J. C. BONNER.

TRANSPORTATION SYSTEM.

APPLICATION FILED AUG. 18, 1917.

1,280,141.

Patented Oct. 1, 1918.

8 SHEETS—SHEET 1.

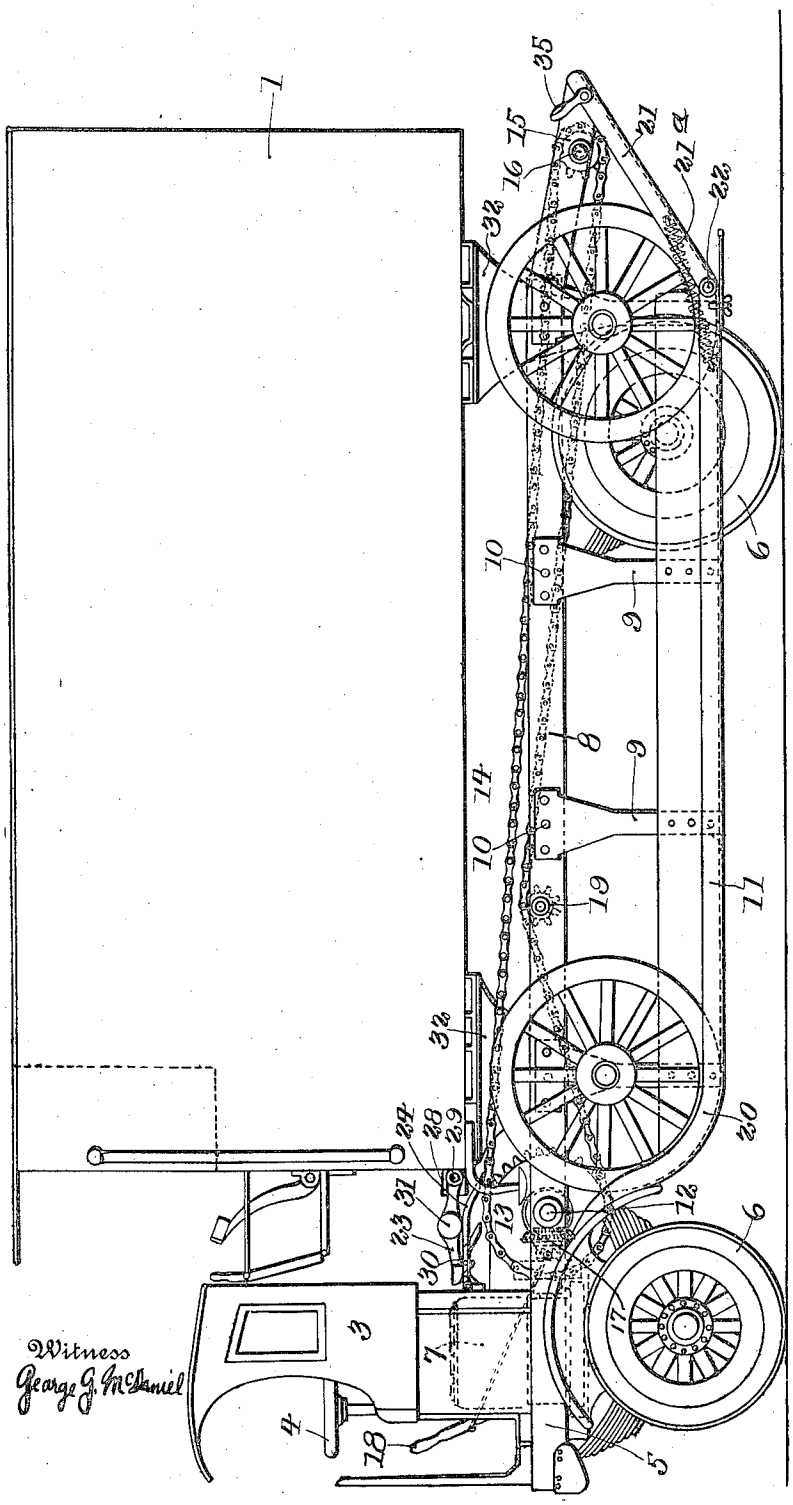


Fig. 1.

Witness
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8 SHEETS—SHEET 2.

