

[54] DOOR ARRANGEMENT FOR VEHICLES

292,190 7/1965 Netherlands..... 49/153

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[57] ABSTRACT

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A door arrangement for a door opening of a vehicle wherein hinge means and guide means interconnecting the door with the body of the vehicle are provided, the hinge and guide means including hinge struts and guide struts secured at one end to the vehicle body, and a rod member interconnecting the other ends of the hinge and guide struts. Releasable means are also provided for securing one of said hinge struts and said rod members to the door so that the door may be moved to an open position about the one end of the hinge and guide struts obliquely with respect to the plane of the door opening. Alternatively, the door may be accordingly moved to an open position about the one end of the hinge and guide struts perpendicularly with respect to the plane of the door opening.

[56] References Cited

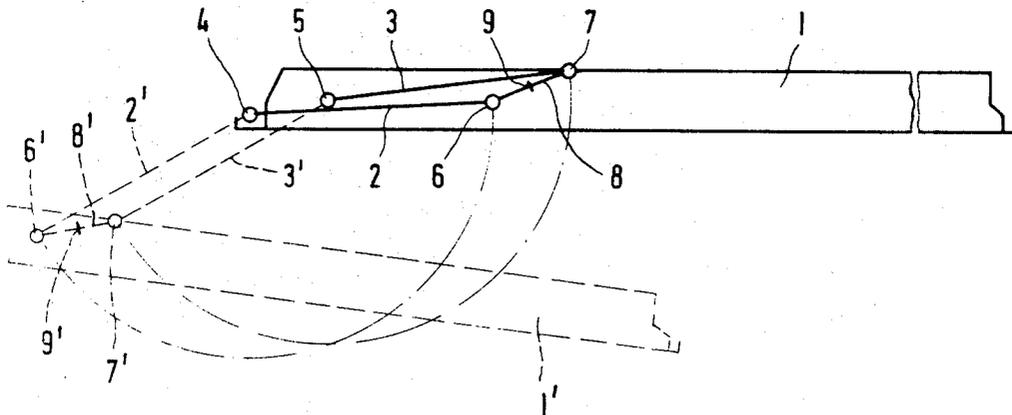
UNITED STATES PATENTS

3,006,683 10/1961 Smith..... 49/248
3,074,755 1/1963 Peras 49/248
3,095,600 7/1963 Bretzner 49/248 X

