

March 4, 1941.

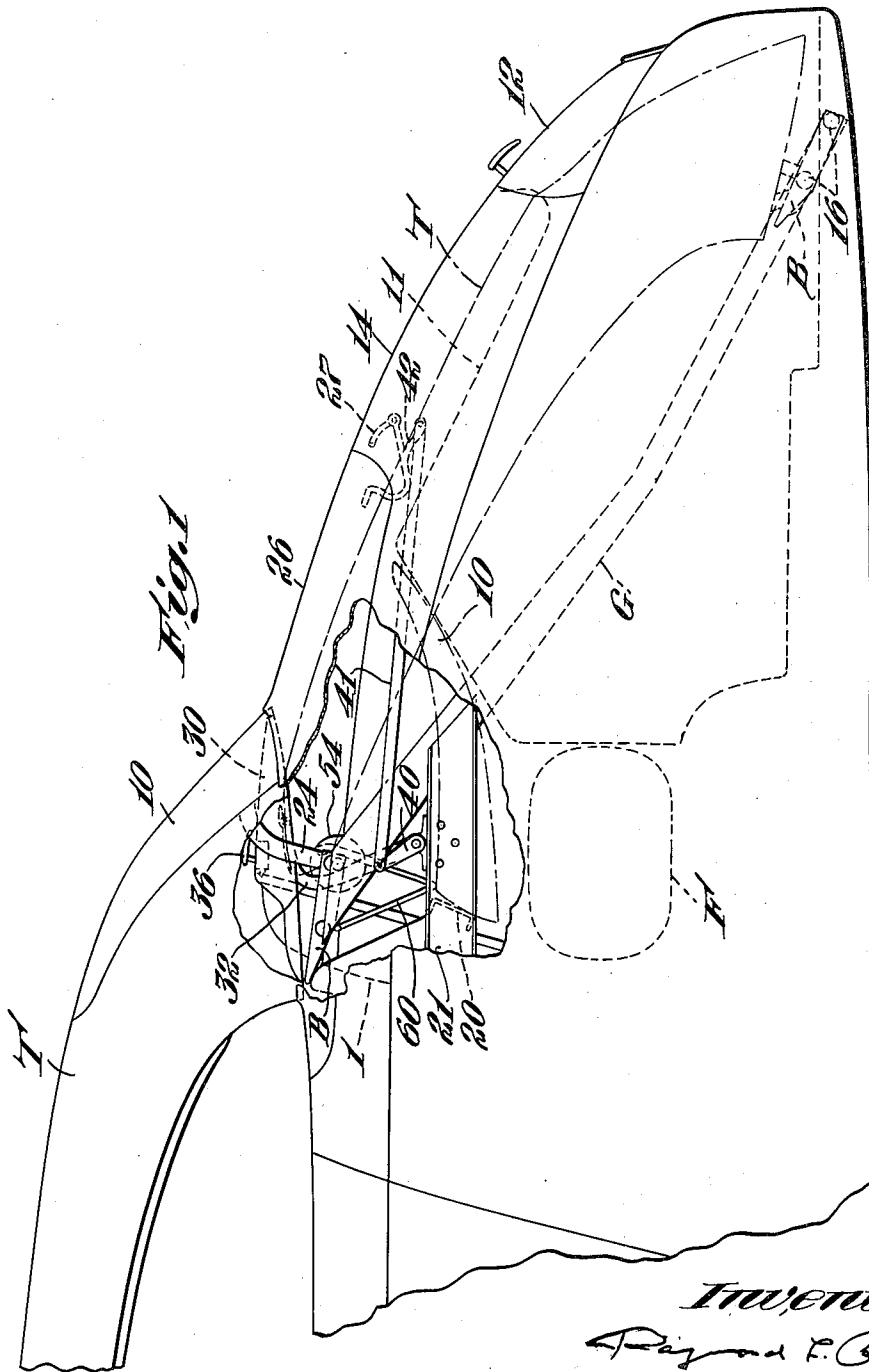
R. L. CARR

2,234,040

CONVERTIBLE BODY

Filed Nov. 30, 1939

3 Sheets-Sheet 1



Inventor
Raymond L. Carr

March 4, 1941.

