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(54) **SLIDING DOOR HINGE**

(57) A hinge (1) for a sliding vehicle door (2), wherein the hinge has a first end (3) for being connected to the body side and a second end (4) for being connected to the door (2). The first end (3) has a pivot point and the second end (4) has a pivot point (5). The pivot point (5) of the second end (4) comprises a running element (6) for running along a rail (7) and wherein the second end (4) further comprises a second running element (8) arranged at a distance from the running element (6) of the

pivot point (5). The pivot point of the first end (3), the pivot point (5) of the second end (4) and the second running element (8) form a triangle. In use upon turning the hinge (1) about the second end pivot point (5) the second running element (8) engages with the rail (7) such that the second running element (8) will run along the rail (7) at a distance from the running element (6) of the pivot point (5) upon sliding the vehicle door.

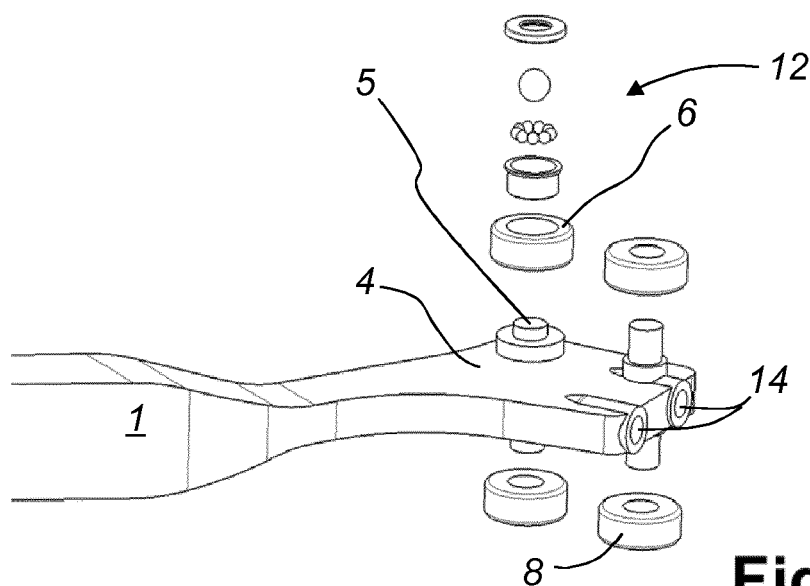


Fig. 4

Description

TECHNICAL FIELD

[0001] The present invention relates to a hinge for a sliding vehicle door, the hinge having a first end for being connected to the body side and a second end for being connected to the door. Further, the first end has a pivot point and the second end also has a pivot point.

BACKGROUND

[0002] A sliding door is a type of door mounted on or suspended from a track for the door to slide, usually horizontally. It is a feature predominately used for minibuses and buses to provide a large entrance or exit for passengers without obstructing the adjacent pathway between the vehicle and any adjoining object on the side of passenger and commercial vans. Accordingly, it allows for a larger unobstructed access to the interior for loading and unloading.

[0003] Sliding doors are often used in mini Multi Purpose Vehicles (MPVs) but are more commonly used in full-sized MPVs. Their use has increased over the years as MPVs have increased in popularity, because it gives easy access and makes parking in tight spaces possible. The most common type of sliding door, that has a three-point suspension and opens outwards, then runs along the side of the vehicle, was introduced in 1964.

[0004] Most common are vehicles with sliding doors where the track is on the exterior of the vehicle. There are also sliding doors where the track is on the inside of the door and on the side of the door itself. This allows the exterior to remain clean in design and yet the door can slide past the trailing edge of the car. The solutions with the track on the inside of the door are generally bulky.

SUMMARY

[0005] It is an object of the present invention to provide an alternative solution for a sliding door on a vehicle with a hinge and hinge system that is relatively light but at the same time provides stability.

According to a first aspect of the present disclosure a hinge for a sliding vehicle door has a first end for being connected to the body side and a second end for being connected to the door. The first end has a pivot point and the second end has a pivot point. The pivot point of the second end comprises a running element for running along a rail and wherein the second end further comprises a second running element arranged at a distance from the running element of the pivot point. The pivot point of the first end, the pivot point of the second end and the second running element form a triangle. In use upon turning the hinge about the second end pivot point the second running element engages with the rail such that the second running element will run along the rail at a distance from the running element of the pivot point upon sliding

the vehicle door.

[0006] The second end having a running element as well as a pivot point at a distance from each other provides for a more stable solution when the door is being opened or is open as compared to only having a pivot point for the door. With this solution it is not necessary to have a hinge on the top side of the door since the stability of the two points and a hinge on the lower side of the door is sufficient.

[0007] According to one aspect of the present disclosure the running element of the pivot point comprises a wheel. Preferably, the wheel is arranged with a bearing, for instance a ball bearing, in order to minimize the friction.

