

(No Model.)

J. C. OLIVER & J. M. HUNTER.

VEHICLE SPRING.

No. 353,324.

Patented Nov. 30, 1886.

Fig 1.

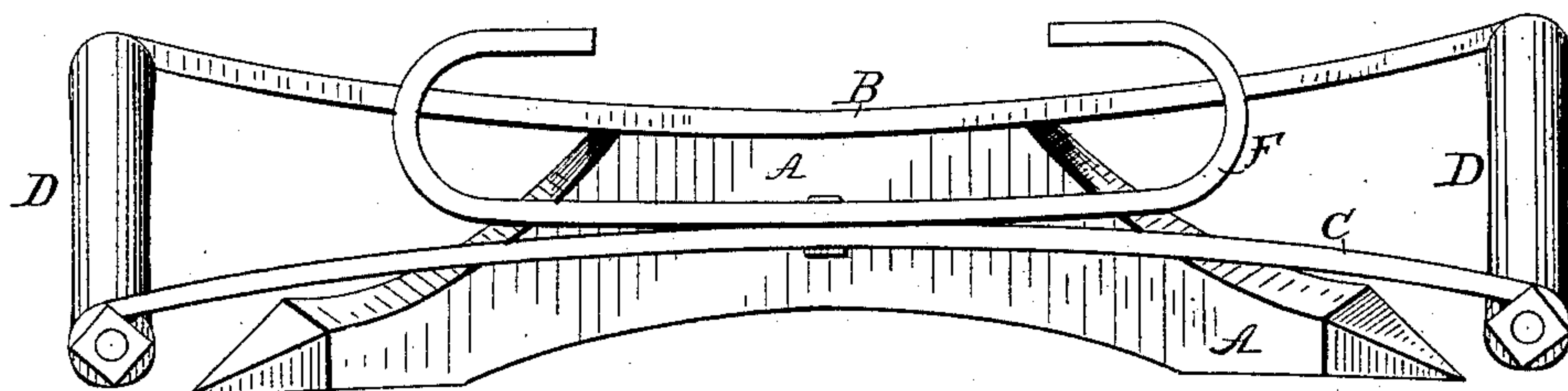


Fig 2.

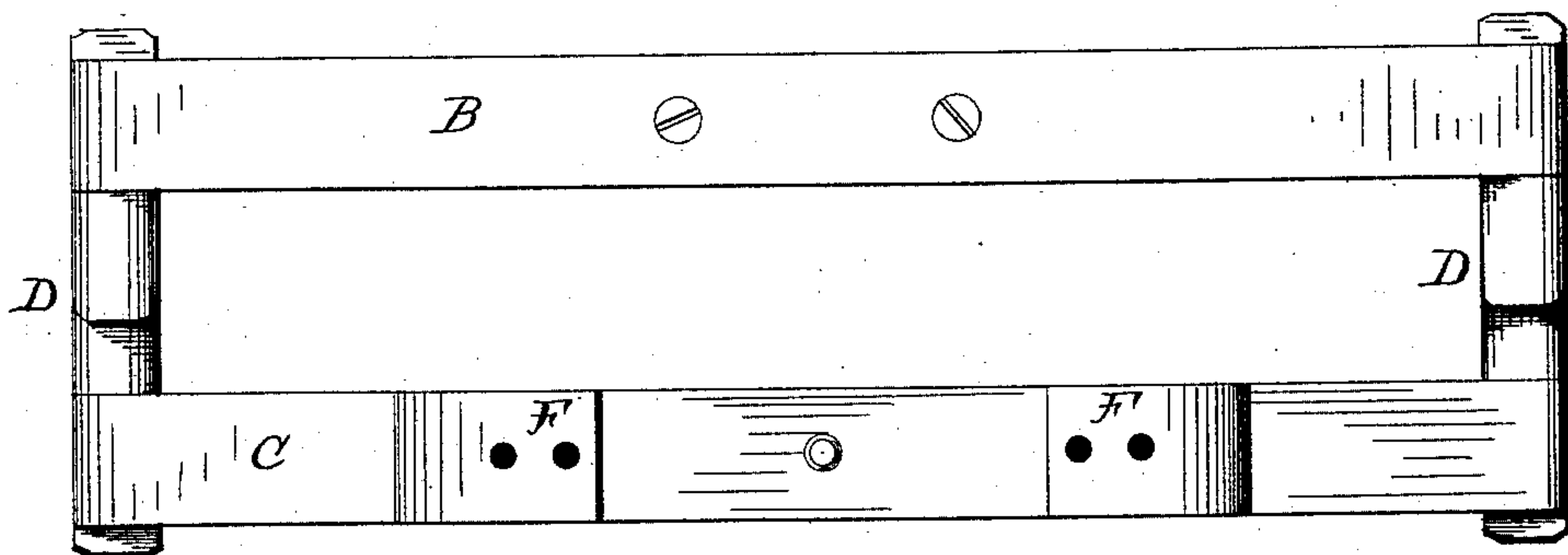


Fig 3.