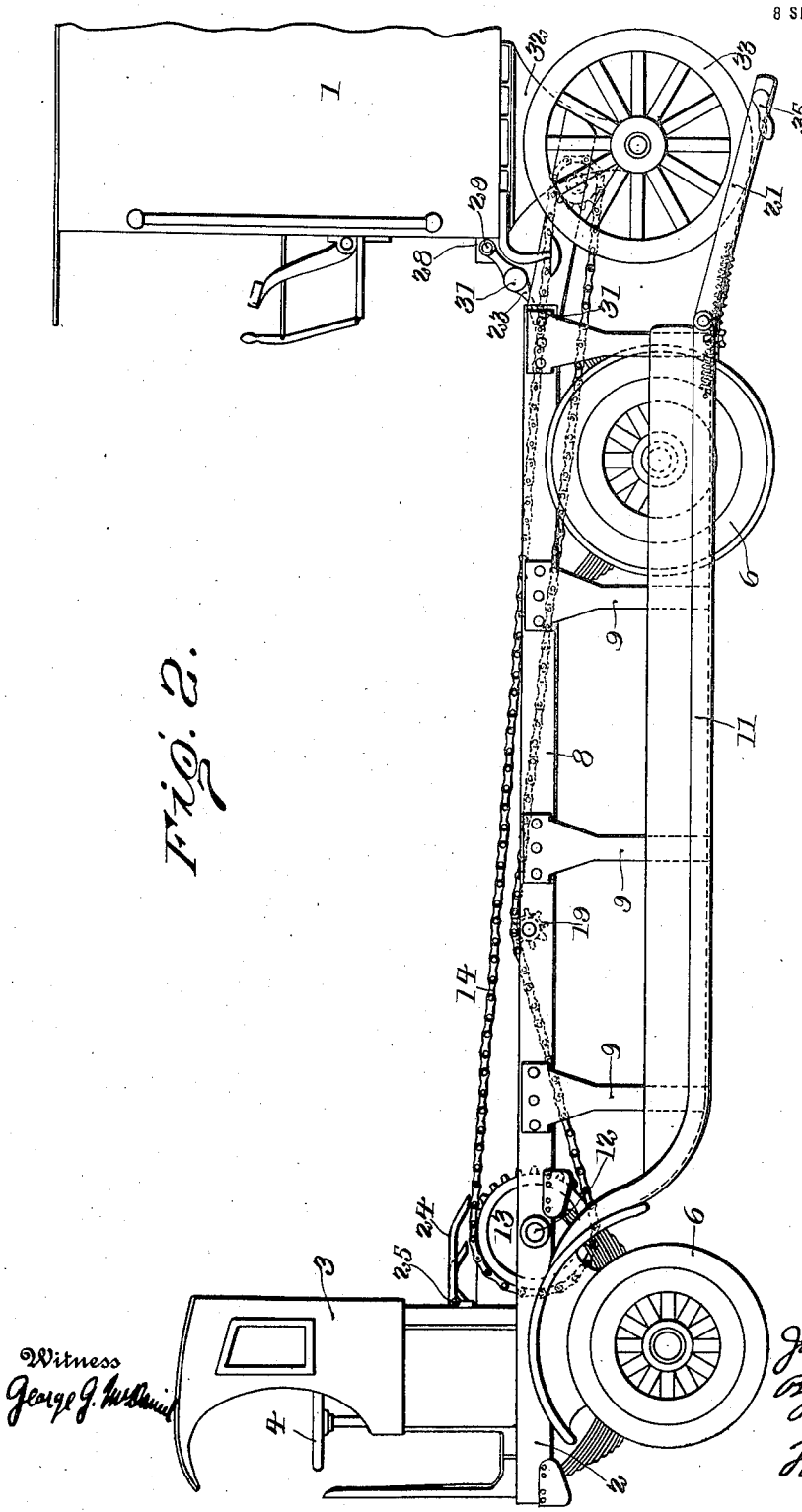


Fig. 2.

Witness
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8 SHEETS—SHEET 3.

Fig. 3.

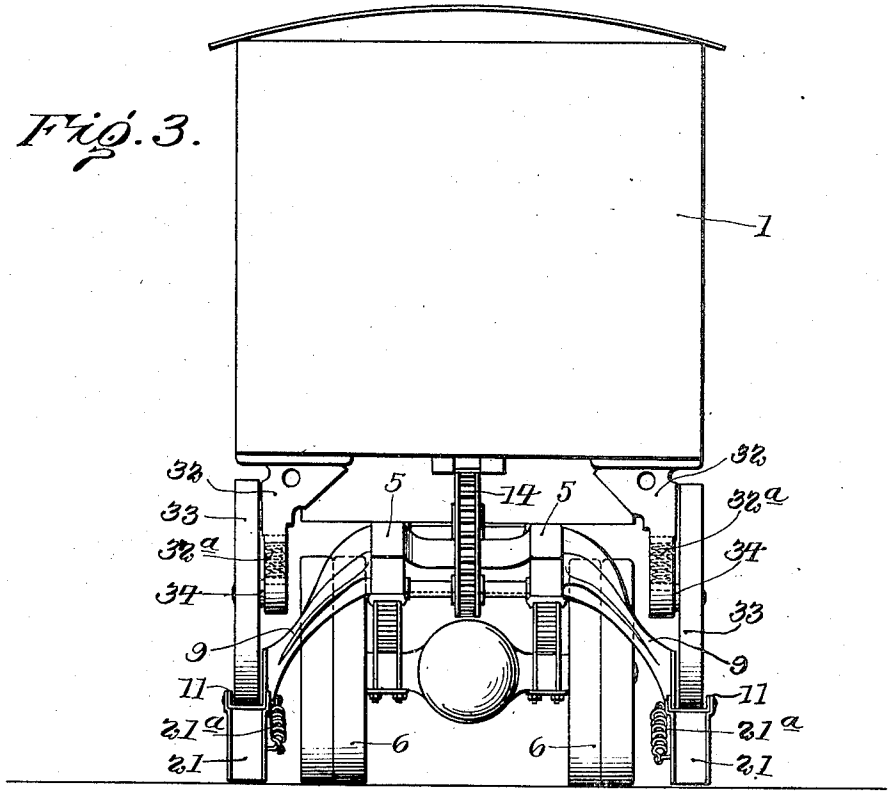


Fig. 4.

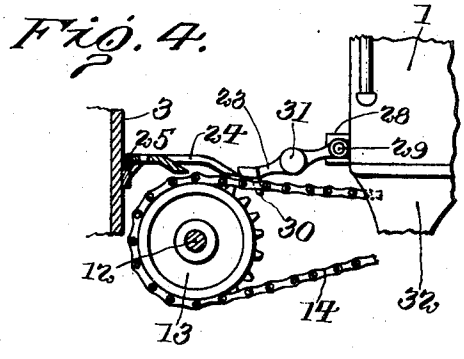
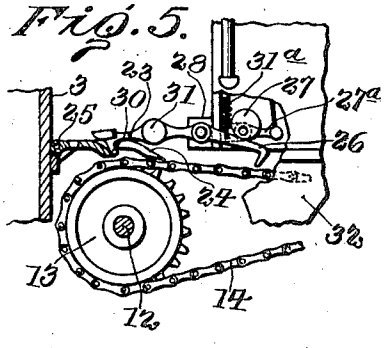


Fig. 5.



Witness

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TRANSPORTATION SYSTEM.

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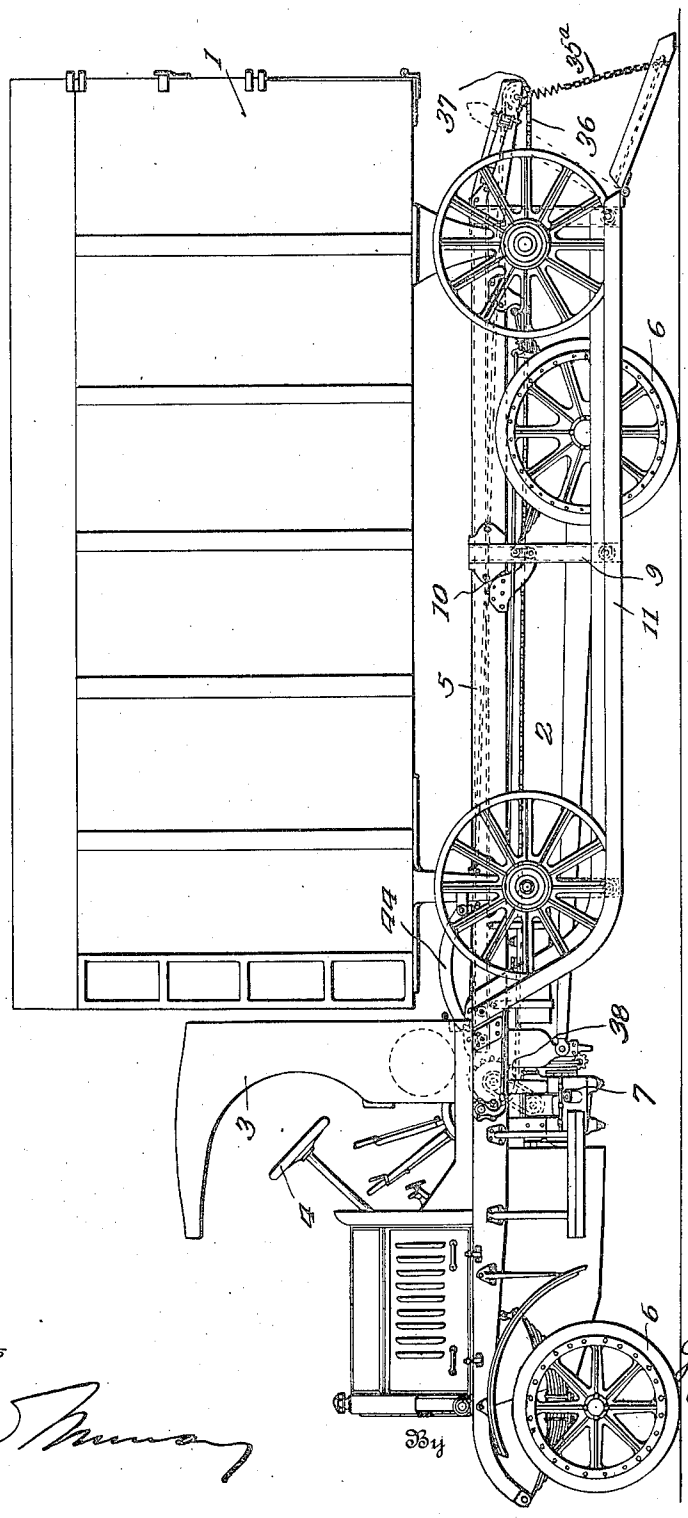


