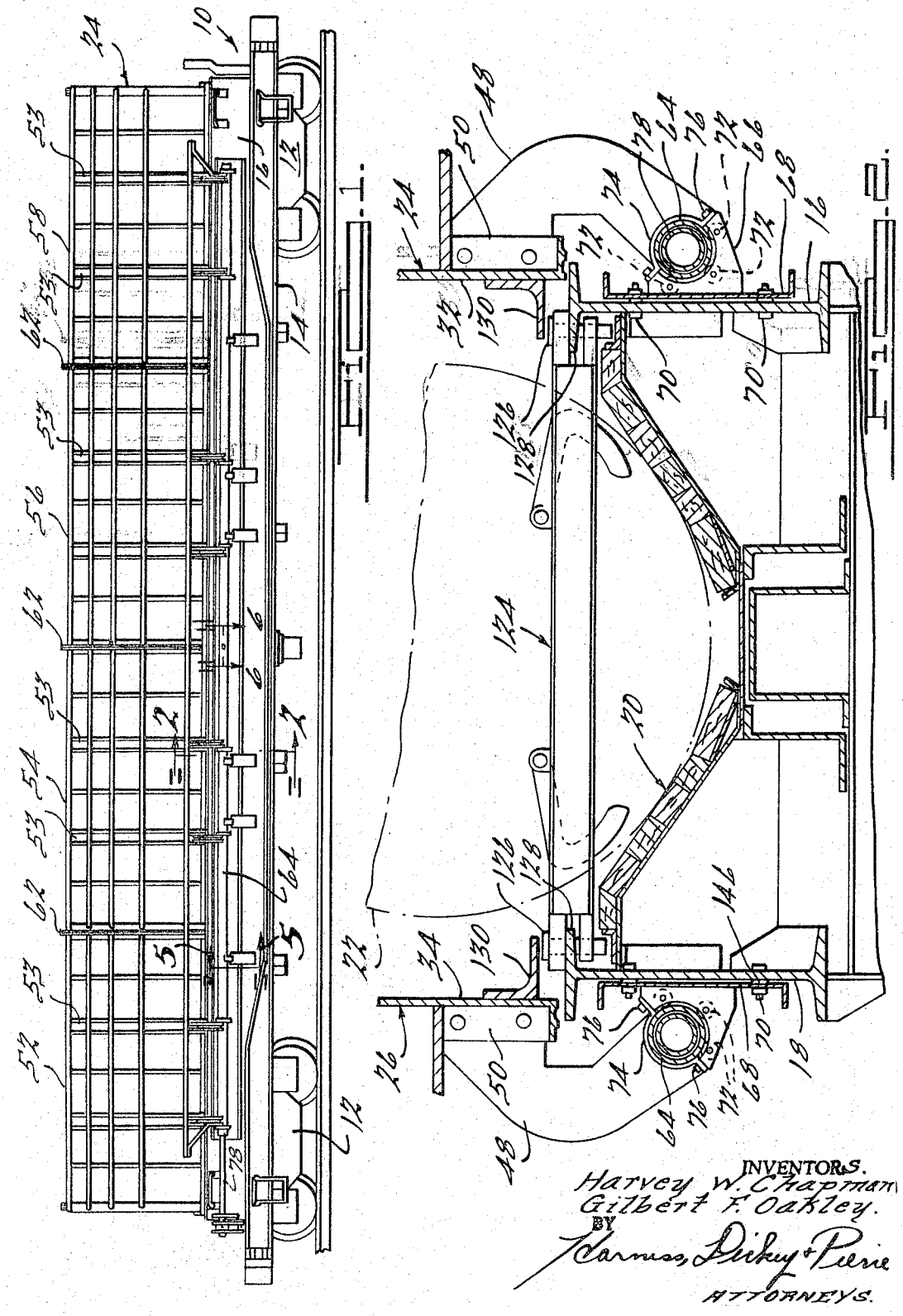
March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 1



INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley.
BY
Carmody, Dicky & Pierce
ATTORNEYS.

March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 2

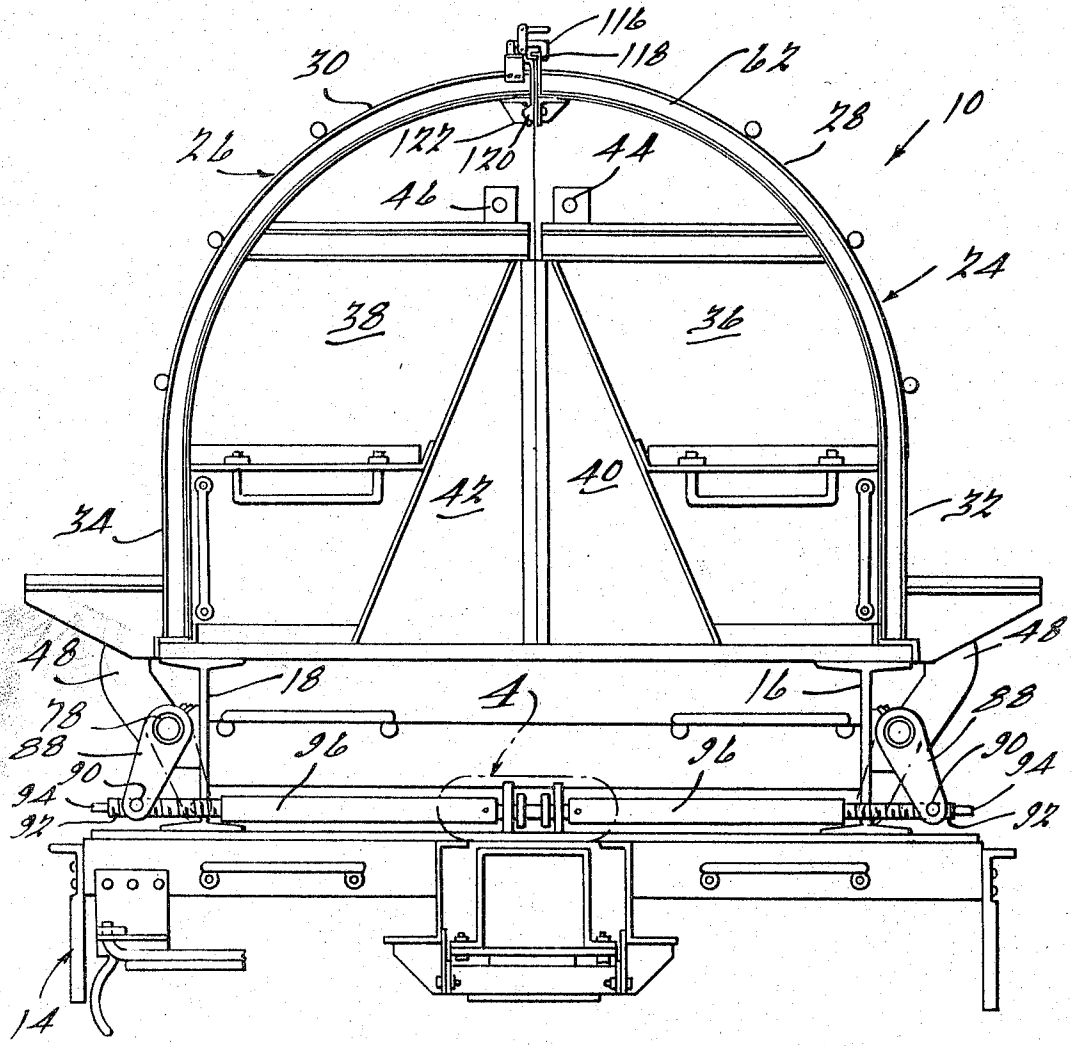


FIG. 3.

