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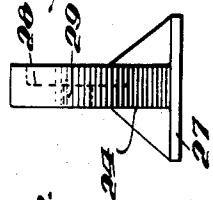
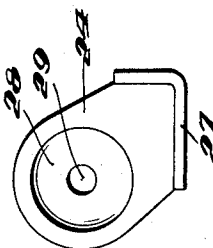
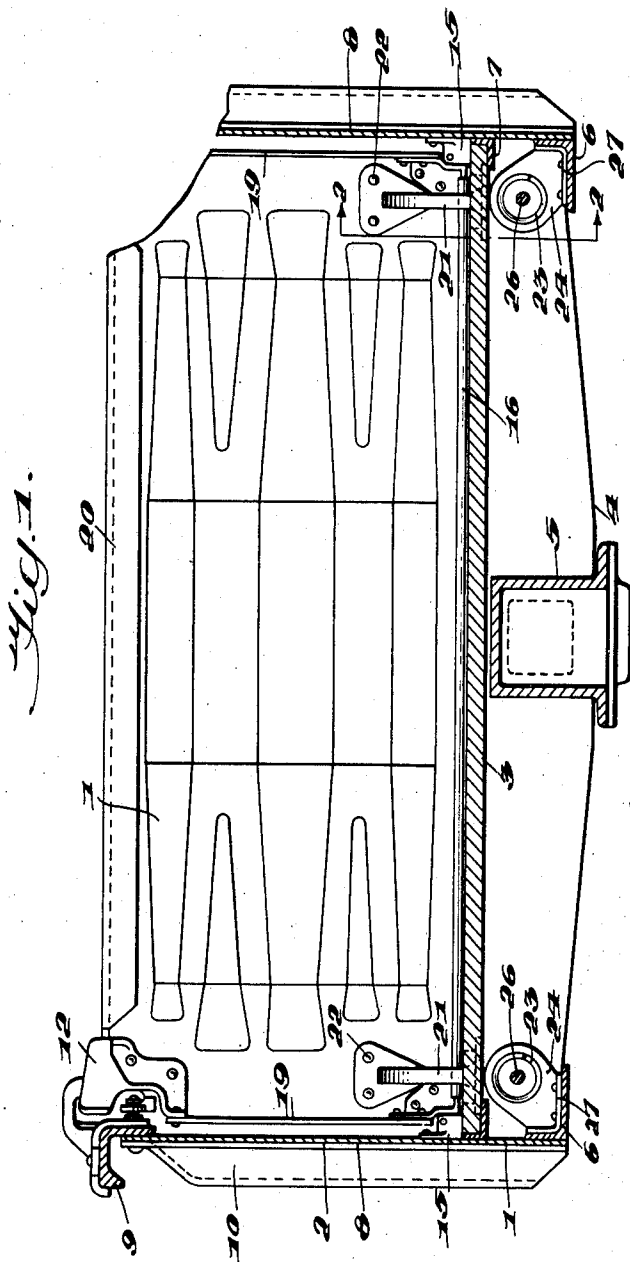
O. INGRAM

2,484,512

DROP END GONDOLA CAR

Filed June 28, 1945

7 Sheets-Sheet 1



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2,484,512

DROP END GONDOLA CAR

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7 Sheets-Sheet 2

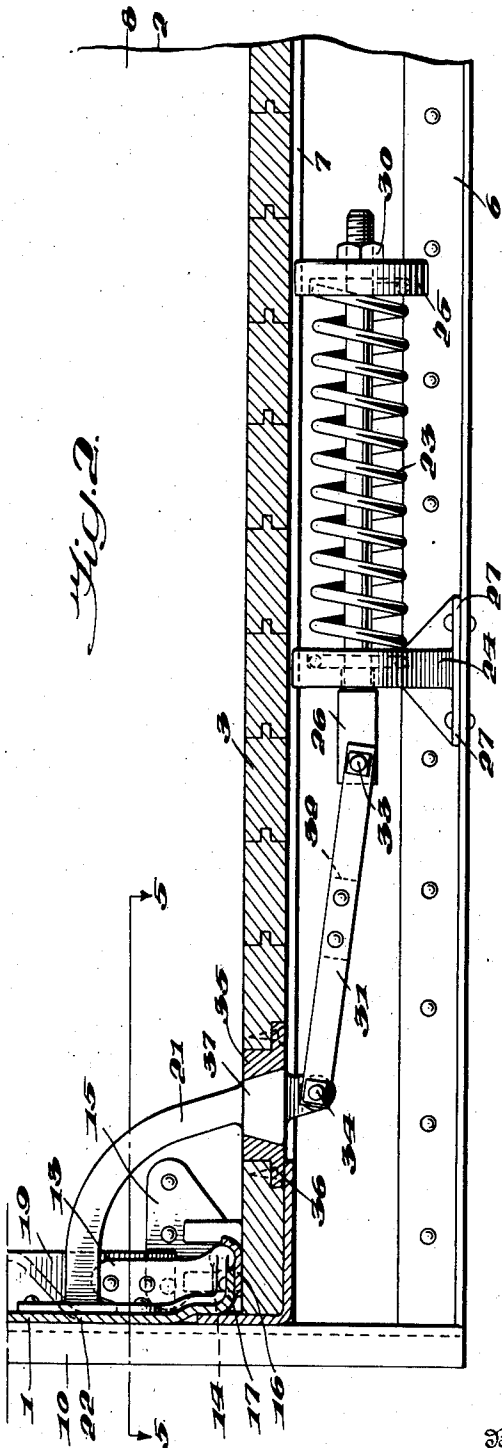
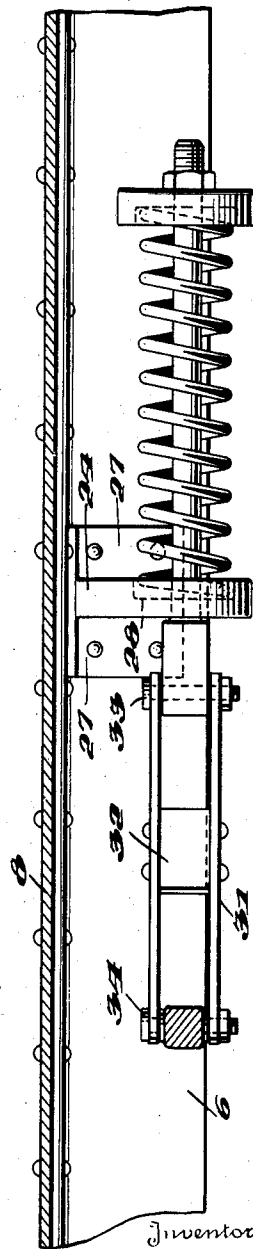


Fig. 3.



