

A. MIDDLETON, Jr.

Car-Springs.

No. 152,398.

Patented June 23, 1874.

FIG. 1.

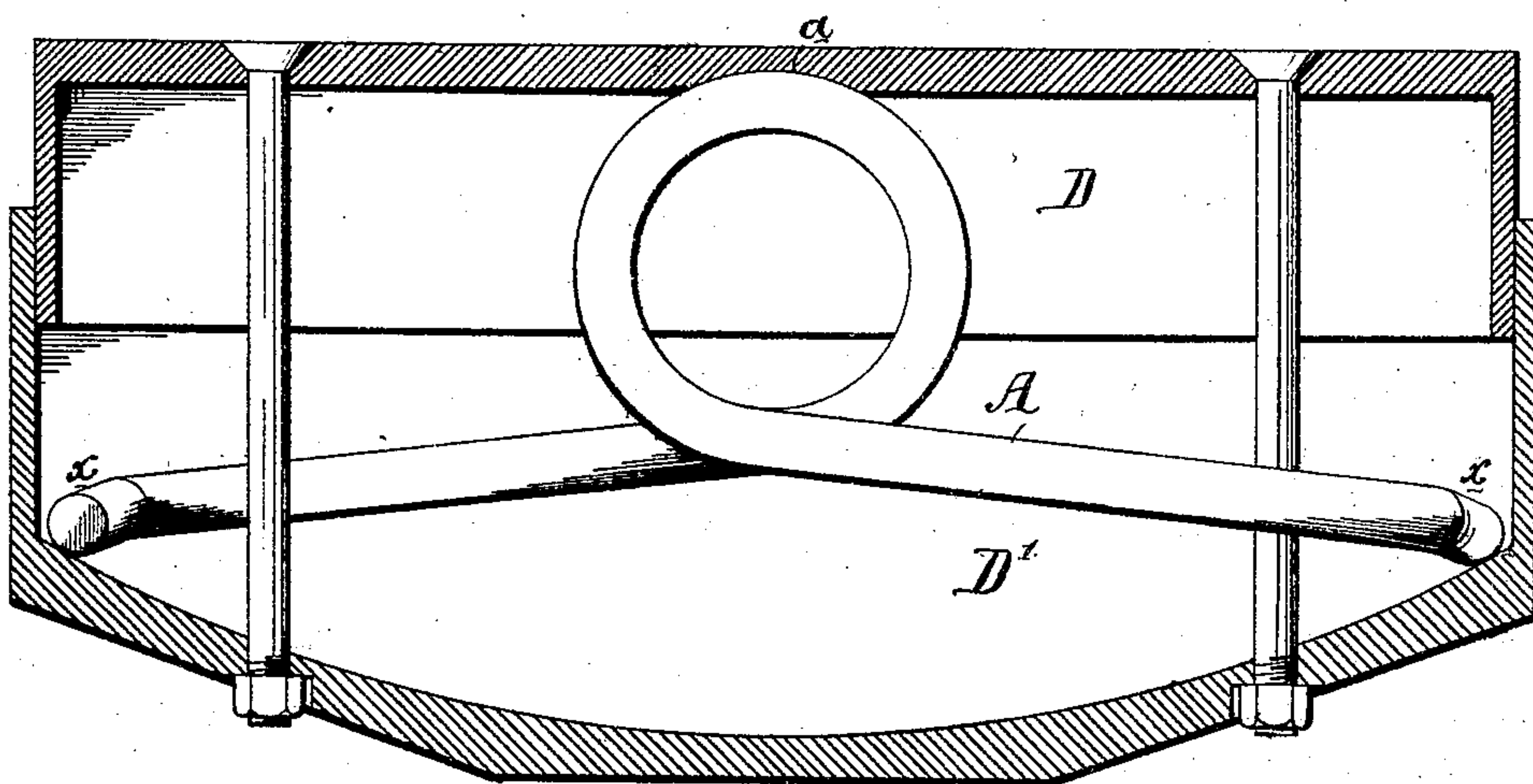


FIG. 2.

