

No. 709,073.

Patented Sept. 16, 1902.

J. A. BRILL & E. S. BUCKNAM.  
CONVERTIBLE RAILWAY CAR.

(Application filed Feb. 1, 1901.)

4 Sheets—Sheet 1.

(No Model.)

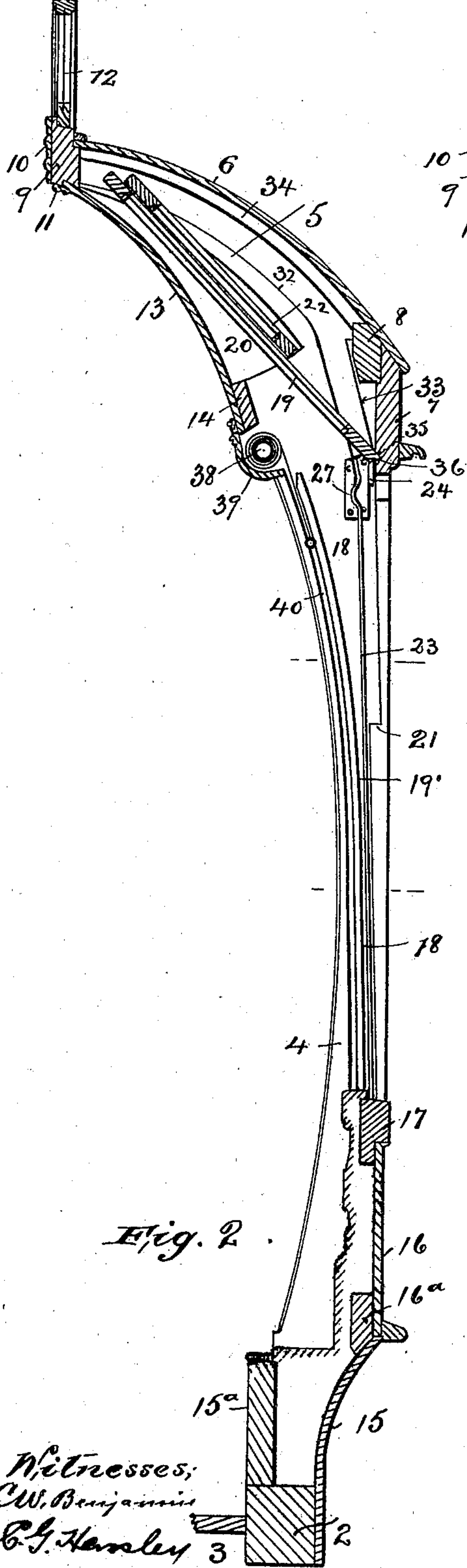


Fig. 2.

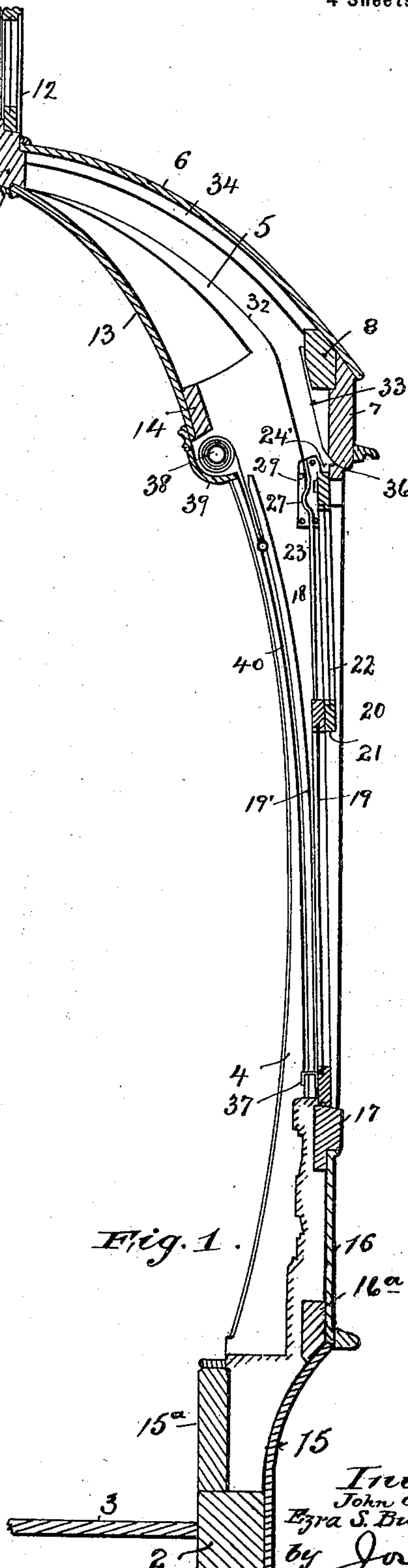


Fig. 1.

