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(54) **Support hinge of a vehicle hood, in particular for accessing to an engine compartment of an industrial or commercial vehicle**

(57) The present invention relates to a support hinge of a vehicle hood, in particular for accessing to an engine compartment of an industrial or commercial vehicle. The hinge according to the invention defines a plane of rotation (P) and an open position and a closed position of said hood. Said hinge comprises a first flange and a second flange respectively connected to the body (20) and to the hood of the vehicle. The hinge (1) comprises also

a locking plate (2) hinged to the first flange (11) and comprising a sliding guide (22) for a guide pin (31b) connected to the second flange (12). Such sliding guide (22) comprises at least an engagement portion (24b), suitable to engage said guide pin (31b) when said second flange (12) reaches a predetermined position with respect to said first flange, in order to block said hood (10) in open position.

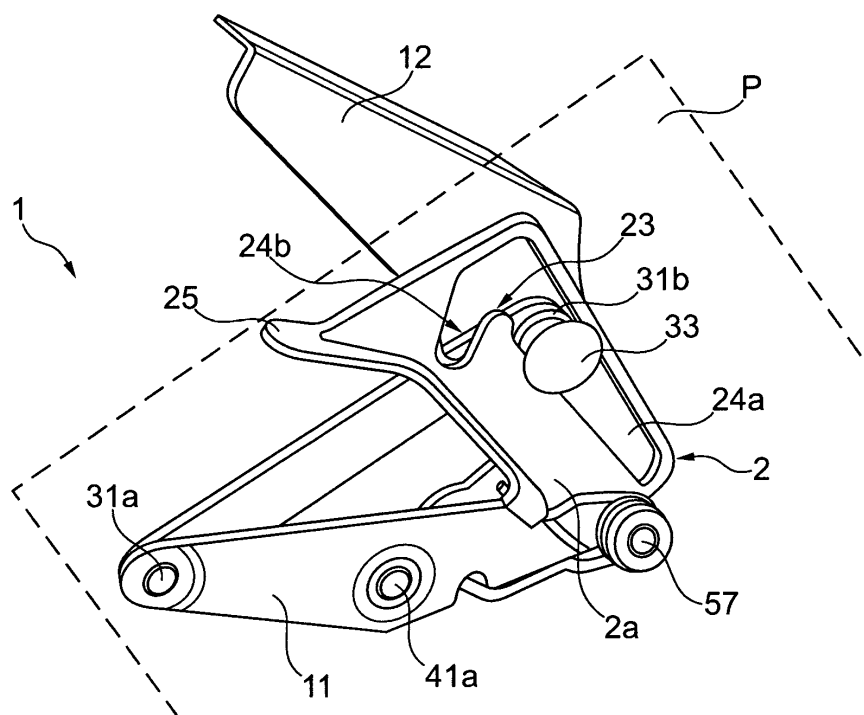


Fig. 3

Description

FIELD OF THE INVENTION

[0001] The present invention refers to the field of the support hinges of vehicle hoods, in particular for accessing to an engine compartment or to another compartment of an industrial or commercial vehicle. In particular the present invention relates to a support hinge of a vehicle hood comprising a device for blocking the hood integrated to the hinge itself.

DESCRIPTION OF THE PRIOR ART

[0002] As it is known, motor vehicles, both passenger transport vehicles and industrial or commercial vehicles, comprise at least a "vehicle hood", such expression indicating a door of the vehicle which, in open position, is raised upwards by an edge, in order to access to the engine compartment or to another compartment. Each hood is usually hinged, by another edge, to the body of a vehicle and is maintained in raised position by means of a support rod which is put between the raised edge of the hood, opposite with respect to the hinged one, and the body itself of the vehicle.

[0003] In order to avoid accidents, the hood usually comprises an appropriate seat where it is possible to engage the end of the support rod, in order to prevent the hood from closing, for example, while an operator is leaned over the engine compartment. The engagement between the support rod and the hood is maintained by the weight of the hood itself.

