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SHOCK ABSORPTION FOR MOTOR CARS WITH WHEELS SUSPENDED TO TRACK ALTERING SWINGING HALF-AXLES

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Fig. 3.

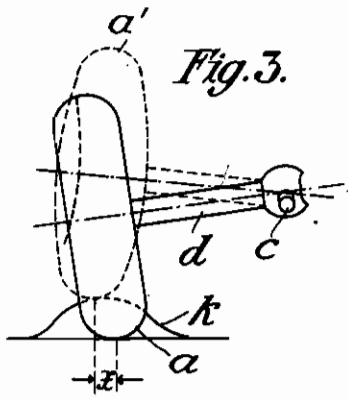


Fig. 1.

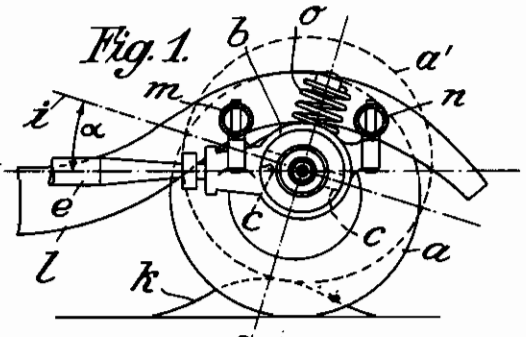
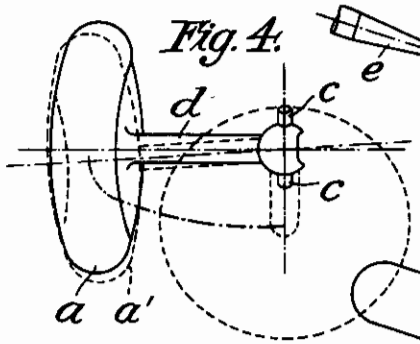


Fig. 4.



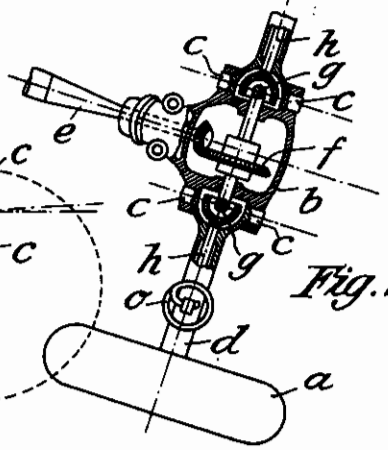


Fig. 2.

Fig. 5.

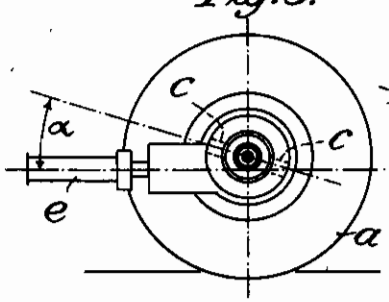
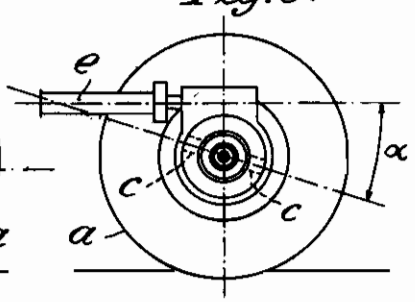


Fig. 6.



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ALIEN PROPERTY CUSTODIAN

SHOCK ABSORPTION FOR MOTOR CARS WITH WHEELS SUSPENDED TO TRACK ALTERING SWINGING HALF-AXLES

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The invention relates to a shock absorption for motor cars with wheels suspended to track altering swinging half-axles, for instance driven rear wheels, and its purpose is a good absorption of the shocks proceeding from the road, and an adaptation of the wheels to the track alterations occurring with the resilience. For this purpose the wheels are suspended to the vehicle framework or top (which means either the vehicle frame, or for instance a self contained body) substantially in such a way that each wheel may execute an up and down motion with respect to the vehicle top, doing simultaneously with the up-motion a motion to the rear and a swinging motion around a vertical axis, towards the outside. Specially for this purpose a journalling of the wheels on such swinging half-axles or so called pendulum half-axles is provided that swing together with the wheels as one unit around a joint at the vehicle top, or parts connected to it, so that it immediately takes part of every motion of the swinging half-axle. In order to produce the effect according to the invention, such pendulum half-axles are jointed to the vehicle top preferably by means of joints the turning axes of which, around which the pendulum half axles swing, are inclined backward to the road, the angle of inclination to a horizontal plane being preferably 5 to 30 degrees.