Witnesses;  
C. W. Benjamin  
C. F. Hawley

Inventors  
John A. Brill &  
Ezra S. Bucknam  
by Joseph L. Levy  
att'y





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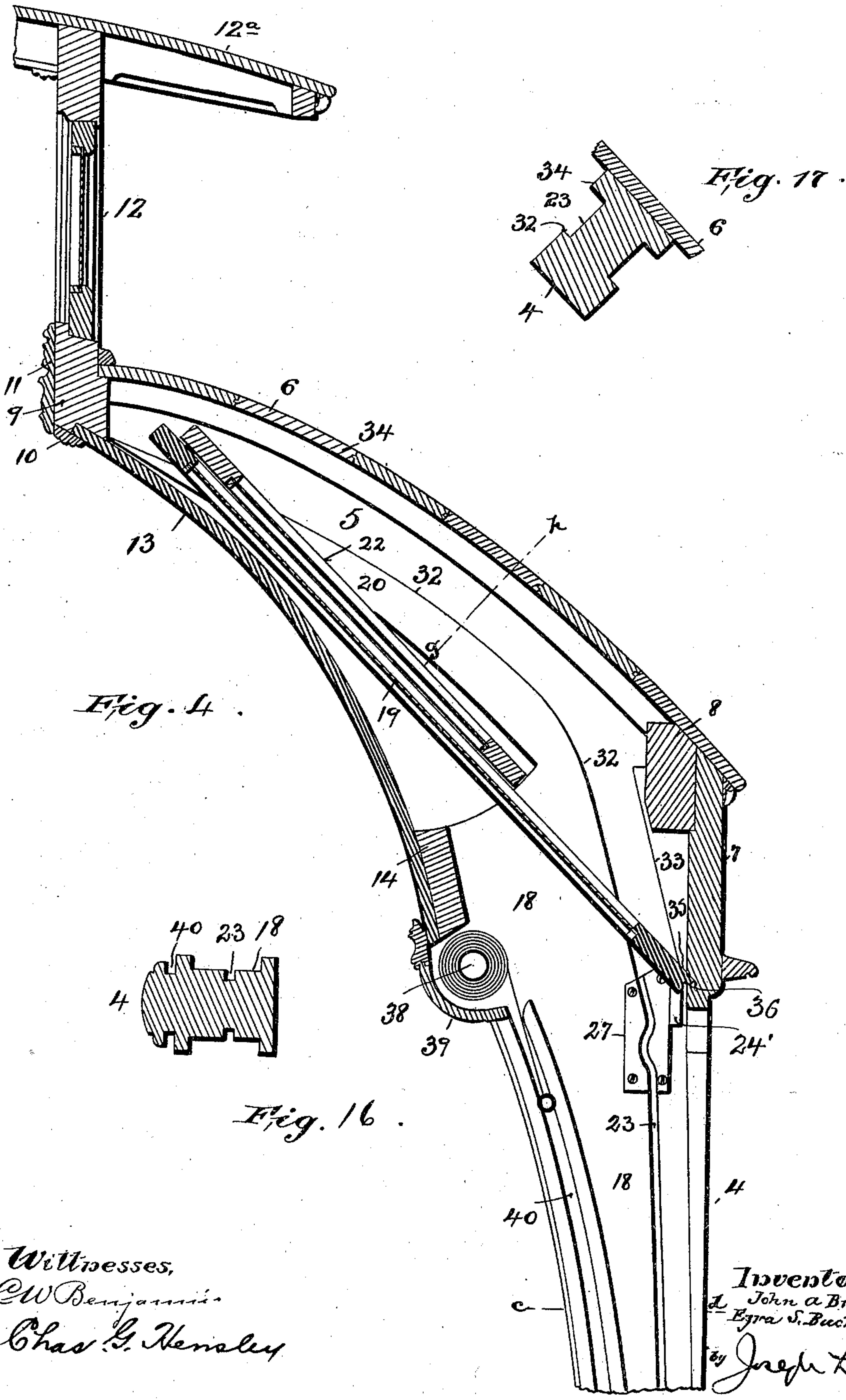
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(No Model.)

