2 Sheets—Sheet 1.

R. VOSE.

Carriage-Spring.

No. 38,432.

Patented May 5, 1863.

Fig. 1.

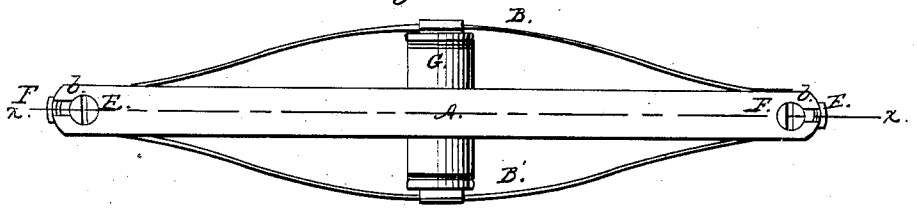


Fig. 2.

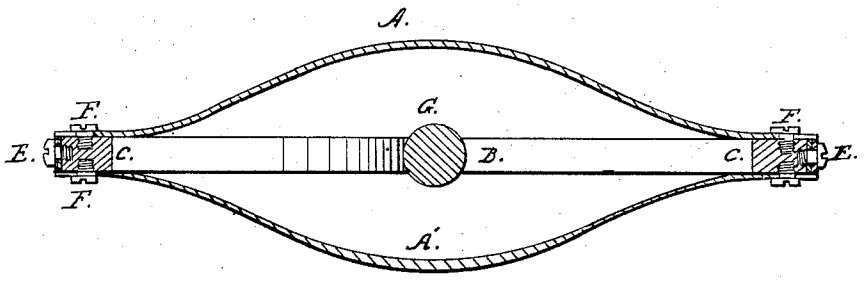
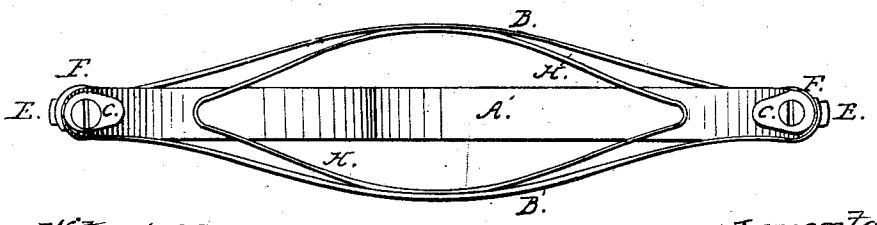


Fig. 3.



Witnesses:
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Victor B. Wells

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by Robbins & Burr
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2 Sheets—Sheet 2.

R. VOSE.

Carriage-Spring.

No. 38,432. Patented May 5, 1863.

Fig. 5.

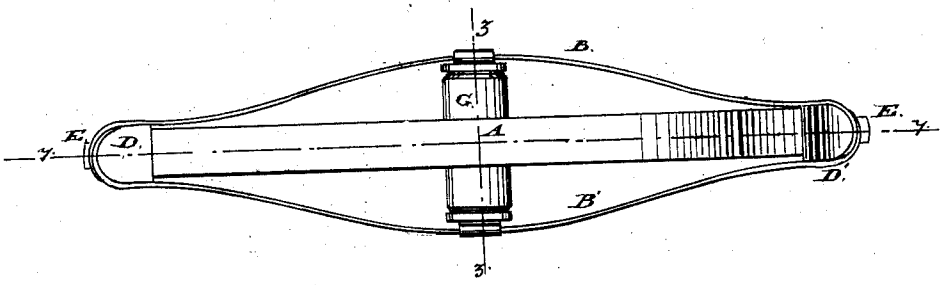


Fig. 6.

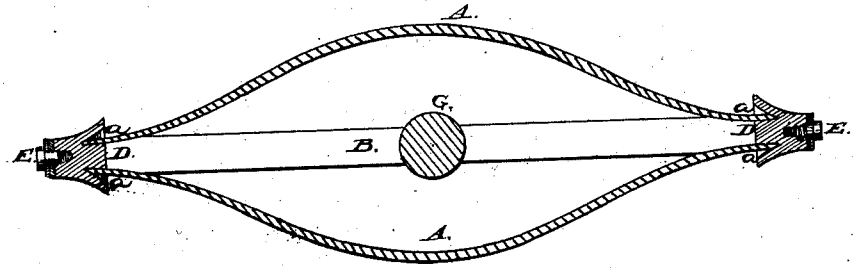


Fig. 4.

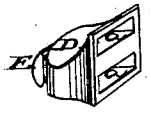
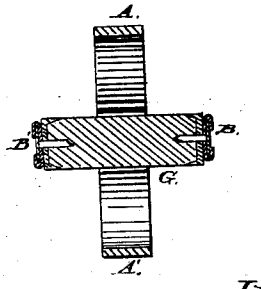


Fig. 7.



Witnesses.

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Victor B Bell

Inventor:

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Atty's

UNITED STATES PATENT OFFICE.

