

June 13, 1933.

R. L. CARR

1,913,583

VEHICLE BODY

Filed Sept. 25, 1931

2 Sheets-Sheet 1

Fig. 1

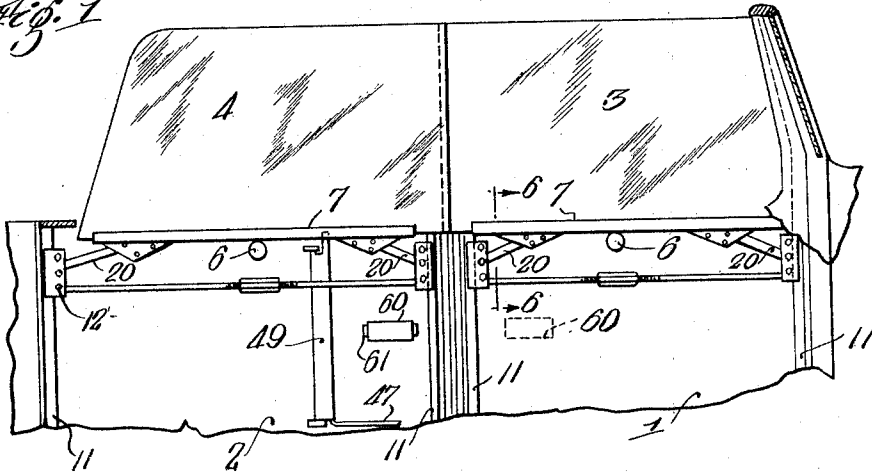


Fig. 2

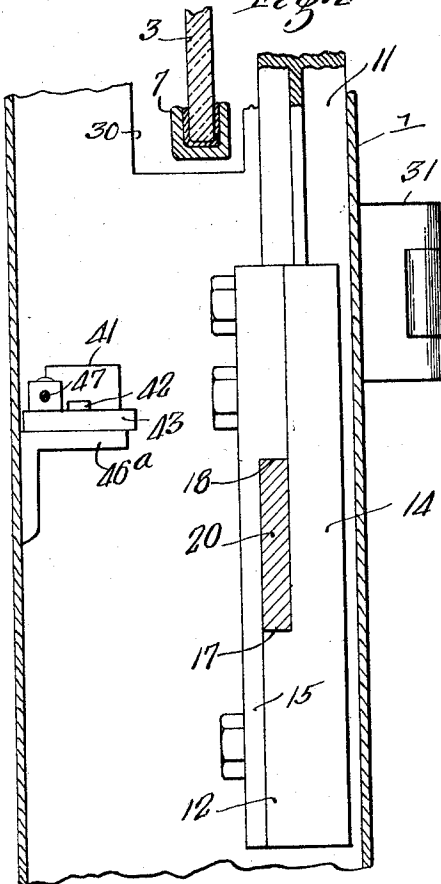
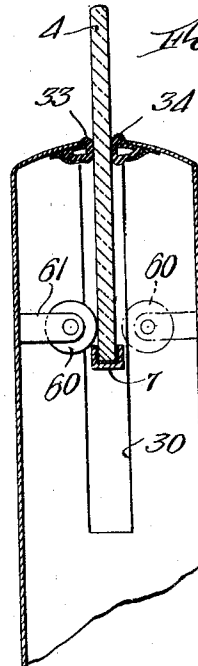


