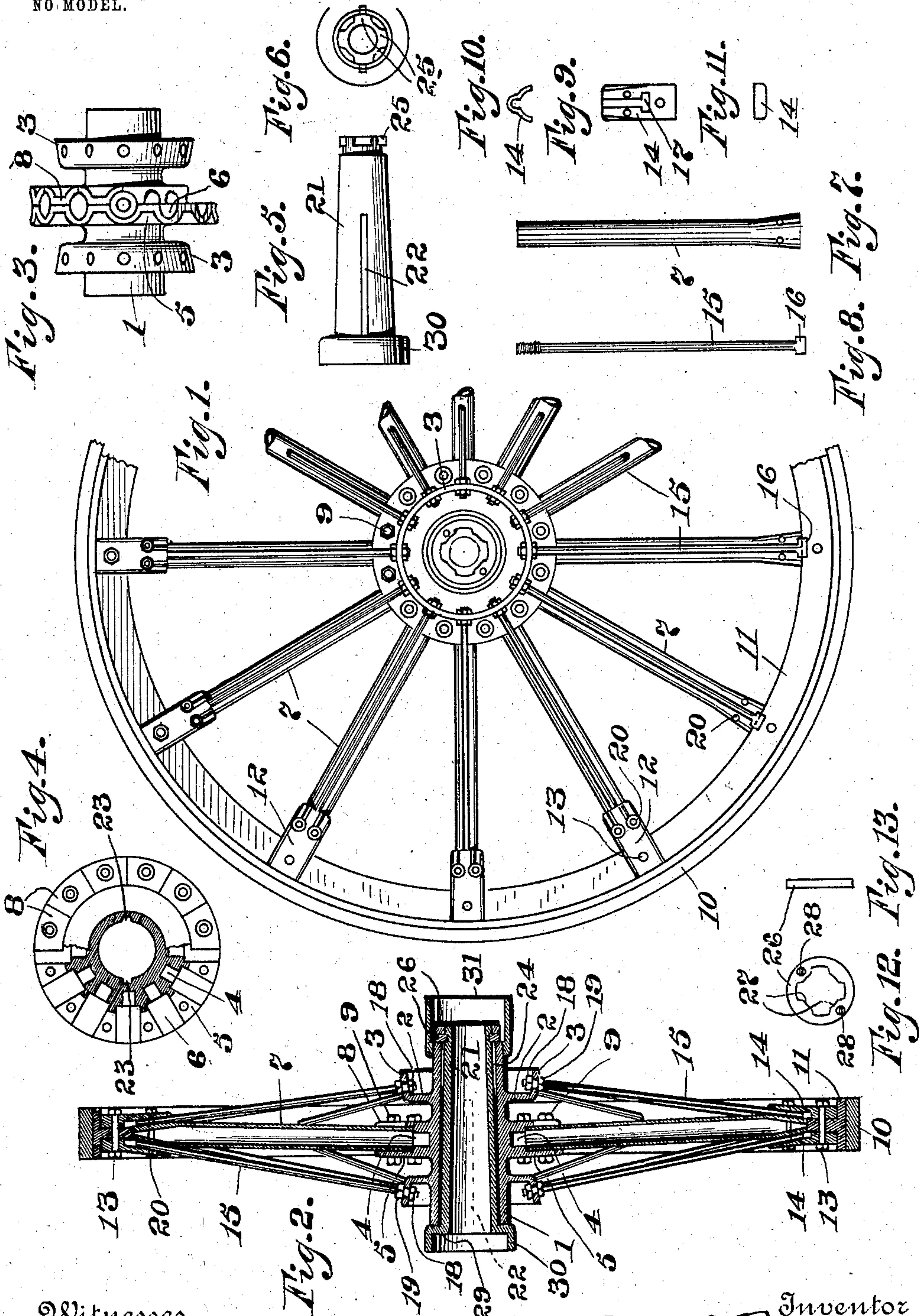


C. MILLER.
WHEEL.

APPLICATION FILED MAY 17, 1900.

