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J. MENZIES.

TRAM CAR.

No. 350,263. Patented Oct. 5, 1886.

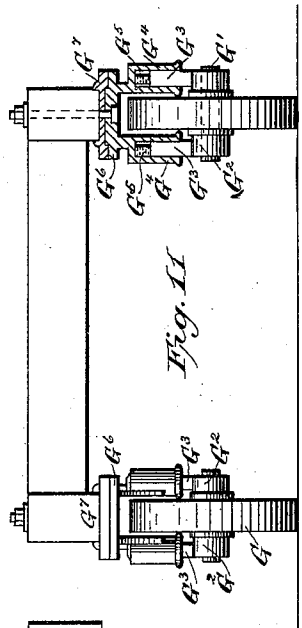


Fig. 11

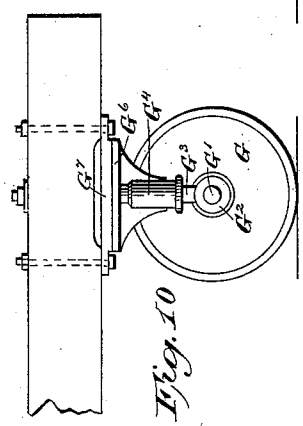


Fig. 10

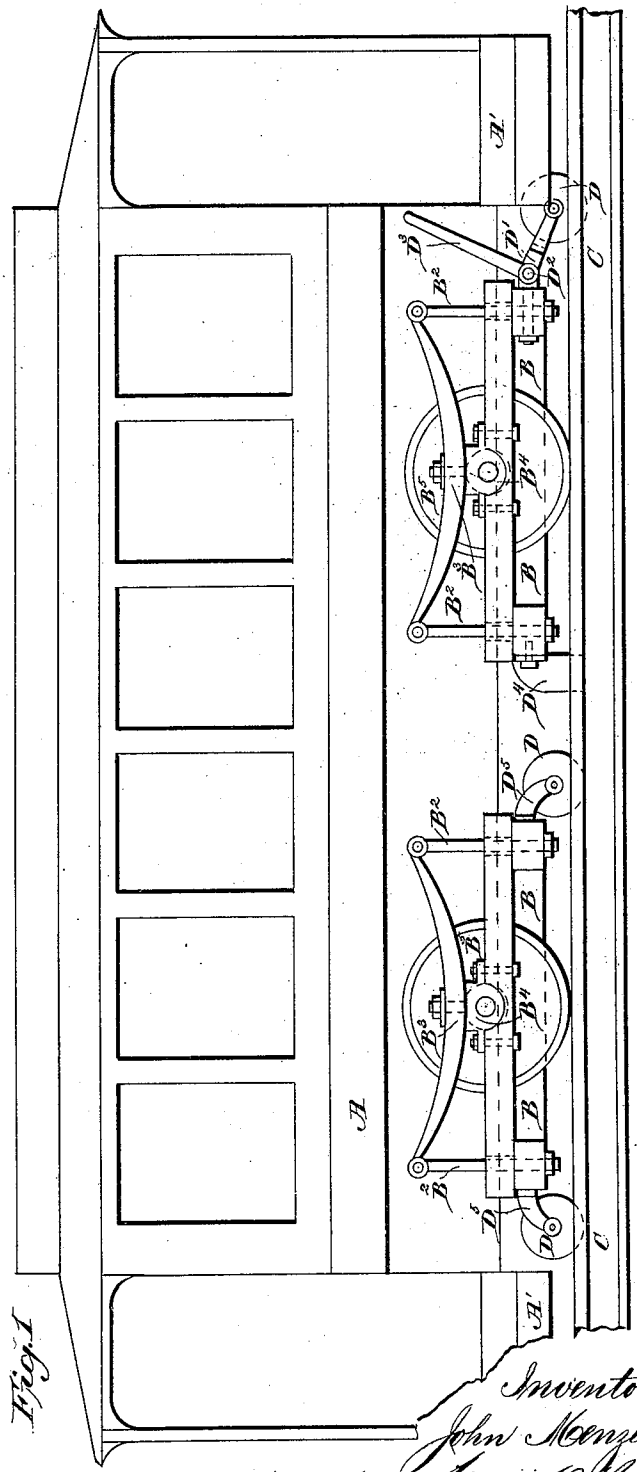


Fig. 1

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J. MENZIES.

