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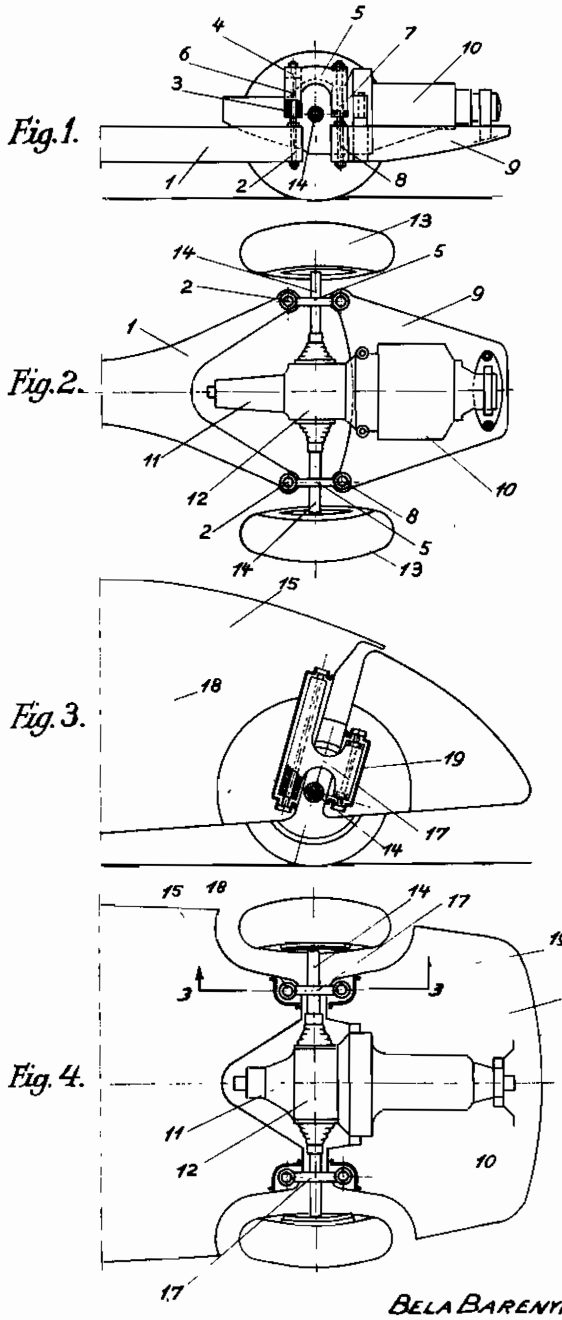

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RESILIENT CONNECTION OF A WHEEL SUSPENSION OR AN AXLE AGGREGATE TO THE FRAME OR THE BODY OF A VEHICLE

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The present invention relates to a resilient connection of a wheel suspension or an axle aggregate to the frame or the body of a vehicle, especially for vehicles with gauge altering oscillating halfaxles.

Devices for resiliently connecting a wheel suspension or an axle aggregate to the frame or the body of a vehicle are described in the copending application "Resilient connection of a wheel suspension or a suspension of an aggregate of an axle to a vehicle" of the same inventors, according to which the wheel suspension or the axle aggregate is guided by a link quadrangle actuated by springs and swingably arranged in a substantially vertical plane in such a manner, that the wheel suspension or the axle aggregate may yield transversely to the direction of drive relatively to the frame or the body of the vehicle. This connection consists in an aggregate of axles connected to a cross member and also connected with the latter by means of the usual spring suspensions, the cross member being additionally connected with the vehicle by a member independent from the before mentioned spring suspension, which can yield substantially transversely to the direction of drive as well as upwardly, but showing a very small resiliency at the uttermost in other directions.

The present invention relates to an improvement of such resilient connections and substantially consists in so arranging the links of a link quadrangle, preferably a parallelogram with regard to the transverse plane extending through the centre of the wheels that the two connecting joints of each link are arranged on different sides of the transverse plane. This arrangement has the advantage that the forces transmitted from the wheels upon the frame or the body of the vehicle may cause the smallest possible bending and tilting moments only in the joints of the connecting links.

Preferably simultaneously a resiliency in the direction of the axis of the joints or a resiliency in all directions respectively is provided for instance by arranging rubber sleeves in the joints of the link quadrangle. The links may be U- or H-shaped to adapt them to more advantageously receive the forces to be transferred, the guide members or the driving shafts of the wheels respectively being passed between the vertical webs of the links containing the connecting joints. In this case preferably two rubber sleeves are arranged axially to and in spaced relation from each other, one being provided at the lower and the other at the upper end of the vertical web (serving as bearing) of the U- or H-shaped link. The axes of the joints of the links may extend vertically or under a certain angle to the vertical, particularly in the direction of shock of the wheels.

