May 2, 1950 O. INGRAM 2,506,218

SPRING DEVICE FOR DROP END DOORS OF GONDOLA CARS

Filed March 6, 1946 2 Sheets-Sheet 1

Fig. 1.

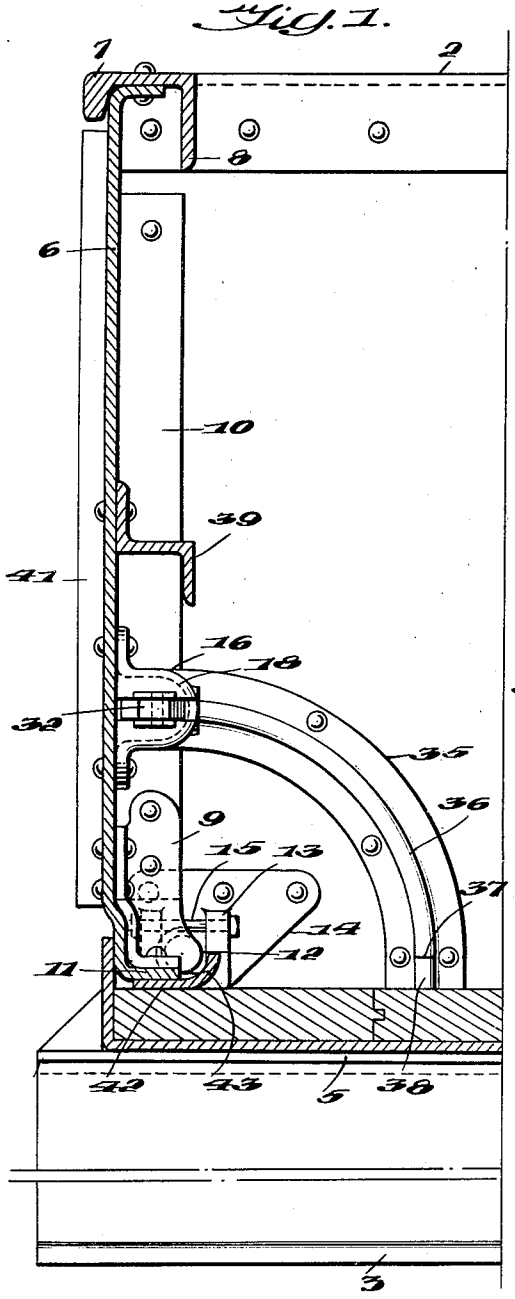
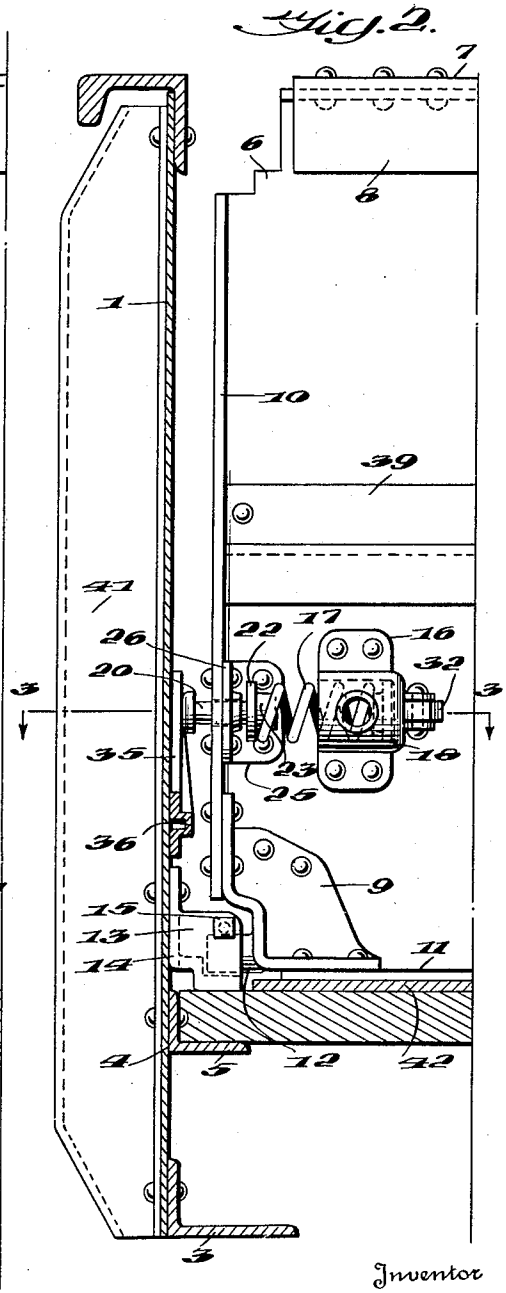


Fig. 2.



