July 14, 1931. W. J. HAGMAN 1,814,917

BUS TRANSPORTATION SYSTEM

Filed May 31, 1928 2 Sheets-Sheet 1

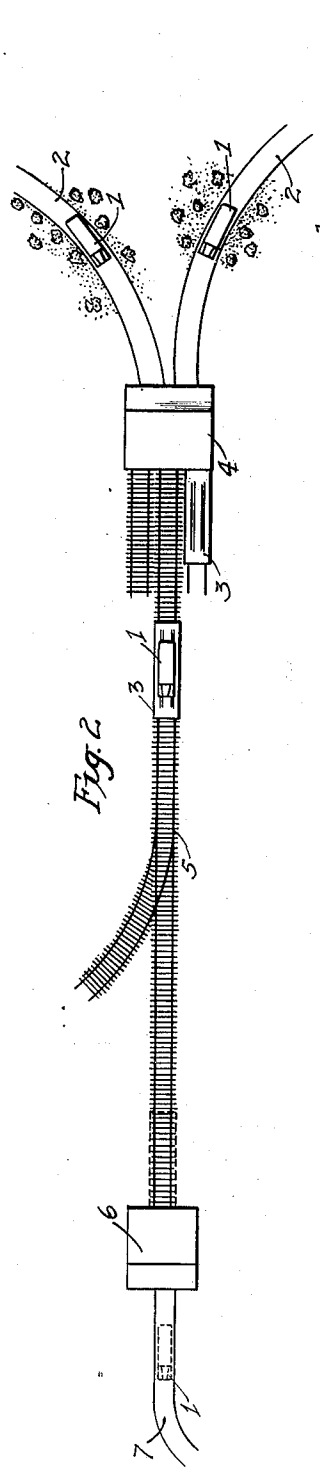


Fig. 2

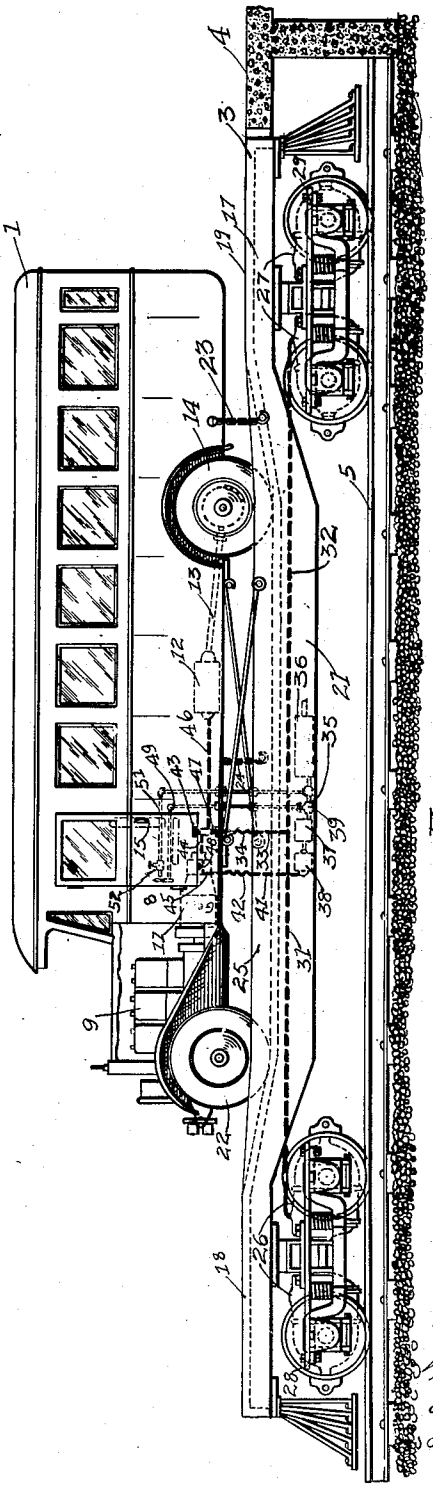


Fig. 1

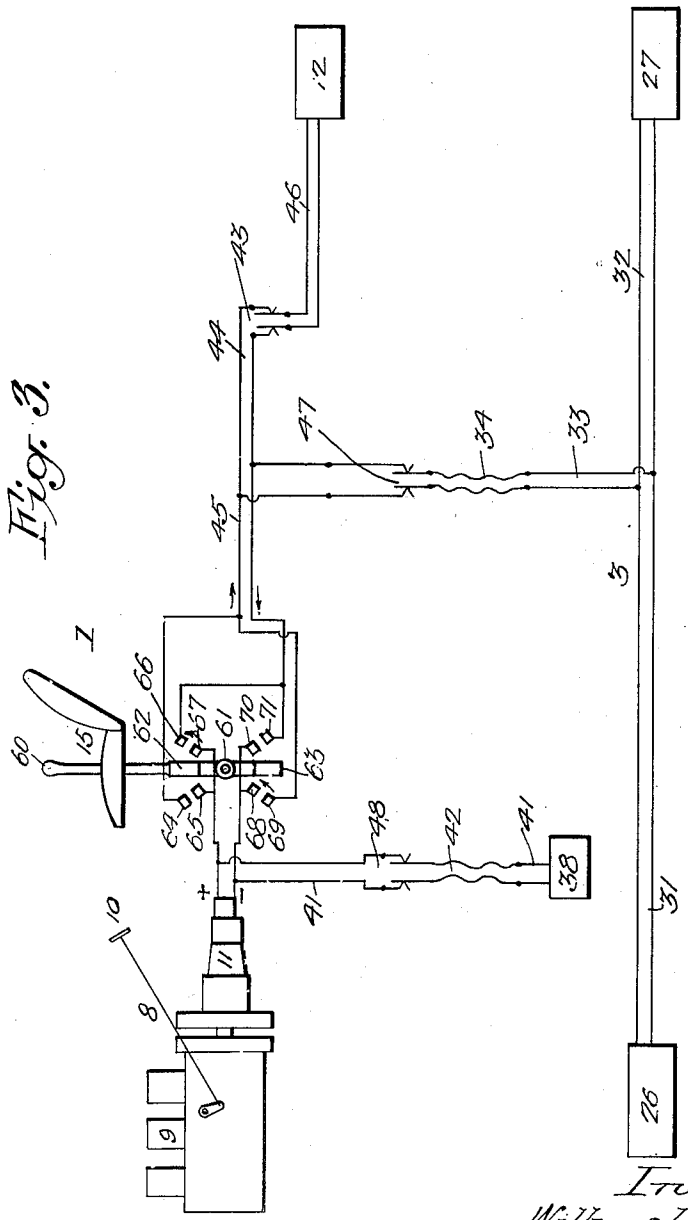
Inventor:
William J. Hagman,
by his Attorneys.
Howson & Howson

July 14, 1931. W. J. HAGMAN 1,814,917

BUS TRANSPORTATION SYSTEM

Filed May 31, 1928 2 Sheets-Sheet 2

Fig. 3.



Inventor:
William J. Hagman
by his Attorneys.
Howson & Howson

Patented July 14, 1931

1,814,917

UNITED STATES PATENT OFFICE

WILLIAM J. HAGMAN, OF PHILADELPHIA, PENNSYLVANIA

BUS TRANSPORTATION SYSTEM

Application filed May 31, 1928. Serial No. 281,897.

My invention relates to means for and method of transportation, and it has for one object the provision of an improved method of transporting passengers or freight over a highway comprising a rail and road sections.

A more specific object of my invention is to provide a method of transportation, wherein a road vehicle first makes a collection run, then is transported by a railway car while fully loaded to a desired point, and finally makes a discharge run over a road section.

