Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

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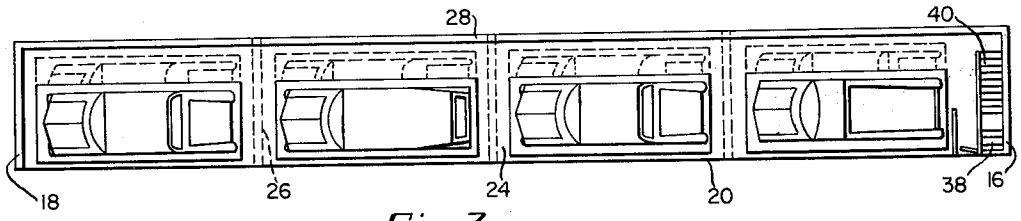


Fig. 3

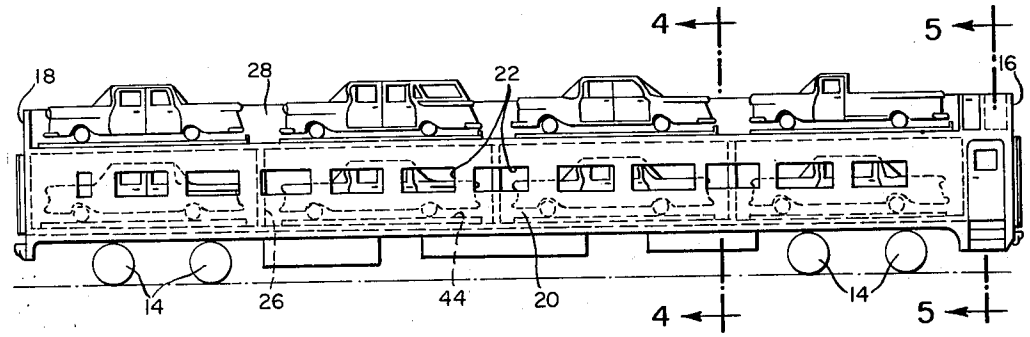


Fig. 2

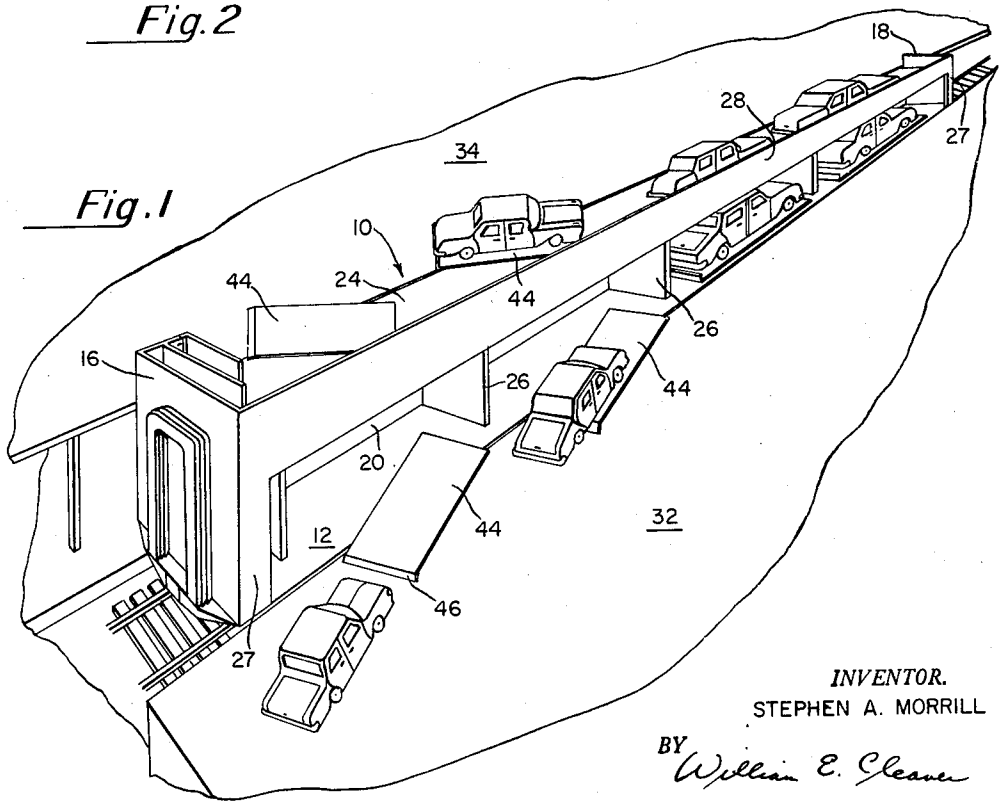


Fig. 1

INVENTOR.
STEPHEN A. MORRILL

BY William E. Cleaver

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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 2

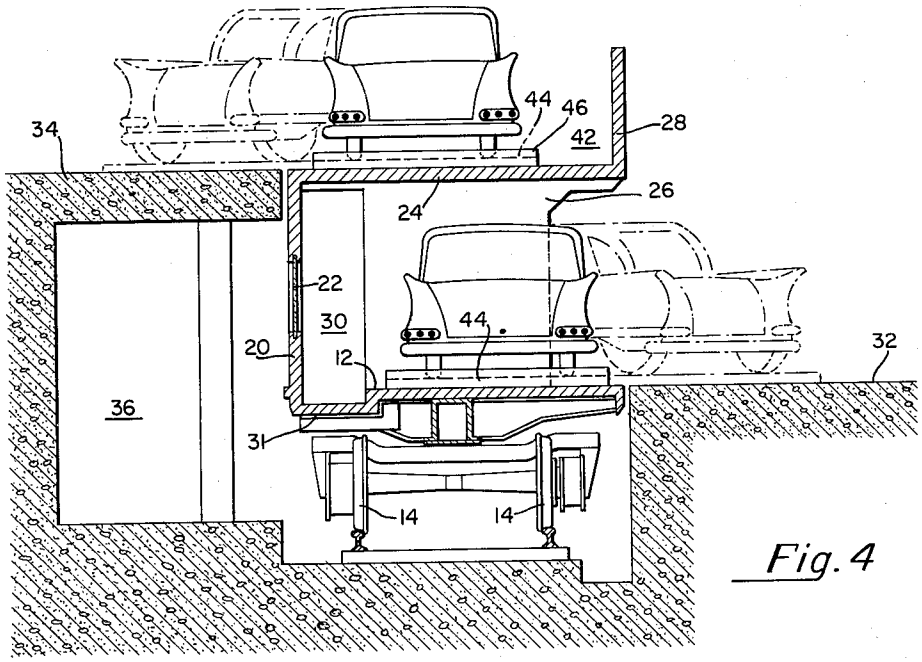


Fig. 4

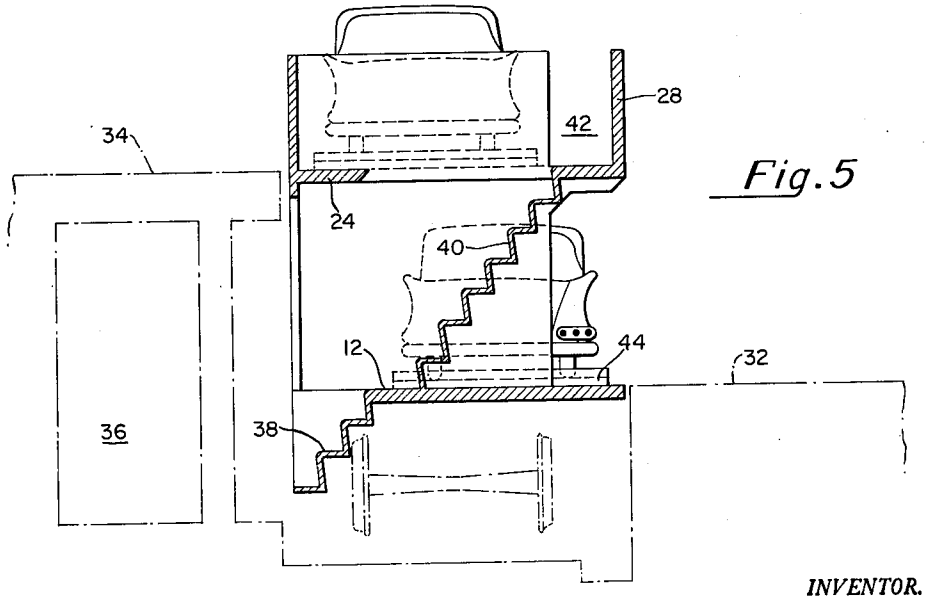


Fig. 5

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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 3