Fig. 6.

Witness

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TRANSPORTATION SYSTEM.

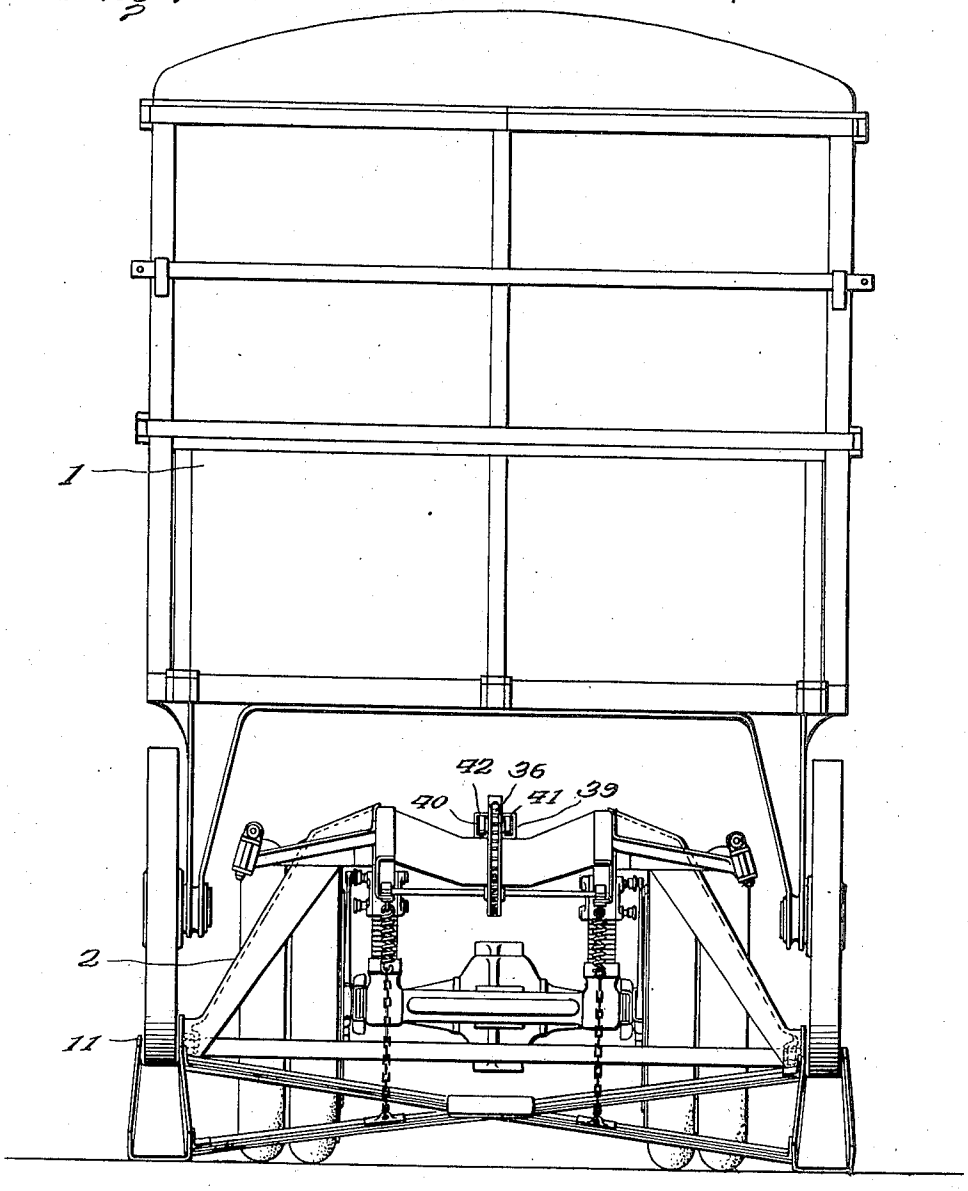
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8 SHEETS—SHEET 5.

Fig. 7.



Witness

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TRANSPORTATION SYSTEM.

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Patented Oct. 1, 1918.

