E. O. ELLIOTT.

HOPPER CAR.

APPLICATION FILED AUG. 14, 1915.

1,174,134.

Patented Mar. 7, 1916.

2 SHEETS—SHEET 1.

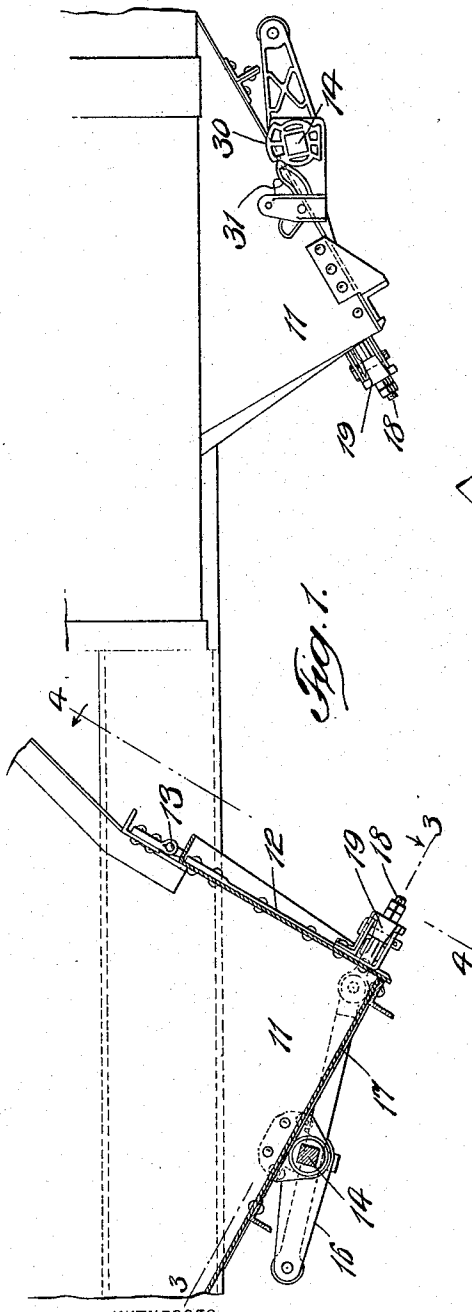


Fig. 1.

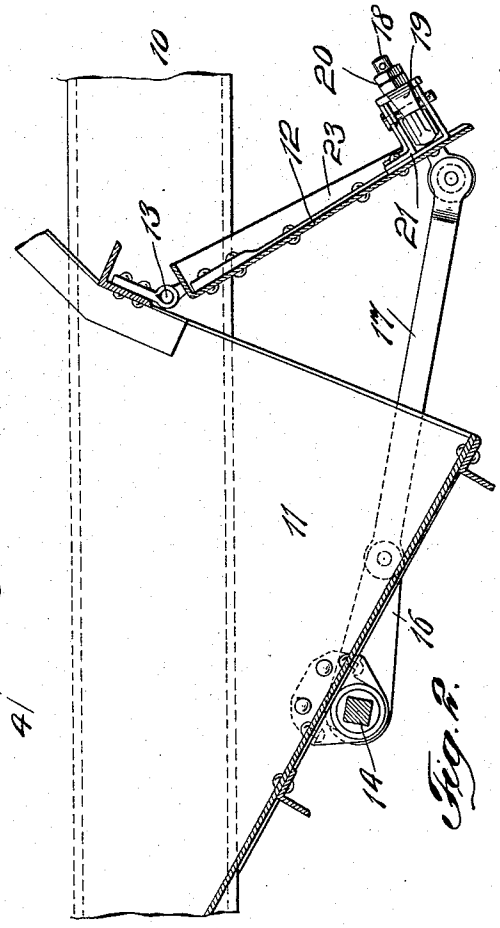


Fig. 2.

WITNESSES:

Julian H. Hunt.

Arthur Marcin.

INVENTOR

Edward O. Elliott

BY

Chas. C. Gill

ATTORNEY

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

E. O. ELLIOTT.

HOPPER CAR.

APPLICATION FILED AUG. 14, 1915.

1,174,134.

Patented Mar. 7, 1916.

2 SHEETS—SHEET 2.

Fig. 3.

