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OR A SUSPENSION OF AN AGGREGATE
OF AN AXLE TO A VEHICLE
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Fig. 3.

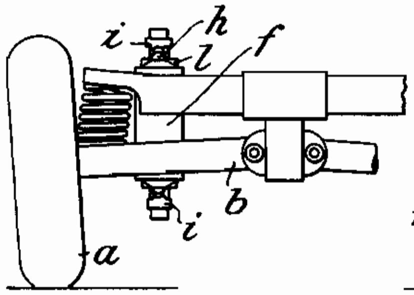


Fig. 1.

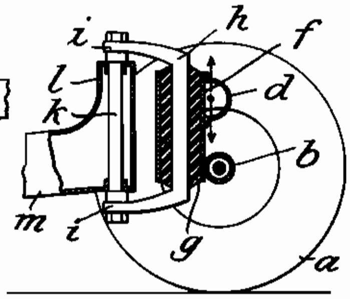
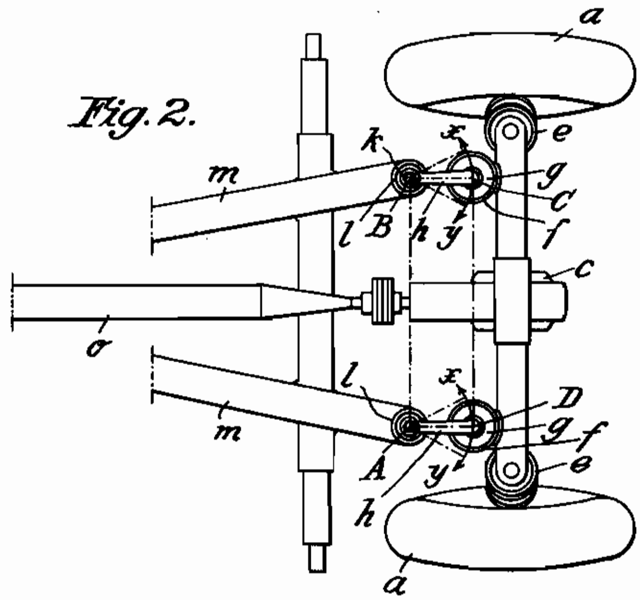


Fig. 2.



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ALIEN PROPERTY CUSTODIAN

RESILIENT CONNECTION OF A WHEEL SUSPENSION OR A SUSPENSION OF AN AGGREGATE OF AN AXLE TO A VEHICLE

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The present invention relates to a resilient connection of a wheel suspension or a suspension of of aggregate of an axle to a vehicle (the frame or the carriage body of a vehicle), particularly for vehicles provided with half axles of oscillation, altering the gage. The invention substantially consists in this that independent on the main spring-suspension of the wheels, the wheel suspension or the aggregate of the axle cam yield substantially transversely to the direction of drive as well as upwardly, i. e. in a direction vertically or inclined to the track-way, has, however, in another direction no or only a slight resiliency with regard to the frame or to the carriage body of the vehicle.

In connection with wheel suspensions in which the wheels during deflecting of the springs are subjected to alterations of the gage, particularly therefore in connection with so-called oscillating half axles, shocks vertically as well as transversely directed to the direction of drive occur in the joints of the oscillating half axles which result from the fact, that the point of contact of the wheel with the rod surface tends to change its distance from the centre longitudinal plane of the vehicle.

According to the invention these shocks, acting substantially in a vertical and also in a transverse direction to the direction of drive, are intercepted and absorbed before they may be transferred to the frame. Simultaneously resiliency in an other direction is rendered as small as possible to exclude a tendency of the vehicle towards floating and to avoid if possible indefinite movements of the axle relatively to the frame.

In suitable adaptation to the forces occurring and to the conditions of movement, the resiliency transversely to the direction of drive preferably is selected larger than the upwardly directed resiliency in such a manner that the first mentioned resiliency corresponds completely or substantially completely to the alteration of the gage of the vehicles. The resiliency in a transverse direction as well as in an upward direction is obtained by the same elastic buffers which are arranged between the frame or the carriage body of the vehicle on the one hand and a supporting member for the aggregate of the axle or the wheel suspension on the other hand, while the main spring-suspension of the wheels preferably is mounted between the wheel or a member oscillating with the wheel and the supporting member.

The invention furthermore consists in this that, for the purpose of obtaining a resiliency of the aggegrate of the axle or the wheel suspension in a transverse direction and eventually in a vertical direction, a mechanism, preferably a link parallelogram swingably arranged substantially in a horizontal plane and subjected to the action of a spring is provided which serves to guide the wheel suspension or the aggregate of the axle. The resiliency of the link parallelogram hereby preferably is obtained by spring members subjected to torsional stress and mounted in the joints of this link parallelogram. For instance it is possible to use spiral springs or torsion bars. A particular advantageous arrangement is the employment of rubber sleeves arranged in the joints of the link parallelogram, preferably in the joints connecting the links to the member supporting the wheel suspension or the aggregate of the axle. The rubber buffers hereby are subjected to thrust stresses for the purpose of obtaining a vertical resiliency and to torsional stresses for the purpose of obtaining a transverse resiliency of the aggregate of the axle.

