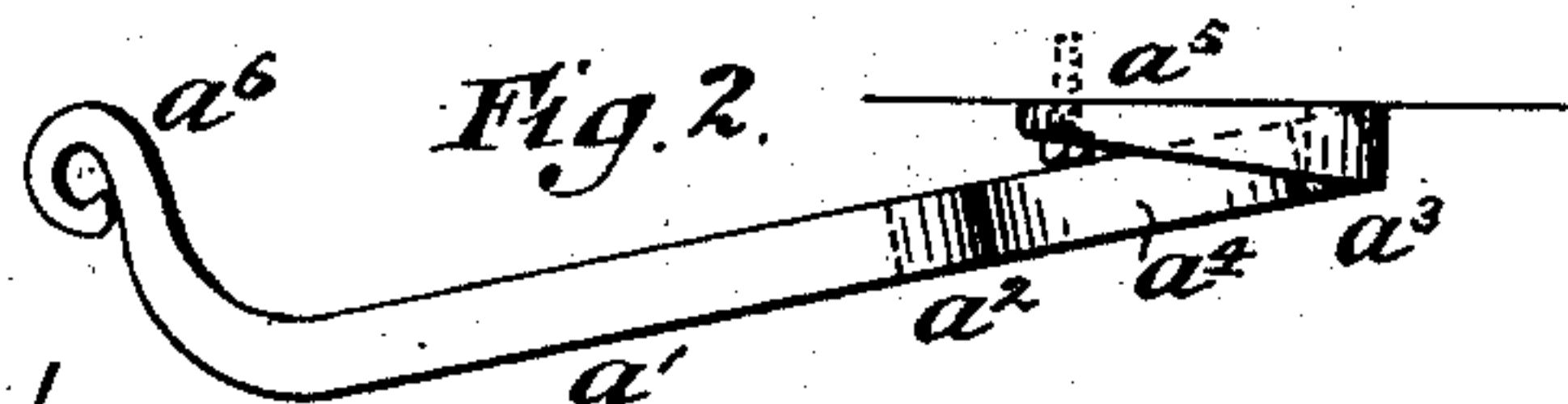