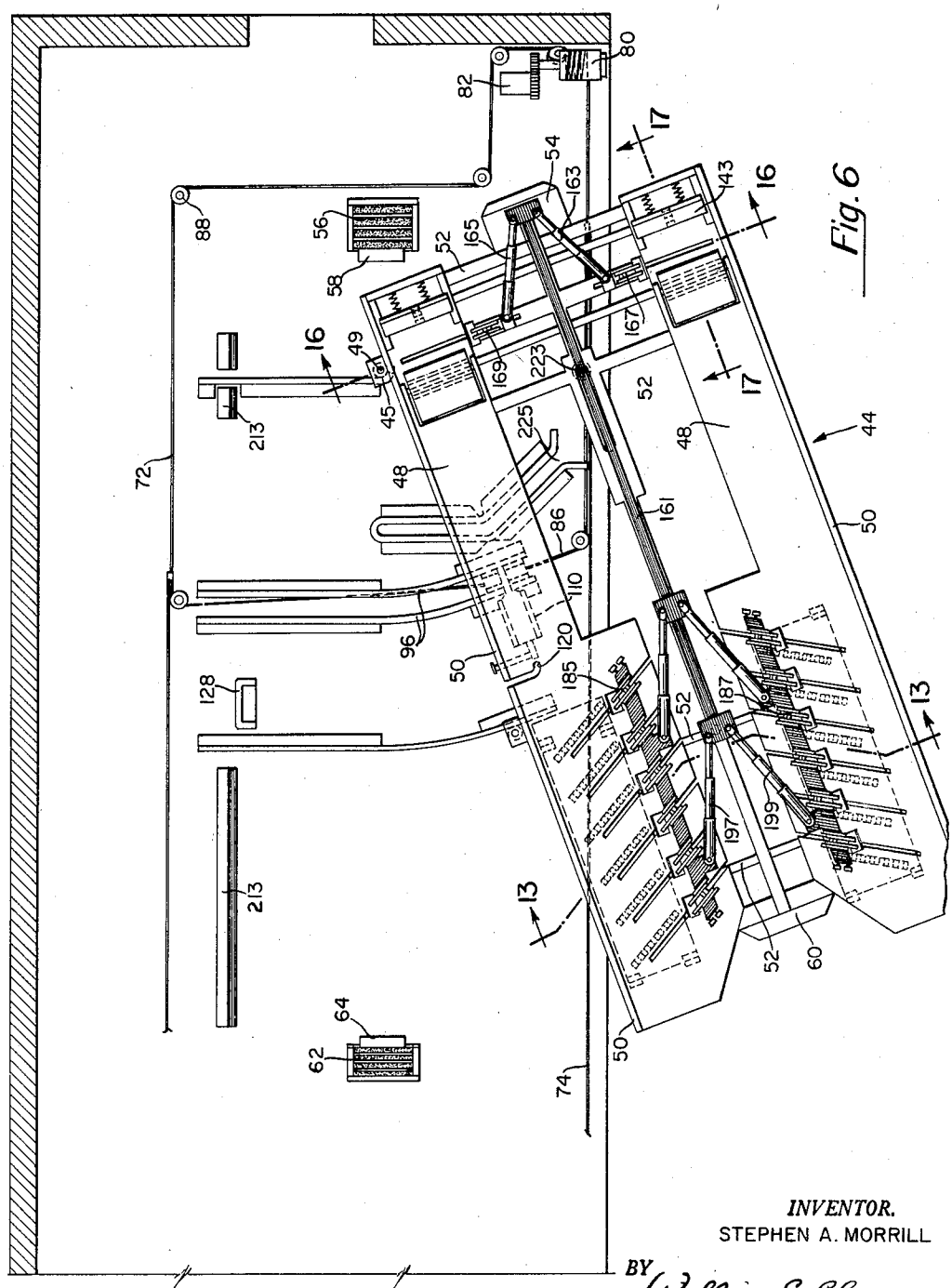


Fig. 6

INVENTOR.
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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 4

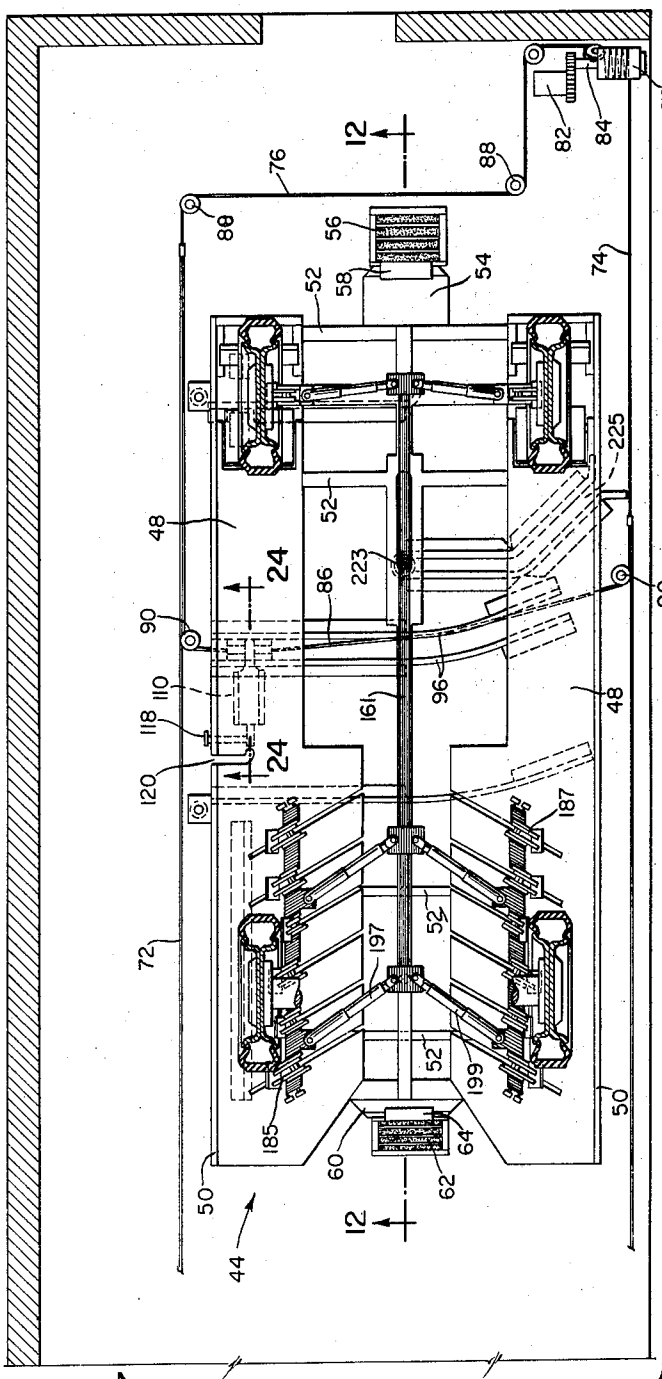


Fig. 7

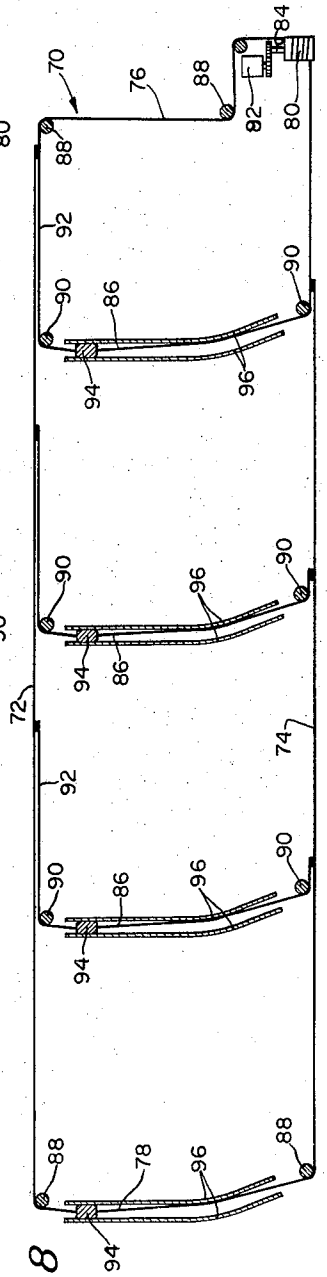


Fig. 8

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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 5

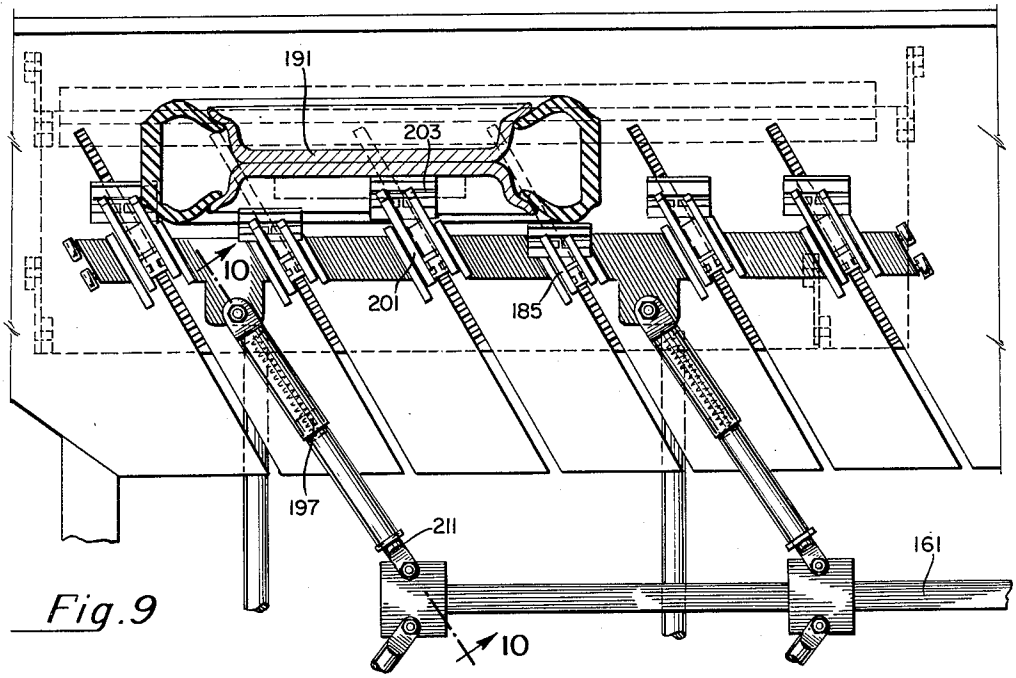
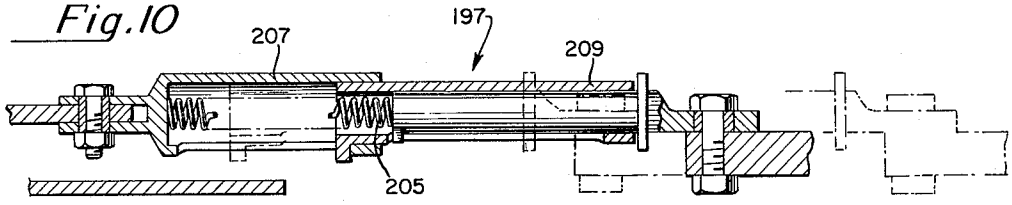