Fig. 3



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2 Sheets-Sheet 2

Fig. 1

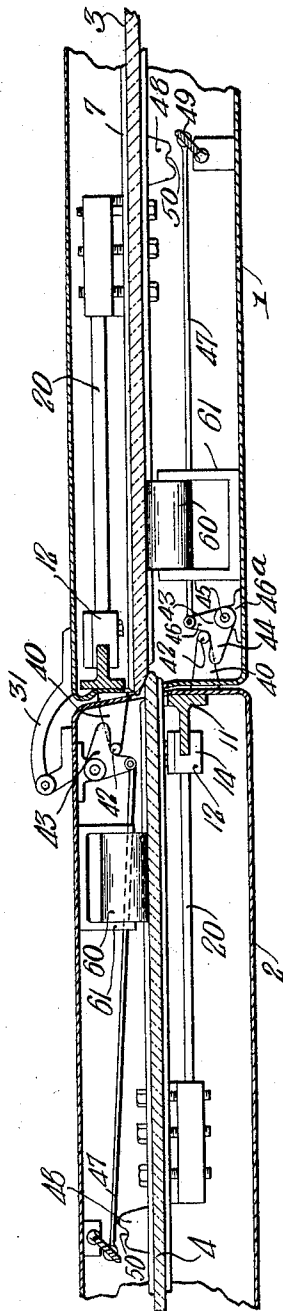


Fig. 2

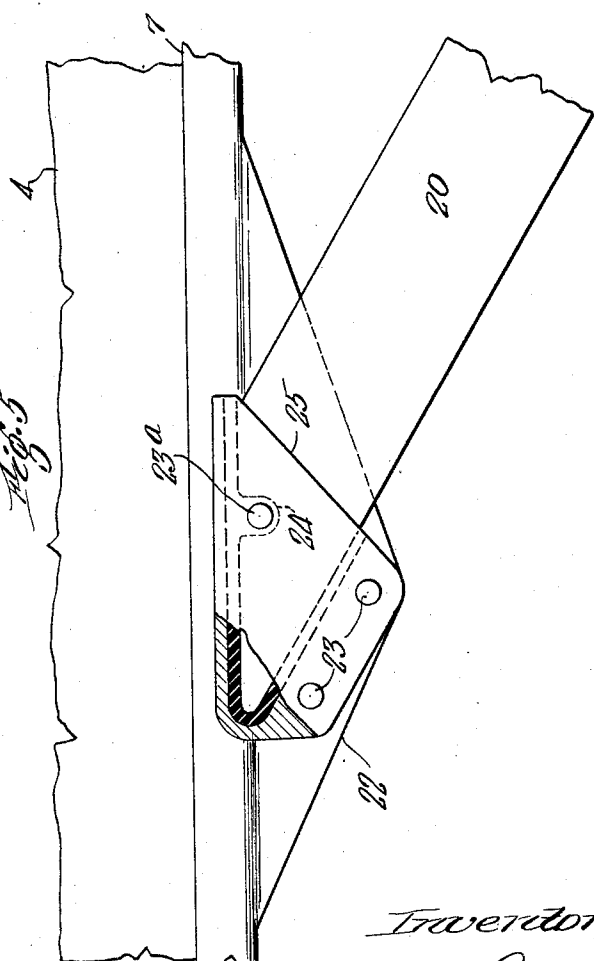
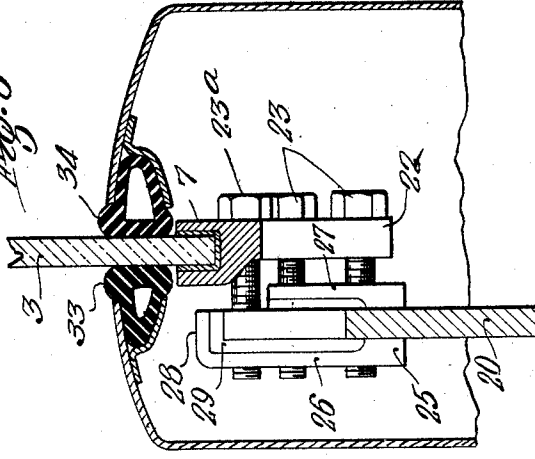


Fig. 3



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UNITED STATES PATENT OFFICE

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VEHICLE BODY

Application filed September 25, 1931. Serial No. 565,003.

This invention relates to improved vehicle bodies, and more particularly to bodies having movable windows or panels arranged in direct juxtaposition to provide a continuous closure wall, such, for example, as disclosed and claimed in my copending applications Serial No. 183,199, filed April 12, 1927, now Patent No. 1,826,865, and Serial No. 371,162, filed June 12, 1929.

In accordance with the present invention, resilient means such as disclosed in the above-identified copending applications may be employed yieldably to hold the panel edges together. The panels may slide in engagement with each other throughout the path of each panel, so that one panel may engage the edge of the other even when the first panel is fully raised and the other fully lowered. To permit this continuous engagement of the panel edges, the adjoining ends of the body wall sections upon which the panels are carried may be provided with suitable slots, such as are disclosed in the above-identified patent and application. Preferably one of the body wall sections is a swinging door which is pivotally connected to the adjoining section by any suitable hinging arrangement. The resilient means supporting the panels tends to tip the upper end of one panel inwardly toward the other panel a greater distance than its lower end; thus, for example, when the panels are separated from each other, as by door movement, the upper end of each panel will tip toward the other panel while its lower end will move but a relatively slight distance toward the other panel. It is, therefore, desirable to provide means positively to assure proper reengagement of the panel edges. The present invention provides improved means of this character which is effective substantially to prevent this tipping action of each of the panels, so that the resilient elements supporting the panels are held under substantially normal stress when the panel edges are separated due to door opening. Accordingly, the panel edges may remain substantially parallel to each other as the door closes so that their definite reengagement is assured. Furthermore, this means for retaining the resilient elements

under stress is effective in preventing the panel edges from meeting each other with any undue shock.

