

April 25, 1939.

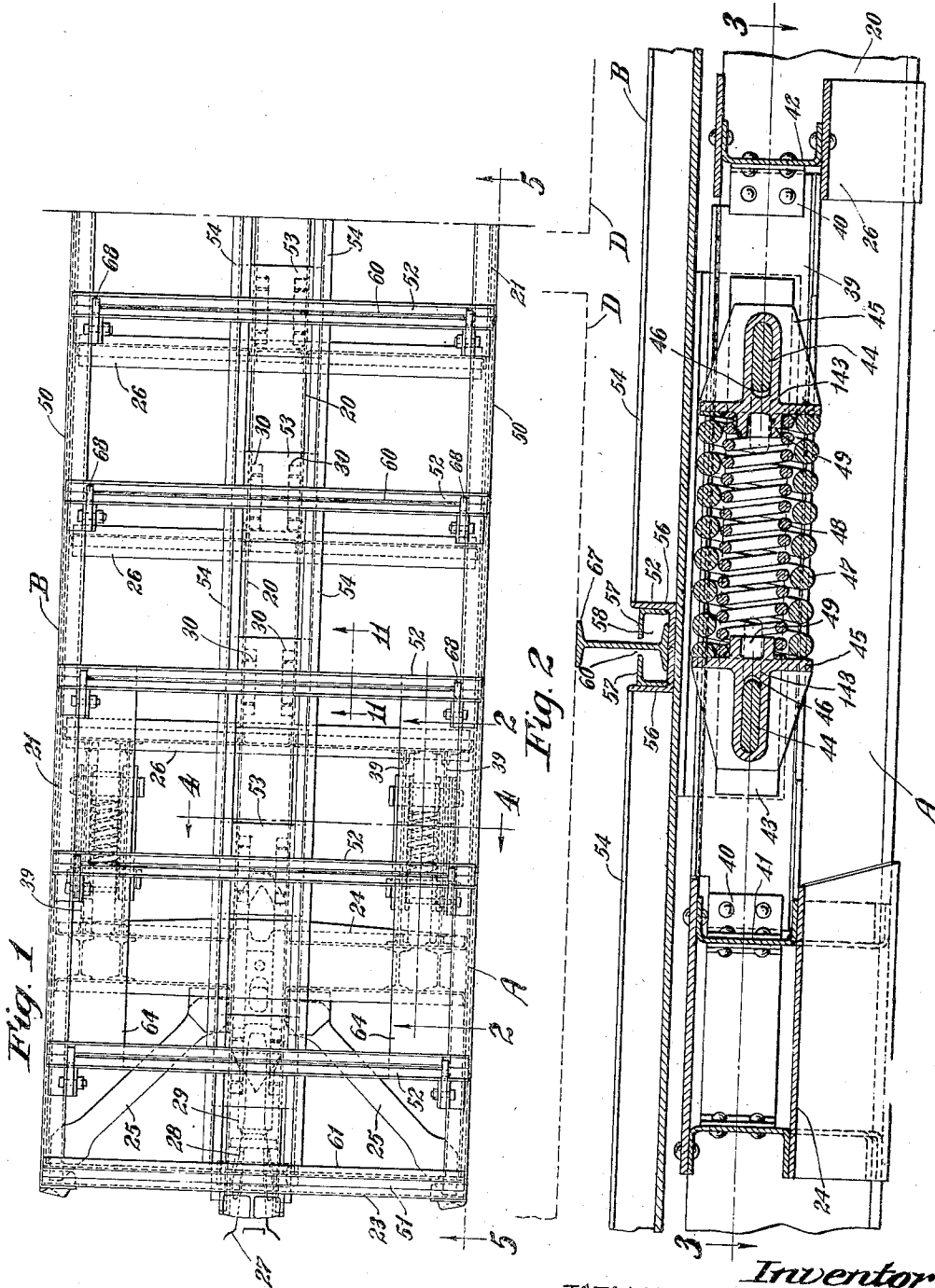
W. M. DWYER

2,155,533

CAR CONSTRUCTION

Filed Aug. 31, 1936

4 Sheets-Sheet 1



Inventor
William M. Dwyer
By Henry Tuchs
Atty.