Fig. 9

Fig. 10



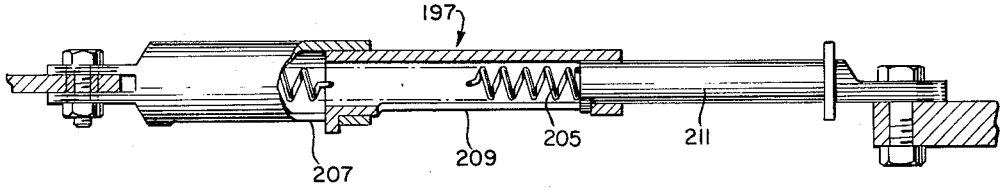


Fig. 11

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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 6

Fig. 12

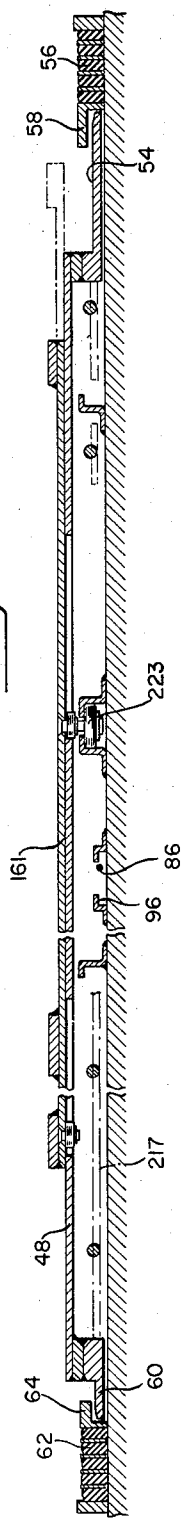


Fig. 14

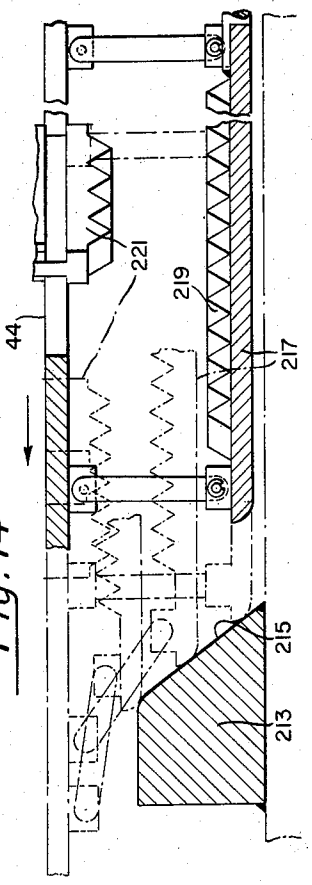


Fig. 15

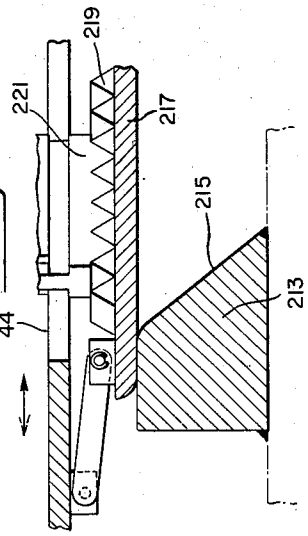
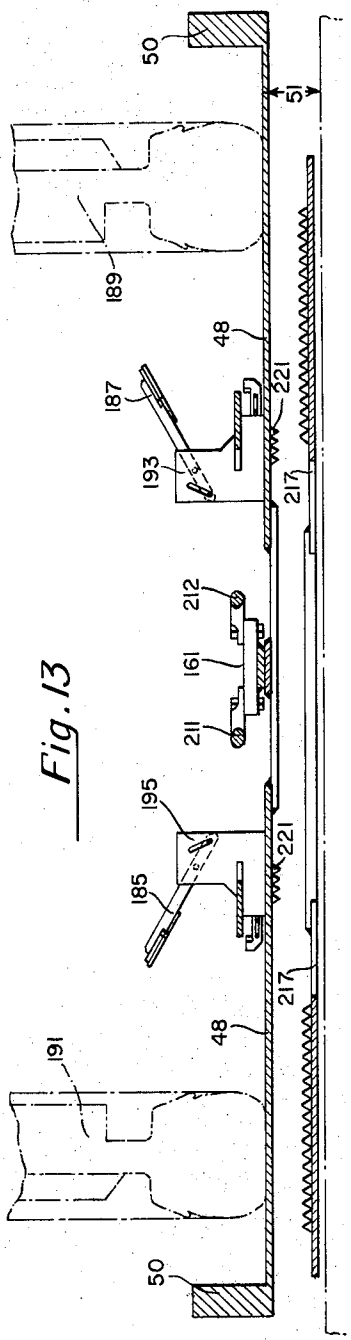


Fig. 13



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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 7

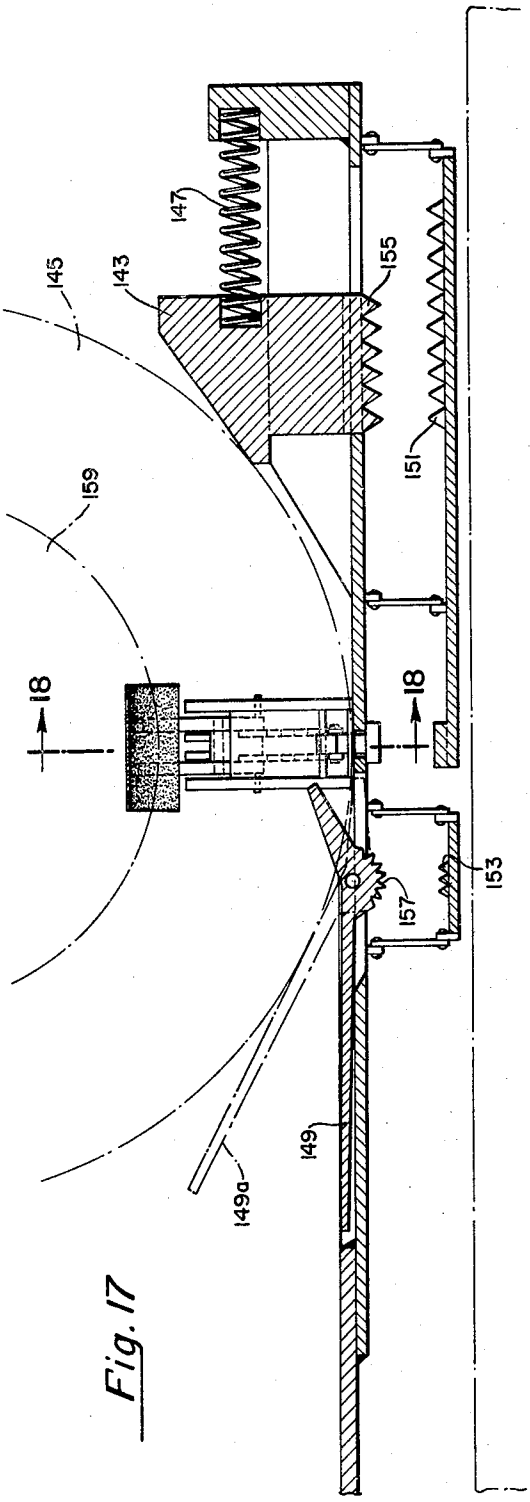


Fig. 17

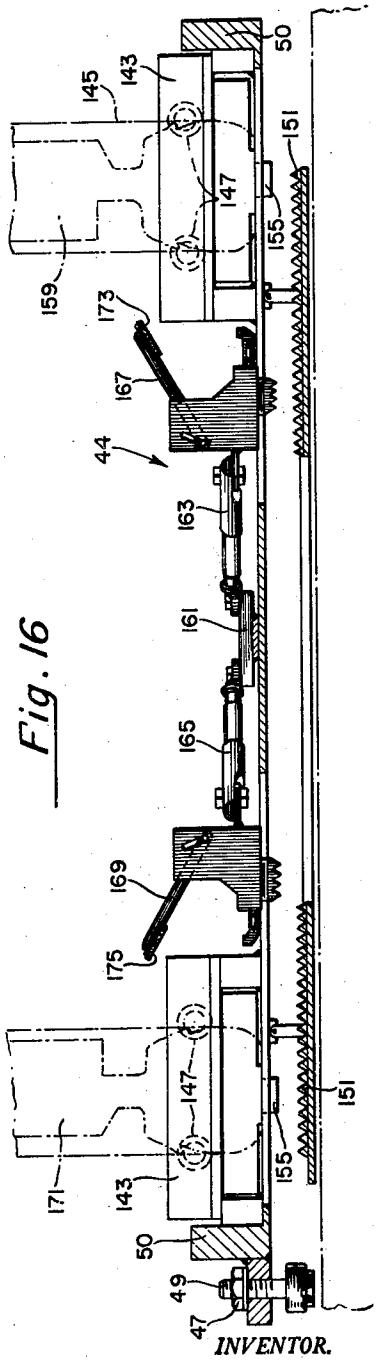


Fig. 16

INVENTOR.
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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 8

