March 29, 1932. J. R. BLACKHALL ET AL 1,851,486

RAILWAY CAR

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FIG. 1.

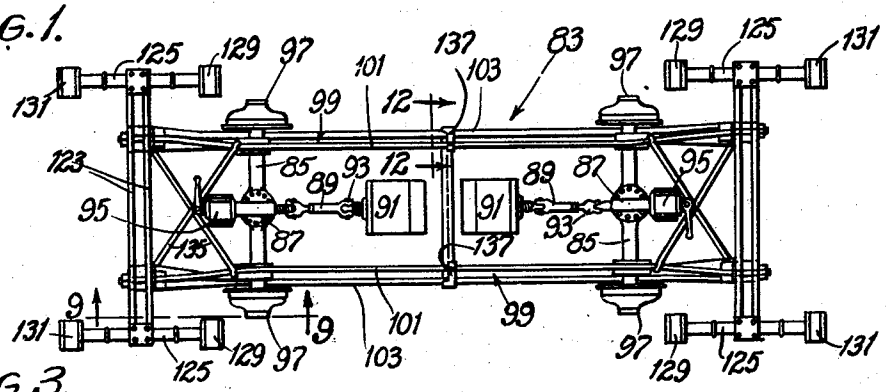


FIG. 3.

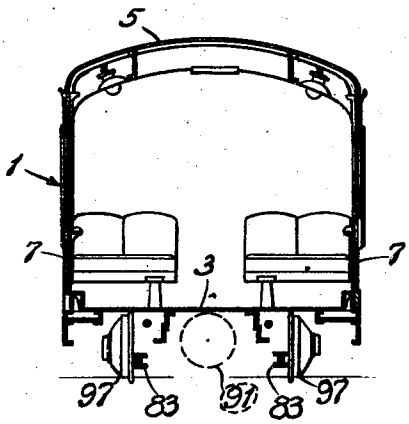


FIG. 9.

FIG. 6.

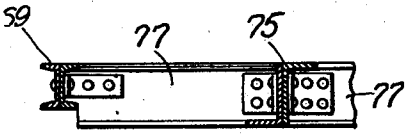


FIG. 7.

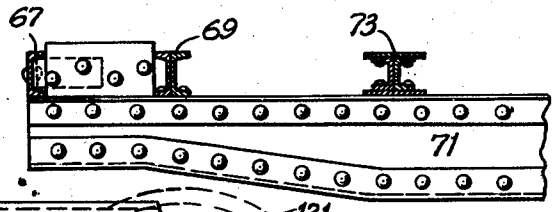


FIG. 8.

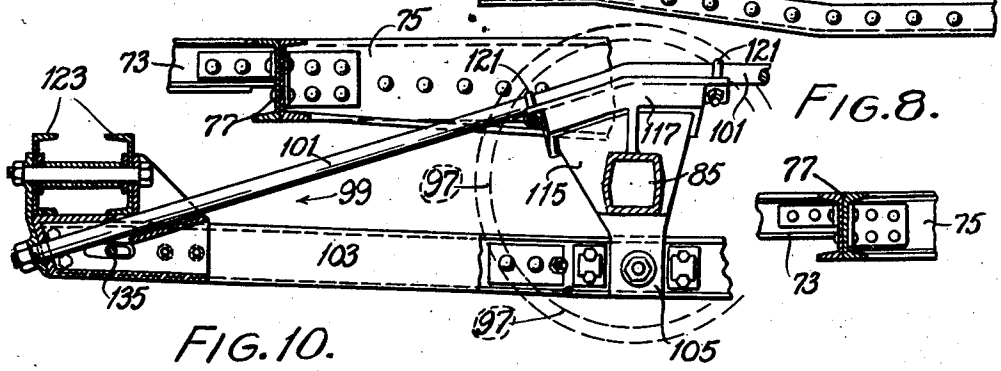
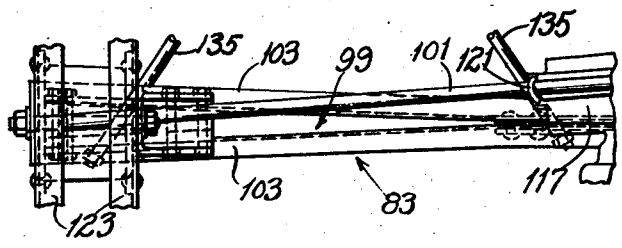


FIG. 10.