[0004] A first drawback of such largely used solution lies in that the rod may hamper the maintenance operations of the vehicle's engine, or the loading of the compartment closed by the hood. In particular, during such maintenance and/or loading operations, the operator has to pay particular attention to his/her movements in order to avoid an unwanted disengagement of the support rod of the hood, provoking an undesired closing of the hood itself.

[0005] A second problem lies in that the hood, having a large surface, is highly affected by the action of the wind, thus, if the maintenance or the loading of the compartment are performed outdoors, the risk that the support rod is disengaged from its seat by the action of the wind is very high, thus generating dangerous situations.

[0006] According to these considerations it is evident that using hood support rods is not a practical technical solution and at the same time it is not safe. Other known solutions use one or more pneumatic shock absorbers to support the hood. This solution however cannot be considered as acceptable, since also such shock absorbers hamper the access to the hood they support. Moreover it can be observed that the use of such shock absorbers is inconvenient also in economic terms, due to their high cost.

SUMMARY OF THE INVENTION

[0007] The main task of the present invention is to overcome all the drawbacks described above. In the scope of this task, a first purpose of the present invention is to allow an easy and safe access to the compartment when the hood is raised. Another aim of the present invention is to avoid using hood locking rods. Another aim of the present invention is to maintain the hood in raised position by means of a limited number of components that can be easily assembled between each other at competitive costs.

[0008] This task and these purposes are reached by means of a support hinge of a vehicle hood, in particular for accessing to the engine compartment of an industrial or commercial vehicle, according to what is indicated in claim 1.

[0009] The hinge according to the invention advantageously integrates a hood locking device which allows to avoid using the usual support rod, thus solving the technical problems mentioned above connected to its use. The dependent claims are an integral part of this description, which describes preferred alternative embodiments of the invention.

Brief description of the Figures

[0010] Further purposes and advantages of this invention will become clear from the following detailed description of a preferred embodiment and from the drawings that are attached hereto that are merely illustrative and not limitative, in which:

- Figure 1 shows a perspective exploded view of a support device of a vehicle hood according to the present invention;
- Figure 2 is a lateral view of the hinge of Figure 1 in closed configuration;
- Figure 3 is a lateral view of the hinge of Figure 2 during the opening movement;
- Figure 4 is a lateral view of the hinge of Figure 2 in open configuration;
- figure 5 shows a prospective view of a portion of a vehicle on which the hinge of Figure 2 is mounted.

[0011] In the figures the same reference numbers and letters identify the same elements or components.

Detailed description of preferred embodiments of the invention

[0012] With particular reference to the figures, the hinge 1 that is object of the present invention is a hinge comprising a first flange 11 intended to be fixed to a vehicle body 20 and a second flange 12 intended to be fixed to a vehicle hood 10.

[0013] Both flanges 11, 12 may have folded portions,

respectively 111 e 121, suitable to fit to and to be connected with the vehicle hood 10 and the vehicle body 20 respectively.

[0014] The hinge 1 comprises a pair of arms 13 and 14 each one of them comprising a first end, 13a and 14a respectively, hinged on the first flange 11, and a second end, 13b and 14b respectively, hinged on the second flange 12. The arms 13, 14 are preferably arranged to be substantially parallel, namely so that they do not cross during any of the possible intermediate positions that can be reached during the rotation between the open and the closed position of the hood 10 or vice versa. Thus the hinge defines, by its arms 13 and 14, a plane of rotation P (see Figure 3). In particular, as it can be seen in the figures, the hinge 1 has substantially an articulated quadrilateral or a parallelogram configuration.

[0015] The hinge 1 comprises a first pin 31a which hinges the first end 13a of the first arm 13 to the first flange 11. On the other hand, a second pin 41a hinges the first end 14a of the second arm 14 to the first flange 11. A third pin 31b hinges the second end 13b of the first arm 13 to the second flange 12. A fourth pin 41b hinges the second end 14b of the second arm 14 to the second flange 12.

