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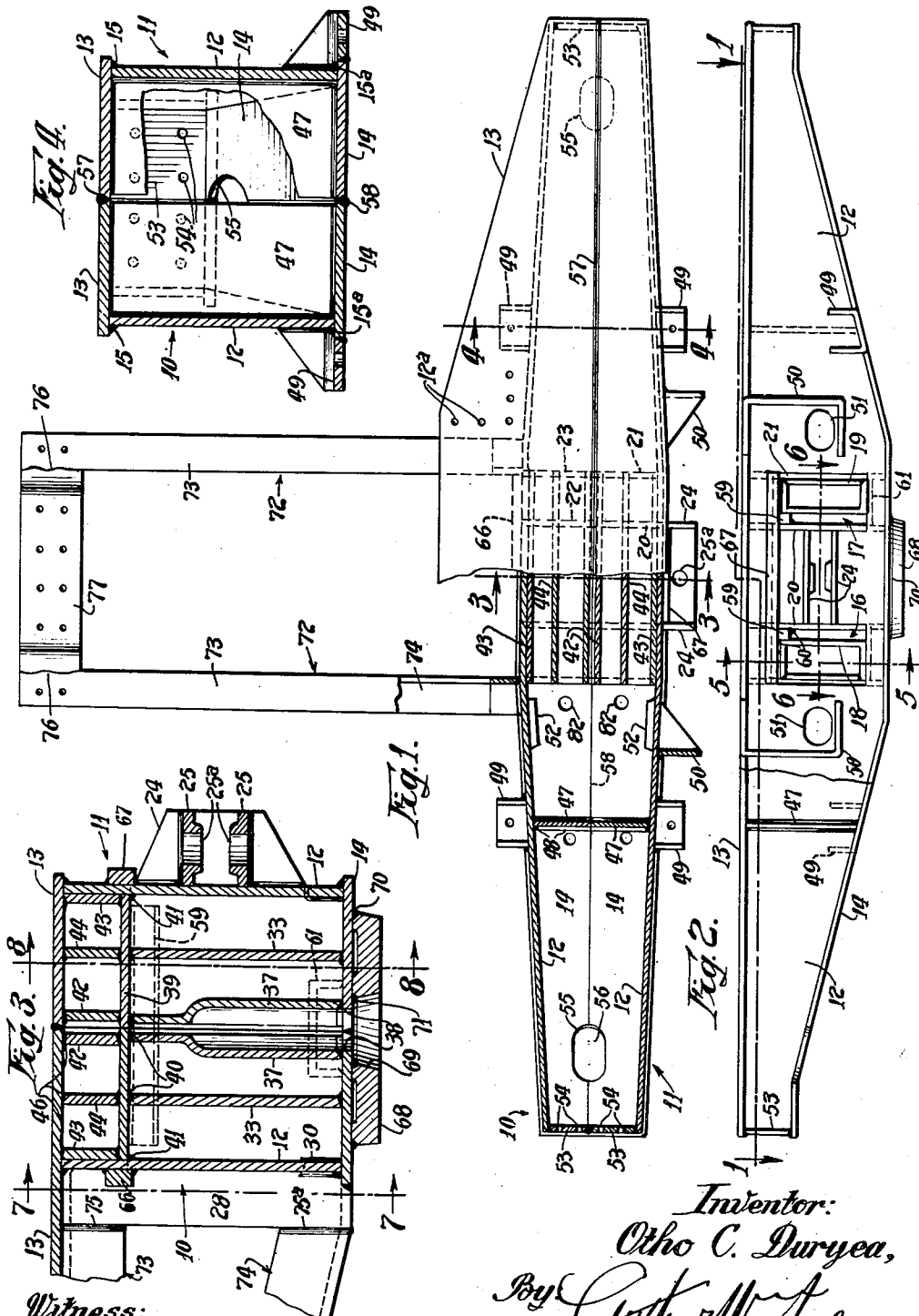
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2,184,337

CAR BODY BOLSTER

Filed Sept. 3, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

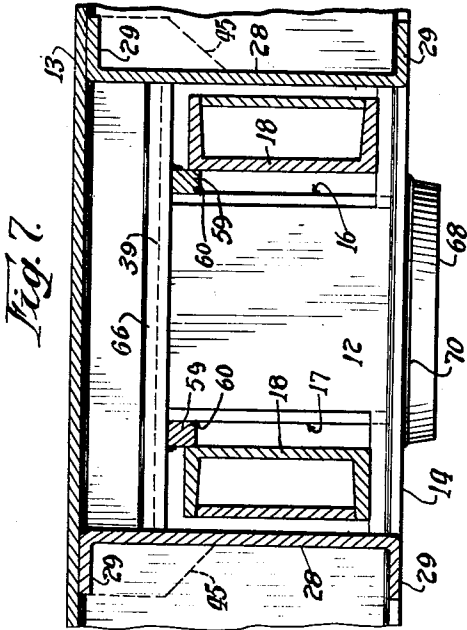


Fig. 7.

