

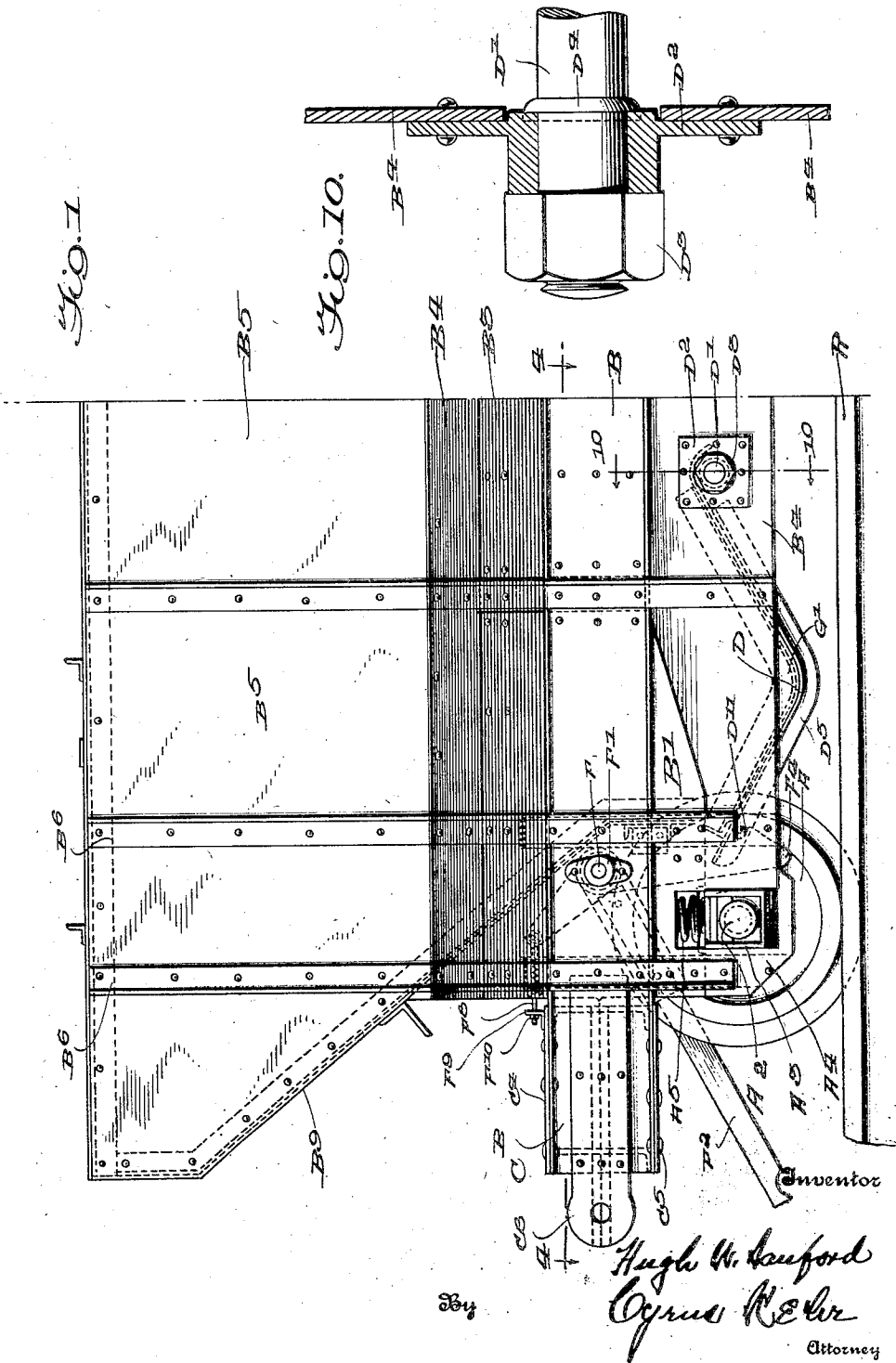
March 17, 1931.

H. W. SANFORD

1,796,348

RAILWAY CAR

Filed April 19, 1928 8 Sheets-Sheet 1



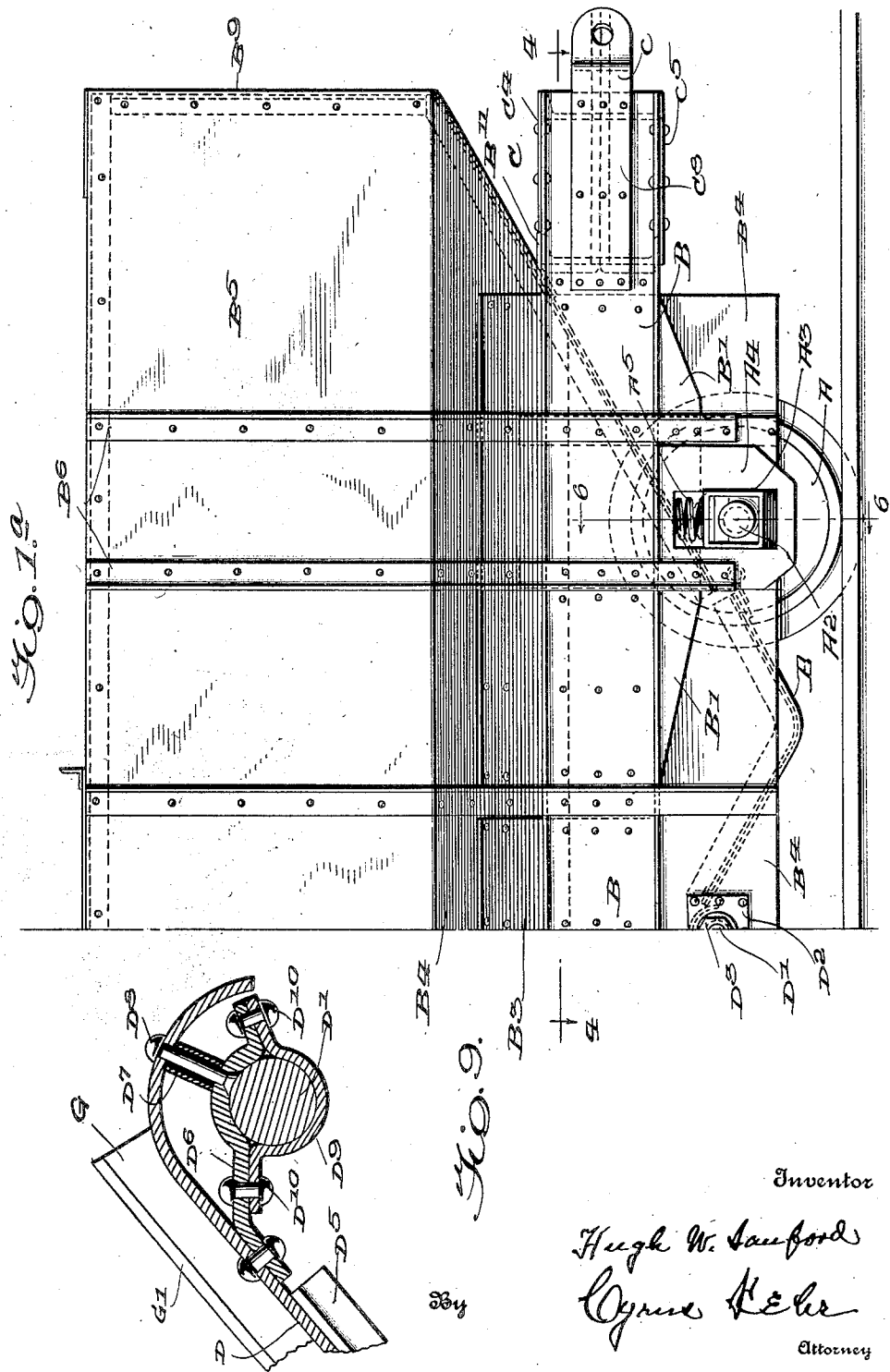
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RAILWAY CAR

