

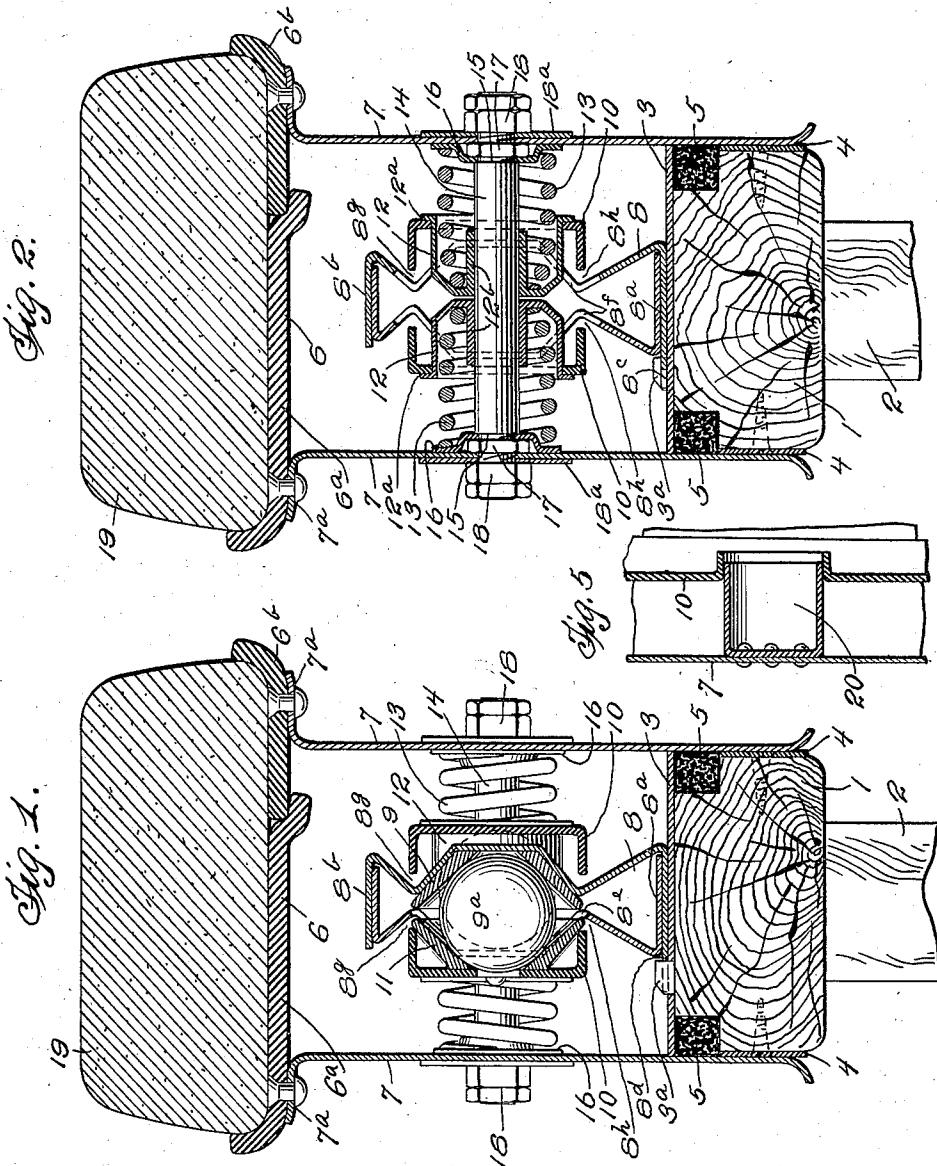
L. G. HANDY.
WHEEL.

APPLICATION FILED JUNE 4, 1910.

1,013,998.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.