[0008] According to another aspect of the disclosure, the second running element comprises a wheel. For the same reason as stated above for the running element of the pivot point, the wheel is preferably arranged with a bearing, for instance a ball bearing.

[0009] Another aspect of the present disclosure is to provide a hinge system for a sliding vehicle door comprising a hinge according to the above. The system comprises a rail engaged with the running element of the second end pivot point of the hinge such that the running element runs along the rail upon opening or closing the vehicle door.

[0010] According to one aspect the rail of the hinge system is a hollow profile with a recess along the rail, the width of the recess being larger than the thickness of the hinge and smaller than the width of the running element. Thus, the running element of the pivot point is always situated in the hollow profile with the hinge running in the recess. Upon opening the door the hinge is rotated about the pivot point with the running element until the second running element engages in the hollow profile. Further opening of the door will result in the running element of the pivot point as well as the second running element will move inside the hollow profile and thus the hinge will not rotate around the pivot point after the second running element has engaged with the hollow profile.

[0011] According to yet another aspect of the present disclosure, the elongate recess of the hollow profile has one part with a width larger than the width of the second running element. Upon opening the vehicle door the second running element will enter into the hollow profile through this part of the recess with the larger width.

[0012] According to an alternative aspect of the hinge system the rail is T-shaped. Thus, with this solution the running elements will move on the outside of the rail rather than inside as is the case with the hollow profile as rail.

[0013] Similarly as with the hollow profile rail, according to a further aspect the T-shaped rail has one part that is I-shaped. Upon opening the vehicle door the second running element will be moved onto the T-shaped rail at the part of the rail missing the flanges of the T-shape, i. e. at the part of the rail that is I-shaped.

[0014] Further features of, and advantages with, the present invention will become apparent when studying

the appended claims and the following description. The skilled person realize that different features of the present invention may be combined to create embodiments other than those described in the following, without departing from the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of exemplary embodiments of the present invention, wherein:

Figure 1 is a schematic perspective view of a vehicle door in closed position with a hinge system according to the present disclosure,

Figure 2 is a schematic perspective view of the vehicle door in figure 1 in a position between closed and open,

Figure 3 is schematic perspective view of the vehicle door in figures 1 and 2 in a fully opened position, and

Figure 4 is a exploded view of the second end of an embodiment of the hinge according to the present disclosure.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

[0016] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. The invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness. Like reference character refer to like elements throughout the description.

[0017] With reference to the figures a hinge 1 for a sliding vehicle door 2 is shown. The hinge 1 and vehicle door 2 are in the figures 1-3 a left back door. However, the same principle as disclosed below is applicable for the right front door, and reversed for a left front door or a back door on the right side. The hinge has a first end 3 for being connected to the body side and a second end 4 for being connected to the door 2. The first end has a pivot point and the second end 4 has a pivot point 5.

[0018] The pivot point 5 of the second end 4 comprises a running element 6, a wheel, for running along a hollow profile rail 7 and the second end 4 further comprises a second running element 8 arranged at a distance from the running element 6 of the pivot point 5.

[0019] The pivot point of the first end 3, the pivot point 5 of the second end 4, and the second running element 8 form a triangle. In figure 1 a sliding door 2 is shown in

a closed position. The first end 3 of the hinge is pivotally connected to a fastening bracket 11. As can be seen the hinge 1 is more or less in line with the hollow profile rail 7 with the second end 4 partly outside the rail 7 with the second running element 8. The second running element is in the embodiment shown made up of two wheels, one wheel on opposite sides of the hinge 1. Inside the hollow profile rail 7 is the running element 6 (see figure 4) at the pivot point 5 of the second end 4.

[0020] When the door 2 is opened, the hinge 1 initially turns about the pivot point 5 at the second end 4 of the hinge 1. Seen from above the hinge 1 rotates anti clockwise about the pivot point 5 such that the second running element 8 of the hinge's 1 second end 4 is received inside the hollow profile rail 7 through the part 10 of the rail 7 recess that has a width greater than the width of the second running element 8.

[0021] Both running elements 6, 8 are shown as pair of wheels equipped with ball bearings 12 in order to minimize the friction and thus the power needed to open the door.

[0022] When the second running element 8 is engaged with the rail 7, the hinge 1 moves linearly relative the rail 7/door 2 upon further opening of the door as indicated in figure 2.

[0023] In order for the hinge 1 not to run out of the rail 7, a stopping bracket 13 is arranged at one end of the rail 7. As can be seen in figure 3, the hinge 1 has reached the stopping bracket 13 and this also means that the door is fully open. For increased stability in the fully open position, the stopping bracket 13 is preferably equipped with two pins that releasably fits in the openings 14 of the hinge, i.e. a kind of plug and socket connection.