Fig. 18

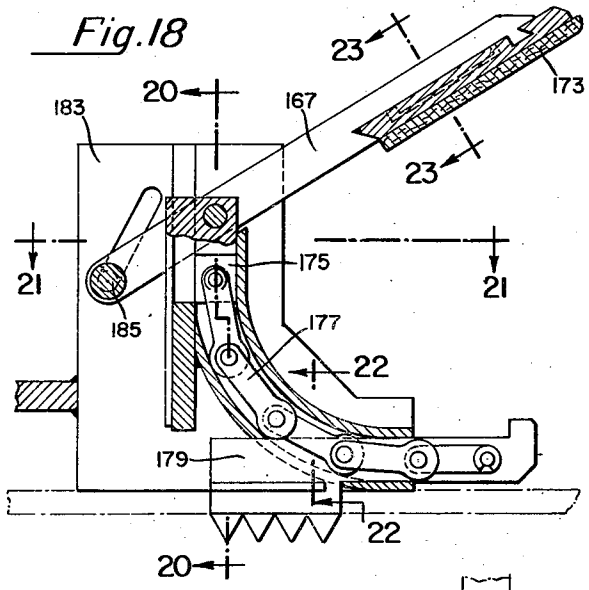


Fig. 20

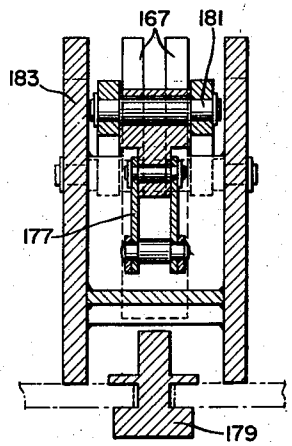
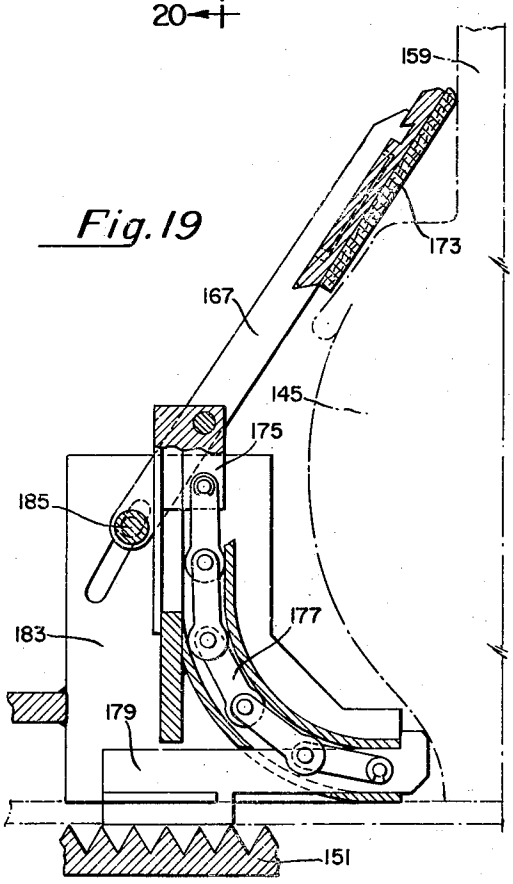


Fig. 19



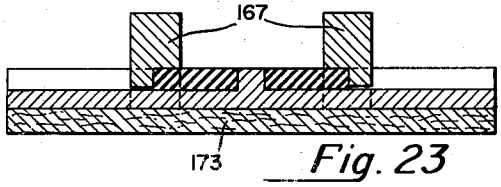


Fig. 23

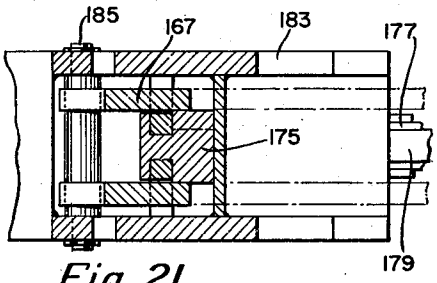


Fig. 21

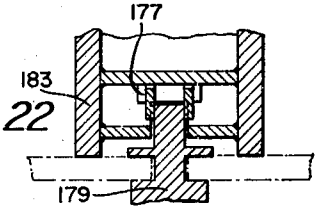


Fig. 22

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Sept. 22, 1964 S. A. MORRILL 3,149,583

RAILWAY CAR

Filed May 11, 1961 9 Sheets-Sheet 9

Fig. 24

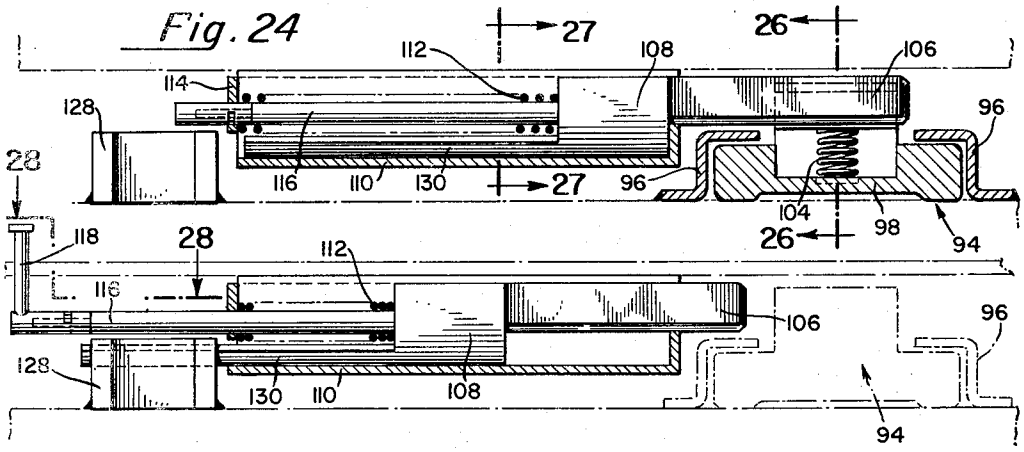


Fig. 25

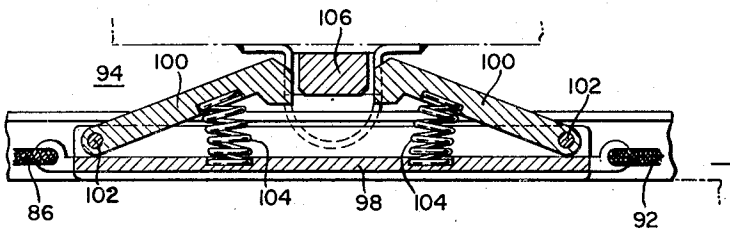


Fig. 26

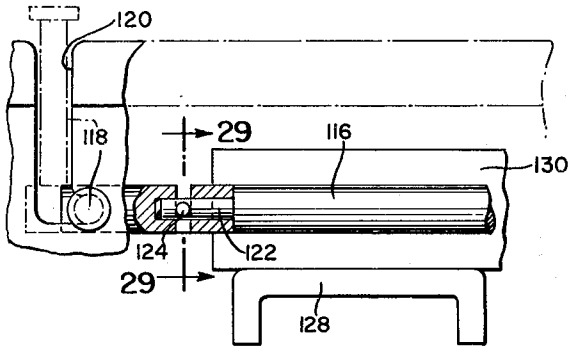


Fig. 28

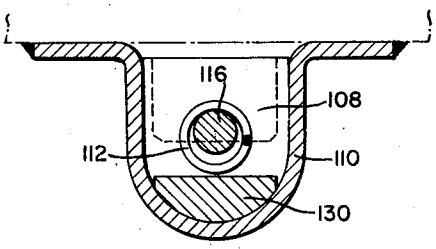


Fig. 27

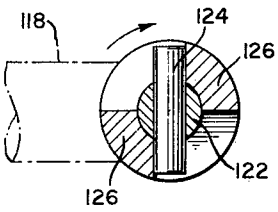


Fig. 30

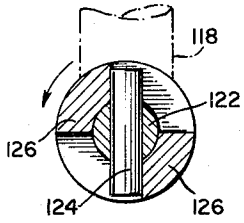


Fig. 29

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United States Patent Office 3,149,583 Patented Sept. 22, 1964

3,149,583

RAILWAY CAR

Stephen A. Morrill, 21 Main Ave., Berwyn, Pa.

Filed May 11, 1961, Ser. No. 109,320
6 Claims. (Cl. 105—368)

This invention relates to the handling and transporting of motor vehicles and more particularly to the use of railway cars for carrying automobiles and to the facilities for loading, storing and unloading automobiles for transportation by such means.

A general object of this invention is to provide an improved railway automobile carrier capable of side loading and unloading automobiles either singly or as a group from appropriate alternate different level side loading platforms without delay in either the loading or unloading process.

Another object of the invention is to have the automobile passenger-owner load and unload his own automobile onto and off of the novel arrangement himself using only the driving controls of his own automobile without the necessity of directive assistance from outside personnel.

Another object is to provide a railway car from which and to which automobiles can be loaded and unloaded, singly or in groups, in short periods using the services of a minimum of carrier-employed supervising employees.

Another object is to provide improved means for tying down and securing automobiles for travel.

Another object of the invention is to provide a design substantial enough so that passenger-owners can be expected to move fore and aft through the automobile carriers to and from their automobiles and the passenger-carrying cars while the train is in motion. Thus, by enabling the passenger-owners to be at or near their automobiles when the train stops and, by allowing passenger-owners to load their automobiles right up to train departure, the time necessary for loading and unloading automobiles at terminals and way points is greatly lessened.

The design, therefore, of this railway automobile carrier is primarily functional, designed not so much for what is most efficient from a train weight per unit carried standpoint (since new railroad locomotive power now available to move passenger trains makes this of doubtful value) but on what is necessary to adapt present day railroad equipment and operating practices to the requirements for successfully carrying passengers' automobiles; what is to be substantially an automobile "ferry" service.

It is to be understood that within the comprehension of this invention special loading and unloading platforms are provided adjacent to suitable railroad tracks for the purpose of loading and unloading automobiles.

These and other objects of my invention will become apparent from the following description of a preferred embodiment thereof, reference being had to the accompanying drawings.