WITNESSES

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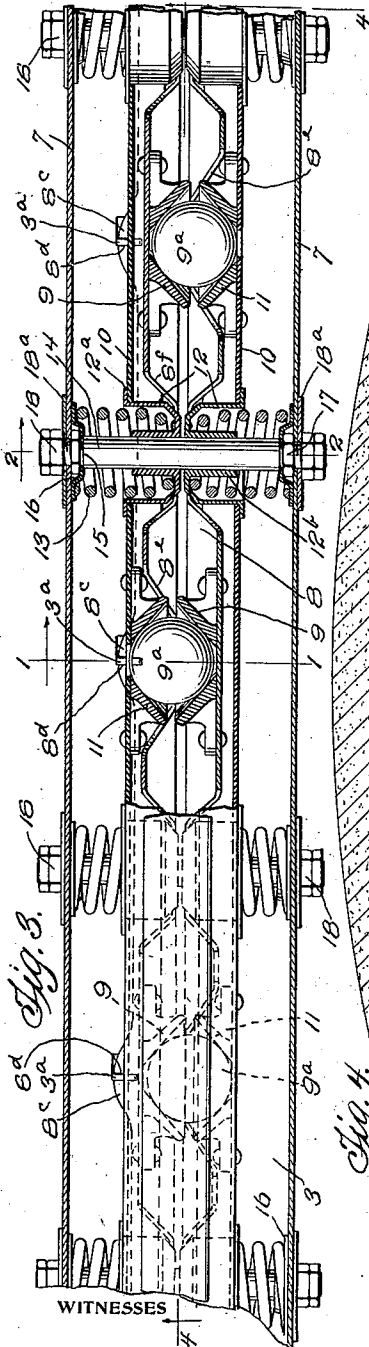
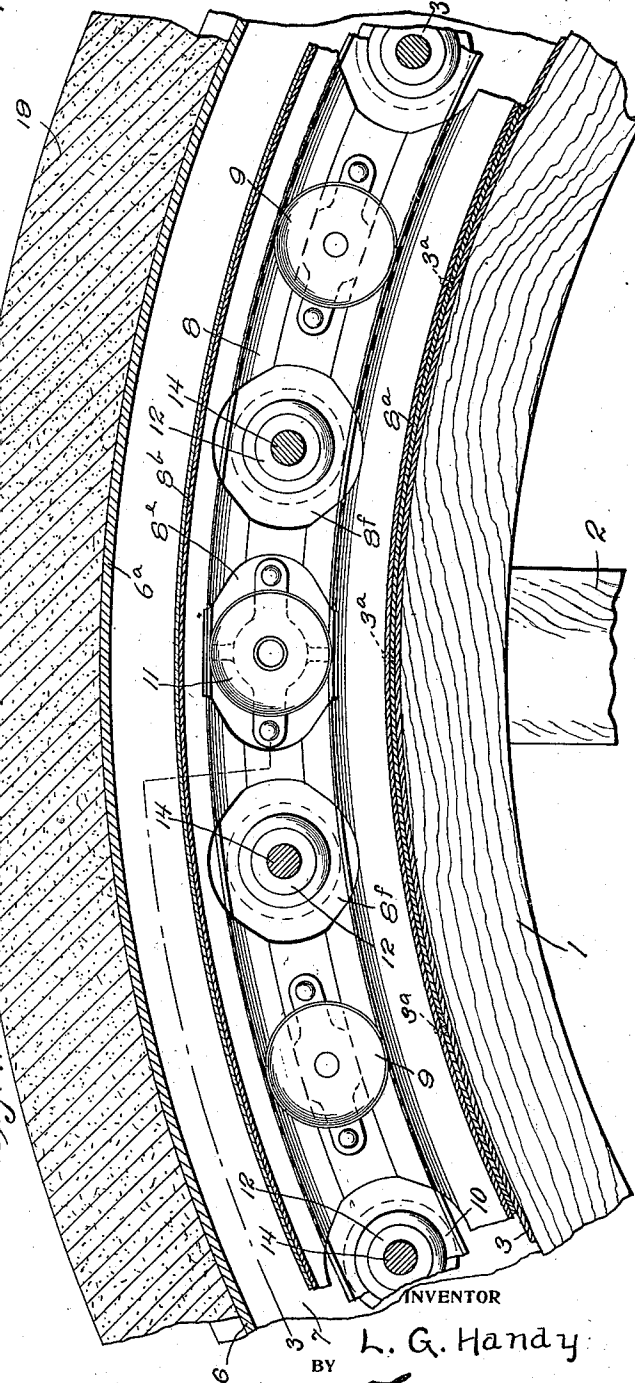