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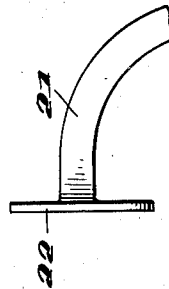
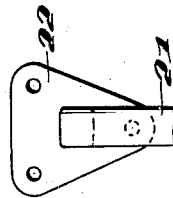
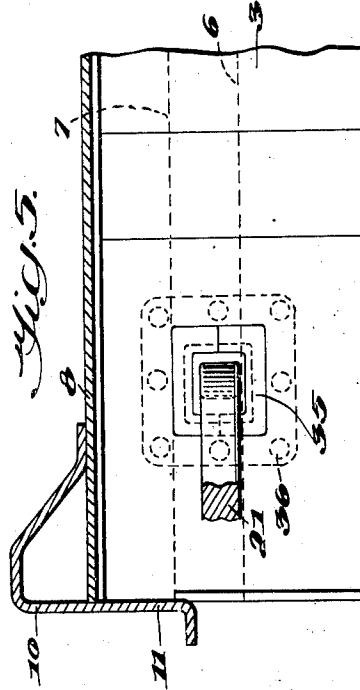
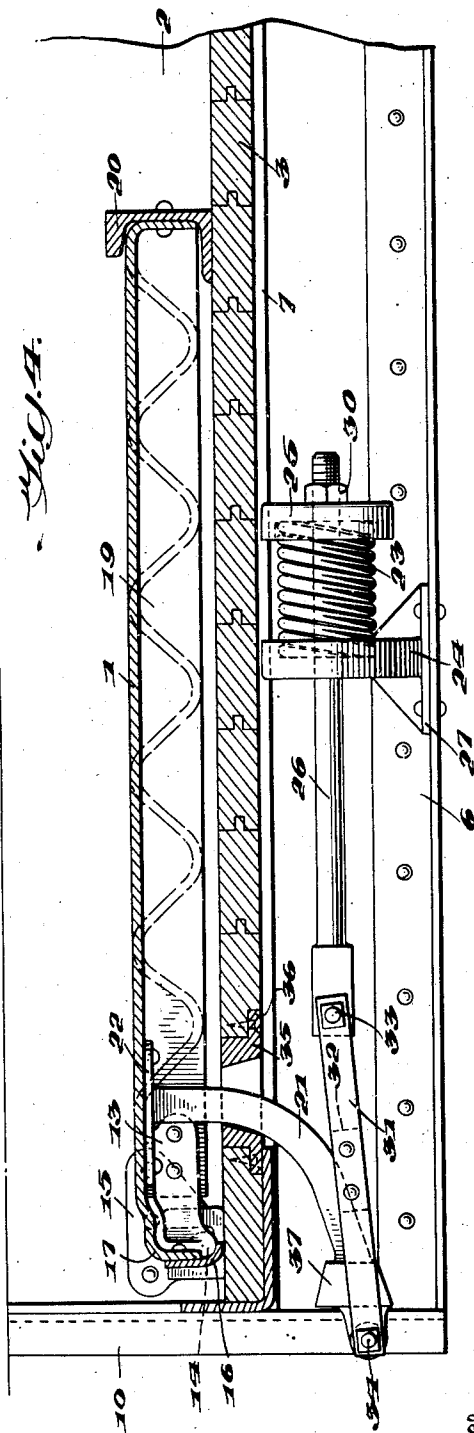
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DROP END GONDOLA CAR

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7 Sheets-Sheet 3



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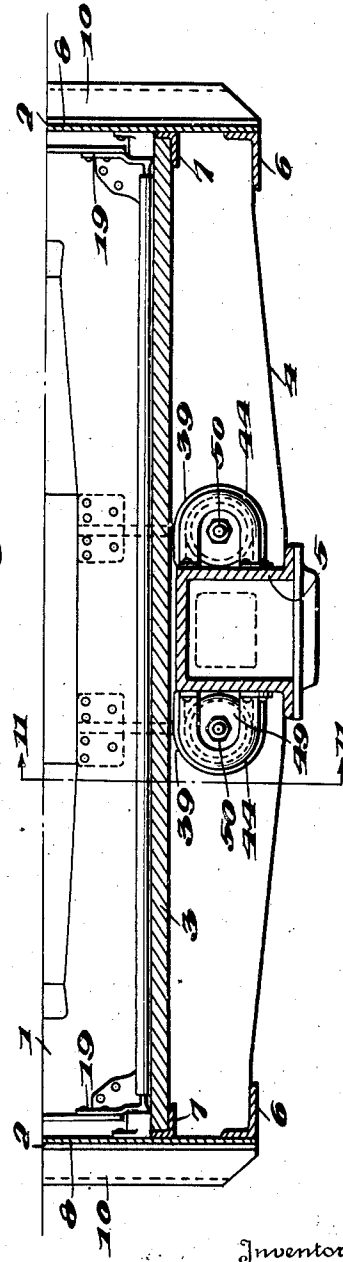
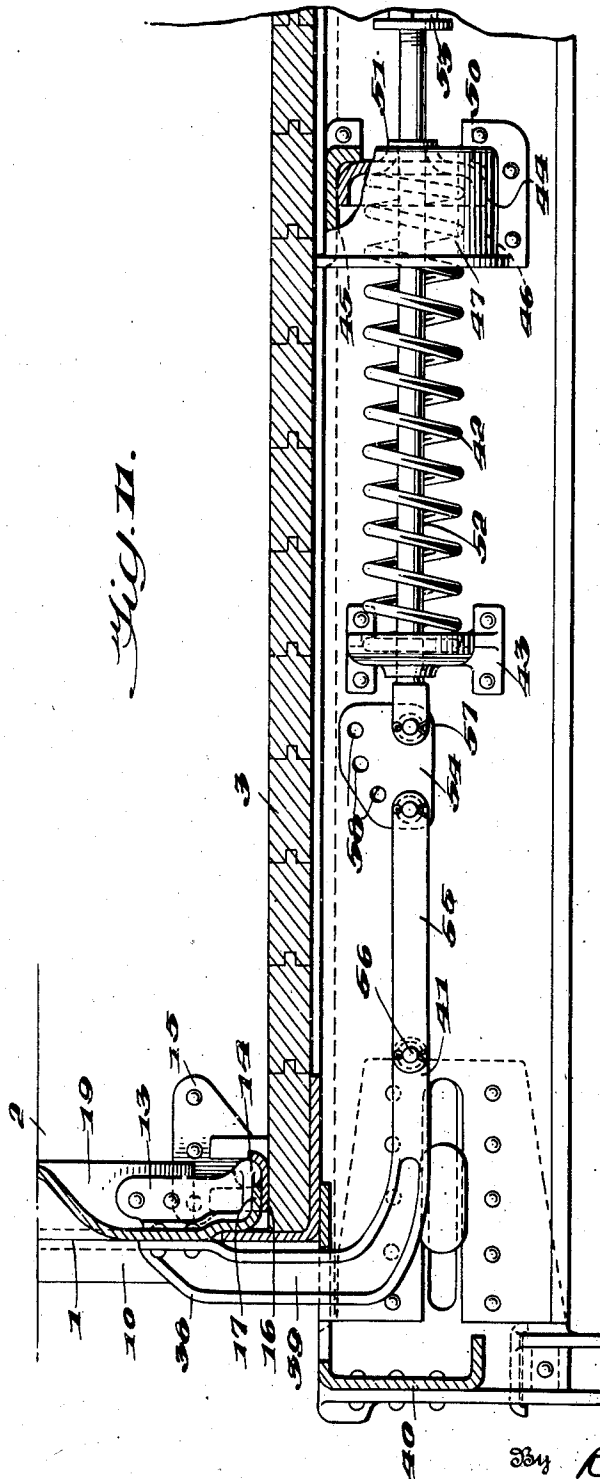
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DROP END GONDOLA CAR