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RAILWAY CAR

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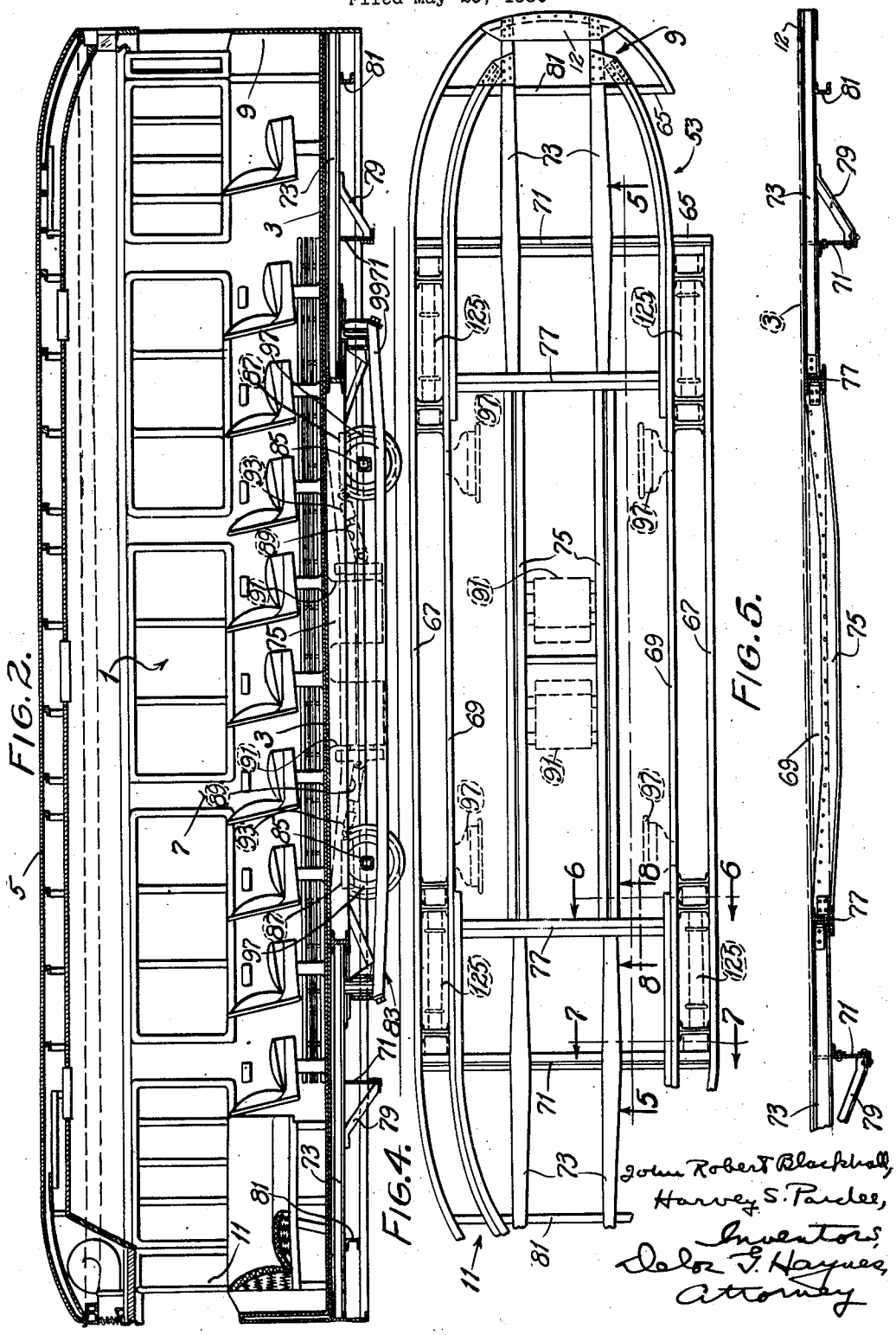

FIG. 2.

FIG. 4.

FIG. 5.

