H. C. KELLER.

SPRING WHEEL.

APPLICATION FILED JAN. 29, 1910.

1,016,693.

Patented Feb. 6, 1912.

FIG. 1.

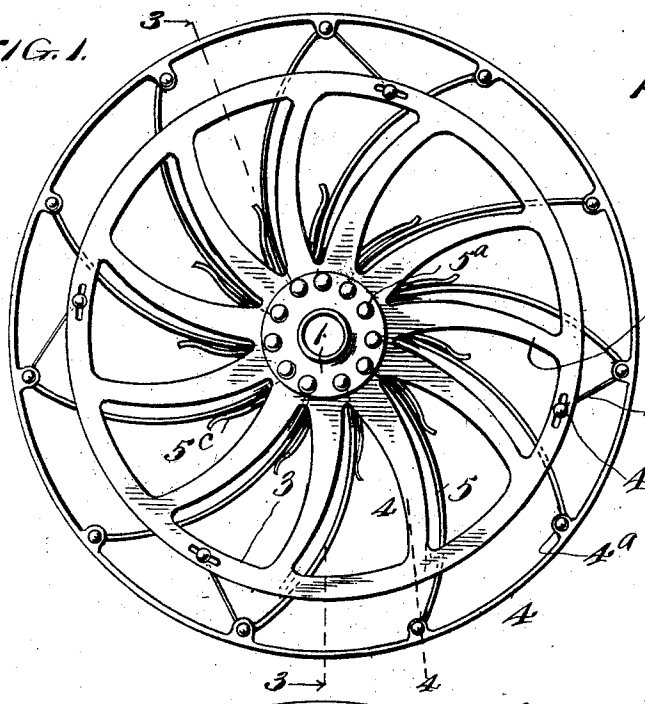


FIG. 3.

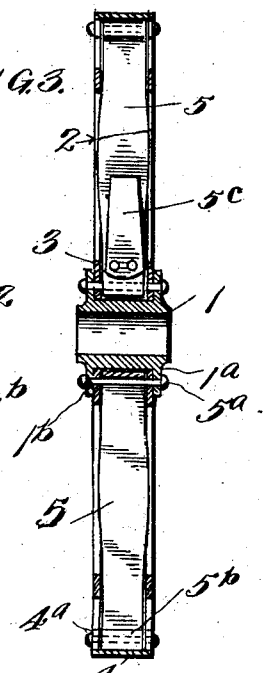


FIG. 2.

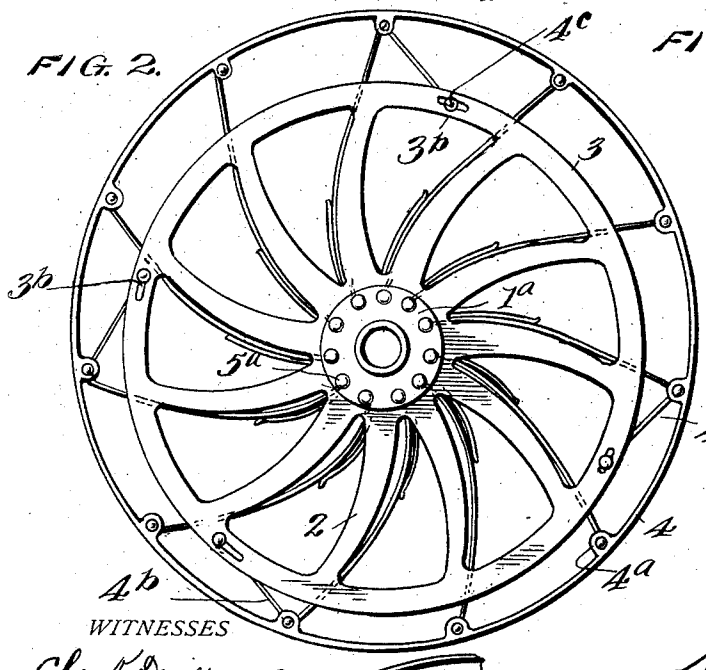


FIG. 5.

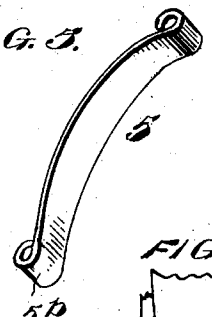
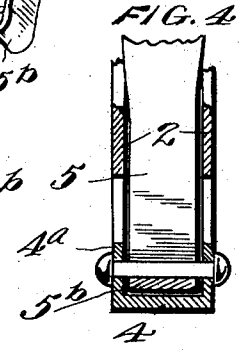


FIG. 4.



WITNESSES

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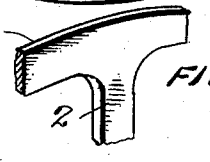

FIG. 6

INVENTOR

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UNITED STATES PATENT OFFICE.

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SPRING-WHEEL.

1,016,693. Specification of Letters Patent. Patented Feb. 6, 1912.

Application filed January 29, 1910. Serial No. 540,743.

