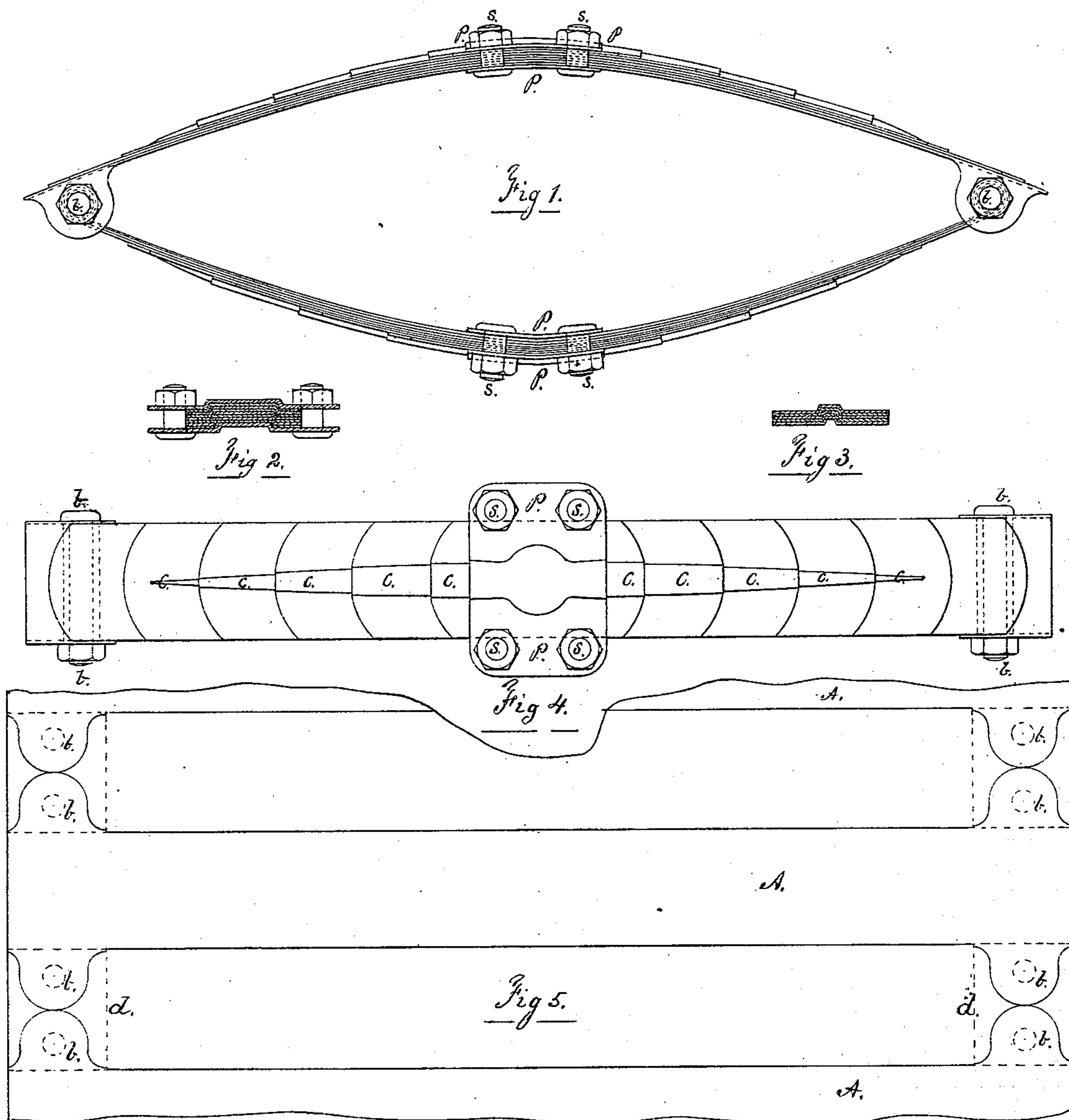


R. HALLORAN.

Improvement in Elliptic Springs for Vehicles.

No. 123,396.

Patented Feb. 6, 1872.



Stanley S. Stout

Witnesses.

Richard D. Halloran

W. H. Morley

per Boyd Elliott atty

Inventor.

