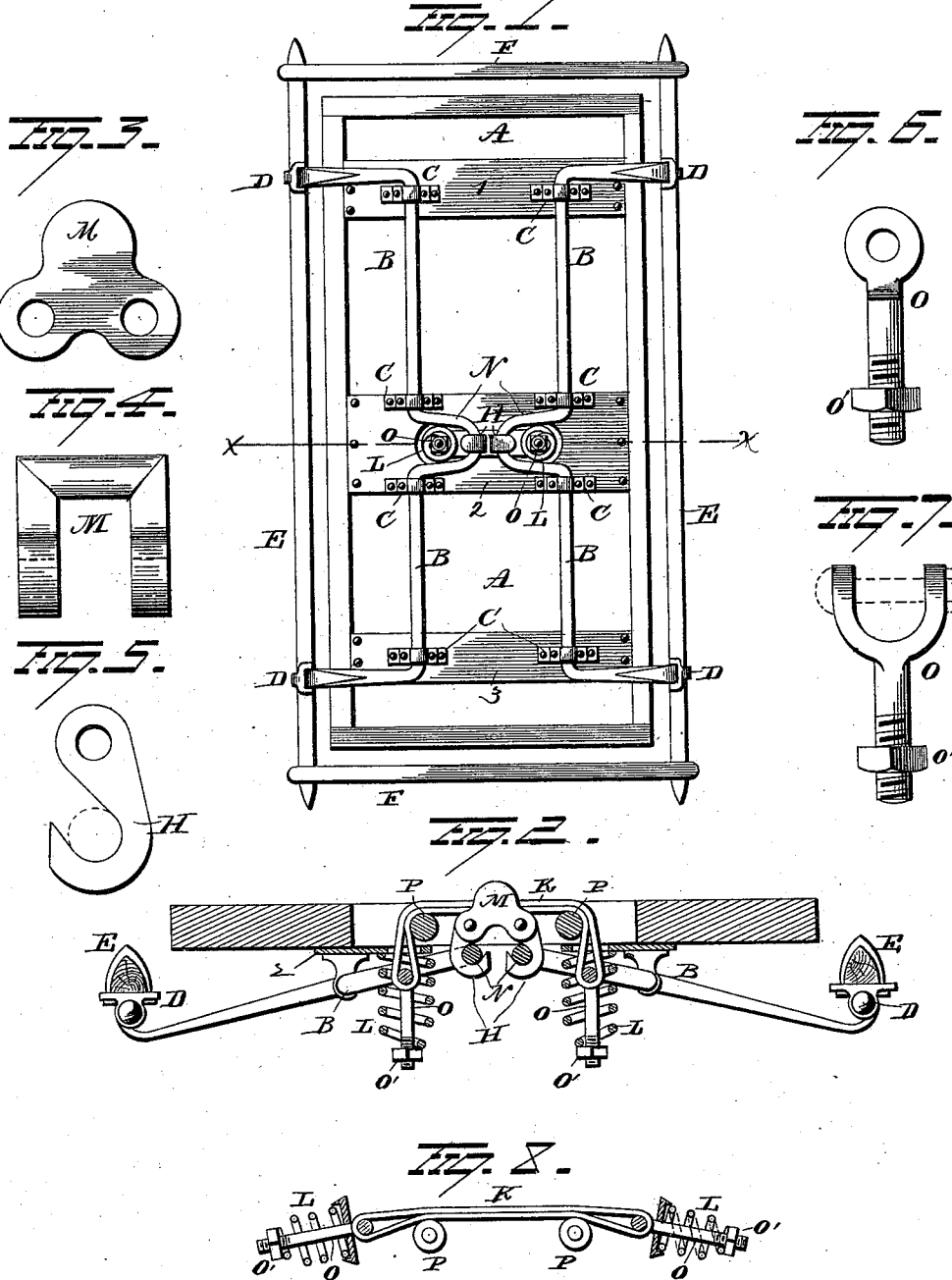


(No Model.)

H. C. SWAN.
VEHICLE SPRING.

No. 418,770.

Patented Jan. 7, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY C. SWAN, OF CHICAGO, ILLINOIS.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 418,770, dated January 7, 1890.

Application filed April 19, 1889. Serial No. 307,787. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SWAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and 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 same.

My invention relates to an improvement in vehicle-springs, and more particularly to that class of springs known as "center-action springs."

Various devices have been invented to equalize the weight of the load and to keep the body of the vehicle level or approximately level under all conditions, and also to admit of its adjustability; but thus far all have been more or less defective in these several particulars, especially the last mentioned—as, for example, some of this class of springs are so constructed that when the tension on the springs is tightened by means of the adjusting-bolt it simply lifts the inner arms of rock-shafts, thereby raising the body proportionately, consequently increasing the distance between the body and the reach of the vehicle, and thereby admitting the carrying of heavy loads without striking the reach. Others are so constructed that when the tension is tightened on the spring by means of adjusting-bolts the inner arms of rock-shafts are brought to bear against the cushion located underneath the body in such a position as to come in contact with inner arms of rock-shafts. By this means the inner arms of rock-shafts are prevented from being lifted as the tension is tightened on the spring, and the result is that a greater load is required to move the spring to action than would be needed were it not so cushioned. Thus if a spring of this nature should be adjusted to carry a heavy load, and it is desired to carry a light load, it becomes necessary to get the required elasticity to change the tension on the spring in order to arrive at the desired result.

