Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 1

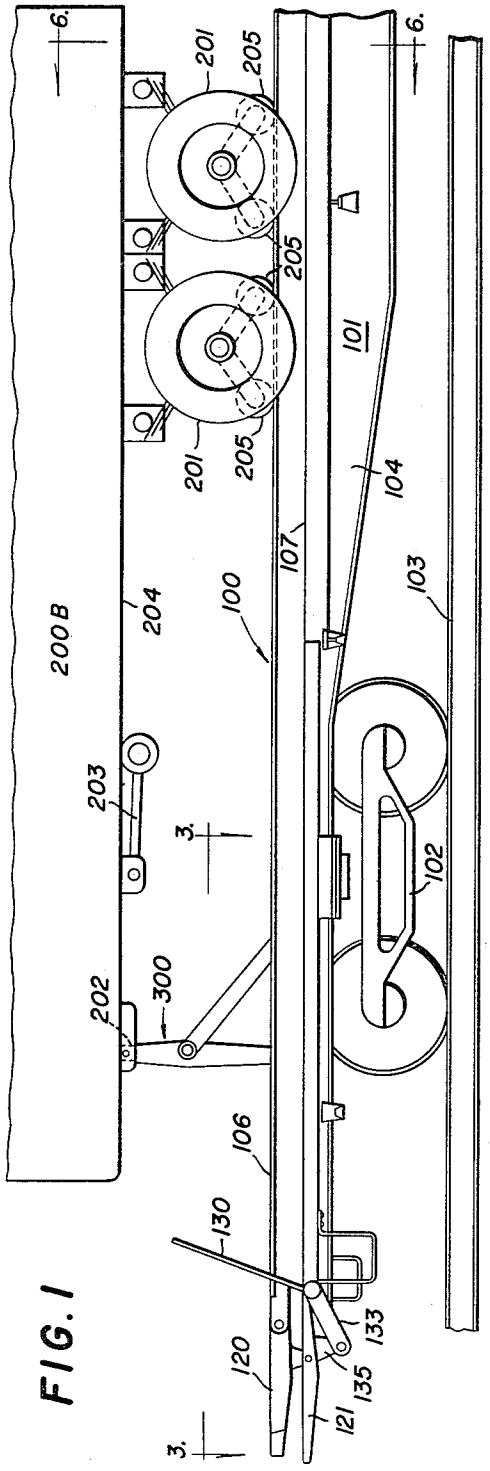


FIG. 1

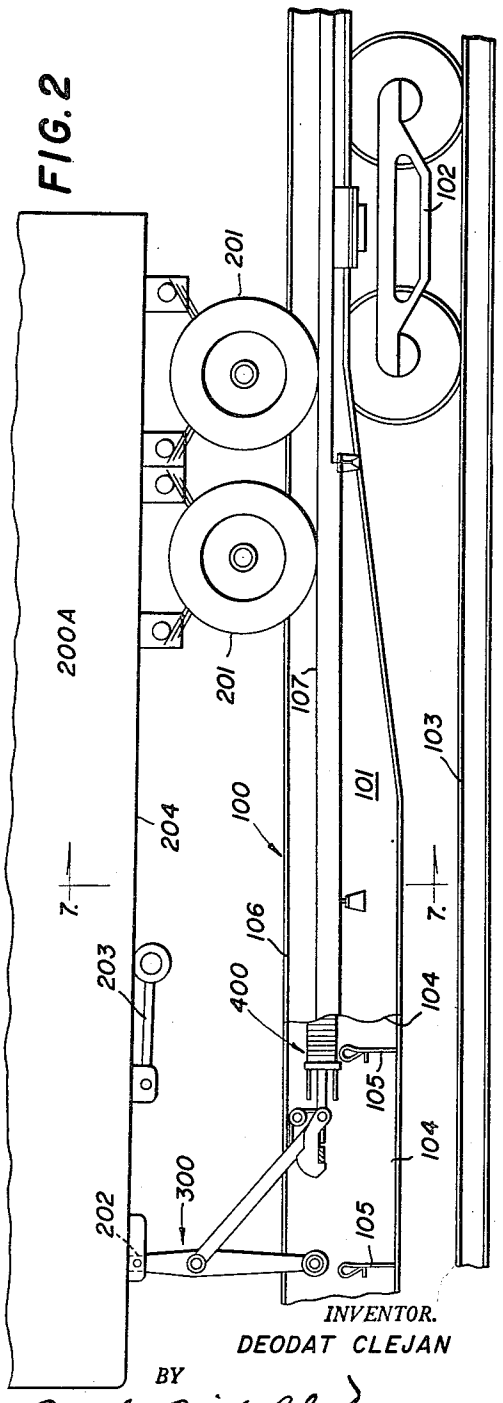


FIG. 2

INVENTOR.
DEODAT CLEJAN

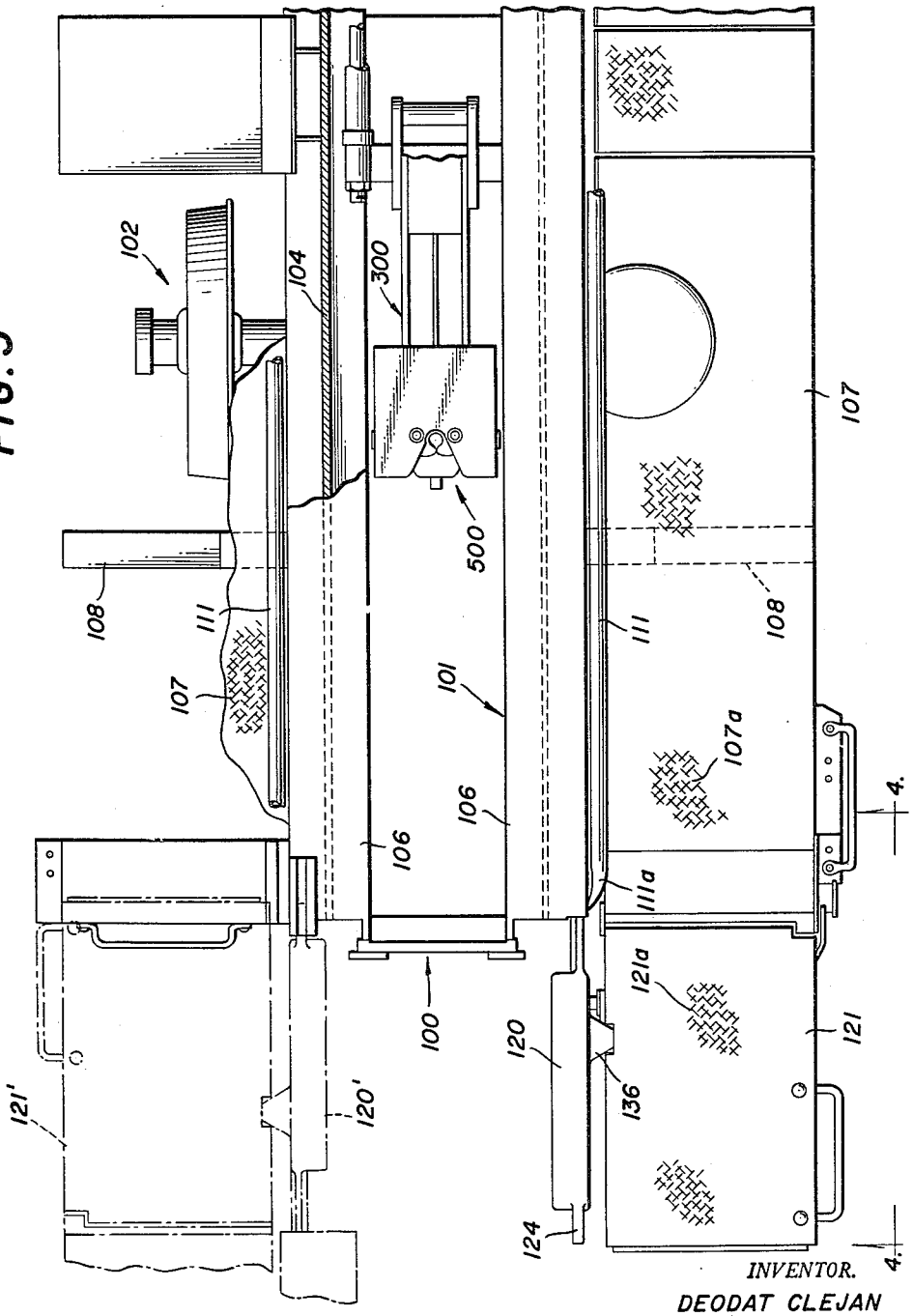
BY
Prangley, Baird, Clayton
Miller & Vogel
ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 2

FIG. 3



INVENTOR.
DEODAT CLEJAN

BY
Brumley, Baird, Clayton, Miller & Vogel
ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 3

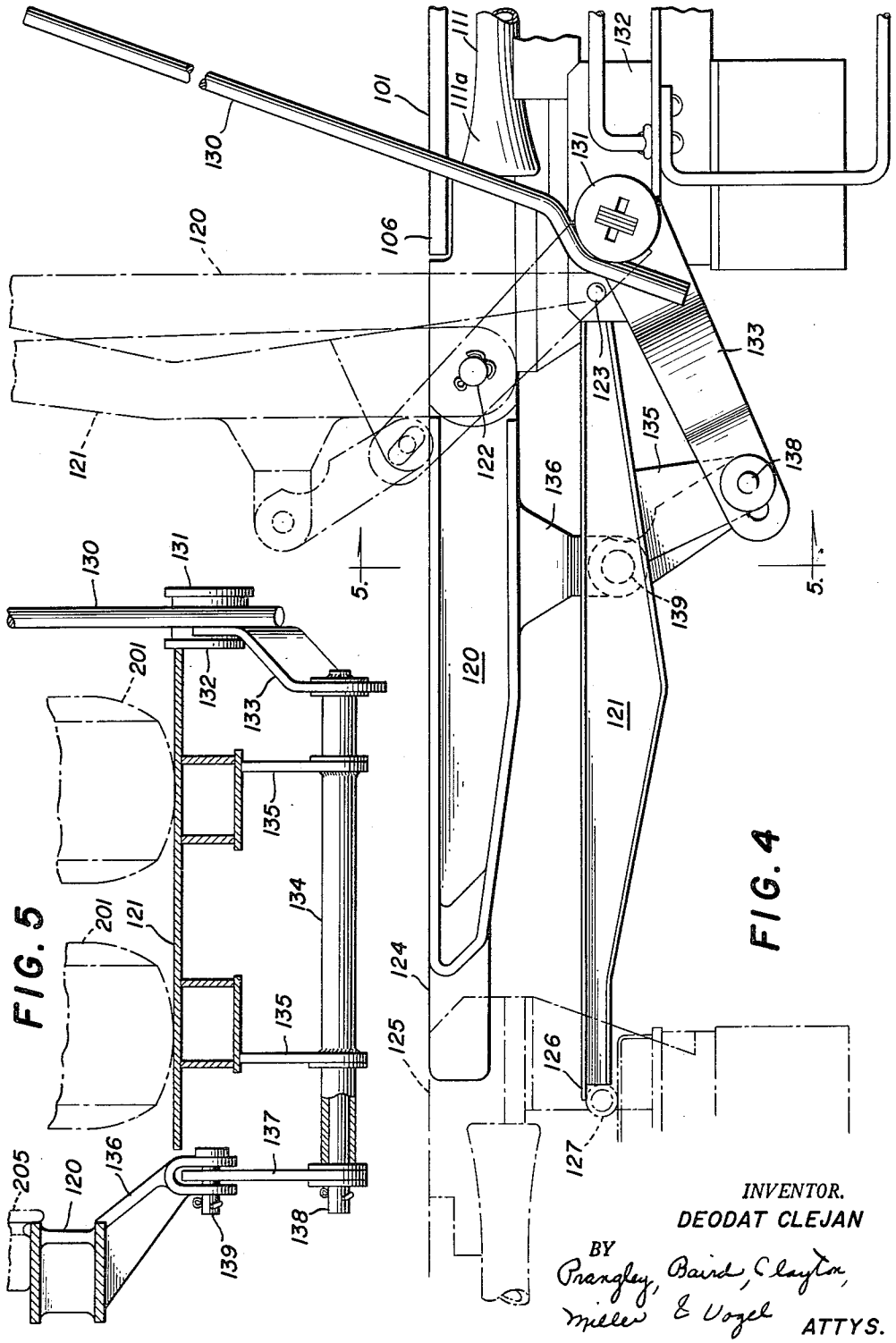


FIG. 4

FIG. 5

INVENTOR.
DEODAT CLEJAN

BY Prangley, Baird, Clayton, Miller & Vogel ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 4

FIG. 7

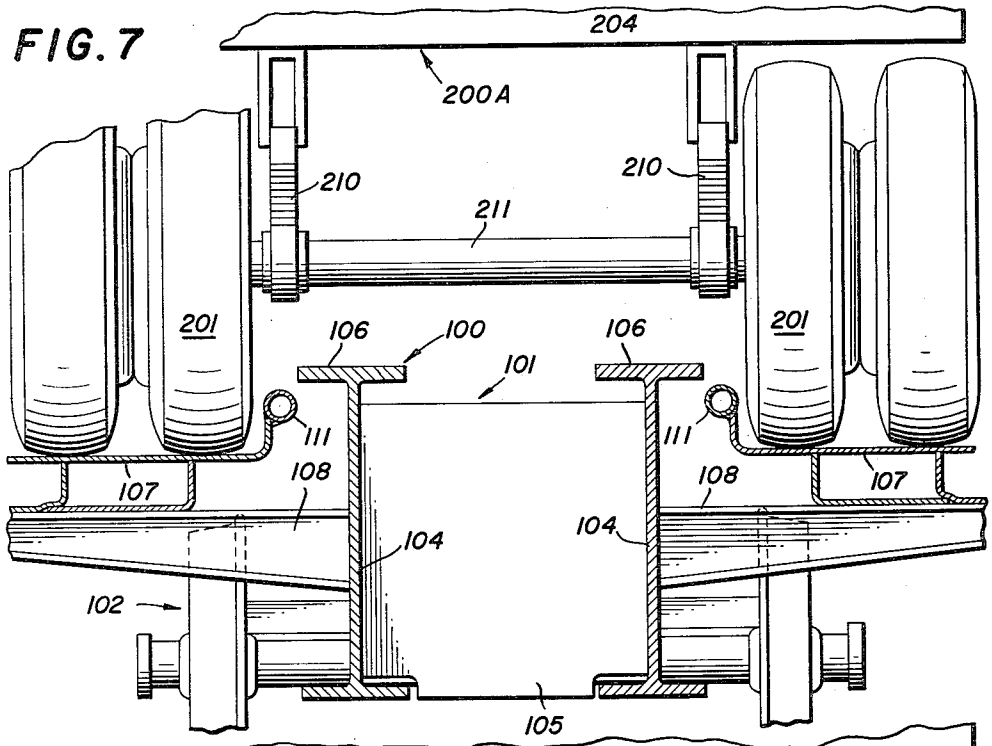
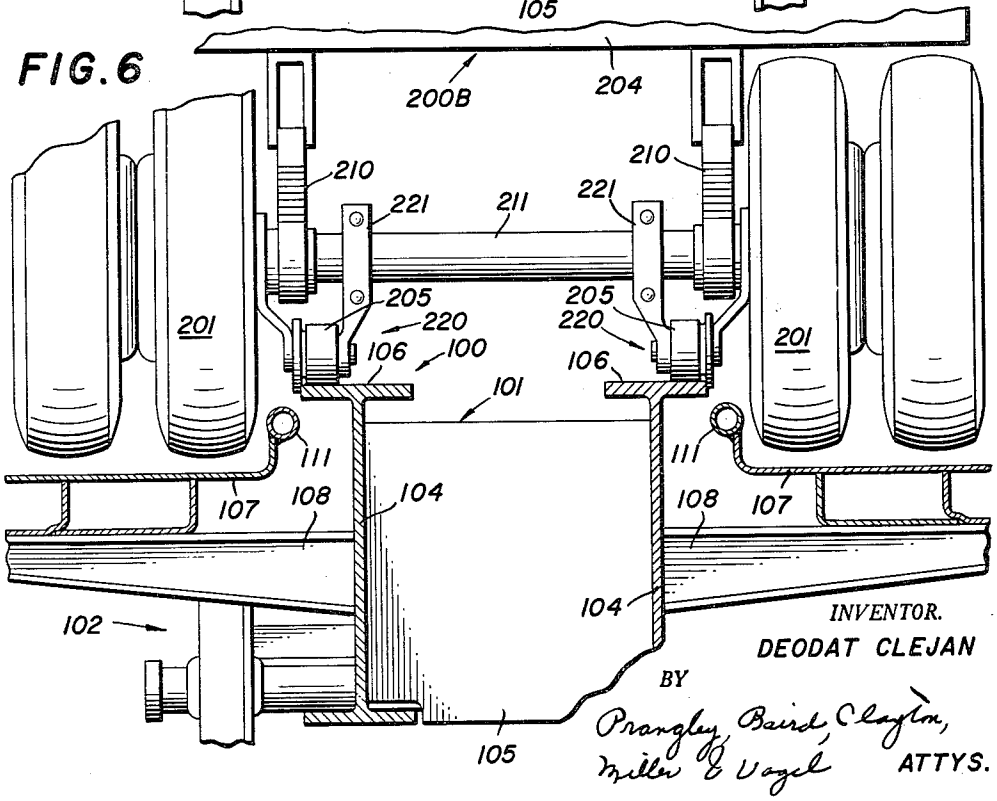


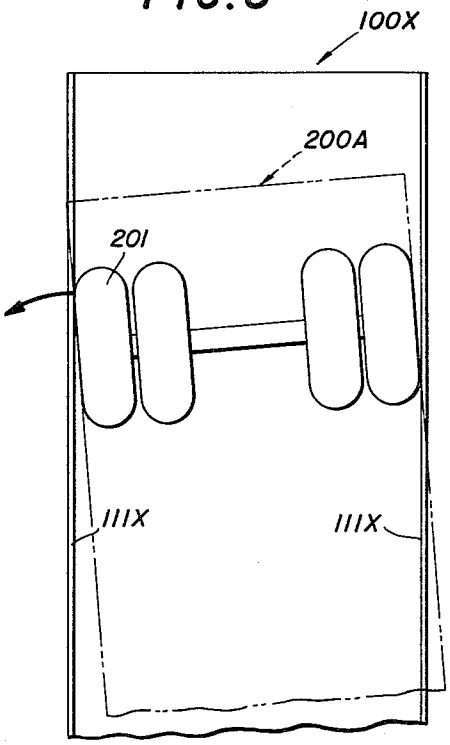
FIG. 6



INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton, Miller & Vogel ATTYS.

