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DOOR MECHANISM FOR GONDOLA CARS

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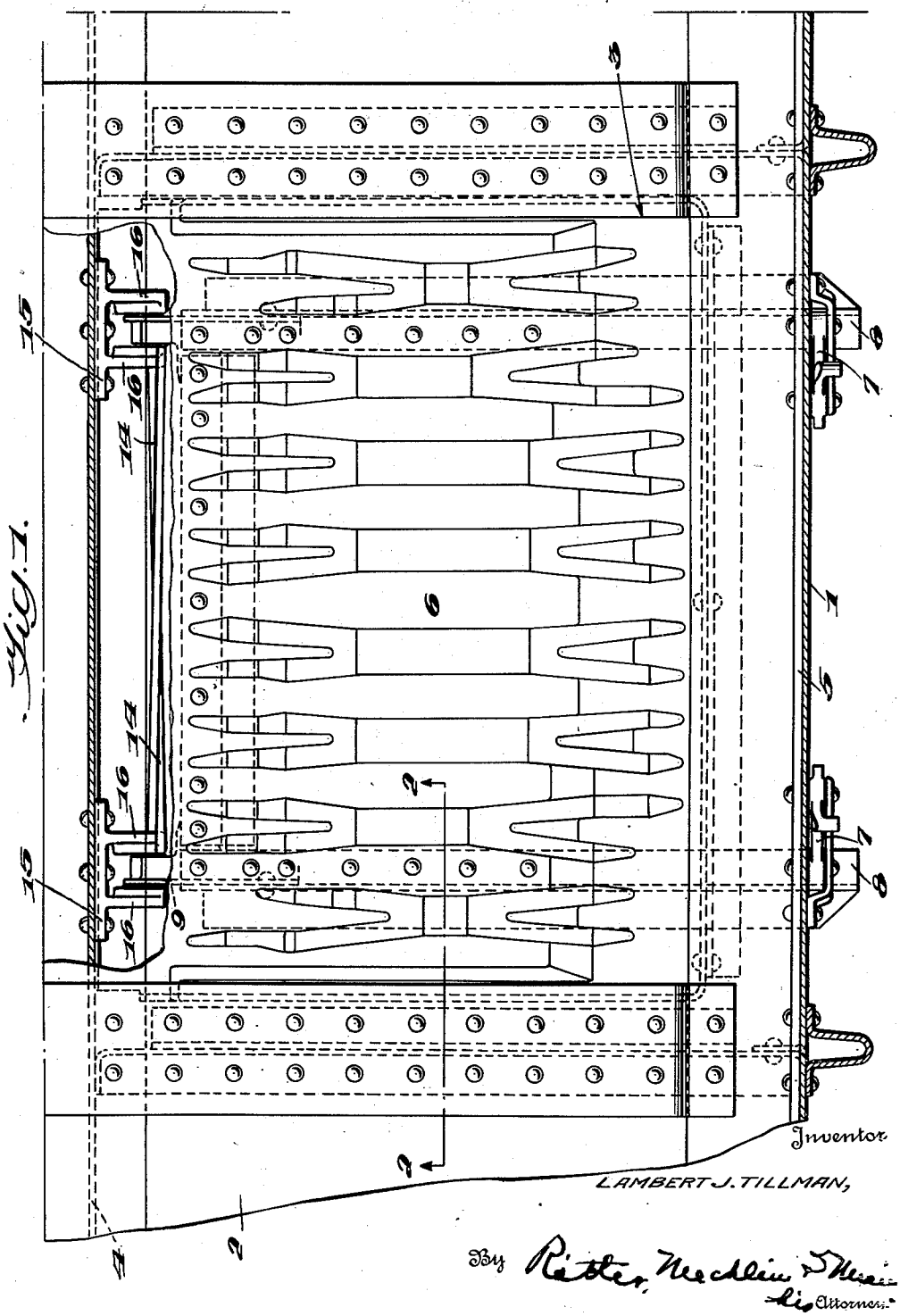