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Fig. 3.

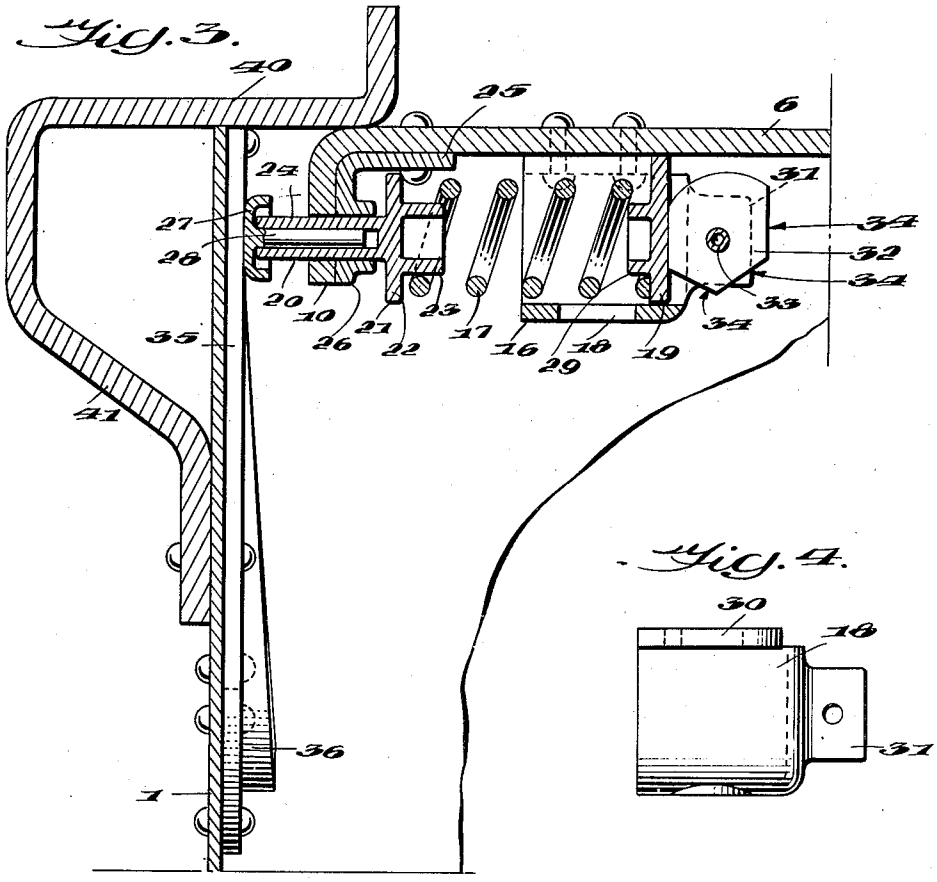


Fig. 4.

Fig. 6.

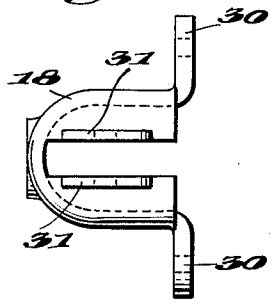
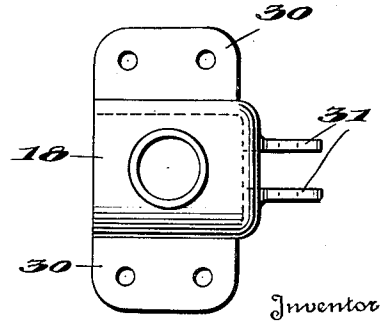


Fig. 5.



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UNITED STATES PATENT OFFICE

2,506,218

SPRING DEVICE FOR DROP END DOORS OF GONDOLA CARS

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Application March 6, 1946, Serial No. 652,390

8 Claims. (Cl. 105—406)

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My invention relates to railway gondola cars and more particularly to such railway cars as are provided with drop end doors.

As is known, the weight of drop end doors of gondola cars varies between 600 to 800 pounds. Accordingly, it is not safe, when moving the door from closed to open position to merely unlock the conventional door securing mechanism and let the door freely fall by gravity into open position. If permitted to swing in this manner from closed to open position, the door, being so heavy, will be subjected to injury, as will also the parts of the car on which the door falls and the pivotal mounting of the door. Or, if several trainmen are employed to prevent the free fall of the door and let it down gradually, there is always the possibility of some one of them being injured because of negligence of others. It is to reduce these hazards of opening the heavy drop end doors of gondola cars that the present invention has been devised.

The principal object of the invention is to provide a buffing or checking means whereby the drop end doors may be safely permitted to move by themselves from closed to open position.

