

Jan. 24, 1939.

J. B. D. THOMPSON ET AL
LIGHT WEIGHT CAR CONSTRUCTION

2,145,064

Filed Dec. 6, 1935

6 Sheets-Sheet 1

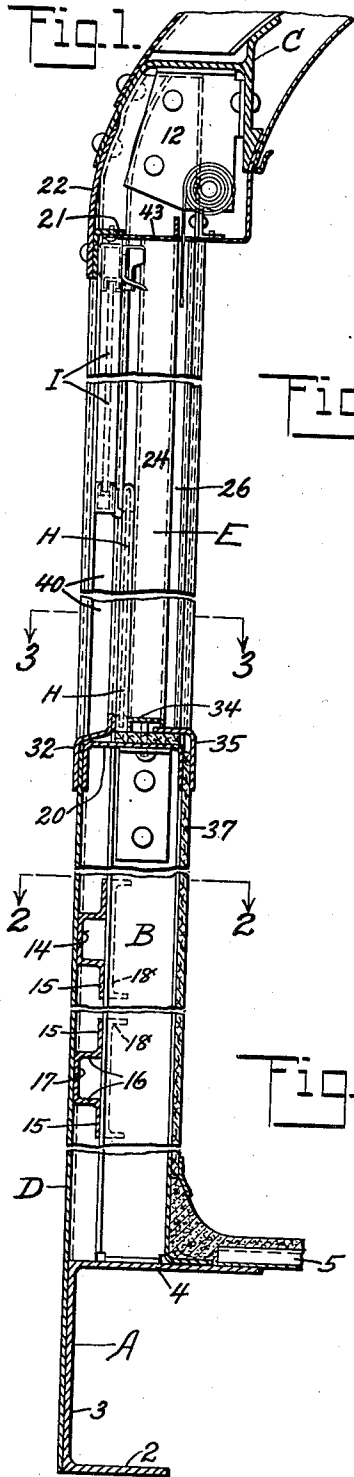


Fig. 5

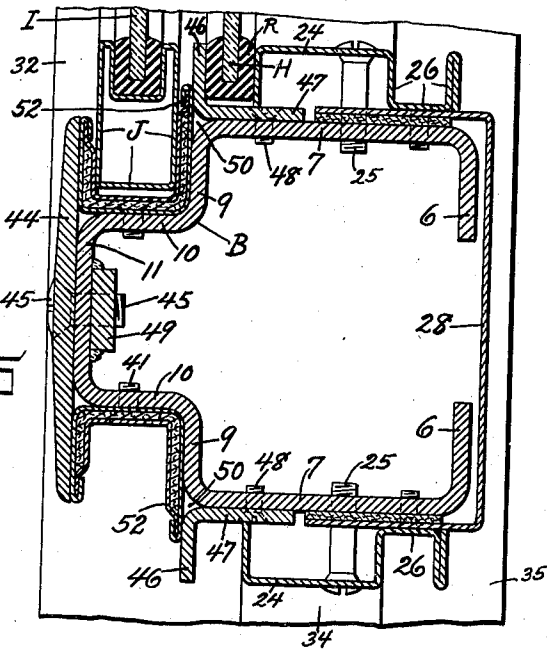
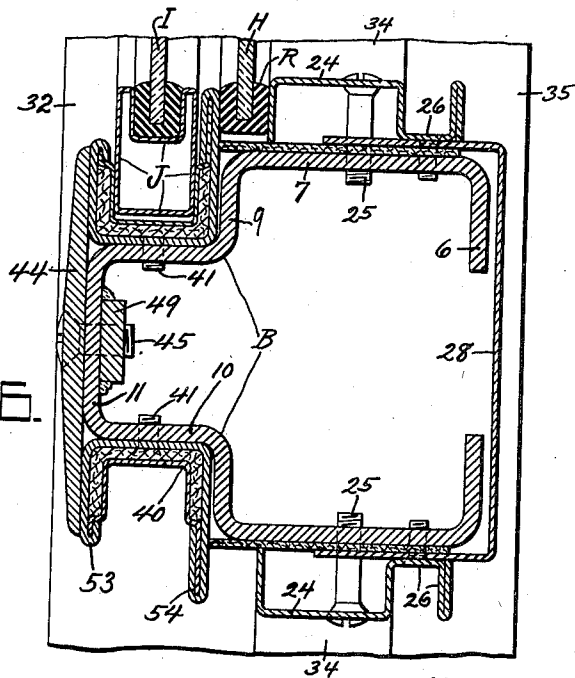


