No. 764,737. PATENTED JULY 12, 1904.

E. S. LEA.

MOTOR VEHICLE.

APPLICATION FILED SEPT. 1, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

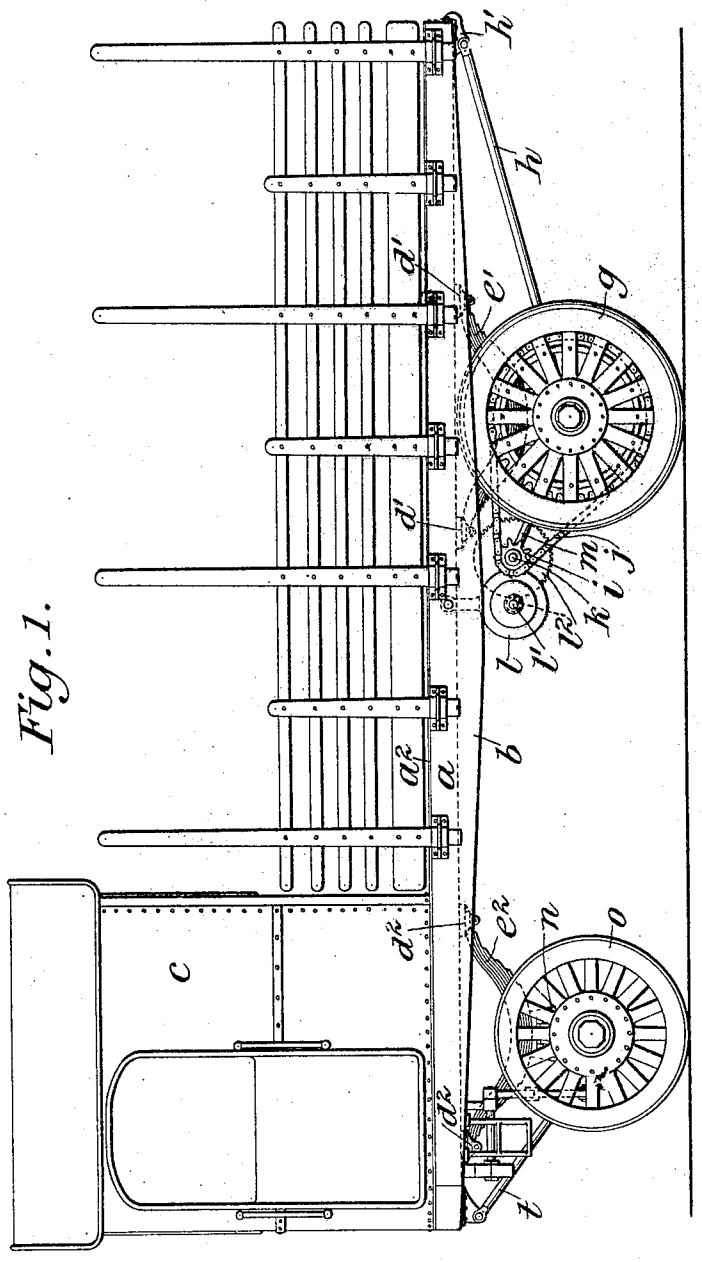


Fig. 1.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

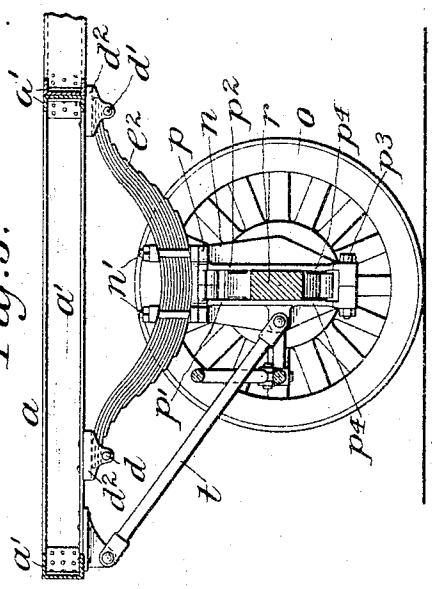


Fig. 4.