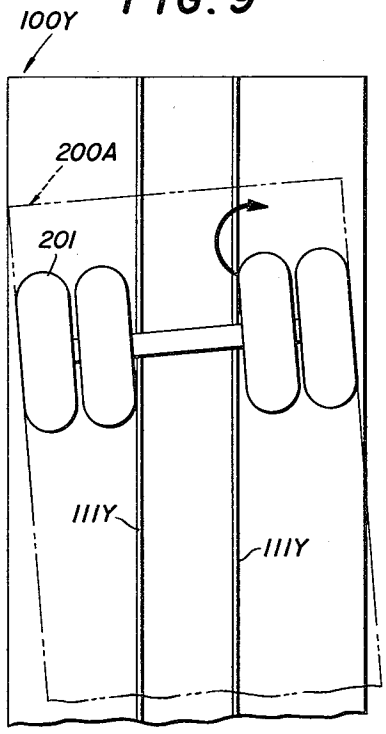
Aug. 21, 1962 D. CLEJAN 3,050,320
FIFTH-WHEEL MECHANISMS FOR HITCHES
CARRIED BY RAILWAY CARS
Original Filed Dec. 22, 1959 14 Sheets-Sheet 5

FIG. 8



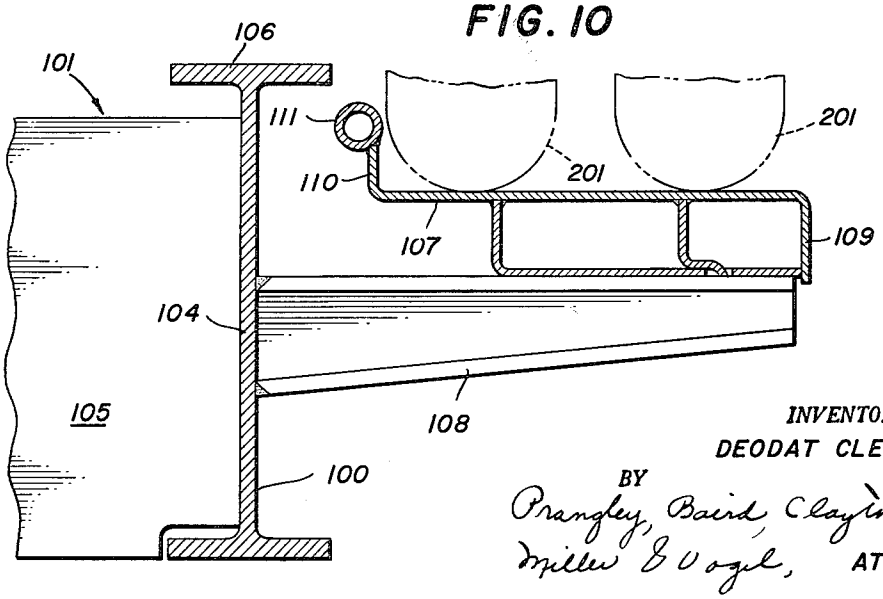
OUTSIDE GUIDE RAILS
TEND TO JACK-KNIFE TRAILER

FIG. 9



INSIDE GUIDE RAILS
TEND TO RECENTER TRAILER

FIG. 10



INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton,
Miller & Vogel, ATTYS.

FIG. 11

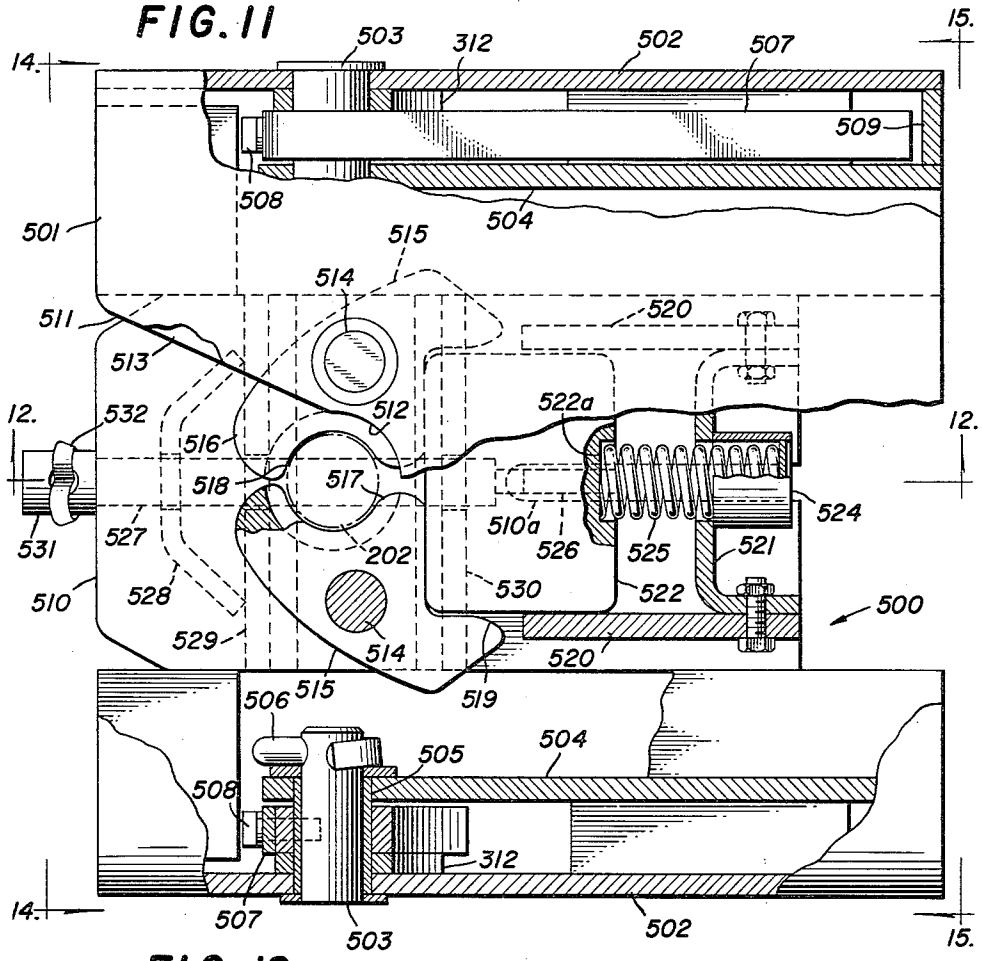
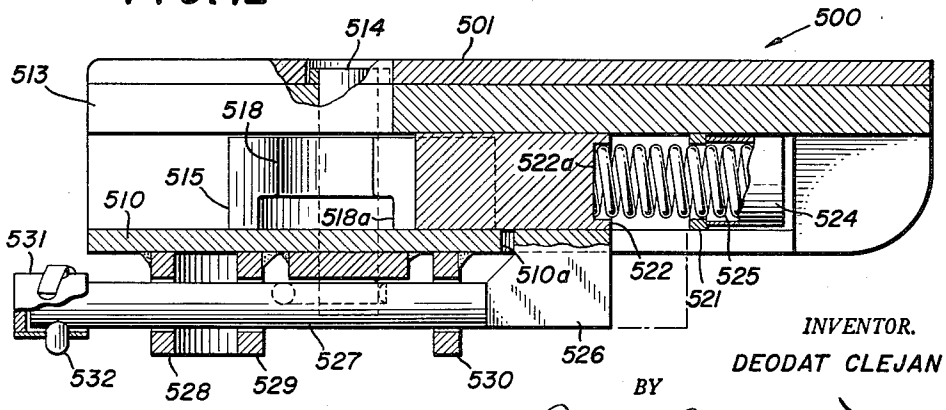


FIG. 12



INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton, Miller & Vogel
ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320
FIFTH-WHEEL MECHANISMS FOR HITCHES
CARRIED BY RAILWAY CARS
Original Filed Dec. 22, 1959 14 Sheets-Sheet 7

FIG. 13

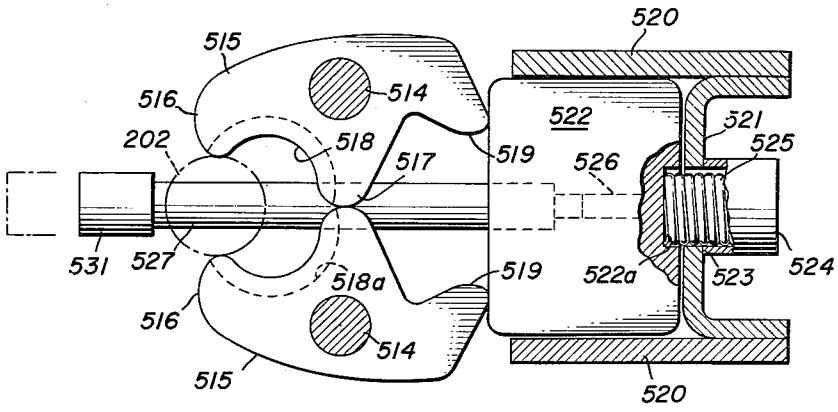


FIG. 14

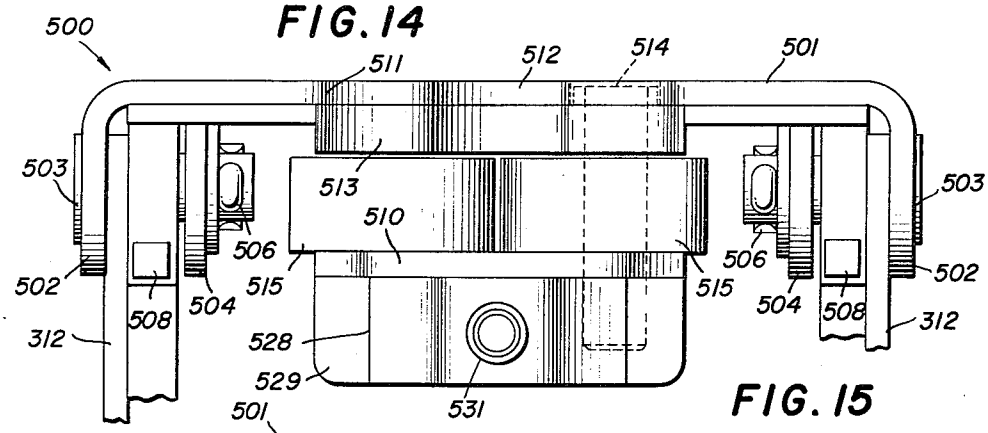


FIG. 15

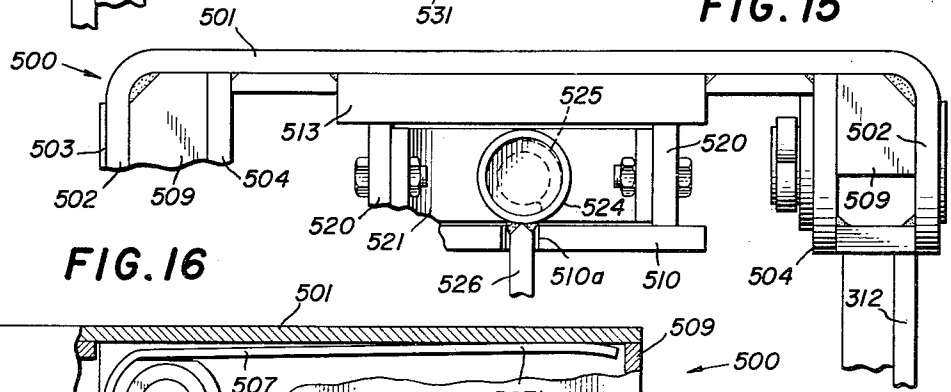
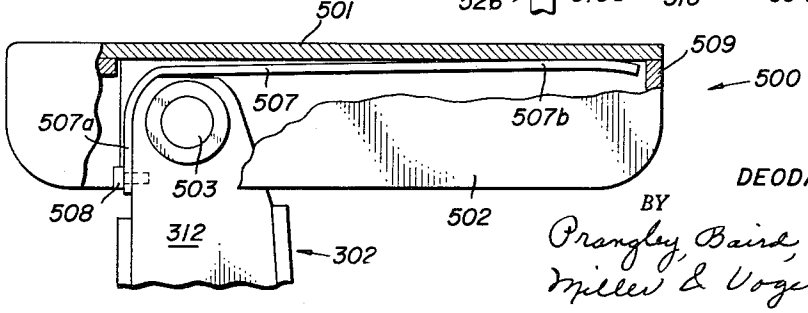