A primary feature of the invention consists in providing a drop end door with spring means for exerting frictional force on the car sides which becomes greater as the door approaches open position.

Another feature of the invention consists in providing the door with spring means having portions engageable with the sides of the car, the sides being provided with means for increasing the forces exerted by the springs during movement of the door from closed to open position.

A further feature of the invention consists in providing the door with a pair of helical springs adjacent opposite sides thereof, the springs being cooperable with members adapted to frictionally engage inwardly inclined portions of the side walls of the car so as to cause the springs to exert greater forces as the door approaches open position.

A still further feature of the invention consists in providing a drop end door having inturned side marginal flanges with members extending through the flanges to engage helical springs mounted on the door, the springs being designed to maintain the members in frictional engagement with the side walls of the car and the members being movable inwardly as the door moves toward closed position to cause the springs to exert increasingly greater forces as the door approaches closed position.

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

In the drawings,

Figure 1 is a vertical longitudinal sectional view adjacent one end of a gondola car having a drop end door.

Figure 2 is a transverse vertical sectional view of the car adjacent one side of the drop end door.

Figure 3 is an enlarged sectional view taken on line 3—3 of Figure 2.

Figure 4 is a plan view of the housing for the inner end of one of the helical springs.

Figure 5 is a front view of the housing illustrated in Figure 4.

Figure 6 is an end view of the housing.

Although I have shown only one side of a railway car, it will be appreciated that the side of the car shown and the cooperating mechanism is duplicated on the opposite side of the car.

Referring more particularly to the drawings, 1 indicates the side walls of the car which are preferably of sheet metal, being provided with top rails 2 at their upper ends and with side sill structures at their lower ends. The side sill structure of each wall includes a lower side sill angle 3 and a comparatively smaller upper angle 4 having an inturned horizontal flange 5 on which the adjacent end of a wooden car floor may be supported.

Pivotally mounted at opposite ends of the gondola car are drop end doors 6, only one of which has been shown since the two doors are identical. The upper ends of the doors are flanged inwardly for attachment to the horizontal legs of top bulb angles 7 which have substantially vertical legs or flanges for resting upon the floor or other suitable means when the door is in open position.

The pivotal connection of the door to the car body may be of conventional construction embodying brackets 9 rigidly secured to the lower corners of the door to the inturned side marginal flanges 10 of the door and the lower or bottom marginal flange 11 thereof. Each of the brackets 9 is formed with a laterally projecting hinge pintle 12 which projects into a substantially U-shaped recess 13 formed on the bracket 14 rigidly secured to the adjacent side wall of the car. The hinge pintles are removably maintained in the recesses 13 by bolts 15 which extend across the upper portions of the U-shaped recess. To snub or check inward pivotal movement of the door from upright closed position to horizontal open position, a pair of spring devices 16 are mounted

on the door. Each of these spring devices includes a helical spring 17 which at its inner end is disposed within a housing 18 in engagement with a follower 19 and which at its outer end engages a plunger or the like 20.

The plunger 20 may advantageously be formed in two parts, one of which, 21, has a base portion 22 in engagement with the spring 17. A cylindrical centering flange 23 extends from one side of the base 22 into the adjacent helix of the spring and a cored tubular member 24 projects from the other side of the base through the adjacent side marginal flange 10 of the door. As shown, the portion of the door through which member 24 extends may be suitably reinforced by a bracket 25 which, in addition to being rigidly secured to the main body portion of the door, has a portion 26 overlapping the inner face of the adjacent marginal flange provided with an opening which is in registry with the opening in the door flange. The other part of the plunger has a head 27 and an elongated stem 28 which fits within the tubular extension of the main part of the plunger.

The follower 19 against which the inner end of the spring bears is likewise provided with a projecting portion 29 which extends into the adjacent helix of the spring for centering it.

In addition to the oppositely extending base flanges 30 by which the inwardly opening housing is secured to the door, the housing is also formed with a pair of rearwardly extending lugs 31 between which a member 32 is rotatably mounted, as indicated at 33 for engaging the outer face of the follower 19. The member 32 is provided with a plurality of angularly related faces 34 spaced unequal distances from the axis of rotation of the member so that by selectively choosing the face to engage the follower, the compression of the spring may be selectively adjusted.

Mounted on each of the car side walls adjacent opposite side edges of the door are members 35 respectively having portions 36 which incline inwardly with respect to the walls. Members 35, together with the incline portions 36 thereof, are curved about the pivotal axis of the door as a center so that the heads 27 of the spring devices will frictionally engage them during the entire time the dor is moving to open position. As the portions 36 incline inwardly with respect to the car sides and the heads 27 remain in engagement therewith during opening movement of the door, it will be seen that the springs are progressively compressed with the result that the frictional forces exerted by the heads on the car sides increase as the door approaches open position.

