Feb. 13, 1934. M. P. BLOMBERG ET AL 1,946,520

RAILWAY CAR

Filed March 30, 1929 2 Sheets-Sheet 1

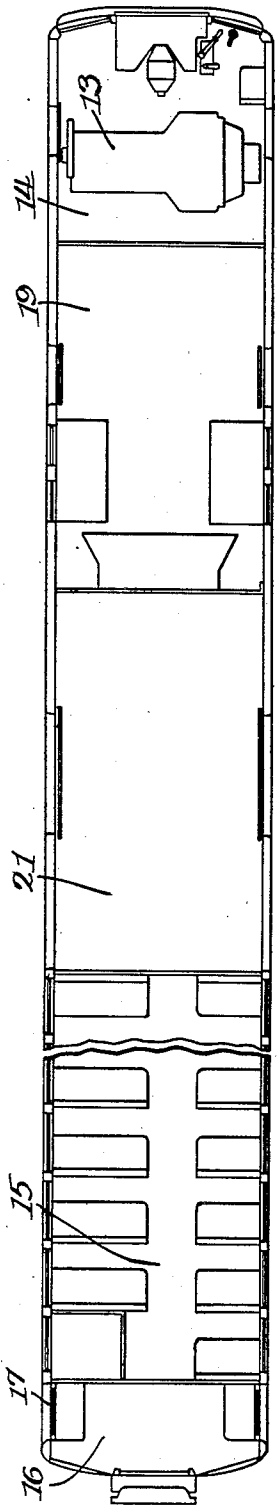


Fig. 2

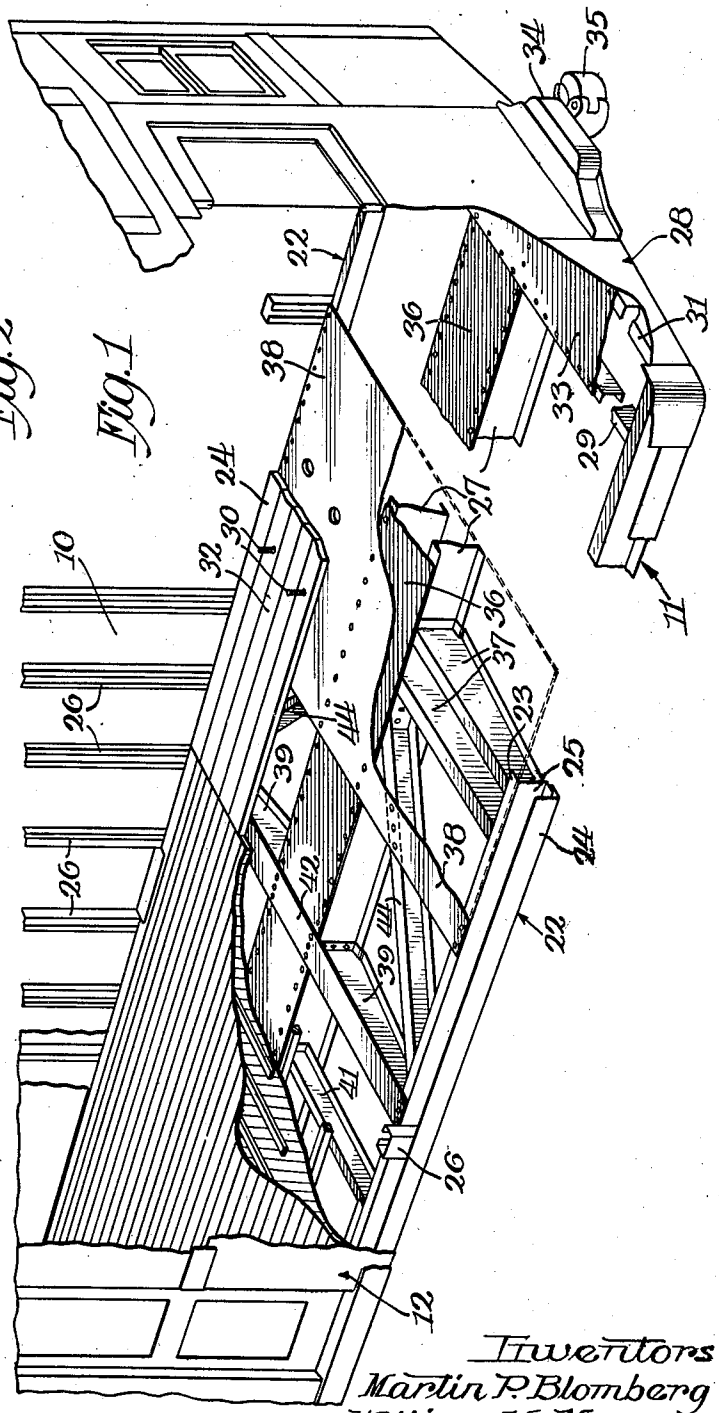


Fig. 1

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RAILWAY CAR

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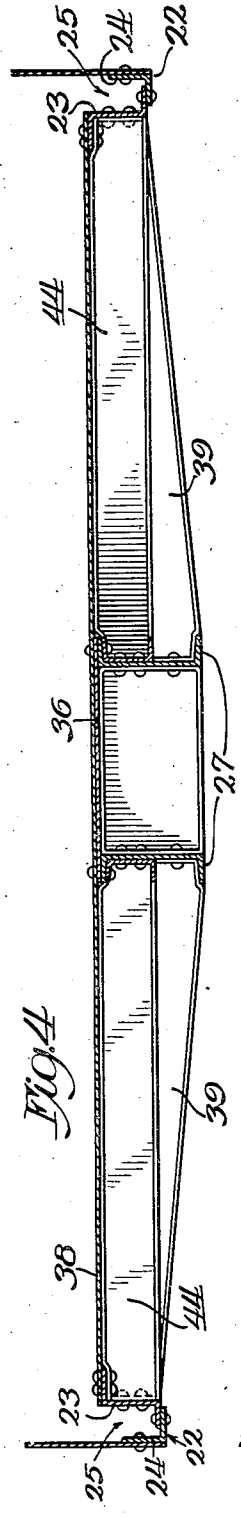


