

J. D. RICHARDSON.
Carriage-Springs.

No. 138,438.

Patented April 29, 1873.

Fig. 1

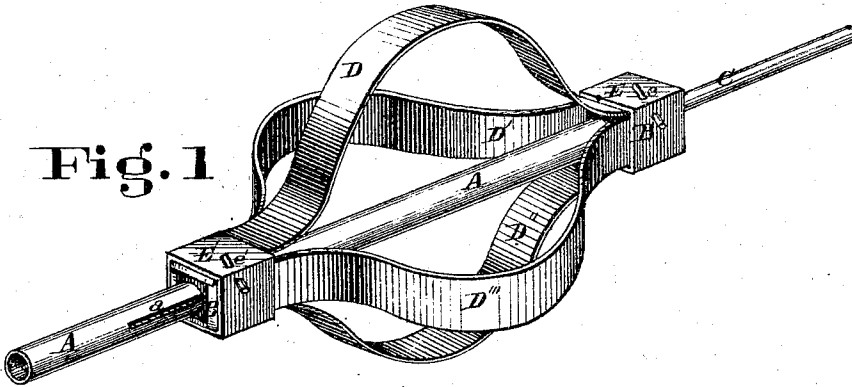
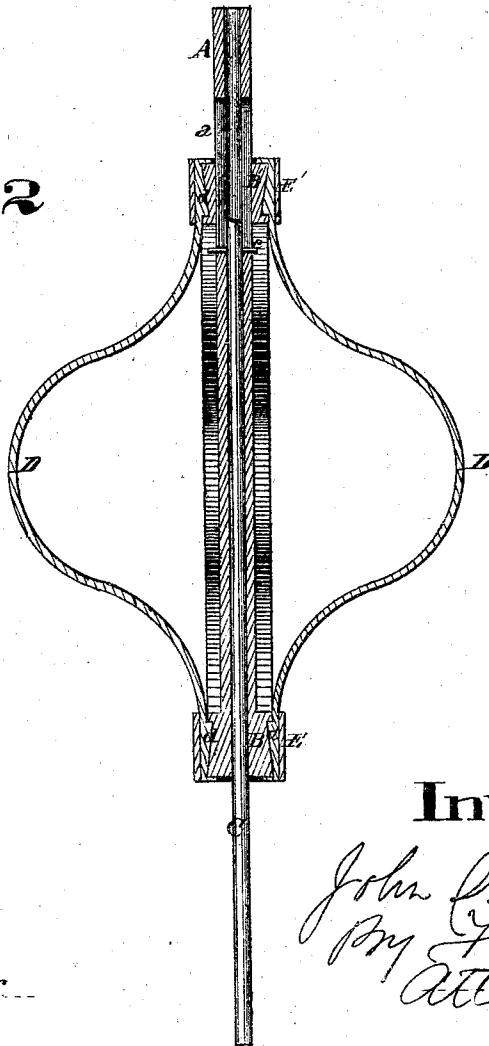


Fig. 2



Attest

Notary

Ch. E. Webber

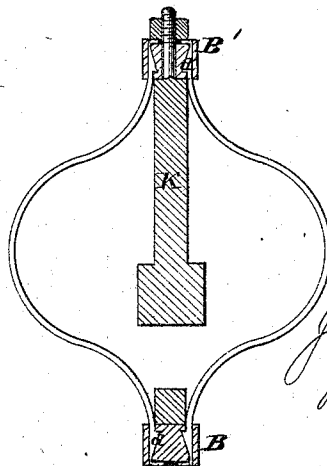
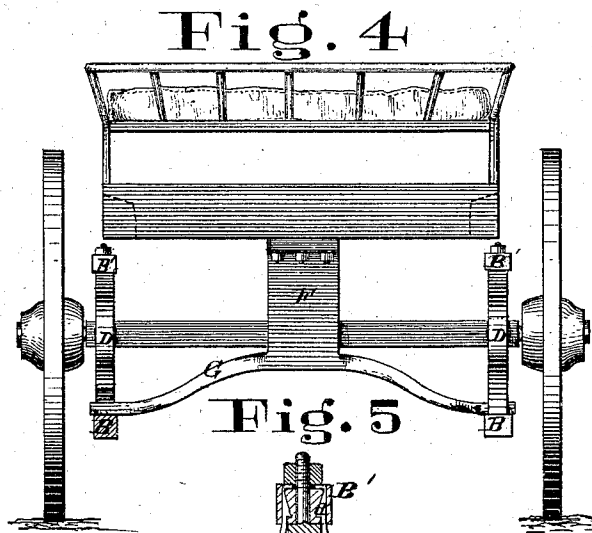
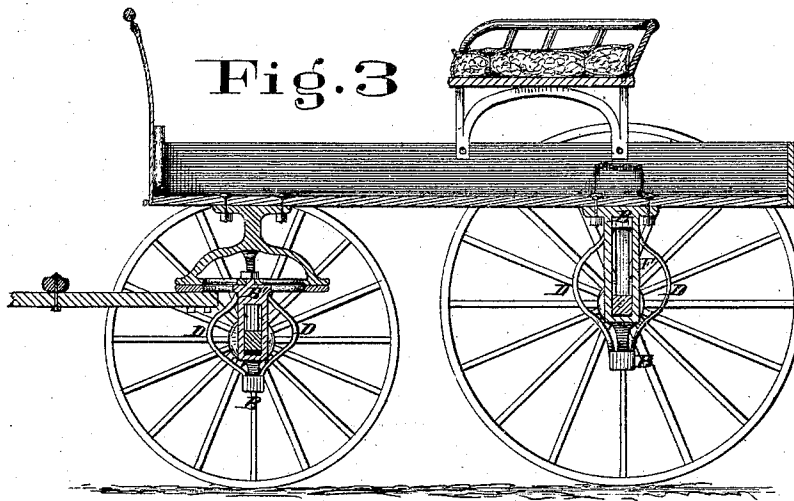
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UNITED STATES PATENT OFFICE