To all whom it may concern:

Be it known that I, HENRY C. KELLER, citizen of the United States, residing at Bondville, in the county of Champaign and State of Illinois, have invented certain new and useful Improvements in Spring-Wheels, of which the following is a specification.

My invention relates to vehicle wheels, and particularly to that type thereof now more generally known as spring wheels.

The object of my invention is to provide a vehicle-wheel of the class referred to, wherein, with a minimum number of elements employed in its construction, there shall constantly exist the required maximum degree of resiliency and a great degree of strength and rigidity.

Another object is so to arrange the elements of the construction as to permit an easy and practically frictionless actuation thereof, thereby rendering the construction more durable and less likely to derangement.

With these objects in view, and others of equal importance, my invention comprises the construction and novel arrangement and combination of parts as hereinafter fully described and claimed.

In the accompanying drawings, wherein I have illustrated the preferred embodiment of my invention (and one of many forms thereof), Figure 1 is a view in elevation of a vehicle-wheel with my invention applied, the parts appearing in their normal position; Fig. 2 is a similar view, the parts being shown in the position they assume when actuated; Fig. 3 is a vertical section thereof taken on the line 3—3, Fig. 1; Fig. 4 is a similar view, on an enlarged scale, taken on the line 4—4, Fig. 1, and showing more clearly the manner of attaching the spring-members to the outer rim; Fig. 5 is a view in perspective of one of the resilient-members, detached from the wheel; Fig. 6 is a detached, fragmentary sectional view, partly in section, of the outer end of a spoke, showing on an enlarged scale its form of attachment to the rim.

In these drawings: 1 designates the hub of a vehicle-wheel of any preferred form; 2 the spokes extending therefrom; 3 the inner or spoke-rims, there being two of these, (in parallel relation) and to which the spokes 2 are connected; 4 the outer or spring-rim; and 5 the resilient or spring-members which extend tangentially from the hub 1, and between the two parallel spoke-rims, and then connect at their outer ends with the outer rim 4, in a manner presently to be described.

The hub may be of any appropriate size and form, and preferably comprises two spaced disks or side-plates 1^a, 1^a suitably connected to each other. These are provided with equidistantly-disposed circumferential apertures 1^b, through which extend bolts or other securing means 5^a for pivotally attaching the spring-members 5 in the hub between the spokes 2. Rigidly secured to, or formed integrally with, these side plates, intermediate of the spring-members 5, are the spokes 2. These spokes are of less length than the members 5, but are arranged tangentially, similarly as are said members. At their outer ends, they are attached to, or formed integrally with, the inner rims 3. As shown, the spring members 5, intermediate of their ends and, thus, for a portion of their length, are of a width somewhat greater than the space between the proximate pair of rigid spokes 2. By reason of this construction, the portions of the members 5 which extend beyond the edges of the spokes 2 are adapted to engage with said spokes, whereby the latter constitute elongated abutments to limit the flexure of the spring members 5.

The tangential spring-members 5, each, have their outer ends provided with a clevis or attaching-piece 5^b which is to be mounted in a lug or block 4^a secured to the inner periphery of the outer rim 4, as clearly shown in Fig. 4. If preferred and when desirable, I may also attach to the rim-lug 4^a auxiliary connecting-elements 4^b to serve as a stay-device, and which, at their opposite ends, are attached to slidable pins or bolts 4^c, shiftingly disposed in elongated slots or recesses 3^b cut in the rims 3 intermediate the points of attachment thereto of the spokes 2. Said slots are of sufficient length to permit the necessary movement therein of the bolt 4^c when shifted by the connecting-element 4^b in being actuated by the movement of the outer rim. These stay-devices are designed to maintain the parts against undesirable movement when the wheel is rotated in the opposite direction and there will, then, be no spring-action to the wheel. It is to be understood, also, that the spring-members 5 may be augmented by auxiliary leaf or other form of springs 5^c, as shown in Fig. 1.

Operation: It will be understood that

when the various parts are in the positions shown in Fig. 1, they are in approximately normal position. When the outer rim 4 is actuated, as by the weight being supported, or when it encounters something in the path of its travel, it will flex the spring-members 5, and the parts will move toward and into the positions shown in Fig. 2. If the vehicle is backed, the stay-devices will prevent such movement.

The springs 5 are of any required degree of strength and resilience, but are so designed and arranged (tangentially) that they may be of comparatively light construction, and yet afford the required degree of resistance. Moreover, they are removable for repairs or replacement. It is obvious that the outer rim can have no greater extent of movement than the tread of the inner rim 3. The pivotal connection of the springs 5 to the rim 4 allows such freedom of movement of the rim 4 as may be desirable; but no more, for the reason that the spring-members will, in their flexing movement, engage the tangential spokes and be thereby restrained from further movement. Likewise, the manner of attaching the spokes 2 to the rims 3 permits a limited movement of the rims relative to the hub 1.

To the rim 4 is to be secured the usual clencher-rim for holding a solid tire.

My invention is adapted particularly for use on automobiles, and is especially valuable as a drive-wheel, wherein the torsional strain is always exceedingly great.

