

J. O. NEIKIRK & F. SEABERG

CAR CONSTRUCTION.

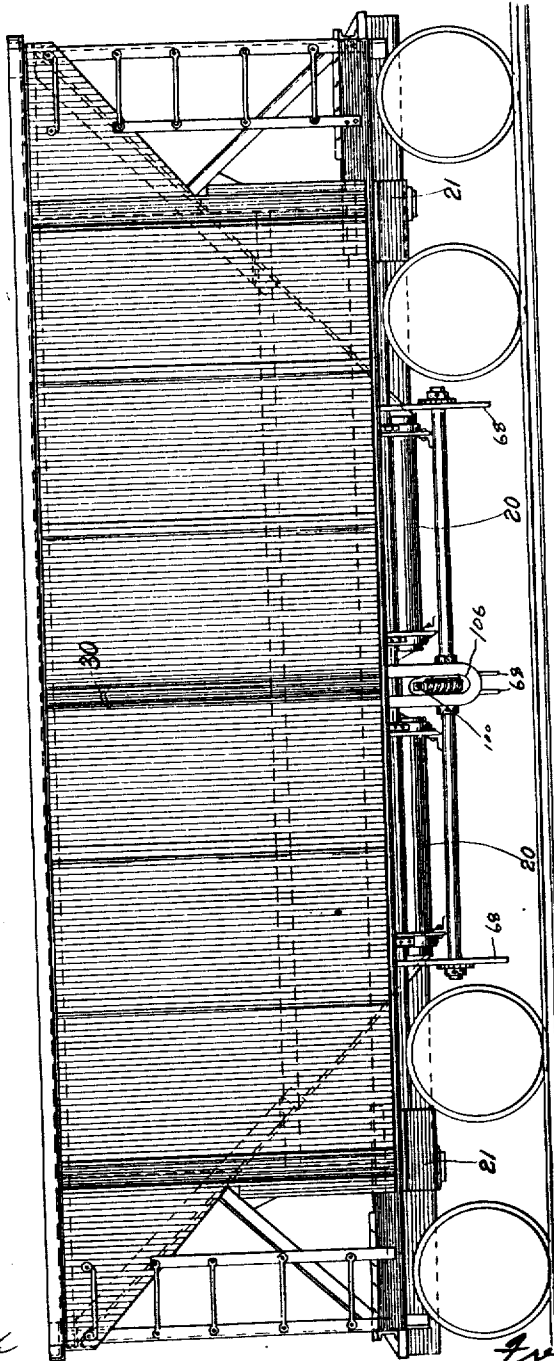
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Patented Dec. 12, 1911.

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1,011,235.

Fig. 1



Witnesses:

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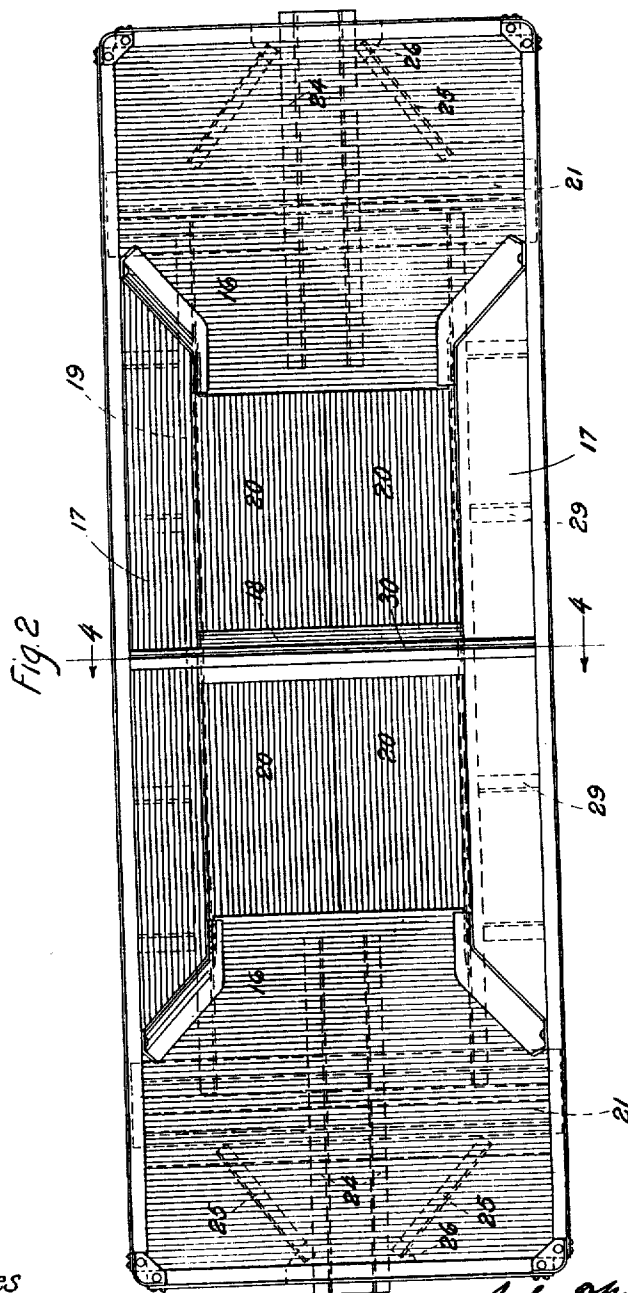
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Witnesses
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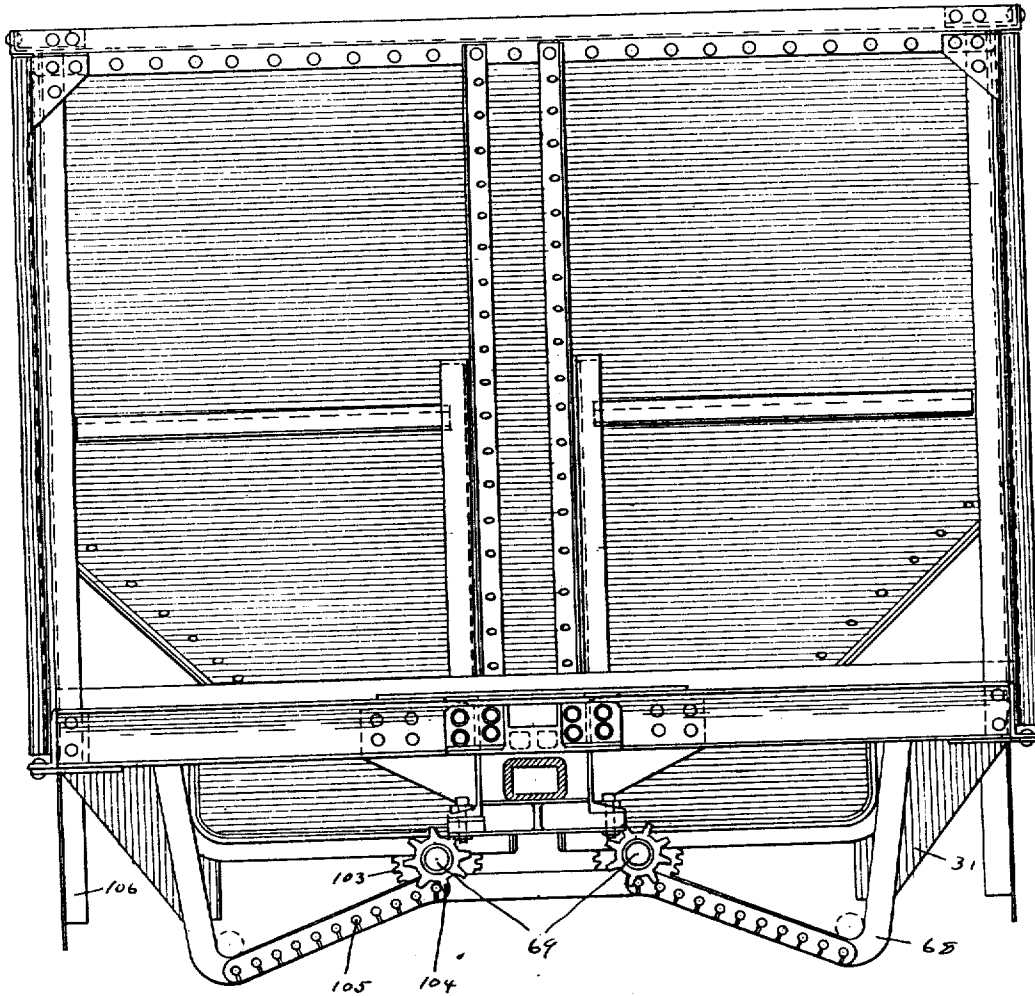
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7 SHEETS—SHEET 3.

1,011,235.