TRAM CAR.

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Fig. 2

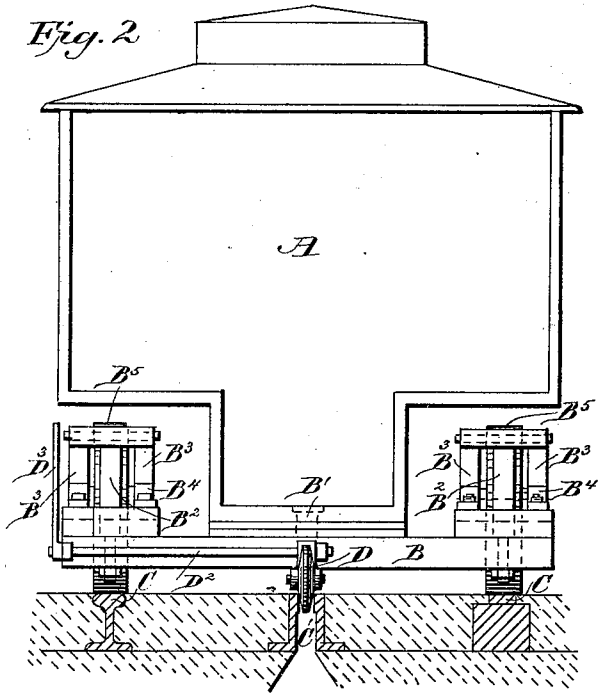


Fig. 8

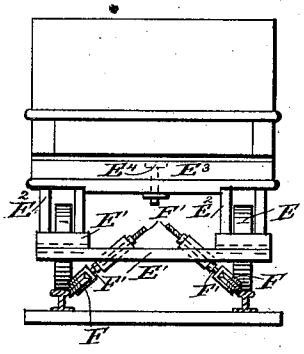
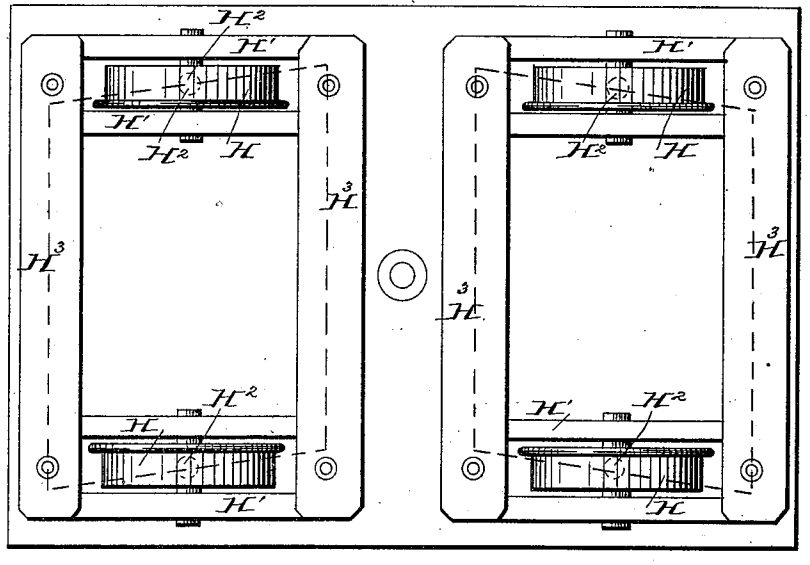


Fig. 12



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TRAM CAR.