Fig. 6



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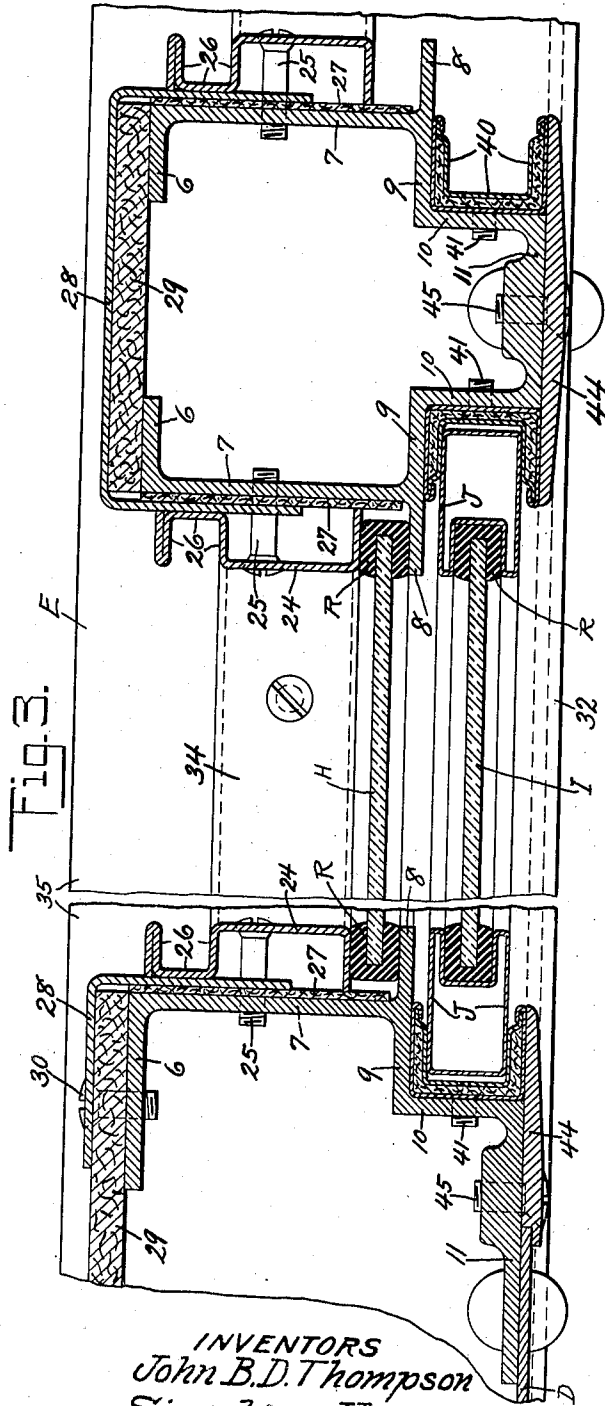
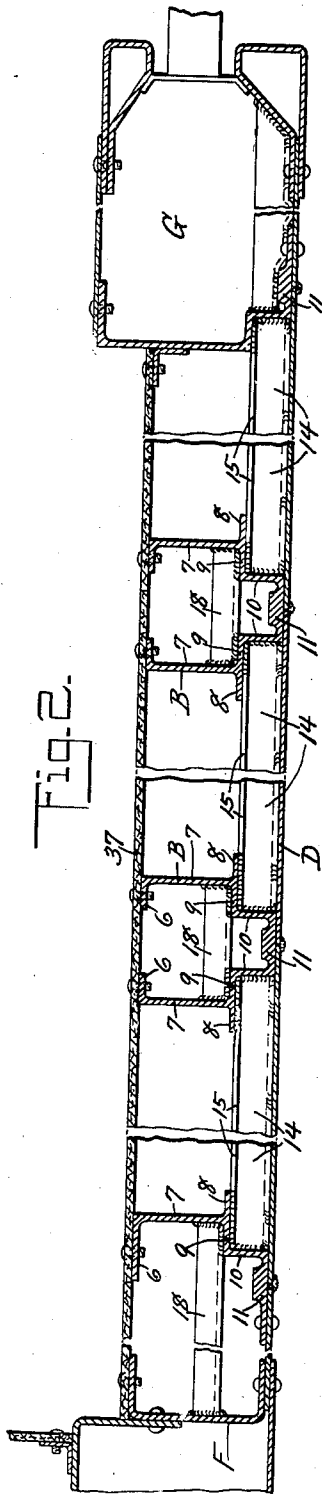
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6 Sheets-Sheet 2



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Fig. 10.