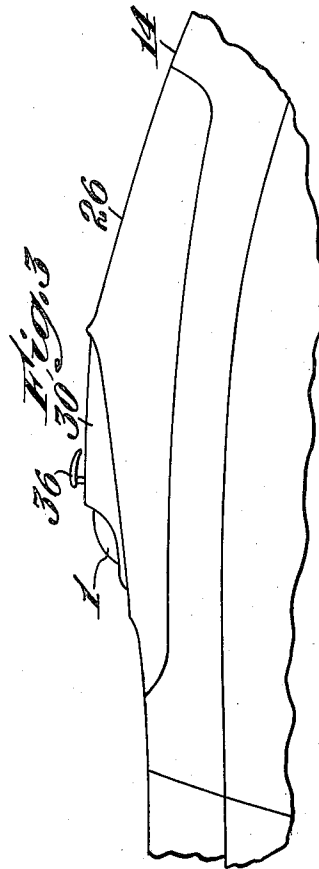
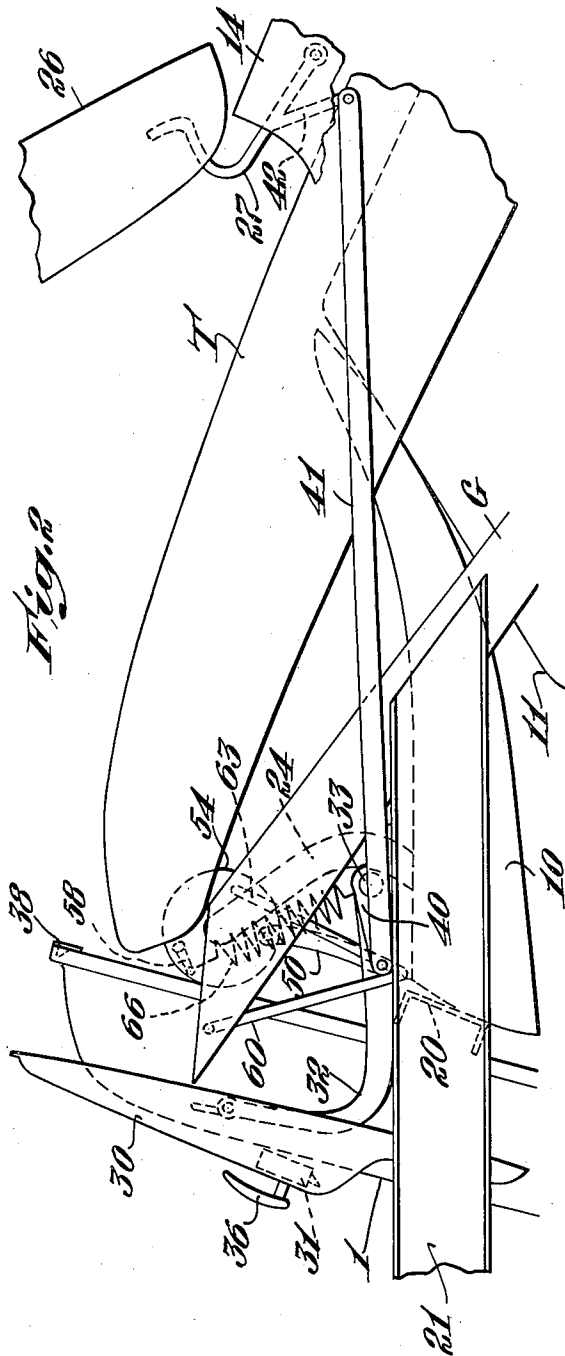
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3 Sheets-Sheet 2