NO MODEL.



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WHEEL.

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To all whom it may concern:

Be it known that I, CONRAD MILLER, a citizen of the United States, residing at Leadville, in the county of Lake and State of Colorado, have invented certain new and useful Improvements in Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

This invention relates to improvements in wheels.

The object of the present invention is to provide a wheel the parts of which are so constructed and arranged as to be formed en-
15 tirely of metal, preferably steel, and also to provide a wheel in which the parts may be readily removed when injured in order to facilitate replacing of the same by new parts.

20 A further object of the invention is to provide a wheel in which wear thereon may be easily compensated for, and, furthermore, to so construct the wheel that the spokes thereof shall remain under the proper degree of
25 tension at all times.

With these and other objects in view, which will appear as the nature of the improvements is better understood, the invention consists, substantially, in the novel construction, combination, and arrangement of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation, partly broken away, of a wheel constructed in accordance with the present invention. Fig. 2 is a vertical transverse sectional view thereof. Fig. 3 is a side elevation of the hub, a portion of the spoke-clamping plates
40 being removed. Fig. 4 is a transverse sectional view, partly in elevation, of said hub. Fig. 5 is a side elevation of the axle-box. Fig. 6 is an end elevation thereof. Fig. 7 is a side elevation of one of the spokes. Fig. 8
45 is a similar view of one of the tie-rods. Fig. 9 is an elevation looking at the inner side of one of the plates constituting the spoke-sockets. Fig. 10 is a view looking at the inner end thereof; Fig. 11, a similar view looking at the outer end thereof. Figs. 12 and 13
50 are side and edge elevations, respectively, of

one of the locking-washers carried by the axle-box.

Referring to the drawings, the numeral 1 designates a tapering hub, which is provided
55 at points intermediate its ends with integral annular spaced flanges 2, provided with circumferential lips 3. The central portion of said hub is provided with a series of radial sockets 4, and extending outwardly from one
60 side of said sockets is an annular attaching-flange 5, which flange is provided at its inner face with a series of semicircular recesses 6, said recesses merging into the sockets 4 and together therewith being designed to receive
65 the inner ends of a series of tubular spokes 7. A series of clamping-plates 8 is mounted upon the hub 1 adjacent to the sockets 4, but at the side thereof which is opposite to the flange 5, the inner face of the edges of each of said
70 plates being shaped, as shown in Fig. 3, so as to correspond to the shape of the spokes, and by means of securing-bolts 9 it will be seen that said clamping-plates are securely fast-
75 ened to the flange 5, and thereby retain the spokes 7 within the sockets 4, the bolts 9 passing through the flange 5 between the recesses 6 thereof, and the plates 8 being so arranged that one of the same will overlap two of the
80 recesses. This construction enables a single spoke when injured to be easily removed and replaced by another.

The numeral 10 designates the tire, which is secured to a felly 11, the latter being T-shaped in cross-section, and arranged around
85 said felly is a series of spoke-sockets 12, the same being secured to the felly 11 by bolts 13 and each comprising a pair of steel castings or drop-forged plates 14, having their inner
90 ends flared, as clearly shown in Fig. 2, for receiving the outer ends of the spokes 7. Tie-rods 15 are arranged at the sides of each of the spokes 7, the outer ends of said rods lying within the sockets 12 and being upset, as at
95 16, so as to fit within pockets 17, formed in the inner faces of the plates 14, while the inner ends of said tie-rods pass through the lips 3 and are held therein by means of securing-nuts 18 and jam-nuts 19. The securing-nuts
100 18 are arranged on the inner faces of the lips 3, and the jam-nuts 19 are arranged on the outer faces of said lips, and hence it will be

seen that different degrees of tension may be imparted to the tie-rods 15 as is necessary to prevent the spokes loosening, and consequently rattling. It will also be observed that the inner end of each of the plates 14 is substantially semicircular in cross-section, as shown in Fig. 10, so that said plates snugly fit upon and receive the outer ends of the spokes 7 and tie-rods 15. Binding-bolts 20 are also employed to secure the sockets 12, tie-rods 15, and spokes 7 together.

