July 3, 1951 J. MacVEIGH 2,559,540

ARTICULATED RAILWAY VEHICLE

Filed July 2, 1948 2 Sheets-Sheet 1

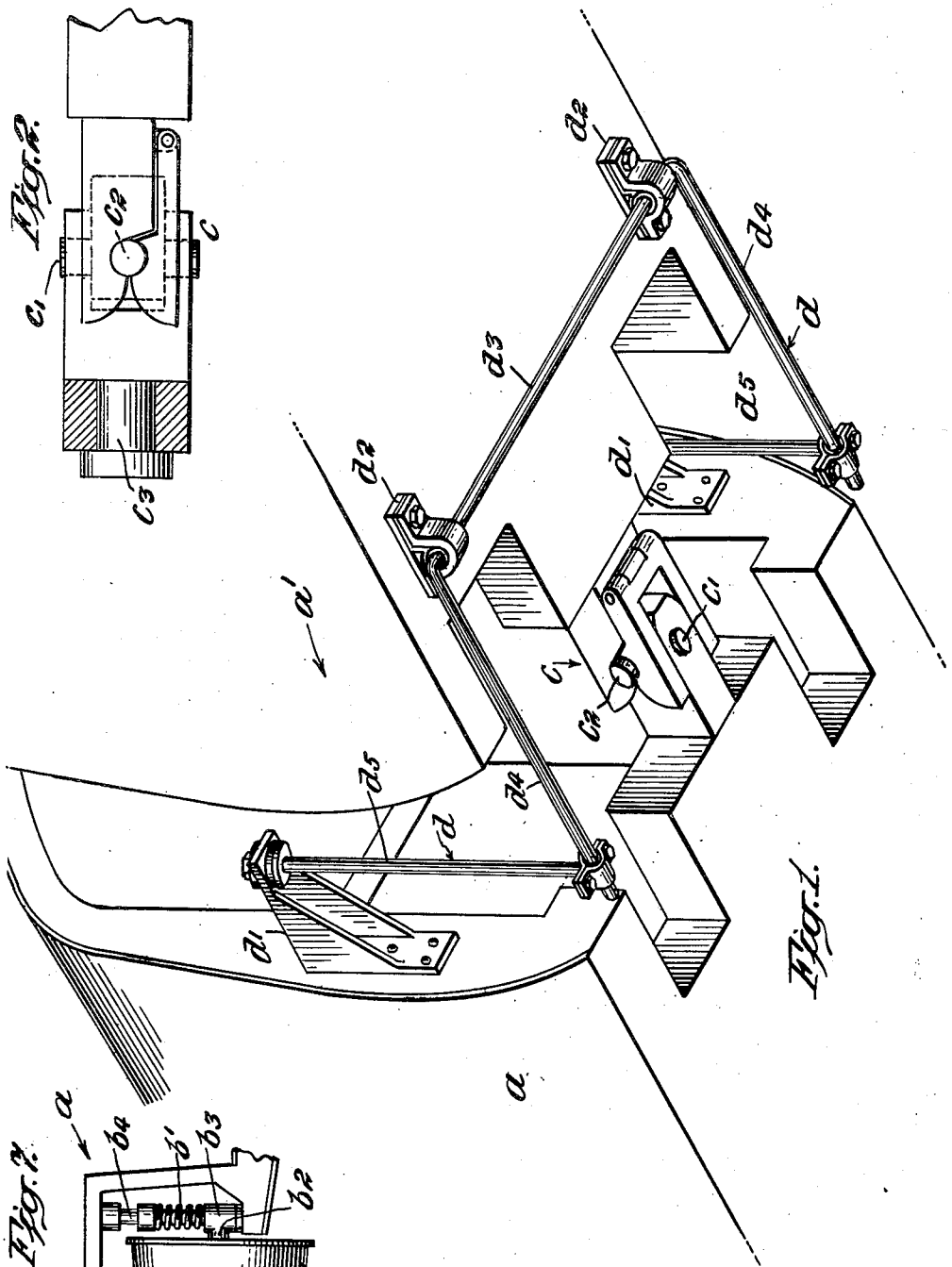


Fig. 1.

Fig. 2.

Fig. 3.