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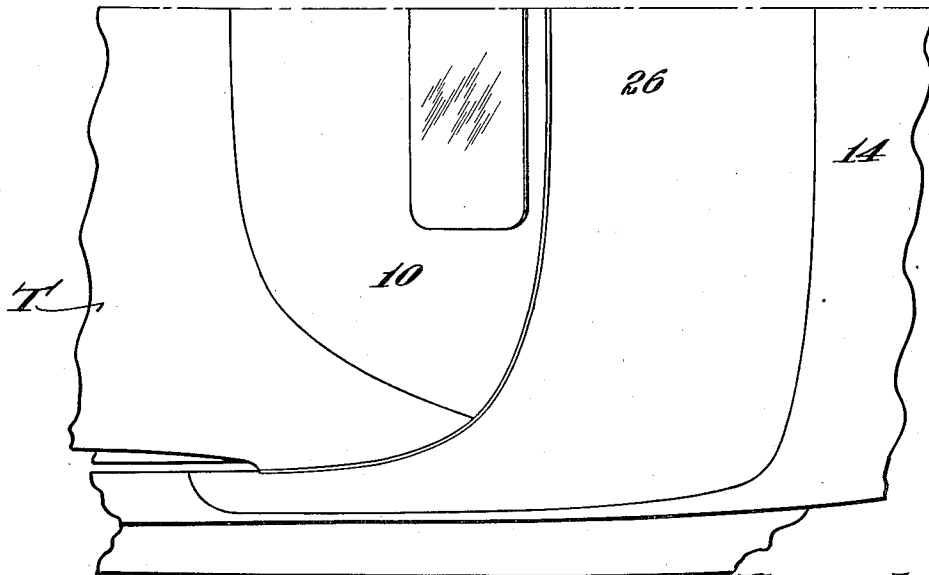
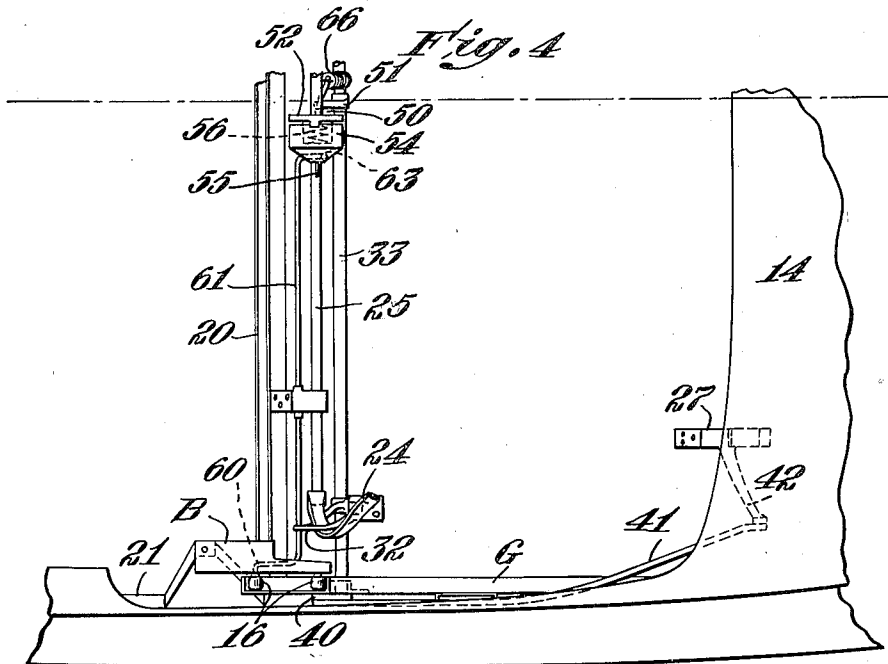


Fig. 5

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UNITED STATES PATENT OFFICE

2,234,040

CONVERTIBLE BODY

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Application November 30, 1939, Serial No. 306,795

17 Claims. (Cl. 296—107)

This invention relates to improved vehicle bodies of the general type disclosed in my copending application Serial No. 35,610, filed August 10, 1935. A body of this type is characterized by a top comprising a body portion or a shell which is movable from a raised position to a lowered position in a deck behind the passenger compartment. Preferably the deck may contain a storage compartment, the shell of the top providing an opening which is closed by a separate rear panel when the top is raised, the panel being movable to lowered position in such a manner that access is afforded to the storage compartment through the opening in the rear of the shell when the top is lowered.

As disclosed in said copending application, the deck may have a fixed wall portion extending, for example, to a region substantially over the mid-portion of the lowered top. In front of this wall section the deck may provide an opening through which the shell passes from its raised to its lowered position. A suitable closure or closures may be afforded for this opening.

The present invention is more particularly directed to an improved arrangement of a closure or closures for this opening, to an improved arrangement for mounting the panel and for positioning the same when lowered, and generally to linkage for interconnecting two closures for the opening at the front of the deck and/or for connecting one or both of these closures to the rear panel of the top. In general, arrangements of the type disclosed herein permit the more convenient lowering and raising of the top.