4 Sheets—Sheet 3.



Witnesses,  
C. W. Benjamin  
Chas. G. Henaley

Inventors,  
John A. Brill &  
Ezra S. Bucknam  
by Joseph L. Low  
att'y

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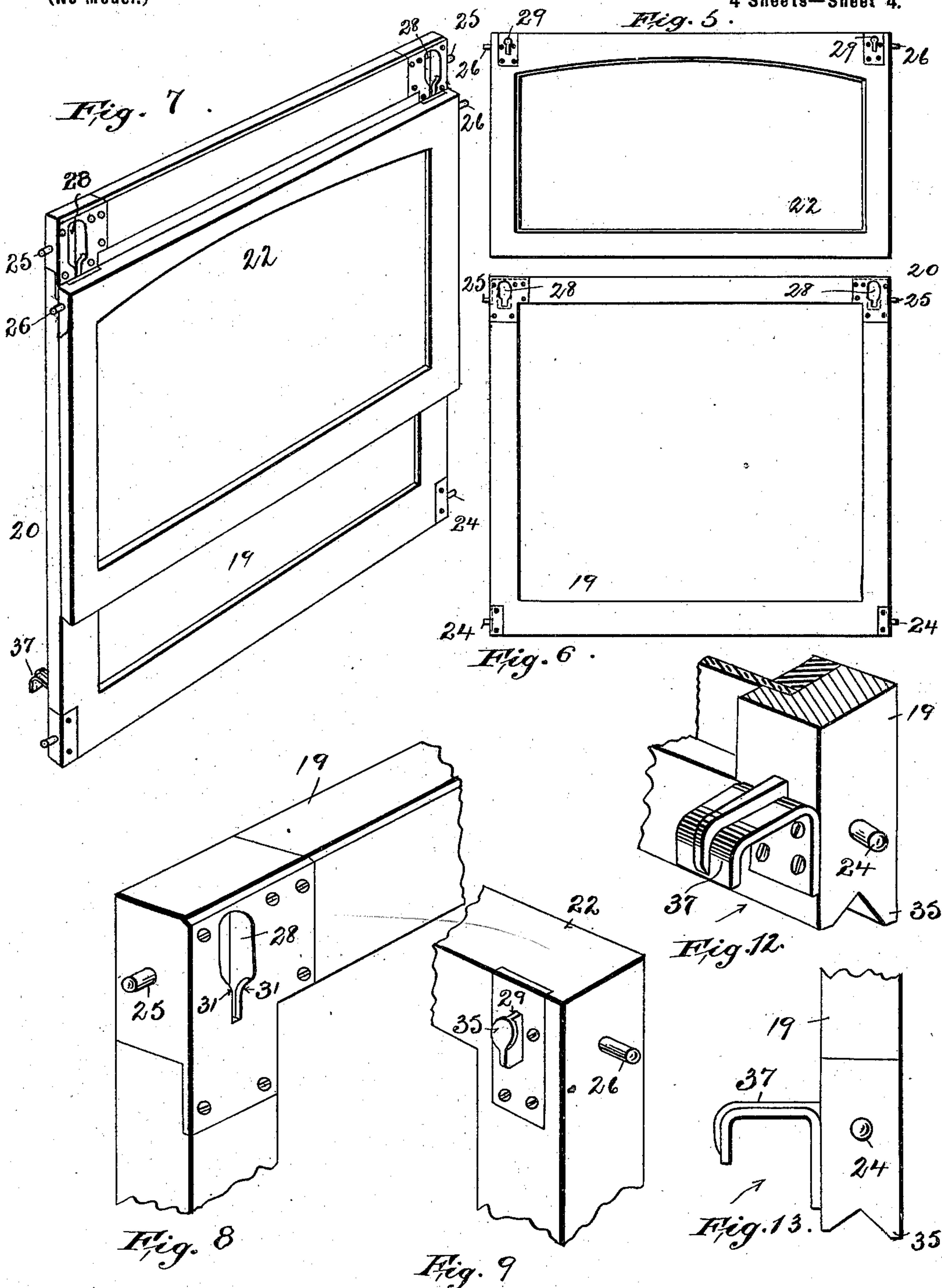
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(No Model.)