8 SHEETS—SHEET 6.

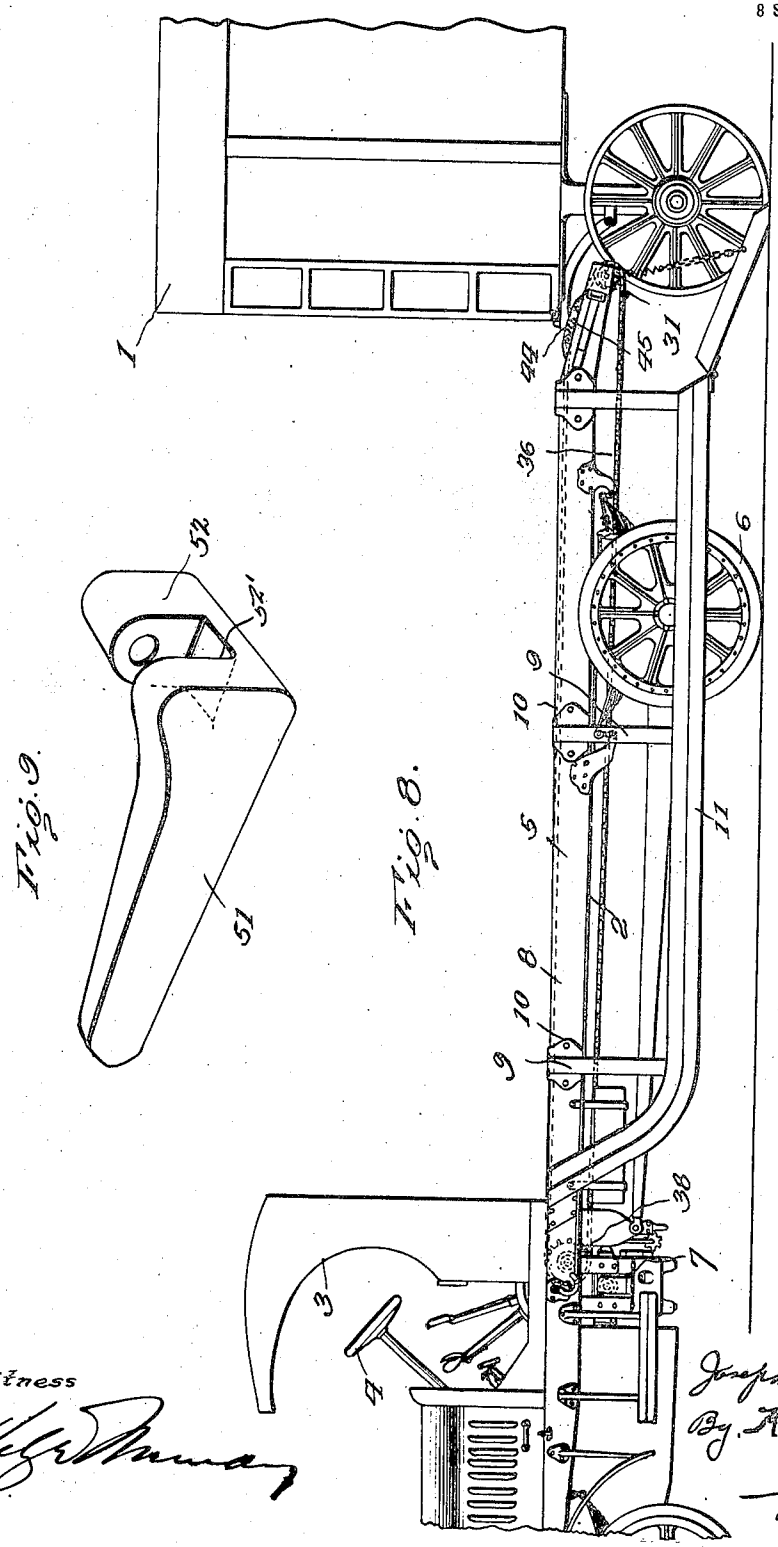


Fig. 8.

Fig. 9.

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TRANSPORTATION SYSTEM.

APPLICATION FILED AUG. 18, 1917.

1,280,141.

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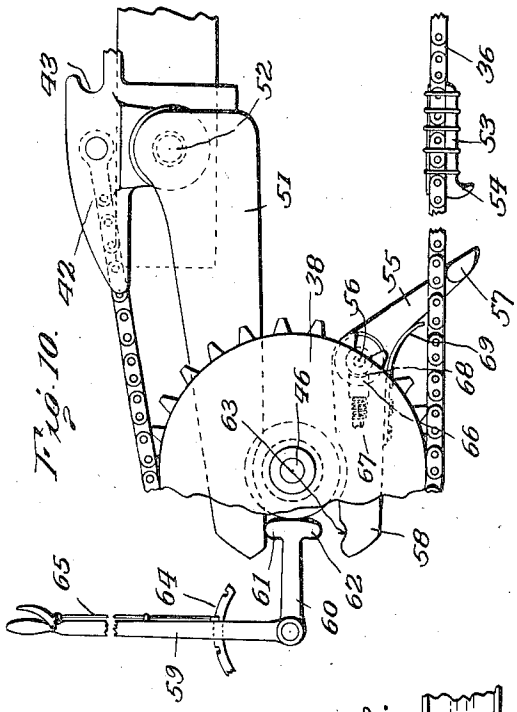


Fig. 10.

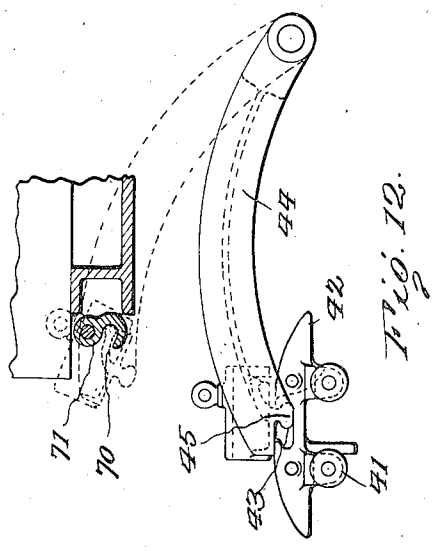


Fig. 12.

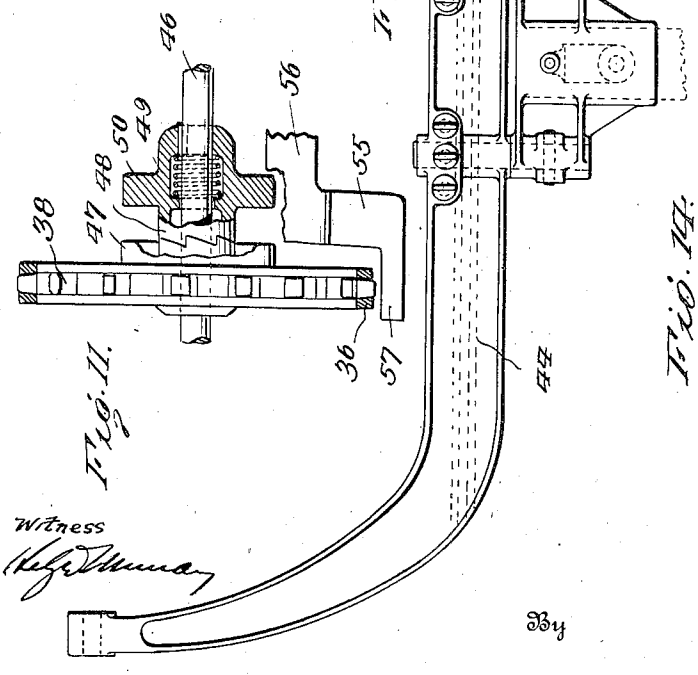


Fig. 11.

