No. 645,699. Patented Mar. 20, 1900.

J. L. ANCELLE.

SPRING WHEEL FOR VEHICLES.

(No Model.) (Application filed June 26, 1899.)

Fig. 1.

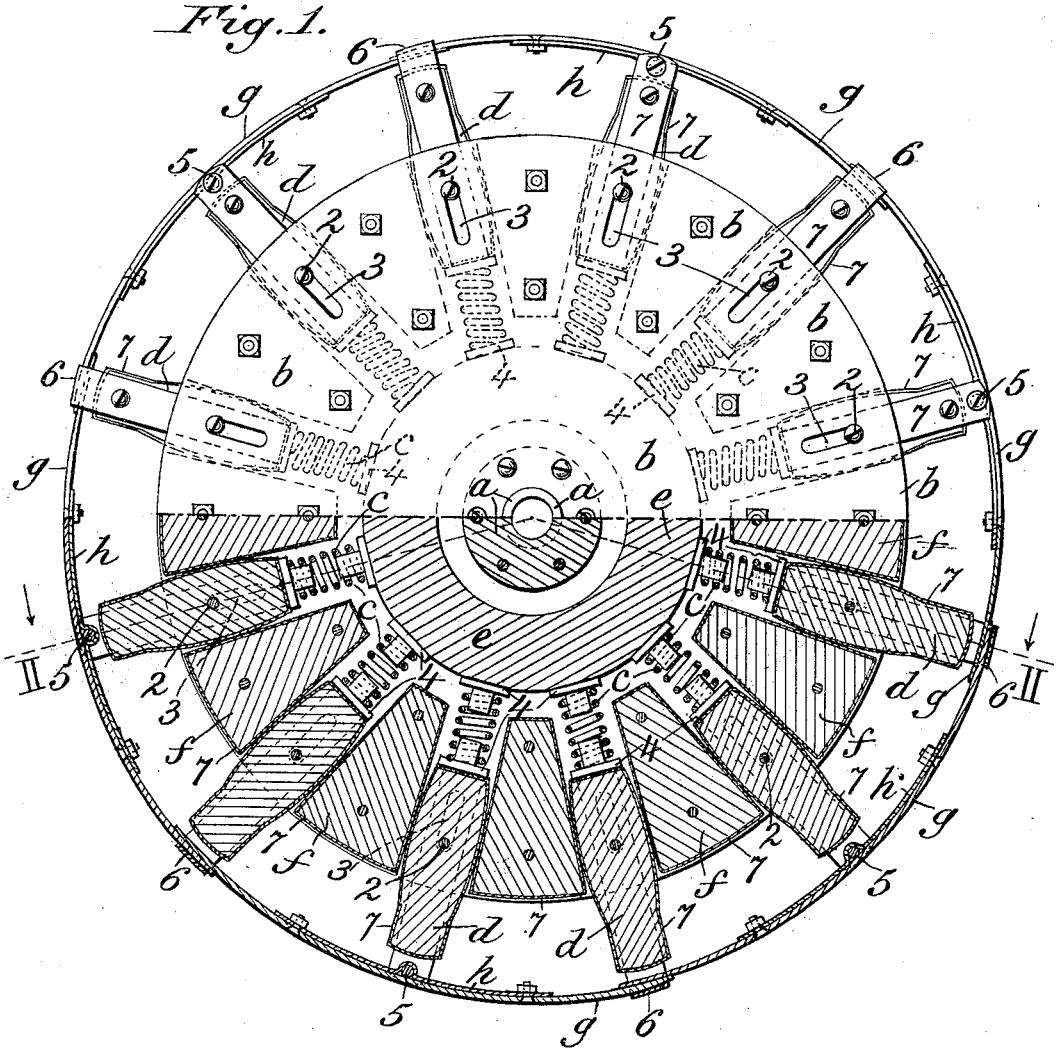
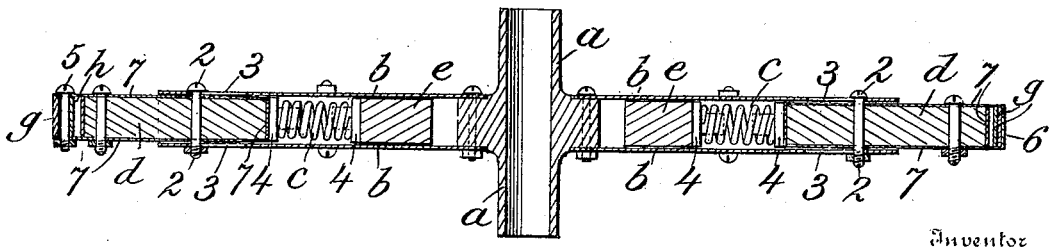


Fig. 2.



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UNITED STATES PATENT OFFICE.

JEAN LOUIS ANCELLE, OF PERU, INDIANA.