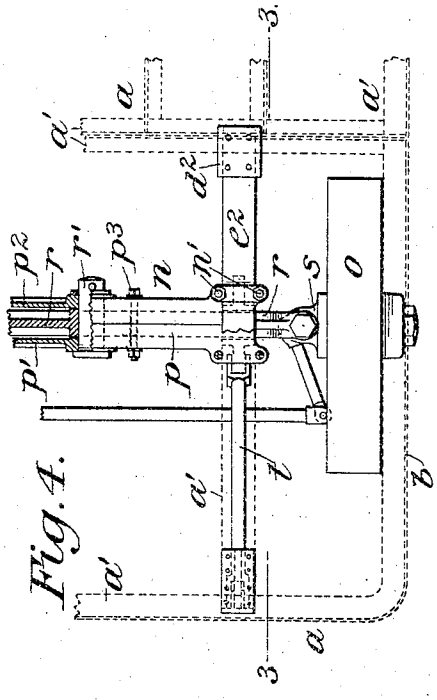
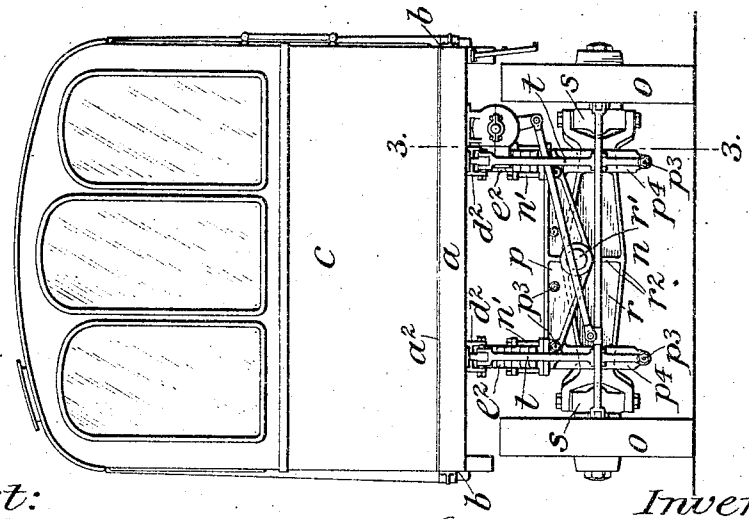


Fig. 2.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

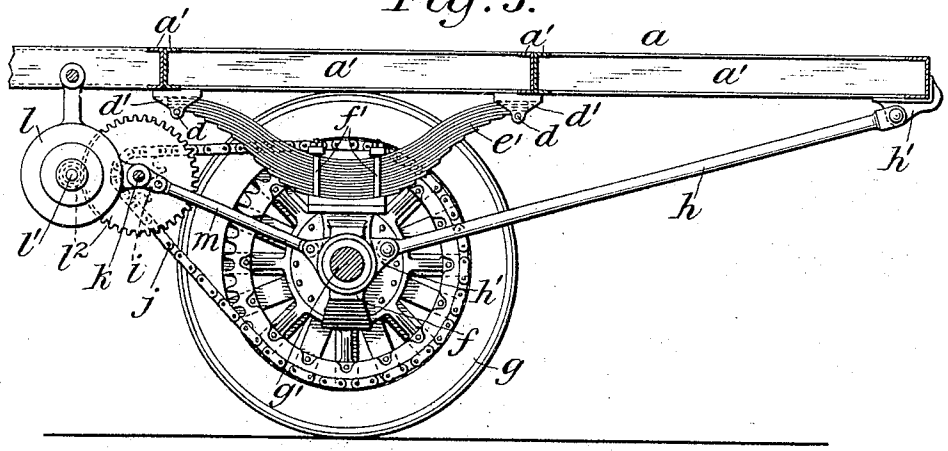


Fig. 6.

