J. A. McCONNELL.
Vehicle-Spring.

No. 219,967. Patented Sept. 23, 1879.

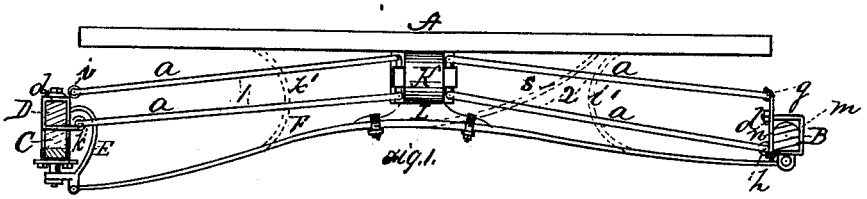

Fig. 1.

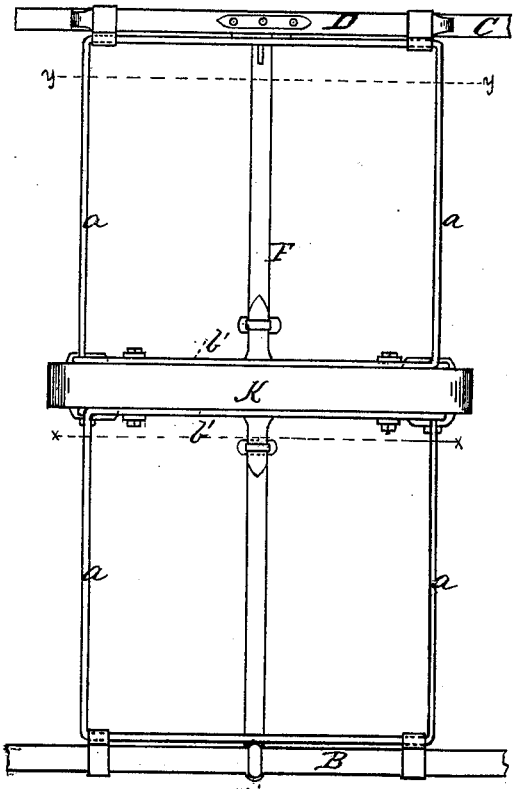

Fig. 2.

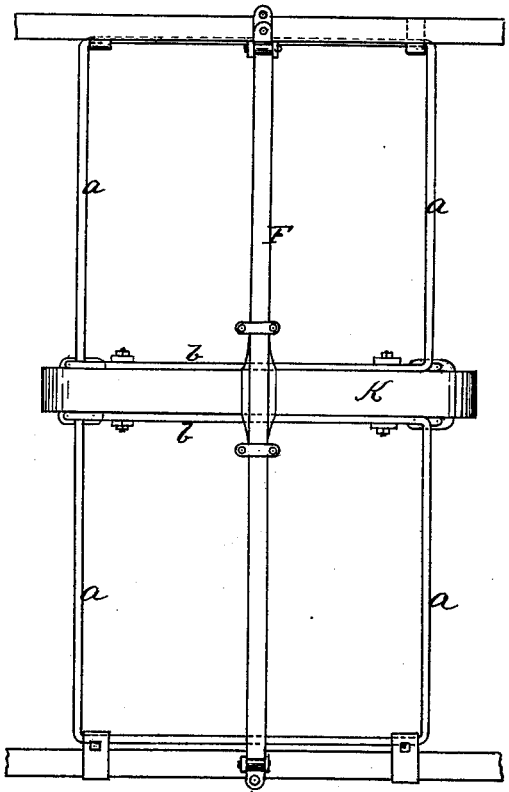

Fig. 3.

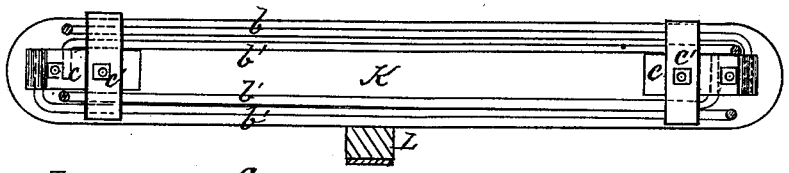

Fig. 4.

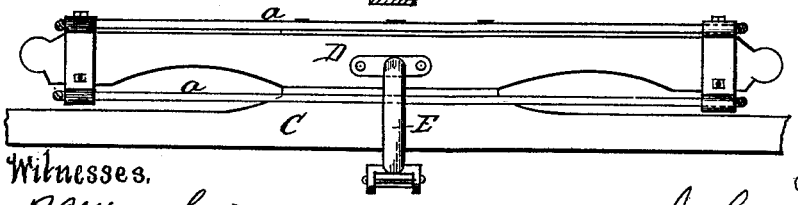

Fig. 5.

Witnesses.
R. A. Marshall
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UNITED STATES PATENT OFFICE.

JOHN A. McCONNELL, OF HULTON, PENNSYLVANIA, ASSIGNOR TO WILLIAM W. GRIER, OF SAME PLACE.

IMPROVEMENT IN VEHICLE-SPRINGS.

Specification forming part of Letters Patent No. **219,967**, dated September 23, 1879; application filed June 20, 1879.