Filed April 19, 1928 8 Sheets-Sheet 2



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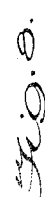
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RAILWAY CAR

Filed April 19, 1928

8 Sheets-Sheet 3



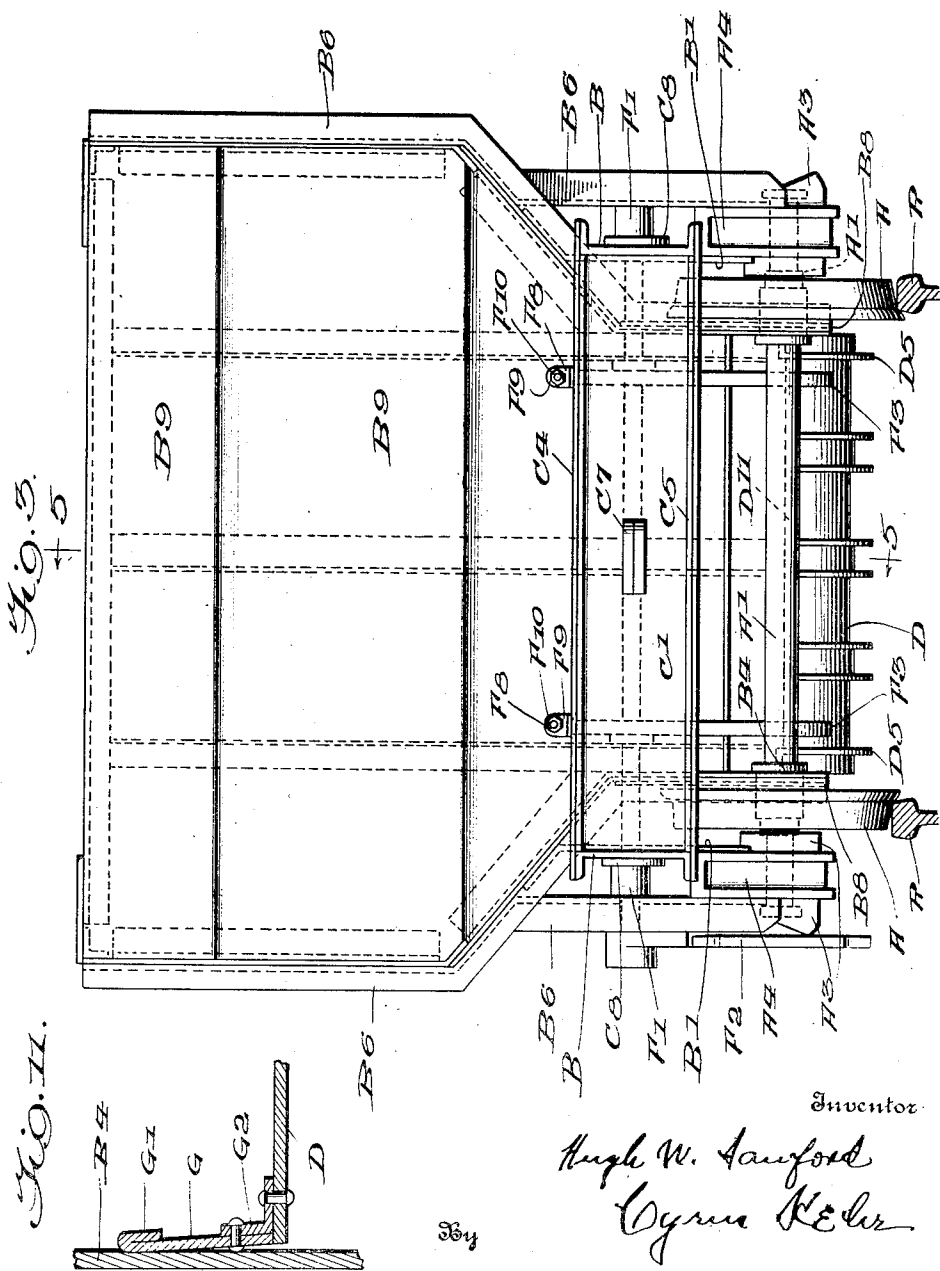
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RAILWAY CAR