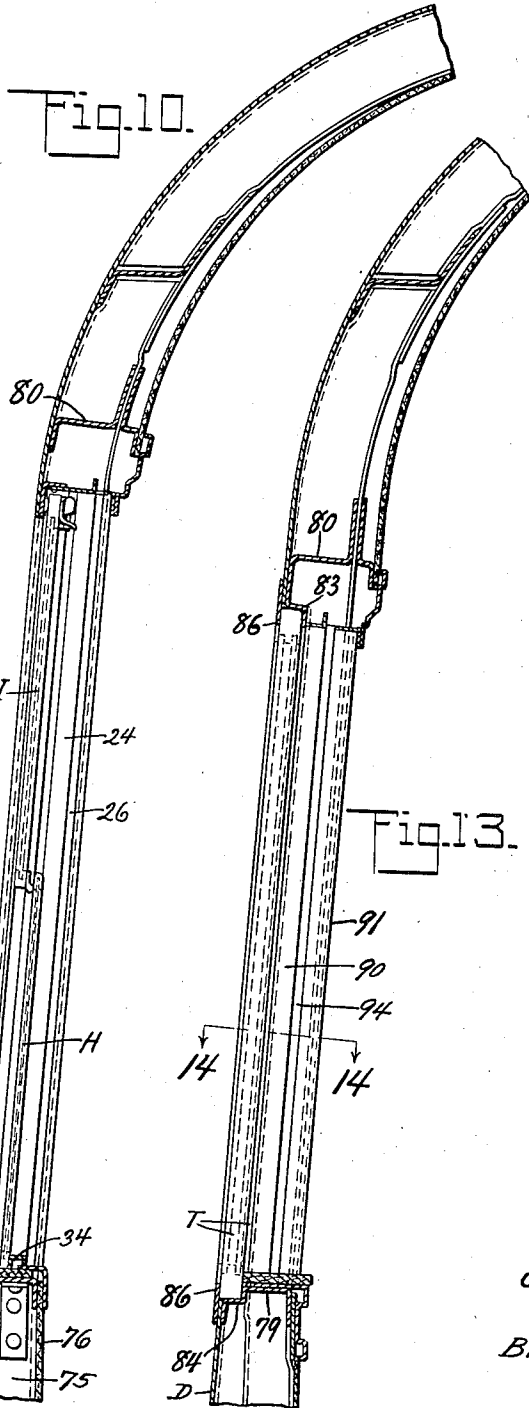


Fig. 13.

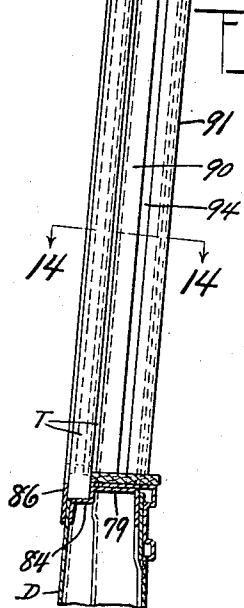
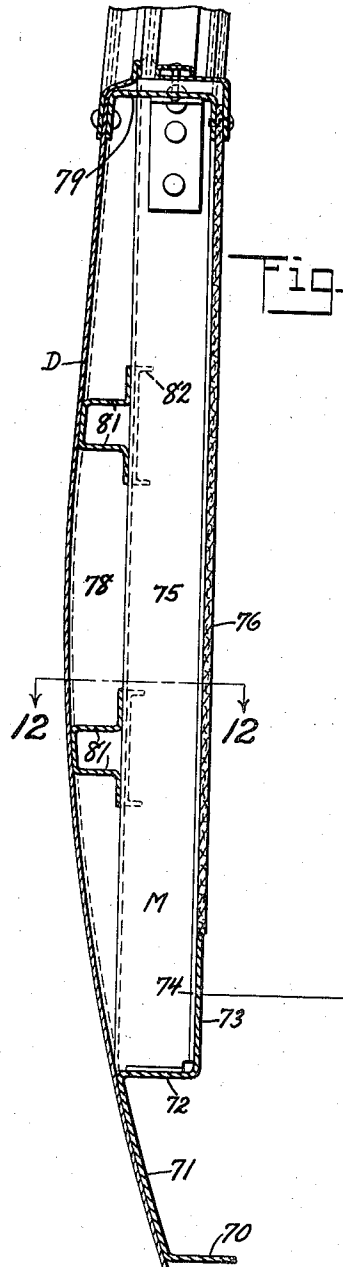


Fig. 11.



