Aug. 13, 1929. E. A. SELF 1,724,149

RAILROAD CAR CONSTRUCTION

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Fig. 3

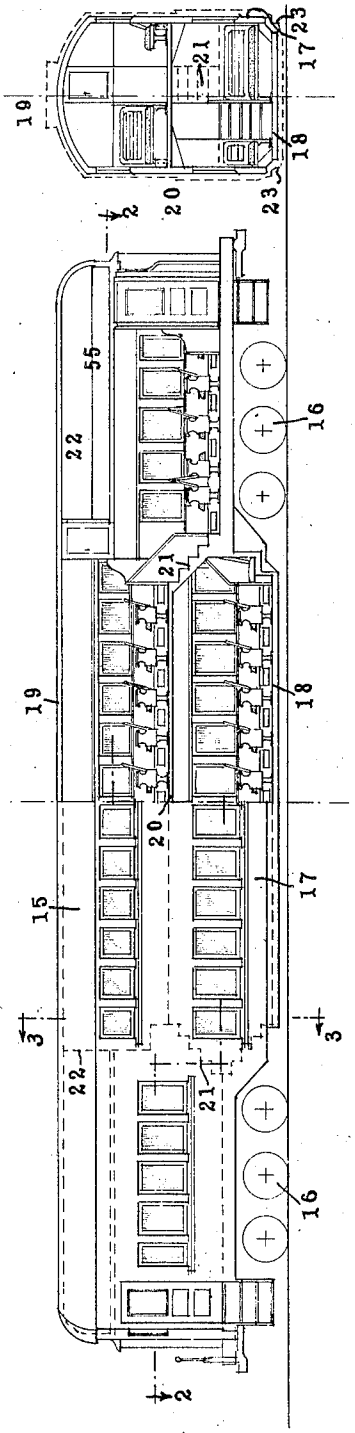
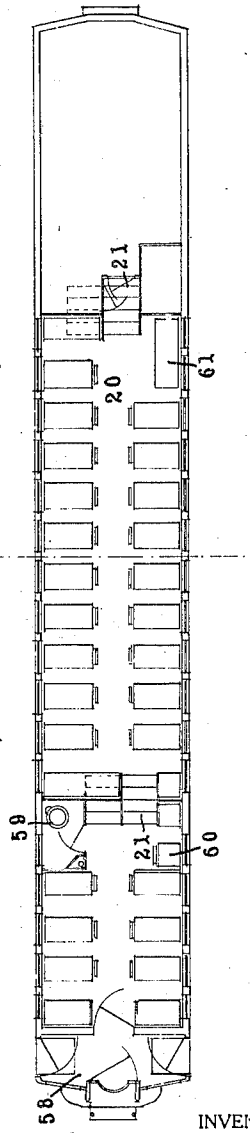


