United States Patent

[11] 3,595,408

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[21] Appl. No. **817,907**
[22] Filed **Apr. 21, 1969**
[45] Patented **July 27, 1971**
[73] Assignee **General American Transportation Corporation**
Chicago, Ill.

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[54] **SYSTEMS FOR STORING AND TRANSPORTING LADINGS**
18 Claims, 52 Drawing Figs.

[52] U.S. Cl. ..... 214/38 CC, 214/515, 220/1 B, 248/146, 296/35 A
[51] Int. Cl. B65g 67/02
[50] Field of Search 214/38.46, 515; 296/35, 35.1; 248/146

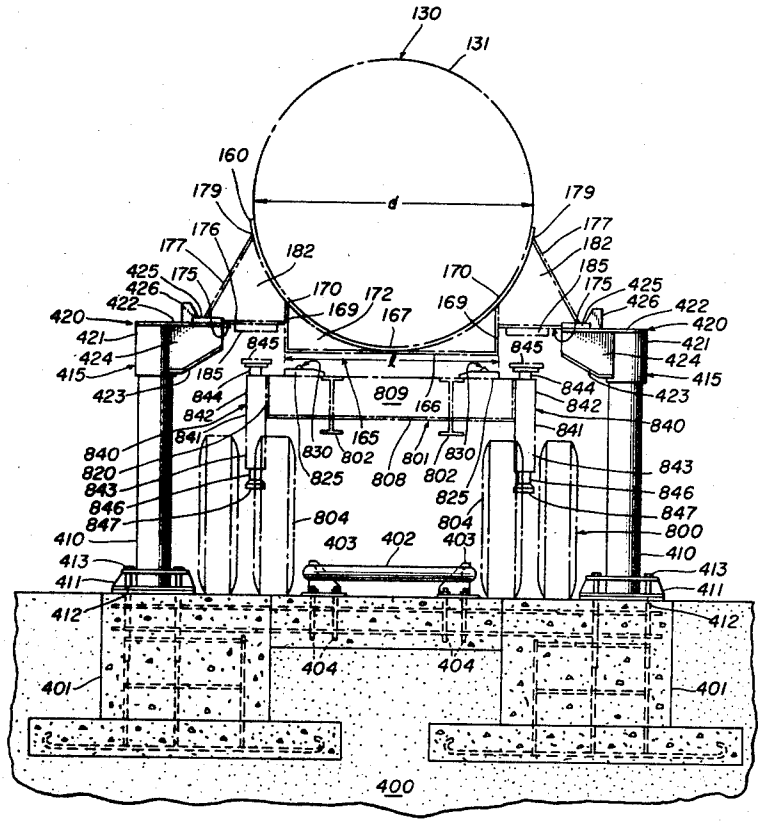
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Primary Examiner—Gerald M. Forlenza
Attorney—Prangley, Clayton, Mullin, Dithmar & Vogel

ABSTRACT: There is disclosed herein systems for storing and for transporting tanks for containing ladings, and the components thereof, including a tank having a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof, a stationary support station including a first pair of spaced-apart support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart support posts disposed on opposite sides of the longitudinal axis and spaced from the first pair of support posts, the first and second support posts carrying first and second support structure respectively, the first and second support structures being shiftable between receiving positions and supporting positions, the tank bolsters and the support posts and the support structures being arranged so that the tank bolsters can be positioned upon the support structures when the support structures are in the supporting positions thereof, a road vehicle including a frame provided with road wheels and having a first body bolster disposed adjacent to one end thereof and a second body bolster disposed adjacent to the other end thereof, the tank bolsters and the body bolsters being arranged so that the tank bolsters can be positioned respectively on the body bolsters, the support posts in each pair of support posts being spaced-apart a distance to receive the road vehicle therebetween with the tank mounted thereon when the support structures are in the receiving positions thereof, and lifting means on the frame for causing relative vertical movement between the tank and the support structures.

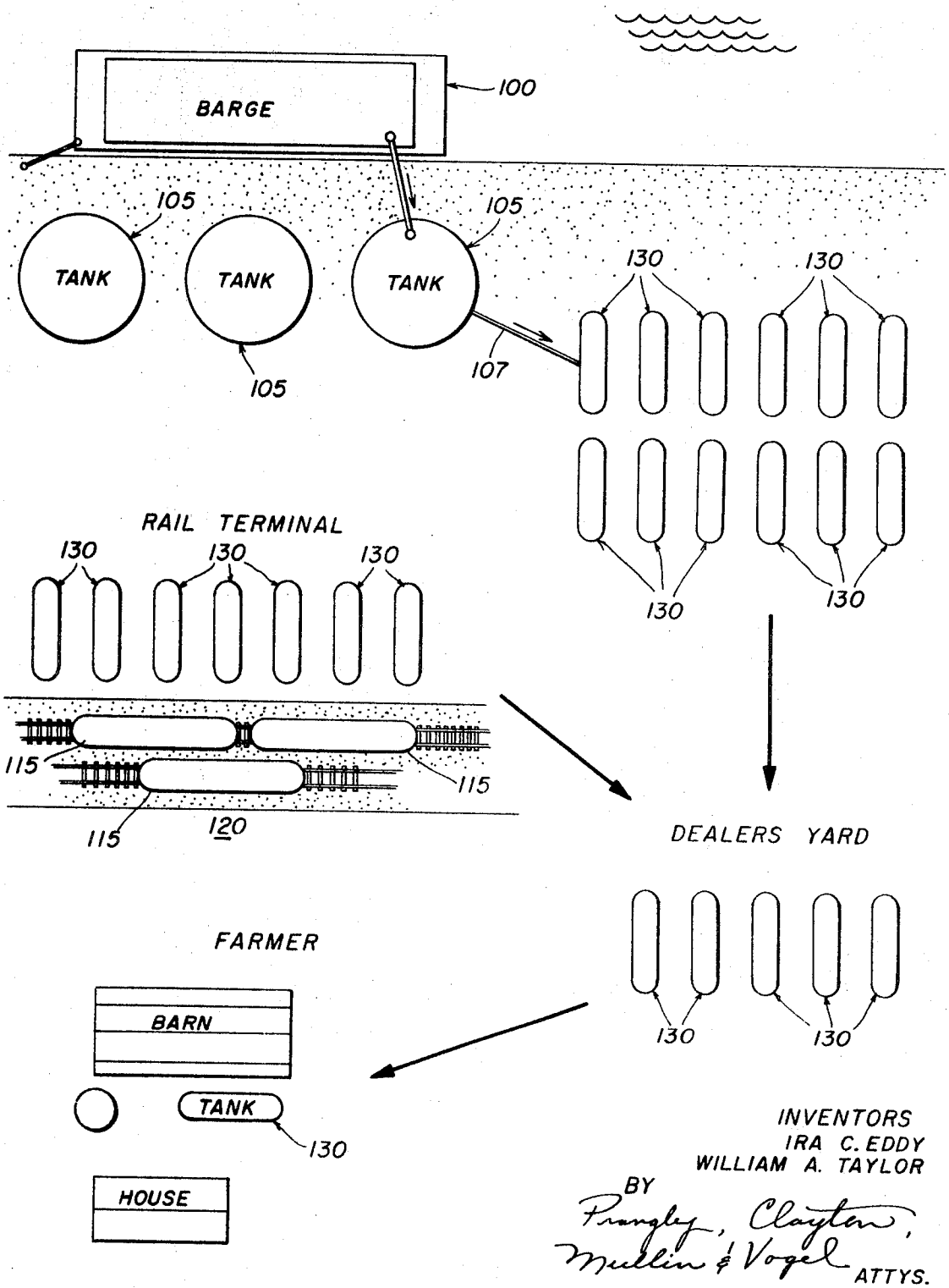


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SHEET 01 OF 20

FIG. 1



INVENTORS
IRA C. EDDY
WILLIAM A. TAYLOR

BY
Prangley, Clayton, Mullin & Vogel
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FIG. 2

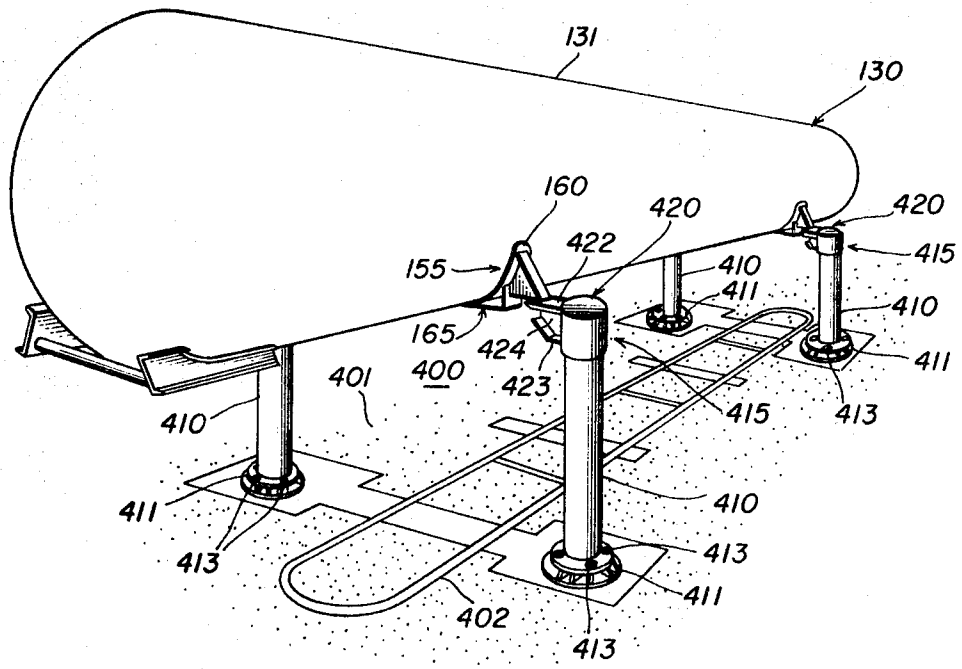
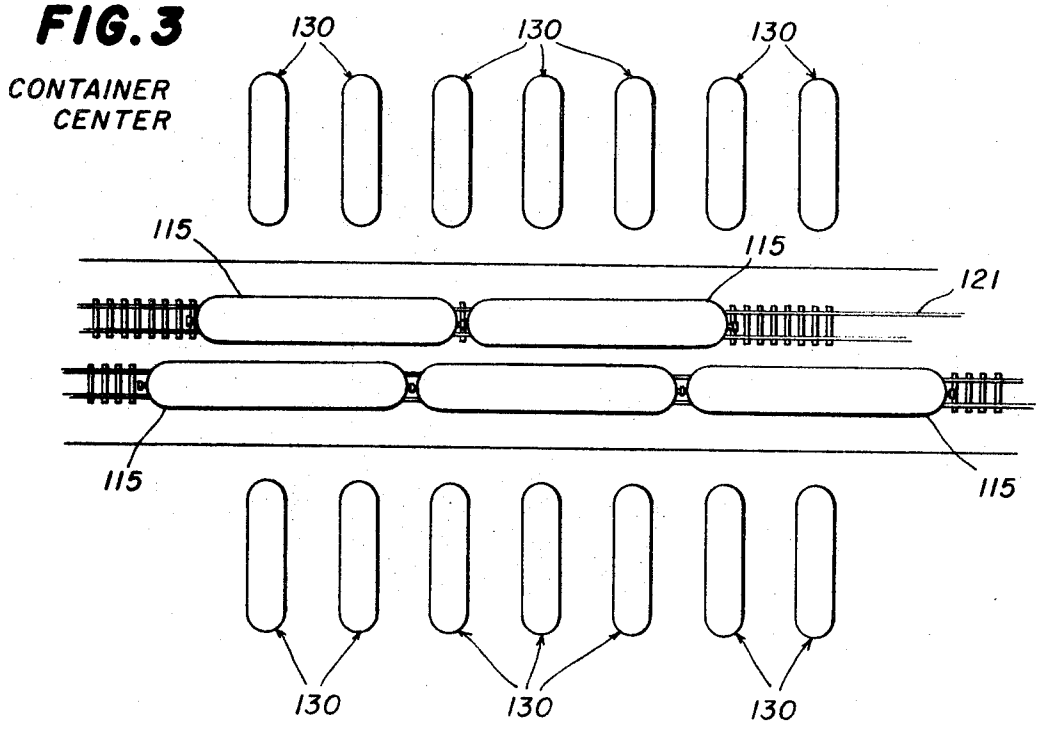

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FIG. 3


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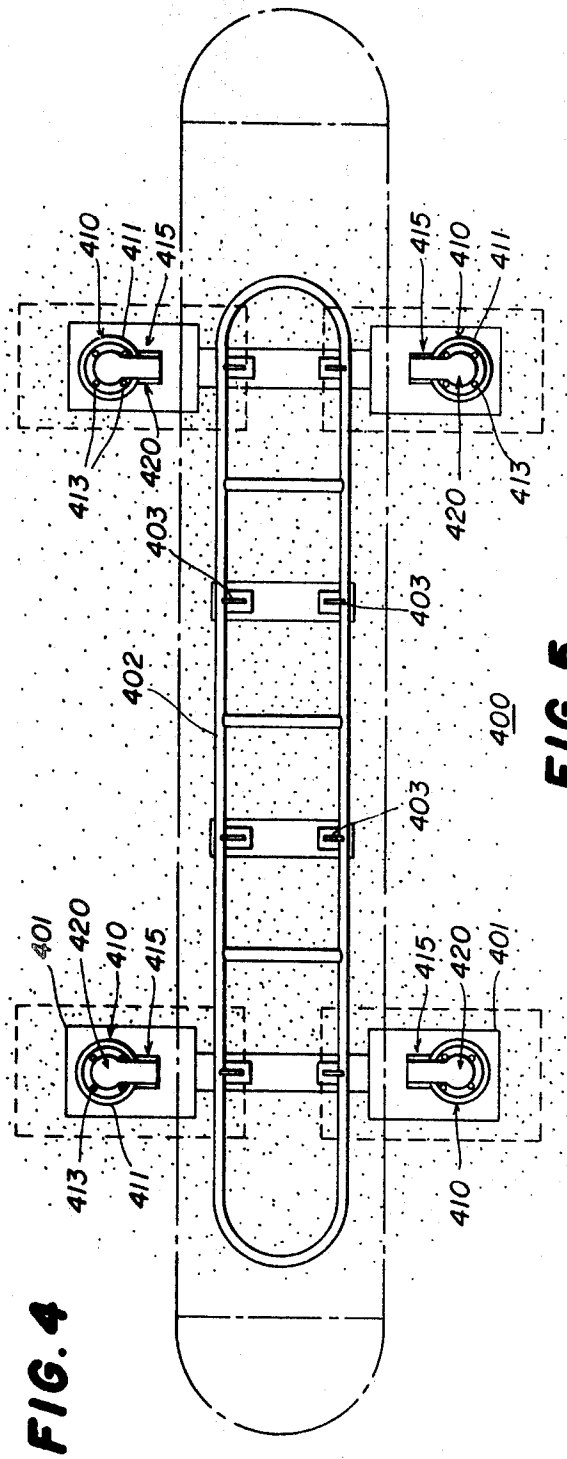

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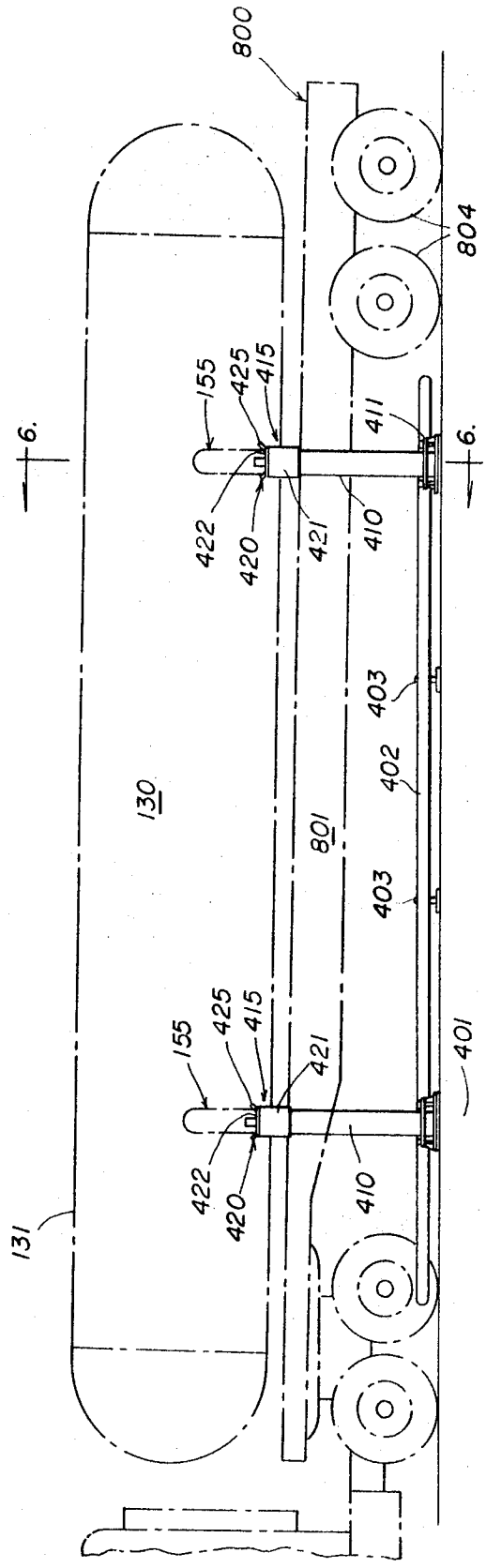

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FIG. 5

FIG. 6

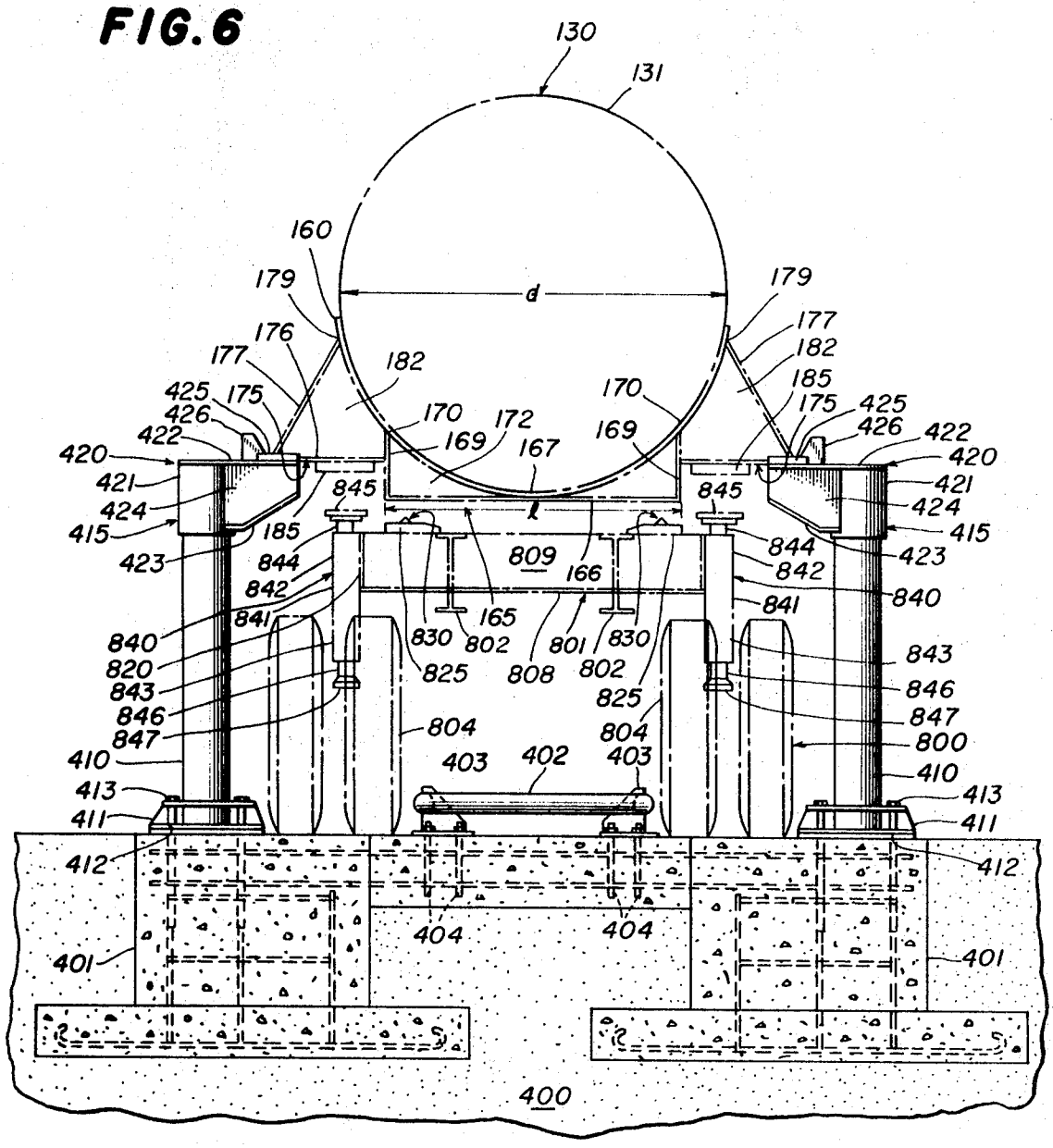

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FIG. 7

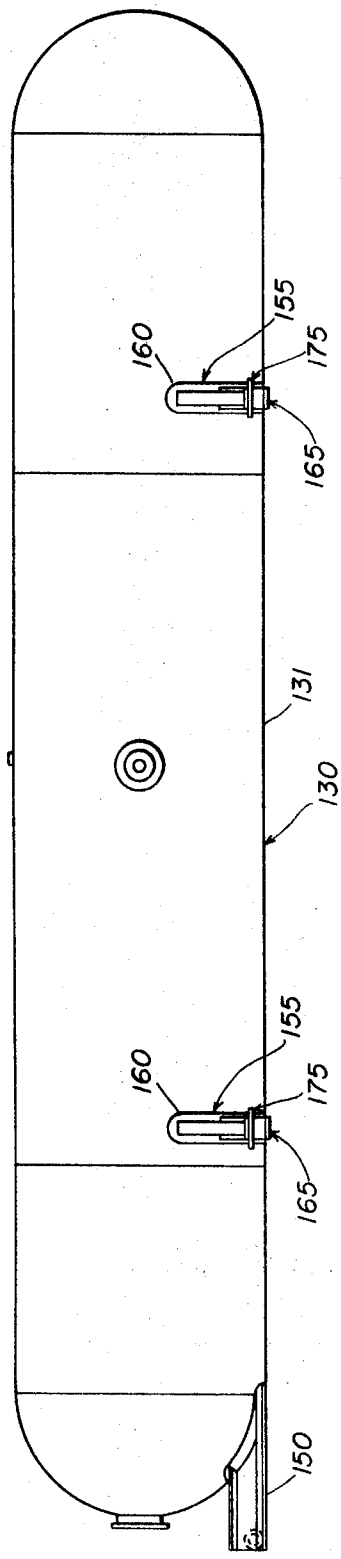


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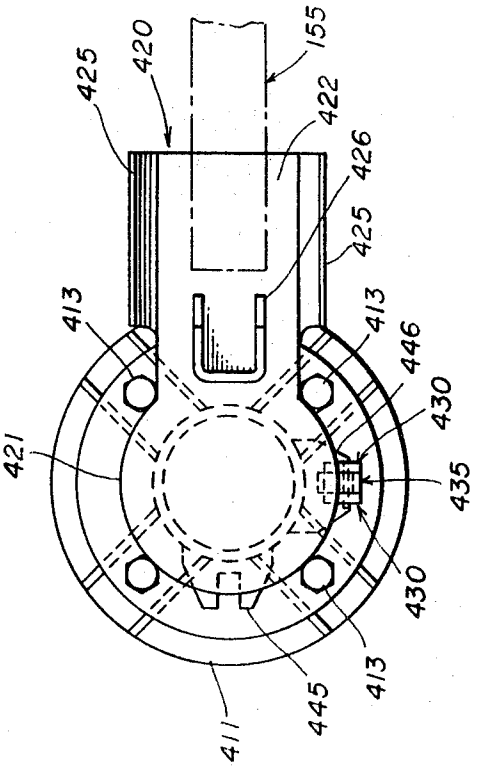