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7 Sheets-Sheet 4



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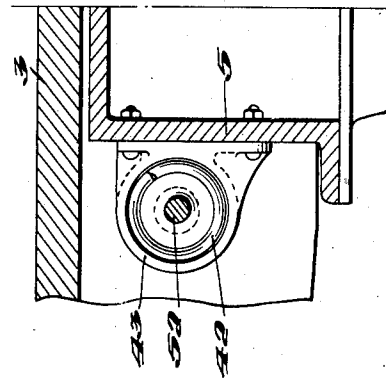
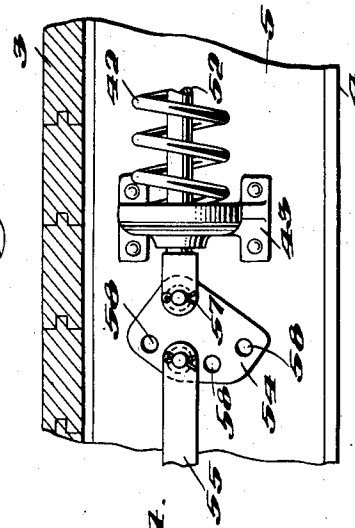
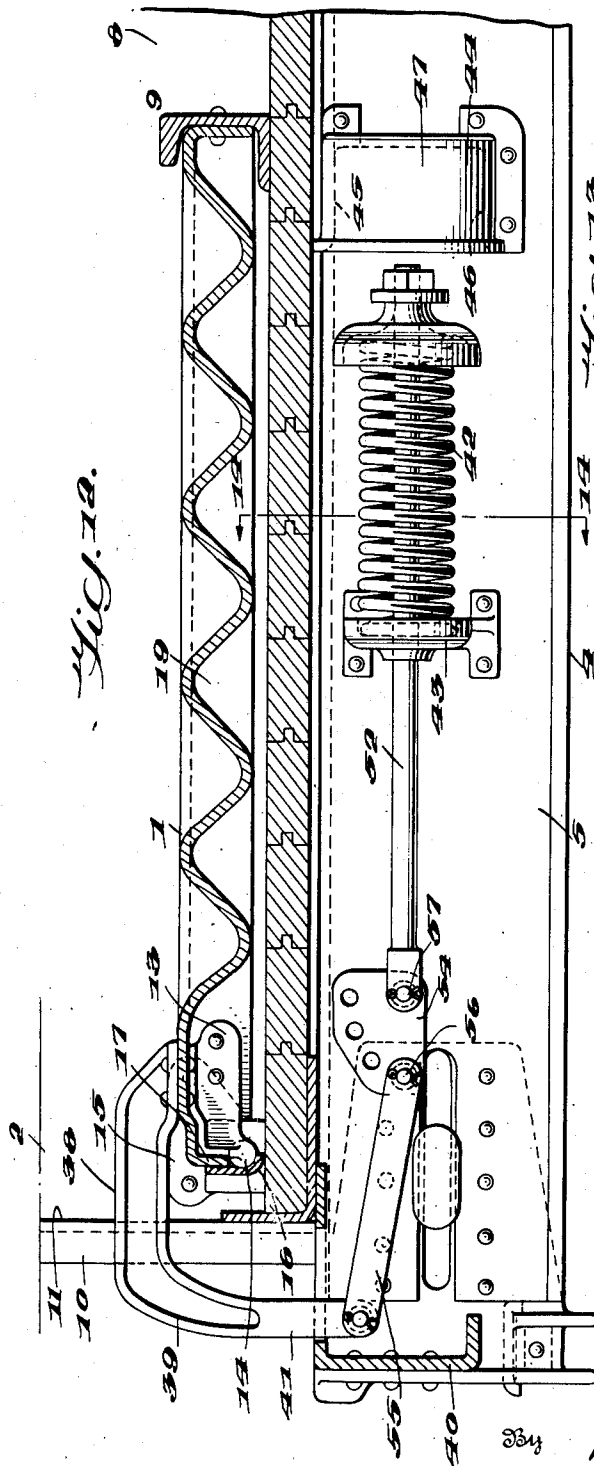
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DROP END GONDOLA CAR