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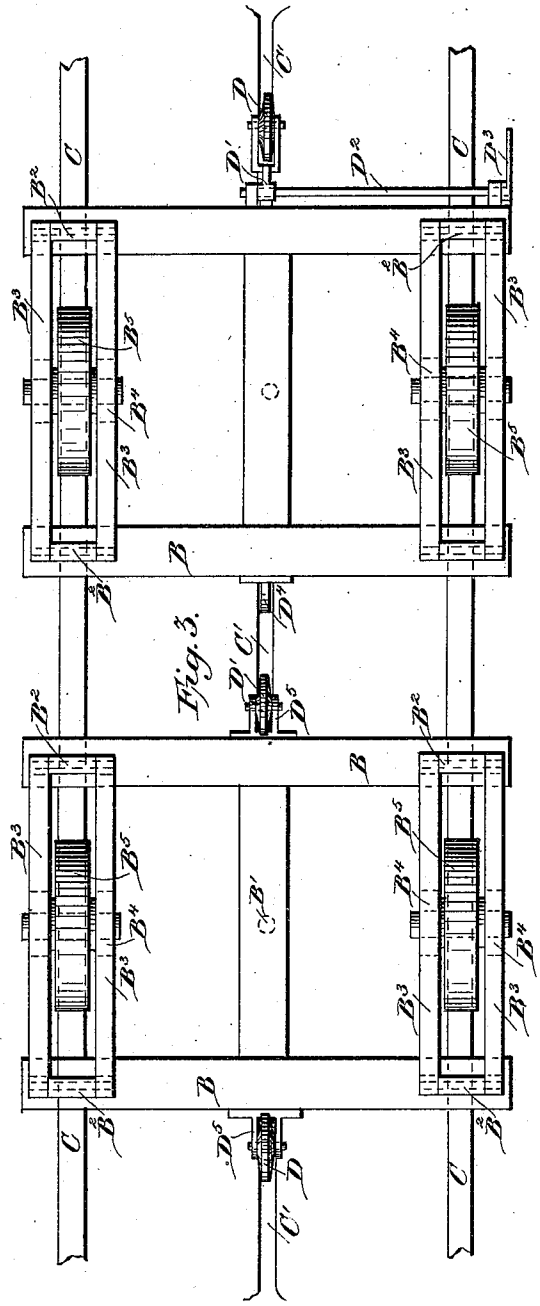


Fig. 3.

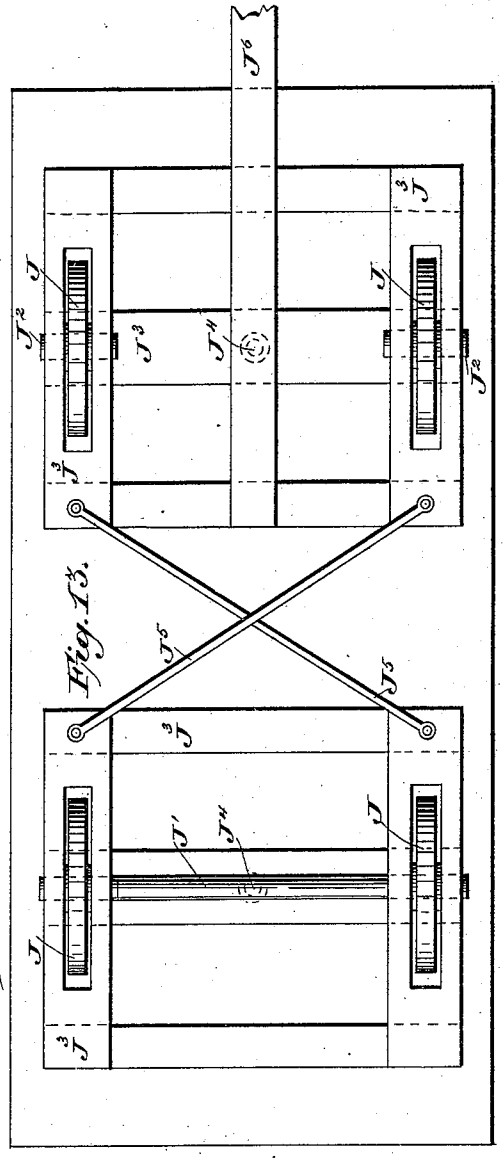


Fig. 4.

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TRAM CAR.