Fig. 3.

Fig. 4.



WITNESSES

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WHEEL.

1,013,998.

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To all whom it may concern:

Be it known that I, LEVIN GESSFORD HANDY, residing at Rutherford, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Wheels, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a transverse sectional view through a fragment of the wheel embodying the invention, the section being taken on the plane indicated by line 1—1 of Fig. 3. Fig. 2 is a similar section, taken on the plane indicated by line 2—2 of Fig. 3. Fig. 3 is a section taken on the plane indicated by line 3—3 of Fig. 4. Fig. 4 is a section taken on the plane indicated by line 4—4 of Fig. 3. Fig. 5 is a detail section showing a modification of a portion of the construction shown in Fig. 3.

Referring to the drawings by numerals, 1 indicates the felly, 2 the spokes and 3 the fixed rim of any ordinary wheel, which elements with the hub, not shown, constitute the wheel body. Suitable circumferential wear plates, or rings, 4, are secured to the opposite side faces of the felly, and the felly is formed with circumferential grooves around the outer corners which may be filled with packing rings 5. Arranged to slide upon the opposite wear plates 4 and secured to the under face of a detachable rim 6 is a pair of guide plates or rings 7. The inner edges of the plates 7 are turned laterally so as to stiffen the same. The outer edges are turned laterally and riveted, or otherwise secured to the under face of the detachable rim, as at 7^a. The inner circumference of the rim is somewhat greater than the outer circumference of the felly and the space between is designed to contain the operating parts of the device. The side plates 7, extending from the rim to the felly, and slid-

ing upon the opposite packing rings 5, effectually prevent dust and other foreign particles from reaching the interior.

Within the space between the detachable rim and the felly, and positioned, approximately midway in the width of the rim 3, is a ring 8 comprised of a pair of circumferentially disposed sheet steel annuli, which are held rigidly together in any suitable manner as by welding, and the outer and inner edge portions thereof are flanged toward each other and have the flanges lapping or telescoped so as to form inner and outer stiff and unyielding bands, as 8^a and 8^b. The inner edge of ring 8 snugly fits the rim 3, and is held in engagement therewith, against independent circumferential movement, by lugs 3^a fixed to and extending radially from rim 3 into guiding slots 8^c formed in laterally disposed ears 8^e outstanding from the inner edge of ring 8 and spaced apart circumferentially of the wheel body. Lugs 3^a may be formed in various ways, one convenient method of forming the same, consisting in stamping the lugs up from the body of the rim 3.

Each annulus of ring 8 is formed with a series of evenly spaced apertures 8^e, each aperture of each annulus appearing approximately midway between the two contiguous apertures of the other annulus. Thus apertures 8^e are staggered about the ring 8, one opening at one side and the next at the other throughout the ring. A cup 9 is fixed to the ring 8 at each aperture 8^e, as by being riveted or otherwise suitably fixed to the opposite annulus from that formed with the particular aperture 8^e, each cup 9 being thus fixed to the inner face of the respective annulus and opening toward and exposed by the aperture 8^e of the other annulus, each of said apertures being preferably elongated circumferentially of the ring 8 for accommodating circumferential play of the parts.