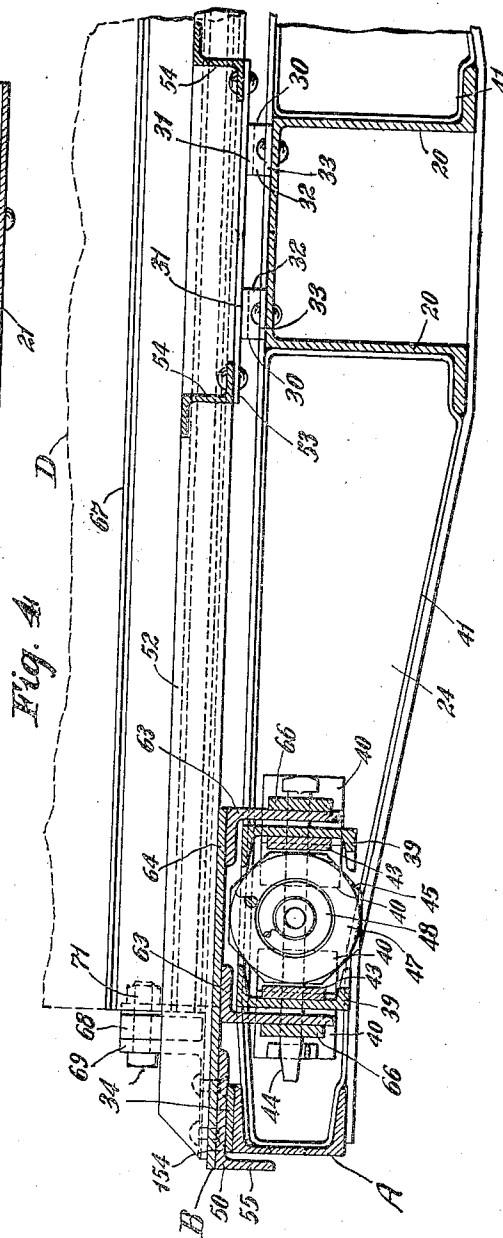
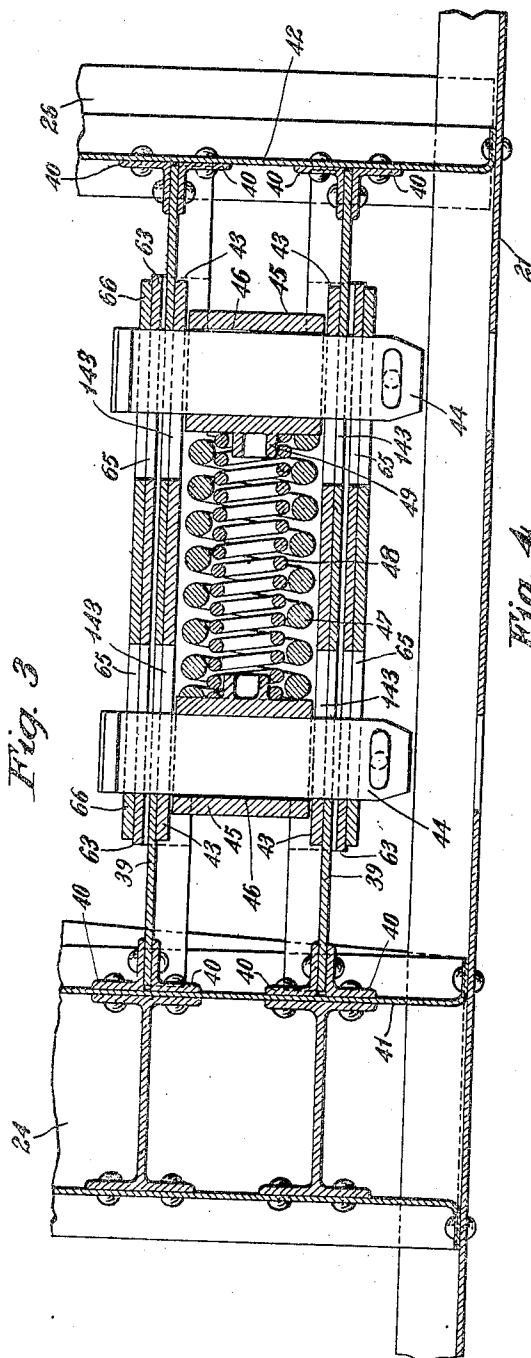
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W. M. DWYER
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4 Sheets-Sheet 2



Inventor
William M. Dwyer
By Henry Fuchs
Atty.

April 25, 1939.

