Feb. 7, 1939. H. C. LIMA 2,146,436

RAILWAY CAR

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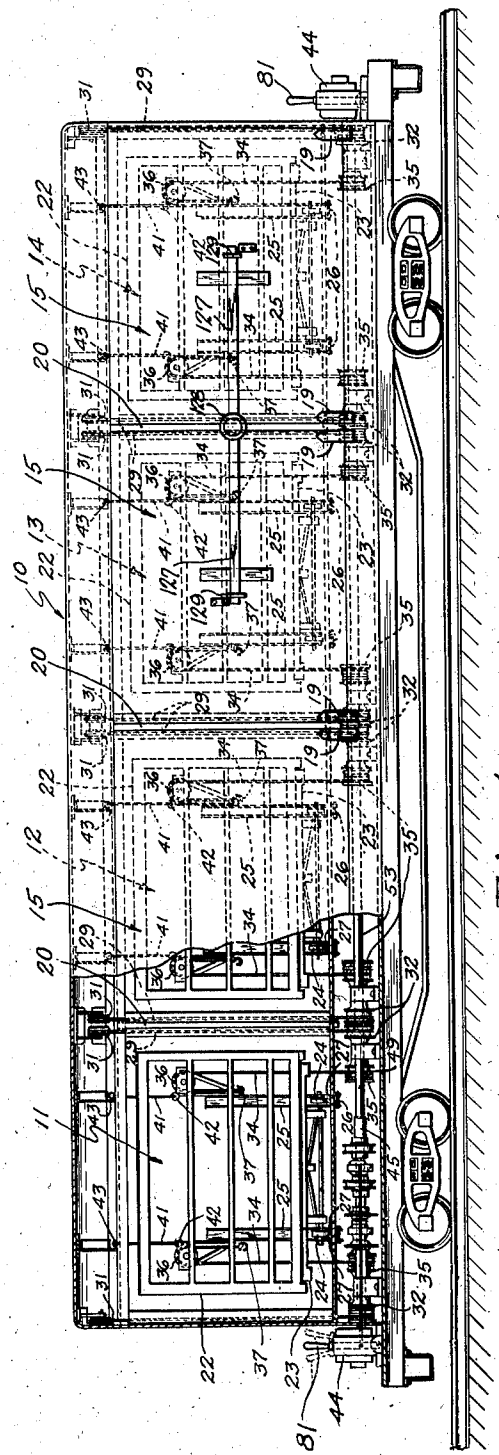


Fig. 1

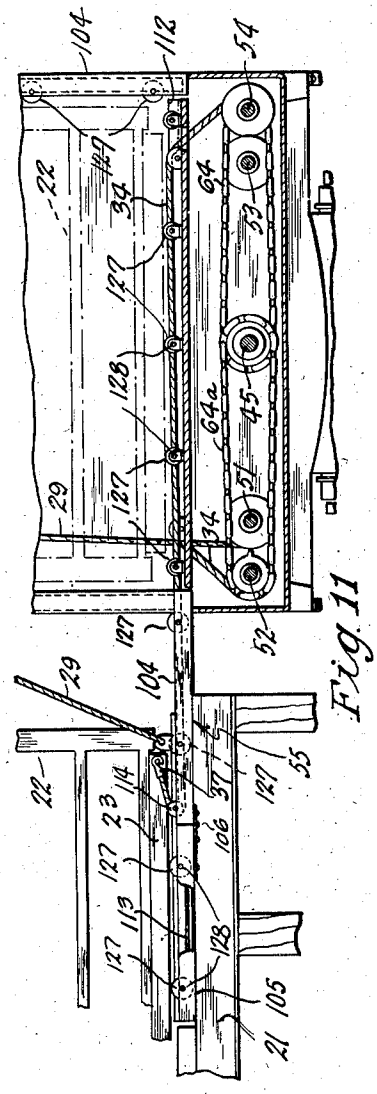


Fig. 11

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RAILWAY CAR

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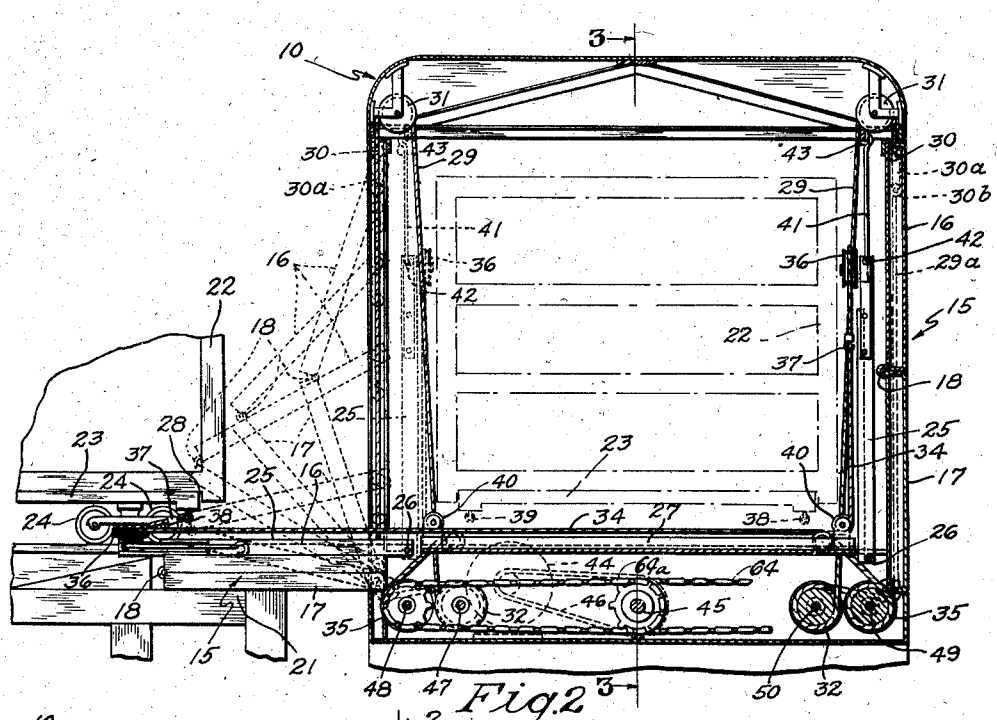