Occupying positions upon opposite sides of the ring 8 and movable laterally in guides hereinafter mentioned, is a pair of inflexible, circumferentially disposed rings 10. The rings 10 are preferably stiffened by inwardly turned marginal flanges. Secured to the opposing faces of each of the rings 10

and between the inturned flanges thereof, at points coöperating with the cups 9 are cups 11 forming pairs with cups 9. The cups 11 therefore are disposed alternately or in staggered relation. A ball 9^a is disposed between the cups of each pair of cups, and is designed to lie normally at the bottom of the cups, so that any sliding movement of the cups relative to each other will cause the ball to ride out the inclined walls of the cups, and move the cups and rings 10 apart.

At points spaced circumferentially of rings 10 intermediate each of the cups 11, each of the rings 10 is provided with a spring supporting pocket 12. The pockets are fitted into suitable apertures in the rings and between the flanges thereof. The pockets 12 are flanged and secured at their open ends, in any desired manner, to the respective rings 10, as at 12^a, and the bottoms thereof are fitted with suitable sleeves as 12^b, which are designed to slide longitudinally along the bolts 14 and guide the rings 10 in their lateral movement. Extending from the hollow of each of the pockets to the inner wall of the adjoining guide plate 7 is a compression spring 13. The pockets are arranged in pairs so that the two pockets of each pair are directly opposite across the face of the felly. Bolts 14 extend centrally through each pair of springs and through apertures in the bottoms of the pockets. The opposite ends of each of the bolts are shouldered, as at 15. The outer ends of the springs rest in the bottom of the cups 16 which are apertured to receive the reduced ends of the bolt 14 and concaved to admit a retaining nut 17. The ends of each of the bolts 14 extend through registering apertures in the respective guide plates 7 and are retained by suitable nuts 18 adapted for binding the whole firmly together, a washer 18^a being fixed to each guide plate 7 and surrounds the bolt 14 for increasing the bearing of the bolt on the respective plate 7.

With the above construction, it will be apparent that the rings 10 with their respective spring pockets 12 and ball cups 9 will be free to move apart, with the sleeves 12^b sliding freely along the bolts 14, as guides and supports therefor and against the tension of the springs 13.

The ring 8 is apertured, as at 8^c, for the free passage and movements of the bolts 14 and pockets 12. Each annulus of ring 8 is formed with concentric, annular depressions 8^s and 8^h, forming stiffening rings, and conforming transversely to the inclined walls of and snugly receiving cups 9 and also conforming to the edgewise travel of rings 10.

The detachable rim 6 is formed of two sections 6^a and 6^b. The section 6^a carries one of the plates 7 and the section 6^b carries the other, the juncture between the two sections being preferably slightly to one side of

the circumferential median line of the rim. The narrower of the two sections is designed to fit into an annular recess formed upon the adjoining edge of the other section in such manner as to prevent independent edgewise movement of one of the sections relative to the other when the wheel is assembled, bolts 14 and guide plates 17 rigidly connecting the two sections together.

It will be noted that by removing the nuts 18 and the narrower of the rim sections with its connected guide plate, the entire interior mechanism may be drawn bodily from its position about the wheel body so as to facilitate any repairs or renewals which may be necessary. If desired, the nuts and washers upon the left hand side (Fig. 1) only may be removed and the interior mechanism withdrawn with the right-hand side plate or vice versa. Bodily application and removal of the resilient and frictional means of engagement between the wheel body and detachable rim may thus be accomplished without dismantling or dislocating the parts.

A muffling tire 19 is preferably provided on rim 6.

