No. 627,869. Patented June 27, 1899.

O. MORRILL & H. P. WELLS.

ELLIPTIC SPRING.

(Application filed Apr. 10, 1899.)

(No Model.)

Fig. 1.

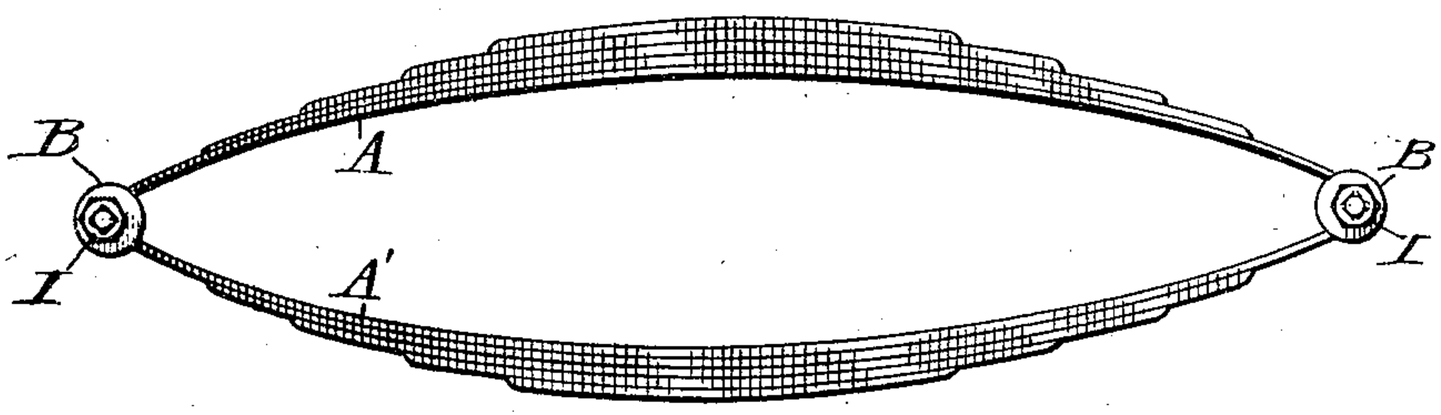


Fig. 2.

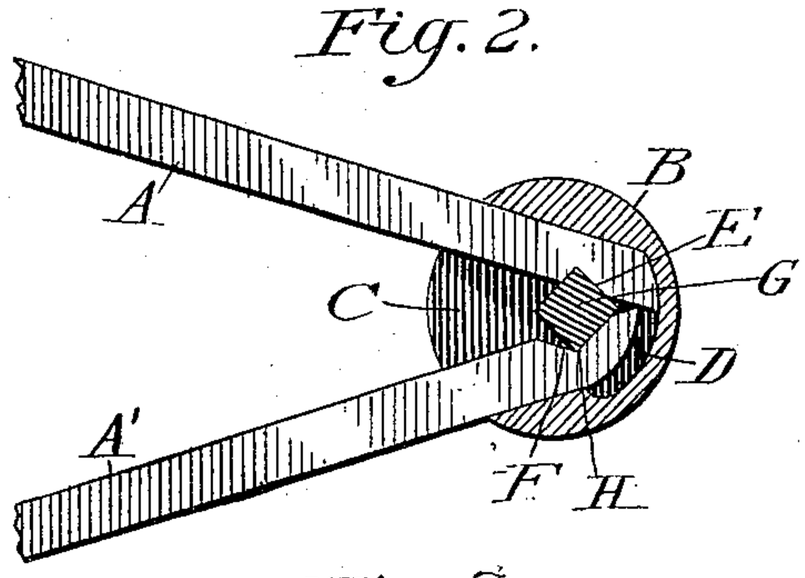
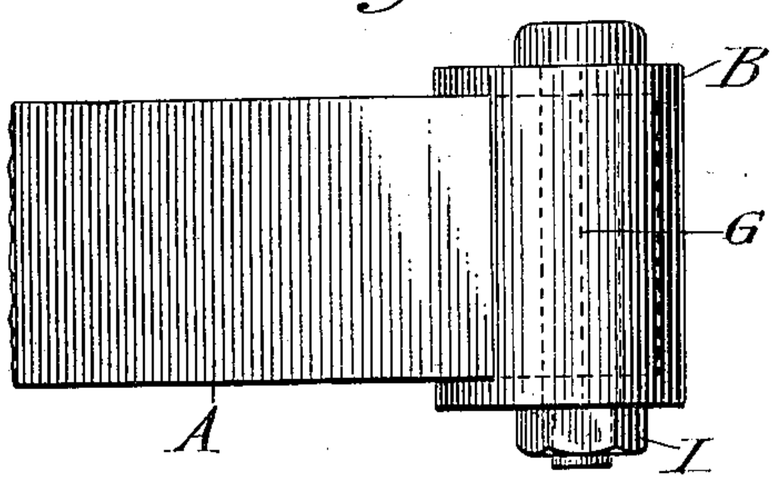


