(No Model.)

2 Sheets—Sheet 1.

J. B. ARMSTRONG.

SPRING VEHICLE.

No. 299,191. Patented May 27, 1884.

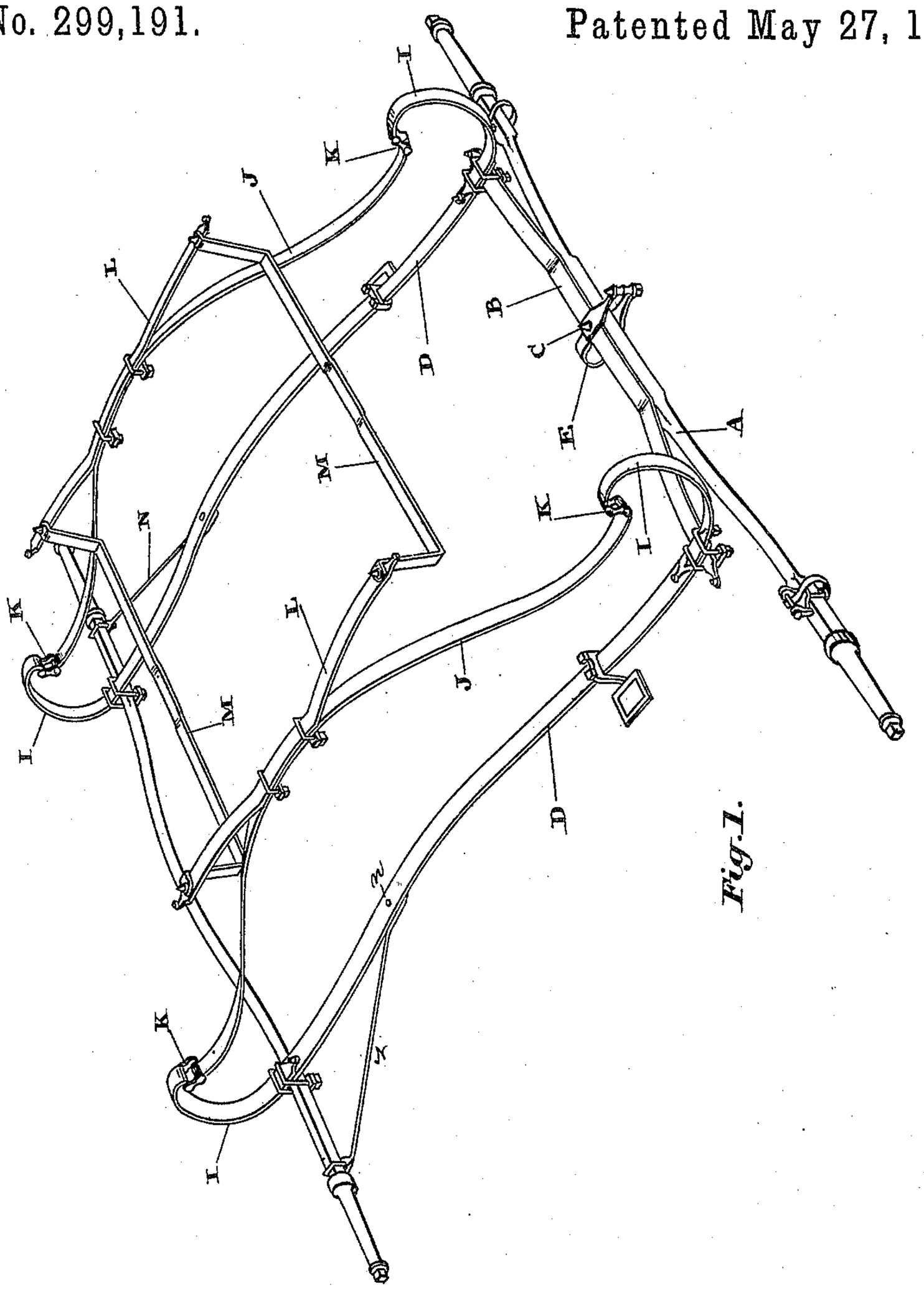

Fig. 1.

Witnesses.

Lewis Townsend

Chas. E. Baldwin

Inventor.

John B. Armstrong.

by Donald C. Ridout & Co

Attorneys

(No Model.)

2 Sheets—Sheet 2.

J. B. ARMSTRONG.

SPRING VEHICLE.

No. 299,191. Patented May 27, 1884.

