No. 607,039. Patented July 12, 1898.

G. HAYES.

WHEEL FOR VEHICLES.

(Application filed July 23, 1897.)

(No Model.) 2 Sheets—Sheet 1.

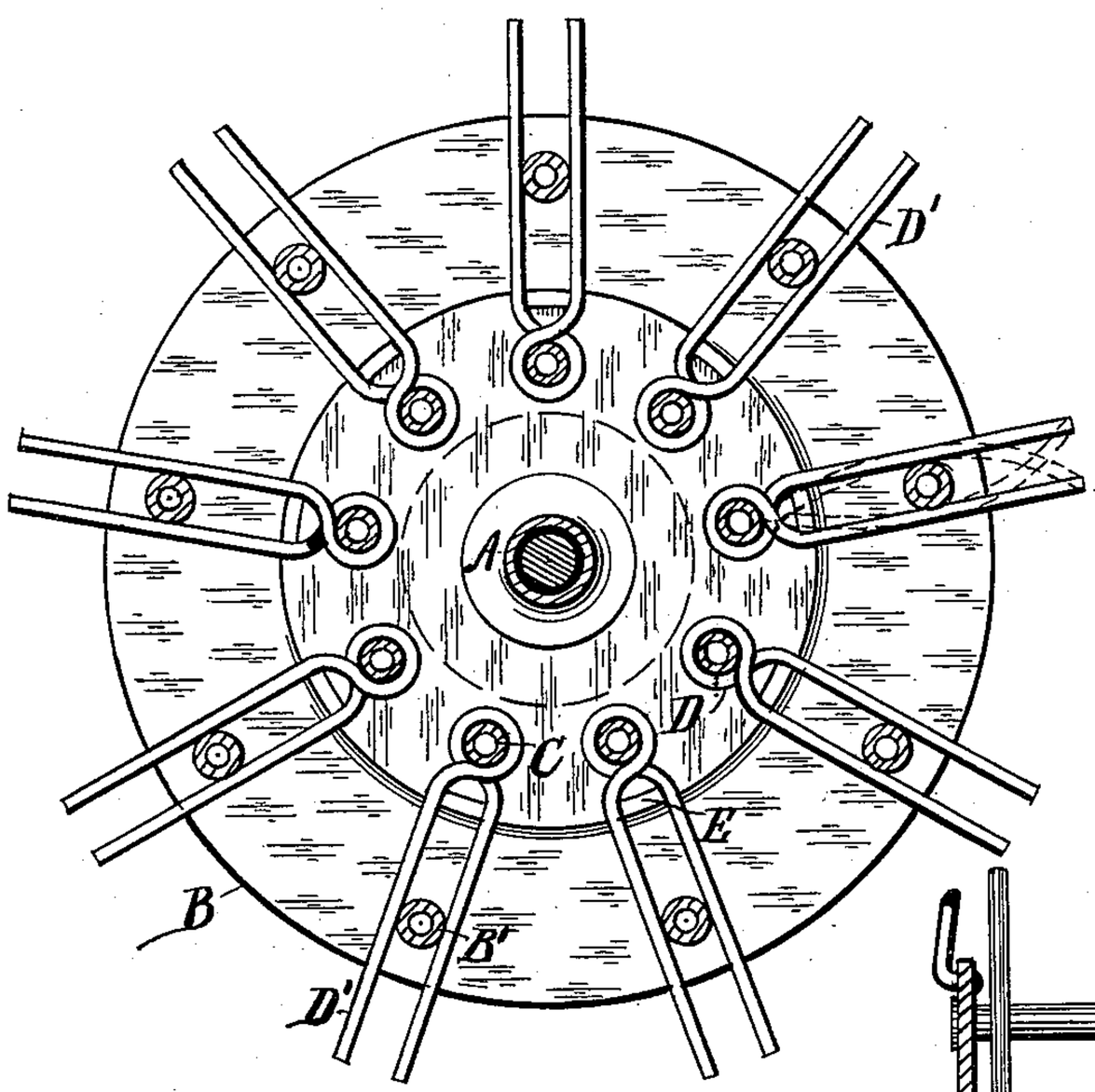

Fig. 1.