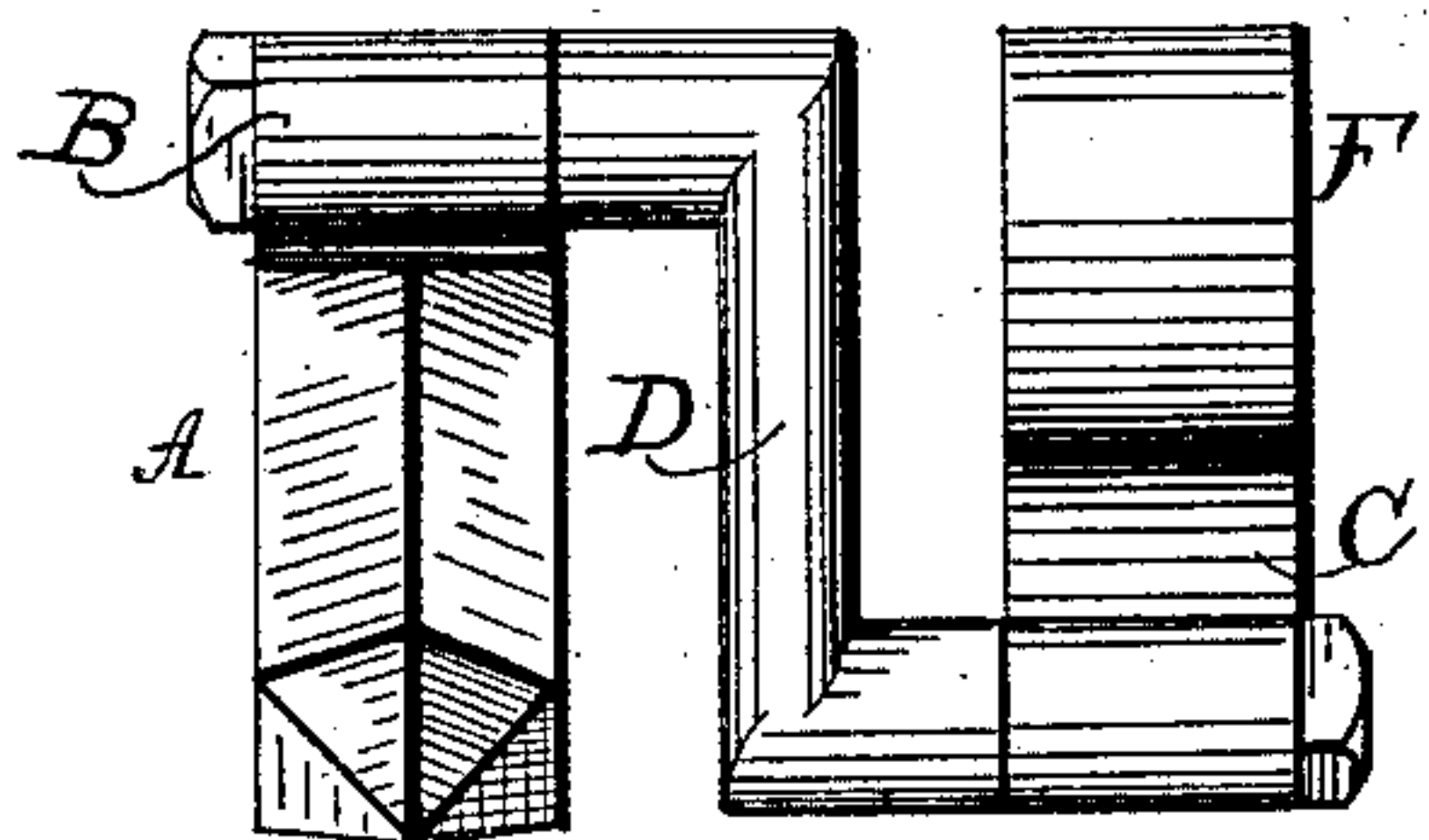


Fig 5.

