

Jan. 7, 1958

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2,818,982

CUSHION UNDERFRAMES

Filed Sept. 30, 1954

2 Sheets-Sheet 1

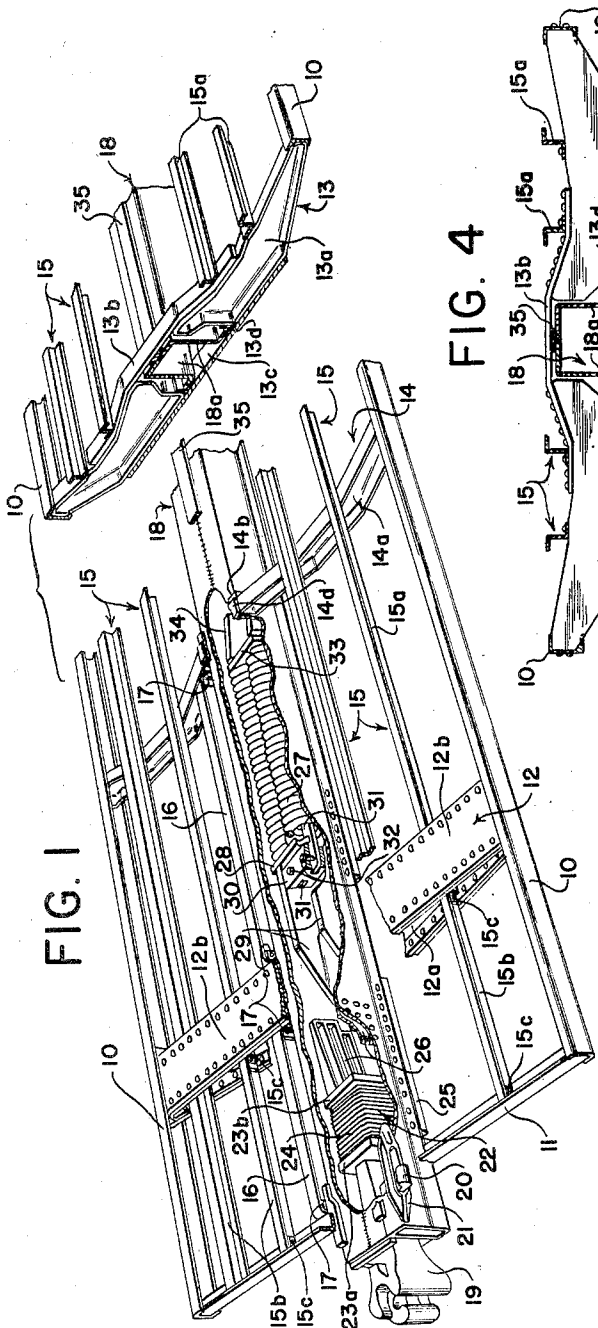


FIG. 4

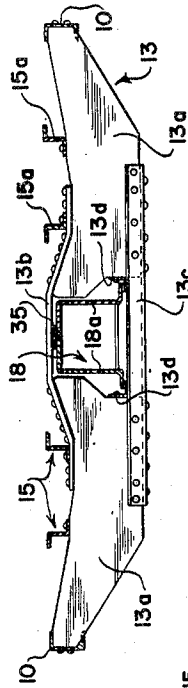
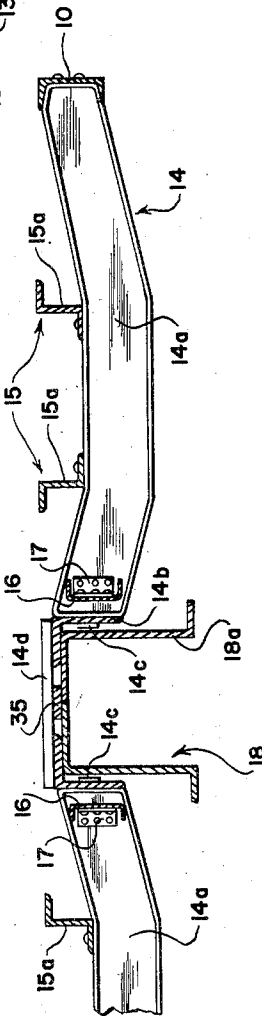


