April 25, 1950 O. INGRAM 2,505,290

RAILWAY CAR DOOR MECHANISM

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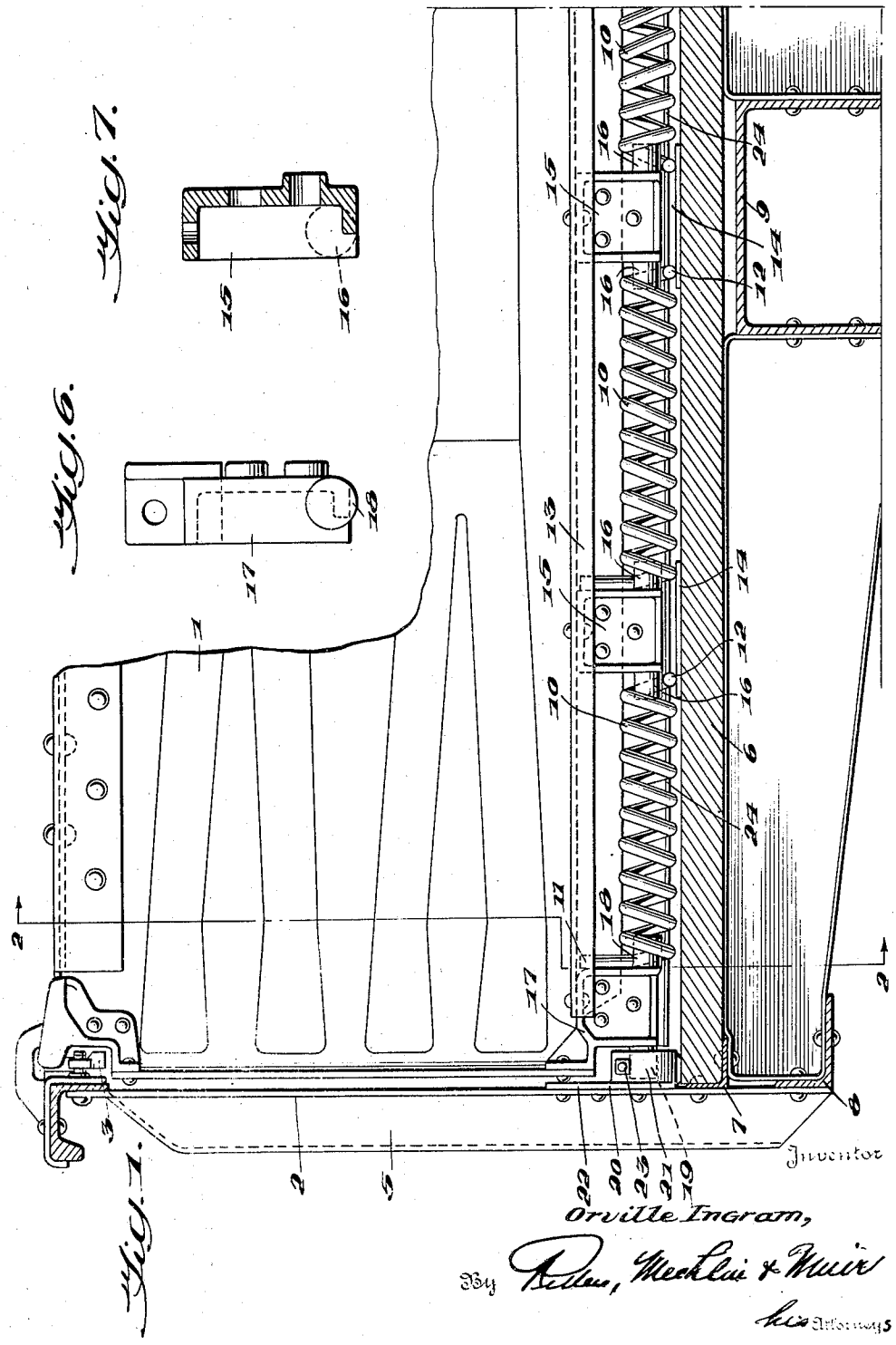


Fig. 7.

Fig. 6.

Fig. 1.

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Fig. 2.