Fig. 3



Witnesses

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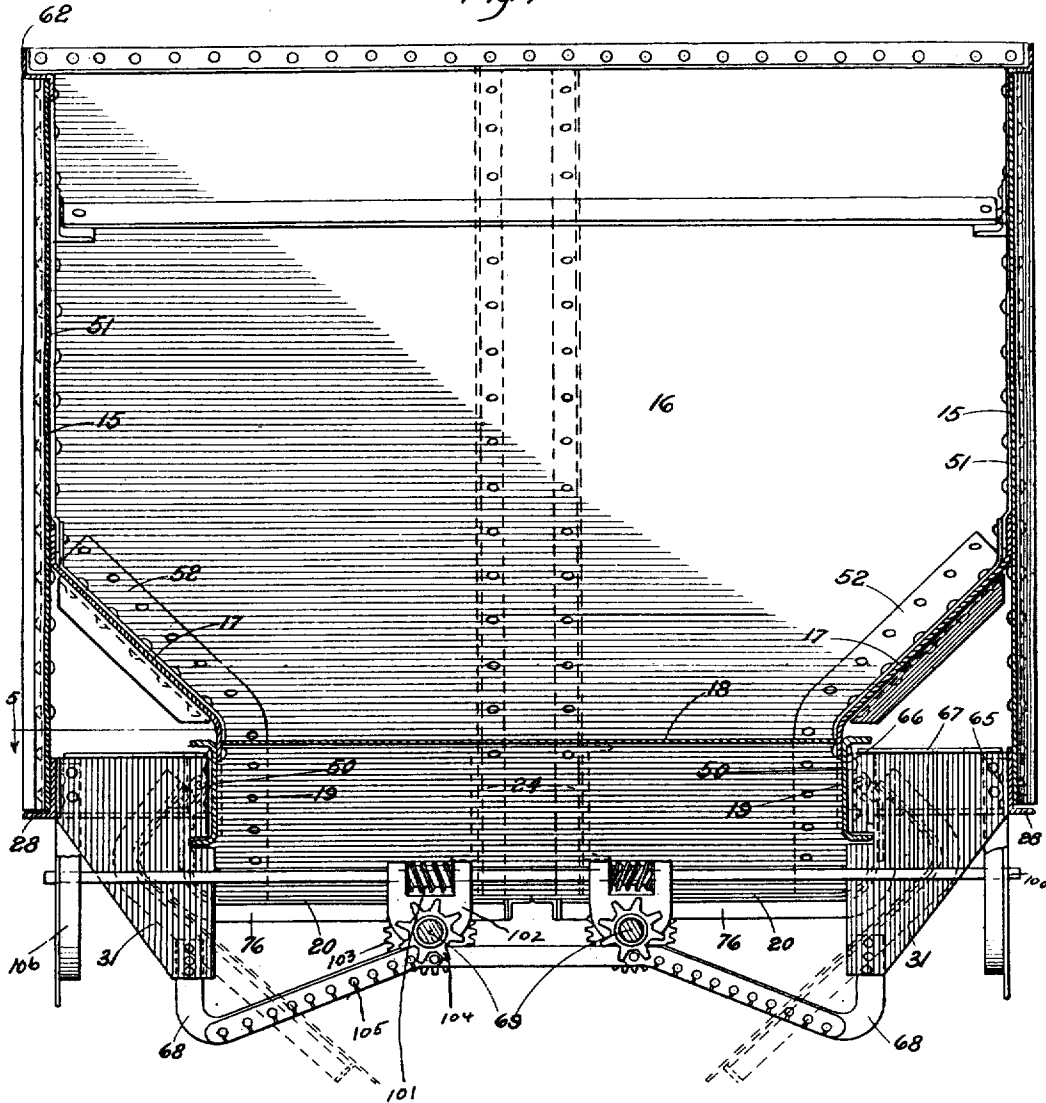
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7 SHEETS—SHEET 4.

Fig. 4



Witnesses
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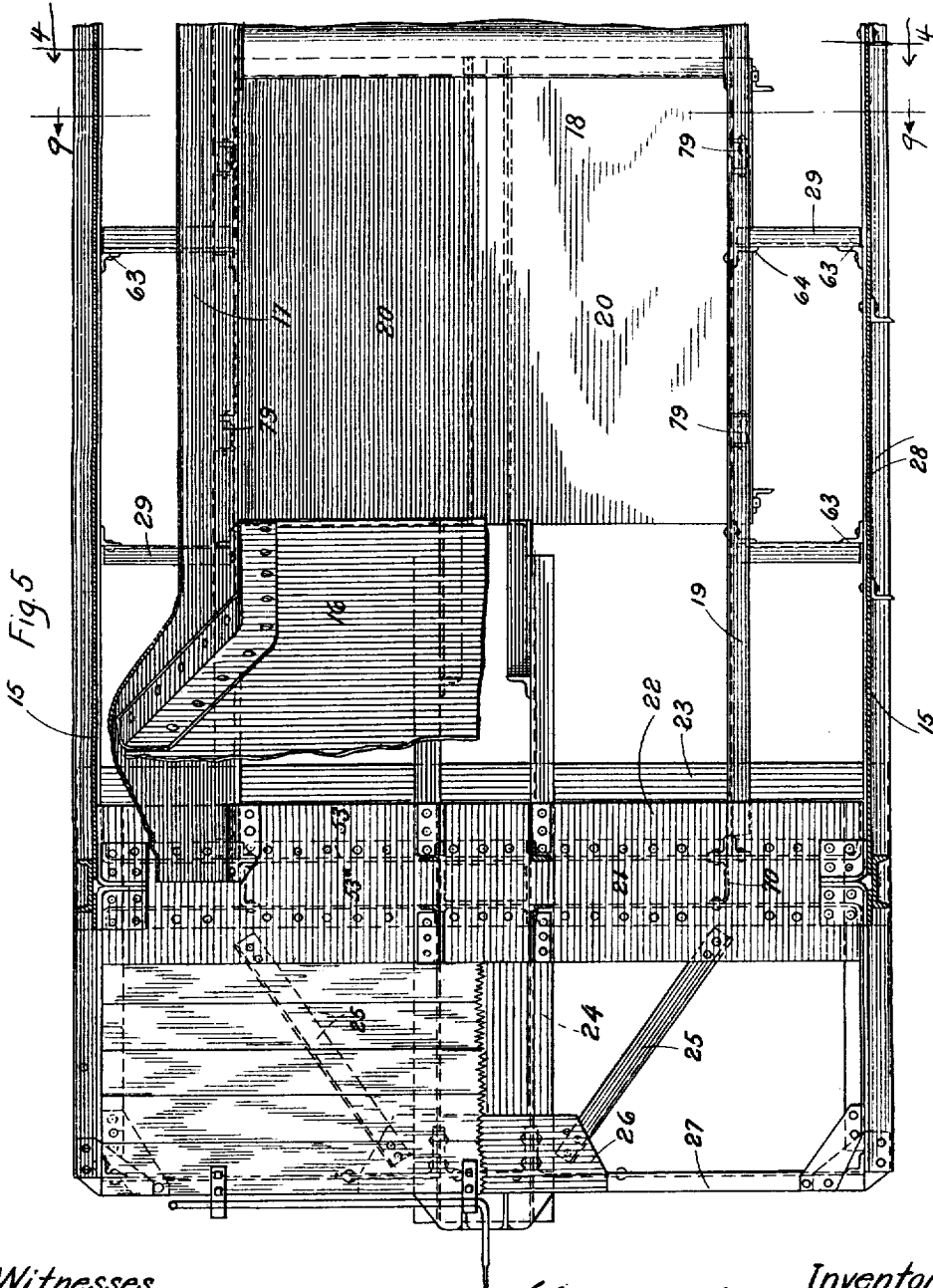
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7 SHEETS-SHEET 5.