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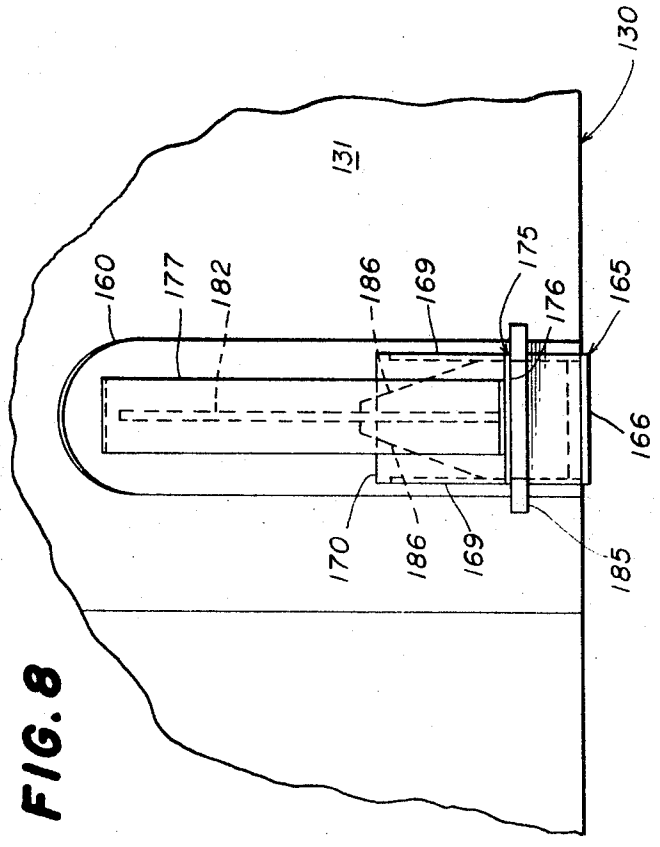


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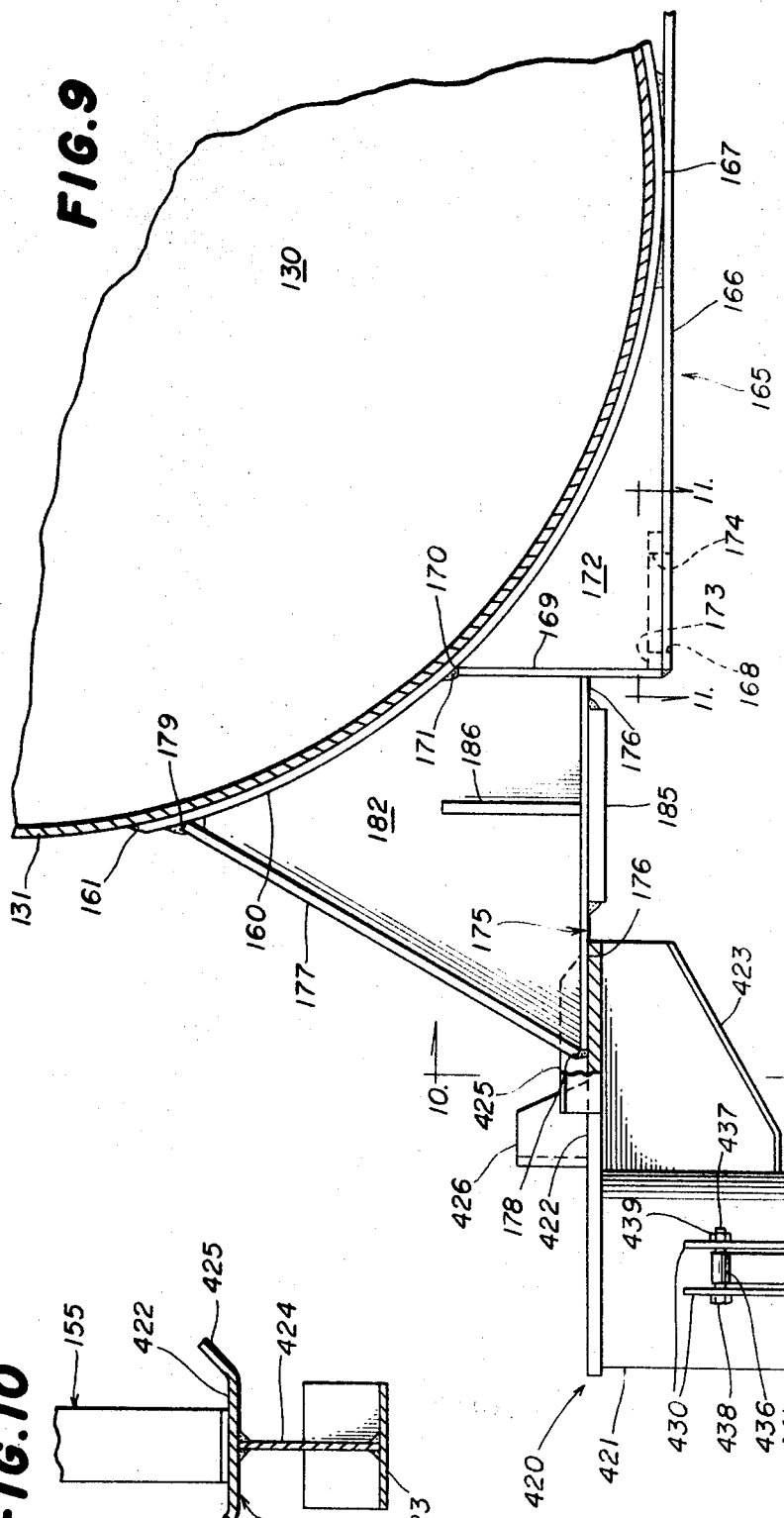


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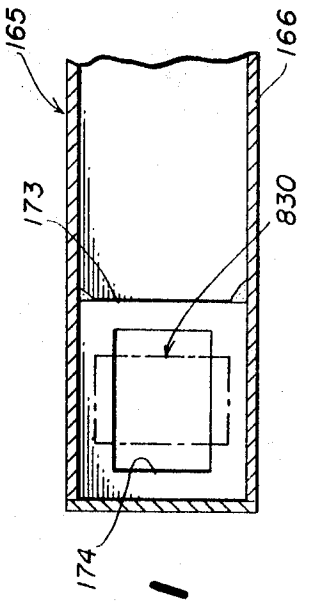


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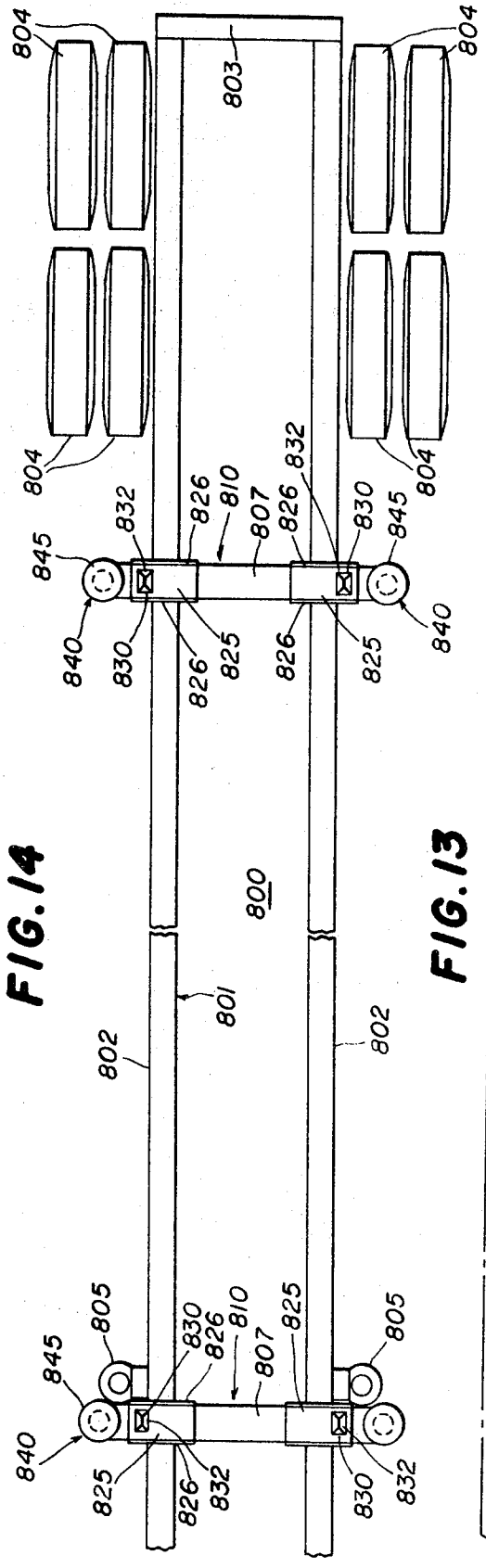

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FIG. 14

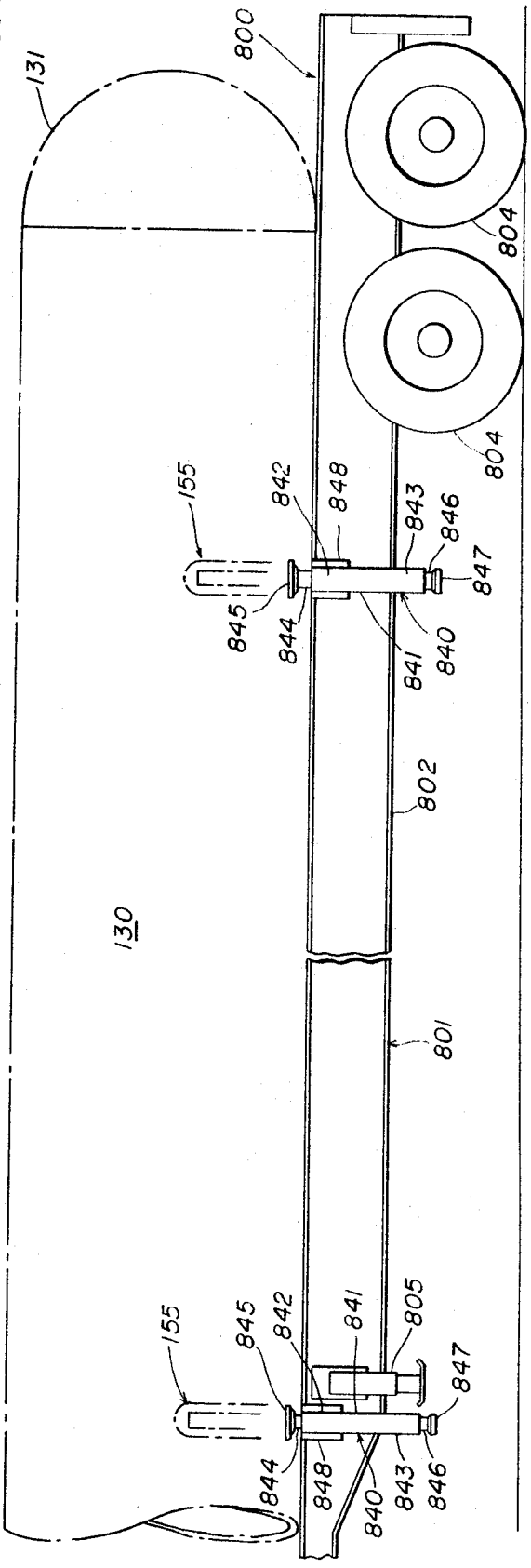

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FIG. 13

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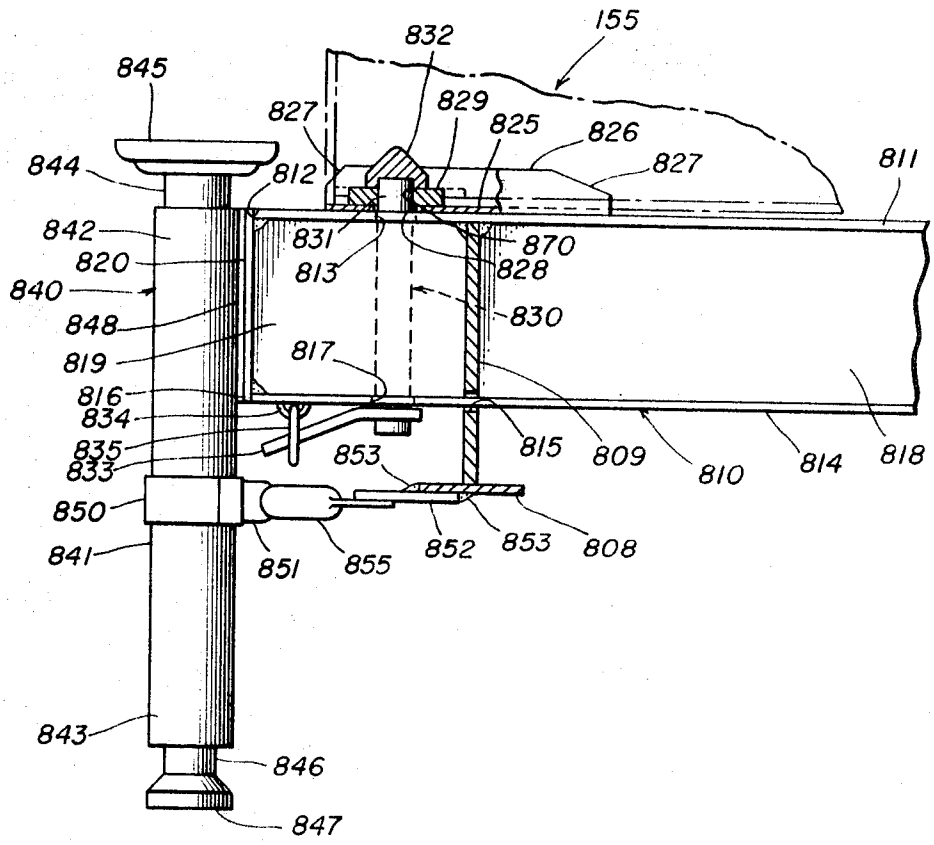

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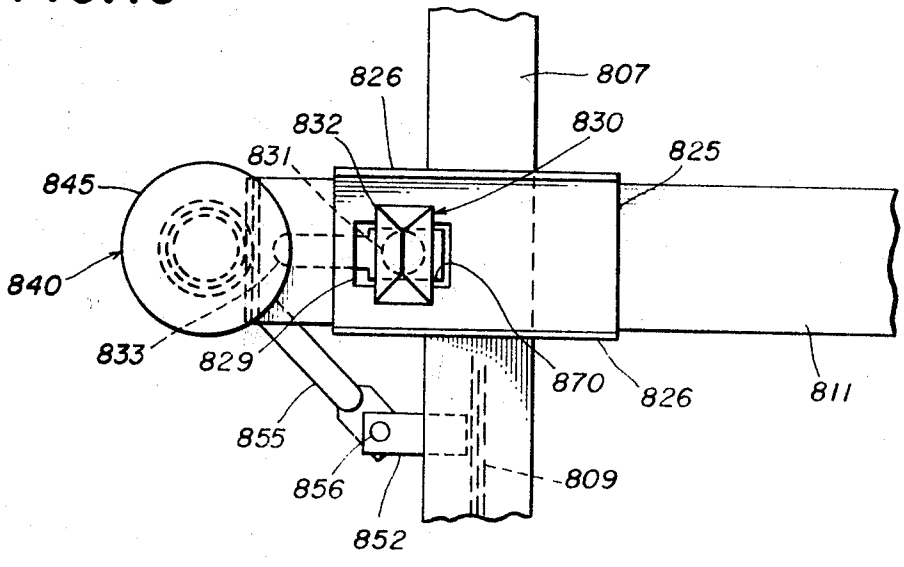

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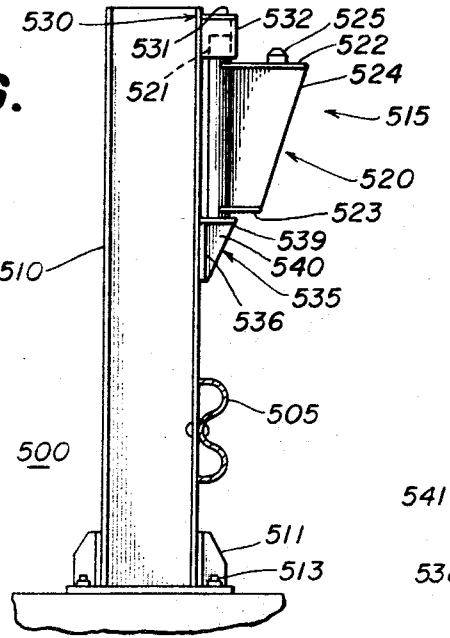


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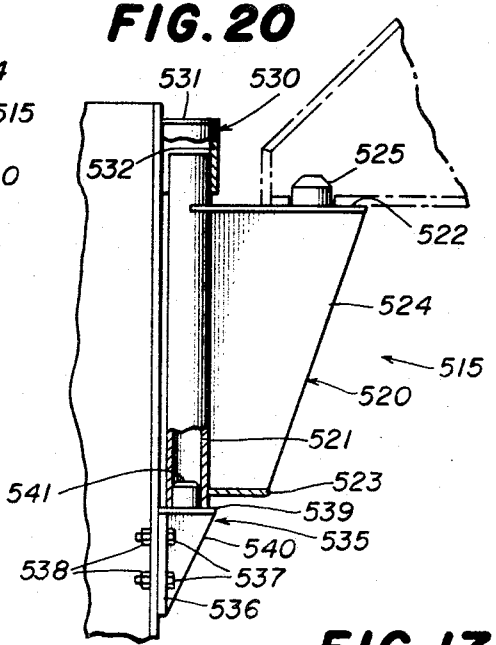


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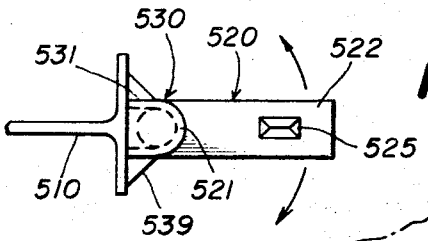


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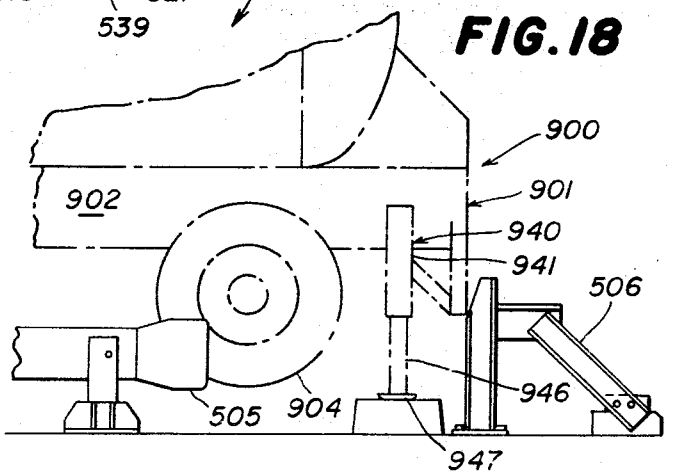


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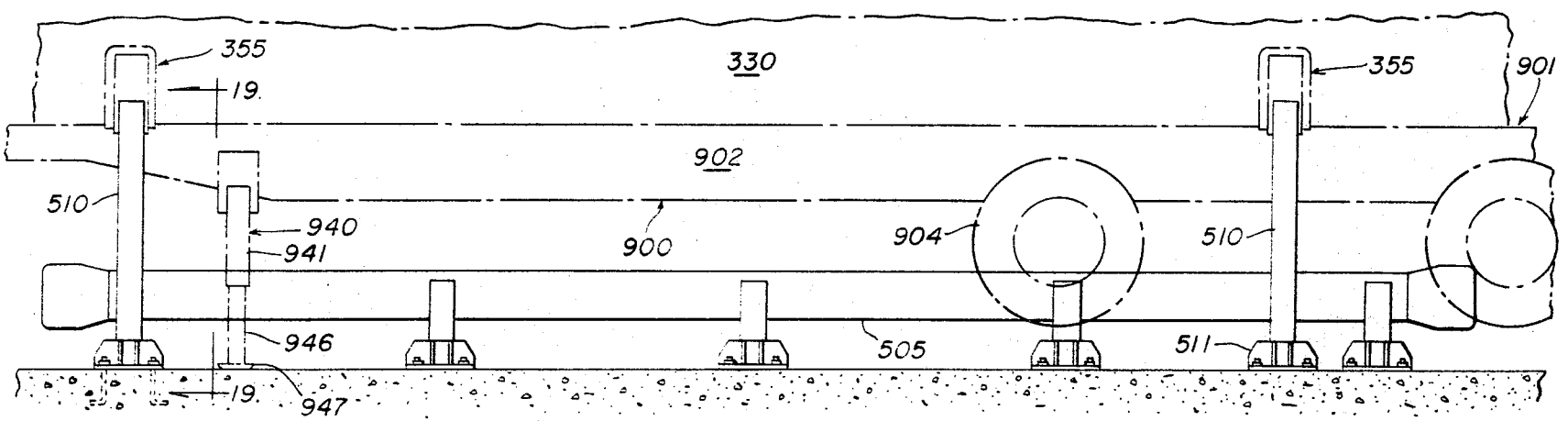


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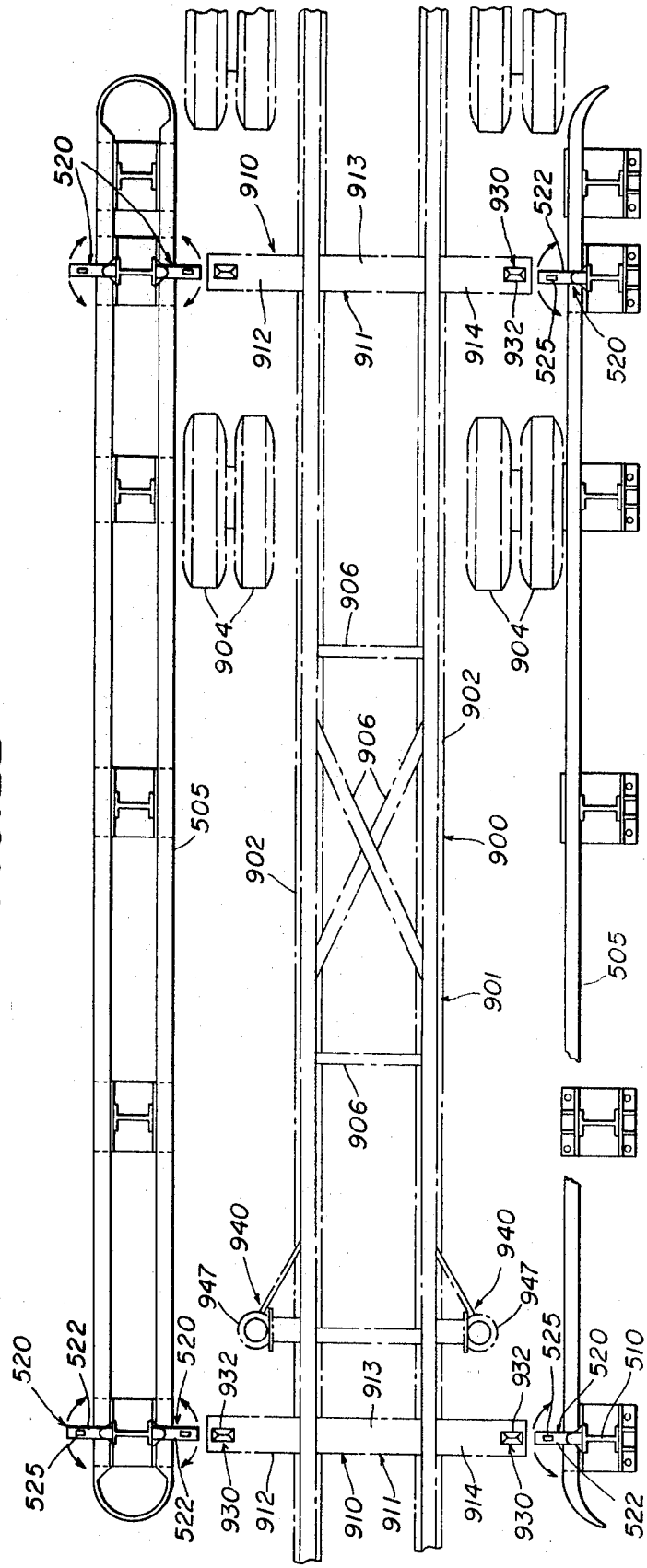