Filed April 19, 1928 8 Sheets-Sheet 4



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RAILWAY CAR

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8 Sheets-Sheet 5

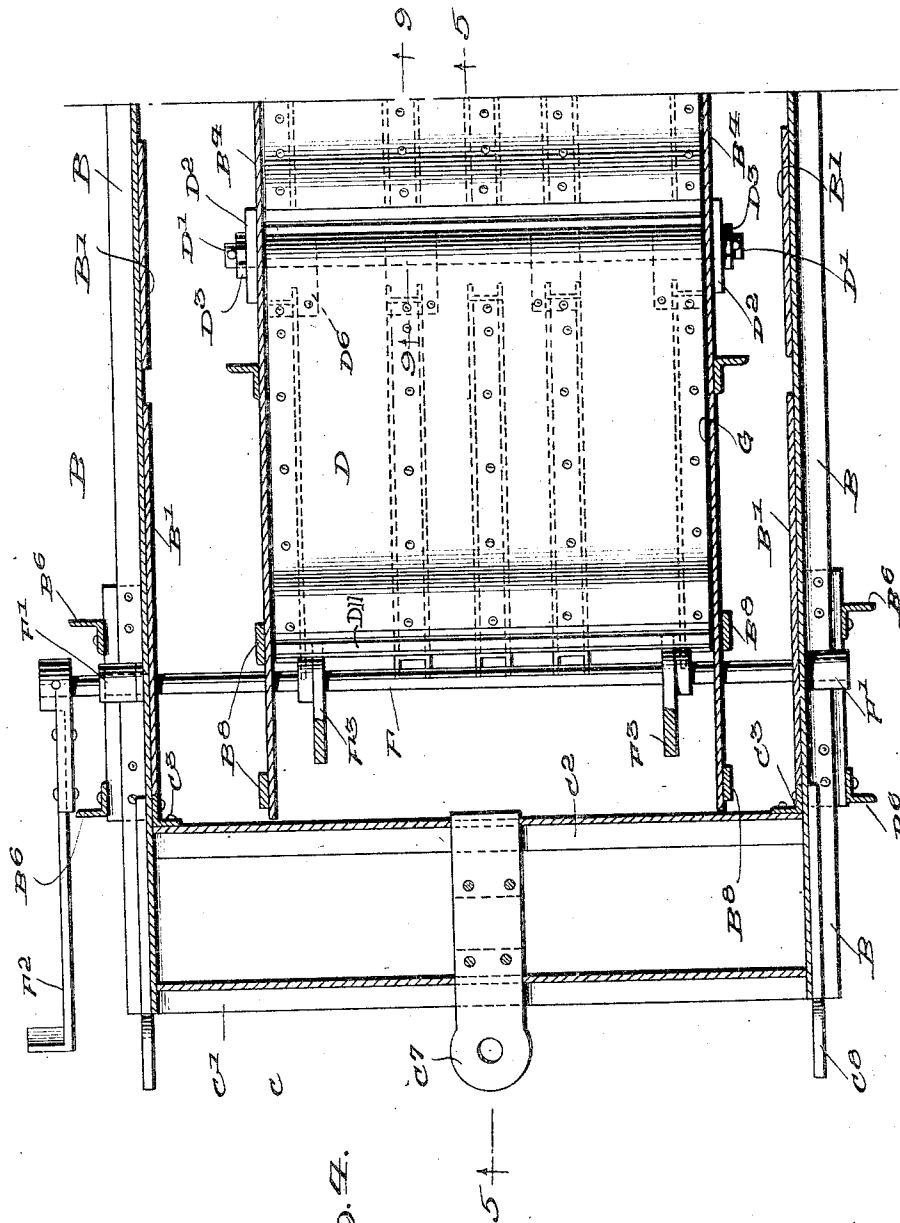


Fig. 4.

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RAILWAY CAR

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8 Sheets-Sheet 6

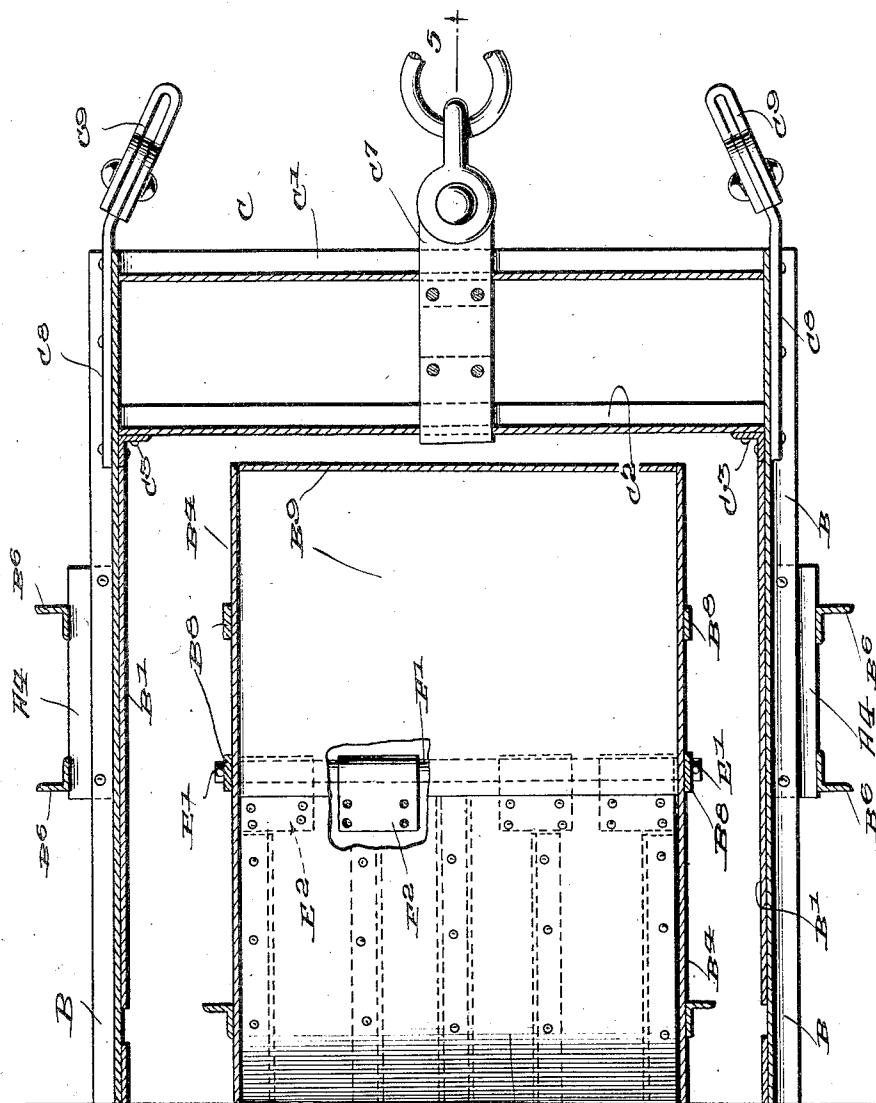


Fig. 4a.