Fig. 2

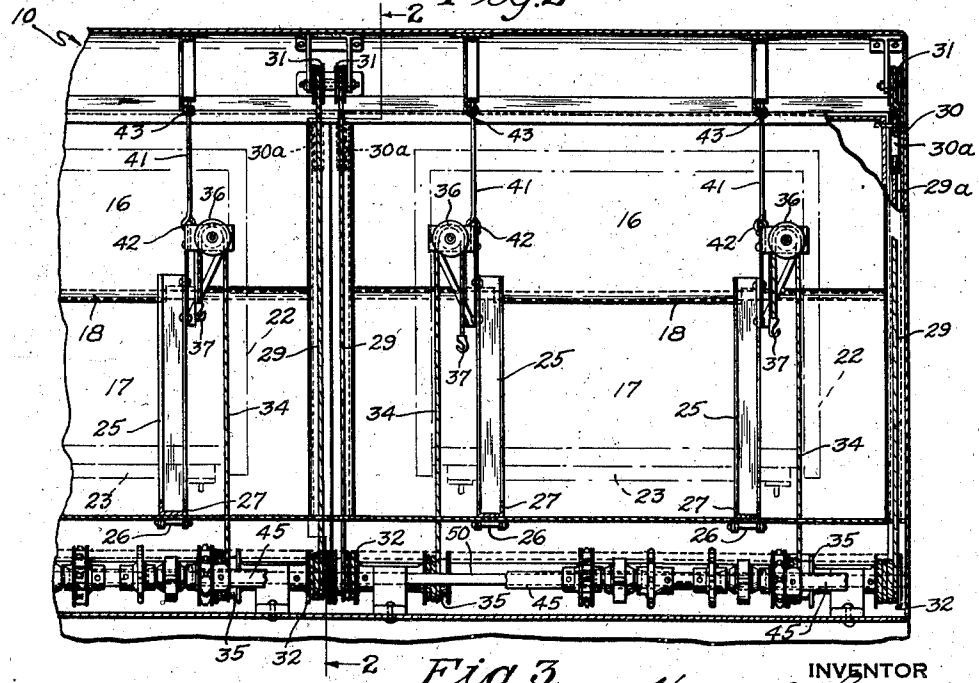


Fig. 3

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RAILWAY CAR

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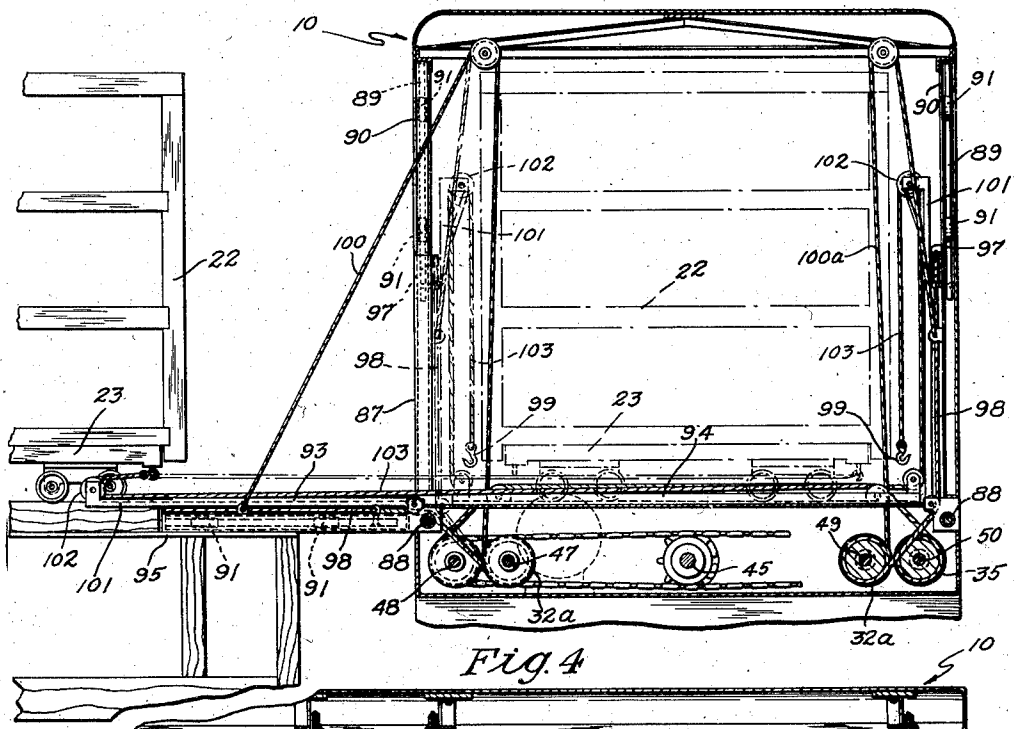


