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WHEEL SUSPENSION FOR VEHICLES
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Fig. 1.

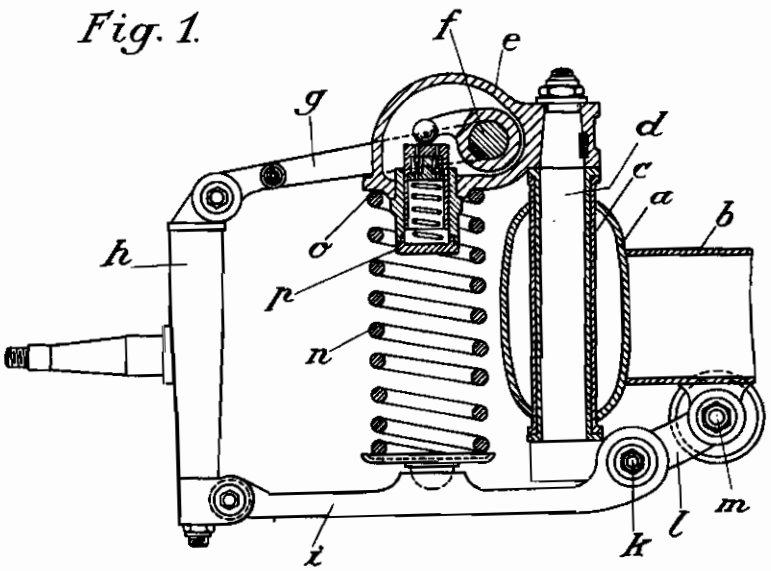
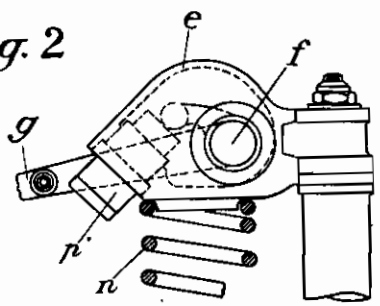


Fig. 2



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ALIEN PROPERTY CUSTODIAN

WHEEL SUSPENSION FOR VEHICLES

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This invention relates to improvements in wheel suspensions, more particularly by means of two links arranged one above the other and comprising a springing system by means of an unguided helical spring or of a likely mounted spring. One feature of the invention consists in that the spring bears by its one end against the casing of the shock absorber. In a particularly suitable embodiment, the casing of the shock absorber forms simultaneously the bearing support for a guiding link of the wheel, for instance for the upper link of the link quadrangle.

By this invention a particularly simple and advantageous supporting device of the wheel springing system is produced. According to the invention particular bearing supports mounted hitherto in the known arrangements for supporting the spring and secured for instance laterally with respect to the frame side member are suppressed, as the shock absorber, which is necessary without that, is employed for supporting the spring. Simultaneously by this means distortion stresses at the frame, which are produced by lateral arrangement of a spring support, are avoided.

Furthermore, if the casing of the shock absorber serves simultaneously as an abutment for guiding links a supplementary simplification of the construction is realized by suppressing a separate bearing upport. In this case the shock absorber, besides its proper function as a shock absorber, has simultaneously the function of supporting the guiding link and bearing the wheel springing system.

Furthermore this invention consists in that in a wheel suspension of the characterized manner, which against the action of springing buffers is capable of yielding a little essentially about a vertical axis, the spring by its one end bears against the oscillating part of the wheel suspension, advantageously against the lower link of a link quadrangle, and by its other end against a member supporting the wheel suspension system, said member itself not oscillating, but being only capable of yielding—with respect to the frame—in a limited manner essentially about a vertical axis. In this case too, the spring bears advantageously against a casing of the shock absorber forming simultaneously the bearing support for the one guide link and forming also part of the wheel suspension system capable of yielding about a vertical axis.

In the known arrangements executed in a similar manner, the helical spring was mounted in a vertical direction and—by its one end—bearing against the lower guiding link capable of yielding about the vertical axis and—by its upper end—against a bearing support fixedly secured to the frame. By this means, lateral relative displacements of the lower end of the spring with respect to the upper end of the spring were produced, these displacements producing lateral stresses of the spring in a supplementary manner. By this invention the said lateral stresses of the spring are avoided, both ends of the helical spring bearing against bearing surfaces, which only together are capable of yielding about a vertical axis. By this means lateral relative displacements are suppressed. Furthermore the advantage is realized that by the springing system no immediate torque stresses of the frame are produced. On the contrary, all the stresses due to the wheel can be transmitted to the frame only by the vertical trunnion, i. e. at a point, where the frame without that possesses a greater rigidity.

The invention is illustrated in the accompanying drawing, the Figures 1 and 2 of which showing two embodiments thereof.

In the drawing, *a* represents a lateral tubular frame side member of a vehicle, *b* a cross member, for instance likewise of tubular form and which connects together the two lateral frame cross members. In a tubular sleeve *c* vertically passing through the frame side member *a* at the point of connection between the latter and the cross member, is disposed a trunnion *d* capable of oscillating about a vertical axis. At the top of the trunnion passing beyond the frame side member is disposed a casing *e* of a shock absorber or damper, for instance of a dashpot type shock absorber, in such a manner that the shock absorber reaches beyond the outside of the frame side member and eccentrically with respect to the oscillation axis. In the casing of the shock absorber is disposed—by means of a bolt *f* passing through the casing of the shock absorber and operating the same in an adequate manner—an upper link *g* for a wheel bearing member *h* resp., for a steering swivel pin of the wheel. The lower link *i* for guiding the wheel is fixed on the underside of the vertical trunnion by means of the pivot *k*.

An arm *l*, which bears in both directions of rotation against rubber buffers mounted on the cross member *b*, serves for elastically supporting the trunnion *d* about its vertical axis.

The springing of the wheel is provided by means of an unguided helical spring *n*, which, by its underside immediately or for instance by insertion of a bearing support supported itself, by means of a ball joint, bears against the lower

guiding link *c* and by its upper end against a collar *o* of the casing *e* of the shock absorber. The supporting parts of the end of the spring may be fixedly connected for instance by means of lock members. The most it is sufficient however that the supporting ends of the spring are secured against lateral displacement. Furthermore, inside the helical springs there may be provided rubber buffers or similar stops limiting the upward stroke of the wheel and eventually likewise the downward stroke.

In the embodiment of Fig. 1 the cylinder *p* of the shock absorber screwed into the casing *e* serves simultaneously for securing the upper end of the helical spring against lateral displacement.

In the embodiment of Fig. 2 however, the damping cylinder *p* is arranged outside the helical spring, so that the cylinder resp. the damping piston may be removed and replaced independently of dismounting the helical spring.

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