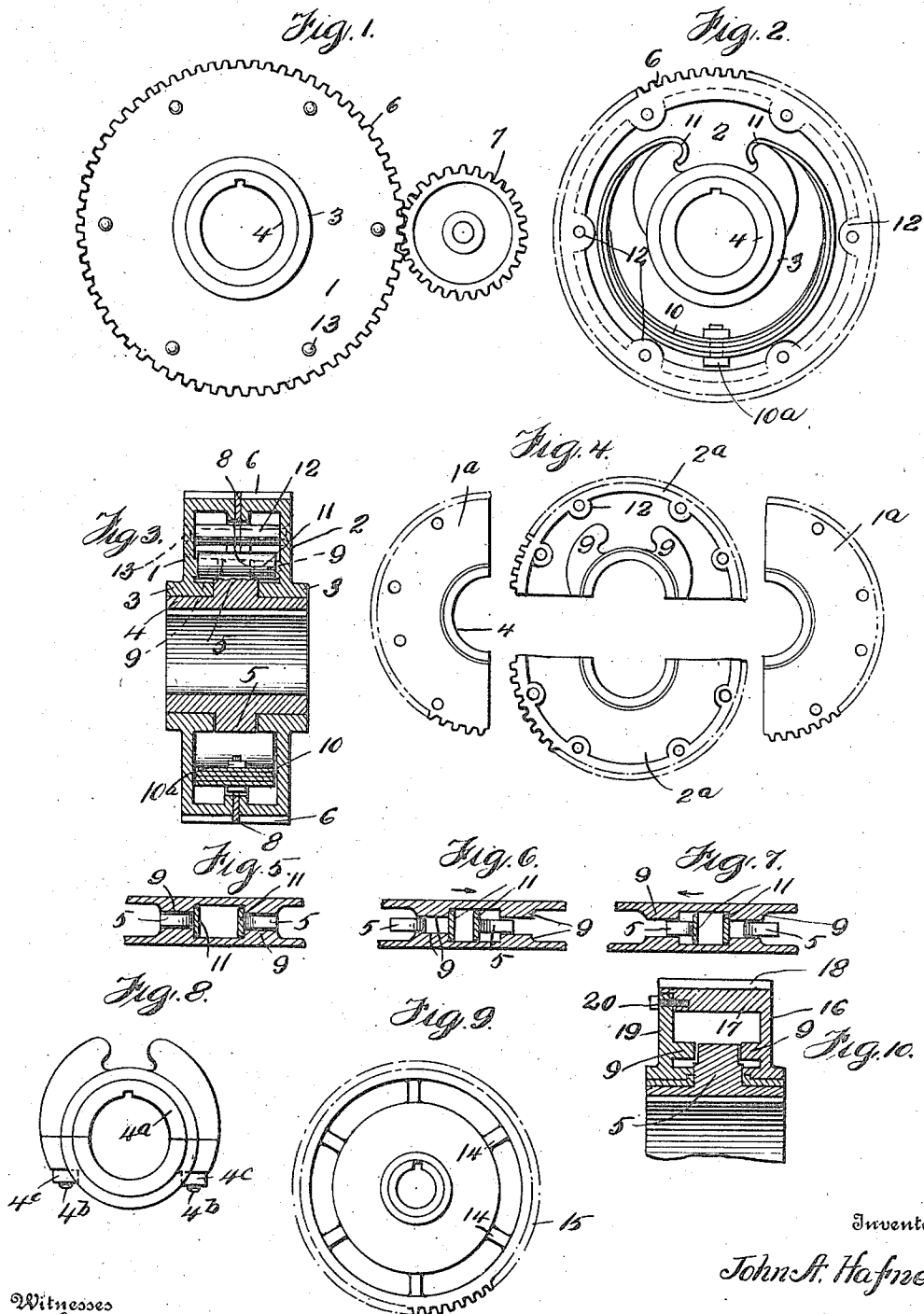


J. A. HAFNER.
YIELDING DRIVING MEMBER.
APPLICATION FILED SEPT. 18, 1907.

1,085,731.

