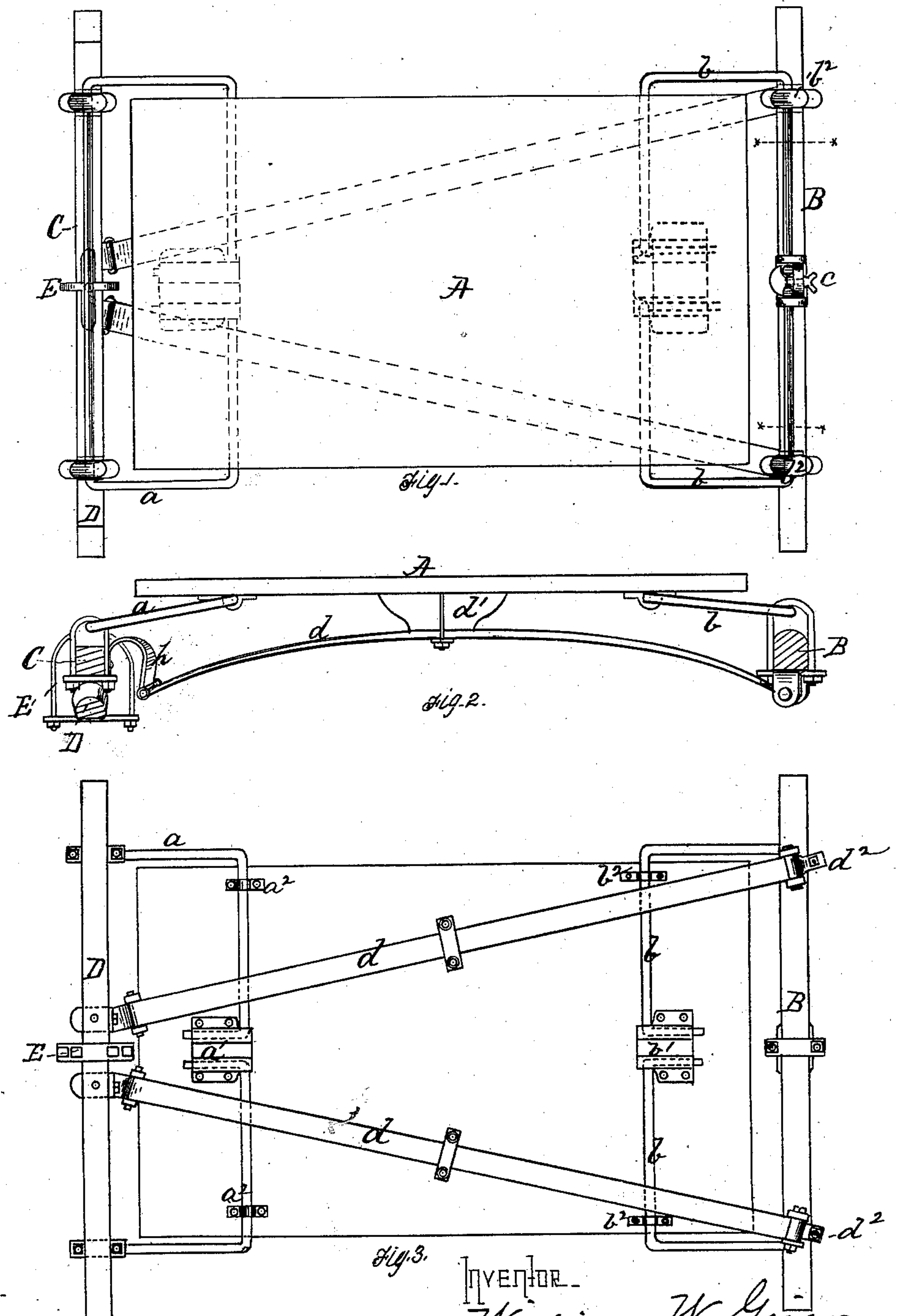


W. W. GRIER.  
Vehicle-Spring.

No. 216,179.

Patented June 3, 1879.



Witnesses.