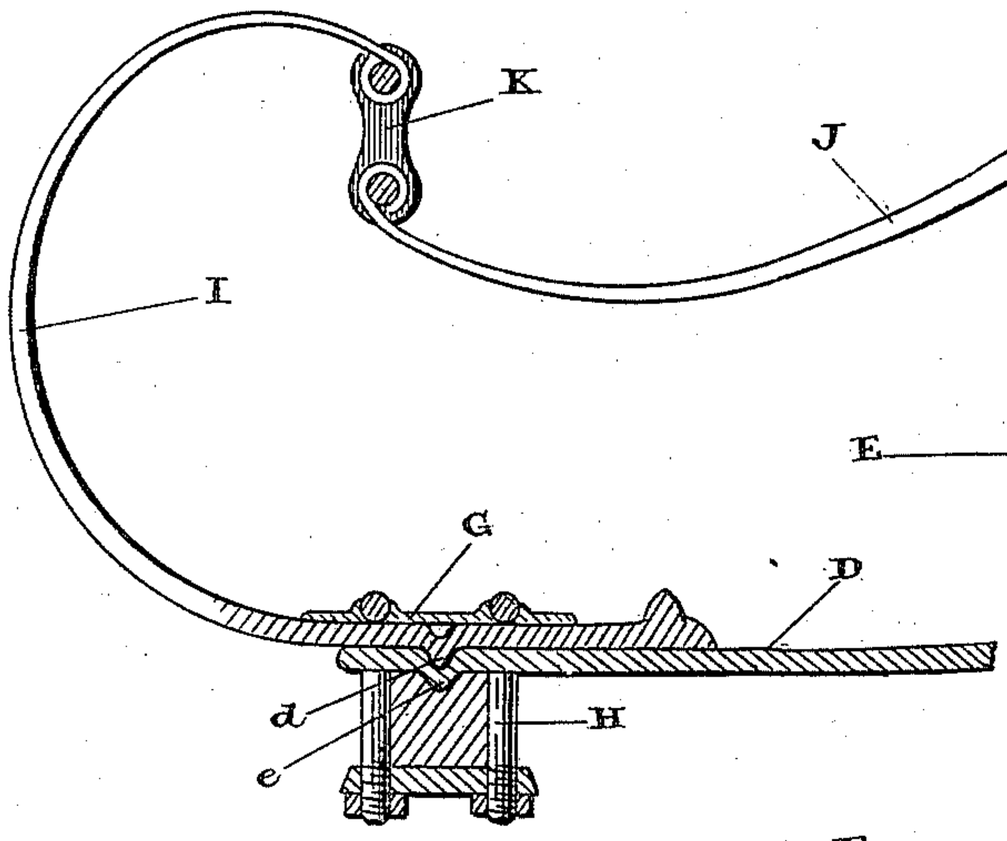

Fig. 2.

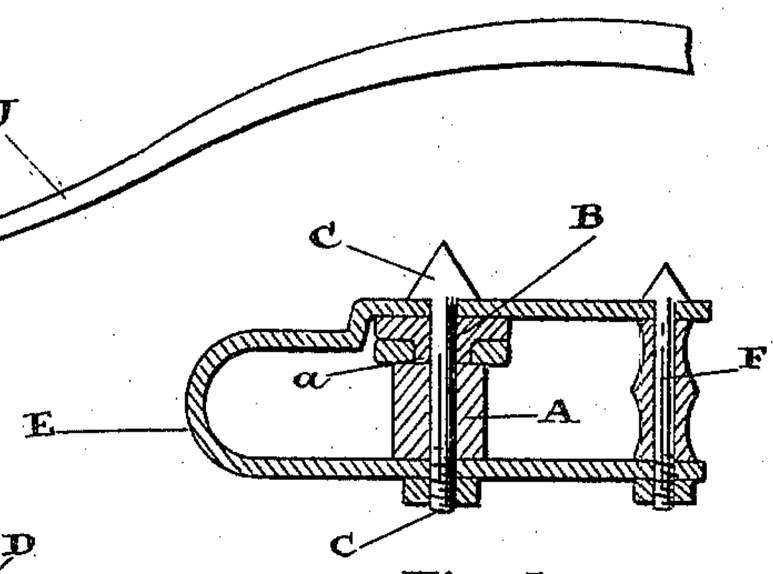

Fig. 3.