By the invention the following advantages will be obtained:

If one of the wheels strikes an elevation of the road attempting to lift the wheel, and if the shock strikes the circumference of the wheel at a place before its central transverse plane, besides a vertical component of force, a more or less smaller horizontal component of force is produced in backward direction. The resulting force therefore acts under an angle forming according to the condition of the road an angle of 5 to 30° with the vertical.

The wheel being able to execute besides a resilience towards above, simultaneously a backward component of motion, also the horizontal shocks are wholly or at least partially absorbed. Most favorable herewith is a resilience of the wheel in the direction of the resulting force.

Furthermore by means of the invention the advantage is obtained that the wheel adjusts itself somewhat slanting towards the outside from its position in the driving direction, according to the outward slewing motion occurring with the resilience. It is well known that with swinging half axles, specially with pendulum half axles the track of the wheels becomes substantially wider with the resilience of one or of both wheels. Lateral transverse motions of the wheels are produced, the consequence of which being an increased wear of the tires. Supposing the swinging half axles are supplied with the usual horizontal joints, the contact-line of the wheel with the road is displaced in parallel with respect to the central longitudinal plane of the vehicle.

The wheel executing according to the invention simultaneously a slewing motion around a vertical axis towards the outside the wear of the wheels may be substantially diminished, as in consequence of the slanting position of the wheel towards the outside occurring herewith, the wheel rolls into the wider track, so that the so called erasing or wearing of the wheels, when passing from the smaller into the wider track, is wholly or at least partially avoided.

By the slanting position of the joints in which the pendulum half axles are suspended, the above mentioned effect may be obtained in a most simple way.

In the drawing one type of the invention is shown diagrammatically by way of example:

Fig. 1 shows the side view of a driven rear axle.

Fig. 2 shows a plan view of the journalling and the drive of the pendulum half axles in the plane of swinging axle joints.

Fig. 3 is a diagrammatical view of a swinging half axle arranged according to the invention.

Fig. 4 is a plan view of this swinging half axle, and

Figs. 5 and 6 show two types with a somewhat altered drive.

In the drawings *a* are the rear wheels, *b* the axle or differential gear casing to which at both sides of the central longitudinal plane of the vehicle by means of the pins *c* the pendulum half axles *d* are jointed. The drive ensues through a cardan shaft *e* coming for instance from a motor in the front, driving through the axle gear *f*, containing eventually a differential gear, and through the cardan shaft *g* the axle shafts *h* journaled in the half axles *d*. The cardan joints *g* are arranged here within the axis *i* of the joints *c*.

As will be evident from the illustrations this axis *i* of the joints *c* is inclined under an angle α to the horizontal or to the usually horizontal cardan shaft *e*, the angle α being substantially so chosen that the axis *i* around which the pendulum half axles swing, extend in a direction perpendicular to the direction of the shocks imparted to the wheel by the road.

With the type shown by way of example in Figs. 1 and 2 the center of the wheel or the joints *g* respectively are lying in the same height as the cardan shaft *e*. For the axle gear in this case a bevel gear is provided. With the types shown in the Figures 5 and 6 with which the wheel-centers or the joints are arranged above or below the cardan shaft *e*, the drive of the half axles may be effected by means of worm wheels or a worm gear or the like. The shock absorption of the half axles against the frame may be done in any desired way, for instance by means of helical springs, laminated or torsional springs which may be arranged for instance in the axis of the joints *c*. With the type according to Figs. 1 and 2 helical springs o are provided for the shock absorption, the axis of action of which is lying in a slanting swinging plane of the half axles.

The manner of action of the arrangement according to the invention is the following:

When the wheel strikes an elevation on the road, as shown in Figs. 1 and 3, the wheel swings around the axis *i* of the joint *c* upward (see Figs. 1 and 3). At the same time the wheel executes a motion-component backward (see Figs. 1 and 4) so that also the shocks acting opposite to the driving direction will be absorbed. The new position of the wheel is indicated by dotted lines at *a'*.

As shown in Fig. 3, with this resilience the track of the rear wheel is widened by the amount *x*. As however, as evident specially from the Figures 3 and 4, simultaneously the wheel takes a slanting position when passing from the position *a* to the position *a'*, also in consequence of the inclination of the turning axis *i*, the wheel may roll from the narrow into the wider track without or substantially without lateral erasing or wearing. As in these moments in consequence of the action of the masses a strong wheel-pressure is produced, by these means a substantial diminishing of the load and a saving in tires is effected.

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