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(54) Slidable gull-wing door
Schiebbare Flügeltür
Porte coulissante en ailes de papillon

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Description

Field of the Invention

The present invention relates to a wheeled automotive vehicle having, a body structure providing a driver compartment and comprising an opening into the compartment, a door cooperatively dimensioned and configured to close said opening, said opening being formed by portions of the body structure at the front and rear side of said opening, a hinge pivotally holding said door, in a first position, at one of said front and rear side of said opening. A door with these features is shown in document FR 2 699 126. Furthermore, the invention relates to a method of operating such a door of a wheeled automotive vehicle.

Technical Background

Crowded urban environment provides a need for more efficient use of parking spaces. Non-conventional door closures for wheeled automotive vehicles have been experimented with for many years, showing up in specialty cars and prototypes.

With conventional doors that swing out from the vehicle around a substantially vertical axis the length of the door must be minimized to reduce its outward trajectory when opened. In addition to making egress and access to the front seat a bit more complicated since the opening into the wheeled automotive vehicle is reduced these type of doors also requires that one enter from one direction, normally from the rear of the vehicle. Everyone, who's had an automotive vehicle are familiar with the issues of swinging in and out doors in order to pass an open door and enter from the intended direction (i.e. from the rear).

A further issue with doors of conventional type is the potential hazard when the door is dangerously swung out into, motor, bicycle or pedestrian traffic during a stop by a side of the road or street. US 6,676,193 B1 of Hanagan shows a compact vehicle with an upwardly opening side door. However, it is realized that the degree of opening during normal operation is low, making it difficult for people to access and egress. It is anticipated that there is a need for improvement of automobile doors for wheeled vehicles, such as for sedans, vans, trucks and other automobiles, and the issues of easy access as well as safe and comfortable opening needs to be further addressed.

Summary of the Invention

In addition to provide for a comfortable access and egress of a vehicle it is an object to provide for a more direct possibility to enter or leave regardless of where you come from or where your heading when leaving the car.

It is a more general object of the invention to provide a vehicle that requires a minimal amount of space beside the entry door for driver access or egress.

It is still a further object of the invention to provide for a door that is easy to handle and suitable for use of e.g. handicapped people.

These and other objects are achieved by a according to independent claim 1 and a method according to independent claim 10. Preferred embodiments of the invention are defined in the dependent claims.

According to the invention there is provided a wheeled automotive vehicle having, a body structure providing a driver compartment and comprising an opening into the compartment, a door cooperatively dimensioned and configured to close said opening, said opening being formed by portions of the body structure at the front and rear side of said opening, a hinge pivotally holding said door, in a first position, at one of said front and rear side of said opening. A guide system being provided along a lower portion of the door in its closed condition and on the same side of the opening as the hinge, said door, during opening, being manoeuvrable upwardly along said guide system until it reaches said first position, from which first position, the door is pivotally movable around an axis, propagating in the transverse direction of said vehicle, and in a direction away from said opening.

Preferably, the guide system being provided at the lower A-pillar of said vehicle.

Advantageously, said hinge in the first position being formed by a pivoting device positioned by a lower front portion of said door.

The door desirably comprises biasing means operatively connected to said guide system. Furthermore, said door comprising a set of biasing means operatively connected to said hinge. The vehicle preferably includes a first set of biasing means connected between the frame and the door. Usually, said first set of biasing means I a gas spring. Desirably, torsion springs are included about the pivoting axis biasing the door into an open position. Alternatively, the opening and closing movement of the door is achieved powered by a motor or manually.

According to a second aspect of the invention a roof portion is arranged fixed to said door thereby enabling said roof portion to follow the motion of said door during opening and closing movement. More preferably, said roof portion is arranged fixed to one of said doors on respective left and right side of said vehicle.

Preferably, said guide system comprising a guide and a pair of guide rollers adapted to follow said guide. The use of two guide rollers provided near one another provides for an improved guiding of the movement, especially in the initial stage of movement. Upon initial movement of the door, the upper rear edge portion of the door preferably moves outwardly from the frame.