5

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RAILWAY CAR

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Fig. 6.

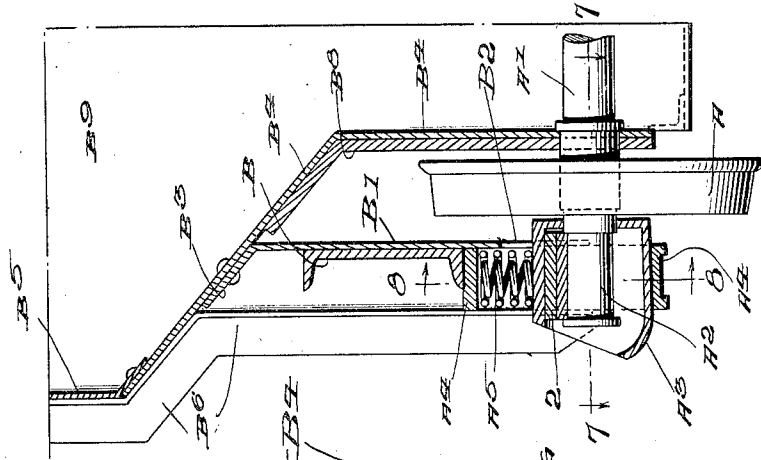
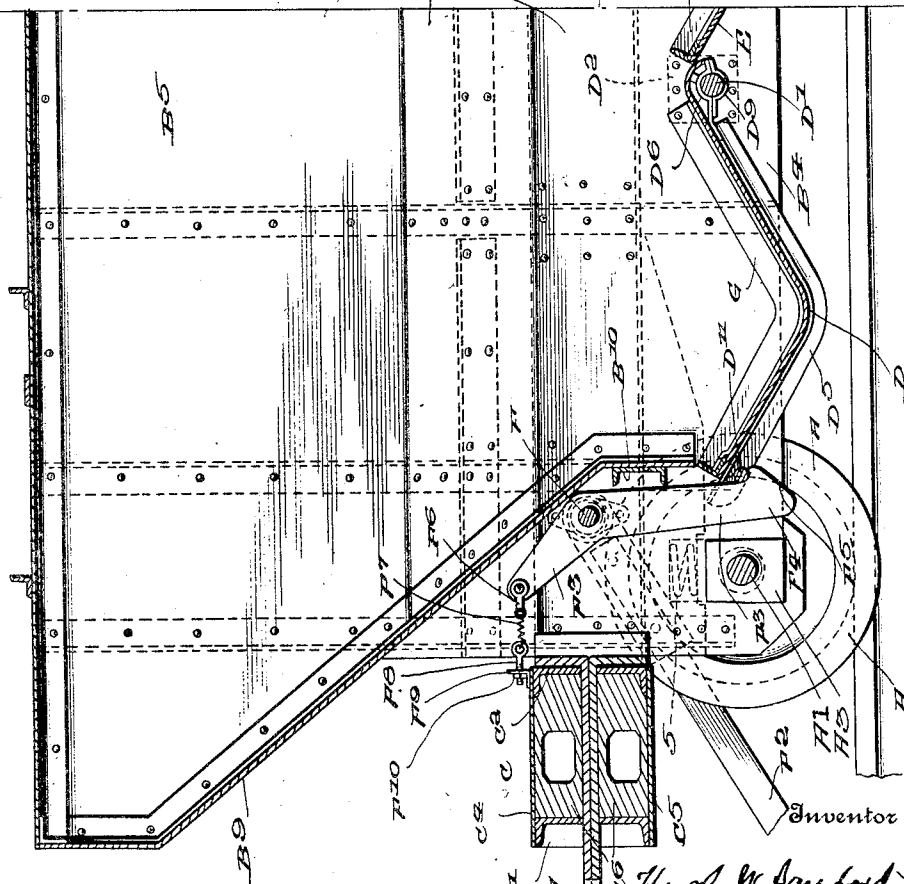


Fig. 5.