FIG. 16



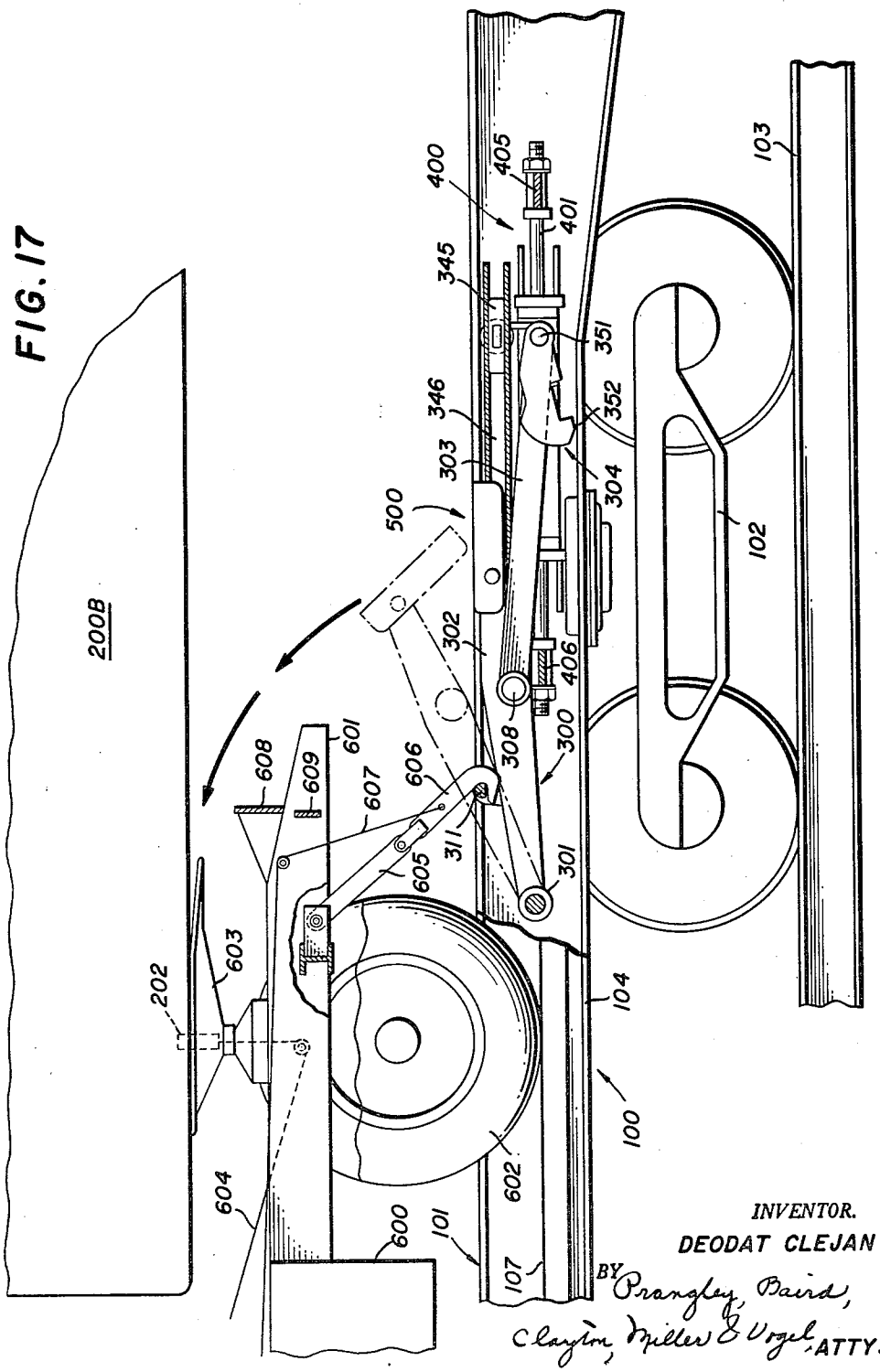
INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton, Miller & Vogel, ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 8

FIG. 17



INVENTOR.
DEODAT CLEJAN
BY Brangley, Baird, Clayton, Miller & Vogel, ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320
FIFTH-WHEEL MECHANISMS FOR HITCHES
CARRIED BY RAILWAY CARS
Original Filed Dec. 22, 1959 14 Sheets-Sheet 9

FIG. 19

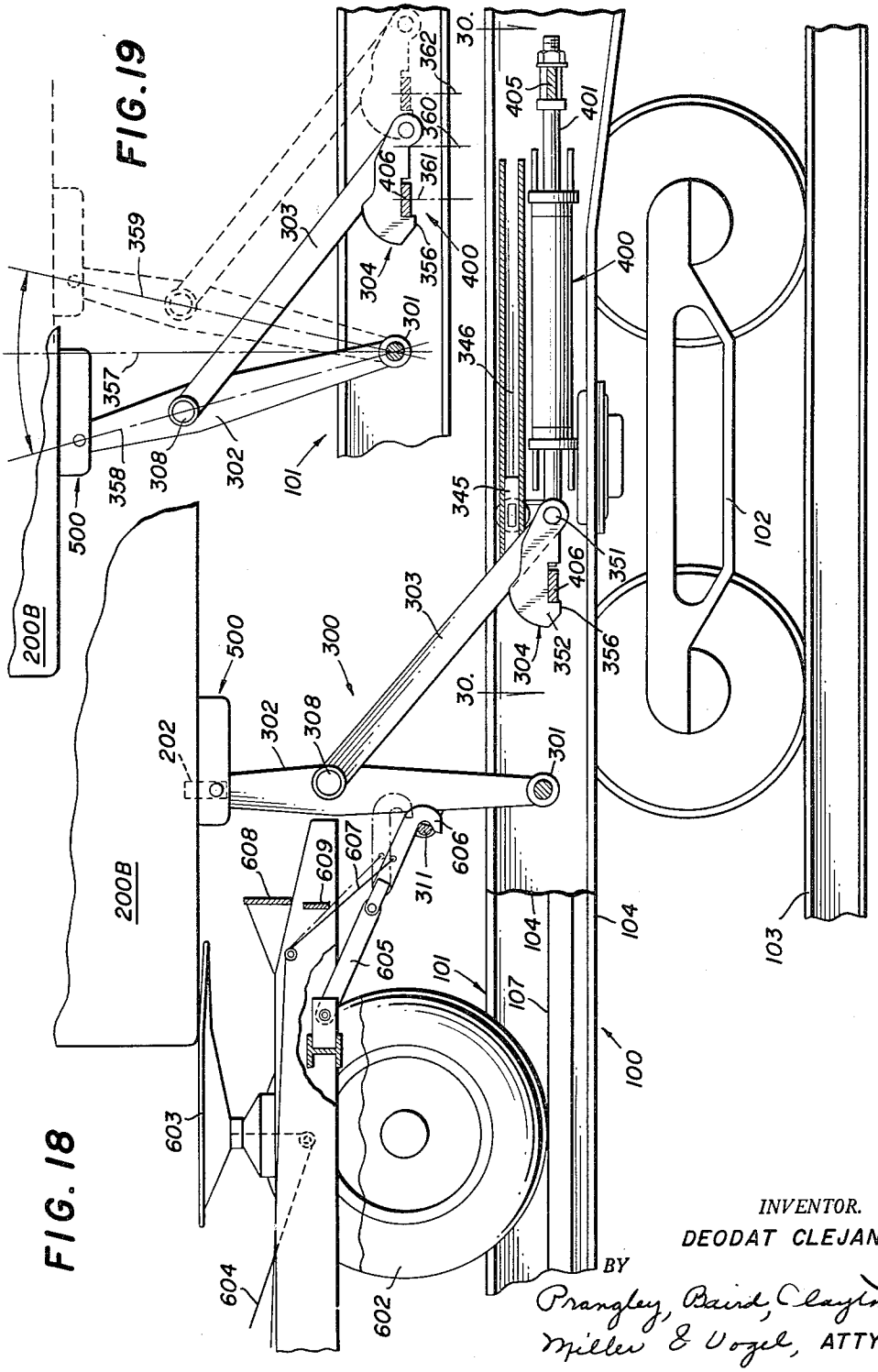


FIG. 18

INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton,
Miller & Vogel, ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 10

FIG. 21

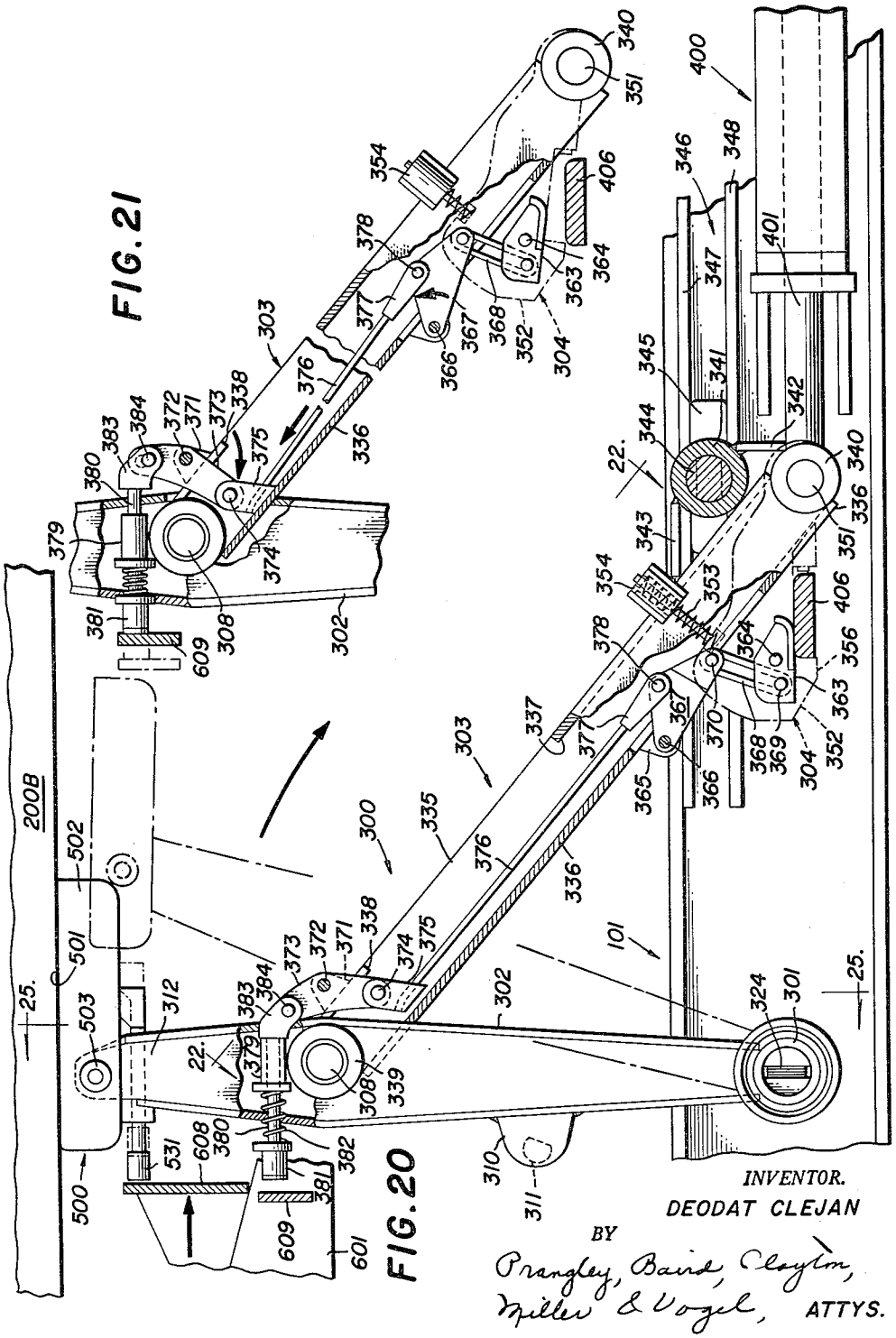


FIG. 20

INVENTOR.
DEODAT CLEJAN
BY
Prangley, Baird, Clayton, Miller & Vogel, ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 11

FIG. 22

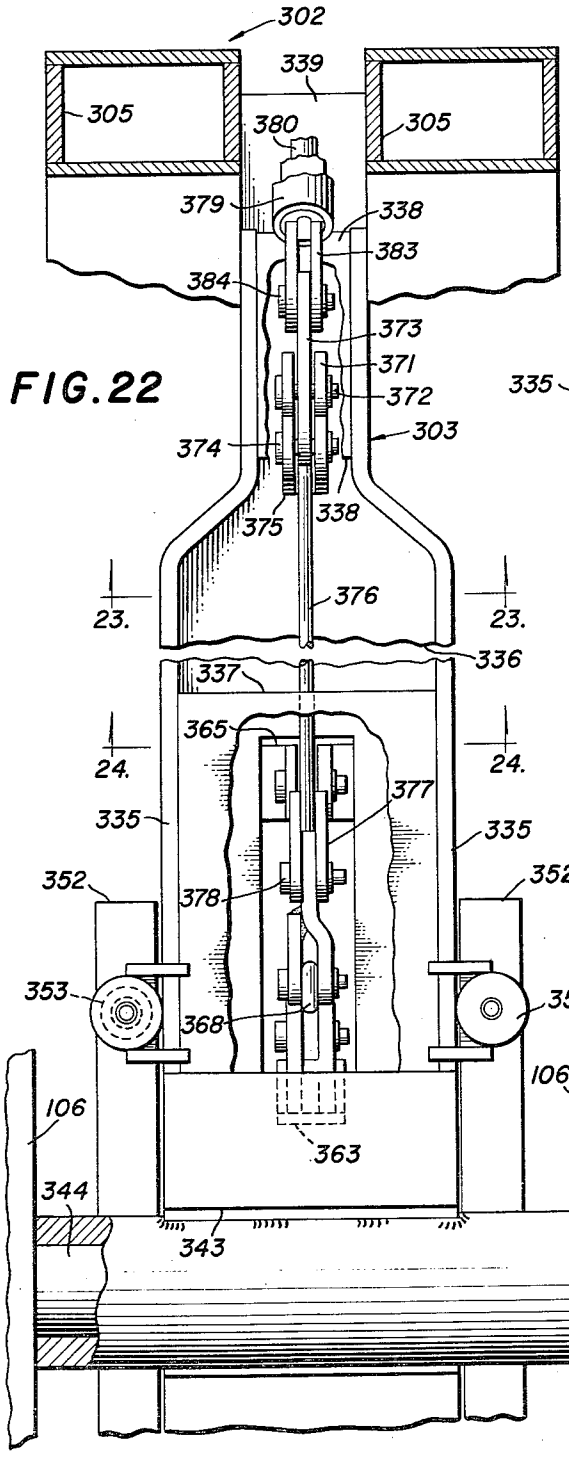


FIG. 23

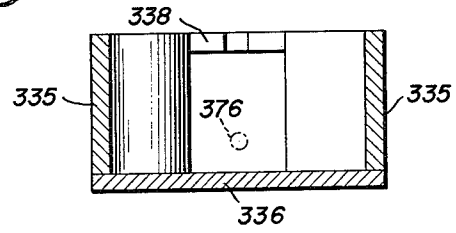
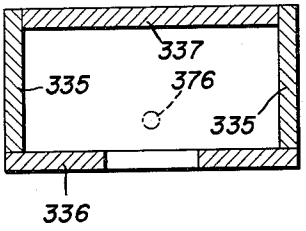


FIG. 24



INVENTOR.
DEODAT CLEJAN
BY Brangley, Baird, Clayton, Miller & Vogel, ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320
FIFTH-WHEEL MECHANISMS FOR HITCHES
CARRIED BY RAILWAY CARS
Original Filed Dec. 22, 1959 14 Sheets-Sheet 12

FIG. 25

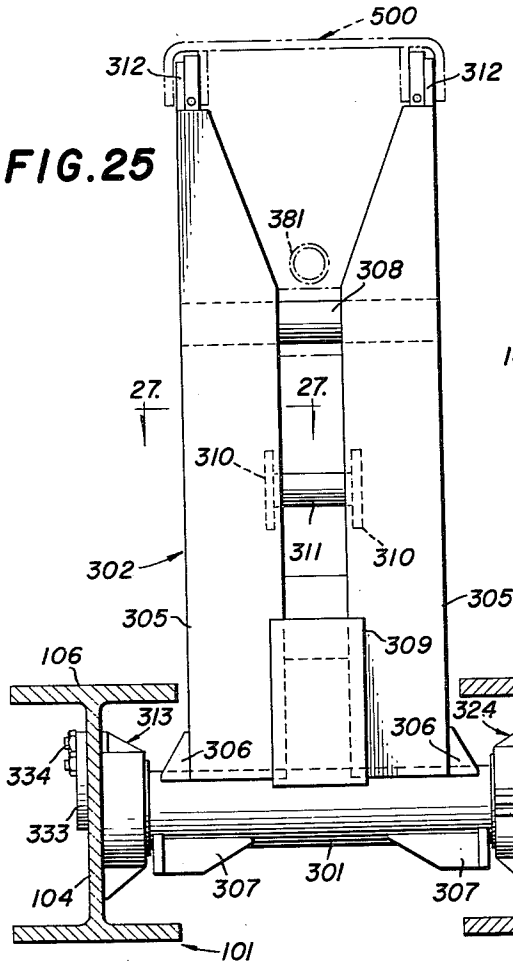


FIG. 26

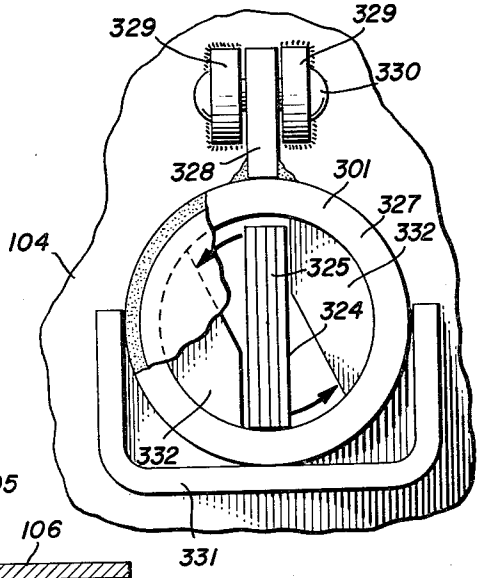
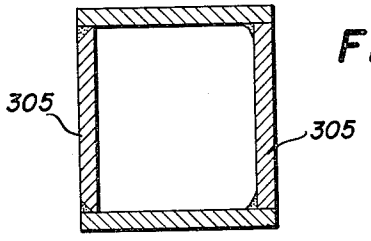