FIG. 5



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FIG. 2

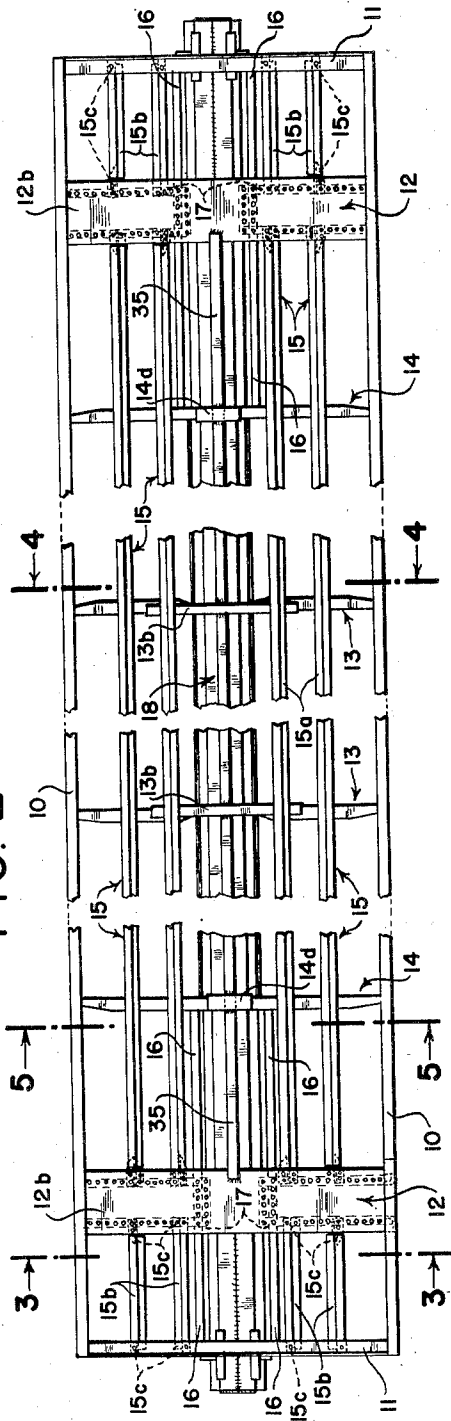
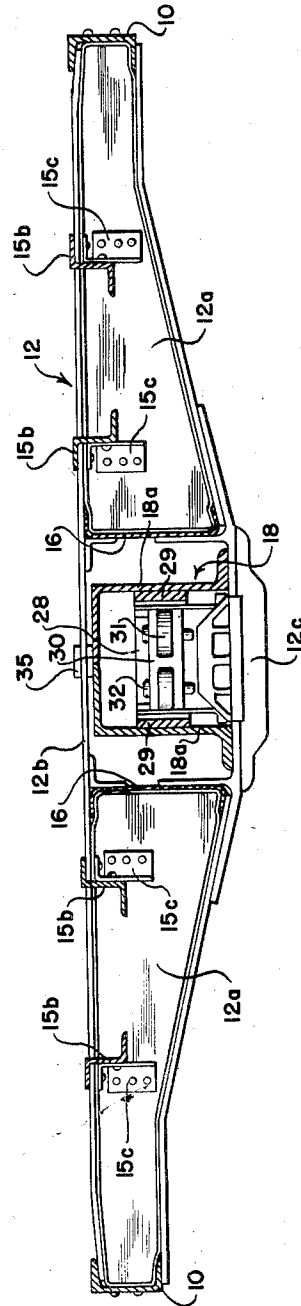


FIG. 3



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2,818,982

CUSHION UNDERFRAMES

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Application September 30, 1954, Serial No. 459,424

6 Claims. (Cl. 213—8)

This invention relates to cushion underframes for use on railway cars, that is, underframes, which include a rigid draft and buffing column extending substantially the length of the car and attached at its ends to the couplers, the column being movable endwise against the resistance of cushioning means when forces in buff and draft are applied to the couplers. More particularly, the invention is concerned with a novel cushion underframe, which is superior to prior similar underframes, in that it has substantially increased capacity with little or no increase in weight and is less expensive to construct.