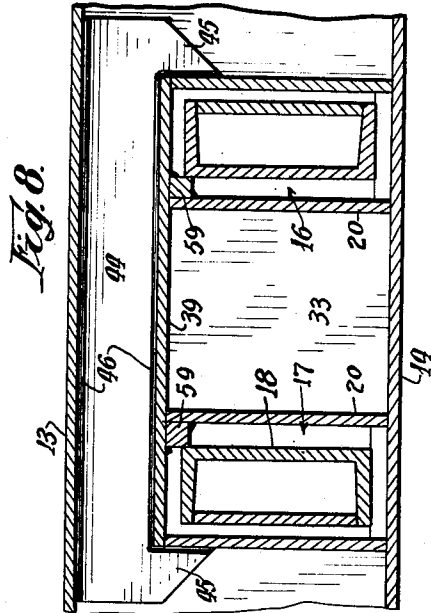


Fig. 8.

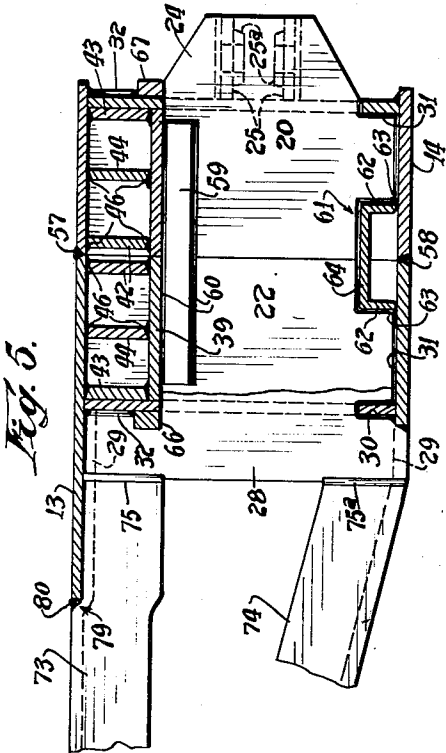


Fig. 5.

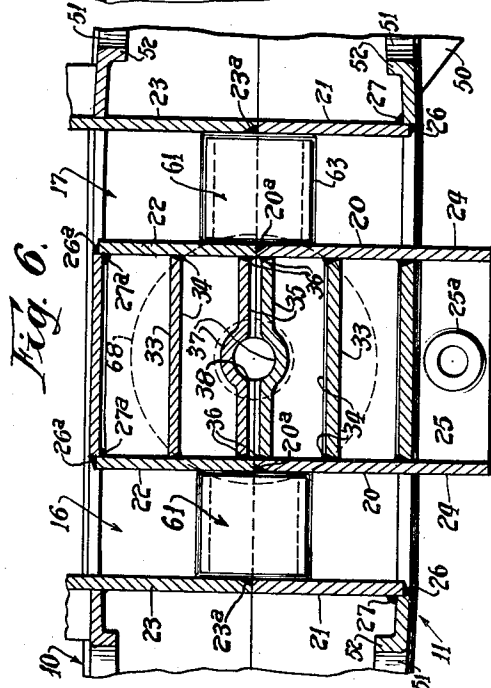


Fig. 6.

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UNITED STATES PATENT OFFICE

2,184,337

CAR BODY BOLSTER

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Application September 3, 1936, Serial No. 99,186

4 Claims. (Cl. 105—226)

This invention relates to improvements in car body bolsters and it consists of the matters herein-after described and more particularly pointed out in the appended claims. The present invention is somewhat allied to but is an improvement over that illustrated and described in my prior United States Letters Patent No. 2,132,232 granted October 4, 1938.

The car body bolster with which the present invention is more particularly concerned, is of the kind used in the well known Duryea type of underframe. In such underframes, a center sill passes through openings provided therefor in the body bolster, the connection being through cushion gears arranged between the sill and bolster.