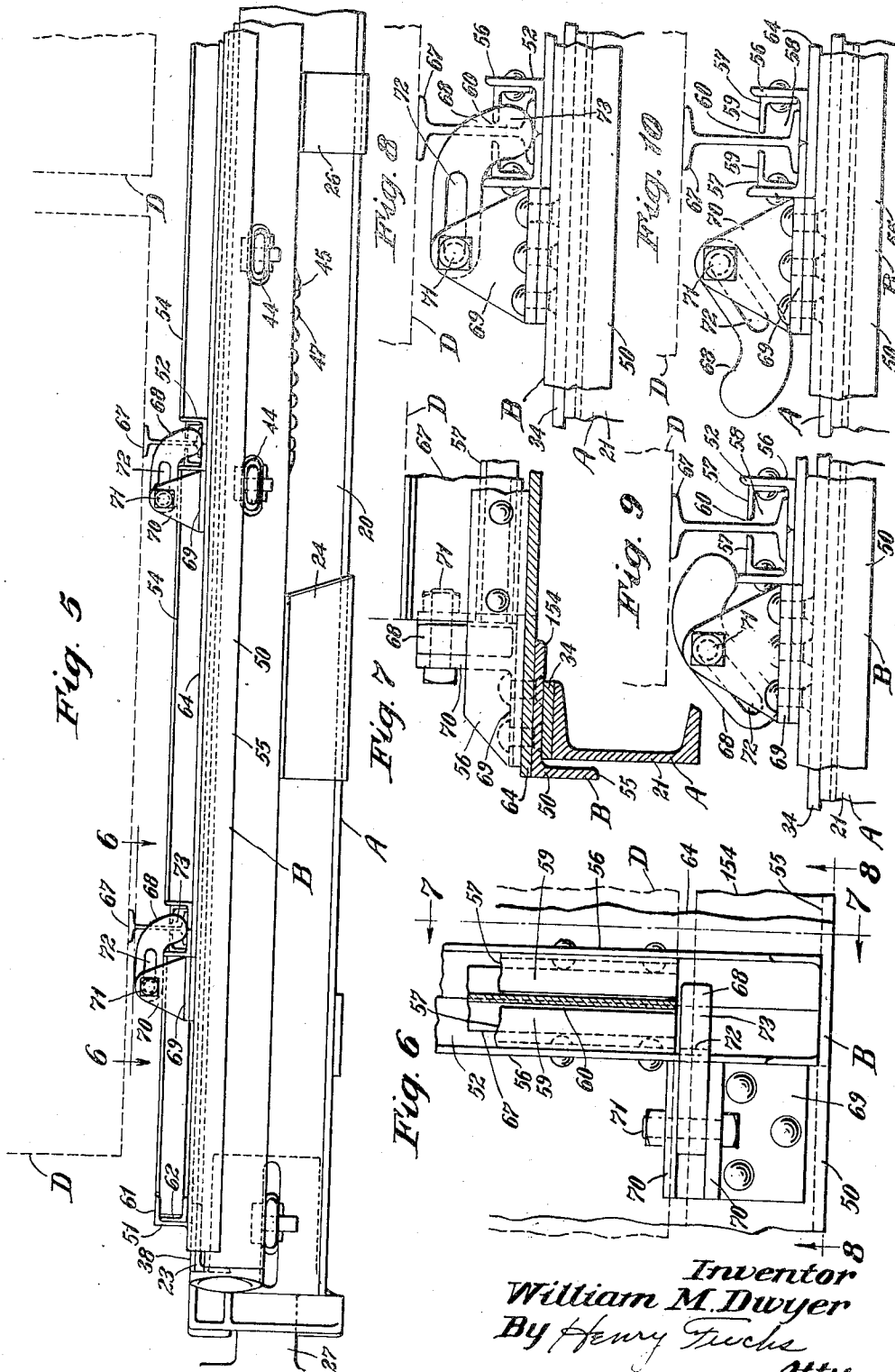
W. M. DWYER

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4 Sheets-Sheet 3



Inventor
William M. Dwyer
By Henry Truchs
Atty.

April 25, 1939.