4 Sheets—Sheet 4.



Witnesses:  
Chas. G. Hensley

Inventors:  
John A. Brill &  
Ezra S. Bucknam.  
by Joseph R. Bay



# UNITED STATES PATENT OFFICE.

JOHN A. BRILL AND EZRA SANGER BUCKNAM, OF PHILADELPHIA, PENNSYLVANIA; SAID BUCKNAM ASSIGNOR TO SAID BRILL.

## CONVERTIBLE RAILWAY-CAR.

SPECIFICATION forming part of Letters Patent No. 709,073, dated September 16, 1902.

Application filed February 1, 1901. Serial No. 45,545. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN A. BRILL and EZRA SANGER BUCKNAM, citizens of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Convertible Railway-Cars, of which the following is a specification.

Our invention relates to improvements in the construction of cars, and while some of its features are applicable to all kinds its greatest field of usefulness at present is in connection with those intended for city or suburban use, in which means are provided for readily converting the car into either an open or closed form for summer or winter use.

It has for its object the production of a convenient, simple, and economical car construction and one that will withstand the hard usage incident to poor road-beds and careless handling. The particular class of car to which they are shown applied in the drawings is generally termed a "convertible" car or, specifically, a "semiconvertible" car, having a storage-space within the roof for the movable panels and which may have transverse seats located between the side stanchions or posts; but it is to be understood that they are not limited to cars of such construction, as they are capable in many aspects of general application.

To the accomplishment of the foregoing and such other objects as may hereinafter appear our invention consists in the construction and combination of parts hereinafter particularly described, and further pointed out in the claims, reference being had to the accompanying drawings, forming a part hereof, in which the same reference-letters designate like parts throughout the several views, and in which—

Figure 1 is a cross-sectional view through one side of a car embodying our invention and showing the panels in normal position. Fig. 2 is a similar view showing the panels in stored position. Fig. 3 is a section of the roof and the upper portion of the post, taken at the same point as Fig. 1, but showing the construction on an enlarged scale and with the sash-panels in their lower position. Fig. 4 is a similar view, also on an enlarged scale,

but showing the sash-panels stored in the roof. Fig. 5 is a side elevation of the inner face of the upper section of the sash-panel. Fig. 6 is a similar view of the outside of the lower section of the sash-panel. Fig. 7 is a perspective view of the two sections of the sash-panel locked together ready for lifting and storing in the roof of the car. Fig. 8 is a perspective view of the female portion of the means for locking the two sash-sections together. Fig. 9 is a similar view of the co-operating male portion. Fig. 10 is a cross-sectional view of the same parts locked together and taken on the line  $x x$  of Fig. 11. Fig. 11 is a cross-section of the same parts on the line  $z z$ , Fig. 10. Fig. 12 shows in perspective the handles or lifting members for the lower sash-sections. Fig. 13 is a side view of the same. Fig. 14 is a cross-section of the upright posts on the line  $a b$ , Fig. 3, showing the guiding-grooves in detail. Fig. 15 is a similar view of the same part on the line  $e f$ , Fig. 3. Fig. 16 is a cross-section of the posts, taken on the line  $c d$ , Fig. 4; and Fig. 17 is a cross-section of the roof portion of the same posts, taken on the line  $g h$ , Fig. 4.

In the drawings, 2 represents the usual longitudinal sill of the car-body, to which the flooring 3 is secured, as well as the vertical posts 4, placed at the ends of the car and at intervals along its sides and which are preferably extended, as at 5, with an inclined and curved horn or brace toward the center of the car to support the roof-boards 6 and for other purposes hereinafter described. At their upper ends or what corresponds to the upper ends of the usual posts they are secured to the weather-board 7, and the construction is strengthened by the presence of the longitudinal rail 6, the inner ends of the curved extensions being secured to the ventilator-rail 9, over which the moldings 10 and 11 are placed for appearance sake. The usual ventilators 12 and upper deck 12<sup>a</sup> are provided as in the ordinary car, the head-lining or ceiling 13 being secured to the ventilator-rail 9 at its upper edge and to a longitudinal rail or stay 14 at its lower edge, which rail is secured to and supported in notches in the posts 4, as shown. The posts 4 have straight outer edges corresponding to the sides of the car and are curved



on the inside to conform to the interior of the car, being wider at the top and at the bottom than in the middle for strength of construction and for convenience, as will be explained.