To all whom it may concern:

Be it known that I, JOHN A. McCONNELL, of Hulton, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Vehicle-Springs; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of devices embodying my invention. Fig. 2 is a top view of the gear, the bed being removed. Fig. 3 is an under-side view. Figs. 4 and 5 are sectional views, looking in opposite directions from the line *y y*, Fig. 2.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of torsion-spring vehicles; and consists, first, in the combination, with a vehicle-bed and head-block or axle, (as the case may be,) of a quadrilateral-shaped torsion-spring formed of a single rod or bar, the two ends of which pass each other transversely of the bed and have a separate rigid attachment to the bed, so that a torsional spring action is obtained from each end, and a transverse bracing, which prevents side motion of the bed, is effected; second, in the combination of two quadrilateral-shaped torsion springs, each spring having lapping ends separately secured to the bed transversely, and the two springs arranged parallel and attached to the bed and to the head-block or axle at opposite sides thereof, so that the torsion-springs will act in unison and prevent the rolling of the axle, as well as rocking or side motion of the bed; third, in the combination of two pairs of parallel quadrilateral torsion-springs, one pair attached to the bed and head-block, the other pair to the bed and rear axle, and a spring-reach, whereby the axles are held more perfectly from rolling, and elasticity to resist shocks and strains to the gear is obtained.

The object of the present invention is to simplify and cheapen the construction and preserve the symmetry and finish, as well as the easy-riding qualities, of light road-wagons and similar vehicles.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the bed or body, B the rear axle, C the front axle, and D the head-block, of a road-wagon or other vehicle.

In conjunction with the parts above specified, I employ torsion-springs *a*, of a general quadrilateral form, the torsion-arms *b b'* of which lap or pass each other transversely of the bed, and are separately and rigidly connected to the bed, as at *c c'*, while the opposite side of the quadrilateral is secured either to the head-block or axle by suitable clips *d*. This quadrilateral form of the spring and transverse lapping or passing of the torsion-arms equalizes the thrust upon the gear when the load is unequally placed on the bed, and counteracts side motion or rocking of the body, so that such a form of spring has special advantages, when combined with the head-block or axle and bed, independent of the other combinations into which it enters, and which are hereinafter described.

In constructing my gear I prefer to use two pairs (1 and 2) of quadrilateral springs, *a*, one (1) pair extending from the bed to the head-block, and the other (2) pair extending from the bed to the rear axle. Each pair is composed of two quadrilateral torsion-springs, *a*, arranged parallel and at such distance apart as will permit them to act in unison without causing the rotation of the axle or twisting of the head-block. Said springs are connected by the transversely-lapping torsion-arms *b b'* to the cross-brace K, and to either the head-block (pair 1) or rear axle, (pair 2,) as the case may be, at points *g h i k*, above and below said parts B D.

The clips used for connecting the torsion-springs to the head-block and rear axle are preferably of the form shown—that is to say, composed of the loop or bent portion, that may be called the "clip-section," *m*, and the straight piece *n*, or what might be termed the "clip-yoke," each section *m* and *n* having an eye or bearing for one of the torsion-springs; but, in lieu of such a clip, any suitable means of securing the torsion-springs may be employed.

E indicates a fifth-wheel, of any approved

or suitable form. F represents a spring-perch or semi-elliptic spring, (one or more of which can be used,) and which extends from its point of attachment under the rear axle to its point of attachment back of or below the front axle, and preferably has a rigid central connection to the bed, (or brace K, attached thereto,) as at L. This rigid central connection serves to cause the spring-perch F to coact with the quadrilateral torsion-springs in resisting the side rocking of the body when the load is unequally distributed on the bed, and it also assists in insuring the proper bracing and draft of the rear axle to facilitate tracking; but the central connection at L is not essential, as the arrangement of the torsion-springs *a* is such that they will produce substantially the same result—non-rotation of the axle and tracking—when used with any form of spring-perch.

Instead of a continuous spring-perch, as shown in full line, the perch may consist of two curved springs, one extending from the rear axle to the bed, as shown in Fig. 1 at dotted line *i'*, springing from the full line between the rear axle and brace K, and the other extending from the front axle to the bed, as shown by dotted line *k'*, Fig. 1, springing from the full line to the bed; or the springs may extend under the cross-brace K, as shown by dotted line *s*.

The construction being substantially as specified, it will be observed that the torsion on each spring is transverse of the bed and in opposite directions, so that this, together with the quadrilateral form of the spring, causes the bed to resist any tendency to rocking or side motion when unequally loaded; and the torsion-springs being also arranged in pairs substantially parallel, and having their connections to the axle and head-block substantially the same distance apart that they are at the bed, the rear axle will not be rotated materially or the head-block twisted by the action of the springs, and thus the gear will be relieved of strain, and a simple, effective, and easy-riding torsion-spring vehicle will be obtained.

Having thus described the nature, object, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the axle or head-block and bed of a vehicle, of a quadrilateral-shaped torsion-spring formed of a single bar or rod, the two ends of which pass each other transversely of the bed and have a separate rigid attachment to the bed, so as to obtain a torsional spring action from each end.

2. The combination of two quadrilateral-shaped torsion-springs, arranged parallel and attached to the bed, as described, and to the head-block or axles at opposite sides thereof, so as to have a unity of action, and thus prevent the rolling of the axle and equalize an unequal pressure on the bed.

3. A vehicle having two pairs of parallel torsion-springs, attached as described, one pair to the head-block and bed, and the other pair to the rear axle and bed, and a spring-reach, whereby the axles are held more perfectly from rolling, and elasticity to resist shocks and strains to the gear is obtained.

In testimony whereof I, the said JOHN A. MCCONNELL, have hereunto set my hand

JOHN A. MCCONNELL.

Witnesses:

JAMES H. PORTE,

F. W. RITTER, Jr.