

No. 724,213.

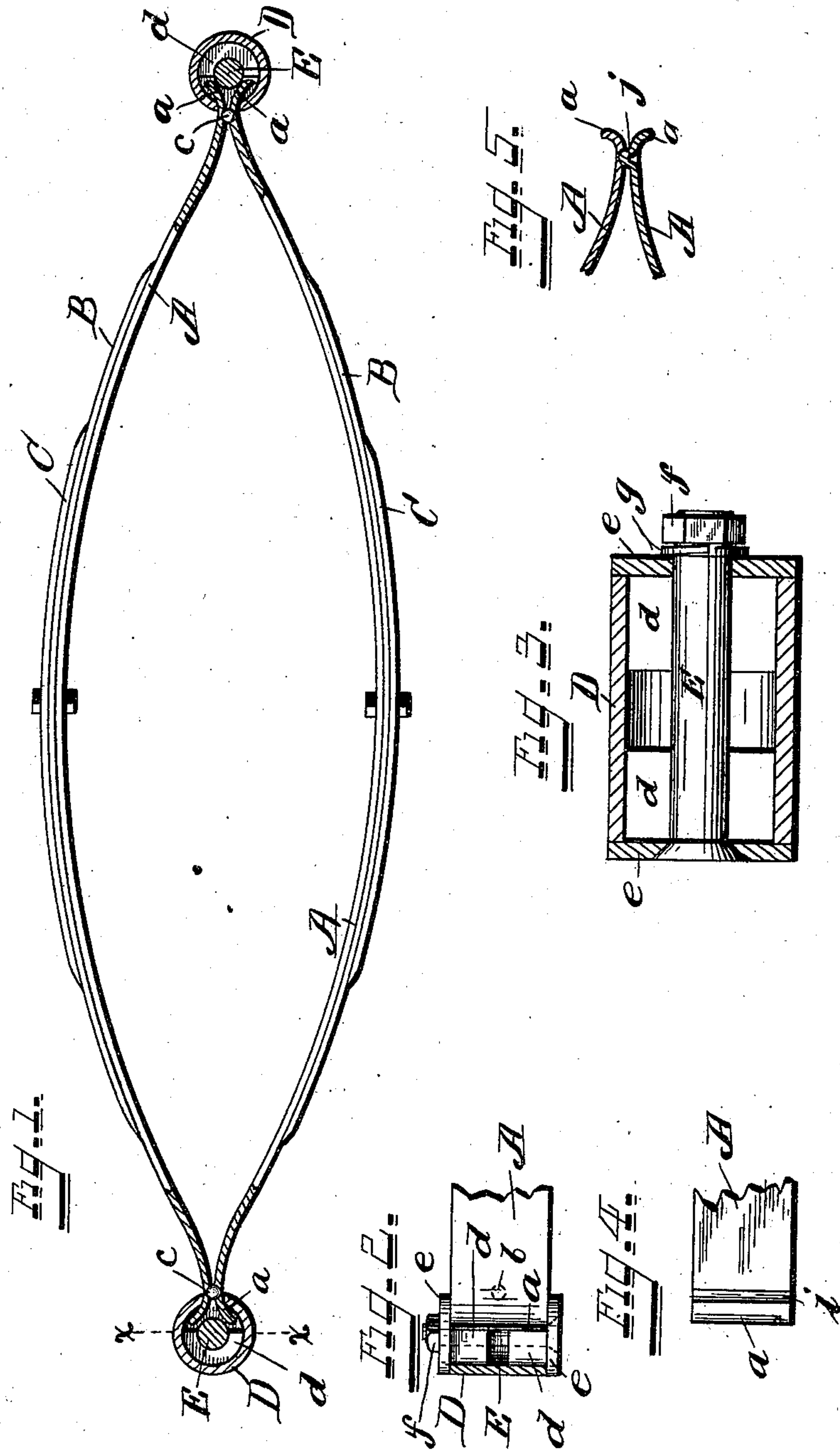
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ELLIPTICAL SPRING.

APPLICATION FILED OCT. 9, 1902.

NO MODEL.



Witnesses.

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UNITED STATES PATENT OFFICE.

EZRA B. SMITH AND EDWARD FUNK, OF CINCINNATI, OHIO.

ELLIPTICAL SPRING.