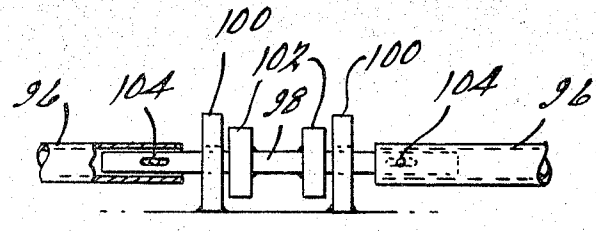


FIG. 4.

INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley
BY
Barnes, Dicky & Purer
ATTORNEYS.

March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 3

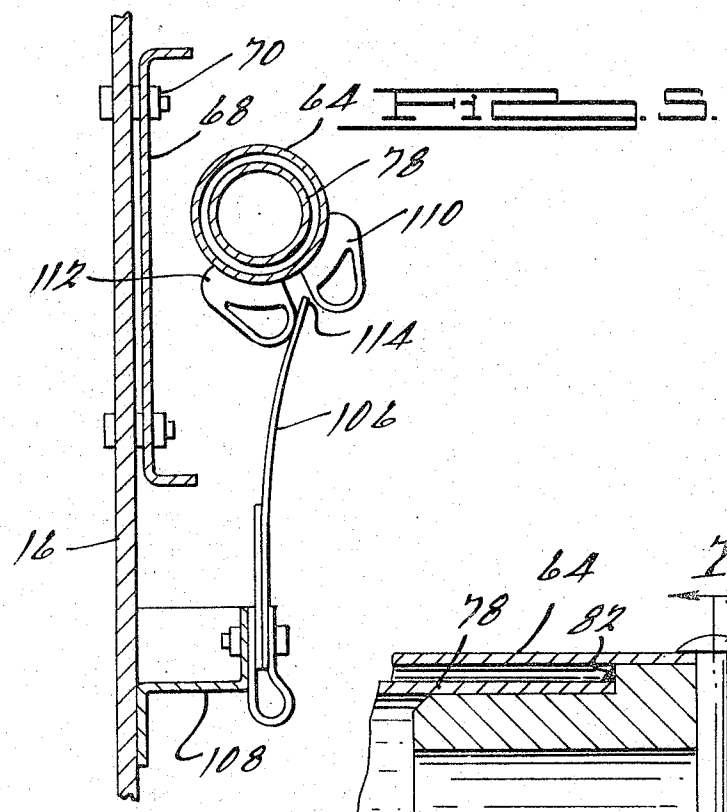


FIG. 5.

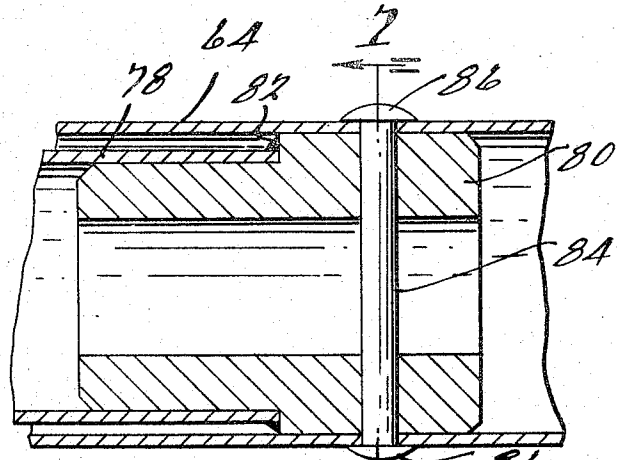


FIG. 6.

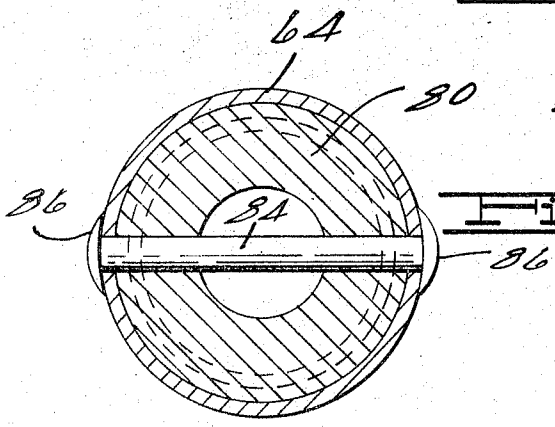


FIG. 7.

INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley
BY
Barnes, Dickey & Pierce.
ATTORNEYS.

March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 4

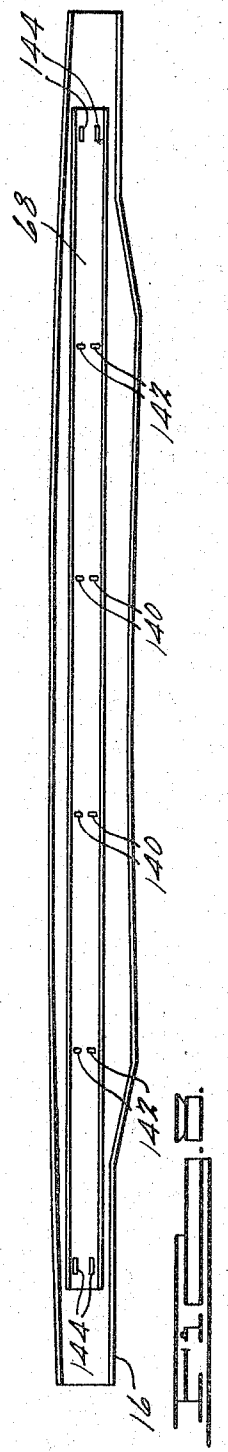


FIG. 9.

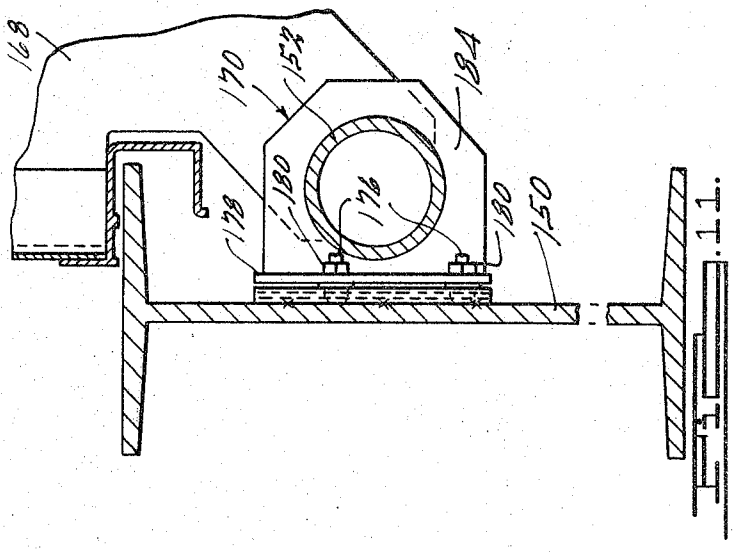


FIG. 11.