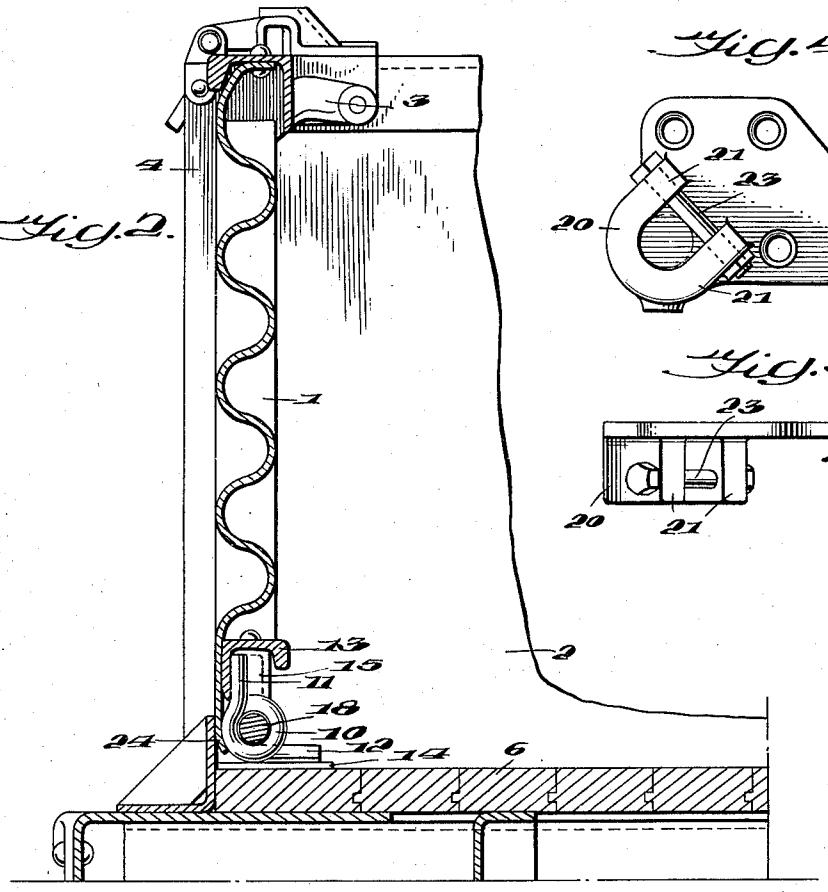
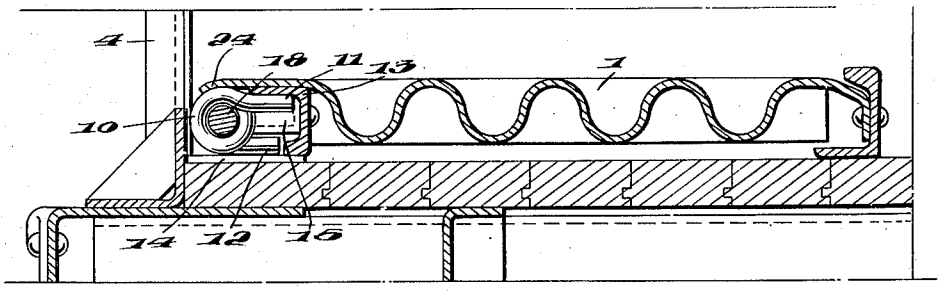


Fig. 4.

Fig. 5.

Fig. 3.



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RAILWAY CAR DOOR MECHANISM

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Application September 10, 1945, Serial No. 615,439

3 Claims. (Cl. 105—406)

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My invention relates to railway freight cars and is particularly applicable to gondola cars having drop doors of the type wherein the movement of the door from open position to closed position necessitates overcoming its weight.

Such doors are large and cumbersome weighing upon an average in the neighborhood of 800 or 850 pounds in gondola cars commonly in use. Because of their weight much difficulty is experienced in moving such doors upwardly against the action of gravity from open position to closed position. The closing of these doors usually requires from two to four men for its accomplishment or else the use of a crane or some mechanical means if the latter is available; and since these doors swing downwardly to open position under the influence of gravity, it not infrequently occurs, particularly in the case of so-called drop end doors of gondola cars, that the men engaged in manipulating the door suffer injury as a result of the door getting out of their control and suddenly swinging toward open position.

The primary object of the invention is to provide a railway car having one or more hinged doors which swing to open position under the influence of gravity with means enabling such doors to be readily closed manually without the expenditure of great effort.