SPECIFICATION forming part of Letters Patent No. 724,213, dated March 31, 1903.

Application filed October 9, 1902. Serial No. 126,553. (No model.)

To all whom it may concern:

Be it known that we, EZRA B. SMITH and EDWARD FUNK, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Elliptical Springs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to elliptical springs for vehicles; and it has for its object an improved construction of the heads of such springs by which the leaves are united at their ends, whereby the weakening of the leaves is prevented, the spring simplified in construction and rendered more efficient and durable, and that disagreeable squeaking noise which is so frequent in springs of ordinary construction as they play up and down is prevented.

The novelty of our invention will be hereinafter set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of an elliptical spring embodying our invention. Fig. 2 is a plan view, partly in section, of the left-hand head of Fig. 1. Fig. 3 is an enlarged sectional view on the dotted line $x-x$ of Fig. 1 looking to the left. Fig. 4 is a detail plan view of the end of one of the securing-leaves under a modified form of construction. Fig. 5 is a sectional elevation of a pair of such leaves shown united and under a still further modified form of construction.

The same letters of reference are used to indicate identical parts in all the figures.

The leaves A B C, of which there may be any number desired to suit the burden of the spring, are of the usual or any suitable construction, and the leaves A are the innermost leaves, which are coupled at their ends to the heads. The ends of these leaves A may be bent or curved outwardly at their ends, as seen at a , and where they come in contact with each other each is provided with central recesses b on their adjacent faces, and in said recesses are confined steel balls of the kind used in ball-bearings. The curved ends of the leaves have slipped over them a split metal spring-tube D of a length just equal to the width of

the leaves A, and into the ends of this split tube D are inserted two semitubular spacing-blocks d , provided at their ends with washers e of a diameter equal to the external diameter of the split tubes D, to the ends of which they form covers, as seen in Figs. 2 and 3. Passed through perforations in these washers or covers e for each head is a bolt E, whose head is shaped to fit a countersink in one of the washers and whose opposite threaded end has screwed upon it a nut f , with an interposed split spring-washer g , Fig. 3. This construction forms a very cheap, simple, and secure head for the united ends of the leaves in which the latter are securely held and are given sufficient play under the opening and closing action of the springs and without longitudinal movement upon each other owing to the ball-bearings.

It is to be observed that by our construction we have a head which unites the ends of the leaves without requiring the same to be pivoted together, although said head is secured upon the leaves to hold them securely against any lateral movement and to reinforce them when they are compressed, and we also provide a bearing between the two leaves in the nature of a ball-bearing, which unites them and prevents them from slipping longitudinally one upon the other. As accomplishing this last result the construction illustrated in Fig. 4 may be employed, where instead of a perforation to receive a ball a channel i is formed across the leaves on their adjacent sides to receive a small steel cylinder of the same width as the leaves and which is partly recessed in both, or, as seen in Fig. 5, one of the leaves may have a projection or teat j , formed in it by a punch, which engages a recess in the opposite leaf similar to the recess b , which receives the ball.

In the modification of Fig. 4 the channel i need not extend entirely across the leaf, but may terminate before reaching the outer edges of the leaf, as indicated by the dotted lines, to form a pocket to receive an antifriction-cylinder of less width than the width of the leaf, as will be readily understood.

By means of the spacing blocks or lugs $d d$, which form bearings for the bolts E, the ends of the leaves A where they enter the tubular

heads are reinforced and supported against any unusual strains that the springs may be put to when they are compressed beyond a point which is usual in their ordinary work.

5 Should the compression of the springs be extreme, they will be thrown upon the tubular head, which will bear a part of the strain exerted upon the springs themselves.

Having thus fully described our invention,
10 we claim—

1. In elliptical-spring construction, the combination of the inner leaves having antifrictional bearings to secure simultaneous longitudinal movement of the leaves, a spring-
15 metal tubular head embracing the ends of said leaves and coacting therewith to reinforce the same, and washers secured to the

ends of said spring-metal tubular heads, substantially as described.

2. In elliptical-spring construction, the combination of inner leaves having their extreme meeting ends bent away from each other, a spring-metal tubular head embracing said ends and coacting with the same to reinforce the leaves, antifrictional bearings between the
25 leaves within the peripheries of the tubular heads, and washers secured to and covering the ends of said spring-metal tubular heads, substantially as described.

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Witnesses:

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