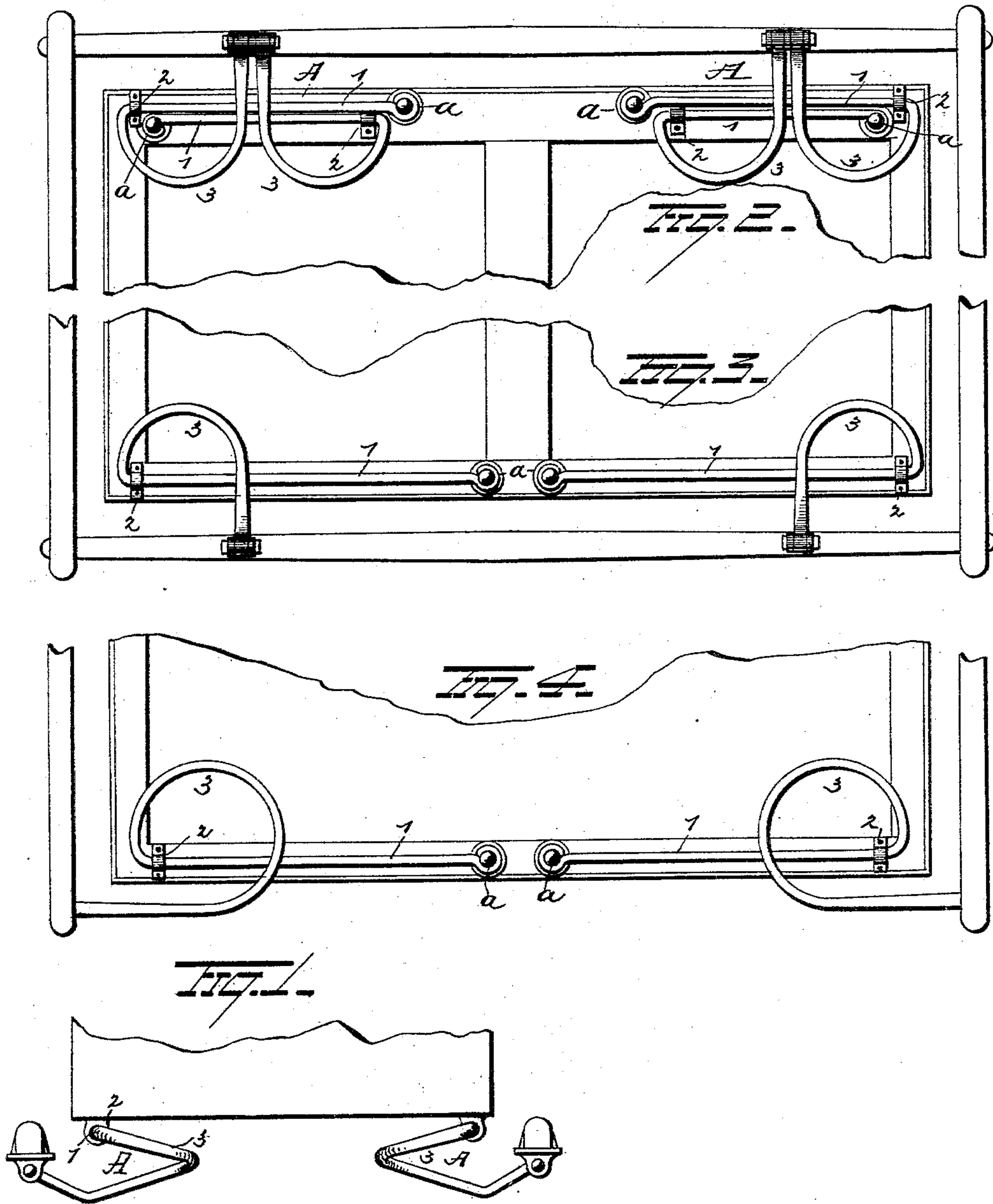


(No Model.)

F. P. CONRAD.
VEHICLE SPRING.

No. 414,496.

Patented Nov. 5, 1889.