In present cushion underframes of the Duryea type, as disclosed in Duryea Patent 1,693,194, issued November 27, 1928, the underframe proper ordinarily comprises side sills extending longitudinally of the car, bolsters near each end of the car, cross bearers at the door posts at the ends of the car door openings, and one or more additional cross bearers between each door post and the adjacent bolster, depending upon the length of the car. Such a cross bearer is a structural member which, like a bolster, extends from one side sill to the other, and the bolsters and cross bearers support the longitudinal members or stringers, on which the car floor rests. The bolsters and cross bearers have openings midway between their ends with the bottom of the opening in a bolster closed by a center filler casting, while the bottom of the opening through a cross bearer is closed by a tie bar. The rigid draft and buffing column extends through the openings in the bolsters and cross bearers and is supported by the center filler castings and the tie bars. Load is transmitted to the upper side of the column by a wear strip, which extends along the upper side of the column between the bolsters, and the load so applied causes the development of friction between the strip and the upper side of the column upon endwise movement of the column. Friction also develops during movement of the column between the column and the center filler castings and tie bars, partly because of the applied load and partly because of the weight of the column. With the construction described, the load, which is transmitted through the wear strip to the upper side of the column, is derived from that part of the car lading resting on the axial area of the car floor above the column.

In railway cars, which are equipped with draft gears and include fixed longitudinal sills, the underframe includes bolsters near opposite ends of the car, a pair of cross bearers ordinarily located at the door posts, and cross ties, which are normally flanged plates having their outer ends attached to the side sills and their inner ends attached to the adjacent longitudinal sill. Such cross ties are lighter in weight and less expensive to make than cross bearers, but it has not been possible to make use of them in cushion underframes, as heretofore constructed, since inner ends of the cross ties cannot be attached to the moving draft and buffing column.

The present invention is directed to the provision of a cushion underframe, in which an increase in capacity without increase in weight is obtained by the use of

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cross ties of novel construction. The new underframe includes side sills connected by a pair of bolsters and a pair of cross bearers, which may be disposed at the door posts. In addition, the underframe contains floating cross ties, that is, cross ties having their outer ends secured to the side sills and their inner ends resting on the upper side of the draft and buffing column and supported thereby. The inner ends of aligned cross ties are connected by a tie plate resting upon and secured to the wear strip, which extends along and rests upon the upper side of the column, and the cross ties transmit to the column the load carried by areas of the car floor on opposite sides of the column and extending about halfway to the side sills. The cross ties and wear strip thus transmit to the column of the new underframe a substantially greater load than would be transmitted by the wear strip of a cushion underframe of the construction heretofore employed and the application of the increased load to the column results in the development of greater friction with a greater absorption of the forces in buff and draft applied to the column. The total weight of the group of cross ties required in a form of the new underframe for a car of given length is not substantially greater and may be less than the total weight of the cross bearers in a conventional cushion underframe for such a car. As the cost of such cross ties is no greater than that of the cross bearers, the new cushion underframe may thus afford a substantial increase in capacity over present underframes without substantial increase in either weight or cost and with a possible reduction in both.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which

Fig. 1 is a fragmentary perspective view of a cushion underframe embodying the invention;

Fig. 2 is a fragmentary plan view of the underframe of Fig. 1; and

Figs. 3, 4, and 5 are sectional views on the lines 3—3, 4—4, and 5—5, respectively, of Fig. 2.

The underframe illustrated in the drawings comprises side sills 10 extending longitudinally of the car and connected by end sills 11, a pair of bolsters 12, and a number of cross bearers 13 and cross ties 14. While the number of cross bearers and cross ties employed will vary with the length of the car and its capacity, an underframe for a typical car includes a pair of cross bearers lying at opposite ends of the door openings, a pair of aligned cross ties between the cross bearers, and pairs of aligned cross ties between each cross bearer and the adjacent bolster. The underframe also includes a plurality of longitudinal members or stringers 15, each of which includes a major section 15a extending between the bolsters and resting on the cross bearers and cross ties and end sections 15b secured to the outer face of each bolster by brackets 15c and extending to the adjacent end sill.