Fig. 13.

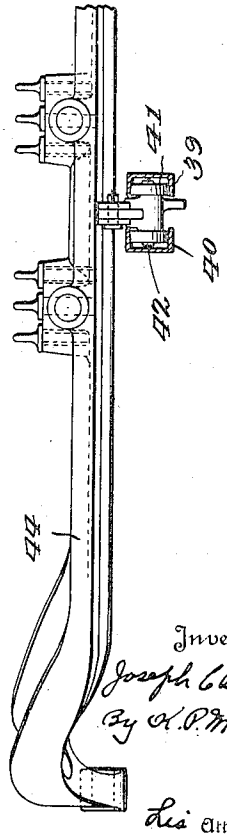


Fig. 14.

Witness

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TRANSPORTATION SYSTEM.

APPLICATION FILED AUG. 18, 1917.

1,280,141.

Patented Oct. 1, 1918.

8 SHEETS—SHEET 8.

Fig. 15.

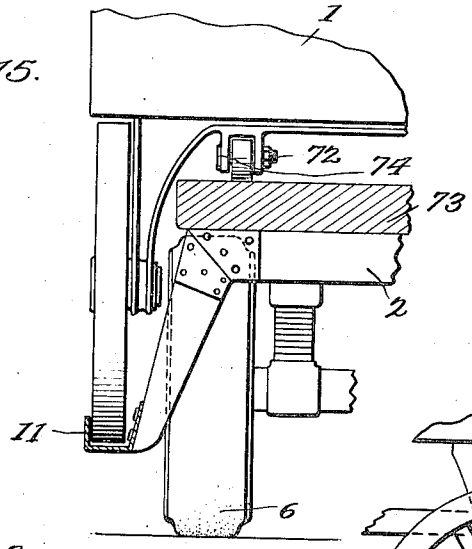


Fig. 17.

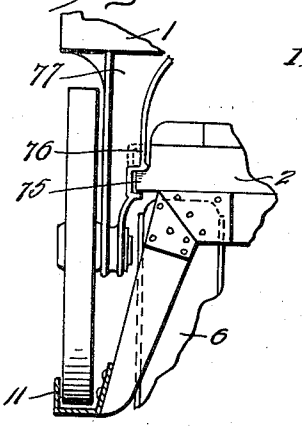


Fig. 18.

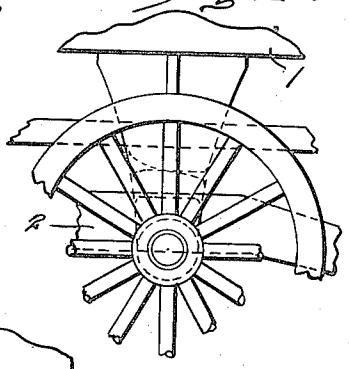
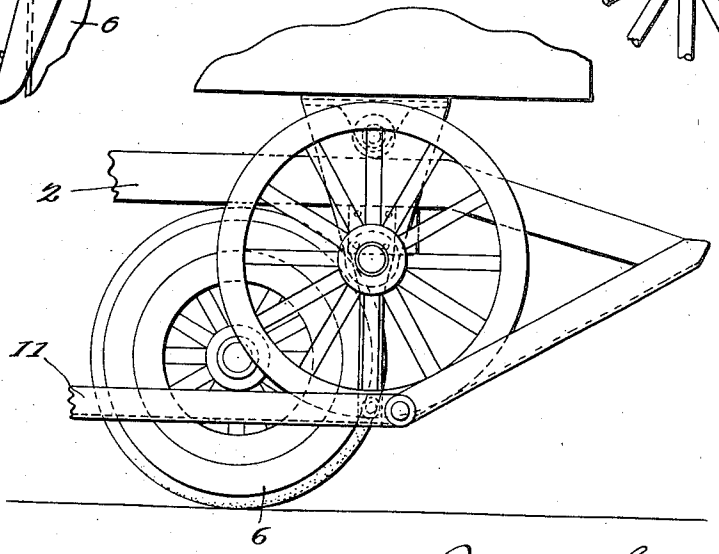


Fig. 16.



Witness

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UNITED STATES PATENT OFFICE.

JOSEPH CLAYBAUGH BONNER, OF TOLEDO, OHIO.

TRANSPORTATION SYSTEM.

1,280,141. Specification of Letters Patent. Patented Oct. 1, 1918.

Application filed August 18, 1917. Serial No. 186,983.

To all whom it may concern:

Be it known that I JOSEPH C. BONNER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Transportation Systems, of which the following is a specification.

This invention relates to transportation systems; and it comprises complementary vehicles, one of which is arranged to carry the other and to load or unload the other, the carrying vehicle advantageously being motor driven and provided with depending supports for the carried vehicle, and the carried vehicle being advantageously a road wagon, either power or horse propelled, and being of a wider gage than the carrying vehicle; and it further comprises complementary vehicles, one being advantageously a motor propelled vehicle adapted to carry the other, such carried vehicle being either motor or horse propelled and of wider gage than the carrying vehicle, and provided with means whereby it may engage loading mechanism carried by the carrying vehicle, such loading means being power driven from the power-propelled means of the carrying vehicle; all as more fully hereinafter set forth and as claimed.

In my application Serial No. 867,865 filed October 21, 1914, I have described and claimed in a transportation system two complementary vehicles, one of narrower gage than the other, the vehicle of wider gage being adapted to travel on roads, and, when in transportation position, resting on the vehicle of narrower gage with the axes of the wheels of the wider vehicle at points below the horizontal plane of engagement of the two vehicles, and the axes of the wheels of the wider vehicle being above the axes of the wheels of the narrower vehicle when both vehicles are on the same ground level. In other words, the carried vehicle in my said application is adapted to straddle the carrying vehicle when the two vehicles are on the same ground level. In my said application I provide means for elevating the carried vehicle with respect to the carrying vehicle to disengage the carried vehicle from the ground. In my present application, while the carried vehicle is advantageously of wider gage than the carrying vehicle, the elevating mechanism need not be employed. The carrying vehicle of this invention is particularly adapted for use in transporting the carried vehicle to or from railroad terminals.

According to my said prior application, I may assemble two or more vehicles in elevated position upon flat railroad cars for the purpose of transporting the vehicles long distances. The vehicle or road wagons of said application are intended to be unloaded and drawn by horses or self-propelled, if of the automobile type, to the warehouses, or points of delivery for the merchandise carried. It is relatively expensive to provide a large number of motor driven road wagons and to utilize these as mere box cars for transporting merchandise long distances, and, furthermore, such wagons are heavy and add to the dead weight which must be transported. It is, therefore, a desideratum in this art to provide means for easily, inexpensively and quickly loading the merchandise transporting vehicle on to a carrying vehicle, and in such event, the merchandise transporting vehicle may be a mere road wagon or other receptacle.

