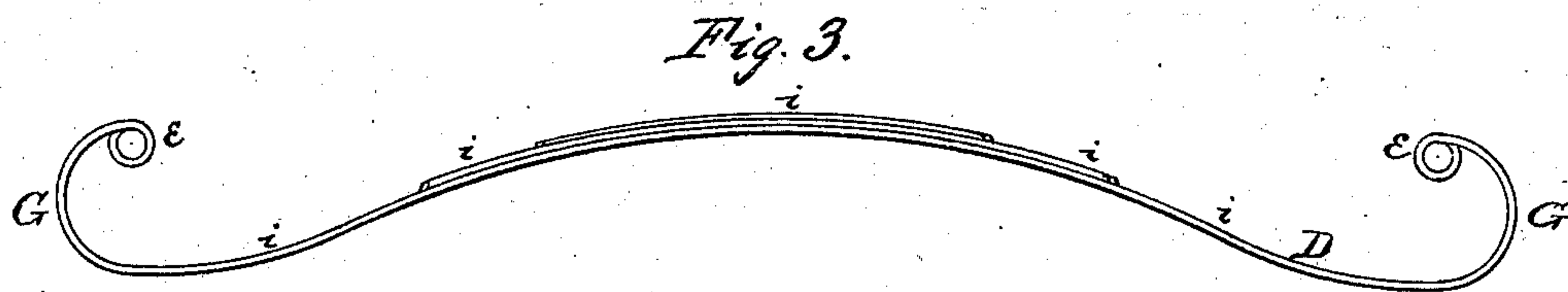
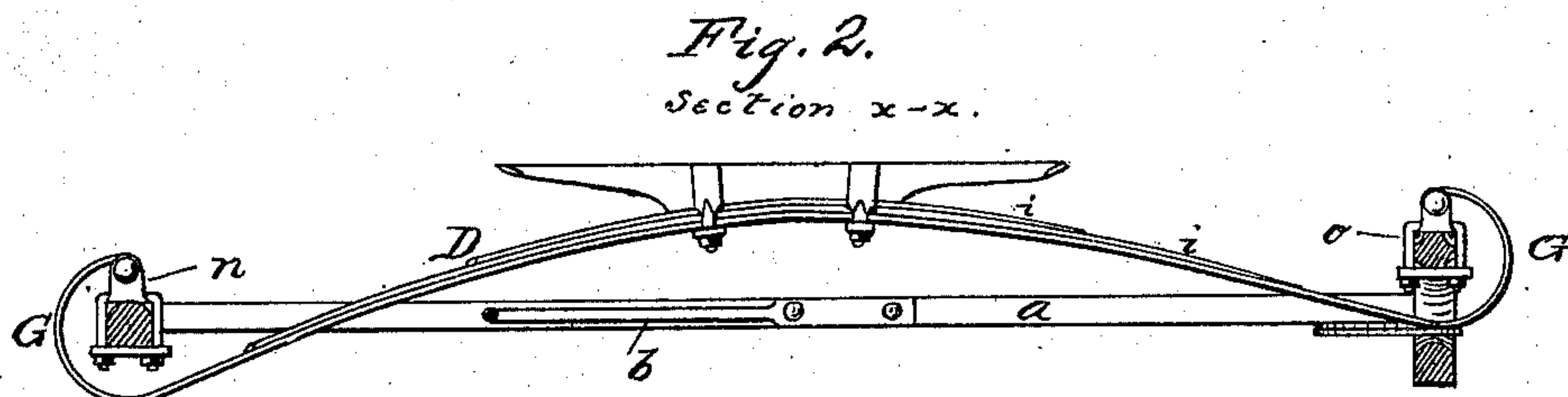