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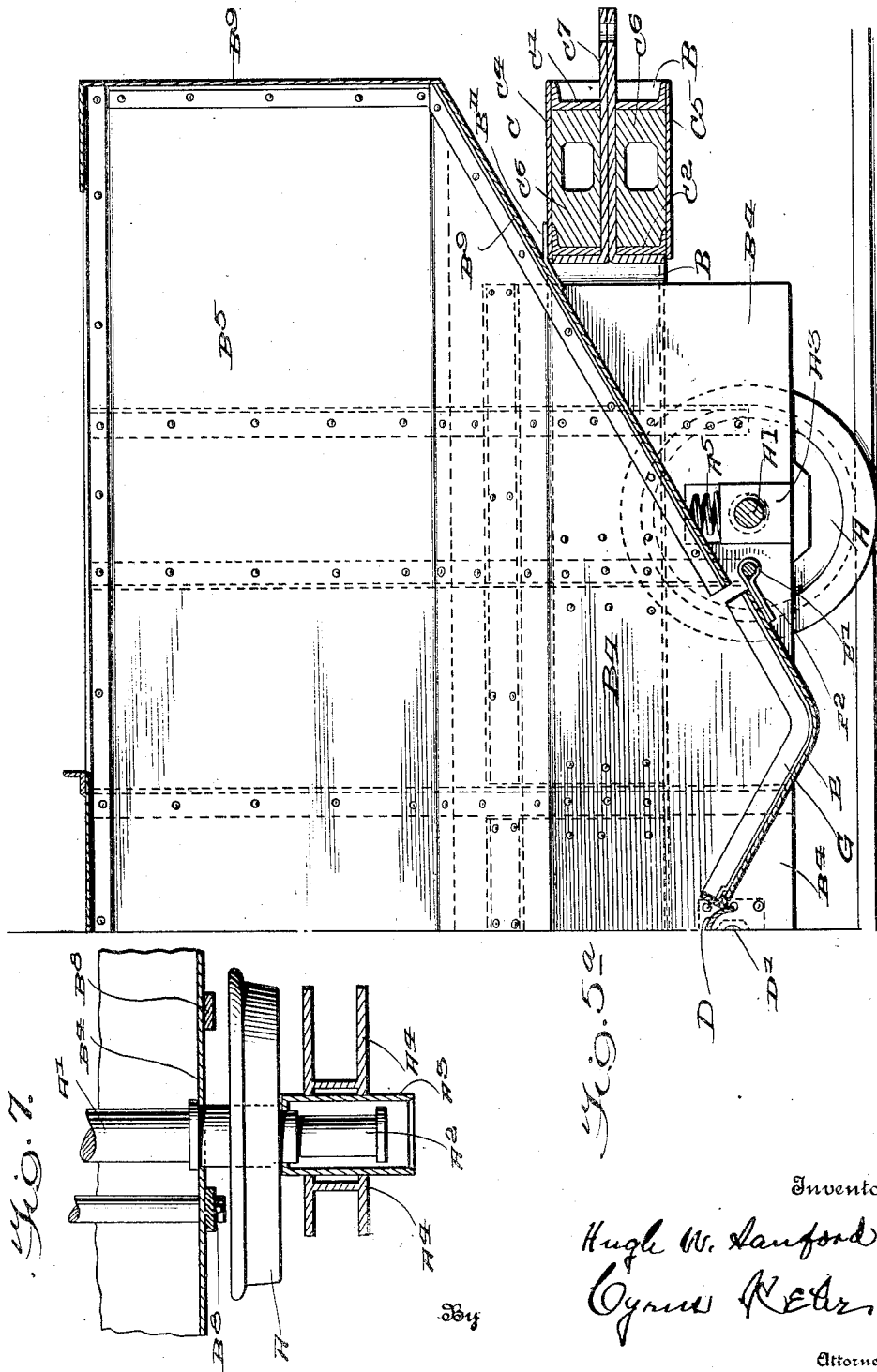
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RAILWAY CAR

Filed April 19, 1928

8 Sheets-Sheet 8



UNITED STATES PATENT OFFICE

HUGH W. SANFORD, OF KNOXVILLE, TENNESSEE

RAILWAY CAR

Application filed April 19, 1928. Serial No. 271,269.

This invention relates to cars for hauling minerals, such as coal at mines, and similar material; and the invention relates particularly to such cars in which provision is made for emptying the car by discharging the material downward through the bottom of the car by displacement of the bottom.

Such cars have heretofore been made with a bottom consisting of a plurality of doors opening and closing automatically and each having one end hinged to the car body on an axial line which is horizontal and transverse to the length of the car and the group of doors being associated with releasable means for holding them in the elevated or closed position.

The object of this invention is to so construct such cars as to give them more capacity for holding material relative to a given width of track gage and to afford more space in the bottom opening for the discharge of the material. There are many mines in which the track gage is narrow relative to the quantity of material it is desirable to haul in a car of the length which is feasible in view of the curves in the track. Furthermore, because frequently the material is in large pieces or lumps and the danger of those pieces lodging in the discharge opening and stopping the discharge from the car, it is desirable to make the discharge opening larger than heretofore relative to a given track gage, even if such enlarging is no more than a few inches. For even such a small increase in size of the discharge opening will serve to allow the passing of many large pieces which would otherwise become lodged and stop the discharge.

With these objects in view, I have produced such a car in which, among other features, there is the leading feature of axles separated far from each other and entirely out of the range of the discharge opening, track wheels, axles extending through said wheels and having their outer ends supporting the car body. Thus a combination is made in which there is a wide separation of the side sills or similar members which form parts of the door structure at the sides of the car body and the space to be occupied by a plurality of automatic hinged bottom doors

is made wider than could be the case if the body supports were at the inner sides of the wheels; and said space is made longer by reason of the larger distance between the axles.

In the accompanying drawings,

Fig. 1 is a side elevation of the rear half of a car embodying my improvement;

Fig. 1a is a side elevation of the forward half of the same car;

Fig. 2 is a front end view looking at the car from the right as shown by Fig. 1a;

Fig. 3 is a rear end view looking at the car from the left as shown by Fig. 1;

Figs. 4 and 4a together form a horizontal section on the line, 4—4, of Figs. 1, and 1a, Fig. 4 showing the left hand part and Fig. 4a the right hand part of the machine;

Figs. 5 and 5a show an upright section on the line, 5—5, of Figs. 2, 3, 4 and 4a, looking in the direction of the arrows, Fig. 5 showing the rear part and Fig. 5a showing the forward part of the machine;

Fig. 6 is an upright section on the line, 6—6, of Fig. 1a, looking toward the left;

Fig. 7 is a horizontal section on the line, 7—7, of Fig. 6;

Fig. 8 is an upright section on the line, 8—8, of Fig. 6, looking in the direction of the arrows;

Fig. 9 is a horizontal upright section on the left hand part of the line, 9—9, of Fig. 4;

Fig. 10 is an upright, transverse detail section on the line, 10—10, of Fig. 1, looking toward the left;

Fig. 11 is an upright, transverse section across a side edge of one of the doors.

Referring to the drawings, it is to be noted that the right hand end of the car, as shown in Figs. 1a, 4a, and 5a, is the forward end of the car.

A, A, are the track wheels. A1 are axles supported by the wheels. The axles extend through the wheels and their outer ends are in the form of journals, A2, resting in axle boxes, A3, which are guided for up and down movement in pedestals, as will be described further on.

