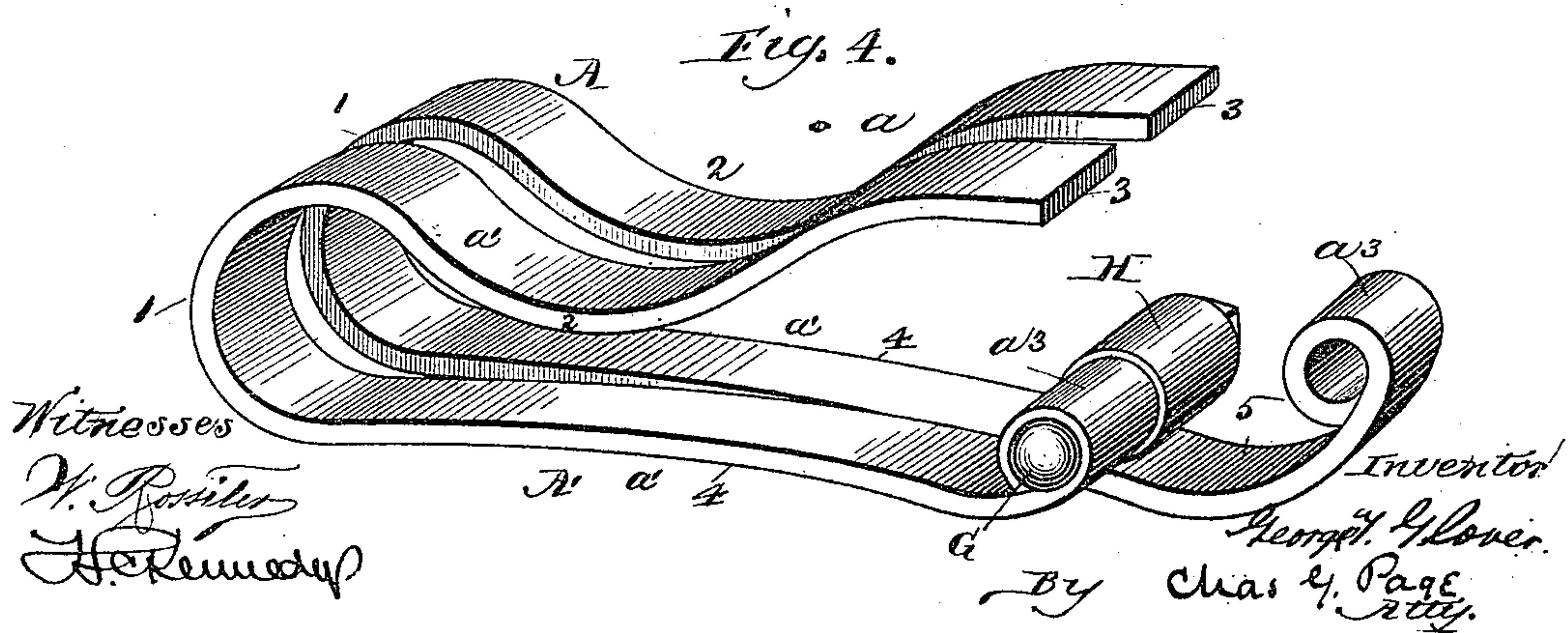
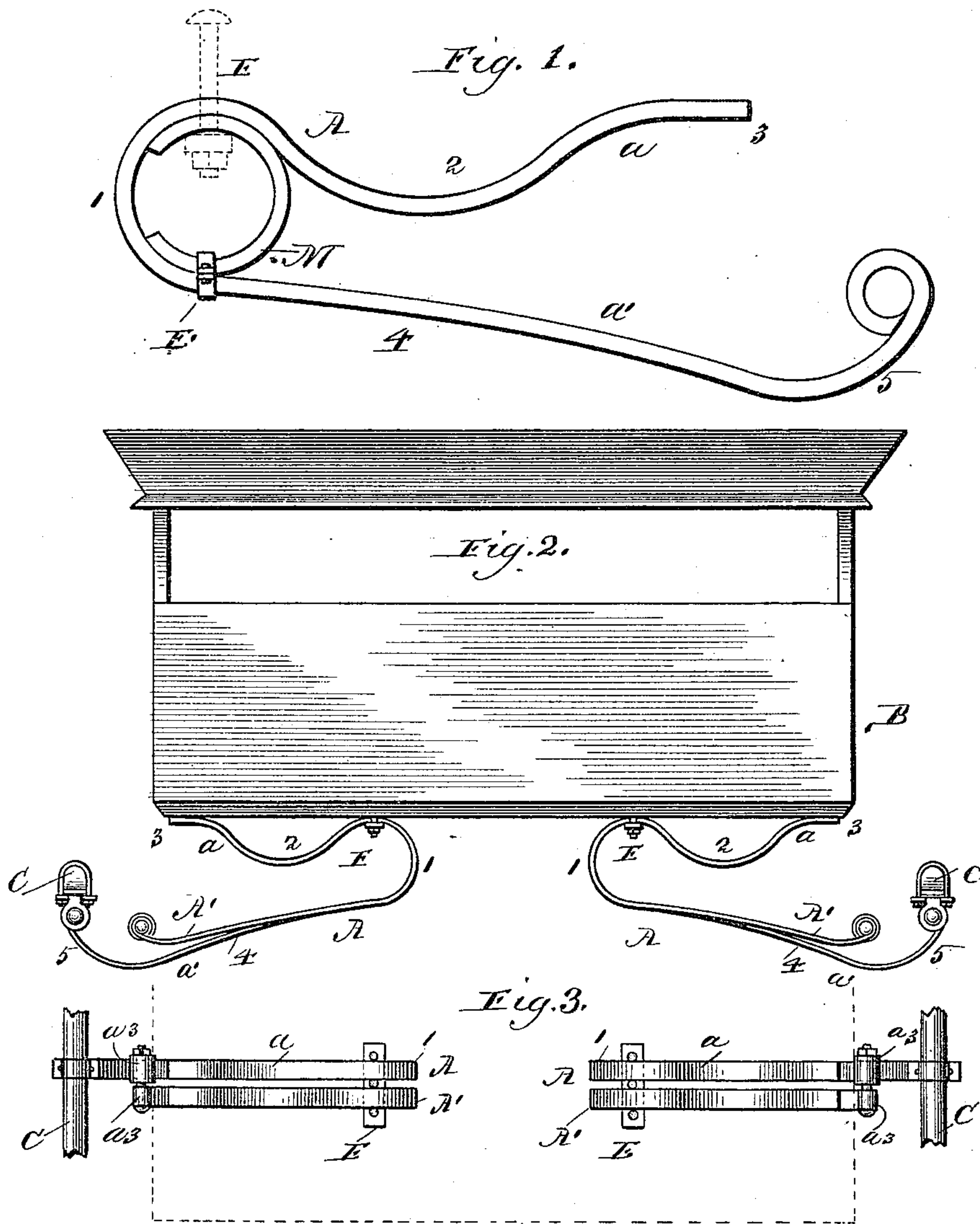


