J. W. FARNOFF.

LOCKING AND SHIFTING MECHANISM FOR DEMOUNTABLE WHEEL RIMS.

APPLICATION FILED FEB. 27, 1911.

994,828. Patented June 13, 1911

2 SHEETS-SHEET 1.

Fig. 2.

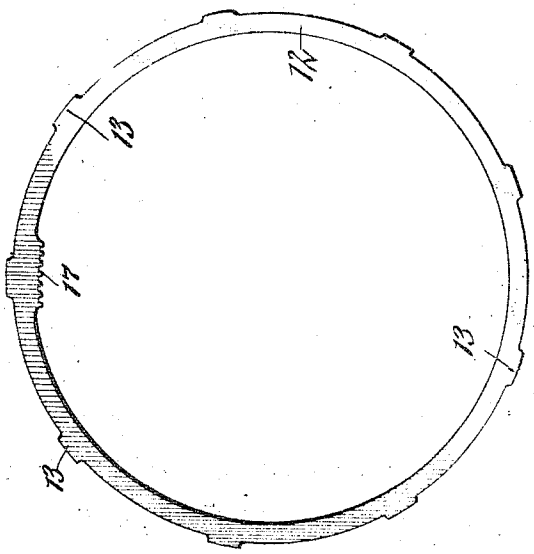
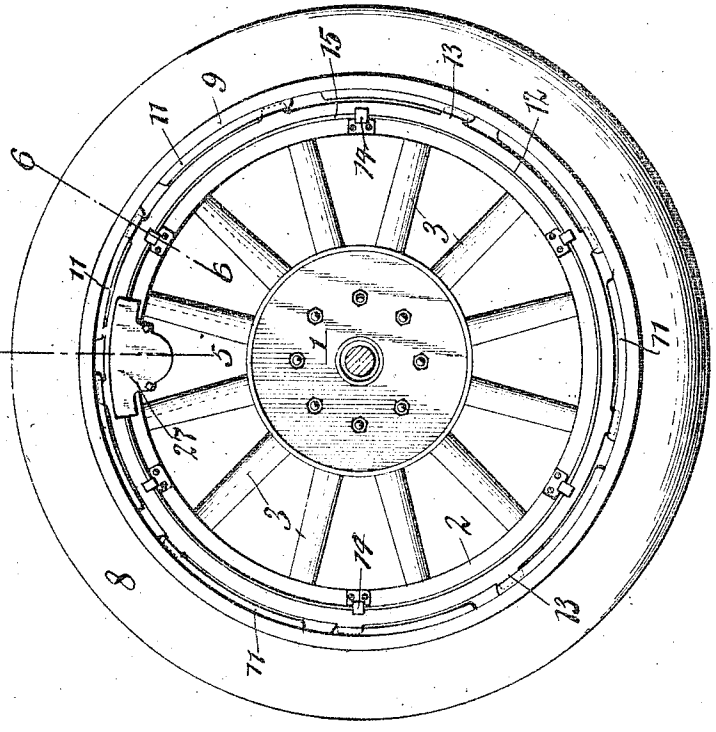


Fig. 1.



Witnesses:
Alfred Bakenhagen.
Richard Sommer

Inventor
Jay W. Farnoff
by Geyer & Pohle
Attorneys

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2 SHEETS—SHEET 2.

Fig. 3.

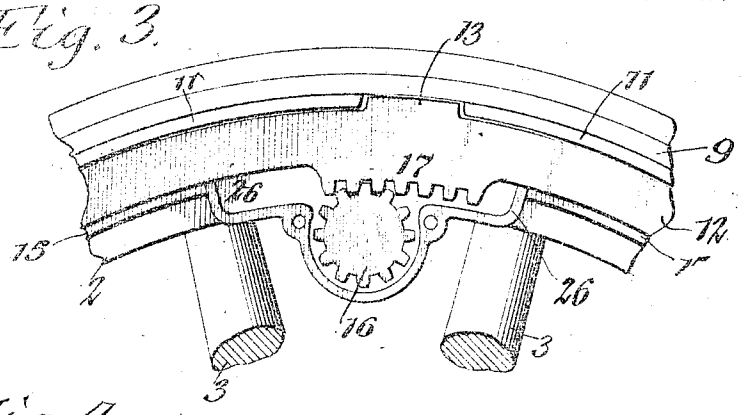


Fig. 4.