FIG. 1 is a perspective view of a passenger railway car modified in accordance with this invention and showing the loading and storing of motor vehicles in separate stalls from a specially designed railway platform;

FIG. 2 is a longitudinal side elevation of a railway car of FIG. 1 showing the same in fully loaded condition;

FIG. 3 is a top plan view of the loaded railway car of FIG. 2;

FIG. 4 is a vertical cross-sectional view through a loaded railway car taken along line 4—4 of FIG. 2 and also showing in section the adjacent loading and unloading decks of an automobile railway station;

FIG. 5 is a vertical cross-sectional view through one end of a loaded railway car taken along line 5—5 of

FIG. 2 and showing in dotted outline the relation of the loading and unloading decks of an automobile railway station;

FIG. 6 is a horizontal sectional view through an endmost stall of the railway car showing in top plan the automobile loading platform of this invention projecting angularly therefrom in loading and unloading position;

FIG. 7 is a view similar to FIG. 6 but showing the automobile supporting platform in fully stored position within its stall of the railway car;

FIG. 8 is a schematic view of a railway car constructed in accordance with this invention and showing the cable control system for moving the automobile supporting platforms into and out of their respective stalls of the railway car;

FIG. 9 is an enlarged fragmentary view of the automobile supporting platform showing one of the clamps thereon engaging the rear wheel of an automobile;

FIG. 10 is an enlarged longitudinal sectional view of one of the operating arms of the rear wheel clamps taken along line 10—10 of FIG. 9 and showing the same in collapsed position when the clamp is in retracted inoperative condition;

FIG. 11 is a view similar to FIG. 10 but showing the operating arm thereof in extended position when the clamp is in projected wheel engaging position;

FIG. 12 is a sectional view along the longitudinal median line of the automobile supporting platform as indicated by line 12—12 of FIG. 7 and showing adjacent flooring of the railway car in section;

FIG. 13 is a cross-sectional view of the automobile supporting platform taken along line 13—13 of FIG. 6 and showing a locking mechanism for the rear wheel hold-down devices in retracted inoperative position;

FIG. 14 is an enlarged fragmentary sectional view of the locking mechanism in association with one of the rear wheel clamps and showing by full and dotted lines the movement of the locking mechanism from retracted inoperative position to raised operative position;

FIG. 15 is a view similar to FIG. 14 but showing the locking mechanism in full engagement with cooperating parts of the clamp to lock the same in wheel engaging position;

FIG. 16 is a cross-sectional view through the forward portion of the automobile supporting platform taken along line 16—16 of FIG. 6 and showing the front wheel clamp in retracted inoperative position;

FIG. 17 is a sectional view taken along line 17—17 of FIG. 6 and showing one of the front wheel holding mechanisms of the automobile supporting platform;

FIG. 18 is an enlarged vertical sectional view taken along line 18—18 of FIG. 17 and showing the normal retracted position of one of the front wheel clamps;

FIG. 19 is a view similar to FIG. 18 but showing the front clamps thereof in a wheel engaging position at maximum extended height;

FIG. 20 is a vertical sectional view of a front wheel clamp taken along line 20—20 of FIG. 18;

FIG. 21 is a horizontal cross-sectional view taken along line 21—21 of FIG. 18;

FIG. 22 is a vertical cross-sectional view taken along line 22—22 of FIG. 18;

FIG. 23 is an enlarged sectional view of the head of a front wheel clamp taken along line 23—23 of FIG. 18;

FIG. 24 is an enlarged longitudinal sectional view taken along line 24—24 of FIG. 7 and showing the operative position of the mechanism for connecting the automobile carrying platform to the cable control system;

FIG. 25 is a view similar to FIG. 24 but showing the cable connecting mechanism for the platform in discon-

nected position but serving in this position to lock the platform within its stall in the railway car;

FIG. 26 is a vertical cross-sectional view taken along line 26—26 of FIG. 24 and showing details of the construction of the platform and cable connecting mechanism;

FIG. 27 is an enlarged cross-sectional view taken along line 27—27 of FIG. 24;

FIG. 28 is an enlarged sectional view taken along line 28—28 of FIG. 25 and showing the platform locking position of the cable connecting mechanism and a manual control handle therefor;

FIG. 29 is an enlarged detail sectional view taken along line 29—29 of FIG. 28 and showing the locking position of the handle control for the cable connecting mechanism; and

FIG. 30 is a view similar to FIG. 29 but showing the operating position of the handle control for the cable connecting mechanism.

This invention contemplates utilizing old, discarded railroad passenger cars and modifying them to provide stowage for the transportation of a plurality of automobiles. This is not to minimize the possibility that new railway cars constructed along similar lines may be used, but the description of this invention will proceed from the premise that old discarded railroad passenger cars are being converted to be used for carrying automobiles.

In constructing an automobile carrier from an old discarded railroad passenger car all passenger amenities are removed, such as seats, washrooms, air conditioning, water facilities, etc., and the car is stripped down leaving the center sill, the end posts and side posts, including vestibules, buffers, doors, etc., and one side which may be maintained complete up to a height above rail of around 10', with windows and side plating. The passageway into the car from each side at track level and from each side into the car at lower platform level, will be maintained according to the present configuration of the car (i.e., without modification).

The modification of the basic shell of an old, discarded railroad passenger car into an automobile carrier is shown in FIGS. 1 to 5. Referring to these figures, the railway car 10 comprises the center sill or floor 12 immediately above the track engaging trucks 14, end posts and related frame members 16 and 18 including the vestibules, buffers and doors, and one side wall 20 containing the passenger windows 22.

An upper floor 24 of the car, consisting of a standard framework of structural pieces, is placed at a height governed by the prevailing maximum height of present and projected future automobiles and fastened onto the retained structures of the car and the retained upright end portions of the car. The side opposite the retained side wall 20 of the car on the lower level is open for the whole length of the car except that at the end of each automobile stall a vertical partition structure 26 is placed from the sill and crossbearer to the upper floor 24, and in from the side enough to allow unobstructed movement of loading platforms as will be later described. Above this open lower side of the railway car, still utilizing the retained end portions of the car properly modified, a truss 27 is placed to provide longitudinal support for the open side of the railway car and to maintain a general framework within which the railway car can be supported. This truss 27 includes the side wall 28 of a relatively short height as shown.

Along the railway car side whose general configuration is retained, a passenger walkway 30 (FIG. 4) is provided by reconstructing the cross bearers 31 to provide a U at the outer edge longitudinally along the length of the car with the exception that those portions at the bolsters over the trucks are maintained at present height or near present height for truck clearance. It is intended that as best possible this passageway be high enough for general passage by automobile passenger-owners and others, it being understood that in the portion over the wheels the clearance is likely to be restricted and most passengers of normal height may have to crouch over as they pass through. Further longitudinal support may be provided along the center of the car by constructing archways longitudinally within each automobile loading stall between the inner edge of the loading stall and the walkway within the car, while still maintaining room necessary for full size motor vehicles to be placed within the stalls.

A feature of the invention is the provision of a specially designed automobile loading and unloading station into which railway cars of the design of the invention are moved. As shown in FIGS. 1, 4 and 5, the station has two levels, a lower level or deck 32 on one side of the railway car and on substantially the same level as the lower sill or floor 12 of the railway car, and an upper level or deck 34 on the other side of the railway car on substantially the same level as the upper floor 24 of the car.

In operation, a railroad car 10 having the two levels 12 and 24, each adapted to receive and house a plural number of automobiles in an end-to-end relation, is advanced on rails between the opposite loading decks or platforms 32 and 34 of the station, the former positioned at the height level of the lower floor 12 of the railroad car and the latter at the height level of the upper floor 24, as shown in FIGS. 4 and 5. The upper level 24 of the railroad car is open on that side toward its station platform 34 and the lower level 12 of the railroad car is open on that side toward its station platform 32. The railway car of the present invention is designed to have the automobiles loaded and unloaded individually, and, if desired, by the passenger owners themselves, through the respective open sides of the two floor levels thereof. As shown in FIGS. 1, 4 and 5, the underside of the station platform 34 may be undercut to provide a passageway 36, and passengers and railroad employees may gain access to the railway car 10 by the conventional steps 38 leading to the vestibules of the railway car. A second flight of steps 40 in each vestibule will enable access to the upper floor of the car where a walkway 42 protected by the short side wall 28 extends the length of the car. Although not shown it is to be understood that there are protective walls on the decks 32 and 34 so that the automobiles cannot run over the edge of the platform.

For the purpose of accomplishing the individual loading and unloading of automobiles, each automobile stall of the railroad car 10 (FIG. 1) is provided with an automobile loading and carrying device or platform 44 of a general rectangular configuration which, in the loaded position, is within the lateral dimensions of the automobile stall and extends in alignment with the longitudinal dimension thereof, but which is capable of lateral movement to assume an angular position with respect to the railway car for loading and unloading operations as shown in FIG. 1. The lateral shiftable movement of each platform 44 is accomplished by the provision of a pivotal mounting therefor, which in order to gain maximum longitudinal usage in each automobile loading position causes the device first to move sideways out of its stall in the railway car and then to pivot to assume the angular position (shown in FIG. 1) with respect to the car for loading and unloading operations. When so angularly disposed, it is evident in FIG. 1 that an automobile may be driven over either deck 32 or 34 of the loading and unloading station and upon a selected loading device 44, and then thereafter be swung by the device into the stall of the railway car to bring the automobile completely within the confines of the railway car. In the small scale view of FIG. 1, each loading device 44 is simply exemplified by a rectangularly shaped panel, the construction and operating features of which will be brought out more fully hereinafter. A folding ramp may be provided at the loading end of each automobile carrying device 44 as

shown at 46 in FIG. 1 in order to facilitate movement of the automobile onto and off of the device.

The automobile loading, supporting and unloading devices on platforms 44 are preferably units of rectangular configuration and are so designed that they are substantially similar in construction to one another and may be completely interchangeable from railway car to railway car and application to application. Each unit is able to accept a full range of automotive vehicles from small European and American compact models to the largest American models without adjustment of loading, unloading, or securing mechanisms.