5 They are made in one piece; but it is conceivable that they may be made up of sections, if preferred. Forexample, the roof portions 5, which correspond to rafters or braces in the usual car and are, as stated, inclined or

10 curved horns extending from the straight portion, may be made separate and attached thereto by any desired means, the only requirement being that they shall virtually constitute continuations of the said posts 4. The

15 head-lining or ceiling 13, as before stated, is secured at its lower edge to the rail 14, which is supported in notches in the inner edges of the posts 4. These posts being wide at this point, as stated, considerable space is provided in the roof between the said lining 13,

20 the ventilator-rail 9, the roof-boards 6 or roof proper, and the weather-board 7, which space is utilized for the purpose of storing the removable panels, as will be explained herein-

25 after. The lower parts of the sides of the car consist of the stationary concave or base-panel 15 and a center panel 16, which extends as far as the belt-rail 17, the latter being secured to the posts 4. A rail 16<sup>a</sup>, also secured to the

30 posts 4, helps to sustain the panels, and the usual step or base-board 15<sup>a</sup> is provided. The center panels are made as thin as is consistent with strength and good workmanship, their inner side being of any desired kind. Against

35 these panels or fillets and between the posts 4 the transverse seats (not shown) are adapted to be placed with their ends abutting, as stated, the said panels. This disposition of the seats allows the total width of the car to be reduced

40 much more than could be done if they were placed with their ends against the posts, as in the usual construction; but it necessitates other means for storing the sash-panels than in the usual casing between the posts. This,

45 however, we accomplish by providing the roof as already referred to. It will be understood, of course, that so far as some phases of our invention are concerned the fact of stationary panels extending as high as the belt-

50 rail or stationary panels at all is of no moment, as undoubtedly the spaces devoted to each could be changed at will or the whole panel could be removable if such construction, though unusual in this form of car, were

55 desired. In order to accomplish this object of conveniently storing the removable panels—in this case sectional sash-panels in the roof-spaces—the opposing faces of the posts 4 are grooved or recessed, as at 18, in which the

60 lower section 19 of the sash-panel 20 closely fits at its lower end and along the outer edge when in its lower position. From the point 19' this groove widens and from a little higher point extends substantially to the

65 full width of the post and to its inner curved end, except a narrow strip along the outer and upper edge of the same. The outer

edge of this groove is stepped, as at 21, on which rests the lower edge of the upper section 22 of the sash-panel 20, both upper and

70 lower sections of this panel fitting closely against the outer edge of the groove to provide a close weather-tight joint. Another groove 23 is formed in the bottom of the groove 18, in which the guiding-trunnions 24

75 and 25 of the section 19 travel to guide it from lowest to normal position within the roof. It is of just sufficient width along the side openings to accommodate the said trunnions; but as it begins to enter the curved

80 portion 5 of the post it is widened, as at 24, said widened portion extending, as stated, into the curved inclined portion of the post. A short narrow groove is made to accommodate the trunnions or lugs 26 at the upper

85 sides of the upper section of the panel to guide and hold the said upper edge firmly against the outer edge of the groove, the lower edge of the same being held in place by the upper edge of the lower section, which

90 overlaps it. The said panel 20 is made in sections, so that they may be folded or packed together for storing in the roof-space, which is limited, and as they are to be made in sections it is desirable to have the lower section

95 capable of a slight independent rise and yet to carry the other with it when entirely raised. To this end a switch or turnout 27 is provided in the groove 18 near the upper edge of the panel for the purpose of enabling the one section

100 to grasp the other or of locking or interlocking the two together, so that the lower may be independently raised a short distance, or they may be pushed up into the roof storage-space together. For the purpose

105 of automatically locking these two panels together the upper corners of the lower section are provided with key-slots 28, formed therein in any desired manner, as by means of a wholly metal corner let into the sash,

110 and corresponding corners of the upper sections are provided with projections 29, secured thereto as desired and having the overhanging or projecting portions 30, which are adapted to enter the key-slots or the lower

115 panel and engage behind the inwardly-projecting lips 31 thereof. These comprise the female and male portions of the interlocking means. When the lower section is raised to a considerable extent, its trunnions 25 engage

120 the turnouts 27 in the posts, causing the upper edge of the section to pass the projecting lugs 29 on the upper section, and as the trunnions strike the outward curves of the turnout the upper edge of the section is again

125 brought up to the upper section, and the projection 29 enters the key-slot 28, and as it travels upwardly they (the projections 29) pass into the contracted portions of said slots, locking the two together. As they are raised