While the rotatable member 22 may be disposed in such a position that the spring 17 is not under compression when the door is in closed position, it is preferred that the adjustment of member 32 be such that the spring will be under some initial compression when the door is in this position. Instead of having the incline portions 36 extend all the way to the floor of the car, the inclines preferably terminate a short distance above the floor, as indicated at 37. At their lower ends, the inclines lead to substantially vertical raised portions 38 so that, when the door is in open position, the forces exerted by the springs will cause the heads 27 to frictionally engage those portions. With the door in this position and the heads 27 engaging the substantially vertical portions 38, the force exerted by the springs, instead of permitting the door to rise slightly above the floor and jiggle up and down while the car is in transit, will serve to frictionally hold the drop end door in engagement with the floor whether the car be stationary or in transit.

To prevent the spring devices from being injured when the door is open, a transversely extending Z-bar 39 may be secured to the door just above the spring devices. This Z-bar is so arranged with respect to the top coping angle 2 that the weight of the door when opened may be primarily taken by the angle and the Z-bar.

When the door is in closed position, it engages the inner faces of webs 40 of corner posts 41 and, as the door swings from closed to open position, a wear plate 42 secured to the lower marginal flange 11 of the door and having a curved portion 43 concentric with the hinge pintles 12 moves relatively to the floor and the hinged edge of the door is supported on the curved portion 43 when the door is fully open.

Various modifications may be made in the particular embodiment of the invention here illustrated and described without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A railway gondola car having a drop end door pivotally connected thereto, said door having inturned marginal flanges along its side edges, a helical spring mounted on the door with its axis substantially parallel with the axis of the door, a plunger respectively cooperable with said helical spring and extending through said flanges for exerting a frictional force on the adjacent car side, and means having a cam surface attached to said car side for causing the spring pressure exerted by said spring to increase as the door approaches open position.

2. A railway gondola car having a drop end door pivotally connected thereto, said door having an inturned marginal flange along one of its side edges, extending through said flange and engageable with an adjacent car side, a spring for maintaining said plunger in frictional engagement with the adjacent car side, a movable abutment on the door against which said spring reacts, and means having a cam surface on said car side for respectively increasing the pressure of said spring as the door approaches open position.

3. A railway gondola car having a drop end door pivotally connected thereto, a spring device mounted on the door, said device being frictionally engageable with the adjacent side wall of the car, and members carried by said side walls having cam surfaces for respectively increasing the frictional force of said spring device as the door is moved to open position, said spring device including a plunger engageable with the members on the adjacent side of the car, a spring for maintaining the plunger in frictional engagement with said member, and a movable abutment on the door against which the spring reacts.

4. A railway gondola car having a drop end door pivotally connected thereto, a member having a cam surface carried by the adjacent side of the car, and a spring device mounted on the door and cooperable with said member, said device including a helical spring, an element maintained by the spring in frictional engagement with the member on the adjacent side of the car for progressively compressing the spring when the door is moved toward open position, and a movable abutment against which the spring reacts.

5. A railway gondola car having a drop end

door pivotally connected thereto, a spring device carried by the door having portions for exerting a frictional force on the adjacent side of the car, and means mounted on the car side having a cam surface for increasing the frictional force of said spring device during movement of the door to open position, said device including a compression spring and a movable element for selectively adjusting the magnitude of the compression of said spring.

6. A railway gondola car having a drop end door pivotally connected thereto, a member carried by the adjacent side of the car and having a cam surface, a spring device mounted on the door respectively cooperable with said member, said device comprising a helical spring, a member cooperable with one end of the spring frictionally engageable with said member on the adjacent side of the car during movement of the door to open position, and adjustable means cooperable with the other end of said spring for selectively adjusting the magnitude of the compression of the spring.

7. A railway gondola car having a drop end door pivotally connected thereto, a member carried by the adjacent side of the car and having a cam surface, a spring mounted on the door having its axis parallel with the pivotal axis of the door, means cooperable with the outer end of said spring for frictionally engaging said member on the adjacent side of the car, a housing for the inner end of said spring, a follower disposed within said housing engageable with the

inner end of said spring, and means adapted to actuate said follower to selectively adjust the magnitude of compression of said spring.

8. A railway gondola car having a pivotally mounted drop end door adapted to occupy a substantially horizontal position overlapping the floor of the car when in open position, an arcuate member having a cam surface carried by a side of the car, the lower end of said cam surface terminating in a substantially vertical portion, and a spring unit mounted on the door having a portion engageable with said cam surface for affording frictional resistance to movement of the door to open position, said unit being in frictional engagement with said vertical portion of the arcuate member when the door is fully open.

ORVILLE INGRAM.

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