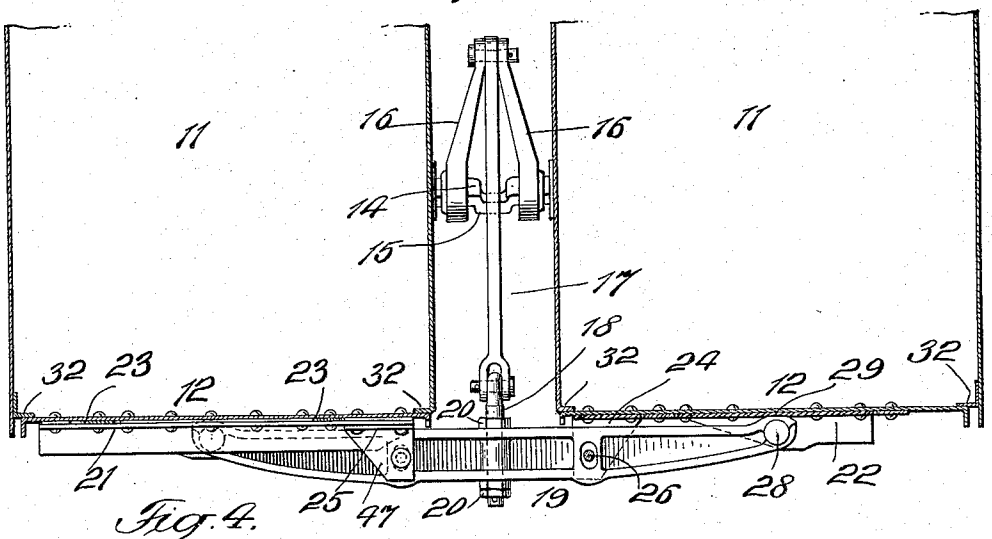
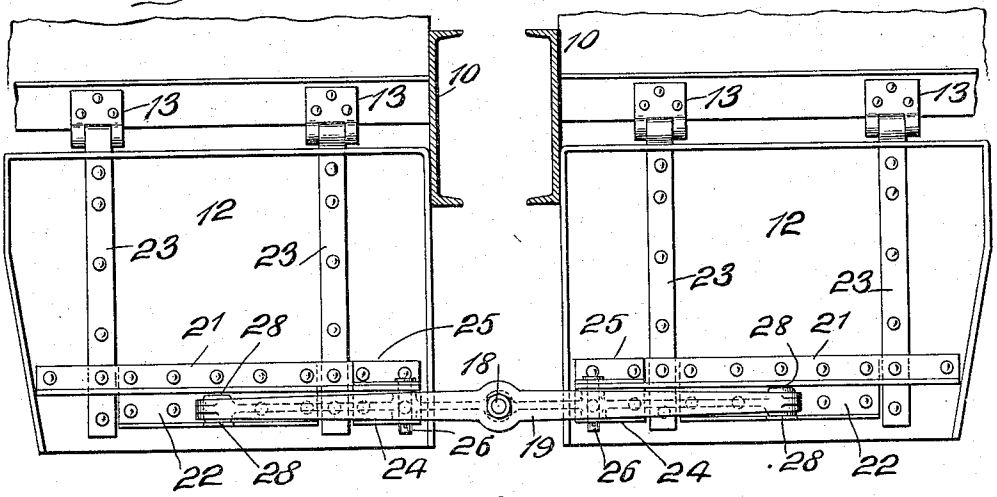


Fig. 4.



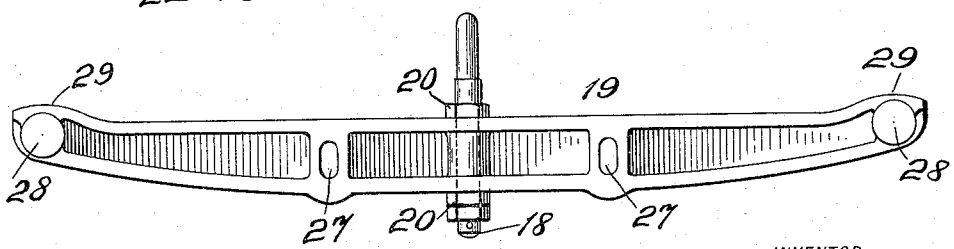


Fig. 5.

WITNESSES:

Arthur Marion.

INVENTOR

Edward O. Elliott,

BY

Chas. C. Gill

ATTORNEY

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD O. ELLIOTT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO NATIONAL RAILWAY APPLIANCE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HOPPER-CAR.

1,174,134. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed August 14, 1915. Serial No. 45,479.

To all whom it may concern:

Be it known that I, EDWARD O. ELLIOTT, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hopper-Cars, of which the following is a specification.