Another object of my invention is to provide means, whereby the electrical driving motors of a railway car may be operated by power supplied from the electrical power plant of a road vehicle transported by said railway car.

A further object of my invention is to provide, in combination, a road vehicle having a power plant, a railway car for transporting said road vehicle provided with a brake system, and means whereby said brake system may be operated by energy derived from the power plant of said road vehicle.

A still further object of my invention is to mount a road vehicle on a railway car and then interconnect the electrical power plant of the road vehicle with the driving means of the railway car, so that the operation of the railway car may be controlled by the means that normally controls the operation of the road vehicle.

Other objects and applications of my invention, as well as details of construction and operation, whereby my invention may be practiced, will be apparent more fully hereinafter, when taken in connection with the accompanying drawings, wherein

Fig. 1 is a side elevational view of a road vehicle mounted on a railway car positioned at a loading or unloading station;

Fig. 2 is a diagrammatic view illustrating my transportation system; and

Fig. 3 diagrammatically illustrates one manner of controlling the road vehicle and the rail car.

Considerable difficulty has been experienced by the railroads in meeting the competition of the highly developed bus systems. In accordance with my invention, I provide a system of bus transportation that efficiently makes use of the highly organized railway system, as well as very greatly increases the convenience of passenger railway transportation.

Broadly speaking, I provide a system of transportation, wherein a road vehicle or bus 1 first makes a collection run over a predetermined highway route 2. The loaded road vehicle 1 is then run onto a railway car 3 from a station platform 4 and transported by the railway car 3 over a track section 5 to a desired destination. Here the road vehicle 1 is unloaded from the railway car 3 onto a platform 6 from which it travels over a scheduled highway route 7, discharging passengers as desired. The convenience and ease of such transportation system, as well as its low maintenance cost, are readily apparent.

Referring more specifically to the structure of Fig. 1, the road vehicle 1 is preferably of the gas-electric type, a power plant 8 of which comprises a gas engine 9, an electrical generator 11, a driving motor 12 and mechanism 13 for interconnecting the driving motor 12 with the rear driving wheels 14 for the road vehicle 1. A seat for the driver of the road vehicle 1 is shown at 15 and the usual control means for starting, stopping and reversing the vehicle 1 is also provided.

In the commercially accepted types of gas-electric road vehicles the speed of the vehicle is controlled by acceleration and deceleration of the internal combustion engine that drives the electric generator. Variations in the speed of the electric generator causes corresponding variations in the voltage supplied to the electric motor or motors by which the traction wheels of the vehicle are driven.

The acceleration of the internal combustion engine 9, in the present instance, for the purpose of illustration, is shown as being under control of the usual foot accelerator 10, within reach of the operator occupying the driver's seat 15.

The starting, stopping and reversing of these commercially accepted types of gas-electric vehicles is controlled in any one of a number of different ways, depending upon the choice of the builder of the vehicle.

For the purpose of illustrating one of many practical ways of controlling the starting, stopping and reversing of a road vehicle of the general type above noted I have shown in Fig. 3 of the drawings, the usual hand lever 60 which is found adjacent the driver's seat in this general type of road vehicle.

The hand lever 60 is shown as a means for controlling a switch which in turn controls the flow of current through an electric circuit, on the road vehicle, that includes the generator 11 and the electric traction motors 12 of the road vehicle.

In the present instance, the hand lever 60 is shown as being operatively connected to a movable switch element 61 having separate contacts 62 and 63. The contact 62, when the lever 60 is in the stop position, is centrally located between two pairs of fixed contacts 64—65 and 66—67, while the contact 63 is centrally located between two pairs of fixed contacts 68—69 and 70—71. When the lever 60 is moved to one position, for forward movement of the vehicle, the movable contact 62 closes the circuit between the fixed contacts 64—65 and the movable contact 63 closes the circuit between the fixed contact 70—71. When the lever 60 is moved to a reverse position, the movable contact 62 closes the circuit between the fixed contacts 66—67 while the movable contact 63 closes the circuit between the fixed contact 68—69. These fixed contacts are connected to the terminals of the generator 11 and the motor 12 in the manner, for example, as illustrated diagrammatically in Fig. 3.