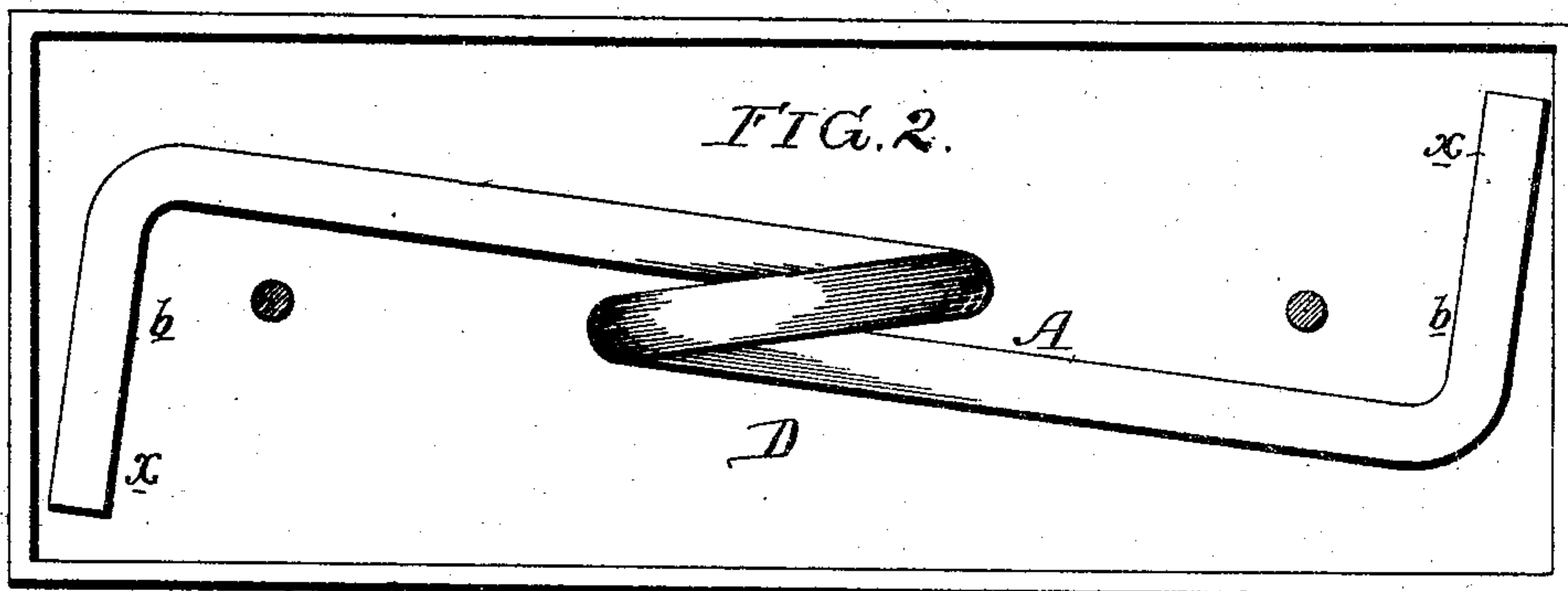


FIG. 3.