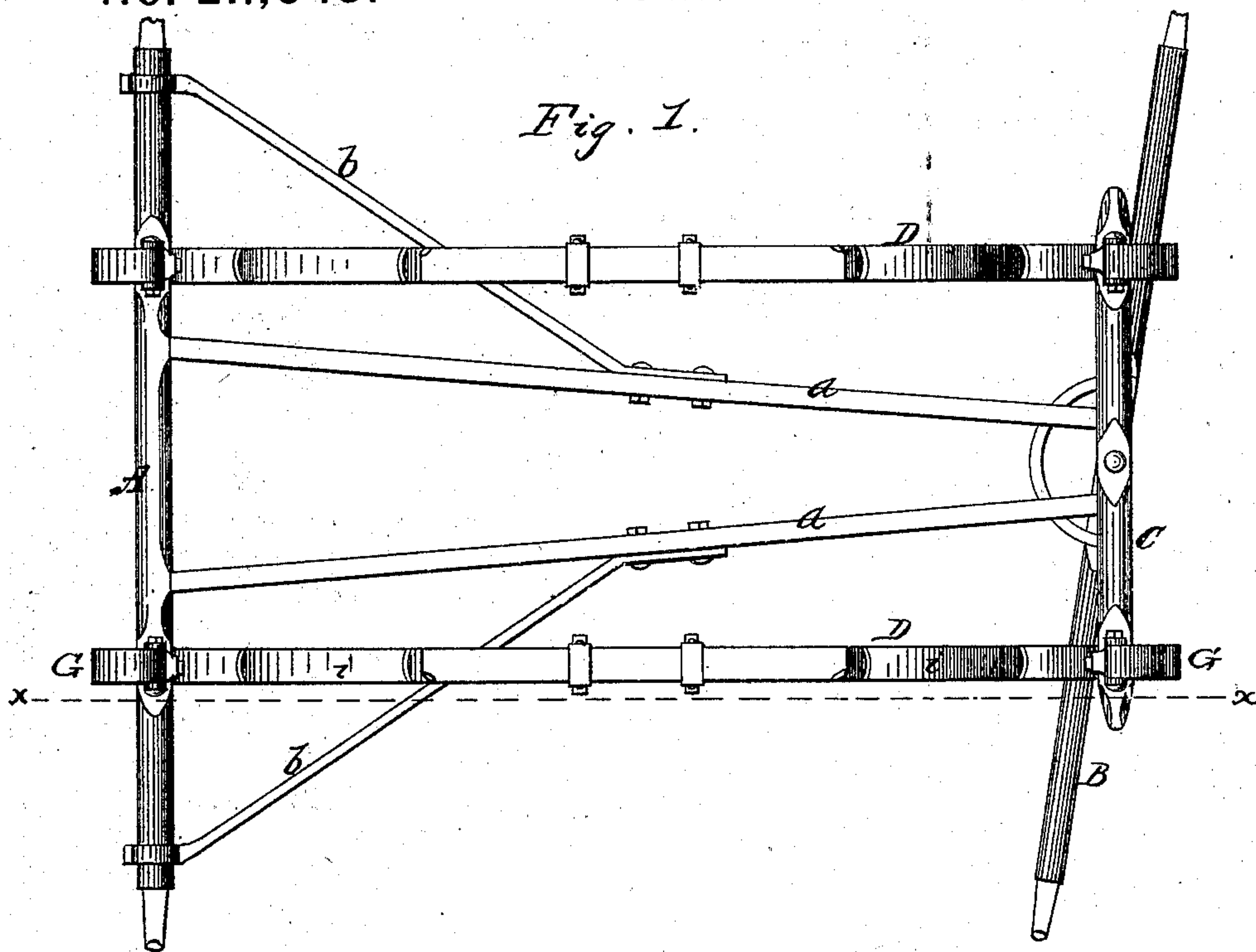