Fig. 4

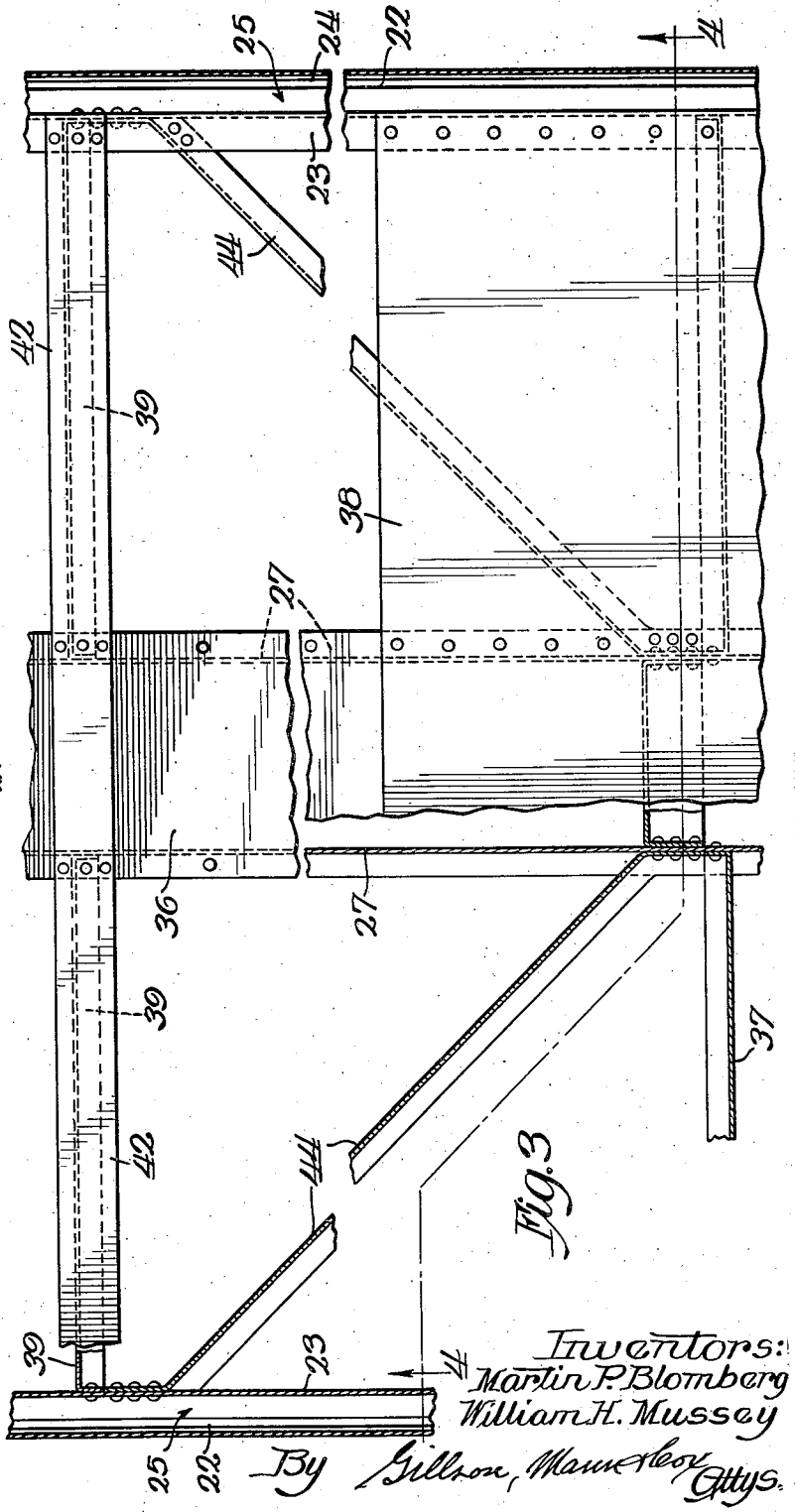


Fig. 3

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UNITED STATES PATENT OFFICE

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RAILWAY CAR

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Application March 30, 1929. Serial No. 351,241

3 Claims. (Cl. 105—414)

This invention relates to railway cars, and more particularly to the frame construction thereof.

The principal object of the invention is the provision of a railway car of such construction as to have minimum weight and maximum strength.

Another object of the invention is the provision of a new and improved underframe construction of a minimum weight for railway cars wherein buffs on the end of the car will be transmitted to the side frame members.

A further object of the invention is the provision of a novel arrangement of underframe members in a self-propelled railway car wherein the buffing stresses or strains are transmitted principally to the side sills of the car, together with a new and improved arrangement of frame members for absorbing the vibrations of the motor or propelling means.

Another object of the invention is the provision of a car of minimum weight having a new and novel arrangement of frame members for absorbing the shocks incident to the buffing stresses to which the car may be subjected while in use.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a perspective view of a railway motor car embodying the invention, with parts in section and parts broken away;

Fig. 2 is a diagrammatic plan view of the car;

Fig. 3 is a plan view of a portion of the underframing of the front end of a car with parts broken away and parts in section;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Referring now to the drawings, the reference character 10 designates a railway car embodying the present invention. The form of construction selected to illustrate one embodiment of the invention, comprises the underframing 11 and the superstructure or car body portion 12.

The form of car shown is especially adapted for interurban service and is preferably, though not necessarily, electrically operated by a small power unit 13 mounted in a compartment 14 in what for convenience of description will be termed the front end of the car. The generator is preferably operated by an internal combustion engine forming a portion of the power unit.