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7 Sheets-Sheet 5



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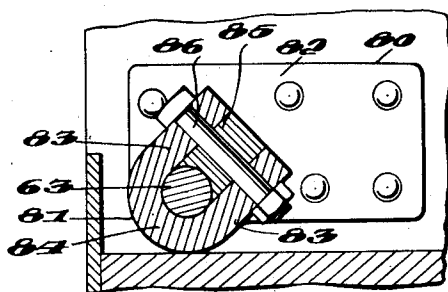
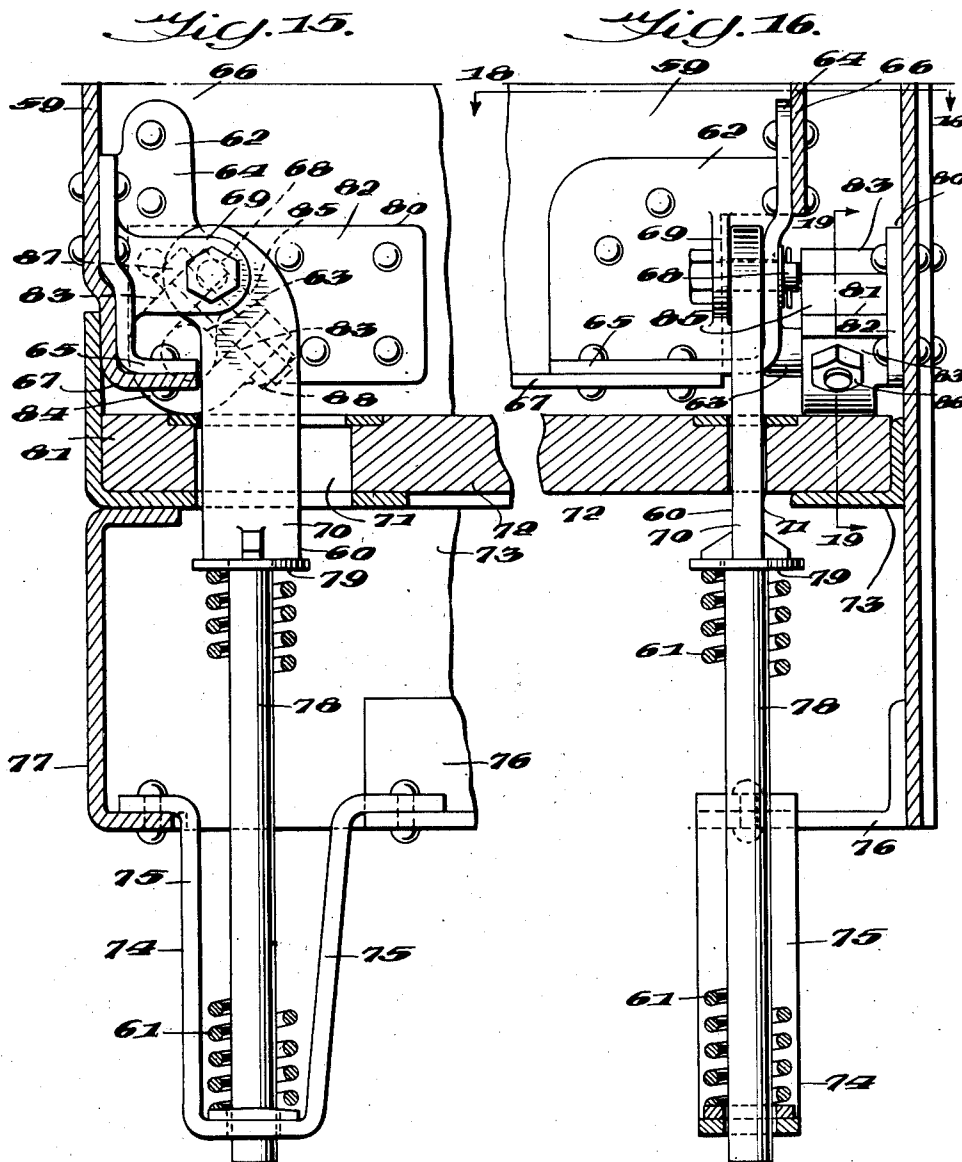
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DROP END GONDOLA CAR

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7 Sheets-Sheet 6



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2,484,512

DROP END GONDOLA CAR

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7 Sheets-Sheet 7

Fig. 77.

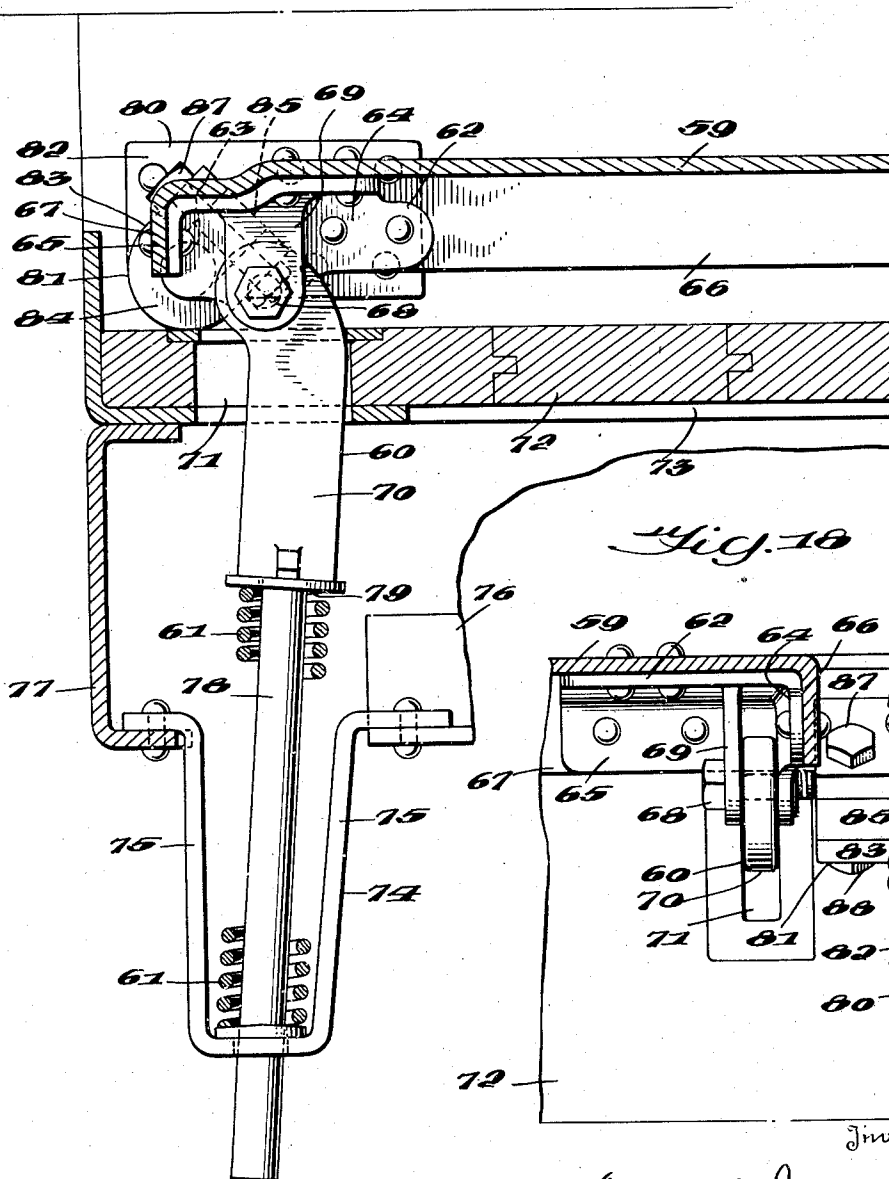
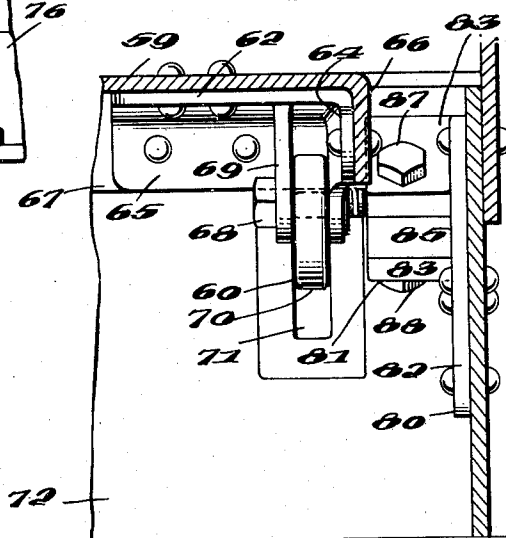


Fig. 18



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By Letter. The Clerk of the Court
his Attorney &

UNITED STATES PATENT OFFICE

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DROP END GONDOLA CAR

Orville Ingram, Washington, D. C.

