M. C. KRARUP.

TRACTOR WHEEL.

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1,135,533.

Patented Apr. 13, 1915.

Fig. 2.

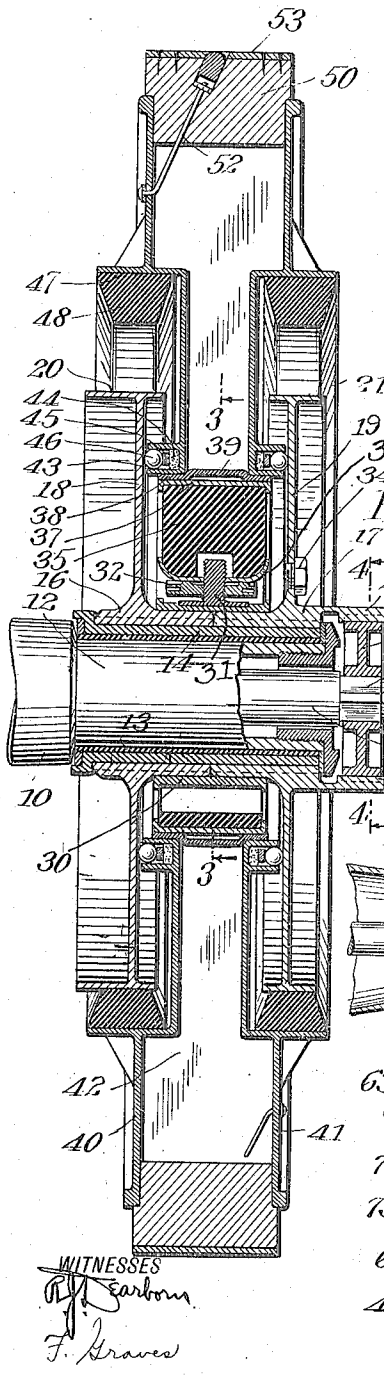


Fig. 1.

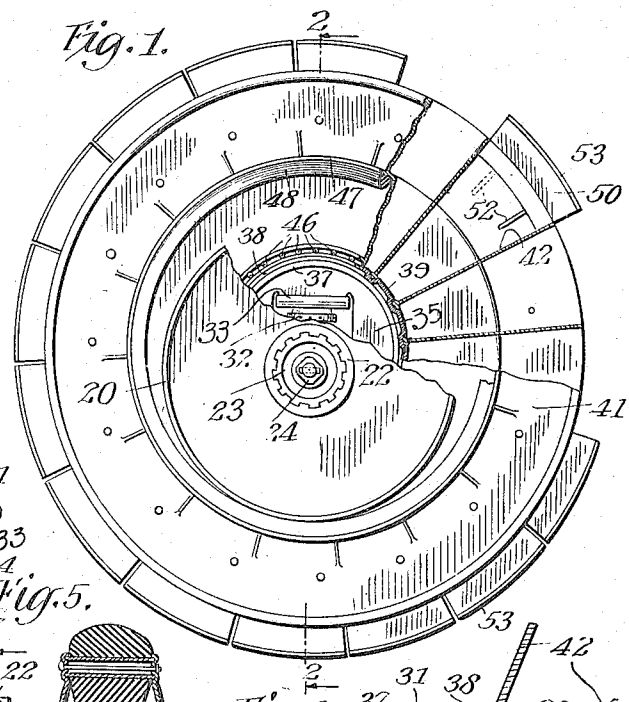


Fig. 5.