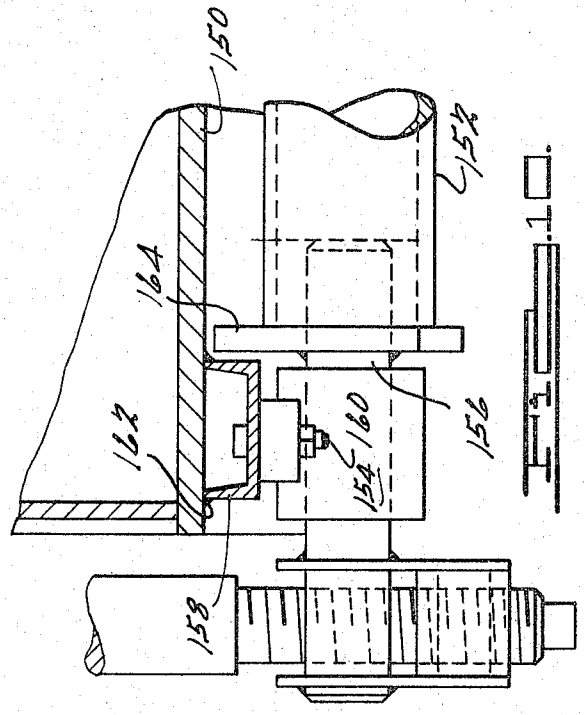


FIG. 10.

INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley.
BY
Harness Dickey & Pierce
ATTORNEYS.

March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 5

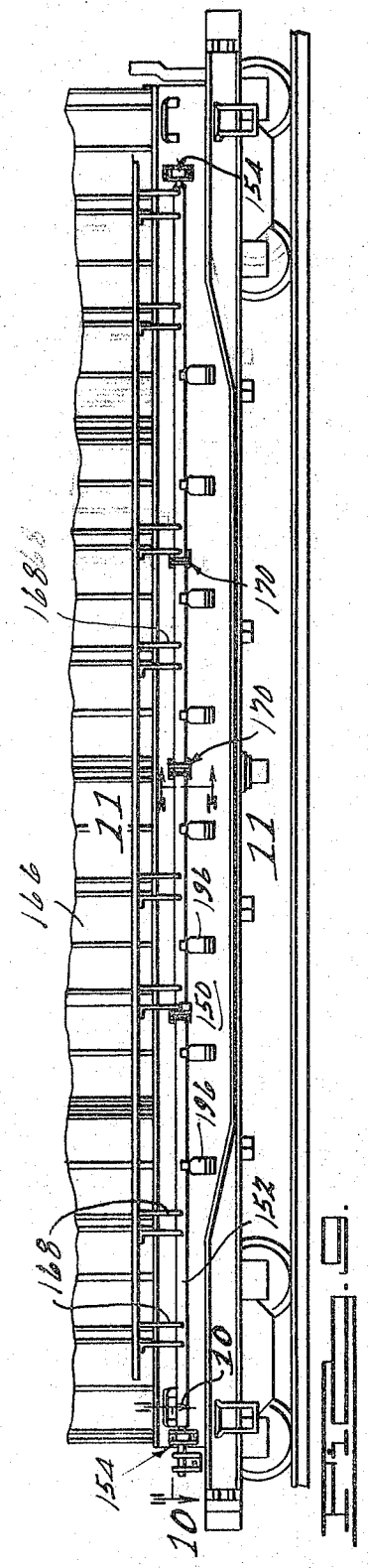


Fig. 9.

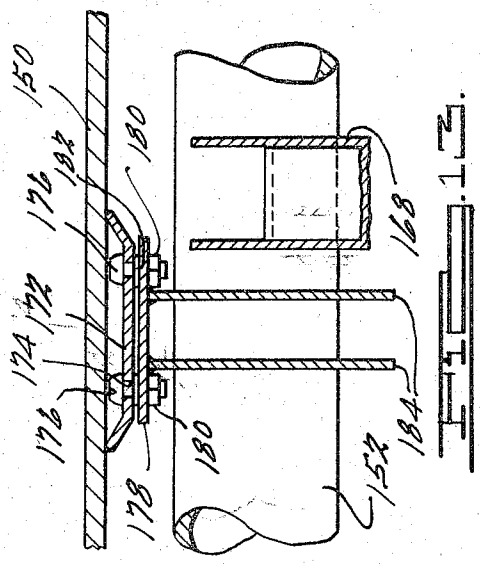


Fig. 13.

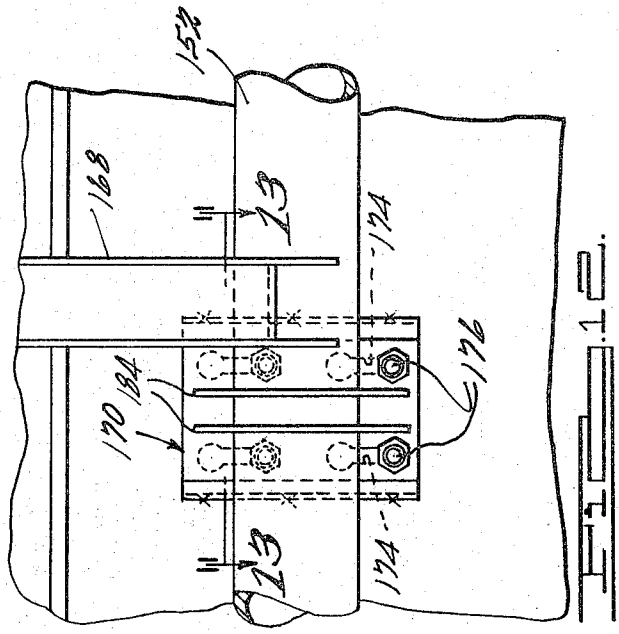


Fig. 12.

INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

March 7, 1967 H. W. CHAPMAN ETAL 3,307,495

RAILWAY CAR

Filed Feb. 9, 1965 6 Sheets-Sheet 6

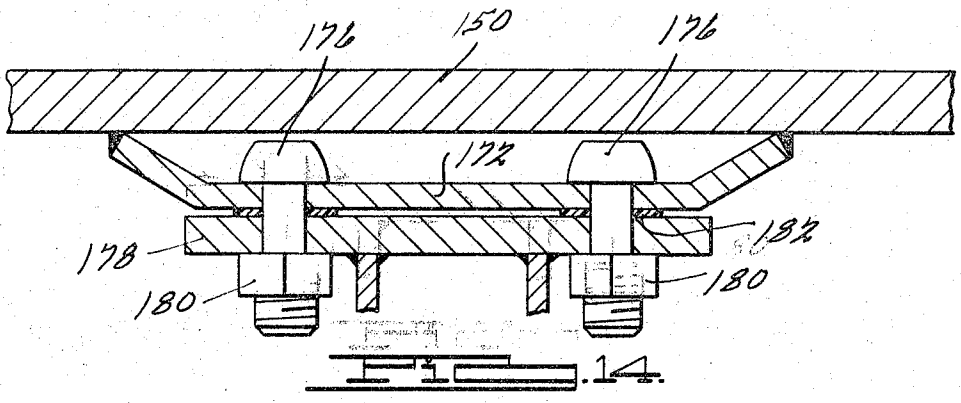


FIG. 14.