R. PORTER.  
Side-Spring for Vehicles.

No. 211,045.

Patented Dec. 17, 1878.



Witnesses.

J. A. Pollock.  
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# UNITED STATES PATENT OFFICE.

ROBERT PORTER, OF HULTON, PENNSYLVANIA.

## IMPROVEMENT IN SIDE SPRINGS FOR VEHICLES.

Specification forming part of Letters Patent No. **211,045**, dated December 17, 1878; application filed November 1, 1878.

*To all whom it may concern:*

Be it known that I, ROBERT PORTER, of Hulton, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Side Springs for Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a plan view; Fig. 2, a vertical section on line *x x* of Fig. 1; Fig. 3, a modification in shape of spring.

Side springs, as at present usually constructed, are open to objections. They must be used without a reach or perch, and if one spring be more heavily loaded than the other it expands and throws the front wheels out of track by pushing on that end of the axle. This has a very bad effect, wearing out the gear too rapidly, and making it hard to pull. There is great difficulty, then, in always keeping the running-gear square. The springs stand above the axle, rendering it necessary to place the body of the vehicle up high, making it awkward to get into and top-heavy in motion. This is partially remedied by mounting the body between the springs; but this again causes another objection. The springs are then in the way, and prevent a short turn being made. Should a spring break there is danger to life and limb, as there would, in such event, be no connection on one side from axle to head-block. The fastenings and fittings are numerous and costly, generally requiring special machinery to make them, so that an ordinary blacksmith can hardly succeed in replacing a broken part. Side motion is a frequent and annoying objection.

I overcome all these difficulties by my invention, which consists in the employment of a peculiar spring, which extends out under and beyond both axle and head-block, bending up and back for attachment to the shackles, and in the combination and arrangement of parts, substantially as hereinafter fully described and claimed.

More particularly my invention is as follows: A designates the rear axle; B, the front

axle, and C the head-block, the two latter having any desired fifth-wheel connections. The head-block and rear axle are rigidly connected together by a single braced perch, or by the reaches *a a*, as shown, and stiffened by the braces *b b*. This gives all the stiffness, squareness, and strength obtainable. The body of the vehicle rests, along each side, directly upon bolsters, which surmount springs D, of peculiar form. The main portion is elliptical, having two, three, or more leaves, *i*, as in Fig. 2. Toward each end the longest leaf takes a reverse curve, which sweeps in under the axle and head-block, beyond which it returns upon itself to form the **C** ends G, which terminate in the scrolls *e* for attachment. I have thus a combined double **C** and elliptic spring. A double sweep is shown in Fig. 3.

Shackles *n* are bolted to the axle A so that their attaching-points are above the axle, preferably, and in the same manner shackles *o* are bolted to the head-blocks C. The springs are placed in position with their ends passing under the rear axle and head-block, projecting behind the former and beyond the latter. The scrolls *e* on the returning ends G are placed in their respective shackles, and the bolts passed through and nuts attached.

The result is that while I can obtain any degree of stiffness or elasticity to the springs to make them suitable for any desired use, I have a rigid running-gear, which will always maintain its proper relations, since the strain of expansion and contraction caused by extra weight and jolting is all received in the springs themselves, and is not put upon the running-gear, for when the main portion of the spring flatten out and expands the two **C** ends give way to the expansion, swinging on the shackle-pins without putting any strain whatever on the latter, or on the axle or head-block; consequently the wheels will always track. Only two springs and four shackles are necessary. This effects great economy in construction. Should a spring break I have the wheels still safely connected by a reach. The springs are under the body, and hence give plenty of room for a sharp turn. The springs passing under axle and head-block permit the body to be hung conveniently low, giving the body more stability of motion and greater steadiness.



There is no annoying side motion, since the springs run straight forward and backward, permitting no torsion nor wobbling.

The springs can be thrown into most graceful and pleasing curves, thus enhancing the appearance of the vehicle to which they are applied.

I am aware that a spring of substantially the shape above shown has been applied to a "three-spring" carriage, located above and parallel with the rear axle, serving as a cross-spring, in connection with two side elliptical springs; but the location, operation, and purpose of my springs are of an entirely different nature.

I do not lay claim to the shape of the spring; nor do I claim, broadly, a side spring having a **C** end, as I am aware of such having been used in connection with a rigid side bar, the spring being a straight flat one with **C** end; but my spring is elliptical, is a side spring, has no rigid side bar to kill the elasticity between fastenings, stands at right angles to the axles, and is continuous from axle to head-block.

I claim as my invention—

1. The combination, with axle **A** and head-block **C**, having the shackles *n o*, of the double **C**-ended half-elliptic side springs **D**, passing out under axle and head-block, respectively, and, returning, fastened to said shackles, said springs **D** forming the immediate and only support for the vehicle-body, substantially as shown.

2. The combination of the described double **C**-ended half-elliptic side springs **D**, shackles *n o*, axle **A**, head-block **C**, and reach or perch *a*, said springs **D** forming the immediate and only support for the vehicle-body, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of October, 1878.

ROBERT PORTER.

Witnesses:

A. F. DIMOND,  
H. D. FRAZIER.