130 the trunnions 25 follow the edge 32 of the groove 23. The outer inclined edge 33 of the said groove, which is the full width of the post, serves to prevent any interference of



the sashes with the rail 8 or the roof-boards as they are raised. The object of widening grooves 18 to substantially the full width of the upper and inner ends of the posts 4 is now  
 5 apparent, for the sash-panels, although guided by their trunnions in the deeper grooves 23, overlap the edges of said grooves in passing from their lower to their stored positions and also while they are so stored. In order to  
 10 keep the panels in their stored positions, some means must be provided to lock them therein. One means of accomplishing this is shown in the drawings—that is, by forming the lower edge of the lower section of the panel as indi-  
 15 cated in Fig. 12, the outer lip 35 of which when the panels are raised passes into the groove or recess 36, formed in the weatherboard 7. This recess forms an abutment for the end of the sash and is of course capable of being  
 20 formed in any desired manner, as by properly-shaped projections. The lower edge of the panel may be otherwise shaped or not grooved at all; but this is considered the best method. After raising the panels, as shown,  
 25 the lower edge is pushed outward and allowed to drop into said recess. This effectually prevents the sash from dropping or from working loose. When it is desired to lower the sash-panel, it is pulled forward out of the recess  
 30 and dropped downwardly, the lower trunnions 24 naturally following the groove 23, while the upper trunnions 25 travel along the lower edge of the inclined portion of the same groove until they reach the turnout 27. By this time  
 35 the trunnions 26 of the upper section have passed into the short groove 24, and as the lower section travels downwardly the switches 27 serve to unlock the lugs 29 from the slots 28, when it can be moved down to a normal  
 40 position. The lifts or handles 37 are attached to the lower corners of the sections 19 for convenience.

A curtain-roller 38 is journaled between the inner edges of the posts 4 at their upper and  
 45 widened ends and is covered interiorly with a molding 39. A groove 40 of the same depth as the groove 18 is formed along the inner edge of the post following its curvature and for the purpose of guiding the curtain and  
 50 extends down to the belt-rail. It is capable of the same use whether the sash-panel is raised or lowered.

While we have shown and described a specific construction, we would have it understood that the invention is not limited thereto,  
 55 as many and various changes, substitutions, and alterations could be made therein and still come within its purview; but

What we claim, and desire to secure by Letters Patent, is—

1. In a car having side openings, and posts to define said openings, the combination with a plurality of movable and separable panels,  
 65 grooves in the posts to control the up-and-down movements of said panels, and means for automatically locking and unlocking the

panels together as they are moved up and down in said grooves.

2. In a convertible car, the combination with grooves or guides in the space between the  
 70 head-lining and roof, of the separable and inflexible panels each having means connecting its separate groove, the panels being adapted to be independently tilted in an inclined po-  
 75 sition in the said space and supported therein, and means for automatically locking and unlocking the panels as they are raised and lowered in said grooves.

3. In a car, the combination with posts having roof extensions and oppositely-disposed  
 80 grooves therein, separate grooves in each of the posts merging into the extension-grooves, a turnout located at the junction of one of the post-grooves and the extension-grooves, separate panels movable in said grooves, and  
 85 means carried by said panels alternately engaged and disengaged by said turnout.

4. In a car, the combination with the posts having roof extensions, a groove in each of the  
 90 extensions, openings in the car between the posts, a plurality of panels, stepped supports for the panels and grooves leading from said steps to the extension-groove, the lower panel having a flanged opening, and the upper panel  
 95 a tongue adapted to engage the opening, and a turnout in the groove for the lower panel located adjacent the union of this latter groove and the extension-groove.

5. In a car having side openings, and posts to define said openings, the combination of a  
 100 plurality of movable and separable panels, grooves in the posts to control the up-and-down movements of said panels together, and disengaging them from each other as they are moved up and down in said grooves.

6. In a car having side posts and an opening between said posts, of upper and lower pan-  
 105 els for closing said openings, engaging members carried by each of said panels, and means for causing said engaging members to auto-  
 110 matically lock and unlock during the raising and lowering of said panels.

7. In a car having side openings and roof-spaces, posts to define said openings, separate  
 115 grooves in the posts, inflexible sectional panels to fill said openings and which are movable in the separate grooves, means to cause the lower section to engage and lock with the upper section when it is raised, whereby lift-  
 120 ing the lower section also lifts the said upper section both together into the roof, and means for automatically disengaging them when lowered.

8. In a car having side openings, posts to define said openings, sectional sash-panels,  
 125 means to cause a lower section to lock with and thereby raise said upper section, and means for automatically disengaging said panels when being lowered.