Fig. 1

Fig. 2



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Fig. 6

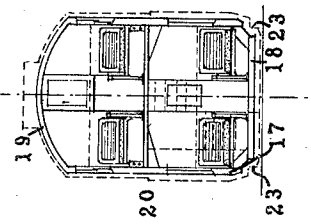


Fig. 4

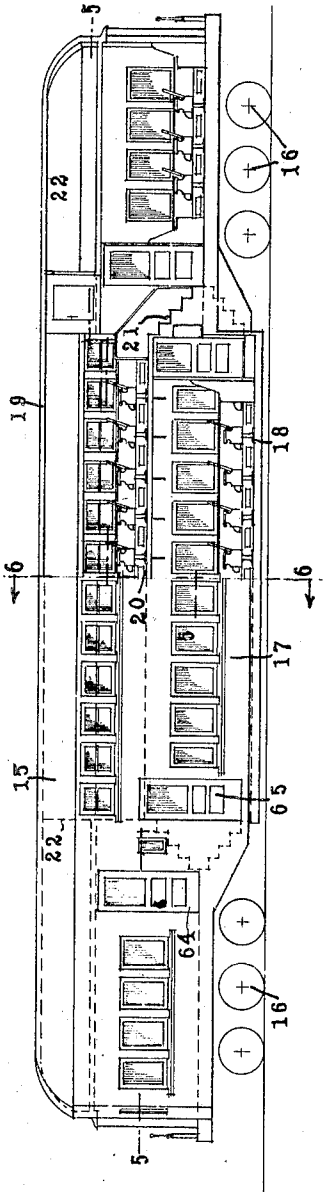
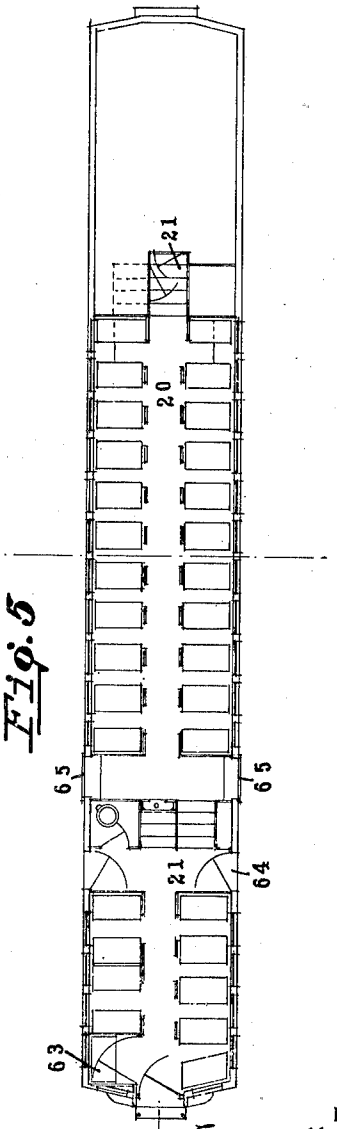