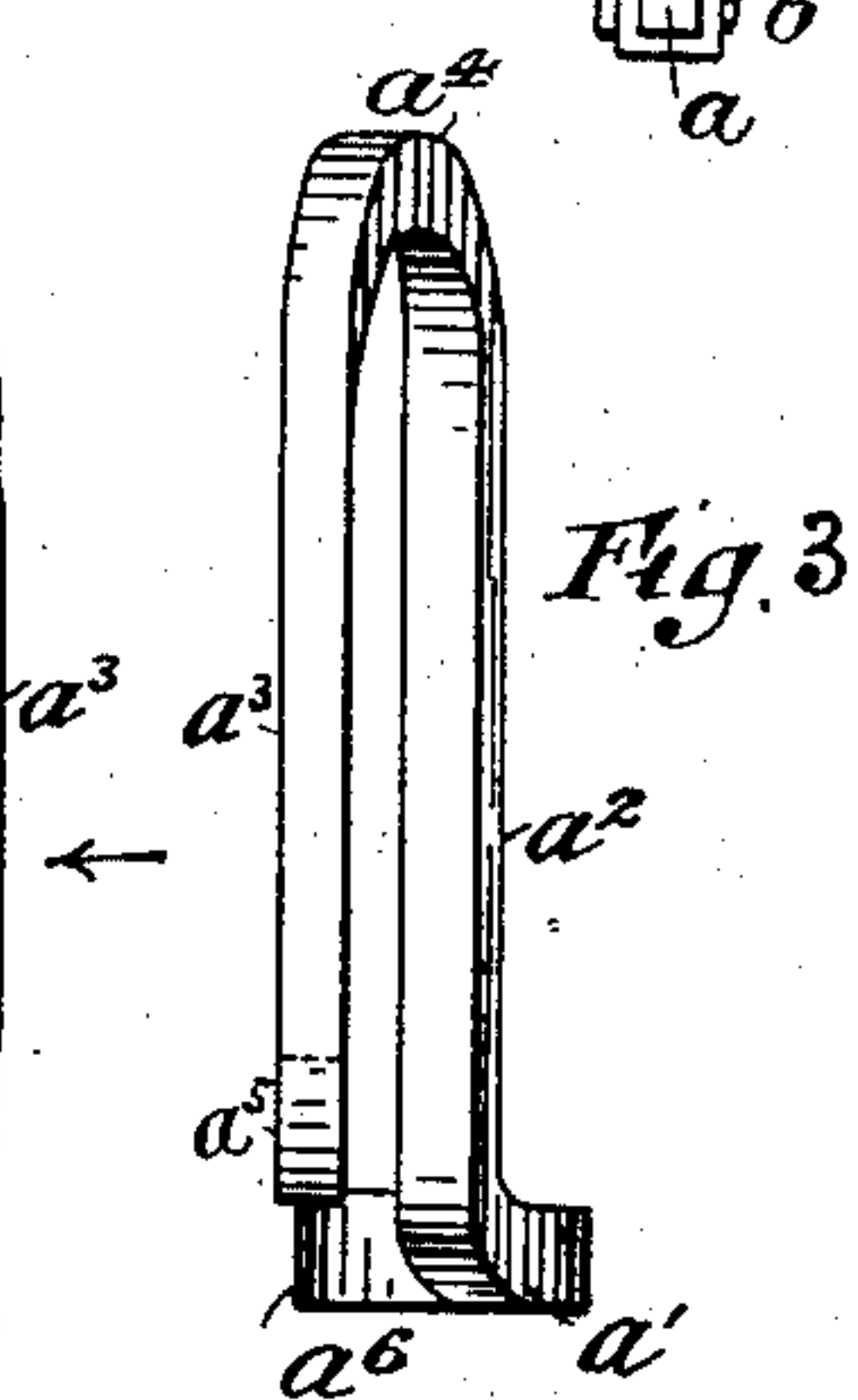
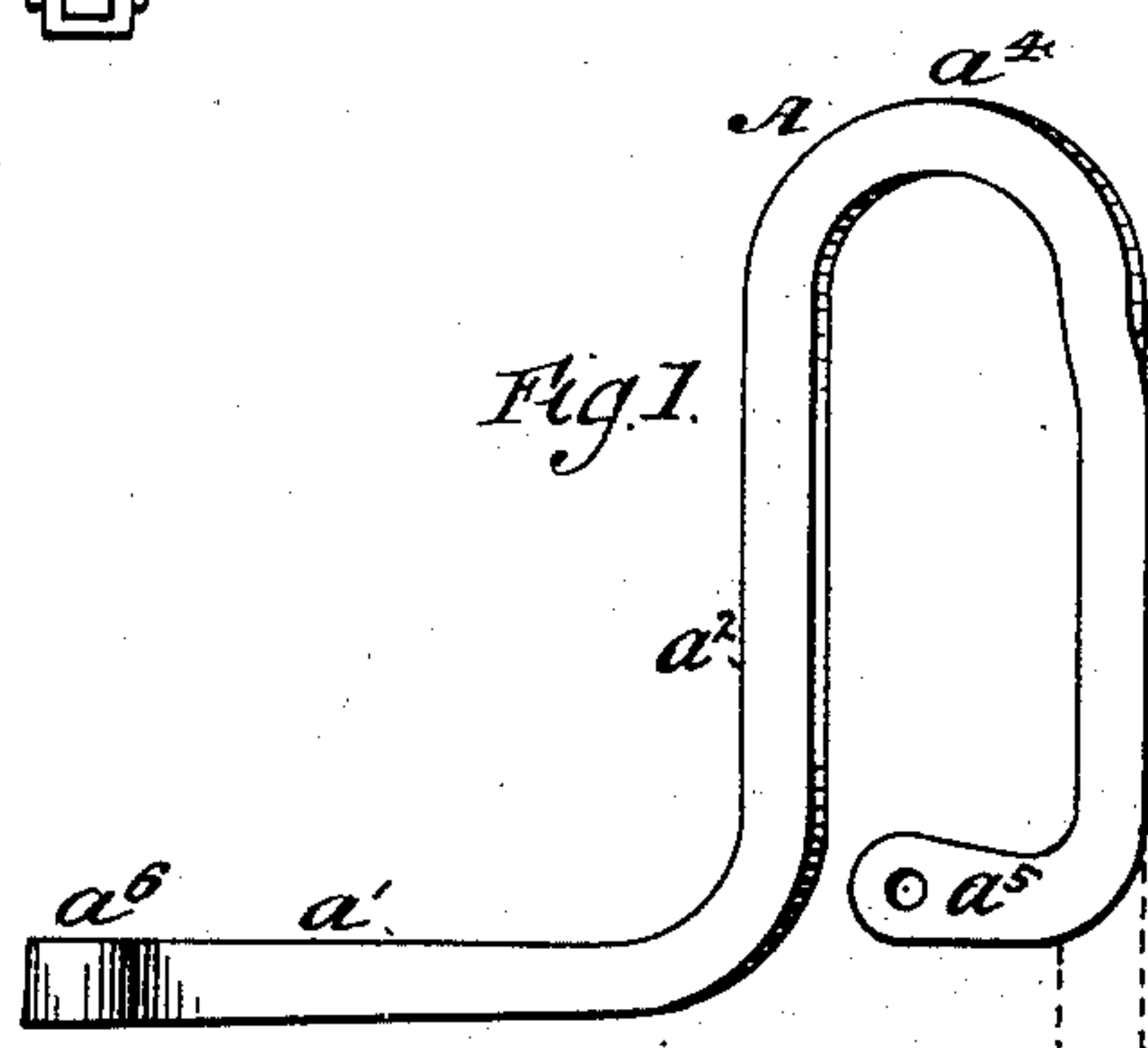