9. In a car having side openings, posts to define said openings, sectional sash-panels,  
 130 means to cause the lower section to lock with



the upper section when it is raised, and means for automatically disengaging said panels.

10. In a car having side openings, posts to define said openings, sectional sash-panels for said openings, means for freely raising the lower sash-panel for some distance, locking members carried by said upper and lower panels, and means for automatically locking said members, said lower panel thereby engaging and carrying the upper section along with it when pushed up a farther distance.

11. A car having side openings, and a laterally-extending roof storage-space, posts defining said openings, separate grooves in the posts leading into said space, sectional panels movable in said grooves to close said openings, and means for automatically locking and unlocking said sections during raising and lowering.

12. In a car having side openings, a roof provided with storage-spaces, sectional sash-panels for said openings, means allowing the lower section to be freely raised for some distance, locking devices carried by said upper and lower panels, and means for locking said members, the lower panel thereby engaging and carrying with it the other section when raised a farther distance and to storage position within the roof-space.

13. In a car having side openings, a roof provided with storage-spaces, posts to define said openings and extending up into said spaces, sectional sash-panels adapted to be stored in said spaces, guiding and folding means for said panels in connection with the posts, and means for interlocking said panels at a predetermined point during the raising of said lower panel, both panels being thereby carried together into the storage-space.

14. In a car having openings, posts to define said openings, sectional panels for said openings, grooves or guides on the posts for said panels, and a turnout or switch in the guides to cause one section to interlock with another in being raised.

15. In a car having side openings, a sectional panel to close said opening, interlocking members carried by said panels adapted to automatically lock and unlock during the raising and lowering of said panels.

16. A car having side openings, posts to define said openings, sectional panels to fill said openings, grooves in the posts for said panels, a curve or turnout in one of said grooves to cause one section to engage with and lift another when it is raised.

17. A car having side openings, posts to define said openings, sectional panels to fill said openings and having trunnions thereon, and posts having grooves for said trunnions, and a curve or turnout in the grooves to cause one section to engage and lift another when the first is raised.

18. A car having side openings, posts to define said openings, a sash-panel consisting of upper and lower sections, said posts having grooves for said panels and turnouts in said

grooves to enable the lower section to grasp and carry the upper section when the said lower section is raised.

19. A car having side openings, posts to define said openings, sectional panels to fill said openings and provided with trunnions, said posts having grooves or recessed portions in which said panels fit and slide, and other grooves made in the bottom of said first grooves for the trunnions on the panels, the latter being provided with a turnout to cause one section to engage and lift the other when the first is raised.

20. A car having side openings, posts having separate grooves to define said openings, sectional panels to fill said openings and which are movable in separate grooves, a fixed support in different planes on the posts for each of the sections, projections on one section, the other being provided with a socket, and means to cause said socket and projection to interlock when the lower section is raised whereby the other is lifted and carried along with it and to be disengaged by lowering the sections.

21. A car having side openings, grooved posts to define said openings, sectional panels movable in the grooves to fill said openings, one of said sections being provided with a slotted socket on its perpendicular face, said socket having lips projecting laterally thereof and over the slot, and another section having a projecting lug on its face opposing the slotted face of the other panel, and means for causing said lug and socket to interlock when one section is raised, whereby the other will be lifted and carried with it.

22. In a car having side openings, posts to define said openings, sectional panels to fill said openings, the lower section being provided with a key-slot and the upper with a corresponding projection, trunnions or lugs on the panels, the posts being provided with grooves for said trunnions and having turnouts or curves therein to cause said slot in the lower section to engage with the projection on the upper when said lower section is raised.

23. In a car having side openings, posts to define said openings having grooves therein, sectional panels guided by said grooves to close said openings, said panels being in different planes between the posts, means to cause said sections to automatically interlock, and rise together when the lower section is lifted.

24. In a car having side openings and roof storage-spaces, posts to define said openings having grooves in their opposing faces, sectional panels to fill said openings and guided by said grooves side by side, a turnout or switch in said grooves to cause said sections to interlock when the power is lifted into the roof storage-space.

25. In a car having side openings and roof storage-spaces, posts to define said openings having grooves in their opposing faces, sectional panels to fill said openings and guided



by said grooves, means to cause one section to travel alongside the other when it is lifted, locking members carried by said panels, and means formed in said grooves for causing said lower and upper panels to engage to carry the latter into the roof storage-space and sustain it therein.

