H. JEFFREY.

ELLIPTIC SPRING.

APPLICATION FILED JULY 12, 1909.

941,521. Patented Nov. 30, 1909.

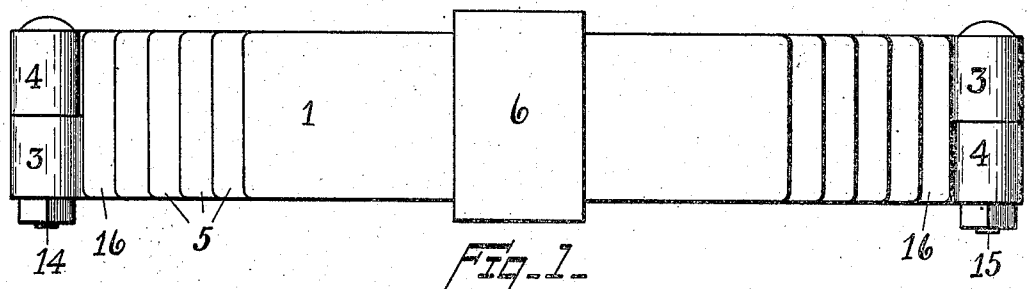

FIG. 1.

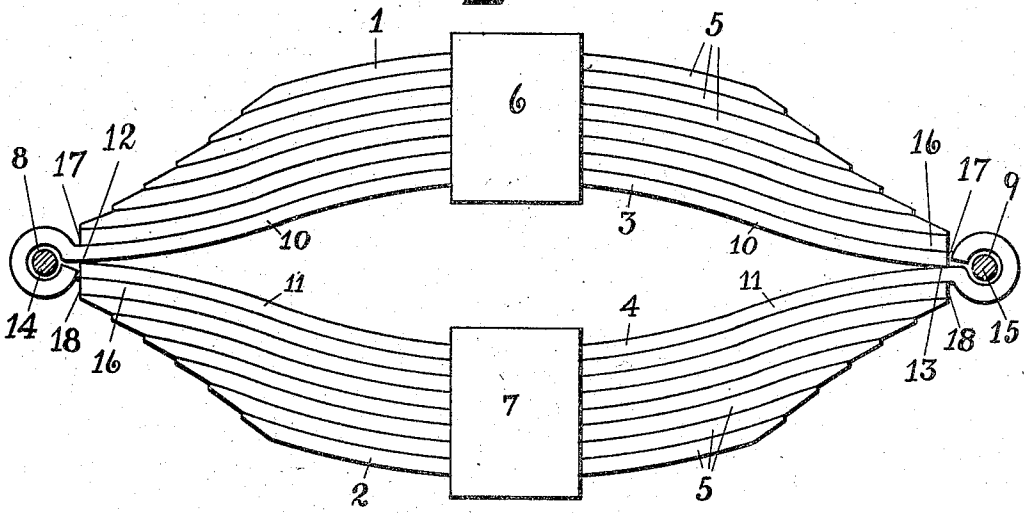

FIG. 2.

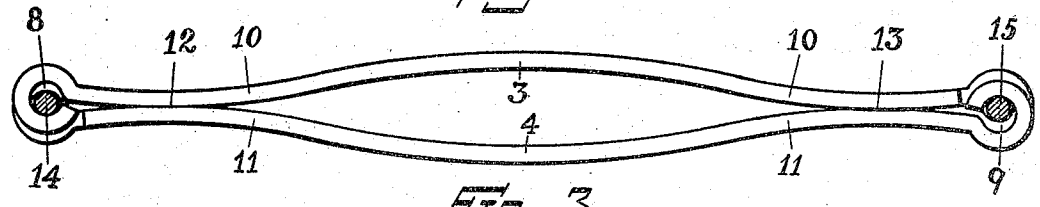

FIG. 3.

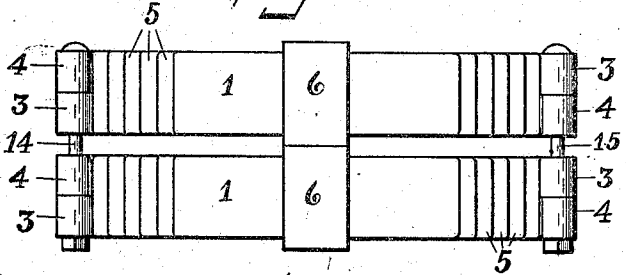

FIG. 4.

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ELLIPTIC SPRING.

941,521. Specification of Letters Patent. Patented Nov. 30, 1909.