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RAILWAY CAR

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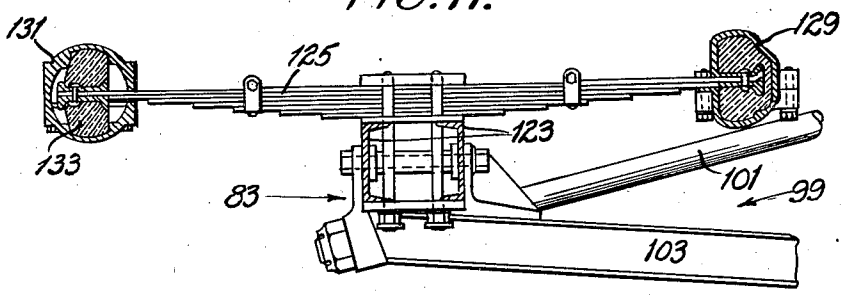
FIG. 11.



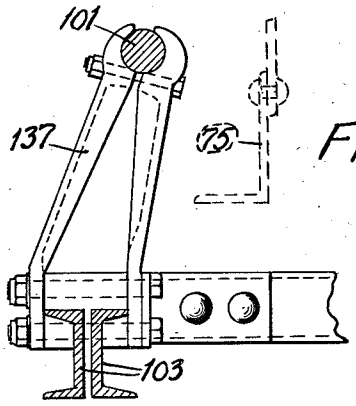


FIG. 12.

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Patented Mar. 29, 1932 1,851,486

UNITED STATES PATENT OFFICE

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RAILWAY CAR

Original application filed May 1, 1929, Serial No. 359,480. Divided and this application filed May 29, 1930. Serial No. 456,864.

This invention relates to railway cars, and with regard to certain more specific features, to electric railway cars.

This invention is a division of the invention set forth in our patent application, Serial No. 359,480, filed May 1, 1929, for railway car.

Among the several objects of the invention may be noted the provision of an improved railway car on which a chassis or truck is used having easy riding qualities and wherein articulation between the chassis and body is eliminated with increased ability to pass around short curves; and the provision of a car of the class described having improved structural features for accomplishing the above. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a plan view of a chassis;

Fig. 2 is a longitudinal section;

Fig. 3 is a cross section;

Fig. 4 is a plan view of the underframe of a car, the wheels and springs of the car being indicated in position by dotted lines;

Fig. 5 is a section taken on line 5—5 of Fig. 4;

Fig. 6 is an underframe detailed section taken on line 6—6 of Fig. 4;

Fig. 7 is an underframe detailed section taken on line 7—7 of Fig. 4;

Fig. 8 is an underframe detailed section taken on line 8—8 of Fig. 4;

Fig. 9 is a fragmentary detail of the chassis and underframe showing an end connection and cantilever support for the frame, being taken along line 9—9 of Fig. 1;

Fig. 10 is a plan view of the chassis portion of Fig. 9;

Fig. 11 is a reduced section taken similar to Fig. 9, but being outside of the spring, parts being broken away; and,

Fig. 12 is an enlarged cross section taken on line 12—12 of Fig. 1, showing a chassis center tie.

Similar reference characters indicate corresponding parts through the several views of the drawings.

Referring now more particularly to Figs. 1 to 3, there is illustrated at numeral 1 a car body having a floor 3 and a roof 5 with suitable sides 7 and front and rear ends 9 and 11 respectively.

Referring to the car broadly, it may be noted that the drawings show a car with a single front entrance 53 but it is to be understood that a double-end car may be had by providing another entrance at the rear. As will be shown later, a space 65 is provided through the under framework of the car to accommodate the step well. If a double ended car were used a similar space would be provided at the other end of the car.

The underframe is shown more particularly in Figs. 4 to 8 and comprises an outer sill 67 which surrounds the underframe, except as to points of discontinuity at the step well or wells, as the case may be. Spaced inwardly from the sill 67, but located merely sidewardly and not endwardly are I-shaped side supporting sills 69. A transom 71 is positioned beneath the channel 67 and side sills 69 and serves the purpose of supporting short longitudinal vestibule supporting cantilever channels 73. Beneath the main body of the car and in line with the channels 73 are main trusses 75. Cross supports 77 are provided between the vestibule supporting channels 73 and the main struts 75 so as to join them, the outer ends of the vestibule supports 73 being gusseted with the side rails 69. These outer ends of the members 73 are also extended to receive gussets 12 and thereby be joined to the edge sill member 67.

