S. M. BOWER.

TRACTION WHEEL.

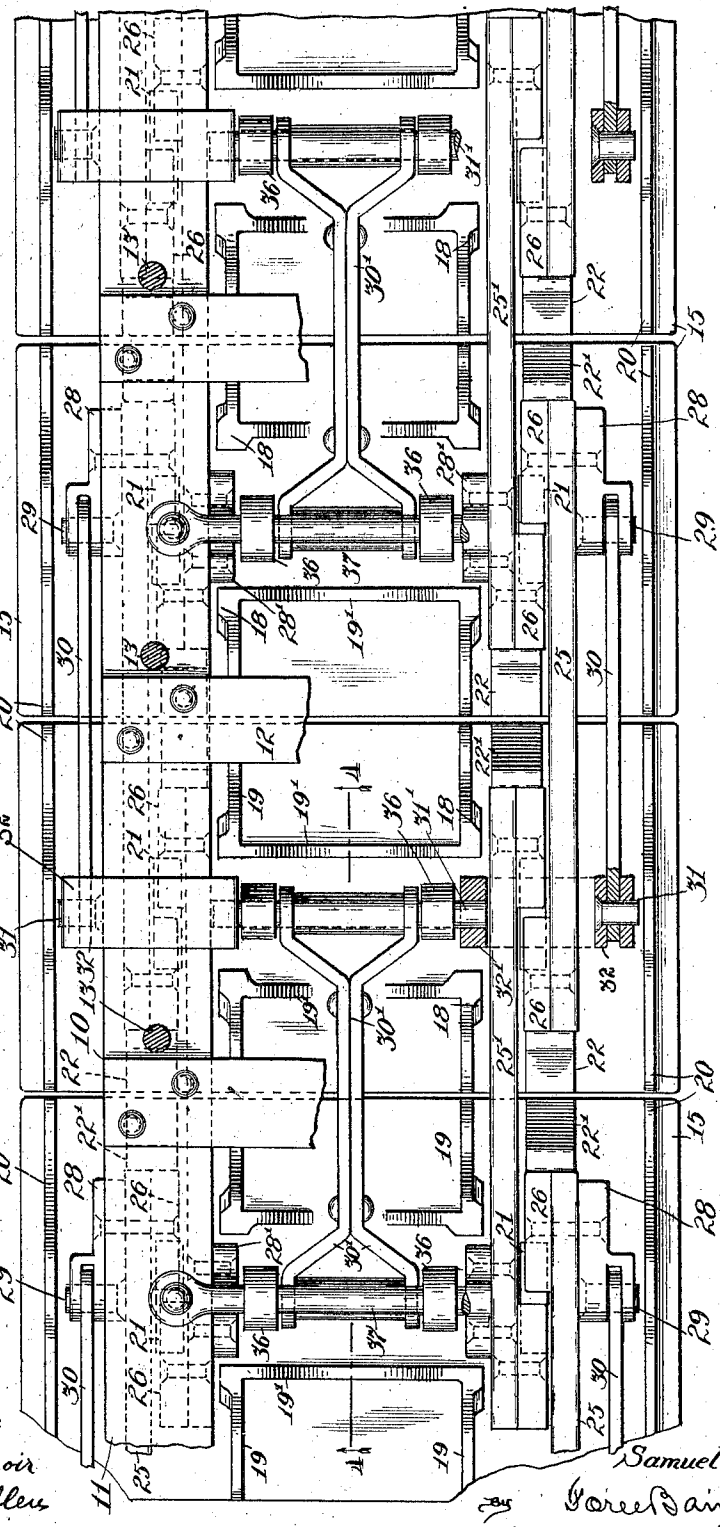
APPLICATION FILED SEPT. 6, 1910.

1,038,835.