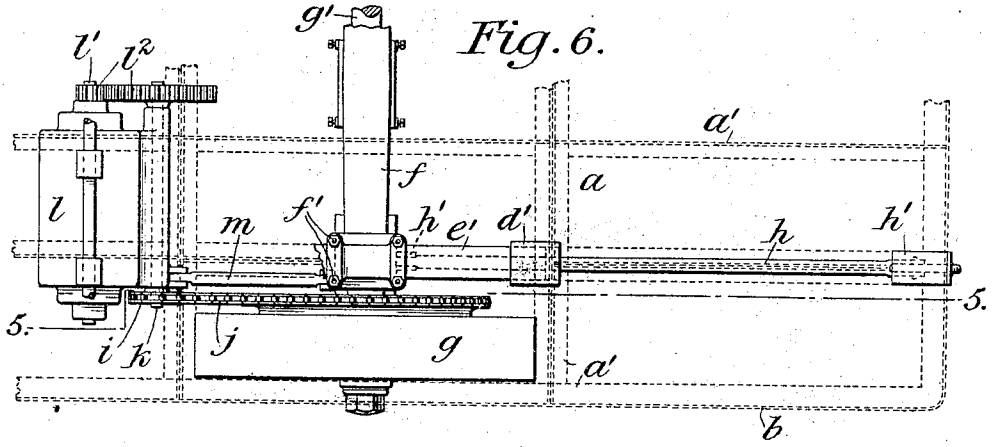
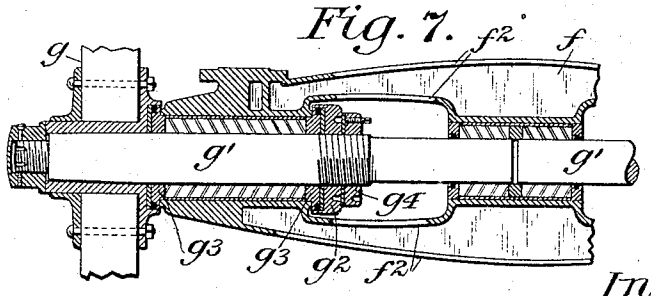


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWARD S. LEA, OF RUTHERFORD, NEW JERSEY, ASSIGNOR TO THE TURBINE ELECTRIC TRUCK COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 764,737, dated July 12, 1904.

Application filed September 1, 1903. Serial No. 171,477. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. LEA, a citizen of the United States, residing in Rutherford, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Motor-Vehicles, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to improvements in motor-vehicles, and particularly to running-gear suitable for use in the heavier types of motor-vehicles.

In a heavy motor-vehicle it is essential that the vehicle-body and the trucks upon which the body is supported be united to each other by some sort of connection which will not yield horizontally or become wrenched apart when subjected to the heavy horizontal strains which occur with more or less frequency when the vehicle is in use. The customary springs which are necessarily employed to support the vehicle-body yieldingly upon the trucks and are therefore connections between the body and trucks are not adapted to bear these heavy horizontal strains, which tend to twist them out of shape, break them, and wrench them from the supports to which they are attached.

One object of the invention is to provide means whereby the strains upon the springs in vehicles, and particularly in heavy vehicles, may be removed and the vehicles run over all kinds of roads without twisting the springs; and to this end the invention consists in providing members to take up these strains, which members preferably serve as means for attaching the body to the trucks, the body otherwise being supported loosely or freely upon the trucks.

Another object of the invention is to provide connections between the driving-wheels in such a construction and driving mechanism mounted upon the vehicle-body, such that the driving mechanism shall always remain in operative relation with the driving-wheels notwithstanding the movement of the body upon or to and from the driving-truck.

In the accompanying drawings, Figure 1 is a view in side elevation of a motor-vehicle embodying the invention. Fig. 2 is a view of the same in front elevation, the rear truck and the driving mechanism not being shown. Fig. 3 is a view in section, taken through the forward truck upon a plane indicated by the lines 3 3 in Figs. 2 and 4. Fig. 4 is a plan view of a portion of the forward end of the vehicle, showing the construction of the forward truck and some of the steering connections, the frame of the platform being indicated by dotted lines. Fig. 5 is a detail view in section of the rear truck and portion of the body, the section being indicated by the lines 5 5 in Fig. 6. Fig. 6 is a detail plan view of a portion of the rear end of the vehicle, showing a part of the rear truck, one of the driving-wheels, and the corresponding motor. Fig. 7 is a vertical central section of a part of the rear truck.

The vehicle chosen to illustrate the invention is one of the heavier types of motor-vehicles, and, as shown in the drawings, the vehicle-body comprises a platform *a*, having side frames *b* and upon the forward end a cab *c*, within which the motive power is generated and from which the vehicle is driven and controlled. The framework of the platform is comprised in the present case of channel-irons a', which are covered with a suitable flooring a^2, and to which are secured brackets d' and d^2, which form housings or seats for the ends of the body-springs e' and e^2. These brackets are riveted or otherwise firmly secured to the channel-irons, and the ends of the springs rest freely therein, being adapted to slide back and forth and being retained in these housings or seats by bolts *d*, each of which extend from one side to the other side of a bracket.