When the car is intended for general use, it may be, and preferably is, divided into a plurality of compartments. The rear end is divided into a passenger compartment 15 and a vestibule 16 which is provided with a door 17 and steps at each side of the car in the usual manner. The intermediate portion of the car may, if desired, be divided into a mail compartment 19 and a baggage compartment 21. While the car as shown contains a plurality of compartments, it is understood that this is a matter of convenience and may be varied to meet the needs of any particular locality within which the cars are operated.

In the construction of cars of this type, it is very desirable that the weight of the cars be reduced to a minimum and that their strength be maintained at a maximum. The underframe structure of the car is constructed with these objects in view, and comprises the side sills 22, see Fig. 1, which may be formed of Z-shaped bars 23 to one flange of which the angle bars 24 are rigidly attached to form the channels 25 at each side of the car for receiving the lower ends of the parts 26.

A pair of center sills 27 extend from end to end of the car as is usual in such constructions. These sills are comparatively light, much lighter than is normally used, because their principal function is to assist in supporting the floor of the car as will presently appear. They may be of any suitable form in cross section, but are preferably in the form of channel bars turned back to back, as clearly shown in Fig. 1 of the drawings.

At the front end of the car, the side sills are connected together at their forward ends by the buffer end sill member 28 which comprises the channel members 29 and 31 extending between and secured to the side and center sills, and the anti-telescopic plate 33 extending from side to side of the car and rigidly secured to said side and center sills and to said channel members 29 and 31 for forming a rigid front buffer sill construction. The buffer 34 and coupler member 35 are mounted on the front end of the car in the usual manner. A plate 36 extending from end to end of the car is secured to the upper flanges of the center sills by welding or riveting and forms with said sills a light but fairly rigid column.

A pair of bolster diaphragms or cross bearers 37 having their inner ends secured in the channel of the adjacent center sill, extend between the center sills and the side sills of the car, at each side thereof.