According to my present invention the carrying vehicle is advantageously a motor driven wagon without a body; that is, an automobile chassis with the wheels, driving mechanism and, preferably, a driver's cab. To the chassis there is attached on either side a depending rail or track, forming supports upon which the carried vehicle may rest, and to the chassis there is secured mechanism for loading or unloading the road wagon or merchandise transporting vehicle. The tracks of the chassis may be provided with stops at their front ends to limit the forward drive of the merchandise vehicle and at their rear ends there are provided either hinged or pivoted members arranged to be lowered to form incline planes up which the merchandise vehicle may travel and further arranged to form stops to hold the merchandise vehicle in place. The merchandise vehicle is provided with automatic means for engaging a portion of the loading mechanism of the chassis, said means being preferably a type permitting automatic disengaging movement from the

loading means when the merchandise vehicle is in the proper position on the tracks.

In another embodiment of the invention, the carried vehicle is provided with means for automatically disengaging the loading mechanism from the operating mechanism or drive, thereby stopping the loading mechanism when the wagon or carried vehicle is in its proper position either on or off the truck or carrying vehicle.

In the accompanying drawings I have shown several embodiments of this invention, certain unimportant details being omitted for clarity of presentation. In this showing—

Figure 1 is a side elevation of the carrying vehicle and the carried vehicle with the latter in position for transportation by the former.

Fig. 2 is a side elevation of the two vehicles showing the carried vehicle, or the merchandise vehicle, in position for loading it on to the carrying vehicle;

Fig. 3 is a rear elevation of Fig. 1;

Fig. 4 is a detail view showing the position of the merchandise wagon as it is being drawn into position; and

Fig. 5 is a similar view showing the hook of the merchandise wagon disengaged from the chain.

Fig. 6 is a side elevation of another form of the invention showing the carried vehicle in loaded position;

Fig. 7 is a rear elevation of Fig. 6;

Fig. 8 is a side elevation of the carrying vehicle and the front end of a carried vehicle in position to be loaded;

Fig. 9 is a detail perspective of a wedge block used in the mechanism for automatically stopping the loading mechanism;

Fig. 10 is a detail view of the clutch and operating means for the loading mechanism;

Fig. 11 is a detail of the clutch at right angles to Fig. 10;

Fig. 12 is a detail view showing the wagon hound in engagement with the loading mechanism, and showing, in dotted lines, the hound disengaged;

Fig. 13 is a plan view of a portion of the hound;

Fig. 14 is a side elevation thereof;

Fig. 15 is a rear elevation of a portion of the carrying vehicle and a portion of the carried vehicle showing rollers on the carried vehicle supporting the weight of the same and relieving the weight from the tracks or supports;

Fig. 16 is a side elevation of the form shown in Fig. 15;

Fig. 17 is a rear elevation of a portion of the apparatus showing lifting means for removing the weight of the carried vehicle from the tracks, and

Fig. 18 is a side elevation thereof.

Referring to the drawings, reference numeral 1 designates the carried vehicle, which will hereinafter be referred to as the merchandise wagon, and 2 indicates the carrying or transportation vehicle, which will hereinafter be referred to as the motor vehicle, although it is to be understood that certain exigencies may warrant the use of the power propelling means in the merchandise wagon or of other propelling means for the motor vehicle.

The motor vehicle is provided with the driver's seat and cab 3 and steering wheel 4. The chassis 5 is substantially flat and carries the usual running gear, road wheels 6 and an engine or motor 7. The tracks or runways for reception and retention of the wheels of the merchandise wagon are securely attached to the horizontal beams 8 of the chassis by means of the rigid hangers 9 riveted or otherwise secured to the beams at 10. I consider it advisable to hang the tracks 11 below the axles of the wheels of the motor vehicle for the purpose of placing the center of gravity of the load as low as possible. The distances between the bottom of the treads of the wheels of the merchandise wagon and the bottom of such wagon should be slightly greater than the distances between the tracks 11 and the top of the chassis beams 8, in order that the merchandise wagon may straddle the chassis when its wheels are on the tracks.

Keyed to a shaft 12, journaled in the beams (8) is a gear wheel 13 adapted to drive chain 14. At the rear of the chassis sprocket 15 is keyed to a shaft 16 suitably journaled in the beams (8). If desired, the shafts need not be journaled in the beams but in that case the gears (13) and (15) should be journaled on the shafts. The gear (13) is driven from the motor by means of suitable gear shifting mechanism 17 operable from the driver's seat through lever 18 provided for connecting the gear (13) with the motor of the vehicle. Since any type of engine may be employed, and since any gear shifting device may be used, I have eliminated the details from the drawings, as they form no part of my invention except in the combination in which they are used.

In some instances, particularly when the running gear of the motor vehicle and the engine and accessory parts occupy the space under the chassis, I guide the chain (14) over the idler 19.

The tracks are provided with forward extremities 20 curved upwardly and serving as stops to limit the forward movement of the merchandise wagon and with pivoted rear sections 21 attached at 22 to the tracks and arranged to be elevated to the position shown in Fig. 1 and thus serve as chucks for the rear wheels of the merchandise wagon, the pivoted sections being, also adapted to be lowered as shown in Fig. 2, to

serve as inclined planes up which the merchandise wagon is drawn.

The merchandise wagon is arranged to straddle the chassis of the motor vehicle and is placed in position upon the latter by means of the loading mechanism to be described. Ear or lug 28 has pivoted to it at 29 a hook 23 provided with an end 30 corresponding substantially to one of the teeth of gear (13). This hook may be weighted as at 31. When the merchandise wagon is to be loaded upon the motor vehicle the latter is backed in substantially the position shown in Fig. 2 or the merchandise wagon is drawn into that position and the hook 23 is allowed to fall between the links of the chain, the pivoted sections of the tracks having been lowered to form inclined planes. The driver of the motor vehicle thereupon shifts gears to cause driving gear (13) to actuate the chain and to pull the merchandise wagon up the inclines and on to the tracks 11. For the purpose of automatically disengaging the hook (23) from the chain when the merchandise wagon is in carrying position, the cam plate 24 extending over a portion of the gear (13) is used. When the end (30) of the hook reaches the cam plate (24) it rides up the same and thereby is automatically disengaged from the chain.