Patented Sept. 17, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

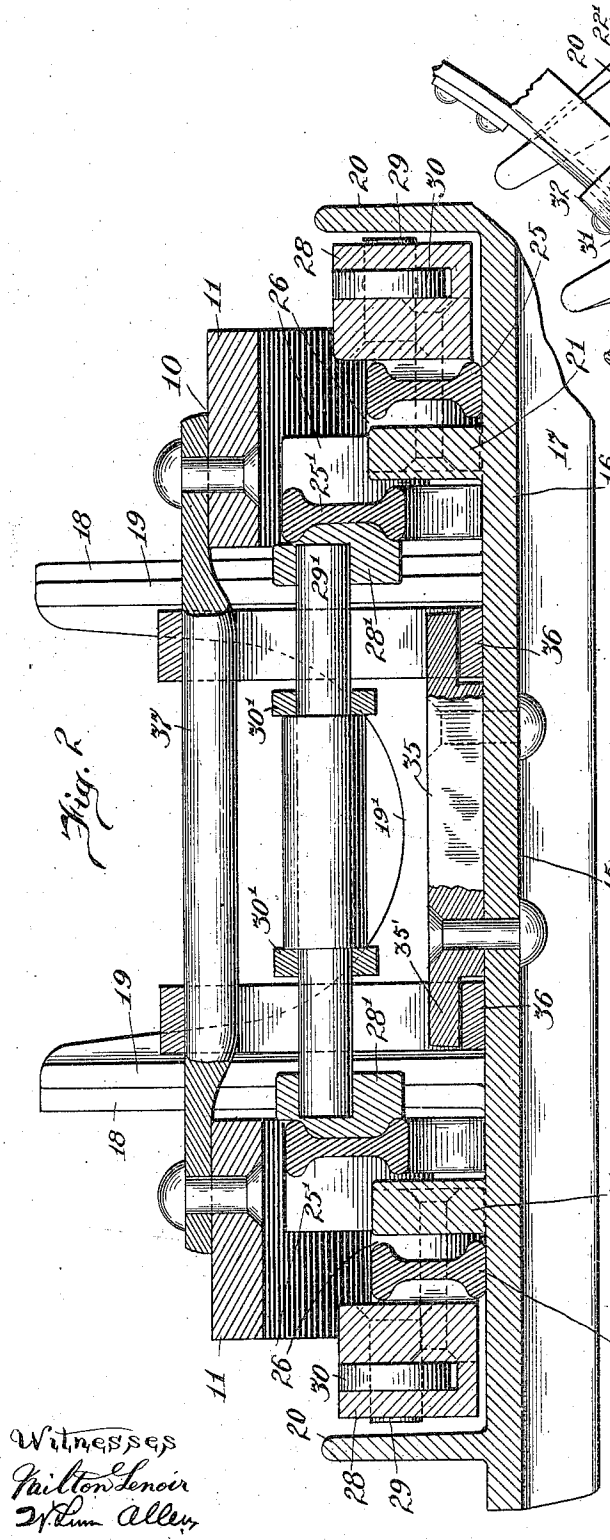

Fig. 2.

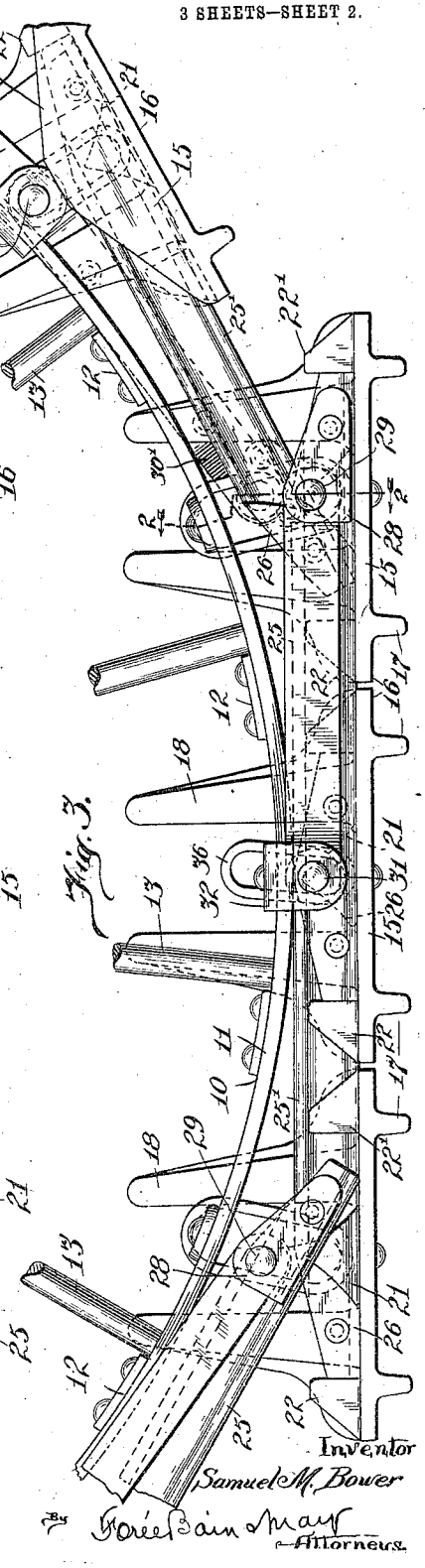

Fig. 3.

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3 SHEETS—SHEET 3.