At each side of the car body is a metal side sill, B. In the form shown in the draw-

ings, each such sill is a channel having its flanges turned outward. To the inner face of each side sill is attached a sill plate, B1, which extends downward below the axles, the plate being notched at B2 to make room for the axles. A short way above each sill the side plate is turned outward to form a slanting flange, B3, on which rests the slanting part of a lower body side plate, B4, which is suitably attached to the flange, B3, and extends inward to and then downward in a plane which is upright and parallel to the sill plate, B1, and far enough from the plate, B1, to make room for the wheels, A. The plates, B4, extend downward below the axles and are notched to make room for the axles.

The upper edge of each lower body side plate, B4, meets the upper body side plate, B5, and is suitably secured thereto. That plate is shown as being upright and extending to the height of the car body. Adjacent each axle end, two angle bars, B6, extend over and are secured to the outer face of the wall, B5, and a part of the slanting portion of the lower body side plate, B4, to the slanting flange, B3, of the sill plate, B1, and then downward in an upright position far enough from the sill plate to make room for the pedestal, A4. The upper end of the pedestal, A4, bears against the lower face of the adjacent side sill and thus supports said sill. The pedestal is secured to the angle bars B6, and to the sill plate, B1, and the lower flange of the side sill, B, by means of rivets or bolts. The axle box, A3, surrounds the journal, A2, and extends horizontally through the pedestal, the pedestal having upright faces forming guide ways permitting up and down movement of the axle box. (Figs. 1, 1a, 6 7 and 8). Between the axle box, A3, and the upper horizontal part of the pedestal, A4, is a spring, A5, which serves as a cushion between the axle box and the pedestal. The wheels and axles constitute supports for the body. Thus we have under each end of the body a wheel and axle support.

The ends of the side sill, B, project beyond the end edges of the sill plates, B1. Between those ends is the horizontal end structure, C, consisting of the rectangular frame formed by the side sill and those structures. Each end structure has an outer metal channel, C1, and an inner metal channel, C2, the outer channel extending horizontally from one side sill to the other and having each end bearing against the inner face of the adjacent side sill at the end of the sill, while the channel member, C2, similarly meets the inner faces of the side sills farther toward the body of the car. The drawings show it near the adjacent upright edge of the channel plate, B1. The ends of the channel member, C2, are secured to the side rails by upright corner angle members, C3,

which have their flanges resting against the back face of the channel member, C2, and suitably secured thereto as by means of rivets, the other flange resting against the inner face of the side sill and secured thereto in the same manner. The drawings (Figs. 4 and 4a) show that flange of the corner angle member filling the space between the channel member, C2, and the adjacent edge of the side sill plate, B1. A top plate, C4, extends from one side sill to the other and from one channel plate to the other and rests on the upper flanges of the side sills and the upper flanges of the channel members and is secured to said flanges by rivets. A similar lower plate, C5, is applied in the same manner to the lower flanges of the side sills and the angle members. On the middle longitudinal line of the frame consisting of the side sills and the end structures, a coupling member, C7, extends through the channel member, C1, and the channel member, C2. Said coupling member is shown as being formed of two pieces of strap metal lying upon each other until they reach through the rear channel, C2, where they are spread to bear against the inner face of the channel member, C2. The outer end of the member, C7, is apertured to receive any other coupling member, for example, a clevis which supports a link or similar member connected with another car, as is already well known and need not be here illustrated and described in detail. Filling bodies, C6, occupy the spaces between the plates, C4 and C5, and the channel members, C1 and C2, and the coupling member, C7, and are secured to the coupling members and the plates, C4 and C5, by bolts or rivets.

At the front end of each side sill, B, a metal strap, C8, is laid against the outer face of the upright web of the sill and secured thereto by rivets. Each such strap extends horizontally forward away from the end of the sill and obliquely toward the extended middle longitudinal line of the car. To each such end is attached a clevis, C9, to which a chain or any similar coupling device may be attached for connection with the adjacent end of another car. At the rear end of the car other straps, C8, are similarly applied, but left straight. Thus three coupling devices are applied to each end of the car.

In approximately the upright, transverse plane extending across the car perpendicularly to the length of the car and through an angle bar, B6, at each side of the car, an upright reinforcing metal strap, B8, is applied to the outer face of each body side plate, B4, and suitably riveted thereto. These straps, B8, extend from or near the lower edge of the plates, B4, upward to or nearly to the sill plates, B1.

From the upper edge of each upper body side plate, B5, a body end plate, B9, extends

downward and then obliquely in a plane extending over the adjacent axle, A1, and along the lower body plates, B4, and a short distance across the axle. The lateral edges of these body end plates are secured to the body plates, B4 and B5, in any suitable manner. Near the lower edge of each body end plate, B9, a reinforcing channel member, B10, is applied horizontally against the outer face of the end plate and suitably secured thereto as by means of rivets. The forward body end plate, B9, bears against and is riveted to a metal strap, B11, which rests on and is riveted or bolted to the upper part of the adjacent end structures, C.

The rear end plate extends farther away from the rear axle, A1, than is the case with the forward end plate relative to the forward axle. Thus additional space is afforded between the rear axle and the rear end structure for the latch mechanism which serves to hold the rear door as will now be described.

The releasable bottom of the car consists of a rear door, D, and a forward door, E. These two doors together extend across the space between the lower edges of the body side plates, B4, and the lower edges of the body end plates, B9.

Each door is bent or curved downward between its ends, whereby the depth of the car is extended. The forward end of the rear door is hinged to a transverse shaft, D1, which has each end extending through the adjacent body plate, B4, and a bearing, D2, secured to said plate. A nut, D3, is threaded to the outer end of the shaft and engages the adjacent end of the bearing, D2. The inner end of the bearing is engaged by an annular shoulder, D4, formed on the shaft (Fig. 10). At or near each side edge of the door, D, an angle bar, D5, is applied to the under face of the door, one flange of said bar being laid flatwise against the lower face of the door and riveted to the door and the other flange being directed downward. This angle bar extends nearly to the shaft, D1. The body of the door extends above and across the shaft, D1, and is curved to be concentric with said shaft. (Figs. 1, 4, 5 and 9.)