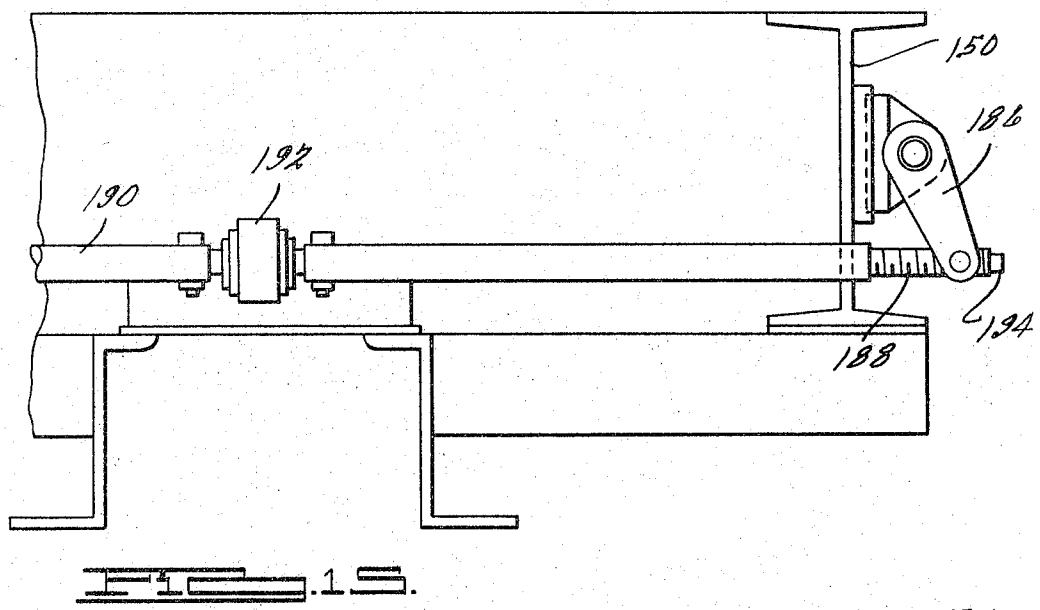


FIG. 15.

INVENTORS.
Harvey W. Chapman
Gilbert F. Oakley.
BY
Harness, Dickey & Pierce
ATTORNEYS.

United States Patent Office 3,307,495 Patented Mar. 7, 1967

3,307,495

RAILWAY CAR

Harvey W. Chapman, Detroit, and Gilbert F. Oakley, Livonia, Mich., assignors to Evans Products Company, Plymouth, Mich., a corporation of Michigan

Filed Feb. 9, 1965, Ser. No. 433,840
18 Claims. (Cl. 105—367)

The present invention relates to railway cars and more particularly to an improved car of the type adapted for transporting coils of steel and similar freight and in which covers are provided for protecting the freight from the weather, and which may be opened for loading and unloading.

It is an object of the present invention to provide an improved railway car of the above mentioned type which is simple in design, durable of construction, reliable and efficient in operation and economical to manufacture.

More specifically, it is an object of the present invention to provide an improved railway car of the above mentioned type employing cover halves mounted for movement between closed positions in which the freight is fully covered and open positions in which the car may be loaded and unloaded, and to provide improved means for mounting the cover halves for movement between these positions and to provide improved means for effecting such movement.

Another object of the present invention is to provide a railroad car of the above mentioned type in which the means for mounting the cover halves and moving them between their closed and open positions includes spring means loaded in both the closed and open positions and effective to assist in movement of the cover halves from both positions.

It is a further object of the present invention to provide a railway car of the above mentioned type including cross members for bracing the coiled steel or other freight received in the car and in which the cover halves co-operate with the attachment means for securing the ends of the cross members in place so that this attachment means cannot be detached when the cover halves are in closed position.

It is also an object of the invention to provide improved means for mounting the cover halves so that the car body may deflect as when it is loaded or unloaded, or as an incident to normal movement over the rails or switching, without deflecting or distorting the cover halves.

Other and more detailed objects of the present invention will be apparent to those skilled in the art from a consideration of the following specification, the appended claims and the accompanying drawings wherein:

FIGURE 1 is a side elevational view of a railway car embodying the features of the present invention;

FIGURE 2 is a broken enlarged sectional view of the structure illustrated in FIGURE 1 taken substantially along the line 2—2 thereof;

FIGURE 3 is an end elevational view of the left-hand end of the car as illustrated in FIGURE 1;

FIGURE 4 is a broken enlarged view of the portion of the structure illustrated in FIGURE 3 indicated by the circle 4 thereof;

FIGURE 5 is a broken enlarged sectional view of the structure illustrated in FIGURE 1 taken substantially along the line 5—5 thereof;

FIGURE 6 is a broken enlarged sectional view of the structure illustrated in FIGURE 1 taken substantially along the line 6—6 thereof;

FIGURE 7 is a sectional view of the structure illustrated in FIGURE 6 taken along the line 7—7 thereof;

FIGURE 8 is a somewhat diagrammatic view on a reduced scale showing only the side sill members and the channel mounted thereon and illustrating the upward camber of the sill member of the car frame when the car is empty;

FIGURE 9 is a broken side elevational view of a car embodying a modified form of the invention;

FIGURE 10 is a broken view partly in section of a portion at the left-hand end of the car as viewed in FIGURE 9;

FIGURE 11 is a broken enlarged sectional view of the structure illustrated in FIGURE 9 taken substantially along the line 11—11 thereof;

FIGURE 12 is a broken side elevational view of the portion of the structure illustrated in FIGURE 11;

FIGURE 13 is a broken plan view of the structure illustrated in FIGURES 11 and 12;

FIGURE 14 is an enlarged broken sectional view of the structure illustrated in FIGURE 13 taken substantially along the line 14—14 thereof; and

FIGURE 15 is a broken end elevational view showing the lower portion of the left-hand end of the structure illustrated in FIGURE 9.

While only two specific embodiments of the invention are illustrated herein, and such embodiments are especially designed for use in the transporting of coiled steel, it will be appreciated that the improvements of the present invention may be embodied in railway cars designed for the shipment of other freight.