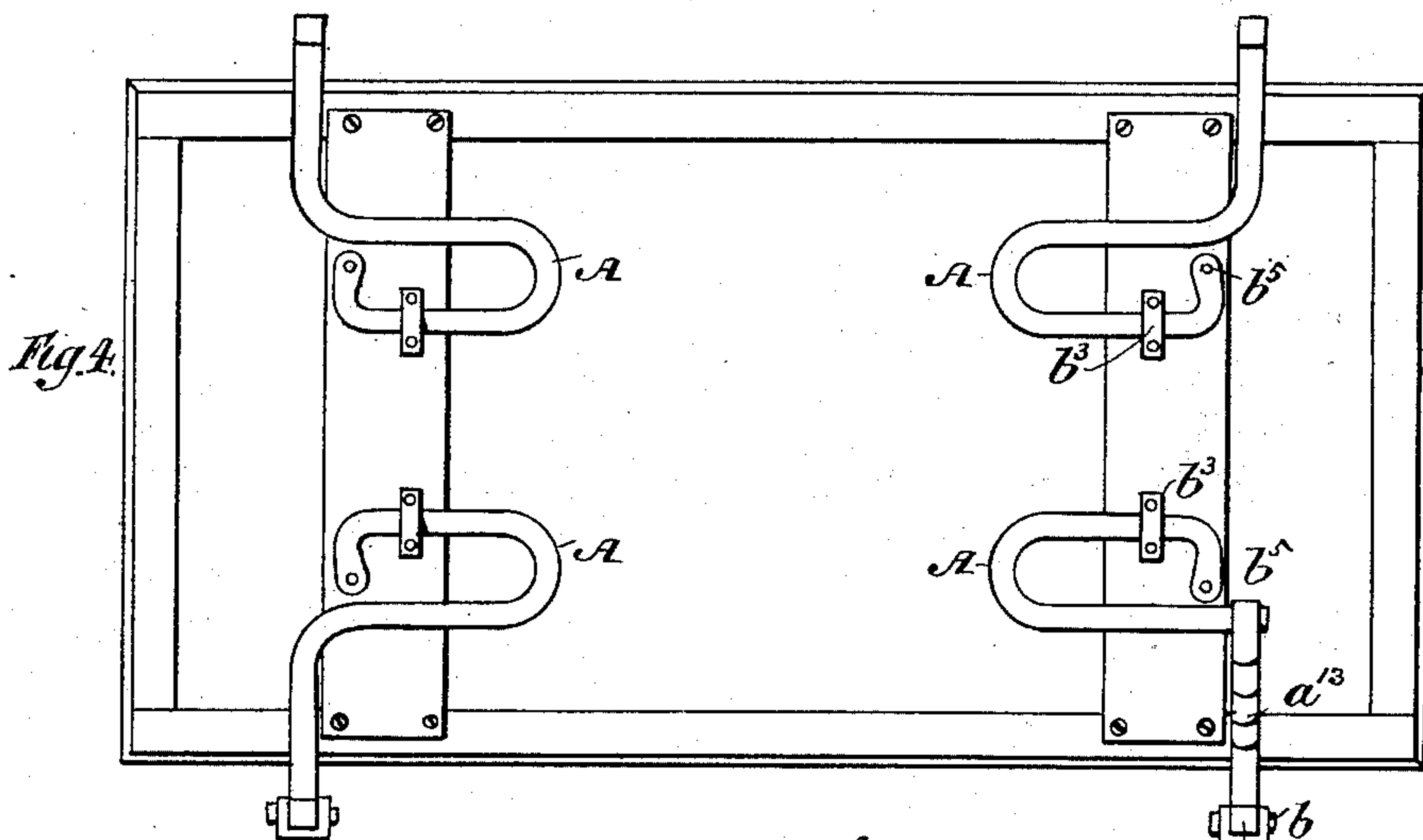