No. 350,263. Patented Oct. 5, 1886.

Fig. 5

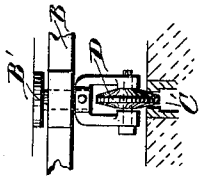


Fig. 6

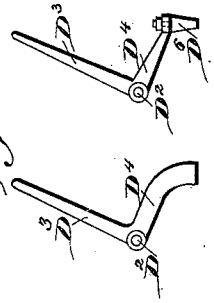


Fig. 3

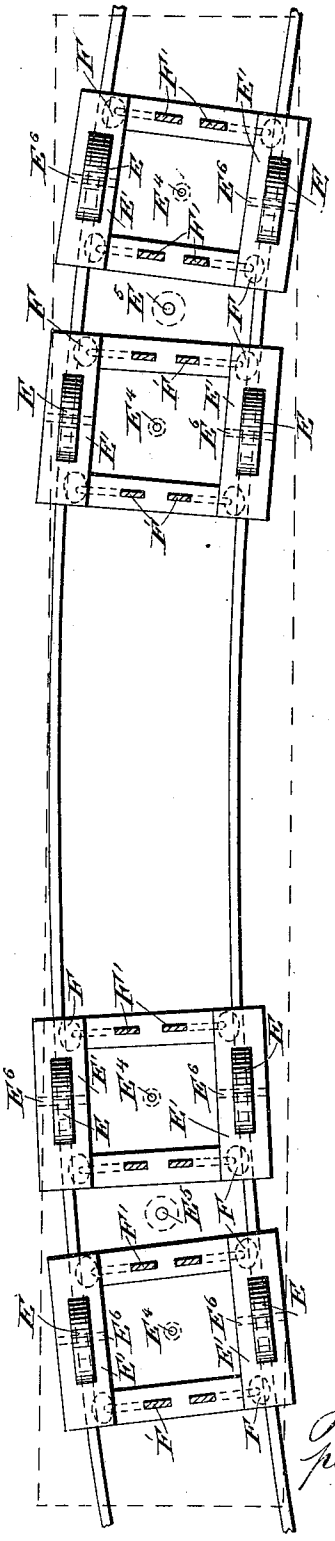
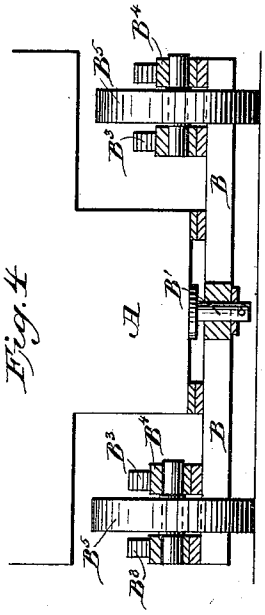


Fig. 4



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(No Model.) 5 Sheets—Sheet 5.

J. MENZIES.

TRAM CAR.

No. 350,263. Patented Oct. 5, 1886.

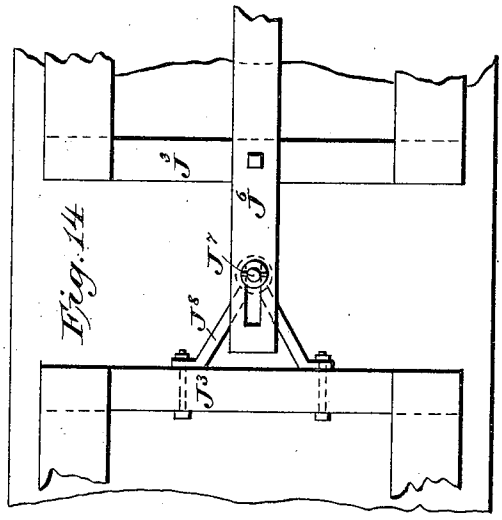


Fig. 14.