(No Model.)

G. T. GLOVER.
VEHICLE SPRING.

No. 440,402.

Patented Nov. 11, 1890.



UNITED STATES PATENT OFFICE.

GEORGE T. GLOVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNITED STATES SPRING COMPANY, OF ILLINOIS.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 440,402, dated November 11, 1890.

Application filed August 15, 1890. Serial No. 362,096. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. GLOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Vehicle-Springs, of which the following is a specification.

My invention relates to a double-armed spring, involving a part circular or substantially part circular shaped spring-bend between its upper and lower arms, and has for its object, first, to strengthen the spring at its said bend in a simple and improved way, and, second, to supplement the action of the double-armed spring by a spring action not called into action when the load is light, but subject to the weight when the same is considerable.

To the attainment of the foregoing and other useful ends, my invention consists in matters hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side edge view of a double-armed spring provided at its middle bend with a spring strengthening-piece in accordance with my improvement. Fig. 2 represents a pair of the double-armed springs applied to a vehicle-body and accompanied by supplemental springs in accordance with my improvement, the spring strengthening-pieces being for convenience of illustration omitted from the bends of the main springs. Fig. 3 is a top plan of the springs of Fig. 2 with the vehicle-body partially indicated in dotted lines. Fig. 4 represents in perspective one of the main springs and its companion supplemental spring.

