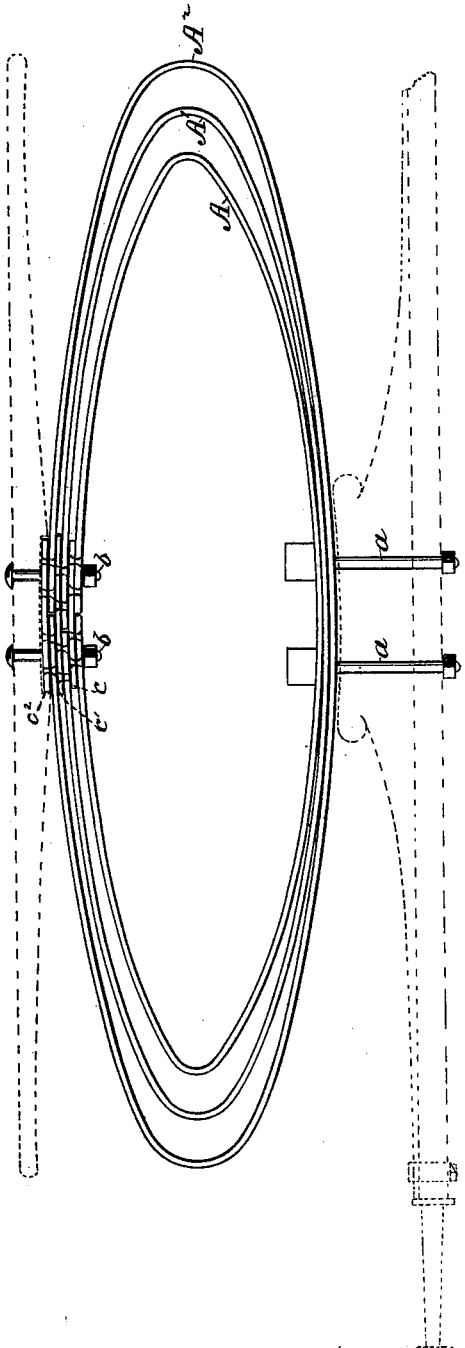
N. J. TILGHMAN.

ELLIPTIC-SPRING.

No. 191,731. Patented June 5, 1877.



WITNESSES:

W. W. Hollingsworth

Edw. W. Byrn

INVENTOR:

Noah J. Tilghman

BY

Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE

NOAH J. TILGHMAN, OF TYASKIN, MARYLAND.

IMPROVEMENT IN ELLIPTIC SPRINGS.

Specification forming part of Letters Patent No. **191,731**, dated June 5, 1877; application filed May 14, 1877.

To all whom it may concern:

Be it known that I, NOAH J. TILGHMAN, of Tyaskin, in the county of Wicomico and State of Maryland, have invented a new and Improved Elliptic Spring; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which the figure is a side view of the spring, with the axle and spring-bar in dotted lines.

My invention relates to an improvement in elliptic springs designed more particularly for the use of vehicles, but applicable for other purposes.

The invention belongs to that class of springs in which the plates are made of a single continuous piece of metal bent around in elliptical form without end joints, and placed one within the other.

The improvement consists in bringing the ends of the plates together so that the free ends of each plate abut, and in riveting said free ends to a lap-joint plate, which performs the double function of connecting the ends of the plate and of separating and removing any one spring of the series from the next adjacent ones, so that such springs do not touch each other at this point, and whereby each spring is rendered capable of free, easy, and independent movement, without impinging against the others, which, to a great extent, obviates the disagreeable creaking noise.

In the drawing, A A^1 A^2 represent three concentrically-arranged elliptical springs, made each of a single plate of steel bent around without joints, and with their free ends abutting against each other in the middle parts of the spring or minor axis of the ellipse. These springs are fastened to each other and to the axle of the vehicle below by means of bolts *a a*, which pass through centrally-arranged holes in said springs, and are fastened to each other at the top, and to the spring-bar of the vehicle-body by means of bolts *b b*.

In order to connect the free ends of the plate of each spring, so as to make each spring integral in itself, I bring the said ends together so as to abut, and apply plates *c* c^1 c^2 to the ends of each spring, the said plates being riveted to the said ends. These plates, which constitute the only novel feature of my invention, serve a twofold purpose in this connection. In the first place, they serve to connect and secure the ends of each spring, to make each spring integrally separable from the rest. In addition to this function, also, when the springs are arranged in series, they alternate with the springs, and thus serve to separate and remove the surface of any one spring from the surface of the next adjacent springs, whereby each spring is permitted to have its own free and independent movement without impinging, griping, and binding against the others, and whereby is avoided the rubbing of the paint, the rusting of the metal, and the consequent disagreeable creaking noise attending the same.

The merit of the continuous form of elliptical spring bent around without end joints is that a much stronger and stiffer spring is secured in proportion to the amount of metal used, for the tension of this spring is represented not only by the elasticity of the long curve, (as is the case when the springs are jointed at their ends,) but this elasticity is reenforced by the elasticity of the short bend at each end, which makes a single-plate spring of this form possess the ability to carry the same burden that a three-plate leaf-spring does when jointed at the end, the thickness of plate being the same in each.

This property, it will be seen, enables me to construct vehicles with a sufficient tension to the spring, but lighter than other vehicles by the amount of weight dispensed with in the spring, while at the same time, by dispensing with the joints and leaves, the manufacture of the spring is greatly simplified, and their production cheapened.

Another important advantage is that, with this construction and arrangement, one section of the spring may be removed from the center, or an additional one may be added thereto, either to diminish or increase the force in adapting the spring to greater or less burdens, the symmetrical arrangement of the one spring within the other readily permitting this without injury to the others, and without other alteration or adaptation than the simple loosening of the bolts, and the insertion or removal of the plate.

Another advantage still, is that, if one of the spring-plates breaks, the others support the vehicle-body and the latter does not fall down, as is the case with the leaf-spring.

Having thus described my invention, what I claim as new is—

The spring herein described, composed of a series of concentric elliptical plates, A A^1 A^2, formed each of a single piece of metal, bent as described, and having their free ends united in the center, and separated by lap-joint plates c c^1 c^2, substantially as described, and for the purpose set forth.

NOAH J. TILGHMAN.

Witnesses:
SOLON C. KEMON,
CHAS. A. PETTIT.