Fig. 4

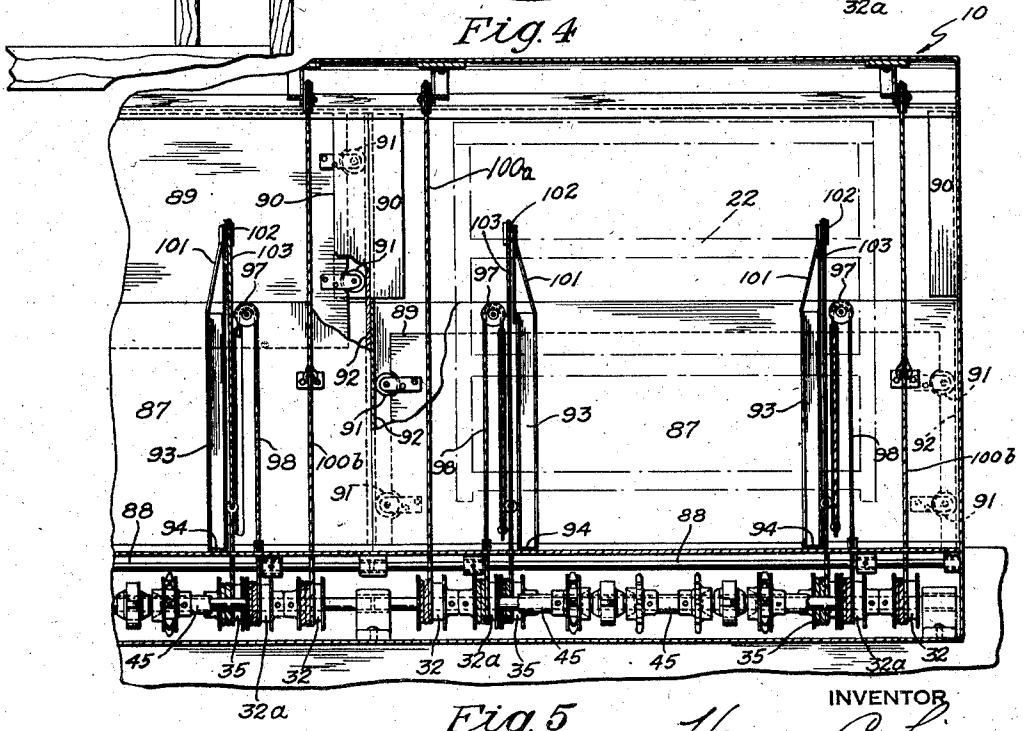


Fig. 5

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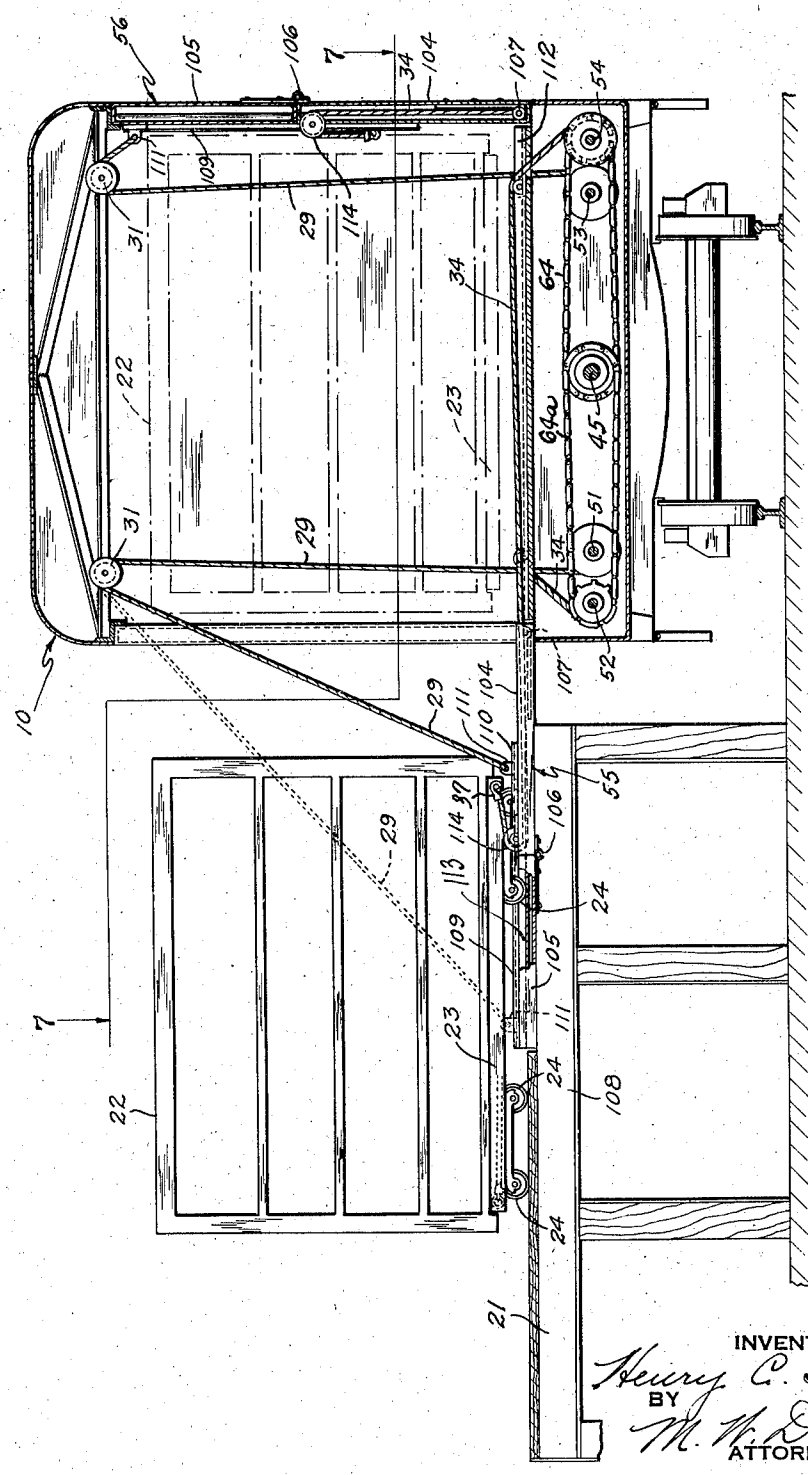