Fig. 3.



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UNITED STATES PATENT OFFICE.

OSGOOD MORRILL AND HARLAN P. WELLS, OF AMESBURY, MASSACHUSETTS.

ELLIPTIC SPRING.

SPECIFICATION forming part of Letters Patent No. 627,869, dated June 27, 1899.

Application filed April 10, 1899. Serial No. 712,498. (No model.)

To all whom it may concern:

Be it known that we, OSGOOD MORRILL and HARLAN P. WELLS, citizens of the United States, residing at Amesbury, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Elliptic Springs, of which the following is a specification.

Our improvements relate to elliptic springs and in particular to the master-leaves and the spring-heads which unite the leaves at the ends.

The object of our invention is the production of a spring in which the ends of the master-leaves will not be weakened by successive heatings or by being bent into the form of a ring to receive a bolt, which will practically eliminate friction between the leaves and spring-heads, and consequently be noiseless when in use, which will utilize the elasticity of at least one master-leaf to approximately the extreme ends thereof, which will be simple in construction, cheap in first cost, and the parts easy to assemble, and which, withal, shall possess other desirable features and characteristics and constitute a superior spring.

With the above end or purpose in view our invention consists in a spring provided at the ends with knife-edged bearings.

Further, it consists in a spring having each pair of the adjacent ends of the master-leaves confined in a spring-head by a bolt provided with a knife-edge.

Further, it consists in the combination, with the ends of the master-leaves, of spring-heads which hold the ends of one leaf practically immovable through the medium of a bolt and allow movement of the ends of the other leaf.

Further, it consists of a spring in which the ends of one master-leaf are held immovable in spring-heads and the ends of the other leaf movable on knife-edged bearings.

Still further, it consists in a spring having the ends of the master-leaves secured in the heads by knife-edged bolts and the ends of one leaf recessed to engage the knife-edges of the bolts, whereby the leaf is held against longitudinal displacement.

Finally, it consists in certain novelties in construction and combinations of parts hereinafter described and claimed.

The accompanying drawings illustrate one example of the physical embodiment of our invention constructed according to the best mode we have so far devised for the application of the principle.

Figure 1 is a side view in elevation of an elliptic spring having the adjacent ends of the master-leaves united by our improved spring-heads. Fig. 2 is a longitudinal sectional view of Fig. 3, showing the shape of the socket made in the head and the relative location of the parts when the spring is uncompressed. Fig. 3 is a plan view of one end of the spring shown in Fig. 1, illustrating the general form of the head and in full and dotted lines the location of the bolt which unites the leaves and head.

Referring to the several figures, the letters A A′ designate the master-leaves of an elliptic spring.

B is a spring-head, in general external appearance shaped like a cylinder; C, a recess or socket made in the body of the metal, within which are located the adjacent ends of the master-leaves, the length of the said recess or socket being equal to the width of a master-leaf, its depth slightly less than the diameter of the head, and its width, measured between the edges, about one-third of the circumference thereof.

D is a normally-unoccupied space at the bottom of the socket adjacent the end of the master-leaf A′ and of substantially the shape shown; E, a notch or recess made in the master-leaf A and extending its entire width; F, a notch or recess made in the end of the master-leaf A′ adjacent its free end; G, a headed and threaded bolt passing centrally through the length of the head and uniting the master-leaves and head, so that the former cannot be withdrawn from the socket in the latter; H, a knife-edged part of the bolt, extending lengthwise of the same for a distance preferably equal to the width of a master-leaf, and I is a nut on the threaded end of the bolt.