1,011,235.



Witnesses

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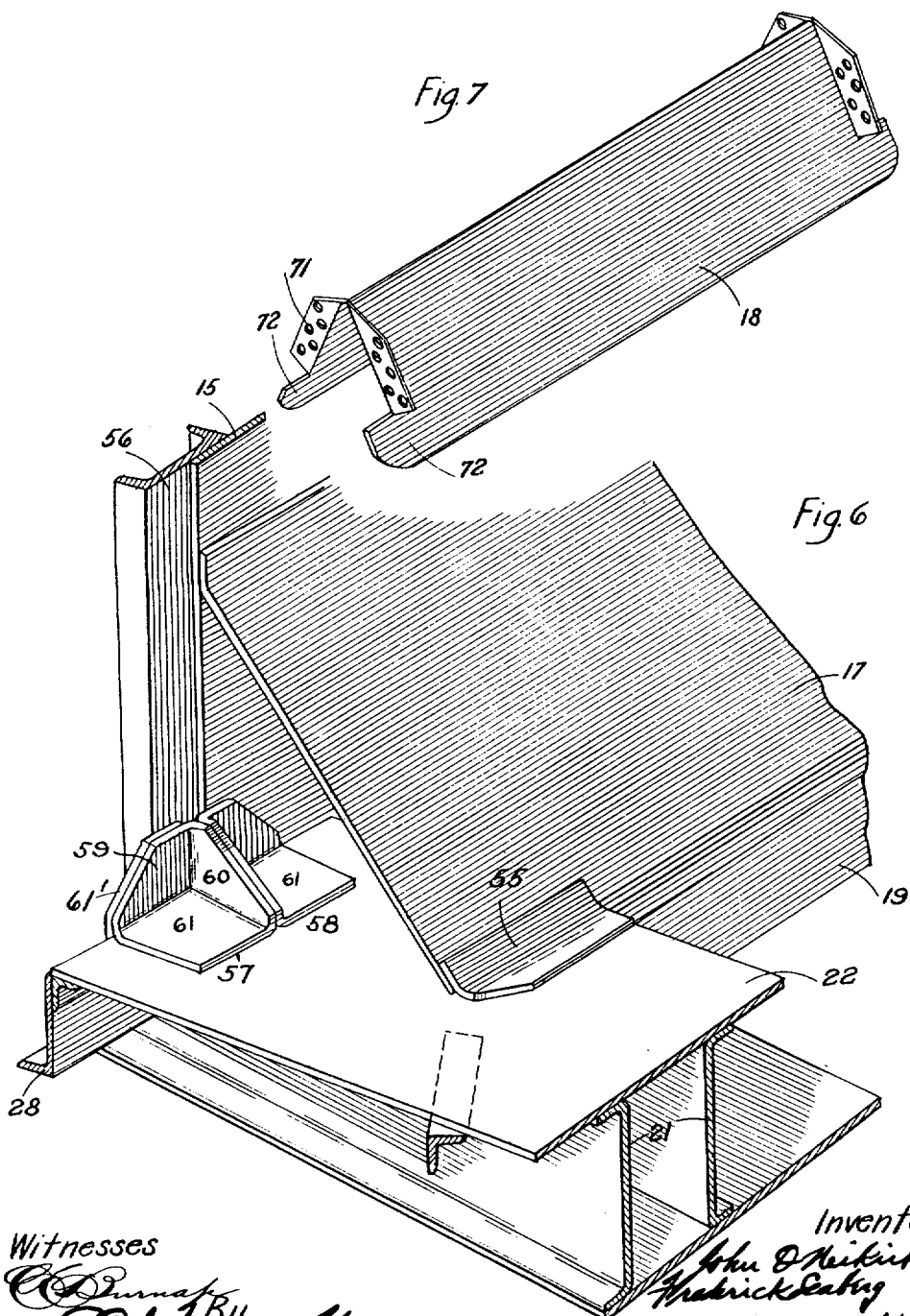
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CAR CONSTRUCTION.
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7 SHEETS—SHEET 6.

1,011,235.