Any desired number of upper hinge members, D6, (Fig. 9) extend across the shaft, D1, below the door body and have their forward ends bent to lie flatwise against the lower face of the door. These ends are riveted to the door. Where these members cross the shaft, D1, they are curved downward to partially surround the shaft. Above the shaft, a spacing sleeve, D7, is placed between the member, D6, and the lower face of the door. A rivet, D8, extends through the spacing member, D6, and said spacing sleeve and the adjacent part of the door and bind said members to each other.

Below each member, D6, a hinge member, D9, extends across the lower face of the shaft,

D1, and is curved to bear against said face and has each end bent to bear flatwise against the hinge member, D6. Those ends are secured to the member, D6, by means of rivets, D10.

The rear end of this door, D, is normally held in the upper position by means of latch mechanism which will now be described.

At the rear end of the door a rod, D11, extends horizontally from one upright flange of the angle bar, D5, to the corresponding flange on the other angle bar, D5, and is supported by said flanges. The ends of said rod are seated in said flanges. Thus said rod is permanently fixed to the door.

Above and a little forward of the rear axle, A1, a latch shaft, F, extends from one side sill to the other and through each side sill. On each end of the axle is a retaining sleeve, F1. An arm, F2, surrounds the left hand end of said shaft and is fixed thereto and extends rearward and obliquely downward (Figs. 1, 3, 4 and 5). This arm is to be arranged to be lifted by a stationary cam placed adjacent the dumping or discharging station as shown and described in my Letters Patent of the United States, No. 1,268,390, dated June 4, 1918. When said arm meets such a cam, the arm is lifted, whereby the latch shaft, F, is rocked or partially turned. On said latch shaft, F, are fixed two latch arms, F3, which are directed downward behind the latch rod, D11, and near each end of said rod. On the lower end of each arm, F3, is a forward-directed hook, F4, which is adapted to reach under and normally support the latch rod, D11, when the door is in its upper or closed position. On the forward lower part of the hook is a slanting face, F5, against which the latch rod, D11, presses to push the hook rearward when the door moves upward into the closed position.

Each arm, F3, extends upward and rearward from the shaft, F. On the upper end of said arm is a clevis, F6, to which is coupled the forward end of a coiled tension spring, F7, the rear end of which is coupled to a tension bolt, F8, which extends through a bracket, F9, which is seated on the upper face of the rear end structure, C. A nut, F10, is threaded on said bolt at the rear of said bracket. By means of these nuts the bolts, F8, may be adjusted to vary the strain on the springs, F7.

It will now be observed that normally the springs, F7, draw the upper ends of the arms, F3, rearward. That tends to rock the latch shaft, F, to hold the lower ends of the arms, F3, and the hooks, F4, in the forward position for maintaining the support of the latch rod, D11, whereby the door is held in the closed position. When the arm, F2, meets the cam at the side of the track and is raised, as above indicated, the arm, F3, is tilted against the strain of the springs, F7, and the hooks, F4, are forced rearward, whereby the latch rod, D11, is released from the hooks and the door

is made free to turn downward in response to the action of the weight of the door and the material resting thereon.

Immediately at the rear of the forward axle, A1, is the forward door shaft, E1. This shaft is horizontal and perpendicular to the length of the car and extends through the adjacent lower body side plates, B4, and through the adjacent reinforcing metal straps, B8. The forward edge of the forward door, E, is hinged to said shaft in any desired manner. The drawings show four metal straps, E2, folded around the shaft and upon each other and laid flatwise against the lower face of the door and secured thereto by means of rivets. The rear end of this door normally rests on the curved forward part of the rear door, D. But the forward door does not extend rearward beyond an upright plane which passes at the front of the rear door shaft, D1. Thus the rear end of the door, E, may pass downward in front of the shaft, D1, when the rear door, D, turns downward to bring its forward edge out of engagement with the rear edge of the forward door. Thus the forward door, E, becomes free to turn downward immediately upon the partial downward movement of the rear door, D, after the hooks, F4, have been released from the latch rod, D11.

While the drawings show two arms, F3, with hooks, F4, at the rear of the rear door, it is to be understood that one arm, F3, with a hook, F4, placed at the middle of the rear edge of the rear door would be operative. But by duplicating these arms, F3, and making the engagement with the door at its rear corners, the door can be held with less strain on said arms and the latch rod, D11.

On every side edge of the two doors there is a rising wall, G, which is to lean outward and bear closely against the inner face of the adjacent lower body side plate, B4, to aid in retaining the material and to reduce outward lateral pressure on the plate, B4. The drawings show the upper edge of the walls, G, having a fold, G1, for stiffening said walls. The drawings show these walls attached by means of an angle bar, G2, having one flange resting on and riveted to the door and having the other flange rising and resting flatwise against and riveted to the walls, G.

For the purpose of this improvement, the axle may rotate or be held stationary, the wheels turning on the axles. Even if the axles are made to turn in the axle boxes, A3, one or both wheels on each axle may be made "loose", as is now done for cars used on tracks having short curves, the purpose being to allow the wheels to roll independently of each other while traversing curves.

By placing the door hinges high and making the distance between the hinges and the opposite edges of the doors short enough, the doors, when released, may turn down into the

upright position without going between the track rails. Thus the opening for the doors may be made wider than the space between the track rails, the releasing and the closing of the doors being performed automatically during the travel of the car on the rail track.

I claim as my invention:

1. In a car of the kind described, the combination of a body having side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels and supporting the car body, a plurality of automatic bottom doors located between and clear of the axles and extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and means for holding said doors in the closed position.

2. In a car of the kind described, the combination of a body having side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels and supporting the car body, a plurality of automatic bottom doors located between and clear of the axles and extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car and engaging each other when in the closed position, and means for holding one of said doors in the closed position.

3. In a car of the kind described, the combination of a body having side walls and side sills outside the side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels and supporting the side sills, a plurality of automatic bottom doors located between and clear of the axles and extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and means for holding said doors in the closed position.

4. In a car of the kind described, the combination of a body having side walls and side sills outside the side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels, axle boxes surrounding said projecting ends, springs between the axle boxes and the side sills, a plurality of

bottom doors extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and means for holding said doors in the closed position.