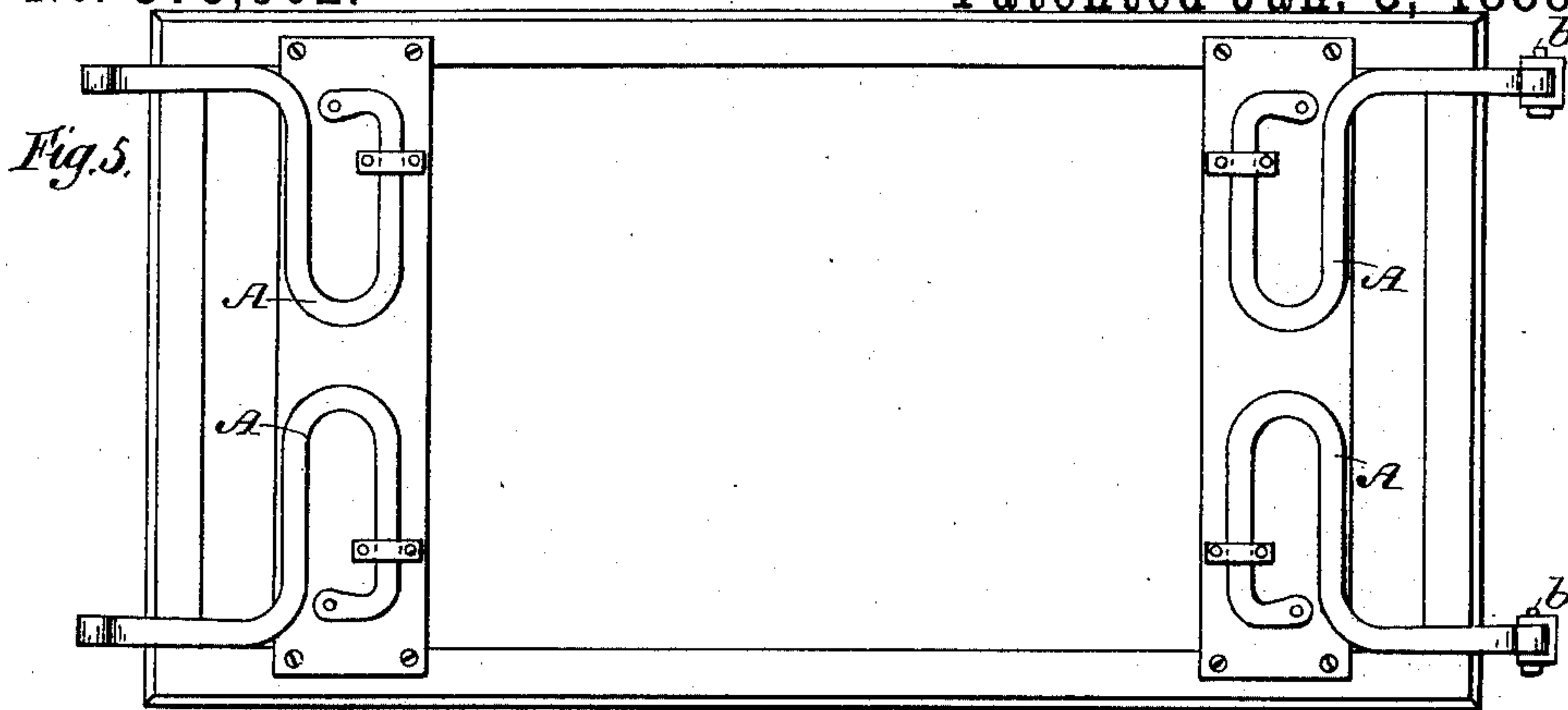