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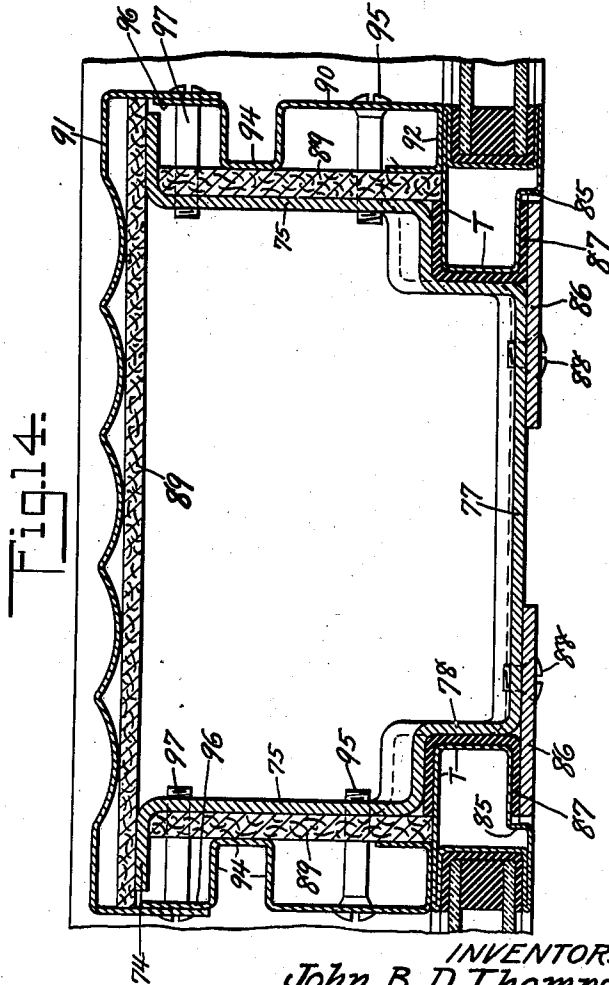
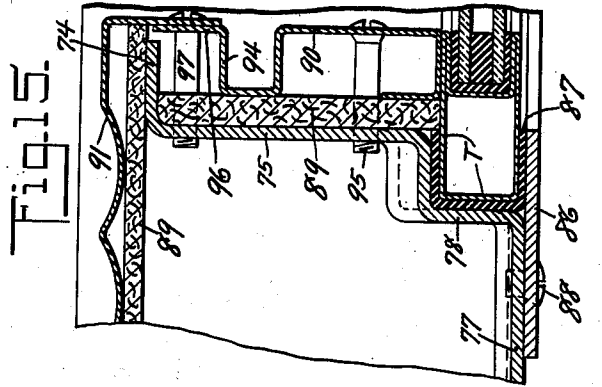
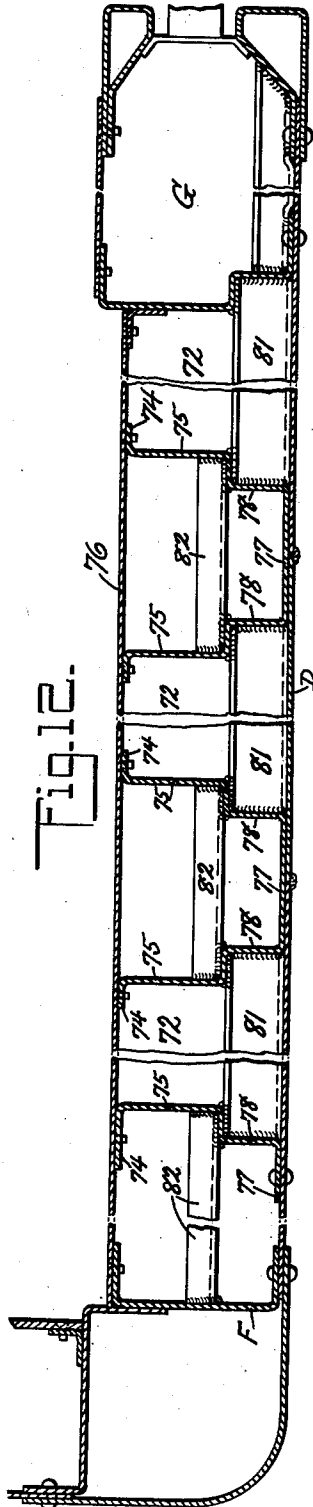
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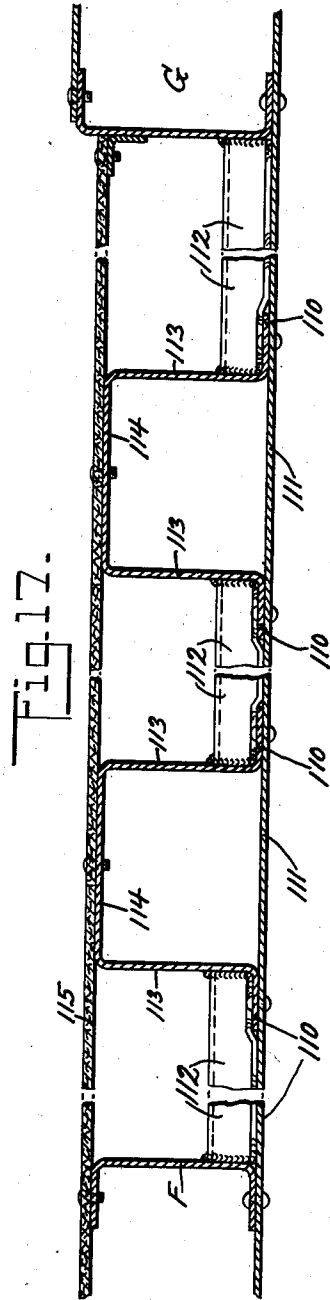
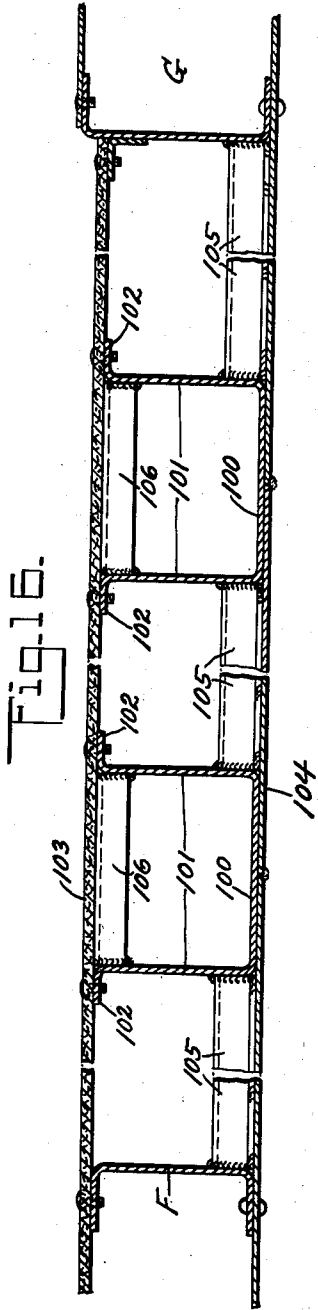
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6 Sheets—Sheet 6