Application June 28, 1945, Serial No. 602,025

32 Claims. (Cl. 105-238)

1

My invention relates to railway cars and more particularly to railway gondola cars having drop end doors which, as is customary, are adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the car floor.

These doors, which are sometimes referred to as end gates, weigh on the average approximately 850 pounds apiece, the exact weight of each door depending, of course, upon the size and design of the door itself. Considerable difficulty is, therefore, most always experienced in moving the door upwardly about its pivot from open horizontal position into closed vertical position. Two or more workmen are usually required to accomplish it or else some mechanical means such, for example, as a crane, which is not always available, must be employed.

The principal object of the invention is, therefore, to provide each drop end gondola car with means associated with the ends or gates thereof to enable them to be easily and readily moved from open to closed position.

Another object of the invention is to provide means enabling the end doors to be closed by a single workman.

A primary feature of the invention consists in providing a railway gondola car with a device disposed beneath the floor thereof having means movable in response to an opening movement of the door to which force is adapted to be applied tending to return the door to closed position.

Another feature of the invention consists in providing the drop end door of a railway car with means movable therewith and extending to a point below the floor cooperable with a device located beneath the floor during opening movement of the door adapted to apply force to said means tending to move the door in a closing direction.

A further feature of the invention consists in providing a drop end door gondola car with a spring device mounted beneath the floor thereof and operable by means attached to the door during an opening movement thereof for energizing the spring to provide a force tending to return the door to closed position.

A still further feature of the invention consists in providing a railway gondola car with a spring device located beneath the floor and fixed with respect to the car underframe and with means attached to and movable with the door extending to a point below the floor for energizing the spring device during an opening movement thereof to provide a force tending to return the door to closed position.

Still another feature of the invention consists in providing the drop end door of a railway car with means attached to and movable therewith and extending downwardly to a point beneath

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the car floor and in further providing a compression spring located beneath the car floor cooperable with an abutment secured to the underframe, the means on the door being operatively connected with the spring for compressing the spring against the abutment during an opening movement of the door so as to provide a force tending to return the door to closed position.

Other and more specific features of the invention, residing in advantageous forms, combinations and relation of parts, will hereinafter appear and be pointed out in the claims.

In the drawings,

Figure 1 is a vertical transverse sectional view of a drop end door gondola car, the view looking toward the inside of the door.

Figure 2 is an enlarged vertical sectional view taken on line 2-2 of Figure 1, the door being in closed position.

Figure 3 is a fragmentary horizontal sectional view taken beneath the car floor showing the spring and adjacent parts in elevation.

Figure 4 is a vertical sectional view corresponding to Figure 2 showing the door in open horizontal position.

Figure 5 is a fragmentary horizontal sectional view taken on a line corresponding to line 5-5 of Figure 2, omitting the door and hinge elements.

Figure 6 is a detail side elevational view of the upper portion of the arm secured to the door.

Figure 7 is a front elevational view of the upper portion of the door arm.

Figure 8 is a side elevational view of the spring abutment.

Figure 9 is a face view of the abutment.

Figure 10 is a vertical transverse sectional view of the lower portion of a drop end door gondola car embodying a modified form of the invention.

Figure 11 is an enlarged vertical sectional view taken longitudinally of the car on line 11-11 of Figure 10, the door being in closed position.

Figure 12 is a view similar to Figure 11 showing the door in open position.

Figure 13 is a fragmentary sectional view longitudinally of the car showing the adjusting link in an adjusted position.

Figure 14 is a fragmentary vertical transverse sectional view of the car center sill and adjacent elements, the view being taken on line 14-14 of Figure 12.

Figure 15 is an enlarged vertical sectional view taken longitudinally of a drop end door gondola car adjacent an end thereof embodying still another form of the invention, the door being shown in closed position.

Figure 16 is a vertical sectional view taken at right angles to Figure 15 looking at the inside of the door.

Figure 17 is a view similar to Figure 15 showing the door in open position.

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Figure 18 is a horizontal sectional view taken on line 18—18 of Figure 16.

Figure 19 is a fragmentary sectional view taken on line 19—19 of Figure 16.

Referring more particularly to the drawings and especially to Figures 1 to 9, inclusive, illustrating one form of the invention, 1 indicates the drop end door of a railway gondola car having sides 2, a floor 3 and an underframe 4, all of any usual or preferred construction.

In this particular embodiment of the invention, the underframe is illustrated as having a center sill 5 and side sill members including side sills 6 and floor supporting angles 7. The floor is composed of transversely extending wood planks supported at their ends on the horizontal flanges of the floor supporting angles 7. The side walls of the car may conveniently comprise side sheets 8 which, together with side stakes, are rigidly secured at their lower portions to the side sill members 6 and 7 and at their upper portions to a top rail 9 in the form of a bulb angle.

At their ends, each side wall is provided, as usual, with a corner post 10 having a portion 11 affording an abutment or stop for the end door. At their upper corners the doors are provided with suitable mechanisms 12 for cooperating with means carried by adjacent portions of the side walls for holding or locking them in closed upright position.

The lower corner of each door is provided with a casting or bracket 13 of suitable construction affording a laterally projecting hinge pintle 14 which cooperates with a bracket 15 secured to the inside of the adjacent side wall whereby the door is pivotally mounted to swing about an axis adjacent its lower edge. A transversely extending plate-like member 16 is rigidly secured to the bottom flange 17 of the door and engages the car floor to support the door intermediate the pintles, the inner end of the member being curved, as usual, around an axis substantially concentric with the axis of the pintles to permit the door to easily move from one position of closure to the other. The pintle castings 13 may be conveniently secured to the lower flange 17 of the door as well as to side flanges 19 thereof and to the body of the door itself. The upper edge of the door is provided, as customary, with a reinforcing angle member 20 adapted to engage the floor of the car when the door is swung inwardly into open substantially horizontal position.

Rigid with the door and extending inwardly therefrom adjacent opposite sides thereof are a pair of arcuate arms 21 which extend downwardly through openings in the floor to a point beneath it. The upper end of the arm is formed with a flanged head 22 whereby it may be conveniently secured to the inner face of the door and, since it is desired to position the arms as closely as possible to the sides of the car where they will not interfere with the placing of lading within the car and will not be struck by mechanism which might be employed to unload the car, the head may be designed so as to overlap the adjacent pintle casting and receive at least one of the securing rivets thereof.

The lower end of each of the arm 21 is connected to a spring device located below the floor so that, when the door is moved from closed to open position, the spring will be energized and thus provide a force which will tend to return the door to closed position.