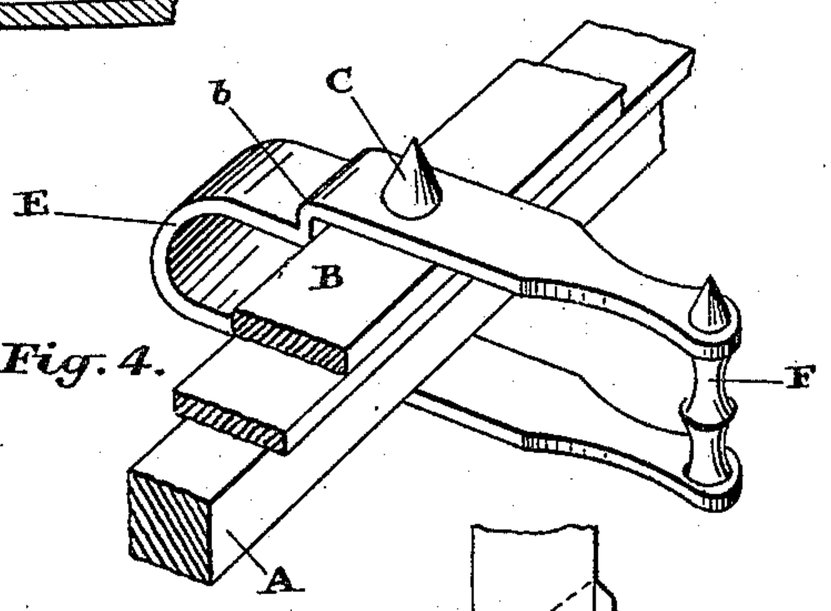

Fig. 4.

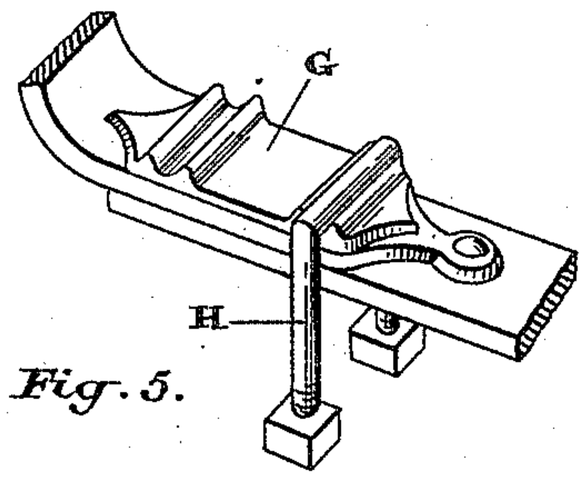

Fig. 5.

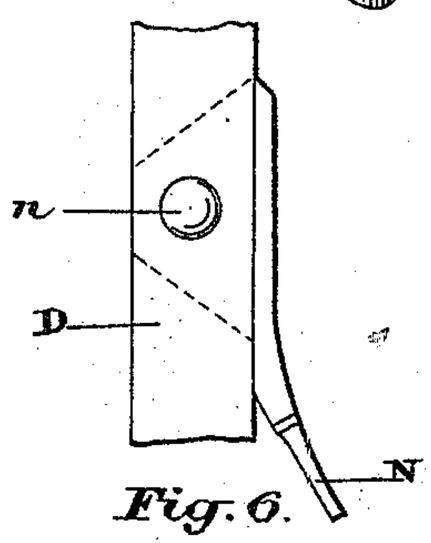

Fig. 6.

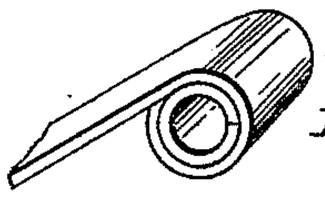

Fig. 8.

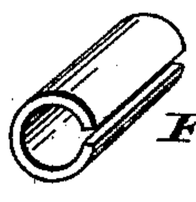

Fig. 9.

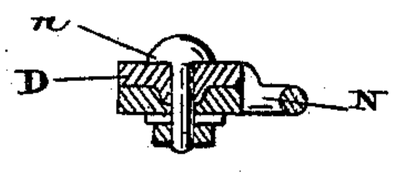

Fig. 7.

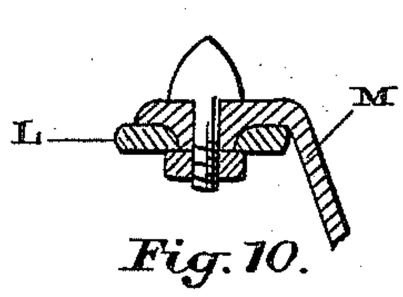

Fig. 10.