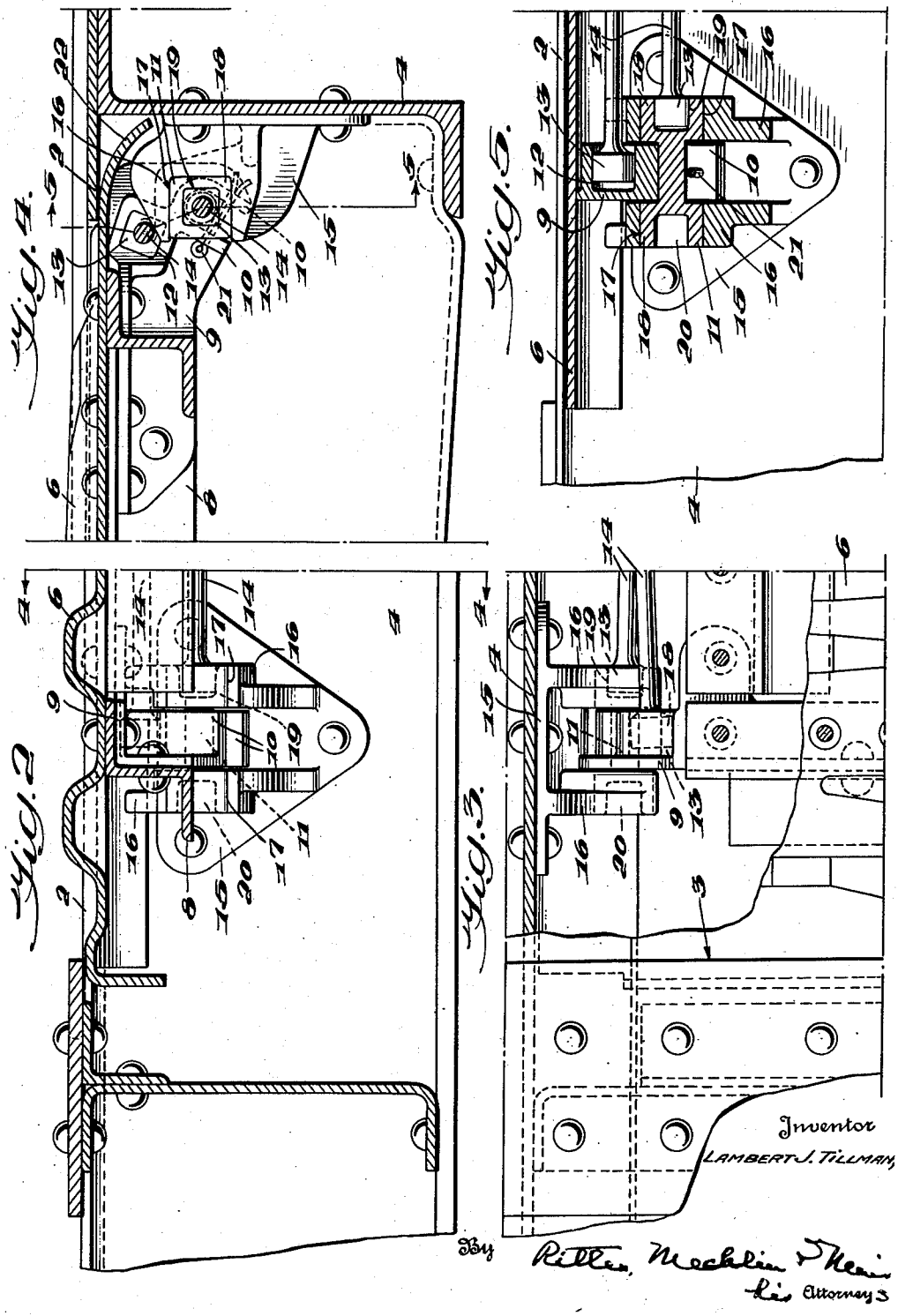
Fig. 1.

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DOOR MECHANISM FOR GONDOLA CARS

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My invention relates to railway freight cars and particularly to gondola cars having doors hinged to the car body in a manner requiring that their swinging movement from open position to closed or lading retaining position be performed in opposition to the action of gravity incident to the weight of the door.

In many gondola cars these hinged doors are large and cumbersome and the combined strength of several men is usually required to raise one of them to its closed position from its open position. Should the men accidentally lose control over the door while moving it toward closed position the resulting sudden swinging movement of the door to open position not infrequently causes serious injury to one or more of the workmen.

The object of the invention is to provide an effective and compact mechanism, capable of practical application to a railway car, for imparting to a hinged car door whose swinging movement from open position to closed position is opposed by the action of gravity, a force generated by the opening movement of the door which tends to move the door towards closed position.

A principal feature of the invention consists in providing, in a railway car having hinged doors whose swinging movement to closed position is opposed by the action of gravity, a plurality of torsion rods extending transversely of the door adjacent the hinge axis thereof, a plurality of spaced brackets rigidly mounted on the door for respectively preventing rotation of one end of each of said rods, and a plurality of spaced brackets rigidly mounted upon a fixed part of the car for respectively securing the other ends of said rods against rotation relative to the car body.