JOHN D. RICHARDSON, OF HOUSTON, TEXAS, ASSIGNOR TO HIMSELF AND
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IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **138,438**, dated April 29, 1873; application filed
August 29, 1872.

To all whom it may concern:

Be it known that I, JOHN D. RICHARDSON, of Houston, Harris county, Texas, have invented a certain new and useful Improvement in Springs, of which the following is a specification:

Nature and Objects of Invention.

My invention consists of a certain construction of spring for wheel vehicles or other uses, wherein double concavo-convex spring-plates, terminating in straight ends with bent hooks, are so connected to stationary and moving heads as to become more or less straightened under the load, thereby assuming a stronger position the heavier the strain becomes, and, while easily flexed under a light strain or at the commencement of a jerk, becoming more and more rigid as it increases, until, under an extreme load, the metal assumes a position directly parallel to the line of strain, thereby opposing its greatest strength to support the load.

Description of the Accompanying Drawing.

Figure 1 is a perspective view of a spring embodying my invention. Fig. 2 is an axial longitudinal section of the same. Fig. 3 is an elevation, partially sectionized, showing the application of a modified form of my invention to a wagon. Fig. 4 is a transverse section of Fig. 3. Fig. 5 is an enlarged section, showing the details of this modification.

A is a hollow metallic spindle, bearing at one end a cubical metallic head, B, which is fixed, and having a similar movable one, B', near its other end, through which it slides. Inside this spindle plays another, C, solid and of smaller diameter, at whose extremity is a key-pin, *c*, which moves in the slots *a* of the spindle A and supports the loose head B'. Assembled upon the four faces of the two heads B B' are four double concavo-convex steel spring-plates, D D' D'' D''', which are held upon the heads partially by their bent ends, partially by swaged projections *d*, which fit into recesses in the heads, and are all confined to their places by the metallic hoops or ferrules E E', which are secured in their position by the key-pins *e e'*, diagonally inserted through the corners of the heads and hoops.

The lower end of spindle C being supported,

and a weight applied upon A, the effect of said weight is to press down the fixed head B, increasing the distance between the heads and straightening the spring-plates, which become more rigid as they are elongated.

Figs. 3, 4, and 5 show a modification of this spring, having only two curved spring-plates, attached to the axle of a wagon, the body of which rests upon a slide, F, which embraces the axle and has at its lower extremity a curved cross-bar, G, which bears at each end upon the lower head B of the spring D, the upper head B' being supported on a solid upright, K, which takes the place of the spindles A C.

The tendency of the load, then, is to elongate the spring, and, as in the first form of spring, to produce a proportionate resistance on the part of the curved plates, which assume a more rigid position as the strain increases, and must evidently, under an extreme load, assume a straight vertical position, in which the action of the spring, as such, ceases, and the whole tensile strength of the metal becomes available to support the weight which is transmitted to the axle by the bent ends and indentations *d*.

The double concavo-convex form of the springs obviates the use of hinges at the ends of the same, as in the C-springs heretofore used in the above-described manner; but the most important advantage gained by the double concavo-convex form is, that the springs may be pulled perfectly straight without bending the metal at the junction with the heads.

Claims.

1. The combination of heads B B' and double concavo-convex bent springs D D', constituting a spring which in use will elongate or straighten under a load, substantially as and for the purpose specified.

2. The combination of heads B B' *d'*, side spring-plates D *d*, and hoops E E', substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOHN D. RICHARDSON.

Witnesses:

H. G. WEBBER,
HENRY MILLWARD.