Witnesses

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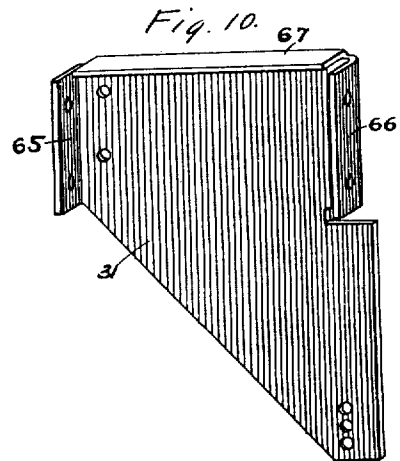
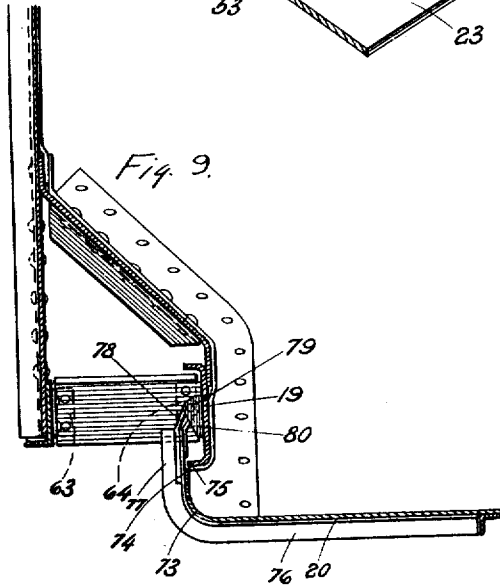
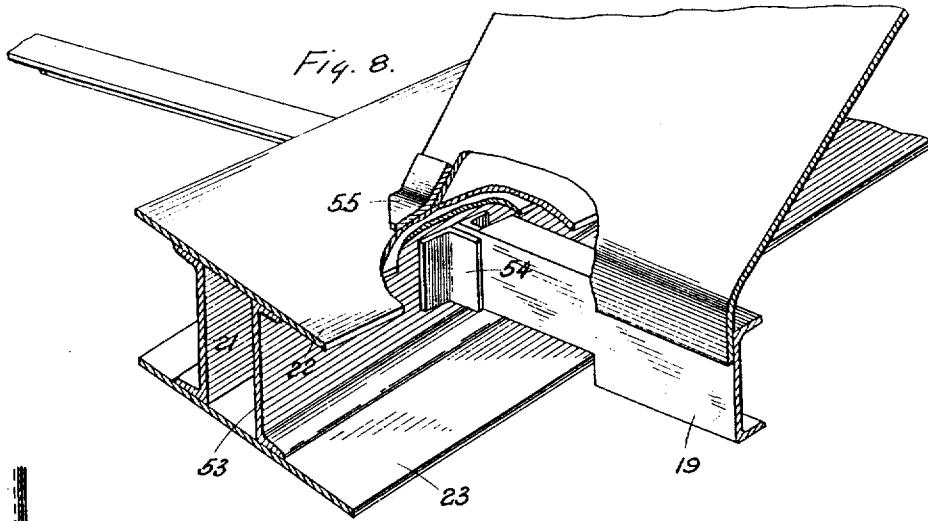
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J. O. NEIKIRK & F. SEABERG.
CAR CONSTRUCTION.
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Patented Dec. 12, 1911.

7 SHEETS—SHEET 7.

1,011,235.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN O. NEIKIRK, OF MORGAN PARK, AND FREDERICK SEABERG, OF CHICAGO, ILLINOIS, ASSIGNORS TO NATIONAL DUMP CAR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

CAR CONSTRUCTION.

1,011,235.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed August 2, 1909. Serial No. 510,878.

To all whom it may concern:

Be it known that we, JOHN O. NEIKIRK and FREDERICK SEABERG, citizens of the United States, residing, respectively, at Morgan Park and Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car Construction, of which the following is a specification.

The object of our invention is to improve railway hopper cars having central discharge openings.

Special objects of our efforts have been to improve the construction, increase the capacity and to provide a form of hopper which permits a free and complete discharge of its contents.

One of the difficulties incident to the construction of central dumping hopper cars has arisen from the necessity of providing a car body with large cubic contents while at the time making the car completely self cleaning when the dump doors are opened. A considerable increase in the length of such a car renders it necessary either to give the ends a very gradual incline in order to carry them to the central opening, such incline being insufficient to cause discharge without assistance, or to increase the length of the central opening to such an extent that when transversely hinged doors are used an objectionably large number of such doors must be employed with their more or less complicated operating mechanism and the obstruction to the opening resulting from their hinged edges. Furthermore in such cars it is usual to make the opening comparatively narrow in order to afford space for intermediate longitudinal sills beneath the stationary part of the hopper, such sills serving to carry the load to the bolsters. If instead of increasing the length of the car in order to secure increased cubic contents, the height be increased the height of the load above the rails is too great to meet the requirements of good railroad practice.