Another feature of the invention, generally stated, consists in providing, in a railway gondola car having a hinged door whose hinge axis is disposed below the car floor adjacent the car center sill and whose swinging movement towards closed position is opposed by the action of gravity, a plurality of torsion rods disposed below the floor adjacent the hinge axis of the door, a plurality of means carried by said door for respectively securing one end of each of said rods against rotation with respect to said door, and spaced means fixed with respect to the car center sill for respectively preventing rotation of the other end of each of said rods with respect to the car center sill.

A further feature of the invention consists in providing in a railway gondola car having a floor formed with a lading discharge opening which is adapted to be closed by a hinged door whose hinge axis is disposed below the floor adjacent the center sill of the car and whose swinging movement to closed position is opposed by the action of gravity, a plurality of spaced brackets rigidly

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secured to the door, a plurality of bracket members rigidly attached to the center sill of the car and cooperating with the brackets secured to the door to constitute means for hingedly mounting the door on the car body, and torsion rod means disposed below the car floor adjacent the hinge axis of the door and having at one end a portion fixed against rotation relative to the door and being provided at the other end with a portion fixed with respect to the underframe of the car.

There are other features of the invention residing in relationships of parts and advantageous details of construction, all as will hereinafter appear.

In the drawings, illustrating a preferred embodiment of the invention, the scope whereof is pointed out in the claims:

Figure 1 is a view partly in plan and partly in horizontal section illustrating the invention as embodied in a drop bottom gondola car, the drop door being in closed position with a portion thereof adjacent the hinge axis broken away to clearly show the relationship of the torsion bars.

Figure 2 is a detail vertical sectional view on the line 2—2 of Figure 1.

Figure 3 is a detail plan view of one corner of the hinged edge of the door shown in Figure 1, a part of the door plate being broken away to disclose the underlying structure.

Figure 4 is a detail vertical section taken on the line 4—4 of Figure 2.

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 4.

In the drawings, 1 indicates the side wall of a railway gondola car and 2 is the car floor. The floor is provided with suitable openings 3 for the discharge of lading and is supported by the car underframe which, as usual, includes a center sill 4 and side sills 5. The lading discharge opening in the floor is adapted to be closed by a hinged door 6 that may be locked in closed position by any suitable means, such, for example, as the well known hooks 7 pivoted to the car side and respectively engaging the outer ends of the door arms 8 secured to the under side of the door.

The hinged door 6, which advantageously may be formed as a corrugated steel plate, has its hinge axis disposed below the floor 2 adjacent the center sill 4. Rigidly mounted upon the under side of the door are spaced brackets 9 which afford means for hinging the door to the car body, each of said brackets being preferably provided for that purpose with substantially parallel spaced jaws 10 which form an open-ended slot or recess for receiving the neighboring hinge pin member 11. At their connected ends, the inner faces of the jaws 10 are curved to provide a suitable bearing for the hinge pin. Each of the brackets 9 is also formed with a polygonal, prefer-

ably square, socket 12 for receiving the correspondingly shaped end 13 of one of the torsion rods 14, to thereby hold one end of each torsion rod against rotation with respect to the hinged door.

Rigidly secured to the center sill 4 are brackets 15 having spaced arms 16 between which the jaws 10 of the respectively adjacent brackets 9 mounted on the door are received. These arms 16 are formed with open-ended polygonal recesses 17 which provide jaws for engaging the correspondingly shaped polygonal heads 18 of the hinge pin members 11 to prevent rotation thereof with respect to the brackets 15 by which they are carried. Each hinge pin member is provided at one end with a polygonal socket 19 for receiving the correspondingly shaped end 13 of one of the torsion rods. To provide means whereby the hinge pin member 11 may be rotated prior to its application to the bracket 15, so that the torsion rod 14 socketed therein may be under initial torsional stress when the parts are in assembled relation and the door is in closed position, the other end of the hinge pin member may also be provided with a polygonal socket 20 to receive a suitable wrench or bar for imparting torsion to the rod 14 through the hinge pin member in which it is socketed. The socket 20 is preferably of the same form as the socket 19.