Fig. 6

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RAILWAY CAR

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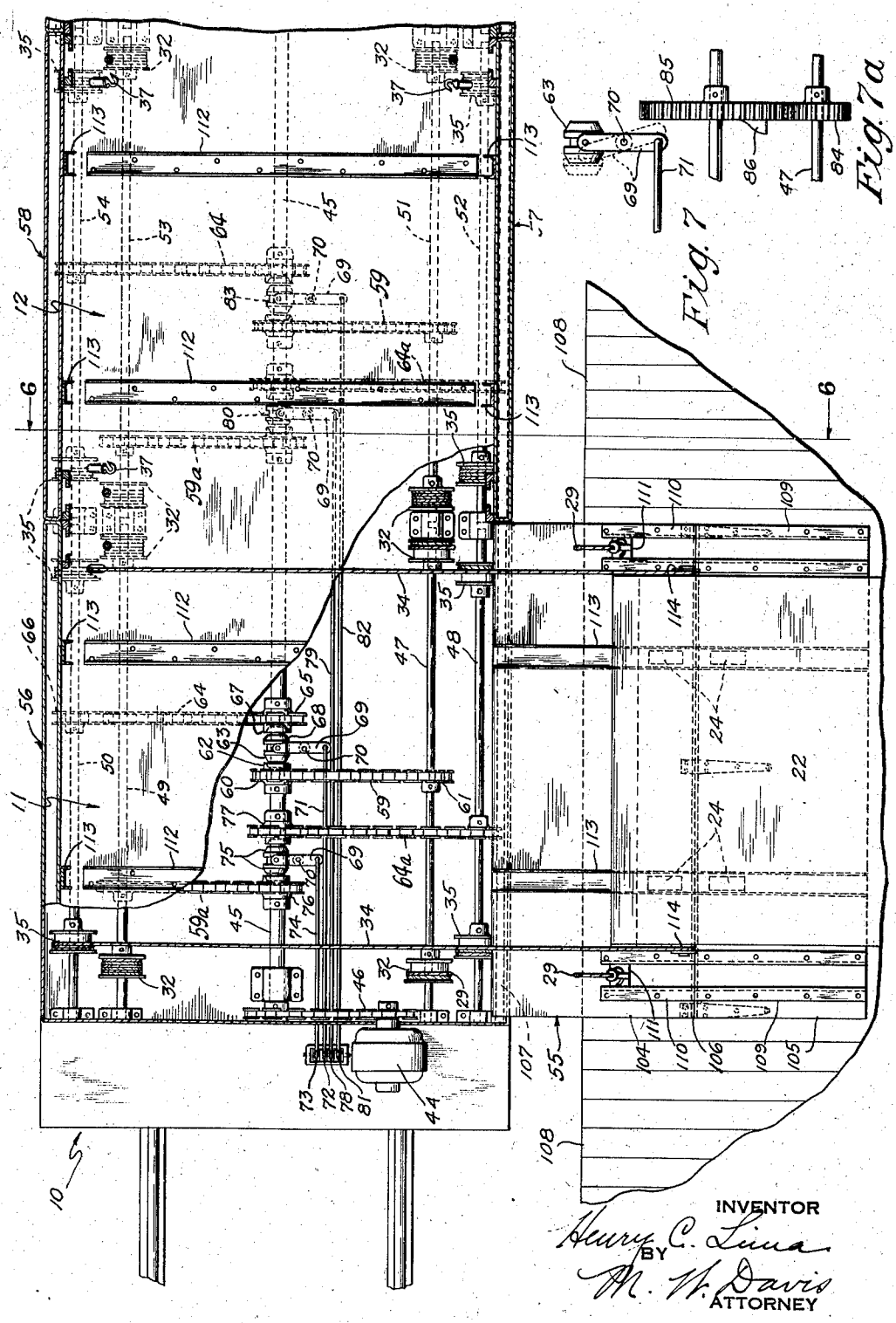


Fig. 7

Fig. 7a

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RAILWAY CAR

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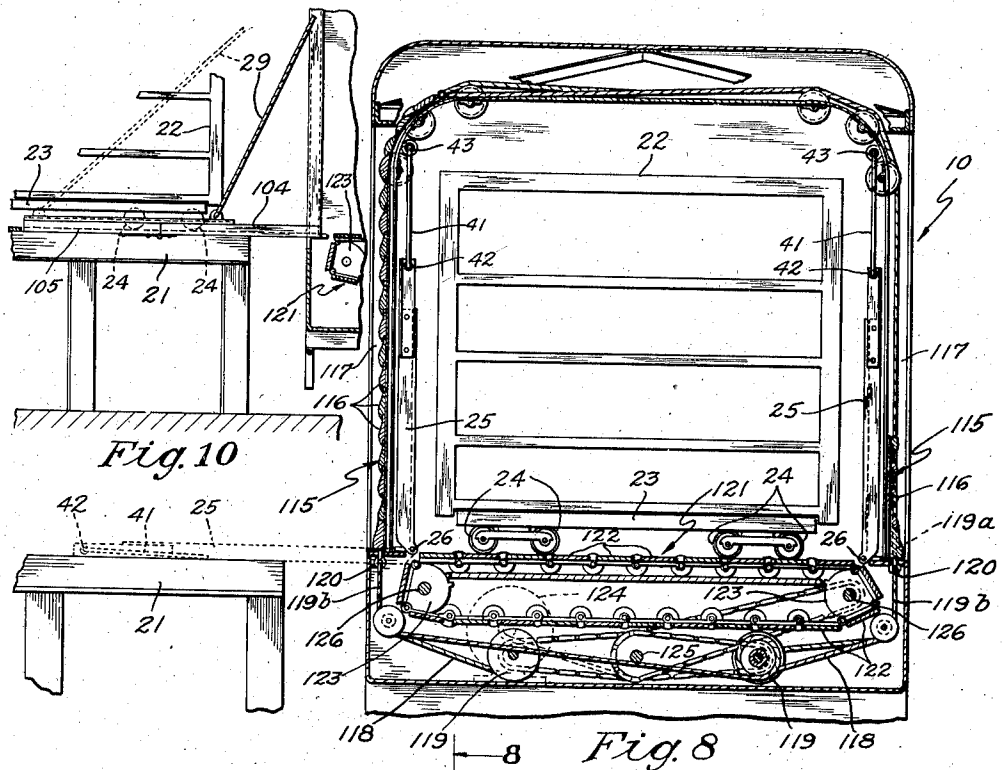