FIG. 27



INVENTOR.
DEODAT CLEJAN
Prangley, Baird, Clayton, Miller & Vogel,
ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 13

FIG. 28

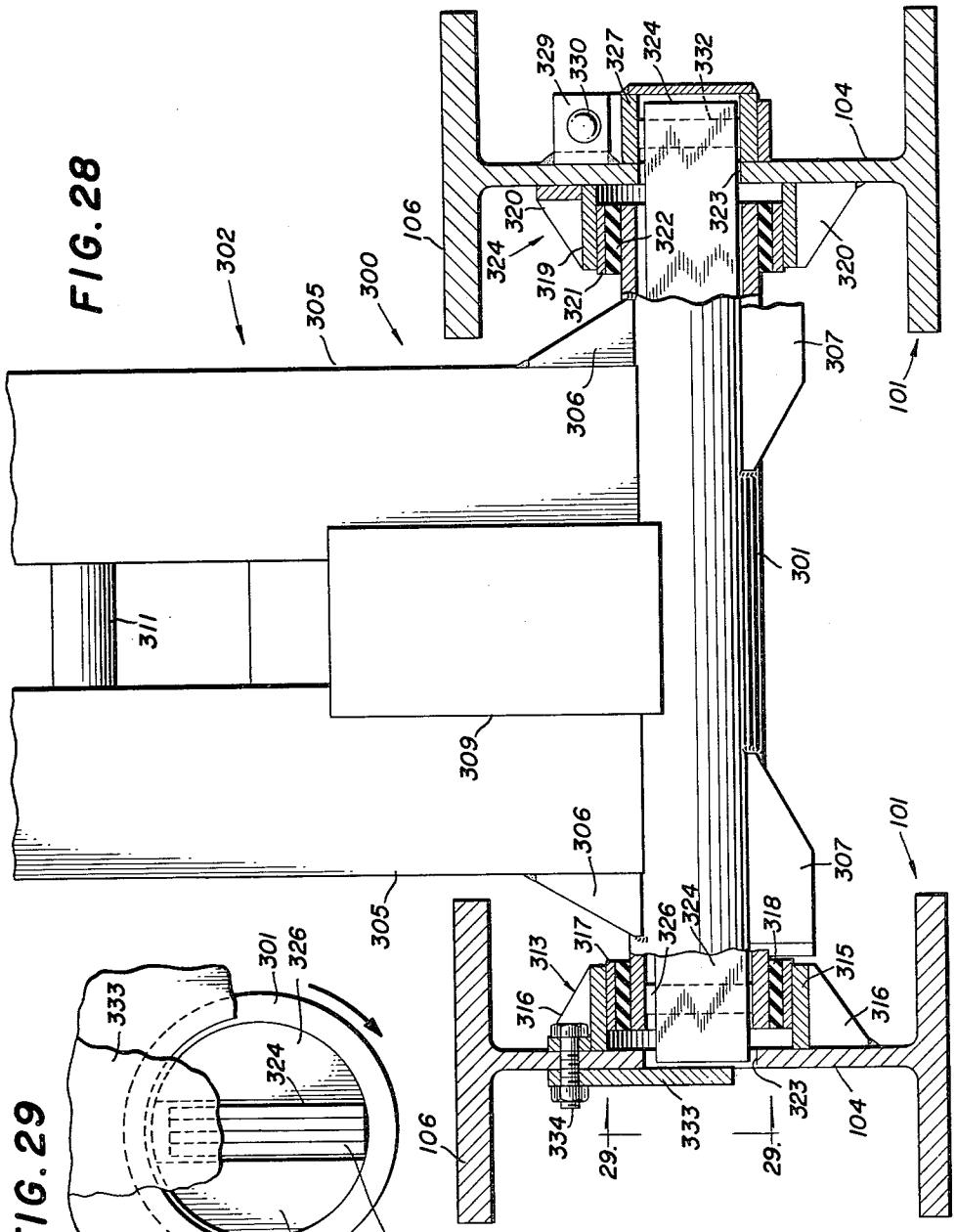


FIG. 29

INVENTOR.
DEODAT CLEJAN

BY
Prangley, Baird, Clayton, Miller & Vogel,
ATTYS.

Aug. 21, 1962 D. CLEJAN 3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Original Filed Dec. 22, 1959 14 Sheets-Sheet 14

FIG. 30

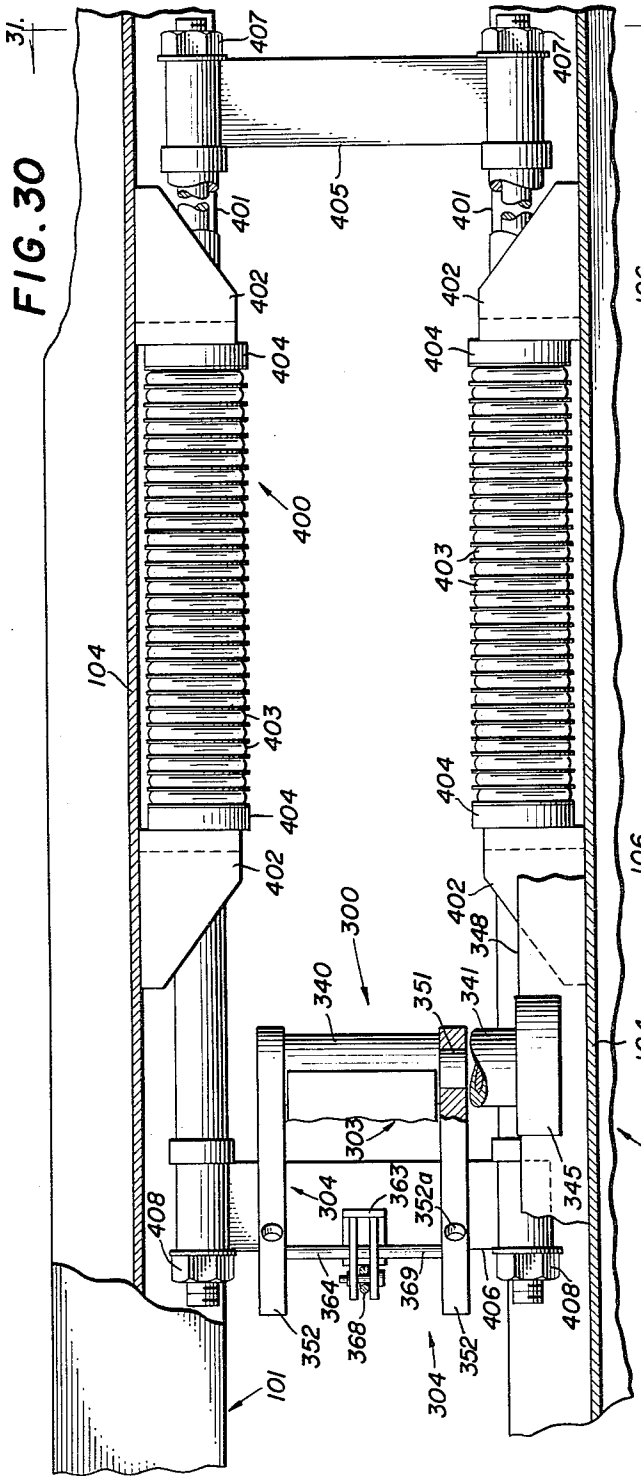
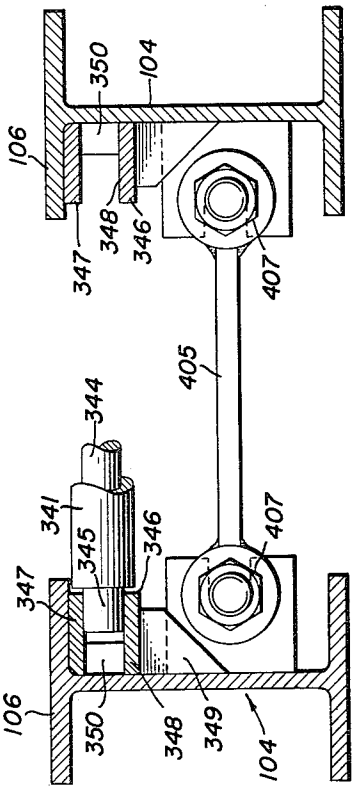


FIG. 31



INVENTOR.
DEODAT CLEJAN
BY Prangley, Baird, Clayton, Miller & Vogel ATTYS.

United States Patent Office 3,050,320 Patented Aug. 21, 1962

3,050,320

FIFTH-WHEEL MECHANISMS FOR HITCHES CARRIED BY RAILWAY CARS

Deodat Clejan, Chicago, Ill., assignor to General American Transportation Corporation, Chicago, Ill., a corporation of New York

Original application Dec. 22, 1959, Ser. No. 861,291. Divided and this application Nov. 16, 1960, Ser. No. 69,628

3 Claims. (Cl. 287—20)

The present invention relates to fifth-wheel mechanisms for hitches carried by railway cars, and more particularly to such fifth-wheel mechanisms that are adapted selectively to support and to retain in place cooperating king pins respectively carried by the front ends of road semi-trailers mounted upon the railway cars.

This application comprises a division of the copending application of Deodat Clejan, Serial No. 861,291, filed December 22, 1959.

It is the principal object of the invention to provide a fifth-wheel mechanism of the character described, that is of improved and simplified construction and arrangement.

Another object of the invention is to provide a fifth-wheel mechanism of the character noted, that is especially adapted for use in a folding hitch that is mounted upon a railway car that is especially adapted for the transportation of road semi-trailers; whereby the fifth-wheel mechanism is movable into a storage position disposed within a recess provided in the top of the railway car, incident to movement of the hitch into its folded position of non-use, so that the fifth-wheel mechanism in its storage position is disposed in a non-interfering position with respect to longitudinal movements of road semi-trailers in supported positions along the top of the railway car.

A further object of the invention is to provide in a road semi-trailer hitch, a fifth-wheel mechanism of improved construction and arrangement, that includes locking jaws that are selectively movable between locked and unlocked positions with respect to the depending king pin carried by the front end of a cooperating road semi-trailer, and an improved arrangement for selectively actuating the locking jaws mentioned between their locked and unlocked positions.

Further features of the invention pertain to the particular arrangement of the elements of the fifth-wheel mechanism, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a fractured side elevational view of a freight transportation system including a railway car provided with a first semi-trailer hitch incorporating a first fifth-wheel mechanism embodying the present invention, this figure illustrating the left-hand end of the railway car mounting an equipped road semi-trailer;

FIG. 2 is another fractured side elevational view of the freight transportation system, including the railway car provided with a second semi-trailer hitch incorporating a second fifth-wheel mechanism embodying the present invention, this figure illustrating the right-hand end of the railway car mounting an unequipped road semi-trailer;

FIG. 3 is an enlarged plan view, partly broken away, of the left-hand end of the railway car, taken in the direction of the arrows along the line 3—3 in FIG. 1;

FIG. 4 is a greatly enlarged side elevational view of the railway car, illustrating the railway bridging rail and the roadway bridging platform carried thereby, this figure

being taken in the direction of the arrows along the line 4—4 in FIG. 3;

FIG. 5 is a greatly enlarged lateral sectional view of the railway bridging rail and the roadway bridging platform, taken in the direction of the arrows along the line 5—5 in FIG. 4;

FIG. 6 is an enlarged lateral sectional view of the railway car, taken in the direction of the arrows along the line 6—6 in FIG. 1, and illustrating the supporting arrangement for the mounted equipped road semi-trailer;

FIG. 7 is an enlarged lateral sectional view of the railway car, taken in the direction of the arrows along the line 7—7 in FIG. 2, and illustrating the supporting arrangement for the mounted unequipped road semi-trailer;

FIG. 8 is a diagrammatic plan view of a conventional railway flat car provided with outside wheel guide rails, and mounting an unequipped road semi-trailer, and illustrating undesirable jack-knifing tendency incident to misaligned loading of the road semi-trailer upon the railway car;

FIG. 9 is a diagrammatic plan view of the inventive railway car of FIGS. 1 and 2 incorporating inside wheel guide rails, and mounting an unequipped road semi-trailer, and illustrating desirable centering tendency incident to misaligned loading of the road semi-trailer upon the railway car;

FIG. 10 is a greatly enlarged fragmentary lateral sectional view of the railway car of FIGS. 1, 2 and 9, illustrating one of the roadway platforms and one of the inside wheel guide rails incorporated therein;

FIG. 11 is a greatly enlarged plan view, partly broken away, of the fifth-wheel mechanism incorporated in the semi-trailer hitch, as shown in FIG. 2, the jaws of this fifth-wheel mechanism being illustrated in their closed positions;

FIG. 12 is a greatly enlarged longitudinal sectional view of this fifth-wheel mechanism, taken in the direction of the arrows along the line 12—12 in FIG. 11;

FIG. 13 is a greatly enlarged fragmentary plan view, similar to FIG. 11, illustrating the jaws of this fifth-wheel mechanism in their open positions;

FIG. 14 is a greatly enlarged front elevational view of this fifth-wheel mechanism, taken in the direction of the arrows along the line 14—14 in FIG. 11;

FIG. 15 is a greatly enlarged rear elevational view of this fifth-wheel mechanism, taken in the direction of the arrows along the line 15—15 in FIG. 11;

FIG. 16 is an enlarged side elevational view, partly broken away, of this fifth-wheel mechanism of FIG. 11;

FIG. 17 is an enlarged side elevational view, partially diagrammatic, of the railway car and the equipped road semi-trailer, as shown in FIG. 1, and also illustrating the rear end of a tractor that is employed in loading the semi-trailer upon the railway car, this figure particularly illustrating the initial step in operating the cooperating semi-trailer hitch from its storage position into its erected position;

FIG. 18 is another enlarged side elevational view, similar to FIG. 17, partially diagrammatic, of the railway car and the equipped road semi-trailer, as shown in FIG. 1, and illustrating the rear end of the tractor that is employed in loading the semi-trailer upon the railway car, this figure particularly illustrating the final step in operating the cooperating semi-trailer hitch from its storage position into its erected position and the transfer of the king pin from the fifth-wheel mechanism carried by the rear end of the tractor to the fifth-wheel mechanism carried by this hitch;

FIG. 19 is an enlarged fragmentary side elevational view of this semi-trailer hitch in its erected position, as shown in FIG. 18, and illustrating the extreme forward

and rearward pivotal positions thereof with respect to its normal upstanding attitude, incident to shock-absorbing actions therein;

FIG. 20 is a greatly enlarged fragmentary side elevational view of this semi-trailer hitch in its erected position, as shown in FIG. 18, and illustrating both the latch mechanism provided in this hitch for restraining the same in its erected position and the latch mechanism provided in the fifth-wheel mechanism carried thereby, and also illustrating the cooperation between certain elements carried by the extreme rear end of the tractor and the two latch mechanisms mentioned, this figure further illustrating the latch position of the latch mechanism carried by this hitch;

FIG. 21 is another greatly enlarged fragmentary side elevational view, similar to FIG. 20, of the latch mechanism provided in this semi-trailer hitch, and illustrating the linkage incorporated therein immediately following tripping of the latch mechanism;

FIG. 22 is a greatly enlarged fragmentary plan view of the diagonal strut incorporated in this semi-trailer hitch, taken in the direction of the arrows along the lines 22—22 in FIG. 20;

FIG. 23 is a greatly enlarged transverse sectional view of the diagonal strut, taken in the direction of the arrows along the line 23—23 in FIG. 22;

FIG. 24 is a greatly enlarged transverse sectional view of the diagonal strut, taken in the direction of the arrows along the line 24—24 in FIG. 22;

FIG. 25 is a greatly enlarged rear elevational view of the standard incorporated in this semi-trailer hitch, taken in the direction of the arrows along the line 25—25 in FIG. 20;

FIG. 26 is a greatly enlarged end elevational view, partly broken away, of the trunnion arrangement mounting one lower end of the standard, taken in the direction of the arrows along the line 26—26 in FIG. 25;

FIG. 27 is a greatly enlarged transverse sectional view of the standard, taken in the direction of the arrows along the line 27—27 in FIG. 25;

FIG. 28 is a greatly enlarged fragmentary rear view of the lower portion of the mounting arrangement for the standard, as shown in FIG. 25;

FIG. 29 is a greatly enlarged end elevational view, partly broken away, of the trunnion arrangement mounting the other lower end of the standard, taken in the direction of the arrows along the line 29—29 in FIG. 28;

FIG. 30 is a greatly enlarged fragmentary horizontal sectional view of one of the shock-absorbing mechanisms mounted in the center sill of the railway car and cooperating with the semi-trailer hitch of FIGS. 1 and 18, this figure being taken in the direction of the arrows along the line 30—30 in FIG. 18; and

FIG. 31 is a greatly enlarged lateral sectional view of this shock-absorbing mechanism, taken in the direction of the arrows along the line 31—31 in FIG. 30.