In the preferred embodiment illustrated, the railway car 10 comprises trucks 12 at the opposite ends thereof upon which the car body 14 may be supported in conventional manner. In the preferred embodiment illustrated the railway car body 14 includes a pair of heavy side sill members in the form of spaced parallel I-beams 16 and 18 disposed in spaced parallel relation at opposite sides of the body 14 and comprising a rigid part thereof. Between the I-beams is mounted a bed generally indicated at 20 which, in the preferred embodiment illustrated is adapted to support coils of sheet steel disposed with their axes extending horizontally and along the length of the car, such a coil being illustrated in broken lines in FIGURE 2 at 22. Cover halves 24 and 26 are mounted on the beams 16 and 18 for pivotal movement between the closed positions illustrated in the drawings and open positions in which the coils of steel or other freight may be loaded onto and unloaded from the bed 20. In the preferred embodiment illustrated each cover half moves through an angle of about 45 degrees in moving between its closed and open positions. The cover halves 24 and 26 are fabricated of sheet metal or other suitable material and includes arcuately shaped wall portions 28 and 30 cooperating to define a generally semi-cylindrical cover portion, the height of which above the bed 20 is increased by virtue of the straight wall sections 32 and 34 of the cover halves. At their opposite ends the cover halves are provided with walls 36 and 38 which, in the preferred embodiment illustrated, include pivotally mounted end wall portions 40 and 42 which swing relative to their respective end walls 37 and 38 above the pivots 44 and 46 when the cover halves are moved to their open position to increase the opening at the end walls of the cover halves in the manner illustrated and described in greater detail in Patent No. 3,009,426, granted November 21, 1961, to the assignee of the present application, and on application of S. M. Nampa.

As is readily seen in FIGURE 1, the cover halves 24 and 26 extend substantially through the entire length of the car 10 and in the preferred embodiment illustrated are formed as five separate sections 52, 54, 56 and 58, the adjacent ones of which are provided with co-operating flanges 62 through which the adjacent sections are secured together. The cover halves 24 and 26 are sup-

ported on the beams **16** and **18** through a plurality of hinge arms **48** which are secured to the lower part of the straight sections **32** and **34** by brackets **50**. The hinge arms **48** extend generally arcuately downwardly and are welded to a tubular operating shaft **64** which is supported on its associated I-beam **16** or **18** through brackets **66** spaced along and welded to a channel **68** which is secured to the outer surface of the associated I-beam **16** or **18** by bolts **70**. The brackets **66** are provided with rollers **72** rotatably supporting the tubular operating shaft **64** which is held in place in the brackets **66** against the roller **72** by straps **74** secured to the brackets **66** by bolts **76**. It will be noted that the hinge arms **48** are spaced along the cover halves as illustrated in FIGURE 1 so that the force applied through these arms in opening and closing the cover halves is spread throughout the length of each cover half. Also, it will be noted that the cover sections are provided with external reinforcing channels **53** disposed at, and to which, the hinge arms **48** are connected.

The force for moving each of the cover halves between its open and closed positions is applied to its associated tubular operating shaft **64** substantially at its midpoint through an inner shaft **78**, the inner end of which carries a drive fitting **80** telescopically received in the end of the inner shaft **78** and welded thereto as indicated at **82** (see FIGURE 6). This drive fitting **80** closely fits the inner bore of the tubular operating shaft **64** and is connected thereto for rotation therewith by the drive pin **84** extending through the drive fitting **80** and the tubular shaft **64** and headed over at its opposite ends as illustrated at **86**. The inner tubular shaft **78** extends outwardly of the left-hand end of the tubular operating shaft **64** as illustrated in FIGURE 1 and carries at its outer end a drive crank **88**. The drive crank **88** for each cover half is provided at its outer end with a nut **90** and each of these nuts is threadedly received on a screw shaft **92**, the outer end of which has a nut portion **94** adapted to be engaged by a power tool, such as an air wrench, for driving the screw shaft **92**. The screw shafts **92** have their inner ends connected as best illustrated in FIGURES 3 and 4 to the outer ends of tubular shafts **96**, the inner ends of which are connected by the universal coupling illustrated in FIGURE 4. This coupling includes a connecting shaft **98** journalled in bearing blocks **100** and the axial movement of which is limited by collars **102** welded to the shaft **98**. Outwardly of the bearing blocks **100** in which it is journalled, the connecting shaft **98** has a pin and slot connection indicated at **104** to each of the tubular shafts **96**. It will now be appreciated that the universal connection afforded by the coupling illustrated in FIGURE 4 permits the raising and lowering of the outer ends of the screw shafts **92** which is required because of the pivotal movement of the crank arms **88** during the rotation of the screw shafts **92** to effect movement of the cover halves between their open and closed positions.

It is also contemplated that, if desired, rather than using a power tool to drive one of the screw shafts **92** through engagement with a nut portion **94** thereof, the motive power may be supplied by a suitable motor such as an air motor permanently installed on the car and operatively connected, for example, to the shaft **98** for effecting desired rotation of the latter.

To facilitate movement of the cover halves between their open and closed positions, a plurality of leaf spring elements **106** are cantilever mounted on the beams **16** and **18** as best illustrated in FIGURE 5 by brackets **108** and the free upper ends of the springs **106** are received between abutments **110** and **112** fixed on the tubular operating shaft **64** and defining a slot **114** therebetween. The abutments **110** and **112** are so positioned that with the cover in the closed position, as illustrated in the drawings, each spring **106** is deflected in one direction from its unloaded condition by the abutment **112** and when the cover is in the open position the spring elements **106** are deflected in the opposite direction from their unloaded condition by the abutments **110**. It will thus be appreicated that the spring elements **106** assist in moving the cover elements both from the closed position and the open position and also that the springs oppose the force of gravity as the cover halves move to either the closed or the open position loading the springs.

The cover halves **24** and **26** are held in the closed position by a latch **116** pivotally mounted on the cover half **26** which engages behind an upstanding keeper flange **118** on the cover half **24**. The cover halves are guided into proper closed position by conically shaped pins **120** carried by the cover half **24** and which are received in apertured brackets **122** carried by the cover half **26**.

Referring to FIGURE 2, it will be seen that the car is provided with cross members generally indicated at **124** which may be of the construction illustrated and described in greater detail in copending application Serial No. 405,937, filed October 23, 1964, assigned to the assignee of the present application and filed in the names of Harvey W. Chapman and Herbert E. Rolfe, Jr. At their opposite ends the cross members **124** are connected to the I-beams **16** and **18** by latch pins **126** extending through apertures provided in the end portions of the cross member **124** which are aligned with apertures spaced along the upper inner flanges **128** of the I-beams **16** and **18**. The cover halves **24** and **26** are provided with angles **130** secured at the inner side thereof adjacent the lower portion of the straight sections **32** and **34** as illustratd in FIGURE 2, which angles are disposed, when the cover sections are in their closed positions, in the path of movement of the latch pins **126** as they are withdrawn from the latched position shown to unlatched positions. It will thus be appreciated that when the cover sections are in the closed positions illustrated, the latch pins **126** cannot be withdrawn and the cross member cannot be detached from the beams **16** and **18**.

Referring to FIGURE 8, it will be seen that the figure illustrates diagrammatically and in somewhat exaggerated manner the upward chamber which the car frame structure has when the car is in the unloaded condition. The heavy side sill member **16** of the car frame is there shown as being upwardly bowed at its center. By way of illustration, when the car is loaded the car frame may deflect at its center as much as one and one-half inches. It is a feature of the present invention that this deflection may occur without corresponding deflection of the cover and the corresponding distortion thereof which may cause misalignment and interfere with the proper operation of the cover. This is accomplished in the construction illustrated in FIGURES 1, 2, 3 and 8 as follows.

