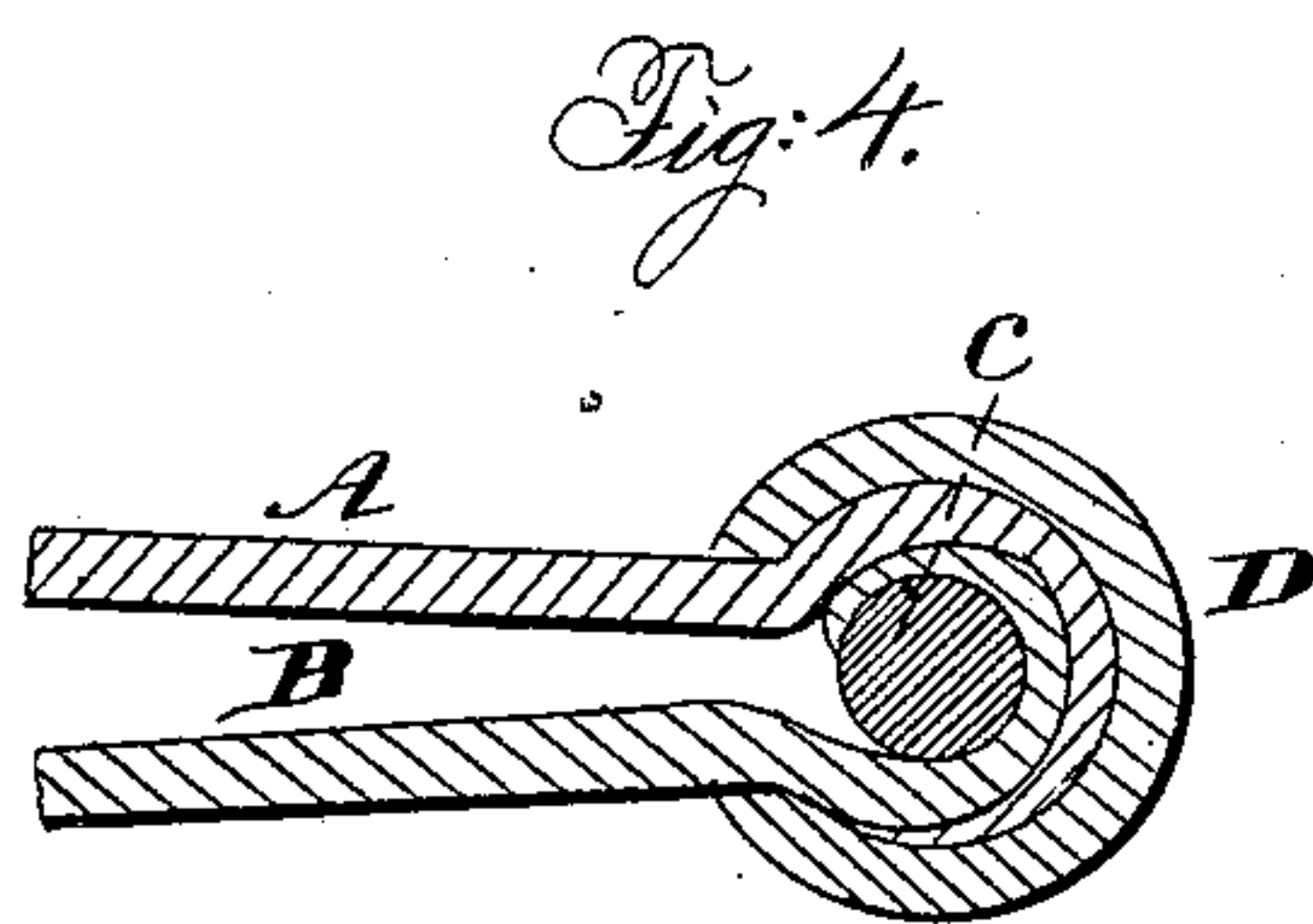