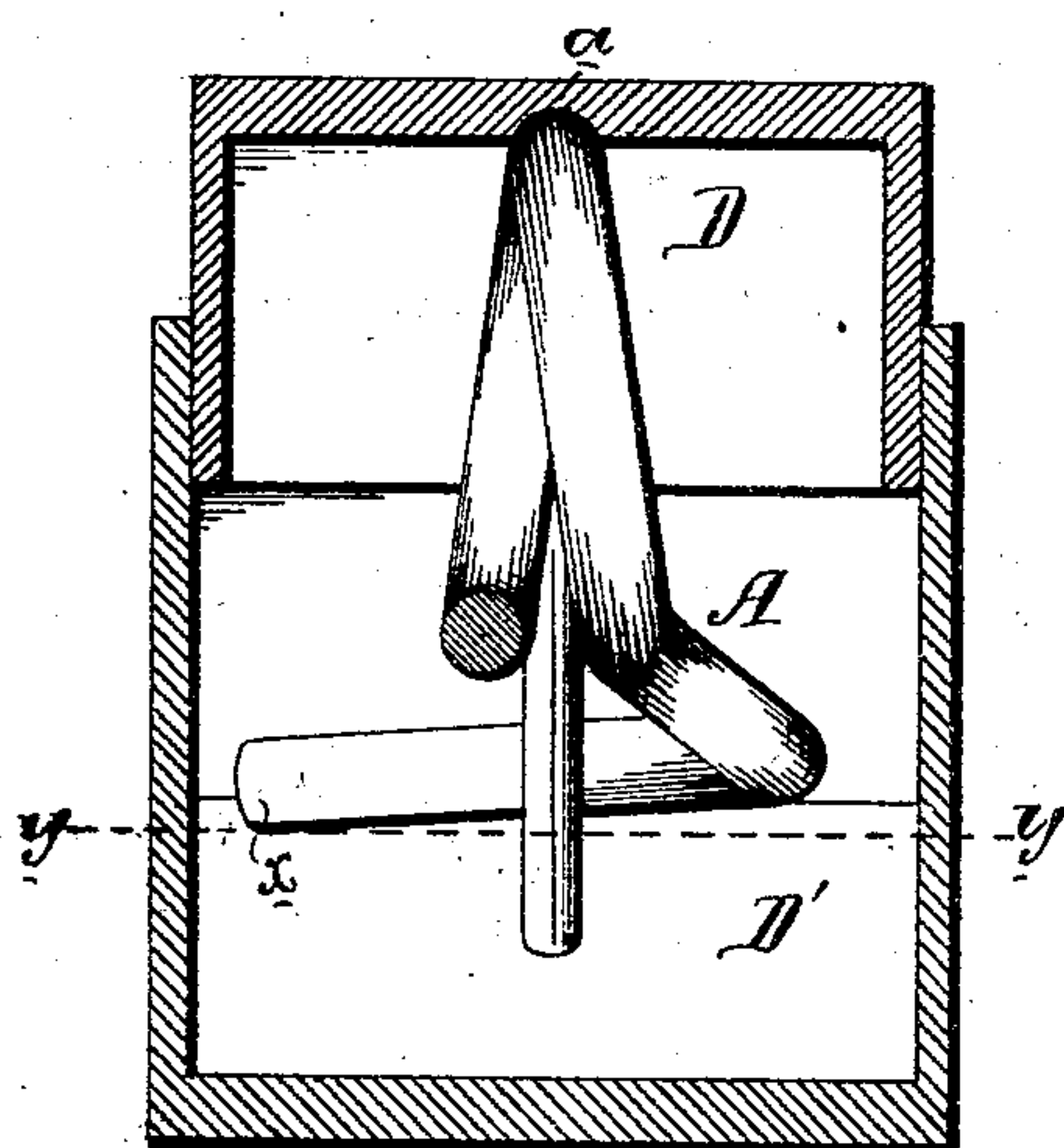
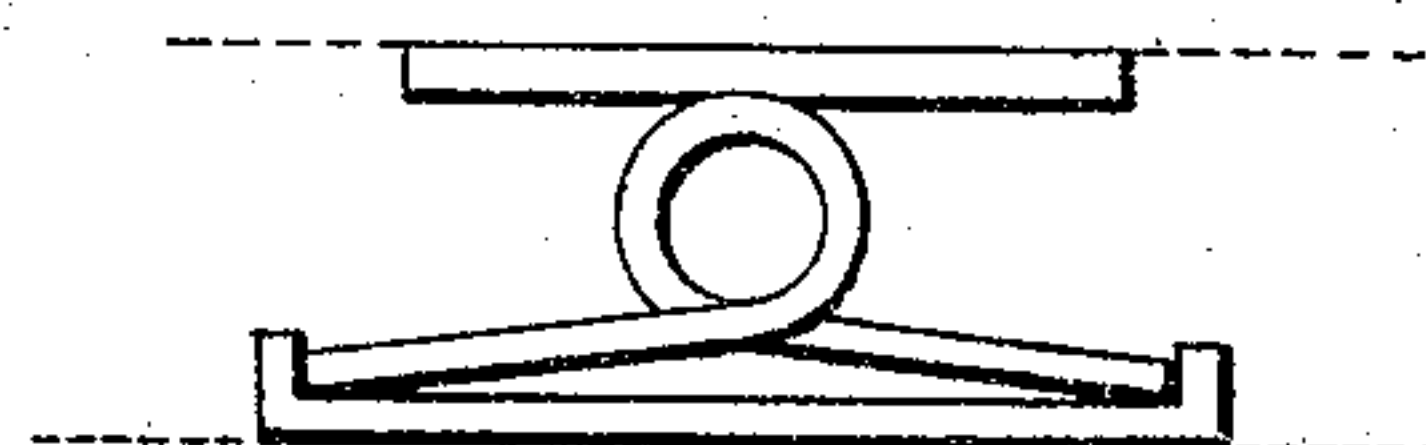