According to our invention a car may be constructed of any desired length, and with an unobstructed discharge opening extending from one bolster to the other and of great width, thus giving a slope to the hopper sufficient to effect without assistance the discharge of the material transported, such slope being not materially less than forty-five degrees. The construction shown in the

drawings and explained herein will render clear the means by which we accomplish this object. Among other things these means include the idea of carrying the load entirely by plate girder sides and the bolsters; the provision of inner side sections sloping toward the center of the car together with cross members extending from said inner side sections to the plate girder sides forming columns extending between the bolsters to resist buffing strains; and the hinging of the doors longitudinally of the car at their outer edges by means of upwardly extending hinges. These and other features of construction will be clearly apparent from the following description and claims taken in connection with the accompanying drawings in which—

Figure 1 is a side elevation of a car embodying our improvements. Fig. 2 is a plan view of same. Fig. 3 is an end elevation. Fig. 4 is a cross section on line 4, 4 of Fig. 2. Fig. 5 is a plan view of one-half the car with portions broken away to show the framework. Fig. 6 is a perspective view showing arrangement of the plates and other parts at the junction of the sloping floor plates and the body bolster. Fig. 7 is a perspective view of the transverse stay and gearing cover at the middle of the car. Fig. 8 is a perspective view of the connection between the body bolster and the lower part of the inner side sections. Fig. 9 is a cross section of the lower part of the side wall and inner side section on the line 9, 9. Fig. 10 is a perspective view of a vertical plate from which the shaft support is hung. In the drawings, the numeral 15 represents the side walls or plates; 16 the sloping end floor plates; 17 the sloping side floor plates; 18 the transverse stay and gearing cover; 19 a channel iron forming the lower parts of the inner side section, which as a whole is made up of the parts 17 and 19; 20 the dump doors; 21 the body bolsters; 22 upper cover plate of the body bolster; 23 lower cover plate of the body bolster; 24 the draft sills; 25 diagonal braces; 26 draft sill gusset plates; 27 end sills; 28 reinforcing angles at the lower edges of the plate girder sides; 29 cross members forming the lower part of the triangular box columns which take the buffing strains between the bolsters; 30 side wall stays; 31 are stay and hanger plates for supporting the guide rail

supports. These are among the principal parts that taken together form the body of the car which constitutes our invention.

In the car shown in the drawings the end floor plates 16 have been given a very steep slope having an angle of about 45 degrees. This causes a very quick discharge, and the lower edges of said plates are placed very low. The sloping inner side sections 17 are also given a steep slope. The inner side sections 17 may be formed of a single plate, but in the present instance we have shown the lower vertical part of the inner side sections as formed of channel irons 19. Plate 17, however, might be continued downwardly and suitably flanged at its lower edge, but the use of the channel irons 19, which are commercial shapes, obviates the necessity of going to the expense of forming a more or less irregular special shape. The channel irons 19 are riveted to the plates 17 thus forming a complete inner side section of the form illustrated. The vertical webs 50 of the channels 19 taken in connection with the sloping end floor plates 16 inclose a discharge opening which has a rectangular form. The length of this opening, in a direction parallel to the track, is very great, thereby giving a large and free opening for the discharge of the material.

The steep slope of the end floor plates 16, and of the side floor plates 17, taken in connection with the depth and large dimensions of the discharge opening provide a space of great capacity for the material to be carried. This great capacity is a very desirable feature in cars of this class and is attained without exceeding the normal height.

The side wall plates 15 are joined to the sloping end floor plates 16 by means of the upturned edges 51 on said plates 16 and suitable rivets in those parts of said plates which lie above the sloping side floor plates 17. The end floor plates 16 and side floor plates 17 are joined by the corner angle pieces 52. The angle pieces 52 are extended below the lower edges of the side floor plates 17 and serve to make the joint between the lower parts of the end floor plates 16 and the vertical webs 50 of the channels 19. Each channel 19 is attached at each of its ends to one of the vertical webs 53 of the bolsters 21, by the angle pieces 54 and suitable rivets. The plates which form the sloping side floor plates 17 are also extended as far as the body bolsters 21 and overlap said bolsters to approximately as far as their center lines. The angle pieces 55 and suitable rivets serve to make a strong connection between the cover plates 22 and said sloping side floor plates 17.

The side wall plates 15 extend from approximately the center of one bolster 21 to the center of the other. They are riveted to the stakes 56 which rise from the outer ex-

terminities of the bolsters 21. The angle pieces 57, 58 each of which has two vertical webs 59, 60, rising from a base 61 connect said stake 56 with the cover plate 22. The stake 56 is also riveted to the angle iron 28. The filler 61' spaces said stake from the piece 58 and is equal in thickness to the side wall plates 15. The angle bars 28 are riveted to the side wall plates 15 at their lower edges. These angle bars are preferably riveted to the inside faces of the side plates 15, with one leg projecting outwardly. At the upper edges of each side wall plate a Z-bar 62 is attached.

The channels 19 are connected with the plate girder sides at intervals by stays 29 formed of channel bars. The connections at the ends of the channel bars are made by means of corner angle pieces 63, 64 and rivets. At the middle of the car are vertical plates 31 having a substantially triangular form. These plates 31 are flanged at 65 to permit riveting to the angles 28, and at 66 to permit riveting to the channels 19. They are also flanged at their upper edges 67, to provide stiffness and rigidity against compression.

