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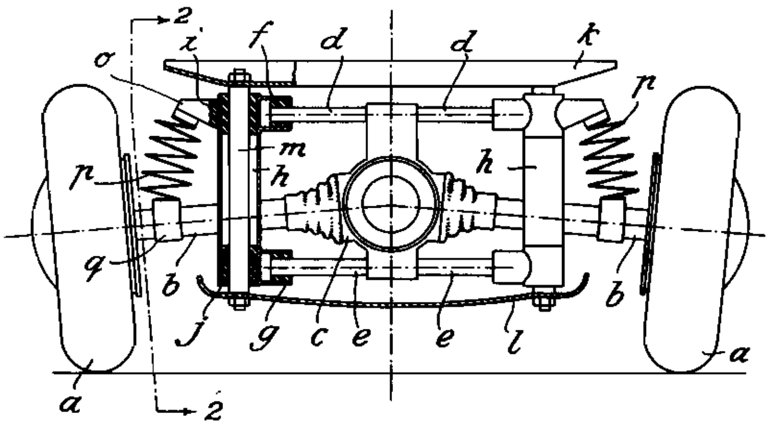
Fig. 1



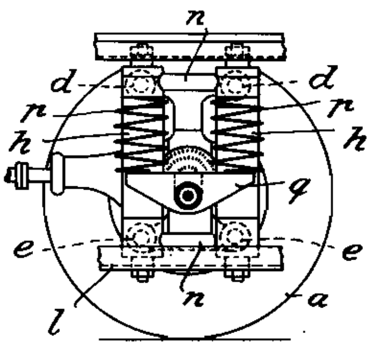


Fig. 2

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CONNECTION OF A WHEEL SUSPENSION TO THE FRAME OR BODY OF A VEHICLE

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The present invention relates to a connection of a wheel suspension to the frame or body of a vehicle (rest of the vehicle) which is resilient in a plurality of directions. More particularly, the invention is concerned with a resilient connection of a wheel suspension or an axle aggregate with the frame or the car body of a motor vehicle consisting substantially in this that, independent on the spring suspension of the wheel, resilient intermediate members are arranged between the members of the vehicle to be united which intermediate members effect a resiliency in directions different from each other, single or main ones. Preferably the intermediate members effecting resiliency in different directions are arranged one behind the other in the sense of the power transmission. The main directions of the various resiliencies, moreover, preferably extend vertically to each other at least as far as one or a portion of the intermediate members is concerned, particularly transversely to the direction of run (eventually also in the direction of run) on the one hand and on the other hand substantially in a vertical direction.

For the resilient connection rubber members of any suitable shape or also guided coiled springs may be used. The use of rubber sleeves is particularly to be recommended which always provide for a main resiliency in the direction of their axis only. By employing a plurality of sleeves arranged one behind the other and at an angle to each other, a substantial resiliency into two or more directions may, however, be obtained according to the invention, whereby a corresponding selection of the sleeves a larger resiliency in the one main direction may be allowed than in the other main direction.

For instance the wheel suspension or the axle aggregate, having a resiliency substantially acting transversely to the direction of run, may be mounted at at least one intermediate member which in turn is fixed to the frame or the car body with a substantially vertical resiliency. In the sense of the power transmission a reversed succession of the resiliency may be provided from the wheels or the axle respectively to the frame or the car body. The first mentioned arrangement, however, allows bearing of the springs, absorbing shocks acting upon the wheels, against the intermediate member in such a manner that the resilient members, for instance rubber sleeves, mainly effecting a resiliency in a transverse direction are not or in a reduced measure only stressed by the weight of the car body or the forces of the springs respectively.

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

In this drawing:

Fig. 1 shows a rear elevation of a rear axle, partially in section, and

Fig. 2 is a section on the line 2—2 of Fig. 1 (side elevation).

