

J. E. JEFFREY.  
Elliptic Springs.

No. 151,881.

Patented June 9, 1874.

Fig. 1.

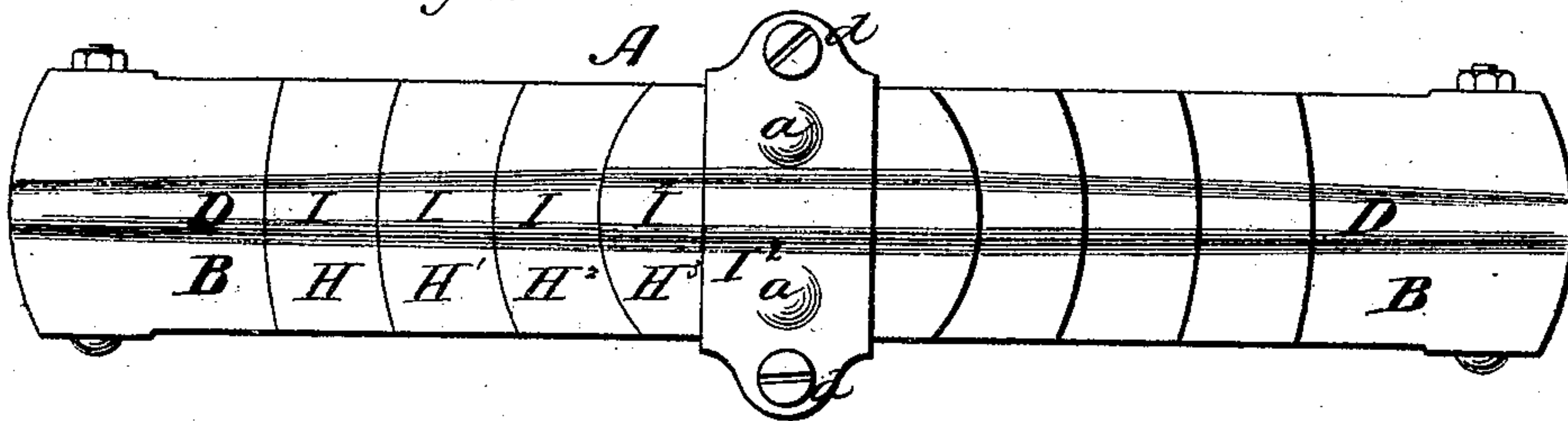


Fig. 2.

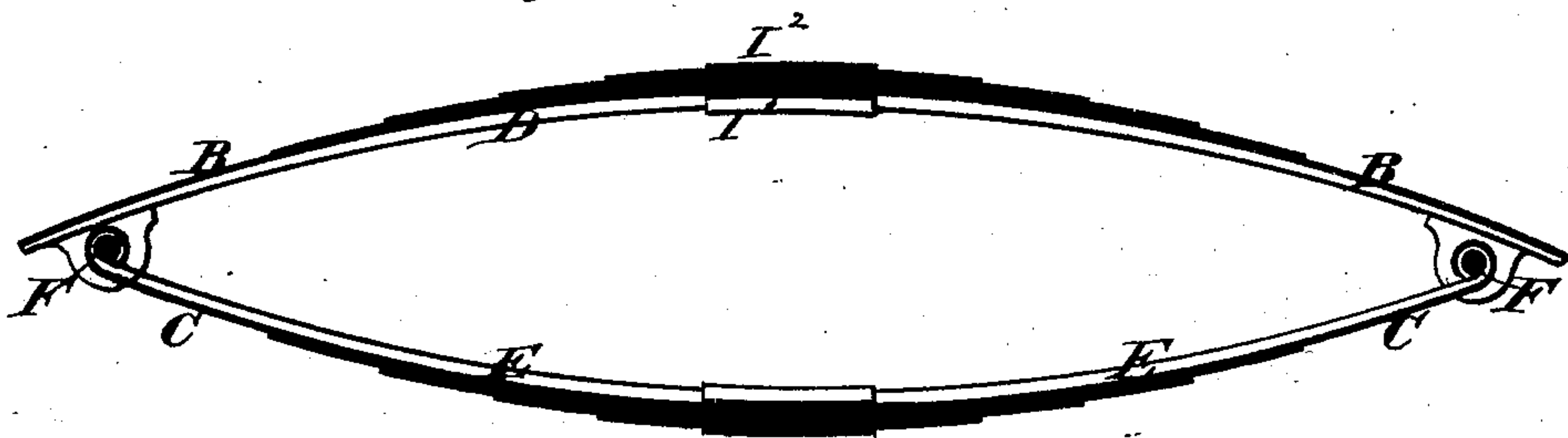


Fig. 3.

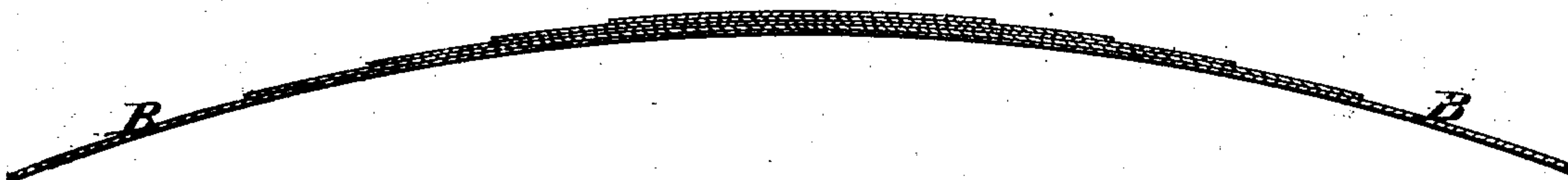


Fig. 4.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

JOHN E. JEFFREY, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN ELLIPTIC SPRINGS.