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To all whom it may concern:

Be it known that I, HARRY JEFFREY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Elliptic Springs, of which the following is a specification.

This invention relates to elliptic vehicle springs, and especially to springs for railroad cars; and the objects of my improvement are, strength and durability, ease of manufacture, cheapness of manufacture, flexibility, to provide a spring in which the stiffness and strength increases proportionately to the pressure upon it, and to avoid friction between the parts. These objects I attain by means of the structure illustrated in the accompanying drawings, in which—

Figure 1 is a plan view; Fig. 2, a side elevation; Fig. 3, a side view of the adjacent fundamental leaves under stress; and, Fig. 4 is a plan view of two spring elements joined together.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

The full elliptic spring comprises the usual upper and lower sections, 1 and 2. My invention inheres in the peculiar construction of the adjacent fundamental leaves 3 and 4. The supplemental leaves, 5, are of the ordinary construction. The leaves of the upper and lower sections of the spring are shown bound together by metal straps, 6 and 7, the two fundamental leaves 3 and 4 are half-and-halved together at their ends, the blanks of which they are formed being correspondingly notched, at one end on the right hand side, and at the other on the left hand side, as indicated by the reference numerals 3 and 4 in Fig. 1. This I prefer to accomplish when shearing the blanks from the bar of stock by a Z-shaped cut. Thus there is no waste of material. The half-bar extensions at the ends of the blank are then formed into symmetrical and similar eyes, 8 and 9. Both fundamental leaves 3 and 4 are formed alike, and are therefore interchangeable. This results in an advantage both in the manufacture and in making repairs.

The leaves 3 and 4 are made, at their ends, 10 and 11, intermediate the eyes and the strap 6 or 7, in the form of an ogee curve, so that when two leaves are placed together mutually facing, their adjacent surfaces bear against each other entirely across their width, at 12 and 13, just inward of each eye. By reason of this construction, (Fig. 3) the leaves 3 and 4, when compressed in operation, bear against each other with a rolling contact, and the greater the stress and consequent compression, the more the contacts at the opposite ends approach each other and the middle of the spring, and the stiffer and stronger the spring becomes. The stiffness and strength of the spring, therefore, increases in proportion to the pressure upon it.

The eyes 8 and 9 need not be accurately formed, since they are not required to have a bearing upon one another or upon a pin or bolt, as is usual.

The leaves 3 and 4 are held in alinement vertically by means of pins, 14 and 15, which are placed through the eyes 8 and 9. These pins do not fit the eyes snugly, but very loosely, being of considerably less diameter than the bore of the eyes. They are adapted to secure the fundamental leaves together laterally, and to allow the eyes to move freely vertically in opposite directions relative to each other with considerable amplitude. This movement is necessary on account of the rolling contact (Fig. 3) between the adjacent leaves 3 and 4. If the eyes 8 and 9 and pins 14 and 15 made a snug bearing the eyes would be broken off when the spring was compressed.

In practice, I prefer to place two or more springs side by side, passing the bolts 14 and 15 through the eyes of the series, and thus joining the several elements together.

The second leaf, 16, of each section of the spring is preferably square on the ends, and brought down to the outer surface of the eyes, as shown at 17 and 18.

Having thus described my invention, so that any one skilled in the art pertaining thereto may make it and understand its use, I claim—

1. In an elliptic spring, having adjacent interconnecting leaves provided with an eye at each end, the eyes of opposite corresponding leaves mutually half-and-halved together laterally, said leaves joined together by a pin adapted to hold them together laterally only, when the spring is under stress, said eyes being of larger diameter than said pin and said pin being of smaller diameter than said eyes, said leaves bearing against each other intermediate said eyes and the middle of the spring,

in such a manner that said leaves in operation bear against each other with a rolling contact.

2. In an elliptic spring, the adjacent fundamental leaves formed at their opposite ends with an ogee curve, the ogee curved portions being oppositely disposed so as to bear against each other in operation with a rolling contact.

3. In an elliptic spring, adjacent fundamental leaves, provided with eyes which are mutually laterally half-and-halved together and secured together by means of pins which act laterally only, said eyes being free to move vertically in opposite directions mutually, and said leaves bearing in operation with a rolling contact.

4. In a full elliptic spring, adjacent fundamental leaves secured together mutually in vertical alinement, adapted to bear against each other in operation with free rolling contact and nearer the middle of the spring as the stress is increased, so that the stiffness of the spring is increased as the pressure thereon is increased.

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