[0016] The hinge 1 according to the invention advantageously comprises a hood locking device 10 in open position. Such locking device comprises a locking plate 2 hinged by a first end 21 to the first flange 11. Said locking plate 2 comprises a through sliding guide 22, through which a guide pin, fixed on the second flange 12 and perpendicular to the plane P, is suitable to slide. According to a preferred embodiment of the invention, such guide pin corresponds to said third pin 31b or to said fourth pin 41b. In particular in the embodiment shown in the figures, the guide pin is defined by a portion of the third pin 31b which rotatably connects the second end 13b of the first arm 13 to the second flange 12. For such reason, the guide pin is indicated in the description also by the expression "guide pin 31b".

[0017] With particular reference to figures 2 and 3, the sliding guide 22 comprises at least an engagement portion 24b, suitable to engage the guide pin 31 when the second flange 12 reaches a predetermined position with respect to the first flange 11, in order to block the hood 10 in open position. In the following a more detailed description will be provided of the movement of the hood 10 between open and closed position determined by the relative movement of the second flange 12 of the hinge 1 with respect to the first flange 11.

[0018] The sliding guide 22 comprises an elongated first portion 24a (in the following also indicated by the expression "first groove 24a") defined between an internal sliding rim 22a and an external rib 29 of the locking plate 2. The sliding guide 22 comprises also a second portion 24a corresponding to the aforementioned engagement portion 24b. In the following, the latter will be indicated also by the expression "second groove 24b".

[0019] The locking plate 2 defines a tooth 23, which

emerges between the first groove 24a and the second groove 24b. The second groove 24b develops along a segment contained with respect to the first groove 24a, developing according to an inclined direction with respect to the first groove 24a itself. As it can be seen above all in Figure 2, the development of the first groove 24a and of the second groove 24b gives to the sliding guide 22 a shape similar to number "1", also because of the presence of the tooth 23. Figure 2 illustrates the hinge 1 in a closed configuration in which the hood 10 is substantially adjacent to the body 20. It can be observed in particular that the second flange 12 occupies a position near to the first flange 11 so that the guide pin 31b occupies in its turn a position near to the first end 21 of the locking plate 2 hinged to the first flange 11.

[0020] Figure 3 shows a condition that can be reached during the opening of the hood. The second flange 12 is spaced from the first flange 11 with respect to the condition of Figure 2 and the pin 31b in the guide 22 is in an intermediate position in the first groove 24a. Figure 4 shows, on the other hand, the hinge 1 in an open configuration, namely when the body of the guide pin 31b is inserted in the groove 24b (engagement portion 24b) of the guide 22, so that it prevents any closing of the hinge and thus of the hood.

[0021] The opening of the hood 10, namely the passage from the condition in figure 2 and the condition in figure 4, is realized by manually moving the hood 10 away from the body 20. During such movement, the second flange 12 moves with respect to the first flange 11 because of the effect of the two articulated arms 13, 14 in order to obtain a rotation when opening the hood 10. Due to the interaction between the guide pin 31b and the sliding guide 22, the rotation of the second flange 12 provokes the rotation of the locking plate 2 and the simultaneous sliding of the guide pin 31b in the sliding guide 22 itself. The progressive opening of the hood 10 causes the guide pin 31b to approach to the tooth 22. The latter substantially defines a predetermined position of the second flange 12 (namely of the hood 10) with respect to the first flange 11 (namely with respect to the body). When such position is passed, the guide pin 31b is led, due to the presence of the tooth 23, to keep the engagement position 24b (second groove 24b) wherein it is firmly positioned. Such condition of the guide pin 31b locks the hood 10 in open position. Thus it is evident that such condition is reached in a substantially automatic way, as a result of the opening of the hood itself and not, as it happens traditionally, by means of a further manual operation of positioning particular locking means independent from the hinge.