In operation, the weight of the vehicle, to which the wheel is applied, will cause the felly with the ring 8 and connected cups 9 to move relative to the rim 6. Since the rings 10 always maintain a position concentric with the rim 6 (by virtue of the guide sleeves and bolt connections) the action of the balls 9^a upon the relatively inclined faces of the cups 9 and 11 will be such as to cause the rings 10 to move away from each other and against the tension of the springs 13. It will be noted that each and every spring will be simultaneously and equally affected by any movement of the rim relative to the felly, so that each of the springs will be called upon, at all times, to bear its exact proportion of the entire load. When the felly is moved relative to the rim, the cups 9 are moved relative to the cups 11 and each of the balls 9^a caused to move away from the center of the cups and to stand with only one point of contact with each of said cups. During any subsequent movement of the cups relative to each other, the balls will simply be caused to rotate within the cups and to ride nearer to or farther from the center of the cups according to the nature of the movement. The band 8^a of the ring 8 is designed to contact with the inner surface of the rim 6 when the parts have moved outwardly to their utmost position so as to prevent possible dislodgment of the balls 9^a from their positions within the cups.

The construction shown in Figure 5 is identical with that described except that the sliding engagement between rings 10 and the bolts 14 is eliminated, and in its stead the

rings 10 are shown slidably mounted upon a cup, as 20, which is secured to the side plate 7. There is, of course, a series of the cups 20, or their equivalent, fixed to each of the plates 7.

What I claim is:—

1. In a wheel, a wheel body, a rim therefor, a circumferentially disposed ring engaging the wheel body and comprising spaced annuli fixed together, cups fixed to the inner faces of the respective annuli, and each opening toward the opposite annulus, each annulus being formed with an aperture for each of the cups of the other annulus exposing such cups through the respective openings, and friction means engaging the exposed faces of the cups through said apertures, said friction means being carried by the rim.

2. In a wheel, a wheel body, a rim therefor, a circumferentially disposed ring comprising annuli fixed together, cups fixed to the inner surface of each annulus of said ring and facing the other annulus, each annulus of the ring having openings exposing the cups of the other annulus through the respective openings, means of engagement between the ring and the wheel body, frictional means engaging the cups of said ring through the openings, and resilient means of engagement between the frictional means and the rim.

3. In a wheel, a wheel body, a rim therefor, circumferentially disposed rings between the rim and wheel body, a ring interposed between said rings and formed of annuli, alternate, oppositely facing staggered cups carried by the second mentioned ring, corresponding cups carried by the first mentioned rings and forming pairs with the cups of the second mentioned ring, and a ball disposed between and within the cups of each pair, means of engagement between the first mentioned rings and one of the first two mentioned elements, and means of engagement between the second mentioned ring and the other of the first two mentioned elements.

4. In a wheel, a wheel body, a rim therefor, spaced rings between the wheel body and rim, a ring interposed therebetween and formed of annuli, cups fixed to the inner face of each annulus of the second mentioned ring and facing the other annulus, each annulus being formed with openings exposing the cups of the other annulus, cups carried by the first mentioned rings and facing and forming pairs with the cups of the second mentioned ring, and a ball between and inclosed by the cups of each pair, means of engagement between the rings and the respective first and second mentioned elements.

5. In a wheel, a wheel body, a rim therefor, guide plates fixed to the rim and ex-

tending into sliding engagement with the wheel body, a circumferentially disposed ring connected to the wheel body, coaxial rings at opposite sides of said first mentioned ring, and having frictional engagement therewith, means connecting the guide plates and extending through and limiting edgewise movement of the second mentioned rings for maintaining the said frictional engagement.

6. In a wheel, a wheel body, a rim therefor, a rigid ring located between the wheel body and said rim, said rigid ring comprising two sections fixedly joined together, annular rings disposed on each side of said rigid ring, side plates attached to said rim, resilient means between said side plates and said annular rings, frictional means between said rigid ring and said annular rings, and means for attaching said rigid ring to said wheel body.

7. In a wheel, a wheel body, a rim therefor, a circumferential rigid ring surrounding said wheel body, said rigid ring comprising two sections fixedly joined together, said sections being provided with openings arranged in circumferential alternation, annular rings, frictional means between said annular rings and said rigid ring, said frictional means extending through said openings, means between said rim and said annular rings for causing said annular rings to be carried by said rim, and means for attaching said rigid ring to said wheel body.