Specification forming part of Letters Patent No. **151,881**, dated June 9, 1874: application filed March 14, 1874.

*To all whom it may concern:*

Be it known that I, JOHN E. JEFFREY, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Elliptic Springs; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a top view; Fig. 2, a longitudinal vertical section, showing tapering rib; Fig. 3, a longitudinal vertical section of one-half of the spring without the rib; and Fig. 4 a transverse section, showing spuds and clamping-plates.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention relates to improvements in elliptic springs; and consists, first, in providing the long upper and lower leaves of the spring with longitudinal ribs, which gradually taper from the center to the outer extremities of the leaves, the latter being made thicker at their outer ends than at the center, and gradually decreasing in thickness to the middle, as hereinafter more fully set forth. My invention also consists in the employment of short leaves, provided with spuds or projections on their upper surfaces, and indentations on their lower faces, the spuds on one leaf fitting into the corresponding indentations in the leaf above them, to hold said leaves more securely in place. My invention further consists in the employment of outer and inner plates provided with spuds and indentations, by means of which the leaves are securely clamped together, as hereinafter more fully set forth.

In the accompanying drawings, A is the elliptic spring, the upper and lower long leaves B C of which are provided with longitudinal ribs D E of concavo-convex form, which extend from the central transverse line of the long upper and lower leaves to their outer extremities, the rib E E, on the lower leaf, extending around the bolts F F, to which its outer ends are attached. The long leaves B C are made thicker at their outer ends than elsewhere, and gradually taper toward the central transverse lines of the leaves, where they are made thinnest. Within certain lim-

its the elasticity of a metallic plate varies in direct proportion with its thickness, the plate being most elastic where it is thinnest, and by so constructing the long leaves B C that they are thickest at their outer extremities, and gradually decrease in thickness toward their transverse central lines, I obtain the greatest amount of elasticity for the elliptic spring.

This construction, however, tends somewhat to weaken the spring at its center, and to remedy this defect the corrugations or longitudinal ribs D E are employed to strengthen the spring, the corrugations being made wider and deeper at the center, where greater strength is required, and gradually tapering toward the outer extremities of the leaves B C, where they are the thickest.

The longitudinal tapering ribs D E may be formed by compression in a screw-press, or by a steam-hammer, or by any of the usual methods of forming such ribs, by means of which the quality of the steel will be improved by the compression or concussion employed in the process.

To further strengthen the spring A, short leaves H H<sup>1</sup> H<sup>2</sup> H<sup>3</sup> are employed, varying successively in length, the lower one, H, being the longest. The leaves H H<sup>1</sup> H<sup>2</sup> H<sup>3</sup> are provided with longitudinal ribs I I on their upper surfaces, and corresponding grooves in their under surfaces, the rib of one leaf fitting into the groove on the under surface of the leaf above it, to prevent lateral play of the leaves. *aa* are spuds or projections stamped, swaged, or otherwise made on the upper surface of each leaf, there being corresponding indentations made by the process on the under surface of each, so that when the short leaves are placed in position the spuds on each leaf will engage with or fit into the indentations in the lower surface of the leaf above it, and thus retain the leaves in place and prevent them from slipping on each other. To prevent a vertical movement of the short leaves H H<sup>1</sup> H<sup>2</sup> H<sup>3</sup>, and hold them more securely in place on the long leaves B C, clamping-plates I<sup>1</sup> I<sup>2</sup> are employed, which I will now proceed to describe.

The clamping-plate I<sup>1</sup>, designed to be placed on the inner side of the long leaf, is provided with a rib, *b*, stamped out across its central transverse line, the rib B fitting in the corre-



sponding groove in the long leaf. *a' a'* are spuds or projections on each side of the rib *b*, which fit into corresponding indentations in the long leaf. *c c* are shoulders on the inner clamping-plate I<sup>1</sup>, which fit over the edges of the long leaf, and prevent all lateral play of the former. *d d* are ears on the outer ends of the clamping-plate I<sup>2</sup>, and provided with screw-threaded perforations for the reception of screw-bolts. A similar outer ribbed clamping-plate, I<sup>2</sup>, provided with perforated ears and spuds, and corresponding indentations, is employed, the clamping-plates being connected together by screw-bolts or their equivalents, thus securely holding the parts together.

It will be seen that by my construction of spuds in one leaf entering corresponding indentations in the contiguous leaf, the leaves are not weakened as in the ordinary construction where holes are punched in the leaves for the introduction of bolts to bind them together.

I claim as my invention—

1. An elliptic spring, the long upper and lower leaves B C of which are made thickest at the outer ends, and gradually taper to the middle, and having longitudinal ribs D E, tapering from the middle to the outer extremities, substantially as described, and for the purpose set forth.

2. The tapering ribbed leaves, having projections on their upper surfaces, and corresponding indentations on their lower surfaces, to hold said leaves in place, substantially as described, and for the purpose set forth.

3. The ribbed clamping-plates, in combination with ribbed leaves provided with spuds and indentations, substantially as described, and for the purpose set forth.

JOHN EDWARD JEFFREY.

Witnesses:

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