A further aspect of the invention relates to improved neutralizing means for protecting the edges of the panels against excessive strains, and to cooperate with the means for holding the panel edges in proper position as the door closes. When one panel is in its fully raised position and the other panel is lowered, the resilient means is effective in pressing the panel edges together with at least substantially the same force, as, for example when the full extent of their edges are in mutual engagement; thus these restricted overlapping edge portions are subjected to relatively high stresses, which are unnecessary, and which may result in undue strain upon the panel edges.

The various features of this invention are particularly advantageous when panels having transparent edges are held in direct juxtaposition to provide a continuous, transparent closure wall. The means for holding the panel edges in proper parallelism as the door closes is advantageous in preventing undue shock to the panel edges while the reaction means also cooperates to this end and also is effective in preventing the subjection of limited portions of the panel edges, as for example the extreme upper edge of a lowered panel and the extreme lower edge of a raised panel to high pressures and objectionable strains.

In the accompanying drawings:

Fig. 1 is a side elevational view of a vehicle body wall with a portion of its inner facing removed to show the panel arrangement and related portions;

Fig. 2 is a vertical sectional detail of the lower part of a body wall section;

Fig. 3 is a vertical section somewhat diagrammatic in character showing the arrangement of the reaction means;

Fig. 4 is a horizontal section of the adjoining ends of the body wall section showing the panels in their lowered positions;

Fig. 5 is an elevational detail of a portion of a panel and its supporting means, parts being broken away and shown in section; and

Fig. 6 is a sectional detail of the lower portion of a panel, its supporting means and the adjoining portion of the body wall.

In the accompanying drawings, the numeral 1 designates a section of a body wall which may be a swinging door, and numeral 2 indicates an adjoining fixed section. Closure panels 3 and 4 are carried by the sections 1 and 2, respectively; these panels being independently slidable from concealed positions within the body wall sections to a raised position thereabove, and being retained in engagement throughout their vertical paths. Any suitable lifting mechanisms may be employed to lift and properly position the panels, the numerals 6 indicating rollers engaging the lower channeled frames 7 of the panels and being parts of any suitable lifting mechanism. The panels preferably have adjoining margins unframed and beveled, as shown in Fig. 5. These beveled edges may, if desired, be provided with cellulosic cushioning material, such as is fully illustrated in my above-identified copending applications.

Vertical guides 11 may be disposed at the end of each body wall section, these guides conveniently being of T cross-sections, as shown in Fig. 4. Guide shoes 12 are slidably mounted upon the guides 11 and preferably comprise two metal elements or blocks 14 and 15, respectively, Fig. 2. The block 14 has a vertical slot engaging the outstanding flange of the guide 11, as shown in Fig. 4, and is provided with a protuberant lower portion to afford a rabbet having an inclined edge designated by numeral 17, the member 15 preferably is provided with a parallel similarly inclined rabbet edge 18, the edges 17 and 18 cooperating with adjoining faces of the metal blocks in providing a diagonally disposed recess to receive the end of an inclined leaf spring 20. Each leaf spring preferably inclines upwardly from its shoe and is connected to an end portion of a frame 7 of one of the panels.

The arrangement of this connection is shown more particularly in Figs. 5 and 6. The channel frames 7 preferably have downwardly extending protuberances 22, a plurality of cap screws 23 and 23^a being arranged in threaded engagement with openings in each protuberance 22. The upper edge of each spring 20 is preferably provided with a slot 24 through which a cap screw 23^a may extend. The upper end of the spring is received in a pocket member 25 which may have a continuous outer wall of substantially trapezoidal form, designated by numeral 26, and may have an inner wall parallel thereto, indicated by numeral 27 but spaced from the upper flange 28 which extends inwardly toward the panel from the outer wall 26 of the pocket member. The lower cap screws 23 preferably are in threaded engagement with

openings in a continuous, solid portion of member 25 below its recessed or pocket portion. Suitable compressible material 29, such as rubber, is preferably disposed between the end of spring 20, and the walls of the pocket member 25, including the flange 28, which is disposed above the horizontal upper edge of the spring. The arrangement of the cap screws permits the adjustment of the position of the upper end of the spring and its exact angular relationship to the plane of the panel, so that the normal stress of the spring when the panels are held in engagement may be varied as desired. This adjustment may be effected by removing the cap screws, then locating the spring in the desired position in relation to the panel, temporarily clamping it in that position, and then replacing the cap screws.