W. M. DWYER
CAR CONSTRUCTION

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Fig. 12

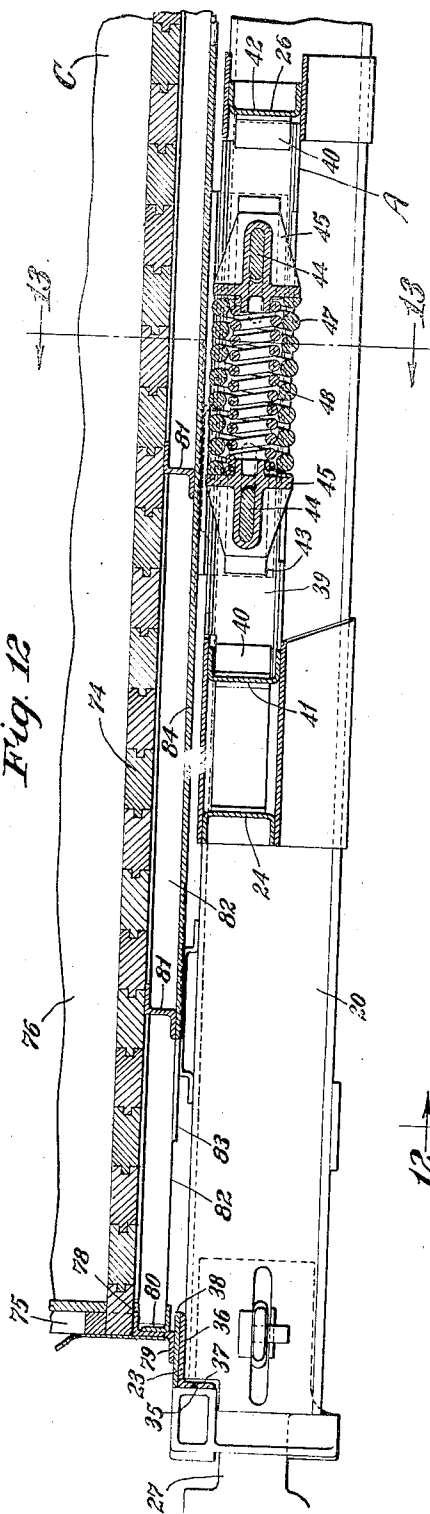


Fig. 11

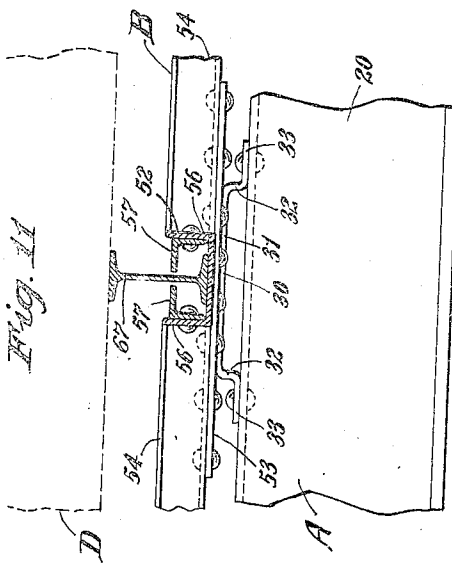
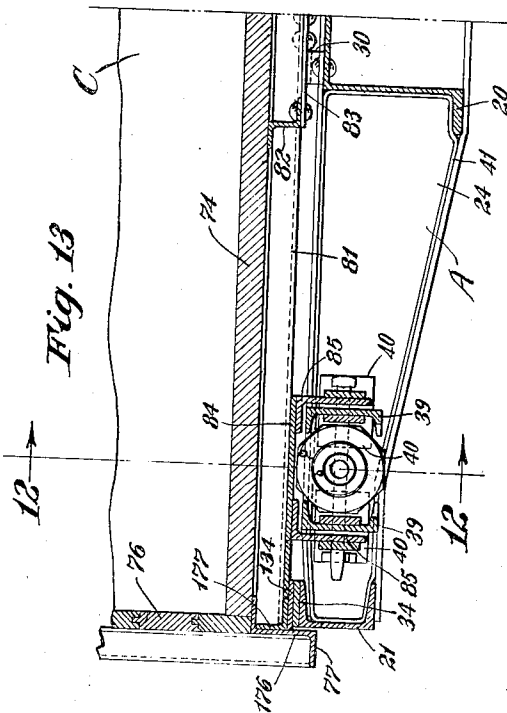


Fig. 13



Inventor
William M. Dwyer
By Henry Tuchs
Atty.

UNITED STATES PATENT OFFICE

2,155,533

CAR CONSTRUCTION

William M. Dwyer, Chicago, Ill., assignor to W.
H. Miner, Inc., Chicago, Ill., a corporation of
Delaware

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4 Claims. (Cl. 105—454)

This invention relates to improvements in car construction.

One object of the invention is to provide a freight car construction comprising an underframe structure and a superimposed car body, wherein the underframe structure and body are so designed that different types or classes of car bodies may be mounted on the underframe without modification of the structure of either part of the car.

Another object of the invention is to provide a car structure wherein the body of the car is mounted for cushioned floating movement on the underframe to protect the lading from damage due to shocks encountered in service.

A more specific object of the invention is to provide a floating car body mounted on an underframe structure, wherein the car body is slidable lengthwise on the underframe structure, and movement thereof is cushioned to protect the lading, and wherein the body is detachable from the underframe structure to permit substitution of another class of car body, whereby the same underframe structure is adapted for use with different car bodies, thus making it possible to standardize the underframe structure throughout for all freight cars.

Other objects of the invention will more clearly appear from the description and claims herein after following.

In the drawings forming a part of this specification, Figure 1 is a top plan view of one end portion of a container car, illustrating my improvements in connection therewith. Figure 2 is an enlarged vertical sectional view, partly broken away, corresponding to the line 2—2 of Figure 1, indicating portions of the containers in dotted lines and showing one of the supporting I-beams for one of the containers in vertical section. Figure 3 is a broken, horizontal sectional view, corresponding substantially to the line 3—3 of Figure 2. Figure 4 is a broken, transverse vertical sectional view, on an enlarged scale, corresponding substantially to the line 4—4 of Figure 1. Figure 5 is a side elevational view, on an enlarged scale and partly broken away, looking in the direction of the arrows 5—5 of Figure 1. Figure 6 is a broken horizontal sectional view, on a still further enlarged scale, corresponding substantially to the line 6—6 of Figure 5. Figure 7 is a vertical sectional view, corresponding substantially to the line 7—7 of Figure 6. Figure 8 is an elevational view looking in the direction of the arrows 8—8 of Figure 6. Figures 9 and 10 are views similar to Figure 8, but showing the locking member

in different positions. Figure 11 is a broken vertical sectional view, on an enlarged scale, corresponding substantially to the line 11—11 of Figure 1. Figure 12 is a view similar to Figure 2, on a slightly reduced scale, illustrating another type or class of car body, mounted on the underframe. Figure 13 is a broken vertical sectional view, corresponding substantially to the line 13—13 of Figure 12.