Witnesses
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G. F. Downing

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UNITED STATES PATENT OFFICE.

FRANK P. CONRAD, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO
LUCIUS H. PRATT, OF SAME PLACE.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 414,496, dated November 5, 1889.

Application filed July 24, 1889. Serial No. 318,541. (No model.)

To all whom it may concern:

Be it known that I, FRANK P. CONRAD, of Buffalo, in the county of Erie and State of New York, have invented certain new and
5 useful Improvements in Vehicle-Springs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the
10 same.

My invention relates to an improvement in vehicle-springs, and more particularly to such as are designated "torsion-springs," the object being to provide an elastic, substantial,
15 and sensitive spring for the support of vehicle-bodies; and to this end the spring consists in a bar of metal bent in such shape that it combines contractile, expansional, and torsional action; and, further, it consists in a
20 bar of metal securely fastened at one end, from which point it extends in a straight line for considerable distance to form the torsional portion, and at the end of this straight portion through a loop, and thence is bent into a
25 spiral or partspiral and supported at its outer end on some part of the running-gear.

It still further consists in certain novel features of construction and combinations of parts, as will be hereinafter described, and
30 pointed out in the claim.

In the accompanying drawings, Figure 1 is a side elevation of a vehicle, showing one form of the springs applied. Fig. 2 is a bottom plan view of a vehicle-body, showing the
35 form of spring particularly applicable to use with a side-bar wagon. Figs. 3 and 4 show a different manner of attaching the springs.

A represents the spring. It is preferably made of a square or round bar of steel. The
40 torsional portion 1 is straight and extends for considerable length along the bottom of the body. One end *a* of this portion is rigidly secured to the bottom of the body by means of a shackle, bolt, clip, or other device, and at the opposite end this portion extends loosely through an eyelet or loop 2. Beyond this point of support the spring is bent
45 back at about right angles to the torsional portion, and thence carried around and downward into a lower plane to form the part spiral 3, and finally it is bent outward across

the torsional portion and at about right angles thereto. It extends some distance outward, and at its extreme outer end is bent upward slightly for attachment, through the instrumentality of a clip or other device, to the
55 side bar. In a four-wheeled vehicle there are usually four of these springs employed—one at each corner of the body—and these may be variously attached, as illustrated in Figs. 2, 3, and 4, and first, as shown in Fig. 2, by
60 arranging the torsional portions 1 of two of the springs parallel with each other and close enough so that the outer ends lie in proximity to each other. When thus arranged, two
65 might be located in each corner to withstand a heavy-weighted body or load, or, as before, two only might be arranged on each side.

In Fig. 3 the location of the two springs is slightly varied by simply attaching them farther apart, or so that their ends *a* are close to
70 each other, thus throwing the spiral portions at the corners or near the corners, according to the length of the torsional portions. In Fig. 4 the only variation consists in the
75 extension of the torsional portions in the opposite direction from that described, or, in other words, outward and opposite each other.

Thus from the description disclosed it will be seen that the gist of the invention consists
80 in the combinations of the torsional and expansional and contractile spring, or, in other words, in the elongated torsional portion rigidly secured at one end and loosely supported at the other, and the spiral or semi-spiral
85 formation at one end of the torsional portion.

The advantages are too evident to require enumeration, and I need only say, in conclusion, that the result derived is the production
90 of a spring combining all the ease and comfort to be obtained from a torsional and yielding spring.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing
95 from the spirit and scope of my invention, and hence I do not wish to limit myself to the precise construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters
100 Patent, is—

A vehicle-spring consisting, essentially, of

a straight torsional portion adapted to be rigidly secured at one end and loosely mounted in a bearing near its opposite end, a curved or semi-spiral portion forming a continuation
5 of the loose end of the torsional portion, and an end section crossing the torsional portion at points between the end bearings of the latter, the said semi-spiral section of the spring being located wholly to one side of the torsional section, substantially as set forth.
10

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

FRANK P. CONRAD.

Witnesses:

CHAS. BRAND,
JNO. C. STROBEL.