The invention pertains more particularly to operating and controlling mechanism for the doors of hopper cars and I present my invention herein as applied to a steel hopper car having two doors at each side of the transverse center thereof, as usual.

The object of my invention is to provide new and improved means for closing the hopper car doors. It has been customary heretofore to connect the two alined doors at each side of the transverse center of the car by a long beam, angle iron or Z-bar extending across both doors and the longitudinal space between the hoppers, this bar or beam being rigidly secured along the lower edges of both doors at several points. The two doors have thus been bound together with the view of their being opened and closed simultaneously and from one set of operating mechanism. Considerable difficulty has been experienced in the matter of having both doors tightly engage their jambs or the flanges provided on the hoppers for the doors, and unless the doors do close tightly, there is a loss of fine lading, such as smaller grades of fuel, during the travel of the car. It is necessary that both doors should seat readily and firmly on their respective jambs, and this it has been more or less difficult to accomplish with the construction now in use. The beam, angle iron or Z-bar hereinbefore referred to as connecting the doors in pairs, has usually been efficient in holding the lower edges of the doors in line, but nevertheless due to the rough nature of steel freight car construction, the doors have not worked satisfactorily. If the four hinges at the top of the doors are not in line, there will be more or less binding and a tendency to bend or warp the doors out of line, so that they will not close tightly. Considerable care is required to line up the doors, cross-beam, hinges and jambs so as to secure a free working and tight fitting door construction and this part of the work of building steel freight cars has been and is more or less neglected, the tendency being to slight what are looked upon as minor adjustments. It is highly desirable however that the doors should work freely and, when closed, tightly and uniformly bind against their jambs, so that there may be no loss of fine lading during transportation.

The purpose of my invention is to assure the free working and tight binding of the doors against their jambs and to do this in a way which will permit each door to tightly close irrespective of whether the doors are exactly in the same line or plane and regardless of the usual irregularities with respect to the car construction.

In carrying out my invention I omit the rigid bar or beam as heretofore connected to the doors at their lower edge portions and provide an equalizing bar flexibly connected with both doors and serving to assure their proper opening and closing and especially their proper closing tightly against their jambs. The ends of the equalizing bar afford surfaces to bind against the doors, and the bar having a flexible connection with each door is enabled to have an independent action against the respective doors, whereby even should the doors be out of true alinement with each other, they both may be forced to close tightly against their jambs.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation, partly broken away and partly in section, of a hopper car equipped with my invention; Fig. 2 is a sectional view on a larger scale through one hopper of the car and showing the door in open position; Fig. 3 is a section through a portion of the car taken on the dotted line 3—3 of Fig. 1; Fig. 4 is a transverse section through the car, taken on the dotted line 4—4 of Fig. 1, and Fig. 5 is a top view on a larger scale of the equalizing bar of my invention.

In the drawings, 10 designates the usual center sills, 11 the customary hoppers at opposite sides of the center of the car and at opposite sides of said center sills, and 12 the doors for the hoppers 11, said doors being secured at their upper edges by hinges 13 and adapted to be opened and closed at will. The doors 12 at each side of the center of the car are substantially in transverse alinement, as usual, and said doors, except for

the features of my invention, are of known character. The car is equipped with transverse operating shafts 14, one shaft being provided for two alined doors and the other shaft for the other two alined doors, and in the drawings these shafts 14 are shown as being recessed or offset at their central portion 15 (Fig. 3). Upon the central portion of each shaft 14 is secured a pair of lever arms 16 between whose outer ends is pivotally secured one end of a connecting rod or link 17 whose other end is bifurcated and pivotally connected with an eye-bolt 18 which extends through a central hole in my equalizing bar 19 and is secured to said bar by nuts 20, which admit of a limited adjustment of said bolt.

The doors 12 have secured to their lower outer transverse portions an upper angle plate 21, a lower angle plate 22 which extends between the hinge-bars 23, a further lower angle plate member 24 located between the inner hinge-bar 23 and the inner edge of the door 12 and an upper angle plate member 25 located above the angle plate member 24 and coöperating therewith. The angle plates 22 extend upwardly behind the angle plates 21 and the lateral flanges of said members 21, 22 form spaces within which the outer ends of the equalizing bar 19 are located.

The angle plate member 24 for each door extends upwardly behind the angle plate 21 and has a lateral flange in which is formed a hole for the reception of a pin 26. The angle plate member 25 has a lateral flange 47 matching the lateral flange of the angle plate member 24 and apertured to receive the upper end of the pin 26. The lateral flanges on the angle plate members 24, 25 are in line with the lateral flanges of the angle plate members 21, 22, and all of said angle plate members are securely riveted to the door 12. Each door 12 is correspondingly provided with the angle plate members 21, 22, 24, 25.