Fig. 10

Fig. 8

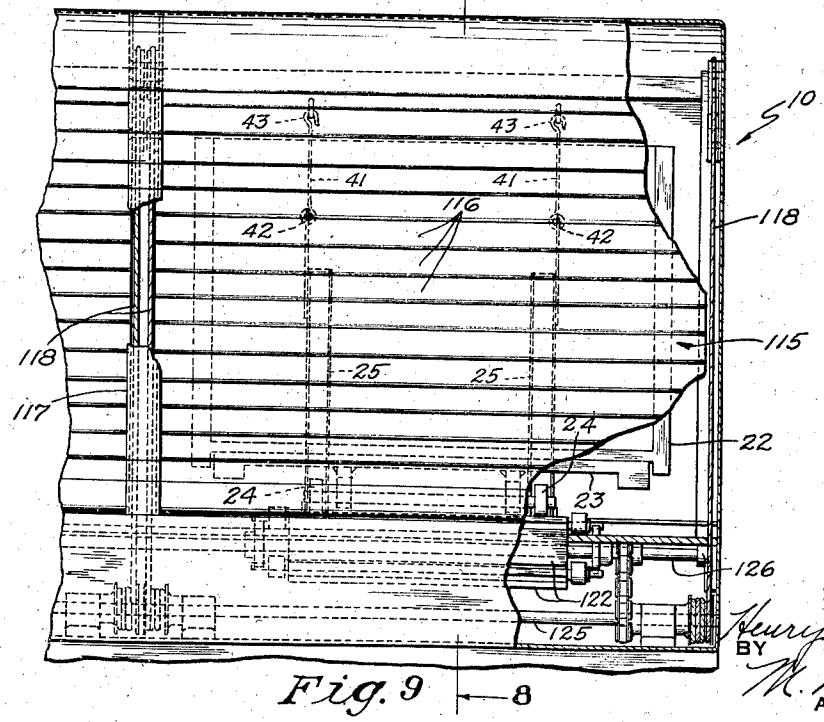


Fig. 9

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UNITED STATES PATENT OFFICE

2,146,436

RAILWAY CAR

Henry C. Lima, Flushing, N. Y., assignor of one-fourth to Max W. Davis, Bridgeport, Conn.

Application November 15, 1935, Serial No. 49,939

5 Claims. (Cl. 214—65)

This invention relates to freight cars for railroads and particularly to new and improved constructions for facilitating loading and unloading of the cars.

It is an object of the invention to provide a construction whereby any section or the entire side of a car may be opened for loading or unloading the car, or any section thereof, and in which there is mechanical means for opening any section of the side of the car, and mechanical means for moving the load from the car to a platform or moving a load from the platform to the car as a unit to facilitate loading and unloading and to greatly reduce the time required for these operations.

It is also an object to provide a construction in which the side of the car is divided into a plurality of doors so constructed and arranged that anyone or all of them can be lowered to bridge the space between the car and a platform and form a support whereby a carrier for a load can be moved from the car to the platform or from the platform to the car. It is also an object to provide individually controlled mechanical means for operating the doors and also mechanism for moving the containers between the car and platform and vice versa.

This and other objects will become apparent as the description proceeds, reference being had to the accompanying drawings showing various applications of the invention, it being understood various modifications and arrangements may be used without departing from the principles of the invention.

In these drawings

Fig. 1 is a side elevation of a freight car showing one form of my invention applied thereto, parts being broken away to more clearly show the construction;

Fig. 2 is a transverse section substantially on line 2—2 of Fig. 3;

Fig. 3 is a longitudinal vertical section of one end portion of the car taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a transverse section similar to Fig. 2 showing a modified construction.

Fig. 5 is a longitudinal section of one end portion of the car showing the construction of Fig. 4;

Fig. 6 is a transverse section showing a somewhat different arrangement and taken substantially on line 6—6 of Fig. 7;

Fig. 7 is a horizontal longitudinal section of one end portion of the car of Fig. 6 and showing in plan an arrangement of mechanism which may be used for operating the doors and loading and unloading the car in all the forms shown, portions being broken away to more clearly show the construction, the section being substantially on line 7—7 of Fig. 6;

Fig. 7a is a detail of an automatic throwout cam.

Fig. 8 is a transverse section showing a further modification taken substantially on line 8—8 of Fig. 7;

Fig. 9 is a side elevation thereof with parts broken away to more clearly show the construction;

Fig. 10 is a vertical section showing still another arrangement; and

Fig. 11 shows another modification.

In the drawings I have not attempted to show all the details of constructions, but the devices are shown more or less diagrammatically for simplicity and clearness. The same fundamental principles are employed in all the forms, but several modifications are shown by way of examples.

In all forms the car, such as a freight car of standard length and size has, in effect, its freight carrying space divided into sections and there are doors on opposite sides of the car for each section so each section if desired can be loaded or unloaded independently of each other section. There is mechanism for operating the doors of each section independently of the other sections and also mechanism whereby the goods or freight may be loaded into or unloaded from each section independently of the other sections. It is also preferred that the mechanisms be either controlled from a single control station at one end of the car or that one half be controlled from a control station at one end of the car and the other half from a similar station at the other end.

There is shown in Fig. 1 a freight car 10 of standard size whose freight space is in effect divided into four sections 11, 12, 13 and 14 although the spaces of the various sections are not ordinarily separated by partitions, but they may be if desired. The opposite sides of each section are composed of doors 15 forming the side walls of the car.

Various constructions and arrangements of these doors may be used. In the form of Figs. 1, 2 and 3 the doors 15 are in two sections, an upper section 16 and a lower section 17 pivoted together at 18 so that the upper section may be folded down onto the lower section. The lower section 17 is hinged to the car at its lower edge by any suitable means such as hinges 19. There may be an upright beam or stanchion 20 be-

tween each pair of doors to support the roof of the car and also assist in supporting the doors in the closed position, or this stanchion may be used only between the doors for the two central sections 12 and 13. These stanchions are removably mounted by any suitable means such as hooks or bolts so that one or more may be removed if it is desirable to load or unload any article which is longer than a single section. Or if preferred their ends may be slidably mounted in guides at the top and bottom edges of the door openings so that when the doors are lowered to open position the stanchions may be slid out of the way toward the end of the car. In this way two or more sections may be loaded or unloaded at one time, or the whole side of the car may be opened.

Thus as shown in Fig. 2 one or more doors on a side of the car may be lowered, the outer end of the lower section 17 resting on a loading or unloading platform 21 at the side of the car, with the upper section 16 of the door folded down on top of this lower section, the movement being as indicated in dotted lines. The door then bridges the space between the car and the platform and forms a support over which the freight goods may be moved from the platform to the car to load it or from the car to the platform to unload it.

The freight may be run by trucks directly over the doors, but it is preferred that the goods be loaded in containers or crates indicated at 22 ready to load into the car as a unit and placed on a carrier 23 on suitable wheels or rollers so that it can be run as a unit into and out of the car over the door. To facilitate this operation the car may be provided with rails 25 pivoted or hinged inside the car as indicated at 26 so that after the door has been let down these rails may be also let down on top of the door as shown and form tracks on which the wheels 24 of the carrier may run. They are shown as channel bars but may be other shapes if found desirable. The floor of the car is also provided with similar rails 27 in alignment with the rails 25 onto which the carrier is run, and on which the flanges retain the carrier when the car is in transit. As shown the carrier 23 is preferably set into or recessed into the bottom of the container or crate 22 as shown at 28 so the container or crate is effectively retained on the carrier in the loading and unloading operations as well as when the car is in motion.