Witnesses.

Lewis Toulmson

Chas. E. Baldwin

Inventor.

John B. Armstrong

by Donald L. Ridout & Co.

Attorneys

UNITED STATES PATENT OFFICE.

JOHN B. ARMSTRONG, OF GUELPH, ONTARIO, CANADA, ASSIGNOR TO THE GUELPH CARRIAGE GOODS COMPANY, (LIMITED,) OF SAME PLACE.

SPRING-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 299,191, dated May 27, 1884.

Application filed February 15, 1883. (No model.) Patented in Canada September 17, 1881.

To all whom it may concern:

Be it known that I, JOHN BELMER ARMSTRONG, a subject of the Queen of Great Britain, residing at the city of Guelph, in the county of Wellington, in the Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Vehicles, of which the following is a specification.

The object of the invention is to produce a light and serviceable buggy-gear made of steel; and it consists in various novel details of construction and arrangement, as will be hereinafter fully set forth.

In the drawings, Figure 1 is a general view of my buggy-gear. Fig. 2 is a detail of C-spring, axle, and shackle. Figs. 3 and 4 are details of head-plate, &c. Fig. 5 is a detail of saddle-plate, &c. Figs. 6 and 7 are details of connection between brace and reach. Fig. 8 shows an end of one of the C-springs, and Fig. 9 the brass sleeve. Fig. 10 shows method of connecting the spring bar and body-loop.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is a front axle, made of steel, and naked—that is to say, the wooden bed-piece, which usually extends from shoulder to shoulder on the axle, is dispensed with. It will be noticed that the head-plate B may be pivoted directly in the center of this axle, or, if preferred, a metal axle-plate may be inserted between them; but no wood is used.

On reference to Fig. 3 it will be seen that the hole for the king-bolt C through the head-plate B is re-enforced by a boss or thimble, *a*, punched from the stock of the plate. This boss or thimble projects into a hole in the axle or plate located between the head-plate and axle, and forms a wearing-point which effectually protects the king-bolt C from the lateral strain and wear, which would otherwise have to be borne entirely by it. It will also be seen that the ends of the head-plate B are curved upward so as to form a front spring for the support of the perches D, which connect the said head-plate to the axle, as shown.

While in the design of the gearing illustrated I think it will be found preferable to employ perches, as illustrated, it will of course be understood that instead of these perches ordinary supporting-springs might be employed.

As illustrated in the drawings, the perches D are made of flat steel and are curved upward between the points of connection.

Instead of curving the perches upward, the same effect of course would be obtained by curving them downward.

E is a loop-shaped plate, the diameter of the loop being slightly greater than the combined diameter of the axle and head-plate, so that when the loop-washer is secured in position by the king-bolt C, which passes through it, the tightening of the nut of the said king-bolt compresses this loop-washer E and causes it to form a spring-washer for the purpose of preventing any rattling at this point of connection. It will be seen that the ends of the loop plate or washer E project beyond the side of the axle, and are connected together by an auxiliary bolt, F, which will hold the loop-plate in position should any accident occur to the king-bolt. It will also be noticed that the loop-plate E has an offset, *b*, on one of its sides, to form a shoulder to butt against the edge of the head-plate, so as to prevent the swiveling of the loop-plate E, which, as will be seen, constitutes a combined spring-washer and safety clevis or clip.

On reference to Fig. 5 it will be seen that the metal saddle-plates G have semicircular recesses formed on their top surfaces, so as to hold in position the clips H, the recesses constituting also a nice finish on either side of the clips.

In Fig. 2, which is an enlarged detail showing the manner in which the C-springs are secured in position, it will be noticed that the teat or projection *d* is formed on the bottom side of the C-springs, which teat fits into the recess formed on the top of the perch by the punching of the stock of the latter to form a similar teat, *e*, on its bottom side, which latter teat fits into a recess. The C-springs I are thus rigidly secured at one end to the axle or head-plate, and are, as shown, set so as to be at right angles thereto, the free ends of the C-springs attached to the rear axle pointing toward the C-springs attached to the head-plate, and are connected together by the side springs, J, the connecting-joints being formed by the free shackles K, which constitute a flexible connection, permitting the free expansive movement of both classes of springs. It will

be noticed that the side springs, J, are made of single-plate steel, and that their ends are curved in a cyma-reversa shape, which form I find, by experience, secures the greatest evenness of elasticity when the side springs are connected, as described, to the C-springs.