Arranged within the hub 1 is a tapering axle-box 21, which is provided at diametrically opposite sides with ribs 22, and said ribs are designed to fit within diametrically opposite grooves 23, formed in the inner face of the hub 1, whereby the axle-box is locked into engagement with said hub, and thereby turns therewith. In addition to this, however, an annular space 24 is left between the axle-box 21 and the inner face of the hub 1, which space is designed to be filled with hard Babbitt metal in order to fasten said parts together without machining, and formed on the outer end of the axle-box is a series of spaced locking-lugs 25. Mounted upon the outer end of the axle-box is a pair of locking-washers 26, (shown in detail in Figs. 12 and 13,) and it will be observed that each of said washers is provided with inwardly-extending spaced locking-lugs 27, the washers 26 being secured together by means of screws 28 or their equivalent. The washers 26 are so arranged that the locking-lugs 27 of the inner washer lie in the rear of the lugs 25 of the axle-box 21, while the lugs 27 of the outer washer lie between said lugs 25, and in placing the washers 26 upon the axle-box 21 the inner washer is first put on and given a partial revolution, (about one-eighth,) so that the lugs 27 of the same will engage the lugs 25 should said inner washer be moved longitudinally with respect to said box, after which the outer washer is positioned directly over said lugs, as shown in Fig. 2, and both washers are then secured together by the screws 28. By reason of the outer washer being placed directly over the lugs 25 the former is incapable of turning, and being connected to the inner washer it will be seen that both washers are locked together and prevented being displaced either by turning or movement longitudinally of the axle-box 21.

A flange 29 is formed at the inner end of the axle-box 21, which together with the washers 26 prevents longitudinal displacement of the box, and said flange 29 terminates in a band 30, adapted to protect the inner end of the axle-spindle, a sand-band 31 being shrunk on the outer end of the hub 1 for the purpose of protecting the adjacent end of said spindle.

By referring to Fig. 2 it will be noted that the wheel is dished, so as to correspond with the tapering of the axle-spindle, and by this construction it will be seen that when the under side of said spindle is in a horizontal plane

the spokes immediately therebeneath during the rotation of the wheel assume a position perpendicular to said side of the spindle, and thereby resist the load in such position. The dishing of the wheel also provides for the easy truing of the same in the event that the parts become loosened.

The manner of assembling the herein-described wheel is as follows: The tire 10 having been shrunk upon the felly 11, in order to secure the same together the spokes 7 are inserted into the hub 1 and the rim placed around the outer ends of the spokes, so that the inner surface of the felly rests upon the outer ends of the spokes. The tie-rods 15 having been secured in the flanges 2 of the hub, the plates 14 of the spoke-sockets 12 are bolted to the felly, so as to secure the rods 15 and the spokes 7 to said felly. After these steps have been taken the tie-rods 15 on the inner side of the wheel or that adjacent to the sand-band 30 are tightened by means of the nuts 18 until the wheel runs true and the spokes 7 are sufficiently rigid in an endwise direction to sustain the wheel in a vertical position, after which the jam-nuts 19 are screwed hard upon the lips 3. This having been done the tie-rods 15 on the outer side of the wheel are brought to the proper tension through the medium of these securing-nuts 18, mounted thereon and maintained against loosening by the jam-nuts 19. The wheel is then in proper condition for use, but should the spokes become loosened during wear increasing the tension of the inner tie-rods 15 tightens the same again, and in the event that the spokes become too much worn to properly respond to the increase of tension referred to such may be readily overcome by inserting a washer of proper thickness in the sockets of the hub in order that the spokes may bear thereagainst. This when the wheel is again assembled renders the latter perfectly tight and overcomes the necessity of purchasing new spokes; but should any of the said spokes break or become injured to such an extent as to be useless each can be readily removed and replaced by a new one without interfering with the other parts of the wheel. It will also be observed that by tightening the nuts 18 and 19 on the inner tie-rods for increasing the tension of the latter the wheel will lose to some extent a portion of its dish, as the spokes approach a vertical plane, and hence said spokes act in the same manner as though they had been elongated, thereby affording a tight fit endwise in the wheel.