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2,145,064

LIGHT WEIGHT CAR CONSTRUCTION

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Application December 6, 1935, Serial No. 53,116

14 Claims. (Cl. 105—401)

This invention relates generally to railway cars and has particular reference to a new and improved body construction therefor.

The trend of car building at the present day is toward the provision of railway cars which are much lighter in weight than those formerly in use and which are so formed as to reduce wind resistance to a minimum.

One object of the present invention is the provision of a railway passenger car of light weight yet which is sufficiently strong to withstand normal service conditions.

Another object of this invention is the provision of a railway passenger car in which projections from, or recesses in, the sides thereof are reduced to a minimum whereby to provide for streamlining.

Still another object of this invention is the provision of a railway car in which the outer surface thereof is substantially smooth and uninterrupted from end to end of the car to reduce wind resistance to a minimum.

A further object of this invention is the provision of a new and improved body frame construction for railway passenger cars.

This invention also contemplates the provision of new and improved means for mounting the window sashes in a railway passenger car.

Another object of this invention is the provision of new and improved body post construction for railway passenger cars.

The above and other objects of this invention will be apparent from the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a broken vertical section through the side wall of the car of the present invention, the view being taken at one of the window openings therein;

Fig. 2 is a sectional view of the line 2—2, Fig. 1 showing one form of body post, and also showing a door pocket at one end of the view and an end post at the opposite end;

Fig. 3 is a sectional view on the line 3—3, Fig. 1 showing the upper sash in the lowered position on one side of the post and in the raised position on the other;

Fig. 4 is an enlarged broken section similar to Fig. 1 but being fragmentary in order to disclose the top and bottom portions of the window;

Fig. 5 is a sectional view showing a modified form of body post;

Fig. 6 is a sectional view showing another modified form of body post;

Fig. 7 is a partial sectional view showing a still

further modified form of body post and sash guide construction;

Fig. 8 is a sectional view showing the body post of Figs. 5 and 6 but disclosing a modified form of sash retaining means;

Fig. 9 is a partial sectional view showing the same type of body post as disclosed in Figs. 5, 6, 7 and 8 showing a further modification of sash retainer;

Fig. 10 is a fragmentary sectional view through the side wall of a car at the window opening showing a modified form of the invention, the view showing the upper portion of a car side and a part of the car roof;

Fig. 11 is a vertical sectional view through a car side at the window opening, the view showing the lower portion of the car form shown in Fig. 10;

Fig. 12 is a sectional view on the line 12—12, Fig. 11;

Fig. 13 is a fragmentary vertical sectional view through the side of a car but showing fixed double paned windows;

Fig. 14 is a sectional view on the line 14—14, Fig. 13;

Fig. 15 is a fragmentary sectional view similar to Fig. 14 but disclosing a modified form of double sash securing means;

Fig. 16 is a sectional view similar to Figs. 2 and 12 but showing a modified form of body post with the bracing means therefor, and

Fig. 17 is a still further modification of the construction, the view being a sectional view similar to Fig. 16 but disclosing the body posts as facing outwardly.

The drawings, as will be evident from the description of figures just above, disclose several modifications of the present invention dealing mainly with sash securing means. However, two types of car bodies are illustrated and reference will now be had to the type shown in Figs. 1 to 4 inclusive in which the car is built with side sills A, side posts B, plate C and outer sheathing D. Window openings E are provided between the side posts and between end post F and door pocket G and, since the car is designed primarily for passenger carrying in subways, the window openings are closed by lower fixed sash H and upper slidable sash I.