Because very little time is required to unload the automobiles the railway car can have fast "turn around" and be used again rather than placed on a siding until it can be unloaded. If only one set of platforms 32 and 34 is available in a station, then the car may be moved facing the same direction irrespective of which direction the train is moving on the track.

With particular reference to FIGS. 6 and 7, each vehicle loading platform 44 is provided on the long sides thereof with two vehicle wheel-supporting track members 48—48 of sufficient width and length to accept all four wheels of an automobile vehicle universally, providing only that the vehicle should have at least the normal 5" clearance (for the underside of the vehicle to ground) and sufficient distance between its wheels to span the wheel clamps (to be described hereinafter) normally located inside of the whel tracks and near the platform (44) center. The vehicle loading platform may be designed to move horizontally in a range of approximately 3" from top surface of the floor of the railway car to top surface of the wheel track 48 (as shown by dimension 51 in FIG. 13). The vehicle track members 48—48 are fastened by transverse and longitudinal structural elements as necessary to form a rigid generally rectangular mechanism which can be moved as a unit. The outer edge of each long side of the platform 44 is provided with a strongback 50 of sufficient strength to provide longitudinal stiffening. Suitable cross members, such as indicated at 52, provide transverse strengthening and stiffening of the platform into the desired unit construction.

It should be understood that universal direction type rollers of sufficient size and number may be attached to the underside of the frame of each platform 44 in such a way that the platform can be rolled on these rollers from the railway car out over the open space between the car and the adjacent loading deck and out onto the loading deck, and reverse, without meeting any resistance due to the open space, or due to slight variances in the heights between the railway car floor and the loading deck.

At average balance points on each of the strongbacks 50 rectangular openings may be cut so that fork lifts can be inserted and a fork lift truck may be utilized, if desired, in removing and placing the vehicle loading platforms on each level of the railway car. In regard to this matter it should be understood from FIG. 16 that the nut 47 can be removed from the threaded stud 49 thereby enabling the platform 44 to be interchanged for repairs with other platforms 44 or placed on or removed from the railway car by a fork lift truck.

Provision is made, as shown in FIGS. 6, 7 and 12, for buffering or snubbing the movement of the automobile suporting platforms 44 while in transit. At the central forward end of each vehicle loading platform 44 there is located a forward buffer plate 54 which in normal aspect for travel on the railway car abuts the forward recoil buffer spring 56 of a heavy rubber composition or the like of standard design attached to the railway car floor. Preferably the buffer plate 54 of the platform fits under a lip 58 of the recoil spring 56. At the center of the after-end of the vehicle loading platform there is placed the after recoil buffer plate 60 which in normal aspect for travel on the railway car abuts the recoil spring 62 of resilient composition similar to the forward buffer 56 which is attached to the railway car floor and preferably fits under lip 64 of the recoil spring. In normal position for travel over railroad line-of-road at high speeds each vehicle loading platform and its loaded vehicle will have a slight floating movement between these two buffer springs 56 and 62 without restriction, the position of the two springs providing snubbing action for hard stops. The overlapping characteristics of the lips 58 and 64 over buffer plates 54 and 60 hold the vehicle loading platform down in place in the railway car maintaining a positive lock characteristic for tie-down which is described in a subsequent section hereof. Obviously other types of overlap mechanisms can be used and the arrangements, represented by the spring 56 and plates 54 and 58, as well as spring 62 and plates 60 and 64, are shown by way of illustration.

The operating cycle for movement of the vehicle supporting platforms 44 takes the platforms (44) at one level, either singly or simultaneously from a position within the railroad car, as shown in FIG. 7, to a position angled out from the railroad car onto the automobile loading deck, as shown in FIG. 6. This is accomplished by means which is disconnectibly coupled to each of the platforms. This form of platform control enables one or more or all of the platforms on the same level of the railway car to be moved simultaneously into and out of the railroad car, depending upon the circumstances encountered in the loading and unloading operations. Thus, as explained hereinafter, any selected one of the platforms may be moved into and out of the railroad car by the same means which enables more than one or all of the platforms on the same level of the railway car to be moved into and out of the car. For accomplishing this operation, power means is provided in the railroad car and connections are made from this power means individually and collectively to all the platforms.

In the illustrated embodiment of the invention, the operating cycle for moving the platforms in and out of the railroad cars is accomplished by flexible cable means, one for each floor level of the railway car, and a power source suitably located in the car for moving the cable means. Referring to the schematic showing in FIG. 8, the cable means for each level of the railway car comprises an endless main cable generally indicated at 70 having two major longitudinally extending side sections 72 and 74 which run approximately the length of the railroad car and further having two minor transversely extending end sections 76 and 78. As shown in FIG. 8, a portion of the endless cable 70 is reaved or wrapped several turns around a drum 80 which, as better shown in FIGS. 6 and 7, may be located near one end of the railway car where it is out of interference with the platforms. A similar endless cable and drum therefor is provided for the other level of the railway car. A reversible electric motor 82 is coupled through suitable gearing to a shaft 84 upon which the drum 80 is mounted, and it is apparent that upon rotation of the motor in one or the other direction, it will tension and pull either the side section 72 of the cable or the other side section 74 of the cable and cause these sections to move in opposite directions to one another as a unit.

In each automobile stall of the railroad car there is provided an intermediate or transversely extending cable section to which the platforms 44 are disconnectibly attachable. One such transverse cable section is the end portion 78 of the main cable 70 most remote from the drum 80. The intermediate transverse cable sections for the remaining three automobile stalls are identified as 86. The remaining three intermediate cross connecting cables 86 are attached at their extremities to the longitudinal sections 72 and 74 of the main cable and by virtue of this attachment move with the main cable. At suitable locations on the floor of the railroad car there are provided roller members around which the cable portions are turned. For the main cable 70, suitable roller mem-

bers 88 are provided at the opposite ends thereof to form its large substantially rectangularly shaped loop shown in FIG. 8. For each of the three cross connecting cables 86, a pair of roller members or sheaves 90 are provided to guide them in their movement. Each pair of sheaves 90 is disposed approximately opposite one another on the two sides of the railroad car floor and provide a transverse movement of the intermediate cable section therebetween in one or the opposite direction depending upon whether the pull of the drum 80 is on section 72 or 74 of the main cable. Each intermediate cross connecting cable 86 has an extension, such as shown at 92 in FIG. 8, sufficient to provide the desired transverse movement of these sections as the main cable is operated. Carried by the end cable section 78 and each intermediate cable section 86 is a device generally indicated at 94 which is disconnectibly connectible to the under side of the platform 44 of its respective stall in the railway car. Each device 94 is guided in its transverse movement by a pair of slightly spaced apart parallel side rails 96—96 shown in FIG. 8, and more particularly illustrated in FIG. 24. These guide rails are mounted on the railway car floor and extend transversely thereof. For the portion of its length each set of guide rails extends perpendicular to the longitudinal dimension of the car but for the shorter portion thereof nearest the open side of the railway car each set extends at a slight acute angle for a purpose described hereinafter.

Each disconnectible coupling device 94 functions as a dolly and may be characterized as such, a preferred construction of which is illustrated in FIGS. 24 and 26. Each dolly comprises a base member or shoe 98 of generally U-shaped cross section slidably guided between a set of side rails 96—96 and under the inwardly turned lips thereof in the manner shown in FIG. 24. In the recess 98 of each dolly shoe there are provided two opposed jaw members 100—100 pivotally mounted at 102 at their outer extremities for rocking movement in a vertical plane. Interposed between each jaw and the shoe is a coiled spring 104 which yieldingly urges its jaw upwardly to the position shown in FIG. 26, where it enters the path of travel of a retractable locking pin 106 fastened to the under side of the platform. The spacing and the opposed relationship of the two jaws 100—100 is such that the pin 106 may be received between the jaws and locked thereby so that the platform will partake of the same movement as the dolly. Each jaw 100 is capable of being cammed to a depressed position against the resistance of its spring as the pin 106 slides thereover (as the dolly 94 moves to the rear of platform 44, to the right in FIG. 26) and upon abutment of the pin with the companion jaw, the depressed jaw will be returned to its raised position interlocking the pin therebetween. In this way, when locking pin 106 is retracted at any point in the operating cycle, the corresponding dolly 94 is free to move without restriction, under that particular vehicle supporting platform 44. Loading and unloading cycles for the other platforms can then take place as the disconnected platform remains in the position it held when disconnected. All that is necessary to "pick-up" the disconnected platform is that locking pin 106 be extended into the area between side rails 96—96 where the dolly 94 can be passed under it and attached as explained above.

The locking pin 106 associated with each dolly 94 is connected to and may form an integral extension to a block 108 slidably fitting a housing 110 which may be of U-shape cross section as shown in FIG. 27. The housing is fixed to the underside of the track member 48 of the platform 44 over which the left road wheels of the automobile roll and guides the block 108 and its pin extension 106 for movement in the fore and aft direction of the platform. FIGS. 6 and 7 show the location of the housing and locking pin in dotted outline. The locking pin 106 is yieldingly urged to its projected locking position by spring means which as illustrated in FIGS. 24, 25 and 27 assumes the shape of a coiled spring 112 bearing against the block 108 at one end and against a strap 114 forming part of the housing and partly closing the end thereof as shown. The locking pin 106 may be manually retracted by a pull rod 116 forming a central rearward extension of the block 108 and also serving as a support for the coiled spring 112 by which it is encircled. The pull rod slidably extends through the strap 114 and is connected at its outer end to a handle 118 (FIG. 25) which is arranged to be conveniently operated by railway service personnel for retracting the locking pin 106, whenever the platform 44, associated therewith, is not to be "swung out" from the railway car.