[0022] In order to facilitate the disengagement operations of the locking plate 2 from the guide pin 31b, the hinge 1 comprises disengagement means. Preferably such means comprise a tongue-shaped portion 25 whose plane develops in a substantially perpendicular way with respect to the plane, parallel to the plane P, wherein the main body 2b of the locking plate 2 develops. An opera-

tion of hood closing may be operated by holding the hood 10 with a hand and by pushing the tongue 25 downwards, namely according to the arrow R indicated in figure 4 and in figure 5. This implies the disengagement of the locking plate 2, namely the disengagement of the second pin 31b of the second groove 24. Consequently it is possible to release the hood 10 or to gently push it towards its closed position. In such step, the guide pin 31b will slide again along the sliding guide 22 until it reaches the position shown in figure 2. The first end 21 of the locking plate 2, according to an alternative embodiment of the invention not shown in the figures, is hinged by means of said second pin 41a to the first flange 11, namely in correspondence of the first end of the second arm 14, while the guide 22 is engaged by the third pin 31b, namely by the pin related to the second end 13b of the first arm 13.

[0023] According to the alternative embodiment shown in the figures, the first end 21 of the locking plate 2 is hinged to the first flange 11 by means of a fifth pin 57 arranged externally with respect to said first pin 31a and second pin 41a, indicating by this that the pin 41a is, on the first flange, in an intermediate position between the first pin 31a and the fifth pin 57. As indicated above, in the preferred embodiment shown in the figures, the sliding guide 22 of the locking plate 2 is engaged by the pin 31b related to the second end 13b of the first arm 13. Such solution is the most advantageous, since it ensures a stiffer hinge 1.

[0024] According to another alternative embodiment not shown in the figures, the sliding guide 22 of the locking plate 2 may be engaged by the fourth pin 41b related to the second end 14b of the second arm 14. According to this alternative embodiment, the first end 21 of the locking plate 2 may be hinged again to the first flange 11 by means of a fifth pin 57 arranged externally with respect to said first pin 31a and second pin 41a, namely so that the pin 41a is, on the plate 11, in an intermediate position between the pin 31a and the fifth pin 57. Such arrangement of the first pin 31a, of the second pin 41a and of the fifth pin 57 is substantially equal to the one shown in the figures.

[0025] With particular reference to figures 2 and 3, it can be observed that the first pin 31a, the second pin 41a and the fifth pin 57 are arranged at the ends of a triangle, for example an isosceles or scalene triangle. The first flange itself 11 may be correspondingly triangle-shaped. According to a preferred embodiment, the hinge comprises a spring 5 more advantageously provided in correspondence of the end 21 of the locking plate 2 in order to automatically push the locking plate 2 itself, so that the body of the guide pin 31b engages the second groove 24b of the sliding guide 22. Such spring 5 performs an elastic action between the first flange 11 and the locking plate 2. In particular the spring 5 acts in the "opening" direction, namely in order to make the locking plate 2 rotate with respect to the first flange 11, causing the hood 10 to open.

[0026] With particular reference to the alternative em-

bodiment shown in the figures, the spring 5 is wound on the fifth pin 57 connecting the locking plate 2 with the first flange 11. The first flange 11 defines a first seat 32 intended to contain a first end 52 of the spring 5 (of the torsion type), while the locking plate 2 defines a second seat 26 intended to contain a second end 56 of the spring 5. It is evident that the two arms 13 and 14 of the hinge 1 and the locking plate 2 are hinged in order to move substantially within the plane of opening P, or within planes parallel to plane P.

[0027] Advantageously, the presence of the spring 5 ensures that, also in case of shakes of the hood 10, for example due to the wind, the locking plate 2 is steady on the pin 31b. In particular, the spring 5 guarantees the contact between the inner side 22a of the sliding guide 22 and the guide pin 31b. Moreover it can be observed that the guide pin 31b has an head end 33 that emerges with respect to the development plane of the main end 2a of the locking plate 2 from a side opposite to the side where the arms 13 and 14 are placed. The diameter of such end 33 is larger than the distance between the inner side 22a of the sliding groove and the rib 29. Such solution further increases the stability and the reliability of the hinge and of the locking device integrated to it. The presence of the rib 29 of the locking plate 2 combined with the dimensions of the head causes the relative movement of the guide pin 31b of the locking plate 2 to always develop on a plane parallel to the plane of opening P of the hinge 1, substantially preventing the lateral disengagement of the pin 31b from the sliding guide 22.