The side sills are of general channel formation having lower flange 2, web 3 and upper flange 4 which is shown as extended to support the floor plates 5. The side posts are in the instance shown formed of extruded metal to provide inner flanges 6, main webs 7, outwardly extending sash

stops 8 substantially in alignment with shoulders 9, from the inner edges of which auxiliary webs 10 extend to be joined by outer portion 11 substantially in the plane of the side sill web. These posts may be considered as formed of either three channels with webs 7 and 11 or as formed of an external flanged U and two angles having legs 7 joined to the external flanges of the U. The lower ends of the posts are suitably secured to the side sill, while the upper ends are modified to conform to the car contour if necessary and be secured to the plate C by suitable means such as pressed clips 12.

The posts are joined intermediate the plate and sill by longitudinally extending external flanged U-shaped bracing members 14 having their external flanges 15 secured to stops 8 and shoulders 9 of the posts, while the flanges 16 abut and are secured to the auxiliary web 10 of the post. These flanges are of such depth as to place the web 17 in the same plane as the post portion 11 in order to receive and stiffen the side sheet or sheathing which is suitably secured as by spot welding to the various posts, braces and side sill. The longitudinal braces are in effect made continuous across the posts by the insertion of short channels 18 secured to the inside of the posts.

The window frames are formed at the sides by the posts, while the bottom is formed by sill 20 suitably secured to the posts and side plate and the top part is formed by angle means 21 suitably secured to the posts in the offset thereof and to the letterboard 22 which underlaps and forms a continuation of the special top plate.

Fixed window pane H is mounted in rubber channels R and is clamped against the stops 8 by means of finish strips 24 held in place by bolts or other means 25. The finish strips are provided with shade or curtain guides 26 and any extended metallic contact between the strips and the post is prevented by an insulating strip 27. The post finish strips 28 are of channel formation insulated from the post by insulating block 29 and these strips are held in place by suitable means 30 as well as by the bolts 25. The bottom portion of the window sash abuts portion 31 of sealing strip 32 securely fastened to the side sheet and framing by suitable means such as rivets 33 and the sash is clamped in place by finish strip 34 which rests upon lower finish strip 35 and is held in place by means such as screw bolts 36. The finish strips are insulated from the framing and posts by insulating material 37 and the lower finish strip is also held in place by screw means 38. The lower sash is thus held securely clamped in position and the customary sash frame is dispensed with, which materially lessens the weight of the unit as well as increases the area of glass available for transmission of light.

The upper or sliding sash I is of necessity mounted in a frame J of somewhat usual construction and this frame is adapted to slide in suitable guides 40 fitted in the bend between post portions 9 and 10 to which latter portion they are secured by suitable means 41. At the upper portion of the window sealing means 42 is provided suitably held in place, but if desirable the guide 40 may be continued across the top edge in which case the top finish strip 43 would be modified. Exterior post finish strip 44 is suitably secured to the post portion 10 as by means of countersunk screw bolts 45 and this strip protects and holds the guide 40 in place. It is ob-

vious that if sash I for any reason needs to be removed, it is only necessary to remove the exterior finish strip and sash guide and that the interior finish need not be disturbed.

In the forms shown in Figs. 5 to 8 inclusive the post design has been changed slightly in order that the post may be formed by dies and advantage thus taken of high tensile steels which do not lend themselves to extrusion. The change in post design necessitates changes in window securing details and several methods of accomplishing the desired result have been shown and will be described in more or less detail. In these figures the post cross section is similar to that described in connection with Figs. 1 to 4 inclusive and wherever possible like reference characters have been applied in order to avoid repetition. This same thing is true of various other elements of the construction and, therefore, emphasis will be placed only on the details wherein the construction varies from that previously described.

In Fig. 5 stop strip 46 is provided having leg 47 secured to the post web by suitable means such as 48 and this strip serves the same function as does stop shoulder 8 of Fig. 3. Members 49 are welded to the post portion 11 in order to provide increased area for the threads of the securing screws 45, while the post insulating strip is dispensed with by having the interior post finish spaced from the post flanges. The use of the stop strip shown necessitates either the welding of the joint 50 or the extension of the window guide as at 52 to seal this joint.

In Fig. 6 the construction of Fig. 5 is still further lightened by the elimination of the stop strip as a separate element. The stop for the inner sash is provided by making the guide strip 40 with at least one element 53 of relatively strong material and by extending this element as at 54 to provide the stop shoulder. This arrangement makes an exceedingly light yet strong and simple construction admirably suited to passenger cars or vehicles.

In Fig. 7 the fixed sash is retained in the same manner as in Fig. 5 and like numerals are used to refer to like parts. In this modification the sealing strip 44 is eliminated as such but its purpose is accomplished by a lighter member 55 overlapped and secured as by spot welding to angle member 56 which is secured to the post by the same means that holds the sash guide in position. The sash guide is reinforced by channel member 57 which provides the necessary strength for the guide and this guide is extended as at 58 to seal the joint adjacent the stop strip.

The modification shown in Fig. 8 is very similar to that shown in Fig. 6 with the exception that the sealing strip 44 is eliminated and a light strip 60 is bent over and secured to the sash guide and has its other portion overlapping and sealing the joint between the sash guide and the post.