Referring now to the rear truck *f*, by which the driving-wheels *g* are carried, Figs. 1, 5, 6, and 7, the attachment of this truck to the vehicle-body will first be particularly described. The body-springs e', one on each side of the vehicle, as just described, rest loosely in the brackets d' and are rigidly secured to the truck *f* in any suitable manner,

as by the bolts f'. At each side of the vehicle are rods or draft-bars h, here two in number, one on each side, and attached to the trucks near their ends. These rods are pivoted at one end to the rear end of the vehicle and at the other end to the truck f, suitable brackets h' being provided upon the truck and upon the vehicle-body, to which these rods are attached. The rods are preferably constructed from tubular steel and are of sufficient strength to withstand very heavy strains. It will thus be seen that the vehicle-body is loosely and yieldingly supported upon the rear or driving truck and not securely or rigidly attached thereto, as herétofore, and that the strains, either torsional, as would be produced by obstructions coming in contact with one or the other of the driving-wheels, or longitudinal, as would be produced by the propulsion of a heavily-loaded vehicle, do not come upon the springs, but are wholly transmitted to the connecting or attaching bars or rods h.

The rear truck f preferably comprises a steel plate or web which is vertically disposed, Fig. 7, and provided with strengthening-ribs f^2. In this truck there is formed a journal-bearing for the axles of the driving-wheels, which bearing is continuous, extending through the center of the truck from one end to the other. The driving-wheels g are independent of each other, each being secured to a short shaft or axle g', which is secured in one end of the journal-bearing in the truck by a collar g^2, threaded upon said axle, friction-washers g^3 being provided between the collar and the journal and between the wheel and the journal, respectively, and a jam-nut g^4 being provided to retain the collar in its proper position.

The driving-wheels receive power from sprockets i through a chain j, the sprockets being geared to short shafts k, journaled, respectively, upon the casings of motors l. In the present case the invention is illustrated as embodied in a vehicle with a two-motor drive; but its application to a vehicle having a single-motor drive will be obvious without separate detailed illustration. In the present case each of the motors l is pivotally supported upon the vehicle-body, so as to be adapted to swing backward and forward, and the motor-shafts l' are geared, respectively, to the sprocket-shafts k by suitable gears l^2. Between the sprocket-shafts k and the respective driving-wheel axles are strut-rods m, pivoted at one end of the rear truck f and at the other end of the motor-casings, respectively, being attached at such points upon the truck and motor-casings that each rod shall lie in a line connecting the center of the corresponding sprocket-shaft with the center of the axle of the corresponding driving-wheel. It will be obvious that with such connections between the driving mechanism and the driving-wheels, when the relative movement between the body and the driving-wheels causes the ends of the body-springs to move back and forth through the brackets d', the strut-rods m will always maintain the respective motors at a constant distance from the axes of the driving-wheels, causing the motors to be swung backward and forward for this purpose, and notwithstanding the relative movement between the body and the driving-truck operative connections will always be maintained between the driving mechanism and driving-wheels and between the driving-truck and the body of the vehicle. It will also be obvious that when a single-motor drive is used, as has been referred to above, the suspended driving mechanism may comprise a differential gear to which power may be transmitted in any suitable and well-known manner, as through a flexible shaft.

Referring now to the forward truck n to which the steering-wheels o are secured, Figs. 1, 2, 3, and 4, a bolster p is rigidly secured to the body-springs e^2 by bolts n'. It is preferable to form this bolster in two portions or castings, one portion or casting forming the plate p' and the other forming the plate p^2, which plates are secured together by bolts p^3. The bolster is provided upon each end thereof with vertical extensions p^4, which form housings for the main steering-wheel axle r, upon which the bolster is pivoted at r'. Said axle preferably comprises a steel plate or web vertically disposed and having strengthening portions or ribs r^2, as in the case of the rear truck, and extending through the housings p^4 carries at either end stub-axles s, upon which the steering-wheels o are journaled.

Pivoted to the housings or extensions p^4 at either side of the vehicle are rods or draft-bars t, the other ends of said rods or bars being pivoted to brackets secured to the front end of the vehicle. The forward end of the vehicle-body, as has already been described, being loosely-supported upon the springs e^2, which rest freely in the brackets d^2, it is at once evident that the draft-bars or rods t will take up all the horizontal strains either torsional or longitudinal, and accordingly the springs e^2, as well as the springs e', will be subjected to none of these strains.