UNITED STATES PATENT OFFICE.

RICHARD HALLORAN, OF NEW YORK, N. Y.

IMPROVEMENT IN ELLIPTIC SPRINGS FOR VEHICLES.

Specification forming part of Letters Patent No. 123,396, dated February 6, 1872; antedated January 31, 1872.

RICHARD HALLORAN.—SPECIFICATION.

I, RICHARD HALLORAN, of the city, county, and State of New York, have invented certain Improvements in Elliptic Springs, of which the following is a specification:

Nature and Object.

My invention relates to that class of springs in which the several leaves are formed of sheet metal, or in which all portions of the leaf may be of the same thickness; and the object of this invention is, first, to compensate for the requisite taper of the several leaves from the center to the ends, as is necessary in a perfect spring; not by tapering the strips for the leaves as is commonly done, but by raising a tapering rib along the center of each leaf of such a degree in width and height as to properly stiffen the leaf from the ends toward the center. A second important object is also accomplished by the raising of said ribs in the several strips or leaves—viz., that of so stiffening the strips of sheet metals that a stiffer spring can be formed from a given weight of metal than is required when the strips or leaves are left flat.

Another important function also arises from such a construction—viz., that the several leaves are held in proper position relatively to each other, without the necessity of using studs or bolts through the leaves, which always weaken the spring.

Drawing.

Figure 1 is a side elevation of the spring as complete. Figs. 2 and 3 are sectional views. Fig. 4 is a top view. Fig. 5 is a plan of the sheet before the first leaf is cut, but laid out ready for the dies, and showing how the metal is economized in the making of such springs from the sheet, as will be hereinafter explained.

It may be remarked here that I have planned and have in process of construction a series of machines to form said springs by the use of dies, and which will be the subject-matter of another patent as soon as ready. But for the present it is only necessary to say that one set of dies punches the first leaf, as at A A, Fig. 5, from the sheet forming the lugs ready for bending;

after which the holes are punched for the pivot-bolts, as at *b b*, and then another set of dies raises the rib C C, which must be of such a shape, both laterally and vertically, as to increase the stiffness of the leaf in just the proportion such stiffness would be increased were the leaf properly forged and tapered to form a perfect spring—that is, a gradually increasing taper from or near the ends of the leaf toward the center both in width and height—and at the center said rib may be swelled to a circular form, but flattened and not spherical or oval-shaped. Then each successive leaf is made to conform in a proper degree of size and shape to the first leaf, so that one will fit snugly upon another throughout the series, and when placed together will form a nut, as seen at Fig. 1, sections of which are seen at Figs. 2 and 3, and a top view of which is shown at Fig. 4. Clamping-plates, as at P P, Figs. 1 and 4, are then placed on both sides of the series, and are held in position partly by their being made to conform to the shape of the rib at the center of the spring, or so much of it as is underneath the plates, and partly by the screw-bolts S S, which extend through the pairs of said plates.

When the lugs are formed by the dies in punching the leaves from the sheet, it is evident that a great waste of metal would be caused were the strips for each leaf cut from the sheet before it were placed under the dies; consequently to economize the metal as much as possible I form said lugs half as long as the leaves are wide, so that the strip which is left between two leaves with lugs will form a shorter leaf, as partially indicated by the dotted lines *d d*.

After the holes are punched in the lugs and the ribs are formed, the lugs are then bent to a right angle with the face of the leaf as in the common form of such springs, and the two inner leaves are held together by screw-bolts or rivets through them, as at *b b*, Figs. 1 and 4. But the joining of the ends, as at *b b*, may be greatly varied, as both the inner top and bottom leaves may be curled in the same direction, and one around the other and fastened by a rivet and washer, thereby dispens-

ing with the lugs at *b b* altogether, as in a recent patent granted to Wm. A. Sweet, of Syracuse, New York; but

What I claim as my invention is—

I claim an elliptic spring, made of sheet metal, having the leaves of substantially the same thickness throughout, but varied in elas-

ticity and resistance by a tapering rib, as described, and for the purposes set forth.

RICHARD HALLORAN.

Witnesses:

BOYD ELIOT,
E. N. ELIOT.