By the above means there is provided an additional sill for supporting the vestibule. This is particularly advantageous inasmuch as said vestibule is arranged on a cantilever portion extending endwardly some distance. As shown in Fig. 5, additional braces 79 serve

to buttress the cantilever effected by the vestibule construction, this being done against the transoms 71. Transverse braces 81 are provided for further stiffening the vestibule portions. The underframe thus described, provides maximum resistance against longitudinal bumping stresses, side sway and bounce. It will be noted that the inner sideward members or sills 69 aid the central longitudinal stiffening members 73 and 75 in resisting endwise thrust. They also provide for the step well space 65 without framing being required below said space. The triple sets of cross members 71, 77 and 81 provide transverse rigidity. The outer sill member 69 is relieved of all endwise thrust and is useful primarily in aiding to hold up the platforms and mid-body on the springs, later to be described.

The above described underframe comprises a substantially rigid structure which is adapted to be set down upon and held to springs on the chassis 83. The chassis comprises two axles 85 and worm reduction gears 87, driven by propeller shafts 89 from motors 91, suitable universal couplings 93 being provided along the propeller shafts. Braking mechanisms 95 are provided, which are described more particularly in connection with the copending application for patent of Harvey S. Pardee, Serial No. 361,277, filed May 8, 1929, for brake. The wheels 97 provided on the axles are the general type referred to in said co-pending application and have the usual treads on the rails.

The two axles 85 are structurally joined by a framework comprising underslung side frames 99, each of which consists of a truss formed by a tension rod 101 and a double channel compression member 103, each side frame 99 extending beyond each axle. It will be noted from Fig. 9 that each compression member 103 is held between downwardly extending lugs 105 of the respective axle 85.

Above each suspension of the class above described on each axle 85 is provided a support 115 which has a saddle 117 formed therewith, the purpose of which is to provide means for holding the tension member 101, this being done by means of U-bolts 121. It is to be noted that the U-bolt fastenings, in conjunction with the pin 105, counteract the torque due to the action of the worm drives of the motors.

At the ends of the side frames 99 are provided cross ties 123 which extend sidewardly a distance greater than the width between the frames 99 or treads of opposite wheels 97. At the ends of these cross beams 123 are supported longitudinal springs 125. It will be seen that by means of this construction the springs are mounted outside of the wheels both transversely and longitudinally, thus obtaining a wide and long spring base. The longitudinal positioning of the springs increases the spring base considerably. Hence the riding qualities of this single unarticulated chassis are equivalent to or better than those of the more complicated, expensive and heavier multiple truck articulated type. The underframe shown in Figs. 6 to 10 is supported on the springs 125 shown in dotted lines, the support being effected between the outer and inner sills 67, 69.

Referring to Fig. 11 it will be seen that the actual mounting between the spring 125 and underframe 127 is accomplished by an anchored rubber padded box 129 at one end of the spring and a box 131 at the other end, in which are rubber spring connections 133, the latter providing for endwise movement and hence serving as a shackle.

As illustrated in Figs. 1 and 10, cross braces or ties 135 are used between the side frames 99 beyond the axles 85, the purpose being to increase rigidity. It will be further noted from Figs. 1 and 10 that center braces 137 are used for holding the tension rods 101 in place at the center of the car. An inward cant is provided for in the case of these braces so that the tension rods 101 aid in resisting transverse stresses.

The motors 91 are mounted on the underframe 127, universal connections 93 providing for the relative movement incurred between the underframe and chassis during operation. The motors are intercostally mounted between the two spaced center trusses 75 as illustrated in Fig. 4 by dotted lines. All the weight of the motors is therefore carried by the springs. Hence the desirable effect of a low ratio of unsprung to sprung weight is effected.

The advantages of spreading the springs apart, both transversely and longitudinally are made clear from the following:

For example, the wheel base is 11 feet between axles and the distance between the centers of the spring supports 18 feet, so that the car body is actually supported on a spring base of 18 feet rather than 11 feet of the wheel base. The outer points of support of the underframe are approximately 22 feet apart. The frame itself is 35′ 2″ long. No inequality of loading can lift the wheels and pitching of the car is limited by the springs which are separated by a distance about equivalent to the truck centers of a double truck car of the same capacity.