A further object of the invention is to associate with a car door, which swings to open position under the influence of gravity, simple, compact, practical and effective means, which are energized by the door during its opening movement so as to exert upon the door a force tending to move the door towards closed position.

A principal feature of the invention consists in associating, in a railway car, a hinged door of the type wherein the weight thereof opposes movement of the door from open to closed position, and torsion spring means adapted to be energized by the door upon its opening movement, the door being provided with abutment means movable therewith for cooperating with the torsion spring means to energize the same during an opening movement of the door, and the torsion spring means having a plurality of spaced portions which engage the car body at points spaced from each other and from the abutment means movable with the door.

A further feature of the invention consists in associating, in a railway car, a hinged door of the type wherein its weight opposes its movement from open to closed position and a plurality of torsion helical springs disposed adjacent the

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hinged edge of the door and extending transversely of the door adjacent the hinged edge thereof, said door having mounted thereon means cooperating with the ends of adjacent springs to maintain said springs in operative relation to the door, and each of said springs having a portion which engages cooperating parts of the car body constituting spring abutments for the spring.

A further feature of the invention consists in associating, in a railway car, a hinged door of the type wherein the weight thereof opposes its movement from open position to closed position, a plurality of torsion helical springs positioned adjacent the hinged edge of the door with their axes substantially coincident with the hinge axis of the door, and a plurality of members carried by the door for maintaining the springs in said axial position, the door having means movable therewith which engage and are adapted to energize the respective springs, and each of said springs being provided with a portion engaging a fixed part of the car body in spring abutment relation therto.

A further feature of the invention consists in associating, in a railway car, a hinged door of the type whose weight opposes its movement from open position to closed position, a plurality of torsion helical springs extending in substantial axial alignment transversely of the door adjacent the hinged edge thereof, and means for maintaining the springs in operative relation to the door and to each door, said means including a plurality of members which are carried by the door and are formed with oppositely disposed portions which project into the respectively adjacent springs.

A further feature of the invention consists in associating, in a railway gondola car, a hinged door of the type whose weight opposes its movement from open position to closed position, and torsion spring means operatively interposed between the door and a fixed part of the car and adapted to be energized by the door during its opening movement, the torsion spring means extending transversely of the car adjacent its hinged edge, and the door having a portion adjacent its hinge axis which is in overlapping relation to the torsion spring means.

Other 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, chosen for the purpose of illustrating the invention the scope whereof will be pointed out in the claims.

Figure 1 is a transverse sectional view of a portion of a railway gondola car of the drop end door type, the door being in closed or upright position.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a view also taken on line 2—2 of Figure 1 but showing the door in open position.

Figure 4 is a detail elevational view illustrating a preferred form of hinge means for cooperating with a hinge pintle bracket secured to the door, the relation of the pintle thereto being indicated by dot and dash lines.

Figure 5 is a plan view of the hinge bracket shown in Figure 4.

Figure 6 is a detail end elevational view of one of the combined hinge brackets and spring holders carried by the door.

Figure 7 is a detail central sectional view of one of the intermediate spring holders carried by the door.

As illustrated in the drawings, the invention is applied to a gondola car having a drop end door 1 which is hinged at its lower edge to the sides 2 of the car. The door, when closed, is in substantially vertical position and is maintained against an accidental opening movement by any suitable or preferred locking mechanism, such, for example, as the well known hook form of locking mechanism 3 which is adapted to have locking engagement with means secured to the corner post 4 of the car body. The side walls 2 of the car may be provided with side stakes 5, as is commonly the case, and the car floor 6 may be composed of transversely extending wood planks which are supported at their ends on the horizontal flanges of the floor supporting angles 7 at opposite sides of the car. The car underframe illustrated is of a well known form providing side sills 8 and a center sill 9 but, like the sides and floor of the car body, may be of any usual construction.

Operatively interposed between the door and the car body are torsion spring means preferably comprising a plurality of springs 10 of helical form. Each of these springs which may advantageously be under some initial torsional stress when the door is in closed position, is provided at one end with a projecting portion or arm 11 engaging the door and each of which is also provided at its other end with a projecting portion or arm 12 for cooperating with a fixed part of the car. For the purpose of providing an abutment on the door for cooperating with the projecting arms 11 of the torsional helical springs, the door may be preferably provided near its hinge axis with a reinforcing member 13 which may conveniently be in the form of a bulb angle. If desired, the arms 12 of the torsion spring, instead of directly engaging the floor 6 of the car, may have contact with metal plates 14 which rest upon the floor and are secured thereto. The helical torsional springs extend transversely of the door 2 with their axes preferably coincident with the hinge axis of the door.