As the greatest weight when the carriage is loaded is carried on the back portion of the gear, I make the rear half of the side springs, J, slightly heavier than the front portion. Consequently the buggy remains level, even when loaded.

L are metal spring-bars secured to the top of the side springs, J. The ends of these bars are curved upward, so as to form a spring-support for the body of the vehicle, which may either rest directly on the said bars L or be supported by the cross-bars or body-loops M, which connect the ends of the bar L together, as shown. The spring-bar L is connected to the body-loop M by a bolt passing through a hole in each, the said hole being re-enforced by a boss formed by the stock punched out of the hole in the body-loop, and fitting into a hole in the spring-bar, for the purpose of strengthening the connection and protecting the connecting-bolt from wear. A brace, N, is rigidly fastened to the axle, and extends obliquely to the perch D, where it is secured by a bolt, *n*, passing through holes in the brace and perch, the said hole in the perch being re-enforced by a boss formed by the stock punched out of the hole, and fitting into a hole in the brace, for the purpose of strengthening the connection and protecting the connecting-bolt from wear.

With the view of providing a cheap and effective bushing to be used at the connections between springs, I form a piece of sheet-brass, as shown in Figs. 8 and 9, into a thimble bent to fit the hole it is intended to bush, but having its ends open, so that it may be sprung into the hole and held therein by its own expansive force.

I deem it important that the C-springs and the side springs, J, be each made of a single plate tapering in thickness, and that they be connected by a swinging flexible connection, for I have found by experience and experiment that such springs are more durable, and possess a greater amount of elasticity in proportion to their weight, and are more even in their power under varying pressure, than springs made of a series of plates or of a single plate tapering in width.

I am aware that single-plate springs tapering in width have been made, and therefore do not claim, broadly, a tapering single-plate-spring; but I am not aware that a single-plate carriage-spring tapering in thickness has ever been before known or used in connection with a single-plate C-spring tapering in thickness, the two being connected by means of a swinging flexible connection. This combination of parts produces effects that neither spring does when used singly, and a soft, easy springing motion is the result when the wheels strike a projection which, with the multiple-leaf springs would make a harsh jar. Moreover, when multiple-leaf or laminated C-springs are used, the endwise motion of the side springs caused by striking an obstruction causes the outer or long leaf of the forward C-springs to separate from the shorter leaves, leaving them without the aid of said shorter leaves, and thus the C-springs have to be unnecessarily strong to prevent breakage, whereas by my combination a soft, easy spring is produced that is not only very cheaply made, but is much more durable than any spring of the same weight that can be produced.

I am also aware that it is not new to connect a single-plate C-spring with a single-plate side spring by means of a flexible connection, and make no claim to such construction.

What I claim as my invention is—

1. The herein-described spring-washer, consisting of a loop-shaped plate of resilient material inclosing the head-plate, axle, and king-bolt, and a piece or bolt secured between the ends of said loop, so as to form a closed link adapted to operate as a safety-clevis and double-spring washer combined, substantially as set forth.

2. The combination, with spring-clevis E and a suitable axle, A, of the spring B, provided with the boss or thimble *a*, and a king-bolt, C, passing therethrough, and a suitable washer adapted to inclose said boss to form a solid bearing for the spring and to prevent wear of the king-bolt, substantially as specified.

3. The combination of the side springs, J, provided with flexible connections at either end, with the superposed springs L and suitable cross-bars, M, substantially as described.

4. The side springs, J, provided with flexible connections at either end, and having the springs L and cross-bars M rigidly attached thereto, in combination with springs I and the elastic perches D, substantially as set forth.

5. The perch D, formed with transverse extension *e*, in combination with a suitable spring provided with extension *d*, and suitable clips, all arranged and operating substantially as specified.

6. In combination with the axle H, formed with an indentation or indentations, the perch D, formed with extension *e*, fitting therein, the spring I, having similar extension, *d*, adapted to be retained within the depression formed by the extension *e*, and suitable clips or clamps, substantially as set forth.

7. The combination, with the single-plate C-spring I, tapering in thickness, of the single-plate side spring, also tapering in thickness, and a swinging flexible connection between the two, substantially as described.

J. B. ARMSTRONG.

Witnesses:
WM. E. SLAKER,
HENRY ARMSTRONG.