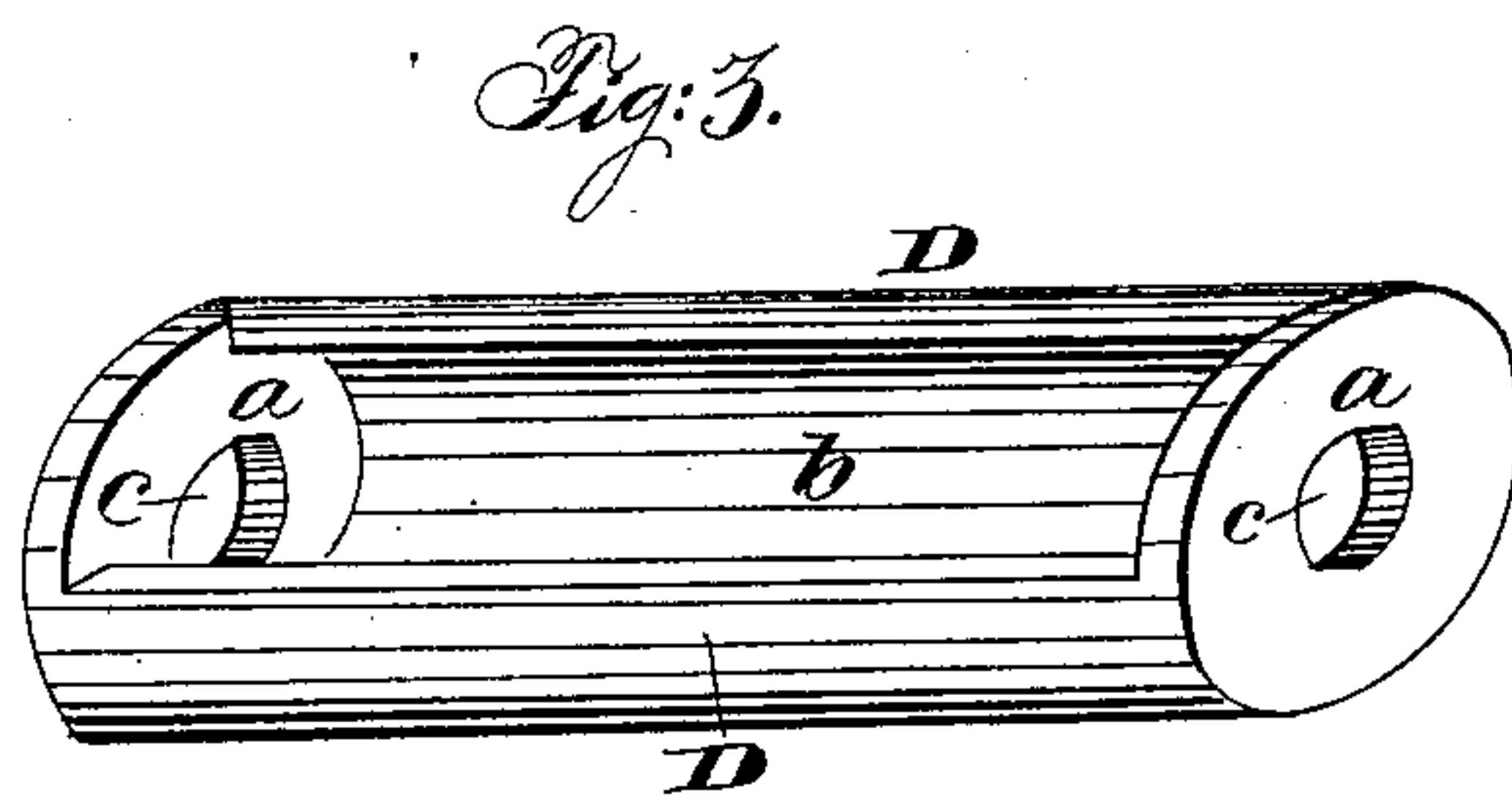
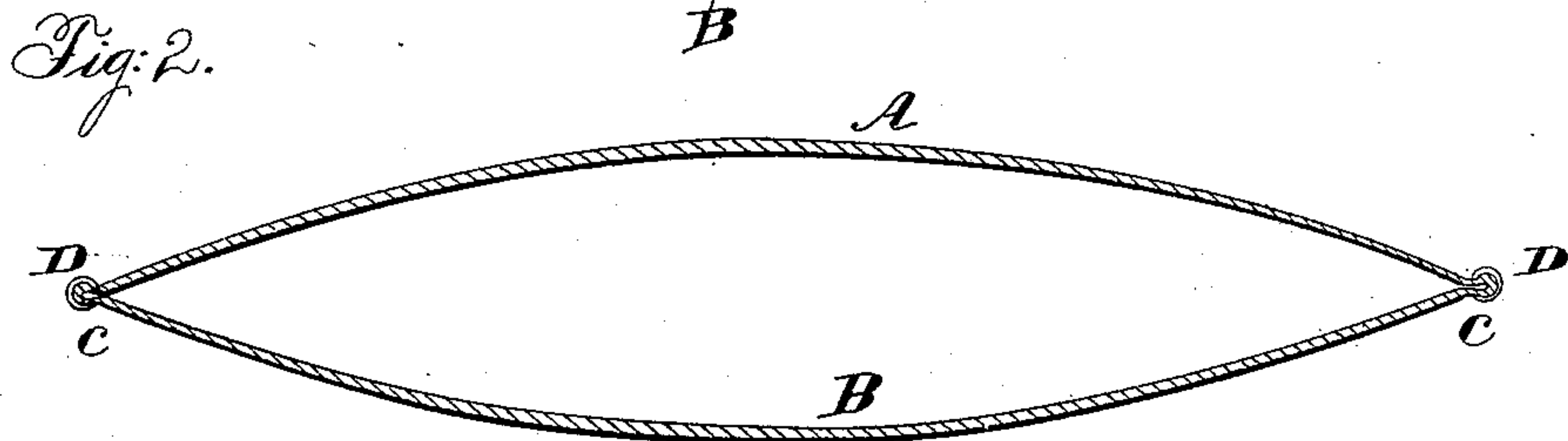