[0028] The hinge according to the invention may be advantageously used also in presence of pneumatic shock absorbers (for example air shock absorbers), since it makes the behaviour of the hood 10 safer, independently from the wear of the air shock absorbers, that may have an unpredictable behaviour with the passing of the time.

[0029] The technical solutions adopted for the support hinge according to the invention allow to completely fulfil the task and the purposes set. In particular the hinge according to the invention integrates advantageously an effective hood locking device which allows to avoid using the usual support rod, namely to overcome the drawbacks mentioned above connected to its use.

[0030] The support hinge according to the invention, can be subjected to numerous variations or modification, without departing from the scope of the invention; moreover all the details may be replaced by others technically equivalent. In practice, the material used and also the dimensions and the shapes may be any, according to the needs and to the state of the art.

Claims

1. Support hinge (1) of a vehicle hood, in particular for accessing to an engine compartment of an industrial or commercial vehicle, comprising a first flange (11)

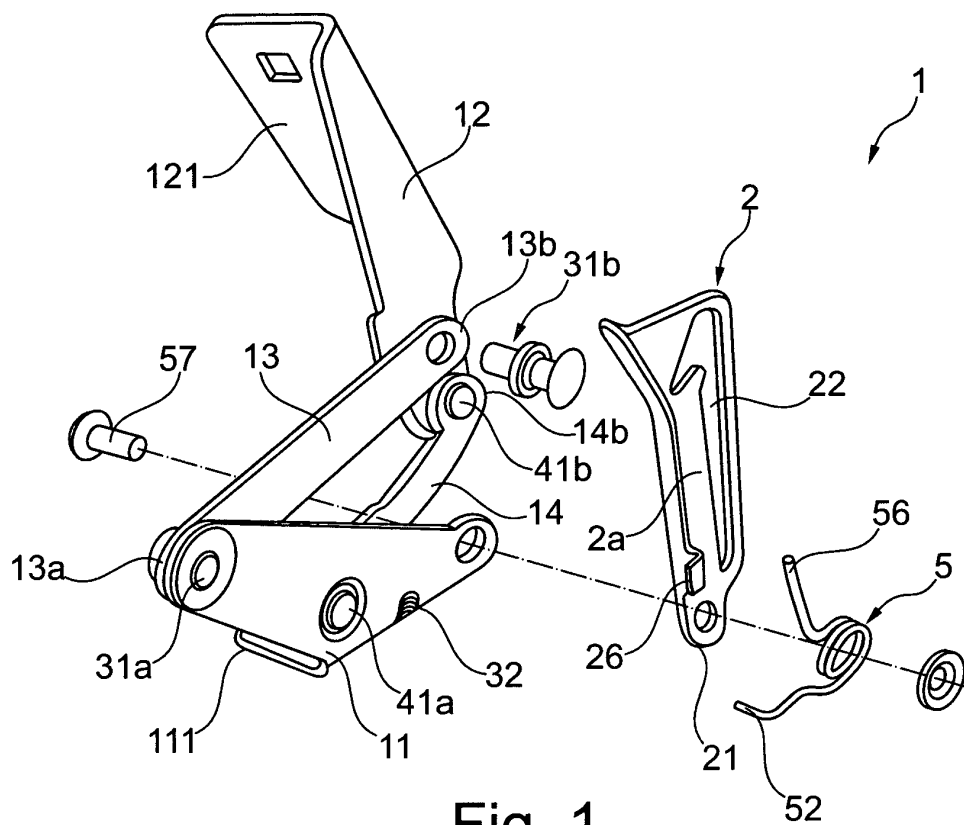
suitable to be connected to a body (20) of said vehicle and a second flange (12) intended to be connected to a hood (10) of said vehicle, said hinge defining a plane (P) of rotation of a flange with respect to the other flange between an open position and a closed position, wherein said support hinge (1) further comprises

- a guide pin (31b) connected to said second flange (21) in order to emerge perpendicularly with respect to said plane of rotation (P)
- a locking plate (2) comprising a first end (21) hinged to the first flange (11) and a sliding guide (22) for said guide pin (31b),

said sliding guide (22) comprising at least an engaging portion (24b) suitable to engage said pin (31b) at a predetermined open position of the support hinge (1) preventing its closing.