SPRING-WHEEL FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 645,699, dated March 20, 1900.

Application filed June 26, 1899. Serial No. 721,993. (No model.)

To all whom it may concern:

Be it known that I, JEAN LOUIS ANCELLE, a citizen of the United States, residing at Peru, in the county of Miami and State of Indiana, have invented certain new and useful Improvements in Spring-Wheels for Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention.

This invention relates to vehicle-wheels provided with springs intermediate the hub and the rim or tire. In such wheels it is customary to have springs on opposite sides of the wheel's axis, and heretofore (so far as I am aware) the weight of the vehicle has been supported entirely by the one or more springs which for the time have their position between the wheel's axis and the ground, or if the springs above the axis give any support at all to the hub the pressure of the so-supported weight is applied to said springs in the opposite sense to that in which it is applied thereto when said springs come between the hub and the ground. In other words, so far as I am aware, in the spring-wheels heretofore devised if a spring is in compression, say, below the wheel's axis it either becomes relieved of the vehicle's weight when the rotation of the wheel brings said spring above the axis or else it then comes into tension in order to sustain a part of said weight. In the case of straight or torsional springs they would be bent in one direction when below and in the reverse direction when above the wheel's axis unless relieved of weight when above the axis. It is desirable to utilize the springs above as well as below the hub, and it is further desirable that the pressure should be applied thereto always in the same sense, (tension or compression or bending in the same direction.) This is accomplished by means of the present invention, in accordance with which the wheel-hub (and consequently the weight carried thereby) is suspended by connections which communicate the pressure to the same spring in the same sense both when it is above and when it is below the wheel's axis. It is not essential that the spring regarded as now above and now below the wheel's axis be a complete spring, for it may be any yielding part of the spring portion of the wheel, although a construction with separate springs is considered most advantageous and will be hereinafter more particularly described.

Appropriate connections for communicating the pressure in the above-indicated manner to the spring portion of the wheel can be made in various modifications without exceeding the limits of the invention, which extends generally to a spring-wheel with such connections; but a special improvement consists in providing the hub with a peripheral bearing on the spring portion of the wheel as opposed to its customary axial bearing therein. In other words, according to this special improvement the hub is supported from points between the spring portion of the wheel and the wheel's periphery.

A further special improvement consists in interposing a floating abutment within a circle of springs upon which the hub has a peripheral bearing, being supported upon the upper ends (or corresponding part) of said springs as they pass above the wheel's axis. Thus the weight first applied to the springs on one side of the axis as they come into position to receive the said weight is transmitted through the floating abutment to those on the other side of the axis to the rim and by the latter to the ground. The abutment might be solid; but it is an advantage to make it hollow (or, in other words, in the form of a ring) and to place the hub within the same.

In the different spring-wheels heretofore devised and in other relations springs have been employed of various materials (as pneumatic springs, rubber springs, metal springs, for example) and of various forms, (as spiral compression-springs, spiral tension-springs, leaf-springs, tongue-springs, torsional springs, for example.) In carrying the present invention into effect springs of any known or suitable material and form may be used; but only spiral compression-springs of metal (which are considered the best or, at least, as useful as any) will be illustrated and particularly described, those skilled in the art being able to substitute springs of other form or material if they should desire to use them.

The improvements above recited are not restricted to any particular form of rim or tire; but a further portion of the invention

consists in forming the wheel-rim of hinged sections connected loosely at their adjacent ends, it being most advantageous to hinge the sections in the middle and to mount them upon spring-supports. These supports may be of any suitable description and may be connected with the hub in any known or suitable way; but it is an advantage and a still further improvement to employ the sectional rim in a spring-wheel in which the hub is so supported as to transmit the weight thereon to the springs in the same sense both above and below the axis, as hereinbefore set forth, and in which the rim-sections are supported by the same springs.

The invention also consists in such other and further parts, improvements, and combinations as are hereinafter set forth.

Figure 1 is a side view of a spring-wheel constructed in accordance with the invention, the upper half being in elevation and the lower half in section in a plane parallel with the side face of the wheel, and Fig. 2 is a view in section on the bent line I I of Fig. 1.

The hub *a* (which is shown hollow, but might be solid) is provided with side plates *b*, by which it is suspended from the springs *c* through the slides *d*, which for the time being are at the upper part of the wheel. The connection with each slide is made by a slot-and-pin or other yielding connection provided with a stop to limit the motion of the slide away from the hub *a*. As shown, there is a bolt 2 through each slide, with each end of said bolt in a slot 3 in corresponding side plate *b*. When a slide *d* is uppermost, the corresponding bolt 2 is at the outer end of its slots 3, so that the plates *b*, and consequently the hub *a* (and the weight on the axle in the hub) are suspended from the said bolt or partly by said bolt and by the bolts of one or more of the slides *d* on either side of the topmost slide. Thus the hub *a* has a peripheral bearing on the springs *c*, being supported at points 2 between the said springs *c* and the periphery of the wheel.