In order to unload the merchandise wagon from the motor vehicle it is only necessary to lower the inclined plane 21, when the weight of the merchandise wagon will cause it to travel backward down the tracks which should be at a slight incline for this purpose. If however, particularly when the merchandise wagon is heavily loaded, it is desired to control the backward movement of the merchandise wagon as it is being unloaded, the hook may be extended beyond the pivot and provided with the extremity 26. This extremity may be forced between the links of the chain by means of a cam 27, operated by means of a lever 27^a. In this instance, the weight 31 of the hook may not be sufficient to overbalance the extremity 26 and therefore I may provide a spring 31^a, normally tending to lift the extremity (26). The relative arrangement of the arms (23) and (26) of the compound hook shown in Fig. 5 may be such as to cause the end (26) of the hook to engage between the links of the chain and thus to hold the merchandise wagon in position. Ordinarily I do not have to resort to the hook for this purpose, since the pivoted sections of the tracks form stops or chucks for the rear wheels of the wagon. These pivoted sections may be provided with springs (21^a) which serve to hold the sections normally out of engagement with the ground. The spring is of a type adapted to hold the inclined plane in position above the ground, preventing the ends from digging into the pavement, when the carrier vehicle is "backed" into position to receive the carried vehicle (see Fig. 6). I may provide a hook 35 at the one end of each of the inclined planes for positively holding such planes in position against the rear end of the longitudinal chassis beams 8 (see Fig. 1). Any other means may be employed for this purpose.

While the transportation wagon may be of any type, I have found that the type shown in my copending application Serial No. 867,865 filed October 21, 1914, is particularly well adapted for the purpose in view. It comprises a body and depending members 32 which may form suitable housings for springs 32^a shown in dotted lines. wheels 33 are journaled to blocks 34 sliding in the depending members 32. Through this arrangement the floor of the loading vehicle is normally at a higher level than the top of the chassis of the motor vehicle, and through this arrangement I secure the advantages pointed out in my copending application which allows the use of the wagon and railroad cars. The depending members (32) are separated at greater distances than the width of the automobile chassis.

In the form shown in Figs. 6 to 14, both inclusive, the carried vehicle (1) is adapted to straddle the carrying vehicle (2) and the wheels of the same are received in the tracks (11). The loading mechanism in this instance comprises a chain 36 passing over a sprocket 37 at the rear of the carrying vehicle and a sprocket 38 at the forward end of the vehicle and advantageously near the driver's seat. Two channel irons 39 and 40 are arranged on each side of the chain and are adapted to receive the rollers 41 of the carrier block 42. The carrier block may be secured to the chain in any suitable manner. A slot or recess 43, advantageously provided with a restricted opening, is arranged in the face of the carrier block. The hound 44 of the carried vehicle is provided with a projection 45 which is adapted to be received in the slot in the face of the carrier block (see Fig. 12). Sprocket 38 is mounted upon a shaft 46, driven in any suitable manner from the engine or other source of power. The sprocket is mounted upon one jaw 47 of a spring pressed clutch 48, whereby the loading mechanism may be disengaged from the drive. The other jaw 49 of the clutch carries a circular plate or disk 50 (see Fig. 11). A wedge block 51 (see Fig. 9) is pivotally secured to the carrier block by means of extension 52 and rides between the two jaws of the clutch when the carrying block reaches a predetermined position. The wedge block is held in proper alinement by the engagement of the face 52′ with the carrier block. The carrying block is so arranged upon the chain that the wedge block will enter between the jaws of the clutch

when the wagon is in its proper loaded position.

Similar means are provided for unloading the carried vehicle from the carrying vehicle. The bar or plate 53 is secured to the chain and provided with an extension 54 at one end. Lever 55 (somewhat in the form of a bell crank lever) is mounted on stub shaft 56 beneath the clutch. The lower end of the lever is extended at right angles as at 57 (see Fig. 10) and engages extension (54) of plate (53) forcing the other end 58 of the lever between the jaws of the clutch and separating them to disengage the sprocket from the drive. This end (58) of the lever is wedge shaped in a similar manner to wedge block 51. The member 53 is arranged in such a position that it will engage the lever 55 when the carried vehicle is in the position shown in Fig. 8, that is, when the vehicle is entirely removed from the tracks or supports.

Fig. 10 which is merely diagrammatic, shows both the wedge block and the lever (55) in engagement with the clutch. When the wedge block is in engagement with the clutch or about to engage the clutch, plate (53) will be near the rear end of the vehicle and when the bar plate 53 is in the position shown in Fig. 10 the carrier block and the wedge block will be in the position indicated in Fig. 8. Fig. 10 is merely used to illustrate the operation of both members.

A pivoted lever 59 mounted in the cab of the vehicle rocks an arm 60 provided with extensions 61 and 62 which engage the end of the wedge block or the lever 55, respectively, to disengage either from the clutch. A notch or recess 63 may be employed to insure contact between the lever or wedge block and the extension of the rocking arm. Means, such as segment 64, and lever 65 are employed for locking the rocking arm in either position.

When the loading mechanism is in the position shown in Fig. 8 and the carried vehicle is about to be loaded upon the carrying vehicle the bar or plate (53) will be in contact with the ends (57) of lever (55), and the opposite end of the lever will be in position between the jaws of the clutch, separating them. In order to permit the end (58) of the lever to be moved from its position between the jaws of the clutch, the lever is made in two sections. The upper section is bored to receive a catch or pin 66 held in position by spring 67. A notch 68 in the lower section of the lever receives the pin holding the sections together. This construction is the ordinary type of spring catch. Leaf spring 69 forces the sections to assume the position shown in Fig. 10. When sufficient pressure or force is placed upon the rocking arm, the end (58) of lever (55) is moved downwardly against the action of the spring (69), the opposite end of the lever remaining stationary. The two jaws of the clutch then engage or mesh automatically and the chain begins to move, carrying the bar plate (53) away from the end of lever (55). When the force from the handle is removed pin (66) is forced into notch (68) by the coil spring and the lever is ready for another operation.

The hound is provided with a hook 70 upon its upper side which engages a swinging hook 71 upon the body of the carried vehicle when it is desired to fasten the hound either before or after the loading and unloading operation. The position of the hound when engaged with the hook is shown in dotted lines in Fig. 12. Of course when the carried vehicle is in position upon the carrying vehicle, the hound remains in engagement with the carrier block, steadying the carried vehicle, the weight of which is supported by the side rails.

Spring 35[a] (see Fig. 6) operates in a manner similar to spring (21[a]), Fig. 1, and maintains the ends of the inclined sections above the ground when in lowered position. The weight of the carried vehicle will force these sections down against the action of the springs.