RICHARD VOSE, OF NEW YORK, N. Y.

IMPROVEMENT IN ELLIPTIC-SPRINGS.

Specification forming part of Letters Patent No. **38,432**, dated May 5, 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 Railroad Car or Carriage Springs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, of which—

Figure 1 is a top view of my improved biplanular spring in combination with a rubber auxiliary, G; Fig. 2, a section of the same, in the line *x x* of Fig. 1; Fig. 3, a top view of my spring, with its upper plate, A, Figs. 1 and 2, removed, and representing an elliptic metallic auxiliary, H, substituted for the rubber spring G. (Shown in Fig. 1.) Fig. 4 is a detached view of an improved cap, D, for securing the ends of my double-elliptic spring. Fig. 5 is a top view of my spring when fitted with the cap D of Fig. 4. Fig. 6 is a longitudinal section through the line *y y* of Fig. 5, showing more clearly the peculiar shape and characteristics of the cap D, in combination with my improved spring; and Fig. 7 is a transverse section in the line *z z* of Fig. 5, illustrating more especially the mode of combining the india-rubber auxiliary spring G (shown in Figs. 1 and 5) with the tension-plates B and B′.

The curved metallic bearing-plates A and A′ of my improved biplanular double-elliptic spring are united to the elastic tension or controlling plates B and B′, and confined in a plane at right angles thereto by means of metallic heads C C, Fig. 2, or D D, Fig. 5. The curved ends of the tension plates B B′ overlap each other upon the outer end of each of these retaining-heads C C or D D, and in this position are confined and secured by means of a stay-screw, E, or other suitable device. The ends of the semi elliptic bearing-plates A and A′ may have outwardly-opening slits *b b*, Fig. 1, to receive projections E E, formed upon the upper and lower faces of the retaining-heads C C. When these projections are embraced by the slits *b b*, their overlapping heads retain the bearing-plates securely in their proper position.

Where the improved head D, Fig. 4, is used to confine the several plates of my improved spring, the necessity of slits or slots in the bearing-plates A and A′, and of projections upon the upper and lower faces of the retaining-heads, is obviated by means of recesses *a a*, which receive and confine the simple ends of the bearing-plates fitted therein, as is clearly illustrated in Fig. 6.

The horizontal or controlling plates B B′ may be strengthened and relieved by an auxiliary spring, G, of india-rubber, Figs. 1, 2, 5, and 6, of metal H, as in Fig. 3, or of any other suitable elastic material, and of such form as may be suitable or desirable in this combination.

In a spring, combined and arranged as herein described, the expansion of the bearing-plates A and A′ is controlled and limited by the tension thereby exerted upon the lateral plates B B′, and I thus not only obtain and combine the maximum of resilient power inherent in the curved metallic plates, but actually increase that power nearly fourfold without augmenting their weight.

By the interposition of relieving-springs G or H between the lateral tension-plates B B′, the strength of my improved spring may be still further increased at pleasure. I have found the use of such auxiliary springs more especially beneficial and desirable in those situations where but one bearing-plate is used, the weight being applied and supported at its center and ends, respectively. I may state also that in some cases these auxiliary springs may be interposed with advantage directly between the bearing-plates A and A′, to act in unison with the tension-plates, when they are combined in my biplanular spring.

In my combination of elastic plates of metal, as above described, to form a single spring of great power and elasticity and superior delicacy, the multiplication of plates by mere superposition is rendered unnecessary, and my peculiar mode of fastening and securing the several plates in my springs obviates the necessity of end bolts and nuts, and of slots in the plates themselves, as found in ordinary elliptic springs, and its by simplicity permits the ready replacement or repair of any one of the distinct parts of the spring, without affecting the remainder. Hence it will be readily understood that my improved spring not only possesses superior strength and elasticity with moderate weight, but can be manufactured

more cheaply, and is more durable and economical in use than any ordinary form of elliptic or semi elliptic spring.

I am aware that springs have heretofore been made in which the expansion of elliptically-curved metallic plates is controlled and limited by means of independent tension plates, acting as vibrating cords thereto, and hence I do not claim this feature as my invention; nor do I claim, broadly, the combination of an auxiliary spring with elliptical or double-bow springs; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of one or more curved metallic bearing-plates A and A′ with one or more curved metallic tension-plates B and B′, when said plates are arranged in planes at right angles to each other, substantially as herein set forth.

2. When bearing-plates A and A′ are arranged and combined with tension-plates B and B′ in the formation of an improved spring, substantially as herein set forth, confining and securing said plates by means of the metallic heads C C and D D, or their equivalents, substantially in the manner herein described.

3. The use of intermediate compensating-springs, when combined with the bearing-plates A and A′ and tension-plates B and B′ of my improved spring, substantially in the manner and for the purpose herein set forth.

This specification of my improved biplanular spring signed by me this 18th day of March, A. D. 1863.

RICHD. VOSE.

In presence of—
A. S. BUTLER,
C. D. GIBSON.