

Feb. 6, 1962

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ROAD AND RAIL VEHICLE

3,019,742

Filed July 19, 1957

2 Sheets-Sheet 1

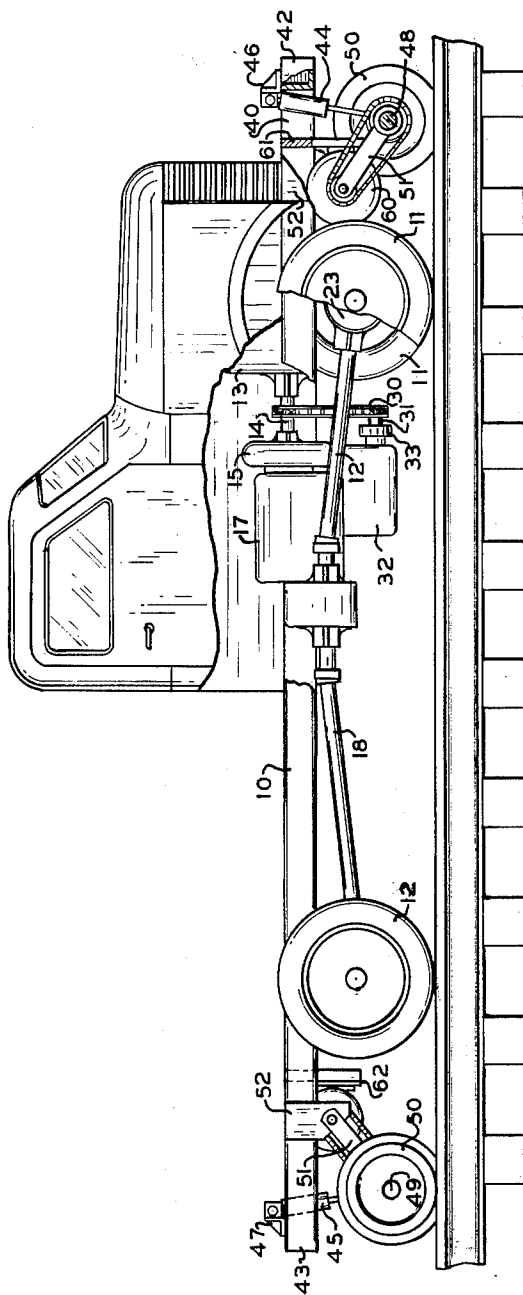


FIG. 1

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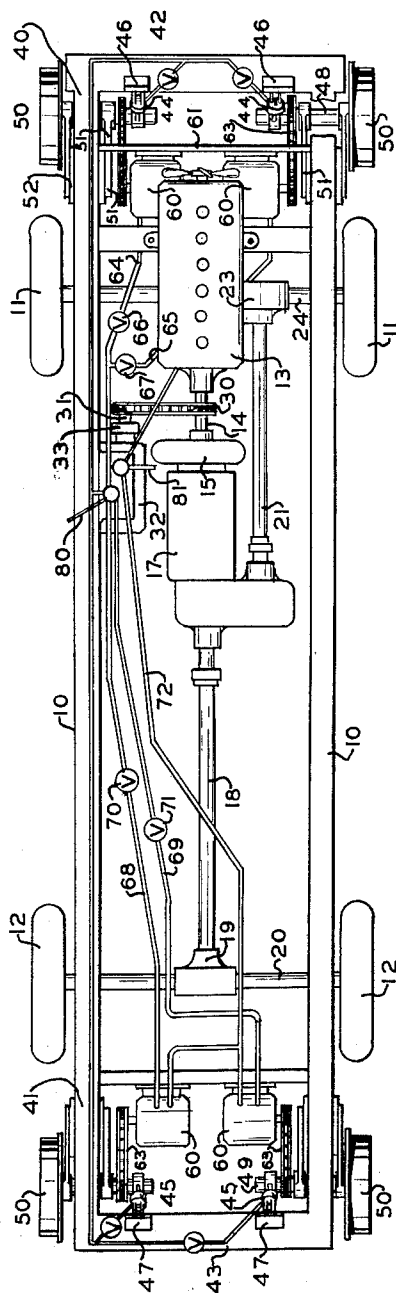


FIG. 2

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3,019,742

ROAD AND RAIL VEHICLE

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Filed July 19, 1957, Ser. No. 673,047

3 Claims. (Cl. 105-215)

This invention relates to railway and road vehicles and is particularly concerned with automotive vehicles which may be self propelled on either roadways or railways. While certain aspects of the present inventive concept may be broadly applicable, the invention is more particularly concerned with its application as a basic maintenance and construction vehicle, including a power plant whereby it is adapted for use as a mobile unit for the conveyance and operation on roads or rails of various types of equipment.