Patented Feb. 3, 1914.



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JOHN A. HAFNER, OF PITTSBURGH, PENNSYLVANIA.

YIELDING DRIVING MEMBER.

1,085,731.

Specification of Letters Patent.

Patented Feb. 3, 1914.

Application filed September 18, 1907. Serial No. 393,448.

To all whom it may concern:

Be it known that I, JOHN A. HAFNER, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Yielding Driving Members, of which the following is a specification.

This invention relates to motor mechanism, and is designed as an improvement upon the invention disclosed in Letters-Patent of the United States No. 620,916, granted to me under date of March 14, 1899.

The primary object of the invention is to provide novel and effective means for preventing excessive strain upon a shaft or axle when starting to revolve in either direction, and also to avoid the jolt, incident to the starting of the motor shaft of electrically propelled vehicles equipped with rigid gearing.

The invention comprises an elastic or yielding gear provided with a spring to absorb or compensate for, the strain of the initial movement of a revolvable shaft.

The construction of the improvement will be fully described hereinafter, in connection with the accompanying drawing which forms a part of this specification, and its features of novelty will be set forth in the appended claims.

In the drawing: Figure 1 is a side elevation of a gear-wheel embodying the invention, in mesh with a driving pinion, Fig. 2 is an elevation of the inner side of one of the sections of the wheel casing, Fig. 3 is a sectional view of the wheel shown in Fig. 1, Fig. 4 is an elevation of a form of the device made up of sections, said sections being shown separated, Figs. 5, 6, and 7 are detail horizontal sections illustrating the different positions of the spring employed, Fig. 5 showing the wheel at rest, Fig. 6 the wheel moving in the direction of the arrow; and Fig. 7 showing the wheel as moving in the opposite direction, Fig. 8 is an elevation of the hub shown in Fig. 4, Fig. 9 is a side elevation of a further modification in which the gear teeth of the wheel casing are formed upon a rim connected to the casing

by radially-disposed arms or spokes, and Fig. 10 is a detail transverse section of another form of casing.

Referring to Figs. 1, 2 and 3, the casing of the wheel consists of two counter-part sections 1 and 2, each formed with an integral bearing 3 for a hub 4, said hub having oppositely-disposed projecting lugs 5. The periphery of the casing is formed with gear teeth 6 adapted to mesh with a driving pinion 7 as illustrated in Fig. 1, and between the two sections 1 and 2 is interposed a disk packing 8 of suitable material, to deaden noise, having its periphery notched to register with the spaces between the teeth of the casing sections. Extending from the inner side of each of the sections 1 and 2 are the oppositely disposed lugs 9, said lugs being adjacent to the lugs 5 of the hub. Within the casing, is arranged a curved spring 10 made up of a series of leaves some of which vary in thickness from the others, for the purpose hereinafter explained. The end of the outer leaf or layer of the spring are bent to form hooks 11 adapted to engage the lugs 5 and 9, the leaves of the springs being connected by a bolt 10^a.

In the modification shown in Fig. 4, one of the casing sections 1^a is divided vertically, and the opposite section 2^a is divided horizontally to break joints with the two halves of the section 1^a.

The casing sections are formed with abutting lugs provided with orifices to receive the rivets or bolts 13 for securing the sections together.

In Fig. 8 the hub 4^a is similar to Fig. 4 and is made up of two longitudinal sections, one section having depending integral studs 4^b fitting sockets in the opposite section and secured by nuts 4^c fitting upon the threaded ends of the studs.

In Fig. 9 another modification of the wheel casing is shown in which a series of arms 14 project radially from the periphery of the casing to the outer ends of which is secured a peripherally toothed rim 15.

A still further modification of the casing is shown in Fig. 10, in which one section 16 of the casing is formed with an annular

flange 17 formed with gear teeth 18, and the other section 19 is of disk form and secured to the edge of the flange 17 serving as a cover or cap for the flange section 16.
 5 Screws 20 or like fastening devices secure the cover 19 removably.