In carrying out my invention, I provide an underframe structure A on which a car body is detachably mounted, the car body being indicated by B in Figures 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11, and by C in Figures 12 and 13. The car body B is of the container carrying type while the car body C is of the gondola type. Figure 1 shows one end portion of the car structure, that is, approximately half of the length of the car from the transverse center line to the outer end thereof, it being understood that the structure from said center line to the opposite end of the car is an exact duplicate of the half of the car shown in Figure 1.

The underframe A of the car comprises longitudinally disposed, spaced, center or draft sills 20, extending from end to end of the car, side sills 21—21, an end sill 23 at each end of the car connected to the side sills and center sills, a transverse body bolster 24 at each end of the car extending from one side sill to the other, diagonal braces 25—25 at each end of the car extending from the corresponding body bolster to the opposite corners at said end of the car, and spaced transom members or cross-bearers 26—26 extending from one side sill to the other. The underframe structure thus far described is of well-known standard design and the center sill 20 is of the type comprising spaced, longitudinally extending, vertical sill members connected by an integral cover plate as shown most clearly in Figure 4. In other words, the center sill is in the form of an inverted channel member. The car is provided with the usual standard coupler 27 at each end which is operatively connected by means of the ordinary yoke 28 to the usual shock absorbing mechanism 29 mounted in the standard pocket provided between the spaced sill members of the draft or center sill member 20.

Pairs of spaced supports 30—30 are mounted on top of the draft sill structure 20, the pairs being arranged in transverse alignment and spaced lengthwise of the car, as shown in Figure 1. The members of each pair are at opposite sides of the center sill 20. Each support 30 is in the form of a bracket including a horizontally dis-

posed, flat, top platelike section 31, upright leg portions 32—32 depending from the platelike section, and horizontally disposed foot members 33—33 in the form of right angular outturned flanges at the lower ends of the legs. The brackets 30 are fixed to the cover plate section of the draft sill 20 and any well-known securing means may be provided for this purpose. As shown in the drawings, rivets extending through the cover plate of the draft sill 20 and the flanges of the brackets 30 are preferably employed. The supporting brackets 30—30 carry the car body and slidably guide the same as hereinafter pointed out. The side sills 21—21 are of channel-shape, as clearly shown in Figures 4 and 13 and have longitudinally extending, flat bearing plates 34—34 mounted on the upper flanges thereof. The bearing plates 34—34 are rigidly fixed to the side sills 21—21.

The end sill structure 23 at each end of the car includes an end sill member proper 35 which is in the form of an angle beam having one of the flanges 36 thereof disposed horizontally and the other flange 37 thereof depending from the horizontal flange 36. The end sill member 35 is rigidly secured to the other parts of the underframe structure and is covered by a flat wear plate 38 overlying the horizontal flange 36 and rigidly secured thereto.

Adjacent to each end of the car and at opposite sides thereof, pairs of spaced, longitudinally extending, vertically disposed channel beams or sills 39—39 are provided. Each pair of channel beams or sills 39 is disposed inwardly of the corresponding side sill 21 between the body bolster 24 and the adjacent cross bearer 26, inwardly of the bolster. As shown most clearly in Figures 1, 2, 3, and 12, the opposite ends of the channel beams or sills 39—39 are fixed respectively to the body bolster 24 and the adjacent cross bearer 26, angle plates 40—40 being provided for this purpose. The angle plates 40—40 at each end of each beam or sill 39 are disposed respectively on the inner and outer sides thereof and are riveted thereto. The angle plates 40—40 at the front ends of the sills 39—39 are preferably riveted to the vertical web of the inner transverse channel member or diaphragm 41 of the body bolster, and the angle plates 40—40 at the rear ends of said beams 39—39 are riveted to the vertical web of the transverse channel member 42, which channel member forms a part of the cross bearer immediately in back of the body bolster 24. The vertical web of each channel beam is reinforced on the inner side by a cheek plate 43 which is rigidly secured thereto. The webs of each pair of beams or sill members 39—39 and the reinforcing cheek plates are provided with front and rear sets of transversely aligned key slots 143—143 and 143—143, slidably accommodating key members 44—44. Front and rear followers 45—45 are mounted between the beam members 39—39 of each pair and are supported by the key members 44—44 which extend through the followers, the key members closely fitting the key openings 46—46 provided in the followers. Each follower and the corresponding key thus move in unison. Outer and inner cushioning springs 47 and 48 are interposed between the front and rear followers 45—45 associated with each pair of sills 39—39, the inner spring 48 being lighter than the outer spring and being held centered by bosses 49—49 on the front and rear followers 45—45 engaged within the opposite ends of the coil 48.

