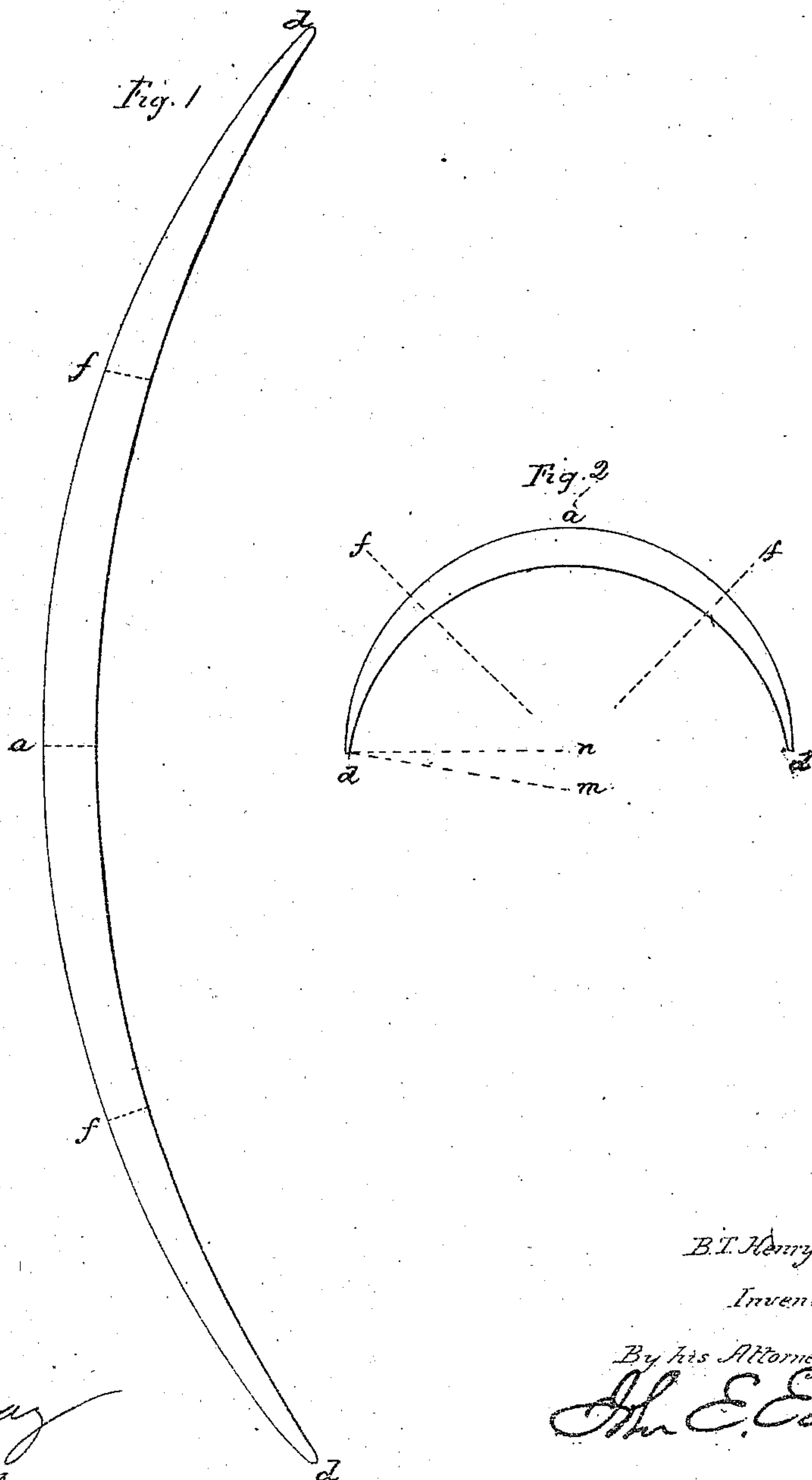


B. T. HENRY.
Carriage Spring

No. 100,626.

Patented March 8, 1870.



Witnesses.

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BENJAMIN T. HENRY, OF NEW HAVEN, CONNECTICUT.

Letters Patent No. 100,626, dated March 8, 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, BENJAMIN T. HENRY, of New Haven, in the county of New Haven, 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 drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent in—

Figure 1, a side-view of a single spring; and in

Figure 2, diagram illustrating the principle of construction of this spring.

This invention relates to an improvement in springs for land carriages, commonly formed from several layers or plates of steel laid one above the other, and known as elliptic springs, the object being to construct a spring from a single plate of metal. While I am aware that this object has been attempted by rolling the plate from the center toward the ends of a gradual and regular diminish, I am also aware that such construction has invariably proved a failure, inasmuch as by practical tests the springs thus constructed are found to break at about the same place, that is, about midway between the center and end of the spring.

As the greatest strain upon the spring is at the center, and the least at the ends, it follows that there must be a proportionate thickness, whereby an equal strength may be maintained throughout the entire length of the spring; and

My invention consists in constructing the spring from a single thickness of metal, rolled from the center toward the end, diminishing in thickness as the strain decreases.

At the center *a* the spring is the thickest, there being the greatest strain, and thinnest at the point *d*.

As heretofore formed, the spring at the point *f*, midway between the center and ends, has been of a thickness less one-half the difference between the end and center, that is to say, the spring diminishing regularly from the center to the ends, and springs of this construction are by practical tests found to break

somewhere from the point *f* toward the ends of the spring. To avoid this, I construct my spring upon the principle shown in diagram, fig. 2, the same reference being used as in fig. 1.

At the point *d* it will be evident that the breaking-strain is as nothing, that is to say, a perfect edge or point of metal there would support any amount at the center *a*.

By practical tests I find that the breaking-strain upon the spring, from the point *a* to the point *d*, diminishes in proportion to the thickness ascertained by describing the upper line from one center *n* of a given radius, and the underside from another center *m* of the same radius, and upon this principle I construct the spring as shown in fig. 1, as the spring cannot be a complete half circle, as in fig. 2, the points *d* must be of sufficient thickness to support the weight at the center, then finding, as in fig. 2, that at the point *f* the metal is about two-thirds the thickness of the metal at the point *a*, I make the thickness at the point *f*, the same as at the point *d*, and two-thirds the difference between the point *d* and point *a*, then these points *a*, *d* and *f* being formed, and the proper curvature given to either the upper or lower line, I find a common center to these said points, and describe the circle to intersect the said points, which gives a proportionate thickness to the spring throughout its length. Thus, commencing at the center, I draw the metal down, decreasing toward the ends in the proportion described; hence I produce a spring which is no more liable to break in one place than another, and the elasticity of which is alike at all points.

I claim, as my invention—

Carriage-springs formed from a single piece or thickness of metal, diminishing in thickness from the center toward each end in proportion, and substantially in the manner set forth.

B. T. HENRY.

Witnesses:

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