Mechanism is provided for raising and lowering the doors and also for shifting the carrier 23 with its crate or container into and out of the car, and these same mechanisms can be employed for operating the doors or closures and the carriers for the various modifications of the car constructions and arrangements shown. In the arrangement illustrated there are two power operated cables for operating each door in each section. There are also in each section power operated cables for moving the carrier for the goods into the car from the loading platform at each side of the car and power operated cables for moving the carrier from the car to a platform at either side of the car. In the arrangement of Figs. 1, 2 and 3 cables 29 are connected to the upper section 16 of the door at each side thereof adjacent its upper edge at 30 by any suitable means such as links 30a and run over guide pulleys 31 carried by the framework of the roof of the car to drums 32 under the door of the car and driven by mechanism to raise and lower the doors as will presently be described. The other ends 29a of the cables after passing around the drums are also connected to the links 30a at 30b. The doors may be locked in their closed positions by any suitable locking means.

For shifting the carrier 23 and its container 22 out of the car to the platform 21 a pair of cables 34 is provided from winding drums 35 under the floor of the car. There are also provided guide pulleys 36 on the pivoted rails 25. When these rails are lowered the cables 34 running around the pulleys 36 may be connected to the rear portion of carrier 23 by a hook 37 on the ends of the cable being hooked into an eye 38 on the carrier. Then by operating the drums 35 (by mechanism presently to be described) to wind up the cables the carrier will be run out of the car from the dotted line position of Fig. 2 to the full line position on the platform and left there to be unloaded at the convenience of the consignee.

To move the carrier 23 and its container into the car is an equally simple operation. In this operation the hook 37 of the cable 34 is merely hooked into an eye 39 adjacent the outer end of the carrier without passing around pulley 36 and by operating the drums 35 the carrier with its container is drawn into the car to the dotted line position. Then the doors 15 may be closed by means of the drums 32 and the cables 29 and sealed. It will be noted the drums 32 for operating the doors at the left hand side of the car is located adjacent that side and the drums 32 for operating the doors on the right hand side of the car are located adjacent that side. However, the drums 35 for moving the carrier out of and into the left side of the car is located adjacent the right hand side and vice versa. A small guide pulley 40 may be used for cable 34 to keep it in position when rails 25 are in the upper position. These rails will be raised to this position when the door is raised or they may be raised and lowered by hand or by cables 29. They may be secured in their raised positions by any suitable means such for example as the hooks 41 pivoted to the rails at 42 and having a hook 43 at their upper ends to hook into a member of the roof framing.

A plan view of a mechanism for operating the doors and carriers for all the different modifications illustrated is shown in plan view in Fig. 7, although in that figure it is shown with the door arrangement of Fig. 6 instead of that of Figs. 2 and 3. At any suitable location on the car is one or more motors 44. There are preferably two motors mounted one adjacent each end of the car, one motor being used to operate the doors and carriers for the two sections of the car adjacent that end, although the motor at one end may be used for operating all the doors and carriers for the car. The motor 44 is shown as an electric motor but may be any other suitable type of motor such as air, water, etc., or if preferred the mechanisms may be operated by hand cranks through suitable gearing. Running longitudinally of the car preferably substantially centrally thereof under the floor of the car is a main drive shaft 45 driven from the motor 44 by any suitable reducing drive such for example as a chain drive 46, operating over suitable sprockets on the motor shaft and shaft 45. Any other suitable type of drive such as gearing may be used if preferred. On opposite sides of the shaft 45 and preferably adjacent the sides of the car are driven shafts 47 to 54, there being two of these driven shafts for

operating each door and the carrier through each door. Thus the shaft 47 is for operating the door 55 of Fig. 7 or 15 (Fig. 2) at the left side of section 11 of the car, and shaft 50 is used for operating the carrier 23 through this door. In the same way shaft 49 is used for operating the door 56 on the opposite side of the car for this section in Fig. 7 or door 15 on the right hand side Fig. 2, and shaft 48 is used for operating the carrier through this door. The same arrangement is used for the doors and carriers for the other sections. Thus as shown in Fig. 7 shafts 51 and 54 are used respectively for operating the door 57 and the carrier through this door of the second section 12, while shafts 53 and 52 are used for operating door 58 on the opposite side and the carrier through this door.

The various shafts may be operated to open and close the various doors and move the carriers into and out of the various sections of the car by the arrangement of drives shown in Fig. 7, although I am not limited to this arrangement as it may be modified or changed as is found desirable. The arrangement shown is simple and effective and easy to control, and by it the mechanism for operating a door of a section and the mechanism for shifting of a carrier through that door may be controlled with a single lever.

Thus the shaft 47 for operating the door 55 at the lower or left hand side of the first section 11 has a pair of drums 32 for the cables 29 for operating the door, and the shaft 50 has drums 35 for operating the cables 34 for shifting the carrier 23 into and out of the car. The shaft 47 is driven by a chain 59 running over sprockets 60 and 61 on shafts 45 and 47 respectively, the sprocket 61 being fastened on the shaft 47 while sprocket 60 is loose on shaft 45. Sprocket 60 has a female cone 62 adapted to be engaged by a male friction cone 63 splined to shaft 45 so as to turn with it but slidable on the shaft to and from engagement with cone 62.

Shaft 50 is driven by a similar chain 64 running over sprockets 65 and 66 on shafts 45 and 50 respectively, sprocket 65 being loose on shaft 45 while sprocket 66 is secured to shaft 50. Sprocket 65 also has a female clutch cone 67 to be engaged by the cone 68 forming the other end of cone 63. Cones 63 and 68 may be shifted to and from the cones 62 and 67 by a forked lever 69 pivoted at 70 and connected by a rod 71 to a control lever 72 at the end of the car. It will be seen when the cones 63—68 are in the intermediate position neither sprocket will be driven, but if lever 72 is thrown to the right cone 63 is engaged with cone 62 to drive sprocket 60 and shaft 47 to operate door 55. If lever 72 is thrown to the left from the intermediate position cone 68 will engage cone 67 to drive sprocket 65 and shaft 50 to shift the carrier into and out of the car as desired. The motor 44 will be controlled by a reversing switch controlled from the station at the end of the car where the lever 72 is located so the shafts will be rotated in the proper direction to open or close the door, or to move the carrier into or out of the car.