Heretofore, such bolsters were made either as an integral casting or they were built up from prefabricated plates and a center casting, riveted together. Both the cast and the riveted bolsters are objectionable in certain respects.

Cast bolsters of this type are heavy and the cost is high. In riveted bolsters, overlapping joints are used and this necessitates care in matching up holes in the overlapped parts and difficulties are encountered in making tight rivets. Also, inside corner seams are present in which water may lodge and thus start bolster corrosion. Again, the rivet heads on the top of the bolster require routing out of the car body flooring to accommodate said heads and this, of course, adds to the expense.

One of the objects of the present invention is to provide a car body bolster of this kind adapted for use in the Duryea type of underframe and which avoids the objectionable features of the cast and riveted car body bolsters.

Another object of the invention is to provide a car body bolster of this kind which is simple in design, lighter in weight than the cast or riveted bolsters and which at the same time provides the strength and rigidity required in the finished bolster.

A further object of the invention is to provide a body bolster made from a plurality of plates of such pattern form that they may be secured together by butt welding, thus eliminating overlapping joints.

Again, it is an object of the invention to provide a bolster of this kind comprising two matched, longitudinal halves butt welded together, with each half in itself made up of a set of preformed plates welded together previous to the welding of said halves together.

Again, it is another object of the invention to provide a body bolster of a general hollow box-like cross section made up from preformed plates, certain of which have openings there-through for the passage of the center sill, the bolster being so braced in the vicinity of said openings as to resist all stresses and strains imposed thereon in use for its intended purpose.

The above mentioned objects of the invention, as well as others, together with the advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view partly in top plan and partly in horizontal section of a car body bolster embodying the preferred form of the invention, the plane of the section being indicated by the line 1—1 of Fig. 2;

Fig. 2 is a view in elevation of the bolster with parts of the left hand end thereof shown as broken away better to disclose the interior construction thereof;

Fig. 3 is a transverse vertical section through the bolster on an enlarged scale as taken on the line 3—3 of Fig. 1;

Fig. 4 is a transverse vertical section through an end portion of the bolster in the plane of the side bearing bracket, as indicated by the line 4—4 of Fig. 1;

Fig. 5 is a detail transverse vertical sectional view through a part of the bolster as taken on the line 5—5 of Fig. 2;

Fig. 6 is a detail horizontal sectional view through a part of the bolster as taken on the line 6—6 of Fig. 2;

Fig. 7 is a detail vertical sectional view through a part of the bolster as taken on the line 7—7 of Fig. 3, and

Fig. 8 is another detail vertical sectional view through the bolster as taken on the line 8—8 of Fig. 3 and with the center plate omitted.

In general, the body of the bolster is made up of two longitudinal channel-like halves, each in turn being fabricated from a plurality of patterned plates welded together, said plates in the finished bolster body coacting to form the laterally spaced, vertical shear resisting diaphragms and the top and bottom tension and compression members respectively. In this instance, the tension member of the bolster body constitutes the cover plate of the bolster.

Of the two patterned plates which constitute the diaphragm, each has a pair of longitudinally spaced openings therein. In the finished bolster body, the openings in the two diaphragms reg-

bolster for passage of the center sill members there-through.

Due to the presence of these openings, certain stiffening elements and braces are employed in the mid portions of the body to bridge around said openings and strengthen and reinforce each half in the vicinity of said openings. Therefore, the bolster is not weakened by the presence of said openings.

Certain of the bracing and stiffening elements associated with one body half project outwardly beyond the diaphragm thereof to provide a connection for the springs of the gear which cushion the relative movement between the bolster and center sill in use. Certain of the elements associated with the other half, also project outwardly beyond the diaphragm thereof to provide the connection for one end of a pair of associated torque arms, the other end of which is adapted for connection with an end sill forming a part of the car underframe.

Each diaphragm has its associated tension and compression members or plates welded thereto in operative relation to form the two channel-like halves of the body. Before these two halves are joined in body forming relation, each half has its braces and stiffener plates welded therein and then both halves are welded together to form a substantially completed hollow box-like body which is open at both ends. A closure plate is then welded in each open end of the body to complete the same.

As each half of the bolster body is substantially the same in its general structure, a detailed description of one will suffice for both.