Advantageously, the opposite door opening side, through its entire propagation along the opening, has a wider inclination in relation to a horizontal plane...
than the guide of the guide system provided at one opening side. The shape of the guide rail generally follows that of the opening side where it is positioned.

[0017] In order to more clearly describe the invention an example of a preferred method of providing an opening of a wheeled automotive vehicle having, a body structure providing a driver compartment and comprising an opening into the compartment, a door cooperatively dimensioned and configured to close said opening, said opening being formed by portions of the body structure at the front and rear side of said opening, a hinge pivotally holding said door, in a first position, at one of said front and rear side of said opening. Said door, during opening, being manoeuvred upwardly along a guide system being provided along a lower portion of the door as seen in its closed condition and on the same side of the opening as the hinge, when said door having reached said first position, the door is pivoted around an axis, said axis propagating in the transverse direction of said vehicle, and said door is pivoted in a direction away from said opening, is provided.

Brief Description of the Drawings

[0018] A currently preferred embodiment of the present invention will now be described in more detail, with reference to the accompanying drawings.

[0019] Fig. 1 is a perspective view of an example of a wheeled automotive vehicle appropriate for providing an opening according to the method of the present invention.

[0020] Fig. 2a discloses a cross sectional elevation of a guide system according to first embodiment of the wheeled automotive vehicle when said door is in a closed condition.

[0021] Fig. 2b discloses a cross sectional elevation of a guide system according to first embodiment of the wheeled automotive vehicle when said door is in said first position (A).

[0022] Figs. 3a-3c discloses an opening sequence, as seen from the side, of a vehicle according to a first embodiment of the invention. Fig. 3a discloses a closed condition, fig. 3b discloses an intermediate first position (A) and fig. 3c discloses an opened condition of a wheeled automotive vehicle according to a first embodiment of the invention.

[0023] Figs. 4a-4c discloses an opening sequence, as seen from the side, of a vehicle according to a second embodiment of the invention. Fig. 4a discloses a closed condition, fig. 4b discloses an intermediate first position (A) and fig. 4c discloses an opened condition of a wheeled automotive vehicle according to a second embodiment of the invention.

Detailed Description of Preferred Embodiments

[0024] A first embodiment of the invention related to a wheeled automotive vehicle will be described in more detail in the following with reference to the accompanying drawings.

[0025] Referring now to Fig. 1, where a car 1 is disclosed with a body structure 2. The body structure 2 provides a driver compartment 3. An opening 4 into the compartment 3 is covered by a door 9 cooperatively dimensioned and configured to close said opening 4.

[0026] With reference to figs. 3a-3c an opening sequence of a vehicle according to a first embodiment of the invention is disclosed. Fig. 3a discloses a closed condition of the door 9 from which closed condition the door is actutable for opening movement. Preferably, the door is actuated by a remote key or key FOB and the opening movement is performed automatically. However, it is also possible to open the door manually by simply grabbing a handle. In fig. 3b the door is in an intermediate first position (A). As can be seen the opening 4 is formed by portions of the body structure at the front 5 and rear 6 side of said opening 4. A guide system 8 is provided along a lower A-pillar 11. When the door reaches the first position (A) a hinge 7 is pivotably holding said door, at said front side of the opening 5, said door 9 is pivotally movable around an axis 10, propagating in the transverse direction of said vehicle 1. The door is pivoted in a direction away from said opening. By a pivoting angle of 90 degrees an almost total opening degree is accomplished, although a pivoting angle from 30 degrees or more will be sufficient to provide for an accurate opening degree in combination with the initial sliding movement. A door in its open condition is disclosed in fig 3c.