The form of the invention shown in the drawings is what is believed to be a preferable embodiment thereof; but inasmuch as the invention is susceptible of various changes in the form, proportion, and minor details of construction the right is reserved to modify or vary the same as falls within the spirit and scope thereof.

Having thus described the invention, what

is claimed as new, and desired to be secured by Letters Patent, is—

1. A wheel, comprising a hub provided with annular spaced flanges, spokes suitably secured to said hub, a felly carried by said spokes, tie-rods extending from said felly to the flanges of said hub and suitably secured thereto, and sectional sockets carried by the felly and receiving both the spokes and the tie-rods.

2. A wheel, comprising a hub, spokes suitably secured thereto, a felly, sectional sockets carried by said felly and receiving said spokes, and tie-rods received by and extending from said sockets to the hub.

3. A wheel, comprising a hub provided with annular flanges, spokes suitably secured to said hub, a felly, sectional sockets carried by said felly and receiving said spokes, and tie-rods extending from said sockets to the flanges of the hub and secured thereto.

4. A wheel, comprising a hub provided with radial sockets, spokes fitted in said sockets, a felly carried by said spokes, tie-rods extending from said felly to said hub, and sectional sockets carried by the felly and receiving both the spokes and the tie-rods.

5. A wheel, comprising a hub provided with annular flanges and also having a series of radial sockets, spokes fitted in said sockets, a felly carried by said spokes, tie-rods extending from said felly to the flanges of the hub and secured thereto, and sectional sockets carried by the felly and receiving both the spokes and the tie-rods.

6. A wheel, comprising a hub provided with annular flanges and also having a series of radial sockets, spokes fitted in said sockets, a felly, sectional sockets carried by said felly and receiving the spokes, and tie-rods also received by said sockets and extending from the sockets to the flanges of the hub.

7. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof and projecting beyond the plane of the sockets, spokes fitted in said sockets, means for securing the spokes therein, a felly carried by the spokes, and means for tensioning the latter.

8. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof and projecting beyond the plane of the sockets, a series of spokes fitted in said sockets, a series of clamping-plates for securing the spokes therein, and a felly carried by the spokes.

9. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof and projecting beyond the plane of the sockets, said flange being provided at its inner side with a series of recesses, spokes fitting in said recesses, means for clamping the spokes therein, a felly carried by said spokes, and means for tensioning the latter.

10. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof and projecting beyond the plane of the sockets, said flange being provided at its inner side with a series of recesses, spokes fitting in said recesses, a series of clamping-plates for securing the spokes therein, and a felly carried by said spokes.

11. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof, said flange being provided at its inner side with a series of semicircular recesses, spokes fitting in said recesses, a series of clamping-plates for securing the spokes therein, each of said plates having its edges shaped to conform to the shape of the spokes, and a felly carried by said spokes.

12. A wheel, comprising a hub provided with a series of radial sockets and having an attaching-flange arranged at one side thereof, said flange being provided at its inner side with a series of semicircular recesses, spokes fitting in said recesses, a series of clamping-plates for securing the spokes therein, each of said plates being so positioned as to overlap two of the recesses and having its edges shaped to conform to the shape of the spokes, and a felly carried by said spokes.

13. A wheel, comprising a hub, spokes suitably connected to said hub, a felly carried by said spokes, sockets carried by said felly and receiving said spokes, each of said sockets comprising a pair of flared plates, and means for connecting the same to the felly, and means for tensioning the spokes.