2. Hinge according to the claim 1, further comprising a pressure spring (5) acting on said first flange (11) and said locking plate (2) in order to make said first pin (31b) engage in said engagement position (24b).
3. Hinge according to claim 1 or 2, wherein said sliding guide (22) comprises a first portion (24a) and said engagement portion (24b), defining a configuration substantially "1"-shaped.
4. Hinge (1) according to one of the previous claims, wherein said locking plate (2) defines a tooth (23) emerging between said engagement portion (24b) and said first portion (24a) of said sliding guide (22).
5. Hinge (1) according to any of the previous claims, further comprising a pair of arms (13,14), each one of them comprising a second end (13b,14b) hinged to the second flange (12), one of the arms (13, 14) being hinged by means of said guide pin (31b).
6. Hinge (1) according to claim 5, wherein said each one of said pair of arms (13,14) comprises a first end (13a,14a) hinged on said first flange (11) and wherein said locking plate (2) is hinged to the first flange (11) by means of the same pin which hinges the first end of the other arm (14, 13) to the first flange (11).
7. Hinge (1) according to claim 5, wherein said each one of said pair of arms (13,14) comprises a first end (13a,14a) hinged on said first flange (11) by means of a respective first end (13a,14a) and by means of the respective first pin (31b) and second pin (41b) and wherein said first end (21) of the locking plate (2) is hinged to the first flange (11) by means of a further pin (57) arranged so that the second pin (41a) is, on the first flange (11), in an intermediate position between the first pin (31a) and said further pin (57).

8. Hinge according to the claim 7, further comprising a pressure spring (5) wound on said further pin (57) and acting on said first flange (11) and said locking plate (2) in order to make said first pin (31b) engage in said engagement position (24b).
9. Hinge (11) according to claim 8, wherein said first flange (11) defines a first seat (32) in order to contain a first end (52) of said spring (5) and wherein said locking plate (2) defines a second seat (26) intended to contain a second end (56) of said spring (5).
10. Hinge (11) according to claim 1 or 2, wherein said locking plate (2) comprises means for disengaging said guide pin (31b) from said engagement position (24b) in order to make said second flange (12) close on said first flange (11).
11. Hinge (11) according to claim 10 wherein said disengagement means are defined by a tongue-shaped portion (25) of said locking plate (2), said tongue-shaped portion (25) having a plane development substantially perpendicular to the plane (P) of rotation.
12. Vehicle comprising a hood (10) and a body (20) and **characterizing in that** it comprises at least a support hinge (1) of the hood (10) according to any of the previous claims.