When the vehicle is in use and is being driven, the power from the driving mechanism will be transmitted to the rear or driving truck. The rear or driving truck instead of transmitting this power to the body of the vehicle through the body-springs will pull the vehicle-body through the rods or draft-bars h, connecting the rear truck with the rear end of the vehicle, and the vehicle-body in turn will pull the forward truck through the rods or draft-bars t. When the vehicle is driven backward, the rear truck pushes the body through the rods h and the body in turn pushes the forward truck through the rods t,

forces of compression acting along the rods *h* and *t* in place of the tensile forces which act when the vehicle is being driven forward.

It will be obvious that various changes may be made in the details of construction of the various parts described herein and in their manner of arrangement without departing from the spirit of the invention, and it will be understood that the invention is not limited to the precise construction and arrangement shown and described.

I claim as my invention—

1. The combination of a vehicle-body, rear and forward trucks the rear truck carrying the driving-wheels, a draft-bar connecting the rear truck and the body and extending rearward and a draft-bar connecting the forward truck and the body and extending forward, whereby the rear truck pulls the body and the body pulls the forward truck.

2. The combination of a vehicle-body, rear and forward trucks the rear truck carrying the driving-wheels, springs secured to each of said trucks and upon which the body rests freely, a draft-bar at each end of the rear truck having pivotal connections with said truck and the rear end of the body, a draft-bar at each end of the forward truck having pivotal connections with said truck and the forward end of the body, whereby the rear truck pulls the body and the body pulls the forward truck and the springs are relieved from all horizontal strain.

3. The combination with a vehicle-body, of a driving-truck therefor, springs loosely connecting the driving-truck to the body, a pivoted driving mechanism upon the body, a strut-rod between the truck and driving mechanism, and a draft-rod extending rearward from the truck connecting the truck and body.

4. The combination with a vehicle-body, of a driving-truck therefor, springs loosely connecting the driving-truck to the body, a driving mechanism pivoted on the body, a strut-rod pivoted at one end to the driving mechanism, and at the other end to the truck, and a draft-rod pivoted at one end to the truck and at the other end to the rear of the body.

5. The combination with a vehicle-body, of a driving-truck therefor, springs loosely connecting the driving-truck with the body, a driving mechanism pivoted upon the body forward of said truck, a strut-rod between the driving mechanism and truck, and a draft-rod extending rearward from the truck connecting the truck and body.

6. The combination with a vehicle-body, driving mechanism pivoted upon the body, a truck, springs between the truck and the body, and driving-wheels carried by the truck of two rods one of which is a draft-bar and is pivotally connected with the truck and the rear of the body, and the other of which is a straight rod and is pivotally connected with the truck and driving mechanism, whereby the relative movement of the body and truck takes place without affecting the operative connections between the driving mechanism and the truck and the truck and the body respectively.

7. The combination of a vehicle-body, independent driving-wheels upon which the body is yieldingly supported, independent motors pivoted upon the body and operatively connected with the respective driving-wheels, and two rods through which the vehicle-body is pulled by the driving-wheels and another two rods by which the motors are swung backward and forward to compensate for the relative movement between the wheels and the body.

8. The combination of a vehicle-body, a truck upon which the rear of the body is yieldingly supported, independent driving-wheels upon the truck, a motor for each driving-wheel pivoted upon the body and operatively connected with said driving-wheel, a rod upon each side of the wheel pivotally connecting the truck with the rear end of the vehicle, and a rod upon each side of the vehicle pivotally secured to the motor upon that side and to the truck adjacent to the driving-wheel axle.

9. The combination of a vehicle-body, a bolster upon which said body is supported, an axle pivoted to said bolster, lateral extensions through which the axle extends, and draft-bars secured to the extensions and to the body of the vehicle.

10. The combination of a vehicle-body, a bolster upon which said body is supported, an axle pivoted to said bolster, lateral extensions through which the axle extends, and draft-bars secured at one end to the extensions and at the other end to the front end of the vehicle-body.

11. The combination of a vehicle-body, a bolster, springs secured to said bolster and upon which the body rests freely, an axle pivoted to said bolster, lateral extensions through which the axle extends, and draft-bars pivoted at one end to the extensions and at the other end to the front end of the vehicle-body.

This specification signed and witnessed this 29th day of August, A. D. 1903.

EDWARD S. LEA.

In presence of—
LUCIUS VARNEY,
P. H. WINCHESTER.