Referring now in detail to that embodiment of the invention illustrated in the drawings and particularly to Figs. 1 and 2 thereof, 10 and 11 indicate respectively, the two halves of the body. Each half, which is of a substantial channel cross section, comprises an upright web or shear resisting member 12, a top plate 13 and a bottom plate 14 which function as the tension and compression members respectively of the associated half. The top and bottom edges of the diaphragm 12 are each welded to one margin of the associated plates 13 and 14 respectively, a short distance inwardly from the edges thereof, as indicated at 15 and 15^a respectively in Fig. 4. Preferably these welds are on the outside of the respective members of each body half.

In the mid portion of each diaphragm and spaced equal distances upon each side of the transverse median line thereof, coincident with the center of the center sill is a pair of rectangular openings 16 and 17 respectively. In the finished bolster, the openings in said diaphragms align so that the longitudinal members 18 and 19 of the center sill may pass therethrough. These members of the center sill best appear in Figs. 1, 7 and 8.

The openings 16 and 17 are so arranged vertically that the bottom edges thereof are closer to the compression members 14—14 than the top edges are to the tension members.

The sides of the openings in each half of the body are formed by inner and outer stiffener plates 20—21 and 22—23 respectively. Certain upright edges of all of said plates are disposed substantially the plane of the opposed edges of the tension and compression members 13 and 14. The top edges of said plates terminate in the plane of the top edges of the openings 16 and 17 while the bottom edges of said plates rest upon the associated compression members 14. The

outer corners of the inner ends of the plates 20 of one of the body halves, are bevelled off as at 20a in Fig. 6. The inner corners of the inner ends of the plates 22 of the other body half, are bevelled off as at 22a in Fig. 6. The purpose of these bevelled corners 20a—22a will appear later.

Each inner plate 20 of the body part 11 is provided with an outer end extension 24 of a height to pass through and outwardly beyond the openings 16 and 17 in the associated diaphragm for a suitable distance. Said extensions are connected together by a pair of horizontal plates 25—25, arranged in vertically spaced relation about midway between the top and bottom edges thereof. These plates 25—25 provide the means for connecting the links of a certain spring cushioning gear (not shown) but which is conventional in the Duryea underframe. The plates 25 are formed with oppositely facing bosses 25a to receive the pin whereby the link previously mentioned is operatively connected to the bolster.

The outer plates 21 of the body half 11 have no extensions corresponding to those of the inner plates. A line of welding 26 follows the bottom edges of the plates 20—21 where they engage the compression member. The outer end of the outer plates 21 extend into the diaphragm openings 16 and 17 but not through the same so as to lap against that part of the diaphragm defining the outer edge of said openings as best appears in Fig. 6. A line of welding 26 is then laid in along the edges of said plates 21 and then another line of welding 27 is run along the inside corner as defined by the right angled surfaces of said plates 21—21 and the diaphragm 12. These two welds thus form a lap weld instead of merely a butt weld at this point and the strength of the connection thus afforded is greatly increased.

The outer end of the inner plates 22 of the body half 10 are secured in the diaphragm openings 16 and 17 in the same manner as that above described in connection with the outer plates 21 of the body half 11. Therefore, the lines of welding are indicated at 26a and 27a in Fig. 6.

The outer plates 23 of the body half 10 are formed outwardly beyond the diaphragm thereof with upright extensions 28—28 of a height approximating that of the associated diaphragm. The top end part of each extension is bent outwardly to form a flange 29, the top surface of which engages the under side of the associated top plate 13. The purpose of said extensions and their flanges will appear later. A bottom part of the plates 23—23 are notched out as at 30 to fit over that part of the diaphragm below the associated openings 16 and 17 therein as best appears in Fig. 3. Lines of welding 31—32 secure said outer plates to the diaphragm and to the tension member 14 of the body half 10. The least height of the plates 23—23 is slightly less than either diagonal dimension of the openings 16—17 to permit placing of said plates in position during assembly of the body half 10.

Between the inner transverse stiffener plates 20—20 and 22—22 of each body half 10 and 11, in a plane mid way between the diaphragm 12 and the edge of the associated compression member 14 is an upright, longitudinal stiffener strut or plate 33. This plate is welded at its bottom and end edges to the tension member 14 and to the associated inner plates 20—22 as at 34 in Fig. 6. A second upright longitudinal stiffener strut or plate 35 is welded as at 36 at its bottom

and end edges to the compression member 14 and to the inner margins of the inner plates 20—22 respectively. The plates 33—35 in both body halves are of the same height as those parts of the inner and outer transverse plates before mentioned so that the top edges of all of said plates are in the same horizontal plane.