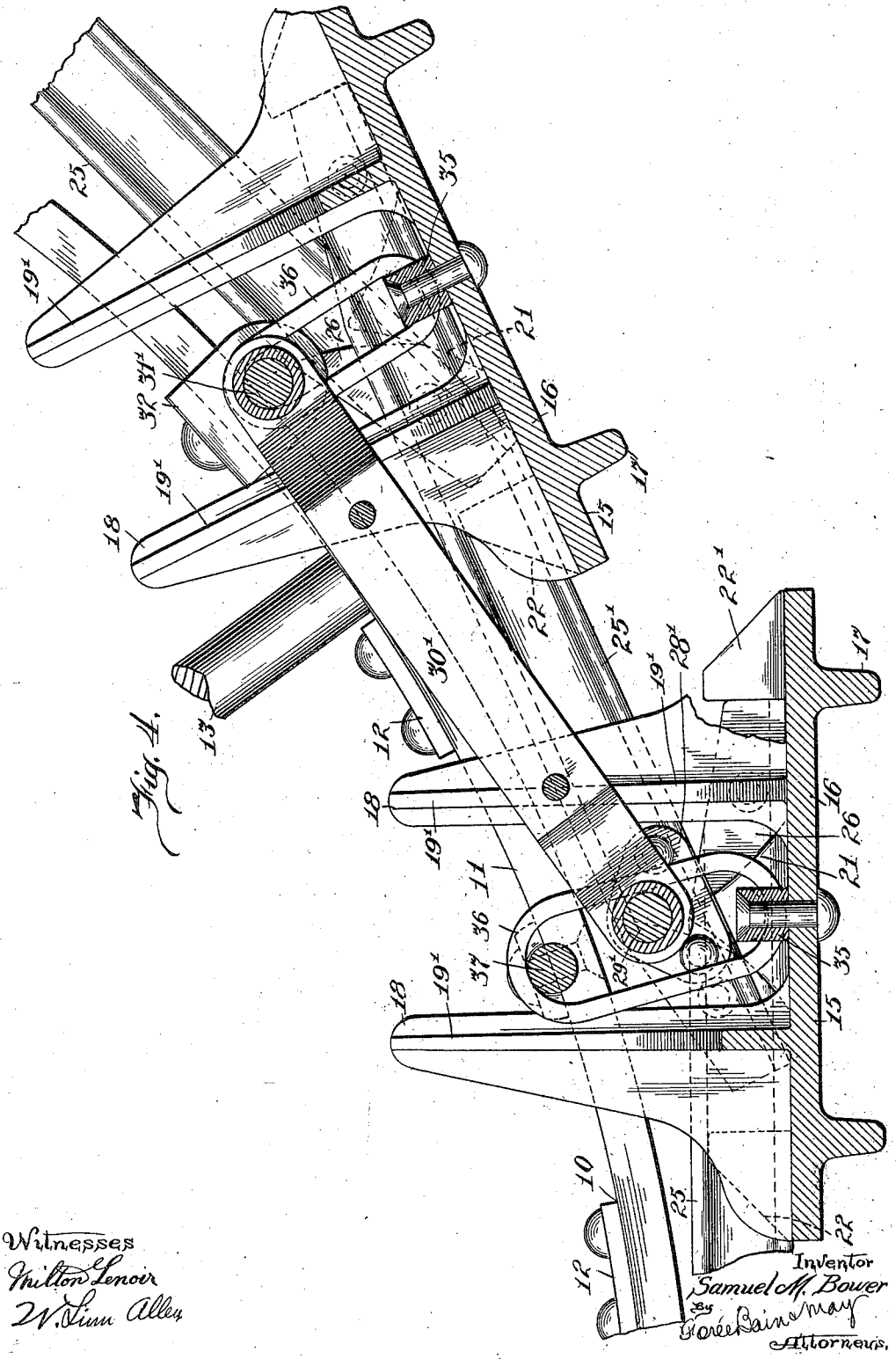

Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL M. BOWER, OF CHICAGO, ILLINOIS.

TRACTION-WHEEL.

1,038,835. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed September 6, 1910. Serial No. 580,744.

To all whom it may concern:

Be it known that I, SAMUEL M. BOWER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Traction-Wheels, of which the following is a specification.

My invention relates to improvements in traction wheels and in some of its features more particularly to traction wheels wherein an annular rim carries in rotation a series of exterior rocking feet, associated with rocking bridge-members, interposed between the feet and rim to span the joint of adjacent feet.