[0024] It is to be understood that the present invention is not limited to the embodiment described above and illustrated in the drawings; rather, the skilled person will recognize that many changes and modifications may be made within the scope of the appended claims. For example, the rail could be T-shaped such that wheels or some sliding block could grip and run on the outside of the flanges of the rail as running elements. Further, the rail could be divided into two parts separated from each other instead of the part with the opening 10 as shown in the embodiment of the drawings.

[0025] Also, the running elements could instead of wheels be sliding elements, for instance some plastic block with low friction against the rail.

Claims

1. A hinge (1) for a sliding vehicle door (2), the hinge having a first end (3) for being connected to the body side and a second end (4) for being connected to the door (2), the first end having a pivot point and the second end (4) having a pivot point (5),
characterized in
that the pivot point (5) of the second end (4) com-

prises a running element (6) for running along a rail (7) and wherein the second end (4) further comprises a second running element (8) arranged at a distance from the running element (6) of the pivot point (5), the pivot point of the first end (3), the pivot point (5) of the second end (4) and the second running element (8) forming a triangle, wherein in use upon turning the hinge (1) about the second end pivot point (5) the second running element (8) engages with the rail (7) such that the second running element (8) will run along the rail (7) at a distance from the running element (6) of the pivot point (5) upon sliding the vehicle door.

2. The hinge (1) according to claim 1, wherein the running element (6) of the pivot point (5) comprises a wheel. 15
3. The hinge (1) according to any of the preceding claims, wherein the second running element (8) comprises a wheel. 20
4. A hinge system for a sliding vehicle door (2) comprising a hinge (1) according to any of the preceding claims, wherein the system comprises a rail (7) engaged with the running element (6) of the second end pivot point (5) of the hinge (1) such that the running element (6) runs along the rail (7) upon opening or closing the vehicle door (2). 25
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5. The hinge system according to claim 4, wherein the rail (7) is a hollow profile with a recess (9) along the rail, the width of the recess (9) being larger than the thickness of the hinge (1) and smaller than the width of the running elements (6, 8). 35
6. The hinge system according to claim 5, wherein the elongate recess (9) has one part (10) with a width larger than the width of the second running element (8). 40
7. The hinge system according to claim 4, wherein the rail is T-shaped.
8. The hinge system according to claim 7, wherein the rail has one part that is I-shaped. 45

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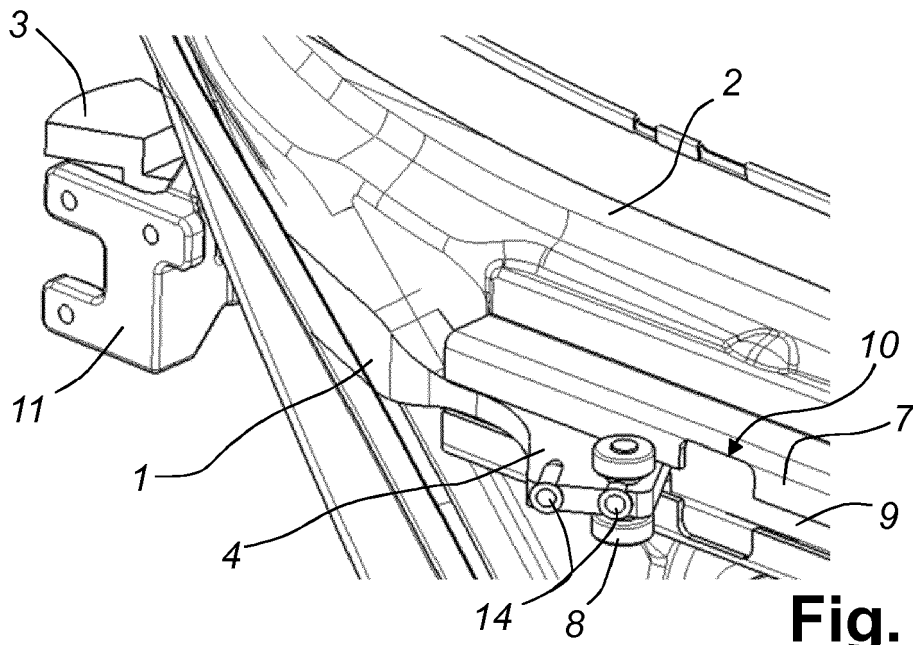