[0027] The hinge 7 is formed by a pivoting device positioned by a lower front portion 12 of said door 9. Referring now to figs 2a-2b the initial sliding movement of the door 9 along the guide system 8 is disclosed. At the top of the door 9 a seal 18 is provided resting on the roof structure 15 of the vehicle. The guide system 8 consist of a guide 16 and a pair of guide rollers 17 adapted to follow said guide 16 in the desired path to the first position (A) as disclosed in fig 2b. Having reached the first position (A) a pivoting movement of the door is following. During closing the procedure is reverse to the above described.

[0028] Furthermore, the door 9 comprising biasing means (not shown) operatively connected to said guide system 8. A second set of biasing means (not shown) is operatively connected to said hinge 7.

With reference to figs. 4a-4c an opening sequence of a vehicle according to a second embodiment of the invention is disclosed. Fig. 3a discloses a closed condition of the door 9 from which closed condition the door is actutable for opening movement. A roof portion 15 is arranged fixed to said door thereby enabling said roof portion to follow the motion of said door during opening and closing movement. Furthermore, said roof portion is arranged fixed to one of said doors on respective left and right side of said vehicle thus forming a semisymmetric system taken from the longitudinal mid of the vehicle.

[0029] Preferably, the door is actuated by a remote key or key FOB and the opening movement is performed automatically. However, it is also possible to open the door
A wheeled automotive vehicle (1) having, a body structure (2) providing a driver compartment (3) and comprising an opening (4) into the compartment, a door (9) cooperatively dimensioned and configured to close said opening (4), said opening (4) being formed by portions of the body structure (2) at the front (5) and rear (6) side of said opening (4), a hinge (7) pivotably holding said door (9), in a first position (A), at one of said front and rear side (5, 6) of said opening (4), characterised in that a guide system (8) being provided along a lower portion of the door (9) in its closed condition and on the same side of the opening as the hinge (7), said door (9), during opening, being manoeuvrable upwardly along said guide system (8) until it reaches said first position (A), from which first position (A), the door (9) is pivotally movable around an axis (10), propagating in the transverse direction of said vehicle (1), and in a direction away (B) from said opening (4).

2. The vehicle (1) according to claim 1, in which vehicle (1) the guide system (8) being provided at the lower A-pillar (11) of said vehicle (1).

3. The vehicle (1) according to any one of claims 1-2, in which vehicle (1) said hinge (7) in the first position (A) being formed by a pivoting device positioned by a lower front portion (12) of each said door 9. Different from figs. 2a-2b the guide system 8 is arranged vertical in order not to squeeze the roof portion 15. The top of the door 9 is provided fixed to the roof structure 15 of the vehicle. The guide system 8 consist of a guide 16 and a pair of guide rollers 17 adapted to follow said guide 16 in the desired path to the first position (A) as disclosed in fig 2b. Having reached the first position (A) a pivoting movement of the door and the associated roof portion is following. During closing the procedure is reverse to the above described.

4. The vehicle (1) according to any one of claims 1-3, in which vehicle (1) said door (9) comprising biasing means operatively connected to said guide system (8).

5. The vehicle (1) according to any one of claims 1-4, in which vehicle (1) said door (9) comprising a set of biasing means operatively connected to said hinge (7).

6. The vehicle (1) according to any one of claims 1-5, in which vehicle (1) a roof portion (15) is arranged fixed to said door (9) thereby enabling said roof portion (15) to follow the motion of said door (9) during opening and closing movement.

7. The vehicle (1) according to claim 6, in which vehicle (1) said roof portion (15) is arranged fixed to one of said doors (9) on respective left and right side of said vehicle (1).

8. The vehicle (1) according to any one of claims 1-7, in which vehicle (1) said guide system (8) comprising a guide (16) and a pair of guide rollers (17) adapted to follow said guide (16).

9. The vehicle (1) according to any one of claims 1-8, in which vehicle (1), the opposite door opening side, through its entire propagation along the opening (4), has a wider inclination in relation to a horizontal plane than that of the guide (16) of the guide system (8).

