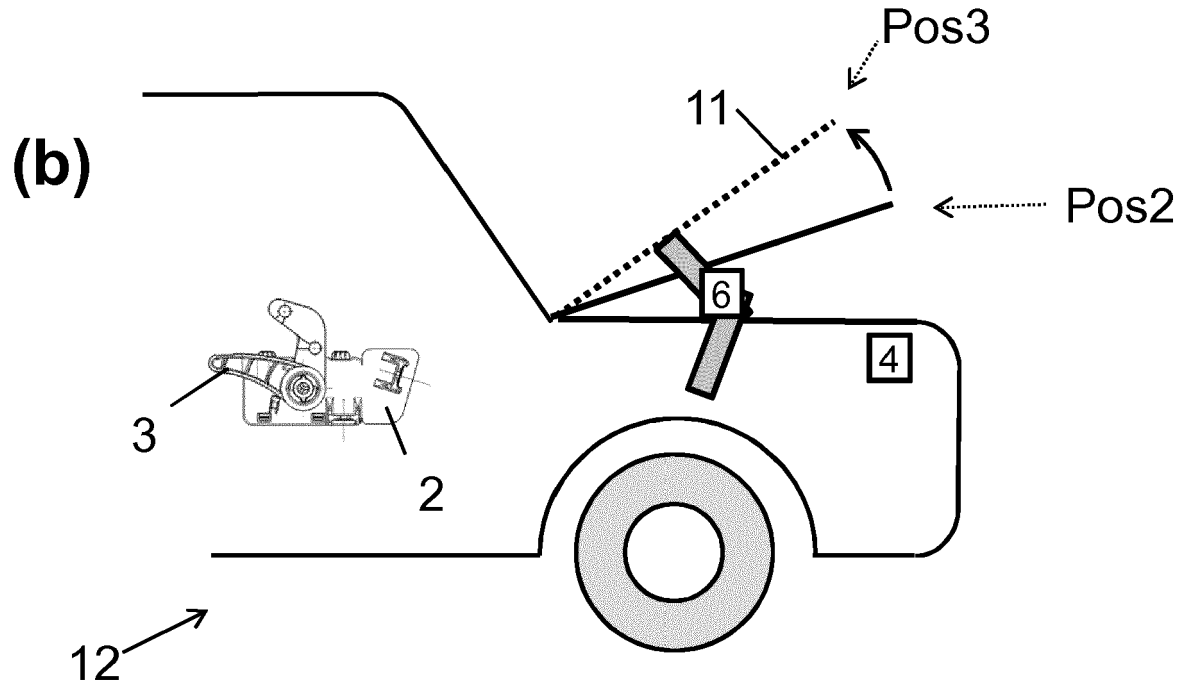


FIG. 6



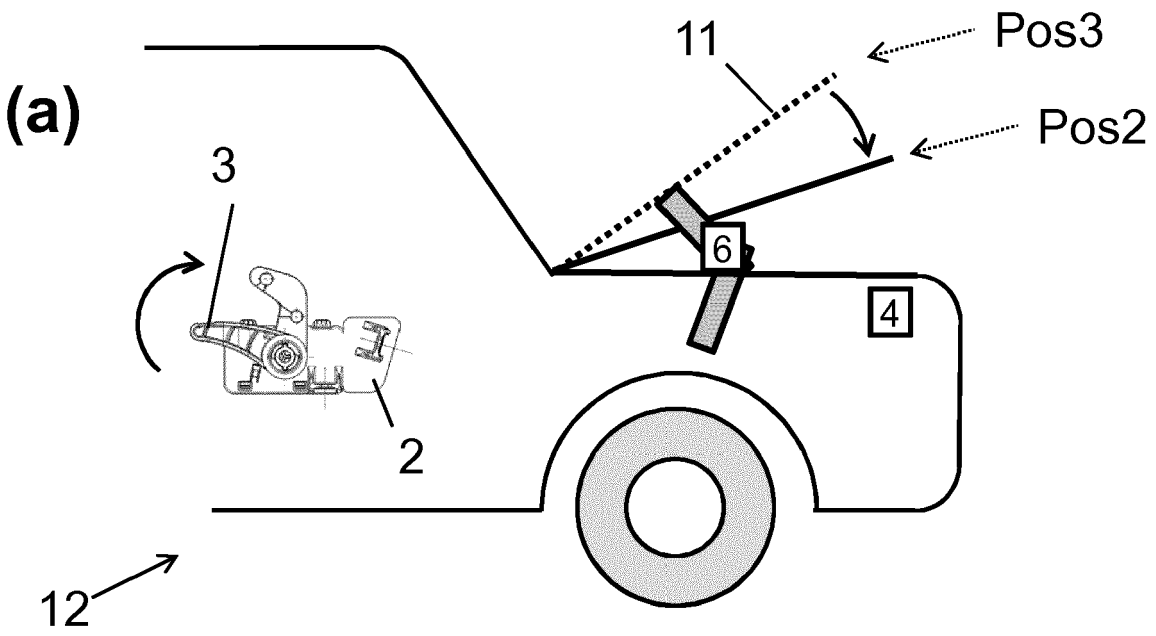


Latch 4: locked => unlocked (= release)
Hinge 6: unlocked => capable of going into lock

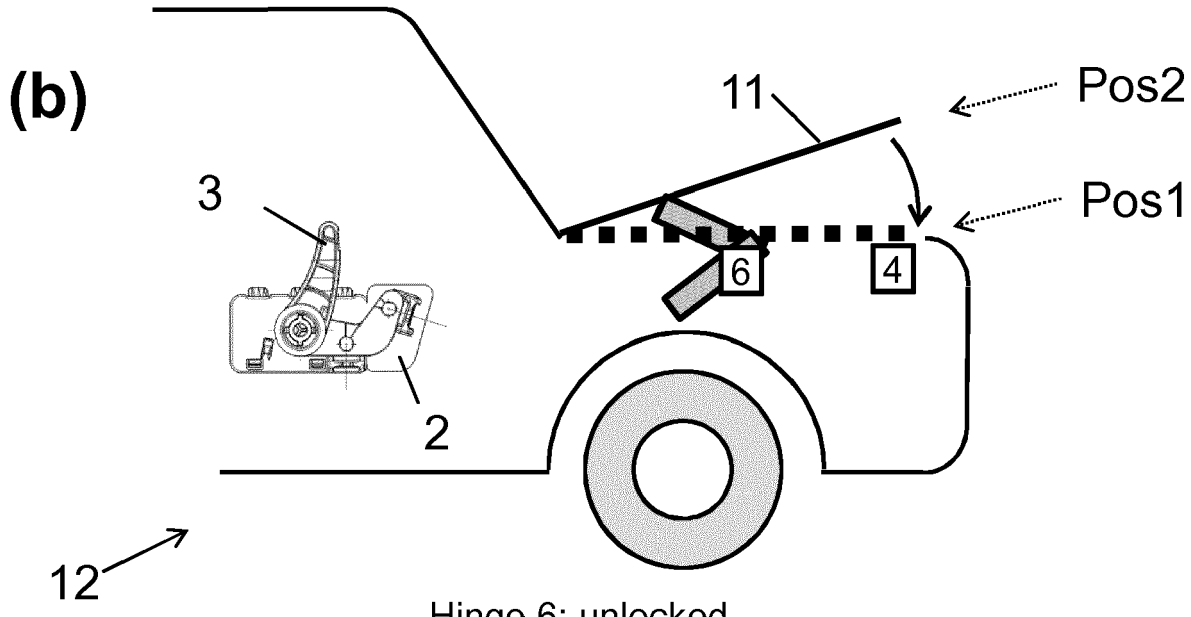


Latch 4: unlocked
Hinge 6: capable of going into lock => locked

FIG. 7



Hinge 6: locked => unlocked (= release)
Latch 4: open => capable of going into lock



Hinge 6: unlocked
Latch 4: capable of going into lock => locked

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 4370

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	US 2013/049403 A1 (FANNON JOSEPH P [US] ET AL) 28 February 2013 (2013-02-28) * the whole document *	1,6	INV. E05B83/24 E05C17/00 E05C17/48
A,D	US 8 162 093 B2 (VOLKER SCHEUCH [DE] ET AL) 24 April 2012 (2012-04-24) * the whole document *	1-7	E05C17/58 E05D11/10 ADD.
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TECHNICAL FIELDS SEARCHED (IPC)

E05B
E05C
E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 May 2018	Robelin, Fabrice

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

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 15 4370

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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30-05-2018

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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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