The railway car 3 comprises a platform 17 having elevated end portions 18 and 19 in alignment therewith and a centrally depressed portion 21 which is of sufficient length to receive rear and front wheels 14 and 22 of the road vehicle 1. The portion 21 is depressed so as to permit the lowering of the center of gravity of the road vehicle 1 as much as possible. Longitudinal movement of the road vehicle 1 may be prevented in any desirable way, as by chains 23 and 24. Transverse movement of the car is prevented by mounting the rear and front wheels 14 and 22 in longitudinally extending grooves 25.

The railway car 3 may be driven by electric motors 26 and 27 which are mounted on trucks 28 and 29 positioned directly under the end portions 18 and 19, respectively, of the car platform 17. These motors are connected by cables 31 and 32 to a common supply cable 33 having a flexible portion 34. The railway car 3 is also provided with an air-brake system 35 which comprises an air tank 36, an air compressor 37, a driving motor 38 for the air compressor, and an air-control valve 39 for the brake system 35. The driving motor 38 for the compressor 37 is connected to a supply cable 41 having a flexible portion 42.

According to my invention, the driving motors 26 and 27, as well as the air-brake system 35, are adapted to be operated by power derived from the gas-electric power plant 8 of the road vehicle 1,—my invention further contemplating the control of the equipment on the railway car 3 directly from the driver's seat 15 of the road vehicle by the usual means employed for starting, stopping and reversing the road vehicle 1 as above described. To this end, when the road vehicle 1 has been moved onto the railway car 3 under its own power, I actuate a plug switch 43 so as to disconnect a live portion 44 of a cable 45 from a rear portion 46 which is connected directly to the driving motor 12. The live portion 44 of the cable 45, however, is connected by a plug switch 47 to a free end of the flexible portion 34 of the common supply cable 33.

Thus, the currents developed by the generator 11 are supplied directly to the motors 26 and 27 through the common cable 33 and the cable sections 31 and 32, respectively, and the amount of current supplied is determined by the control apparatus of the road vehicle 1 in the usual manner, i. e. the hand lever 60 is moved to an operative position and as the speed of the engine 9 is increased or decreased the electric output of the generator 11 is correspondingly changed, varying the current supplied to the motors 26 and 27 of the railway car 3. Since, the motor 12 is disconnected by reason of the opening of the plug switch 43, the wheels 14 cannot be operated.

The supply cable 41 for the compressor motor 38 is connected at this time to the generator 11 through a plug switch 48, so that power for operating the brake system 35 is also supplied from the power plant 8 of the road vehicle. The lower valve 39 for the brake system 35 is now connected by lever mechanism 49 to a point directly accessible from the driver's seat 15, as shown in Fig. 1. The supplementary control means for the brake mechanism 35 may be also provided by extending an air pipe 51 from the air compressor system 35 to a point immediately adjacent to the driver's seat 15 and mounting a control valve 52 thereon. In this way, two controls for the brake mechanism 35 of the car 3 is provided at the driver's seat 15.