The plates 31 serve the combined purposes of stays for connecting the parts 19 and 28, and of supports for the guide rails 68 which are attached to them at their lower ends. The rails 68 serve as guides and supports for the dump door operating shafts 69. The end sill diagonal braces 25 are attached at their inner ends to the cover plates 22 of the body bolsters 21 and at their outer ends to the draft sill gusset plates 26. A strut 70 joins the vertical webs 53 and 53^a of the body bolster and serves to assist in transmitting the buffing thrusts.

The transverse stay or gearing cover 18, shown fully in Fig. 7, is formed preferably of a single plate bent at the middle of its width into an inverted V-shape. It is flanged at the ends 71 and riveted through said flanges to the webs 50 of the channels 19. The projecting ends 72 lie beneath the channels 19 and are fitted to the round corners 73 of the doors 20. The lower edges of said transverse stay 18 are on a level with the lower edges of the sloping end floor plates 16, which latter are similarly fitted to the doors 20. This transverse stay serves the two purposes of a strong and rigid connection between the car sides, and also as a very efficient protection for the gearing.

The transverse stay or gearing cover 18 divides the discharge opening into two parts each of which is approximately square. The discharge of the material through these openings is controlled by the dump doors 20 which are of rectangular form with their longer dimensions longitudinally disposed with relation to the car body. The dump doors 20 are hinged to the channels 19 and

meet at the center of the car. The greater part of the doors 20 is horizontally disposed and fits against the lower edges of the sloping end floor plates 16 and of the gear cover 18.

The outer edges 74 of the dump doors are bent upwardly and lie adjacent the outer edges 75 of the lower flanges of the channels 19. The bend in the doors 20 is given a large radius and is fitted to the curved edges of the projections 72 of the gear cover 18 and also to the lower corners of the sloping end floor plates 16. The angle bars 76 are attached to the bottoms of the doors and serve as stiffeners therefor. They are also bent around the upwardly bent portion near the outer edges 75 and are extended a considerable distance upward beyond said edges. The upwardly projecting ends 77 serve as convenient means for the attachment of the hinge loops 78 which extend still farther beyond the upwardly turned edge. The said loops 78 are inwardly turned to engage the hinge pin 79 which is carried by the bracket 80 fixed to the vertical web 50 of the main sill 19.

The elevated position of the hinge pins 79 above the level of the main body of the dump doors 20 produces important effects in the operation of said doors. One of said effects consists in causing the inner edges of the doors to move in paths having a greater horizontal component and a less vertical component than would be the case if the doors were hinged at a level with their inner edges. This inclined relation of the arc of movement causes the said edges to move rapidly outward. This gives a quick opening effect to the doors. It will be seen that the elevated hinge causes the outer portion of the door to move outwardly and upwardly and the net result of this mode of hinging is to produce a small downward movement of the inner edge of the door, and a large outward movement. The load carrying space in the bottom of the hopper can therefore be extended to a greater depth and the capacity of the car is thereby greatly increased.

The outward and upward movement of the outer portions of the doors carries them to a position directly below the open space existing between the channels 19 and car sides. This space is covered by the sloping side floor plates 17 and is further inclosed by the lower portion of the side wall plates 15. The stay bars 29 and plates 31 complete the closure of what may be termed a box girder. This box girder comprises the parts 19, 17, 15, 28, 63 and 31 and extends from bolster to bolster.

By providing longitudinally hinged doors for the hopper we are enabled to secure a large unobstructed central door opening and to operate the doors by simple mechanism,

which mechanism, however, we do not claim herein, the same being the invention of John O. Neikirk as set forth in his Patent No. 956,819, granted May 3, 1910. Just beyond the ends of the doors and at the center of the car beneath the housing 18 are shaft supporting tracks 68. These supports or tracks are hung from the plates 31 and slope upwardly from their outer ends toward the center of the car, having a horizontal section at the car center. Operating upon these tracks are shafts 69 which by their movement transversely of the car along the tracks serve to operate the doors. When the shafts are rolled inward and upward to the position illustrated in Fig. 4 they rest upon the horizontal central part of the track 68. As the doors themselves rest upon the shafts they are supported in closed position by a direct vertical thrust upon a fixed part of the car and in their closed position no component of the weight of the load acts upon any of the movable mechanism but simply causes a direct thrust upon the fixed tracks 68 through the shafts 69.

In order to operate the shafts 69 we have shown improved mechanism similar to that described and claimed in Patent 956,819 above referred to. This mechanism comprises a transverse rotatable shaft 100 upon which are splined screw-threaded sleeves 101, these sleeves being rotatably fixed with relation to the shaft 100, but movable longitudinally thereon. Yokes 102 are slidably mounted upon the shafts 100 at their upper ends, and the lower ends of each of said yokes rotatably engages one of the shafts 69. The screw-threaded sleeves 101 engage worm-wheels 103 fixedly secured to the shafts 69, and said shafts 69 also carry sprocket wheels 104 rigidly secured thereto. The sprocket wheels 104 engage sprocket teeth 105 upon the central track supports 68. Rotation of the shaft 100 imparts a similar movement to the screw-threaded sleeves 101 and the engagement of these sleeves with the worms 103 upon the shafts 69 causes said shafts also to rotate. The gears 104 being fixed to the shaft 69 cause said shafts to move bodily when rotated through the engagement of said gears with the sprocket teeth 105, and as the shafts 69 move outwardly and downwardly from the position shown in Fig. 4 the yokes 102 slide along the shaft 100 and carry said shaft downwardly with the shafts 69, the function of the yokes 102 being to keep the sleeves 101 in mesh with the worms 103. As shown in Figs. 1 and 4 the upward and downward movement of the shaft 100 takes place through guides 106 at the sides of the car, the structural parts of the car being so arranged as to leave clearance for such movement. The shaft 100 may be rotated by a suitable handle applied to its squared end or otherwise