Referring now to FIGS. 1 and 2 of the drawings, the freight transportation system there illustrated is of the construction and arrangement of that disclosed in the copending parent application of Deodat Clejan, Serial No. 861,291, filed December 22, 1959; which system essentially comprises a railway car 100 of the universal type in that it is adapted to support and to transport indiscriminately road vehicles of first and second types. As illustrated, a road vehicle 200A of the first type is mounted on the right-hand end of the railway car 100 and a road vehicle 200B of the second type is mounted on the left-hand end of the railway car 100. Specifically, the road vehicle 200A of the first type is in the form of a road semi-trailer and essentially comprises a chassis provided with a rear end carrying road wheels 201 and a front end carrying both a king pin 202 and a front landing gear 203, as well as a body 204 adapted to receive the cargo that is to be transported. The road vehicle 200B of the second type is also in the form of a road semi-trailer and is essentially of the same construction as that of the road vehicle 200A of the first type, except that it also carries at the rear end thereof dolly mechanisms including track rollers, indicated at 205. Accordingly, it will be understood that the road semi-trailer 200A of the first type is entirely conventional and is unequipped with respect to the dolly mechanisms mentioned; whereas the road semi-trailer 200B of the second type is entirely conventional, except for the incorporation therein of the dolly mechanisms mentioned. Thus hereinafter, the road semi-trailer 200A of the first type is referred to as an "unequipped" trailer, while the road semi-trailer 200B of the second type is referred to as an "equipped" trailer.

Before proceeding with further description of the structural details of the trailers 200A and 200B, it is pointed out that the railway car 100 of the universal type essentially comprises, as best shown in FIGS. 1, 2, 3, 6 and 7, a longitudinally extending center sill 101 of "fish-belly" construction supported at the opposite ends thereof by a pair of trucks 102 of standard rail gauge that cooperate with an associated railway track 103, also of standard rail gauge. The center sill 101 essentially comprises a pair of longitudinally extending and laterally spaced-apart I-beams 104 that are suitably connected together at a plurality of longitudinally spaced-apart points by a corresponding plurality of cross braces 105. The top flanges 106 of the I-beams constitute a pair of longitudinally extending and laterally spaced-apart rails provided on the top of the center sill 101 and constituting a trackway of given narrow gauge. Also the railway car 100 comprises a pair of longitudinally extending and laterally spaced-apart platforms 107 respectively carried by the outer sides of the webs of the I-beams 104 and respectively projecting outwardly therefrom and disposed below the top flanges 106 and constituting a roadway of standard road gauge. In the arrangement, and as best shown in FIGS. 6, 7 and 10, each of the platforms 107 is supported by a a plurality of longitudinally spaced-apart and laterally outwardly projecting cantilever beams 108 disposed therebelow in supporting relation therewith, the inner ends of the beams 108 being rigidly secured, as by welding, to the outer side of the web of the adjacent I-beam 104.

Specifically, each of the platforms 107 is of fabricated structure and of substantial box-like configuration, including an outer downwardly turned flange 109 and an inner upwardly turned flange 110. Also, the railway car 100 comprises a pair of longitudinally extending and laterally spaced-apart wheel guide rails 111 respectviely carried upon the extreme upper ends of the upwardly directly flanges 110 provided on the inner edges of the platforms 107. As best shown in FIG. 10, each of the wheel guide rails 111 is preferably of substantially tubular form and is secured, as by welding, upon the extreme upper end of the associated upwardly directed flange 110; whereby each of the wheel guide rails 111 is disposed below the adjacent rail 106 carried on the top of the associated I-beam 104 and above the top of the associated platform 107. Also, each of the wheel guide rails 111 is disposed laterally outwardly of the adjacent rail 106 and laterally inwardly of the inner edge of the associated platform 107 and presents a smooth outwardly facing rubbing surface to the adjacent inner surface of the inner road wheel 201 carried by an unequipped trailer 200A; which arrangement is utilized for a purpose more fully explained hereinafter.

As best shown in FIG. 7, the unequipped trailer 200A is provided at the rear end thereof with spring mechanisms 210 carrying a pair of laterally extending tandem axles 211 that, in turn, carry the road wheels 201 on the outer ends thereof, dual road wheels 201 being illustrated for the purpose of description. When the unequipped trailer 200A is mounted upon the top of the railway car 100, the road wheels 201 directly engage the platforms 107 so that the rear axles 211 straddle the top of the center sill 101 and are positioned above the track rails 106 and

out of contact therewith, as clearly illustrated in FIG. 7.

As best shown in FIG. 6, the equipped trailer 200B is constructed at the rear end thereof in a manner identical to that of the unequipped trailer 200A, as shown in FIG. 7, except for the provision of the previously mentioned dolly mechanisms, indicated at 220. For the purpose of the present description, the dolly mechanisms 220 have been illustrated as essentially comprising brackets 221 suitably secured to the opposite sides of the rear axles 211 in straddling relation with respect to the respectively associated spring mechanisms 210; whereby the track rollers 205 respectively carried by the brackets 221 are disposed directly below the spring mechanisms 210 and are of the previously mentioned narrow gauge of the track rails 206. When the equipped trailer 200B is mounted upon the top of the railway car 100 the track rollers 205 carried by the rear axles 211 straddle the track rails 106 and engage the same for the purpose of supporting the rear end of the trailer 200B so as to mount the same upon the top of the center sill 101 with the road wheels 201 projecting outwardly over the platforms 107 and positioned thereabove and out of contact therewith, as clearly illustrated in FIG. 6.

Recapitulating: When the unequipped trailer 200A is mounted upon the top of the center sill 101, the rear end thereof is directly supported by the engagements between the road wheels 201 and the platforms 107; and when the equipped trailer 200B is mounted upon the top of the center sill 101, the rear end thereof is directly supported by the engagements between the track rollers 205 and the track rails 106.

Again referring to FIGS. 1 and 2, the railway car 100 carries two longitudinally spaced-apart semi-trailer hitches 300 of identical construction and arrangement, one of the hitches 300 being disposed adjacent to the left-hand end of the railway car 100, as shown in FIG. 1, and normally disposed in supporting relation with the cooperating front end of the trailer 200B mounted upon the left-hand end of the railway car 100, and the other of the hitches 300 being disposed adjacent to the central portion of the railway car 100, as shown in FIG. 2, and normally disposed in supporting relation with the cooperating front end of the trailer 200A mounted upon the right-hand end of the railway car 100. As explained more fully hereinafter, the hitch 300 disposed in supporting relation with the front end of the trailer 200B also normally latches in place the king pin 202 thereof; and similarly, the hitch 300 disposed in supporting relation with the front end of the trailer 200A also normally latches in place the king pin 202 thereof. Accordingly, regardless of the type of the semi-trailer 200A or 200B that is mounted upon the top of the railway car 100, the front end thereof is always supported in the same manner by the cooperating hitch 300, and also regardless of the mounted position of the semi-trailer with respect to the opposite ends of the railway car 100.

A plurality of the railway cars 100 are normally arranged in a train, the adjacent ends of the railway cars being coupled together by car couplers, not shown; and the semi-trailers 200A and 200B are loaded indiscriminately upon the string of railway cars 100 longitudinally with respect to the train. In order to accommodate such longitudinal loading of the trailers 200A and 200B, each of the railway cars 100 comprises end structure providing both a continuous trackway and a continuous roadway along the train of railway cars 100; and this end structure that is provided at the left-hand end of the railway car 100 is best shown in FIGS. 1, 3, 4 and 5. More particularly, and referring to FIG. 3, the lower car rail 106 has pivotally connected thereto a bridging rail 120 and the lower car platform 111 has pivotally connected thereto a bridging platform 121. As best shown in FIGS. 4 and 5, the inner end of the bridging rail 120 is pivotally connected by a pivot pin 122 to the adjacent extreme outer end of the lower car rail 106 and the inner end of the bridging platform 121 is pivotally connected by a pivot pin 123 to the adjacent extreme outer end of the lower car platform 107. The outer end of the bridging rail 120 is provided with structure 124 that is adapted to cooperate with an abutment, indicated at 125, carried by the adjacent extreme outer end of the rail structure of the coupled railway car; and the extreme outer end of the bridging platform 121 is provided with structure 126 that is adapted to cooperate with an abutment, indicated at 127, carried by the adjacent extreme outer end of the platform structure of the coupled railway car. The bridging rail 120 and the bridging platform 121 each have active positions, indicated in solid lines in FIG. 4, and inactive positions, indicated in dotted lines in FIG. 4; and the bridging rail 120 and the bridging platform 121 are movable together between their active and inactive positions, as explained more fully hereinafter. More particularly, when the bridging rail 120 occupies its active position, its lower position illustrated in FIG. 4, the structure 124 engages the adjacent abutment 125, thereby completing a continuous rail system between the two coupled railway cars 100; and likewise, when the bridging platform 121 occupies its active position, its lower position illustrated in FIG. 4, the structure 126 engages the abutment 127, thereby completing a continuous road system between the two coupled railway cars 100.

It will be understood that the right-hand end of the railway car 100 comprises end structure identical to that provided at the left-hand end of the railway car 100, except that the bridging rail and the bridging platform involved are disposed in cooperating relation with respect to the upper car rail 106 and the upper car platform 107. Accordingly, each railway car 100 carries at each end thereof end structure that is complementary to the end structure carried by either end of any other railway car 100, so that, either end of any railway car 100 may be connected to either end of another railway car 100. This will be best understood by reference to FIG. 3, wherein it will be appreciated that the rail bridge 120 and the platform bridge 121 carried at the left-hand end of the raliway car illustrated produces continuous rail and road systems with respect to the lower side of the right-hand end of the coupled railway car, not shown, disposed at the left of the railway car 100 illustrated; while the rail bridge indicated at 120' and the platform bridge indicated at 121' carried at the right-hand end of the coupled railway car, not illustrated, produce continuous rail and road systems with respect to the upper side of the left-hand end of the railway car 100 illustrated. Also it is noted that, as shown in FIG. 3, the upper surfaces of the car platforms 107 and the upper surfaces of each of the bridging platforms 121 may carry embosses, respectively indicated at 107*a* and 121*a*, so as to provide additional frictional contact with the engaging road wheels 201 of a semi-trailer 200A or 200B, or other road vehicle, supported thereby.

Again referring to FIGS. 4 and 5, the bridging rail 120 and the bridging platform 121 are actuated simultaneously by an arrangement including a manually operable lever or handle 130 that is connected at the lower end thereof to a bushing 131 mounted upon a pivot pin carried by a plate 132 secured to the adjacent outer edge of the car platform 107. The bushing 131 is rigidly connected to the inner end of an arm 133, the outer end of which is connected to a tube 134 that is, in turn, connected to the underportion of the bridging platform 121 by a pair of tabs 135. Also, the bridging platform 121 is linked to the bridging rail 120 by an arrangement including a tab 136 carried by the bridging rail 120, and a link 137. One end of the link 137 is connected by a pivot pin 138 arranged in the end of the tube 134 and the other end of the link 137 is connected to the tab 136 by a spindle 139. Accordingly, when the lever or handle 130 is rotated in the clockwise direction, as viewed in FIG. 4, from its position illustrated, the bushing 131 is correspondingly rotated causing the arm 133 to lift the bridging platform 121

from its active position illustrated in full lines into its inactive position illustrated in dotted lines. As the bridging platform **121** is thus rotated in the clockwise direction, as viewed in FIG. 4, about the pivot pin **123**, the motion is transmitted by the link **137** to the bridging rail **120** so that the bridging rail **120** is rotated in the clockwise direction about the pivot pin **122** from its active position illustrated in full lines into its inactive position illustrated in dotted broken lines. Accordingly, it will be understood that the bridging rail **120** and the bridging platform **121** may be readily moved simultaneously between their active and inactive positions by corresponding manipulations of the lever or handle **130**. At this point it is mentioned that the bridging rail **120** and the bridging platform **121** occupy their lowered or active positions only during loading of the semi-trailers **200A** and **200B** upon the coupled railway cars **100**; and after the loading operation, the bridging rail **120** and the bridging platform **121** are operated into their raised or inactive positions. It will, of course, be understood that the inactive positions of the bridging rails **120** and the bridging pulatforms **121** accommodate articulation of the coupled railway cars **100**, without bending or other damage to these bridging elements **120** and **121**.

The above-described mechanism for simultaneously actuating the bridging rail **120** and the bridging platform **121** between their respective active or use positions and their inactive or storage positions is disclosed and claimed in the copending application of Albert E. Price, Serial No. 35,734, filed June 13, 1960.

As previously noted, the semi-trailers **200A** and **200B** are normally loaded longitudinally upon the railway car, and ordinarily a tractor is employed in this operation; which tractor may be either equipped or unequipped. The unequipped tractor is entirely conventional, comprising a chassis provided with a front axle carrying front road wheels that are steered and a rear axle carrying rear road wheels that are driven, as well as a motor and the usual facilities. Also, the rear end of the unequipped tractor carries a conventional fifth-wheel mechanism that is selectively operative between active and inactive positions with respect to the depending king pin **202** carried by the front end of the semi-trailer **200A** or **200B**, the fifth-wheel mechanism in its active position supporting the front end of the semi-trailer and latching the king pin in place, and the fifth-wheel mechanism in its inactive position unlatching the king pin to facilitate the removal of the semi-trailer from its supported position. The equipped tractor is identical to the above described conventional tractor, except that it further comprises low front rollers carried by the front axle and disposed inwardly with respect to the front road wheels, and also driven rear rail wheels disposed inwardly with respect to the rear road wheels. The front rollers are flanged to face inwardly so that they are adapted to straddle the track rails **106** carried on the top of the center sill **101** of the railway car **100** and to guide thereon. The driven rear rail wheels are driven together with the rear road wheels and are also flanged to face inwardly so that they too are adapted to straddle the track rails **106** carried on the top of the center sill **101** of the railway car **100** and to guide thereon.

In the loading operation the fifth-wheel mechanism carried by the tractor, and regardless of the type thereof, is coupled to the king pin **202** carried by the front end of the semi-trailer **200A** or **200B**, and this coupled unit is backed upon the railway car **100**. In the event the unequipped semi-trailer **200A** is involved, the road wheels **201** thereof engage the platforms **107** and cooperate with the wheel guide rails **111** to insure centering of the semi-trailer **200A** upon the top of the railway car **100** as it is backed in place thereon. In the event the equipped semi-trailer **200B** is involved, the low rollers **205** carried by the rear axle **211** straddle and engage the track rails **106** and guide thereon so that the road wheels **201** are disposed above the platforms **107**, whereby automatic centering of the semi-trailer **200B** is assured. The guiding and centering of an unequipped tractor, as it is backed upon the top of the railway car **100**, is substantially identical to that of the unequipped semi-trailer **200A**; and likewise, the centering and guiding of the equipped tractor, as it is backed upon the top of the railway car **100**, is substantially identical to that of the equipped semi-trailer **200B**.

Before describing in greater detail the centering and guiding of an unequipped semi-trailer and an unequipped tractor upon the railway car **100**, reference is made to the schematic diagram of FIGS. 8 and 9. In FIG. 8, there is illustrated a conventional railway flat car **100X** that is provided with outside wheel guide rails **111X** disposed along the opposite sides thereof, and there is shown diagrammatically an unequipped semi-trailer **200A** mounted upon the top of the conventional railway flat car **100X**, and illustrating the case wherein there is substantial misalignment between the center line of the conventional railway car **100X** and the center line of the unequipped semi-trailer **200A**. In FIG. 9, there is illustrated diagrammatically an unequipped semi-trailer **200A** mounted uopn the top of the inventive railway car **100Y**, provided with the inside wheel guide rails **111Y** disposed adjacent to the center thereof and on opposite sides of the center line thereof, and illustrating the case wherein there is substantial misalignment between the center line of the inventive railway car **100Y** and the center line of the unequipped semi-trailer **200A**.

