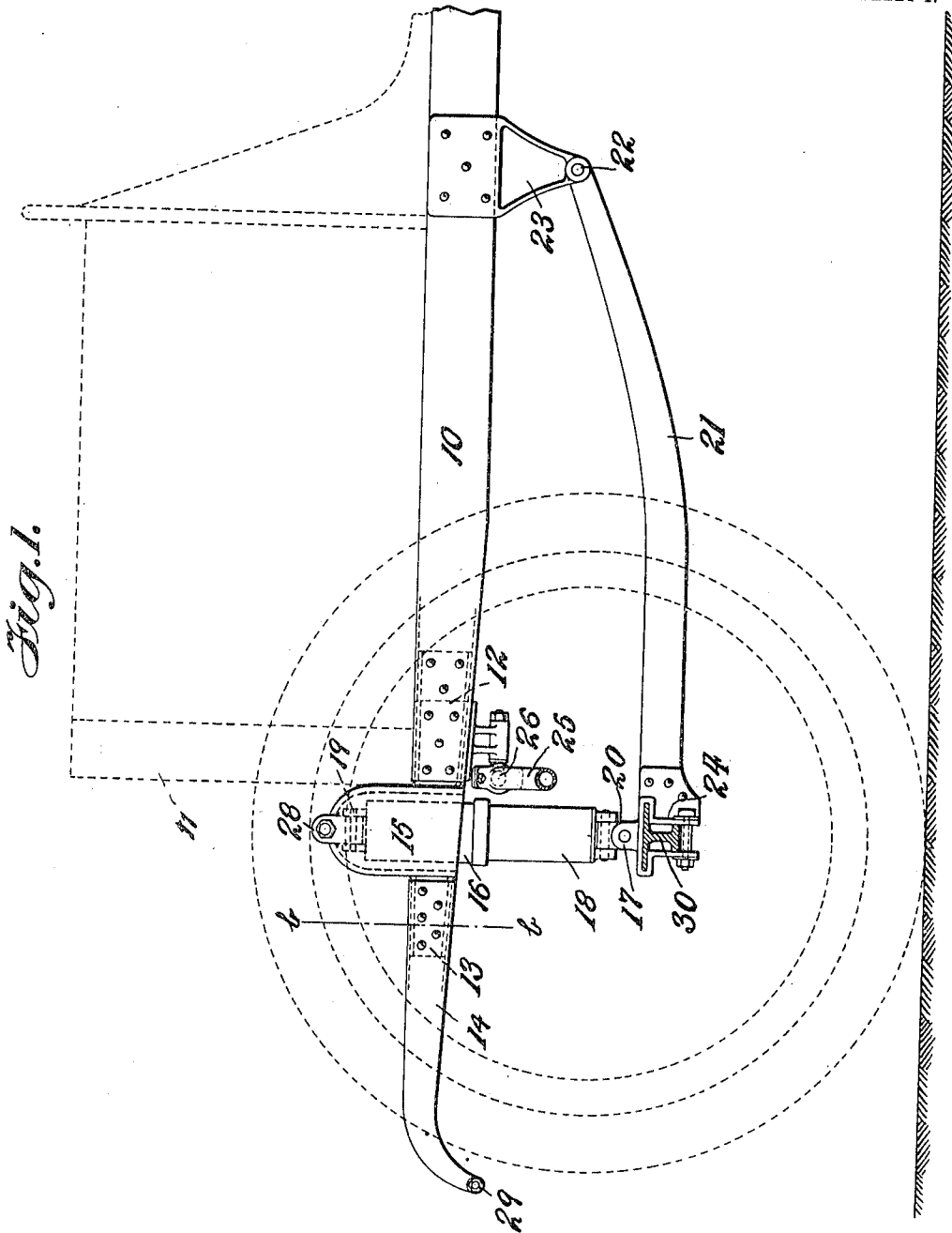


R. LIEBAU.
SPRING VEHICLE.
APPLICATION FILED JULY 27, 1910.

1,020,209.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.



WITNESSES:
Chas. J. Clagett
Amos Wright

INVENTOR
Richard Liebau
BY
G. C. Allen ATTORNEYS

UNITED STATES PATENT OFFICE.

RICHARD LIEBAU, OF WATERVLIET, NEW YORK.

SPRING-VEHICLE.

1,020,209.

Specification of Letters Patent.

Patented Mar. 12, 1912.

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To all whom it may concern.

Be it known that I, RICHARD LIEBAU, a citizen of the United States, and resident of Watervliet, in the county of Albany and State of New York, have invented certain new and useful Improvements Relating to Spring-Vehicles, of which the following is a specification.