The main spring A consists of a flat spring-bar, which is bent to provide the spring with an upper spring-arm *a*, a lower spring-arm *a'*, and a curved middle spring-bend 1 between said spring-arms. The upper spring-arm may be straight and secured to the vehicle box or body B in any suitable way; but I prefer forming it with a downward bend 2 and attaching it to said body by a clip E at a point adjacent to the bend 1, so as to leave its outer end 3 free, as and for the purpose set forth in my application, Serial No. 367,839, for Letters Patent of the United States filed on or about Octo-

ber 11, 1890. The lower spring-arm *a'* is at its outer upturned end 5 shackled to one of the end or side bars C of the vehicle and arranged so that under a heavy load the upper spring-arm can cushion on the lower arm at about the point 4.

The strengthening spring-piece M is bent into circular or substantially circular form, but is of a length to leave a gap or space between its ends, as herein shown. This spring-piece M is arranged within the middle bend of the main spring with its gap opposite the middle point of the bend 1, and is held in place by an upper clip E and a lower clip E'. These clips embrace the said spring-piece and arms of the main spring at points back of the ends of the spring-piece M, so as to leave end portions of the spring-piece free upon the underside of the spring-bend 1. The clips preferably permit the end portions of the spring-piece M to slip upon the main spring when the bend 1 is contracted or tends to close under the load, in which way the spring-piece can also close or contract. The spring-piece strengthens the main spring at its bend, and also prevents breakage incident to the rebound of the main spring. The spring-piece also permits the main spring to have in effect a wrapping action about it, and thereby prevents breakage under a heavy load or jolt, since the strain in place of coming at any one point along the bend 1 will be distributed along the same.

As a matter of further improvement, I duplicate to a certain extent the spring A where the springs are used to sustain a heavy load. This arrangement is illustrated in Figs. 2, 3, and 4, wherein the main spring A is arranged and applied as hereinbefore set forth and a supplemental or auxiliary correspondingly-shaped spring A' arranged alongside the same. This supplemental spring is formed like the spring A and has its several corresponding portions correspondingly lettered and numbered. The upper arm of the supplemental spring is, like the corresponding arm of spring A, secured to the vehicle by a clip, as at E. The lower arm of the supplemental spring is, however, made somewhat shorter than the arm of the main spring A and has its free end portion formed somewhat straighter than the

end portion 5 of the main spring, or bent up to some extent, so that its said end shall normally stand somewhat higher than the end portion 5 of the main spring. The supplemental spring has, however, its free end portion adapted to engage or cushion upon the outer end portion 5 of the main spring when the springs are subject to an unusually heavy load. As a simple mode of forming the outer ends of the springs, they are each bent to form an eye a^3 . By such arrangement the eye of the main spring can receive the bolt of a shackle, by which it is attached to the side bar C. On the other hand, the eye at the free end of the supplemental spring can hold a bolt G, which extends beyond one end of the eye, so as to receive and carry a small roll N. This roll will strike upon the main spring when the springs are subjected to sufficient weight and will readily move along the said main spring during flexure of the bowed portion of the supplemental spring, in which way the supplemental spring may have at its free end a temporary sliding or movable connection with the main spring. The spring-piece M can also be applied to the middle bend in the spring A', when so desired.

What I claim as my invention is—

1. The combination, with the double-armed spring bent to provide it with a bend 1 between its arms and having its said arms respectively clipped to the vehicle-body and shackled to one of the side bars, of the substantially part-circular strengthening spring-piece M, arranged within the bend of the spring with its ends terminating short of the middle point of said bend and at points back of its said ends held in connection with the spring by clips E and E', substantially as set forth.

2. The combination, with the double-armed main spring having its upper arm applied to the vehicle-body and its lower arm connected with a side bar or like portion of the vehicle, of the auxiliary double-armed spring having its upper arm applied to the vehicle-body and its lower arm left free and arranged to cushion upon the lower arm of the main spring, substantially as and for the purpose set forth.

GEORGE T. GLOVER.

Witnesses:

HARRY COBB KENNEDY.

T. WAGNER.