Means is provided for releasably locking the coupling pin 106 in the retracted position and thus completely freeing its platform 44 from control movement by its associated dolly 94. In the illustrated embodiment of the invention, this consists in providing the handle 118 with a rotation movement relative to the pull rod 116 such that when the handle is in its retracted position it may be swung into a slot 120 in the wheel track member 48 and held thereby against the pressure of the spring 112 tending to return the block 108 and its pin 106 to coupling engagement with the dolly 94. For this purpose the handle is connected to the pull rod 116 by a pin connection which permits the handle to rotate approximately 90° relative to the pull rod. As shown in FIGS. 28, 29 and 30, the pull rod is provided with a reduced extension 122 upon which the handle is journaled. A cross pin 124 is carried by the extension and the handle is provided with two opposed quadrant-shaped projections 126—126 slidably fitting over the pull rod extension 122 and adapted to abut the cross pin and limit the rotation of the handle to approximately 90°. When fully retracted, the handle may be swung into the slot 120 as shown by a comparison of the dotted and full line positions of the handle in FIG. 28.

Means is provided for releasably locking each platform 44 from lateral movement or side sway in the railway car when the same is released from coupling engagement with its dolly. The same mechanism utilized for coupling the platform to the dolly is also designed to accomplish this purpose. As shown in FIGS. 6, 24 and 25, the floor in each automobile stall of the railway car is provided with an upstanding stop member in the form of a lug 128. Each lug is fixed to the floor close to the path of travel of the housing 110 and rises to a height short of the level of the pull rod 116 and handle connection as shown in FIGS. 24 and 25. The pull rod is thus free to ride over the lug stop. However, the block 108 is provided with a lower rearward extension 130 which may be rounded on its underside to slidably fit the curvature of the housing as shown in FIG. 27 and is projectionable into position behind the lug 128 as shown in FIG. 25. The stop lug is so stationed that when the platform 44 is swung completely into the railway car to the position illustrated in FIG. 7 the lower extension 130 will just pass by the lug and at a level below the height of the lug. Thus, when the handle 118 is pulled to retract the pin from coupling engagement with the dolly the extension 130 passes by the side of the lug remote from the opening of the railway car through which the platform is swung and the lug and the extension serve to lock the platform from swinging motion in that direction. It is evident that the mechanism including the block 108 and its forward and rearward extensions not only serves to enable the platform to be coupled to the dolly 94 to provide platform 44 movement but also serves to lock the platform 44 against lateral movement toward the open side of the car when the platform is uncoupled from the dolly.

In addition to providing means to secure the platforms 44 so that they do not move laterally it follows that a means has to be provided to secure an automobile to its platform. A number of problems were taken into con-

sideration in devising the means for securing the automobiles to the platforms. Primarily the device has to be an automatic system requiring a minimum amount of time to secure an automobile (or a plurality thereof) in order to insure that automobiles can be loaded and *secured* in approximately the same amount of time that it takes to put passengers aboard. In addition the automobile-securing means has to be able to handle automobiles having various lengths and varying wheel bases to accommodate luxury-type automobiles as well as compacts, casually loaded by passenger owners.

A study of FIGS. 6 and 7, as well as FIGS. 9 through 23, reveals how this is accomplished. In FIG. 6 it can be seen that when an automobile is driven onto the platform **44** its front tires abut against the two spring-loaded front wheel chocks **141** and **143**. As can be seen in FIG. 17, the chock **143** is beveled to allow for maximum amount of surface friction between the tire **145** and the chock **143**. In FIG. 17 it is evident that when the automobile is driven forward it compresses the spring **147** until the locking lever **149** is cammed forward, as shown in its dashed line position **149***a*. Although shown for illustration convenience as being of relatively light metal it should be understood that locking level **149** is fabricated of heavy gage metal. When the automobile is in this last-described forward position the hand brake of the automobile is set which keeps the automobile in this position until the lower locking teeth **151** and **153** respectively engage the upper locking teeth **155** and **157**, as will be explained hereinafter. When the locking teeth **153** and **157** are engaged the locking lever **149** is held in the position shown at **149***a* so that the wheel **159** is secured from moving either forward or backward, with or without the hand brake being set. The pressure of the spring **147**, and hence chock **143**, causes the tire **145** to rest firmly against the lever **149** in its **149***a* position. Insofar as the operator of the automobile is concerned, he need only drive the automobile onto the platform 44 until the front tires bump the front tire chocks (such as chocks **141** and **143**), and then set the hand brake on the automobile, thereafter the securing operation is automatic. Obviously the front tires and/or front wheels on both sides of the automobile are handled in the same manner.

FIG. 16 depicts the mechanism for securing the automobile from moving laterally or from rocking so as to turn over or flip over. Referring momentarily to FIG. 6, it can be seen that when the tie-down activating bar **161** is moved to the left of the figure (as will be explained later), the telescoping press bars **163** and **165** push the wheel clamps **167** and **169** toward the wheel positions. Keeping this operation in mind, study FIG. 16. In FIG. 16 as the tie-down activating bar **161** is moved outward from the figure the wheel clamp **167** is moved to the right toward wheel **159** while the wheel clamp **169** is moved to the left toward wheel **171**. As the holding plates **173** and **175** come in contact with the rims of the respective wheels **159** and **171**, the wheel clamps **167** and **169** are cammed upward. This arrangement can be seen better from FIGS. 18 and 19. In FIG. 18 the wheel clamp **167** is shown before the holding plate comes in contact with the wheel. In FIG. 19 the wheel clamp **167** is shown having been cammed upward into wedged contact with the rim of the wheel **159**. It should be understood that although the wheel clamps, such as clamp **167**, are shown with flat surfaces these clamps can have other designs such as to fit completely and snugly over the rim of the wheel.

As the wheel clamp **167** is cammed upward the pivot block **175** lifts the chain **177** which causes the set block **179** to be moved to the left. As the set block **179** is moved to the left it assumes different positions with respect to the lower locking teeth **151**. Therefore when the lower locking teeth **151** are raised into position (as will be explained) the clamping arm **167** is fixed to hold the wheel **159** from moving laterally or from rocking. As wheel clamp **167** (FIG. 18) is cammed horizontally upward, the holding plate **173** touches the lower portion of the automobile wheel and then slides upward "finding" the farthest outward position possible, while at the same time through inter connection of block **175**, chain **177**, and block **179**, block **179** is moved to the left. Since wheel configurations for various makes of vehicles are different at various points a "balance" will be reached where block **173**, and the right face of block **179** will both abut portions of the wheel, and no further upward camming motion will be possible. In this way, such a "balance" will be reached on small as well as large vehicles without wheel clamp **167** moving upward after it has passed over the inner rim of the automobile wheel.

FIGS. 20 through 23 show portions of a wheel clamp of FIG. 18 in sectional views to illustrate thhe construction thereof. FIG. 20 shows the shaft **181** up which the wheel clamp **167** rotates. It can be seen in FIG. 20 how the chain **177** moves within the housing **183**. FIG. 21 shows the positioning rod **185** which guides the wheel clamp **167** as it is cammed upward. FIG. 22 depicts how the chain **177** fits over the set block **179**. FIG. 23 shows how the holding plate **173** is fastened to the wheel clamp **167**.

Consider now how the rear wheels of an automobile are fastened or secured to the platform **44**. In FIG. 6 it can be seen that a plurality of rear wheel clamps are provided, similar to wheel clamps **185** and **187**. When the tie-down activating bar **161** moves toward the left of FIG. 6, the wheel clamp **185** is moved toward the top of FIG. 6 while wheel clamp **187** is moved toward the bottom of FIG. 6. In this way the wheel clamps are cammed against the rear wheels of the automobile in a fashion similar to that described in connection with the front wheels (and which will be explained in more detail). Before turning from FIG. 6 it should be noted that the plurality of wheel clamps, spaced as shown, enable automobiles of different lengths to be secured to the respective platforms. In other words by virtue of the numerous rear wheel clamps, there is a pair of wheel clamps available to fit the rear wheels of any of the various lengths that an automobile might be, from a deluxe sedan to a compact type.

Examine now the rear wheel clamp device, in detail, as depicted in FIG. 13. When the tie-down actuating arm **161** moves perpendicularly out from the figure the two rear wheel clamps **185** and **187** are moved (along with five other pairs of wheel clamps) toward the wheels **189** and **191**. The housing mechanisms **193** and **195** are moved toward the wheels **189** and **191** by linkage connected to rods **211** and **212**, not shown in FIG. 13 but shown as the telescope arms **197** and **199** in FIG. 6. As the wheel clamp **185** comes in contact with wheel **191** it is cammed upward and assumes a position similar to that shown for locking arm **167** in FIG. 19, but does not lock over the rim as can be seen in FIG. 9.

The rear wheel locking arm arrangement is shown in greater detail in FIG. 9. The locking arm **185** (or **187** on the right hand side of the automobile) bumps into the tire and is cammed upward and "out of the way"; but it is the adjacent wheel clamp **201**, whose holding plate **203** which fits over the rim to secure the rear wheel **191** into position. The other rear wheel **189**, not shown in FIG. 9, is secured in a similar fashion.

FIGS. 10 and 11 show the internal structure of a telescope arm such as **197**. The spring **205** attempts to drive the two fitted sleeves **207** and **209** from the rod **211** (from a compressed mode), shown in FIG. 10, to an elongated mode shown in FIG. 11. The telescope arms make the operation of the tie-down actuating arm **161** feasible since the telescoping arms supply the angular force to drive the housing mechanisms, which pivot the wheel clamps, toward the automobile wheels (both forward and rear).

In the description thus far mechanisms have been

examined which secure the front wheels so that the automobile does not move forward, backward, sideward or rock and in addition mechanisms have been examined which secure the rear wheels so that the automobile will not move sideward or rock. However, as mentioned earlier, all the devices must be positively locked by the lower locking teeth (such as teeth 151, FIG. 17) engaging the upper locking teeth (such as teeth 155, FIG. 17). The arrangement for accomplishing the engagement of these two sets of locking teeth is shown in FIGS. 14 and 15.

