(No Model.)

S. W. LUDLOW.

VEHICLE SPRING.

No. 306,409. Patented Oct. 14, 1884.

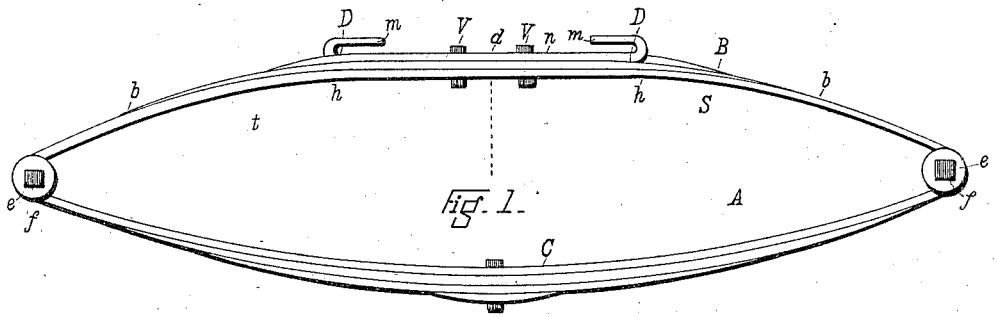

fig. 1.

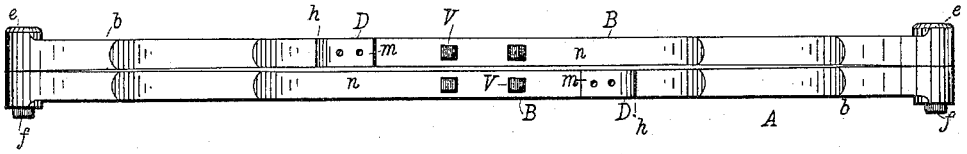

fig. 2.

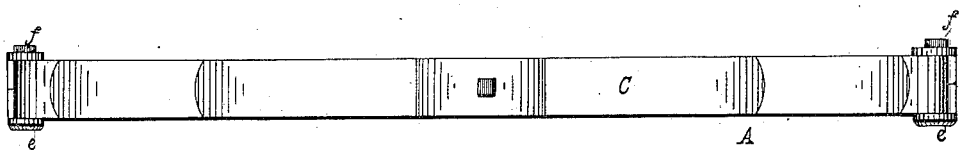

fig. 3.

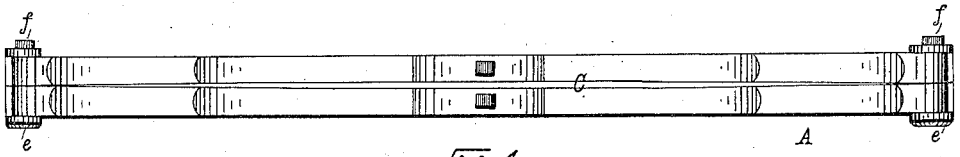

fig. 4.

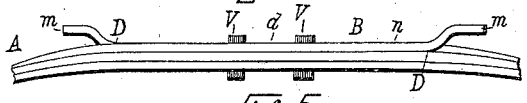

fig. 5.

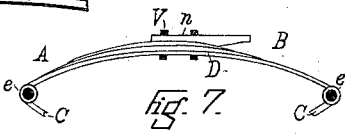

fig. 7.

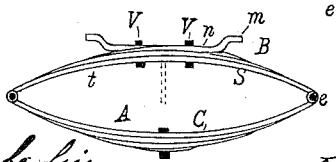

fig. 6.

Attest

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UNITED STATES PATENT OFFICE.

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VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 306,409, dated October 14, 1884.

Application filed January 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL W. LUDLOW, of the city of Cincinnati, county of Hamilton, and State of Ohio, have invented certain new and useful Improvements in Vehicle-Springs, of which the following is a specification.

My invention relates to that class of vehicle-springs known as "elliptic springs," and is designed to make provision for their effectually withstanding the thrusts to which the vehicle may be subjected in the direction of the length of the spring.

In the accompanying drawings, forming part of this specification, Figure 1 represents a side elevation of a spring embodying my invention. Fig. 2 represents a top view of the spring shown in Fig. 1. Fig. 3 represents a bottom view of the same spring. Fig. 4 represents a bottom view of the spring when two bottom springs are used. Fig. 5 represents a side elevation of the upper portion of the spring showing one of the modifications which can be made in the form of those free ends of the spring to which the body of the vehicle or its connections is attached. Fig. 6 represents a spring embodying certain features of my invention, the upper half of the spring being of the regular semi-elliptic shape. Fig. 7 represents the upper half of the spring, and illustrates one of the preferred modes of stiffening the spring and of making provision for the bearing.

A indicates the spring as an entirety. The upper half consists of two spring members, B B, placed side by side. The shape of the members B B have not the compound curves a' and a^2, as shown in a former patent, No. 290,251, granted December 18, 1883, but in side elevation may be of a uniform curve, (as, for example, the usual semi-elliptic curve as shown in Fig. 6,) but is preferably of the curve shown in Fig. 1—that is to say, the end portions, $b\,b$, of each spring are of an elliptic curve, and their middle or central portion, d, is of a somewhat flattened curve (*i. e.*, of a curve having a longer radius) or is altogether flat. The bottom or opposing member, C, is preferably of a semi-elliptic form, and may consist of two springs placed side by side; but a single spring is preferred, as shown in Fig. 3. Each of the upper members, B B, have but one bearing-point, D, which is placed between the end and center of the spring, and is located at or near the point h of said member. Separating the bearing-points D D enables the spring A to withstand the thrusts to which the vehicle may be subjected in the direction of the length of the spring, and omitting the double or compound curves a' and a^2, as shown in my Patent No. 290,251, prevents the bearing-points D D of members B B from changing their relative positions when loaded or unloaded, thus allowing rigid attachments to be made to the body or its connections at the said bearing-points D D. Otherwise a sliding attachment for one of the bearing-points D would have to be provided. By using two upper spring members, B B, the length of the same upper spring member is not shortened, but each retains the full length of the lower spring member, C, and permits the elasticity of the usual elliptic spring. The bottom spring member, C, of the spring A is connected to the axle or other parts of the running-gear in any preferred manner.

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

1. A vehicle-spring composed of two upper spring members, B B, placed side by side, and their central portion flattened, and each member B having its bearing D at or near the point h of its length, the spring members B B being connected pivotally at their ends to an opposing or lower member or members, C, forming one spring, substantially as and for the purposes specified.

2. In combination with a lower semi-elliptic spring member or members, two upper spring members, B B, of a semi-elliptic form, each spring member B B having its bearing-point D at or near the point h of its length, and pivotally connected to said spring C at their ends, making one spring, substantially as and for the purposes specified.

SAMUEL W. LUDLOW.

Witnesses:
JNO. W. STREHLI,
WALTER CHAMBERLIN.