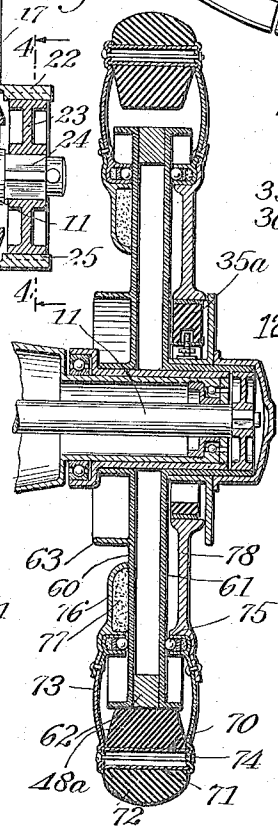


Fig. 3

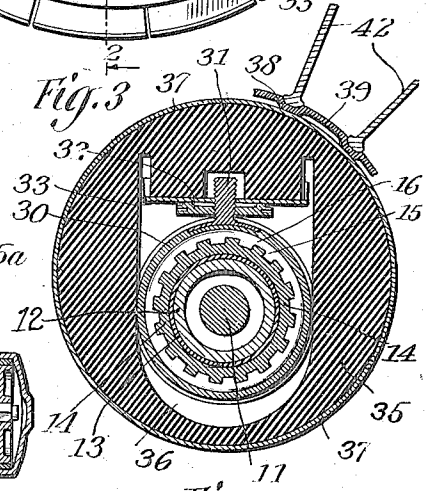
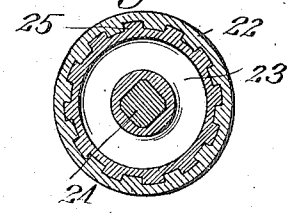


Fig. 4.



WITNESSES

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TRACTOR-WHEEL.

1,135,533. Specification of Letters Patent. Patented Apr. 13, 1915.

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To all whom it may concern:

Be it known that I, MARIUS C. KRARUP, a citizen of the United States of America, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Tractor-Wheels, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in vehicle wheels and its object is to provide a simple and effective device by means of which a powerful tractive effect may be obtained. This and other objects of the invention will appear in the following specification in which I will describe my invention, the novel features of which I will set forth in appended claims.

Referring to the drawings: Figure 1 is a side elevation of a wheel which embodies the present invention. In this figure certain portions are broken away and others shown in section to more clearly show the construction and arrangement of parts. Fig. 2 is a sectional end elevation on a larger scale of the wheel shown in Fig. 1, the section being taken on the line 2—2 of Fig. 1. In Fig. 3 the central portion of the mechanism is shown in sectional side elevation, the section being taken on the line 3—3 of Fig. 2. Fig. 4 is a similar section on the line 4—4 of Fig. 2. Fig. 5 is a sectional end elevation of a wheel of a different construction which also embodies this invention.

Like characters of reference designate corresponding parts in all the figures.

10 designates the hollow axle of the vehicle through the center of which extends the driving shaft 11. Over the cylindrical end 12 of the shaft is a bushing 13 over which is mounted a rotatable collar 14. The outside of this collar is toothed or serrated as at 15, and over it are fitted to rotate with it the hubs 16 and 17 of two circular driving members. Each of these comprises a web such as 18 and 19, which webs are parallel with each other, a rim flange such as 20 and 21. These rim flanges are preferably cylindrical and of equal diameter. The hub 17 is extended as at 22 and is rigidly connected with the driving shaft by an intermediate member 23, the inside of which fits over the squared end 24 of the driving shaft, and the outside of which is toothed or serrated as at 25 to fit into the similarly shaped interior of the hub extension 22.

Mounted to rotate upon the outside of the hubs 16 and 17 is a collar 30, from which extends a threaded stud 31 which carries upon it an internally threaded adjusting member 32 which presses upwardly against a metallic washer 33. The periphery of the member 32 is notched or provided with holes by means of which it may be rotated, access to this part being provided by means of an opening in the web 19 which is closed by a removable threaded plug 34.

35 is a circular member of resilient material such as rubber compound, which is constructed with an elongated parallel sided opening 36 of sufficient width to fit freely over the collar 30, and around which is a metallic band 37. Over this band is rotatably supported a ring 38 which, for convenience of assembling, may be split transversely, and which is constructed with a series of equally spaced projections 39.