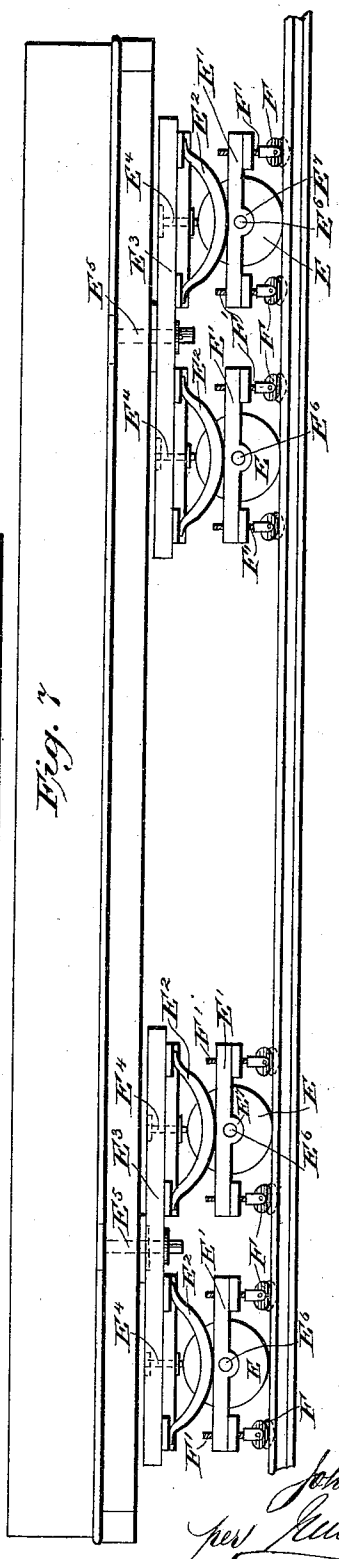


Fig. 7.

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Inventor
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per Henry A. Wise
Assistt

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UNITED STATES PATENT OFFICE.

JOHN MENZIES, OF KYNETON, VICTORIA.

TRAM-CAR.

SPECIFICATION forming part of Letters Patent No. 350,263, dated October 5, 1886.

Application filed April 9, 1886. Serial No. 198,373. (No model.) Patented in Victoria January 22, 1885, No. 3,944.

To all whom it may concern:

Be it known that I, JOHN MENZIES, a subject of the Queen of Great Britain, residing at High Street, Kyneton, in the British Colony of Victoria, corn-factor, have invented new and useful Improvements in and Connected with Tram-Cars, Railway Rolling-Stock and other Vehicles, (for which I, in conjunction with Arthur Hope, of Yarra Bank, South Melbourne, in the said colony, engineer, and James Fulton, of Greville Street, Prahran, also in the said colony, engineer, have obtained Letters Patent in the British Colony of Victoria, patent dated the 22d day of January, 1885, and numbered 3,944,) of which the following is a specification.

This invention has been designed, principally, with the object of lessening the cost and maintenance of street-tramways and their cars, and is intended for use, principally, in connection with such lines as have a groove for the gripping-stem between the rails. Further, it is designed to cause the wheels of such cars or railway rolling-stock to take their proper radial position on the rails when traveling over curves, and also to retain them on the track without the aid of flanged wheels. The rails which I prefer to use for the tramways are perfectly flat, without any groove for the wheel-flange or any upstanding ribs whatever, so that when laid flush with the streets they are no obstruction to the vehicular traffic passing over them; but for railways I do not propose to alter the construction of the permanent way.

The first improvement relates to the wheels and the mode of mounting the cars upon them, this latter part being applicable to other vehicles. Thus each wheel or pair of wheels is secured within a separate frame, and such frame is attached to the car or under frame by means of a central pivot or bolt, so that when turning sharp curves the wheel-frames are caused to radiate independently of each other, either by the aid of guide-wheels working against the side of the rails, or by guide stems or wheels traveling within the groove and thus causing the wheels to follow more closely the line of said curve, and as the wheels are made without flanges the friction on them and the rails is reduced to a minimum.