In Fig. 9 a channel member is provided having an outer flange 62, web 63 and elongated flange 64 which is of such a length as to provide a stop for the inner or fixed sash. This channel receives the regular or unmodified guide strip 40 and also carries secured thereto the sealing strip 65 which seals the joint between the channel and the adjacent car structure. In this as in all the other modifications it is, of course, obvious that the usual car sealing cement is used around all members that are exposed to the weather and

will effectively seal all joints against ingress of moisture due to inequalities of construction.

It is seen from the preceding description that an extremely light construction has been provided by the elimination of all unnecessary elements and that this has been accomplished without the sacrifice of any strength. In fact the post section as used will for the same weight be considerably stronger both as a beam and as a column than the customary side post. It is also obvious that the projections from the smooth contour of the car have been reduced to a minimum and that the windows have been placed as nearly in the plane of the side as is possible with the sliding type of window. The constructions described will lend themselves admirably to the use of fixed sash wherever it is possible such as in air conditioned cars to use such sash.

Referring now to the construction shown by Figs. 10 to 12 inclusive wherein a modified car construction is disclosed. The side sill in this case is provided with lower flange 70, web 71 conforming to the car contour, upper flange 72 and re-flange 73 which is adapted to overlap and be secured to the flanges 74 of side posts M resting upon and secured to flange 72. The posts are similar in design to those previously described in connection with Figs. 5 to 9 inclusive with the exception that the flanges 74 are turned outwardly from the web 75 to facilitate attachment of the side sill and lining 76, and also with the exception that the web 77 is curved to conform to the car contour which necessitates the varying depth of portion 78 as clearly shown in Fig. 11. The portions of the post above the window sill 79 are similar in cross section to those in Figs. 5 to 9 inclusive and are subject to the same modifications in window securing means, while the upper end of the post is secured to the plate 80 in any desired manner. The posts are joined by longitudinal members 81 which are continued across the posts by channel shaped members 82 exactly as described in connection with Fig. 2.

The car construction shown in Figs. 13 and 14 discloses the manner in which fixed sash such as is used on air conditioned cars may be applied. The side posts are of the same type as previously described and the only necessary changes in the framing consist of the addition of an angle shaped extension 83 to plate 80 and the pressing of window sill 79 to provide offset portion 84. The sash, which is preferably of the double paned type, is mounted in rubber carried by frame T, which frame is formed with an offset 85 of such depth as to bring the outer surface of the frame flush with the retaining member 86, thus positioning the glass as near in alignment with the car sides as is possible. The frame is mounted in rubber sealing channel 87 and the whole held in place by the member 86 through the use of removable means 88. It is thus seen that the window is held clamped as nearly as possible in the plane of the car side and that it is readily removable without disturbing the interior finish now to be described.

The side post has secured thereto insulating blocks 89 which are protected by finish strips 90 and 91. The finish strip 90 is provided at one edge with flat surface 92 abutting the window frame and is held spaced from the insulating block by flange 93 and channel shaped curtain guide 94. The finish strip is held in place by means 95 and is provided adjacent the curtain guide with flange 96 to which the finish strip 91 is secured by suitable means such as 97.

The modification shown in Fig. 15 is identical with that shown in Fig. 14 with the exception that an unmodified sash frame has been used which causes the window to be recessed from the car side a greater degree. Since the construction is so similar to that of Fig. 14 the same reference numerals have been used and the same description will apply.

The modification shown in Fig. 16 discloses the manner in which the present type of side post and side construction may be rigidified. The side posts are of external flanged U-shape having web 100, flanges 101 and re-flanges 102 which form means to which the car lining 103 is secured. Side sheets 104 are secured to the posts as by spot welding and the longitudinal channel form braces 105 are welded to the posts and to the side sheets and these braces are in effect made continuous by welding channels 106 to the free edges of the post flanges. This construction will in effect give the same results insofar as strength is concerned as does the construction shown in Figs. 2 and 12 but will, of course, require the type of window construction now used.

In Fig. 17 the posts are turned from the position shown in Fig. 16 and the re-flanges 110 are secured to the side sheet 111 which continues the effect of the longitudinal inter-post braces 112. The braces are welded to the post re-flanges 110 and flanges 113, while the post web 114 being on the inside of the car furnishes a flat surface to which the car lining 115 may be secured.

Although various modifications and arrangements of parts have been disclosed in more or less detail, it is obvious that improvements and further modifications will suggest themselves to one skilled in the art, but such improvements and modifications are contemplated as fall within the scope of the appended claims.

What is claimed is:

1. The combination with a metallic car body having a side wall comprising in part, spaced posts having inner and outer surfaces, shoulders on said posts located intermediate said surfaces and substantially parallel thereto, inner and outer wall members each secured to its respective post surface, and brace means secured to said shoulders and one of said wall members.