FOREIGN PATENTS OR APPLICATIONS

1,087,935 8/1960 Germany 49/153

2 Claims, 2 Drawing Figures



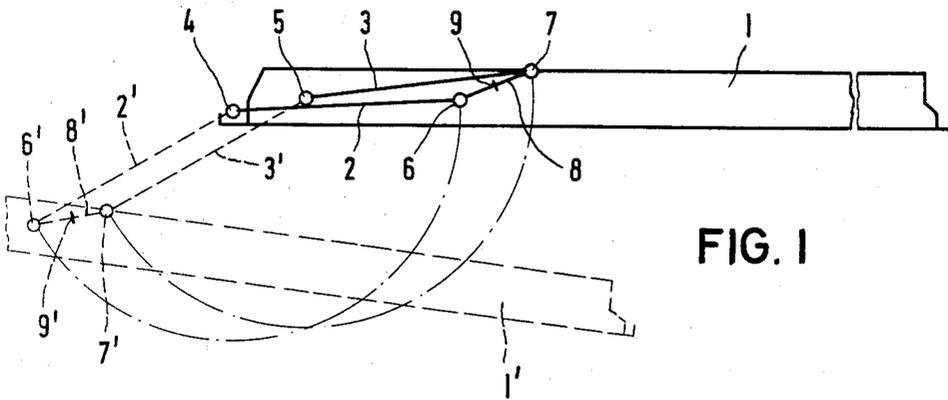


FIG. 1

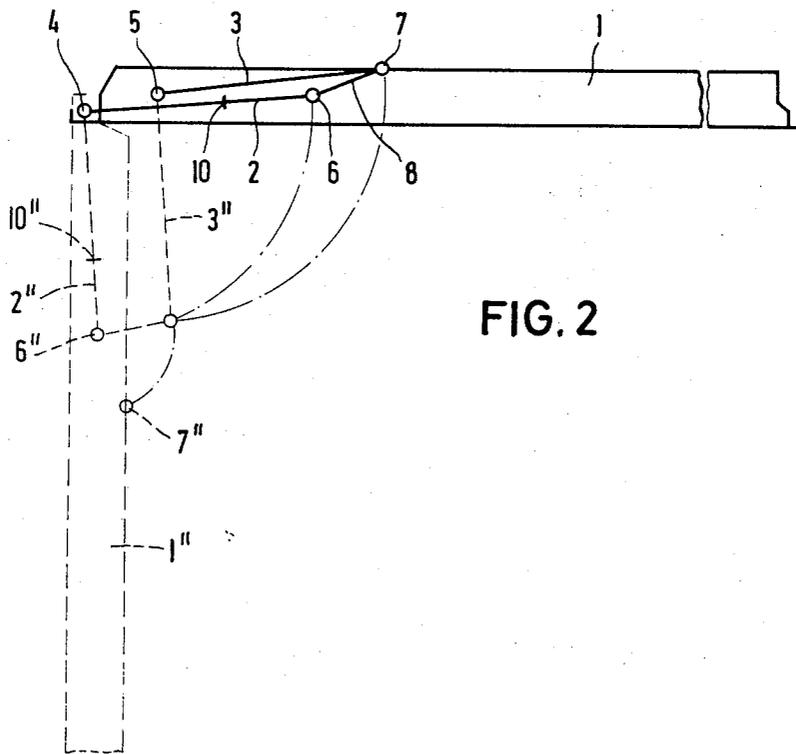


FIG. 2

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DOOR ARRANGEMENT FOR VEHICLES

In U. S. patent application Ser. No. 140,113 filed May 4, 1971, commonly owned herewith, a door arrangement for vehicles is disclosed as having hinge means interconnecting the door to the vehicle in such a manner that, in its open position, the door will be moved obliquely with respect to the longitudinal axis of the vehicle and will cover up a lateral edge of the vehicle outwardly of one end of the vehicle and of the door opening. Such a door arrangement also has a guide means interconnecting the door with the vehicle wherein the guide means together with the hinge means, will serve to permit the door to be swung outwardly toward the one end of the vehicle outwardly of the plane of the door opening, and will also serve to permit the door to be swung closed back into the plane of the door opening.

By reason of such an arrangement, as explained therein, the door may be opened in less space as compared to similar prior art arrangements, requires less space laterally than the known pivoting door, and requires less space laterally of the door opening than those door arrangements which are moved parallel toward themselves out of the door opening and into end positions on the side of the door opening.

Both the hinge means and guide means in the above referred-to application comprise elongated struts each pivotally secured at one end to the vehicle and at their other ends to the door in such a manner as to swing outwardly through a predetermined angle. However, if these struts are bent to some degree, the door may jam so that it may be difficult for it to be opened. Also, in certain parking situations, it may be that either on the side of the vehicle or immediately in front and/or behind the vehicle, other vehicles will be parked which may prevent the door from being fully opened.

The invention herein therefore serves to slightly modify such an arrangement so that the door may be opened either obliquely with respect to the plane of the door opening or in the manner of a double or folding door pivoting outwardly at one end thereof.

This choice of door opening is effected by means of a simple modification of the hinge means and guide means attachments to the door along with the provision of an additional rod member.

The hinge means and guide means each comprise, as in the above-mentioned application, struts located at the top and bottom of the door. Each of the struts are pivotally secured at one end to the vehicle body and have a rod member interconnecting their other ends. In order for the door to be opened obliquely with respect to the plane of the door opening, this rod member is releasably secured to the door. On the other hand, the door may be opened alternately as a standard hinged or pivoting door about a pivotal axis at one end by simply providing a releasable securing means for the hinge struts so as to secure them, instead of the rod member, to the door.

Furthermore, the guide struts may be wholly unattached for the pivoting door arrangement in order to collapse these struts into the plane of the door after it is opened.

These releasable securing means may be of any well-known type as, for example, a latch or clamp mounted on the door.

In the drawings, FIGS. 1 and 2 are each top schematic views showing the two positions in which the door may be opened.

In FIG. 1, the door arrangement and operation of the door permits it to be opened as a swinging door similar to that in the above referred-to application. In FIG. 2, the hinge and guide means arrangement is the same except that the door operates as a pivoting door because of the different hinge and guide means attachments. Both figures show in solid lines the position of the door in its closed position within the door opening. On the other hand, the broken lines show the opened position of the door in both figures and similar parts are identified by the same reference numerals.