FIG. 4.



Witnesses,

E. H. Eckfeldt  
Hubert Howron

Allen Middleton Jr.  
By his Atty.  
Horsum and Son.

# UNITED STATES PATENT OFFICE.

ALLEN MIDDLETON, JR., OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **152,398**, dated June 23, 1874; application filed April 14, 1874.

*To all whom it may concern:*

Be it known that I, ALLEN MIDDLETON, Jr., of Philadelphia, Pennsylvania, have invented an Improvement in Car-Springs, of which the following is a specification:

The object of my invention is to make a cheap and effective spring for railroad-cars and other vehicles, by combining a bent rod or rods, A, with a box or plates, as shown in the vertical section, Figure 1, plan view, Fig. 2, and transverse section, Fig. 3, or modification, Fig. 4, of the accompanying drawing.

In making the spring proper I prefer to use a round steel bar, and, after bending it to the shape shown in the drawing, impart to it a proper spring temper. Bessemer steel, however, may be used, and the rod may be square or of other sectional shape.

The middle of the rod is bent or coiled on a circle, or nearly so, and this circular portion of the rod is adapted to a socket, *a*, formed in the upper portion D of a box or casing, this upper portion fitting snugly, but so as to slide freely in a lower portion, D', which is depressed in the middle, as shown in Fig. 1. The opposite ends of the elastic rod A are bent, as shown in the plan view, Fig. 1, the extreme ends *x x* of the bent portions *b* being lodged in or very near the opposite corners of the lower portion of the box. These bent ends *b* of the rod are inclined, as shown in the transverse section, Fig. 3, so that when there is no load on the spring the rod bears with its two ends *x x* only on the lower portion of the box, while it is steadied laterally by the recess or socket *a* in the upper portion.

On pressure being applied to the box, the elastic rod will yield throughout its entire length. First, there will be the torsional strain imparted to the rod mainly throughout its straight portions, this torsion being imparted by the desire of the inclined ends *b* to reach a horizontal bearing on the line *y y*, Fig. 3. When the opposite ends of the rod reach the

corners of the lower portion of the box, while the pressure is continued, the straight portion of the rod must be subjected to a longitudinal compression, which tends to open the circular portion or coil; and, when the rod is so far compressed that the straight portions occupy a position below a horizontal line, this portion must also yield. On the gradual withdrawal of pressure from the box there will be a general recoil of the rod throughout its entire length.

It is not essential in carrying out my invention that the elastic rod should be provided with bent ends *b*, but I prefer to use them, and to incline them in the manner described, so as to increase the elastic capacity of the said rod.

If desired, the box may be dispensed with, and simple plates may be used in the manner illustrated in Fig. 4.

Two or more elastic rods may be used in connection with one box, or with the plates, and the elasticity of the rods may be increased by coiling them twice instead of once in the middle.

I claim as my invention—

1. A car-spring in which an elastic rod, coiled in the middle and confined at the ends, is combined with a box or plates, substantially as set forth.

2. In a car-spring, the elastic rod A, having the opposite bent and inclined ends *b*, for the purpose specified.

3. In a car-spring, the elastic coiled rod, in combination with a recess or socket, *a*, in the upper portion of the box or plate, for the reception of the coil, as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALLEN MIDDLETON, JR.

Witnesses:

WM. A. STEEL,  
HARRY SMITH.