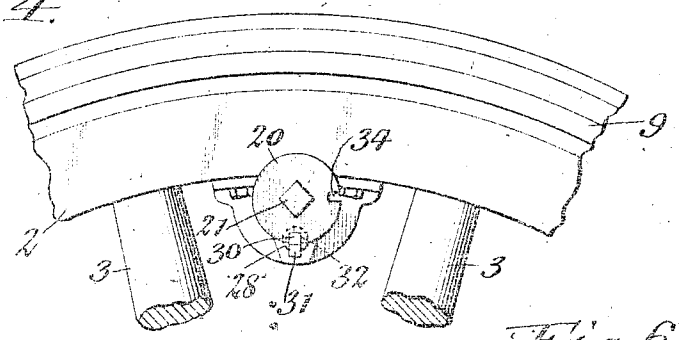


Fig. 5.

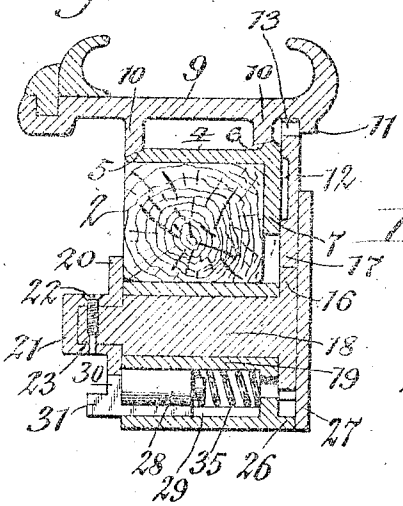


Fig. 6.

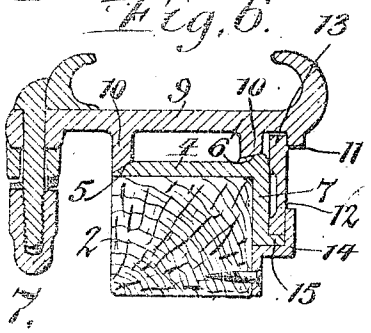
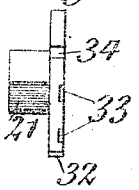


Fig. 7.



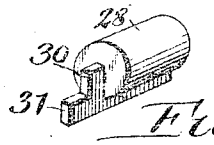


Fig. 8.

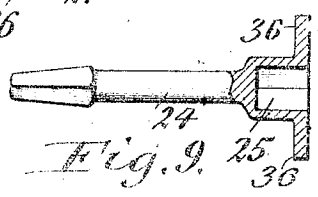


Fig. 9.

Witnesses:-
Alfred Bakenhagen.
Richard Sommer

Inventor
Jay W. Farnoff
by Geyer & Sopp
Attorneys

UNITED STATES PATENT OFFICE.

JAY W. FARNOFF, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO WALTER J. REIMAN, OF BUFFALO, NEW YORK.

LOCKING AND SHIFTING MECHANISM FOR DEMOUNTABLE WHEEL-RIMS.

994,828. Specification of Letters Patent. **Patented June 13, 1911.**

Application filed February 27, 1911. Serial No. 611,003.

To all whom it may concern:

Be it known that I, JAY W. FARNOFF, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Locking and Shifting Mechanism for Demountable Wheel-Rims, of which the following is a specification.