Between the inner ends of the springs *c* is the floating abutment *e*, by which the pressure is conveyed from the springs *c* (in compression) above the axis of the wheel to the springs *c* (also in compression) below the said axis. The loose or floating abutment *e* is shown in the form of a ring surrounding the hub *a*. The pressure of the lower springs is borne by the underlying slides *d* and the rim, which latter rests directly (or indirectly if an outer rim or tire be used) upon the ground. The floating abutment *e* is held from lateral displacement by the side plates *b*. As shown, there is a follower 4 at each end of each spring, and the slides *d* move between guides *f*, fast on the side plates *b*.

The new or improved sectional wheel-rim is formed of sections *g*, hinged at 5 to spring-supports, which consist, as shown, of alternate slides *d* and are loosely connected with each other at their adjacent ends by the loops 6 on other spring-supports, which consist, as shown, of the intermediate slides *d*. The sections can yield to irregularities in the road or to the weight of the vehicle. By having them hinged in the middle they act as levers in conveying the pressure to other spring-supports or slides *d*.

When the hub is suspended, as shown, so that it bears peripherally upon the spring portion of the wheel, the sectional construction gives increased flexibility to the upper as well as to the lower part of the rim, and the lever action in transmitting movement from one slide *d* to others is performed at said upper as well as at said lower part of the rim. The guides *f* could be made integral with the plates *b*; but as shown they are separate pieces. The slides *d* and guides *f* are shown as made of wood, provided with wear-plates or facing-strips 7, of metal; but they could be made all of metal, or any suitable arrangement could be adopted. It will of course be understood, and, in fact, has hereinabove been said, in effect, that parts of the invention may be used separately and many modifications may be made so long as the principle of the invention or of one or more of the parts thereof is used. The hinge-bolt 5 is held, as shown, between the body of a section *g* and a holding-plate *h*, bolted thereto, a recess to receive the bolt being formed in the holding-plate *h*. The new or improved wheels can be used on bicycles, carriages, railway-cars, and other vehicles.

The rim of the wheel, as herein shown, may run on the ground or it may be protected by an outer rim or tire of any suitable description. The hub and spring portion of the wheel shown may, in fact, form the center of small diameter to a wheel as large in diameter as the user may find it expedient to make. In such case the inclosing portion as a whole or any suitable part thereof can be regarded as the rim for said hub and spring portion.

I claim as my invention or discovery—

1. A wheel composed of a hub, a rim, a spring portion within the rim, and connections between said hub and said spring portion for communicating the pressure to the same spring in the same sense as well when it is above as when it is below the wheel's axis, substantially as described.

2. A spring-wheel having its hub supported from points between the spring portion of said wheel and the wheel's periphery, so that in running the pressure is in the same sense on a spring when the latter is above as when it is below the wheel's axis, substantially as described.

3. A wheel composed of a rim, springs within the rim, a floating abutment within the springs, and a hub supported from the upper ends of the springs as they pass above the wheel's axis, substantially as described.

4. A wheel composed of a sectional rim, a spring portion within the rim, and connections between said hub and said spring portion for communicating the pressure to the

same spring in the same sense as well when it is above as when it is below the wheel's axis, substantially as described.

5. A wheel having a rim composed of sections hinged in the middle and loosely connected at the ends, substantially as described.

6. A spring-wheel having a rim composed of sections hinged in the middle to spring-supports and loosely connected at the ends, substantially as described.

7. A spring-wheel having a rim composed of sections hinged at the middle to one set of spring-supports and connected at the ends with another set of such supports, substantially as described.

8. A spring-wheel having a rim composed of sections bearing peripherally upon the spring portion of said wheel, and a hub which has also a peripheral bearing upon said spring portion, substantially as described.

9. A wheel composed of a rim, rim-supports, a floating abutment, springs between said supports and said abutment, and a hub having a slot-and-pin connection with said supports, substantially as described.

10. A wheel composed of a rim in sections, rim-supports with which said sections are loosely connected, a floating abutment, springs between said supports and said abutment, and a hub having a slot-and-pin connection with said supports, substantially as described.

11. A wheel composed of a rim in sections, a set of rim-supports hinged to the middle of said sections, a second set of rim-supports connected loosely with the ends of said sections, a floating abutment, springs between said supports and said abutment, and a hub having a peripheral bearing on said springs, substantially as described.

12. A spring-wheel composed of a rim, sliding rim-supports bearing peripherally on the spring portion of said wheel, and a hub carrying guides for said supports and bearing on said spring portion at points between the same and the wheel's periphery, substantially as described.

13. A wheel composed of a rim, springs within the rim, a floating abutment in the form of a ring within the springs, and a hub within said abutment supported from the upper ends of the springs as they pass above the wheel's axis, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JEAN LOUIS ANCELLE.

Witnesses:
MICHEL KANTZER,
A. GEHRING.