The car body B, which is carried by the un-

derframe A, is in the form of a skeleton structure including spaced, longitudinally disposed side sills 50—50 extending from end to end of the car body, a transverse end sill 51 at each end of the car connecting the side sills, transverse cross bearers 52—52 arranged in spaced relation lengthwise of the car, supporting bearing plates 53—53 secured to the underneath sides of the cross bearers 52—52 and a plurality of longitudinally extending, laterally spaced beams 54—54 and 54—54 of Z-shaped cross section, secured to the bearing plates 53—53 and forming, in effect, spaced center sill members. Each side sill member 50 is in the form of an angle beam, as clearly shown in Figures 4 and 7, having one of the flanges 154 thereof disposed horizontally and secured to the underneath sides of the outer ends of the cross bearers 52—52, and having the other flange 55 thereof depending from the outer edge of the flange 154 and overhanging the outer side of the corresponding side sill 21 of the underframe A. Each cross bearer 52 includes two angle beams 56—56 arranged to form a channel member, and angle bars 57—57 secured to the inner sides of the vertical flanges of the angle beams 56—56 forming said channel member. The angle beams 57—57 have their vertical flanges riveted or otherwise secured to the angle beams 56—56. The horizontal flanges of said angle beams are disposed uppermost, in horizontal alignment, and project toward each other. The angle beams 57—57, together with the channel member, thus provide a guideway 59 having laterally, inwardly directed, top walls 59—59 defining a slot 60 therebetween. The bearing plates 53—53 correspond in number to the cross bearers 52—52 and support said cross bearers along the central longitudinal axis of the car. As shown most clearly in Figures 1 and 11, each bearing plate 53 projects beyond opposite sides of the associated cross bearer 52 and serves as a connection between the ends of adjacent longitudinal Z-beams 54—54 of the center sill structure. As shown most clearly in Figure 4, each Z-beam 54 has the central web thereof disposed vertically and the top and bottom flanges thereof directed respectively outwardly and inwardly. The Z-beams 54—54 of the opposed center sill members are disposed at opposite sides of the plates 53 and have their bottom flanges at opposite ends of each beam 54 bearing on and secured to the upper sides of the plates 53—53. As will be evident, the plates 53—53, together with the longitudinally disposed, laterally spaced Z-beams 54—54, which are secured to these plates, thus form a continuous center sill structure extending from end to end of the car. The cross bearers are preferably also secured to the plates 53—53 to rigidify the car body structure.

The end sill member 51 at each end of the car body structure B comprises a Z-beam 61 and an angle beam 62 secured to the Z-beam. The top and bottom flanges of the Z-beam 61 project respectively inwardly and outwardly and the angle beam 62 has one of the flanges thereof disposed vertically and fixed to the inner face of the vertical web of the Z-beam 61. The other flange of the angle beam 62 projects rearwardly from the lower edge of the vertical flange thereof and is in a horizontal plane which is raised slightly above the plane of the outwardly projecting lower flange of the Z-beam 61. The top flange of the Z-beam 61 and the horizontal bottom flange of the angle beam 62 embrace the outer ends of the center sill members 54—54 and are secured thereto. The outer ends of the side sills 50—50 have the hori-

68 mounted on a bracket 69 secured to the corresponding side sill 50 of the body B. The latch arm 68 is swingingly and slidably mounted between spaced, upstanding lugs 70—70 on the bracket 69 and is mounted for pivotal and sliding movement on a pivot pin 71 extending through a longitudinal slot 72 in said arm 68. At the outer end, the latch arm 68 has a laterally extending toe portion 73 adapted to be swung into position to close the open end of the guideway 58, as shown in Figures 5 and 6. When the latches at opposite ends of the cross bearers are in the latching position shown in Figures 5 and 6, the supporting I-beam of the container is blocked against movement laterally of the car and the container is securely held in position on the car. To permit removal of the containers, the latch arm 68 is moved to either of the positions shown in Figures 9 and 10, thus leaving the end openings of the guideways 58 of the cross bearers 52 unobstructed. Ordinarily, if there is no obstruction to swinging movement of the latch arm 68, the same is swung to the position shown in Figure 10, to permit application and removal of the containers. However, when containers of greater width than the spacing between the latch members at opposite ends of the cross bearers are being handled so that the projecting ends of the containers overhang the latch members and thus prevent swinging the latter on their pivots, the latch arms 68—68 may then be lifted and slid outwardly to the position shown in Figure 9, the slotted arrangement of the latch arms permitting of this movement.

35 The gondola body C, illustrated in Figures 12 and 13, comprises the usual end, side, and bottom walls, the bottom wall being indicated by 74, one of the end walls by 75, and one of the side walls by 76. The body C is provided with side sills 176, each comprising a beam 77 of Z-shaped cross section and an angle beam 177. The beam 77 has the upper flange thereof directed inwardly and the lower flange thereof directed outwardly, and the vertical flange of the angle beam 177 is secured to the inner side of the vertical web of the beam 77. The other flange of the angle beam 177 is disposed horizontally and is directed inwardly. As shown in Figure 13, the horizontal flange of the beam 177 has a bearing plate 134 secured to its under side which is slidably supported on the bearing plate 34 of the side sill 21 of the underframe A. The inwardly directed top flange of the Z-beam is fixed to the bottom wall 74 of the gondola body of the car.