Referring more particularly to FIG. 8, it will be observed that under the conditions mentioned, wherein there is a substantial misalignment between the center line of the unequipped semi-trailer **200A** and the center line of the conventional railway flat car **100X**, as the semi-trailer **200A** is backed, one of the outside road wheels **201** thereof engages the adjacent outside guide rail **111X**, thereby exerting a rotational torque upon the rear end of the semi-trailer **200A** tending to cause further misalignment between the two center lines mentioned and the resulting jack-knifing of the semi-trailer **200A** with respect to the tractor, at the connection between the king pin **202** of the semi-trailer **200A** and the supporting fifth-wheel mechanism carried by the rear end of the tractor. When this occurs, the driver must operate the tractor in the forward direction in order to relieve the jack-knifing mentioned; whereby the loading of the unequipped semi-trailer **200A** upon the conventional flat car **100X** is effected by a series of alternate rearward and forward movements of the unequipped semi-trailer **200A** and the coupled tractor; which operations are, of course, time-consuming and substantially injurious to the rubber of the road wheels carried by these two coupled vehicles.

Referring more particularly to FIG. 9, it will be observed that under the conditions mentioned, wherein there is a substantial misalignment between the center line of the unequipped semi-trailer **200A** and the center line of the inventive railway car **100Y**, as the semi-trailer **200A** is backed, one of the inside road wheels **201** thereof engages the adjacent inside guide rail **111Y**, thereby exerting a rotational torque upon the rear end of the semi-trailer **200A** tending to minimize the misalignment between the two center lines mentioned and the resulting prevention of jack-knifing of the semi-trailer **200A** with respect to the tractor, at the connection between the king pin **202** of the semi-trailer **200A** and the supporting fifth-wheel mechanism carried by the rear end of the tractor. Since this occurs, the driver may continue to operate the tractor in the rearward direction, as the jack-knifing tendency mentioned is automatically relieved; whereby the loading of the unequipped semi-trailer **200A** upon the inventive railway car **100Y** is effected by a continuous rearward movement of the unequipped semi-trailer **200A** and the coupled tractor; which operations are, of course, effected rapidly and without damage to the rubber of the road wheels carried by these two coupled vehicles.

With further reference to the wheel guiding and centering arrangement that is incorporated in the railway car **100**, it will be observed in FIGS. 3 and 4 that the wheel guiding rails **111** extend substantially from end-to-end of the center sill **101** and that each extreme outer end of each wheel guiding rail **111** is flared and curved inwardly toward the web of the adjacent I-beam **104**, as indicated at **111***a*, thereby positively to prevent scuffing of the inside surface of the rubber of the inside road wheels **201** carried by the unequipped road semi-trailer **200A** incident to loading the same upon the railway car **100** in the manner described above.

Referring now to FIGS. 17, 18 and 19, the semi-trailer hitch **300** that is incorporated in the left-hand end of the railway car **100** and arranged in cooperating relation with the equipped semi-trailer **200B** is illustrated in greater detail; which semi-trailer hitch **300** is identical to the semi-trailer hitch **300** incorporated in the central portion of the railway car **100** and arranged in cooperating relation with the unequipped semi-trailer **200A**. The semi-trailer hitch **300** illustrated essentially comprises a laterally extending trunnion **301** supported at the opposite ends thereof in the webs of the laterally spaced-apart I-beams **104** of the center sill **101**, a standard **302**, and a strut **303**; which hitch **300** is operative between a storage position, as shown in FIG. 17, wherein it is disposed within the hollow center sill **101** and below the top thereof, and an erected position, as shown in FIG. 18, wherein it is disposed out of the hollow center sill **101** and well above the top thereof. Also two longitudinally spaced-apart shock-absorbers **400** are incorporated in the center sill **101** and respectively arranged in cooperating relation with the semi-trailer hitches **300**. Furthermore, the upper end of the standard **302** of each of the semi-trailer hitches **300** carries a fifth-wheel mechanism **500**; and as illustrated in FIGS. 18 and 19, when the semi-trailer hitch **300** occupies its erected position, the fifth-wheel mechanism **500** is adapted to support the front end of the associated equipped semi-trailer **200B**, the fifth-wheel mechanism **500** engaging and holding the cooperating king pin **202** depending from the front end of the semi-trailer **200B**, as indicated in FIG. 18. Also, when the hitch **300** occupies its erected position, the rear end of the strut **303** is operatively connected to the shock-absorbing mechanism **400** by latch structure **304** that is carried by the lower end of the strut **303**.

As best shown in FIGS. 20 and 25 to 29, inclusive, the trunnion **301** is of generally tubular form, and the standard **302** comprises a pair of laterally spaced-apart legs **305**, each of substantially box-like form, as shown in FIG. 27, and rigidly secured to the intermediate portion of the trunnion **301**, as by welding. Also, the connections between the lower ends of the legs **305** and the trunnion **301** are reinforced by suitable gusset plates **306** secured in place, as by welding, between the lower ends of the legs **305** and the trunnion **301**. Further, the outer ends of the trunnion **301** are reinforced adjacent to the lower portions thereof by suitable gusset plates **307**, so as to lend the required rigidity to the trunnion **301**. The upper portions of the legs **305** are rigidly secured together by a laterally extending pivot pin **308**, to which the upper end of the strut **303** is pivotally connected, as explained more fully hereinafter; also, the lower ends of the legs **305** are rigidly secured together by a tie plate **309** that is further secured to the adjacent central portion of the trunnion **301**. Further, the front sides of the legs **305** carry forwardly projecting ears **310** between which there is rigidly secured a hook shaft **311** (see FIGS. 20, 25 and 28), that is employed in operating the hitch **300** from its storage position of FIG. 17 into its erected position of FIG. 18. The upper ends of the legs **305** taper outwardly, as illustrated in FIG. 25; and the extreme upper ends of the legs **305** carry a pair of laterally spaced-apart lugs **312** to which the associated fifth-wheel mechanism **500** is pivotally connected, as explained more fully hereinafter.

Referring now to FIGS. 25 to 29, inclusive, the opposite ends of the trunnion **301** terminate respectively adjacent to the inside surfaces of the webs of the associated I-beams **104** and are respectively supported for pivotal movements by associated bearing structures **313** and **314** located between the upper and lower flanges of the respectively associated I-beams **104**. As viewed in FIG. 28, the bearing structure **313** is arranged at the left-hand end of the trunnion **301** and the bearing structure **314** is arranged at the right-hand end of the trunnion **301**; whereby the standard **302** is disposed between the upper flanges or track rails **106** of the I-beams **104** of the center sill **101**, so that the standard **302** may be readily pivoted between its stored and erected positions, as previously noted, without interference with the I-beams **104**. More particularly, the bearing structure **313** comprises a supporting ring **315** that is rigidly secured to the adjacent inner surface of the web of the associated I-beam **104** by a plurality of gusset plates **316**; which supporting ring **315** receives a bearing ring **317** internally thereof and arranged for rotary movements with respect thereto; which bearing ring **317** is arranged in surrounding relation with the adjacent left-hand end of the trunnion **301** with a resilient cushioning ring **318** therebetween. Preferably, the cushioning ring **318** is formed of neoprene; or other resilient rubber-like material, and is bonded to the adjacent inner surface of the bearing ring **317** and to the adjacent outer surface of the left-hand end of the trunnion **301**. Similarly, the bearing structure **314** comprises a supporting ring **319** that is rigidly secured to the adjacent inner surface of the web of the associated I-beam **104** by a plurality of gusset plates **320**; which supporting ring **319** receives a bearing ring **321** internally thereof and arranged for rotary movements with respect thereto; which bearing ring **321** is arranged in surrounding relation with the adjacent ring-hand end of the trunnion **301** with a resilient cushioning ring **322** therebetween. Preferably, the cushioning ring **322** is formed of neoprene, or other resilient rubber-like material, and is bonded to the adjacent inner surface of the bearing ring **321** and to the adjacent outer surface of the right-hand end of the trunnion **301**.

Accordingly, it will be appreciated that the bearing structures **313** and **314** not only support the trunnion **301** for pivotal movements between the webs of the associated laterally spaced-apart I-beams **104**, but they also provide a resilient mounting between the trunnion **301** and the I-beams **104**, thereby effecting cushioning of the standard **302** in its erected position, for a purpose more fully explained hereinafter.

Still referring to FIG. 28, a pair of aligned openings **323** are respectively formed in the webs of the laterally spaced-apart I-beams **104** in alignment with the opposite ends of the tubular trunnion **301**; and arranged within the tubular trunnion **301** and extending laterally therethrough is a torsion member **324** that essentially comprises a plurality of individual leaf springs **325** arranged in stacked relation, as best illustrated in FIGS. 26 and 29. Referring now to FIGS. 28 and 29, a pair of abutments **326** are arranged in the outer left-hand end of the tubular trunnion **301** and rigidly secured thereto; which abutments **326** are disposed on opposite sides of the adjacent left-hand end of the torsion member **324**; whereby the left-hand end of the torsion member **324** rotates directly with the adjacent left-hand end of the trunnion **301** incident to rotation of the trunnion **301** in the bearing structure **313** and **314**. Referring now to FIGS. 28 and 26, a cap **327** is arranged on the outer side of the web of the I-beam **104** disposed on the right-hand side of the center sill **101**, as viewed in FIG. 28; which cap **327** carries an upwardly projecting tab **328** arranged between a pair of outwardly projecting ears **329** rigidly secured to the adjacent outer surface of the adjacent web of the I-beam **104**; and the tab **328** is mounted upon the ears **329** for pivotal movement with respect thereto by an associated pivot pin **330**. Thus, it will be understood that the cap **327** is pivot-

ally movable with respect to the associated web of the I-beam 104 about the pivot pin 330, thereby to afford access to the adjacent right-hand end of the torsion member 324, when the cap 327 occupies its open position with respect to the associated opening 323. Further, a substantially U-shaped retainer 331 is disposed below the cap 327 and rigidly secured to the adjacent surface of the web of the I-beam 104; which retainer 331 restrains the cap 327 against longitudinal movements from side to side, as viewed in FIG. 26. Arranged within the cap 327 are a pair of abutments 332 that are rigidly secured thereto and disposed on opposite sides of the adjacent right-hand end of the torsion member 324.

When the standard 302 occupies its erected position, the torsion member 324 is unstrained and may be removed from its normal position within the trunnion 301 through the opening 323 provided in the web of the adjacent I-beam 104 in the left-hand end of the trunnion 301, as viewed in FIG. 28, after removal of an associated cover 333 carried by the adjacent web of the I-beam 104 and normally secured in place by a bolt 334 provided with an associated nut. Accordingly, when the standard 302 occupies its erected position, the unstrained torsion member 324 extends laterally through the trunnion 301, the left-hand end of the torsion member 324 being disposed between the associated abutments 326 rigdly secured to the trunnion 301 and the right-hand end of the torsion member 324 projecting through the opening 323 provided in the web of the associated I-beam 104 and into the cap 327 and disposed between the abutments 332 rigdly secured thereto. As the standard 302 is moved from its erected positon, as shown in FIG. 18, toward its storage position, as shown in FIG. 17, the trunnion 301 is rotated in the clockwise direction causing the abutments 326 arranged in the left-hand end thereof to twist the left-hand end of the torsion member 324 in the clockwise direction, as viewed in FIG. 29, so that the right-hand end of the torsion member 324 is rotated in the counterclockwise direction, as viewed in FIG. 26. The initial counterclockwise rotation of the torsion member 324, as viewed in FIG. 26, is unopposed; however, after rotation of the torsion member 324 through a predetermined angle in the counterclockwise direction, the right-hand end thereof engages the abutments 332 that are arranged in the cap 327 and rigidly secured thereto, whereby the torsion member 324 is strained as the left-hand end thereof is rotated further in the clockwise direction, as viewed in FIG. 29, since the right-hand end of the torsion member 324 cannot be rotated further in the counterclockwise direction, as viewed in FIG. 26, as the cap 327 is fixedly secured to the web of the adjacent I-beam 104 by the arrangement including the ears 329 and the retainer 331, as shown in FIG. 26. Accordingly, as the standard 302 is pivoted in the clockwise direction from its erected position of FIG. 18, into its storage position of FIG. 17, the torsion member 324 is strained, or twisted between the pair of abutments 326 and the pair of abutments 332, so as to store energy in the torsion member 324 as the standard 302 is pivoted into its final storage position, as shown in FIG. 17. Of course, this straining of the torsion member 324 is productive of a reactive force between the cap 327 and the left-hand end of the trunnion 301, as viewed in FIG. 28, thereby opposing the final pivotal movement of the standard 302 into its storage position, as shown in FIG. 17; which reactive force, tending to move the standard 302 from its storage positon of FIG. 17 back into its erected position of FIG. 18, minimizes the torque that must be exerted from the outside upon the hitch 300 in order to move the same from its storage position of FIG. 17 into its erected position of FIG. 18.

Referring now to FIGS. 20 to 24, inclusive, and 31, the strut 303 is of substantially box-like form including a pair of side plates 335, a bottom plate 336, a lower top plate 337 and an upper top plate 338. The upper ends of the side plates 335 are inwardly offset toward each other, so that the upper end of the strut 303 is substantially narrower in the lateral direction than is the lower end thereof; the upper end of the strut 303 terminates in a laterally extending hollow bearing 339 that is journalled upon the pivot pin 308 extending between the legs 305 of the standard 302; and the lower end of the strut 303 terminates in respective lower and upper laterally extending tubular members 340 and 341 (see particularly FIG. 20). The upper tubular member 341 is rigidly secured to the lower tubular member 340 by an associated gusset plate 342, and the upper tubular member 341 is rigidly secured to the lower top plate 337 by an associated gusset plate 343; whereby the lower end of the strut 303 carries the tubular members 340 and 341 rigidly secured thereto. The upper tubular member 341 constitutes a bearing member in which there is journalled a laterally extending supporting shaft 344; and the opposite ends of the supporting shaft 344 carry a pair of slides 345 that are respectively arranged in a pair of trackways 346 respectively carried by the pair of laterally spaced-apart I-beams 104.

As best shown in FIGS. 20 and 31, each of the trackways 346 is located adjacent to the junction between the upper portion of the web of the associated I-beam 104 and the upper flange 106 thereof and below the inwardly directed projection of the upper flange 106 thereof; and each of the trackways 341 comprises an upper rail element 347 and a lower element 348. The upper rail element 347 may be secured directly to the undersurface of the inwardly directed projection of the upper flange 106, and each of the lower rail elements 347 may be supported by a suitable number of longitudinally spaced-apart gusset plates 349 directly secured to the inner surface of the web of the associated I-beam 104. Finally, the rail elements 347 may be secured together in vertical spaced-apart relationship by a number of longitudinally spaced-apart blocks 350 arranged therebetween.

Accordingly, it will be understood that the upper end of the strut 303 is pivotally connected to the intermediate portion of the standard 302 by the cooperation between the pivot pin 308 and the bearing member 339; while the lower end of the strut 303 is supported by the pair of shoes 345 arranged in sliding engagements with the pair of laterally spaced-apart trackways 346 respectively carried by the laterally spaced-apart I-beams 104 of the center sill 101. Thus the movements of the standard 302 between its storage position of FIG. 17 and its erected position of FIG. 18 are guided upon the center sill 101, and particularly through the strut 303 by the sliding movements of the shoes 345 along the trackways 346. More specifically, when the standard 302 is moved from its erected position, as shown in FIG. 20, the lower end thereof is pivoted in the clockwise direction with the trunnion 301; whereby the lower end of the strut 303 moves toward the right, this movement of the strut 303 being guided by the cooperation between the shoes 345 and the cooperating trackways 346.