Fig. 5



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Fig. 11

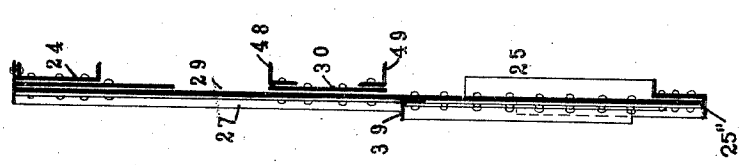


Fig. 8

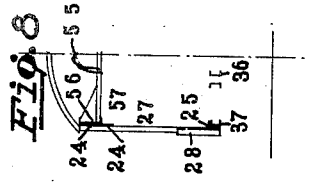


Fig. 9

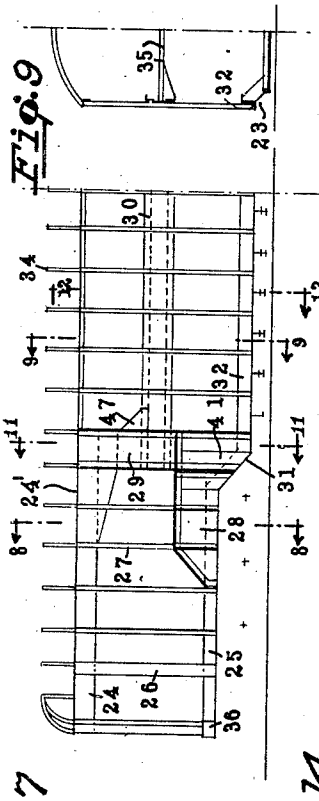


Fig. 7



Fig. 14

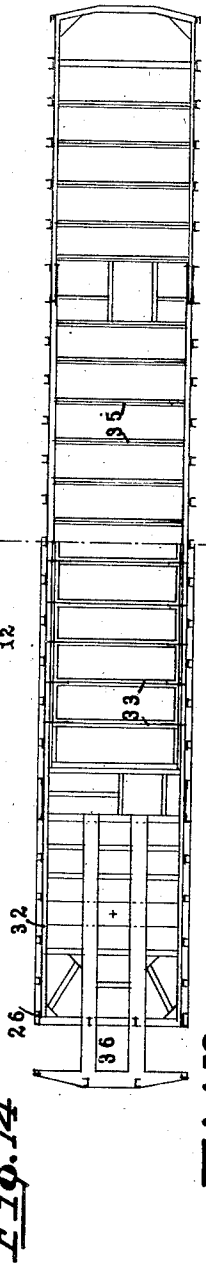


Fig. 10

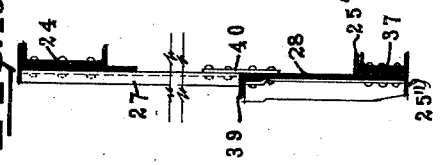


Fig. 13

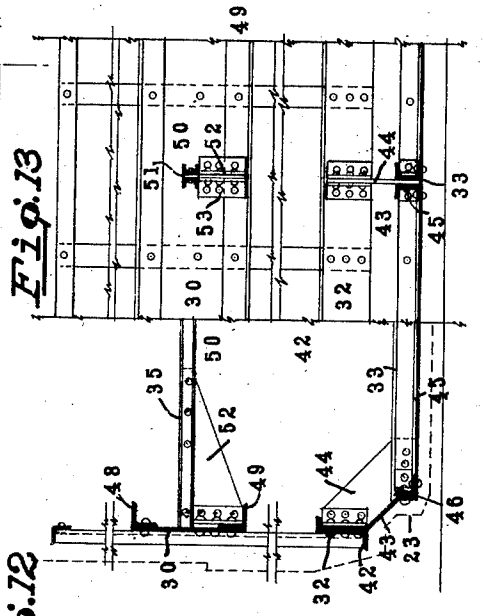
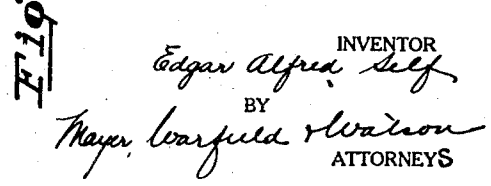