Each of the bolsters is of conventional construction and includes a pair of box structures 12a extending inwardly from the respective side sills with their inner ends spaced apart to provide an opening between them. The box structures have a common cover plate 12b extending from one side sill to the other across the top of the opening and they are connected at the bottom by a center filler casting 12c, which closes the bottom of the opening. A pair of torque arms 16 of channel form are secured to each end sill and extend inwardly between the respective bolster side sections and the center filler casting of the bolster to the adjacent cross ties, to which they are attached by brackets 17.

Each cross bearer 13 is of standard construction and comprises a pair of flanged plates 13a having their outer ends connected to the side sills 10 and their inner ends spaced apart to provide an opening in alignment with the openings through the bolsters between the cover plate 12b

and the casting 12c thereof. The plates 13a are connected at the top by a cover plate 13b and at the bottom by a tie bar 13c. Angle irons 13d secured to the inner ends of plates 13a have horizontal flanges resting on top of the tie bar 13c. The angle irons connect the cross bearers and the column rests upon wear plates on the horizontal flanges of the angle irons at the cross bearers. The plates 13a are cut away at their upper ends, so that the main sections 15a of the stringers may be secured thereto and to the top of the cover plate 13b with the tops of the stringers lying in a plane.

Each cross tie 14 comprises a flanged plate 14a secured at its outer end to one of the side sills 10 and having its top dipping down to provide support for the stringer sections 15a with the top flanges of the latter in the desired plane. The inner ends of the plates 14a of aligned cross ties are spaced apart a distance corresponding to the spacing between the plates 13a of the cross bearers and are provided with angle irons 14b having vertical flanges secured to the ends of the plates and carrying wear strips 14c on their opposed faces. The horizontal flanges of the angle irons lie at the top of the cross ties and extend toward each other. A cover plate 14d connects the horizontal flanges of the angle irons. If desired, aligned cross ties may be connected by cross members extending beneath and providing support for the column.

The draft and buffing column 18 extends lengthwise of the underframe through the aligned openings through the bolsters, cross bearers, and cross ties. The column is formed of a pair of Z-bars 18a having their top flanges abutting and secured together and the bottom flanges of the bars rest upon the center filler castings 12c of the bolsters and the tie bars 13c of the cross bearers. At each end of the column, it carries a coupler 19, the shank of which enters the column and is secured in place by a key 20. The key extends through openings through the column, which are reinforced by cheek plates 21, and through an opening in the coupler shank. At its inner end, the shank of each coupler abuts a cushioning unit 22, which may comprise a pair of front and rear followers 23a, 23b separated by a group of rubber springs 24. The cushioning unit is supported on a carrier plate 25 extending between the bottom flanges of the column and the rear follower 23b of the unit abuts a pair of stop members 26 secured to the inner faces of the vertical webs of the column.

The column is movable endwise and its movements are resisted by cushioning means, which may comprise pairs of coil springs 27 mounted inward from each bolster and bearing at their outer ends against a follower 28 abutting the inner ends of extensions 29 from the center filler casting of the bolster. The extensions 29 are connected by a cross member 30, which may be integral therewith and abut follower 28, and headed links 31 extending through the respective springs have rings at one end, which lie within openings in member 30 and are held in place by pins 32. The inner ends of the springs abut a follower 33, which bears against stops 34 secured to the inner faces of the vertical webs of the column. The links pass through openings in follower 33 and their heads engage the inner face thereof. With this arrangement, movement of the column in either direction results in compression of the pairs of springs 27 at each end.