R. W. Smushall  
J. K. Smith

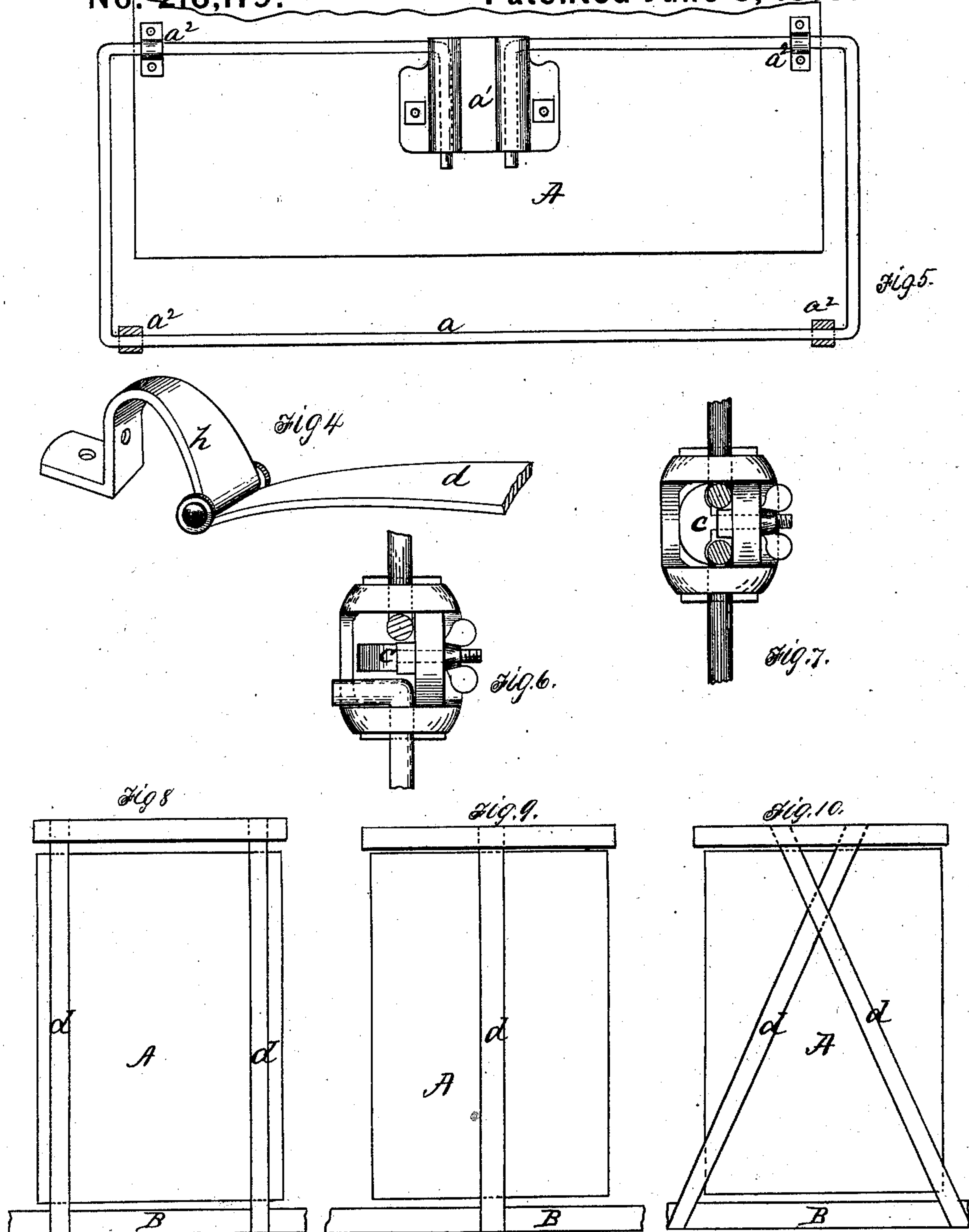
Inventor.

William W. Grier  
by Bakewell & Kerr  
Attys

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# UNITED STATES PATENT OFFICE

WILLIAM W. GRIER, OF HULTON, PENNSYLVANIA.

## IMPROVEMENT IN VEHICLE-SPRINGS.

Specification forming part of Letters Patent No. **216,179**, dated June 3, 1879; application filed March 15, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM W. GRIER, 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 top view of devices embodying my invention. Fig. 2 is a side view of the same. Fig. 3 is a bottom view. Fig. 4 is an enlarged view of the front attachment of the semi-elliptic springs. Fig. 5 is a detached view of the preferred form of torsion-spring. Figs. 6 and 7 are enlarged detail views of the devices employed for binding the ends of the torsion-springs. Figs. 8, 9, and 10 show several ways of arranging the semi-elliptic springs.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of that class of vehicles commonly termed "no-perch vehicles;" and consists, mainly, in the combination of torsion and semi-elliptic springs, the latter rigidly connected to the bed, or its equivalent, at or near the center, and the several springs relatively arranged so as, in a great measure, if not entirely, to prevent the rotation of the axles and obviate side motion when the load is unevenly distributed.

It also consists in details of construction, which will be hereinafter more specifically set forth.

Heretofore in the construction of no-perch vehicles the gear considered most desirable, and that approved by the trade, has been composed of two sets of semi-elliptic springs longitudinally arranged and rigidly connected centrally, as by proper arrangement with relation to the axle and bed both rotation of the axle and side motion of the bed can be almost entirely obviated thereby; but the objection thereto is the cost, as to obtain good results the best material and perfection of workmanship are required.