Referring now to FIGS. 20, 22 and 30, the lower tubular member 340 carried by the lower end of the strut 303 constitutes a bearing member for a laterally extending shaft 351 that comprises a portion of the previously mentioned latch structure 304. More particularly, the latch structure 304 comprises a pair of laterally spaced-apart latch elements 352 rigidly secured to the extreme outer ends of the shaft 351, the latch elements 352 being disposed outwardly of the respectively adjacent side plates 335 of the strut 303, as shown in FIG. 22. As illustrated, the two latch elements 352 project forwardly with respect to the shaft 351 and are normally biased downwardly in the counterclockwise direction, with respect to the strut 303, as viewed in FIG. 20, by a pair of cooperating laterally spaced-apart coil springs 353. Each of the coil springs 353 cooperates with one of the latch elements 352, one end of the coil spring 353 being arranged in an associated cup 354 rigidly secured to the

adjacent side plate 335 of the strut 303, and the other end of the coil spring 353 being received in a recess 352a provided in the upper surface of the adjacent latch element 352 (see FIG. 30). Each of the latch elements 352 carries a downwardly directed latch portion or dog 356 having set and trip positions with respect to the associated shock-absorbing mechanism 400, as explained more fully below.

Referring now to FIGS. 20, 30 and 31, the shock-absorbing mechanism 400 that cooperates with the associated hitch 300 essentially comprises two longitudinally extending and laterally spaced-apart shaft 401 respectively arranged adjacent to the webs of the associated I-beams 104 of the center sill 101 and generally positioned rearwardly of the cooperating lower end of the strut 303 of the hitch 300. More particularly, the shock-absorbing mechanism 400 is housed within the hollow center sill 101, and each of the longitudinally extending shafts 401 is mounted for longitudinal sliding movements with respect to the associated I-beam 104. As illustrated, each of the shafts 101 is mounted for longitudinal movements in a pair of longitudinally spaced-apart brackets 402 carried by the web of the associated I-beam 104 and projecting inwardly with respect thereto. The intermediate portion of the shaft 401 carries a stack of resilient snubbing rings 403 arranged in surrounding relation with respect thereto and disposed between the brackets 402; which snubbing rings 403 are preferably formed of neoprene, or other resilient cushioning material. Specifically, the snubbing rings 403 are disposed in stacked relation between two longitudinally spaced-apart annular collars 404 arranged in surrounding relationship with respect to the shaft 401 and disposed adjacent to the respective brackets 402. The rear ends of the shafts 401 are operatively connected together by a laterally extending rear tie bar 405, and the front ends of the shafts 401 are operatively connected together by a laterally extending front tie bar 406, the tie bars 405 and 406 being removably secured in place by cooperating nuts 407 and 408 arranged on the threaded rear and front ends of the shafts 401. In the arrangement, the front tie bar 406 cooperates with the pair of latch elements 352 carried by the lower end of the strut 303 of the hitch 300; and specifically, the latch elements 352 are operative into set and trip positions with respect to the front tie bar 406, as respectively shown in FIGS. 20 and 21, and explained more fully hereinafter.

It will be understood that when the front tie bar 406 is moved rearwardly, or to the right, with respect to the center sill 101, the rearwardly moving shafts 401 compress the two stacks of snubbing rings 403 between the left-hand collars 404 and the right-hand brackets 402; and conversely, when the tie bar 406 is moved forwardly, or to the left, with respect to the center sill 101, the forwardly moving shafts 401 compress the two stacks of snubbing rings 403 between the right-hand collars 404 and the left-hand brackets 402. Accordingly, the mechanism 400 not only resiliently opposes the movements of the front tie bar 406 with respect to the normal position thereof, as illustrated in FIG. 30, but it also snubs these movements and dissipates the energy thereof; which snubbing action is, of course, transmitted to the adjacent hitch 300, when the latch structure 304 occupies its set position.

Again referring to FIGS. 18 and 20, when the standard 302 is pivoted in the counterclockwise direction from its storage position, as shown in FIG. 17, into its erected position, as shown in FIG. 18, the strut 303 moves to the left and into an upwardly inclined position, as shown in FIG. 18; whereby the latch elements 352 carried by the rear end of the strut 303 slide over the front tie bar 406 and into their latched positions, as shown in FIGS. 18 and 20; whereby at this time, the lower end of the strut 303 is latched to the adjacent shock-absorbing mechanism 400, thereby to retain the hitch 300 in its erected position. In the erected position of the hitch 300, the standard 302 is biased by the connected shock-absorbing mechanism 400 into a normal upstanding attitude, as shown in FIG. 18, and as indicated by the vertical disposed center line 357, as shown in FIG. 19. At this time, the standard 302 is pivotally movable with the trunnion 301 fore-and-aft with respect to its normal upstanding attitude and longitudinally of the center sill 101 between the extreme forward position, indicated by the center line 358, and the extreme rearward position, indicated by the center line 359, as shown in FIG. 19. These pivotal movements of the standard 302 in its erected position are, of course, transmitted thereto through the fifth-wheel mechanism 500 by the connected equipped semi-trailer 200B, incident to rolling movements of the connected semi-trailer 200B longitudinally of the center sill 101; and these pivotal movements of the standard 302 are transmitted by the strut 303 to the front tie bar 406 of the shock-absorbing mechanism 400; whereby the pivotal movements mentioned are cushioned and limited by the shock-absorbing mechanism 400 effecting corresponding cushioning and limiting of the movements of the semi-trailer 200B. More particularly, as shown in FIG. 19, when the standard 302 occupies its normal upstanding attitude disposed along the center line 357, the front tie bar 406 occupies its normal position disposed along the center line 360; as the standard 302 is pivoted forwardly into the position of the center line 358, the front tie bar 406 is moved forwardly to the position of the center line 361; and as the standard 302 is pivoted rearwardly into the position of the center line 359, the front tie bar 406 is moved rearwardly to the position of the center line 362. From a comparison of the positions of the center lines 357, 358 and 359 with the center lines 360, 361 and 362, it will be appreciated that the movements of the upper end of the standard 302, and consequently of the fifth-wheel mechanism 500 carried thereby, are increased or multiplied with respect to the movements of the front tie bar 406, due to the mechanical advantage of the linkage of the elements incorporated in the hitch 300. In the view of the foregoing, it will be appreciated that the shock-absorbing mechanism 400 prevents the transmission of severe longitudinal shocks from the center sill 101 of the railway car 100 to the equipped semi-trailer 200B connected to the hitch 300 and mounted upon the top of the center sill 101.

Again referring to FIGS. 20 and 21, it is noted that tripping mechanism is incorporated in the hitch 300 for the purpose of selectively operating the latch structure 304 from its latched position, as shown in FIG. 20, into its unlatched position, as shown in FIG. 21. More particularly, a cam 363 is arranged between the laterally spaced-apart latch elements 352 and is pivotally mounted upon a pivot pin 364 extending between the latch elements 352. A pair of laterally spaced-apart ears 365 are carried by the lower end of the strut 303 and connected together by a pivot pin 366; and a lever 367 is pivotally mounted upon the pivot pin 366 and arranged in an opening provided in the bottom plate 336 of the strut 303 and adjacent to the cam 363. A link 368 is connected between a pivot pin 369 carried by the cam 363 and a pivot pin 370 carried by the lever 367. A pair of laterally spaced-apart ears 371 are carried by the upper end of the strut 303 and connected together by a laterally extending pivot pin 372, upon which there is mounted a lever 373. The lower end of the lever 373 is connected by a pivot pin 374 to a fixture 375 that is connected to the upper end of a tie bar 376; and the lower end of the tie bar 376 is connected to a fixture 377 that is connected by a pivot pin 378 to the lever 367. A barrel 379 is secured to the upper end of the standard 302 above the pivot pin 308; and arranged within the barrel 379 is a plunger 380 that is mounted for sliding movement with respect thereto, the outer end of the plunger 380 terminating in a strike button 381, and the plunger 380 being biased toward the left,

as viewed in FIG. 20, by a surrounding coil spring 382 acting between the adjacent ends of the barrel 379 and the strike button 381. The right-hand end of the plunger 380 carries a fixture 383 that is secured by a pivot pin 384 to the upper end of the lever 373. Accordingly, the cam 363 is operatively connected to the strike button 381 through the linkage above described; and moreover, the cam 363 is biased into its position, as shown in FIG. 20, through the linkage described by the coil spring 382.

In order to operate the cam 363 so as to effect lifting of the latch elements 352 in the clockwise direction about the pivot pin 351, as viewed in FIG. 20, and the consequent operation of the latch elements 352 into their unlatching positions with respect to the front tie bar 406 and into the positions as illustrated in FIG. 21, the strike button 381 is operated or moved from its extended position, as shown in FIG. 20, toward the right, as shown in FIG. 21. This movement of the strike button 381 toward the right is against the bias of the coil spring 382; whereby the plunger 380 is moved toward the right with respect to the barrel 379, thereby moving the fixture 383 toward the right, causing the lever 373 to be rotated in the clockwise direction about the pivot pin 372, with the result that the fixture 375 is lifted upwardly moving the tie bar 376 upwardly. The upward movement of the tie bar 376 rotates the lever 367 in the counterclockwise direction, as viewed in FIG. 20, lifting the link 368 upwardly, so that the cam 363 is rotated in the clockwise direction, as viewed in FIG. 20; whereby the lower curved end thereof cams against the top surface of the front tie bar 406, lifting the latch elements 353 upwardly from their latching positions of FIG. 20 into their unlatching positions of FIG. 21. Also, at this time, the force that is exerted upon the strike button 381, following operation of the latch elements 352 into their unlatching positions of FIG. 21, effects clockwise rotation of the standard 302 with the trunnion 301; whereby the hitch 300 is moved from its erected position of FIG. 18 back into its storage position of FIG. 17, since the hitch 300 is gravity-biased into its storage position.

Of course, after the force is removed from the strike button 381, the coil spring 382 returns the strike button 381 and the remainder of the linkage back into the positions, as illustrated in FIG. 20, with the result that the cam 363 is returned back into its normal position; however, at this time, the lower end of the strut 303 has moved rearwardly, guided by the sliding engagements between the shoes 345 and the trackways 346; whereby the hitch 300 in its storage position is operatively disconnected from the associated shock-absorbing mechanism 400, as clearly illustrated in FIG. 17.

Considering now the construction and arrangement of the fifth-wheel mechanism 500, embodying the features of the present invention, and referring to FIGS. 11 to 16, inclusive, this mechanism essentially comprises a head in the form of a top plate 501 defining a table adapted to engage the reinforced understructure of the front end of either an unequipped semi-trailer 200A or an equipped semi-trailer 200B; which top plate 501 is provided with a pair of laterally spaced-apart and downwardly directed side aprons 502 extending longitudinally of the center sill 101 of the railway car 100; which side aprons 502 are pivotally connected adjacent to the front ends thereof, the left-hand ends thereof, as viewed in FIG. 11, to the outwardly directed lugs 312 carried by the upper ends of the legs 305 of the standard 302 by an arrangement including a pair of pivot pins 503. More particularly, a pair of longitudinally extending and laterally spaced-apart plates 504 are respectively arranged inwardly of the side aprons 502 and in spaced relation therewith, the upper edge of the plates 504 being suitably secured, as by welding, to the lower surface of the top plate 501. The plates 504 lend additional rigidity to the structure and respectively receive the inner ends of the previously mentioned pivot pins 503. In the arrangement, each of the pivot pins 503 is disposed within a cylindrical bearing element 505 that extends through aligned openings provided in the adjacent side apron 502 and in the adjacent plate 504, the inner end of the pivot pin 503 having an opening therein through which a cotter key 506 is arranged. Accordingly, the head of the fifth-wheel mechanism 500 is mounted upon the lugs 312 carried by the upper ends of the legs 305 of the standard 302 for pivotal movements about the aligned pivot pins 503; and the head is normally restrained in a position disposed substantially normally to the standard 302, as shown in FIG. 16, by an arrangement including a pair of laterally spaced-apart and longitudinally extending leaf springs 507 acting between the lugs 312 on the standard 302 and the undersurface of the top plate 501. More particularly, as illustrated in FIG. 16, each of the leaf springs 507 is substantially L-shaped, including a short downwardly directed leg 507*a* wrapped over the adjacent lug 312 on the standard 302 and secured in place by an associated screw 508 and a long rearwardly extending leg 507*b* arranged immediately below the undersurface of the top plate 501 and in engagement therewith.

Further, the head of the mechanism 500 comprises a rear plate 509, disposed at the right-hand side of FIG. 11, and a bottom plate 510 spaced below the top plate 501 and cooperating therewith to provide a hollow boxlike structure having an open front end disposed at the left of FIG. 11. Also, a guide slot 511 is formed in the central front portion of the top plate 501 and having rearwardly converging side walls terminating in a substantially semi-circular recess 512 disposed adjacent to the longitudinal center line of the top plate 501 and rearwardly of the front edge thereof; which recess 512 defines a home position for the cooperating depending king pin 202 carried by the front end of an associated semi-trailer 200A, etc.

The lower central portion of the top plate 501 is reinforced by a top block 513 disposed therebelow and positioned forwardly above the bottom plate 510; the top block 513 and the bottom plate 510 are suitably secured in assembled relation with the top block 513 spaced above the bottom plate 510. Also, the top block 513 has a guide slot formed in the front central portion thereof that generally conforms to the guide slot 511 formed in the top plate 501, as well as a centrally disposed semi-circular recess at the rear central portion thereof that generally conforms to the semi-circular recess 512 formed in the top plate 501.

A pair of laterally spaced-apart and vertically disposed pivot pins 514 are arranged on opposite sides of the semi-circular recess 512 and extend through the top block 513 and the bottom plate 510; and upon the pivot pins 514, a pair of locking members 515 are respectively pivotally mounted intermediate the ends thereof. Each of the locking members 515 comprises, as best shown in FIG. 13, a forwardly directed protuberance 516 and an inwardly directed centrally disposed protuberance 517 cooperating to define a forwardly directed substantially semi-circular locking jaw 518; and also, each of the locking members 515 comprises a rearwardly directed cam 519. Accordingly, the locking elements 515 are pivotally mounted upon the pivot pins 514 between the upper block 513 and the lower plate 510 and are movable between locking and unlocking positions with respect to a cooperating king pin 202, indicated in broken lines in FIG. 13.

Also arranged between the top block 513 and the bottom plate 510 and rearwardly of the locking members 513 is guide structure including a pair of longitudinally extending and laterally spaced-apart guide members 520 and a connecting bridge member 521; and arranged between the guide members 520 and forwardly of the bridging member 521, there is disposed a locking block 522. The locking block 522 is located rearwardly of the locking members 515 and forwardly of the bridging member 521 and is mounted for longitudinal sliding movements upon the bottom plate 510 along the longitudinal axis of

the head of the mechanism 500. A centrally disposed opening 523 is arranged in the bridging member 521 that is covered by an associated hollow cap 524; and within the cap 524 there is arranged a compression spring 525. As viewed in FIG. 13, the rear end of the compression spring 525 bears against the end of the cap 524 and the front end of the compression spring 525 is arranged in a recess 522*a* provided in the rear end of the locking block 522; whereby the compression spring 525 biases the locking block 522 forwardly, or toward the left, as viewed in FIG. 13, into engagement with the cams 519 carried by the rear ends of the locking members 515.

When the blocking members 515 occupy their unlocking positions, as shown in FIG. 13, the locking jaws 518 are open and are adapted to receive a cooperating king pin 202 when moved longitudinally rearwardly thereinto and the cams 519 engage the locking block 522; whereby the locking block 522 restrains the locking members 515 in their unlocking positions illustrated, by frictional engagement. At this time, in the event a king pin 202 is moved longitudinally rearwardly between the locking jaws 518, it will pass between the front protuberances 516 carried by the locking members 515 and will engage the centrally disposed protuberances 517 as it arrives in its home position in the semi-circular recess 512 provided in the top plate 501; whereby the engagements of the king pin 202 with the central protuberances 517 rotates the locking members 515 about the pivot pins 514 to spread the cams 519 away from each other, as viewed in FIG. 13, so that the cams 519 ride over the adjacent corners at the front end of the locking block 522, with the result that the compression spring 525 projects the locking block 522 forwardly between the cams 519 and into its locking position, shown in FIG. 11. At this time, the king pin 202 is firmly gripped between the locking jaws 518 and its home position in the semi-circular recess 512 provided in the top plate 501 and is retained in place by virtue of the fact that the locking block 522 is now projected between the cams 519 provided at the rear ends of the locking members 515.