The main or driven part of the wheel is constructed to form two side members 40, 41 connected by radial flanges 42 between the inner ends of which the projections 39 of ring 38 fit. Each is constructed to form an annular channel such as 43 which serves as a ball race and in each of said channels is a ring 44 of resilient material, a metallic ring 45 and a series of balls 46 which bear upon the inner surfaces of the webs 18 and 19 respectively. Each of these side members is also constructed to form an annular shoulder such as 47 to which is affixed a driven ring 48 of rubber compound or of other material having a comparatively high coefficient of friction. The weight of the vehicle rests upon these driven rings where the rim flanges 20—21 contact with them. As the material of the rings 48 is somewhat resilient, there is an arc of contact between these parts of material length.

The tire blocks 50 fit between outer ends of the radial webs 42 and side members 40, 41, and are detachably secured by some suitable means such for example as bolts 52 passing through one of the side members and into the tire blocks. These blocks may be of wood or any desired material suitable for the surface over which they are to be used, and because they are detachable they may be changed for blocks of different char-

acter. The blocks shown in the drawings are constructed with smooth treads over which are covers 53 which are also smooth, but it is obvious that the outer surfaces of the blocks may be of any form desired.

Before specifically describing the modification which is illustrated in Fig. 5, I will point out the operation of the device which now has been fully described. The inner wheel which comprises the rim flanges 20—21 is engine driven and drives the outer wheel at the arc of contact of these rim flanges upon the driven rings 48, at a speed reduction proportional to the difference in diameters of the rings 48 and the flanges 20 and 21. The coefficient of friction between the driving and driven substances may be as high as desired by suitable selection of the materials of which these parts are constructed. It is within the scope of this invention to construct these parts to form intermeshing gears between which there can be no slip. A powerful driving effect is obtained which is increased when the outer wheel resists rotation as the inner wheel has a tendency to roll up upon the driven rings 48 when that part of the weight of the vehicle which is sustained by the wheel is shifted ahead of a vertical line through the center of the outer wheel and thus aids in driving the outer wheel, which driving effect is still greater when gears are used because there is then no slipping between the driving and driven members.

The member 35 is adjusted to bear upon the upper portion of the ring 38 and by this simple expedient the rim-flanges 20—21 are prevented from jumping away from the driven rings 48. The balls 46 steadily guide the outer wheel between the supported parts of the inner wheel. The wheel is therefore capable of withstanding lateral strains and its driving and driven elements cannot be thrown apart by jars caused by running over uneven surfaces.

Braking mechanism may be applied to the inner wheel where it is most effective. The interior surface of flange 20 affords a convenient place to apply such mechanism.

In the construction illustrated in Fig. 5, the inner driving wheel is connected with the power shaft 11 in some such way as that previously described. This wheel is constructed to form two flanged webs 60, 61 connected as in the former case by transverse webs, the inner flanges of webs 60, 61 forming a hub by which they are connected with the power shaft, and the outer flanges of which form the periphery of the driving wheel. The openings in the periphery may be filled with inserts 62 of wood or other suitable material. An annular flange 63 to which the brake mechanism may be applied, projects from the side member 60.

The outer wheel comprises two tire rims 70 and 71, the outer of which supports the wheel tire 72 and the inner of which supports a driven ring 48A upon which the driving wheel rests. These tire rims are rigidly held in annular grooves in a pair of side members such as 73 by bolts 74, the inner portions of which side members are constructed to form races for balls 75. To the inner side member is connected an annular frame 76 which carries a buffer ring 77 in close proximity with the web 60 which serves to protect the balls 75 on that side. To the outer side member is connected a disk 78, the inner part of which forms a ring concentric with the tire rims 70, 71, and within which is an upwardly pressed circular resilient member 35A which serves to prevent the driving wheel leaving the driven ring 48A.

Two structures embodying this invention are illustrated and described herein to show that I do not limit myself to any specific form or construction for I intend no other limitations than those imposed by the appended claims.

What I claims is:

1. A vehicle wheel comprising an inner driving wheel and an outer driven wheel, said outer wheel having a circular central portion, and an up-standing member within said central portion adjustably supported by said inner driving wheel arranged to prevent the separation of said wheels from driving engagement.

2. A vehicle wheel comprising an inner driving wheel and an outer driven wheel, said outer wheel having a circular central portion, a member within said central portion arranged to prevent the separation of said wheels from driving engagement, means for maintaining the upper portion of said member above the center of the inner wheel and means for adjusting the position of said member.