8. In a wheel, a wheel body, a rim therefor, a circumferentially disposed rigid ring between the wheel body and said rim, said rigid ring comprising two sections fixedly joined together, annular rings, side plates operatively connected with said rim, resilient means interposed between said annular rings and said side plates, frictional means cooperating with said rigid ring and said annular rings, and means for attaching said rigid ring to said wheel body.

9. In a wheel, a wheel body, a rim therefor, a circumferentially disposed rigid ring, annular rings, said rigid ring being formed of two sections, said sections being provided with openings arranged in circumferential alternation, frictional means between said rigid ring and said annular rings, means for attaching said rigid ring to said wheel body, and means for attaching said rigid ring to said rim.

10. In a wheel, a wheel body, a rim therefor, a rigid ring member disposed between said rim and said wheel body, said rigid ring member comprising sections fixedly joined together, openings in said sections arranged in circumferential alternation, annular rings, frictional means between said rigid ring and said annular rings, said frictional means passing through said openings, through bolts, spring members carried

by said through bolts and operatively connected with said annular rings, means for connecting said through bolts with said rim, and means for attaching said rigid ring to
5 said wheel body.

11. In a wheel, a wheel body, a rim therefor, said rim being formed in two sections, a rigid ring disposed between said wheel body and said rim, said rigid ring comprising
10 sections fixedly joined together, openings in said sections arranged in circumferential alternation, annular rings, operative means interposed between said annular rings and said rigid ring, side plates connected to each section of said rim, supporting
15 members for resilient springs, resilient springs carried by said supporting members and cooperating with said annular rings, removable means for locking said supporting members to said side plates, and means for
20 attaching said rigid ring to said wheel body.

12. A device of the class described including a rigid ring, a series of cups carried
25 by said rigid ring, annular rings, a series of cups carried by said annular rings, each cup carried by the annular rings being positioned opposite to a cup on the rigid ring, balls interposed between the cups carried
30 by said annular rings and the cups carried by said rigid ring, supporting members passing through openings in said annular rings and in said rigid ring and adapted to carry resilient springs, and resilient
35 springs carried by said supporting members and cooperating with said annular rings.

13. In a wheel, a wheel body, a rim therefor, a circumferentially disposed rigid ring
40 between the rim and the wheel body, said ring comprising annuli having their webs spaced apart and being provided with flanges, one of the flanges being recessed, radial lugs extending from the wheel body into the recesses of the flange, and means of

resilient engagement between said ring and
the rim. 45

14. In a wheel, a wheel body, a rim therefor, a circumferentially disposed rigid ring between the rim and the wheel body, said
ring comprising annuli having their webs
50 spaced apart and the flanges telescoping, one of the flanges being recessed, radial lugs extending from the wheel body into the recess of the flange, and means of resilient engagement between said ring and the rim. 55

15. In a wheel, a wheel body, a rim therefor, a rigid ring located between the wheel and the rim, annular rings disposed on each
side of said rigid ring, friction means located in staggered relation and on opposite
60 sides of said rigid ring and between said rigid ring and said annular rings, side plates attached to said rim, resilient means between said side plates and said annular
rings, means for guiding said annular rings
65 during their lateral movement, and means for attaching said rigid ring to said wheel body.

16. A device of the class described including a rigid ring, said rigid ring being
70 formed of sections fixedly joined together, said sections being provided with openings located in circumferential alternation, annular rings, cooperating means extending
75 through said openings and interposed between said annular rings and said rigid ring, supporting members for carrying resilient springs, and resilient springs carried
by said supporting members and cooperating
80 with said annular rings to exert pressure upon said interposed means.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

LEVIN GESSFORD HANDY.

Witnesses:

EDGAR M. KITCHIN,

FRANK V. COOPER.