

R. VOSE.  
Car Spring.

No. 40,968

Patented Dec. 15, 1863.

Fig. 1.

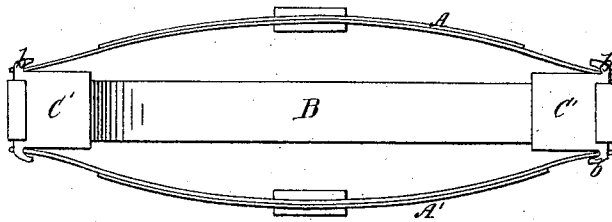


Fig. 2.

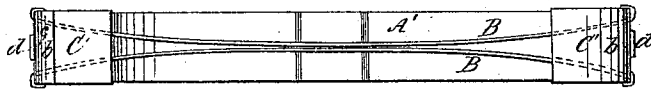


Fig. 4.

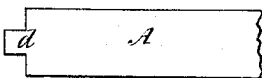


Fig. 5.

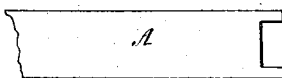


Fig. 7.

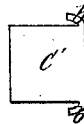


Fig. 8.



Fig. 6.



Fig. 3.

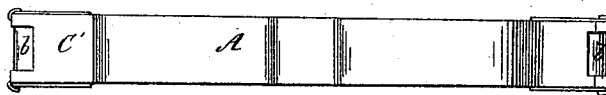


Fig. 9.

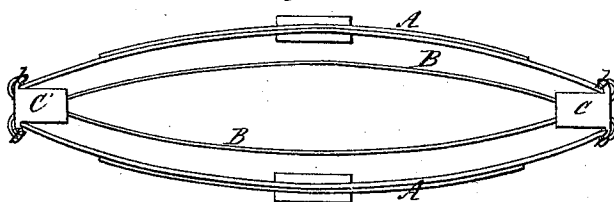
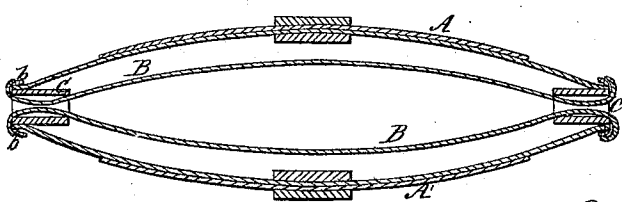


Fig. 10.



Witnesses:

*Richard P. Doyle*  
*A. McCombe*

Inventor:

*Richard Vose*  
By *Robbing & Burr*  
*attys*

# UNITED STATES PATENT OFFICE.

RICHARD VOSE, OF NEW YORK, N. Y.

## IMPROVEMENT IN CONFINING THE ENDS OF ELLIPTIC SPRINGS.

Specification forming part of Letters Patent No. 40,968, dated December 15, 1863.

*To all whom it may concern:*

Be it known that I, RICHARD VOSE, of the city, county, and State of New York, have invented a new and useful Improvement in Springs for Railroad-Cars and Other Vehicles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and of which—

Figure 1 is a side elevation of my improved spring; Fig. 2, a top view of the same, with one series of bearing-plates, A, removed; Fig. 3, a top view of a spring complete, illustrating a mode of securing the ends of the bearing-plate differing somewhat from that shown in Figs. 1 and 2; Figs. 4 and 5, detached views of portions of the bearing-plates, showing different modes of forming the ends thereof; Fig. 6, a plan view of the metallic plate or "blank" from which the end cap is to be formed; Fig. 7, a side elevation of the end cap, and Fig. 8 an end view of the same; Fig. 9, a side elevation of an elliptic tension-spring, in which all the plates operate in the same plane and are secured by the use of my improved caps; and Fig. 10, a longitudinal central section of the same, showing clearly the mode in which said plates are arranged and combined with each other.

Similar letters indicate like parts in each of the drawings.

My invention relates to that class of elliptic springs which are combined with supplementary plates acting by lateral tension; and it consists of an improved mode of combining and securing the several bearing and tension plates which form the entire spring.

The springs illustrated in the accompanying drawings are composed, essentially, of two series of bearing-plates, A A', and two inwardly-curved tension spring-plates, B B', combined and secured in their proper relative positions by means of rectangular retaining-caps or end pieces, c c. These caps may be formed of any suitable metal, cast in proper molds, or may be quickly made by bending a metallic plate or blank of the proper width and form (see Fig. 6 of the accompanying drawings) into the rectangular shape required. The ends a a of the plate, being made to overlap slightly, are united by welding. The offsets b b, Fig. 6, left in the metallic

blank for this purpose, form extensions of the opposite sides of the rectangular cap made out of the same, which, being doubled back upon a line even with the edges of the remaining two sides, (as shown in Fig. 7,) form retaining-pockets to receive and retain the ends of the bearing-plates A A', as is clearly shown in Fig. 1.

In order to secure more firmly the ends of the bearing-plates A A', slots c c are cut in the offsets forming the pockets b b, to receive corresponding tongues, d, (see Fig. 1,) formed upon the ends of these plates; or the pockets b b may be made narrow or small enough in width to pass within recesses cut in the ends of the plates A A', as seen in Figs. 5 and 3. Either of these arrangements will produce a reliable fastening for the ends of the bearing-plates, yet other modes of obtaining the same result suggest themselves, and I contemplate all which are equivalent to those described.

In order to secure in their proper active positions the tension-plates B B, which complete my spring, I pass their ends through the caps C C and bend them around the outer edges of said caps, as clearly shown in Figs. 2 and 10. Projecting pins might be placed upon the edges of the caps to enter slots cut to receive them in the ends of the plates B B; but this is not, in my opinion, necessary. Indeed, in this my improved manner of combining the ends of the several plates forming a tension elliptic spring the absence of all bolts, rivets, screws, or other devices rendering the perforation of the plates necessary will be remarked as one of the chief advantages attendant upon the use of my invention.

In these my improved double tension-springs the tension-plates may be arranged at pleasure to operate in a direction parallel with that of the bearing-plates, (as shown in Figs. 9 and 10,) or at right angles thereto, (as seen in Figs. 1 and 2,) and from their peculiarity of arrangement, should any one plate or part become unserviceable by reason of wear, breakage, or other accident, the damaged piece may be promptly removed and replaced independently of the remaining parts. It will be observed, also, that as the ends of the tension-plates are not rigidly confined, but are left free to expand, their liability to accidental breakage is almost entirely removed, while their peculiar position within or between the bearing-

plates protects them fully and gives to the whole spring great neatness and compactness.

The main feature of my improved springs consists in the use of hollow caps to retain the ends of the spring-plates, and these may be tubular or oblate, as well as rectangular, although the latter appears to be the most practical form in this connection.

I contemplate the application of these my improved hollow end caps, to all elliptic springs, which, in addition to the usual bearing-plates, are supplied with tension-plates, whether the tension-plates are curved inwardly, as illustrated in the drawings, or outwardly, as described in my patent for biplanular springs issued on the 5th day of May, 1863.

Having thus fully described my improvement in the construction of tension-springs,

what I claim therein as new, and desire to secure by Letters Patent, is—

1. The combination of curved tension spring-plates with elastic bearing-plates in the construction of a tension elliptic spring, when said tension-plates are self-retained in their proper positions, and left free to expand independently of each other, substantially as is herein set forth and described.

2. The use of hollow end caps to retain and secure the ends of the elastic plates in an elliptical or semi-elliptical tension plate-spring, substantially in the manner and for the purpose herein set forth.

RICHD. VOSE.

In presence of—

A. L. BUTLER,

JOHN B. SPAULDING.