While the construction is such that the door is held in hinged relation with the car by the weight of the door itself, a cotter pin 21 or the like which extends through the jaws 10 of the bracket 9 may, if desired, be employed to lock the hinged edge of the door against any accidental upward movement. To protect the brackets 9 and 15 and the torsion rods 14 against possible injury when the door 4 is open and lading is being discharged from the car, the edge of the door adjacent its hinge axis is preferably curved as indicated at 22, the center of curvature substantially corresponding to the hinge axis of the door.

The torsion rods 14 are disposed adjacent the hinged edge of the door and may conveniently be of circular cross section except for their end portions 13, one of the square ends 13 of each rod being positioned in the corresponding socket 12 of one of the brackets 9 carried by the door and the other square end portion 13 of the same torsion rod being positioned in the socket 19 formed in the adjacent end of the hinge pin member 11 mounted on the corresponding bracket 15 secured to the center sill 4. As the hinge pin members 11, when in assembled position, are incapable of rotation with respect to the brackets 15 upon which they are mounted, they function the same as if they were integral parts of said brackets; but to facilitate assemblage as well as to provide means for conveniently placing the rods 14 under initial torsion, the hinge pin members are preferably made to be separable from the brackets 15.

When the door swings to open position under the influence of gravity, it energizes the torsion rods 14 by causing the ends thereof which are socketed in the brackets 9 secured to the door to be twisted or rotated with respect to the ends of the rods which are held in fixed position by reason of their socketed engagement with the hinge pin members 11 carried by the brackets 15 rigidly mounted on the car center sill 4. The stress so imparted to the torsion rods 14 thus serves materially to decrease the force necessary to be exerted by workmen when the door is moved to closed position manually; and in order to reduce as far as practicable the force required to move the door from open position to closed position, while still enabling the door to open fully under the influence of gravity, it is preferred that the torsion rods 14 be of such strength and elasticity that the force to close the door which they exert as the result of the initial torsional stress imparted to them and that additionally generated in them during an opening movement of the door shall together be only somewhat less than the force with which gravity opposes the swinging movement of the door from open position towards closed position.

What I claim is:

1. A door mechanism for railway car hinged doors whose swinging movement from open position towards closed position is opposed by the action of gravity, said mechanism comprising a plurality of torsion rods extending transversely of the door adjacent its hinge axis, a plurality of brackets rigidly mounted on the door adjacent said axis and spaced from each other, a corresponding plurality of spaced brackets rigidly secured to a fixed part of the car adjacent said axis, each of said last named brackets having mounted thereon a pin member for forming a hinged connection with the adjacent bracket mounted on the door, each of said hinge pins and the brackets upon which they are respectively mounted being provided with engaging portions preventing rotation of said pins relative to their respective brackets, said rods being provided at each end with a polygonal portion held against rotation with respect to one of said brackets adjacent thereto, the said brackets which are mounted on the door each being provided with means for engaging one of said polygonal portions to hold it against rotation, and each of said hinge pin members being formed with a portion for cooperating with said polygonal portion of one of said rods to prevent rotation of said portion of said rod with respect to said pin member.

2. A door mechanism for railway car hinged doors whose swinging movement from open position towards closed position is opposed by the action of gravity, said mechanism comprising a plurality of torsion rods extending transversely of the door adjacent its hinge axis, said torsion rods having their adjacent ends spaced from each other in a direction substantially normal to the hinge axis of the door and their ends being of polygonal cross section, a plurality of spaced brackets rigidly mounted on the door adjacent said axis and each provided with a polygonal recess for receiving the adjacent end of one of said rods, a plurality of spaced brackets rigidly secured to a fixed part of the car adjacent said axis, each of said last named brackets having mounted thereon a pin member for forming a hinged connection with the adjacent bracket mounted on the door, each of said hinge pin members and the brackets upon which they are respectively mounted being provided with engaging portions which coact to prevent rotation of said pin members relative to their respective brackets, each of said hinge pin members being formed with a socket for receiving the polygonal end portion of one of said rods to thereby prevent rotation of said end portion with respect to said pin member, and each of said brackets mounted on the door being provided with spaced jaws forming a recess for receiving said hinge pin member.