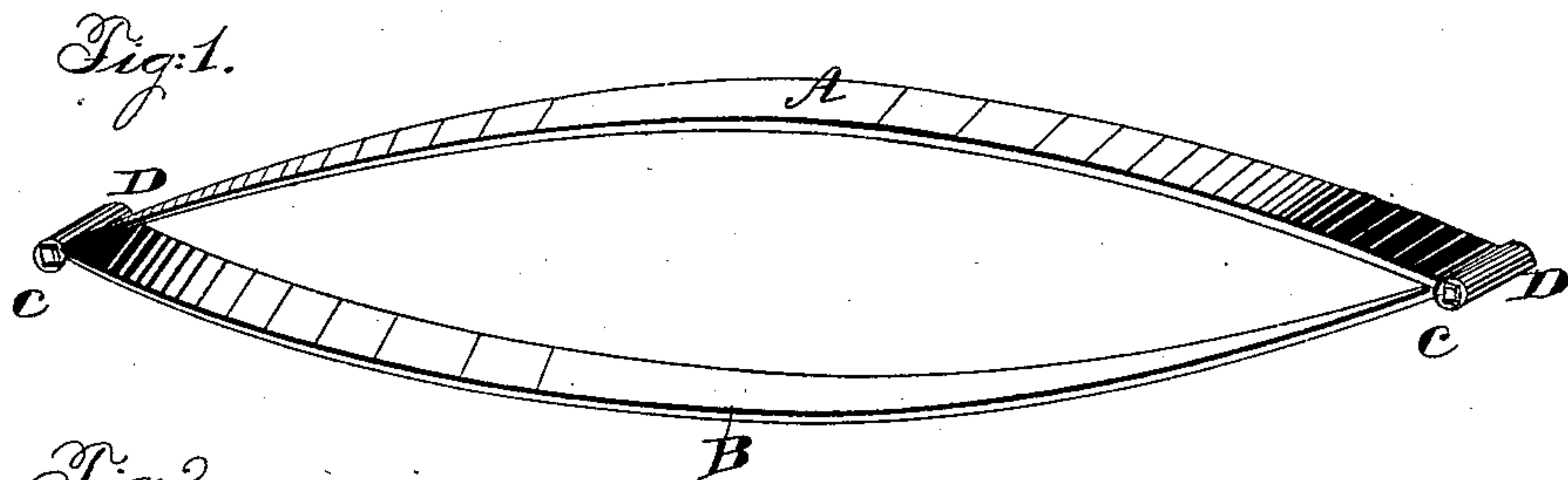