2. The combination with a metallic car body having a side wall comprising in part, spaced substantially hollow posts each having inner and outer surfaces connected by spaced portions, said portions being provided with shoulders intermediate said surfaces, inner and outer wall members each secured to its respective post surface, brace means secured to said shoulders and one of said wall members, and additional brace means directly connecting the shoulders of each post.

3. The combination with a metallic car body having a side wall comprising, spaced posts having inner and outer surfaces connected by spaced portions, said spaced portions being laterally offset intermediate said surfaces to form shoulder portions, said posts forming the sides of window openings, longitudinal members connecting the posts to complete the window openings, inner and outer wall members secured to the respective post surface and to at least one of the longitudinal members, said longitudinal members having shoulders substantially in the plane of the post shoulders, window units in said openings, and means cooperating with said shoulders for clamping said units in position.

4. The combination with a metallic car body having a side wall with a window therein, spaced

posts forming the sides of the window opening, longitudinal members connecting said posts to complete the window opening, said posts having inner and outer surfaces connected by spaced apart portions, said portions being provided with shoulders, a fixed and a movable window unit in said opening, guide means for said movable unit, said guide means having a portion thereof providing stop means against which said fixed unit may be held, and means cooperating with said post shoulders to retain said guide means in position, said last named means contacting said post outer surface to form a weatherproof seal.

5. The combination with a metallic car body having a side wall with a window therein, spaced posts forming the sides of the window opening, longitudinal members connecting said posts to complete the window opening, said posts having inner and outer surfaces connected by spaced apart portions, said portions being provided with shoulders, a fixed and a movable window unit in said opening, guide means for said movable unit, said guide means having a portion thereof providing stop means against which said fixed unit may be held, means cooperating with said post shoulders to retain said guide means in position, said last named means contacting said post outer surface to form a weather-proof seal, and means comprising finish members cooperating with said stop means for holding said fixed unit in position.

6. The combination with a metallic car body having a side wall with a window therein, spaced posts forming the sides of the window opening, longitudinal members connecting said posts to complete the window opening, said posts having inner and outer surfaces connected by spaced apart portions, said spaced portions being laterally offset intermediate said surfaces to form shoulder portions, a window unit in said opening, means cooperating with said posts and shoulder portions for retaining said unit in position, and longitudinal means interposed between said shoulder portions and connecting said posts to form a strong wall structure below the window opening.

7. The combination with a metallic car body having a side wall with window openings therein, spaced posts defining the sides of said openings, each of said posts comprising, inner and outer surfaces adapted to receive wall members, Z-shaped portions joining said surfaces, and providing shoulders for the reception of window units, said shoulders also accommodating longitudinal bracing means joining said posts.

8. The combination with a metallic car body having a side wall with window openings therein, spaced posts defining the sides of said openings, each of said posts comprising, inner and outer surfaces adapted to receive wall members, Z-shaped portions joining said surfaces with the web of the Z providing shoulders, said web being extended to provide stop means, and said should-

der and stop means providing supporting abutments for window units.

9. The combination with a metallic car body having a side wall with window openings therein, spaced posts defining the sides of said openings, each of said posts comprising, inner and outer surfaces adapted to receive wall members, Z-shaped portions joining said surfaces with the web of the Z providing shoulders, said web being extended to provide stop means, and said shoulder and stop means providing supporting abutments for window units and for brace means connecting the posts.

10. The combination with a metallic car body having a side wall with window openings therein, sash members for said openings, a plurality of spaced posts defining the sides of said openings, each of said posts including spaced side wall portions offset to form reduced outer end portions, the offsets of said post side wall portions forming inner stops for the sash members, and means extending from the offsets at substantially right angles to the post side wall portions forming outer stops for another sash member.

11. In a streamline railway car structure, side walls, channel side posts defining window openings, the side walls of said channel posts being offset to form reduced outer end portions, the offsets of said post side walls forming stops for a sash member, and vertical guide members projecting at substantially right angles from said side walls adjacent said offsets to form guide means for an additional sash member.

12. A metallic car body comprising in part, side sills and side posts, said posts being of channel form and inwardly faced, the side walls of said channels including main and auxiliary web portions and being laterally offset intermediate the web portions to form outwardly faced shoulders, and plate members fixed to the channels and extending parallel to said shoulders forming window receiving openings.

13. A metallic car body comprising in part, side walls and side posts, said posts being of channel form and inwardly faced, the side walls of said channels including main and auxiliary web portions, and being laterally offset intermediate the web portions to form shoulder portions of less width than said posts, and brace means between the shoulder portions of said post members.

14. The combination with a metallic car body having side walls with window openings therein, spaced posts defining the sides of said openings, each of said posts comprising inner and outer surfaces connected by spaced portions, said spaced portions being offset laterally thereof to define shoulder portions, brace means between the spaced portions of each post, and brace means extending between the posts, said brace means respectively engaging the opposite sides of said shoulder portions.

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