3. A door mechanism for railway car hinged doors whose swinging movement from open position to closed position is opposed by the action of

gravity, said mechanism comprising a plurality of torsion rods extending transversely of the door adjacent its hinge axis and each having at its opposite ends a polygonal portion, a plurality of spaced brackets rigidly secured to a fixed part of the car adjacent said axis, a plurality of spaced brackets rigidly mounted on the door adjacent its hinged edge, each of said first named brackets being provided with spaced arms for receiving a portion of the adjacent bracket secured to the door and being also provided with jaws forming an open-ended recess for receiving the correspondingly adjacent end of a hinge pin member, hinge pin members which are respectively disposed in the recesses between the jaws of their respective brackets and each of which is provided at one end with a socket for receiving the neighboring end of one of said rods to prevent rotation of said end of the rod with respect to the hinge pin member, and each of the brackets which are mounted on the door being provided with means connected to the neighboring end of one of said rods and with spaced jaws forming an open-ended recess for engaging said hinge pin member.

4. Door mechanism for the hinged door of a railway car of the type having a floor provided with an opening for the discharge of lading and an underframe supporting said floor including a center sill, said mechanism comprising a plurality of torsion rods disposed below the floor adjacent the hinge axis of the door, spaced brackets rigid with the door adjacent the hinge axis thereof for respectively securing one end of each rod against rotation with respect to the door, and spaced means adjacent the hinge axis of the door for respectively preventing rotation of the other end of each of said rods with respect to the center sill, said brackets being respectively hingedly mounted on said spaced means.

5. Door mechanism for the hinged door of a railway gondola car of the type having a floor provided with an opening for the discharge of lading and an underframe for supporting said floor including a center sill, said mechanism comprising a plurality of brackets spaced from each other and rigidly secured to the door, a plurality of torsion rods disposed below said floor adjacent the hinge axis of the door, said brackets and said rods being respectively provided with coacting means for securing one end of each rod against rotation with respect to the neighboring bracket, and spaced means adjacent the hinge axis of the door and rigidly connected to the center sill for respectively preventing rotation of the other end of each of said rods, said brackets being respectively hingedly connected to said spaced means.

6. Door mechanism for the hinged door of a railway gondola car of the type having a floor provided with an opening for the discharge of lading and an underframe for supporting said floor including a center sill, said mechanism comprising a plurality of brackets rigidly secured to the door in spaced relation to each other adjacent the hinged edge of the door, a plurality of bracket members rigidly secured to the center sill and spaced from each other adjacent said hinged edge, and torsion rod means disposed below said floor adjacent the hinge axis of the door and extending in the direction of length of the center sill, said torsion rod means being provided at one end with a portion secured to said brackets against relative rotation with respect to the door and being provided at the other end with a portion secured to said bracket members and fixed against relative rotation with respect to the center sill.

7. Door mechanism for the hinged door of a railway gondola car of the type having a floor provided with an opening for the discharge of lading and an underframe for supporting said floor including a center sill, said mechanism comprising a plurality of torsion rods disposed below the floor adjacent the hinge axis of the door, each of said rods being provided with polygonal heads at its opposite ends, a plurality of brackets rigidly secured to the door in spaced relation to each other and each provided with a socket for receiving the neighboring head of one of said rods, a plurality of brackets each rigidly secured to the center sill in spaced relation to each other and each provided with means engaging a hinge pin member to prevent rotation thereof, and a plurality of hinge pin members respectively carried by said last named brackets and each provided at one end with a socket for receiving the polygonal head of one of said torsion rods.

8. A door mechanism for a railway car hinged door whose swinging movement from open position to closed position is opposed by the action of gravity, said mechanism including a plurality of torsion rods provided with polygonal heads at their opposite ends, a plurality of brackets rigidly secured to the door adjacent its hinged edge in spaced relation to each other and each provided with a socket for receiving a polygonal head of one of said rods, a plurality of spaced brackets each rigidly secured to a fixed part of the car adjacent the hinged edge of the door and each provided with means engaging a hinge pin member to prevent rotation thereof, and a plurality of hinge pin members each having at one end a socket for receiving and prevening rotation of one of the heads of one of said torsion rods and each being formed at its other end for cooperation with means whereby it may be rotated before assembly with its cooperating bracket to cause the rod socketed therein to be under initial torsional stress when the parts are in assembled relation and the door is in closed position.

9. A door mechanism for railway car hinged doors whose swinging movement from open position to closed position is opposed by the action of gravity, said mechanism comprising a plurality of torsion rods extending transversely of the door adjacent its hinge axis, a pair of brackets rigidly mounted on the door, and a pair of brackets rigidly secured to a fixed part of the car and having hinge pins, said brackets secured to the door respectively having portions straddling said hinge pins for hingedly connecting the door to the car, the opposite ends of each of said torsion rods being respectively fixedly secured to one of said brackets on the door and to one of said brackets on the car.

LAMBERT J. TILLMAN.

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