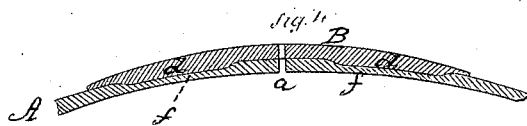
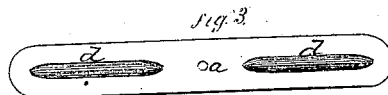
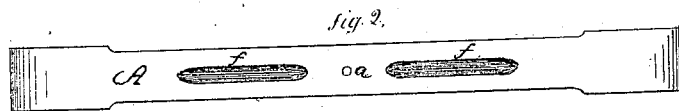
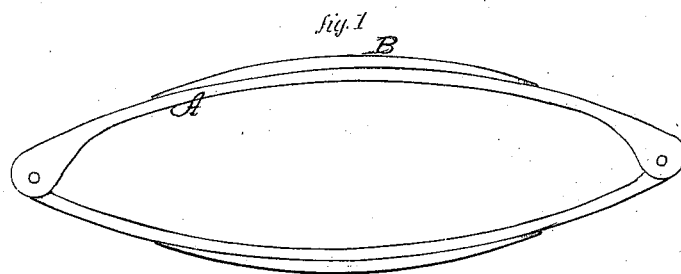


F. B. MORSE.  
Carriage Spring.

No. 108,929.

Patented Nov. 1, 1870.



Francis B. Morse  
Inventor

Witnesses

J. H. Shumway  
A. J. Abbotts

By his Attorney.

John E. Earle

# United States Patent Office.

FRANCIS B. MORSE, OF PLANTSVILLE, CONNECTICUT, ASSIGNOR <sup>himself and</sup> TO H. D. SMITH & CO., OF SAME PLACE.

Letters Patent No. 108,929, dated November 1, 1870.

## IMPROVEMENT IN CARRIAGE-SPRINGS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, FRANCIS B. MORSE, of Plantsville, in the county of Hartford and State of Connecticut, have invented a new Improvement in Carriage-Springs; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents in—

Figure 1, a side view of the spring;

Figure 2, the upper side of the principal lift of the spring;

Figure 3, the second or additional lift; and in

Figure 4, a longitudinal central section through the spring.

This invention relates to an improvement in that class of springs for carriages known as elliptic springs.

In this class of springs a great difficulty arises from the breaking of the spring, and further, from the fact that to properly secure the spring to the axle or spring-bar the spring must be perforated at the center, which, in the ordinary construction, materially weakens the spring at that point. To overcome these difficulties is the object of my invention.

In describing the spring I shall refer to the upper portion of an elliptic spring, or what would be, if alone and single, a half-elliptic spring.

My invention consists in forming upon the under side of the second or outer lift two ribs, each starting at a little distance from the center and dying out near the end of the spring, so that the spring by these ribs is greatly strengthened, while the end may be tapered down very thin, the full thickness maintained at the center for the perforation, and the lower or principal lift formed with grooves corresponding to and so as to receive the said ribs.

A is the principal lift, formed with heads, by which it is secured to the other part, or to form a single half-elliptic spring in the usual manner.

By preference I make this spring of nearly equal thickness from head to head, and over this I arrange a second lift, B, thereby increasing the thickness very materially at the center, and to such an extent that the perforation *a* through the spring will not render the spring any weaker at that point than at others, and this lift is tapered gradually to a point, as seen in fig. 1.

Upon the under side of the outside lift B, I form ribs *d d*, starting a little way from the center, as seen in figs. 3 and 4, that is, at where the diminished thickness of the part B begins, and running toward and dying out near the point, as seen in figs. 3 and 4. These ribs support the diminishing lift B, so that it retains nearly as much strength toward the point as if it had not been reduced in thickness.

Upon the outer surface of the part A, I form grooves *f*, corresponding to the said ribs, as seen in figs. 2 and 4. These grooves are formed by indentation, and have the effect upon the spring of a corrugation, and strengthens the spring at those points proportionately.

These ribs and grooves serve also to retain the lifts in position and prevent any lateral movement.

By this construction the spring is made of sufficient strength at the center to permit perforating without injury, and the second lift, constructed with ribs, as described, serves fully to support and strengthen the spring at those points where the breakage mostly takes place.

I claim as my invention—

An elliptic spring, composed of two lifts, the outer one formed with two ribs and the inner with corresponding recesses upon their meeting surfaces, so as to be combined in the manner and for the purpose set forth.

F. B. MORSE.

Witnesses:

A. J. TIBBITS,  
J. H. SHUMWAY.