One of the objects of my present invention is to provide a construction by which the possibility of emplacing a foot upon the supporting surface in a tilting position is practically obviated, and other objects of the invention, relating to the improvement of such traction wheels, in general and in specific construction, will become apparent to those skilled in the art from the following description taken in conjunction with the accompanying drawings, in which—

Figure 1 is a plan projection with parts broken away of a peripheral fragment of a wheel embodying my invention; Fig. 2 is a transverse section on line 2—2 of Fig. 3; Fig. 3 is a side elevation of a fragment of a wheel; and Fig. 4 is an enlarged section on line 4—4 of Fig. 1.

In the construction of the specific wheel shown in the drawings, I employ a rim structure 10 comprising two parallel annuli, or rings, 11—11, preferably relatively broad and flat, spaced apart and interconnected by cross bars, 12, said rim members having connected therewith the spokes 13, radiating from a suitable hub, not shown. The feet, 15, of joint length approximately coinciding with the rim periphery, are disposed exteriorly upon the rim and are connected therewith by means to be described, to be carried in rotation by the rim. Each foot 15 preferably provides a flat base, 16, having transverse cleats, 17, on its under or tread surface, the upper surface of the base being provided with upwardly projecting guide posts, 18—18, arranged two on each side of the longitudinal median line, to lie just inside of the respective annuli 11—11, and said guides merging into reinforcing webs, 19 and 19′, respectively, extending longitudinally and transversely of the foot. Each foot is also preferably provided on its top surface with edge flanges, 20, and in appropriate position, centrally of the length of the foot, and flanking, or outside of, the contiguous guides 18, are provided a pair of locking lugs, 21. Adjacent the front and rear edges of each foot are also provided pairs of thrust lugs, 22 and 22′, respectively, alining longitudinally, or peripherally of the wheel, with the lugs 21, these lugs serving to cooperate with the bridge structures in a manner to be described. No direct weight-imposing bearing is effected by the rim upon the feet, in the preferred construction shown, there being constantly interposed between the peripheral surface of the rim and the adjacent weight-carrying feet, bridge structures generally indicated at 25 and 25′. Each bridge, 25 or 25′, is of a length greater than the peripheral extent of a foot, so as to span between two adjacent feet from points oppositely beyond the longitudinal centers thereof; said bridges disposed in pairs correspondingly positioned on opposite sides of the wheel beneath the appropriate rim annuli. The bridges are, of course, arranged so that their ends overlap longitudinally, the outer bridges 25 being disposed to pass outside of the center lugs, 21, of the feet, and bridges 25′ arranged to pass inside of said lugs, or between said lugs and the longitudinal axis of the foot. Each bridge has, between it and the adjacent overlapping bridges, offsets or locking projections 26, to interlock with the appropriate foot lugs 21 and 22 or 22′; the lug 21 being of generally triangular shape with its sloping ends concaved, and the coacting end of each offset 26 being correspondingly shaped so that under the operation of the wheel to be described, the offset end of the bridge may be brought into its locking position smoothly and without needless friction.

It will be obvious that when a bridge member is positioned flat upon the upper surfaces of two feet, emplaced horizontally end to end as shown in Fig. 3, its two ends are so interlocked with the feet that traction strain imparted to the bridges may be imparted thereby to the feet, and yet that the bridges may effect their individual rocking motions approaching or receding from position to interlock the emplaced feet (as shown at the ends of Fig. 3) smoothly and substantially without friction.

Each bridge is articulated with the rim to receive traction strain therefrom, and yet to be capable of its rocking movement necessary for its coöperation with the feet, and to this end I preferably provide as connecting means for each bridge a link at one end pivoted to the rim and at its opposite end pivoted to the bridge, each such link having an effective length between the pivot centers equal to the length of a foot and having its pivot centers coinciding in relation to the rim with the centers of the respective feet overlain by the bridge to which the link is attached. Thus in the specific construction shown I provide upon one extremity of each outer bridge, 25, a bearing bracket, 28, carrying a pivot 29 to which is connected one extremity of a link 30, the opposite end of which is secured by a pivot 31 to a bracket structure 32 straddling the overlying annulus in alinement with a foot center and providing upon the inner side of the rim a pivot-receiving ear, 32′. Such connections for all of the outer bridge members 25 are identical throughout the wheel and the inner bridge members 25′ have connections which are identical in operating effect with those described, although the specific constructions of the links and their connection is different from that described to accommodate the mounting of the links between the rim annuli. Thus, I mount in the ears, 32′, of opposing brackets 32, a pivot pin 31′, to which is connected the extremity of a link 30′, formed of two connected pieces to form bifurcated ends for wide bearings, the remote extremity of said link being connected to pivot pin 29′ spanning between attaching brackets 28′ upon opposite inner bridges 25′. Thus, there occurs a pair of pivot brackets 32 opposite the center of every second foot, and pairs of links for two pairs of bridges diverge from such brackets for connection with their respective bridges at their remote extremities, the free overlapping extremities of said bridges lying radially beyond said brackets.