Heretofore, the design and manufacture of railway maintenance and construction equipment has generally followed a pattern in which individual units are each designed and constructed as individual instrumentalities for different specific operations.

The present invention seeks to provide a universal mobile unit for self propulsion on either highways or railways which embodies a source of power for the motivation of various instrumentalities and one which is so constructed and arranged as to provide for the selective attachment, support and conveyance of such various types of maintenance equipment so that the one unit may be universally applicable for carrying out a wide variety of maintenance and construction operations. An important feature of the present invention is the provision of means for selectively applying either rail wheels to a railway rail for motivation and support of the unit and/or for the application of roadway tires for the support and motivation of the unit on a paved highway. The arrangement also provides for the application of such roadway tires to a railway rail whereby the inherent superior tractive effect of conventional rubber treads may be applicable in the motivation of the unit on railway rails while the railway wheels engage the rails to preclude lateral displacement of the unit from the rails. It is also an important feature of the present invention to provide means by which the weight sustained by the railway wheels with respect to the weight sustained by the roadway wheels may be adjusted, balanced, and distributed in accordance with varying circumstances and requirements.

In general terms that form of the present invention here shown by way of example may be broadly defined as comprising a generally conventional roadway vehicle truck chassis power plant and control equipment in combination with pivotally suspended forward and rear flanged rail engaging wheels together with means for varying the relative elevation of the roadway engaging wheels and the railway wheels whereby they may not only be alternately used, but whereby both may be simultaneously engaged with the railway rail, the balance of weight sustained by each being adjustable. Furthermore, the unit includes means by which the railway wheels and/or the roadway engaging wheels may be selectively rotated for propulsion or by which they may be synchronously rotated together to provide a dual traction. It is also an important feature of the invention to include in the unit, a power mechanism by which the operation of the wheel elevating mechanism may be operated and which further provides power for the operation of various and sundry types of rail maintenance and construction equipment which may be formed as a part of the unit or attached thereto, either to be supported thereby or connected for entrainment.

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It is therefore among the primary objects of the present invention to provide a novel and improved roadway and rail vehicle which may be conveniently and selectively operable for self propulsion on either roadways or railways.

Another object of the present invention is to provide a railway maintenance or construction unit including railway wheels and roadway wheels, both of which may be selectively engaged with railway rails for applying tractive forces thereto.

It is also an object of the present invention to provide in a railway maintenance and construction unit both rail wheels and roadway wheels which may be readily adjusted for selectively and variably sustaining the weight of the unit to provide selective distribution of weight supported by the wheels.

It is also an object of the present invention to provide a universally operable self propelled unit including a power source whereby various maintenance and/or construction instrumentalities may be detachably secured to the unit and by which their operation may be motivated from a source of power included in said unit.

Numerous other objects, features and advantages of the present invention will be apparent from consideration of the following specification taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevation partly broken away of one preferred embodiment of the present inventive concept.

FIG. 2 is a top plan view of the chassis, traction means and drive mechanism as well as the power plant of that form of the invention as disclosed in FIG. 1.

Referring more particularly to the drawing, it will be seen that the vehicle of the present invention may be in the general form of a conventional roadway vehicle of the truck type embodying a longitudinally extending chassis, side frame members 10 of which suitably support through appropriate conventional spring mounting (not shown) the usual front and rear wheels 11 and 12, respectively. The chassis also supports and mounts a generally conventional power plant in the form of an internal combustion engine 13, the drive of which may lead through a power shaft 14 to a clutch mechanism as indicated at 15 and therefrom to a gear change mechanism 17. The transmission drive extends rearwardly through propeller shaft 18 to the conventional differential drive indicated at 19 for the axles 20 of the rear wheels 12. Similarly, a forwardly extending drive 21 extends to a differential 23 for driving the axle 24 of the forward wheels 11. It will be understood that this drive assembly may be of conventional four wheel truck drive wherein the transmission mechanism 17 may selectively drive either the forward or rear wheels. The clutch mechanism 15 provides for the operation of the motor 13 without imparting rotation to the wheels.

