E. SPAULDING.
Vehicle Spring.

No. 237,625. Patented Feb. 8, 1881.

Fig. I.

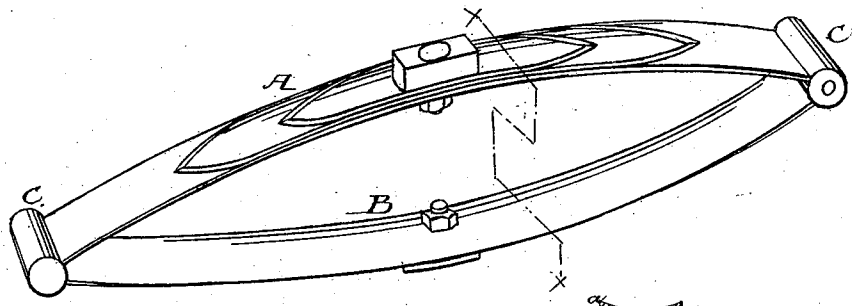


Fig. 4.

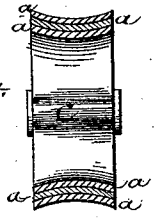


Fig. II.

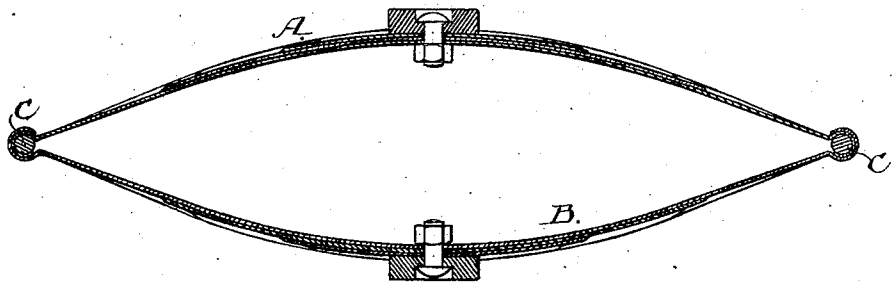


Fig. III.



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EDWARD SPAULDING, OF BROOKLYN, NEW YORK.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 237,625, dated February 8, 1881.

Application filed January 17, 1880.

To all whom it may concern:

Be it known that I, EDWARD SPAULDING, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Carriage and Wagon Springs, of which the following specification, taken in connection with the drawings forming part thereof, furnishes a full description.

My invention relates to an improvement in wagon-springs.

Heretofore half-springs have been constructed of several plates of steel, each plate being of concavo-convex form in cross-section, the convex side of the plate being located on the under side of the spring. This form of spring has been found defective in use, owing to the fact that the pressure exerted on the spring operates to produce a tensile strain on opposite edges of each leaf or plate of the spring, and as the edges of the plates are the weakest portion thereof slight flaws or weak points in the edges of the spring are soon opened by the tensile strain, causing a break in the plate, and thus the efficiency of the spring is destroyed. Also, elliptic springs have been constructed with both the upper and lower halves of the spring made of concavo-convex form in cross-section, and the two halves so united that the convex sides of both halves of the spring will be located on their upper sides and the concave sides on their under sides. In the form of spring last described the tensile strain is relieved from the edges of the lower half of the spring and transmitted to the central portion thereof while the edges are subjected to a crushing force. Thus it will be observed that the lower half of the spring was prevented from cracking or parting at its edges, owing to the relief of the tensile strain on the edges thereof; but the form of spring last described was also found defective and impracticable in use for the following reasons: The upper half of the spring being arranged with the concave side underneath, the edges were subjected to the tensile strain caused by the pressure exerted upon the spring, and hence the edges were soon cracked or parted, which operated to ruin the complete spring.

The object of my invention is to obviate the defects in wagon-springs heretofore referred to and provide a spring in which the tensile strain will be exerted on the central portions of the plates composing the upper and lower halves of an elliptic spring and causing the edges of the springs to sustain the crushing force due to the weight imposed upon the springs.

With this end in view my invention consists in an elliptic spring, each half being formed of a plate or plates made concavo-convex in form in cross-section, and the springs arranged and connected so that the convex sides of the upper and lower halves of the spring will be located adjacent to each other and the concave sides will be located on the upper and lower sides of the spring.

In the accompanying drawings, Figure 1 is a view in perspective of a wagon-spring embodying my invention. Fig. 2 is a vertical longitudinal section. Fig. 3 is a cross-section of one-half of the spring, and Fig. 4 is a cross-section of the upper and lower halves of the elliptic spring.

A represents the upper, and B the lower, half of an elliptic spring, said parts being secured at their opposite ends by bolts C, or connected in any suitable manner. Each half of the spring is composed of one or more steel plates, *a*, which are constructed of concavo-convex form in cross-section, as shown in the drawings. The curved form of the springs insures increased strength and elasticity thereto, and when a compound spring is composed of several leaves or plates the convex side of one leaf will fit within the concave side of the next adjacent leaf or plate, thus preventing any lateral displacement of the several leaves or plates and obviating the necessity for slots and studs usually employed in springs made of flat leaves or plates. This is an important item in manufacture, as costly labor and machinery are required to produce springs with interlocking slots and studs; and, further, the springs are materially weakened by forming slots therein. When successive layers of plates or leaves are required the longitudinal edges of the plates should be made somewhat thinner than the central portion, so that the plates will fit one upon the other, and thus enable the spring to have a uniform movement.

I find that the convexity in the cross-section

which gives the best general results for all widths of steel is that which is an arc of the circle which the linear width of the plate would describe as a radius.

It will be observed that both the upper and lower halves of the spring, when subjected to pressure, will spring toward the concave sides, the tension of the spring being exerted on the convex sides. Thus the tensile strain due to the pressure imposed upon the spring will be exerted on the longitudinal centers of the leaves or plates of the upper and lower halves of the spring, while the opposite edges of the leaves or plates of both the upper and lower halves of the spring will be subjected to a crushing force, and hence, should there be any flaws or cracks in the edges of the leaves or plates, the tendency will be to close the cracks or openings instead of opening them.

Both halves of the spring constructed in accordance with my invention will be uniform in extent of movement, and also capable of withstanding an equal amount of strain, so that each half will sustain the proper share of work.

These springs may be applied to all kinds of carriages, from the locomotive-engine to the lightest carriage or wagon, when lightness, strength, and uniformity of action are desired.

I make no claim in this patent to a half-spring composed of one or more plates or leaves made concavo-convex in form in cross-section and constructed to insure a crushing strain on the opposite edges of the plate or plates, as I reserve such subject-matter for a subsequent application.

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

1. An elliptic spring the upper and lower halves of which are of concavo-convex form in cross-section and arranged with their convex sides toward each other, substantially as set forth.

2. An elliptic spring the upper and lower halves of which are each composed of several leaves or plates, each being of concavo-convex form in cross-section, said halves being arranged with their convex sides toward each other, substantially as set forth.

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