(No Model.)

J. B. ARMSTRONG.

SPRING.

No. 267,317. Patented Nov. 14, 1882.

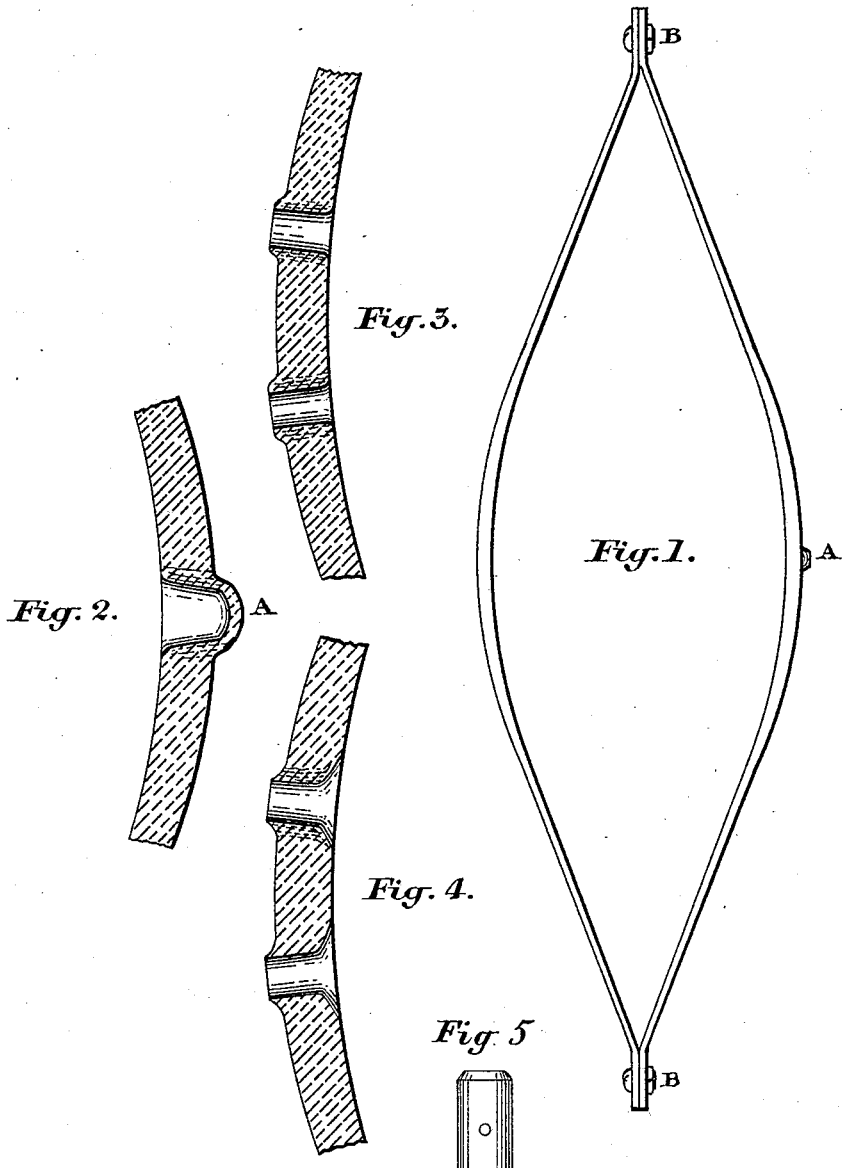

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5

Witnesses.

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JOHN B. ARMSTRONG, OF GUELPH, ONTARIO, CANADA.

SPRING.

SPECIFICATION forming part of Letters Patent No. 267,317, dated November 14, 1882.

Application filed March 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN BELMER ARMSTRONG, a subject of the Queen of Great Britain, residing at the city of Guelph, in the county of Wellington, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Springs, of which the following is a specification.

My invention relates more particularly to that class of springs known as "single-plate springs;" and it consists of the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

Figure 1 is a side elevation of my improved single-plate elliptic spring. Fig. 2 is an enlarged detail, showing the center portion of the spring, with the teat punched out of the solid stock. Figs. 3 and 4 are enlarged details of a portion of the plate, showing the formation of the holes. Fig. 5 illustrates the means for obtaining the independent boss or thimble, the construction there shown being made the subject-matter of a separate application.

After many years of experience in the manufacture of single-plate springs, I have at last discovered that in order to secure the greatest ease of motion and at the same time have the strain evenly distributed throughout the plate it is necessary to graduate the thickness of the spring on a taper of twelve sixty-fourths of an inch to the foot. I have experimented for some years, and have at last arrived at this taper as being the only one which will give the desired elasticity and ease of motion to the spring. In single-plate springs lightness is one of the objects aimed at. The plates are made so thin that the removal of any portion of the material is calculated to weaken the spring at that particular point. To avoid this, and at the same time enable me to obtain either a center teat or holes for the center bolts, I in the first instance punch the stock of the spring, so that it will protrude and form a teat, A, on the inside or outside face of the plate as may be required, but without breaking the material or in any other way weakening the spring at that point.

In order to have a hole for the center bolts, without weakening the plate at the point pierced, I use a punch and punch-block, so shaped that it will force the skin of the plate through the hole, forming either a concave hole, as shown in Fig. 4, or a straighter hole, as shown in Fig. 3. This I accomplish by means of a pointed drill or punch which will neither take away any portion of the metal nor materially rupture the fiber nor injure the grain. By slow punching the metal immediately surrounding the point of the punch is deflected downward and outward to form a separate boss at approximate right angles to the plane of the spring, as it is confined in the hollow block, where it is forced.

A sleeve or thimble being formed, when the spring is punched as shown in Fig. 3, by the outer skin of the plate protruding beyond the surface of the face, or when punched as shown in Fig. 4 a convex projection is formed on the outer side and a concave indentation on the inner side of the spring around the hole. Consequently in either case the point in the plate through which the hole is made is, if anything, stronger, while the projection formed on the face of the plate forms a teat which assists in securing the spring on its seat. In order to secure the ends of an elliptic spring rigidly together, the ends are straightened on a line with the longitudinal center of the spring, and the inside faces of the ends thus straightened are brought into contact with each other, and held rigidly together by a bolt, rivet, or clamping device, or only separated by a light piece of packing. By thus clamping the ends of the plates rigidly together there can be no movement in the joints, and consequently not only is all noise prevented, but also the wear caused by the rubbing of the plates together is obviated.

I am aware of Patents Nos. 68,217, 100,626, 151,881, and 237,849, and I do not claim the construction shown in either.

What I claim is—

A single-plate elliptic spring having holes re-enforced by a boss or thimble to receive the fastening-bolts, said holes being so punched that the grain of the stock at the hole is turned at or about at right angles to the spring, whereby the spring is strengthened at the holes, substantially as described.

J. B. ARMSTRONG.

Witnesses:
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