Also, as best illustrated in FIGS. 12 and 13, the locking jaws 518 provided on the front end of the locking members 515 are contoured to define a cavity 518*a* at the lower portions thereof disposed closely adjacent to the top surface of the bottom plate 510, so as to conform to the normal shape of the king pin 202. More particularly, the depending king pin 202 carried by the front end of a semi-trailer 200A or 200B normally comprises an enlarged head that is supported by the top surface of the bottom plate 510 in the home position thereof in the semi-circular recess 512 provided in the top plate 501; whereby the locking jaws 518 grip the shank of the cooperating king pin 202, as well as the enlarged head thereof disposed in the cavities 518*a*, as noted above.

As best shown in FIGS. 12 and 13, the rear end of the block 522 carries a depending tab 526 that is disposed in a cooperating centrally disposed and longitudinally extending slot 510*a* provided in the bottom plate 510; whereby the tab 526 projects downwardly below the bottom plate 510. A longitudinally extending and centrally disposed plunger 527 is mounted below the plate 510 upon a number of depending elements 528, 529 and 530 carried thereby; and the rear end of the plunger 527 is connected to the tab 526. The front end of the plunger 527 projects forwardly of the front end of the head of the mechanism 500 and terminates in a strike button 531 that is secured in place thereupon by an associated cotter key 532. More particularly, the plunger 527 is mounted in cooperating openings provided in the elements 528, 529 and 530 for sliding movements longitudinally of the bottom plate 510, thereby to effect corresponding sliding movements of the connected locking block 522 with respect to the cams 519 carried at the rear ends of the locking members 515.

When the locking jaws 518 carried by the locking members 515 occupy their locking positions, as illustrated in FIGS. 11 and 12, the locking block 522 occupies its forwardly projected position, as previously explained; whereby the plunger 527 occupies its forwardly projected position, also illustrated in FIGS. 11 and 12, the locking block 522 and the plunger 527 being moved into their forward positions by the compression spring 525. At this time, in the event the strike button 531 is struck a blow and moved rearwardly toward the right, as viewed in FIGS. 11 and 12, the plunger 527 is moved rearwardly causing the locking block 522 to move rearwardly against the bias of the compression spring 525 so that the locking block 522 is moved from between the cams 519 in order to accommodate rotational movements of the locking members 515 to move the locking jaws 518 into their unlocking positions with respect to the associated king pin 202, as shown in FIG. 13.

Reconsidering the operation of the hitch 300 and the method of loading the equipped semi-trailer 200B onto the top of the railway car 100, reference is again made to FIGS. 17 and 18, and it is assumed that at this time, the, hitch 300 occupies its storage position, as illustrated in FIG. 17. In this loading operation, a tractor 600 partially illustrated in FIGS. 17 and 18, is employed; and the rear end of the chassis of the tractor 600 is indicated at 601 as being supported by rear road wheels 602; and also, it is assumed that the tractor 600 is of the unequipped type, so that the road wheels 602 thereof are supported upon the road platforms 107 carried on the opposite sides of the center sill 101 of the railway car 100, in the manner previously explained. Also, the rear end of the chassis 601 carries a conventional fifth-wheel mechanism 603 that is adapted to support the front end of the associated semi-trailer 200B and selectively to lock and to unlock the king pin 202 thereof. The fifth-wheel mechanism 603 is arranged automatically to receivie and to lock the associated king pin 202, and the fifth-wheel mechanism 603 may be operated into unlocking relation with respect to the king pin 202 through an associated control cable 604 that may be governed from the cab, not shown, of the tractor 600. Also the rear end of the chassis 601 carries a pivotally mounted link 605 that, in turn, carries a pivotally mounted hook 606; which link 605 and hook 606 may be suitably operated through an associated control cable 607 that may be governed from the cab of the tractor 600. Further, the rear end of the chassis 601 carries two centrally disposed and longitudinally spaced-apart stops or abutments 608 and 609 that are arranged respectively to cooperate with the strike buttons 531 and 381 respectively carried by the fifth-wheel mechanism 500 and by the hitch 300, as indicated in FIG. 20. This arrangement is described more fully below, but, at this time, it is noted that the abutment 608 is disposed more rearwardly than is the abutment 609, so that the abutment 608 first strikes the strike button 531 and immediately thereafter, the abutment 609 strikes the strike button 381.

Returning now to the method of loading the equipped semi-trailer 200B upon the top of the railway car 100 and again referring to FIG. 17, the king pin 202 of the semi-trailer 200B is coupled to the fifth-wheel mechanism 603 carried by the rear end of the chassis 601 of the tractor 600, while the semi-trailer 200B and the tractor 600 are in the freight yard associated with the railway track 103, upon which the railway car 100 is standing. The tractor 600 draws the coupled semi-trailer 200B to the vicinity of the adjacent front end of the railway car 100 and then backs the semi-trailer 200B rearwardly onto the top of the railway car 100, with the rail bridging member 120 and the platform bridging member 121 in their lower positions, in the manner previously explained; whereby the semi-trailer 200B and then the tractor 600 are backed upon the adjacent left-hand end of the railway car 100, the rear end of the semi-trailer 200B

being supported by the engagements between the track rollers 205 and the track rails 106 carried by the top of the I-beams 104 and the road wheels 602 of the tractor 600 engaging the platforms 107 carried by the opposite sides of the center sill 101 of the railway car 100, in the manner previously explained.

More particularly, the semi-trailer 200B is backed over the hitch 300 in its storage position, as shown in FIG. 17 and so that the hook 606 carried by the rear end of the chassis 601 of the tractor 600 is disposed above the hook shaft 311 carried by the standard 302 of the hitch 300. The control cable 607 is manipulated from the cab of the tractor 600, so as to lower the link 605 and the hook 606 in order to cause the hook 606 to engage the hook shaft 311, as illustrated in FIG. 17. At this time, the tractor 600 and the coupled semi-trailer 200B is moved forwardly under the motive power of the tractor 600, so that the hook 606 pulls forwardly upon the hook shaft 311 causing the standard 302 to pivot in the counterclockwise direction about the trunnion 301, as viewed in FIG. 17; whereby the standard 302 is pivoted upwardly and into an upstanding position disposed behind the rear end of the chassis 601 positioning the fifth-wheel mechanism 500 behind the fifth-wheel mechanism 603. At this time, the control cable 604 is actuated in order to operate the fifth-wheel mechanism 603 so as to uncouple the king pin 202 carried by the front end of the semi-trailer 200B while the tractor 600 is driven forwardly pivoting further the standard 302 into its normal upstanding attitude. The tractor 600 is then driven further forwardly so as to pivot the standard 302 into its fully upstanding attitude; whereby the hitch 300 is operated into its fully erected position, as shown in FIG. 18, so that the fifth-wheel mechanism 603 is moved from under the front end of the semi-trailer 200B and the fiifth-wheel mechanism 500 is moved immediately thereafter under the front end of the semi-trailer 200B. At this time, the fifth-wheel mechanism 500 operates automatically to receive the king pin 202 of the semi-trailer 200B and to lock the same in place; and also the latch structure 304 is operated into its latched position with respect to the front tie bar 406 of the shock-absorbing mechanism 400. The tractor 600 is then backed up slightly so as to disengage the hook 606 from the hook shaft 311; and the control cable 607 is actuated from the cab of the tractor 600 so as to raise the link 605 and the hook 606 back into their normal elevated positions. At this time, the tractor 600 is completely disconnected from the hitch 300; the hitch 300 occupies its erected position; and the fifth-wheel mechanism 500 supports the front end of the semi-trailer 200B and locks in place the king pin 202 of the semi-trailer 200B. Accordingly, the front end of the semi-trailer 200B is connected to the fifth-wheel mechanism 500, and the hitch 300 in its erected position is operatively connected to the shock-absorbing mechanism 400. Of course, the tractor 600 is then driven off of the left-hand end of the railway car 100 to be employed in further loading operations. In view of the foregoing, it will be understood that a flying transfer is made of the support of the front end of the semi-trailer 200B from the fifth-wheel mechanism 603 carried by the rear end of the chassis 601 of the tractor 600 to the fifth-wheel mechanism 500 carried by the upper end of the standard 302 of the hitch 300 carried by the railway car 100, with a continuous forward movement of the tractor 600 along the top of the railway car 100.

As previously explained, during the operation of the railway car 100, the semi-trailer 200B is mounted upon the top thereof and is capable of limited longitudinal rolling movements therealong; which longitudinal movements of the semi-trailer 200B and the connected fifth-wheel mechanism 500 take place together, and as a unit, imparting corresponding fore-and-aft movements to the hitch 300 and the consequent transmission of such fore-and-aft movements to the shock-absorbing mechanism 400; whereby the shock-absorbing mechanism 400 absorbs the severe longitudinal shocks effecting cushioned and limited longitudinal movements of the semi-trailer 200B in its mounted position upon the top of the railway car 100.

Considering now the method of unloading the semi-trailer 200B from its mounted position upon the top of the railway car 100, and again referring to FIGS. 17 and 18, and also to FIG. 20, it is noted that the tractor 600 is backed onto the left-hand end of the railway car 100, in the manner previously explained, until the rear end of the chassis 601 thereof is located immediately forwardly with respect to the hitch 300 in its erected position supporting the front end of the semi-trailer 200B. Upon further rearward movement of the tractor 600 along the top of the railway car 100, the fifth-wheel mechanism 603 is moved below the front end of the semi-trailer 200B and then the abutments 608 and 609 sequentionally engage the respective cooperating strike buttons 531 and 381. More particularly, when the abutment 608 engages the strike button 531, the fifth-wheel mechanism 500 is operated in the manner previously explained; whereby the locking jaws 518 incorporated therein are operated into their unlocking positions with respect to the king pin 202 carried by the front end of the semi-trailer 200B; when the abutment 609 engages the strike button 381, the cam 363 is operated to actuate the latch structure 304 into its unlatching position with respect to the front tie bar 406 of the shock-absorbing mechanism 400. Also, the impact from the abutment 609 carried by the rear end of the chassis 601 of the tractor 600 and the strike button 381 effects rotation of the standard 302 in the clockwise direction, with the trunnion 301, as viewed in FIG. 18; whereby the hitch 300 is moved from its erected position of FIG. 18 back into its storage position of FIG. 17 fundamentally by the action of gravity. In the movement of the hitch 300 out of its erected position, the fifth-wheel mechanism 500 disengages the front end of the semi-trailer 200B and immediately thereafter the fifth-wheel mechanism 603 engages and supports the front end of the semi-trailer 200B effecting locking in place of the king pin 202 carried by the front end of the semi-trailer 200B. At this time, the front end of the semi-trailer 200B is supported upon the fifth-wheel mechanism 603 carried by the rear end of the chassis 601 of the tractor 600; whereby the tractor 600 may be driven forwardly off of the left-hand end of the railway car 100 drawing the coupled semi-trailer 200B along therewith, so as to complete the unloading operation. In view of the foregoing, it will be understood that the rearward movement of the tractor 600 along the top of the railway car 100 in the unloading operation described above, is continuous; whereby a flying transfer is made of the support of the front end of the semi-trailer 200B from the fifth-wheel mechanism 500 carried by the hitch 300 to the fifth-wheel mechanism 603 carried by the rear end of the chassis 601 of the tractor 600; and simultaneously the hitch 300 is moved from its erected position of FIG. 18 back into its storage position of FIG. 17.

As a constructional example of the railway car 100: the flanged wheels carried by the trucks 102 and cooperating with the track rails 103 are of standard rail gauge; the longitudinal distance between the striker plates carried at the opposite ends of the center sill 101 is 85 ft. 8 in.; the vertical distance between the top of the road platforms 107 carried by the center sill 101 and the top of the track rails 103 is 3 ft. ½ in.; the vertical distance between the top of the top flanges 106 of the I-beams 104 incorporated in the center sill 101 and the top of the road platforms 107 is 8 in.; the lateral distance between the downwardly turned flanges 109 carried by the opposite sides of the road platforms 107 is 8 ft. 4 in.; the lateral distance between the outside edges of the

top flanges 106 of the I-beams 104 incorporated in the center sill 101 is 3 ft. 3⅛ in.±¼ in.; the lateral distance between the inside edges of the top flanges 106 of the I-beams 104 incorporated in the center sill 101 is 1 ft. 5 15/16 in.±¼ in.; and the other dimensions involved are generally related to those mentioned above in accordance with the scales of the various figures of the drawings.

In view of the foregoing, it is apparent that there has been provided in a freight transportation system involving a railway car, equipped road semi-trailers, unequipped road semi-trailers, equipped tractors and unequipped tractors, an improved arrangement; wherein the railway car incorporates two semi-trailer hitches respectively provided with two shock-absorbing devices; and wherein the two semi-trailer hitches respectively incorporate two fifth-wheel mechanisms of improved construction and arrangement. Also, the railway car is of the universal type in that it is capable of transporting indiscriminately equipped road semi-trailers and unequipped road semi-trailers, while affording shock-absorption protection to the transported road semi-trailers during the transportation thereof. Finally, the two fifth-wheel mechanisms respectively incorporated in the two road semi-trailer hitches incorporated in the railway car are of improved and simplified construction and arrangement.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A hitch for a road semi-trailer of the type including a rear end carrying road wheels and a front end carrying a downwardly projecting king pin; said hitch comprising a head including hollow substantially box-like structure provided with an open front end and vertically spaced-apart top and bottom plates, said top plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating king pin and to define a home position therefor, a pair of locking members arranged within said hollow head and between said plates and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements above the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking positions with respect to a cooperating king pin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws into their locking position, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking position, means biasing said block into its forward position, an elongated slide bar arranged below said bottom plate and mounted for longitudinal movements between forward and rearward positions with respect thereto, the front end of said slide bar projecting longitudinally forwardly of the front end of said head so that it is readily accessible from the exterior when the front end of a semi-trailer is supported by said head, and means connecting the rear end of said slide bar to said block, whereby movement of said slide bar into its rearward position moves said block against said biasing means into its rearward position.

2. A hitch for a road semi-trailer of the type including a rear end carrying road wheels and a front end carrying a downwardly projecting king pin; said hitch comprising a head including hollow substantially box-like structure provided with an open front end and vertically spaced-apart top and bottom plates, said top plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating king pin and to define a home position therefor, a pair of locking members arranged within said hollow head and between said plates and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking positions with respect to a cooperating king pin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws into their locking position, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking position, means biasing said block into its forward position, movement of said locking jaws into their locking position effecting movement of the rear ends of said locking members away from each other, whereby said biasing means moves said block from its rearward position into its forward position, movement of said locking jaws into their unlocking position with said block in its rearward position effecting movement of the rear ends of said locking members toward each other and in front of said block in its rearward position to restrain the same therein, an elongated slide bar arranged below said bottom plate and mounted for longitudinal movements between forward and rearward positions with respect thereto, the front end of said slide bar projecting longitudinally forwardly of the front end of said head so that it is readily accessible from the exterior when the front end of a semi-trailer is supported by said head, and means connecting the rear end of said slide bar to said block, whereby movement of said slide bar into its rearward position moves said block against said biasing means into its rearward position.

3. A hitch for a road semi-trailer of the type including a rear end carrying road wheels and a front end carrying a downwardly projecting king pin; said hitch comprising a head including hollow substantially box-like structure provided with an open front end and vertically spaced-apart top and bottom plates, said top plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating king pin and to define a home position therefor, a pair of locking members arranged within said hollow head and between said plates and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking positions with respect to a cooperating king pin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and re-

straining said locking jaws into their locking position, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking position, means biasing said block into its forward position, movement of said locking jaws into their locking position effecting movement of the rear ends of said locking members away from each other, whereby said biasing means moves said block from its rearward position into its forward position, movement of said locking jaws into their unlocking position with said block in its rearward position effecting movement of the rear ends of said locking members toward each other and in front of said block in its rearward position to restrain the same therein, a pair of actuators respectively carried by the intermediate portions of said locking members and respectively projecting inwardly therefrom below said guide slot, whereby a king pin moving in said guide slot toward its home position first passes through said locking jaws in their unlocking position and then engages said actuators, whereby said locking jaws are

moved from their unlocking position into their locking position, movement of a king pin in said guide slot out of its home position with said block in its rearward position effecting movement of said locking jaws from their locking positions back into their unlocking position, an elongated slide bar arranged below said bottom plate and mounted for longitudinal movements between forward and rearward positions with respect thereto, the front end of said slide bar projecting longitudinally forwardly of the front end of said head so that it is readily accessible from the exterior when the front end of a semitrailer is supported by said head, and means connecting the rear end of said slide bar to said block, whereby movement of said slide bar into its rearward position moves said block against said biasing means into its rearward position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,519,090 Winn ---------- Aug. 15, 1950