All of the other doors and carriers may be controlled in the same way. Thus lever 73 through rod 74 will control the double ended cone 75 cooperating with clutch sprockets 76 and 77 to operate shafts 49 and 48 respectively to thus operate door 56 and the carrier through this door. In the same way lever 78 through rod 79 will control clutch 80 to control operation of shafts 53 and 52, while lever 81 through rod 82 will control clutch 83 to control operation of shafts 51 and 54.

The doors and carriers in the two sections 13 and 14 at the other end of the car may be controlled by a similar mechanism with a motor, reversing switch, and the four levers corresponding to levers 73, 72, 78 and 81 located at that end of the car for controlling similar clutches for driving the respective door and carrier operating shafts. Or if preferred the main drive shaft 45 may be extended the full length of the car and all the door and carrier shafts driven from it with all the control levers located at one end of the car.

As indicated above this arrangement of the drive shafts and their controls of Fig. 7 may be used with all the various forms and arrangements of doors shown in the various figures of the drawings. It will be seen that with this arrangement a single lever controls the operation of a door and shifting of a carrier through this door. In operation the operator may release the driving clutch for the door or the carrier at the end of the door or carrier movement, or automatic means may be provided either to open the control switch for the motor to stop it, or to shift the clutch to release it at the end of the desired movement, such for example as a cam geared to each drum shaft by reducing gearing, as indicated in Fig. 7*a*. In this figure 84 is a small gear on the shaft 47 meshing with a larger gear 85 carrying a cam 86 which after a given movement engages the lever 69 in the dotted position to shift it to the intermediate position to release clutch 63.

In the arrangement shown in Figs. 4 and 5, the door instead of having its two sections hinged together as in Figs. 2 and 3, comprises a lower section 87 pivoted or hinged to the car frame at 88 and an upper section 89 slidable from the top into the lower section 87 which is hollow and open at its upper edge for that purpose. Above the lower section are U-shaped guides 90 at the sides of the door opening for the edges of the upper section 89, and mounted on the edges of this section are rolls 91 running on the bottoms of these guides to facilitate movement of the upper section. These rolls also run on the end walls 92 of the lower section 87 when the upper section is lowered down into it.

Mounted on the inner wall of the lower section are rails in alignment with the rails 94 on the floor of the car for the wheels of the carrier 23 to run on. These correspond to the rails 25 and 27 respectively of the arrangement of Figs. 2 and 3. However, in the arrangement of Figs. 4 and 5 rails 93 may be mounted on the lower section 87 of the door so as to move with it, and thus when the door section is swung outwardly and downwardly about its pivot 88 to the position at the left of Fig. 4 to bridge the distance between the car and the loading platform 95 the rails 93 automatically move to position for the carrier wheels to run on. These rails 93 and 94 as in the first arrangement are preferably substantially U-shaped or channel members to guide the carrier wheels but may be of other forms.

Also, mounted on the lower door section are pulleys 97 over which cables 98 may run from drums 32*a* on the door operating shaft 49 for the door on the opposite side of the car. These cables may carry hooks 99 to attach to the upper sections 89 of the door to raise it from and lower it into the lower section 87. After it is lowered into

the lower section then this lower section may in turn be lowered about its pivot 88 by cables 100 running from drums 32 on the door operating shaft 47. When the door on the other or right hand side of the car is to be operated the upper door section is raised and lowered by cables 100 while after the upper section is lowered the two sections may be swung outwardly and controlled by cables 100a at that side of the car. If desired the other end of cable 100a after passing around the drum may also be connected to the door as shown at 100b but is not necessarily so. After the carrier is moved out or in the doors are raised about the pivot 88, and then the upper section 89 is raised from the lower section 87.

Also, mounted on the lower door section, as for example by extension brackets 101, are pulleys 102 over which run cables 103 which may be hooked into carrier 23 to shift it into and out of the car after the doors are lowered as shown at the left of Fig. 4, as described in connection with Figs. 2 and 3. The cables 103 are driven from the drums 35 on shaft 49.

In the form shown in Figs. 6 and 7 the doors are made in two sections 104 and 105 hinged together at 106, while the lower section is hinged at its lower end to the car at 107 so that both may be swung down and outwardly to bridge the space between the car and the loading and unloading platform 108 as shown in Fig. 6. The door sections may be lowered without folding the upper about the hinge 106 as shown in Fig. 6 or if desired this upper section may first be folded downwardly about the hinges 106 against the outer side of the lower section 104 and then both sections lowered in this condition to the platform and form a bridge for moving the carrier 23 with its freight container 22 to and from the car. For lowering the doors the cables 29 may be used and operated by the power mechanism under the floor of the car as above described. The attachment of this cable may be shifted between the two sections of the door as desired. For this purpose aligned guides 109 and 110 may be mounted on the inner sides of the door section in which a shoe or block 111 may slide and to which cables 34 are attached. When the doors are in raised or closed position this shoe is in the upper part of guide 109 but may be shifted to guides 110 on the lower door section as shown in full lines before folding the upper section down onto the lower. Then the lowering of the doors may be controlled by the cable as it is thus secured to the lower section. If the door is to be lowered without folding then the shoe may be left in the upper guides 109 so as to be attached to the upper door section as shown in dotted lines. It is also moved to this position to raise the door to closed position.

In this construction there are rails 112 preferably of channel sections on the floor of the car for the wheels of the truck or carrier 23 and on the inner walls of the door are mounted similar rails 113 in alignment with rails 112 for the carrier to run on over the door between the car and the platform. The carrier may be drawn into and out of the car by cables 34 operated from the drums 35 of the power mechanism as previously described. The door may carry pulleys 114 over which these cables may run in shifting the carrier from the car to the platform.