This invention relates to a shifting and locking device for demountable wheel rims and has the object to provide means whereby the rim may be quickly attached to or removed from the wheel, which will securely lock the rim in its operative position and which consists of but very few parts which are of simple construction and not liable to get out of order.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a side elevation of a wheel provided with my improvements, the wheel being viewed from the inner side. Fig. 2 is a side elevation of the locking ring detached from the wheel. Fig. 3 is a fragmentary side elevation, of the wheel, on an enlarged scale, viewed from the inner side and showing the mechanism whereby the locking ring is rotated. Fig. 4 is a fragmentary side elevation of the wheel, on an enlarged scale, viewed from the outer side and showing the means whereby the locking ring is shifted and the catch for holding the same in position. Figs. 5 and 6 are transverse sections, on an enlarged scale, taken in the correspondingly numbered lines in Fig. 1. Fig. 7 is an edge view of the locking disk whereby the locking ring is held in position. Fig. 8 is a perspective view of the catch forming part of the locking mechanism. Fig. 9 is a sectional side elevation of the wrench whereby the locking ring shifting mechanism is operated.

Similar letters of reference indicate corresponding parts throughout the several views.

The wheel shown in the drawings for illustrating the application of my invention comprises a hub 1, a felly 2 and a plurality of spokes 3 connecting the hub and felly. On its periphery the felly is provided with an inner bearing ring 4 which may be secured thereto in any suitable manner. At its inner and outer edges this bearing ring is provided with two inclined or beveled annular bearing faces 5, 6 and on its inner edge the same is provided with an inwardly projecting annular flange 7 which engages with the inner side of the felly.

9 represents the demountable tire supporting rim to the outer side of which the tire 8 may be secured in any suitable manner while its inner side or bore is provided with two inwardly projecting bearing flanges 10 having inclined faces which engage with the inclined bearing faces of the felly rim.

My improved shifting and locking mechanism for the demountable wheel rim which is associated with the above mentioned parts of the wheel is constructed as follows:

11 represents an annular row of locking lugs projecting inwardly from the inner edge of the bore of the tire rim and separated by an intervening space from the adjacent flange of the felly rim.

12 represents a locking ring which bears on its rear side against the front side of the felly flange and is provided at its periphery with an annular row of locking lugs 13 which are adapted to be engaged behind the lugs of the tire rim. When the spaces between the lugs of the tire rim are opposite the lugs of the locking ring the tire rim may be slipped on and off the felly rim but when the locking ring is turned so that its lugs are arranged behind the lugs of the tire rim while the latter is on the felly rim these parts are interlocked and the tire is held in position on the wheel. During this rotary movement of the locking ring into and out of its operative position the same is guided by a plurality of clips or brackets 14 which are secured to the inner side of the felly and lap outwardly over the ring. The locking ring is further guided by means of an angular laterally projecting rib 15 arranged at the inner edge of the felly flange and engaging with the bore of the locking ring, as shown in Figs. 3 and 6.

The rotary movement of the locking ring is effected by means of a gear pinion 16 meshing with a gear rack 17 formed on a part of the bore of the locking ring. Where the gear pinion and rack intermesh the guide rib 15 is cut away so as to form a recess for receiving the rack and pinion, as shown in Fig. 3. The gear pinion is preferably formed integrally with and on the

inner end of a short horizontal shaft 18 which is journaled transversely in a bearing 19 secured to the inner side of the felly, as shown in Fig. 5. This shaft is held against lengthwise movement in its bearing by engagement of the pinion with the inner end of the bearing and a locking disk 20 which has an outwardly projecting hub or shank 21 secured by a screw 22 to the reduced outer end 23 of the shaft and which bears against the outer end of the bearing. The turning of the shaft and the parts associated therewith may be effected by various means but preferably by means of a wrench 24 having a flat sided socket 25 which is adapted to engage with the hub 21 of the locking disk which is made of corresponding flat sided form for this purpose.