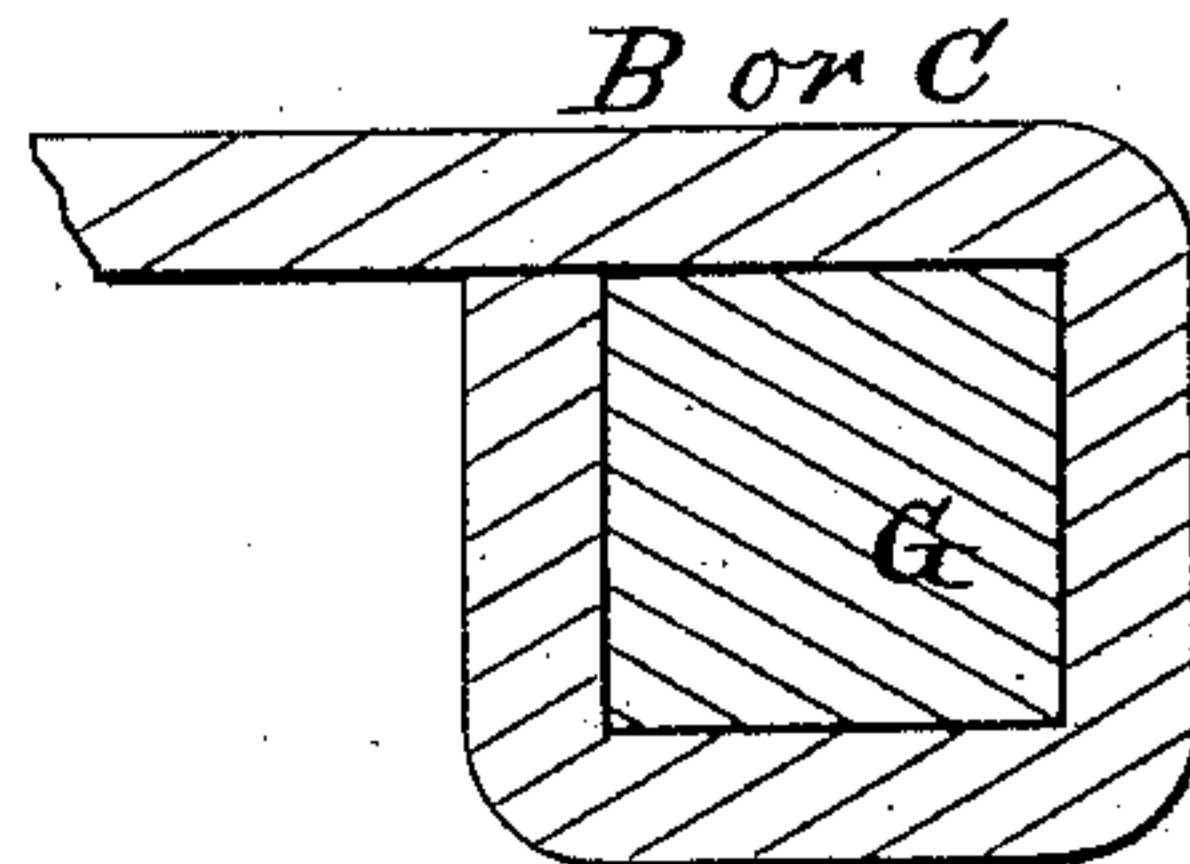
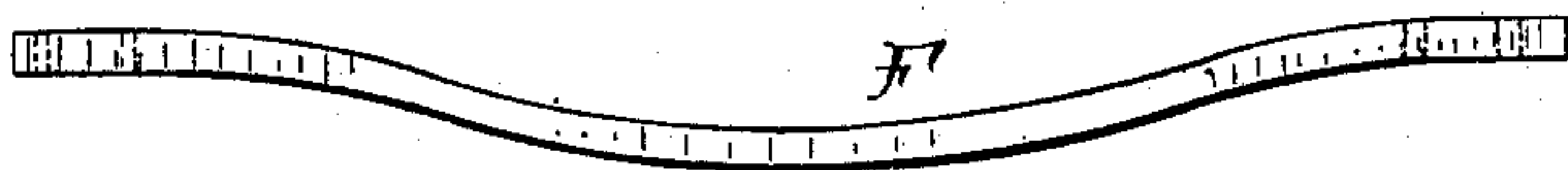


Fig 4.