In the present embodiment of the invention, each spring device is mounted adjacent the ad-

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joining side wall and includes a coil or helical spring 23, an abutment 24 engageable with one end of the spring, a cap 25 engageable with the other end of the spring, and a rod or the like 26 engageable with the cap for transmitting a force thereto tending to compress the spring against the abutment. The abutment is preferably secured to a side sill of the car and for this purpose it may be conveniently formed with flanges 27 which may be easily riveted to the sill. A recess 28 is preferably formed in the body portion of the abutment to receive the adjacent end of the coacting spring and an aperture 29 may be formed in the abutment concentric with the recess through which the rod 26 extends.

The cap 25 may be of conventional design, being nothing more than a circular disk having a recess in the spring engaging face to receive the spring and a concentric opening through which the rod 26 extends. The end of the rod adjacent the cap is preferably screw threaded to receive a nut 30 whereby the position of the cap on the rod may be readily adjusted and the cap retained on the rod.

The opposite end of rod 26 may be squared as shown and connected to the lower end of the adjacent arcuate arm 21 by a link 31 which conveniently consists of two laterally spaced bars rigidly connected at their central portions with an intervening spacing block 32. The link is pivotally connected by a bolt or the like 33 to the square end of rod 26 and is pivotally connected to the lower end of the arcuate arm 21 by a bolt or the like 34.

The opening in the car floor through which the arm 24 extends is preferably formed by a two part metal member 35 positioned within an aperture in the wood floor. Each part of this member has a base flange 36 whereby it may be readily secured by screws or other convenient means to the floor and the opening which it defines is of substantially rectangular shape in cross section, but the walls bounding the opening diverge downwardly so as to cooperate with a similarly formed plug-like portion 37 on the arcuate arm. The opening in the floor for the arm is, therefore, tightly sealed when the door is in upright closed position, as shown in Figure 2. By making the member 35 in two parts, it will be perceived that it may be readily assembled with adjacent parts.

The lower end of the arcuate arm which is connected to the link 31 is movable in a path concentric with the pivotal axis of the door and it is so positioned with respect thereto that, when the door is moved into substantially horizontal open position, it is caused to move beyond the vertical plane passing through that axis. As soon as the door has been lifted slightly from the floor, the spring, however, then functions to tend to cause the door to continue to move toward closed position. It has been found to be sufficient to use springs which are energized to exert a closing force on the door somewhat less than is actually required to produce such movement but, of course, it will be appreciated that heavier springs may be employed, if desired, so as to completely counter-balance the door. A spring which exerts a closing force on the door of only about fifty pounds or so less than is required to move the door from open to closed position is adequate to enable it to be operated by a single workman.

That form of the invention illustrated in Figures 10 to 14, inclusive, is applied to a railway gondola car having the same structural features as the car illustrated in the form of the invention

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shown in Figures 1 to 9, inclusive, and corresponding features of car construction are, therefore, designated by similar reference numerals.

Each drop end door 1 in this embodiment is provided with a pair of means 38 connected to the outside of the lower portion thereof, each of which may advantageously consist of a rigid arm 39 riveted at its upper end to the outer face of the door and extending downwardly outside of the car body through an opening in the end sill 40 to a point beneath the floor. The rigid arms of each door terminate in inwardly extending portions 41 underlying the car floor arranged on opposite sides of the center sill 5 as appears from Figure 10. Each arm 39 is connected to a spring device which is energized upon opening movement of the door to provide a force which tends to return the door to closed position.

These spring devices which are positioned on opposite sides of the center sill, each includes a spring 42, an abutment 43 cooperable with one end of the spring and a housing 44 cooperable with the opposite end thereof. The housing 44 which is open at its inner side and has flanges whereby it may be easily attached to the center sill is formed with top and bottom walls 45 and 46 respectively connected by a curved outer wall 47 and a rear wall 48 formed with a slot 49. A spring cap 50 is disposed within the recess and has a rearwardly extending portion or boss 51 projecting through the slot 49.

A spring actuating rod 52 extends continuously through an opening in the abutment 43 coaxially with the spring and through an opening in the spring cap 50 and terminates sufficiently far from the boss 51 thereof so that it can be provided with an adjustable member or nut 53 in spaced relation to the boss which will not move into engagement with the spring cap to actuate the spring until after the door has been swung toward open position a predetermined amount.

The lower end of each rigid arm 39 and the adjacent end of the spring rod 52 are operatively connected by means consisting of a pivotally connected link 55 and an adjusting plate 54. The link is pivotally connected to the arm 39 by a pin or the like 56 and the adjusting plate 54 is pivotally connected to the spring rod 52 by a pin 57. It is thus apparent that, when the door is moved from closed position as shown in Figure 11 to open position as shown in Figure 12, the spring rod 52 is caused to actuate the spring and thereby energize it to provide a force tending to return the door to closed position.

The nut 53 may be so positioned on the spring rod that, when the door is moved from closed to open position, it will not engage the spring cap until after the door has moved for about one-third of its entire distance. Thereafter continued movement of the spring rod will result in compressing the spring. By having the spring act upon reverse movement of the door for only about the first two-thirds of that movement a spring of greater capacity can be used than would be possible in the case where the spring operates during the entire closing movement and the force which is necessary to close the door for the remaining one-third distance may be easily exerted by a single workman.

In cases where the nut 53 cannot be adjusted to effect its engagement with the spring cap at the desired time the adjusting plate 54 can easily and quickly be employed to effect this result. The plate is formed with a series of apertures 58 disposed in a path eccentric with respect to

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the opening which receives the pin 57 for connecting it to the spring rod. Thus the distance between the inner end of the arm 39 on the door and the adjacent end of the spring rod 52 may be varied by rotating the plate with respect to the rod, as is indicated in Figure 13, so as to enable the plate 54 and link 55 to be connected in different positions of adjustment.

In the form of the invention illustrated in Figures 15 to 19, inclusive, the drop end door 59 is provided with members 60 which are movably connected to it and extend downwardly through openings in the car floor for energizing springs 61 which are supported in substantially upright positions beneath the floor.

The castings 62 which are positioned at the lower corners of the door and have laterally projecting pintles 63, have marginal flanges 64 and 65 respectively which are rigidly secured to side and bottom marginal flanges 66 and 67 respectively of the door.

Each casting has pivotally connected to it by a pin or bolt 68 which extends through an opening in the side flange of the casting and through an opening in an inwardly spaced lug 69, a rigid member 70 which has a plate-like upper portion 71 disposed within a slot 71 in the car floor 72 closely adjacent the car side, the adjoining end of the floor being supported, as usual, by a floor supporting angle 73.

The substantially upright spring 61 which is adapted to be energized by movement of the door transmitted to it by the movement of the member 69 may be conveniently supported by a substantially U-shaped bracket 74 having upwardly extending arms 75 terminating in portions respectively secured to the car side sill 76 and the end sill 77. Disposed within the spring and extending downwardly through an opening in the lower portion of the U-shaped bracket 74 is a rod-like member 78 which may advantageously be formed as an integral part of member 60, a shoulder 79 being provided at the juncture of the parts 70 and 78 for engaging the upper end of the spring.