The adjoining ends of the body wall sections 1 and 2 are preferably provided with vertical slots 30, Fig. 3, to permit the panel edges to remain in engagement throughout the path of each panel. As shown in Fig. 6, hollow elements of compressible material, such as rubber, may extend along the upper edge of the vehicle body wall to engage the body portions of the panels and to aid in holding them in proper position. One of the elements designated by numeral 33 may be somewhat heavier than the other element 34 and may thus be effective in pressing the corresponding panel in the direction of the element 34 and against the other panel.

The hinges 31 for the door (one of which is shown in Fig. 4) preferably are arranged to provide a hinge axis outwardly of the rear section 2 to permit the proper swinging of the door, this arrangement, however, being effective in separating the panel edges when the door opens. Since the resilient elements or springs 20 when properly positioned in relation to the panels will tend to cause them to incline toward each other when the door is opened, it is desirable to provide means to ensure proper engagement of the panel edges and to avoid any undue shock therebetween. For this purpose I provide duplicate or similar means in each of the body wall sections cooperating with a part projecting from the other section.

As shown in Fig. 4, an arm 40 may project from the end of each section into the adjoining section, a suitable opening 41, Fig. 2, being provided for this purpose. An upwardly extending stud 42 is disposed at the end of each arm 41 and is engageable with a swinging cam element 43. This cam is of the same general type as shown in my copending application Serial No. 371,162, and is provided with an arm 44 which is disposed in the path of the stud 42, so that when the door opens the cam element 43 is swung about its pivot element 45 which connects to a fixed bracket 46^a upon the body wall. Each cam

43 preferably has a second arm 46 extending at an angle to the arm 44 and articulated to a link 47 which in turn is pivotally connected to the lower end of a swinging member 49.

5 This member has a vertical extent slightly greater than the length of the vertical path of the panel, and may be swung by the movement of the corresponding cam 43 into engagement with a fixed cam 48 carried by the frame 7 of the panel. This fixed cam may be of the general type described in my co-
10 pending application Serial No. 371,162, having a protuberant portion past which the member 49 moves into engagement with a notch 50, thus locking the springs 20 in
15 stressed condition as the cam 43 is swung due to the opening of the door.

When the door closes, each of the studs 42 engages an arm 46 of a cam 43 to cause
20 the member 49 to be moved out of engagement with the fixed cam 48, thus permitting the springs to be effective in pressing the corresponding panel against the edge of the adjoining panel. The parts are so propor-
25 tioned that the springs are held under stress by the locking engagement of members 48 and 49 until the door has closely approached its closed position, so that the panels do not
30 move into contact until the door has practically closed. Accordingly, the panel edges may be substantially parallel when they en-
gage each other and undue shock is thus avoided.

When one panel is fully raised and the
35 other panel is fully lowered, but small portions of the panel edges are in engagement. On the other hand, the lowered panel is not only being acted upon by the springs 20 con-
nected to its lower end, but by the resilient
40 element 33 contacting its upper portion. Thus the entire force of the supporting springs and the compressible element 33 is largely concentrated upon the small portion
45 of the panel edge which is in engagement with the adjoining panel. In order partially to offset and neutralize this unnecessarily large force acting upon a small portion of
50 the panel edge, I provide compressible elements 60, such as rollers, carried by brackets 61 disposed within each body wall section
at a position to engage the lower edge of a
55 panel when it is in a position substantially one-half way between its fully raised and its fully lowered position, see Fig. 3. Each com-
pressible element 60 is preferably arranged
to engage the face of the corresponding panel
which is opposite the face engaged by the
60 element 33, i. e., each element 60 engages the same face of the corresponding panel that is
engaged by the adjoining panel. Thus the
element 60 cooperates with the adjoining
panel in opposing the force of the element
33 and the springs 20 which are tending to
65 press the panel edges together. The element
60 being compressible permits the passage

of the frame 7 as the panel is being raised or lowered.

When the panels are fully raised, it is evident that the rollers 60 do not engage the
70 panels and are ineffective. When one of the panels has been lowered, to substantially its mid position, as shown in Fig. 3, its lower part is engaged by the member 60 which tends
somewhat to counteract the effect of the sup-
75 porting springs 20, the mid portion of the panel being acted upon by the compressible element 33 which tends to press the panel toward the adjoining panel. Obviously less
80 force is needed to hold the panel edges together when they are in their mid positions than when they are fully raised, since the force applied to the panels are received not
only from the springs 20 at their lower ends
but also from the elements 33 which are dis-
85 posed at the top of the body wall and engaging their mid portions. When one of the panels is fully lowered, the springs 20 and
the element 33 cooperate in applying forces
at the upper and lower ends of the panel to
90 hold it in proper engagement with the adjoining panel, these forces being somewhat counteracted by the pressure of the element 60 engaging the mid portion of the panel.