It is the object of my present invention to overcome these objections and to produce a spring which will effectually equalize the

load in the body wherever it may be placed, or, in other words, carry the body level at all times regardless of the location of the load therein.

A further object is to provide a spring which will admit of being adjusted to suit a heavy or light load without changing the position of the body in relation to the gear.

With these ends in view the invention consists in a flexible suspension-brace employed in connection with elastic and yielding parts, so that the body is sensitive to the slightest touch or pressure.

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

In the accompanying drawings, Figure 1 is a bottom plan view of the vehicle-bottom. Fig. 2 is a vertical sectional view on line $x x$ of Fig. 1. Figs. 3 and 4 are detached views of a clevis or shackle. Fig. 5 shows a hook which couples by means of bolts with the shackle or clevis and holds the rock-shaft in position. Figs. 6 and 7 are views of the adjusting-bolt, and Fig. 8 is a modification.

A represents the body of a vehicle to which my improved spring is applied. To the bottom of this body plates 1, 2, and 3 are secured. The center plate is slotted to receive certain parts of the spring; but otherwise the plates are substantially alike. At each side of the body there are the usual side bars E E, which are connected at their ends by the half end springs F F. A pair of rock-shafts B B are connected with the body by means of loops C C, and the ends of these shafts are loosely joined to the side bars E E by shackles D D. These rock-shafts are similar in shape and so placed that their ends project in opposite directions, while midway between the ends they are bent inwardly toward each other, forming the cranks or arms N N, which approach each other quite closely, as indicated by the drawings.

A flexible suspension brace or strap K is supported loosely upon rollers P P, so that its ends may depend through slots in the plate 2. This brace or strap may be constructed of leather, flexible metal, or link-shackles with the same result, and it is preferably made in

a double fold, so that loops are formed at the ends. Bolts O O are held in these loops, and the spiral springs L L are mounted on them, with one end against the bottom of the body and the other in position to receive the impact of the adjusting-nuts O' O'. These springs have sufficient strength to hold the suspension brace or strap taut over the rollers, equal tension being exerted in opposite directions at each end. Thus it will be seen when the adjusting-nuts on the bolts are tightened it depresses the spiral springs L L, thereby increasing the tensile strain on the suspension brace or strap, and when it is loosened it diminishes this tensile strain in the same proportion.

The shackle or clevis M is suspended on the brace or strap between the rollers P P, and hooks H H depend loosely upon the shackles or clevis and receive and hold the cranks N N. Now when the suspension brace or strap is drawn taut over the rollers all the tension that may be brought to bear on the springs would not change the elevation of the body, nor would it interfere with the free and sensitive action of the spring. By this means I accomplish what other prior inventions have been supposed to do to a greater or less extent—namely, a spring, whether under a heavy or light tension, which is sensitive to the touch without changing the elevation.

In the modification shown in Fig. 8 a slight change is made in the location of the spiral springs L L. In this instance they are placed obliquely instead of vertically. Otherwise the parts are the same as in former construction.

Various forms of springs may be brought into use to accomplish the objects sought; various forms of shackles and appliances may be brought into use to take the place of the shackles described; various forms of rock-shafts may also be used to take the place of the rock-shaft described; also, the springs may be applied in different positions, the essential features consisting in a means by which the inner arms or cranks of the rock-shaft are held in position by means of a device constructed of any suitable material and drawn taut between two yielding connections, and hence I do not wish to be in any way limited to the construction herein set forth; but,

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

1. In a vehicle, the combination, with a

body, of a brace or strap supported therein and yieldingly connected thereto at its ends, and pivoted levers connected at one end to said brace or strap and at the other end to the body-supporting frame, substantially as set forth.

2. In a vehicle, the combination, with a body, of a brace or strap supported therein and yieldingly connected thereto at its ends, and levers pivoted to the body and pivotally connected at one end with the strap or brace and at their opposite ends to the body-supporting frame, substantially as set forth.

3. In a vehicle, the combination, with a body, of a flexible brace or strap supported therein and connected thereto at its ends, and levers pivoted to the body and connected at one end with the flexible brace or strap and at the other ends to the body-supporting frame, substantially as set forth.

4. In a vehicle, the combination, with the body, side bars, and rock-shafts connected therewith, of a suspension brace or strap held taut by tensile devices at its ends, and means for loosely connecting the suspension brace or strap with the rock-shafts, substantially as set forth.

5. In a vehicle, the combination, with the body, side bars, and rock-shafts connecting the side bars and body, of a suspension brace or strap, a shackle thereon, and hooks loosely connecting said strap with the rock-shafts, substantially as set forth.

6. In a vehicle, the combination, with the body, side bars, and rock-shafts, of a suspension brace or strap, springs for holding the latter taut, devices for regulating the tension of the springs, and means for connecting the strap and the rock-shafts, substantially as set forth.

7. In a vehicle, the combination, with a body, side bars, and rock-shafts having cranks thereon, of a suspension brace or strap, rollers, bolts depending from the strap, springs on the bolts, adjusting-nuts, and a shackle and hooks connecting the cranks of the rock-shafts with the suspension brace or strap, substantially as set forth.

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

HENRY C. SWAN.

Witnesses:

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CHAS. B. SCOTT.