To reduce the cost of construction, and for other reasons, torsion-springs have also been used singly and in sets, arranged both transversely and longitudinally; but when arranged

transversely the line of draft is not direct from axle to axle, but through the bed, and the axles being substantially independent each of the other there is more or less tendency to rotation and non-tracking of the wheels; and where the torsion-springs are arranged longitudinally there is the constant tendency to side motion of the bed when the load is unequally distributed.

The object of the present invention is therefore to cheapen and simplify the construction of no-perch vehicles, and at the same time retain all the advantages derived from the more expensive constructions.

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, B the hind axle, C the head-block, and D the front axle, of a no-perch vehicle. E is a fifth-wheel of any approved form. In connection with said parts I employ torsion-springs of any approved form, arranged transversely, and semi-elliptic springs, arranged longitudinally. The preferred form for the torsion-springs is that shown in Fig. 5—that is to say, a bar or rod, *a*, bent in form of a quadrilateral or equivalent figure, the two ends rigidly secured to the bed, as at *a*<sup>1</sup>, and the rod provided with bearings *a*<sup>2</sup> on the bed and head-block, the rod extending along the head-block and free to turn in said bearings *a*<sup>2</sup>. Such form gives a long and efficient torsion, permitting lighter rods to be employed, and equalizes the resistance, so as to materially diminish side motion when the load is unequally distributed on the bed. The same construction of torsion-spring may be adopted for the rear axle, or in lieu thereof the construction shown may be employed—viz., two rods or bars, *b*, bent at right angles, having one end of each rod fixed to the bed, as at *b*<sup>1</sup>, and provided with bearings *b*<sup>2</sup> on the bed and rear axle, said rods *b* either terminating at the points indicated by the lines *x x* or extending to near the middle of the axle, as preferred. In the latter case it may become desirable at times to increase the power of the springs *b* by fixing both ends, for which purpose I provide a binding-screw or equivalent device, *c*, of such form that it can be used



either to gripe the ends of the springs (see Fig. 7) or permit them to play in their bearings. (See Fig. 6.)

$d$  indicate semi-elliptic springs, one or more of which are employed, arranged longitudinally at a suitable distance below the bed A, and connected thereto by a rigid central connection,  $d^1$ . The arrangement of the semi-elliptic springs  $d$  may be as shown in diagrams 8, 9, and 10, or any other well-known arrangement employed in the construction of no-perch vehicles, but is preferably that shown in Fig. 3, wherein two are employed diverging from a point near the fifth-wheel E, and having their rear ends clipped to the under side of the rear axle, as at  $d^2$ . The front end of each semi-elliptic spring  $d$  is preferably pivoted to a curved hanger,  $h$ , attached to the head block, said hanger being of spring-steel, so as to be slightly yielding, whereby the end-thrust of the springs  $d$  will be relieved; but I do not expect or intend to be limited to such manner of attaching the front end of the semi-elliptic springs.

The construction being substantially as specified, and judgment having been exercised in proportioning the semi-elliptic spring to the position and movement of the torsion-springs and the average load to be carried, the operation of the devices will be as follows: The distance the axle and head-block are projected by the change of position of the torsion-springs will be substantially the same as the projection given to the same parts by the change in curve of the semi-elliptic springs. Consequently there will be practical non-rotation of the axle.

The advantages of my invention are simplicity and reduced cost of construction, strength, lightness, and symmetry.

I do not claim a double torsion-spring formed of two parallel torsion-rods connected

by a lever-arm common to both springs, said springs being connected, respectively, to the gear and body of the vehicle; but,

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a no-perch vehicle, the combination of the torsion-springs and the longitudinally-arranged semi-elliptic spring or springs, the latter rigidly connected to the bed at or near the center or mid-length, substantially as and for the purpose specified.

2. The combination, in a no-perch vehicle, of the torsion-springs with one or more longitudinal semi-elliptic springs, the latter rigidly connected to the bed and provided at the front end or ends with a spring hanger or hangers, substantially as and for the purpose specified.

3. The combination, with the body and running-gear of a vehicle, of a torsion-spring having two parallel arms connected by a single lever-arm, one of the two parallel arms so fixed or secured to either the bed or gear as to form a single torsion-spring, and the other provided with a set or binding screw, which can be applied at will to convert the spring into a double torsion-spring, substantially as specified.

4. The combination, with the body and gear of a vehicle, of two torsion-springs,  $b$ , arranged substantially as shown, each spring having one end fixed or rigidly secured to either the bed or gear, and a binding-screw common to both springs, whereby the free ends of the springs may be secured at will, substantially as and for the purpose specified.

In testimony whereof I, the said WILLIAM W. GRIER, have hereunto set my hand.

WILLIAM W. GRIER.

Witnesses:

R. H. WHITTLESEY,  
F. W. RITTER, Jr.