(No Model.)

E. STORM.
SPRING FOR VEHICLES.

No. 375,902.

Patented Jan. 3, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

EDWARD STORM, OF POUGHKEEPSIE, NEW YORK.

SPRING FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 375,902, dated January 3, 1888.

Application filed March 5, 1887. Serial No. 229,804. (No model.)

To all whom it may concern:

Be it known that I, EDWARD STORM, of Poughkeepsie, Dutchess county, and the State of New York, have invented a certain new and useful Improvement in Springs for Vehicles, of which the following is a specification.

I will describe a spring embodying my improvement and then point out its novel features in the claims.

In the accompanying drawings, Figure 1 is a plan view of a spring embodying my improvement. Fig. 2 is an edge view of the same. Fig. 3 is an edge view of the spring when looked at in the direction indicated by the arrow which is arranged adjacent to Fig. 1. Fig. 4 is an inverted plan view of the body of a vehicle and springs embodying my improvement applied thereto. Fig. 5 is a view similar to that represented by Fig. 4, except that in it the springs are shown as applied in a different manner.

Similar letters of reference designate corresponding parts in all the figures.

A designates springs embodying my improvement. Each of these springs consists of a portion, a' , which may be termed a "hanger;" a portion, a^2 , extending at an approximate right angle to said portion a' ; a portion, a^4 , extending farther away from the hanger in the direction of the length of the latter; a portion, a^3 , extending back parallel or approximately parallel with the portion a^2 , and a portion, a^5 , extending at an angle to the portion a^3 and toward the hanger. As shown, all the parts of this spring are made in one integral piece. The material used will, of course, preferably be of steel. It is not essential that the hanger portion a' should be made integral with the other parts, as it may, if preferred, be made separately, and keyed or otherwise fastened to the portion a^2 of the spring.

While I have given but a general description of one spring embodying my improvement, it is necessary for me to add to what I have already said, that these springs will not all be exactly alike. Some will be the reverse of others. To use a common expression, some will be rights and others will be lefts. I mean by this that in some of the springs the portion a^2 will extend to the right from the portion a' , whereas in other springs the said portion a^2 will extend to the left from the portion a' . The

reason for making some of these springs rights and others lefts will be apparent upon a consideration of Figs. 4 and 5.