In Figs. 8 and 9 is shown still another arrangement. In this form the doors 115 are made of a series of slats 116 hinged together and the door may be slid vertically in guideways 117 at their opposite edges into the top of the car. It may be shifted up and down by cable 118 operated over drums 119 the same as cable 29, the opposite ends of the cable 119a and 119b being connected to the lower portion of the door at 120. By operating the drums in opposite directions the door may be raised and lowered. As seen in Fig. 8 there is one of these doors on each side of the car for each section of the car as in the forms previously described. This type of door may be used in place of the forms shown in Figs. 1 to 7 with the mechanism for moving the carrier for the freight container in and out of the car to and from the platform, except that with this door a separate bridge member is required or pivoted rails like the rails 25 of Figs. 2 and 3 may be used for bridging the space between the car and the platform. Or as shown in Figs. 8 and 9 each section of the car may have an endless movable floor 121 composed of sections 122 pivoted together and running over sprockets 123 at opposite sides of the car. This floor may be operated in opposite directions by mechanism similar to that used in the other forms for moving the carrier. That is a motor 124 driving shaft 125 through suitable gearing or chain drive which in turn drives one of the shafts 126 carrying the sprockets. This drive and operation of doors 115 may be controlled by the same system of clutches and control levers at an operator's station at the end of the car the same as shown in Fig. 7. If desired this endless movable floor may be used with the forms of doors shown in Figs. 1 to 7. This is indicated in Fig. 10 where one end of the movable floor is shown at 121 and a door in two hinged sections 104 and 105 like that in Fig. 6 is shown and operated in the same manner.

Although the wheels or rollers on which the carrier 23 for the goods is shifted may be on the carrier itself as illustrated in Figs. 1 to 10 they are not necessarily so. Thus as shown in Fig. 11 instead of having the wheels or rollers 24 on the carrier, rollers 127 may be mounted in suitable bearings 128 on the door itself in any of the forms shown in Figs. 1 to 10 and also on the car floor. The carrier 23 can then be shifted into and out of the car over these rollers by the same mechanism as is used to shift the carriers with wheels or rollers on the carrier as shown in the other figures. The doors may also be raised and lowered by the same mechanisms. The tracks for the carrier wheels may be omitted or the doors and the car floor may be provided with both the tracks and the rollers so as to accommodate carriers with wheels and carriers without wheels. In this case the rollers could be located between the tracks.

In Fig. 11 I have shown the rollers as applied to the door and its operating construction corresponding to that of Fig. 6, which has the tracks 112 and 113 but this is merely illustrative as the rollers 127 can be used with any of the arrangements of Figs. 1 to 10.

It will be clear from the above the doors for any section of the car and on either side of the car can be operated by power mechanism controlled from a control station at any suitable location preferably at one end of the car. Also, that when a door is open the carrier with its freight container can be moved into and out of the car to and from the loading platform by similar power mechanism controlled from the same station. Or if desired all the doors on one side of the car can be opened at the same time and freight moved into or out of these sections at

the same time. This greatly facilitates loading and unloading of a car as it can be accomplished in a short time, and as the freight may be in containers on a carrier which may be moved into and out of the car as a unit these units can be loaded with freight on the platform before the freight car arrives and unloaded on the platform after the car leaves, avoiding delays and also demurrage charges on the cars.

The various doors may be locked and secured in closed position by any suitable means. A conventional locking bar for each door is shown at 127 in Fig. 1 pivoted to the intermediate post at 128 and swingable about said pivot to and from the hooked clasp 129 in which it may be sealed and locked in the conventional manner.

Having thus set forth the nature of my said invention, what I claim is:

1. A railway freight car having a body including a side wall comprising a plurality of doors providing access to various sections of the car, means in each section for receiving and retaining a carrier for a container of goods, supporting means on the car at each section movable to and from a position projecting from the car to bridge the space between the car and a platform at the side of the car independently of mechanism on the platform, said supporting means being adapted to carry the carrier in either direction between the car and the platform, and mechanism located entirely on the car and connected to the carrier to completely move the carrier over said supporting means from the car to the platform and from the platform to the car.

2. A railroad freight car having a body including a side wall comprising a plurality of doors giving access to a plurality of sections of the car, means in each section for receiving a wheeled carrier for a container of goods, guide and supporting means for the carrier mounted on the car at each section and movable to and from a position projecting laterally from the side of the car to a platform at the side of the car, and power mechanism mounted wholly on the car connected to the carrier to run it over said supporting means from the car to the platform and to run the carrier over said supporting means from the platform to its section in the car.

3. A railroad freight car comprising a body including a side wall having a plurality of door openings giving access to a plurality of sections of the car, supporting means mounted on the car in alignment with each opening and movable to and from a position projecting laterally from the car to bridge the space between the car and a loading platform at the side thereof, said supporting means being adapted to carry a carrier for freight from the car to the platform and from the platform to the car, means mounted on the car at each section for completely shifting the carrier over the supporting means to the platform comprising a drum, a cable connected to the drum to be wound thereon, a guide for the cable mounted on said supporting means adjacent the outer end thereof so that the cable may lead from the drum over the guide to the carrier independently of the platform, and means for operating the drum to draw the cable around the guide to shift the carrier from the car over the supporting means to the platform.

4. A railroad freight car comprising a body including a side wall having a plurality of door openings giving access to a plurality of sections of the car, supporting means mounted on the car located in alignment with each opening and movable to and from a position bridging the space between the car and a loading platform at one side thereof and adapted to support individual carriers for freight to carry them from the car to the platform and from the platform to the car, carriers movable over said bridging means and through said openings to and from the car, and power means mounted wholly on the car and including means projecting laterally from the car to completely move the carriers over said supporting means to the car from the platform and from the car to the platform.

5. A railroad freight car comprising a body including a side wall having a plurality of door openings giving access to a plurality of sections of the car, tracks mounted on the car and movable to a position in alignment with each opening projecting laterally from the car to bridge the space between the car and a loading platform at one side thereof, said tracks being adapted to support individual carriers for freight and carry them between the platform and the car, wheeled carriers movable over said tracks to and from the car through said openings, containers for freight removably mounted on the carriers, and power means mounted wholly on the car and extending laterally therefrom to completely move the carriers to and from the car from and to the platform.

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