The longitudinal plates 35—35 of both halves of the body, are each formed at a point between its ends with a curved portion 37 opening into a recess 38 in the associated compression member 14 to form one-half of the opening in the bolster body bottom to receive the king or center pin of the truck, not shown. This curved portion extends part way up the plate 35 from its bottom edge as appears in Fig. 3. The upright plates before mentioned all act as shear resisting stiffener struts as is apparent.

Engaged upon the top edges of the previously mentioned upright plates in each body half 10 and 11 respectively is a horizontal top plate 39. This top plate is welded to the top edges of said upright plates as at 40 and is also welded to the inner face of the associated diaphragm 12 as at 41.

Between the top plate 39 in each body half and the tension member 13 thereof are inner, outer and intermediate upright stiffener plates 42—43 and 44 respectively. The plates 42—44 are arranged in the planes of the associated plates 35—35 while the other or outer plate 43 is engaged against the inner face of the associated diaphragm 12 as best appears in Fig. 3. The plates 42—43 and 44 have downwardly facing end hooks 45 (see Fig. 8) which engage the upper end end portion of the outer plates 21—23 in the respective halves of the body. These plates 42—43 and 44 function as shear resisting ribs between the top plate 39 and tension member 13 and are welded thereto and to the upright stiffener plates 21—23 as at 46. Said plates 42—43 and 44 which assist in providing a hollow box-like structure above the top plates 39, are welded in place during their assembly in the associated half of the body. By means of the hooks 45 mentioned the plates 42—43 and 44 are secured not only to the tension member 13 and top plate 39 but also to the outer upright plates 21—23 of the associated body half to form a rigid structure above each sill opening in the finished bolster body.

A suitable distance outwardly from the outer plate 21—23 of each body half, I provide therein an upright rib plate 47 which is welded as at 48 along one vertical edge and its two horizontal edges to the diaphragm and to the tension and compression members of the respective body half. These plates 47 are arranged substantially in or near the planes of the side bearings to be employed with the finished body bolster to there form stiffening members therefor.

On the outer surface of the diaphragm of each half of the bolster body, near its bottom edge, in the plane of the rib plates 47 are welded short channel brackets 49. Each bracket which has a cut away inner corner to fit about the projecting margins of the compression member 14 as shown in Fig. 4, has an inclined bottom which corresponds to the inclination of the compression member at this point. The purpose of said brackets is to permit the attachment of a part of the associated side bearing (not shown).

On the outer surface of the diaphragm of the body half 11 and spaced longitudinally from the sill openings 16 and 17 therein, angle brackets

50 are welded. Upon these brackets certain supports (not shown) are engaged and upon which the flooring of the associated car body to be supported by the body bolster is secured in place. In the diaphragm of each body half 10 and 11, midway between the tension and compression members at the center portion of each body half, are openings 51—51. These openings, which are arranged within the brackets 50, are defined by inwardly extending flanges 52. Said openings are intended for use in the finished bolster for the passage of the usual train lines and brake rods (not shown) through the bolster.

Each body half as thus far described is of a channel-like cross section and is open at its ends. In each open end of each body half is welded a closure plate 53 having openings 54 therein whereby they may be riveted to the side sills (not shown) of the underframe in which the bolster body is embodied. Each compression member 14 is provided near its ends with recesses 55. In the finished bolster body these recesses register to form an opening 56 for the insertion of a tool to buck up the rivets employed in securing the ends of the body to the side sills before mentioned.

After the various parts before mentioned have been welded in assembled relation in their respective halves 10 and 11 of the bolster body, said halves are brought together with the edges of the tension and compression members of one body half, abutting those of the other. It is to be understood that these edges have been previously bevelled off so that when brought together, they coact to define a groove to receive the longitudinal lines of welding 57—58 respectively. These lines of welding extend the full length of the bolster and down the ends thereof to join the end closure plates 53 together. Of course, before these welding operations are carried out, the body halves 10 and 11 are suitably positioned to assure the alignment of the stiffener plates 20—21 of one body half with the stiffener plates 22—23 in the other.

After the two halves 10 and 11 have been welded together a center sill guide member 59 in the form of a rectangular bar is positioned in each corner as defined by the outer surfaces of the stiffener plates 20—22 and the top plates 39 of both halves. Lines of welding 60 are made to secure these bars in place. Said bars are of such length as to have a considerable overlap with the plates to which they are welded and act not only as guides for the channels 18 of the center sill but they also assist in connecting the two halves of the body together transversely. It is pointed out that in the application and welding of said bars, the same is performed through the openings 16 and 17 in the diaphragms and which give complete access thereto.