26. In a car having side openings and grooved posts, a roof providing storage-spaces above said openings and between the posts, upper and lower panels to move in the grooves to close said openings, means carried by said panels and combined with the said grooves to lock the panels together in said storage-spaces, and means for engaging one of the said panels to retain both of said panels in said storage-space.

27. In a car having side openings, and grooved posts, a storage-space formed above the said openings beneath the roof of the car and between said posts, combined with a pair of upper and lower panels adapted to close said openings, and means partly formed by said grooves and by devices carried by said panels for automatically locking the panels together while being raised into said storage-spaces, and means for retaining the panels in said storage-space.

28. In a car, having side openings and posts, and storage-spaces above said openings beneath the roof of the car and between the posts, the said posts defining said openings, grooves in the said side posts extending into the said storage-spaces, upper and lower panels guided by said grooved side posts, means carried by said panels and adapted to cooperate with said grooves for automatically locking said panels together while being raised into the storage-space, and unlocking them while being lowered from said storage-space, and further means for retaining said panels in said storage-space.

29. In a car having side openings, a roof providing storage-spaces above said openings, upper and lower panels adapted to close said openings, means carried by said panels adapted to automatically lock and unlock the panels to and from each other as they enter and leave said storage-spaces and to maintain them locked in said storage-spaces, and further means for engaging one of said panels to retain both of said panels in said storage-space.

30. In a car having side openings, and storage-spaces above said openings beneath the roof of the car, posts defining said openings, upper and lower panels adapted to close said openings, means for automatically locking said panels together while being raised into said storage-space, and a recess adapted to receive the lower end of said lower panel to support both panels in said storage-spaces.

31. In a car having side openings, a roof provided with storage-spaces, posts to define said openings, panels to close said openings, and means whereby the said panels can be lifted into the roof, and a recess formed in

one wall of the said space, the lower end of the said panel being grooved to fit within the recess.

32. As a new article of manufacture, a post for cars having a groove therein, and being provided with a turnout or curve in said groove.

33. As a new article of manufacture, a post for cars provided with grooves side by side, one of said grooves being provided with a turnout, substantially as described.

34. As a new article of manufacture, a post for cars having a curved extension and provided with a groove or depression narrow at one end and wide in the curved portion, another groove in the bottom of said first groove and also running into the curved extension.

35. As a new article of manufacture, a post for cars having a curved extension and with superimposed grooves extending up into the curved portion, one being deeper than the other, the deeper groove having two substantially parallel portions, one being provided with a turnout or switch.

36. As a new article of manufacture, a post for cars having a curved extension and with superimposed grooves extending up, into the curved portion, one being deeper than the other, the deeper groove having two substantially parallel legs emerging from a wide portion thereof, said wide portion extending in the curved portion, and one of said legs having a turnout therein, and still another groove in the other edge of the same face of the post.

37. In a car having side openings, and storage-spaces above said openings below the roof of the car, of side posts defining said openings, upper and lower panels fitted between said posts, interlocking devices carried by said upper and lower panels, adapted to automatically lock and unlock during the raising and lowering of said panels, and a recess in said storage-space adapted to support the lower end of one of said panels.

38. In a car having side openings, and storage-spaces above said openings below the roof of the car, of grooved side posts defining said openings, upper and lower sashes fitted into the grooves of said side posts, locking members carried by said sashes, and means for automatically engaging and disengaging said locking members during the raising and lowering of said panels.

39. In a convertible car having side openings extending down to the belt-rail, sectional sash-panels to close said openings, stationary panels to close the sides of the car below the belt-rail, means to store said sectional panels in the roof, and a curtain-roller journaled between said posts.

40. The combination with the sash or panels, of a key-slot formed in the upper edge of one panel, and a projection from the other panel adapted to engage the slot in the other panel.

41. The combination with the sashes or panels, of a key-slot 28, having narrowing projections 31 formed on one of the panels, and a pro-



jection 29 having the overhanging portions 30  
formed on the other panel for engagement  
with said slot.

42. In a convertible open and closed car, the  
5 combination of a sliding window-sash and  
panel, one of said parts being formed with an  
engaging device to hold the other part thereto  
when the parts are brought together with one  
part overlying the other.

Signed at the city of Philadelphia, county 10  
of Philadelphia, and State of Pennsylvania,  
this 9th day of January, 1901.

JOHN A. BRILL.

EZRA SANGER BUCKNAM.

Witnesses:

J. W. CAMAC,

RELLA HAPPERSETT.