In the form shown in Figs. 15 and 16 of the drawings the carried vehicle is provided with rollers 72 mounted at each side adapted to ride along the flat top 73 of the carrying vehicle. The rollers are mounted in bearings 74 secured to the wagon body and the wheel pedestal. The rollers may be employed as auxiliary supporting means for removing the weight from the tracks or supports. In such cases the upright flange of the track forms the guide for positioning the carried vehicle and wheels of the carried vehicle are in engagement with the base of the track only when the loading operation commences. When the vehicle is in loaded position, the lower tread of the wheel is slightly spaced from the track (see Fig. 15). Under some circumstances the tracks may be entirely replaced by the rollers and additional means, such as angle irons, placed upon the top of the body of the carrying vehicle for properly guiding the carried vehicle.

In Figs. 17 and 18 I have shown means for removing the weight of the carried vehicles from the tracks after the vehicle is in position. In this instance a cam plate or projection 75 is arranged upon the body of the carrying vehicle near the rear end. The carried vehicle is provided with a cam recess 76 upon the rear pedestal 77 which engages the cam projection. Although I have only shown a single cam and a single projection, four or more of each are actually employed, two upon each side of the wagon near the front and rear. The projections upon the wagon body are so arranged as to enter the

recesses when the carried vehicle has almost reached its proper position upon the carrying vehicle. The cam entering the recess tends to lift the body until the lower tread of the wheel is raised from the track and the weight of the wagon is assumed by the truck body through the cam projections, forming the points of contact. The cams may be placed on the floor of the carrying vehicle, if desired, and engage with the under side of the floor of the carried vehicle to raise the latter.

What I claim is:—

1. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side and with loading means and mechanism for operating the same, the carried vehicle provided with means for engaging said loading means, the wheels of the carried vehicle being arranged to provide a clearance space beneath the body of the vehicle extending above the axes of the wheels whereby the carrying vehicle may rest with its wheels upon said supports.

2. In a transportation system, two complementary vehicles, one of wider gage than the other and one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side and further provided with loading means and mechanism for operating the same, the carried vehicle provided with means for engaging said loading means and arranged to automatically disengage said loading means upon a predetermined relative position of the two vehicles.

3. In a transportation system, two complementary vehicles, one of wider gage than the other and one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side below the level of the axes of the wheels, and further provided with loading means and mechanism for operating the same, the carried vehicle provided with means for engaging said loading means and for automatically disengaging said loading means upon a predetermined relative position of the two vehicles, and said carried vehicle adapted to straddle the said carrying vehicle and rest with its wheels upon said supports.

4. In a transportation system, two complementary vehicles, one of wider gage than the other, the vehicle of narrower gage provided with longitudinal supports on either side, said supports having at the rear ends pivoted members for forming inclined planes, and said narrower gage vehicle provided with loading means and mechanism for operating same, the vehicle of wider gage provided with means for engaging said loading means, the wheels of the vehicle of wider gage being arranged to provide a clearance space beneath the body of the vehicle extending above the axes of the wheels whereby the wider vehicle may be drawn into position up said inclined planes and rest with its wheels upon said supports.

5. In a transportation system, a vehicle provided with means for loading another vehicle thereon, said first vehicle having depending supports and means on said supports for forming inclined planes up which the second vehicle may be drawn, said means forming the inclined planes being provided with yieldable means for holding them out of contact with the ground when in lowered position.

6. In a transportation system, a vehicle provided with means for loading another vehicle thereon, and further provided with supports upon which said other vehicle may rest, the wheels of the second vehicle being arranged to provide a clearance space beneath the body extending above the axes of the wheels, loading means on said first vehicle, mechanism for operating the same, and stops carried by said vehicle for limiting the forward movement of the second vehicle with respect to the first.

7. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with loading means comprising a chain, a gear and sprocket over which the chain may travel and means for driving the gear, the carried vehicle provided with means for engaging the said chain, and additional means upon the carrying vehicle for disengaging said means and said chain when the carried vehicle is in a predetermined position with respect to the carrying vehicle.

8. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with loading means comprising a chain, a gear and sprocket over which the chain may travel and means for driving the gear, hook disengaging means in proximity to the gear, the carried vehicle provided with a hook for engaging said chain, said hook adapted to engage said hook disengaging means upon a predetermined relative position of the two vehicles whereby the carried vehicle may be loaded upon the carrying vehicle to said predetermined position.

9. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with loading means comprising a chain, a gear and sprocket over which the chain may travel, means for driving the gear, and a cam plate in proximity to the gear, the carried vehicle provided with a hook having a cam surface, said hook adapted to engage the chain whereby the carried vehicle is drawn upon the carrying vehicle,

the cam surface of the hook engaging the cam plate upon a predetermined position of the two vehicles to disengage the hook from the chain.

10. A construction as described in claim 1 wherein said complementary vehicles are provided with coöperating means to lift the carried vehicle to remove the weight from said supports.

11. A construction as described in claim 1 wherein one of said complementary vehicles is provided with a cam projection and the other with a cam recess to lift the carried vehicle to remove the weight from said supports.

12. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side and with loading means, mechanism for operating the same and means for automatically disengaging the loading means from the operating means, the carried vehicle provided with means for engaging said loading means and adapted to straddle the said carrying vehicle and rest with its wheels upon said supports.

13. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side and with loading means, mechanism for operating the same and means for automatically disengaging the loading means from the operating means when the carried vehicle has assumed its proper position on said carrying vehicle, the carried vehicle provided with means for engaging said loading means and adapted to straddle the said carrying vehicle and rest with its wheels upon said supports.

14. In a transportation system, two complementary vehicles, one arranged for carrying the other, the carrying vehicle provided with longitudinal depending supports on either side and with loading means, mechanism for operating the same and means for automatically disengaging the loading means from the operating means when the carried vehicle is removed from the carrying vehicle, the carried vehicle provided with means for engaging said loading means and adapted to straddle the said carrying vehicle and rest with its wheels upon said supports.

15. A construction as described in claim 1 wherein said loading means and said operating means are connected by a spring pressed clutch, and means for automatically releasing said clutch.

16. A construction as described in claim 1 wherein said loading means and said operating means are connected by a spring pressed clutch, and a wedge block for automatically releasing said clutch.

17. A construction as described in claim 1 wherein said loading means and said operating means are connected by a spring pressed clutch, and a pivoted lever for automatically releasing said clutch.

18. In combination, a pair of complementary vehicles, one carried by the other, means for supporting the carried vehicle upon the carrying vehicle loading mechanism arranged upon one of said vehicles, means for driving said loading mechanism, and automatic means carried by the second vehicle to disconnect said loading mechanism from the drive.

19. In a transportation system, a vehicle provided with means for loading another vehicle thereon, said first vehicle having depending supports and means on said supports for forming inclined planes up which the second vehicle may be drawn, said means forming the inclined planes being provided with springs for holding them out of contact with the ground, when in lowered position.

In testimony whereof, I affix my signature.

JOSEPH CLAYBAUGH BONNER.