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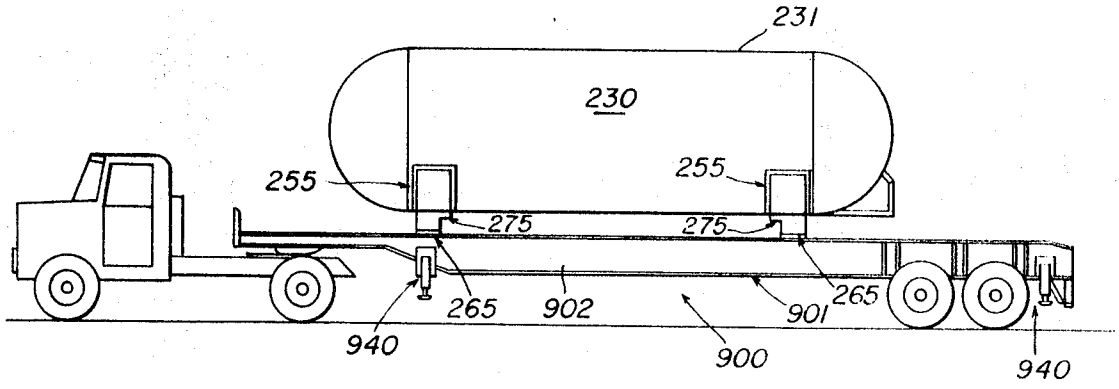
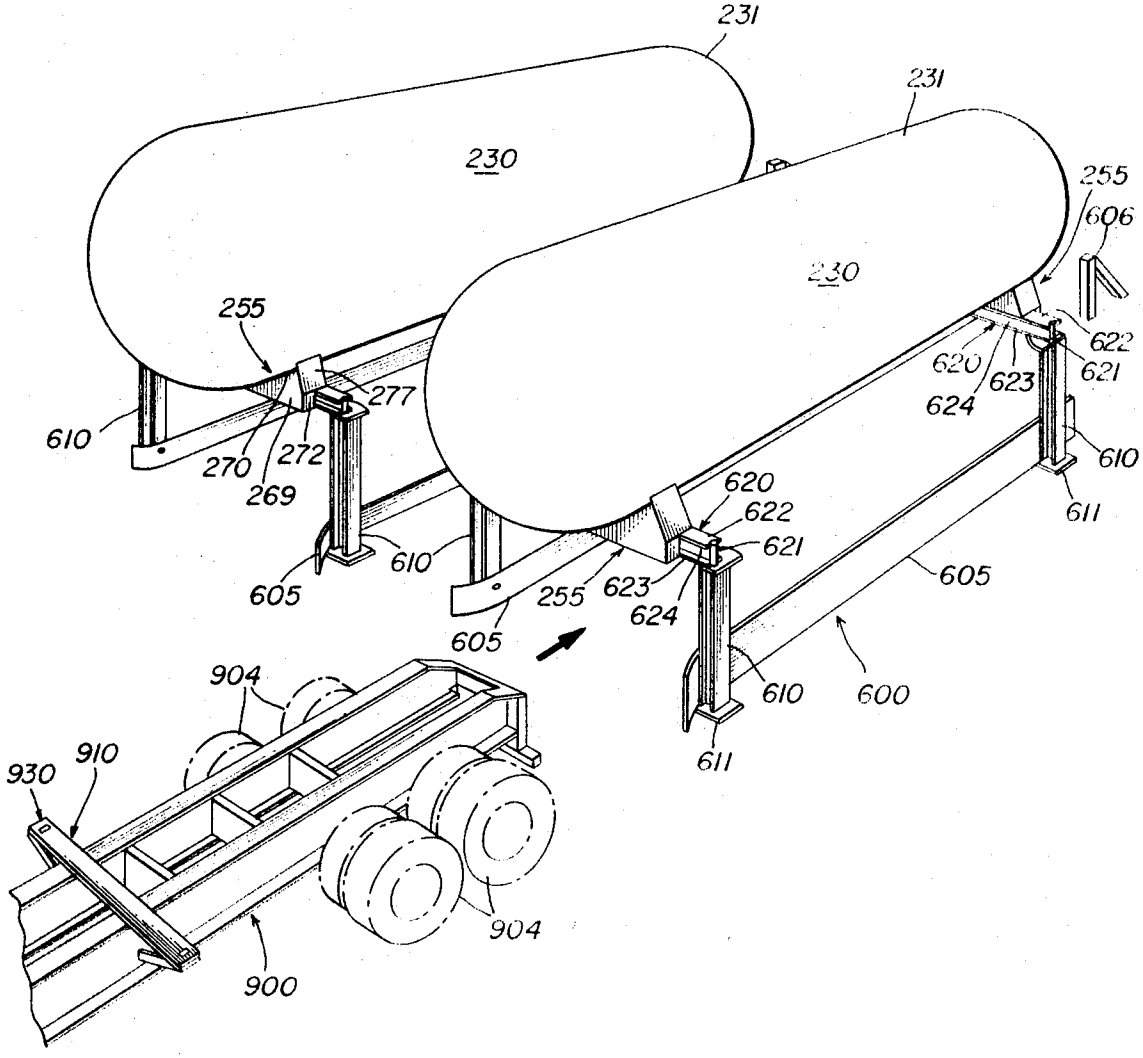

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FIG. 24


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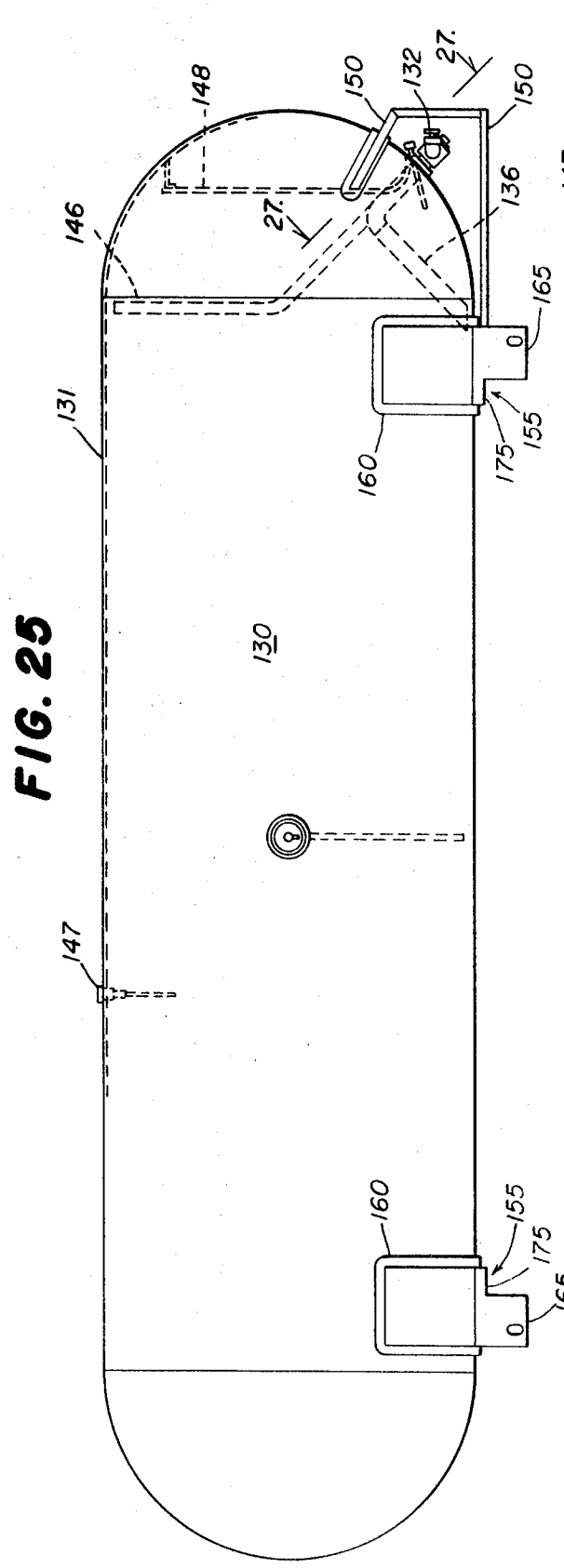


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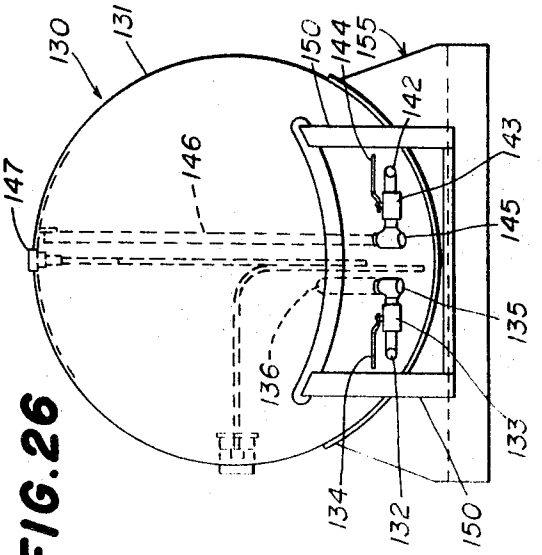


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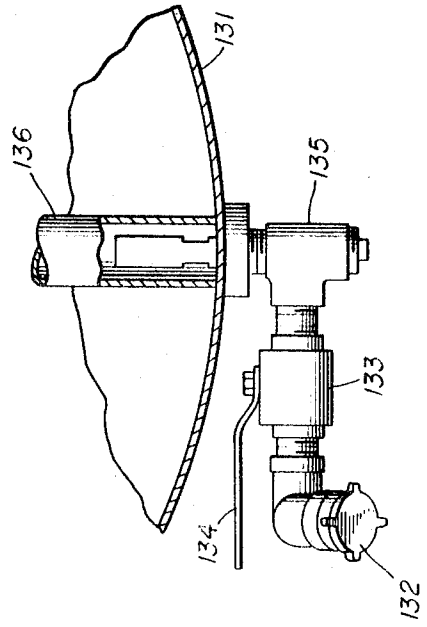


FIG. 27

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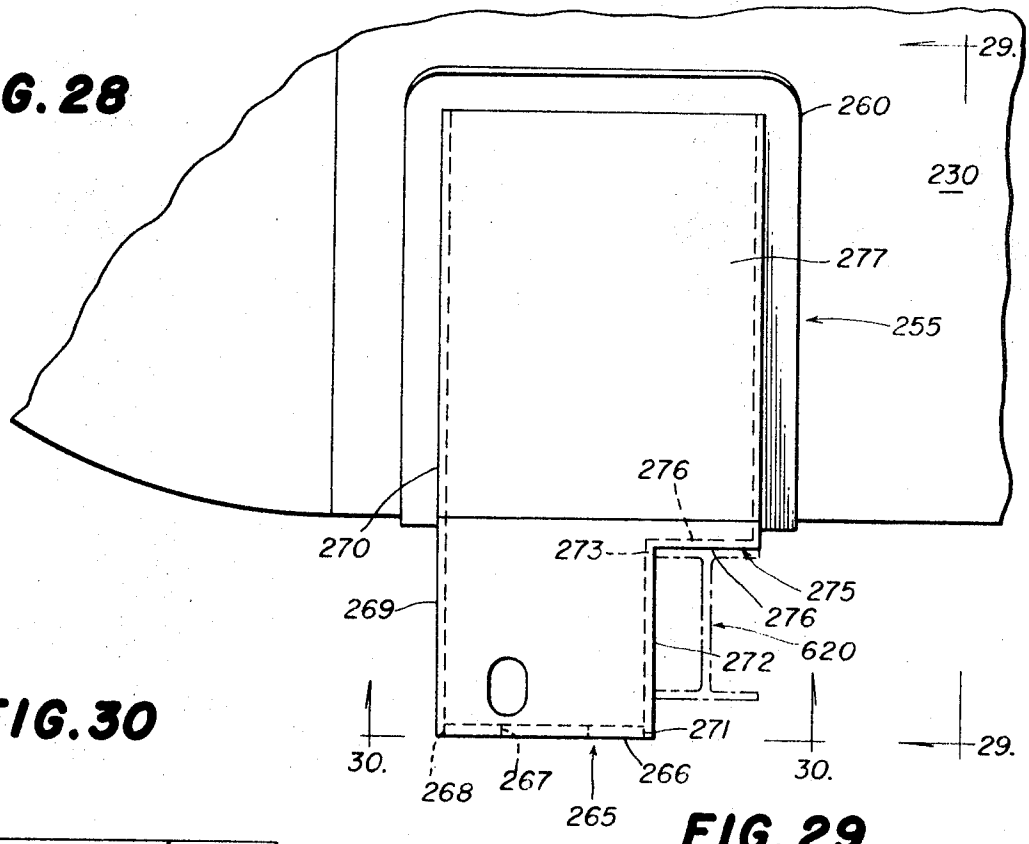


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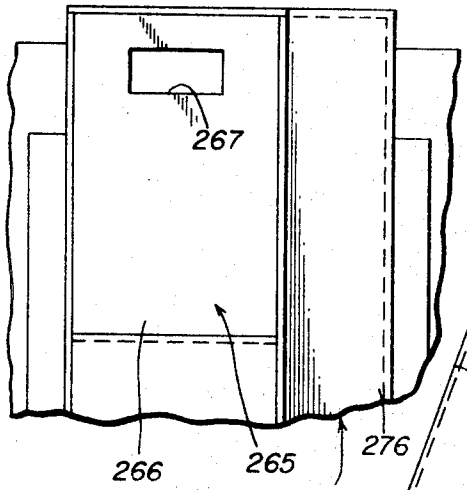
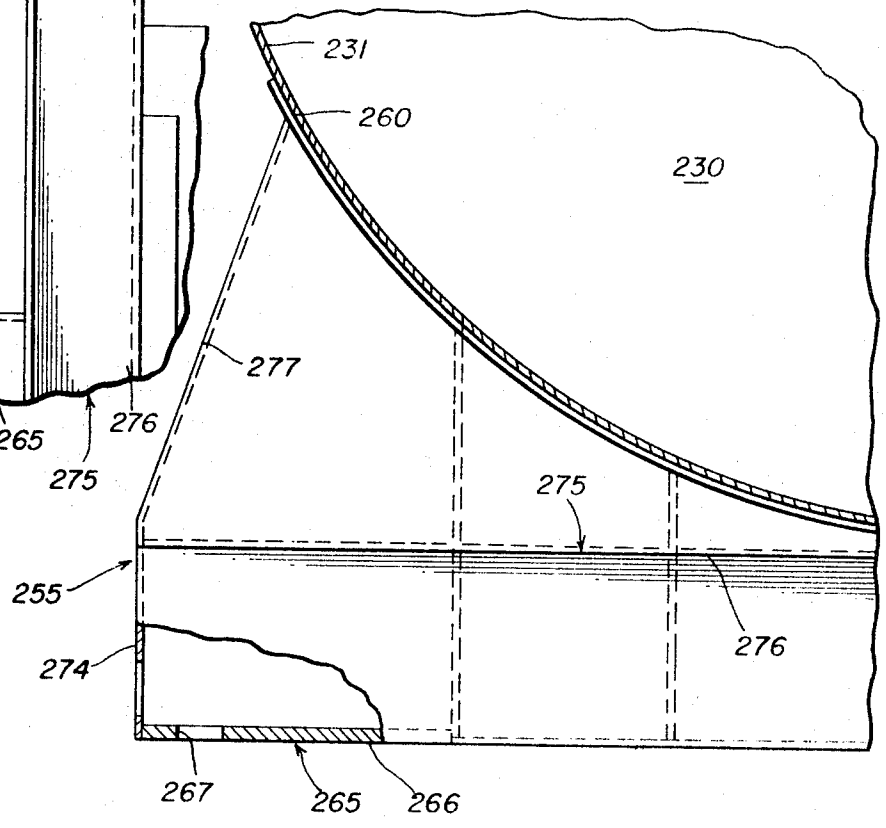


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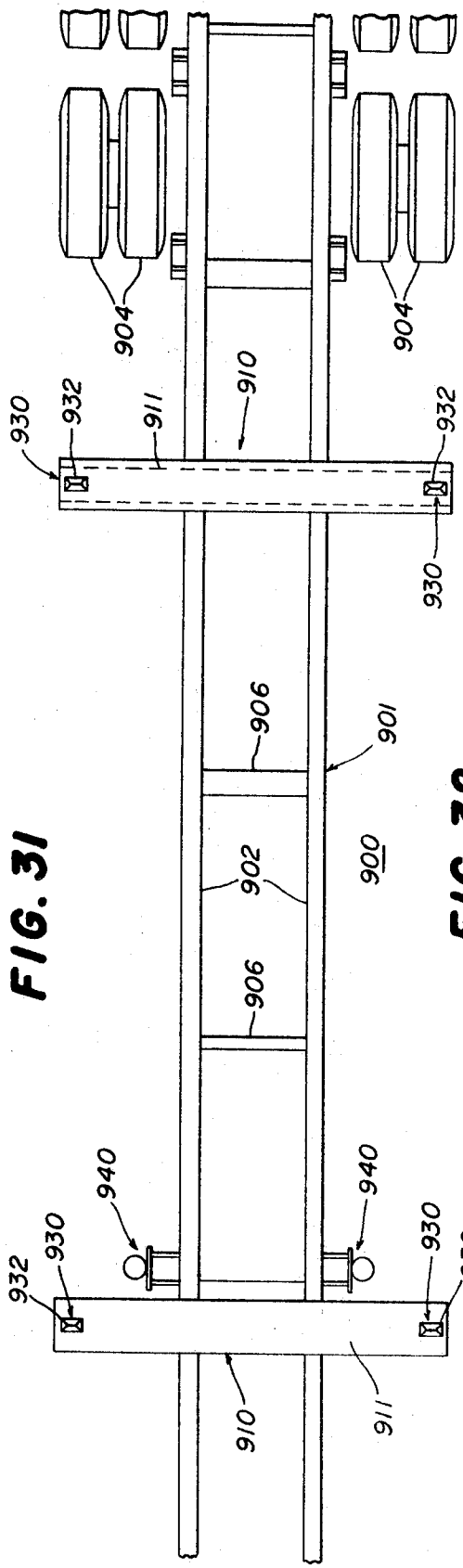