One important aspect of the present invention involves the positioning of the rear panel, when lowered, so that its upper, narrower portion may be straddled by the rear part of the top, which provides the lower wider portion of the rear opening, while the wider lower part of the panel may be disposed below the path of the top. In this position the panel may be disposed so that the face thereof which was outermost and uppermost when the top was raised is located below the face thereof which was innermost when the top was raised. Thus the panel may be swung through an angle of more than 90°, for example, of the order of 120°. The panel preferably may be provided with guiding means to ensure its proper positioning both when raised and when lowered.

Preferably two swinging closures may be provided for the opening at the front of the deck,

these closures having juxtaposed edges in the region of the rear part of the raised top. The front closure preferably swings downwardly and forwardly and the rear closure upwardly and rearwardly. These closures preferably are interconnected so that manipulation of one thereof is effective in causing concomitant movement of the other closure and so that, when one closure is locked in normal position, the other closure is also simultaneously locked in its normal position.

Another aspect of the invention involves the interconnection of the swinging rear panel with a closure so that movement of the closure is effective in swinging the panel when the top is raised, suitable means being provided to prevent such movement of the panel in response to movement of the closure when the top is lowered.

A further aspect of the invention relates to the arrangement of the parts so that they may move in counterbalancing relation to each other, and further to the provision of counterbalancing means for the swinging rear panel.

In the accompanying drawings:

Fig. 1 is a side elevation of the rear part of a vehicle body exemplifying the principles of this invention, a part of the wall of the body being broken away and parts being shown in optional positions by dot and dash lines;

Fig. 2 is a diagrammatic view of the linkage connecting the closures and the rear panel, also showing the position of certain adjoining parts;

Fig. 3 is an elevational detail of a portion of the body, showing the closures in their normal positions when the top is in its lowered position;

Fig. 4 is a plan view of a portion of the body, with the rear seat and the closures for the opening at the front of the deck removed, parts being broken away and shown in section; and

Fig. 5 is a plan view of a similar portion of the body, showing the top in its raised position.

A vehicle body of the type disclosed herein may be provided with a passenger compartment including a front seat (not shown) and a rear seat 1. The body is provided with a top having a body portion or shell T to extend over the passenger compartment in the general manner disclosed in my above-identified copending application. Such a top is provided with a rear panel 10 which, when removed, leaves an opening in the shell so that the latter may move downwardly in straddling relation to a baggage or storage compartment 11. A rear door 12 affords access to this compartment through the

opening at the rear of the lowered shell. In front of the door 12 the rear deck is provided with a fixed wall section 14, and in front of this section there is an opening through which the shell T may move from its raised position to its lowered position, shown in dot and dash lines in Fig. 1.

Any suitable supporting and guiding structure may be provided for the shell T, such as a guide G at each side of the body comprising a straight upwardly inclined channel at the rear of the deck and a continuation thereof in the form of a more steeply inclined channel having upwardly diverging flanges. Rolls 16 may be mounted on brackets B at each side of the shell in the general manner disclosed in my copending application Serial No. 306,794, filed on even date herewith, and may be guided in the channel to direct the shell T from its raised to its lowered position or vice versa.

As shown for example in Fig. 5, the panel 10 and the corresponding opening at the rear of shell T may be wider at their lower parts or near the rear of the top than at their upper parts. In accordance with this invention, the lowered panel may be positioned so that its narrower portion is straddled by the rear of the top T as the latter passes from its raised to its lowered position, the portion of the top which defines the lower, wider part of the rear opening straddling the upper, narrower part of the panel, and the wider, lower part of the panel being disposed below the path of the shell or top. Thus adequate clearance may be provided to permit movement of the top without interference by the panel and yet the panel may be rigid and non-distortable. In this position, as shown, the normally outer face of the panel is disposed beneath the inner portion thereof; in other words, the panel may be swung through an angle somewhat greater than a right angle, for example, of the order of 120°.

In its lowered position, the upper part of the panel 10 may conveniently rest upon a downwardly and forwardly inclined wall at the front of the storage compartment 11. This wall may be covered with suitable cushioning material such as a soft pile fabric. The lower part of the panel may engage a transverse frame member 20 which connects longitudinal frame members 21 that extend along opposite sides of the body beside the rear seat.