A bolster cover plate 38, shown partly in full and partly in dotted lines in Fig. 1, extends over these bolster diaphragms and is rigidly secured to the same and to the center and side sills for

constituting a rigid frame construction for supporting the motor generator set 13, suitable flooring 32 being interposed between the said plate 38 and the power unit. The latter is rigidly secured in position by suitable bolts 30 or like fasteners secured to the flooring 32 suitable openings being provided in the plate 38 for accommodating the heads of these bolts and for permitting their removal. The bolster diaphragm members 37 and bolster cover plate 38 constitute what may be termed the front body end sill member as distinguished from the buffer end sill member 28.

A suitable number of cross bearers 39 and cross members 41 are provided throughout the length of the car to insure sufficient rigidity to the underframe and to support the floor members of the car. These members are secured to the side and center sills in any suitable manner as by riveting or welding. Tie plates 42 extending from side sill to side sill of the car over the cross bearers constitute tie members for assisting the cross bearers and members in preventing the side sills from spreading apart during buffing operations.

It is common practice to construct the underframing of a car in such a manner that the buffing force at the front end thereof is transmitted to the center sills of the car; consequently the center sills must be of heavy material. In order to lighten the center sills and at the same time provide adequate means for receiving the shocks, suitable means are provided for transmitting this buffing force to the side sills of the car.

As shown, diagonal braces 44, preferably channel members, are employed for this purpose. These braces are attached to the web and flanges of the center sills 27 as by riveting or welding at a point adjacent to the bolster diaphragms 37. They extend divergently rearwardly and are attached to the side sills adjacent to the cross bearers 39. The bolster cover plate 38 is rigidly connected to these brace members, thereby adding to the rigidity of the front body sill construction.

By means of this arrangement, any buffing force at the front of the car to which the center sills are subjected will be transmitted along the forward ends of the sills to the bolster diaphragm members and the front ends of the braces 44 and along said braces to the side sills of the car, thus relieving the intermediate portions of the center sills of those buffing strains or forces.

Furthermore, in event of abnormal buffing forces, as front end collision and the like, the center and side sills between the bolster diaphragms 37 and the rigid buffing end sill 28 will be the first to crumple up or collapse, thus acting to a great extent as a buffer to protect the remainder of the car.

The brace members 44 also perform another very important function. They are so arranged that they transmit the vibrations incident to the operation of the power unit to the side sill construction at the sides of the car. The length and comparative lightness of the center sill members renders them susceptible to vibration and were the vibrations of the operating power unit transferred directly to them, especially if the vibrations of the power unit synchronized with the vibrations or segmental vibrations of these members, there would soon be built up an objectional vibration that would affect the whole car.

In order to avoid this objection, the brace members 44 are attached at their rear ends to the side sill members adjacent to cross bearers that in turn are located at or adjacent to the points of contraflexure, whereby the whole depth of the side frame of the car, considered as a girder, resists such vibration. The points of contraflexure of the side sills are the points of minimum vibration of those sills and are determined by the effect of the load on the sills between the supporting bolsters 37 to which the car trucks are attached and between each bolster 37 and the adjacent extreme end of the sill. Consequently, since the cross-bearers 39 are rigidly secured to the points of contraflexure and to the center sills, any vibration of the engine transmitted rearwardly along the center sill will be damped by the cross-bearers at their point of attachment thereto. The period of vibration of the side frame naturally due to its moment of inertia and extreme depth is such that it not only does not magnify the vibration of the power plant, but rather deadens any vibration that may be transmitted to it.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that various changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

We claim as our invention:

1. In a railway car, the combination of comparatively light center sills and side sills, bolster diaphragm members rigidly secured to said center and side sills, a bolster cover plate extending over said sills and members and rigidly secured thereto, a power unit mounted on said plate, a pair of brace members secured to said center sills adjacent to said diaphragm members and extending divergently rearwardly and secured to said side sills adjacent to a point of contraflexure of said side sills for dampening vibration of said power unit during its operation.

2. In a railway car, the combination of comparatively light center sills and side sills, bolster diaphragm members rigidly secured to said center and side sills, a power unit above said bolster diaphragm members, cross-bearers rigidly secured to said center sill and extending transversely to said car, a pair of brace members secured to said center sill adjacent to said diaphragm members and extending divergently rearwardly, and means for securing said cross-bearers and braces rigidly to said side sills adjacent to a point of contraflexure of said side sills for dampening the vibration of said power unit during its operation.

3. In a railway car, the combination of comparatively light center sills and side sills, bolster diaphragm members rigidly secured to said center and side sills, a power unit above said bolster diaphragm members, cross-bearers rigidly secured to said center sill and to said side sills adjacent to a point of contraflexure of said side sills whereby vibrations of said power unit transmitted rearwardly along said center sill during the operation of said unit will be dampened by said cross-bearers.

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