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FIG. 31

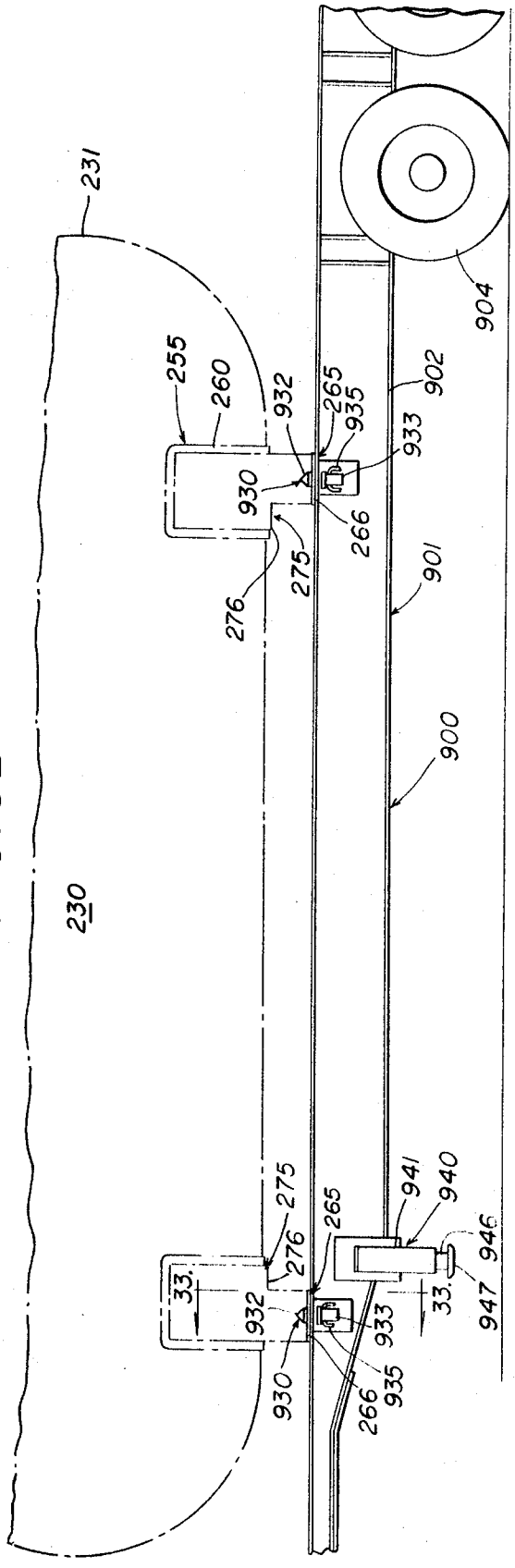
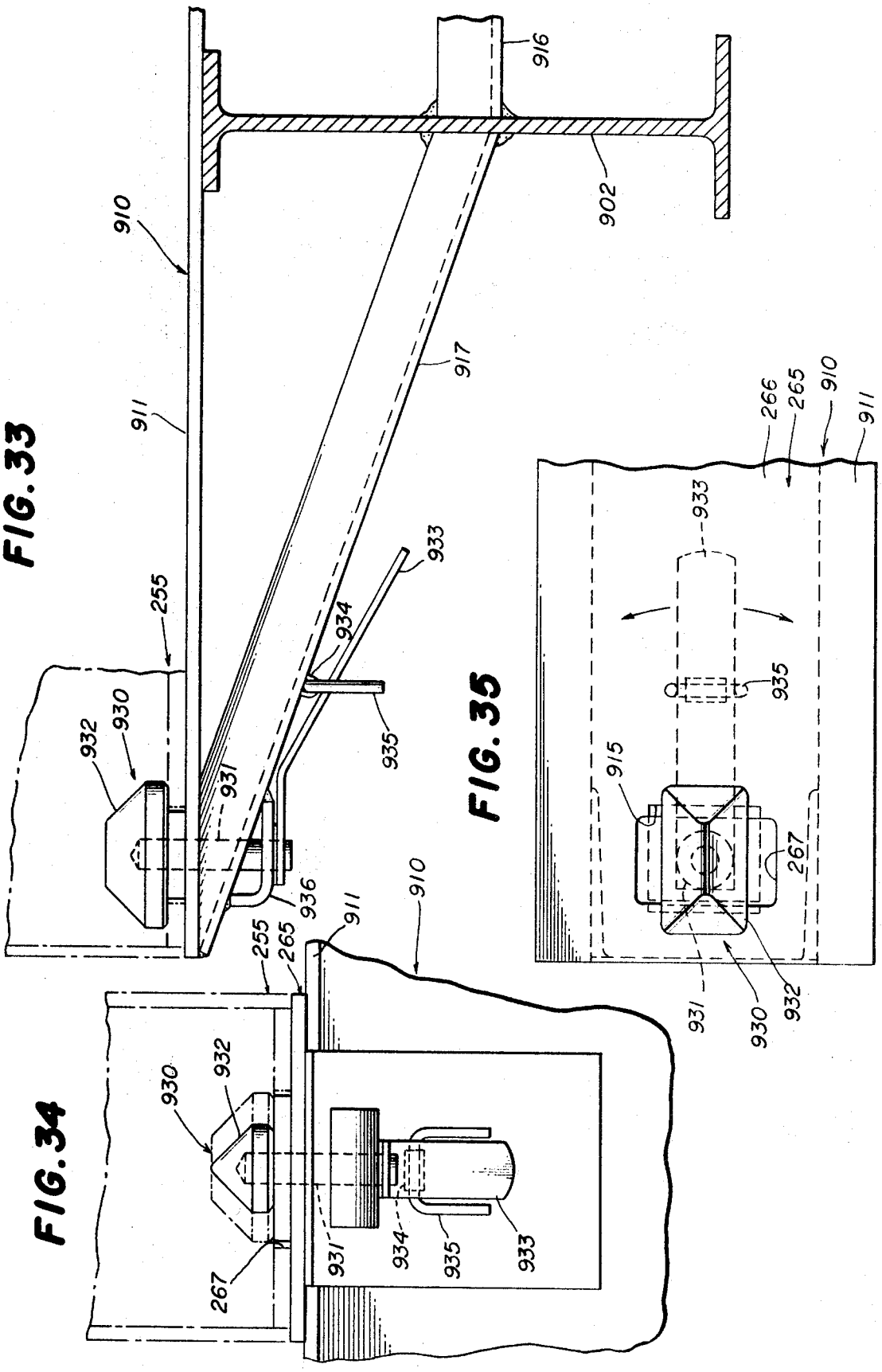
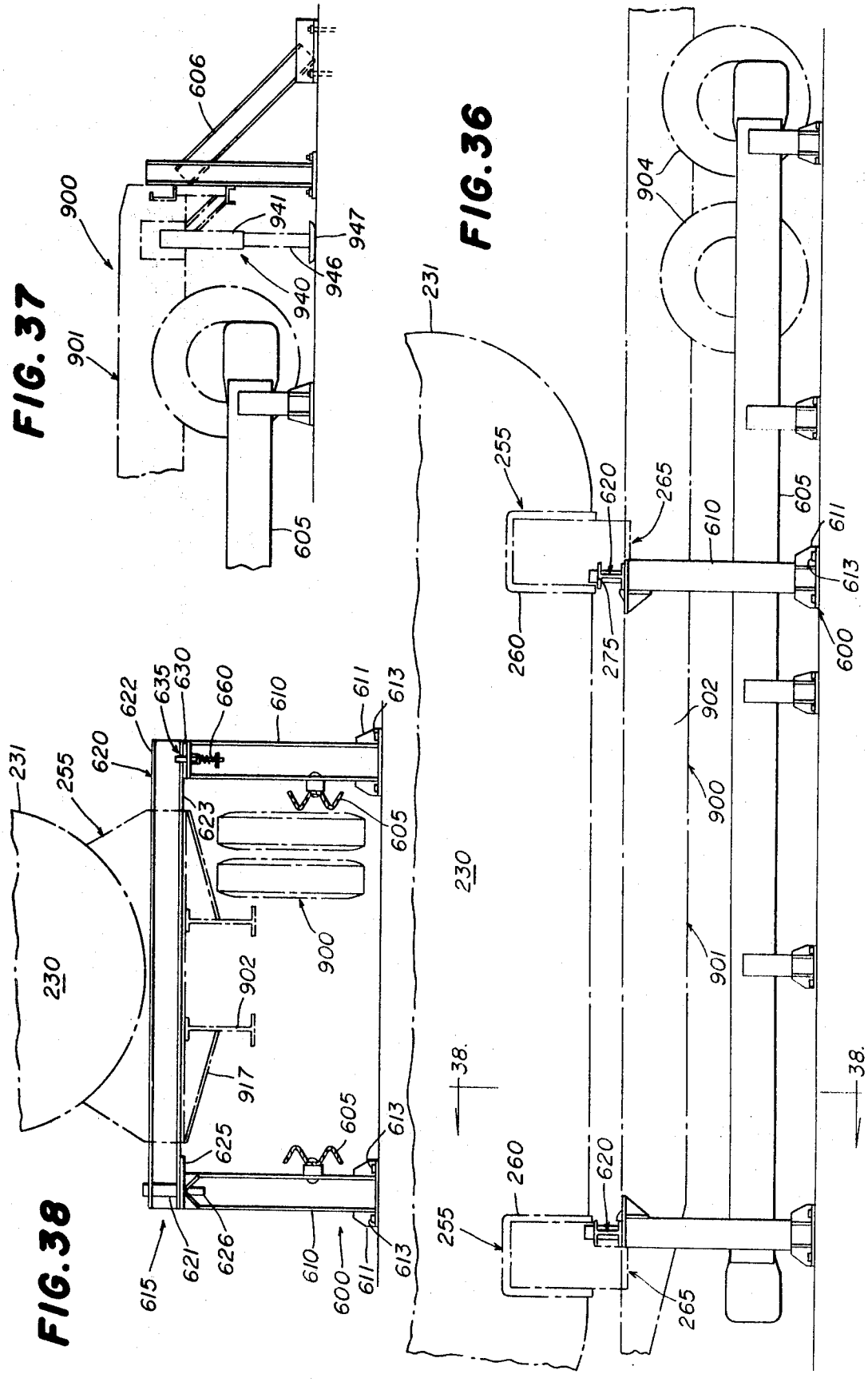

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FIG. 32


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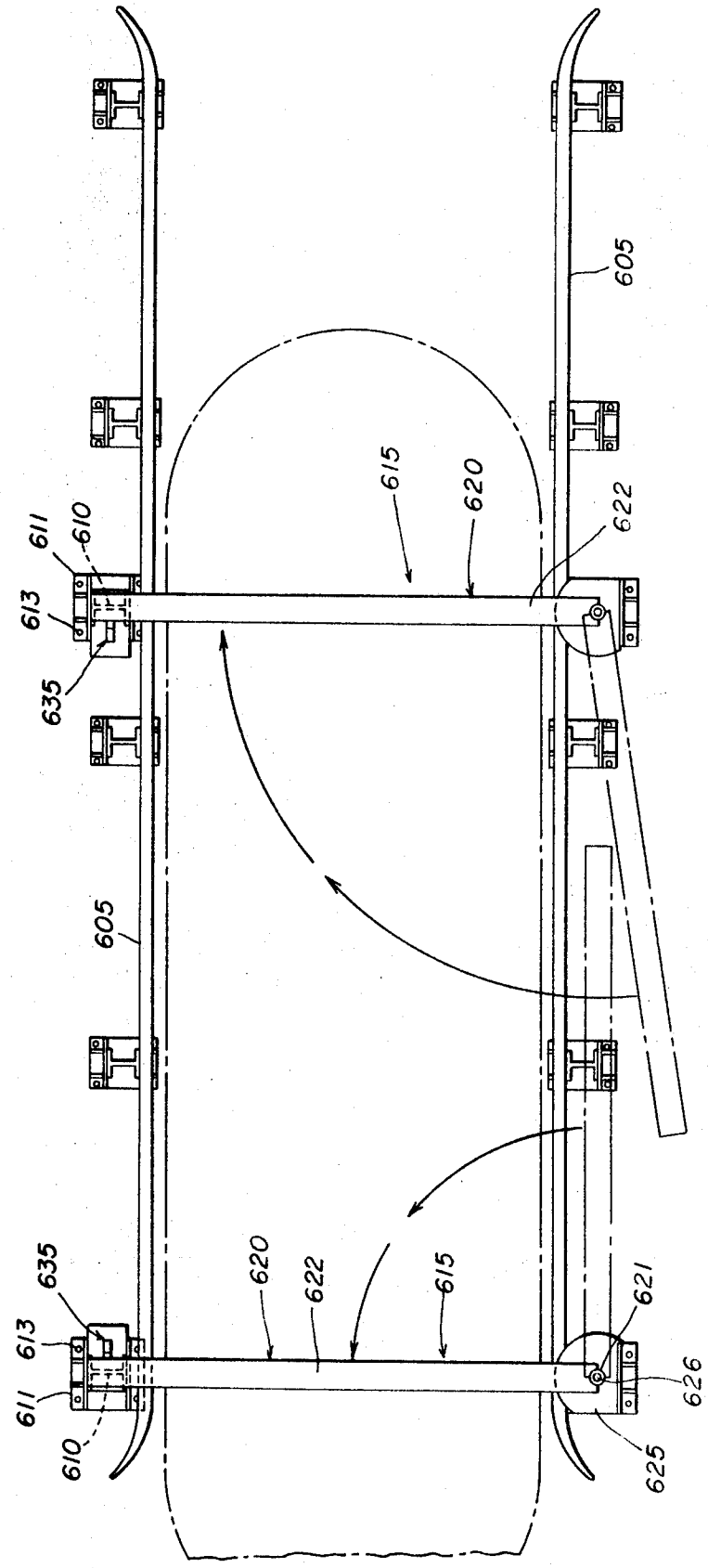

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FIG. 39

FIG. 40

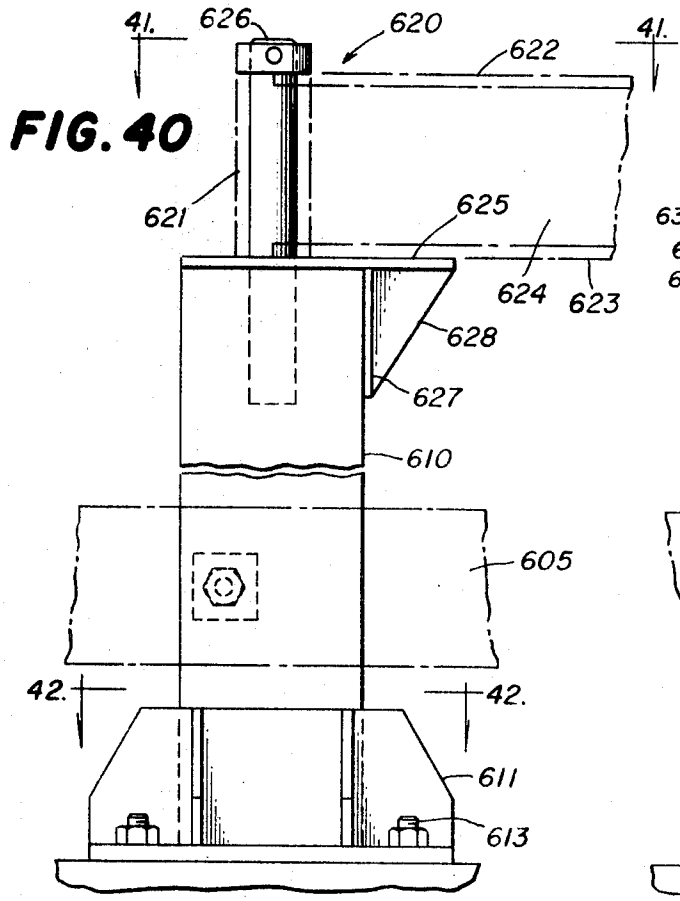


FIG. 43

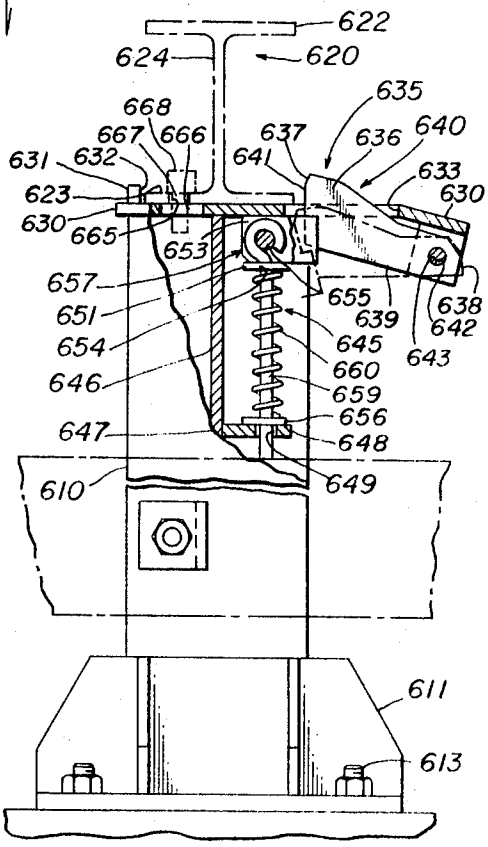


FIG. 44

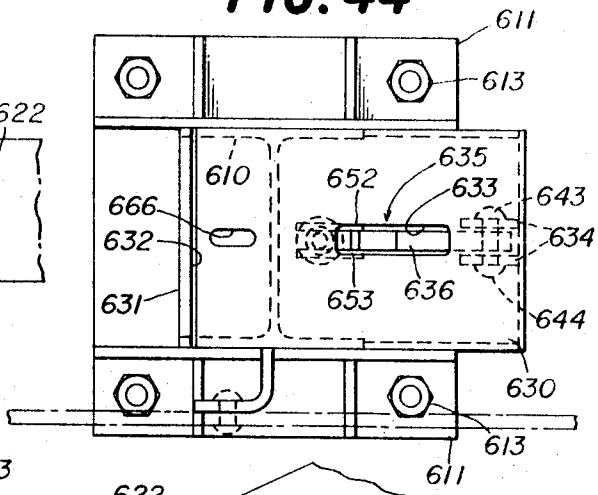


FIG. 41

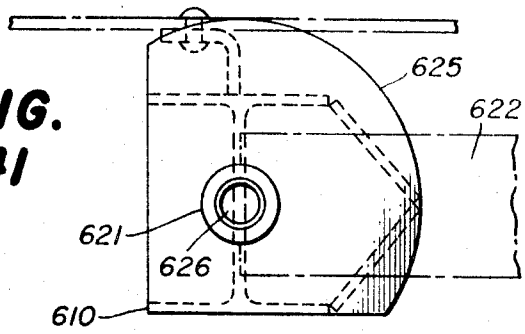
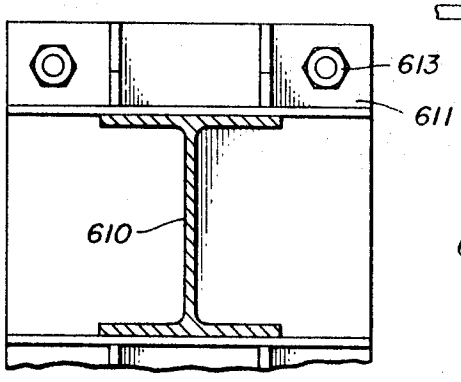


FIG. 42



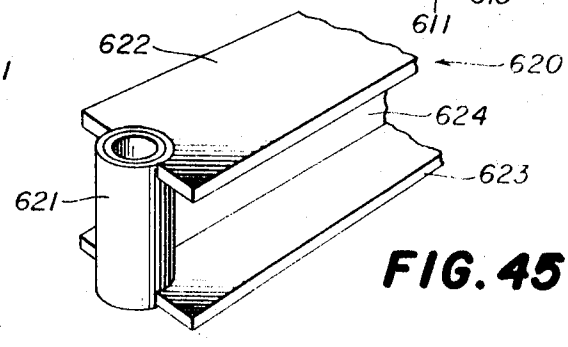


FIG. 45

FIG. 49

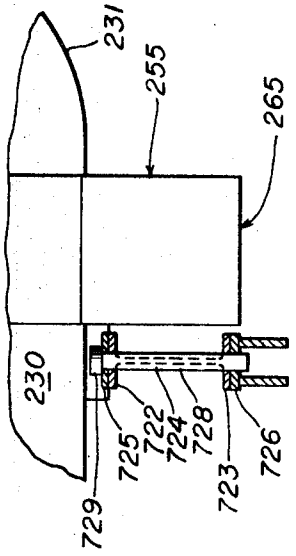


FIG. 47

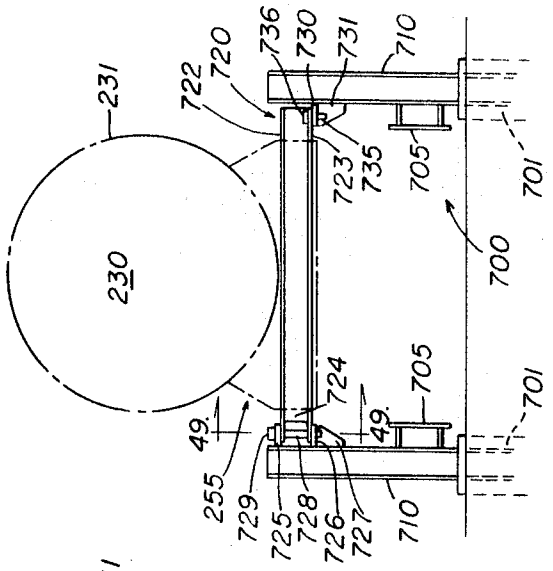


FIG. 48

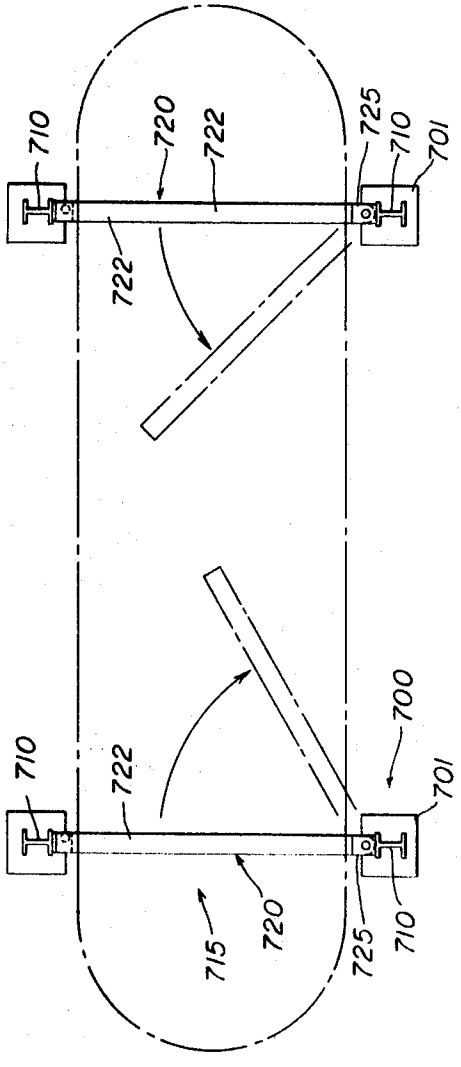
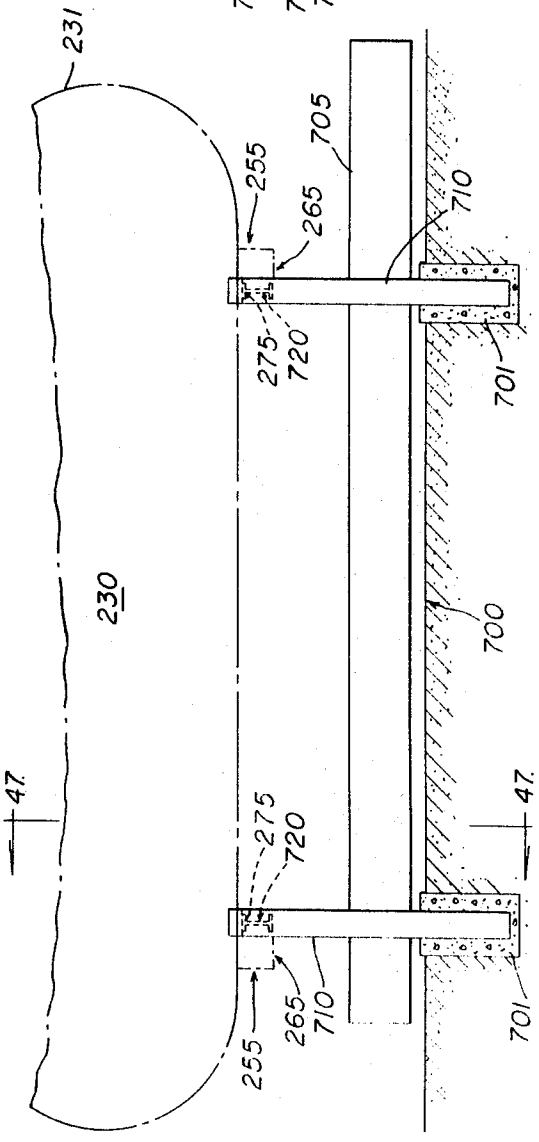


FIG. 46



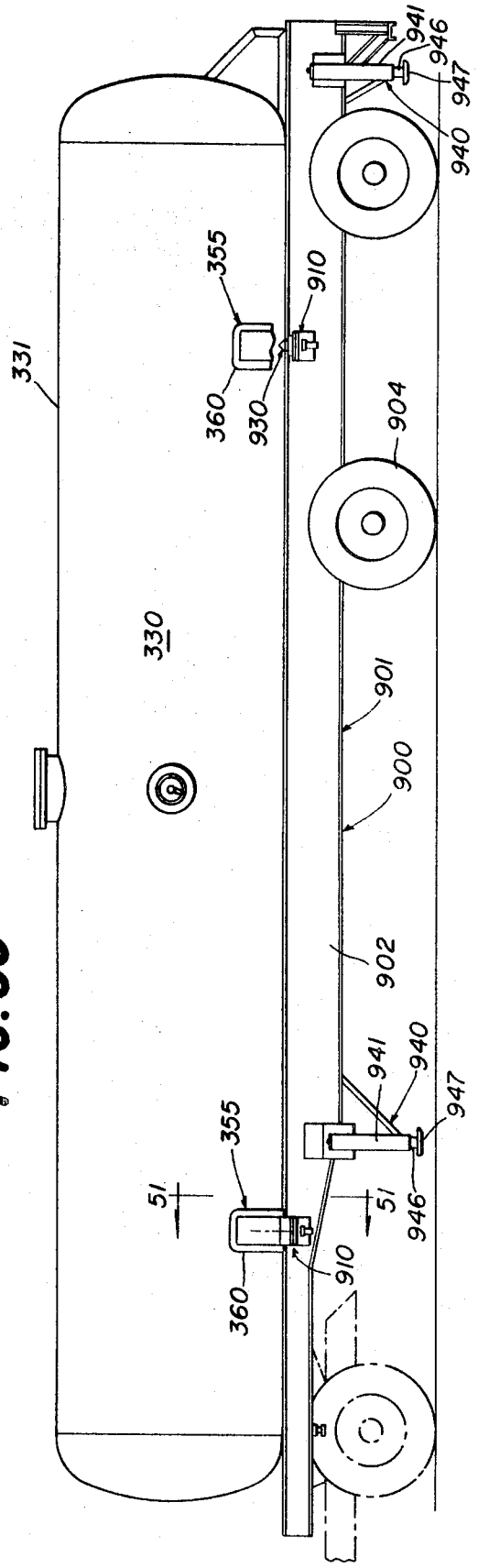


FIG. 50

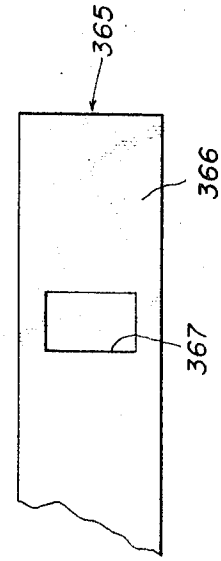


FIG. 52

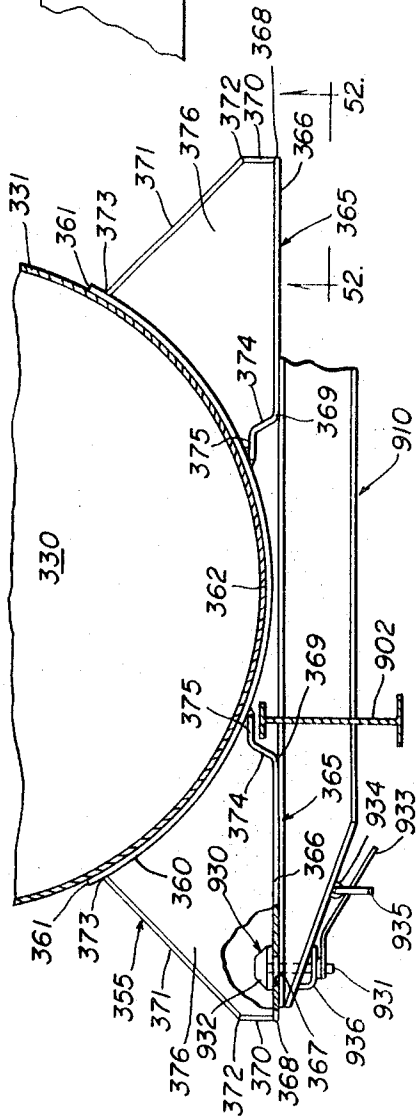


FIG. 51

SYSTEMS FOR STORING AND TRANSPORTING LADINGS

The present invention is directed to novel systems for storing and for transporting tanks for containing ladings, and to novel components of such systems, including a storage tank for containing ladings, a stationary support station for receiving the tank and a road vehicle for transporting the tanks to and from the stationary support station.