The rear wheels *a* are mounted upon oscillating half axles *b* which are linked to the casing *c* of the differential gear serving as axle support. Fixed to projections of the casing *c* are two upper transverse rods *d* and two lower transverse rods *e* the pivot-like ends of which are mounted by means of transversely arranged rubber sleeves *f* and *g* respectively in lateral tube-like projections of four vertical sleeves *h*. Each of these sleeves in turn is journalled by means of an upper rubber sleeve *i* and a lower rubber sleeve *j* upon a vertical pivot *m* fixed to the frame or to suitable members *k* and *l* respectively of the car body. The sleeves *h* may be arranged separately or connected together by transverse members to form a rigid unit. In the construction shown the two sleeves *h* provided at each side of the vehicle are rigidly connected to each other by connecting tubes *n*, the oscillating half axles *b* extending through the space between the sleeves and the connecting tubes. Each of the sleeves is provided with a spring bracket o against which bears a coiled spring *p* the lower end of which is fixed to a spring bracket *q* provided at the oscillating half axle. Eventually a single spring bearing against the upper connecting tube *n* could be used for instance.

As may be seen, the differential gear casing may yield together with the oscillating half axles *b*, the rear wheels *a* and the transverse rods *d* and *e* on the one hand substantially to the extent of the resiliency of the horizontal rubber sleeves *f* and *g* transversely to the direction of run, and on the other hand together with the sleeves *h* substantially to the extent of the resiliency of the vertical rubber sleeves *i* and *j* in a vertical direction, each of the rubber sleeves simultaneously allowing a resiliency, but indeed a small resiliency only, in an other direction also, so that a metallic contact of the individual members is obviated. However, it would also be sufficient, for instance, if the vertical rubber sleeves only would allow a resiliency into all directions, the horizontal rubber sleeves, however, exclusively a resiliency transversely to the direction of run. As the spring brackets o are provided at the sleeves *h* which with regard to the car

body may yield substantially in a vertical direction only, the rubber sleeves *f* and *g* are released to a substantial extent from the weight of the car body viz. from the forces to be transmitted by the springs *p* respectively, so that a weak resiliency of the axle aggregate in the transverse direction may be obtained.

In this case the use of non-guided coiled springs *p* is of particular advantage in so far as these springs, in spite of their bearing against members which are not movable in a transverse direction, offer practically no resistance to resiliency in a transverse direction.

By the combination of a resiliency in a transverse direction with a resiliency in a vertical direction as proposed according to the invention, oscillating phenomenons of the car body may be prevented in an effective manner by the use of simple and under working conditions reliable resilient intermediate members. The invention is of particular importance in connection with gauge altering oscillating half axles. The transverse shocks occurring on deflection of the springs of the wheels are absorbed first of all by the transversely arranged rubber sleeves. The vertical rubber sleeves simultaneously allow an advantageous resiliency of the axle aggregate about a longitudinal axis of the vehicle.

The invention may be used also in connection with other axle constructions, for instance front axles. Moreover, a resiliency according to the invention may eventually also be provided between the frame carrying the front- and rear-axles and the car body. Furthermore, a portion of the resilient intermediate members may have also a main resiliency in the longitudinal direction of the vehicle instead of, for instance, in the transverse direction or in a vertical direction or additionally to such resilient intermediate members. With such a construction principally the shocks acting in the direction of run may elastically be absorbed.

Preferably the rubber sleeves are adhesively connected to the pivots extending through them or to the metal sleeves enclosing them or to interposed metal sleeves serving for connecting purposes respectively. This may be done by vulcanisation. The connection, however, may be effected in any other suitable manner also. E. g. it would be possible to provide the rubber sleeve inside and outside with metal sleeves which are then connected to the parts to be elastically connected e. g. by means of screwing.

The invention may be applied to rigid axles, preferably to oscillating axles and more especially to oscillating half axles. It may be applied to one, more or all axle aggregates of a vehicle; this latter having one axle aggregate (trailer) or two or more axle aggregates. It is of course also possible to apply the invention to cars without a frame.

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