The channels **68** upon which the cover halves **24** and **26** are mounted through the arms **48** and the hinge tube **64** are supported on the side sill members **16** and **18** so as to permit vertical movement of the center portions of the side sill members **16** and **18** relative to the central portions of the channel **68** during the above mentioned deflection of these sill members as a part of the deflection of the car from when it is loaded. The channels **68** are also supported so as to permit the longitudinal movement of their end portions relative to the side sill members which occurs during such deflection of the car body frame. Referring to FIGURE 8, it will be seen that the channel **68** is provided, in spaced relation to the center thereof, with spaced pairs of vertically elongated apertures **140** through which the above mentioned bolts **70** extend to secure the center portion of the channel **68** to the center portion of the side sill members **16** and **18**. Approximately halfway between the apertures **140** and the adjacent ends of the channel **68** are additional pairs of vertically elongated apertures **142** which may be slightly wider horizontally than the apertures **140**. Adjacent each end of the channel **68** are additional pairs of horizontally elongated apertures **144**. Similar bolts **70** are used through all of the apertures

140 and 142 and 144 and on said bolts and disposed between each channel 68 and the side sill member to which it is connected are anti-friction washers 146 (see FIGURE 2). By way of illustration, one make of such washers is sold under the trademark Oilite. The bolts 70 at each of the apertures 140, 142 and 144 prevent movement of the channel 68 transversely of the car body while permitting movement in the vertical plane of the web of the channel 68.

It will now be appreciated that during the deflection of the side sill members 16 and 18 relative to the channel 68, the center portion of the side sill member adjacent the apertures 140 will move vertically but will have very little horizontal movement whereas at the end portions of the channel 68 adjacent the apertures 144 the movement of the side sill members relative to the channel 68 will be horizontal. In the intermediate portions of the side sill members adjacent the apertures 142 there will be some vertical movement during such deflection and some horizontal movement of the side sill member relative to the channel 68. This latter horizontal movement is accommodated by proportioning the slots 142 so that the horizontal dimension thereof is larger than the diameter of the shanks of the bolts 70 to permit such movement. Similarly, the apertures 140 are slightly larger horizontally than the diameter of the shanks of the bolts 70 to provide for any slight movement of the portions of the side sill members adjacent these apertures in a horizontal direction relative to the channel 68 which may result from the short spacing of these apertures 140 from the center of the channel 68. The structure of the assembly consisting of the cover halves 24 and 26, the structure supporting them on the channels 68, and the channels 68 has sufficient rigidity so that no vertical support for this assembly is required intermediate the end apertures 164 at which the opposite end portions of the channel 68 are supported on the side sill members 16 and 18 by the bolts 70.

It will thus be seen from a consideration of the foregoing description of the structure illustrated in FIGURES 1 to 8, inclusive, that the applicants have provided a construction in which the car frame may deflect in a vertical direction as, for example, when the car is loaded or unloaded, without causing corresponding distortion or deflection of the cover halves and without producing the interference with proper operation of the covers which would result from such distortion and deflection.

Referring to the modified construction illustrated in FIGURES 9 through 15, inclusive, it will be seen that the same result is obtained in the construction there illustrated. Except for the differences noted hereinafter, the construction of the modification illustrated in FIGURES 9 to 15, inclusive, may be in accordance with the construction illustrated in FIGURES 1 to 8, inclusive.

In the construction of FIGURES 9 to 15, inclusive, the side sill members 150 may be of the same construction as the side sill members 16 and 18 but it will be noted that in this modified construction there are no channels 68. Each hinge tube 152 is supported at its opposite ends directly on the side sill member 150 through self-aligning bearings 154 as best illustrated in FIGURE 10. As there illustrated, each hinge tube 152 carries a shaft 156 mounted in each end thereof and extending through and supported in a self-aligning bearing 154 which is mounted on the sill member 150 by a short channel section 158 to which it is secured by bolts 160 and which is in turn welded to the side sill member 150 as indicated at 162. At each end of the hinge tube 152 the shaft 156 carries a stop plate 164 welded thereto and disposed adjacent the channel 158 to limit longitudinal movement of the hinge tube 152. Intermediate the ends of the hinge tube 152 the cover halves, one of which is indicated at 166, are supported thereon at a plurality of points spaced therealong by hinge arms 168. Also, at a plurality of points spaced along each hinge tube 152 it is held against horizontal movement relative to the side sill member and transversely of the car body by support assemblies generally indicated at 170.

Each of these support assemblies comprises a plate 172 welded to the side sill member 150 and having the center portion thereof disposed in spaced parallel relation to the side sill member as illustrated in FIGURE 13. The plate 172 is provided with a plurality of keyhole slots 174, the upper portion of which is adapted to receive the heads of bolts 176, the shanks of which extend through a mounting plate 178 and receive nuts 180. On the bolts 176 and intermediate the mounting plate 176 and the plate 172 are anti-friction washers 182 such, for example, as the above-mentioned Oilite washers. The keyhole slots 174 in the plates 172 have a vertically extending portion adapted to receive the shank of the bolts 176 and are of a length adapted to accommodate the relative movement between the side sill member 150 and the hinge tube 152 during deflection of the frame of the car upon the loading thereof. In the embodiment illustrated in FIGURE 9, one of the support assemblies 170 is located at the center of the car and two support assemblies 170 are disposed in equal spaced relation at opposite sides of the center one. Because of the spacing of these last mentioned support assemblies from the center of the car, it will be appreciated that there will be some small horizontal movement of the portion of the side sill member to which these support assemblies are secured longitudinally relative to the adjacent portion of the hinge tube 152 during deflection of the car frame and accordingly, the width of the lower portion of the keyhole slot 174 in which the shank of the bolt 176 moves during such deflection is larger than the diameter of the shank of the bolt sufficiently to permit such movement. The mounting plate 178 carries a pair of spaced parallel vertically disposed support flanges which are apertured to receive the hinge tube 152.

From the foregoing it will be appreciated that while the support assemblies 170 permit any required movement of the mouting plate 178 relative to the plate 172 during deflection of the car frame, the mounting assemblies 170 serve to support the hinge tube against movement horizontally tranversely of the car body toward or away from the side sill member 150.

It will be noted that FIGURE 12 shows the position of the bolts 176 at the bottom of the keyhole slots 174 which is the position occupied when the car is empty and the car frame has the upward camber illustrated in FIGURE 8. The proportions of the keyhole slots 174 are such that after insertion of the heads of the bolts 176 through the upper portion of these slots during assembly of the support assemblies 170, the shanks of the bolts 176 remain within the lower portions of the slots, both while the car is empty and during all deflections of the car frame relative to the hinge tube 152. Here, again, in the embodiment illustrated in FIGURES 9 through 15, inclusive, the structure of the cover halves 166 and their connections to the hinge tube 152 are such as to provide a self-supporting structure which does not require vertical support other than at the self aligning bearings 154 through which it receives its sole vertical support.

For operating the cover halves 166 between the open and closed positions, the shafts 156 at the left-hand end of the hinge tube 152, as viewed in FIGURE 9, and which are shown in FIGURE 10, extend beyond the self-aligning bearing 154 and carry an actuating arm 186 (see FIGURE 15). As in the above described embodiment illustrated in FIGURES 1 to 8, inclusive, these arms 186 are operated by reversely threaded shafts 188 and 190 universally connected as indicated at 192 and provided with end portions 194 adapted for engagement by a suitably driven power tool indicated at 196 and leaf spring elements similar to the leaf spring elements 106 of the embodiment illustrated in FIGURES 1 to 8, inclusive, and which function similarly to facilitate movement of the cover halves between their open and closed positions.