The principal object of this invention is to provide a system for storing and for transporting tanks for containing ladings, the system including a tank and a stationary support station for receiving the tank and a road vehicle for transporting the tank to and from the support station; the tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof; a stationary support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from the first pair of stationary support posts, the first support posts carrying first support structure shiftable between a receiving position and a supporting position and the second support posts carrying second support structure shiftable between a receiving position and a supporting position, the tank bolsters and the support posts and the support structures being arranged so that the tank bolsters can be positioned upon the support structures when the support structures are in the supporting positions thereof; a road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of the frame and a second body bolster disposed adjacent to the other end of the frame, the tank bolsters and the body bolsters being arranged so that the tank bolsters can be positioned respectively upon the body bolsters, the support posts in each pair of support posts being spaced-apart a distance to receive the road vehicle therebetween with the tank mounted on the frame when the support structures are in the receiving positions thereof, and lifting means on the frame for causing relative vertical movement between the tank and the support structures.

Another object of this invention is to provide a system of the type set forth wherein the tank bolsters include a support plate for mounting the tank on the stationary support station and a chassis mount spaced from the support plate for mounting the tank on the road vehicle.

Another object of this invention is to provide a system of the type set forth wherein each of the tank bolsters includes a pair of laterally spaced-apart support plates for mounting the adjacent end of the tank on the stationary support station, and a pair of spaced-apart chassis mounts spaced laterally inwardly with respect to the associated pair of support plates for mounting the adjacent end of the tank on the road vehicle.

In connection with the foregoing object, it is still another object of this invention to provide a system of the type set forth wherein each of the tank bolsters further includes a pair of jacking points spaced from both the associated pair of support plates and the associated pair of chassis mounts and disposed in lateral alignment therewith.

Still another object of this invention is to provide a system of the type set forth wherein each of the support posts of the stationary support station includes a support brace movable between a receiving position and a supporting position, the tank bolsters and the support posts and the support braces being arranged so that the tank bolsters can be positioned upon the support braces when the support braces are in the supporting positions thereof.

In connection with the foregoing object it is still another object of this invention to provide a system of the type set forth wherein each of the support braces is provided with means for locking the support brace in the supporting position thereof and the receiving position thereof respectively.

A further object of this invention is to provide a system of the type set forth wherein the stationary support station includes a first support bracket having one end thereof pivotally mounted on one of the first support posts and pivotal between a receiving position wherein the other end of the first support bracket is spaced from the other of the first support posts and a supporting position wherein the other end of the first support bracket is support on the other first support post, and a second support bracket having one end thereof pivotally mounted on one of the second support posts and pivotal between a receiving position wherein the other end of the second support bracket is spaced from the other of the second support posts and a supporting position wherein the other end of the second support bracket is supported on the other second support post.

In connections with the foregoing object, it is another object of this invention to provide a system of the type set forth which includes a latch mechanism for locking each of the support brackets in the supporting positions thereof respectively.

Another object of this invention is to provide a system of the type set forth which includes first lock mechanism for locking the tank bolsters on the support structures, and second lock mechanism for locking the tank bolsters on the body bolsters of the road vehicle.

Yet another object of this invention is to provide a system of the type set forth wherein the road vehicle includes lifting means on the frame thereof for causing relative vertical movement between the tank and the support structures and for causing relative vertical movement between the tank and the frame.

A further object of this invention is to provide a system of the type set forth wherein each of the tank bolsters includes a pair of spaced-apart jacking points and each of the body bolsters on the road vehicle includes a pair of jack mechanism for engaging the jacking points to cause relative vertical movement between the tank and the support structures and relative vertical movement between the tank and the frame.

Still another object of this invention is to provide a system of the type set forth wherein the road vehicle includes lifting means on the frame thereof for causing relative vertical movement between the frame and the support structures.

Another object of this invention is to provide a tank for use in a system for storing and for transporting ladings and having a body wall defining a closed chamber for containing ladings and having means for introducing fluid ladings thereinto and for removing fluid ladings therefrom, and a first tank bolster mounted on the body wall adjacent to one end thereof and a second tank bolster mounted on the body wall adjacent to the other end thereof, the first and second support structures of the support station cooperating with the first and second tank bolsters for mounting the tank thereon when the support structures are in the supporting positions thereof, and the first and second tank bolsters cooperating with the associated first and second body bolsters on the road vehicle for mounting the tank thereon, whereby the lifting means on the road vehicle may be operated to lift and transfer the tank between the stationary support station and the road vehicle.

In connection with the foregoing object, it is another object to provide a tank of the type set forth wherein the first tank bolster includes a first support plate for mounting the adjacent end of the tank on the stationary support station and the second tank bolster includes a second support plate for mounting the adjacent end of the tank on the stationary support station, and the first tank bolster further including a first chassis mount offset longitudinally with respect to the associated first support plate for mounting the adjacent end of the tank on the road vehicle and the second tank bolster further including a second chassis mount offset longitudinally with respect to the associated second support plate for mounting the adjacent end of the tank on the road vehicle, the first and second support plates being arranged to be seated upon and supported by the associated first and second support structures of the support station respectively when the first

and second support structures are in the supporting positions thereof, and the first and second chassis mounts being arranged to be seated upon and supported by the associated first and second body bolsters on the road vehicle respectively for mounting the tank on the associated road vehicle.

In connection with the foregoing object, it is still another object of this invention to provide a tank of the type set forth wherein each of the tank bolsters further includes first jacking points spaced from and in lateral alignment with the associated first support plates and first chassis mounts and in horizontal alignment with the associated first support plates, and second jacking points spaced from and in lateral alignment with the associated second support plates and second chassis mounts and in horizontal alignment with the associated second support plates.

A further object of this invention is to provide a stationary support station for use in the system for storing and for transporting ladings, wherein the system includes a tank for containing ladings and having a first tank bolster disposed adjacent to one end thereof and a second tank bolster disposed adjacent to the other end thereof, and a road vehicle including a first body bolster for receiving the first tank bolster and a second body bolster for receiving the second tank bolster and lifting means on the frame thereof for causing relative vertical movement between the tank and the stationary support station, the stationary support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from the first pair of stationary support posts, the first support posts carrying first support structure shiftable between a receiving position and a supporting position and the second support posts carrying second support structure shiftable between a receiving position and a supporting position, the tank bolsters and the support posts and the support structures being arranged so that the tank bolsters can be positioned shiftably upon the support structures when the support structures are in the supporting positions thereof, the support posts in each of the pair of support posts being spaced apart a distance to receive the associated road vehicle therebetween with the tank mounted on the frame when the support structures are in the receiving position thereof.

Still another object of this invention is to provide a road vehicle for use in a system for storing and for transporting ladings, wherein the system includes a tank for containing ladings and having a first tank bolster disposed adjacent to one end thereof and a second tank bolster disposed adjacent to the other end thereof, and a stationary support station including a first pair of support posts carrying first support structure shiftable between a receiving position and a supporting position and a second pair of support posts carrying second support structure shiftable between a receiving position and a supporting position, the support posts in each of the pair of support posts being spaced apart a distance to receive the road vehicle therebetween with the tank mounted thereon when the support structures are in the receiving positions thereof, the road vehicle having a chassis including a frame provided with road wheels and a first body bolster disposed adjacent to one end of the frame and a second body bolster disposed adjacent to the other end of the frame, the tank bolsters and the body bolsters being arranged so that the tank bolsters can be positioned respectively upon the body bolsters, and lifting means on the frame for causing relative vertical movement between the tank and the support structures and for causing relative vertical movement between the tank and the frame.

In connection with the foregoing object, it is another object of this invention to provide a road vehicle of the type set forth wherein the lifting means on the frame causes relative vertical movement between the frame and the support structures.

Further features of the invention pertain to the particular arrangement of the parts and components 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:

FIG. 1 is an overall plan view of the system for transporting ladings from a river terminal to an ultimate distribution point, such as a farm;

FIG. 2 is a perspective view of a storage tank disposed upon a stationary support station embodying the principles of the present invention;

FIG. 3 is a top plan view showing a railway storage tank center;

FIG. 4 is a top plan view of a stationary support station embodying the principles of the present invention and showing the relative positioning of storage tank thereon in phantom lines;

FIG. 5 is a side elevational view of a tank disposed at a stationary support station and having a road vehicle disposed therein and beneath the tank;

FIG. 6 is a cross-sectional view of the storage tank disposed at a stationary support station with a road vehicle disposed therein taken in the direction of the arrows along the line 6–6 in FIG. 5;

FIG. 7 is a side elevational view of a storage tank embodying the principles of the present invention;

FIG. 8 is an enlarged partly fragmented view showing one of the tank bolsters of the storage tank;

FIG. 9 is a side elevational partly cross-sectional view of the storage tank including the tank bolster disposed on the support structure of a support post in a support station embodying the principles of the present invention;

FIG. 10 is a side cross-sectional view of the tank bolster disposed on the support structure of the support station taken in the direction of the arrows along the line 10–10 in FIG. 9;

FIG. 11 is a top cross-sectional view of a chassis mount taken in the direction of the arrows along the line 11–11 in FIG. 9;

FIG. 12 is a top plan view of one of the support structures and associated support posts embodying the principles of the present invention;

FIG. 13 is a side elevational, partly fragmented, view of a storage tank having the tank bolster thereof disposed on the body bolster of a road vehicle;

FIG. 14 is a top plan view, partly fragmented, of a road vehicle including the body bolsters and jack mechanisms embodying the principles of the present invention;

FIG. 15 is a side elevational partly cross-sectional view of a body bolster of a road vehicle including the jack mechanism and lock mechanism associated therewith and having a tank bolster disposed thereon;

FIG. 16 is a top plan view of a body bolster of a road vehicle including the jack mechanism and the lock mechanism associated therewith;

FIG. 17 is a side elevational view, partly fragmented, of a road vehicle disposed within the support station having the jack mechanisms thereof extended to raise the frame of the road vehicle and contacting the tank bolsters on the storage tank with the body bolsters on the road vehicle;

FIG. 18 is a side elevational view, showing the rear end of a road vehicle disposed against the stop guide of the support station and having the jack mechanism thereon engaged to raise the frame into contact with the storage tank;

FIG. 19 is a side elevational view of a second embodiment of a support post having a shiftable support brace thereon taken in the direction of the arrows along the line 19–19 in FIG. 17;

FIG. 20 is an enlarged side elevational partly cross section view of a support brace disposed in the supporting position thereof and having a tank bolster disposed thereon;

FIG. 21 is a top plan view of a support brace disposed in the supporting position thereof;

FIG. 22 is a top plan view of the embodiment of a stationary support station having support braces on each support post

and being disposed in the supporting positions thereof, and having a road vehicle disposed therebetween;

FIG. 23 is a side elevational view of a storage tank disposed on the frame of a road vehicle, the storage tank including another embodiment of tank bolsters;

FIG. 24 is a perspective view of two stationary support stations each including another embodiment of support structures thereon and having storage tanks disposed thereon and a road vehicle positioned for entry into one of the support stations;

FIG. 25 is a side elevational cross-sectional view of a storage tank showing the inlet and outlet valves;

FIG. 26 is a rear end view of a storage tank showing the inlet and outlet valves;

FIG. 27 is a cross-sectional view of the outlet valve of a tank taken in the direction of the arrows along the line 27–27 in FIG. 25;

FIG. 28 is a cross-sectional view of the embodiment of a tank bolster as illustrated in perspective view in FIG. 24;

FIG. 29 is a cross-sectional view of the tank bolster taken in the direction of the arrows along the line 29–29 in FIG. 28;

FIG. 30 is a bottom view of the tank bolster and the associated support structure taken in the direction of the arrows along the line 30–30 in FIG. 28;

FIG. 31 is a top plan view of a road vehicle including the frame and body bolsters thereof;

FIG. 32 is a side elevational view, partly in cross section, showing a storage tank having the tank bolsters thereof disposed on the associated body bolsters of a road vehicle;

FIG. 33 is a cross-sectional view of the lock mechanism for locking the tank bolsters on the body bolsters taken in the direction of the arrows along the line 33–33 in FIG. 32;

FIG. 34 is a cross-sectional view again showing the lock mechanism for locking the tank bolster on the body bolster illustrating the engaged and disengaged positions respectively of the lock head;

FIG. 35 is a top plan view of the lock mechanism for locking the tank bolsters of the body bolsters;

FIG. 36 is a side elevational view of a support station having support brackets extending between the respective support posts and showing a tank in phantom lines disposed thereon and a road vehicle, also in phantom, having the frame in the lifting position;

FIG. 37 is a side elevational view of the rear end of the road vehicle disposed against the rear stop guide of the support station and having the jack mechanism thereof engaged to raise the frame above the underlying support surface;

FIG. 38 is a cross-sectional view of the stationary support station have support brackets and a storage tank disposed thereon and a road vehicle disposed therebetween and in the raised position taken in the direction of the arrows along the line 38–38 in FIG. 36;

FIG. 39 is a top plan view of the stationary support station having support brackets pivoted between a supporting position shown in solid lines, and a receiving position shown in dashed lines;

FIG. 40 is a side elevational partly fragmented view of a support post and the associated support bracket pivotally mounted on the top end thereof;

FIG. 41 is a top plan view of the support post and the associated support bracket pivotally mounted thereon taken in the direction of the arrows along the line 41–41 in FIG. 40;

FIG. 42 is a top plan view of the support post and associated attachment collar taken in the direction of the arrows along the line 42–42 in FIG. 40;

FIG. 43 is a side elevational partly cross section view of the support post which supports the opposing end of the support bracket and the latch mechanism for locking the support bracket in the supporting position thereof;

FIG. 44 is a top plan view of the support post on which the opposing end of the supporting bracket rests and the latch mechanism thereon;

FIG. 45 is a perspective view, partly fragmented, of the support bracket and the associated pivot collar;

FIG. 46 is a side elevational view of a stationary support station having another form of support brackets thereon disposed below the top ends of the respective support posts and a storage tank disposed thereon;

FIG. 47 is a cross-sectional view of a stationary support station and the support brackets thereof taken in the direction of the arrows along the line 47–47 in FIG. 46;

FIG. 48 is a top plan view of the support station and the respective support brackets pivotally mounted on the associated support posts;

FIG. 49 is a cross-sectional view showing a tank bolster disposed on the support bracket taken in the direction of the arrows along the line 49–49 in FIG. 47;

FIG. 50 is a side elevational view of a road vehicle having a storage tank disposed thereon having another form of tank bolster locked onto the body bolsters of the road vehicle;

FIG. 51 is a cross-sectional view of the tank and associated tank bolster disposed on the body bolster taken in the direction of the arrows along the line 51–51 in FIG. 50; and

FIG. 52 is a bottom view of the tank bolster and lock aperture therein taken in the direction of the arrows along the line 52–52 in FIG. 51.

Referring to FIG. 1 of the drawings, there is shown an overall plan view of the system for storing and for transporting ladings, and particularly fluid ladings such as anhydrous ammonia, from a river terminal to an ultimate user. The lading is first transported to the river terminal by means of a barge 100, from which it is pumped into a stationary tank 105 by means of a primary pipe 106. FRom the stationary storage tank 105, the lading is then piped through a secondary pipe 107 into a number of portable storage tanks 130 each of which is disposed upon a stationary support station (not shown in FIG. 1). Each of the portable storage tanks 130 may then be transported to another distribution point such as a dealer's yard by means of a road vehicle, and from this point, the lading may be distributed to an ultimate user such as a former, again by means of a road vehicle, where the portable storage tank 130 is again disposed upon a stationary support station (not shown in FIG. 1) constructed at that location, all in accordance with the principles of the present invention. FIG. 1 further illustrates a second method of distribution for ladings whereby the fluid may initially be transported in a railway tank car 115 from which the fluid is pumped into several of the portable storage tanks 130 each of which is disposed on a stationary support station (not shown). Each of the portable storage tanks 130 may then be transported to another distribution point by means of a road vehicle, and subsequently transported to the ultimate user again by means of a road vehicle as previously described.

The invention as disclosed herein generally includes three basic components; a stationary support station 400 provided with shiftable support structures, a portable storage tank 130 having tank bolsters mounted thereon, and a road vehicle 800 provided with body bolsters and lifting means whereby the tank 130 may be supported by and transferred between the stationary support station 400 and the road vehicle 800. The accompanying drawings illustrate various embodiments of each of the above-mentioned components as follows; FIGS. 2 through 16 illustrate one embodiment of each of a stationary support station with the associated support structures thereof, a portable storage tank with the associated tank bolsters thereof and a road vehicle with the associated body bolsters thereof including lifting means for causing relative vertical movement between the tank and the support structures; FIGS. 17 through 22 illustrate a second embodiment of a stationary support station with the associated support structures thereof, and a second embodiment of a road vehicle with the associated body bolsters and lifting means thereof; FIGS. 23 through 45 illustrate still another embodiment of a stationary support station with the associated support structures thereof and another embodiment of a portable storage tank with the associated tank bolsters thereof; FIGS. 46 through 49 illustrate still another embodiment of a stationary support station with the associated support structures thereof; and FIGS. 50

through 52 illustrate still another embodiment of a portable storage tank with the associated tank bolsters thereof.

Referring now to FIGS. 2, 3 and 4 of the drawings, there is shown a railway storage tank center 120 (FIG. 3) wherein railway tank cars 115 are transported along the railway tracks 121 in order to position the tank cars 115 adjacent to the portable storage tanks 130. The fluid lading, which for illustrative purposes may be anhydrous ammonia, may then be pumped from the railway tank car 115 to the several portable storage tanks 130 by means of suitable pipes (not shown). The portable storage tanks 130 are then ready for distribution to the ultimate user in accordance with the principles of the present invention.

The details of the portable storage tank 130 will now be described in greater detail. In FIGS. 2 and 6 through 9 of the drawings, there is illustrated one embodiment of the portable storage tank 130 embodying the principles of the present invention. The portable storage tank 130 is shown to include a body wall 131 defining a closed chamber for containing ladings and having a generally elongated cylindrical configuration, as shown in FIG. 2 of the drawings, although other shapes and configurations of storage tanks 130 may be successfully utilized in connection with this invention. The details of the inlet and outlet structures for the tank are shown more clearly in FIGS. 25 through 27 of the drawings. Referring specifically to FIGS. 25 and 26, there is shown a tank 130 having a body wall 131 defining a closed chamber for containing the ladings having an outlet fitting 132 and an inlet fitting 142 disposed adjacent the rear end of the tank 130. The outlet fitting 132 is joined to a ball valve (not shown) enclosed within a housing 133 and provided with a valve handle 134 for opening and closing the ball valve. The valve is in turn connected to a valve coupling 135 which is in turn joined to an outlet pipe 136 which enters through the body wall 131 of the tank 130 and is disposed adjacent the bottom portion of the interior of the tank 130. Similarly, the inlet fitting 142 is connected to a ball valve (not shown) enclosed within a valve housing 143 provided with a valve handle 144 for opening and closing the ball valve. The valve is in turn connected to a valve coupling 145 which is in turn joined to an inlet pipe 146 which enters through the body wall 131 of the tank 130 and extends upwardly such that the pipe opening is adjacent the upper portion of the interior of the tank 130. The relationship of the outlet fitting 132, valve housing 133, valve handle 134, valve coupling 135 and the joinder thereof with the outlet pipe 136 is shown in detail in FIG. 27. A relief valve 147 is provided adjacent the top end of the tank 130 in the customary manner. The outlet and inlet fittings, 132 and 142 respectively, and the associated structures named above are protected by means of guard rails 150 mounted on the tank 130 adjacent the rear end thereof and disposed to partially overhang and encircle these structures. In addition, a vapor line 148 is provided which is vented through the body wall 131 of the tank 130 in order to balance the vapors between tanks when transferring the lading from one tank to another.

The tank 130 is further provided with tank bolsters 155, one tank bolster 155 being disposed adjacent to the opposite ends of the tank 130 respectively, as shown in FIGS. 2 and 7 of the drawings. Having reference to FIGS. 6 and 9, each tank bolster 155 includes an arcuate tank support plate 160 mounted on the body wall 131 of the tank 130 by any suitable means such as weldments 161. The arcuate tank support plate 160 follows the contour of the outer surface of the tank body wall 131 and is disposed in face-to-face relationship with respect thereto extending around the lower portion of the tank body wall 131 for supporting the tank 130 when it is disposed upon the stationary support station 400 and the road vehicle 800 respectively. The tank bolster 155 also includes a chassis mount 165 consisting of a lower support wall 166, having a central portion 167, the chassis mount 165 being mounted on the arcuate tank support plate 160 adjacent the central portion 167 of the lower support wall 166 thereof and in tangential relationship with respect thereto, the lower support wall 166 extending transversely with respect to the longitudinal axis of the tank 130 having a length l slightly less than the diameter d of the tank 130. The lower support wall 166 includes an aperture 168 disposed therein and positioned between the central portion 167 thereof and the outer end of the lower support wall 166. Each end of the lower support wall 166 includes a side support wall 169 extending upwardly therefrom and in normal relation thereto, the upper end 170 thereof being mounted on the arcuate tank support plate 160 by any suitable means such as a weldment 171. A first web plate 172 is provided between the arcuate tank support plate 160, the lower support wall 166 and the side support wall 169 respectively for the purpose of rigidifying the associated structures. The lower support wall 166 further includes a bearing plate 173 disposed on the upper surface thereof and positioned adjacent to the first web plate 172, the bearing plate 173 further including an aperture 174 disposed therein and in vertical alignment with the aperture 168 disposed in the lower support wall 166, the apertures 168 and 174 being provided for a purpose to be described hereinafter. As illustrated in FIG. 6, the structure described hereinabove is provided on each side of the tank bolster 155 thereby forming a pair of chassis mounts 165 for each tank bolster 155.