Fig. 1

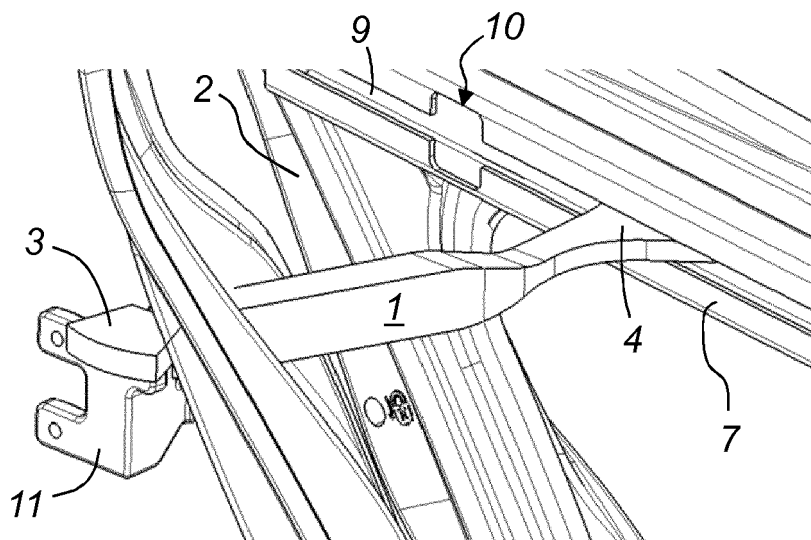


Fig. 2

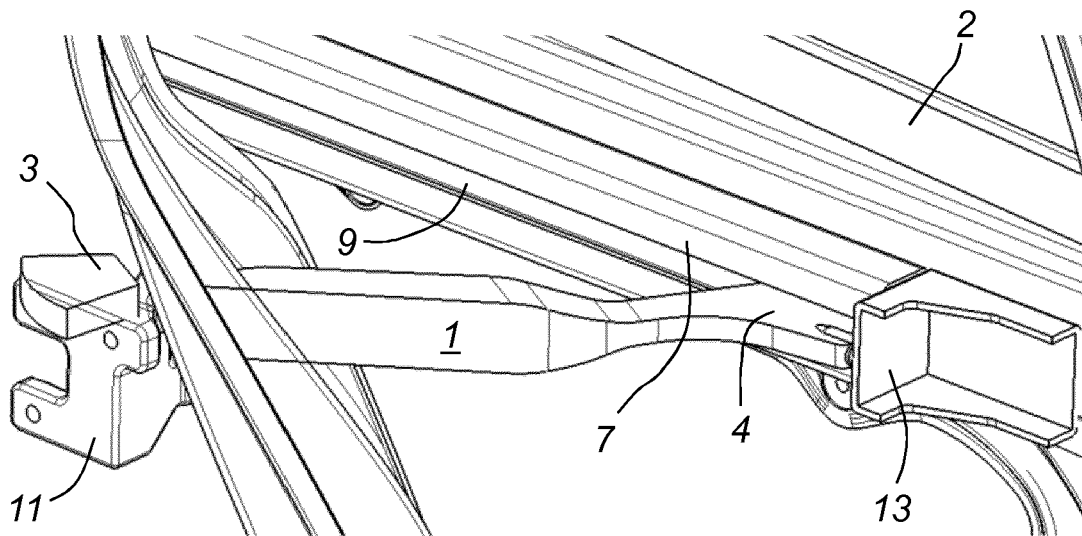


Fig. 3

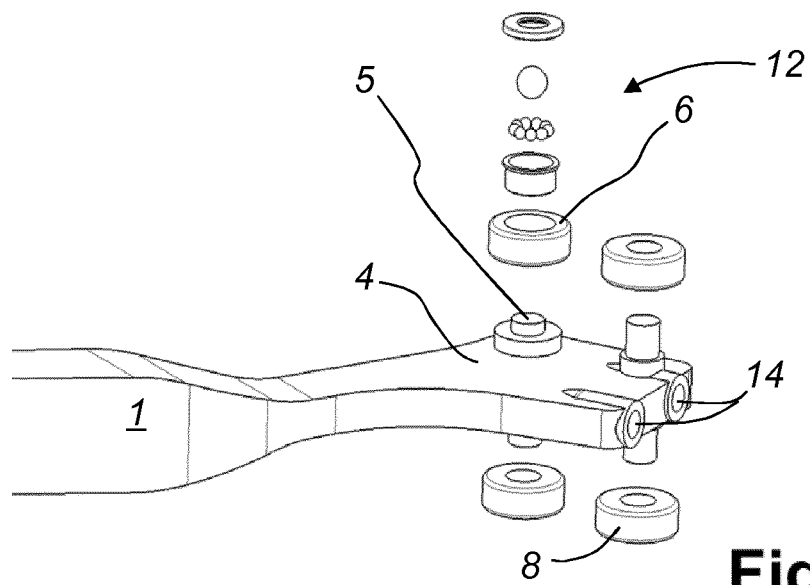


Fig. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 18 20 7554

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			TECHNICAL FIELDS SEARCHED (IPC)
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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 4 April 2019	Examiner Rémondot, Xavier
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
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EP 18 20 7554

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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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