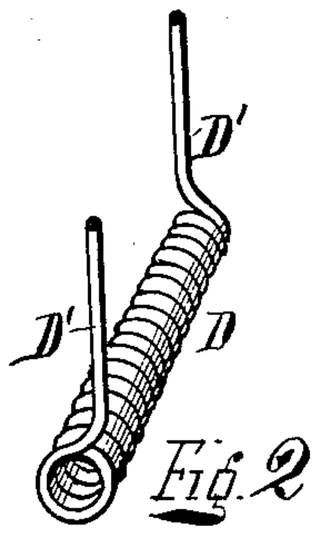

Fig. 2.

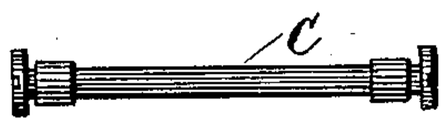

Fig. 3.

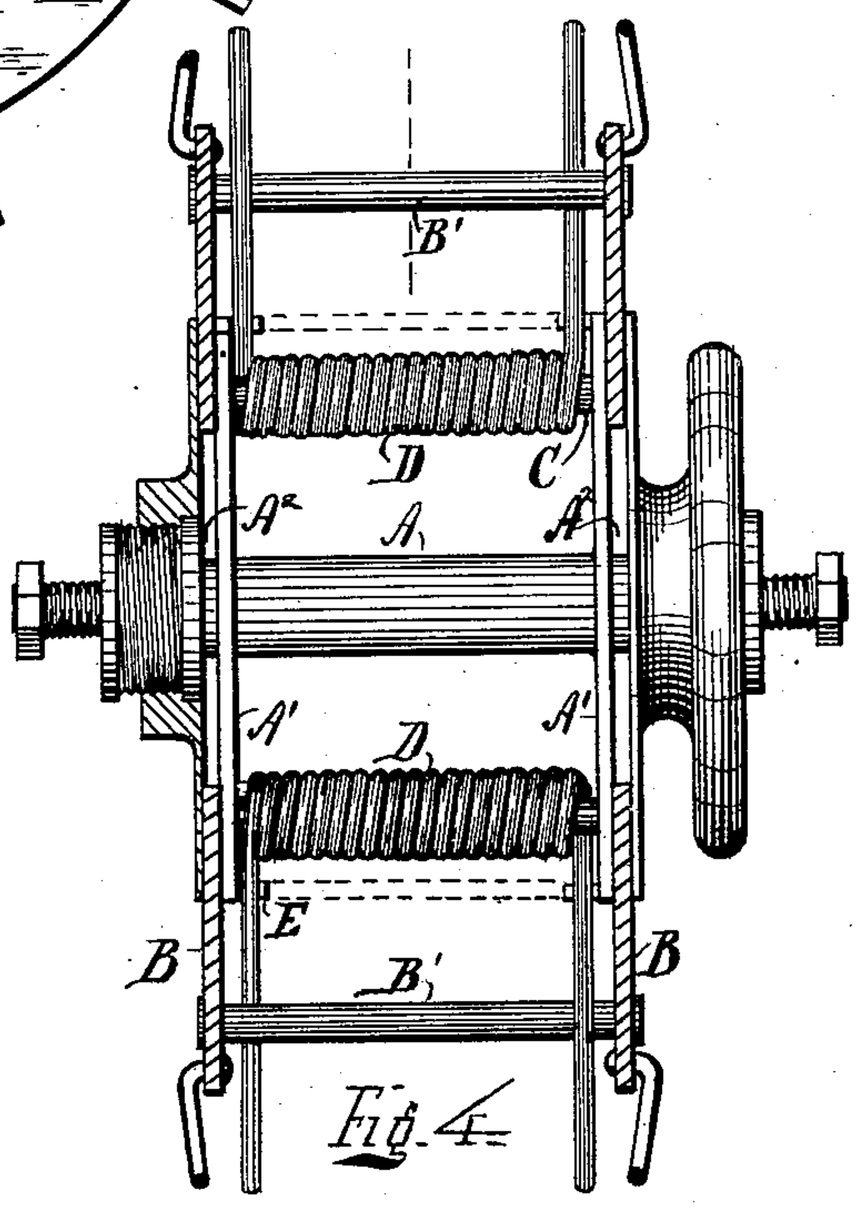

Fig. 4.

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WHEEL FOR VEHICLES.

(Application filed July 23, 1897.)

(No Model.) 2 Sheets—Sheet 2.