It will be seen in view of the above that with fewer parts there is effected greater simplicity and decreased weight and greater stability is had in regard to transverse rolling and longitudinal rocking. The springs are placed at a greater distance apart transversely than is possible on a two truck car. The spring base is both wider and longer, although the wheel base may be the same as on other single truck cars, thus providing ability to take curves of short radius.

Inasmuch as no swinging links or springs are provided to permit of lateral motion of the body in relation to the chassis the car rides without side sway or nosing. This means that the springs need be stiff enough only to take care of vertical movement of the car body as a whole; whereas if they were placed closer together they would need to limit rolling and/or pitching about the center of gravity as well as the vertical movement of the body. This extra duty means less resilient springs than are made possible by our invention.

The feature whereby side frames of the chassis are underslung results in the car floor being close to the ground. Hence a passenger may easily and quickly step into or out of the car which is conducive to high schedule speeds.

Inasmuch as the ends 129 of the springs 125 are anchored in rubber, appreciable movement of the underframe with respect to the chassis is prevented and the thrust in accelerating and retarding the car is transmitted through the rubber and taken up quietly. As described, the shackle end of the spring is connected through the rubber insulators described and in such a manner as to permit motion caused by spring deflection, although this end of each spring does not carry thrusts but takes vertical load only.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, 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.

We claim:

1. A chassis for cars comprising a pair of tranverse axles, side frames joining said axles longitudinally and extending beyond said axles to provide cantilevers, cross beams supported transversely at the ends of said cantilever and extending transversely a distance greater than the distance between said side frames and means for supporting a car body located at the ends of said transverse beams.

2. A chassis for cars comprising transverse axles, side frames positioned longitudinally and forming extensions beyond said axles, transverse members on the extensions beyond the axles, said transverse members extending sidewardly a distance greater than the distance between the side frames and longitudinal springs affixed near the ends of the transverse members for supporting a car body.

3. A chassis for cars comprising transverse axles, side frames located longitudinally of said axles, said side members comprising trusses each having one member which is underslung with respect to the axles, said side frames extending longitudinally beyond the axles, cross ties bracing the side members and beyond the axle, transverse members near the ends of the cross members extending laterally and having near the ends thereof supporting means for a car body.

4. A chassis for cars comprising a pair of unarticulated axles, side frames joining said axles longitudinally, wheels on the axles outside of the side frames, said side frames extending beyond the axles, cross ties between the extensions beyond the axles, transverse members located at the ends of the extensions and supporting means on said transverse members.

5. A chassis for cars comprising a pair of unarticulated axles, side frames joining said axles longitudinally, wheels on the axles outside of the side frames, said side frames extending beyond the axles, cross ties between the extensions beyond the axles, transverse members located at the ends of the extensions and supporting means at the ends of said transverse members, said side frames comprising trusses having the lower member thereof underslung with respect to said axles.

6. A chassis for cars comprising axles, wheels thereon, side frames fastened to said axles within the tread of said wheels, said side frames extending beyond the axles to form cantilevers, transverse members located across the cantilevers and supporting springs on the transverse members, said supporting springs being separated such a distance that no point on any spring is located within the rectangle formed by the treads of the wheels.

7. A chassis for cars comprising a plurality of unarticulated axles, wheels on the axles, side frames joining said axles longitudinally, said side frames extending beyond the axles, transverse members located on the extensions and supporting springs on the transverse members.

8. A chassis for cars comprising a plurality of unarticulated axles, wheels on the axles, said wheels having treads, side frames joining said axles longitudinally, said side frames extending beyond the axles, transverse members located on the extensions and supporting means on the transverse members, said supporting members lying entirely outside of the rectangle formed within the wheel locations.

9. In a railway car, an underframe comprising endwise cantilever supports, at least one member joining said supports, inner sills connected near the ends of said support, a chassis for the underframe comprising transverse axles, side frames positioned longitudinally and forming extensions beyond said axles, transverse members on the extensions, said transverse members extending sidewardly a distance greater than the distance between the side frames and springs affixed near

the ends of the transverse members, said springs supporting said underframe at points near the inner ends of the cantilevers.