10. A method of providing an opening of a wheeled automotive vehicle (1) having, a body structure (2) providing a driver compartment (3) and comprising an opening (4) into the compartment, a door (9) cooperatively dimensioned and configured to close said opening (4), said opening (4) being
formed by portions of the body structure (2) at the front (5) and rear (6) side of said opening (4), a hinge (7) pivotably holding said door (9), in a first position (A), at one of said front and rear side (5, 6) of said opening (4),

characterised in that
said door (9), during opening, being manoeuvred upwardly along a guide system (8) being provided along a lower portion of the door (9) as seen in its closed condition on the same side of the opening as the hinge (7), when said door having reached said first position (A), the door (9) is pivoted around an axis (10), said axis (10) propagating in the transverse direction of said vehicle (1), and said door (9) is pivoted in a direction away (B) from said opening (4).

Patentansprüche

1. Kraftfahrzeug (1) mit Rädern und einem Karosserieaufbau (2), der einen Fahrerraum (3) zur Verfügung stellt und eine Öffnung (4) zu dem Raum umfasst, einer Tür (9), die kooperativ bemessen und so konfiguriert ist, dass sie die Öffnung (4) verschliesst, die aus Anteilen des Karosserieaufbaus (2) an der vorderen (5) und hinteren (6) Seite der Öffnung (4) gebildet wird, einem Scharnier (7) an der vorderen oder der hinteren Seite (5, 6) der Öffnung (4), das die Tür (9) schwenkbar in einer ersten Position (A) hält, dadurch gekennzeichnet, dass ein Führungssystem (8) entlang eines unteren Abschnitts der Tür (9) in ihrem geschlossenen Zustand und auf der gleichen Seite der Öffnung wie das Scharnier (7) vorgesehen ist, die Tür (9) während des Öffnens entlang des Führungssystems (8) nach oben manövriert werden kann, bis sie die erste Position (A) erreicht, von der aus die Tür (9) schwenkbar um eine Achse (10), die sich in einer Richtung quer zum Fahrzeug (1) erstreckt, und in einer Richtung (B) von der Öffnung (4) weg bewegt werden kann.

2. Fahrzeug (1) nach Anspruch 1, in dem das Führungssystem (8) an der unteren A-Säule (11) des Fahrzeugs (1) angebracht ist.

3. Fahrzeug (1) nach einem der Ansprüche 1 - 2, in dem das Scharnier (7) in der ersten Position (A) durch eine Schwenkvorrichtung gebildet, die durch einen unteren vorderen Abschnitt (12) der Tür (9) positioniert wird.

4. Fahrzeug (1) nach einem der Ansprüche 1 - 3, in dem die Tür (9) vorspannender Mittel umfasst, die operativ mit dem Führungssystem (8) verbunden sind.

5. Fahrzeug (1) nach einem der Ansprüche 1 - 4, in dem die Tür (9) einen Satz vorspannender Mittel umfasst, die operativ mit dem Scharnier (7) verbunden sind.

6. Fahrzeug (1) nach einem der Ansprüche 1 - 5, in dem ein Dachabschnitt (15) fest an der Tür (9) angebracht ist und dadurch in die Lage versetzt wird, der Bewegung der Tür (9) während der öffnenden und schliessenden Bewegung zu folgen.

7. Fahrzeug (1) nach Anspruch 6, in dem der Dachabschnitt (15) fest an einer der Türen (9) auf der linken bzw. rechten Seite des Fahrzeugs (1) angebracht ist.

8. Fahrzeug (1) nach einem der Ansprüche 1 - 7, in dem das Führungssystem (8) eine Führung (16) sowie ein Paar von Führungsrollen (17) umfasst, die dafür eingerichtet sind, der Führung (16) zu folgen.

9. Fahrzeug (1) nach einem der Ansprüche 1 - 8, in dem die gegenüberliegende Türöffnungsseite während ihrer gesamten Bewegung entlang der Öffnung (4) eine breitere Neigung bezüglich einer waagerechten Ebene besitzt als die Führung (16) des Führungssystems (8).