Fig. 12

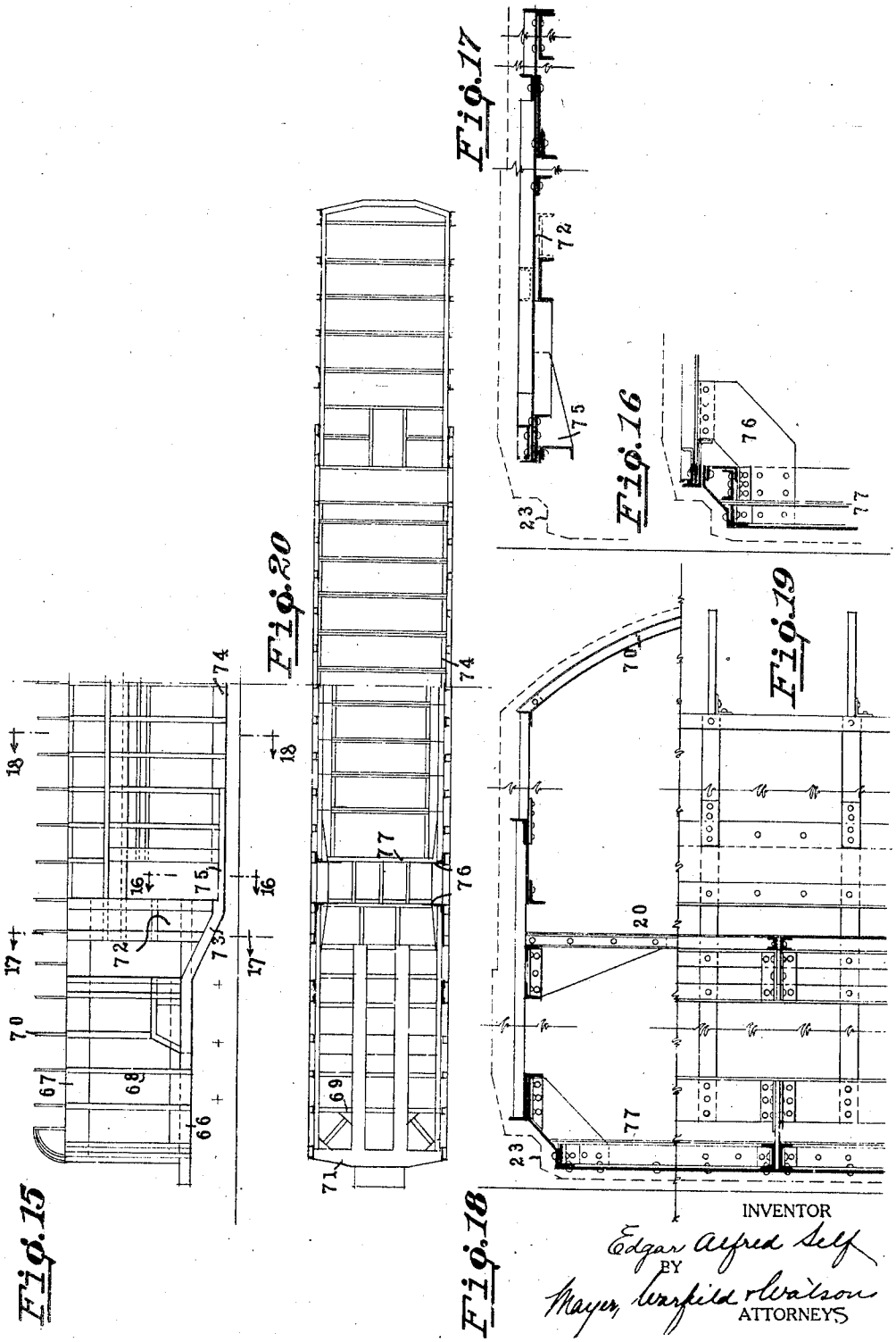


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Patented Aug. 13, 1929. 1,724,149

UNITED STATES PATENT OFFICE.

EDGAR ALFRED SELF, OF BRONXVILLE, NEW YORK.

RAILROAD CAR CONSTRUCTION.

Application filed July 6, 1925. Serial No. 41,502.

This invention relates to improved types of vehicles, and particularly, railway rolling stock.

It is an object of the invention to increase the carrying capacity of a railroad car, particularly of the passenger type, without necessitating a rearrangement of rails, enlargement of tunnels and cuts, heightening of bridges, etc.

It is a further object to also increase the seating capacity of a railroad car in proportion to the increase in carrying capacity thereof, and without substantially altering the effective space available to each seat occupant.

A still further object resides in the construction of a car which, when loaded, will have a low center of gravity, and in which provision will be made for all necessary car appliances or accessories.

A still further object resides in a novel form of structural units providing a car skeleton, around which a car body accomplishing the foregoing objects may be built.

Another object is that of furnishing a car capable of accomplishing the results previously outlined, and which will be comparatively simple in construction, and the parts of which may be of a relatively uncomplicated type and capable of being readily assembled.

With these and further objects in mind, the invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the application of which will be indicated in the claims.

Additional objects will be apparent upon reference to the specification and drawings, which latter illustrate practical embodiments of the invention, and in which:

Fig. 1 is a side elevation of one form of car constructed within the terms of the present invention, the side wall being broken away throughout one end portion of this car to disclose the interior thereof;

Fig. 2 is a sectional plan view, taken on the lines 2—2 of Fig. 1;

Fig. 3 is a transverse section, taken on the lines 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 1, but showing a slightly different type of car;

Fig. 5 is a view corresponding to Fig. 2, and taken on the lines 5—5 of Fig. 4;

Fig. 6 is a transverse sectional view taken along the lines 6—6 and in the direction of the arrows in Fig. 4;

Fig. 7 shows one end of a car skeleton such as may be utilized for providing a car of the type shown in Figs. 1 to 3;

Figs. 8 and 9 are transverse sectional views taken along the lines 8—8 and 9—9 and in the direction of the arrows indicated in Fig 7;

Fig. 10 is an enlarged sectional view taken along the lines 8—8, but showing merely the units forming the side portion of the skeleton at this point;

Fig. 11 is an enlarged sectional view taken along the lines 11—11 and showing the units forming the side portions of the skeleton at this point;

Fig. 12 is an enlarged sectional view taken along the lines 12—12 of Fig. 7;

Fig. 13 is a fragmentary side elevation of the parts as shown in Fig. 12;

Fig. 14 is a plan view of the car skeleton taken on the lines 2—2 as illustrated in Fig. 1;

Fig. 15 is similar to Fig. 7, but shows a car skeleton of a type suitable for use in the construction of a car of the nature shown in Figs 4 to 6 inclusive;

Figs. 16 and 17 are views corresponding to Figs. 10 and 11, but taken along the lines 16—16 and 17—17 of Fig. 15;

Fig. 18 is taken along the lines 18—18 of Fig. 15;

Fig. 19 is a fragmentary side elevation of the parts as shown in Fig. 18; and

Fig. 20 is a plan view of a car skeleton of the nature shown in Fig. 15 taken along the lines 5—5 of Fig. 4.