Moreover, instead of only connecting one axle to the frame or the body of the vehicle the link quadrangles may also advantageously serve to connect individual sections of a subdivided frame or body of a vehicle, whereby one of the sections simultaneously is formed as support of an axle aggregate. Furthermore, the axle aggregate with the entire driving block including the motor may be combined to a unit which is resiliently connected to the rest of the frame or the body of the vehicle by the link quadrangle swingably arranged in the horizontal plane.

In connection with vehicle bodies subdivided in sections and provided with a joint between adjacent sections obliquely arranged to the track or road, it is, moreover, of advantage to arrange the axes of the joints of the links substantially in parallel to the said joint.

In the accompanying drawings two constructions according to the invention are diagrammatically shown by way of example.

In these drawings:

Fig. 1 is a side elevation of a resilient connecting device according to the invention,

Fig. 2 is the plan view of the construction shown in Fig. 1,

Fig. 3 is a side elevation of a second construction according to the invention, and

Fig. 4 shows the plan view of the device illustrated in Fig. 3.

In the construction shown in Figs. 1 and 2 the rear end of the frame 1 is forked. At the ends of the forked arms vertical pivots 2 are arranged upon which are mounted by means of vertical webs 6 U-shaped links 5 open at the lower end. Between said webs and said pivots annular rubber buffers 3 and 4 are provided. Preferably the inner surface and the outer surface respectively of the annular rubber buffers 3 and 4 are rigidly connected, for instance by vulcanization, to the vertical pivot 2 and the tube-like web 6 of the link 5 respectively. Due to this arrangement the links 5 may yield about the axis of the pivot 2 to a limited extent against the action of the rubber buffers 3 and 4. The bearing simultaneously may be such that a resiliency in all directions may be obtained without metallic contact occurring between the pivot 2 and the link 5.

Furthermore, the other end of the link 5 formed by the vertical web 7 of the U-shaped link is

hingeably connected by a vertical pivot 8 to a vat-like frame plate 9 with or without interposition of rubber buffers in such a manner that the frame 1 together with the frame plate or the vat 9 and the two lateral links 5 forms a link quadrangle adapted to swing in a horizontal plane. A driving motor 10 is fixed upon the vat 9 for instance at three or four points with interposition of suitable rubber buffers or other elastic members. At the front side of the driving motor the driving aggregate, consisting of the change speed gear 11 and the axle gear 12, is connected in such a manner as to lie within the space between the fork of the frame 1, the vat 9 and the lateral links 5 of the horizontal link quadrangle. The rear wheels 13 are journalled upon half axles adapted to swing which are linked laterally to the axle gear 12 in such a manner that they may swing up and down within the space between the two vertical webs 6 and 7 of the U-shaped links 5.

The shock absorption of the wheels may be effected in any desired manner preferably so that the springs bear against the driving block 10, 11 and 12 or against the vat 9, respectively. Eventually, however, the ends of springs, for instance non-guided coiled springs, facing the frame may directly or with interposition of movable intermediate members bear against the frame 1. The bearing of the springs against the driving block or the vat 9, however, has the advantage that the forces and shocks absorbed by the springs may be transferred upon the frame 1 or the body of the vehicle only after being dampened by the rubber buffers 3 and 4.

Due to the arrangement of the link quadrangle adapted to swing in the horizontal plane and formed by the links 5, the transverse movements and transverse shocks, occurring during elastic deflection of the oscillating half axles 14, may be compensated by lateral yielding of the driving aggregate or the vat 9 respectively, so that the frame or the body of the vehicle may substantially remain unaffected by these transverse shocks and transverse movements.

The construction shown in Figs. 3 and 4 differs from the construction described above substantially by the fact that instead of a special frame 1 a self-supporting carriage body 15 is provided which is connected to the rear section 18 of the body on the vehicle by the H-shaped links 17. The pivots 18 and 19 of the connecting joints of the links 17, furthermore, are not arranged vertically to the track or road but about in the direction of shock of the wheel and about in parallel to the separating joint 20 between the sections 15 and 16 of the body of the vehicle. For the rest, the arrangement is the same as in the case of the construction according to Figs. 1 and 2, the driving aggregate 10, 11, 12 being mounted upon the rear section 16 of the body of the vehicle.

Due to the fact that the oscillating half axles 14 are passed between the joints 2 and 8 of the links 5 or between the joints 18 and 19 of the links 17 respectively, i. e. that the joints of the links are arranged at both sides of a substantially vertical transverse plane extending through the centers of the wheels, the links are particularly slightly strained by the wheel pressures occurring, so that a high safety in the connection of the axle aggregate or the portion of the vehicle connected to the axle aggregate respectively to the rest of the vehicle is ensured.

Axle aggregate according to the invention means an axle with two wheels together with the axle drive, the change gear and the motor. A part of an axle aggregate means therefore e. g. the axle with the two wheels or this part together with the axle drive or these two parts with the change gear.

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