By the use of such a link parallelogram, the forces occurring may be controlled in a particular suitable manner, because the vertical forces act in the direction of the axis of the pivots of the links and are absorbed in a particular convenient and reliable manner by the bearings of the pivots of the links or by the rubber sleeves respectively. Simultaneously the link parallelogram allows a kinematic positive guidance of the axle transversely to the longitudinal direction of the frame or the carriage body of the vehicle. It is possible that the pivots of the links on the vehicle show an inclination in a vertical plane positioned in the direction of the drive.

In the accompanying drawing one construction according to the invention is shown by way of example.

In this drawing:

Fig. 1 shows a side elevation of an aggregate of the axle according to the invention,

Fig. 2 is a plan view of this construction, and

Fig. 3 shows a rear elevation of same.

The wheels *a* are mounted upon half axles of oscillation *b* formed as oscillating half axles which are laterally linked to a differential gear *c* by means of pivots. The differential gear *c* is fixed to a transversely arranged supporting member *d* against the ends of which bear the not guided coiled springs serving as main spring-suspension of the wheels.

Welded or in other suitable manner fixed to the supporting member *d* are metal sleeves *f*. In the latter rubber sleeves *g* are mounted the outer surfaces of which are preferably biassed to a certain degree and connected in a strongly adherent manner to the metal sleeves *f* and the inner surfaces to the pivot like centre portion of a U-shaped link *h*. Passed through the outer ends *i* of each link *h* is a vertical supporting pivot *k* which is journalled in the upwardly bent rear end *l* of a tube-like longitudinal beam *m* of the frame.

To drive the wheel a Cardan shaft o is used which for instance is driven by a motor arranged in front.

As may be seen from Fig. 2, the frame together with the two links *h* and the supporting member *d* forms a link parallelogram A—B—C—D swingably arranged in the horizontal plane. With upwardly directed shocks the rubber sleeves *g* are subjected to thrust stresses, whereas with shocks, acting in a transverse direction, the rubber sleeves *g* are torsionally stressed. The links hereby swing about the joint points A and B respectively in the direction of the arrow *x* or *y* respectively to the right- or left hand side of drive, whereby they correspondingly guide in parallel the aggregate of the axles. Consequently during deflecting of the springs of the wheel and the hereby caused alterations of the gage the entire aggregate of the axle may laterally give way with regard to the frame or the carriage body of the vehicle respectively without the frame or the carriage body of the vehicle positively participating in this lateral movement. Shocks and vibration phenomenona occurring at the frame are hereby avoided.

Instead of providing a resiliency of the entire aggregate of the axle, i. e. a joint resiliency of both wheels of a pair of wheels, a corresponding resiliency of each individual wheel suspension of a pair of wheels may be provided. In this case, each wheel is suspended from a special supporting member which, for instance due to a connection by means of a horizontally arranged link parallelogram, may yield in a transverse direction as well as eventually in a vertical direction also. This arrangement is of advantage in so far, as the lateral movement of one of the two wheels not positively causes a corresponding movement of the other wheel.

Moreover, instead of being arranged to swing in a horizontal plane, the link parallelogram may also be arranged to swing in a plane somewhat inclined to the horizontal plane, for instance in a plane inclined upwardly towards the rear, whereby forces, returning the aggregate of the axle, automatically come to action. Moreover, the joints, particularly the joint enclosed by the rubber sleeve *g*, may be so arranged that their axles steeply extend upwardly in the direction of the shocks acting on the wheel, i. e. towards the rear. Hereby shocks, caused by the wheel running over unevennesses of the rod, may be absorbed in a favorable manner.

Moreover, by the use of a link parallelogram, oscillating in a horizontal or nearly horizontal plane, a transverse resiliency may be provided eventually also without providing for a vertical resiliency. The rubber sleeves *g* preferably are arranged as near as possible to the vertical transverse plane passing through the centre of the wheels. The rubber sleeves thereby may be arranged in front or in rear of the oscillating axles, whereby the latter eventually may be passed between the U-shaped links.

Instead of rubber sleeves or similar resilient elements subjected to torsional stresses, other springs also may be used which tend to hold the link parallelogram in a centre plane. The links eventually may be replaced by leaf springs in such an arrangement in which the planes of the individual leaves of the springs extend vertically so that the leaf spring may transversely swing to the direction of drive.

In connection with individually yieldable wheel suspensions, link systems different from the form of a parallelogram may be used.

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