The equalizer or equalizing bar 19 extends between the angle plate members hereinbefore described and from about the middle portion of one door 12 to the middle portion of the other door 12 and said bar at its middle portion is connected by the eye bolt 18 with the link 17. The equalizing bar 19 is formed with transversely elongated holes 27 and those portions of the bar 19 containing said holes lie between the lateral flanges of the angle iron members 24, 25 and the pins 26 pass through said flanges and said holes 27, as will be understood on reference to Figs. 3 and 4. The holes 27 are elongated so as to allow freedom for limited movement of the bar 19 independently of the pins 26, so that for illustration when the doors 12 are in closed position, one pin 26 might be at the inner end of its hole 27 in the bar 19, while the other pin 26 might be in some other position in its hole 27 of said bar. The bar 19 is formed on its upper and lower sides, at its outer ends, with hubs or projections 28 which are confined between the lateral flanges of the angle bar members 21, 22 and afford limited rubbing or frictional surfaces for engagement with said lateral flanges; and at its ends said bar 19 curves inwardly and presents rounded surfaces 29 to engage and when necessary rock on the vertical flanges of the angle iron members 22, as shown in Fig. 3. The equalizer or equalizing bar 19 has a flexible connection and engagement with the doors 12. both by reason of the fact that the pins 26 are smaller in diameter than the holes 27 in said bar and that the ends of the bar present restricted bearing surfaces 29 to the surfaces they engage carried by the doors. There is sufficient freedom in the connection of the eye bolt 18 with the link 17 and in the connection of the link 17 to the arms 16 to permit of a limited lateral rocking movement of the bar 19.

The shafts 14 are equipped with plates 30 to be engaged by locking dogs 31, as usual, and the operating rigging or mechanism to which I have applied the equalizing bar 19 as illustrative of my invention, is not separately claimed herein and is of known type in wide commercial use. The car illustrated is also of known type in wide commercial use and in the arrangement of the doors 12 shown the cars dump their lading between the track-rails. Other types of cars have doors in pairs which open longitudinally, whereas the doors 12 shown open transversely of the car. The car shown is of the steel hopper car variety and the doors 12 when in closed position abut against the jambs or flanges 32, as shown in Fig. 3, and it is one of the purposes of my invention to compel the doors 12 to firmly engage the jambs or flanges 32 so as to prevent the sifting out of the lading during the travel of the car.

The operation of the link 17, lever arms 16 and shaft 14 requires no special description, since these features are all well known; and it may be said here that my invention is not limited to the special link 17, lever arms 16 and shafts 14, since these features constitute only one form of well known hopper car door operating rigging or mechanism. The main features of my invention relate to the equalizing bar 19 and doors 12. It has been described that the bar 19 is pivotally connected by the eye bolt 18 with the link 17 and that at each side of its center, said bar is connected with the doors by means of the pins 26 and lateral flanges of the angle iron members 24, 25, said lateral flanges forming brackets or jaws between which the bar 19 is located and which are

perforated in line with the elongated holes or openings 27 in said bar to receive the pins 26. The ends of the equalizing bar 19 bear against those flanges of the angle iron members 22 which are riveted against the outer faces of the doors 12 and said flanges afford wearing plates for the ends of the bar 19 and in addition thereto the angle iron members 22 reinforce the doors 12, stiffening them and serving to prevent said doors from springing at their outer edges when the pressure is applied at the center of the doors. The angle iron members 21 further reinforce the doors 12 against springing action and aid in distributing the stress exerted by the bar 19 in holding the door shut, over the greater portion of the lower edge of the door.

In Fig. 1 I show the door 12 in its closed position, and in Fig. 2 in its open position and it will be understood that when the shaft 14 is rotated in one direction it will, through the lever arms 16, link 17 and bar 19, force the alined doors to their open position and that on a reverse rotation of the shaft 14 said mechanism will draw the doors to their closed position.

The main object of my invention is to provide means whereby each door 12 may be securely closed against its jambs regardless of some irregularities in car construction by reason of which said doors would not both securely close, and this function I accomplish by the equalizing bar 19, which by means of the pins 26 and elongated openings 27 is flexibly connected at each side of its center and between its ends and its center with the doors 12, the ends of said bar being turned inwardly toward the doors and rounded, by preference, to press and rock against the lower central portions of the same. The bar 19 by reason of the enlarged openings or holes 27 therein has, what I term, a flexible connection with the doors, and hence if one door 12 should not be in true alinement with the other door 12, said bar may press with its ends against both doors and bind said doors closely against their jambs. In the prior art where the two doors have been rigidly connected together by a transverse beam or bar, the two doors could not be closely bound against their jambs unless said doors, jambs, as well as the hinges, and other features of the car, were in accurate relative adjustment.