Each tank bolster 155 further includes a pair of support plates 175 disposed on opposite ends of the tank bolster 155 for mounting the associated end of the tank 130 on the stationary support station as shown in FIGS. 6 and 9 of the drawings. Each support plate 175 includes an upper support wall 176 extending laterally outwardly from the associated side support wall 169 and spaced upwardly from and in parallel relationship to the lower support wall 166. The upper support wall 176 extends laterally outwardly to a point beyond the outside diameter of the tank 150 as illustrated in FIGS. 6 and 9 of the drawings. A side support brace 177 is provided extending from the outer end of the upper support wall 176 upwardly and angularly inwardly whereby the lower end 178 of the brace is mounted on the outer end of the upper support wall 176 and the upper end 179 of the brace is mounted on the arcuate tank support plate 160, the respective ends 178 and 179 of the side support brace 177 being mounted on the upper support wall 176 and the arcuate tank support plate 160 respectively by means of weldments 181. A second web plate 182 is provided between the arcuate tank support plate 160 and the upper support wall 176 and the side support brace 177 for the purpose of rigidifying the support plate 175. The upper support wall 176 further includes a jack guide plate 185 mounted on the lower surface thereof and disposed between the side support wall 169 and the outer end of the upper support wall 176 for a purpose to be described hereinafter. A gusset 186 is disposed immediately above the jack guide plate 185 in order to provide reinforcement therefor, the gusset 186 being positioned centrally on the jack guide plate 185 and being mounted on the upper surface of the upper support wall 176 and extending upwardly therefrom and mounted on the side surface of the web plate 182. Again, each tank bolster 155 includes a support plate 175 of the type described on either side thereof thereby to provide a pair of support plates 175 for mounting the adjacent end of the tank 130 on the associated stationary support station.

FIGS. 23, 24, 28—30, 32 36 and 38—45 illustrate still another embodiment of a tank bolster 255. Referring specifically to FIG. 29 of the drawings, there is shown a portable storage tank 230 including a body wall 231 defining a closed chamber for containing ladings, the tank 230 being of a generally elongated cylindrical configuration as described with respect to the storage tank 130 shown in FIG. 2 of the drawings. The tank 230 is provided with tank bolsters 255, one tank bolster 255 being disposed adjacent to the opposite ends of the tank 230 respectively as shown in FIGS. 23 and 24 of the drawings.

The tank bolster 255 includes an arcuate tank support plate 260 mounted on the body wall 231 of the tank 230 by any suitable means such as weldments for example. The arcuate

tank support plate 260 follows the contour of the outside surface of the tank body wall 231 and is disposed in face to face relationship with respect thereto and extends around the lower portion of the body wall 231 for supporting the tank 230 thereagainst.

As illustrated in FIGS. 28 and 29, the tank bolster 255 further includes a chassis mount 265 consisting of a lower support wall 266 extending transversely with respect to the longitudinal axis of the tank 250 and having a length *l'* equal to or slightly greater than the outside diameter *d'* of the tank 230. The lower support wall 266 includes two apertures 267, one such aperture 267 being disposed adjacent to one end thereof and another aperture 267 being disposed adjacent to the other end thereof, the apertures 267 being provided for a purpose to be described hereinafter. The lower support wall 266 has a forward edge 268 having a front wall 269 extending upwardly therefrom, the upper edge 270 thereof following the arcuate contour of the arcuate tank support plate 260 and being mounted thereto by any suitable means such as weldments for example. The lower support wall 266 has an inner edge 271 having a rear wall 272 extending upwardly therefrom and in normal relation thereto, the rear wall 272 having an upper edge 273 spaced slightly below the bottom of the tank 230. Extending upwardly from the side edges of the lower support wall 266 are side support walls 274 which extend upwardly to the upper edge 273 of the rear wall 271.

Each tank bolster 255 further includes a support plate 275 consisting of an upper support wall 276 extending transversely with respect to the longitudinal axis of the tank 230, the upper support wall 276 being spaced vertically upwardly from the lower support wall 266 and being offset longitudinally therefrom and in parallel relationship with respect thereto, and extending laterally rearwardly from the upper edge 273 of the rear wall 272. Finally, there is provided a side support brace 277 having a width equal to the combined widths of the side edge of the upper support wall 276 and the upper edge of the side support wall 274 and extending angularly between the upper edge of the arcuate tank support plate 260 and an edge formed by the side edge of the upper support wall 276 and the upper edge of the side support wall 274.

Another embodiment of a portable storage tank 330 is shown in FIGS. 50 through 52 of the drawings. Referring specifically to FIG. 51, there is shown a portable storage tank 330 including a body 331 defining a closed chamber for containing ladings, the tank 330 again being of a generally elongated cylindrical configuration. The tank 330 is provided with tank bolsters 355, one tank bolster 355 being disposed adjacent to opposite ends of the tank 330 respectively, as generally illustrated in FIG. 50.

The tank bolster 355 includes an arcuate tank support plate 360 having spaced outer side edges 361 and a central portion 362 mounted on the body wall 331 of the tank 330 by any suitable means such as weldments for example. The arcuate tank support plate 360 follows the contour of the outside surface of the tank body wall 331 and is disposed in face-to-face relationship with respect thereto and extends around the lower portion of the body wall 331 for supporting the tank 330 thereagainst.

The tank bolster 355 further includes a chassis mount 365 consisting of a first support wall 366 extending transversely with respect to the longitudinal axis of the tank 350, the first support wall 366 extending outwardly slightly beyond the side edge of the tank 330 to an outer side edge 368. The first support wall 366 includes an aperture 367 disposed adjacent to the outer side edge 368 thereof, the aperture 367 being provided for a purpose to be described hereinafter. The first support wall 366 further includes a side support wall 370 extending upwardly from the outer edge 368 of the first support wall 366 and in normal relation with respect thereto. There is further provided a side support brace 371 having a lower edge 372 mounted on the upper edge of the side support wall 370 and extending angularly upwardly therefrom to an upper edge 373 which is mounted on the arcuate tank support plate 360 adjacent the outer edge 361 thereof. The first support wall 366 extends inwardly to an inner edge 369 spaced from the central portion 362 of the arcuate tank support plate 360, the inner edge 369 having an oblique portion 374 curved obliquely upwardly therefrom and having an outer edge portion 375 extending laterally inwardly therefrom whereby the outer edge portion 375 is in parallel relationship with respect to the first support wall 366. A web plate 376 is provided extending between the first support wall 366 and the side support wall 370 and the side brace 371 and the arcuate tank support plate 360 and the outer edge portion 375, the web plate 376 providing structural rigidity for the associated structures.

Each tank bolster 355 includes a structure of the type described hereinabove on either side of the arcuate tank support plate 360 whereby there is provided a pair of chassis mounts 365 for supporting the adjacent end of the tank. In this particular embodiment of a tank bolster 355 the chassis mount 365 also serves the purpose of a support plate for mounting the adjacent end of the tank 330 on the associated stationary support station.

The details of the stationary support station 400 will now be described in greater detail. Referring once again to FIGS. 2 through 12 of the drawings there is shown a storage tank 130 disposed upon a stationary support station 400, one such stationary support station 400 being provided for each portable storage tank 130.

The understructure of the stationary support station 400 generally includes a load-bearing foundation 401 comprising reinforced concrete or the like. A track guide 402 is disposed along the longitudinal axis of the stationary support station 400, the track guide 402 being mounted on the foundation 401 by means of a plurality of braces 403 which are, in turn, mounted on the foundation 401 by means of anchor bolts 404 the lower ends of which are embedded in the foundation 401 (see FIG. 6). The stationary support station 400 includes four support posts 410 arranged in pairs whereby a first pair of support posts 410 are spaced apart and disposed on opposite sides of the longitudinal axis of the stationary support station 400, and a second pair of stationary support posts 410 are spaced apart and disposed on opposite sides of the longitudinal axis thereof, the second pair of support posts 410 being spaced longitudinally from the first pair thereof. Each of the support posts 410 is mounted on the load-bearing foundation 401 by means of a collar 411 encircling the lower end of the support post 410, the collar 411 having a plurality of apertures 412 provided therein around the periphery thereof. The collar 411 is mounted on the foundation 401 by means of a plurality of anchor bolts 413 disposed through the apertures 412 provided in the collar 411, the lower ends of the anchor bolts 413 being embedded in the foundation 401, whereby each stationary support post 410 is securely mounted on the foundation 401 in an upright position. As described above, the track guide 402 is disposed along the longitudinal axis of the stationary support station 400, the track guide 402 being disposed longitudinally between the respective support posts 410 in each pair of support posts 410.

In the embodiment of the stationary support station 400 illustrated in FIGS. 2 through 12 and particularly in FIG. 9 of the drawings each of the support posts 410 is shown to include a support structure 415 movable between a supporting position (as illustrated in FIGS. 2 and 6) and a receiving position wherein each of the support structures 415 are shifted at least 90° away from the supporting positions thereof. The details of the support structure 415 will now be described in greater detail.

As illustrated in FIG. 2, 6 and 12, each support structure 415 comprises a support brace 420 including a cylindrical housing 421 being closed at the top end thereof and open at the bottom end thereof, the housing 421 having a diameter slightly greater than the diameter of the associated support post 410 whereby the housing 421 may accommodate the associated support post 410 in the open end thereof and is adapted to be shiftably disposed thereon. The housing 421 in-

cludes an upper support plate **422** extending laterally outwardly from the top end thereof, a lower support plate **423** extending laterally outwardly from the bottom end of the housing **421** spaced from and in parallel relationship with respect to the upper support plate **422**, the outer end of the lower support plate **423** being turned obliquely upwardly toward the upper support plate **422** and a support gusset **424** extending between the upper surface of the lower support plate **423** and the lower surface of the upper support plate **422**, the support gusset **424** being positioned centrally on the associated surfaces for providing structural rigidity for the upper support plate **422**. The upper support plate **422** is further provided with side guides **425** extending obliquely upwardly from the side edges thereof and a centering guide **426** mounted on and extending upwardly from the upper support plate **422**, the centering guide **426** being spaced from the side guides **425** and spaced inwardly with respect to the outer edge of the upper support plate **422**. The side guides **425** and centering guide **426** are provided for a purpose to be described hereinafter.

The housing **421** further includes a pair of bar support gussets **430** in spaced relationship with respect to one another and extending laterally outwardly therefrom, each support gusset **430** being provided with an aperture centrally disposed therein. A locking bar **435** is provided, the upper end of which is provided with a pin channel **436** for accommodating a pin **437** therethrough. The locking bar **435** is pivotally mounted on the bar support gussets **430** by means of a pin **437** which is disposed through the apertures **431** provided in the bar support gussets **430** and the pin channel **436** provided in the locking bar **435**. The pin is provided with a head **438** at its one end and a locknut **439** threadedly mounted at its other end in order to securely hold the pin **437** in the apertures **431** of the pin channel **436**. A positioning lug **440** is mounted on the housing **421** immediately below the pair of support gussets **430**, the positioning lug **440** including two members **441** and **442** spaced apart a sufficient distance in order to receive the locking bar **435** therebetween. Each support post **410** includes a receiving positioning lug **445** mounted thereon and spaced slightly below the bottom end of the housing **421**, and a supporting positioning lug **446** spaced circumferentially from the receiving positioning lug **445** and mounted on the support post slightly below the bottom end of the housing **421**. The respective members of the receiving positioning lug **445** and the supporting positioning lug **446** are similarly spaced apart a sufficient distance in order to receive the locking bar **435** therebetween respectively.

FIGS. **17** through **22** illustrate another embodiment of a stationary support station **500** which may be utilized in connection with the novel system disclosed herein. The stationary support station **500** includes four support posts **510** arranged in pairs whereby the support posts **510** in the first pair of support posts **510** are spaced apart and disposed on the opposite sides of the longitudinal axis of the stationary support station **500**, and the support posts **510** in the second pair of support posts **510** are spaced apart and disposed on opposite sides of the longitudinal axis thereof, the second pair of support posts **510** being spaced longitudinally from the first pair thereof, as is more clearly shown in FIG. **22**. Each of the support posts **510** is mounted on a load-bearing foundation (not shown in FIG. **22**) in a manner similar to that described with respect to the stationary support station **400** previously described. This embodiment of stationary support station **500** is shown to further include a bumper rail **505** mounted on the innermost side surfaces of the support posts **510** adjacent the lower ends thereof. One bumpers rail **505** is provided longitudinally between respective members of the pairs of support posts **510** in order to protect the support posts **510** against accidental collision with the road vehicle **800** as it is backed into the support station **500**, and to provide additional guide members for the operator of the road vehicle **800**. In addition, the support station **500** includes a stop guide **506** mounted on the foundation adjacent one end thereof, the stop guide **506** being positioned centrally along the longitudinal axis thereof. The stop guide **506** similarly aids the operator to properly position the road vehicle **800** in the support station **500** by preventing the road vehicle **800** from being driven too far rearwardly. It is to be understood that the bumper rails **505** and stop guide **506** may be provided in connection with any of the embodiments of support stations **400**, **500**, **600** and **700** respectively described herein.

Referring more specifically to FIGS. **19** through **22**, each of the support posts **510** is shown to include a support structure generally indicated at **515** movable between a supporting position as illustrated particularly in FIG. **20** and a receiving position wherein each of the support structures **515** is shifted at least 90° away from the supporting position thereof.

Each support structure **515** comprises a support brace generally indicated at **520** which includes a hollow swivel pin **521** having an upper support plate **522** mounted thereon adjacent the top end thereof and extending laterally outwardly therefrom and a lower support plate **523** mounted thereon adjacent the lower end thereof and extending laterally outwardly therefrom, the lower support plate **523** being spaced from and in parallel relationship with respect to the upper support plate **522**, and a web plate **524** extending between the upper surface of the lower support plate **523** and the lower surface of the upper support plate **522**, the web plate **524** being positioned centrally on the associated surfaces for providing structural rigidity for the upper support plate **522**. A lockpin **525** is mounted on the upper surface of the upper support plate **522** adjacent the outer end thereof, the lock pin **525** being provided for a purpose to be described hereinafter.

Each support post **510** includes a pin housing **530** mounted adjacent the top end of the support post **510**, the pin housing **530** being closed at the top end thereof by means of a roof **531** and sidewall **532** and open at the bottom end thereof in order to receive the top end of the hollow swivel pin **521** therein. The support post **510** also includes a pin support gusset generally indicated at **535** having an attachment flange **536** disposed immediately adjacent to the support post **510** and including apertures (not shown) therein for mounting the pin support gusset **535** to the associated support post **510** by means of threaded bolts **537** and locknuts **538**. The pin support gusset **535** further includes a support wall **539** extending laterally outwardly from the upper end of the attachment flange **536** and in normal relation thereto and a web plate **540** extending diagonally between the attachment flange **536** and the lower surface of the support wall **539** to provide structural rigidity for the associated structures. The support wall **539** includes a pin pivot **541** mounted on the upper surface thereof and extending laterally upwardly therefrom and having a diameter slightly less than the inside diameter of the hollow swivel pin **521**. Hence, the upper end of the hollow swivel pin **521** is accommodated within the pin housing **530** while the lower end of the hollow swivel pin **521** is fitted over the pin pivot **541** whereby the hollow swivel pin **521** is pivotally mounted on the associated support post **510**.

Each support post **510** may be provided with a pair of support braces **520** mounted thereon in back-to-back relationship as more clearly shown in FIG. **22** of the drawings. In this manner, one of each pair of support posts **510** may be utilized for supporting the support structure **515** for the next adjacent stationary support station **500**.

Another embodiment of a stationary support station **600** which may be utilized in connection with this invention is illustrated in FIGS. **24**, **36**, **38—45** of the drawings. The stationary support station **600** again includes four support posts **610** arranged in pairs whereby the support posts **610** in the first pair of support posts **610** are spaced apart and disposed on the opposite sides of the longitudinal axis of the stationary support station **600**, and the support posts **610** in the second pair of support posts **610** are spaced apart and disposed on the opposite sides of the longitudinal axis thereof, the second pair of support posts **610** being spaced longitudinally from the first pair thereof as shown in FIG. **4** of the drawings. Each of the

support posts 610 is mounted on a load-bearing foundation (not shown) by means of a collar 611 which is, in turn, mounted on the load-bearing foundation by means of anchor bolts 613 disposed through apertures provided in the collar 411, all in a manner similar to that described with respect to the stationary support station 400 as previously set forth. Once again, the stationary support station 600 is provided with bumper rails 605 mounted longitudinally between respective members of the pairs of support posts 610, in order to protect the support posts 610 against accidental collision, and a stop guide 606 for aiding the positioning of the rear end of the road vehicle 800. Referring more specifically to FIGS. 38, and 40—45, each pair of support posts 610 is shown to include a support structure generally indicated at 615 movable between a supporting position and a receiving position wherein each of the support structures 615 is shifted at least 90° away from the supporting position thereof, each of these positions being more clearly shown in FIG. 39.

Each support structure 615 comprises a support bracket 620 which includes a pin housing 621 disposed adjacent to one end of the support bracket 620 and having an upper support plate 622 mounted thereon adjacent the upper end of the pin housing 621 and extending laterally outwardly therefrom a distance slightly greater than the distance between the opposing support posts 610 in the respective pair of support posts 610, and a lower support plate 623 mounted thereon adjacent the lower end of the pin housing 621 and extending laterally outwardly therefrom a distance equal to the length of the upper support plate 622 and the lower support plate 623 being spaced from and in parallel relationship with respect to the upper support plate 622, and a first web plate 624 extending between the upper surface of the lower support plate 623 and the lower surface of the upper support plate 622, the web plate being positioned centrally on the associated surfaces for providing structural rigidity for the upper support plate 622. One of the support posts 610 in each pair of support posts 610 includes a pivot plate 625 mounted on the top end thereof and having a swivel pin 626 mounted thereon and extending upwardly therefrom. The swivel pin 626 has a diameter slightly less than the inside diameter of the pin housing 621 whereby the swivel pin 626 may be accommodated within the pin housing 621 in order to pivotally mount the support bracket 620 on the associated support post 610. The pivot plate 625 extends laterally outwardly for a short distance in the direction of and immediately below the lower support plate 623 in order to provide additional support therefor. The pivot plate 625 includes a support wall 627 extending downwardly from the lower surface thereof, mounted on the side of the support posts 610, and having a second web plate 628 extending angularly between the support wall 627 and the underside of the pivot plate 625.

The opposing support post 610 in the respective pair of support posts 610 includes a support member 630 mounted on the top end thereof which is adapted to receive and support the free-swinging end of the support bracket 620. The support member 630 includes a boss 631 mounted on the upper surface thereof adjacent the forward end thereof and extending upwardly therefrom a short distance, the boss having an abutment surface 632 for preventing the support bracket 620 from sweeping across the upper surface of the support member 630. The support member 630 further includes an aperture 633 disposed therein, spaced from the boss 631 and positioned adjacent the rear edge of the support member 630. The rear surface of the support member 630 is curved slightly downwardly and includes a pair of spaced apart dependent flanges 634 depending from the underside thereof adjacent the rear end thereof, each of the flanges being provided with an aperture disposed therein, the respective apertures being disposed in horizontal alignment. A latch mechanism, generally indicated at 635, is provided in order to lock the support bracket 620 in the supporting position thereof with the lower support plate 623 disposed upon the upper surface of the support member 630.

The latch mechanism 635 is more clearly shown in FIG. 43 and includes an arm 636 having a forward end 637, a rear end 638 and a cammed upper surface 640. The arm 636 is provided with an aperture 642 disposed adjacent the rear end 638 thereof. The arm 636 is pivotally mounted on the support member 63 by inserting the rear end 638 thereof into the space between the dependent flanges 634 with the aperture 642 in the arm 636 in horizontal alignment with the apertures provided in the respective dependent flanges 634. A threaded bolt 643 is inserted through the respective apertures and held in position by a locknut 644 (see FIG. 44), thereby to pivotally mount the rear end of the arm 636 on the under surface of the support member 630. In the normal resting position of the latch mechanism 635, the cammed upper surface 640 thereof protrudes upwardly through the aperture 633 provided in the support member 630 and is held in this position by means of a spring assembly, generally indicated at 645.

The spring assembly 645 includes a vertical support flange 646 mounted on the support post 610 and extending downwardly from the under surface of the support member 630 adjacent the forward end thereof, to a bottom end 647 spaced from the support member 630, and a horizontal support flange 648 extending laterally outwardly from the bottom end 647 of the vertical support flange 646, the horizontal support flange 648 being similarly mounted on the support post 610. The horizontal support flange 648 is provided with an aperture 649 disposed adjacent to the outer end thereof, the aperture 649 being provided for a purpose to be described herein. The spring assembly 645 further includes an upper spring platform 651 spaced downwardly from the under surface of the support member 630 and having an inner ear 652 disposed adjacent the inner side edge thereof and extending upwardly therefrom to a point immediately below the support member 630, and an outer ear 653 spaced from the inner ear 652 and extending laterally upwardly therefrom, the respective ears 652 and 653 being spaced apart a sufficient distance in order to accommodate the forward end 637 of the arm 636 therebetween. The upper spring platform 651 further includes an aperture 654 disposed therein and spaced between the outer ear 653 and the outer side edge of the platform 651. The outer side surface of the outer ear 653 is provided with a stud 655 extending laterally outwardly therefrom and spaced above the aperture 654 provided in the upper spring platform 651. The forward end 637 of the arm 636 is disposed between the ears 652 and 653 respectively, adjacent the lower end thereof, and mounted thereon by any suitable means such as weldments. There is also provided a lower spring platform 656 spaced from and in vertical alignment with the upper spring platform 651 and normally disposed upon the upper surface of the horizontal support flange 648, the lower spring platform 656 having an aperture disposed therein and in vertical alignment with the aperture 654 in the upper spring platform 651. An eyebolt 657 is provided having the eye 658 thereof disposed about the stud 655 and having a stem 659 extending downwardly therefrom and disposed through the aperture 654 in the upper spring platform 651 and through the aperture in the lower spring platform 656 and through the aperture provided in the horizontal support flange 648, the stem 659 extending slightly below the lower surface of the horizontal support flange 648. The stem 659 of the eyebolt 657 carries a compression spring 660 thereon the upper end of which rests against the lower surface of the upper spring platform 651 and the lower end of which is disposed against the upper surface of the lower spring platform 656, the spring 660 normally urging the spring platforms 651 and 656 respectively, apart.

As was mentioned previously, in the normal resting position of the latch mechanism 635, the upper cammed surface 640 of the arm 636 protrudes through the aperture 633 provided in the support member 630 whereby the forward end 637 of the arm 636 forms an abutment surface 641. As the arm 636 is pushed in a downwardly direction, the associated ears 652 and 653, respectively, and the upper spring platform 651 are forced against the spring 660 thereby compressing the spring

660. In this position, the cammed surface 640 of the arm 636 is forced down through the aperture 633 whereby no portion of the arm 636 extends beyond the upper surface of the support member 630. When the force pushing the arm 636 downwardly is removed, the spring 660 urges the upper spring platform 651, and hence the arm 636, upwardly whereby the cammed surface 640 of the arm 636 is once again disposed in protruding relationship with respect to the aperture 633 in the support member 630. Hence, the support bracket 620 may be pivoted across the support member 630 contacting the upper cammed surface 640 of the arm 636 pushing it downwardly thereby to allow further pivotal movement of the support bracket in a forwardly direction. Once the lower support plate 623 of the support bracket 620 has cleared the arm 636, the spring 660 urges the arm downwardly whereby the lower support plate 623 is securely held between the abutment surface 632 of the boss 631 and the abutment surface 641 of the arm 636.