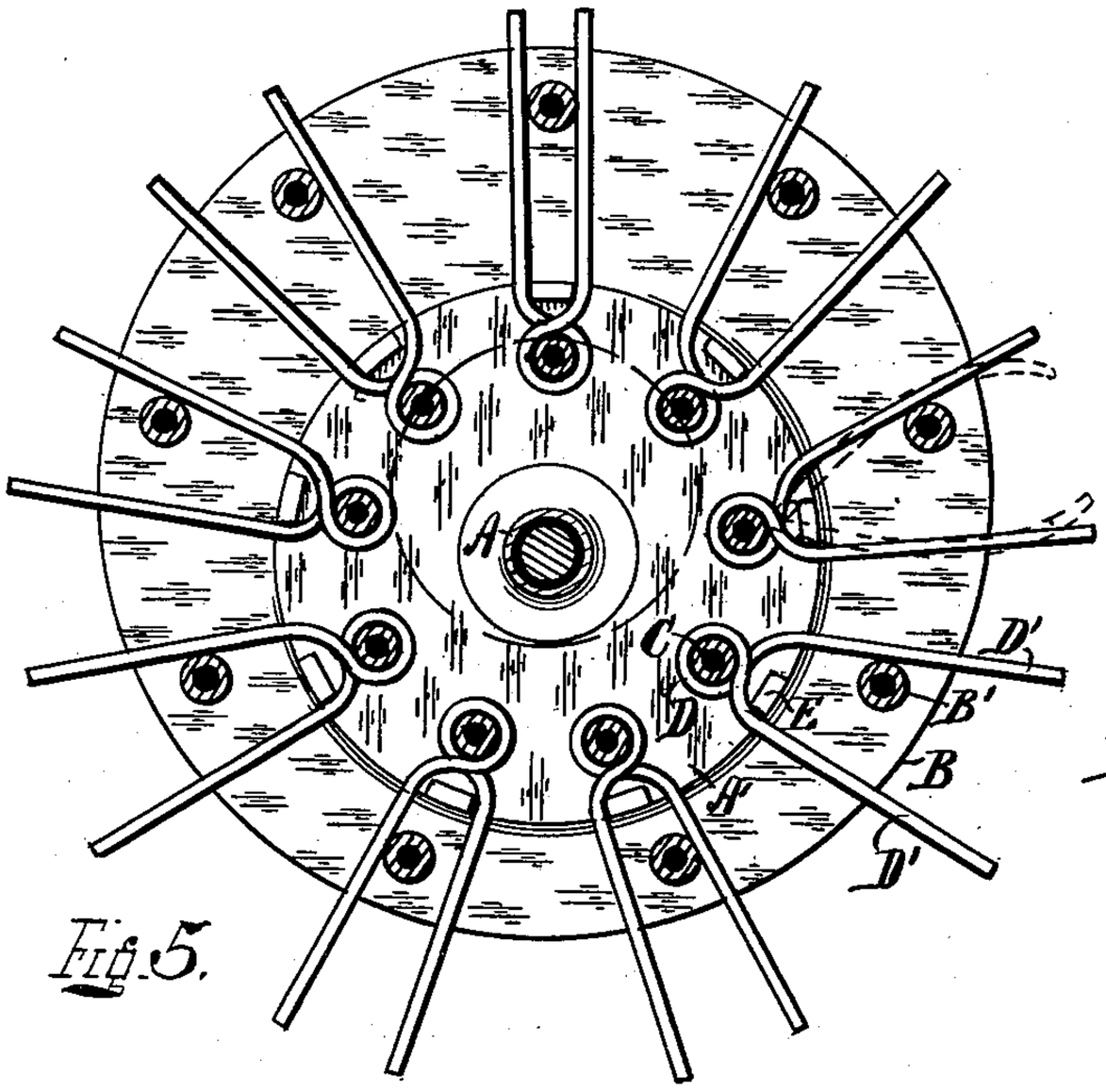

Fig. 5.