10. In a railway car, an underframe comprising a central support, intermediate sills connected near the ends of said support, an outer sill, a chassis for the underframe comprising transverse axles, side frames positioned longitudinally and forming extensions beyond said axles, transverse members on the extensions, said transverse members extending sidewardly a distance greater than the distance between the side frames and springs affixed near the ends of the transverse members, said springs joining with the underframe at points between the intermediate and outer sills.

11. In a railway car, an underframe comprising endwise cantilever supports, at least one member joining said supports, inner sills connected near the ends of said supports, a chassis for the underframe comprising transverse axles, side frames positioned longitudinally and forming extensions beyond said axles, transverse members on the extension, said transverse members extending sidewardly a distance greater than the distance between the side frames and springs affixed near the ends of the transverse members, said springs supporting said underframe at points near the inner ends of the cantilevers, said member which joins the cantilever supports lying wholly within the distance between said transverse members.

12. In a railway car, an underframe comprising endwise cantilever supports, at least one member joining said supports, inner sills connected near the ends of said supports, a chassis for the underframe comprising transverse axles, side frames positioned longitudinally and forming extensions beyond said axles, transverse members on the extensions, said transverse members extending sidewardly a distance greater than the distance between the side frames and springs affixed near the ends of the transverse members, said springs supporting said underframe at points near the inner ends of the cantilevers, said member which joins the cantilever supports lying wholly within the distance between said transverse members and motors supported by said mid-positioned member.

13. An underframe comprising longitudinal trusses, endwise supporting members longitudinally extending from said trusses, said trusses and members being adapted in combination to support a superstructure, intermediate sills joined at the ends of the endwise members and passing sidewardly of the trusses, and an outer sill positioned substantially around said other members.

14. An underframe for cars comprising at least one central longitudinal stiffening member, at least one intermediate sill joined at the ends of said stiffening member and an outer sill substantially surrounding said inner sill.

15. An underframe for cars comprising at least one central longitudinal stiffening member, at least one intermediate sill joined at the ends of said stiffening member, an outer sill substantially surrounding said intermediate sill, said stiffening member comprising at least in part a truss.

16. An underframe for cars comprising at least one mid-positioned truss, at least one cantilever extension positioned endwise of said truss at each end, intermediate side sills joined near the outer ends of said cantilever extensions, and an outer sill substantilly surrounding said intermediate sill.

17. An underframe for cars comprising at least one mid-positioned truss, at least one cantilever extension positioned endwise of said truss at each end, intermediate side sills joined at the ends of said cantilever extension, and an outer sill substantially surrounding said inner sill and transom members for stiffening the cantilever members.

18. An underframe for cars comprising endwise cantilever supports, at least one member joining said supports, intermediate sills connected near the ends of said supports for receiving longitudinal thrusts and at least one outer sill beyond the intermediate sill.

19. An underframe for cars comprising endwise cantilever supports, at least one central member joining said supports, intermediate sills connected with and near the ends of said supports, at least one outer sill beyond the intermediate sill and transoms located transversely beneath the cantilever portions.

20. An underframe for cars comprising endwise cantilever supports, at least one central truss joining said supports, intermediate sills connected with the ends of said supports for receiving longitudinal thrusts, at least one outer sill beyond the inner sill and transoms located transversely beneath the cantilever portions and braces for stiffening the cantilever portions with said transoms.

21. A chassis for cars comprising axles, wheels thereon, side frames fastened to said axles within the tread of said wheels, said side frames extending beyond the axles to form cantilevers, transverse members located across the cantilevers and supporting springs having their outermost portions separated a distance longitudinally greater than the distance between outermost sets of wheels and separated transversely a distance which is greater than the distance between the treads of the wheels on a given axle.

22. In a railway car, an underframe comprising endwise supports, at least one member joining said supports, inner sills connected to said supports and outer sills, said outer sills being discontinuous to permit positioning of at least one door well.

23. An underframe comprising longitudi-

nal trusses, endwise supporting members longitudinally extending from said trusses, said trusses and members being adapted in combination to support a superstructure, intermediate sills joined at the ends of the endwise members and passing sidewardly of the trusses, and an outer sill positioned substantially around said other members, said outer sill being discontinuous to permit positioning of at least one door well.

In testimony whereof, we have signed our names to this specification this 23rd day of May, 1930.

JOHN ROBERT BLACKHALL.
HARVEY S. PARDEE.