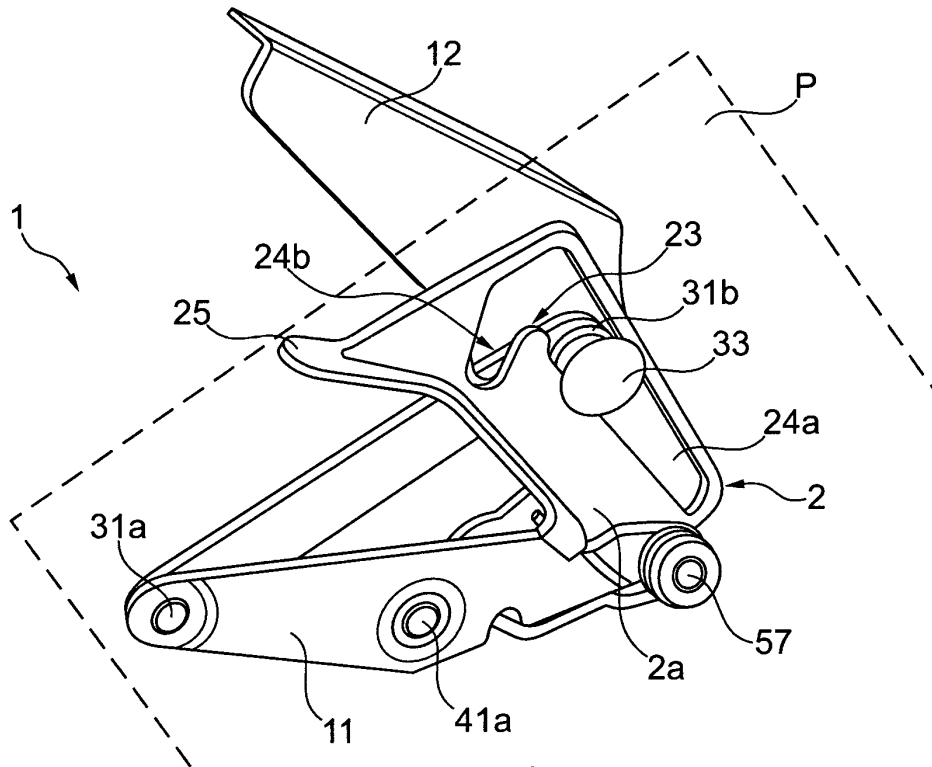


Fig. 3

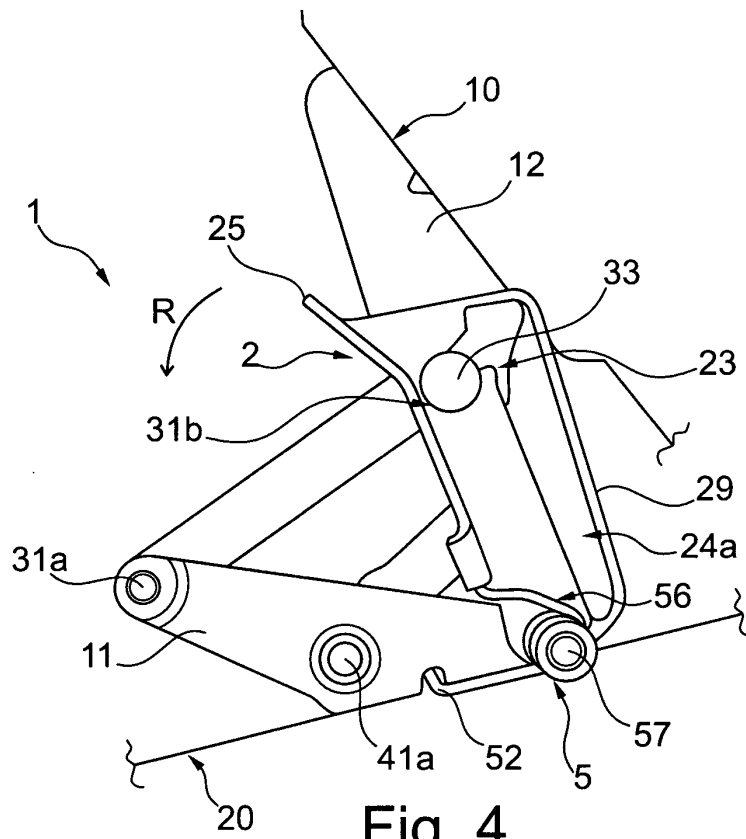


Fig. 4

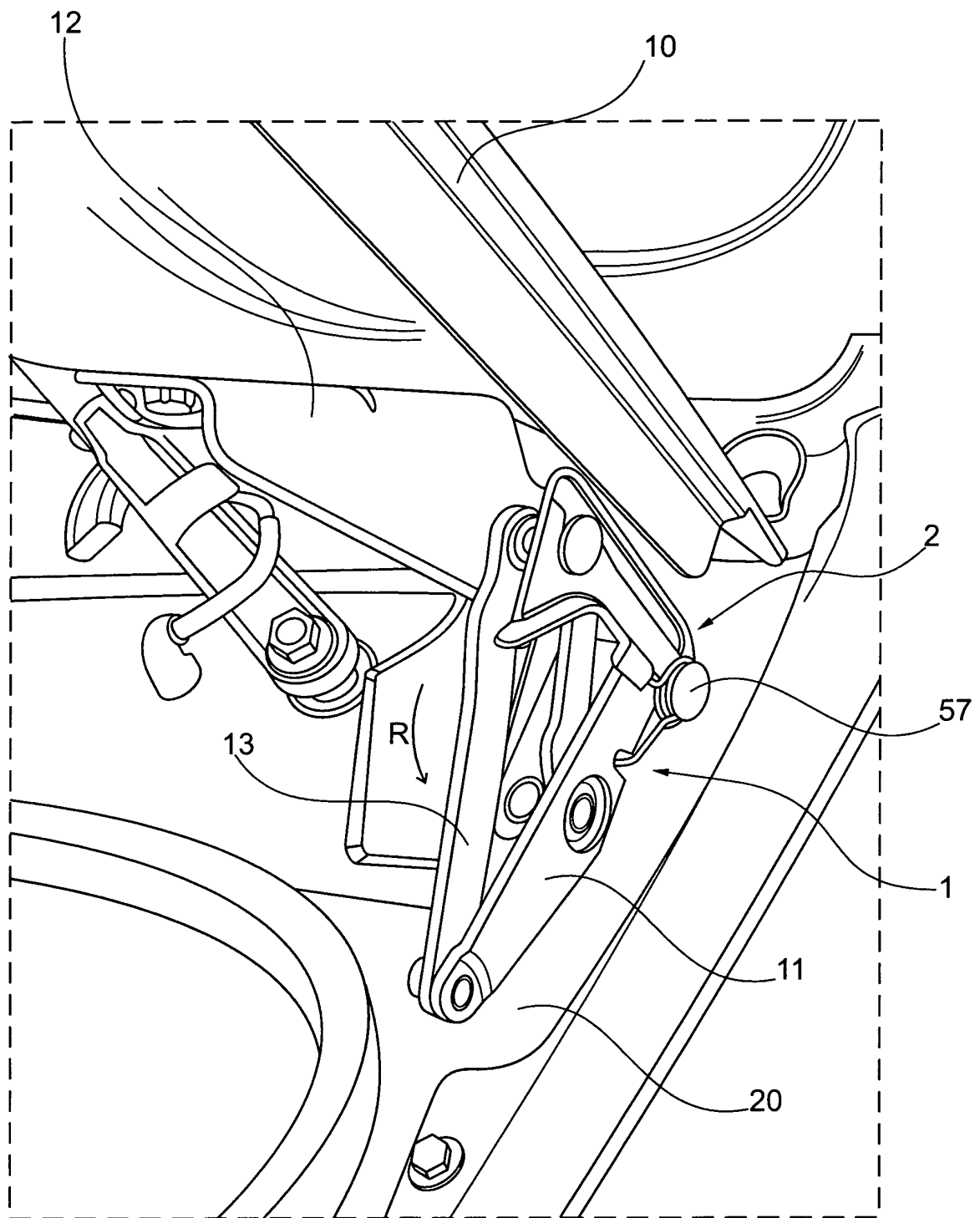


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 1924

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 5 992 550 A (GRÖNLUND M) 30 November 1999 (1999-11-30) * figures 2-4 * * column 3, lines 27-53 * * column 4, lines 21-67 * -----	1-12	INV. E05D11/10 E05C17/08
X	DE 39 17 967 A1 (SCHARWÄCHTER GMBH CO KG) 16 August 1990 (1990-08-16) * column 4, line 47 - column 5, line 27 * * figure 1 * -----	1-12	
X	FR 2 714 929 A1 (M.G.I. COUTIER S.A.) 13 July 1995 (1995-07-13) * page 3, line 33 - page 4, line 31 * * figures 1, 2 * -----	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05C E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 November 2011	Examiner Mund, André
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 17 1924

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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29-11-2011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5992550	A	30-11-1999	NONE	
DE 3917967	A1	16-08-1990	NONE	
FR 2714929	A1	13-07-1995	NONE	