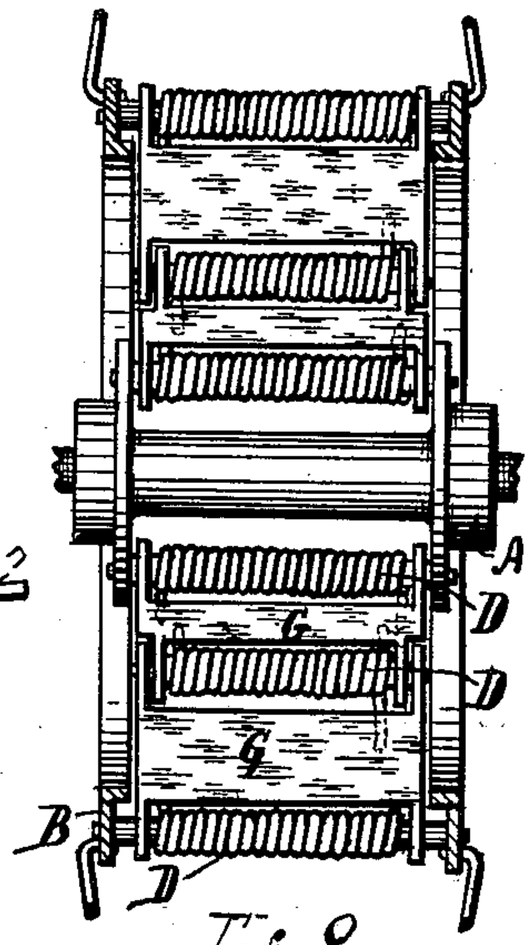

Fig. 8.

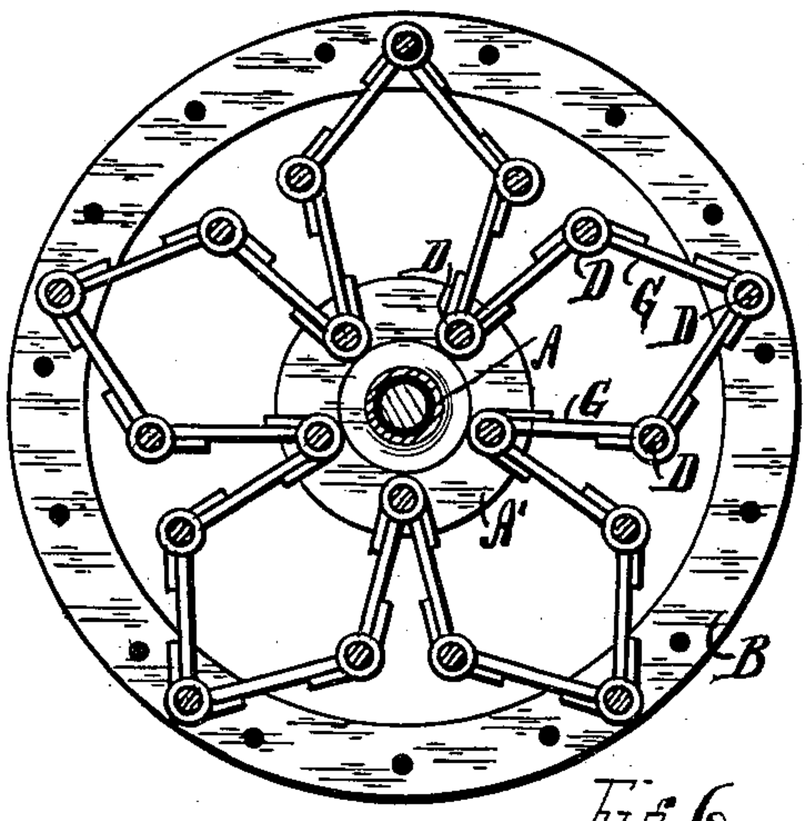

Fig. 6.