For connection of the feet to the rim, loose articulation to permit some radial displacement of the feet relative to the rim and to permit the rocking movements of the feet relative to the rim is requisite, and may be provided for in many ways. The specific construction which I herein show employs upon each foot a transverse cleat 35, secured to the foot at its longitudinal center, the cleat having reduced extremities 35′, each partially encompassed by an open loop 36, the opposite end of said loop encircling a suitable transverse bar or pin anchored to the rim. With respect to those alternate feet corresponding with the brackets 32, the loops 36 may be made to encircle the pivot bars, 31′, which are anchored in the brackets 32, and for the intermediate feet, cross bars 37 may be secured to the rim and the loops 36 extended sufficiently to encompass them, as obviously the pivot bars 29′ move with the bridge end and are not anchored to the rim.

In the operation of the wheel, it will be apparent that the feet are carried in rotation by the rim through the loose articulating connections described, and that the feet will be successively emplaced upon the ground, either two or three feet always contacting with the ground and affording a large bearing surface to the wheel. The wheel rim rolls upon the bridges, which in turn receive support upon the feet, each bridge when emplaced upon two feet interlocking therewith so that traction strain may be transmitted through the bridge to the feet, traction strain being imparted to the bridges through the link connections with the rim. It will be observed that if, as a foot approaches the ground, its forward end meets with an obstruction, tending to cause uptilting of the toe of the foot, so that the heel of the foot would,—if the tilting were permitted—dig into the ground, such tilting is prevented by that bridge which spans from the previously emplaced foot to the foot approaching the ground, such bridge interposed between the emplaced foot and the rim acting under the weight of the rim to exert a pressure upon the remote end of the adjoining foot which is descending to operative position. This feature of my invention among others, I regard as novel and important, insuring the proper emplacement of each foot without limiting the flexibility of the articulation of the feet, and also providing for a highly effective distribution of the weight between feet.

While for purposes of full disclosure I have specifically described a particular embodiment of my invention, some of the details of which I may claim for their particular advantages, it will be apparent to those skilled in the art that my invention in its broader aspects is not limited to the specific construction shown and that many changes may be made in the embodiment without departure from the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. In a traction wheel, the combination of a rim, feet independently mounted on the rim for rocking movement, and means for positively preventing tilting of each foot when approaching the ground comprising a bridge member between the foot and rim, one end of said bridge overlying the foot in front of its point of connection to the rim and the other end overlying the foot next in rear thereof, whereby some of the pressure of the rim is transmitted through said bridge

to the forward end of each foot as it approaches the ground positively to prevent digging of its rear edge into the ground as it descends.

2. In a traction wheel, the combination of a rim, feet each connected to the rim for rocking movement, a bridge between the rim and each pair of feet throughout the wheel, the end of each bridge overlapping the end of adjoining bridges to extend beyond the points of connection of the feet to the rim, means of connection of each bridge to the rim to leave both ends thereof free for radial movement.

3. In a traction wheel the combination of a rim, comprising separated annuli, feet carried by the rim extending across the annuli, bridges arranged in alternating, overlapping, inner and outer pairs, a link member between each inner pair of bridges and the rim within the annuli, and a link between each outer bridge and the rim.

4. In a traction wheel the combination of a rim, feet carried thereby, a lug adjacent the front and rear edge of each foot, a bridge extending between the rear lug of each foot to the front lug of the foot next in front thereof, and a link connecting each bridge to the rim.

5. In a traction wheel the combination of a rim, comprising separated annuli, feet therefor, cross pieces between the annuli at the longitudinal center of each foot, means of engagement between each foot, and the associated cross piece to support said foot upon the rim, inner and outer bridges, links pivoted upon alternate cross pieces and pivoted at their free ends to the appropriate inner bridges, cleats upon the rim alternating with the link-supporting cross pieces, and links pivoted between said cleats and outer bridges.

6. In a traction wheel, the combination of a rim comprising separated annuli, feet exteriorly carried by the rim extending across said annuli, bridges arranged in pairs between the annuli and the feet, each bridge spanning the joint of two adjacent feet, and the bridges successively overlapping, and swinging links connecting the bridges with the rim, the links for each outer bridge-pair flanking the annuli, and the links for each inner bridge-pair lying between the annuli.

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

SAMUEL M. BOWER.

In the presence of—
W. LINN ALLEN,
MARY F. ALLEN.

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