5. In a car of the kind described, the combination of a body having side walls and side sills outside the side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels, axle boxes surrounding said projecting ends, pedestals intervening the axle boxes and the side sills, a plurality of bottom doors extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and means for holding said doors in the closed position.

6. In a car of the kind described, the combination of a body having side walls and side sills outside the side walls, an axle under each end of the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, the ends of the axles projecting through the wheels, axle boxes surrounding said projecting ends, upright bars on the outer sides of the side walls and pedestals joined to said bars and the side sills, a plurality of bottom doors extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and means for holding said doors in the closed position.

7. In a car of the kind described, the combination of a bottom door hinged at its front edge on a line which is horizontal and transverse to the length of the car, a horizontal transverse rock-shaft located above the rear end of the door, a forward-directed hook fixed on the rock-shaft and extending downward in position to engage the rear end of the door, an arm fixed on one end of the rock-shaft and extending rearward and adapted to be actuated by a member adjacent the track.

8. In a car of the kind described, the combination of a bottom door hinged at its front edge on a line which is horizontal and transverse to the length of the car, a horizontal transverse rock-shaft located above the rear end of the door, a plurality of forward-directed hooks fixed on the rock-shaft and extending downward in position to engage the rear end of the door, and an arm fixed on one end of the rock-shaft and extending rearward and adapted to be actuated by a member adjacent the track.

9. In a car of the kind described, the combination of a bottom door hinged at its front edge on a line which is horizontal and trans-

verse to the length of the car, a horizontal transverse rock-shaft located above the rear end of the door, a forward-directed hook fixed on the rock-shaft and extending downward in position to engage the rear end of the door, an arm fixed on and extending upward from the rock shaft, a spring tending to move said arm rearward, and an arm fixed on one end of the rock-shaft and extending rearward and adapted to be actuated by a member adjacent the track.

10. In a car of the kind described, the combination of a bottom door hinged at its front edge on a line which is horizontal and transverse to the length of the car, a horizontal rod on the rear end of the door, a horizontal transverse rock-shaft located above the rear end of the door, a forward-directed hook fixed on the rock-shaft and extending downward in position to engage said horizontal rod, an arm fixed on one end of the rock-shaft and extending rearward and adapted to be actuated by a member adjacent the track.

11. In a car of the kind described, the combination of a plurality of bottom doors adapted for automatic opening and closing and hinged on lines which are horizontal and transverse to the length of the car, a horizontal transverse rock-shaft located above the rear end of the rear door, a forward-directed hook fixed on the rock shaft and extending downward in position to engage the rear end of the rear door, an arm fixed on one end of the rock shaft and extending rearward and adapted to be actuated by a member adjacent the track.

12. In a car of the kind described, the combination of a body having side walls, an axle located under each end of the body and supporting the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, a plurality of bottom doors adapted for automatic opening and closing and located between and clear of the axles and extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car, and automatic means for holding said doors in the closed position.

13. In a car of the kind described, the combination of a body having side walls, an axle located under each end of the body and supporting the body and held in a plane which is upright and transverse to the body, track wheels on the axles adjacent the upright planes of the lower parts of said side walls, a plurality of bottom doors adapted for automatic opening and closing and located between and clear of the axles and extending from the lower part of one side wall to the other and hinged on lines which are horizontal and transverse to the length of the car and engaging each other when in the closed

position, and automatic means for holding one of said doors in the closed position.

14. In a railway car, the combination with a car body comprising side sills, axles below the side sills, bearings between the ends of the axles and the side sills, wheels on the axles between the bearings, side walls supported by the side sills and extending downward below said sills, a plurality of bottom doors located between the downward extensions and hinged by their forward ends to said downward extensions on lines which are horizontal and transverse to the car body, and means for holding said doors in the closed position.

15. In a railway car, the combination with a car body comprising side sills, axles below the side sills, bearings between the ends of the axles and the side sills, wheels on the axles between the bearings, side walls supported by the side sills and extending downward below said sills, a plurality of bottom doors located between the downward extensions and hinged by their forward ends to said downward extensions on lines which are horizontal and transverse to the car body, and latch mechanism for engaging the rear part of the rear door, and the forward end of said door being in operative relation with the rear end of the next forward door for holding said next forward door in the closed position when the rear door is in the closed position.

16. In a railway car, the combination with a car body comprising side sills, axles below the side sills, bearings between the ends of the axles and the side sills, wheels on the axles between the bearings, side walls supported by the side sills and extending downward below the sills and between the longitudinal upright planes of the wheels, a plurality of bottom doors located between said downward extensions and hinged by their forward ends to said extensions on lines which are horizontal and transverse to the car body, and means for holding said doors in the closed position.

17. In a railway car, the combination with a car body, of an axle at each end of the body, axle bearings, means yieldingly supporting said bearings for up and down movement in an upright plane transverse to the car, wheels on said axles, the body having side walls extending downward between said axles, a plurality of bottom doors located between the lower parts of the side walls and hinged by their forward ends to said side walls on lines which are horizontal and transverse to the car body, and means for holding said doors in the closed position.

18. In a railway car, the combination with a car body, of an axle at each end of the body, axle bearings, means yieldingly supporting said bearings for up and down movement in an upright plane transverse to the

car, wheels on said axles, a plurality of bottom doors located between the axles and hinged on lines which are horizontal and transverse to the car body and adapted to engage means at the path of the doors when the doors are open, whereby the doors are automatically raised into the closed position by reason of the car passing said means, and releasable holding means associated with the doors for engaging and holding the doors after they have been raised.

19. In a railway car, the combination with a car body, of a supporting axle at each end of the body, bearings for said axles, means yieldingly supporting said bearings for up and down movement in an upright plane transverse to the car, wheels on said axles, a plurality of bottom doors located between the axles and adapted to engage means at the path of the doors when the doors are open, whereby the doors are automatically moved into the closed position by reason of the car passing said means.

In testimony whereof I have signed my name, this 16th day of April, in the year one thousand nine hundred and twenty-eight.

HUGH W. SANFORD.