The flange of the angle which projects inwardly from the door is disposed above the springs and extends sufficiently into the car body to prevent crated lading in the car from shifting into engagement with the springs.

Secured to the door adjacent its hinged edge are a plurality of members 15 having oppositely disposed cylindrical projections 16 which respectively extend into the adjacent springs 10 for

the purpose of maintaining the latter in alignment and in operative relation to the door 1. The door is preferably hinged to the car body by means of brackets 17, one of which is rigidly secured to the door at opposite sides of the car. Each of these hinge brackets is provided with a cylindrical projection 18 which enters the bore of the neighboring helical spring 10 to maintain it in assembled relation to the door. Each of these hinge brackets 17 is also provided with a cylindrical trunnion 19 which cooperates with a hinge bracket 20 secured to the neighboring car side. The brackets 15 and 17 are preferably respectively secured to the two legs of the reinforcing angle 13 and consequently serve to rigidify it. The hinge bracket 20 is preferably formed with jaws 21 which are curved at their inner ends to provide a cylindrical bearing for the trunnion 19 of the hinge bracket 16 and it may also be formed with a plate portion 22 whereby it may be riveted to the side of the car. When the door 1 is in assembled relation to the car body, the hinge trunnion 19 is retained in position by means of a bolt 23 which passes through openings of the jaws 21.

As will be seen upon reference to Figures 1 and 2 of the drawings, the door is preferably provided adjacent its hinge axis with a portion 24 which overlaps the springs 10 and thereby serves to protect them when the door is in open position. This portion 24 of the door preferably terminates sufficiently far above the floor 6 to afford clearance for any material, such as coal, that otherwise might become packed along the hinged edge of the door and interfere with its operation.

When the door executes an opening movement, its weight energizes the several torsional springs 10 simultaneously and, as the axes of the springs are in alignment with the hinge axis of the door, the torsion imparted to the springs is proportional to the change in angular movement of the door throughout its movement to open position. When fully opened the free edge of the projecting flange of the angle 13 may conveniently rest on a fixed part of the car floor to support the hinged edge of the door. A single spring for the purpose intended would be prohibitive in dimensions and so would be impractical and, if it were of suitable dimensions enabling it to be applied to a car, it would be unsatisfactory in use because the great weight of the door would cause it to be overstressed. The use of torsion spring means comprising a plurality of torsion springs is especially advantageous in that, if one spring should fail, the workman still has some control of the door and does not suddenly have its entire weight come upon him, and moreover there is no twisting tendency of the door which would tend to shift it out of parallel relation to its hinge axis.

What I claim is:

1. In a railway car, the combination of a hinged sheet metal door whose weight opposes its movement from open position to closed position, torsion springs associated with the door adjacent the hinged edge thereof adapted to be energized by said door upon an opening movement thereof, a reinforcing member extending along the hinged edge of the door having a plate portion secured to the inner face of the door and an angularly disposed plate portion disposed above said spring means for preventing crated lading within the car from shifting into engagement with said spring means when the door is

closed, each of said spring means having spaced portions respectively engaging a fixed portion of the car and the said plate portion of the reinforcing member secured to the door.

2. In a railway car, the combination of a hinged sheet metal door whose weight opposes its movement from open to closed position, torsion spring means associated with the hinged edge of the door adapted to be energized upon an opening movement of the door, a reinforcing member extending along the hinged edge of the door, said reinforcing member having a portion projecting from the inner face of the door above said spring means adapted to rest upon a fixed part of the car when the door is in open position, and each of said springs having one end portion engageable with said reinforcing member and the other end portion engageable with a fixed part of the car body.

3. In a railway car, the combination of a hinged sheet metal door whose weight opposes its movement from open position to closed position, a plurality of torsion springs mounted on the inner face of the door adapted to be energized by said door upon an opening movement thereof, an angle reinforcing member extending along the hinged edge of the door having a leg secured

to the inner face of the door and a leg projecting inwardly therefrom above said spring means, and a plurality of members secured to both legs of said reinforcing angle and respectively interposed between adjacent springs for maintaining them in operative relation, and each of said springs having portions respectively in engagement with said reinforcing member and a fixed part of the car.

ORVILLE INGRAM.

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