My construction is advantageous over spring wheels which, for instance, employ coil-springs extending between the tire-rim and the hub and having but the one spoke-rim, in that, in the latter, where they are utilized as drive wheels, the springs will, naturally, be brought into a binding engagement with the spokes, whereby their function and efficiency will be greatly reduced, if not entirely defeated. In my construction, such a result is impossible since, even should the springs and spokes engage, such engagement will not engender a great amount of friction and binding and thereby render the construction useless. Moreover, the parts are so disposed relatively, and so operatively connected, that the wheel is never prevented from performing its resilient action. The superposed weight will be so poised that, when the drive is started and becomes effective on the drive-wheel, there will be no torsion, "lost motion," etc., but the vehicle will immediately start on its rotation. It has been found that, in the usual form of spring-wheels, the outer or tire-rim will have rotated to a considerable degree before the wheel, hub, etc., will have started. Furthermore, in my construction, the arrangement is such (as already described) that there is no unrestrained movement of parts, which would result in an undesirable rattling thereof.

While I have described my invention in more or less detail, yet it is to be understood that I do not limit myself to such details except in so far as they may be specified in the claims.

Having thus described my invention, its construction, and the mode of operation thereof, what I claim and desire to secure by Letters-Patent is:—

1. In a vehicle-wheel, a hub, a series of spokes arranged in pairs and secured thereto, a pair of spoke rims to each of which a spoke of each pair is secured at its outer end, a tire-rim of diameter larger than the spoke-rims, and resilient-members pivoted to said tire-rim and to the hub, said resilient-members being of greater width for a portion of their length than the space between each pair of the aforementioned spokes, whereby the latter constitute elongated abutments to limit the flexure of said resilient-members.

2. In a vehicle-wheel, a hub, a series of spokes arranged in pairs and secured thereto, a pair of spoke rims to each of which a spoke of each pair is secured at its outer end, said spoke rims being spaced apart, a tire-rim of diameter larger than the spoke-rims, and resilient-members pivoted to said tire-rim and to the hub, said resilient-members being of greater width for a portion of their length than the space between each pair of the aforementioned spokes, whereby the latter constitute elongated abutments to limit the flexure of said resilient-members.

3. In a vehicle-wheel, a hub, a series of spokes arranged in pairs and secured thereto, a pair of spoke-rims to each of which a spoke of each pair is secured at its outer end, a tire-rim of diameter larger than the spoke-rims, and tangentially-arranged resilient-members pivoted to said tire-rim and to the hub, said resilient-members being of greater width for a portion of their length than the space between each pair of the aforementioned spokes, whereby the latter constitute elongated abutments to limit the flexure of said resilient-members.

4. In a vehicle-wheel, a hub, tangentially-arranged spokes secured thereto, a plurality of spaced spoke-rims to which said spokes are secured at their outer portions, a single tire-rim encircling the spoke-rims and lying in a plane between said spaced rims, and tangentially-disposed flexible members secured to said hub and to said tire-rim and lying between said spoke-rims the space between each pair of said spokes being less than the width of a portion of each of the flexible members, whereby the spokes constitute elongated limit-abutments to control the flexure of said members.

5. In a vehicle-wheel, a hub, tangentially-

arranged spokes secured thereto, a plurality of spaced spoke-rims to which said spokes are secured at their outer portions, a single tire-rim encircling the spoke-rims and lying in a plane between said spaced rims, tangentially-disposed resilient-members secured to said hub and to said tire-rim and lying between said spoke-rims, said resilient-members being of greater width for a portion of their length than the space between each pair of the aforementioned spokes whereby the latter constitute elongated abutments to limit the flexure of said resilient-members, and pivot-members embraced by the ends of said resilient-members and mounted in said tire-rim.

6. In a vehicle-wheel, a hub, tangentially-arranged spokes secured thereto, a plurality of spaced spoke-rims to which said spokes are secured at their outer portions, a single tire-rim encircling the spoke-rims and lying in a plane between said spaced rims, tangentially-disposed resilient-members secured to said hub and to said tire-rim and lying between said spoke-rims, said resilient members being of greater width for a portion of their length than the space between each proximate pair of the aforementioned spokes, whereby the latter constitute elongated abutments to limit the flexure of said resilient members and means for limiting movement of said resilient-members and tire-rim during reverse rotation of the wheel comprising a shifting connecting-element between said spoke-rims and the tire-rim.

7. In a vehicle-wheel, a hub, tangentially-arranged spokes secured thereto, a plurality of spaced spoke-rims to which said spokes are secured at their outer portions, a single tire-rim encircling the spoke-rims and lying in a plane between said spaced rims, tangentially-disposed resilient-members secured to said hub and to said tire-rim and lying between said spoke-rims, said resilient members being of greater width for a portion of their length than the space between each pair of the aforementioned spokes, whereby the latter constitute elongated abutments to limit the flexure of said resilient members, and auxiliary resilient-members arranged in contiguity to said first-mentioned resilient-members.

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

HENRY C. KELLER.

Witnesses:
FRANK H. BOGGS,
CHAS. E. KELLER.