In my former patent the inner separable cover of the spring casing is provided with inner teeth engaging the teeth of the pinion acting as a coupling. Said pinion revolves loosely on the armature shaft and gears with the driving mechanism of the car. This method requires an extra long, and specially-designed armature shaft, wider
 15 pinion and takes up valuable space, so that only small motors can be used, and it is also very difficult and expensive to provide the gears with gear coverings to hold grease or oil and keep out dirt. In said patent the
 20 leaves of the curved spring are made of equal thickness. It is well known that in the construction of flat coil springs the leaves being of the same thickness, the small coils and shorter lengths will be of greater
 25 stiffness than those of greater radius and length. Hence when a curved spring is made of two or more leaves of equal thickness the strain on the various leaves is unequal and the spring will not have the pliability and strength it ought to possess. To
 30 obviate this difficulty I make the spring of varying thicknesses of plates or leaves, that is, the longer plates being thicker than the shorter plates, the thickness should be in
 35 proportion to the increase in the length of the plates, so that all of the plates of the springs will be of equal stiffness.

In my present invention the spring casing is provided with teeth at its periphery
 40 thus forming an elastic wheel, which may be placed on the axle of the car, and as this wheel may be of the same dimensions as an ordinary wheel, it may be placed in the same gear case, thus the elastic element would require no extra room and expensive complications.
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Having fully described my invention what I claim as new and desire to secure by Letters Patent, is—

50 1. A yielding driving member comprising a hollow casing formed of two parts, said casing having a central bore and inwardly extending hubs or flanges, a hub rotatably mounted in the bore of the casing,
 55 the flanges forming bearings for said hub, a yielding member connected to the hub and the casing, arranged to transmit power from one to the other, and means for connecting the two parts to each other; substantially as described.
 60

2. A driving member comprising a hollow casing formed of two parts, said casing having a central bore and inwardly ex-

tending hubs or flanges, a hub rotatably mounted in the bore of the casing and having oppositely disposed lugs thereon, the bore forming bearings for said hub, said casing having projections on each side of the oppositely disposed lugs on the hub, and a spring engaging the lugs on the hub and the projections on the casing to transmit power from one to the other; substantially as described.
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3. A driving member comprising a hollow casing formed of a plurality of parts, said casing having a central bore and inwardly extending annular flanges, a hub rotatably mounted in the bore of the casing, the bore forming bearings for said hub, oppositely disposed lugs formed integrally with the hub, there being a plurality of projections on each part of the casing in line with the oppositely disposed lugs on the hub, a spring arranged to engage the lug on the hub and the projections on the casing to transmit power from one to the other, and means for securing the parts of the casing to each other; substantially as described.
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4. A yielding driving member, comprising a hollow four part casing having a central bore and inwardly extending hubs or flanges 3, there being projections on the casing, a split hub connected by studs or bolts rotatably mounted in the bore of the hollow casing and having lugs registering with the projections on the casing, and a spring engaging the lugs on the casing and projections on the hub to transmit power from one to the other; substantially as described.
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5. A yielding driving member comprising a hollow sectional casing having a working rim, and projections on the inner walls of the casing, a hub rotatably mounted in the casing, having projections formed integrally therewith and in-line with the projections on the casing, a spring having hooked ends arranged to engage the projections on the casing and the projections on the hub and arranged to form a yielding driving connection between the hub and the casing, and through bolts extending through the members of the casing; substantially as described.
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6. A yielding driving member, comprising a hollow casing having a working rim, said casing being composed of two dished cylindrical members, each of said dished members being divided on a radial line, the line of division of one member being at right angles to the line of division of the other member, the inner wall of each of the dished members having projections thereon, a hub rotatably mounted in the casing and having lugs formed integrally
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therewith and in line with the projections
on the casing, a spring having hooked ends
arranged to engage the projections on the
casing and the projections on the hub and
5 arranged to form a yielding driving con-
nection between the hub and the rim on the
casing and through bolts passing through
both of the dished members arranged to se-

cure the two members to each other; sub-
stantially as described.

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

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Witnesses:

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