Witnesses  
O. E. Stevens.  
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James C. Oliver.  
J. Montgomery Hunter.  
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# UNITED STATES PATENT OFFICE.

JAMES C. OLIVER AND J. MONTGOMERY HUNTER, OF LOUISVILLE, KY.

## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 353,324, dated November 30, 1886.

Application filed April 17, 1886. Serial No. 199,216. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES C. OLIVER and JAMES MONTGOMERY HUNTER, citizens of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Vehicle-Springs; and we 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 appertains to make and use the same.

This invention relates to that class of vehicle-springs which are made up of two or more individual springs connected at their ends by hanging connections.

The object of the invention is to obtain the advantages of a compound spring in less vertical space than is occupied by the elliptic and other similar compound springs, and to attach together the individual springs by means of hanging connections, on the principle of loop or stirrup connections, whereby the advantages of pendent springs may be obtained without the swinging propensity thereof.

To this end our invention consists in the construction and combination of parts forming a vehicle-spring hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of our spring. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a modification of a part thereof, and Fig. 5 is a transverse vertical section of our spring-eye and joint-bolt or crank wrist-pin on a larger scale.

A indicates an axle-tree. B is a semi-elliptic spring rigidly secured at its center upon the axle-tree. C is a similar semi-elliptic spring placed parallel with and lower than the spring B, and connected therewith by two crank-shaped hangers, D. The central portion of the spring B curves downward and the central portion of the spring C curves upward; but the whole of the spring C is lower than the plane of the spring B and lower than the plane of attachment of spring B to the axle-tree, in order that the spring C, which is to support the carriage-body, may actually hang from the axle. To adapt this spring to be attached either to a side-bar carriage or to

a cross-bar carriage without alteration, we provide an additional spring-leaf, F, either in the double-C shape shown in Fig. 1, or in the semi-elliptic form shown in Fig. 4.

The springs C and F are riveted or bolted together centrally, their convex sides meeting. The spring F is provided with holes in each end, whereby it may be bolted directly to a carriage-body, dispensing with the usual spring-bar; or it may be bolted or clipped directly to the side bars of the carriage.

In order that a carriage provided with our springs may not have the lateral swinging motion, so objectionable in some carriages having springs hung by loops or cranks, we form the wrists G of our crank-hangers D square, and we provide square eyes in the ends of the springs, to fit tightly thereon. By this means the cranks are prevented from turning in the spring-eyes, so that they cannot swing, thus resisting the sidewise motion of the carriage-body; and yet this resistance is not rigid and positive, as it would be if the eyes of the springs B and C were joined at each end by a single straight bolt; for the cranks acted upon by the sidewise motion serve as levers to bend both springs a little up and down, thus relieving the rider and the carriage from shocks and saving wear upon the working parts.

We are aware that crank-hangers for springs have been shown before, notably in a patent to W. Boughton; but his method of applying the said crank-hangers is materially different from ours in two essential points: First, the suspended spring is bent centrally upward, and the suspending-spring is bent centrally downward far below it, so that the principle of suspension is almost wholly counteracted. In ours all parts of the suspended spring are below the plane of the suspending-spring. Secondly, our squared wrists to the cranks and squared eyes to the springs are different in construction and operation from their common round wrists and eyes, and ours accomplish by this means a long-desired purpose, which his cannot accomplish.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of a semi-elliptic spring placed with its convex side downward and

having eyes in its ends, crank-shaped hangers hung in the said eyes, and another semi-elliptic spring having eyes in its ends engaging the lower wrists of the said crank-hangers, and 5 curved centrally upward, the last-named spring being hung upon the said hangers wholly below the plane of the first-named spring, substantially as shown and described.

2. The combination of two semi-elliptical 10 springs, two crank-shaped hangers connecting their ends, whereby one spring is hung upon the other entirely below the plane thereof, and another leaf of a spring centrally secured upon the lower spring, and having perforated 15 ends rising above the plane of the lower spring, substantially as shown and described.

3. The combination, with two springs having square eyes at their ends, of two crank-shaped hangers having square wrists to closely fit the said eyes, substantially as shown and 20 described.

4. A spring-hanger in the form of a crank having square wrists, substantially as shown and described.

In testimony whereof we affix our signatures 25 in presence of two witnesses.

JAMES C. OLIVER.

J. MONTGOMERY HUNTER.

Witnesses:

HAMILTON HUNTER,  
GEO. P. WELLER.