The fuel tank F may conveniently be positioned directly back of the seat 1 and below the lowered panel 10 as well as in front of the storage compartment 11. Thus the storage compartment may have a more convenient shape than otherwise would be feasible.

Preferably the panel 10 is provided with suitable guiding and supporting means to facilitate its movement from lowered to raised position and particularly to ensure its proper lateral positioning when brought into engagement with the top T. For this purpose I prefer to employ curved supporting arms 24 at each side of the panel, which swing about a transverse axis, being fixed, for example, to the ends of a transverse rotatable shaft 25 that lies between the upper ends of guides G (Fig. 4).

The opening at the front of the deck preferably is provided with a swinging lid or closure 26 which is connected by suitable hinges 27 to the fixed wall 14. Thus the closure 26 may be swung upwardly to the position shown in Fig. 2. The front edge of the lid 26 preferably is

flared upwardly and may be provided with any suitable cushioning and weather sealing means, such as a rubber strip, to engage the lower portion of the outer wall of the top, both at the sides and the rear of the latter. It is thus evident that when the top is in its normal raised position and the lid is engaging the same, a continuous relatively smooth and finished appearance is afforded for the outer part of the body.

If desired, the remaining portion of the opening through which the shell passes from raised to lowered position may be left uncovered or a suitable flexible apron may be provided to cover this opening, at least when the top is lowered, suitable snap buttons or the like being provided to retain this apron in position. However, I prefer to employ a second relatively rigid closure 30 for the front portion of the opening, this closure having its rear edge juxtaposed to the front edge of the closure 26 when the closures are in normal position. The closure 30 preferably may be mounted on a pair of supporting arms 32 which are fixed to a transverse shaft 33 below and somewhat behind the shaft 25. Preferably the arms 32 may be pivotally connected to the corresponding sides of the lid 30 to permit slight movement of the lid relative to the arms.

A suitable handle 36 may be arranged at the front of the closure 30 to operate a lock or latch 31, the bolt of which engages a striker 38 (Fig. 2) on the upper part of the rear seat back.

In accordance with this invention, the closures preferably are interconnected. For this purpose the shaft 33 may extend outwardly beyond the guides G at each side of the vehicle and may support crank arms 40 which are articulated to elongate links 41 that in turn are pivotally connected to arms 42 fixed to the swinging portions of the hinges 27. Preferably these parts are so arranged that when the front closure 30 has been swung downwardly to its open position in front of the upper portion of the back of the rear seat, as shown in Fig. 2, the cranks 40 have moved through dead center positions, so that the closure 26 is then held in its raised position. As the closures are being moved from their closed positions, the front closure 30 is swung downwardly and forwardly and the rear closure 26 upwardly and rearwardly. Since one closure is being moved upwardly while the other is being moved downwardly, there is a consequent counterbalancing effect; the closure 26, however, may ordinarily be larger and heavier than the closure 30 so that some effort is required to move the latter toward its open position.

When the closure 30 is in its normal position, it may provide a portion extending beneath the rear part of the top. When the handle 36 is actuated, this closure may be swung slightly about its pivotal connections with arms 32 so that its lower end is depressed and its upper end is raised to clear the rear part of the top and the upper edge of the rear seat back respectively. The closure is then swung downwardly, and as this movement occurs, the lid 26 is swung upwardly and the movement is continued until the cranks 40 pass through their dead center positions so that the closure 26 is thereupon temporarily locked in place.

Preferably, although not necessarily, the panel 10 is also arranged so that it may be moved from raised to lowered position or vice versa in response to movement of the closure 30. For this purpose I preferably provide a link 50 (Fig. 7)

2) articulated to a crank 51 fixed to the mid-portion of the shaft 33. The axis of the pivotal connection between link 50 and crank 51 in the illustrated arrangement (Fig. 4) is aligned with the axes of the connections between links 41 and cranks 40. The upper end of the link 50 is preferably pivotally connected to a disk 52 (Fig. 4) which is freely rotatable upon the shaft 25 near the mid-portion of the latter. The disk 52 conveniently forms one member of a dog clutch, the cooperating member 54 of which is slidable along the shaft 25 and is rotatable therewith, a key or spline 55 being provided for that purpose. The member 54 preferably is in the form of a hollow casing containing a compression spring 56 surrounding the shaft 25 and tending to urge the members 54 and 52 of the dog clutch apart. The face of the member 54 remote from the disk 52 is preferably beveled, as shown.