In FIG. 14 there is shown a lug 213 attached to floor of railway car which has a slanted face 215 disposed perpendicular to the movement of the platform 44 or the deflecting locking plate 217 thereof. As the platform 44 is swung into the railway car the deflecting locking plate 217 is cammed upward and to the right by the lug 213 as shown by the multiple positions in dashed lines in FIG. 14. FIG. 15 shows the deflecting locking plate 217 fully raised on lug 213 so that the lower locking teeth 219 are engaged with the upper locking teeth 221 thereby securing the mechanisms previously described and thus firmly fixing the car to the platform. By adjusting the angle of contact of any set of opposing locking teeth, an inclined plane action can be set up during locking which will act to "tighten-down" any of the vehicle securing mechanisms to which applied as locking takes place.

It becomes apparent in retrospect that the loading and unloading of the automobile is simple and rapid. In loading, an empty platform is made available for an automobile. The automobile is driven on the platform until its front wheel tires abut the chocks 141 and 143. In this position the hand brake is set. Thereafter everything is automatic. As the platform swings onto the railway car the idler 223 (FIGS. 6 and 7) slips into the track 225 and forces the activating bar toward the rear of the automobile. The activating bar 161 causes the locking arms to move outward and be positioned to hold the wheels, and subsequently the deflecting locking plates 217 (FIGS. 14 and 15) are raised so that the lower locking teeth (such as teeth 219) engage the upper locking teeth (such as teeth 221) of the locking arms, locking lever and chock thereby securing the automobile to the platform. In unloading the locking pin 106 (FIGS. 24 and 25) is released to be spring-driven into the dolly 94. The dolly 94 is pulled by the cable mechanism (FIG. 8) toward the open side of the railway car and hence moves the platform 44 to the open side of the railway car. Subsequently the pivot pin 49 (FIGS. 6 and 16) slides to the end of its track 45 (FIG. 6) and causes the platform 44 to pivot outwardly from the open end of the car tending toward a perpendicular angle with the railway car until the drum 80 ceases pulling the cable 86. The locking plates 217, 151 and 153 drop down by gravity releasing all vehicle locking devices. In accordance with this process the platform 44 is swung into and out of the railway car to enable automobiles to be loaded and unloaded.

The invention has been described in connection with a particular embodiment but certain considerations should be taken into account as being within the scope of the present invention. In FIGS. 1 through 5 automobiles are shown placed in the same direction on their loading platforms on both levels. In order that the side of the automobile normally used by driver-owner may be adjacent to walkways 30 and 42 the system can provide the loading levels in the opposite direction from that shown or just have the upper level above the lower level. Further, it should be clearly understood that motor vehicles other than automobiles are considered for ferrying within the scope of the invention. For instance such motor vehicles as trucks, busses, air cars, wheeled containers carrying normal railroad "head end" type baggage, freight or mail can readily be carried. It should also be understood that the principles of the invention can readily be adapted to any carrier vehicles which load and unload automobiles and the like. Within the scope of this invention nothing precludes the use of fork lift trucks, in the absence of suitable platforms 32 and 34 from placing the loading platforms 44 onto and off of the railways cars, and at the same time activating the vehicle securing devices so that upon placing the platform on the appropriate level of the railway car and shoving it inward through the mechanism, that the carried vehicle would be loaded and secured for travel.

Further it should be understood that although the preferred embodiment illustrates a car with two floors (to make maximum use of the railroad car) obviously a railroad car with only one floor can be used and such a concept is within the scope of the present invention.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claims.

What I claim is:

1. An automobile transporting railroad car comprising, in combination; a railroad car body having two vertically separated floors and constructed to provide openings on one side thereof for the loading and unloading of automobiles onto and off of one floor of said railroad car and to provide openings on the opposite side thereof for the loading and unloading of automobiles onto and off of the second floor of said railroad car; a plurality of individual automobile loading and unloading platforms disposed on each of said floors of said railroad car body, said platforms having associated means to render each of them movable from positions within said railroad car body to positions projecting laterally thereof through said side openings so that the farthest projected end of each platform lies free of the close end of its adjacent platform thereby enabling a plurality of automobiles to be loaded or unloaded simultaneously onto or from a plurality of said platforms and means carried by each platform and operable to engage the road wheels of an automobile thereon to secure the same to the associated platform, said last-mentioned means being self operable upon movement of its platform from the lateral projecting position to the position within said railroad car body to engage the road wheels of an automobile on the platform.

2. An automobile transporting railroad car comprising, in combination: a railroad car body constructed interiorly to provide two vertically separated floors extending substantially the length of the car, the railroad car body being constructed to provide openings on one side thereof for loading and unloading automobiles onto and off of one floor of the car and to provide openings on the opposite side thereof for loading and unloading onto and off of the second floor of the car; a plurality of automobile loading and unloading platforms carried on each floor of the railroad car in spaced apart relationship longitudinally of the railroad car; means individually mounting each platform on its associated floor of the railroad car for movement from a position wholly within the car body to a position projecting laterally from the railroad car body, each platform being moved through the side opening of the floor upon which it is carried; means for moving the platforms on each floor from said one position to said other position either collectively as a group or independently of one another and means carried by each platform and operable to engage the road wheels of an automobile thereon to secure the same to the associated platform, said last-mentioned means being self-operable upon movement of its platform from the lateral projecting position to the position wholly within the car body to engage the road wheels of an automobile on the platform.

3. An automobile transporting railroad car comprising, in combination: a railroad car body having two vertically

separated floors extending substantially the length thereof and constructed interiorly to provide a plurality of longitudinally spaced apart automobile stalls on each floor thereof with each stall having an opening in the side of the car body through which an automobile may be moved into and out of the stall; an automobile loading and unloading platform with one each assigned to an associated stall; means mounting each automobile platform on the floor of its stall and providing for movement of the platform from a position within the stall to a position projecting laterally of the car body through said opening in the side wall so that the farthest projected end of each platform lies free of the close end of its adjacent platform thereby enabling a plurality of automobiles to be loaded or unloaded simultaneously onto or from a plurality of said platforms; power means on each floor of the railroad car for moving the platforms thereon from said one position to the other position of their movements; means for operation thereby; and means carried by each platform and operable to engage the under structure of an automobile thereon to secure the same to the platform, said last-mentioned means being self operable upon movement of its platform from the lateral projecting position to the position within the stall to engage the under structure of an automobile on the platform.

4. An automobile transporting railroad car comprising, in combination: a railroad car having two vertically separated floors extending substantially the length thereof and being constructed interiorly to provide a plurality of longitudinally spaced apart automobile stalls on each floor thereof, said railroad car having a lower side wall closing the stalls of the lower floor along one side of the railroad car and an upper wall closing the stalls of the upper floor along the opposite side of the railroad car, the side portions of the railroad car opposite to the lower and upper walls providing openings for the stalls into which automobiles may be moved into and out of the stalls; a plurality of automobile loading and unloading platforms with one each assigned to each stall; means mounting each automobile platform on the floor of its stall and providing movement of the platform from a position within the stall to a position projecting laterally of the railroad car through the opening provided for the stall so that the farthest projected end of each platform lies free of the close end of its adjacent platform thereby enabling a plurality of automobiles to be loaded or unloaded simultaneously onto or from a plurality of said platforms; power means on each floor of the railroad car for moving the platforms thereon from either of said positions to the other position of their movements; means for disconnectibly coupling each platform to said power means for operation thereby; and means carried by each platform and operable to engage the road wheels of an automobile thereon to secure the same to the platform, said means being self operable upon movement of its platform from the laterally projecting position to the position within the stall for engaging the road wheels of an automobile on the platform.

5. An automobile transporting railroad car comprising, in combination: a railroad car having two vertically separated floors extending substantially the length of the car and being constructed to provide openings on one side thereof for the loading and unloading of automobiles onto and off of one floor of the railroad car and to provide openings on the opposite side thereof for the loading and unloading of automobiles onto and off of the second floor of the car, a plurality of automobile loading and unloading platforms carried on each floor of the railroad car in spaced apart relationship longitudinally of the car, means individually mounting each platform on its respective floor of the car for movement from a position wholly within the railroad car to a position projecting laterally from the car through an adjacent side opening thereof so that the farthest projected end of each platform lies free of the close end of its adjacent platform thereby enabling a plurality of automobiles to be loaded or unloaded simultaneously onto or from a plurality of said platforms, means carried by each platform and operable to engage the road wheels of an automobile thereon to secure the same to the associated platform, said last-mentioned means being self operable upon movement of its platform from the lateral position to the position wholly within the railroad car to engage the road wheels of an automobile on the platform and a cable system on each floor of the railroad car and connected to the platforms on its respective floor for effecting the movements thereof between said two positions of movement.

6. An automobile transporting railroad car comprising, in combination: a railroad car being constructed interiorly to provide a floor extending substantially the length thereof and to provide a plurality of longitudinally spaced apart automobile stalls along the floor thereof, said railroad car having a side wall closing the automobile stalls along one side of the railroad car and having openings along the other side of the railroad car for the stalls into which automobiles may be moved into and out of the stalls, an automobile loading and unloading platform individual to each stall, means mounting each automobile platform on the floor and providing movement of the platform from a position within the stall to a position projecting laterally of the railroad car through the opening provided for the stall so that the farthest projected end of each platform lies free of the close end of its adjacent platform thereby enabling a plurality of automobiles to be loaded or unloaded simultaneously onto or from a plurality of said platforms, power means in the railroad car for moving the platforms from either of said positions to the other of said positions of their movements, means for disconnectibly coupling each platform to said power means for operation thereby, means carried by each platform and operable to engage the road wheels of an automobile thereon to secure the same to the platform, said means being self operable upon movement of its platform from the laterally projecting position to the position within the stall for engaging the road wheels of an automobile on the platform.

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