J. E. JEFFREY.

Springs for Vehicles.

No. 147,644. Patented Feb. 17, 1874.

Fig. 4.

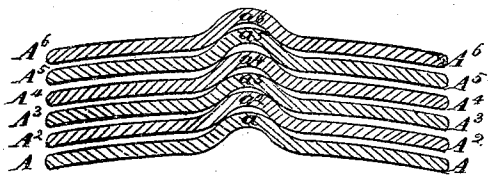


Fig. 5.

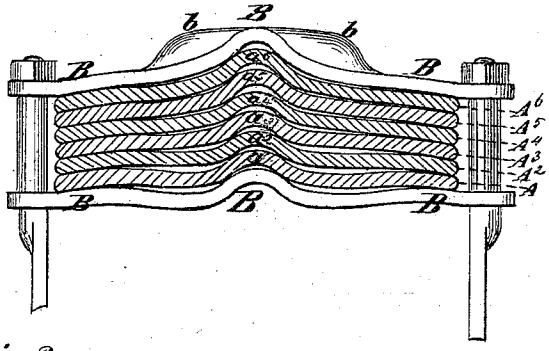


Fig. 3

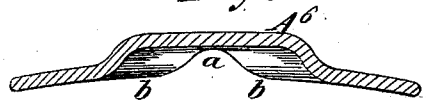
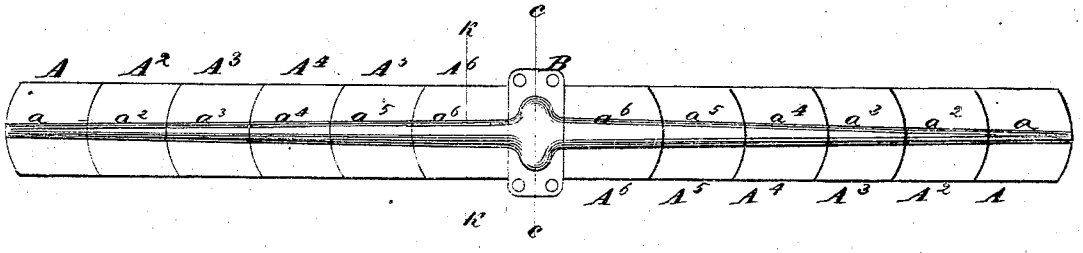


Fig. 2.

Fig. 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN E. JEFFREY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SPRINGS FOR VEHICLES.

Specification forming part of Letters Patent No. **147,644**, dated February 17, 1874; application filed February 8, 1873.

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 a new and useful Improvement in Elliptic Springs, of which the following is a specification:

This invention has for its object to improve the construction of compound elliptic springs—that is to say, of elliptic springs made in layers or leaves of sheet metal, such as are frequently used on vehicles of various kinds, and for other purposes. The invention has for its object, principally, to make such compound spring laterally elliptic in its body; and consists in forming or upsetting on each leaf a rib extending the length of the leaf, and provided in its middle with side enlargements or a cross-rib. The shape, in cross-section, of the rib named is rounding off toward the top of the spring, and rounding, also, on the top of the rib; and when several leaves forming such ribs, all of equal size except as to length, are placed upon another, the ribs will, where they fit into each other, leave small concavo-convex spaces between them; and if strain or pressure is applied to the spring, it will be in itself compressed by reducing the thickness of these said spaces.

I am aware that a patent has been granted to R. Halloran on the 6th February, 1872, and numbered 123,396, in which the leaves of a compound elliptic spring are provided with ribs; but the ribs in Halloran's patent are larger for the upper leaves than for the lower, so that they fit exactly into each other, and do not make the spring laterally elastic. This fact will fully appear from Figs. 2 and 3 of Halloran's patent. Moreover, the ribs of the spring shown in Halloran's patent are made with straight sides, and, therefore, not capable of the gradual and lateral expansion which is necessary to give the spring the elasticity desired. By having his leaves constructed with ribs of varying sizes, it is necessary for him, also, to manufacture each leaf by a separate pair of dies, while I use but one pair of dies for all the leaves of the entire spring.

In the accompanying drawing, Figure 1 represents a top view of my improved compound spring. Fig. 2 is a longitudinal section of the lower longer leaf of the same. Fig. 3 is a detail transverse section of the upper leaf, the line *k k*, Fig. 1, indicating the plane of section; and Fig. 4 is a vertical transverse section on the line *c c*, Fig. 1, showing the leaves of the spring placed together, but not yet clamped by the clamping-plate. Fig. 5 is a transverse section, in the same line *k k*, of the spring complete.

Similar letters of reference indicate corresponding parts in all the figures.

A A^2 A^3 A^4 A^5 A^6 are the six, more or less, leaves of which the spring is composed, the lowermost leaf, A, being longer than the one next above, and this, again, longer than the one above it, &c., the uppermost leaf being the shortest, as is clearly shown in Fig. 1. The leaves are made of sheet metal, of suitable thickness, and each one has a longitudinal rib formed on its upper surface, and a corresponding depression in the lower surface, by being upset between a suitable pair of dies. These dies are so shaped that, on the lowermost leaf, A, the rib *a* will gradually vanish at or toward the ends, as is clearly indicated in Fig. 2. The next upper leaf, being upset between the same pair of dies, will have its rib a^2 exactly like that of the corresponding length of the lower leaf, and so with each upper leaf, the ribs a^3 a^4 a^5 a^6 all being formed between the same pair of dies, and, therefore, equal in cross-section wherever they are above each other. Of course the uppermost leaf, a^6, will have its rib but very little, or not at all, reduced in width or height toward the end; or, at least, the reduction is so gradual that, if it does exist, it can hardly be ascertained on the shortest leaf. In the center of each leaf the rib *a* has lateral extensions *b*, which fully appear in the drawing, and which are all alike in all the several leaves. The clamping-plates B B′ of the spring are provided with a longitudinal rib and with cross-ribs, the same as the leaves of the spring.

From Fig. 5 it will appear that a spring thus constructed, when it has several leaves superposed, will be free to have vertical as well as lateral elasticity, as each lower leaf supports the one next above only with part of the side of the rib, leaving spaces between the upset parts of the leaves, as well as between the flat parts thereof. When pressure or strain is applied to the spring, the upset parts of the

leaves under such pressure or strain will become momentarily flattened out, thus causing the spring to have lateral elasticity, and not only the longitudinal elasticity usually found in such springs.

A spring thus made will, therefore, be better adapted to the purpose for which wagon-springs are intended, and will serve to preserve the wagon-bodies from rapid wear better than the springs heretofore in use.

I claim as my invention—

A compound spring, the leaves A A^2 A^3, &c., of which are formed with rounded longitudinal ribs *a* a^2 a^3, &c., and cross-ribs *b*, said ribs being equal in cross-section wherever they are above one another, all substantially as set forth.

JOHN E. JEFFREY.

Witnesses:
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