Assuming that the clutch is engaged, the disk 52 is then rotatable with the shaft 25. Accordingly when the closure 30 is swung from its closed to its lowered position, rotation of the shaft 33 is effective through the crank 51 and link 50 in causing rotation of the shaft 25 to swing the panel 10 from its raised to its lowered position. As this occurs, the weight of the panel 10 is effective in aiding the closure 30 in counterbalancing the weight of the rising closure 26, and in fact it may be desirable to provide a counterbalancing spring 66 to balance a portion of the excess weight of the panel 10. The spring 66, for example, may have one end secured to the shaft 33 and the other end connected to a curved rod 58 extending from the disk 52 (Figs. 2 and 4).

The arrangement so far described would result in the lifting of the panel 10 whenever the closure 30 was moved to its raised or closed position, which would be undesirable when the shell T was lowered. I therefore have provided the spring 56 for disengaging the clutch provided by members 52 and 54 when the shell is lowered. Under these conditions, the spring 56 is effective in urging the parts 54 and 52 apart so that movement of the closures can take place without affecting movement of the panel 10, which is then in its lowered position.

When the top T is raised, however, one of the brackets B thereon, which carries the rolls 16, engages the out-turned end of an arm 60 provided on a swinging rod or shaft 61, the inner end of which provides a radial arm 63 (Figs. 2 and 4) engageable with the beveled face of the member 54, these parts providing a cam-like action so that swinging movement of the member 61 is effective in urging the member 54 inwardly against the action of the spring 56 to engage the cooperating parts of the dog clutch. Accordingly, when the shell is raised and the closure 30 is swung downwardly preparatory to lowering the shell, this movement is simultaneously effective in causing the upward movement of the closure 26 and the downward movement of the panel 10 to its lowered position. Thereupon the top T may be rolled to its lowered position, shown in dot and dash lines in Fig. 1. When this occurs, the member 61 is free to swing in a clockwise direction, as viewed in Figs. 1 and 2, in response to the camming action of the part 54 under the action of spring 56 and the clutch is disengaged so that the closures 30 and 26 may be returned to their normal positions without affecting the panel 10.

When the top is again raised, the bracket B

swings the member 60—61 to the position shown in Fig. 1, thereby reengaging the clutch so that, when the closure 30 is again swung to its normal position, the panel 10 is raised into engagement with the rear of the top while the closure 26 is swung downwardly over the same.

While I have disclosed herein the preferred arrangement of interconnecting the various moving parts associated with a lowerable top shell, namely the closure or closures for the opening at the front of the deck and the panel at the rear of the top, it is to be understood that portions of this invention may be employed to particular advantage without necessarily employing all parts thereof. Thus, for example, it is advantageous to mount the panel 10 in the manner illustrated herein without interconnecting the same with one or more closures. It is also advantageous to provide a swinging outer closure without a swinging inner closure, and it is advantageous to connect either a front or rear closure to the swinging panel.

It is evident that the present invention provides particularly convenient means facilitating the movement of a top of the type disclosed herein from its raised to its lowered position, since the top need only be disconnected from the windshield standards in the usual manner, the closure 30 swung downwardly, which automatically lowers the panel 10 and opens the closure 26, and the top then be rolled to its lowered position, whereupon the closures may be returned to normal position merely by manipulation of the closure 30. The locking means 31 on the closure 30 is effective through the linkage in holding both closures in their normal positions, and the front edge of the closure 26 which engages the lower part of the panel 10 cooperates with the arms 24 and the linkage in retaining the panel in its raised position, although additional fastening means may be provided for this panel if desired.

While I have disclosed but a single fastening means on the closure 30, it is obvious that fastening means at opposite sides of the same may be employed instead of or in addition to a latch at the middle thereof.

Other arrangements of swinging rear panels are disclosed in my copending applications Serial Nos. 306,794 and 306,796, filed on even date herewith.

I claim:

1. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, and guiding and supporting structure for said shell, said panel being rigid and separable from the shell for movement to a lowered position, the upper parts of the opening and of the panel being narrower than the lower parts thereof, the lowered panel being positioned so that its narrower upper part is straddled by the portion of the shell defining the wider part of the opening as the shell moves between raised and lowered position and so that the wider part of the panel is below the path of the shell.