55 At each end, the body C is provided with an end sill member 78 including a beam 79 of Z-shaped cross section and an angle beam 80 having the vertical flange thereof secured to the vertical web of the Z-beam 79. The upper flange of the Z-beam 79 is directed inwardly and is secured to the bottom 74 of the gondola body of the car. The lower flange of the Z-beam 79 is directed outwardly and is slidably supported on the wear or bearing plate 33 of the end sill 23 of the underframe A. The lower flange of the angle beam 80 is directed inwardly and is disposed in a plane directly above the lower flange of the Z-beam 79.

The body C is also provided with cross bearers 81—81 in the form of beams of Z-shaped cross section, having the top flanges thereof disposed horizontally and secured to the bottom 74 of the car body. The opposite end of each cross bearer 81 is embraced by the inwardly directed top and bottom flanges of the beams 77 and 177 of the side sills 176 and is suitably secured thereto. The

car body C is further provided with longitudinally disposed center sill members, composed of a plurality of spaced, longitudinally extending Z-beams 82 located between the cross bearers 81—81 and extending from one to the other and secured thereto. The outermost Z-beams 82 have their outer ends secured to the end sills 78—78, said outer ends being fixed to the inwardly extending top and bottom flanges of the beams 79 and 80 of the end sills 78—78. The center sill structure of the car body C includes bearing or wear plates 83 similar to the bearing plates 53 hereinbefore described in connection with the body B. The wear plates 83 slidably bear on the upstanding brackets 30—30 of the underframe structure A and are fixed to the bottom flanges of the Z-beam 81 of the center sill structure. At opposite sides at each end of the car body C, a supporting plate 84 is provided which carries the spaced sill members 85—85 which are in all respects similar to the sill members 63—63 hereinbefore described in connection with the car body B, said sill members 85—85 having slots to receive the keys 44—44 for connecting the car body to the underframe car structure A and to the cushioning means of said underframe. The supporting plates 85—85 are fixed to the cross bearers 81—81—81 and the corresponding side sill 176.

The car body C is cushioned against shocks in precisely the same manner as the car body B hereinbefore described.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a railway car, the combination with an underframe including center sills, side sills, bolsters at opposite ends of the car, and transverse cross-bearers connecting the side sills and center sills; of a lading carrying car body supported on said underframe; two pairs of laterally spaced beams at each end of the car, one of said pairs being located at one side of the car and the other pair at the opposite side of said car, said beams being fixed to the corresponding bolster and the adjacent cross-bearer; two pairs of laterally spaced beams at each end of the car body, one of said pairs being fixed at one side of said body and the other pair being fixed at the opposite side of said body; and removable key members for detachably connecting said body to the underframe, said keys having lost motion connection with the pairs of beams of the body and underframe respectively.

2. In a railway car, the combination with an underframe structure including transverse body bolsters at opposite ends of the car, and a cross-bearer adjacent to each bolster; of a lading supporting body slidably mounted on said underframe; longitudinally extending beams at opposite sides of each end of the underframe structure, each of said beams having its outer and inner end fixed respectively to the corresponding bolster and the adjacent cross-bearer, longitudinally extending beams at opposite sides of each end of the body; and removable keys extending through said beams of the body and underframe respectively for detachably connecting the car body to the underframe.

3. In a railway car, the combination with an underframe including transverse bolsters at oppo-

zontal flanges thereof engaged between the horizontal flange of the angle beam 62 of the end sill 51 and are secured to said flange of the beam 62. The bottom flanges of the Z-beams 61—61 of the end sills 51—51 of the car body B rest and are slidable on the flat wear or bearing plates 38—38 of the end sills 23—23 at opposite ends of the car underframe. The horizontal flanges 154—154 of the side sills of the car body B rest and are slidable on the bearing plates 34—34 of the side sills 21—21 of the underframe A. The bearing plates 53—53 of the center sill structure of the car body B rest and are slidable on the upstanding brackets 30—30 of the center sill structure 20 of said underframe A. It will thus be seen that the car body B is slidably supported on the underframe structure A. It is pointed out that the depending flanges 55—55 of the side sills 50—50 of the body B embrace the upper portions of the side sills 21—21 of the underframe structure A, thus preventing lateral displacement of the car body with respect to the underframe A. Another advantage provided by these depending flanges lies in that they form effective shielding means to prevent the attendant from accidentally coming in contact with the relatively movable side sill structure 21—21 of the underframe A.

At opposite ends of the car body B and at each side thereof are provided a pair of laterally spaced, longitudinally extending, short sill members 63—63 which depend from and are secured to a planklike plate member 64, extending from the first to the third cross bearer 52 at the corresponding end of the car and fixed to the underneath sides of said first and third cross bearers and also to the underneath side of the intermediate cross bearer and the corresponding side sill member 50. The sill members 63—63 are of angular cross section and have the horizontal top flanges thereof secured to the cross bearers in any suitable manner. The sill members 63—63 are disposed on opposite sides of, and embrace the sill or beam members 39—39 at the corresponding side of the car. The sill members 63—63 are provided with front and rear, transversely aligned, slots 65—65 which are the same length as the slots 143—143 of the sill or beam members 39—39 and are adapted to accommodate the outer end portions at opposite ends of the keys 44—44. The sill members 63—63 are preferably reinforced by cheek plates 66—66 on the outer sides thereof, these cheek plates having slots registering with the slots 65—65 of said sill members 63—63.