It is apparent that when the halves of the bolster body have been welded together, the inner edges of the inner and outer plates 20—21 of one body half will register or align with and substantially engage the inner edges of the inner and outer plates 22—23 of the other body half. With the edges thus arranged, the bevelled edges 20a—23a before mentioned, will define grooves in which are laid lines of welding 20b and 23b as shown in Fig. 6 to weld said plates together at said edges. These grooves are accessible for welding through the sill openings 16 and 17. It is preferable that said lines of welding 20b—23b be made before the guide bars 59 are welded in position.

To form a sliding bearing support or seat for the center sill member 16, passing through the openings I arrange a member 61 between the associated inner and outer plates 20—21 and 22—23 of both body halves, and which member engages upon at least the tension member of one of said body halves. Preferably said member is in the form of a longitudinally extending piece of channel iron with its flanges 62 facing downwardly and engaged with and welded to both compression members 14 by lines of welding 63. These flanges are of such height as to bring the web 64 thereof substantially flush with the bottom edges of the openings 16 and 17. Lines of welding 65 secure the ends of the channel member to the opposed faces of the plates 20—21 and 22—23 of both halves of the body. With the channel members welded to the said plates of both body halves, as well as to the compression member 14—14 thereof, these members also act to tie the two halves of the body together transversely.

Either before or after the two halves 10 and 11 of the bolster body have been welded together, I provide on the outer face of each diaphragm 12, above the openings 16 and 17 therein, in the plane of the top plates 39, the solid bars 66—67 respectively. The bar 66 (see Fig. 7) is of a length to extend between the upright stiffener plates 23—23 of the body half 10. The bar 67 is of such length as to extend between the extensions 24 of the plates 20 and is welded at its edges to the associated diaphragm 12. These bars act to form solid stops against which certain stop shoulders (not shown) on the sill engage, at the limit of the cushioned relation movement between the center sill and the body bolster as a whole.

After the bolster has been thus far assembled it is turned bottom up and a center plate 68 is arranged in position. This plate forms part of the center bearing between the car body bolster and associated truck bolster (not shown). It is made from a relatively thick metal disc having a center hole 69 which is lined up with the center pin recess in the bolster proper as provided by the parts 37 and 38. The upper corner edges of the center plate are bevelled off as best appears in Fig. 3 to provide a welding groove in which annular lines of welding 70 and 71 are formed to operatively secure the plate to the bolster body.

The bolster is of the kind embodying torque resisting arms whereby the bolster body is connected either to an end sill of the underframe or to a cross bearer thereof. As shown herein, the bolster is of the kind wherein the torque arms are adopted for attachment to the body half 10 either before or after the two halves 10 and 11 are welded together.

In the present instance, said arms will be described as attached to the body half 10 after it has been welded to the body half 11 but this is not to be considered in the restrictive sense.

Referring now to Figs. 1, 3 and 5, 72—72 indicate as a whole a pair of laterally spaced torque arms, each of a truss formation and comprising upper and lower arm members 73 and 74 respectively. Each arm member is preferably made of angle bar. In the case of the angle bars forming the top arm members 73, the top horizontal flanges face outwardly and the vertical flanges face downwardly. The arm members 73 are arranged in a horizontal plane extending at a right angle to the body half 10 and the inner

ends of the angle bars thereof, abut and are welded as at 75 to the top end edges of the plate extensions 28 and to the wings 29 thereon, before mentioned.

In the case of the angle bars forming the bottom arm members 74, the bottom horizontal flanges face outwardly and the vertical flanges face upwardly. The arm members 74 are each welded at their inner ends as at 75a to the bottom end edges of the plate extensions 28 and to the wings 29 thereon before mentioned.

The arm members 74 extend upwardly and outwardly from their inner ends, toward their outer ends and have horizontal outer end parts meeting in abutting relation with the outer end parts of the top arm members 73. The vertical flanges of the angle bars of both arm members are butt welded together at their junction. At the outer ends of said arms the vertical flanges of the angle bars of both arm members are ridged or corrugated as at 76 in Fig. 1. Said outer ends of said arm members are connected by a transverse bracket 77. The mid portion of said bracket is disposed in the plane of the top surfaces of the horizontal flanges of the top arm members 73 and is adapted for engagement and securement to an associated end sill (not shown) of the underframe.