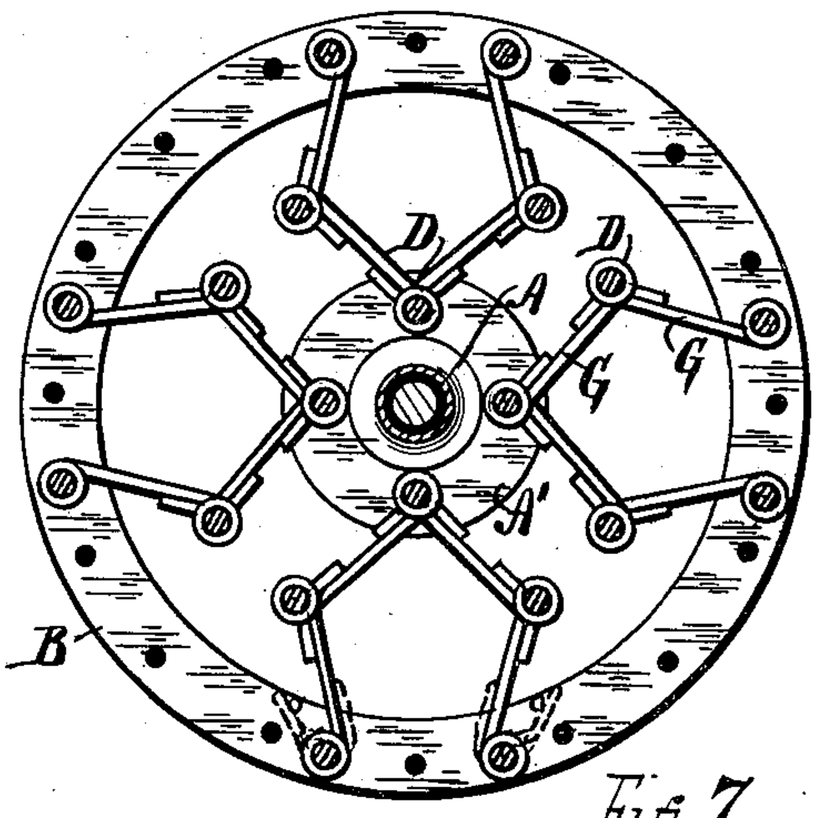

Fig. 7.

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE HAYES, OF NEW YORK, N. Y.

WHEEL FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 607,039, dated July 12, 1898.

Application filed July 23, 1897. Serial No. 645,705. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HAYES, a citizen of the United States, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Wheels for Bicycles and other Vehicles, of which the following is a specification.

My improvement relates to the construction of the central portion of the wheel; and it consists in the employment of cylindrically-coiled spiral springs upon cross-rods or spindles arranged transversely to the plane of the wheel and parallel to the axle of the vehicle; also, to the axle-hub of the wheel, the springs adapted for coiling and uncoiling, according to pressure from weight added to the vehicle or shock received at the rim of the wheel.

It further consists of a construction of wheel-center wherein an axle-hub is resiliently sustained centrally within a separate and special spoke-nave by series of spirally-coiled springs located between and connecting the two, each spring cylindrically posed upon a spindle arranged parallel with the axle-hub.

It further consists of the combination of spiral springs with links of plate metal, whereby several springs are brought into conjunction to operate in unison in affording resilient motion to axle-hub and spoke-nave.

It further consists of the devices and combinations of devices in and about the axle-hub and spoke-nave, as hereinafter more fully described, and pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 represents a cross-section of the hub-center, giving an inside face view of one hub-flange, side cheek of spoke-nave, and springs in the simplest formation, the springs in normal position, as at rest. Fig. 2 represents one spring alone in perspective. Fig. 3 represents a lengthwise elevation of one of the cross-rods or spindles upon which springs are to be placed. Fig. 4 is a vertical section of the wheel-center from side to side of the wheel. Fig. 5 is a cross-section and inner face view similar to that of Fig. 1, illustrating the change of relative position as to axle-hub and spoke-nave when in use under pressure or shock, this being the extreme condition. Figs. 6 and 7 are views of wheel-center analogous to Fig. 1, each illustrating combinations of coiled springs connected by links and in union with axle-hub and spoke-nave as modifications. Fig. 8 is a vertical cross-section of the construction shown in Fig. 7.

On the drawings, A indicates the axle-hub of the wheel, through which the axle supporting the vehicle passes. The axle-hub may be of the usual ball-bearing variety or otherwise. The axle-hub is formed with two flanges A′, one toward each end of the hub, and outside of each flange a groove A^2, beyond which the usual ball-bearing expansion and sprocket wheel is shown, as in Fig. 4.

The spoke-nave of Figs. 1 and 4 is formed as two cheek rings or disks B, each having apertured center of sufficient diameter to permit of such movement of the axle-hub within the same as may be desirable.

The two disks B encircle the axle-hub, one at each end thereof, outside of, but immediately against, a flange A′ of the axle-hub. The two disks B are connected together and at the same time kept at the required distance apart by cross-rods or pillars B′, so that they become a part of the spoke-nave.

The flanges A′ prevent any lateral movement of the spoke-nave after the wheel is completed. At the outer periphery the interior ends of the spokes of the wheel are connected in any suitable manner or essentially as shown.

To obtain a resilient oscillatory or vibratory motion as to the relative position of axle-hub within the spoke-nave under the weight of the rider or influence of shock received at the rim of the wheel, thereby conducing to the comfort of the rider and safety of the wheel and vehicle, a series of coiled springs arranged after the following manner are employed.

At C a series of cross-rods or pillars extend horizontally between the flanges A′ of the axle-hub, having their heads or ends secured rigidly to the flanges, between which they serve as spindles.

D indicates coiled springs sleeved upon the before-mentioned spindles C and having terminals extending outwardly, as at D′, to and beyond the cross-rods or pillars B′ of the spoke-nave, passing the cross-rods B, but not secured thereto.