The second improvement relates to the means I employ for retaining the tram-cars on their tracks. For this purpose I utilize the central groove for the gripping stem or tongue, in which I place suitable stems or guide-wheels firmly attached to and descending from the under carriage of the car, so as to retain it in a central position between the rails when traveling. By this means I am able to dispense with the use of points on such tramways. I also provide means for detaching or raising and lowering the gripping-stems and guide-wheels clear of the level of the road, so that in case of any breakage or accident of any kind to prevent the working of the tramway my cars may be run as an ordinary vehicle on common roads.

In order that my invention may be clearly understood, I will now explain it with reference to the accompanying sheets of drawings, in which—

Figure 1 is a side elevation, and Fig. 2 is a transverse view, of a tram-car in which my improvements are embodied. Fig. 3 is a plan of its wheel-frames, and Fig. 4 is a transverse view, showing the method of attaching the wheel-frames to the car. Fig. 5 shows the method of affixing a guide-wheel to the pivot of the wheel-frame. Fig. 6 shows alternative constructions of the guide-stems. Fig. 7 is a side elevation, and Fig. 8 is an end view, of a railway-truck constructed on the bogie principle, and having my improved guide-wheels attached to the wheel-frames. Fig. 9 is a plan of the wheel-frames, showing them in the position they would assume when the truck is traveling over a curve. Fig. 10 is a side view, and Fig. 11 is an end view and cross-section, of one system of supporting each wheel within an independent frame. Fig. 12 is a plan of the under side of another system of supporting each wheel independently, but in this case the opposite frames are connected together by transverse bars. Fig. 13 is a plan of the under side of a vehicle for ordinary purposes, showing the method of attaching the front and back bogie-frames together, while Fig. 14 shows an alternative means for accomplishing the same purpose.

In Figs. 1 to 6, A is the body of the car, constructed as shown, with its floor brought very close to the ground, which is reached by

the two steps A′. B are the bogie or wheel frames, secured to the car by the central pivot, B′, and these frames support the vertical props B^2, whose upper ends are connected to the springs B^3, to which are affixed the bearings B^4 for the axles of the wheels B^5. C are the rails, which may be of any flat-headed description, and C′ is the central groove. D is the movable guide-wheel, centered on the arm D′, which is secured upon the transverse bar D^2, supported in bearings attached to the frame B, and at the end of which bar is the hand-lever D^3, by which said guide-wheel may be raised from the central groove, C′, when it is desired to run the car on the common roads. On the opposite side of the frame the guide is shown in the form of a stem, D^4, affixed direct to the frame B, and on the other frame the guide-wheels D are shown centered in brackets D^5, which are affixed to the frame B, while Fig. 6 shows that the stem D^4 may be movable, and also that it may be furnished with a conical roller, D^6. The guide-wheel shown in Fig. 5 is intended to be attached to the bogie-frame B immediately under or to the lower end of its pivot B′.

Figs. 7, 8, and 9 represent a railway-truck mounted on the flangeless wheels E, which are supported in the wheel-frames E′, provided with the springs E^2. These wheel-frames are shown attached to the under frame, E^3, of the truck by the central pivot E^4, and the under frame is attached to the bottom of the truck by the central pin or pivot E^5. When trucks are constructed with only a single pair of wheels at either end, it is not necessary to have the under frame, E^3, as the wheel-frame is pivoted direct to the truck. Each wheel is keyed upon a separate axle, E^6, working in bearings E^7, as shown. F are the guide-wheels, which I employ for railway rolling-stock to retain them in position on the rails, and to insure of their axles radiating to take their true position when traveling upon a curve. These guide-wheels are affixed in the position shown in Fig. 8, and they are centered between the bifurcated end of the stem F′, which is affixed to the transverse bar of the wheel-frame, the stems being screwed and furnished with nuts to enable the position of the wheels to be adjusted to a nicety to suit the curves.

Figs. 10 and 11 represent one system of mounting each wheel within a separate frame, which is pivoted directly above the wheel to the frame of the truck or car, after the manner of ordinary casters. In this system the wheels G are keyed upon short axles G′, which work in the bearings G^2, which have upstanding stems G^3, fitting in the sockets G^4, which have within them the springs G^5, as shown. These sockets are cast upon a crown-plate, G^6, which works under and is centered to the plate G^7, which is bolted, as shown, to the frame of the truck or car.