The various illustrated embodiments show the preferred forms of the invention, and, as in Figs. 1 to 6 inclusive, depict a car body generally indicated at 15 which is supported upon trucks 16 disposed adjacent its ends, and which has its central portion suspended between these trucks, as has been indicated at 17. By virtue of this underslung or gondola-like central portion sufficient space is provided between the floor 18 and roof 19 of the car to permit of a central deck-portion 20 extending longitudinally of the car body. Thus, the central portion of the car is divided into an upper and lower level, each providing sufficiently clear head room, and also, having the conventional arrangement of seats, thus increasing the seating

capacity of a car of the same length and normal seating arrangement upwards of 55 per cent.

Ready passage from one end of the car to the other and access to the two different central levels of the car may be afforded by providing pairs of stairways 21 adjacent each deck end, one of the stairways of each pair leading to the upper level, and the other two staircases affording access to the lower level of the car. At this time it is to be understood, of course, that if found practicable and consistent with safety and convenience the number of stairways might be reduced and the carrying capacity of the car accordingly increased.

It will be appreciated that by lowering the central portion of the car the space heretofore generally utilized for air tanks, pressure pumps and other auxiliary machinery—and, if the car is a motor car, rheostats and other electrical appliances—will be rendered unavailable. Now, with a view to furnishing space for the accommodation of these accessories and appliances the end-portions of the car body 15 may be provided with compartments 22 adjacent the roof 19. These compartments, while ample for the accommodation of the various mechanisms, clear the floors of the car ends sufficiently to assure adequate head room at these points, and it will be appreciated that the walls forming these compartments may be of such a character as to adequately muffle any sounds emanating from the mechanisms housed within the same.

Where a car of this type is utilized by a public utility having a third rail system, it will be understood that the central portion of the car might contact with the third rail. In order to overcome this objection it will be observed that in the present exemplification the longitudinal edges of the central portion of the car are recessed as at 23. This recessing, while amply sufficient to accommodate the third rail even during the traversing of an acute curve, is insufficient to materially encroach upon the lower level of the car, and, consequently, the passenger space of this level is not in any manner reduced when this expedient is resorted to.

It will be obvious that in constructing a car of the nature suggested the skeleton or frame will have to be specially designed in order to conform to, and properly support, the car body.

A suitable type of frame has been shown in Figs. 7 to 14 inclusive, which frame is particularly adapted for use in connection with a car of the type illustrated in Figs. 1 to 3. The main portions of the sides of the frame at each end of the car may be formed by utilizing web-members 24, the outer ends of which extend to a point adjacent the car end, and the bases or the parts which are at points furthest from the car end are enlarged as at 24'. These web-members lie adjacent the car roof, and further web-members 25 are disposed adjacent the floor of the frame and have their bodies extending generally parallel to the members 24. The second web-members, i. e., 25, have their outer ends, in the present example, terminating at a point short of the outer car ends, and at this point are connected to the upper web-members by uprights 26 which rigidly secure them to each other. Further uprights comprising the side frame members 27 extend between the web-members 24 and 25 at points short of the outer ends of both of the same, and it is to be observed that each member 25 is enlarged adjacent its base, preferably by securing thereto an additional and broader web 28. Adjacent the inner ends of each the members 24 and 25 a vertically-extending web-member 29 is provided, and it will here be appreciated that the sets of members 24, 25 and 29 each provide in aggregate a U-shaped element, the legs of which in the present instance are broadened adjacent the bases thereof. Extending rearwardly from its base, and serving to connect the U-shaped assemblies at opposite ends of the car, are webs 30, which will thus lie in a plane substantially in line with the central deck-portion 20 which forms the floor of the upper seating compartment.