The support bracket 620 may further be securely locked into position by providing an additional aperture 665 in the lower support plate 623 and another aperture 666 in the support member 630, the apertures 665 and 666 being in vertical alignment when the support bracket 620 is disposed between the boss 631 and the arm 636. A pin 667 having an enlarged head 668 may then be dropped through the apertures 665 and 666 whereby the support bracket 620 is firmly held in the supporting position.

Still another embodiment of a stationary support station 700 which may be utilized in connection with the system disclosed herein is illustrated in FIGS. 46 through 49. Once again, the stationary support station 700 includes four support posts 710 arranged in pairs whereby the support posts 710 in the first pair of support posts 710 are spaced apart and disposed on the opposite sides of the longitudinal axis of the stationary support station 700, and the support posts 710 of the second pair of support posts 710 are spaced apart and disposed on the opposite sides of the longitudinal axis thereof, the second pair of support posts 710 being spaced longitudinally from the first pair thereof as shown in FIG. 48 of the drawings. Again, each of the support posts 710 is mounted on a load-bearing foundation 701 formed of reinforced concrete or the like in a manner similar to that described with respect to the stationary support station 400 previously set forth, and bumper rails 705 longitudinally mounted on the members of respective pairs of supports posts 710. Each pair of supports posts 710 is shown to include a support structure generally indicated at 715 movable between a supporting position and a receiving position wherein each of the support structures 715 is shifted at least 90° away from the supporting position thereof, as indicated by the arrows in FIG. 48.

The support structure 715 is quite similar in structure and method of operation to the support structure 615 described previously with the exception that the pivot plate and the resting point for the support structure 715 is positioned on the sides of the associated support posts 710, as opposed to the top ends thereof as described with respect to the support structure 615.

Each support structure 715 generally comprises a support bracket 720 including an upper support plate 722 having a length slightly less than the distance between the support posts 710 in the associated pair of support posts 710, and a lower support plate 723 spaced apart and having a length equal to the upper support plate 722. The upper and lower support plates 722 and 723 respectively are each provided with an aperture (not shown) adjacent one end thereof, the apertures in the respective plates 722 and 723 being in vertical alignment with one another, and the lower support plate 723 is also provided with a second aperture (not shown) disposed adjacent to the opposing end thereof. The upper and lower support plates 722 and 723 respectively are held together by means of a web plate 724 extending between the lower surface of the upper support plate 723 and the upper surface of the lower support plate 723 and extending laterally from a point spaced inwardly from the apertures in the respective plates 722 and 723 to the opposing ends thereof.

One of the support posts 710 in each pair of support posts 710 includes a first pivot plate 725 mounted thereon and extending laterally inwardly with respect to the opposing support post 710 in the associated pair of support posts 710, the first pivot plate 725 being provided with an aperture (not shown) centrally disposed therein. A second pivot plate 726 is mounted on the same support post 710 being spaced downwardly from the first pivot plate 725 a distance sufficient to accommodate the upper support plate 722 and lower support plate 723 of the support bracket 720 therebetween, the second pivot plate 726 similarly being provided with an aperture (not shown) centrally disposed therein. A web plate 727 is mounted on the support post 710 extending between the lower surface of the second pivot plate 726 and the side of the support post 710 in order to provide structural rigidity for the second pivot plate 726. The support bracket 720 is pivotally mounted to the support post by means of a pivot pin 728 disposed through the aperture in the first pivot plate 725, the apertures in the upper and lower support plates 722 and 723 respectively and the aperture in the second pivot plate 726. The pivot pin 728 has an oversized head 729 mounted on the top end thereof in order to hold the pin 728 in position.

The opposing support post 710 in the respective pair of support posts 710 includes a support member 730 mounted on the side thereof and extending laterally inwardly with respect to the other support post 710 in the respective pair thereof, the support member 730 being in horizontal alignment with the second pivot plate 726. The support member 730 further includes a web plate 731 mounted thereon and extending from the lower surface thereof to the side of the support post 710 in order to provide structural rigidity for the support member 730. The support member 730 further includes an aperture (not shown) disposed therein adjacent to the side edge thereof which aperture is in vertical alignment with the second aperture disposed in the lower support plate 723 when the free-swinging end of the support bracket 720 is disposed upon the support member 730. A lock pin 735 having an oversized head 736 is inserted through the second aperture in the lower support plate 723 and the aperture provided in the support member 730 in order to lock the support bracket 720 in position on the support member 730.

The details of the road vehicle 800 will now be described in greater detail. One embodiment of a road vehicle 800 which may be utilized in the system disclosed herein is illustrated in FIGS. 13 through 16 of the drawings. Referring specifically to FIGS. 13 and 14, there is shown a road vehicle 800 having a frame generally indicated at 801, the frame 801 being defined by two spaced-apart side beams 802, a rear beam 803 mounted on the side beams 802 at the rear ends thereof by means of weldments and a front beam (not shown) similarly mounted on the side beams 802 at the front ends thereof. The rear end of the frame 801 is provided with a plurality of road wheels 804 mounted on axles (not shown) which are, in turn, mounted on the frame 801 in the usual manner. The frame 801 further includes a landing gear 805 mounted thereon adjacent the front end of the frame 801 whereby the front end thereof may be supported in horizontal alignment with the rear end of the frame 801 when the truck cab has been removed. The frame 801 is further provided with two body bolsters generally indicated at 810 which are arranged so that the tank bolsters 155 can be positioned respectively thereupon. Hence, one bolster 810 is disposed adjacent to the front end of the frame 801 and the other body bolster 810 is disposed adjacent to the rear end of the frame 801. The road vehicle 800 is provided with the usual structures adjacent the front end thereof for engaging and disengaging with a motorized truck cab in the usual manner.

The details of the body bolsters 810 are more fully shown in FIGS. 15 and 16 of the drawings. Each bolster 810 has two side portions thereof which are identical in construction and therefore reference will be made to one side thereof and it is

to be understood that the parts named in connection with one side thereof are identical to the structures provided on the other side of the bolster 810.

Each of the side beams 802 of the frame 801 includes an upper support wall 807 and a lower support wall 808 spaced from the upper support wall 807, and a main web plate 809 extending between the upper support wall 807 and the lower support wall 808 along the length thereof, the upper support wall 807 of the side beam 802 having a grooved portion (not shown) adjacent each end of the frame 801. Each body bolster 810 includes an upper cover plate 811 which extends transversely with respect to the longitudinal axis of the frame 801 terminating at an outer side edge 812 spaced outwardly with respect to the beam 802. The upper cover plate 811 fits within the grooved portion of the upper support wall 807 of the beam 802 such that the top surface of the upper cover plate 811 is coextensive with the top surface of the upper support wall 807 of the beam 802. The upper cover plate 811 is further provided with a rectangular aperture disposed adjacent to the upper side edge 812 thereof for a purpose to be described hereinafter. The bolster 810 further includes a lower cover plate 814 extending transversely with respect to the longitudinal axis of the frame 801, the lower cover plate 814 being spaced from and in parallel relationship with respect to the upper cover plate 811 and extending through a slot 815 provided in the main web plate 809 of the side beam 802 and extending laterally outwardly, to an outer side edge 816 in vertical alignment with the outer side edge 812 of the upper cover plate 811. The lower cover plate 814 is similarly provided with a rectangular aperture 817 adjacent the outer side edge 816 thereof, the aperture 817 being in vertical alignment with the aperture 813 provided in the upper cover plate 811. A first web plate 818 is disposed between the upper cover plate 811 and the lower cover plate 814 and extending from the inner side surface of the main web plate 809 of the side beam 802 transversely to the other side beam 802 disposed on the other side of the frame 801. A second web plate 819 is disposed between the upper cover plate 811 and the lower cover plate 814 and extends laterally between the outer side surface of the main web plate 809 of the side beam 802 to an outer side edge in vertical alignment with the outer side edges 812 and 816 of the upper cover plate 811 and lower cover plate 814 respectively. A jack support plate 820 is mounted on the outer side edges 812 and 816 of the upper and lower cover plates 811 and 814 respectively, the jack support plate 820 being provided with a plurality of apertures for a purpose to be described presently. The structures named above are secured to one another by any suitable means such as weldments or the like.

The supporting structures for the body bolster 810 as described hereinabove may be modified in several ways without departing from the scope of the invention disclosed herein. For example, additional structural rigidity may be achieved by providing a pair of web plates 818 and 819 disposed between the respective outer side edges of the upper cover plate 811 and the lower cover plate 814. Similarly, the upper support wall 807 of the side beam 802 need not be grooved in order to accommodate the upper cover plate 811 as indicated above, hence, it is apparent that the precise details of the construction of the supporting plates, webs and the like may be modified as desired.

The upper cover plate 811 is further provided with a bearing plate 825 mounted on the upper surface and disposed adjacent to the outer side 812 thereof. The bearing plate 825 includes side edges 826 extending upwardly therefrom, the side edges 826 being bevelled at the ends thereof as indicated at 827. The bearing plate 820 is similarly provided with a rectangular aperture 828 disposed therein and in vertical alignment with the aperture 813 disposed in the upper cover plate 811. A lock baseplate 829 is provided, the lock baseplate 829 being mounted upon the bearing plate 825 and similarly being provided with a rectangular aperture 870 disposed therein and in vertical alignment with the aperture 828 in the bearing plate 825.

A lock mechanism, generally indicated at 830, is provided for locking the tank bolster 155 onto the body bolster 810 when the tank 130 is disposed upon the road vehicle 800. The lock mechanism 830 includes a lockpin 831 disposed through the apertures 870, 828, 817 and 813 provided in the lock baseplate 829, the bearing plate 825, the lower cover plate 814 and the upper cover plate 811 respectively. The lockpin 831 includes a lock head 832 mounted on the top end thereof, the lock head 832 having the form of a pentahedron with a rectangular base and four surfaces extending upwardly therefrom. The lower end of the lockpin 831 extends below the bottom surface of the lower cover plate 814 and is provided with a handle 833 mounted adjacent the lower end thereof. The bottom surface of the lower cover plate 814 further includes a ring clamp 834 mounted thereon and having a handle lock 835 disposed therethrough, the handle lock 835 being in the form of a steel loop pivotally hung from the ring clamp 834. The ring clamp 834 and the handle lock 835 pivotally mounted therethrough are disposed adjacent to the outer side edge 816 of the lower cover plate 814 whereby the handle lock 835 may be pivoted to secure the handle of the lock mechanism 830 thereby to prevent damage to the lock mechanism 830 when it is in the disengaged position as will be more fully described hereinafter.

Each bolster 810 is further provided with jack mechanism generally indicated at 840 including an elongated cylindrical housing 841, the housing 841 defining an upper chamber 842 and a lower chamber 843. A lifting piston 844 is disposed within the upper chamber 842, having a jackhead 845 mounted on the top end thereof, the upper surface of the jackhead 845 being substantially flat. The lower chamber 843 has a support piston 846 disposed therein, the support piston 846 including a jack support plate 847 mounted on the bottom end thereof, the lower surface thereof being similarly substantially flat. The housing 841 is provided with a mounting plate 848 mounted thereon by any suitable means, the mounting plate 848 having a plurality of apertures (not shown) therein which are in horizontal alignment with the apertures provided in the jack support plate 820. The jack mechanism 840 is mounted on the body bolster 810 by aligning the apertures in the mounting plate 848 and jack support plate 820, respectively, and inserting threaded bolts therethrough which are held in position by locknuts. The housing 841 is further provided with a collar 850 secured around the periphery of the housing 841 intermediate the top and bottom ends thereof the collar 850 having an attachment flange extending laterally therefrom, the flange being provided with an aperture (not shown) centrally disposed therein. The bottom surface of the lower support wall 808 of the side beam 802 includes a mounting flange 852 mounted thereon by weldments 853 and extending laterally outwardly therefrom in the direction of the jack mechanism 840. A jack brace 855 is provided having one end thereof mounted on the attachment flange 851 of the collar 850 by means of a bolt and locknut (not shown), and the other end thereof mounted on the mounting flange 852 by means of a bolt 856 and locknut (not shown), the jack brace 855 providing additional support for the jack mechanism 840.

As indicated previously, each side of each body bolster 810 is provided with a bearing plate 825, lock mechanism 830 and jack mechanism 840 as indicated by the top plan view in FIG. 14. In this manner, one pair of jack mechanism 840 and one pair of lock mechanism 830 is provided for each body bolster 810 disposed on the frame 801 of the road vehicle 800.

Another embodiment of a road vehicle 900 which may be utilized in connection with this invention is illustrated in FIGS. 22, 31, 32, 33—35 and 50 of the drawings. The road vehicle 900 includes a frame generally indicated at 901, being defined by two spaced-apart side beams 902, a rear beam 903 mounted on the side beams 902 on the rear ends thereof by means of weldments and a front beam (not shown) similarly mounted on the side beams 902 on the front ends thereof. The rear end of the frame 901 is provided with a plurality of road wheels 904 mounted on axles (not shown) which are, in turn, mounted on the frame 901 in the usual manner. Additional

structural rigidity is provided by crossbeams **906** mounted between the side beams **902** intermediate in the front beam and rear beam **903** thereof. The frame **901** is further provided with two body bolsters, generally indicated at **910**, which are arranged so that the tank bolsters **155** can be positioned respectively thereupon. Hence, one bolster **910** is disposed adjacent to the front end of the frame **901** and the other body bolster **910** is disposed adjacent to the rear end of the frame **901**.

In the road vehicle **900** shown in FIG. **22** of the drawings each body bolster **910** includes an upper cover plate **911** which is formed in three sections **912**, **913** and **914** respectively, the three sections **912**, **913** and **914** respectively being mounted on the respective side beams **902** by means of weldments or the like. The remaining supporting structures for the body bolster **910** include a lower cover plate (not shown) similarly formed in three sections and mounted on the respective side beams **902**, and a plurality of web plates (not shown) extending between the respective sections of the upper cover plate **911** and the corresponding sections of the lower cover plate and mounted on the respective side beams **902**. In this embodiment, the upper cover plate **911** comprises a bearing plate **925** upon which the respective tank bolsters are disposed when the storage tank is mounted thereon. Each end of the upper cover plate **911** is provided with an aperture in order to accommodate a lock mechanism **930** for locking the tank bolsters on the body bolsters **910**. The road vehicle as illustrated in FIG. **22** is similarly provided with a plurality of jack mechanism **940**, one pair of jack mechanism **940** being mounted adjacent the front end of the frame **901** and another pair of jack mechanism **940** being mounted adjacent the rear end of the frame **901**. Each of the respective pairs of jack mechanism **940** is spaced longitudinally from the associated body bolster **910** whereby this embodiment of a road vehicle **900** is particularly useful in connection with portable storage tanks **230** having tank bolsters **255** including chassis mounts **265** which are spaced longitudinally from the associated support plates **275** as will be more fully described hereinafter.

The road vehicle **900** as illustrated in FIG. **31** of the drawings is fundamentally of the same construction as the road vehicle **900** described above, and for this reason like numerals are utilized to describe like parts. The road vehicle **900**, as shown in FIG. **31** similarly includes a frame **901** defined by a pair of side beams **902**, the rear beam **903** mounted on the side beams at the rear ends thereof and the front beam (not shown) mounted adjacent to the front ends of the respective side beams **902**, and further includes road wheels **904** connected to axles which are mounted adjacent to the rear end thereof in the customary manner. Additional structural rigidity is obtained by including cross beams **906** extending transversely between the respective side beams **902** intermediate the front and rear ends thereof and spaced longitudinally along the length thereof.

The frame **901** is provided with a pair of body bolsters **910**, one body bolster being disposed adjacent each of the respective ends thereof. In the embodiment as shown in FIG. **31**, the body bolster **910** includes a cover plate **911** which is formed as a single piece and extends transversely with respect to the longitudinal axis of the frame **901**, the cover plate **911** being disposed upon the upper surface of the respective side beams **902** and mounted thereon by any suitable means such as weldments. Once again, the cover plate **911** functions as the bearing plate **925** upon which the associated tank bolsters are disposed when the portable storage tank is mounted thereon. Furthermore, each upper cover plate **911** is provided with a rectangular aperture **915** disposed adjacent to the side edges thereof for accommodating the lock mechanism **930** therethrough. Additional structural rigidity is provided by means of a center brace **916** (FIG. **33**) extending between and mounted on the two interior side surfaces of the side beams **902** and positioned intermediate the upper and lower ends thereof and by means of side braces **917** extending angularly between the respective side beam **902** and the outer edge of the upper cover plate **911**, one side brace **917** being provided for each respective side of the body bolsters **910**, as more clearly illustrated in FIG. **33**. Each side member **917** is provided with a rectangular aperture **918** disposed therein adjacent the outer edge thereof, the aperture **918** being in vertical alignment with the aperture **915** disposed in the upper cover plate **911** in order to accommodate the lock mechanism **930** therethrough. Once again, the side braces **917** are mounted on the associated structures by any suitable means such as weldments.

As more clearly illustrated in FIGS. **33—35** of the drawings, the lock mechanism **930** includes a lockpin **931** shiftably disposed in the apertures **915** and **918** respectively. The lockpin **931** includes a lock head **932** mounted on the top end thereof, the lock head **932** having the form of a pentahedron with a rectangular base and four surfaces extending angularly upwardly therefrom. The lower end of the lockpin **931** extends below the lower surface of the upper cover plate **911** and below the lower surface of the side brace **917**, and is provided with a handle **933** mounted thereon adjacent the lower end thereof. The lower surface of the side brace **917** is further provided with a ring clamp **934** mounted thereon which carries a handle clamp **935** extending downwardly therefrom, the handle clamp **935** being provided to engage the handle **933** when the lock mechanism **930** is disengaged thereby to prevent damage to the lock mechanism **930** and associated structures. The lower surface of the side brace **917** further includes a lockpin guide **936** mounted thereon and having an aperture disposed therein through which the lower end of the lockpin **931** is inserted.

The frame **901** is further provided with jack mechanism generally indicated at **940**, one pair of jack mechanism **940** being mounted adjacent the front end of the frame **901** and another pair of jack mechanism **940** being mounted adjacent the rear end of the frame **901**. The jack mechanism **940** generally includes an elongated cylindrical housing **941** having a support piston **946** disposed therein and having a jack support plate **947** mounted on the bottom end thereof. The jack mechanism **940** includes only a support piston **946** for providing lifting movement and therefore, the jack mechanism **940** provides a relative vertical movement between the frame **901** and the underlying support surface, such as the load-bearing foundation **401** of the support station **400**.

As can be observed in FIG. **31**, the road vehicle **900** is provided with two body bolsters **910**, each bolster including a bearing plate **925** and a pair of lock mechanism **930** disposed adjacent the respective side edges thereof. The jack mechanism **940** is mounted separately on the frame **901** in order to provide vertical relative movement between the frame **901** and the underlying support surface.

In operation, a plurality of storage tanks **130** having tank bolsters **155** of the type shown in FIGS. **6** and **9** of the drawings are positioned upon the support braces **420** of a stationary support station **400** located at a terminal or distribution point such as shown in FIG. **1** of the drawings. The lading is pumped from a main storage tank **105** into several of the portable storage tanks **130** by means of a pipe **107**. Each of the storage tanks **130** is now in position to be transferred from the stationary support station **400** to a road vehicle **800** and transported to a secondary location, wherein the portable storage tank **130** is transferred from the road vehicle **800** to another stationary support station **400**.

The portable storage tank **130** of the type having tank bolsters **155** including support plates **175** spaced vertically upwardly and laterally outwardly from the associated chassis mounts **165** mounted thereon and including jack guide plates **185** disposed between the support plates **175** and the chassis mounts **165**, is especially adapted for use in connection with the stationary support station **400** having four support posts **410** which are arranged in pairs, each member of the pair being spaced apart and disposed on either side of a longitudinal axis and the respective pairs of support posts **410** being spaced longitudinally from one another and wherein each of

the support posts 410 includes a support structure 415 consisting of a support brace 420 shiftably disposed thereon, as illustrated in perspective view in FIG. 2, and also in connection with a road vehicle 800 having two body bolsters 810, one body bolster 810 disposed adjacent to the front and rear ends thereof respectively and each body bolster 810 including a pair of bearing plates 825 and a pair of jack mechanism 840 mounted adjacent to the bearing plates 825. In order to support a portable storage tank 130 on the associated stationary support station 400, the locking bars 435 mounted on the support braces 420 are pivoted upwardly and the support braces 420 are shifted into the supporting positions, after which the locking bars 435 are pivoted downwardly and disposed between the respective members 441 and 442 of the positioning lugs 440 and the respective members of the supporting positioning lugs 446 thereby locking the support braces 420 in the supporting positions thereof. The respective support plates 175 on the tank bolsters 155 are disposed upon the associated support braces 420, the support plates 175 being disposed between the side guides 425 of the upper support plates 422, and centrally positioned with respect to the centering guides 426, whereby the portable storage tank 130 is securely held on the stationary support station 400. In order to transfer the tank from the support station 400 to the road vehicle 800 the frame 801 of the road vehicle 800, driven by a motorized cab in the customary manner, is backed into the support station 400 between the members of the respective pairs of support posts 410 in order to position the body bolsters 810 on the road vehicle 800 directly beneath the chassis mounts 165 on the tank bolsters 155, the operator being aided by the track guide 402 mounted on the foundation 401 of the support station 400. The respective jack mechanisms 840 mounted on the tank bolsters 810 are activated whereby the support pistons 846 are lowered in order to rest the jack support plates 847 on the underlying support surface, and the lifting pistons 844 are raised upwardly until the jackheads 845 are in contact with the jack guide plates 185 disposed on the tank bolsters 155. The lifting pistons 844 are caused to lift the tank bolsters 155 above the respective support braces 420, after which the locking bars 435 on the support braces 420 are pivoted upwardly in order to allow the support braces 420 to be shifted through an arc of at least 90° into the receiving positions thereof after which the locking bars 435 are pivoted downwardly and disposed between the respective members 441 and 442 of the positioning lugs 440 and the respective members of the receiving positioning lugs 445 in order to lock the support braces 420 in the receiving positions thereof. The jack mechanisms 840 are then activated to lower the tank bolsters 155 and the associated tank 130 onto the body bolsters 810 of the road vehicle 800 whereby the chassis mounts 165 of the tank bolsters 155 are disposed upon the bearing plates 825 of the body bolsters 810. Once the tank bolsters 155 are disposed upon and supported by the bearing plates 825, the support pistons 846 are then activated and raised upwardly into the lower chambers 843 of the jack housings 841. Each lock mechanism 830 on the body bolster 810 is then engaged in order to lock the tank bolsters 155 on the body bolsters 810. More specifically, the lock handle 833 may be grasped by the operator in order to shift the lock head 832 upwardly by forcing the associated lock pin 831 upwardly, through the aperture 168 disposed in the lower support wall 166 and the aperture 174 in the bearing plate 173 of the chassis mount 165. Once the lock head 832 has entered through the aperture 168 and 174 respectively the lock head 832 is then turned through a 90° arc by shifting the handle 833 on the associated lock pin 831. Since the apertures 168 and 174, and the lock head 832 both have rectangular configuration, the lower surface of the lock head 832 rests against the respective sides of the aperture 174 thereby securely holding the tank bolsters 155 on the body bolsters 810. The road vehicle 800 may then be pulled away from the support station 400 with the portable tank 130 mounted thereon and transported to another location having another stationary support station 400 disposed thereat.