Fig. 12 illustrates another means of mounting wheels according to this system; but in this case the wheels H are shown flanged, and each are again supported in a distinct frame, H′, which is pivoted to the truck at H^2, immediately above the wheel; but these frames are connected together by the transverse bars H^3, thus forming a parallel motion, and so it is evident that if the truck were traveling over a curve the center line of its frame would assume the position indicated by the dotted lines.

Fig. 13 shows the system of mounting an ordinary road-vehicle upon its wheels to allow of its turning the smallest possible curves without undue friction or drag upon its wheels J, which are either both loose upon the one axle, J′, or affixed upon separate short axles J^2. These axles are supported in bearings attached to the wheel-frames J^3, which are pivoted at J^4 to the frame of the vehicle, and these frames are connected to one another by the diagonal rods J^5, so that as the pole J^6 radiates the front frame the back frame is caused to similarly radiate by their being connected together by said rods J^5; or the same may be accomplished by extending the pole J^6 backward and placing its slotted end on the pin J^7, which is attached by means of the bracket J^8 to the back wheel-frame, as shown in Fig. 14.

By constructing tram-cars according to this system the flanges of the wheels are dispensed with. Consequently the cars may be used, if desired, on the common roads. The groove now in use for the gripping-stems is utilized for retaining the cars on the track and governing the radial position of the wheel-axles, thus enabling the cars to turn very small curves with ease and without any drag on the wheels. Further, this system enables the floor of the car to be brought nearer the ground. The system applied to railway rolling-stock also enables the wheel-flanges to be dispensed with, if so desired, as by attaching guide-wheels to the wheel or bogie frames the wheels are retained in position on the rails, and their frames are compelled to radiate, so as to enable the wheels to travel freely over the curves, which consequently can be made of a lesser radius. The system applied to ordinary vehicles is that instead of the back pair of wheels dragging, as is the case when their frames are a fixture to the vehicle, by my system immediately the front pair radiate to take a curve the back pair are compelled to similarly radiate, as before described.

Having thus described the nature of my invention and the manner of performing the same, I would have it understood that I do not confine myself to the precise details herein described and explained, and illustrated in my drawings, so long as the nature and essence of my said invention be retained; but

What I believe to be new, and therefore claim as my improvements in and connected with tram-cars, railway rolling-stock, and other vehicles, is—

1. In a tramway, the combination, substantially as described, of a track having flat top rails and a guide-groove between said rails, with a car-truck, flangeless wheels for said

truck arranged to turn on vertical pivots, and a flangeless guide-wheel operating in the groove of the track, for the purpose specified.

2. In a tramway, the combination, substantially as described, of a track having flat top rails and a guide-groove between said rails, with a car-truck, flangeless wheels for said truck arranged to turn on vertical pivots, a flangeless guide-wheel operating in the groove of the track and turning on a vertical pivot, and means, such as described, for lifting the guide-wheel out of the guide-groove, for the purpose specified.

3. In a tram-car, the combination, with the car-body, of a wheel-frame having the bearings for the wheel-axles located above the frame and flooring of the car, substantially as described, for the purposes specified.

4. In a tram-car, the combination, with the car-body, of a wheel-frame pivoted to the under side thereof, and having the bearings for the wheel-axles located above the frame and floor of the car, substantially as and for the purpose specified.

5. In a tram-car, the combination, with the car-body and a wheel-frame pivoted to the under side thereof, and having the bearings for the wheel-axles located above the frame, of flangeless wheels, and a guide operating to maintain the wheels upon the rails, substantially as described.

6. In a tram-car, the combination, with the car-body, of a wheel-frame pivoted thereto, flangeless wheels mounted in said wheel-frame, a guide-wheel frame, a guide-wheel mounted therein and arranged to run in a groove or way in the track, and a lever pivoted in bearings on said wheel-frame, to which lever said guide-wheel frame is secured, substantially as described, for the purpose specified.

JOHN MENZIES.

Witnesses:
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