INVENTOR.
James MacVeigh
BY
Byerly, Townsend & Watson
ATTORNEYS

July 3, 1951 J. MacVEIGH 2,559,540

ARTICULATED RAILWAY VEHICLE

Filed July 2, 1948 2 Sheets-Sheet 2

Fig. 4.

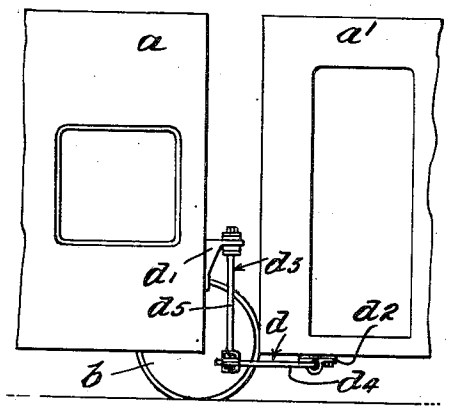


Fig. 5.

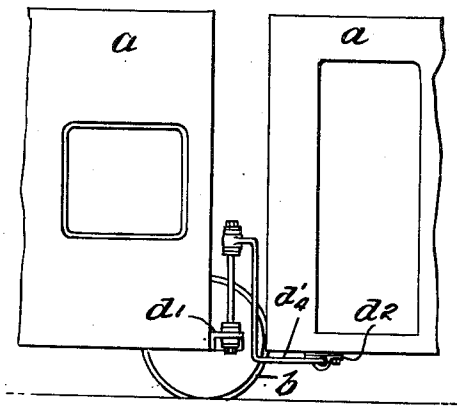
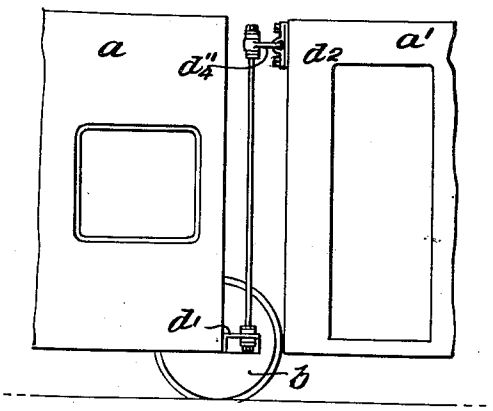


Fig. 6.



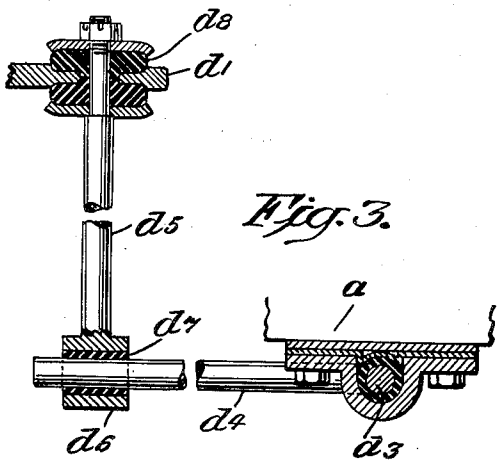
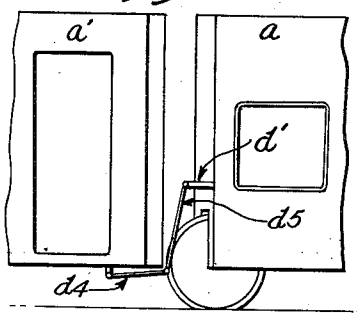


Fig. 3.

Fig. 8A.



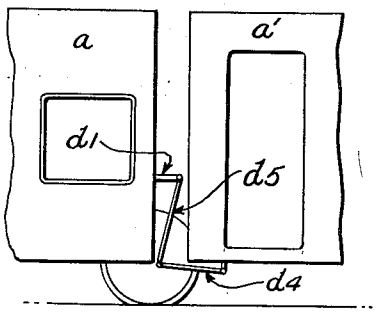


Fig. 8B.