The lower ends or edges of the webs 28 and 29 are cut so as to extend obliquely, as has been indicated at 31, and the inner and lower edges of these members are continued in each instance in the form of a web 32, which extends in the same plane as the lower deck or floor of the central car portion. All side frame members 27 are connected together adjacent their lower edges by cross-beams 33, and at their upper edges by roof-beams 34, all of which extend transversely of the car body. They are also connected together by cross-beams 35, which lie in a plane between the members 30 to provide a foundation for the upper deck floor so that an extremely rigid and counterbalanced construction is assured.

The vestibule portion or portions of the car may be rigidified and supported by the use of T-members 36 of double channel section, which extend longitudinally of the car body and are disposed at the end of the same with their heads projecting into substantially the same plane as the outer ends of the web-members 24 and beyond the uprights 26 and the ends of the members 25.

While the various web-members may be constructed in any desirable manner, it is preferred that they be of the composite type. For example, as aforestated, the members 25 and 28 may be two separate webs, the former having an inwardly-extending flange 25' at its upper edge and an outwardly-extend-

ing flange 25'' at its lower edge. As has been indicated in Fig 10, a U-shaped beam 37 may be applied to the inner face of the web 25, and the whole may be riveted together. The member 28 has its lower edge lying adjacent the flange 25'' of the web-member 25, and this flange extends below the lower edge of the first-named web-member, which latter has an L-shaped beam 39 affixed to its body and adjacent its upper edge so that the entire construction will be rigid. The cross-beams 33 are supported by the assembly, as are likewise the uprights 27, and it is obvious that these various units and others, instead of being retained against relative movement by riveting, might be integral or secured together in any desired manner.

The uprights 27 are each preferably channel members, and those uprights which extend most nearly adjacent the outer ends of the webs 28 may be associated with the frame assembly by the use of straps 40 which project across the joint between these uprights and the webs 28. At this point a plate 41 is provided, which has its upper edge spaced from the web 25 to provide a pocket for the reception of the vertically-extending leg of the L-member 39, so that an extremely rigid construction is furnished.

Now, with a view to furnishing a structure which will provide the desired recess 23 it will be observed that the web 32, in addition to supporting the uprights 27, has at its lower edge an outwardly-extending flange 42 corresponding to the flange 25'', as in Fig. 12. Angled-members 43 are firmly affixed to the beams 32 so that an offset construction is provided at this point furnishing the recess desired, and the entire assembly may be strengthened by having webs 44 associated with the members 43. The cross-beams 33 have their ends secured adjacent the lower edges of the members 43, so that the floor of the car is adequately supported,—it being noted, as in Fig. 13, that, if desired, each one of the cross-members may include a pair of channel-beams 45, between which the web 44 extends, and that adequate support may be assured by the use of L-shaped sill-members 46.

The rigidity of the connection between the beams or webs 30 and 29 may be assured by the use of braces 47 provided adjacent the points of connection of the same, and the webs 30 may have L-shaped members 48 and 49 provided adjacent their upper and lower edges, respectively. The cross-members 35 in the instance of the upper deck are each preferably formed—similarly to the cross-members 33—of a pair of channel-members 50 and an interposed web 51, as in Fig. 13. This web has its outer ends of materially greater width than its body, as at 52, and extending in contact with the inner faces of the webs 30,—proper connection between these elements is assured by L-shaped members 53 arranged one adjacent each face of the portion 52. Thus, the upper deck is effectually braced, and ample strength is assured to furnish a material margin of safety over the strains to which this portion of the car will be subjected.

The compartments 22 embrace a floor-portion 55, which, by means of suitable webs 56, is rigidly secured to the web-members 24, which are not only of sufficient strength to withstand the strains and counteract the impulses occurring incident to normal operation, but are also sufficiently strong to adequately support any auxiliary machine which may be disposed within the compartments.

