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SPRINGING OF MOTOR CARS WITH SWINGING HALF AXLES
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Fig. 1.

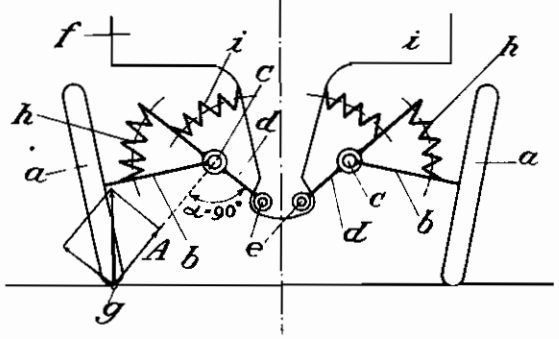


Fig. 2

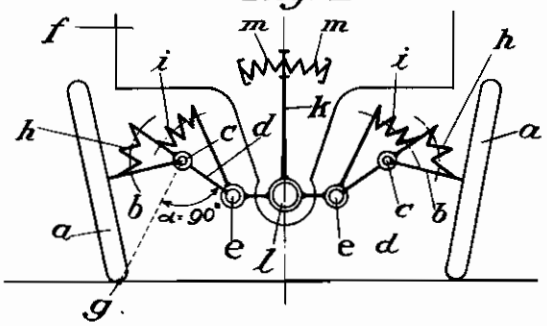
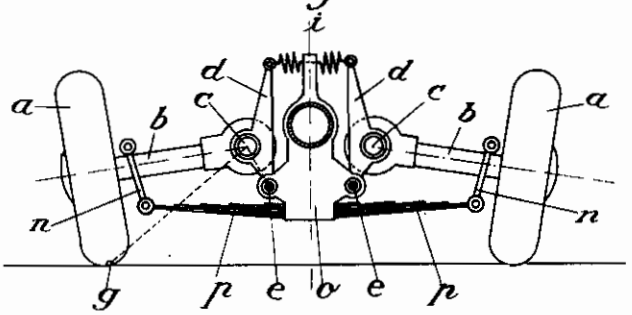


Fig. 3.



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ALIEN PROPERTY CUSTODIAN

SPRINGING OF MOTOR CARS WITH SWINGING HALF AXLES

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The invention relates to a springing of motor cars with swinging half axles, specially so called pendulum half axles, swinging together with the wheels as one unit around an interior framesided joint. (The expression "frame" is here to be understood in the most comprehensive sense and comprises all construction aggregates which may fulfill the duty of the frame, i. e. also for instance self contained car bodies.)

With the springing of such swinging half axles which are connected to the frame immediately by means of a joint, at the contact places of the wheels with the road, transverse forces arise working in corresponding manner between the swinging half axles and the frame. The shocks occurring herewith may produce under circumstances high stresses onto the frame and swinging phenomena.

Accordingly it is a feature of the invention that the swinging half axles are arranged yieldingly with respect to the frame and to each other in transverse direction to the vehicle, and that especially in such a way that they may yield in transverse direction corresponding to the forces tending to an alteration of the track. Preferably the yieldingness herewith is chosen so great that the entire track alteration which would occur at the swinging half axles would not be yieldingly journaled, may be fully compensated. This track alteration may amount to about 5 to 10 cm altogether with vehicles with pendulum half axles. In many cases however it is sufficient if a partial compensation of the track alteration is made possible, if only the transverse shocks are yieldingly taken up in a satisfactory way.

According to a further feature of the invention the direction of the yieldingness is not exactly transverse to the riding direction, but is inclined to it under an angle, and specially under an angle which is determined by the connecting line between the contact point of the wheel with the road, and the inner, i. e. framesided joint of the pertaining half axle.

A specially practical type of the invention is the one in which the swinging half axles are journaled at their end on lever arms which may swing around pivots that are placed above or preferably below the joints for the swinging half axles. The swinging half axles may in this case be sprung against the lever arms or against the frame, the lever arms may be sprung against the frame or the swinging half axles. Also a springing of the swinging half axles against each other or of the lever arms against each other may be provided. In the drawing in Figs. 1 and 2 two springing possibilities of pendulum half axles are shown diagrammatically, while Fig. 3 shows a more structural type.

In Fig. 1 the pendulum half axles *b* carrying the wheels *a* in joints c are jointed at lever arms *d* being themselves jointed at *e* to the frame *f* or to a corresponding part of the vehicle. The lever arms *d* are herewith so arranged that the straight connecting line between the contact joint *g* of the wheel with the road and the joint c includes an angle $\alpha=90°$ with the straight connecting line between the joints c and *e*. The joint *c* may herewith swing around the joint *e* under the effect of the force A arising in the contact joint *g* and being directed towards the joint *e*, in the direction of this force, whereby the track alteration otherwise arising in the contact point *g* is compensated. As shown in Fig. 1 the pendulum half axle *b* is sprung by means of a spring *h* against the lever arm *d* and the lever arm *d* by means of a spring *i* against the frame.

The type according to Fig. 2 is distinguished from the type Fig. 1 substantially by the fact that the joint *e* around which the lever arms *d* may swing is not arranged immediately at the frame *f* but at a compensating lever *k* which may swing around a central pin *l* at the frame *f* against the action of the two springs *m*, and carries the joint *e* for the two wheel suspensions. The springs *i* in this case being interposed between the lever *d* and the compensating lever *k*.

With the type according to Fig. 3 the swinging half axles or pendulum half axles *b* are sprung by the medium of guiding pieces *n* against the frame by the medium of a transverse laminated spring *p* fastened to the frame or to a part o connected to the frame. The lever arm *d* carrying the inner joints c of the swinging half axles is swingingly arranged also in this case around a lower joint *e* and supported against the frame, or against the other lever arm *d* by means of the spring *i*. The angle *g*—*c*—*e* preferably amounts again to 90°, whereby the joint c may yield as well to the vertical as to the horizontal forces arising in it.

The arrangement may however be so made that the motion of the inner joint *c* ensues exclusively in a direction transverse to the riding direction, the yieldingness being so dimensioned in its size that it corresponds to the track alteration which would arise at the contact point of the wheel with the road, if the journalling of the swinging half axles would not be yielding.

Instead of the journalling of the swinging half axles of the lever arms, another yieldingness transverse to the riding direction may be provided, for instance in such a manner that an intermediate piece carrying the joint *c* of each swinging half axle is journalled displaceably transverse to the riding direction at the frame.

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