2. A vehicle body according to claim 1, also provided with means supporting the panel for swinging movement between its raised and lowered positions.

3. A vehicle body according to claim 1, also provided with means supporting the panel for

swinging movement between its raised and lowered position, as well as provided with a counterbalancing spring for urging the panel toward its raised position.

4. A vehicle body according to claim 1, also provided with guiding means to direct said panel to its lowered position.

5. A vehicle body according to claim 1, including a storage compartment beneath the rear of the shell, and also including a fuel tank in front of said compartment and beneath the lowered panel.

6. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, and a swinging lid for said last-named opening, said lid swinging about a transverse axis and having a width of the order of that of the last-named opening.

7. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a front and a rear closure for said opening, normally juxtaposed portions of these closures being in the region of the lower rear portion of the raised top, and mechanism operatively interconnecting said closures, so that one may be moved to effect concomitant movement of both, said mechanism being arranged so that both closures are held in opened position to permit movement of the shell.

8. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a closure for said opening, the major portion of said closure being disposed in front of the rear of the raised top, and means movably supporting said closure so that it may swing downwardly and forwardly to uncover the opening.

9. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a closure for said opening, the major portion of said closure being disposed in front of the rear of the raised top, said closure being swingable downwardly and forwardly, and a second closure for said opening at the rear of the first closure, the second closure being swingable upwardly and rearwardly.

10. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, guiding and supporting structure for said shell, the front of the

deck providing an opening through which the shell may pass, a closure for said opening, said closure being swingable downwardly and forwardly, a second closure for said opening at the rear of the first closure, the second closure being swingable upwardly and rearwardly, and linkage interconnecting said closures for concomitant movement.

11. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a swinging closure for said last-named opening and mechanism operatively interconnecting the panel and closure so that said panel is automatically movable to lowered position when the shell is in raised position in response to swinging movement of said closure to uncover the opening.

12. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a swinging lid for said last-named opening and mechanism operatively interconnecting said lid and panel so that said panel is automatically movable to raised position when the shell is in raised position in response to swinging movement of said lid to cover the opening.

13. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a front and a rear closure for said last-named opening, and linkage interconnecting the closures and panel, automatically in response to movement of one closure to cause movement of the other closure and the panel.

14. In a vehicle body, the combination comprising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a front and a rear closure for said last-named opening, normally juxtaposed portions of these closures being in the region of the lower rear portion of the raised top, linkage interconnecting the closures and panel, automatically in response to movement of one closure to cause movement of the other closure and the panel, and means associated with said linkage automatically effective when the shell is in lowered position to prevent movement of the panel in response to movement of either closure.

15. In a vehicle body, the combination comprising

prising a passenger compartment, a deck behind said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having
 5 a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the front of the deck providing an opening through which the shell may pass, a front and a rear closure for said last-
 10 named opening, normally juxtaposed portions of these closures being in the region of the lower rear portion of the raised top, linkage interconnecting the closures and panel, automatically in response to movement of one closure to cause
 15 movement of the other closure and the panel, and locking means upon one of said closures for locking both closures and the panel in their respective normal positions.

16. In a vehicle body, the combination comprising a passenger compartment, a deck behind
 20 said compartment, a top shell over said compartment, said shell having a rear opening, a movable panel for said opening, said panel when in normal engagement with said shell having a
 25 generally upward and forward inclination, and means swingably supporting said panel so that

it is movable through an angle somewhat greater than a right angle to a lowered position in the front of the deck and in spaced relation to the shell.

17. In a vehicle body, the combination comprising a passenger compartment, a deck behind
 5 said compartment, a top shell movable from a raised position over said compartment to a lowered position within said deck, said shell having
 10 a rear opening, a panel for closing said opening when the shell is raised, guiding and supporting structure for said shell, the deck providing a
 15 front opening through which said shell may pass, a movable closure for said front opening, mechanism operatively interconnecting said panel
 20 and closure when the shell is raised so that movement of the closure to uncover the front opening occurs concomitantly with the lowering
 25 of the panel and so that movement of the closure to close the front opening occurs concomitantly with movement of the panel to close the opening
 in the shell, said mechanism being arranged so that movement of the closure independently of the panel is permitted when the shell and panel
 are in their lowered positions.

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