From the foregoing it is evident that I
95 have provided means particularly effective to protect the adjoining panel edges against undue strain and shock. The elements 60 cooperate with the cam means 43, 50, etc.,
in preventing undue shock when the door
100 is closed and the panels at or near their lowered positions, the rollers, for example, dampening the action of the springs 20 and
elements 33 after the cam 48 has been raised
105 from engagement with the swinging member 49. The reaction means 60 is also effective in preventing the concentration of high strains upon limited portions of the panel
edges, and is effective in reducing the total
110 force which otherwise would be effective in holding the panel edges together when the panels are in intermediate or lowered positions.

I claim:

1. Vehicle body comprising a body wall in-
115 cluding a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means
associated with said panels, said means per-
120 mitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in
mutual engagement, or in intermediate posi-
125 tions, said means comprising a part moving with one of the panels and effective to press it transversely of the body wall toward the
other panel, a resilient element adjoining the
top of the body wall and yieldably engaging
that panel to aid in pressing it against the
130 other panel, and another resilient element

disposed below the first element and engaging that panel in an intermediate position and reacting against said part and first element.

5 2. Vehicle body comprising a body wall including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising parts moving with each of the panels and effective to press them transversely of the body wall toward each other, resilient elements adjoining the top of the body wall and yieldably engaging the panels to aid in pressing them against each other, and an additional resilient element disposed below one of the first-named elements and engaging one panel in an intermediate position to react against the parts and first-named elements acting on that panel.

3. Vehicle body comprising a body wall including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising parts within the body wall effective to press the panel edges against each other throughout the path of each panel, and means effective partially to neutralize the effect of said parts when one of the panels is in an intermediate position.

4. Vehicle body comprising a body wall including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising a part moving with one of the panels and effective to press it transversely of the body wall against the other panel, a resilient element adjoining the top of the body wall and yieldably engaging that panel to aid in pressing it against the other panel, and means effective when that panel is partially lowered to oppose and partially to neutralize the force with which the part and element press the panel against the adjoining panel.

5. Vehicle body comprising a body wall including a swinging door section and an ad-

joining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising a guide in the body wall, a shoe slidably associated with the guide, a spring having an end secured to the shoe, a connection between the opposite end of the spring and the lower part of the panel, said connection including a pocket in which the spring end is received, and cushioning material between the spring end and wall of the pocket.

6. Vehicle body comprising a body wall including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising a guide in the body wall, a shoe slidably associated with the guide, a spring having an end secured to the shoe, a connection between the opposite end of the spring and the lower part of the panel, said shoe including complementary sections between which the spring end is clamped, said sections being shaped to cooperate in providing a recess enclosing said spring end.

7. Vehicle body comprising a body wall including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permitting positioning of the panels in lowered positions within the body wall, in raised positions thereabove where the panels are in mutual engagement, or in intermediate positions, said means comprising resilient means associated with each section and acting upon each of the panels yieldably pressing their edges against each other, and means automatically operable to stress the resilient means associated with each section as the door moves toward its closed position, whereby each panel is moved out of its normal position in relation to the corresponding section.

8. Vehicle body comprising a body wall which includes a swinging door section and an adjoining section, panels carried by said sections respectively, resilient means within the body wall including parts associated with each of said panels and yieldably pressing their edges in overlapping engagement, and automatic means operable to stress the resili-

ient means when the door section is moving toward its closed position to ensure proper meeting of the panel edges as the door closes, said means comprising elements projecting
5 from the end of each of said sections into the other section, and cam elements in the respective sections actuatable by the respective elements projecting into the sections.

9. Vehicle body comprising a body wall
10 including a swinging door section and an adjoining section, a pair of independently movable closure panels carried respectively by said sections, guiding and positioning means associated with said panels, said means permit-
15 ting positioning of the panels in lowered positions within the body wall, in raised positions thereabove, the panels being in mutual engagement throughout their paths, or in intermediate positions, said means holding and
20 being effective to press one panel transversely of the body wall against the other panel, and neutralizing means effective to prevent the panel edges from being subjected to high pressure when one panel is near its raised
25 position and the other panel is near its lowered position.

Signed by me at Boston, Massachusetts,
this 23d day of September, 1931.

RAYMOND L. CARR.