A wear strip 35 extends lengthwise along the upper side of the column and its ends overlie and are secured to the cover plates of the bolsters. The strip passes beneath and is secured to the cover plates 13b of the cross bearers and the cover plates 14d of the pairs of cross ties. When the flooring of the car is installed, wooden blocks or strips are placed to support the flooring above the wear strip and, with this arrangement, the weight of the lading along the central axis of the car is transmitted through the strip to the column. In addition, the load on the area of the floor extending a substantial distance out-

wardly from the column is transmitted to the latter at each cross tie through the tie plate connecting aligned cross ties. As a result, the friction generated upon movement of the column is greater than that which develops upon the movement of the column of a cushion underframe of the prior construction. The new cushion underframe, accordingly, has greater capacity than its predecessors with such increase in capacity attained through the use of the floating cross ties. As pairs of cross ties are lighter in weight and less expensive to construct than cross bearers, the replacement of the cross bearers of former underframes by the pairs of cross ties in the new one provides the stated increase in capacity with little or no increase in cost or weight.

15 We claim:

1. In a cushion underframe for railway cars, the combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, cross bearers connecting the side sills between the bolsters, the bolsters and cross bearers having aligned openings, a rigid draft and buffing column extending lengthwise of the underframe through said openings and resting on parts of the bolsters and cross bearers, and a plurality of cross ties each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolsters, cross bearers, and cross ties.

2. In a cushion underframe for railway cars, the combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, cross bearers connecting the side sills between the bolsters, the bolsters and cross bearers having aligned openings, a rigid draft and buffing column extending lengthwise of the underframe through said openings and resting on parts of the bolsters and cross bearers, a plurality of cross ties aligned in pairs and each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolster, cross bearers, and cross ties, and a cover plate connecting the inner ends of the cross ties of each pair.

3. In a cushion underframe for railway cars, the combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, cross bearers connecting the side sills between the bolsters, the bolsters and cross bearers having aligned openings, a rigid draft and buffing column extending lengthwise of the underframe through said openings and resting on parts of the bolsters and cross bearers, a plurality of cross ties aligned in pairs and each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolsters, cross bearers, and cross ties, a cover plate connecting the inner ends of the cross ties of each pair, and a wear strip connected at its ends to the bolsters and resting upon the upper side of the column, the strip passing beneath and being secured to the cover plates of the pairs of cross ties.

4. In a cushion underframe for railways cars, the combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, each bolster having an opening through it closed at the bottom by a center filler casting, cross bearers connecting the side sills between the bolsters and having openings aligned with the bolster openings and closed at the bottom by tie bars, a rigid draft and buffing column extending lengthwise of the underframe through the bolster and cross bearer openings and resting upon the bolster center filler castings and the cross bearer tie bars, and a plurality of cross ties each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolsters, cross bearers, and cross ties.

5. In a cushion underframe for railway cars, the com-

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5 combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, cross bearers connecting the side sills between the bolsters, the bolsters and cross bearers having aligned openings, a rigid draft and buffing column extending lengthwise of the underframe through said openings and resting on parts of the bolsters and cross bearers, a plurality of cross ties each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolsters, cross bearers, and cross ties, and cushioning means interposed between the column and at least one of the bolsters and resisting movement of the column in either direction from a central position.

6. In a cushion underframe for railway cars, the combination of end sills, side sills connecting the end sills, a pair of bolsters connecting the side sills adjacent the end sills, each bolster having an opening through it closed at the bottom by a center filler casting, cross bearers connecting the side sills between the bolsters and having openings aligned with the bolster openings and closed at the

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bottom by tie bars and at the top by cover plates, a rigid draft and buffing column extending lengthwise of the underframe through the bolster and cross bearer openings and resting upon the bolster center filler castings and the cross bearer tie bars, a plurality of cross ties aligned in pairs and each having its outer end secured to one of the side sills and its inner end resting upon the upper side of the column, the column being movable endwise relatively to the bolsters, cross bearers, and cross ties, a cover plate connecting the inner ends of the cross ties of each pair, and a wear strip connected at its ends to the bolsters, the strip passing beneath and being secured to the cover plates of the cross bearers and cross ties and resting upon the upper side of the column.

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