14. A wheel, comprising a hub, spokes suitably connected thereto, a felly carried by said spokes, sockets carried by said felly and receiving said spokes, each of said sockets comprising a pair of flared plates provided with pockets at their inner sides, and tie-rods extending from said sockets to the hub, said tie-rods fitting within the pockets of the spoke-sockets.

15. A wheel, comprising a hub provided with annular spaced flanges and having a series of radial sockets, said hub being also provided with an attaching-flange arranged at one side of said sockets, spokes fitting within said sockets, means for clamping the spokes therein, a felly carried by said spokes, sockets carried by said felly and receiving said spokes, and tie-rods fitting within said sockets and extending therefrom to the flanges of the hub.

16. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said spokes, said wheel being dished, whereby the spokes, during the rotation of the wheel, extend perpendicularly to the spindle upon which the wheel is mounted when immediately therebeneath, and means for tensioning said spokes laterally of the wheel.

17. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said

spokes, and tie-rods extending from said felly to the hub, said wheel being dished, whereby the spokes, during the rotation of the wheel, extend perpendicularly to the spindle upon
 5 which the wheel is mounted when immediately therebeneath, and means for tensioning said spokes laterally of the wheel.

18. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said
 10 spokes, an axle-box arranged within said hub and provided at one of its ends with a sand-band of greater diameter than the diameter of the hub and at its other end with a series of locking-lugs, and a locking-washer mount-
 15 ed upon said axle-box and engaging said lugs for retaining the axle-box within the hub, the latter fitting between the sand-band and the locking-washer.

19. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said
 20 spokes, an axle-box mounted within said hub and provided at one of its ends with a sand-band of greater diameter than the diameter of the hub and at its other end with a series
 25 of locking-lugs, and a locking-washer mounted on said axle-box and provided with a series of locking-lugs engaging the locking-lugs of said box for retaining the latter in the hub, the latter fitting between the sand-band and
 30 the locking-washer.

20. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said
 spokes, an axle-box arranged within said hub and provided at one of its ends with a sand-
 35 band of greater diameter than the diameter of the hub and at its other end with a series of locking-lugs, and a pair of locking-washers mounted on said box and each provided with a series of locking-lugs engaging
 40 the locking-lugs of the axle-box for retaining the latter in the hub, the latter fitting between the sand-band and the locking-washer.

21. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said

spokes, an axle-box arranged within said hub and provided at one of its ends with a series of locking-lugs and at its other end with a flange of greater diameter than the hub, and a pair of washers mounted upon said axle-box and provided with locking-lugs engaging the locking-lugs of the axle-box for retaining the latter within the hub, the latter fitting between the sand-band and the locking-washer.

22. A wheel, comprising a hub, spokes suitably secured thereto, a felly carried by said
 spokes, an axle-box arranged within said hub and provided at one of its ends with a series of locking-lugs and at its other end with a flange terminating in a sand-band of greater
 6 diameter than the hub, the hub lying between the locking-lugs and said flange, and a pair of locking-washers mounted upon said axle-box and each provided with a series of locking-lugs engaging the locking-lugs of the
 6 axle-box for retaining the latter in the hub.

23. A wheel, comprising a hub provided with annular flanges and having a series of radial sockets, spokes fitting within said sockets, means for clamping the spokes therein, a felly carried by said spokes, sockets carried by said felly and receiving the spokes, tie-rods fitting within said sockets and extending to the flanges of the hub, an axle-box arranged within the hub and provided
 7 at one of its ends with a series of locking-lugs, and at its other end with a flange terminating in a sand-band, and locking-washers mounted upon said axle-box and provided
 7 with lugs engaging the lugs of the axle-box for retaining the latter in the hub.

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

CONRAD MILLER.

Witnesses:

KNUD RASMUSSEN,
 MUSSY COCHRAN.