M. L. BALLARD.

Carriage-Spring.

No. 53,556

Patented Apr. 3, 1866.



Witnesses,

*John D. Patten*  
Thos. J. Chamberlain

Inventor

*Mr. L. Ballard,*  
*at Stoughton*  
*By atty.*

# UNITED STATES PATENT OFFICE.

M. L. BALLARD, OF CANTON, OHIO.

## IMPROVEMENT IN CARRIAGE-SPRINGS, &c.

Specification forming part of Letters Patent No. 53,556, dated April 3, 1866.

*To all whom it may concern:*

Be it known that I, M. L. BALLARD, of Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Carriage and other Springs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a perspective view of the spring. Fig. 2 represents a longitudinal section through the same. Fig. 3 represents, on an enlarged scale and in perspective, one of the caps that cover the ends of the spring. Fig. 4 represents, on a similarly-enlarged scale, a longitudinal section through a portion of a spring, and showing more distinctly how the ends of the spring are fitted to each other, to the bolt, and to the cap.

Similar letters of reference, where they occur in the separate figures, denote like parts of the spring in all the drawings.

The usual method of fastening springs together at their ends is to work lugs on the ends of the springs, or a box or cap, in or through which the bolt passes. Such lugs, caps, or boxes are very expensive and troublesome to make and form upon the plate or leaf of the spring, and when broken or injured, almost irreparable by an ordinary mechanic. In some instances the ends of the springs are fastened by a rivet passing through and through the plates, and in others a kind of cap or box is used for receiving the ends of the spring and a bolt or rivet passed through the box and ends. In such springs there is no end play or motion to the plates composing the springs, and, besides, the holes very much weaken the plates.

My invention consists in uniting the ends of the plates that form the spring by means of an independent cap, through which the bolt passes, and around which bolt and each other the plates are bent, so as to make a firm union, maintain free motion and elasticity, and avoid the working of lugs or the punching of holes

in the ends of said plates or the liability of the springs to spread lengthwise.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A B represent an upper and lower plate, respectively, of an ordinary elliptic carriage-spring. To these plates may be added any additional number of plates or leaves, to give it greater strength and capacity, in the usual way. The ends of the plates A B, as more distinctly shown in Fig. 4, are bent around so that one bend or turn shall snugly enfold the other bend or turn, and leave a space in the inner bend or turn to receive a bolt, C, which, when the cap is in place and said bolt passed through, secures the plates firmly together.

The cap D may be made of any suitable metal having the requisite strength, and may be plain or ornamental and cast or wrought. It is cylindrical in form, with heads *a a* in it, and a slot or cut-away portion, *b*, in its perimeter, that will allow it to be passed over the bent or turned ends of the plates A B and snugly receive and hold them.

The heads *a a* have each a bolt-hole, *c c*, made in them, and when the cap is placed over the ends of the spring a bolt, C, is passed through from head to head, and when its nut is run on the whole is firmly and cheaply united. Instead of a screw-bolt, C, a rivet may be used for holding the spring-plates and cap, though passed through in the same manner as the screw-bolt.

Having thus fully described my invention, what I claim is—

The uniting and holding the ends or plates of a spring by means of an independent cap and bolt or rivet; made and applied substantially in the manner and for the purpose described.

M. L. BALLARD.

Witnesses:

GEO. W. RAFF,  
M. S. FAST.