INVENTOR.
James MacVeigh
BY
Byerly, Townsend & Watson
ATTORNEYS

Patented July 3, 1951

2,559,540

UNITED STATES PATENT OFFICE

2,559,540

ARTICULATED RAILWAY VEHICLE

James MacVeigh, New York, N. Y., assignor to Patentes Talgo, S. A., Madrid, Spain, a corporation of Spain

Application July 2, 1948, Serial No. 36,570

2 Claims. (Cl. 105—453)

1

This invention relates to an articulated railway vehicle and aims to provide a railway vehicle consisting of short articulated sections so integrated as to ride as a unit.

It has been found that danger of derailment on curves may be reduced by guided wheels. Guiding of the wheels to avoid danger of derailment is obtained in a train of cars each of which has only one pair of wheels which are located at its rear end with their axis held perpendicular to the axis of the car, provided that the cars are short in length. Such a train is, however, unsatisfactory for practical use since very short railways cars are subject to pitching motions which are uncomfortable for passengers and which may introduce dangerous strains on the structural parts. This difficulty is avoided in accordance with the present invention by providing a single long railway vehicle consisting of articulated sections which are integrated by connecting means which keep the ends of the sections in alignment and restrain any relative rotation or rolling of the ends of adjacent sections.

An articulated vehicle constructed in accordance with the present invention has a body consisting of a number of short rigid sections each of which has a pair of wheels and a spring suspension at its rear end. The adjacent ends of adjacent sections are connected by integrating means each of which includes a central connection and lateral connections. The central connection includes a vertical pivot and most desirably a universal joint. It is formed to prevent relative translational movements of adjacent ends of adjacent sections but not to prevent relative rotational movements of the section ends. The lateral connections are provided to prevent relative rotational movements of the ends of adjacent sections and, being located at the sides of the vehicle, are capable of preventing such relative movements without being subject to undue strain. The lateral connections are formed in such a way that they do not interfere with relative horizontal turning movements of the sections about the pivot of the central connection. The lateral connections are formed entirely of pivoted bars so that their operation involves no sliding friction.

In order that my invention may clearly be understood, I will describe the specific embodiments of it which are illustrated in the accompanying drawings in which:

Fig. 1 is a bottom perspective view of adjacent ends of two sections of the vehicle body

2

showing the connections between them, the wheels and spring suspensions being omitted for the sake of clearness;

Fig. 2 is a side view of the central connection;

Fig. 3 is a detail of the lateral connections;

Fig. 4 is a side view of the end portions of two adjacent sections of the vehicle showing the lateral connections shown in Fig. 1;

Figs. 5 and 6 are views similar to Fig. 4 showing two modified forms of the lateral connections;

Fig. 7 is a fragmentary rear elevation of one of the sections showing one of the wheels and one of the spring suspensions; and

Figs. 8A and 8B are diagrammatic elevations of the end portions of two adjacent sections taken from opposite sides of the vehicle to show the action of the lateral connections when the vehicle is on a curve in the track.

The vehicle illustrated consists of a plurality of rigid body sections, two of which, a, a', are shown in the drawings. Each section has a pair of wheels b at its rear end and is mounted on its wheels by spring suspensions which may consist of vertical coil springs b' as shown in Fig. 7. As shown in Fig. 7, each wheel is mounted on a short shaft b_2 whose ends are held in slides b_3 mounted on vertical rods b_4 secured to the body of the section. The mounting illustrated serves to retain the axis of each wheel perpendicular to the axis of the section on which it is mounted. The integrating means which make the sections ride as a unit on the spring suspensions b' include central connections c and lateral connections d.

The central connection c is a universal joint coupling provided with a vertical pivot c_1 and a horizontal pivot c_2, which serves to support the weight of the front end of one section on the wheel-supported rear end of the adjacent section, and also to prevent any relative horizontal or vertical transverse movement of the section ends. In order to avoid the severe strains which are placed on the coupler by relative tipping or rotational motions of the section ends, one end of the coupler c is attached to one of the section ends by a horizontal pivot c_3. The coupler connection thus has no tendency to prevent relative rotational movements of the section ends.

The lateral connections d consist of a series of rods connecting brackets d_1 located at widely spaced points of one of the sections, and brackets d_2 located at widely spaced points of the other section. The brackets d_1 and d_2 are most

desirably placed near the sides of the vehicle so that each pair of brackets is separated by a distance greater than the gauge of the wheels. Each bracket d_1 is connected to one of the brackets d_2 by two rods or bars d_4, d_5. The rod or arm d_4, which is normally horizontal, is hinged in the bracket d_2, and the rod d_5, which is normally substantially vertical, is connected to the rod d_4 and to the bracket d_1 by universal joints. Means are provided for preventing the two rods or arms d_4 at opposite sides of the vehicle from swinging in opposite directions. Such means in the form shown consists of a transverse rod d_3 which is made integral with the arms d_4.