In order to prevent grit, dust or dirt from entering between the gear pinion and rack and interfering with their operation or causing undue wear of the same, these parts are inclosed by a casing which preferably comprises a fixed wall or flange 26 arranged on the inner end of the bearing and made of suitable shape so as to inclose the gear pinion and the gear rack in the different positions of the same and a cover or plate 27 secured to the outer edge of the flange 26 by screws or otherwise and extending over the pinion and rack, as shown in Figs. 1 and 5.

Means are provided whereby the shaft and the parts operatively connected therewith are held against movement excepting when the wrench is applied to the shank or hub of the locking disk for turning the shaft. In its preferred form this locking device comprises a catch 28 which slides horizontally and transversely in a guideway 29 arranged on the inner side of the bearing and parallel therewith, a lug projecting outwardly from the outer end of this catch and provided on its inner side with a comparatively short locking tooth 30 and on its outer side with a comparatively long tappet, 31, a plurality of notches 32, 33, 34 arranged on the edge of the locking disk and adapted to be engaged by the locking tooth, and a spring 35 arranged in the guideway and bearing at its inner end against the bottom of this guideway and at its outer end against the back of the catch. The notches 32, 34 of the locking disk extend across the entire space of this disk and represent the positions of this disk when the shaft has been turned either into a position in which the locking ring secures the tire rim on the felly or in a position in which this locking rim permits the tire to be removed from the felly. In the position of the parts shown in Figs. 3, 4 and 5, the locking ring is in its inoperative position and the locking tooth of the catch or follower engages with the rearmost notch 32 of the locking disk. Upon applying the wrench to the shank of the locking disk for turning the locking ring into its operative position, an annular flange 36 on the front end of the wrench engages with the tappet of the catch and pushes the same inwardly together with a locking tooth and associated parts sufficiently to disengage the locking tooth from the rearmost notch 32 of the locking disk, thereby permitting the shaft to be turned freely by the wrench in the direction for shifting the locking ring into its operative position and securing the tire supporting rim to the wheel. When the locking ring has been moved fully into its operative position which is effected by a quarter turn of the shaft and locking disk the wrench is removed from the shank of the locking disk and during such movement the catch is permitted to be projected by the spring and engages its locking tooth with the foremost notch 34 of the locking disk which is now in position to receive this tooth, thereby securely holding the locking ring against movement in the direction which would bring its lugs opposite the spaces between the lugs of the tire supporting rim, and thereby prevent accidental detachment of the tire.

If for any reason the attendant does not turn the locking disk and shaft a full quarter turn before withdrawing the wrench the locking disk will still be held in its partially turned position and hold the lugs of the locking ring in partial engagement with the lugs of the tire supporting ring by reason of the engagement of the locking tooth of the catch with one of the intermediate notches 33 of the locking disk. These last mentioned notches are only formed on the inner side of the locking disk and do not extend fully through the same so that the operator is not confused into deliberately using the intermediate notches but still obtains a measure of safety from these intermediate notches if he should through an oversight not turn the locking disk fully in the direction for securing the tire to the wheel. By this means the attendant automatically locks and unlocks the tire locking mechanism in the act of applying the wrench to the shifting mechanism and insures holding the locking ring in its locked position so that accidental detachment of the tire from the wheel cannot occur.

I claim as my invention:

The combination with a wheel having a felly provided with a seat, a tire supporting rim engaging with said seat and provided with an annular row of locking lugs, a locking ring rotatably supported on said felly and provided with a plurality of locking lugs adapted to engage with the lugs of the tire rim, a bearing arranged on said felly, a shaft journaled in said bearing and

provided with a gear pinion which meshes with a gear rack on said ring, a locking disk arranged on said shaft and provided with a flat sided hub and also with a plurality of notches, and a spring pressed catch guided in a way adjacent to said bearing and having a locking tooth engaging with one of said notches and a tappet projecting normally beyond the locking disk and adapted to be shifted by a wrench applied to said hub.

Witness my hand this 23rd day of February, 1911.

JAY W. FARNOFF.

Witnesses:
THEO. L. POPP,
WALTER J. REIMAN.