10. Verfahren, ein Öffnen für ein Kraftfahrzeug (1) mit Rädern zur Verfügung zu stellen, das einen Karosserieaufbau (2), der einen Fahrerraum (3) zur Verfügung stellt und eine Öffnung (4) zu dem Raum umfasst, eine Tür (9), die kooperativ bemessen und so konfiguriert ist, dass sie die Öffnung (4) verschliesst, die aus Anteilen des Karosserieaufbaus (2) an der vorderen (5) und hinteren (6) Seite der Öffnung (4) gebildet wird, ein Scharnier (7) an der vorderen oder der hinteren Seite (5, 6) der Öffnung (4), das die Tür (9) schwenkbar in einer ersten Position (A) hält, besitzt und dadurch gekennzeichnet ist, dass die Tür (9) während des Öffnens entlang eines Führungssystems (8), das entlang eines unteren Abschnitts der Tür (9), wenn in ihrem geschlossenen Zustand betrachtet, auf der gleichen Seite der Öffnung wie das Scharnier (7) vorgesehen ist, nach oben manövriert wird, die Tür (9), wenn sie die erste Position (A) erreicht hat, um eine Achse (10) geschwenkt wird, die sich in einer Richtung quer zum Fahrzeug (1) erstreckt, und die Tür (9) in einer Richtung (B) von der Öffnung (4) weg geschwenkt wird.
Revendications

1. Véhicule automobile à roues (1) ayant, une carrosserie (2) procurant un habitacle pour conducteur (3) et comprenant une ouverture (4) dans l’habitacle, une portière (9) dimensionnée et configurée de manière coopérative afin de fermer ladite ouverture (4), ladite ouverture (4) étant formée par des portions de la carrosserie (2) sur le côté avant (5) et arrière (6) de ladite ouverture (4), une charnière (7) maintenant de manière pivotante ladite portière (9), dans une première position (A), au niveau de l’un desdits côté avant et arrière (5, 6) de ladite ouverture (4), caractérisée en ce que
un système de guidage (8) étant pourvu le long d’une partie inférieure de la portière (9) dans son état fermé et sur le même côté de l’ouverture que la charnière (7), ladite portière (9), au cours de l’ouverture, étant manœuvrable vers le haut le long du systèmes de guidage (8) jusqu’à ce qu’elle atteigne ladite première position (A), première position (A) à partir de laquelle, la portière (9) peut être déplacée de manière pivotante autour d’un axe (10), se propageant dans la direction transversale dudit véhicule (1), et dans une direction (B) éloignée de ladite ouverture (4).

2. Véhicule (1) selon la revendication 1, véhicule (1) dans lequel le système de guidage (8) est fourni au pilier A inférieur (11) dudit véhicule (1).

3. Véhicule (1) selon l’une quelconque des revendications 1-2, véhicule (1) dans lequel la charnière (7) dans la première position (A) étant formée par un dispositif pivotant positionné par une partie inférieure avant (12) de ladite portière (9).

4. Véhicule (1) selon l’une quelconque des revendications 1-3, véhicule (1) dans lequel ladite portière (9) comprenant un moyen de maintien relié de manière fonctionnelle audit système de guidage (8).

5. Véhicule (1) selon l’une quelconque des revendications 1-4, véhicule (1) dans lequel ladite portière (9) comprenant un ensemble moyens de maintien reliés de manière fonctionnelle à ladite charnière (7).

6. Véhicule (1) selon l’une quelconque des revendications 1-5, véhicule (1) dans lequel une partie de toit (15) est agencée de manière à être fixée à ladite portière (9) permettant ainsi à ladite partie de toit (15) de suivre le mouvement de ladite portière (9) durant un mouvement d’ouverture et de fermeture.

7. Véhicule (1) selon la revendication 6, véhicule (1) dans lequel ladite partie de toit (15) est arrangé de manière à être fixée à l’un desdites portières (9) sur un côté gauche et droite respectif dudit véhicule (1).
REFERENCES CITED IN THE DESCRIPTION

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