My equalizing bar 19 adapts itself to the irregularities in freight car construction and serves as an effectual means for properly closing the doors 12 and binding them against their jambs. The ends of the bar 19 engage the doors either directly or through the plates carried thereby and one end of the bar may extend inwardly further than the other end of the bar and thus the bar may securely engage both doors even though said doors should not be in the same line or plane.

I do not limit my invention to the special angle iron members secured to the doors 12, although those I have shown and described are advantageous, the main point being to so connect the bar 19 with the doors that said bar may be flexible in action and effectually bind both doors in closed position, even though said doors be somewhat out of alinement with each other.

With the prior construction employing a rigid beam connecting the doors 12, a further difficulty frequently arose when it was necessary to force or pry the doors open on account of their freezing to the jambs, this forcing or prying sometimes resulting in a permanent set or spring being given to the doors or said beam, and this difficulty is overcome by the present invention in which by reason of the pins 26 and elongated openings 27 in the bar 19, each door may be acted on as a unit in freeing the door from its jambs.

Other advantages of my invention will be appreciated without further detailed explanation.

My invention is not confined to details of form or construction otherwise than as the claims may require, since I am aware that the mechanical details shown may be modified in many ways without departing from the spirit and purpose of my invention.

What I claim as my invention and desire to secure by Letters-Patent, is:

1. In a hopper car, in combination, hinged doors for the hoppers, door-operating mechanism comprising actuating means carried by the car and an equalizing bar connected therewith and at its ends engaging the doors at about the center thereof, and means loosely connecting said bar between its center and ends with said doors.

2. In a hopper car, in combination, hinged doors for the hoppers, and door operating mechanism comprising actuating means carried by the car and an equalizing bar centrally connected therewith and having a loose connection with the doors and at its ends engaging the doors.

3. In a hopper car, in combination, hinged doors for the hoppers, and door operating mechanism comprising actuating means carried by the car and an equalizing bar centrally connected therewith and rockably connected with the doors with its ends arranged to act independently on the doors.

4. In a hopper car, in combination, hinged doors for the hoppers, door-operating mechanism comprising actuating means carried by the car and an equalizing bar connected therewith and at its ends engaging the doors at about the center thereof, and means loosely connecting said bar between its cen-

ter and ends with said doors and comprising, for each door, a jaw on the door between whose members the bar is confined and a pin extending through said members and bar, said bar being formed with holes to receive and which are greater in diameter than said pins.

5. In a hopper car, in combination, hinged doors for the hoppers, door-operating mechanism comprising actuating means carried by the car and an equalizing bar connected therewith and at its ends engaging the doors at about the center thereof, and means loosely connecting said bar between its center and ends with said doors and comprising, for each door, two angle-iron plates riveted to the door and forming with their lateral flanges a jaw between whose members the bar is confined and a pin extending through close fitting holes in said members and an elongated hole in said bar.

6. In a hopper car, in combination, hinged doors for the hoppers, door-operating mechanism comprising actuating means carried by the car and an equalizing bar connected therewith and at its ends engaging the doors, and means loosely connecting said bar with said doors, said doors each having two transverse angle-iron plates riveted thereto forming between their lateral flanges housings for the end of said bar and one of said plates affording a wearing plate for said end of said bar and both of said plates serving to stiffen the door.

7. In a hopper car, in combination, hinged doors for the hoppers, door-operating mechanism comprising actuating means carried by the car and an equalizing bar connected therewith and at its ends engaging the doors, and means loosely connecting said bar with said doors, said actuating means comprising an operating shaft, a crank frame thereon and a link at one end pivoted to said frame, and said bar having at its center an eye-bolt connected with the other end of said link.

8. In a hopper car, in combination, hinged doors for the hoppers, and door operating mechanism comprising actuating means carried by the car and an equalizing bar centrally connected therewith and having independent loose connections with said doors, with its ends turned inwardly to present restricted bearing surfaces to the doors.

Signed at Reading, in the county of Berks, and State of Pennsylvania, this 11th day of August, A. D. 1915.

EDWARD O. ELLIOTT.

Witnesses:
RICHARD W. KAUCHERS,
HENRY SKEPPELMAN.

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