Fig. 4 represents the application of a spring to a side-bar vehicle. The hanger portions a' of the springs are provided with eyes a^6 , which may be made integral with them and which are connected pivotally to bolts b , secured to clips which are applied to the side bars of the vehicle. I have not deemed it necessary to show the side bars, as these devices are too well known to require illustration.

The portion a^3 of each spring passes through a bearing, b^3 , that is secured to a cross-sill of the vehicle-body by bolts or other suitable means. The portion a^5 of each spring is also secured to the cross sill by a bolt, b^5 , or other suitable device passing through it and the sill.

Each spring has what is termed a "set" in it. I mean by this that the portion a^2 and portion a^3 are offset one from the other, so that they will not be strictly in the same horizontal plane. This may be best understood by reference to Figs. 2 and 3.

It will be seen by reference to Fig. 3 that the offset or deflection occurs at about the point where the portion a^3 joins the curved portion a^4 of a spring. The object of the offset is to enable the portion a^2 to bear against the sill of a vehicle, and yet in such manner that the portion a^2 and the curved portion a^4 will not touch the bottom of the vehicle. Thus the latter will be afforded room for movement when the spring yields.

It will be understood that my springs are combined flexure and torsion springs. Their flexure may occur along the curved portion a^4 , or along the portion a^2 , or along both these portions. The torsional action will occur along the portion a^2 .

My springs may be made of rectangular cross-section and, if desired, of varying thickness at different portions.

In Fig. 5 I have illustrated the method of applying springs embodying my improvement to a different kind of a vehicle. The vehicle represented in this figure has no side bars. The hangers of the springs extend lengthwise of the vehicle-body. The hangers of the springs at the front end of the vehicle-body are connected by bolts b to the front bolster or to an elliptic or semi-elliptic spring arranged

upon the back bolster. The hangers of the springs at the rear end of the vehicle-body are connected by bolts *b* to the hind axle or a bolster arranged thereon, or to elliptic or semi-
5 elliptic springs arranged on the same. My springs will be secured to this vehicle-body in the manner I have previously described in connection with Fig. 4.

By my improvement I am enabled to make
10 a spring which is cheap, light, and effective, and withal one which may be applied by almost any one to any kind of vehicle.

I do not wish to be confined to the exact structure of the springs which I have shown.
15 If desirable, the portions *a*³ may extend beyond the longitudinal line of the hangers, as indicated by dotted lines in Fig. 1.

I would remark that if a separately-made hanger is used with a spring such hanger may
20 be made in the form of a leaf-spring. I have shown one of the hangers thus made in Fig. 4 and marked *a*¹³.

What I claim as my invention, and desire to secure by Letters Patent, is--

25 1. A spring composed of, first, a hanger or portion constituting a hanger; second, a portion extending therefrom at an approximate right angle; third, a portion extending farther

away from the hanger or hanger portion in the direction of the length of the latter, and, 30 fourth, a portion extending back parallel or approximately parallel with the portion that extends from the hanger or portion constituting a hanger at an approximate right angle toward the longitudinal line of the hanger or 35 portion constituting a hanger, substantially as specified.

2. A spring composed of, first, a hanger or portion constituting a hanger; second, a portion extending therefrom at an approximate 40 right angle; third, a portion extending farther away from the hanger or hanger portion in the direction of the length of the latter; fourth, a portion extending back parallel or approximately parallel with the portion that extends 45 from the hanger or portion constituting a hanger at an approximate right angle toward the longitudinal line of the hanger or portion constituting a hanger, and, fifth, a terminal portion extending at an angle to the portion 50 last named toward the hanger or portion constituting a hanger, substantially as specified.

EDWARD STORM.

Witnesses:

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