It will thus be seen that, when the door moves from the upright closed position illustrated in Figure 15 to the substantially horizontal open position of Figure 17, the springs 61 for each door are compressed by downward movement of the members 60. Accordingly the springs are energized and afford a force tending to return the door to closed position.

In the two preceding forms of the invention, the parts are so arranged that the forces which the springs exert on the door tending to move it from open to closed position act, generally, in a direction forcing the lower portion of the door downwardly so that the hinge pintles will be maintained in cooperative relation with the brackets on the car sides which receive them. In the present embodiment, however, the spring when compressed, as in Figure 17, tends to move the lower edge of the door upwardly and thus cause the pintles to disengage the brackets on the car side. To eliminate this difficulty, the brackets 80 on the car side for receiving the pintles are each formed with recessed portions 81 which project inwardly from the base plate 82 of the casting by which it is secured to the adjacent car side. The recessed portion is advantageously of substantially U-shape having spaced walls or legs 83 connected at their lower ends by a semi-cylindrical portion 84. This semi-cylindrical portion provides a bearing for the adjacent

pintle of the door and the walls 83 incline upwardly therefrom in a direction away from the vertical plane of the adjacent car end.

With recesses of this character, the hinge pintles may be easily associated with the brackets and suitable means which is readily accessible may be conveniently employed for locking or holding the pintles within the recesses. This means may comprise a block or the like 85 which is positioned between the inclined walls of each recess and it is preferably formed at its lower edge with a cylindrical portion of substantially the same diameter as the diameter of the cooperating pintle. The block may be conveniently secured to the bracket by a bolt 86 which extends through registering apertures in the bracket walls and the block, the head 87 of the bolt engaging the outer face of one bracket wall and a nut 88 threaded on the opposite end of the bolt engaging the outer face of the other bracket wall, and both head and nut being easily accessible. Thus it will be seen that effective means is provided for restraining upward movement of the hinge pintles of the door within the hinge brackets.

Drop end door gondola cars having the specific structural features here illustrated have been chosen merely for the purpose of illustrating the invention and it will be readily apparent to those skilled in the art that the invention is equally well suitable to other gondola cars possessing different structural features. Moreover, changes and modifications may be made in detail parts of the illustrated forms of the invention without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of rigid means attached to and movable with the door and having a portion disposed below the level of the floor, and spring mechanism beneath the floor for applying to said rigid means when the door is moved inwardly of the car toward open position a force tending to return the door to closed position, said mechanism including a member connected to said rigid means and movable thereby in response to an opening movement of the door so as to be operable to transmit a door closing force thereto.

2. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of spring means located beneath the floor in fixed relation to the underframe, a member attached to and movable with the door and having a portion disposed below the level of the floor, and means operatively connecting said member and spring means for energizing said spring means during movement of the door inwardly of the car toward open position to provide a force tending to return the door to closed position.

3. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of spring means located beneath the floor and attached to the underframe of the car, an abutment for the spring means fixed with

respect to the underframe, a member attached to and movable with the door extending below the level of the floor, and means operatively connecting said spring means and said member for compressing the spring means against said abutment during movement of the door inwardly of the car toward open position whereby the spring means is energized to provide a force tending to return the door to closed position.

4. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a compression spring located beneath the floor in fixed relation to the underframe, and means attached to and movable with the door having a portion disposed beneath the floor, said means including a part cooperable with said spring for compressing it during movement of the door inwardly of the car to open position so that it is caused to provide a force tending to return the door to closed position.

5. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to the door and extending downwardly therefrom to a point beneath the floor, a helical spring located beneath the floor adjacent an end of the car and fixed with respect to the underframe, and means operatively connecting said member to the spring for compressing the spring during movement of the door inwardly of the car toward open position whereby the spring is energized to provide a force tending to return the door to closed position.

6. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to and movable with the door and extending from adjacent the inner face thereof through an opening in the floor to a point beneath the floor, spring means located beneath the floor in fixed relation to the underframe, and means operatively connecting said member and spring means for energizing the spring means during an opening movement of the door to cause it to provide a force tending to return the door to closed position.

7. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of means connected to the door including a rigid member disposed within the car body and extending through an opening in the floor, a spring device disposed beneath the floor rigid with respect to the underframe, and means pivotally connected to the lower end of said member for actuating said spring device during an opening movement of the door whereby said spring device is energized to provide a force tending to return the door to closed position.

8. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in

closed unright position or in open substantially horizontal position overlapping the floor, of members attached to the door adjacent the side edges thereof, said members being movable with the door and respectively having portions disposed beneath the floor when the door is in upright closed position, helical springs below the floor respectively disposed adjacent the side sills, the axis of each of said springs being substantially parallel with a vertical plane passing through the longitudinal axis of the car, and means operatively connecting each of said members with the adjacent spring whereby the springs are energized during an opening movement of the door to provide a force tending to return the door to closed position.

9. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member rigidly attached to the door and having a portion extending downwardly to a point below the level of the car floor when the door is in closed upright position, a spring device located beneath the floor and rigid with respect to the underframe, and means pivotally connecting said member and the spring device for actuating the latter during movement of the door to open position whereby the spring device is energized to provide a force tending to return the door to closed position.

10. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to and movable with the door and having a portion disposed below the level of the floor when the door is in closed upright position, a helical spring located beneath the floor in fixed relation to the underframe and having its axis extending substantially lengthwise of the car, and means operatively connecting said member and said helical spring for energizing the spring during an opening movement of the door to provide a force tending to return the door to closed position.

11. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to and movable with the door and having a portion disposed below the level of the floor, a helical spring beneath the floor anchored to one of the sill members of said underframe and extending lengthwise thereof, and means operatively connecting said member and spring for energizing the spring during opening movement of the door to provide a force tending to return the door to closed position.

12. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of an arcuate member rigidly attached to the inner face of the door and extending through an opening in the car floor to a point beneath the floor, spring means located beneath the floor and fixed with respect to the underframe, and means movably connecting the lower

end of said arcuate member with said spring means so that when the door is moved to open position the spring means will be energized to provide a force tending to return the door to closed position.

13. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to and movable with the door and having a portion disposed beneath the level of the floor adjacent the sides of the car, spring means located beneath the floor and carried by a side sill of the underframe, and means operatively connecting said member and spring means for energizing said spring means during an opening movement of the door to provide a force tending to return the door to closed position.

14. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of an arcuate arm rigidly attached to the inner face of the door and extending therefrom through an opening in the floor to a point beneath the floor, said arm having a portion provided with downwardly diverging surfaces engageable with the portions of the floor bounding the said opening when the door is in closed position, spring means beneath the floor and fixed with respect to the underframe, and means connected to the lower end of said arm and to said spring means so that when the door is moved to open position the spring is energized to provide a force tending to return the door to closed position.

15. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to and movable with the door and having a portion disposed below the level of the floor, spring means located beneath the floor and carried by the center sill of the underframe, and means operatively connecting said member and spring means for energizing said spring means during an opening movement of the door to provide a force tending to return the door to closed position.

16. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to the door and located outside of the car body, said member being movable with the door and having a portion disposed below the level of the floor, spring means beneath the floor and fixed with respect to the underframe, and means operatively connecting said portion and said spring means so that when the door is moved toward open position the spring means is energized to provide a force tending to return it to closed position.

17. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop

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end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a pair of members movable with the door located outside of the car body and having portions disposed beneath the floor, a pair of spring devices mounted on opposite sides of the center sill, and means respectively connecting each of said members with an adjoining spring device so that said spring devices are energized during an opening movement of the door to provide a force tending to return the door to closed position.

18. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a pair of members rigid with the door and movable therewith, each of said members being disposed on the outside of the door and having its lower portion located beneath the floor, a pair of spring means respectively mounted on opposite sides of the center sill and operable by said members during an opening movement of the door so that said means are energized to provide a force tending to return the door to closed position.

19. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a rigid member secured to the outer face of the door and extending downwardly therefrom outside of the car body and terminating in a portion underlying the floor, a spring device located beneath the floor and fixed with respect to the underframe, and means pivotally connecting the lower end of said member and said spring device so that the spring device is energized during opening movement of the door to provide a force tending to return the door to closed position.

20. In a railway gondola car having an underframe consisting of side sill and center sill members and provided with a floor supported by the underframe, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to the door adjacent the center of the car and movable therewith in response to movement thereof, said member having a portion disposed beneath the floor, a helical spring beneath the floor carried by said center sill and having its axis extending substantially longitudinally thereof, and means operatively connecting said portion of the members and said spring so that when the door is moved to open position the spring is energized to provide a force tending to return the door to closed position.

21. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of means connected to the door and extending to a point below the level of the floor, a helical spring beneath the floor, an abutment for one end of the spring carried by the underframe, a housing for the opposite end of the spring carried by the underframe, and means operatively connecting said means and said spring

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for applying force to the end of the spring within said housing during an opening movement of the door to energize the spring and thereby provide a force tending to return the door to closed position.

22. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to and movable with said door and having a portion disposed below the level of the floor, and spring means located beneath the floor adapted to be energized by movement of said member during opening movement of the door to provide a force tending to return the door to closed position, said spring means including a helical spring, an abutment for one end of the spring rigid with the underframe, means affording a housing for the opposite end of the spring rigid with the underframe, and means connected to said member and cooperable with the end of the spring within the housing upon an opening movement of the door for energizing the spring.

23. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to the door and extending downwardly therefrom to a point beneath the floor, a compression spring located beneath the floor fixed with respect to the underframe, and means pivotally connecting said member and said compression spring so that an opening movement of the door will energize the spring to provide a force tending to return it to closed position, said means including an adjustable plate-like link having a pin receiving aperture adjacent one end and a plurality of additional pin receiving apertures arranged in a path eccentric with respect to the first named opening.

24. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member connected to and movable with the door and extending downwardly therefrom to a point beneath the level of the floor, spring means located beneath the floor adapted to exert a force tending to move the door from open to closed position, and means pivotally connected to said member and movable into operative engagement with said spring means during an opening movement of the door for energizing the spring means, said pivotally connected means being operatively engageable with said spring means during opening movement of the door only after said door has been moved a predetermined distance from its normal closed position.

25. In a railway gondola car having an underframe and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a member attached to and movable with the door extending downwardly therefrom to a point beneath the floor, a substantially upright helical spring disposed beneath the floor, means fixed with respect to the underframe for supporting said spring, and means

operatively connecting said member and spring for energizing the spring during an opening movement of the door to provide a force tending to return the door to closed position.

26. In a railway gondola car having an under-frame and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of members pivotally connected to the door and extending downwardly therefrom through openings in the floor, and spring means fixed with respect to the under-frame cooperatively engageable with said members during opening movement of the door whereby the spring means are compressed to provide a force tending to return the door to closed position.

27. In a railway gondola car having an under-frame and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a substantially upright helical spring located beneath the floor, said floor being provided with an opening above the spring and means pivotally connected to said door and extending downwardly through said opening for cooperating with said spring for compressing it during opening movement of the door whereby the spring is energized to provide a force tending to return the door to closed position, said means including an elongated portion extending downwardly within the helical spring for preventing substantial lateral movement thereof.

28. In a railway gondola car having an under-frame and a floor supported thereby, the combination with a pivoted drop end door adapted to be selectively disposed in closed upright position or in open substantially horizontal position overlapping the floor, of a substantially upright helical spring located beneath the floor, a bracket rigid with the underframe and having a portion affording a support for the spring, and means pivotally connected to said door extending downwardly therefrom through an opening in the floor cooperable with the spring for compressing it during opening movement thereof so that it will be energized to provide a force tending to return the door to closed position, said means including an elongated member extending downwardly within said spring and through an opening in said bracket in substantial alignment with the longitudinal axis of the spring.

29. In a railway gondola car having a drop end door, brackets rigid with the door adjacent the lower corners thereof respectively having laterally projecting portions affording hinge pintles for the door, brackets secured to the side walls of the car for receiving said pintles, members pivotally connected to the brackets secured to the door and extending downwardly therefrom through openings in the car floor, and spring means located beneath the floor respectively engageable by said members so as to be energized thereby during opening movement of the door to provide a force tending to return the door to closed position.

30. In a railway gondola car having a drop end door, brackets secured to the lower corners of the door having laterally extending portions affording hinge pintles for the door, brackets on the car sides respectively having recesses for receiving said pintles, and spring means positioned below the floor of the car connected to said door and energized upon opening of the door, said spring means tending to force the door toward closed position when it is in open position, said brackets secured to the car sides having means adapted to prevent the pintles disposed therein from being forced out of cooperative relation therewith by said spring means.

31. In a railway gondola car having a drop end door, brackets secured to the lower corners of the door having laterally extending portions affording hinge pintles for the door, brackets on the car sides respectively having recesses for receiving said pintles, and spring means positioned below the floor of the car connected to said door and energized upon opening of the door, said spring means tending to force the door toward closed position when it is in open position, each of the said brackets secured to the car sides having inclined walls defining the said pintle receiving recess thereof, and means removably secured between said inclined walls above the cooperating pintle for retaining the pintle within the recess.

32. In a railway gondola car having a drop end door, brackets secured to the lower corners of the door having laterally extending portions affording hinge pintles for the door, brackets on the car sides respectively having recesses for receiving said pintles, and spring means positioned below the floor of the car connected to said door and energized upon opening of the door, said spring means tending to force the door toward closed position when it is in open position, each of the said brackets secured to the car sides having a pair of laterally spaced walls defining the said pintle receiving recess thereof, said walls being connected at their lower ends and inclining upwardly in a direction away from the adjacent end of the car, and removable means adapted to be positioned within said recess above the pintle receivable therein.

ORVILLE INGRAM.

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