The door 1 is swiveled by a combined rotary and shifting movement into its position 1' in FIG. 1 so that it will lie obliquely with respect to the longitudinal axis of the vehicle (not shown) and will cover the front or rear end of the vehicle, in a manner similar to the above referred-to application, depending on which end of the vehicle the door is mounted. The corresponding opened position shown in FIG. 2 has been designated 1''. Here, however, a swinging movement of the door takes place about a swinging axis at the left end of the door shown in the Figure.

In accordance with the invention, the two possible opening movements are effected by the same hinge and guide means. The hinge means comprise struts 2 at the top and bottom of the door (only one shown), and the guide means comprise struts 3 also at the top and bottom of the door (again only one shown).

Each arrangement of struts 2 and 3 at the top and bottom is similar to one another so that only one such arrangement will be described.

The position of struts 2 and 3 are designated with a prime (') and a double prime (") for the respective open door positions, FIGS. 1 and 2. Struts 2 and 3 are pivotally secured at one end to the vehicle body in each embodiment as at 4 and 5, respectively. The other end 6 of strut 2 is pivotally secured to the door 1 in each embodiment while the other end 7 of strut 3 in FIG. 1 is releasably secured to the door, directly, or is releasably secured to the door indirectly by means of securing means 9 and rod member 8. Of course, if strut 3 is secured directly to the door at its end 7, the rod 8 may be omitted.

In FIG. 2, the strut 2 is releasably secured between its ends to the door at 10 rod member 8 is needed to cause movement of strut 3 during opening of the door as will be hereinafter described.

The door 1 in FIG. 1 may therefore be swung open in a manner similar to that of the door described in the above-referred-to application. In so doing, the door is pivoted about points 4 and 5 so as to be moved outwardly of the door opening and thereafter forwardly of the door opening along a path shown by the curved phantom lines. The door, in its open position of 1', will therefore be disposed obliquely to the plane of the door opening as the struts are moved to their positions of 2' and 3', shown in dotted lines in the drawing.

In FIG. 2, the arrangement of the struts and the rod member is the same in all respects as in FIG. 1 except that strut 2 is releasably secured to the door as at 10 and end 7 of strut 3 is not secured to the door, while strut 3 in FIG. 1 is pivotally secured to the door at end 7 or releasably at 9 in combination with rod 8. Accordingly, the door 1 may be swung open as a double or

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folding door about points 4 and 5 along a path shown by the phantom lines in the drawing. It can be therefore seen that by contrast to FIG. 1, the door 1'' in FIG. 2 is opened in the manner of a folding door, for example, about pivot points 4 and 5 and that the struts will be disposed in their positions of 2'' and 3'' shown in dotted lines when the door is opened to its position of 1'', i.e., substantially perpendicular to the plane of the door opening. In this embodiment, rod member 8 permits each strut 2 and 3 to be pivoted about points 4 and 5 because of the rigidity of each strut and bar member and the fact that strut 2 is secured to the door at 10 intermediate its ends.

For practical purposes, the strut 2 may be looked upon as the leaf of a hinge swinging about point 4.

If desired, struts 3 may be disconnected from the vehicle body at their ends 5 so as to be collapsed into the plane of the door, shown partially at 7'', when the door is opened to its position 1''.

Obviously, many modifications and variations are possible in the light of the above teachings. For example, the points 4 and 5 may be disposed inwardly of the plane of the door opening. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A door arrangement for a door opening of a vehicle, comprising:

a door adapted to be moved into and out of said door opening;

hinge means and guide means interconnecting said door with the body of said vehicle near one end edge thereof;

said hinge and guide means comprising hinge struts and guide struts, one end of each said strut being pivotally secured to said vehicle body at points spaced from each other, the other end of said hinge struts being pivotally secured to said door, said hinge struts lying in the plane of said door in the closed position thereof;

selectively releasable means for rigidly securing said hinge struts to said door in their position in the plane of the closed door;

selectively releasable means for pivotally securing the other ends of said guide struts to said door spaced from the other ends of said hinge struts;

whereby with only the releasable means for securing the other ends of said guide struts to said door in place, said door is moved outwardly from said door opening and obliquely with respect to the longitudinal axis of the vehicle into an opened position in which it is partly located forwardly and inwardly of said one end edge of said vehicle body covering up said one end edge; and

whereby with only the releasable means for rigidly securing said hinge struts to said door in place said door is swung into an opened position about said one end of said hinge struts.

2. The door arrangement according to claim 1 wherein said releasable means for pivotally securing the other ends of said guide struts comprises a rod member pivotally secured to said other ends of said guide struts and said hinge struts in combination with means for rigidly securing said rod member to said door.

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