In operation, the road vehicle 1 traverses

the road section 2, loading at will and finally reaches the loading platform 4. The road vehicle 1 is now moved under its own power from the platform 4 onto the railway car 3 without in any way disturbing the passengers. The cable 46 leading to the motor 12 is then disconnected by opening the plug switch 43. The cables 34 and 42 are then connected through the plugs 47 and 48, respectively, to the electrical generator 11 of the road-vehicle power plant 8. The road vehicle 1 is also secured in position by chains 23 and 24 or other locking means. The portions of the air pipe line 51 and the valve linkage 49 carried respectively by the road vehicle and the rail car are then connected to complete the control for the rail car. The driver of the road vehicle 1 now operates the power plant 8 in the usual manner, as when traversing the road sections 2 or 7, and the electrical energy developed in the generator 11 is supplied to the motors 26 and 27 in accordance with the position of the control apparatus on the road vehicle. When the railway car has transported the road vehicle 1 to the desired destination, the driver merely operates the brake mechanism 35 through the control linkage 49 or the valve 52, causing the stopping of the car. The cables 34 and 42 are now removed from the switch plugs 47 and 48, and the plug 43 is closed. The air line 51 and linkage 49 are again disconnected from the road vehicle and the chains 23 and 24 are also removed. The operator of the vehicle 1 now drives the same from the railway car 3 onto the platform 6 and then over the route 7 discharging the passengers at desired intervals.

While I have shown only one form of embodiment of my inventon, for the purpose of describing the same and illustrating its principles of construction and operation, it is apparent that various changes and modifications may be made therein, without departing from the spirit of my invention. I desire, therefore, that only such limitations shall be imposed thereon, as are indicated in the appended claims or as are demanded by the prior art.

I claim:

1. The combination with a railway car provided with an air-brake system having a compressor and a driving motor therefor, of a road vehicle adapted to be removably mounted on said railway car and provided with an electrical power plant, and means whereby energy may be supplied to the driving motor for said compressor from the electrical power plant of said road vehicle.

2. Apparatus comprising a road vehicle provided with an electrical power plant, a railway car provided with a driving motor and an electrically operated brake system, and means whereby said driving motor and said brake system may be operated by power from said road vehicle.

3. Apparatus comprising a road vehicle provided with an electrical power plant, a railway car for transporting said road vehicle provided with a driving motor and a brake system, and means whereby said driving motor and said brake system may be controlled from said road vehicle.

4. Apparatus of the character described comprising a road vehicle provided with an electrical power plant, a railway car provided with a driving motor and a brake system, means whereby said brake system and said driving motor may be operated by power from said electrical power plant, and control means for said driving motor and said brake system operable from said road vehicle.

5. In a transportation system, the combination with a road vehicle provided with driving means including an electrical power plant and control means permitting the starting and stopping of said road vehicle, of a railway car for transporting said road vehicle provided with a driving motor and a brake system, and means whereby energy from said electrical power plant may be supplied to said brake system and to said driving motor, permitting the operation of said railway car by said road vehicle and the control of said railway car by said control means.

6. The combination with a road vehicle provided with an electrical power plant, of a railway car for transporting said road vehicle, said car being provided with a driving motor and an air-brake system including a compressor, a driving motor therefor and an air valve, means whereby the power from said vehicle power plant may be supplied to said car driving motor and said compressor driving motor, and means whereby said valve may be controlled from said road vehicle.

7. Apparatus comprising a road vehicle provided with a gas-electric power plant, a railway car for transporting said road vehicle having a driving motor and a braking system comprising an air compressor and an electrical driving motor therefor, means whereby energy from said gas-electric power plant may be supplied to said car driving motor and to said compressor driving motor, and a control valve for said air-brake system operable from the driver's seat of the road vehicle.

8. In a transportation system, a road vehicle provided with an electric power plant, an electric driving motor connected in circuit with said power plant and controlling means for said circuit whereby the actuation of said driving motor may be governed, in combination with a rail car on which said road vehicle is adapted to be mounted, said railway car being provided with an electric driving

motor adapted for propelling said railway car with the road vehicle mounted thereon, an electrically operated brake system, means for disconnecting the road vehicle driving motor from said circuit, means for connecting said brake system of the railway car to the electric circuit on the road vehicle, means for connecting the driving motor of the railway car to said circuit whereby the actuation of the railway car driving motor will be controlled from the driver's station on the road vehicle by the same controlling means that normally controls the actuation of the road vehicle driving motor, and control means for said brake system located at the driver's station of the road vehicle.

WILLIAM J. HAGMAN.