As will be evident, when the keys 44—44 are in place, extending through the slots of the sill members 63—63 and 39—39, the car body B is securely anchored to the underframe A for movement lengthwise of said underframe and such movement is cushioned by the springs 47 and 48 reacting between the followers 45—45 and the attached keys 44—44. The sills 63—63 of the car body B, which embrace the sills 39—39 of the underframe structure A, together with said sills 39—39, form guide means for confining the car body B to longitudinal movement with respect to the underframe A.

As will be evident, the car body B may be readily detached from the underframe A by simply removing the keys 44—44. After the keys have been removed, the body B may be completely detached from the underframe and a body of different character substituted therefor, the latter being made secure to the underframe A by

merely replacing the keys 44—44. Inasmuch as four cushioning means are provided, two at each end of the car and at opposite sides thereof, ample shock absorbing capacity is provided. Further, by connecting the car body to the car underframe at opposite sides at each end of the car, by means of the sills and connecting keys, the car body is securely anchored in place and reliably guided for longitudinal movement on said underframe.

The lading of the car is fully protected against shocks by the cushioning action between the car body and the underframe, which is effected in the following manner: When a shock is imparted to the underframe structure A, the body B moves on the underframe lengthwise of the latter against the cushioning action of the four spring units located at opposite sides of the ends of the car. Assuming that the body B moves to the left, as viewed in Figures 1, 2, and 3, the key 44 at the right hand end of the springs 47 and 48 is carried to the left by shouldered engagement with the sill members 63—63, carrying the right hand spring follower 45 therewith and compressing the springs against the left hand spring follower 45, which is held against movement with respect to the underframe A by the corresponding key 44 which is in shouldered engagement with the left hand end walls of the left hand end slots of the sill members 39—39 of the underframe A. When the car body is moved to the right, as viewed in said figures, due to a shock imparted to the underframe A, the action is substantially the same but in the opposite direction, the spring follower at the left hand end being moved to the right with the car body and compressing the springs against the right hand follower 45 which is held against movement with respect to the underframe A.

The car body B is especially designed for use with containers and such containers are shown in dotted lines in Figures 2, 4, 5, 7, 8, 9, 10, and 11, and are indicated by D—D. The containers D—D are of well-known type, and each is provided with the usual spaced supporting I-beams 67—67, as shown in Figures 2, 4, 5, 6, 7, 8, 9, 10, and 11. When the containers D—D are loaded on the car, they are supported through the I-beams 67—67 on the cross bearers 52—52 of the car body B, these cross bearers being spaced apart a distance corresponding to the spacing of the I-beams 67—67. In loading the containers on the car, the supporting I-beams 67—67 of the containers are slid endwise into the guide openings 58—58 of the cross bearers, the web of the I-beam being accommodated in the slot 60. As will be evident, when the containers have been placed in position on the car, the overhanging top walls 59—59 of the cross bearers prevent lifting of the containers from the car, and the channel construction of the guideway 58, which receives the lower flanges of the I-beam, and the slot of the top wall of said guideway, which accommodates the web of the I-beam, retain said containers against longitudinal displacement with respect to the car body B.

In order to lock the containers in position against lateral displacement on the car and accidental disengagement from the guide channels of the cross bearers 52—52 of the body B, I provide latching means which cooperates with opposite ends of the I-beams 67—67 of the containers. This latch means is located at opposite ends of each cross bearer 52 and the latch means at each end comprises a pivoted and sliding latch arm

site ends of the car and a cross-bearer at each end of the car, inwardly of and adjacent to the corresponding bolster; of longitudinally extending beams on said body and underframe respectively; 5 and removable keys for operatively connecting the beams of the body to the beams of the underframe, said cooperating body and underframe beams being arranged in sets at opposite sides of each end of the car, said underframe beams 10 being fixed to and extending from the transverse bolsters to the adjacent cross-bearers.

4. In a railway car, the combination with an underframe structure including center sills, side sills, end sills, a transverse bolster at each end 15 of said underframe and transverse cross-bearers connecting the side and center sills; of a lading carrying body slidably mounted on said under-

frame; cooperating pairs of longitudinally extending beams on said body and underframe, said pairs of cooperating beams being arranged in sets at opposite sides of each end of the car, the body beams being rigidly fixed to said body and each 5 underframe beam having its opposite ends fixed respectively to the corresponding bolster and the adjacent cross-bearer, each beam of each pair having front and rear key slots; removable keys extending through the front and rear slots of the 10 pairs of each set of beams for detachably connecting the car body to the underframe; and cushioning means yieldingly opposing relative movement of said keys to cushion shocks between 15 said body and underframe.

WILLIAM M. DWYER.