A power take off from the motor shaft 14 is provided by a chain drive 30 coupled with a gear suitably disposed upon the shaft 14 and trained over a gear mounted on a hydraulic pump shaft 31. The pump 32 may thus be driven by the motor 13 independently of the transmission 15 and drive wheels 11 and 12. A clutch 33 is provided by which pump 32 may be engaged or disengaged with the drive shaft 14 as desired.

In that form of the invention here shown, the side frame members 10 of the chassis are extended forwardly as at 40 and rearwardly as at 41 beyond the general length of a normal chassis for the type of vehicle referred. The extensions 40 and 41 are provided with cross rails 42 and 43, respectively. Mounted on opposite sides of the cross rails 42 and 43 are the upper ends of forward and rear hydraulic cylinders 44 and 45, respectively, pivotally engaged in securing brackets 46 and 47.

The pistons of each hydraulic cylinder extend downwardly from the cylinder to engage at their lower ends of forward and rear stub axle shafts 48 and 49, respectively. Upon the outer ends of stubs 48 and 49 are mounted conventional flanged rail wheels 50. The stub axles 48 and 49 are each supported for rotation in the outer ends of downwardly inclined axle links 51 which in turn are pivotally supported from the side rails 10 of the chassis by suitable bearings as indicated by the numeral 52. By this arrangement, it will be seen that the flanged wheels 50 may be raised and lowered with respect to the axis of the wheels 11 and 12 by the admission or release of fluid to the cylinders 44.

Thus, the entire weight of the vehicle may be supported by the wheels 11 and 12 or by the flanged wheels 50. It will also be understood that since the control of the admission and release of fluid to the cylinders may be incremental, the relative elevation of the wheels may be adjusted in such manner as to permit a sharing of the load between the flanged wheels and the roadway wheels as desired. Thus, in some instances, it may be desirable to permit the major load to be carried by the flanged wheels 50, whereby the vehicle is maintained in proper alignment on a railway rail, while the wheels 11 and 12 are nevertheless lowered to apply appropriate pressure on the rails and thus to provide for the effective use of the enhanced traction of the rubber tread of the wheels 11 and 12 on the rails in conjunction with motivation imparted through the flanged wheels 50. Furthermore, it will be noted that variations in the adjustment of the vertical relation of the forward wheels 50 with respect to the rear wheels 50 may shift the load supported by such wheels to bring about such balance or load distribution as may be desired.

For imparting driving rotation to the flanged rail wheels 50, there is provided for each wheel a hydraulic motor 60 mounted on forward and rear cross bars 61 and 62, respectively, extending between the chassis rails 10. Each motor being provided with a chain drive 63 to each associated stub axle of the wheels 50. The forward hydraulic motors 60 are supplied with pressure fluid from the pump 32 through individual pressure supply conduits 64 and 65 under the control of valves 66 and 67. The rear motors 60 are supplied by pressure from the pump 32 through the conduits 68 and 69 under the control of valves 70 and 71. Conduit 72 provides for the return of spent fluid from the motors to the pump 32. By this arrangement, it will be seen that under the control of the valves 66, 67, 70, and 71, the motors 60 may be individually operated to selectively drive any of the flanged wheels 50. It will also be noted that since the pump 32 receives its drive from the internal combustion engine 32 through the clutch 31 that the drive through the motor 60 to the wheels 50 may be synchronized with the mechanical drive through the transmission 17 to the roadway wheels 11 and 12. The pump 32 is also provided with a pressure fluid outlet 80 and a return 81 whereby fluid pressure generated by the pump may be utilized for any of various types of railway road maintenance and construction devices.

