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SYSTEM OF ELASTIC LATERAL BALANCING FOR VEHICLES.

APPLICATION FILED MAY 6, 1921.

1,438,837. Patented Dec. 12, 1922.

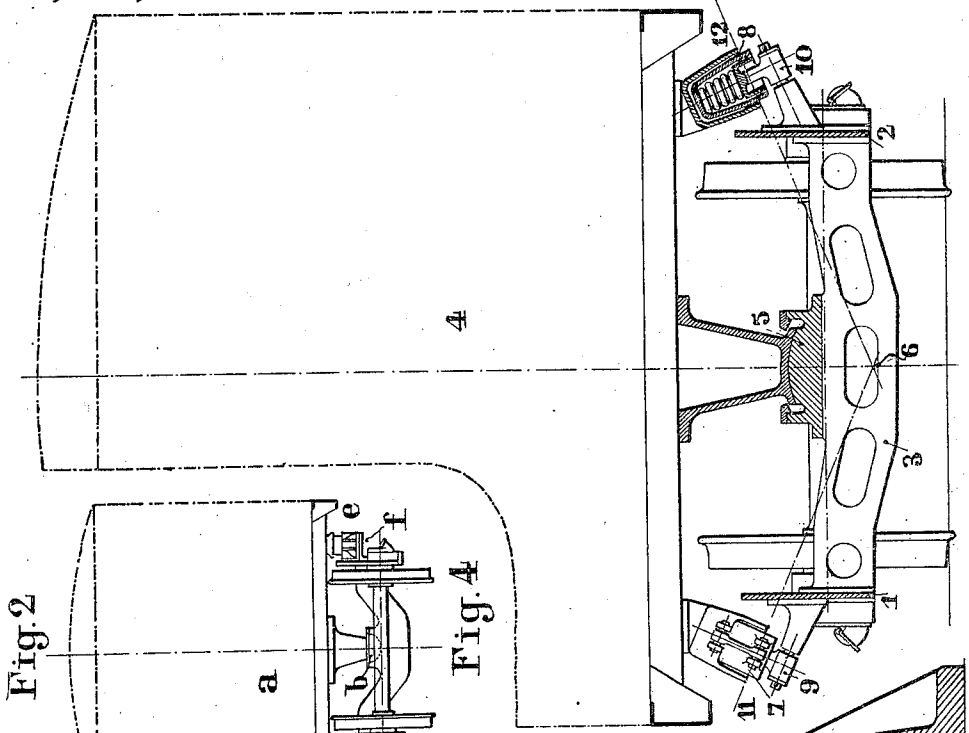


Fig. 2

Fig. 4

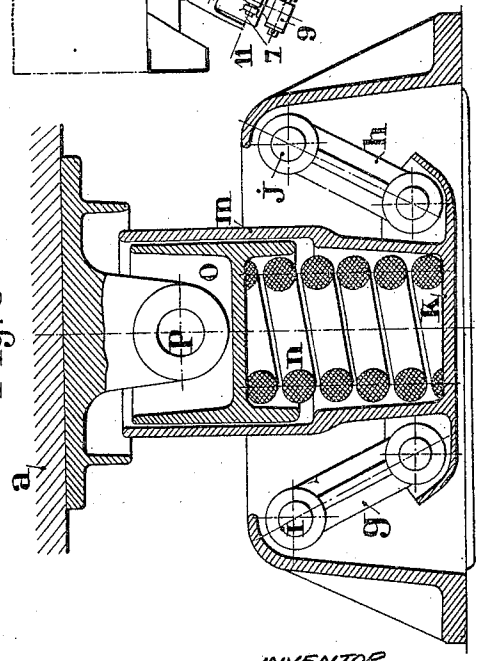


Fig. 3

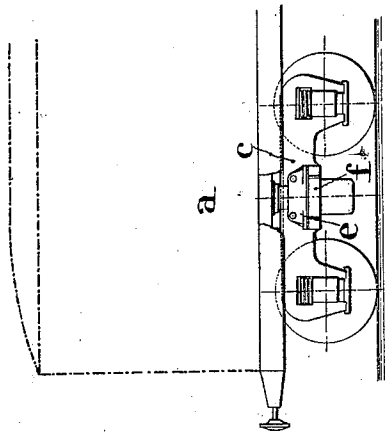


Fig. 1

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UNITED STATES PATENT OFFICE.

PAUL JULES LEBOUCHER, OF PARIS, FRANCE.

SYSTEM OF ELASTIC LATERAL BALANCING FOR VEHICLES.

Application filed May 6, 1921. Serial No. 467,243.

To all whom it may concern:

Be it known that I, PAUL JULES LEBOUCHER, a citizen of the French Republic, and residing in Paris, Seine, 19 Rue Theodore de Banville, France, have invented certain new and useful Improvements in and Relating to Systems of Elastic Lateral Balancing for Vehicles, of which the following is a complete specification.