At E stops are formed to the flanges A′, either as lugs projecting therefrom or as pins threaded thereto or rods crossing, as shown by dotted lines in Fig. 4. The two projecting ends D′ of each coiled spring are so arranged that a pillar B′ of the spoke-nave is between them and also a lug or stop E from a flange A′ of the axle-hub.

When the wheel is quiescent, the arrangement is as shown in Fig. 1; but under pressure upon the axle from the vehicle above or its rider and also from shock received at the rim of the wheel the conditions change approximately after the manner shown in Fig. 5, where it will be readily seen that the two projecting ends of each spring, except that at the top of the figure, are moved more or less apart, according to its position around the circle, one by the pillar B′ between them and the other held back by the stop E, and the two terminals being crossed or projected at opposite sides from the twist brings about a tightening or contraction of the coiled portion. The reaction of the coil immediately following resiliently rearranges the relative condition of the axle-hub and spoke-nave back more or less to its normal position.

The above description applies more especially to Figs. 1 to 5, inclusive, in which construction the springs are all located at the axle-hub.

Instead of the above-described arrangement the spindles upon which the coils are placed may be attached to the spoke-nave rings and the spindles or cross-rods upon or against which their prongs engage or impinge may be attached to the hub-flanges, thereby reversing that method described; also, intermediate or auxiliary coils may be employed, connected to those first mentioned by links or otherwise. The grooves in the hub outside the flanges may be omitted where less motion of the axle-hub within the spoke-nave is to be provided for. The guard-flanges may be formed with the axle-hub or threaded or riveted on, as desired. The coiled springs may be single or double, extending full width between the flanges or in two lengths or more, as desired. The action or relative motion of axle-hub and spoke-nave with respect to each other acts upon the coiled springs, tightening the coils. Their reaction restores them to their normal position resiliently and with comfort to the rider.

In Figs. 6, 7, and 8 such modifications or additional combinations are shown. Figs. 6 and 7 differ only in arrangement, and Fig. 8 is a cross-section of the form shown in Fig. 7. In these modifications the spoke-nave cheeks or disks become mere rings, and several coils, united by links G of plate or sheet metal, serve as connections, combining several coiled springs together as sets. Thus the series required for the wheel comprise several sets, constituting an accumulation of resistance and resiliency suited to excessive weight and rough riding.

I do not confine myself to any number of springs, but employ as many as desirable, according to the requisite exigency and employment of the wheel, and their arrangement may vary in any suitable manner. The springs also may be arranged to coil and uncoil either way, according to position and arrangement chosen.

What I claim as new, and desire to secure by Letters Patent, is—

1. A wheel for bicycles and other vehicles, in which resiliency is derived from cylindrically-coiled springs encircling spindles, cross-rods or pillars, extending parallel to the axle-hub between flanges thereof, the springs having ends extending radially outward, and engaging with a special spoke-nave encircling the axle-hub, essentially as set forth.

2. In a wheel for bicycles and other vehicles, a system of cylindrically-coiled springs upon spindles arranged parallel to the axle-hub between flanges thereof, the ends of the springs linked to other cylindrically-coiled springs upon spindles also arranged parallel to the axle-hub, but connected solely to cheeks or end disks of a special spoke-nave, essentially as set forth.

3. In a wheel for bicycles and other vehicles, a combination consisting of first: an axle-hub having end flanges between which certain spindles are arranged parallel to the axle-hub, connected therewith and encircled by cylindrically-coiled springs; second: a special spoke-nave encircling the axle-hub at a suitable distance therefrom, formed with end cheeks or disks connected by certain spindles extending across parallel to the axle-hub, and encircled by cylindrically-coiled springs; third: certain intermediate free-moving spindles arranged parallel to the axle-hub, and encircled by cylindrically-coiled springs, the spring-bearing spindles, arranged in sets with the springs of each set linked together, essentially as set forth.

4. In a wheel for bicycles and other vehicles, an axle-hub supported centrally within an encircling spoke-nave by sets of cylindrically-coiled springs arranged parallel to the axle-hub, and connected by plates of rigid metal to which projecting ends of the springs are secured, essentially as set forth.

5. In a wheel for bicycles and other vehicles, rigid link-plates arranged parallel to the axle-hub, standing outwardly edgewise thereto, and connected with cylindrically-coiled springs upon spindles arranged parallel to the axle-hub, essentially as set forth.

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Witnesses:
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