This invention relates to vehicles in which the body is given elastic cushion support on the running gear by means of springs of the telescopic pneumatic cylinder type. In my prior application Serial Number 540,807, filed January 29, 1910, I have shown such cylinder supports in advance of the radiator of a motor vehicle and inside the side-bars of the car-frame, and have described and claimed certain transverse tying means for opposing and balancing the twist on the frame due to the point of application of the weight of the body to the cylinders being at one side of the side-bars. The object of the present invention is to eliminate, practically speaking, all such torsional stress, by locating the pneumatic cylinders in the vertical plane of said side bars and applying the weight of the body to the supports at points directly over the side-bars. To this end I take advantage of the forward location of the cylinders in advance of the radiator by cutting the forwardly extended portions or horns of the side-bars and interposing seats for the spring cylinders directly in the line of said side-bars. In the particular form of the invention shown the cylinder seats are formed so as to carry the usual forwardly projecting horns and both the horns and the cylinder seats may be provided with the staying means of my said prior application, if desired, although it is obvious that the central location of the point of application of the weight renders such auxiliary stays less essential, if not unnecessary.

In the accompanying drawings illustrating the invention by the preferred embodiment thereof, Figure 1 is a sectional side elevation of the forward part of an automobile, shown partly in dotted outline, taken on the line *a-a* of Fig. 2; and Fig. 2 is a sectional front elevation taken on the line *b-b* of Fig. 1.

In these views, the numeral 10 indicates the side bars of the load platform, preferably though not necessarily in the form of channel irons. These side-bars are cut transversely in advance of the radiator 11;

and an upward projecting bracket 15 is secured to each side-bar in front of the radiator and directly in line with the side-bar. The bracket is preferably secured to the side-bar by means of a rearwardly extending attaching projection 12, desirably though not necessarily in the nature of an angle iron fitting into the angle-iron side-bar and there secured by bolts. The bracket may be provided with a similar, forward-extending attaching projection 13, to which may be secured the horns 14, of any customary or desirable form, constituting extensions of the side-bars. The brackets are preferably though not necessarily in the form of tubular hoods inclosing the upper cylinder 16 of the telescopic pneumatic spring, the lower cylinder 18 of which is mounted on the running gear.

The pneumatic spring is supported at its upper and lower ends preferably by universal joints 19 and 20, and these joints are in the vertical plane of the axis of the side-bar 10. The vertical arrangement of the cylinders, notwithstanding their advance location may be provided for by providing lower seats therefor in forwardly projecting ends of lever links as shown in my prior application referred to, but I here prefer the specific arrangement shown in the present drawings wherein the axle 30 is located sufficiently in advance of the radiator to permit the spring seat 17 to be located thereon in a vertical plane passing through the axis of the axle. Pneumatic springs of this type operate to best advantage when free from lateral stresses. I have, therefore, shown radius bars or links 21, pivoted at 22 to brackets 23 on the side bars and secured at their forward ends to brackets 24 on the axle. These links may be in the nature of heavy spring blades substantially rigid vertically but sufficiently yieldable laterally, to permit a certain amount of longitudinal twist. One of these links may be connected to the axle by a cylindrical or spherical bearing, as disclosed in my co-pending application Serial Number 540,809, filed January 29, 1910. These links transmit the travel-producing impulses from the car body to the front wheels and prevent fore and aft translation or rocking of the axle relative to the car body. When constructed as just described, in accordance with my prior application, they freely permit end-wise tilting of the axle. In order to prevent

or limit endwise bodily movement of the axle relative to the car body I have shown a cross link 25 pivotally connected at 26 to the load platform and at 27 to the axle; both connections being preferably ball and socket joints. No claim is made herein to the linkages 21 and 25.

The upper ends of the brackets 15 and the ends of the horns 14 may be provided with seats 28 and 29 for attachment of cross-stays if desired.

I claim:

1. In a vehicle, a body having side members, running gear, interposed pneumatic cylinder supports, upper brackets for said cylinder supports secured to the ends of said side members in line therewith, and horns secured to said brackets and constituting extensions of said side members.

2. In a vehicle, a body having transversely severed side bars, running gear, pneumatic cylinder supports for supporting the body on the running gear, and upward projecting brackets for applying the weight of the body to the upper ends of said supports, being inserted between the sections of said side-bars and having forward and rearward

attaching projections overlapping said sections and secured thereto.

3. In a vehicle, the combination with the body and running gear, and interposed pneumatic cylinder supports, of transversely severed body-side-bars, and upper seats for said pneumatic cylinder supports inserted between the sections of said severed side-bars.

4. In a vehicle, the combination with the body and running gear, and interposed pneumatic cylinder supports, of transversely severed body-side-bars, and upper seats for said pneumatic cylinder supports inserted between and extending above the sections of said severed side-bars, the points of application of the weight of the body to said supports being above said side bars and in the vertical plane of the axis of said bars.

Signed at East Pittsburgh in the county of Allegheny and State of Pennsylvania this 21st day of July A. D. 1910.

RICHARD LIEBAU.

Witnesses:

C. W. McGHEE,

E. W. McCALLISTER.