This invention relates to a system of elastic lateral balancing for vehicles with bogies interposed laterally between the bogie frame and the body of the vehicle for the purpose of damping the oscillations of the latter and imparting to it by an adequate compensating couple the stability necessary for good normal running.

The invention applies more particularly to those vehicles in which the bogies have a spherical pivot and it effects a considerable improvement on the slides or bearings usually employed for this purpose in that it permits of doing away practically with the friction set up at the points of support or fulcra and consequently permits of the greatest possible liberty of rotation of the bogie being obtained when following a curved path.

This system also permits of obtaining a good balancing of the bogie by the lowering of the point of support or fulcrum of the pivot relative to the plane of the balancers without having to fear injurious friction in the case of these latter.

This result is obtained by the fact that the bogie is connected to the body of the vehicle by a system pivoted to levers called "rectilinear resistant levers" one of the points of which describes practically a straight line with the lateral elastic supporting member, so that the point of application of the load moves practically in a plane parallel with the plane in which the bogie runs.

The object of this construction is consequently to improve the balancing movement of the bogie, and to allow of the longest possible period of oscillation being provided for the body, that is to say a condition which is essential to good stability at high speeds.

This result is obtained by the combination of an inverted spherical pivot, with two balancing devices which are arranged to act in a direction at right angles to the radius passing through the centre of oscillation.

In the accompanying drawing which represents by way of example a constructional form of the apparatus as applied to a railway vehicle.

Figures 1 and 2 show in elevation and transverse section respectively, the apparatus as applied to a railway car.

Figure 3 is a detail of the balancing device.

Figure 4 shows another arrangement of the apparatus applied to a railway car.

The body a of the vehicle is supported at each of its ends by means of a spherical pivot or trunnion b on the frame c of a bogie.

On either side of this pivot, in a transverse direction are arranged the balancing systems d e each of which rests on a seat f connected to the bogie.

Each of these devices has a set of two levers g h pivoted at i and j respectively to the seat f and pivoted by their other ends to a horizontal connecting member k. This member k carries a cylinder m which contains a coiled spring n compressed by a piston o which can be moved along the cylinder m and rotated about its axis. The piston o carries the trunnion p rigidly connected to the body a of the vehicle.

The dimensions of the parts are combined in such a manner that the trunnion p and the pivots of the levers g and h which connect them with the member k, form what is known as the "Robert triangle," so that under a normal load the lateral movements of the trunnion p, which is the apex of the triangle, take place in a plane parallel to the plane in which the wheels of the bogie run.

On the rotation or "balancing" of the bogie which causes the deformation of each of these two pivoted systems d e gravity does not intervene since the trunnion p rests in a horizontal plane. The pivot b is therefore not relieved of load and the friction is reduced to the friction of the trunnions p and the trunnions of the levers g h that is to say to a negligible quantity, having regard to the small amount of movement usually required in normal use.

The spring n might be replaced by a group of springs or by any other suitable elastic device. The arrangement described might if necessary be inverted, the trunnion p being then rigidly attached to the bogie and the levers g h pivoted to the body of the vehicle.

As shown by Figure 4, the frame of the bogie is composed of longitudinal members 1, 2 and a cross piece 3, and this cross piece 3 supports the body 4 of the vehicle by a spherical pivot 5 which is inverted and works in an oil bath and the centre of oscillation of which is at 6. Two balancing devices 7, 8 are placed on axles 9, 10 so as to act at right angles to the direction of the radii 6, 11 and 6, 12.

It is to be understood that the balancing devices 7 and 8 are substantially similar in construction to those shown in Figures 1, 2 and 3, but inverted and with the levers *g* and *h* pivoted to the body of the vehicle.

In normal running, the bogie behaves with respect to the body of the vehicle as if the real pivot were at 6, that is to say placed as low as it is possible to get it in a good construction affording consequently the maximum of the advantages indicated herein.

What I claim is:

1. In a vehicle, the combination with a truck, and a body pivotally mounted at its longitudinal center on the truck, of elastic balancing devices at the sides of the vehicle, said devices each including two members, one of which is pivoted to one of the said parts and the other having a link connection with the other part.

2. In a vehicle, the combination with a truck, and a body pivotally mounted at its center on the truck, of balancing devices at the sides of the vehicle, each balancing device comprising two telescoping and spring pressed members, one member being pivoted to the truck and the other having a link connection with the body.

3. In a vehicle, the combination with a truck having lateral pivots at its sides, and a body pivotally mounted on the truck, of balancing devices each comprising telescoping and spring pressed members, one member being mounted on the pivots of the truck, and levers pivoted to the other member and to the body.

4. In a vehicle, the combination with a body, and a truck having a frame formed of longitudinal members from which project upwardly inclined pivots, and a cross member connecting the longitudinal members and upon which the body is pivotally mounted, of balancing devices, each consisting of two telescoping members, one member having means pivotally mounting it on the pivots of the truck, a spring between the telescoping members, and levers pivoted to the other member and to the body.

In testimony I have hereunto set my hand at Paris, France, this 12th day April, 1921.

PAUL JULES LEBOUCHER.