As clearly shown in Fig. 2, the wall of the socket adjacent the end of the master-leaf A is shaped to match the end of this leaf, so that when the bolt is inserted the end of the leaf will be practically immovable relative to the head by reason of the side of the bolt be-

ing seated in the recess E, made in the leaf, and forcing the latter into close frictional contact with the wall. Moreover, the bolt G itself cannot when so disposed rotate relative to the head.

The master-leaf A′ is made somewhat shorter than the leaf A and the notch or recess F formed large enough to allow the leaf to rotate about the knife-edge H of the bolt. The space D obviously is necessary to prevent the end of the leaf coming in contact with the bottom wall of the socket during the act of rotation. The entire weight of the load, of whatever nature, above the bolts G will be transmitted to the ends of the master-leaf A′ through the knife-edges H H of the bolts, and as the load increases and the master-leaves bend the bolts and the ends of the leaf A′ will change their relative positions, turning on the knife-edges without any appreciable frictional resistance, and hence without noise.

From the foregoing it is apparent that we have produced a spring which fulfils all the conditions hereinbefore enumerated as the object or purpose of our invention. The knife-edges of the bolts will prevent friction and noise. The strength of the ends of the master-leaves will not be seriously impaired. The elasticity of one leaf of the spring will be utilized approximately to the extreme ends thereof, and other characteristic and desirable results secured.

While we have illustrated and described only one example of the physical embodiment of our invention, we do not thereby intend to limit its scope to such example, inasmuch as changes may be introduced in the process of manufacture. For instance, the nut I may be omitted and the bolt end headed down or upset, the body of the bolt adjacent the knife-edge H may be changed in shape, the recess E also changed in shape and the bolt altered to fit the recess as changed, the bolt made angular, triangular, round, or elliptical, or one edge semi-elliptical, or of other form in cross-section, and the entire spring may be reversed in use, so that the load will be transmitted through the leaf A′ and the knife-edges H H to the leaf A. These and many other colorable changes, modifications, and alterations may be introduced without constituting a substantial departure.

What we claim as new is—

1. An elliptic spring having master-leaves and each pair of the adjacent ends of said leaves provided with a bearing having a knife-edge; in substance as set forth.

2. An elliptic spring having master-leaves and each pair of the adjacent ends of said leaves provided with a bearing having a knife-edge engaging a recess made adjacent the end of one of the master-leaves; in substance as set forth.

3. An elliptic spring having master-leaves and each pair of the adjacent ends of said leaves provided with a bearing consisting of a bolt having a knife-edge; in substance as set forth.

4. The combination in a spring, of spring-heads each having a socket; master-leaves; and means for holding the leaves in position within the sockets; the ends of one master-leaf being movable on bearings having knife-edges, and the ends of the other leaf substantially immovable relative to the heads; in substance as set forth.

5. The combination in a spring, of spring-heads each having a socket; master-leaves; and longitudinal bolts for holding the leaves in position within the sockets; the ends of one master-leaf being movable in the sockets and the ends of the other leaf substantially immovable; in substance as set forth.

6. The combination in a spring, of spring-heads each having a socket; master-leaves; and bolts provided with knife-edges for holding the leaves in position within the sockets; the ends of one master-leaf being movable in the sockets and on the knife-edges and the ends of the other leaf substantially immovable; in substance as set forth.

7. An elliptic spring having master-leaves with straight and unbent ends fitting within sockets made in spring-heads; the ends of one leaf immovable relative to the heads, and the ends of the other leaf movable on bearings which prevent longitudinal displacement of the leaf and which also are provided with knife-edges; in substance as set forth.

8. An elliptic spring having the ends of the master-leaves confined by bolts within sockets made in the spring-heads; one leaf being notched at the ends to engage the bolts and held immovable relative to the head; and the other leaf notched and movable relative to the bolts and held by them against longitudinal displacement; in substance as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

OSGOOD MORRILL.
HARLAN P. WELLS.

Witnesses:
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