as desired. The shafts 69 also carry gears at their ends engaging sprocket teeth upon the support 68 adjacent the ends of the car, thus causing the shafts to preserve their

5 parallel position.

From the foregoing it will be apparent that in our improved car all of the load is carried by the plate girder sides and bolsters and that the buffing strains are resisted by
10 the box girders formed by the lower part of the plate girder sides, the inner side sections 17—19 and the stays 29. This construction renders it possible to provide a central opening of great width and the length of the car
15 may be varied to any extent necessary, the plate girder sides being amply sufficient to carry the load to the bolsters. Furthermore, the longitudinal doors hinged at their outer edges render it possible to effectually close
20 the long door opening and this type of door opening in connection with the form of operating mechanism used opposes a minimum of obstructions to the door opening when the doors are opened. The box girders or columns referred to afford space for the upwardly extending hinges of the dump doors and the use of such upwardly extending hinges.

We claim:

30 1. A hopper car having a load carrying frame consisting of plate girder sides and bolsters, the car body having ends and inner side sections sloping downward toward a central opening at an angle sufficient to
35 cause the discharge of the load, the upper edges of said inner side sections being secured to said plate girder sides and the lower edges of said inner side sections being connected to said plate girders by cross members, the lower part of said plate girder
40 sides, said inner side sections and said cross members forming columns between the bolsters to resist buffing strains, a horizontal floor extending across said central opening, said floor consisting of doors hinged at
45 their outer edges and above the plane of the floor formed thereby when closed, movable door supports beneath said doors and fixed supports beneath said movable supports.

50 2. A hopper car having a load carrying frame consisting of plate girder sides and bolsters, the car body having ends and inner side sections sloping downward toward a central opening at an angle sufficient to
55 cause the discharge of the load, the upper edges of said inner side sections being secured to said plate girder sides and the lower edges of said inner side sections being connected to said plate girders by cross members, the lower part of said plate girder
60 sides, said inner side sections and said cross members forming columns between the bolsters to resist buffing strains, a horizontal floor extending across said central opening,
65 said floor consisting of doors, hinge members

secured to the outer edges of said doors and extending upwardly therefrom, and coacting hinge members inside of said columns and secured thereto.

3. A hopper car having a load carrying 70 frame consisting of plate girder sides and bolsters, the car body having ends and inner side sections sloping downward toward a central opening at an angle sufficient to cause the discharge of the load, the upper
75 edges of said inner side sections being secured to said plate girder sides and the lower edges of said inner side sections being connected to said plate girders by cross members, the lower part of said plate girder sides, 80 said inner side sections and said cross members forming columns between the bolsters to resist buffing strains, a horizontal floor extending across said central opening, said floor consisting of doors, said doors being
85 upturned at their outer edges, stiffening irons secured to and extending transversely of said doors and upwardly beyond the outer upturned edges thereof, into the interior of said columns, hinge members secured to the
90 upturned ends of said stiffening irons, and coacting hinge members inside of said columns and secured thereto.

4. A hopper car having a load carrying 95 frame consisting of plate girder sides and bolsters, the car body having ends and inner side sections sloping downward toward a central opening at an angle sufficient to cause the discharge of the load, the upper
100 edges of said inner side sections being secured to said plate girder sides and the lower edges of said inner side sections being connected to said plate girders by cross members, the lower part of said plate girder
105 sides, said inner side sections and said cross members forming columns between the bolsters to resist buffing strains, a horizontal floor extending across said central opening, said floor consisting of doors, hinge members secured to the outer edges of said doors and
110 extending upwardly therefrom and coacting hinge members inside of said columns and secured to said inner side sections.

5. A hopper car having a load carrying 115 frame consisting of plate girder sides and bolsters, the car body having ends sloping downward to a central opening and inner side sections sloping downwardly toward said opening and extending vertically downward at their inner edges, the sloping parts
120 of said ends and inner side sections having sufficient inclination to cause the discharge of the load, the upper edges of said inner side sections being secured to said plate girder sides and the lower edges of said inner
125 side sections being connected to said plate girders by cross members, the lower part of said plate girder sides, said inner side sections and said cross members forming columns between the bolsters to resist buffing 130

5 strains, a horizontal floor extending across said central opening, said floor consisting of doors hinged at their outer edges and above the plane of the floor formed thereby when closed, movable door supports beneath said doors and fixed supports beneath said movable supports.

In testimony whereof, we have subscribed our names.

JOHN O. NEIKIRK.
FREDERICK SEABERG.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."