From the foregoing, it will be seen that the present invention provides a novel, simple, and improved railway maintenance and construction unit which may be operated upon roadways at normal roadway vehicle speed to expedite the transfer of the unit from one rail line to another. It will further be noted that the unit may be driven on rails in conventional fashion and/or that if desired, the roadway wheels may be lowered to engage the track to provide for increased tractive friction when so desired. By virtue of the arrangement of the hydraulic cylinders for lifting the wheels 50, the load carried by the forward and rear wheels may be balanced and distributed as desired to suit the special requirements of various operating instrumentalities associated with the device. Since the drive for the wheels 11 and 12 as well

as the wheels 50 is variable under control of the transmission 17 with respect to the wheels 11 and 12 and under the control of the valves for the hydraulic motor 60, it will be seen that the wheels may be driven independently and/or synchronously as desired. In the practice of the invention, it will be understood that numerous changes, modifications and the full use of equivalents may be resorted to without departure from the spirit or scope of the invention as defined in the appended claims.

I claim:

1. A railway construction and repair unit adapted for travelling along the pair of spaced parallel rails of a railway track comprising a chassis, a prime mover on said chassis, a pair of forward roadway wheels connected to said chassis, said forward roadway wheels being spaced from each other for engagement respectively with said pair of rails, a pair of rear roadway wheels aligned with said forward roadway wheels for engagement respectively with said rails, a pair of forward railway wheels in front of said forward roadway wheels, a pair of rear railway wheels behind said rear roadway wheels, said forward and rear railway wheels being aligned with said roadway wheels for engagement with said pair of rails, means pivotally connecting said forward railway wheels to the front portion of said chassis, means pivotally connecting said rear railway wheels to the rear of said chassis, drive means connected between said roadway wheels and said prime mover for transmitting power from said prime mover to all of said roadway wheels, hydraulic motors connected to said railway wheels, a hydraulic pump driven by said prime mover for supplying hydraulic fluid under pressure, conduits connected between said pump and each of said hydraulic motors through which said hydraulic fluid flows, means for individually controlling the flow of hydraulic fluid through each of said conduits, hydraulic cylinders connected between said chassis and said railroad wheels for rotating said railway wheels about said means pivotally connecting said railway wheels to said chassis, hydraulic conduits connected between said hydraulic pump and said cylinders, means individual to said cylinders for varying the flow of hydraulic fluid through the last mentioned hydraulic conduits whereby the amount of the weight of the chassis may be distributed in preselected amounts among said wheels.

2. A construction and maintenance unit for railways including a chassis, a power plant mounted on said chassis, forward and rearward roadway wheels on said chassis, forward and rearward railway wheels on said chassis aligned with and outwardly of said roadway wheels, said railway wheels and said roadway wheels being simultaneously engageable with the rails of said railway, first hydraulic means driven from said prime mover for incrementally selectively adjusting the relative heights of each of said railway wheels to selectively support said chassis from said roadway wheels and said railway wheels, second hydraulic means for rotating said railway wheels for propelling said chassis along said rails when said railway wheels engage said rails, a clutch connected to said prime mover, said clutch being connected to said roadway wheels, said prime mover being also connected to the aforesaid hydraulic means for supplying power thereto to individually rotate said railway wheels and individually raise and lower the same with respect to said chassis, and control means for controlling said means for adjusting said wheels, said control means being centrally of said chassis and actuatable by the operator of said unit.

3. A construction and maintenance unit for railways including a chassis, a power plant mounted on said chassis, forward and rearward roadway wheels on said chassis, forward and rearward railway wheels on said chassis aligned with and outwardly of said roadway wheels, said railway wheels and said roadway wheels being simultaneously engageable with the rails of said railway, first hydraulic means driven from said prime mover for incrementally selectively adjusting the relative heights of each

of said railway wheels to selectively support said chassis from said roadway wheels and said railway wheels, second hydraulic means for rotating said railway wheels for propelling said chassis along said rails when said railway wheels engage said rails, a clutch connected to said prime mover, said clutch being connected to said roadway wheels, said prime mover being also connected to the aforesaid hydraulic means for supplying power thereto to rotate said railway wheels and raise and lower the same with respect to said chassis, control means for controlling said means for adjusting said wheels, said control means being centrally of said chassis and actuatable by the operator of said unit, links pivotally mounted on said chassis respectively adjacent said railway wheels and extending forwardly and rearwardly from said chassis, the ends of said links respectively supporting for rotation said railway wheels, individual chains for driving each of said wheels, a hydraulic motor for each of said railway wheels respectively mounted on said chassis in coaxial alignment with the pivots of said links, and chains connected between said motors and said railway wheels for driving said railway wheels from said motors, said motors being connected to said second hydraulic means for receiving hydraulic power from said second hydraulic means.

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