Thus, an adequate frame or skeleton is provided for a car of this general type; and, again considering the detailed interior arrangement of such a car as is shown in Figs. 1 to 3, it will be appreciated that by means of a frame of this nature the ordinary type of vestibule 58 may be utilized. Passing through the vestibule and entering the door to the interior of the car, the more or less conventional seating arrangement will be present as far as that deck-portion which is supported immediately above the trucks is concerned. If desired, a lavatory 59, instead of being provided at the direct end of the car, may be situated adjacent the stair leading to one of the central deck levels, seats 60 of reduced size being provided adjacent the stairway leading to the second level. The seating arrangement on the upper deck level may also be more or less conventional, except, due to the fact that the stairway 21 leading to the same is offset with respect to the center of the car, the end seats 61 may be arranged to extend lengthwise of the car. On the lower level the seating arrangement may also be modified to provide a maximum seating capacity for a car of this type, and it will here be observed that the inner ends of the compartments 22 have those portions of their bodies which are in line with the stairways leading to the upper level recessed so as to provide adequate head room for a person traversing the stairs.

The particular type of car shown in Figs. 4 to 6 inclusive may be quite similar as to interior seating arangement, etc., to the preceding type of car. However, it will be observed that in these figures a car has been illustrated which does not have end vestibules, but in which the seats are preferably extended to a point adjacent the ends of the car, unless the latter be a motor car, in which event a suitable compartment 63 may be furnished for the accommodation of the engineer. This type of car is particularly useful where a train stops at stations having different platform levels. With this in mind swinging doors 64 may be provided in asso-

ciation with the side walls of the cars and upon the deck levels which are directly supported by the trucks; and further doors 65, preferably of the sliding type, may also be associated with the side walls of the car, and, more particularly, at the lower deck level of the central portion thereof. It will be obvious that a car of this character will be extremely useful in the association aforenamed.

While the skeleton for this car may generally be of that type shown in Figs. 7 to 14 inclusive, certain modifications should be made. For example, as has been illustrated in Figs. 15 to 20 inclusive, beams 66 are provided adjacent the floor of the car and above the car trucks, and these beams extend to points adjacent the car ends. Further beams or webs 67 are disposed parallel to the beams 66 and adjacent the upper ends of the uprights 68 which connect these members with one another. Cross-beams 69 may extend between pairs of beams 66, and roof-beams 70 may extend between pairs of beams 67, it being noted—as in Fig. 20—that a T-member 71 may be associated with the floor-beams 69 in order to strengthen the construction. Girders or webs 72 extend between the beams 66 and 67 and at points between the doors 64 and 65, and these assemblies form in aggregate U-shaped members at the car ends. It will be noted that the beams 66 are continued in the form of downwardly-extending portions 73 and central portions 74, which latter may be reduced as at 75 for the purpose of providing a door-sill, it being observed that at this point, as has been particularly shown in Figs. 16 and 17, the downwardly-extending portions 73 may be flared as at 75 to provide maximum strength, and that web-members 76 may extend between the webs or girders 72 and the floor-beams 77 adjacent the same, as has also been indicated in Fig. 20. Aside from these modifications the construction of the skeleton may generally follow the type of framework which is employed in connection with the type of car shown in Figs. 1 to 3.

It will be appreciated that by means of the constructions previously suggested passengers may readily traverse the length of the car, incident to the location of the stairways, etc. Furthermore, even though the roof may be depressed adjacent the side edges, thus decreasing the head room adjacent the side walls, this will in no wise interfere with the comfort of the passengers, in that within the aisles there will be ample head room. This is particularly desirable in connection with the braces 52 which extend between the under face of the deck and the side walls of the car. Thus, there will be no likelihood of the passenger striking his head when being seated or when rising. Furthermore, it will be noted that the floor of the central portion of the car, the deck and the stairways which extend between the car ends and the outer ends of the deck and depressed central portion form, in aggregate, an irregular hexagon having parallel sides, and this construction obviously permits of an extremely strong bracing.

Thus, among others, the objects specifically mentioned are accomplished, and since certain changes may be made in the above vehicle, and different embodiments of the invention could be made, without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, the floor of said central portion being of less width than the distance between the side walls thereof and being positioned below and connected with said side walls whereby to provide a recess for the accommodation of a third rail when said car traverses a curve.

2. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, the side walls of said car being recessed adjacent their lower edges whereby to allow for the accommodation of a third rail.

3. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, a deck arranged within the central portion of said car body and in a horizontal plane above that occupied by the car ends, and means providing a compartment adjacent the roof of one of said car ends, said compartment being adapted to receive the auxiliary machinery of said car and being interrupted at a point short of the plane into which the end of said deck extends.

4. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, a deck arranged within the central portion of said car body and in a horizontal plane above that occupied by the car ends, and means providing a compartment adjacent the roof of one of said car ends, said

compartment being adapted to receive the auxiliary machinery of said car and extending to a point adjacent the adjacent deck end, a stairway extending from the car end to the deck, said compartment being interrupted at a point in line with said stairway.

5. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, a frame for said car, said frame including supporting members extending substantially in line with and carrying the floors of the car ends, vertically arranged supporting members connected therewith adjacent the inner ends of the same, and a pair of longitudinally-extending supporting members connecting a pair of said vertically-extending members, one of said horizontally-extending supporting members being disposed in a plane below the floor of the car ends and substantially in line with the floor of said central portion, the second of said members being disposed in a plane above the floor at the ends of the car, and a deck supported by and substantially in line with said last-named supporting member.

6. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, and a frame for said car, said frame including a pair of U-shaped supporting members having their legs extending in a horizontal direction, and their bases at right angles thereto, a pair of substantially parallel and horizontally-extending supporting members connecting said U-shaped members to each other, one of said last-named supporting members being connected with the bases of said U-shaped members at points substantially intermediate the legs of the same and above the plane occupied by the floor of the car ends, the other of said supporting members being connected with said U-shaped members to extend below the end floors, and a deck supported by the first horizontally-extending member.

7. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, and a frame for said car, said frame including side wall portions each embracing a pair of U-shaped supporting members connected together by a pair of horizontally-extending interposed supporting members, the first of said latter members being connected with the bases of said U-shaped members at points substantially intermediate the legs thereof and serving as a deck support, the second of said horizontally-extending members being also connected with said U-shaped members and extending into a plane below that occupied by the floor of the car ends, a floor for the central portion of said car, and offset members secured to said floor and said last-named horizontally-extending member.

8. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, and a frame for said car, said frame including side wall portions each embracing a pair of U-shaped supporting members connected together by a pair of horizontally-extending interposed supporting members, the first of said latter members being connected with the bases of said U-shaped members at points substantially intermediate the legs thereof and serving as a deck support, the second of said horizontally-extending members being also connected with said U-shaped members and extending into a plane below that occupied by the floor of the car ends, the upper legs of said U-shaped supporting members extending to points adjacent the car ends, the lower legs thereof terminating at points short of the same.

9. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, and a frame for said car, said frame including side wall portions each embracing a pair of U-shaped supporting members connected together by a pair of horizontally-extending interposed supporting members, the first of said latter members being connected with the bases of said U-shaped members at points substantially intermediate the legs thereof and serving as a deck support, the second of said horizontally-extending members being also connected with said U-shaped members and extending into a plane below that occupied by the floor of the car ends, the upper legs of said U-shaped supporting members extending to points adjacent the car ends, the lower legs thereof terminating at points short of the same, cross-members connecting the lower legs of adjacent pairs of U-shaped members, and T-shaped supporting members having their shanks connected with said cross-members, their heads extending into planes occupied by said car ends.

10. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, a deck arranged above said central portion and also above the end portions of said car, stairways leading from the inner ends of such latter portions upwardly to said deck and downwardly to said central portion, said stairways being disposed adjacent each other and at points remote from the sides of said car, and doors in the sides of said car.

11. A railroad car of substantially standard dimensions, including a pair of trucks and a body supported upon and having its central portion extending downwardly between said trucks, a deck arranged above said central portion and also above the end portions of said car, stairways leading from the inner ends of such latter portions upwardly to said deck and downwardly to said central portion, said stairways being disposed adjacent each other and at points remote from the sides of said car, and doors in the sides of said car at points adjacent the outer ends of the same.

In testimony whereof I affix my signature.

EDGAR ALFRED SELF.