To resist shearing strains in said arms, in their torque resisting functions, I provide between the converging vertical flanges of the arm members 73—74, inner and outer web plates (not shown) which are butt welded along their top and bottom edges to the associated edges of said vertical flanges.

The tension member 12 of the body half 10 is made substantially wider at its mid portion than the width of the body half 11 as best shown in Fig. 1. By this arrangement, the tension members 12—12 of both body halves coact to also function as the cover plate for the bolster body. In securing the torque arm members 73—73 to the body half 10 and still maintain the top surface flush with the top surface of the cover plate as a whole, of the bolster body, the inner ends of the arm members are offset as at 79 in Fig. 5. If desired, but not necessarily so, a weld 80 may be employed at this point as shown in Fig. 5.

In that part of the tension member 13, near the point of attachment for the torque arms, are openings 12a whereby one end of suitable diagonal braces (not shown) of the underframe may be attached.

It is apparent that when the two body halves 10 and 11 are welded together, they form a hollow box-like bolster body. As there are certain openings in the bolster body through which water, snow or other foreign matter may at sometime find entrance into the bolster body, I provide in the compression members 14—14 near the plates 21—23, drain openings 82 as in Fig. 1. Also, in the bottom edges of the plates 47, suitable openings are formed so that any matter tending to enter the bolster body through any of the openings therein, drain from said body.

By making the body halves 10 and 11 from suitably patterned plates and welding them together as before mentioned, the necessity of forming dies are obviated and the cost of production materially reduced.

From the construction described, it is apparent that the body bolster is a welded one and is, therefore, free from rivets or bolts.

When the bolster thus made, it forms the equivalent of an integral structure much lighter in

weight but stronger and less costly to produce than either a cast or a riveted structure.

Furthermore, the reduced weight of the body bolster greatly aids in contributing to a reduction in the weight of the car with which it is to be used.

In describing the assembly of the various parts in each body half, it is stated that an end plate 53 is welded in the end of each body half, before the two halves are welded together, the two end plates in each half being welded together at the time the two body halves are welded together. If desired, the two body halves may first be welded together and then a single plate may be welded in each end of the body. Each plate of course, will have openings therein for the rivets whereby the ends of the finished bolster body are attached to the side sills of the center frame.

While in describing the invention, I have referred in detail to the form, arrangement and construction of the various parts thereof, as well as to the sequence and manner of the steps in installing and welding the parts in place, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereby except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A built-up body bolster of the kind described embodying a pair of laterally spaced diaphragms and tension and compression members respectively and with which the top and bottom edges of said diaphragms have a welded connection to form a hollow body, there being aligned sill openings in each diaphragm, upright transversely extending stiffener plates rising from the compression member into substantially the plane of the top of said openings, and means providing a box-like structure in said body between the top ends of said stiffener plates and the tension member and parts of the diaphragms above said openings.

2. A built-up body bolster of the kind described

embodying a pair of laterally spaced diaphragms and tension and compression members respectively and with which the top and bottom ends of said diaphragms have a welded connection to form a hollow body, there being aligned sill openings in each diaphragm, upright, transversely extending stiffener plates rising from the compression member into substantially the plane of the top of said openings, means providing a box-like structure in said body between the top ends of said stiffener plates and the tension member and parts of the diaphragms above said openings, and means welded to said plates and forming guides for the sills to extend through the openings.

3. A car body bolster embodying therein, shear resisting diaphragms and tension and compression members operatively secured together to provide a hollow box-like body, said compression member comprising two longitudinally extending plate-like parts having adjoining edges welded together, one of said plate-like parts projecting laterally beyond one side of the body, and laterally spaced torque arms operatively secured to said side of the body and extending away therefrom and engaging with and being secured to said projecting portion of said one of said plate-like parts.

4. A car body bolster embodying therein, shear resisting diaphragms and tension and compression members operatively secured together to provide a hollow box-like body, said compression member comprising two longitudinally extending plate-like parts having adjoining edges welded together, one of said plate-like parts projecting laterally beyond one side of the body, and laterally spaced torque arms operatively secured to said side of the body and extending away therefrom and engaging with and being secured to said projecting portion of said one of said plate-like parts, said projecting portion of said one of said plate-like parts being formed for the attachment of one end of a pair of diagonal braces therewith.

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