In order to transfer the storage tank 130 from the road vehicle 800 to another stationary support station 400, the process described above is merely reversed. The support braces 420 on the stationary support station 400 are positioned in the receiving positions thereof by pivoting the locking bars 435 upwardly in order to allow the support braces 420 to be shifted laterally through an arc of at least 90° away from the supporting positions thereof, after which the locking bars 435 are pivoted downwardly and disposed between the respective members 441 and 442 of the positioning lugs 440 and the respective members of the supporting positioning lugs 446. The road vehicle 800 having the tank 130 disposed thereon is backed into the support station 400 with the arm 801 thereof being accommodated between the members of the respective pairs of support posts 410. Once again, the operator of the road vehicle 800, is aided by means of the track guide 402 mounted on the foundation 401 in order to properly position the road vehicle 800 in the support station 400. Once the road vehicle 800 is properly positioned with the tank bolsters 155 in horizontal alignment with the respective support posts 410, the lock mechanism 830 are disengaged by shifting the lock heads 832 into alignment with the rectangular apertures 174 and 168 in the lower support walls 166 and bearing plates 173 respectively of the chassis mounts 165 thereby enabling the lock heads 832 to be removed disengaging the lock mechanisms 830. The jack mechanisms 840 are then activated whereby the support pistons 846 are lowered such that the jack support plates 847 contact the underlying support surface, and the lifting pistons 844 are caused to rise until the jackheads 845 are in contact with the jack guide plates 185, thereby to raise the tank bolsters 155 and the associated tank 130 upwardly to a point spaced slightly above the respective support braces 420. The locking bars 435 of the support braces 420 are shifted through an arc to 90° in order to dispose the support braces 420 in the supporting positions thereof with the upper support plates 422 thereof disposed in vertical alignment with the support plates 175 on the tank bolsters 155, after which the locking bars 435 are each pivoted downwardly to dispose the bars 435 between the associated members 441 and 442 of the positioning lugs 440 and the associated members of the supporting positioning lugs 446, thereby locking the support braces 420 in the support positions thereof. The lifting pistons 844 are then lowered thereby lowering the tank bolsters 155, and more specifically, the support plates 175 thereof onto the upper support plates 422 of the support braces 420. The lifting pistons 844 are then completely lowered into the upper chamber 842 of the jack housing 841, and the support pistons 846 are raised into the lower chamber 843 of the housing 841 and the road vehicle 800 may then be removed from the support station 400 leaving the storage tank 130 disposed on the support structures 415 of the support station 400.

The other embodiments of the storage tanks 230 and 330 and the associated tank bolsters thereof 255 and 355 respectively, and the other embodiments of stationary support stations 500, 600 and 700 respectively may similarly be utilized in connection with the system for storing and for transporting ladings as described above. For example, where the portable storage tank 230 having tank bolsters 255 of the type including chassis mounts 265 consisting of a lower support wall 266 and support plates 275 consisting of an upper support wall 276 is utilized, a stationary support station such as the support station 600, or the support station 700 may be utilized in cooperation with this form of storage tank 230. The stationary support station 600 similarly includes four support posts 610 arranged in pairs as previously described each respective pair of support posts 610 having support structures 615 disposed therebetween. Each support structure 615 consists of a support bracket 620 pivotally mounted on one of the support posts 610 by a swivel pin 626 disposed in the pin housing 621. In order to support the tank 230 on the support station 600, the support brackets 620 are pivoted into the supporting positions thereof, each having one end thereof pivotally mounted on the associated support post 610 and resting against the

pivot plate 625 disposed on the upper end of the support posts 610 by means of a swivel pin 626 disposed in the pin housing 621, and the other end of the support bracket 620 supported on the support member 630 which is disposed on the upper end of the other support post 610 in the respective pair of support posts 610. When the support brackets 620 are pivoted into the supporting positions thereof, the free-swinging end of each support bracket 620 is swung across the associated support member 630 mounted on the opposing support post 610 whereby it contacts the latch mechanism 635 disposed on the support member 630, and more specifically, contacts the upper cammed surface 640 of the arm 636 forcing the arm 636 downwardly through the aperture 633 provided in the support member 630 until the lower support plate 623 of the support bracket 620 is swung free and clear of the arm 636 and rests against the boss 631. After arriving at this position, the compression spring 660 forces the arm 636 upwardly through the aperture 633 thereby locking the support bracket 620 between the boss 631 and the arm 636.

The support plate 275 of the tank bolster 255 is disposed upon and supported by the upper support plate 622 of the support bracket 620, with the rear wall 272 of the tank bolster 255 disposed against the outer edges of the upper and lower support plates 622 and 623 respectively thereby to retain the tank bolsters 255 and the associated tank 230 in position upon the stationary support station 600.

In order to remove the storage tank 230 from the stationary support station 600 the frame 901 of the road vehicle 900 is once again backed into the support station 600, the track guide (not shown) and bumper rails 605 aiding the operator of the road vehicle 900 to insert the frame 901 between the members of the respective pairs of support posts 610. The frame 901 is positioned in order to dispose the body bolsters 910 in vertical alignment with the chassis mount 265 of the tank bolsters 255. The jack mechanisms 940 are then activated to lower the support pistons 946 whereby the jack support plates 947 contact the underlying support surface. As the respective support pistons 946 are forced downwardly to their full extend, the frame 901 is raised upwardly thereby causing relative vertical movement between the frame 901 and support brackets 620. The body bolsters 910 contact the respective chassis mounts 265 with the lock heads 932 on the body bolsters 910 disposed in the apertures 267 provided in the lower support wall 266 of the chassis mount 265, thereby raising the tank bolsters 255 of the associated tank 230 upwardly with respect to the support brackets 620. The operator may then engage the lock mechanism 930 on the body bolsters 910 by raising the lock heads 932 through the apertures 267 and turning the respective handle 933 through 90° to lock the lock heads 932 through the apertures 267. The operator then disengages the latch mechanism 635 in order to remove the free-swinging end of the support bracket 620 from the support member 630 and pivots the support brackets 620 through a 90° arc away from the supporting positions thereof into the receiving positions thereof, after which the jack mechanisms 940 are gradually retracted into the housing 841 thereby lowering the frame 901 towards the underlying support surface with the tank 230 mounted thereon. Once the jack mechanisms 940 have been fully retracted, the road vehicle 900 having the tank 230 mounted thereon may then be withdrawn from the support station 600 and transported to another location.

In order to remove the tank 230 from the road vehicle 900, the process described above is merely reversed. The road vehicle 900 with the tank 230 mounted thereon is backed into the support station 600 wherein the support brackets 620 are disposed in the receiving positions thereof, the frame 901 being inserted between the members of the respective pairs of support posts 610. The operator then activates the jack mechanisms 940 to lower the support pistons 946 whereby the jack support plates 947 contact the underlying support surface until the support pistons 946 are lowered to their fullest extent whereby the frame 901 with the tank 230 mounted thereon is raised upwardly to dispose the support plates 275 slightly above the support brackets 620. The respective support brackets 620 are each then pivoted through an arc of 90° whereby the free-swinging end of the bracket 620 is disposed upon the support member 630 of the opposing support post 610 in the respective pair thereof, the free-swinging end of the support bracket 620 being locked on the support member 630 between the boss 631 and the arm 636 of the latch mechanism 635 as previously described. The pin 667 with an enlarged head 668 is then inserted through the apertures 665 and 666 provided in the lower support plates 623 and support members 630, respectively, to securely lock the support brackets 620 in the supporting positions thereof. Once the support brackets 620 have been disposed in the supporting positions thereof, the jack mechanisms 940 are gradually retracted in order to lower the frame 901 and thereby lower the support plates 275 of the tank bolsters 255 into contact with the upper support plates 622 of the support brackets 620. Once contact has been made between the support brackets 620 and the support plates 275, the operator then disengages the lock mechanism 930 on the body bolster 910 by grasping the handle 933 and twisting the lock pin 931 and the associated lock head 932 until the lock head 932 can be removed from the associated aperture 267 in the chassis mount 265. The frame 901 is then continually lowered until the road wheels 904 are once again in contact with the underlying support surface thereby leaving the tank 230 supported on the support brackets 620 of the support station 600. Once the jack mechanisms 940 have been fully retracted the road vehicle 900 may then be removed from the support station 600 and the road vehicle 900 is then free to pick up and transport another tank 230 from one location to another location.

The stationary support station 700 may similarly be utilized in connection with the portable storage tanks 230 having the tank bolsters 255 including chassis mounts 265 and support plates 275 offset longitudinally and spaced vertically from the associated chassis mounts 265. The support brackets 720 of the stationary support station 700 are disposed below the upper end of the respective support posts 710 whereby the center of gravity of the associated structures is thereby lowered. However, the system as described above operates in the same manner where the support station 700 is substituted for the support station 600.

Similarly, the tanks 330 having the tank bolsters 355 wherein the chassis mount 365 includes apertures 367 disposed adjacent to the outer side edges thereof is particularly adapted to be used in connection with the support station 500 wherein each of the support posts 510 is provided with a support brace 520 pivotally mounted on the side of the support post 510 as shown in FIGS. 17 through 22 of the drawings. In this embodiment, each of the support braces 520 are disposed in the supporting positions thereof with the support braces 520 mounted on the members of the respective pairs of support posts 510 extending towards one another. The tank bolsters 355 are disposed upon the support braces 520 with the lockpins 525 disposed within the apertures 367 provided in the support wall 366 of the chassis mount 365.

In order to remove the tank 350 from the support braces 520 of the support station 500, the frame 801 of the road vehicle 800 is backed into the support station 500 in order to position the body bolsters 810 thereof in vertical alignment with the tank bolsters 355. The jack mechanisms 840 are then activated in the manner previously described in order to lift the tank bolsters 355 upwardly above the support braces 520 after which the operator may pivot each of the support braces 520 from the supporting position thereof through an arc of 90° into the receiving position thereof after which the jack mechanisms 540 are activated to lower the tank bolsters 355 onto the body bolsters 810. The lock mechanisms 830 provided on the body bolsters 810 may then be engaged by the operator such that the lock heads 832 thereof are disposed within the apertures 367 provided in the chassis mounts 365 to lock the tank bolsters 355 on the body bolsters 810. The tank

330 is thereby securely mounted on the road vehicle 800 and may be transported to a secondary location.

As shown in FIG. 51 of the drawings the road vehicle 800 may be provided with side beams 802 which extend a slight distance upwardly from the body bolster 810 such that the oblique portions 374 and outer edge portions 375 of the chassis mounts 365 are disposed around the portion of the side beams 802 which extend upwardly beyond the body bolster 810. In this manner, an additional lock structure is provided to ensure that the tank 330 is securely held on the road vehicle 800 during the transportation thereof.

From the above description it will be observed that there has been provided a system for storing and for transporting ladings which fulfills all the objects and advantages set forth above. More specifically, there has been provided a system for storing and for transporting ladings, and the novel components thereof, including a tank for containing the ladings, a stationary support station including support structures for supporting the tank thereon, and a road vehicle for transporting the tank to and from the stationary support station.

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 we claim is:

1. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof and spaced from said first bolster, each of said tank bolsters including a support plate for mounting said tank on said stationary support station and a chassis mount spaced from said support plate for mounting said tank on said road vehicle; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said support plates and said support posts and said support structures being arranged so that said support plates can be positioned respectively upon said support structures when said support structures are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said chassis mounts and said body bolsters being arranged so that said chassis mounts can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said tank and said support structures; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to raise said support plates above said support structures to permit said support structures to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said support plates on said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to raise said support plates above said support structures to permit said support structures to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said support plates onto said support structures.

2. The system for storing and for transporting tanks for containing ladings as set forth in claim 1, wherein each of said support plates is spaced vertically from the associated chassis mount.

3. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first tank bolster disposed adjacent to one end thereof and a second tank bolster disposed adjacent to the other end thereof and spaced from said first bolster, each of said tank bolsters including a support plate for mounting said tank on said stationary support station and a chassis mount offset longitudinally with respect to the associated support plate for mounting the adjacent end of said tank on said road vehicle; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said support plates and said support posts and said support structures being arranged so that said support plates can be positioned upon said support structures when said support structures are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said chassis mounts and said body bolsters being arranged so that said chassis mounts can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said tank and said support structures; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to raise said support plates above said support structures to permit said support structures to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said support plates on said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to raise said support plates above said support structures to permit said support structures to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said support plates onto said support structures.

4. The system for storing and for transporting tanks for containing ladings as set forth in claim 3, wherein each of said support plates is spaced vertically from the associated chassis mount.

5. The system for storing and for transporting tanks for containing ladings as set forth in claim 3, wherein each of said support plates and each of said chassis mounts extend laterally across the associated tank bolster.

6. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transferring said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite

sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, a first support bracket having one end thereof pivotally mounted on one of said first support posts and pivotal between a receiving position wherein the other end of said first support bracket is spaced from the other of said first support posts and a supporting position wherein said other end of said first support bracket is supported on said other first support post, a second support bracket having one end thereof pivotally mounted on one of said second support posts and pivotal between a receiving position wherein the other end of said second support bracket is spaced from the other of said second support posts and a supporting position wherein said other end of said second support bracket is supported on said other second support post, said tank bolsters and said support posts and said support brackets being arranged so that said tank bolsters can be positioned upon said support brackets when said support brackets are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and including a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support brackets are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said tank and said support brackets; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to raise said tank bolsters above said support brackets to permit said support brackets to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said tank bolsters on said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to raise said tank bolsters above said support brackets to permit said support brackets to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said tank bolsters onto said support brackets.

7. The system for storing and for transporting tanks for containing ladings as set forth in claim 6, wherein said stationary support station further includes latch mechanism for locking said support brackets in the supporting positions thereof.

8. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof, each of said tank bolsters including a support plate for mounting said tank on said stationary support station and a chassis mount spaced from said support plate for mounting said tank on said road vehicle and a jacking point spaced from both of said support plates and said chassis mount; said support including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said support plates and said support posts and said support structures being arranged so that said support plates can be positioned respectively upon said support structures when said support structures are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and jack mechanism on said frame for engaging said jacking points to cause relative vertical movement between said tank and said support structures and to cause relative vertical movement between said tank and said frame; whereby in transferring said tank from said support station to said road vehicle said jack mechanism is operated to raise said tank bolsters above said support structures after which said support structures are moved from the supporting positions thereof to the receiving positions thereof and then said jack mechanism is operated to lower said tank bolsters onto said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said jack mechanism is operated to raise said tank bolsters above said support structures after which said support structures are moved from the receiving positions thereof to the supporting positions thereof and then said jack mechanism is operated to lower said tank bolsters onto said support structures.

9. The system for storing and for transporting tanks for containing ladings as set forth in claim 8, wherein said frame includes a first pair of jack mechanism mounted thereon adjacent the opposing ends of said first body bolster and in lateral alignment therewith and a second pair of jack mechanism mounted thereon adjacent the opposing ends of said second body bolster and in lateral alignment therewith.

10. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first tank bolster disposed adjacent to one end thereof and a second tank bolster disposed adjacent to the other end thereof, each of said tank bolsters including a pair of laterally spaced-apart support plates for mounting the adjacent end of said tank on said stationary support station, each of said tank bolsters also including a pair of chassis mounts spaced laterally inwardly and in lateral alignment with respect to the associated support plates for mounting the adjacent end of said tank on said road vehicle, each of said tank bolsters further including a pair of jacking points spaced from both said support plates and said chassis mounts, and in lateral alignment therewith; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said tank bolsters and said support posts and said support structures being arranged so that said tank bolsters can be positioned upon said support structures when said support structures are in the supporting position thereof; said road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and a jack mechanism on each of said body bolsters for engaging said jacking points to cause relative vertical movement between said tank and said support structures and to cause relative vertical movement between said tank and said frame; whereby in transferring said tank from said sup-

port station to said road vehicle said jack mechanisms are operated to lift said tank bolsters from said support structures and to raise said tank bolsters above said support structures after which said support structures are moved from the supporting positions thereof to the receiving positions thereof and then said jack mechanisms are operated to lower said tank bolsters onto said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said jack mechanisms are operated to raise said tank bolsters above said support structure after which said support structures are moved from the receiving positions thereof to the supporting positions thereof and then said jack mechanisms are operated to lower said tank bolsters onto said support structures.

11. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said tank bolsters and said support posts and said support structures being arranged so that said tank bolsters can be positioned upon said support structures when said support structures are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said frame and said support structures; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to lift said frame to raise said body bolsters into engagement with said tank bolsters and to raise said tank bolsters above said support structures after which said support structures are moved from the supporting positions thereof to the receiving positions thereof and then said lifting means is operated to lower said frame until the road wheels thereof contact the underlying support surface, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to lift said frame to raise said tank bolsters above said support structures after which said support structures are moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said frame until said tank bolsters are positioned on said support structures and the wheels on said frame are in contact with the underlying support surface.

12. The system for storing and for transporting tanks for containing ladings as set forth in claim 11, wherein said lifting means comprises a jack mechanism mounted on said frame and adapted to lift said frame with respect to the underlying support surface.

13. The system for storing and for transporting tanks for containing ladings as set forth in claim 12, which includes a first pair of jack mechanism mounted adjacent one end of said frame and a second pair of jack mechanism mounted adjacent to the other end of said frame.

14. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, each of said support posts including a support brace movable between a receiving position and a supporting position, each of said support braces including a housing closed at the top end thereof and open at the bottom end thereof and having a diameter slightly greater than the diameter of the associated support posts, said housing accommodating the associated support post in the open end thereof and adapted to be shiftably disposed upon said support post, an upper support wall extending laterally outwardly from the top end of said housing for supporting the associated tank bolster thereon, and a lower support wall extending laterally outwardly from the bottom end of said housing and in parallel relationship with said upper support wall, and a rigidifying web extending between said upper support wall and said lower support wall, said tank bolsters and said support posts and said support braces being arranged so that said tank bolsters can be positioned upon said support braces when said support braces are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and including a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said tank and said support braces; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to raise said tank bolsters above said support braces to permit said support braces to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said tank bolsters on said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to raise said tank bolsters above said support braces to permit said support braces to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said tank bolsters onto said support braces.

15. The system for storing and transporting tanks for containing ladings as set forth in claim 14, wherein said upper support wall further includes side guides extending upwardly from the opposing sides thereof and a centering guide mounted on and extending upwardly from said upper support wall and spaced from said side guides.

16. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof; said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, each of said support posts including a support brace movable between a receiving position and a supporting position, a receiving positioning lug mounted on said support post and a supporting positioning lug

mounted thereon and spaced from said receiving positioning lug, said receiving positioning lug and said supporting positioning lug being spaced slightly below said support brace, and said support brace including a locking bar having one end thereof pivotally mounted thereon at a pivot point and the other end thereof being freely movable, an upper positioning lug mounted on said support brace and spaced downwardly from and in vertical alignment with the pivot point of said locking bar, whereby to move said support brace from the receiving position thereof to the supporting position thereof said locking bar is pivoted upwardly to permit said support brace to rotate freely until said upper positioning lug is in vertical alignment with said supporting positioning lug after which said bar is pivoted downwardly and disposed between said upper positioning lug and said supporting positioning lug, and whereby in moving said support brace from the supporting position thereof to the receiving position thereof said locking bar is pivoted upwardly to permit said support brace to rotate freely until said upper positioning lug is in vertical alignment with said receiving positioning lug after which said locking bar is pivoted downwardly and disposed between said upper positioning lug and said receiving positioning lug, said tank bolsters and said support posts and said support braces being arranged so that said tank bolsters can be positioned upon said support braces when said support braces are in the supporting positions thereof; said road vehicle including a frame provided with road wheel and including a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for causing relative vertical movement between said tank and said support station to said road vehicle said lifting means is operated to raise said tank bolsters above said support braces to permit said support braces to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said tank bolsters on said body bolsters, and whereby in transferring said tank from said road vehicle to said support station said lifting means is operated to raise said tank bolsters above said support braces to permit said support braces to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said tank bolsters onto said support braces.

17. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof, said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of the longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first pair of support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, said tank bolsters and said support posts and said support structures being arranged so that said tank bolsters can be positioned upon said support structures when said support structures are in the supporting positions thereof; said road vehicle including a frame provided with road wheels and including a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bolsters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, lock mechanism for locking said tank bolsters on said body bolsters, said lock mechanism including first apertures disposed in said first tank bolster and second apertures disposed in said second tank bolster, first lockpins disposed on said first body bolster and second lockpins disposed on said second body bolster, each of said lockpins including a locking head disposed on the upper end thereof and being shiftable between a lock position when said locking heads are inserted into said apertures in said tank bolsters and a release position when said locking heads are removed from said apertures in said tank bolsters, whereby in locking the tank bolsters on said body bolsters said first and second lockpins and said locking heads are shifted upwardly to dispose said locking heads into and through said apertures in said tank bolsters after which said locking heads are shifted into the lock positions thereof, and whereby in removing the tank bolsters from said body bolsters said locking heads are disengaged and withdrawn from said apertures and said tank bolsters and said locking pins are shifted downwardly from the lock positions thereof to the release positions thereof after which the tank bolsters can be removed from said body bolsters, and lifting means on said frame for causing relative vertical movement between said tank and said support structures; whereby in transferring said tank from said support station to said road vehicle said lifting means is operated to raise said tank bolsters above said support structures to permit said support structures to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said tank bolsters on said body bolsters after which said lock mechanism is engaged, and whereby in transferring said tank from said road vehicle to said support station said lock mechanism is released and said lifting means is operated to raise said tank bolsters above said support structures to permit said support structures to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said tank bolsters onto said support structures.

18. A system for storing and for transporting tanks for containing ladings, said system comprising a tank for containing ladings and a stationary support station for receiving said tank and a road vehicle for transporting said tank to and from said support station; said tank including a first bolster disposed adjacent to one end thereof and a second bolster disposed adjacent to the other end thereof, said support station including a first pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and a second pair of spaced-apart stationary support posts disposed on opposite sides of a longitudinal axis and spaced longitudinally from said first pair of stationary support posts, said first pair of support posts carrying first support structure shiftable between a receiving position and a supporting position and said second support posts carrying second support structure shiftable between a receiving position and a supporting position, first lock mechanism for locking said tank bolsters on said support structures, said first lock mechanism including first apertures disposed in said first tank bolster and second apertures disposed in said second tank bolster, first lockpins extending upwardly from said first support structure and second lockpins extending upwardly from said second support structure, each of said lockpins being disposed within associated apertures when said bolsters are positioned upon said support structures, said tank bolsters and said support posts and said support structures being arranged so that said tank bolsters can be positioned upon said support structures when said support structures are in the supporting position thereof; said road vehicle including a frame provided with road wheels and including a first body bolster disposed adjacent to one end of said frame and a second body bolster disposed adjacent to the other end of said frame, said tank bolsters and said body bol-

sters being arranged so that said tank bolsters can be positioned respectively upon said body bolsters, the support posts in each pair of support posts being spaced apart a distance to receive said road vehicle therebetween with said tank mounted on said frame when said support structures are in the receiving positions thereof, and lifting means on said frame for casing relative vertical movement between said tank and said support structures when said first lock mechanism is released; whereby in transferring said tank from said support station to said road vehicle said first lock mechanism is released and said lifting means is operated to raise said tank bolsters above said support structures to permit said support structures to move from the supporting positions thereof to the receiving positions thereof and to permit placement of said tank bolsters on said body bolsters after which said second lock mechanism is engaged, and whereby in transferring said tank from said road vehicle to said support station said second lock mechanism is released and said lifting means is operated to raise said tank bolsters above said support structures to permit said support structures to be moved from the receiving positions thereof to the supporting positions thereof and then said lifting means is operated to lower said tank bolsters onto said support structures after which said first lock mechanism is engaged.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,595,408 Dated July 27, 1971

Inventor(s) Ira C. Eddy and William A. Taylor

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 27, Claim 8, Line 59, after "support" insert

-- station --.

Column 33, Claim 18, line 7, "casing" should be -- causing --.

Signed and sealed this 18th day of January 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents

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