The structure which has been described restrains relative rolling or rotational movements of the vehicle ends, for such movements tend to turn the arms d_4 in opposite directions and are resisted by the transverse rod d_3 to which both arms are secured. On the other hand, the lateral connections described permit free relative horizontal turning of the sections, for in such turning, the vertical rods d_5 are swung out of vertical position in opposite directions. Thus such turning movements tend to raise each arm d_4 and this is freely permitted by the journalling of the transverse rods d_3 in the brackets d_2.

The operation of the lateral connections when the vehicle is rounding a curve in the track is shown in Figs. 8A and 3B. The normally vertical rod d_5 at the outside of the curve is swung rearwardly out of vertical position as shown in Fig. 8A, while the corresponding rod d_5 at the inside of the curve is swung forwardly out of vertical position as shown in Fig. 3B. These two opposite swinging movements of the vertical rod d_5 raise the free ends of the arms d_4 by the same amount so that they cause no strain on the transverse rod d_3. Thus, the lateral connections, while restraining relative rolling movements of the sections, offer no restraint to the turning of the sections on a horizontal curve.

In order to avoid shocks and undue strain on the lateral connections, they are constructed so as to yield slightly against a strong resilient force in resisting relative rolling of the section ends. To permit such yielding, the transverse rod d_3 is formed of spring steel which is capable of a slight torsional yield. Also the universal joints at the ends of the vertical rods d_5 are most desirably of the yielding type as shown in Fig. 3. Thus the ends of the arms d_4 are secured in clamps d_6 at the ends of the vertical rods d_5, and these clamps are provided with hard rubber sleeves d_7 which yield sufficiently to permit the slight universal joint action required. The upper ends of the vertical rods d_5 are also connected with the brackets d_1 through hard rubber washers d_8 which provide the universal joint action at this point.

It is not essential that the brackets d_1 and d_2 be located in the positions indicated in Figs. 1 and 4. Thus as in the modification shown in Fig. 5, the brackets d_1' are located near the bottom of one of the section ends and the arms d_4' are bent upwardly so as to place their ends above the brackets d_1. In the modification shown in Fig. 6, the brackets d_1 are in the same position as shown in Fig. 5, but the brackets d_2 are placed near the top of the other section so that their arms d_4'' may be made straight and yet terminate above the brackets d_1.

What I claim is:

1. An articulated railway vehicle comprising rigid body sections and connections integrating the sections and each including a central connection containing a vertical pivot, and lateral connections comprising a normally vertical rod having one of its ends pivotally attached to one section and a normally horizontal rod hinged on the other section at each side of the vehicle, a pivotal connection between the free end of each vertical rod and the free end of each horizontal rod, and transverse means on said other section connecting and thereby restraining the two horizontal rods at the opposite sides of the section from turning in opposite directions, while permitting free turning thereof in the same direction.

2. In an articulated railway vehicle, the combination with rigid body sections each having a pair of wheels and a spring suspension at its rear end, of integrating means causing the sections to ride as a unit on the spring suspensions and each consisting of a central pivotal connection restraining relative transverse movement of adjacent ends of adjacent sections, and lateral connections restraining relative rotational movements of the adjacent ends of adjacent sections while permitting relative turning of adjacent sections about the pivot of the central connection and consisting of a transverse rod journalled on one of the adjacent sections, normally horizontal arms fixed to the transverse rod at opposite sides of said section, a pair of normally vertical rods pivoted at opposite sides of the other one of the adjacent sections, and a pivotal connection between the end of each vertical rod and the end of each horizontal arm.

JAMES MacVEIGH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
145,366	Saladee	Dec. 9, 1873
397,902	Elliott	Feb. 19, 1889
746,941	Facer et al.	Dec. 15, 1903
2,104,840	Stucki	Jan. 11, 1938

FOREIGN PATENTS

Number	Country	Date
693,928	Germany	July 22, 1940