While only two specific embodiments of the present invention have been illustrated and described in detail herein, it will be readily appreciated by those skilled in the art that numerous modifications and changes may be made without departing from the spirit of the present invention.

What is claimed is:

1. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled steel or the like and a car body supporting said bed, said car body and said bed being supported upon trucks and being deflected in a vertical direction between said trucks in response to the carrying of a load thereupon, means for selectively covering and uncovering the coiled steel and the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, means connected to each of said cover halves adapted to be connected to said car body at the respective sides thereof to provide the sole vertical support for said cover halves and to support each cover half on said car body for pivotal movement relative to said body between a closed position in which said cover halves cover said bed and an open position in which coiled steel or the like may be loaded on or unloaded from said bed, at least one of said last named means being spaced longitudinally from said trucks in a position wherein said bed and said car body undergo substantial vertical deflection under the experience of loading thereupon, said one last named means providing for such vertical deflection of said bed and said car body without accompanying vertical deflection of the point of pivotal support for said cover half provided for thereby.

2. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled steel or the like and a car body supporting said bed, said car body and said bed being supported upon trucks and being deflected in a vertical direction between said trucks in response to the carrying of a load thereupon, means for selectively covering and uncovering the coiled steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, an elongated hinge element extending longitudinally of and connected to each of said cover halves, means connected to each of said hinge elements adapted to be connected to said car body at the respective side thereof to provide the sole vertical support for said cover halves and to support each cover half on said car body for pivotal movement relative to said body between a closed position in which said cover halves cover said bed and an open position in which coiled steel or the like may be loaded on or unloaded from said bed, at least one of said last named means being spaced longitudinally from said trucks in a position wherein said bed and said car body undergo substantial vertical deflection under the experience of loading thereupon, said one last named means providing for such vertical deflection of said bed and said car body without accompanying vertical deflection of the portion of said elongated hinge element supported thereby.

3. In a railway car adapted to carry coiled sheet steel or the like and having means defining a bed for supporting the coiled sheet steel or the like, said bed being supported at spaced locations upon trucks and being deflected in a vertical direction between said trucks in response to the carrying of a load thereupon, means for selectively covering and uncovering the coiled sheet steel or the like comprising cover halves adapted to extend longitudinally of the car and close over the bed, and a plurality of longitudinally spaced means mounting each of said cover halves at a respective side of the car for pivotal movement relative thereto between a closed position and an open position, said last named means providing substantially the sole vertical support for said cover halves upon the car, at least certain of the last named means being spaced longitudinally from said trucks in a position wherein said bed undergoes substantial vertical deflection under the experience of loading thereon and providing for such vertical deflection of said bed without accompanying vertical deflection of the point of pivotal support for the cover half provided for thereby, at least one other of said last named means being positioned contiguous to at least one of said trucks and providing for relative longitudinal movement between said bed and the respective cover half for deflection of said bed under loading without deflection or distortion of said cover halves.

4. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said positions, said means pivotally mounting said cover halves comprising an elongated tubular operating shaft extending along each of said beams and supported thereon at a plurality of points spaced therealong for rotary movement, and means rigidly connecting one of said cover halves to each of said tubular operating shafts at a plurality of points spaced therealong, said means for effecting pivotal movement comprising an operating element rotatably mounted at one end of said car, another shaft telescopically received within one of said operating shafts and extending outwardly thereof at one end thereof and connected to said operating element, said another shaft being connected to said one operating shaft at the midpoint thereof so that opening and closing forces are simultaneously applied to the opposite ends of the cover half connected to said one of said operating shafts.

5. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said position, said means pivotally mounting said cover halves comprising an elongated tubular operating shaft extending along each of said beams and supported thereon at a plurality of points spaced therealong for rotary movement, and means rigidly connecting one of said cover halves to each of said tubular operating shafts at a plurality of points spaced therealong, said means for effecting pivotal movement comprising an operating element rotatably mounted at one end of said car, and extending transversely thereof for operation from either side of said car, another shaft telescopically received within each of said operating shafts and each extending outwardly thereof at one end thereof and connected to said operating element, each said another shaft being connected to the one of said operating shafts in which it is received substantially at the midpoint thereof.

6. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams

mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said positions, said means pivotally mounting said cover halves comprising an elongated operating member extending along each of said beams and supported thereon at a plurality of points spaced therealong for rotary movement, and means rigidly connecting one of said cover halves to each of said operating members at a plurality of points spaced therealong, said means for effecting pivotal movement including spring means mounted on each of said operating members operable to load the spring means as the cover halves are moved to either of said positions so that said spring means will assist in the movement of said cover halves from either of said positions.

7. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said positions, said means pivotally mounting said cover halves comprising an elongated operating member extending along each of said beams and supported thereon at a plurality of points spaced therealong for rotary movement, and means rigidly connecting one of said cover halves to each of said operating members at a plurality of points spaced therealong, said means for effecting pivotal movement including a plurality of leaf springs cantilever mounted on each of said beams spaced longitudinally thereof and disposed when in their unloaded condition substantially in a plane including the axis of said operating member, and a pair of spring engaging abutments mounted on said operating member adjacent each of said springs and defining a slot therebetween receiving the free end of said spring, said abutments being so positioned that said springs are deflected in one direction from their unloaded condition when the cover halves are in one of said positions and are deflected in the opposite direction from said unloaded condition when said cover halves are in the other of said positions.

8. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively coyering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said positions, at least one cross member extending transvesrely of said bed between said beams for bracing coiled steel and the like supported on said bed, co-operating attachment means on said cross member and on said beams including movable latch elements movable between latched and unlatched positions and abutments carried by said cover halves and disposed when said cover halves are in said closed positions in the path of movement of said latch elements from said latched position to said unlatched positions so that said attachment may not be detached when said cover halves are in closed position.

9. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like and comprising a pair of spaced parallel support beams mounted on and extending longitudinally of said car at opposite sides of said bed, cover halves extending longitudinally of said beams, means pivotally mounting said cover halves on said beams for pivotal movement between closed positions in which said cover halves meet over and cover said bed and open positions in which coiled sheet steel or the like may be loaded on or unloaded from said bed, and means for effecting pivotal movement of said cover halves between said positions, said beams having horizontal flanges having apertures spaced therealong, said cross member having apertures at the ends thereof adapted to be selectively aligned with apertures in said beam flanges, and latch pins vertically movable between a latched position in which said latch pin is disposed in such aligned apertures and an unlatched position and abutments carried by said cover halves disposed when said cover halves are in closed position in the path of movement of said latch pins from said latched position to said unlatched position so that said latch pins may not be withdrawn from the latched position to the unlatched position when the cover halves are in closed position.

10. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, means connected to each of said cover halves adapted to be connected to said car body at a pair of points spaced from the longitudinal center thereof and at opposite sides thereof to provide the sole vertical support for said cover halves and to support each cover half on said car body for pivotal movement relative to said body between a closed position in which said cover halves cover said bed and an open position in which coiled sheet steel or the like may be loaded on or unloaded from said bed, said last named means permitting movement relative to said car body longitudinally thereof, and other means connected to each of said cover halves in spaced relation to said last named means and adapted to be connected to said body to substantially prevent horizontal movement transversely of said car body while permitting movement in a vertical plane longitudinally of said body whereby said car body may deflect as during loading and unloading thereof without deflecting or distorting said cover halves.

11. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, means connected to each of said cover halves adapted to be connected to said car body adjacent the opposite ends thereof to provide the sole vertical support for said cover halves and to support each cover half on said car body for pivotal movement relative to said body between a closed position in which said cover halves cover said bed and an open position in which coiled sheet steel or the like may be loaded on or unloaded from said bed, said last named means permittng movement relative to said car body longitudinally thereof and other means connected to each of said cover halves intermediate said last named means and

adapted to be connected to said body to substantially prevent horizontal movement transversely of said car body while permitting movement in a vertical plane longitudinally of said car body whereby said car body may deflect as during loading or unloading thereof without deflecting or distorting said cover halves.

12. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, an elongated hinge element extending longitudinally of and connected to each of said cover halves, means connected to each of said hinge elements adapted to be connected to said car body adjacent the opposite ends thereof to provide the sole vertical support for said cover halves and to support each cover half on said car body for pivotal movement relative to said body between a closed position in which said cover halves cover said bed and an open position in which coiled sheet steel or the like may be loaded on or unloaded from said bed, said last named means permitting movement relative to said car body longitudinally thereof whereby said car body may deflect without deflecting or distorting said cover halves and other means connected to each of said hinge elements intermediate said last named means and adapted to be connected to said body to substantially prevent horizontal movement transversely of said car body while permitting movement in a vertical plane longitudinally of said car body.

13. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, spaced parallel support beams individual to said cover halves and adapted to be mounted on said car body, means mounting each of said cover halves on one of said support beams for pivotal movement relative thereto between a closed position and an open position, means on each of said support beams adapted to connect said beam to said car body adjacent its ends to support said beam on said car body, provide the sole vertical support for said beam and cover halves and to permit movement relative to said car body longitudinally thereof whereby said car body may deflect without deflecting or distorting said beam or said cover halves and other means on each of said beams intermediate said last named means adapted to be connected to said body to substantially prevent horizontal movement transversely of said body while permitting movement in a vertical plane longitudinally of said car body.

14. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, bearings adjacent opposite ends of each of said cover halves adapted to be connected to said body adjacent the opposite ends thereof for supporting said cover halves on said body for pivotal movement relative to said body between closed positions in which said cover halves cover said bed and open positions in which coils of sheet steel or the like may be loaded on or unloaded from said bed, said bearings providing the sole vertical support for said cover halves, while permitting movement relative to said car body longitudinally thereof whereby said car body may deflect as during loading and unloading thereof without corresponding deflection of said cover halves, at least one support assembly connected to each of said cover halves intermediate said bearings and adapted to be connected to said car body to substantially prevent horizontal movement transversely of said car body while permitting movement in a vertical plane longitudinally of said car body.

15. In a railway car adapted to carry coiled steel and the like and having means providing a bed for supporting the coiled sheet steel or the like and a car body supporting said bed, means for selectively covering and uncovering the coiled sheet steel or the like and comprising cover halves adapted to extend longitudinally of said body and close over said bed, bearings adjacent opposite ends of each of said cover halves adapted to be connected to said body adjacent the opposite ends thereof for supporting said cover halves on said body for pivotal movement relative to said body between closed positions in which said cover halves cover said bed and open positions in which coils of sheet steel or the like may be loaded on or unloaded from said bed, said bearings providing the sole vertical support for said cover halves, while permitting movement relative to said car body longitudinally thereof whereby said car body may deflect as during loading and unloading thereof without corresponding deflection of said cover halves, at least one support assembly connected to each of said cover halves intermediate said bearings and adapted to be connected to said car body to substantially prevent horizontal movement transversely of said car body while permitting movement in a vertical plane longitudinally of said car body, each of said assemblies comprising a pair of parallel vertical plates extending longitudinally of said body and means interconnecting said plates to substantially prevent relative movement therebetween at right angles to said plates while permitting such relative movement parallel to said plates.

16. In a railway car adapted to carry coiled sheet steel or the like having means defining a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like comprising cover halves adapted to extend longitudinally of the bed, an elongated tubular operating shaft extending along each side of the car, means supporting each of said tubular operating shafts at a plurality of longitudinally spaced positions upon the respective side of the railway car for rotary movement, means rigidly connecting each of said cover halves to a respective one of said tubular operating shafts at a plurality of longitudinally spaced points therealong, an operating element mounted at one end of the car, a driving shaft telescopically received within each of said operating shafts and projecting outwardly therefrom at the end thereof adjacent the one car end, means connecting said operating element to each of said driving shafts for rotating said driving shafts, and means providing a driving connection between each of said driving shafts and the respective tubular operating shaft substantially at the midpoint of the latter.

17. In a railway car adapted to carry coiled sheet steel or the like having means defining a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like comprising a pair of cover halves adapted to extend longitudinally of the bed, means pivotally mounting said cover halves at the respective side of the car for pivotal movement between a closed position in which said cover halves meet over and cover the bed and an open position in which coiled sheet steel or the like may be loaded or unloaded from the bed, and means for effecting pivotal movement of said cover halves between said positions, said means pivotally mounting said cover halves comprising an elongated operating member extending longitudinally of the respective side of the car and supported thereon at a plurality of longitudinally spaced positions for rotary movement, means rigidly connecting each of said cover halves to a respective one of said operating members at a plurality of longitudinally spaced points therealong, spring means adapted to be affixed to the car, and spring engaging abutments on each of said operating members operable to load said spring means as

said cover halves are moved to either of said positions so that said spring means will assist in the movement of said cover halves from either of said positions.

18. In a railway car adapted to carry coiled sheet steel or the like having means defining a bed for supporting the coiled sheet steel or the like, means for selectively covering and uncovering the coiled sheet steel or the like comprising a pair of cover halves adapted to extend longitudinally of the bed, means pivotally mounting each of said cover halves at the respective side of the car for pivotal movement between a closed position in which said cover halves meet over and cover the bed and an open position in which coiled sheet steel or the like may be loaded on or unloaded from the bed, means for effecting pivotal movement of said cover halves between said positions, at least one cross member extending transversely of the bed for bracing coiled sheet steel or the like supported on the bed, cooperating attachment means on said

cross member and on the car including latch elements movable between latched and unlatched positions, and abutments carried by said cover halves and disposed when said cover halves are in said closed position in the path of movement of said latch elements from said latched position to said unlatched position so that said attachment means may not be detached when said cover halves are in their closed position.

References Cited by the Examiner

UNITED STATES PATENTS

1,934,929	11/1933	Jonsson	105—377
2,547,859	4/1951	Duffie et al.	105—377
3,009,426	11/1961	Nampa	105—367
3,186,357	6/1965	Fillion	105—367

ARTHUR A. LA POINT, *Primary Examiner.*

DRAYTON E. HOFFMAN, *Examiner.*