3. The combination of an axle, a driving wheel supported thereon, a driven wheel having a portion upon which said driving wheel rests in driving engagement, and a circular central portion, a circular member within said central portion of the driven wheel arranged to prevent the separation of said wheels from driving engagement, said circular member being constructed with an opening to receive said axle below the center of the member, a stud freely supported at a fixed distance from the axle and a device upon the stud for adjusting the the position of said member relative to the axle.

4. The combination of an axle, a driving wheel supported thereon, a driven wheel having a portion upon which said driving wheel rests in driving engagement and a circular central portion, a ring rotatable in the central portion of the driven wheel, a second

ring supported at a fixed distance from the axle, and means for keeping said rings spaced apart eccentrically.

5. The combination of an axle, a driving wheel supported thereon, a driven wheel having a portion upon which said driving wheel rests in driving engagement and a circular central portion, a ring rotatable in the central portion of the driven wheel, a second ring supported at a fixed distance from the axle, the center of said second ring being above the center of the axle, and means for keeping the second ring pressed upward against said central portion of the driven wheel.

6. The combination of a fixed axle, a driving wheel rotatably supported thereon, having two spaced circular driving elements, a driven wheel having spaced driven rings upon which the driving elements rest in driving engagement, and an intermediate central circular portion; a circular member within said central portion of the driven wheel arranged to prevent the separation of said driving elements from the driven rings, said member being constructed with an elongated opening having parallel sides within which the axle fits below the center of the member, a threaded stud supported at a fixed distance from the axle and a device upon the stud for adjusting the position of the circular member relative to the axle.

7. The combination of a fixed axle, a driving wheel rotatably supported thereon, having two spaced circular driving elements, a driven wheel supported transversely between said elements having shoulders supporting spaced driven rings of resilient material upon which the driving elements rest in driving engagement and an intermediate central circular portion, a circular member of resilient material within said central portion of the driven wheel arranged to prevent the separation of said driving elements from the driven rings, said members being constructed with an elongated opening having parallel sides within which said axle fits below the center of said member, a threaded stud supported at a fixed distance from the axle and a device upon the stud for adjusting the position of the resilient member relative to the axle.

8. The combination of a fixed axle, a driving wheel rotatably supported thereon, having two spaced circular driving elements, a driven wheel supported transversely between said elements having shoulders supporting spaced driven rings of resilient material upon which the driving elements rest in driving engagement and an intermediate central circular portion, a circular member of resilient material within said central portion of the driven wheel arranged to prevent the separation of said driving elements from the driven rings, said member being constructed with an elongated opening having parallel sides within which said axle fits below the center of said member, a threaded stud supported at a fixed distance from the axle and a device upon the stud for adjusting the position of the resilient member relative to the axle, said driven wheel having circular portions extending beyond said supporting shoulders.

9. The combination of an axle, an inner driving wheel thereon, an outer driven wheel, means for transversely supporting said driven wheel upon the driving wheel, said driven wheel having a circular central portion and a member within said central portion rockingly supported at a fixed distance from the axle and arranged to prevent the separation of said wheels from driving engagement.

10. The combination of a fixed axle, a driving wheel rotatably supported thereon having two spaced circular driving elements, a driven wheel having antifriction bearings acting upon the driving wheel to transversely support the driven wheel thereon, and having shoulders supporting spaced driven rings of resilient material upon which the driving elements rest in driving engagement, said driven wheel having circular portions extending beyond said supporting shoulders.

11. The combination of an axle, a driving wheel thereon, having a circular driving surface, a driven wheel having means for transversely supporting itself upon the driving wheel, and having a driven ring upon which the driving wheel rests in driving engagement, said driven wheel having a circular portion extending beyond said driven ring.

In witness whereof, I have hereunto set my hand in the presence of two subscribing witnesses, this 28 day of January, 1914.

MARIUS C. KRARUP.

Witnesses:
F. GRAVES,
LEONARD HAVERSTEIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."