No. 734,731. PATENTED JULY 28, 1903.

C. MILLER.

WHEEL.

APPLICATION FILED OCT. 3, 1900.

NO MODEL.

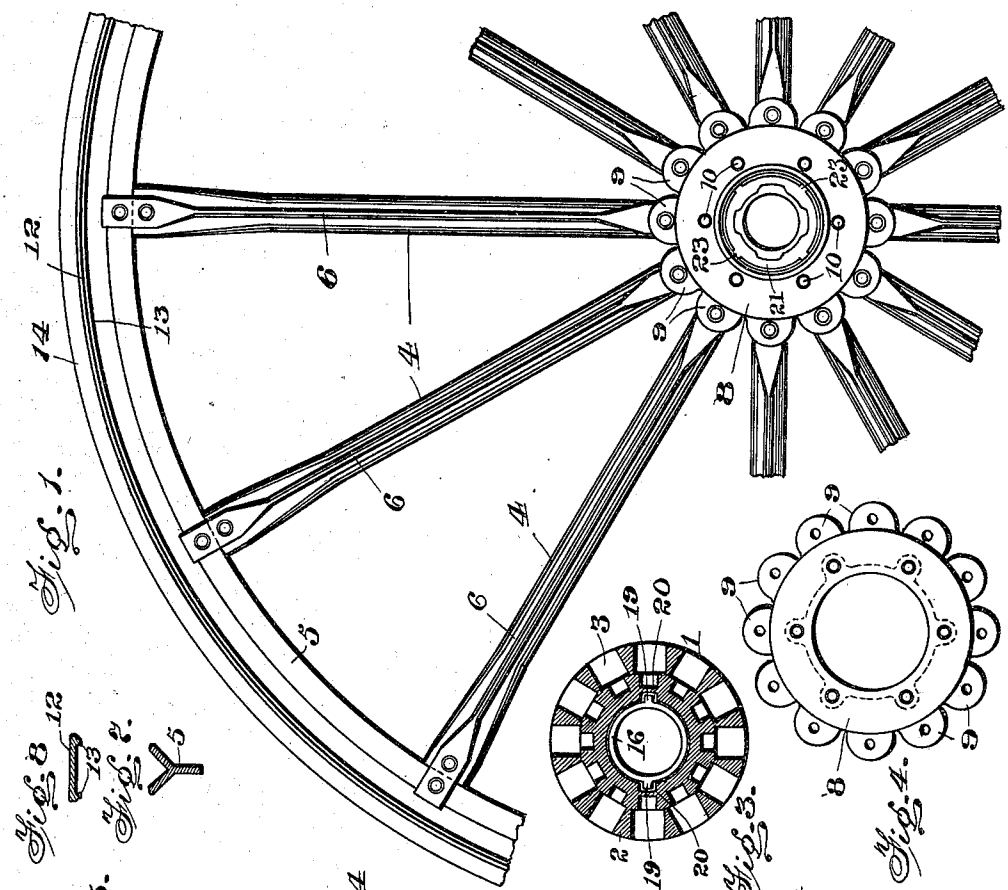

Fig. 1.

Fig. 8.

Fig. 7.

Fig. 3.

Fig. 4.

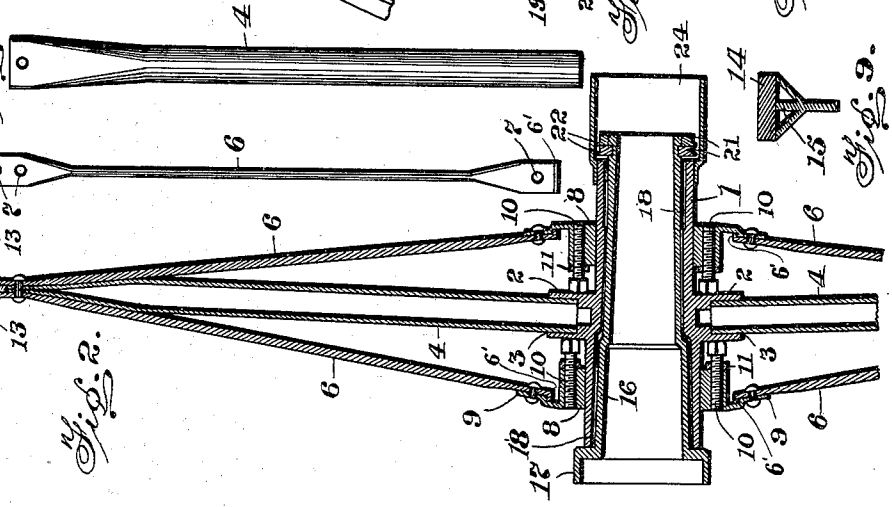

Fig. 2.

Fig. 5.

Fig. 6.

Fig. 9.

Witnesses

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UNITED STATES PATENT OFFICE.

CONRAD MILLER, OF LEADVILLE, COLORADO.

WHEEL.

SPECIFICATION forming part of Letters Patent No. 734,731, dated July 28, 1903.

Application filed October 3, 1900. Serial No. 31,888. (No model.)

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 appertains to make and use the same.

This invention relates to improvements in wheels, and more particulary relates to wheels of the all-metal type.

The object of the present invention is to provide an improved form of wheel in which the number of parts shall be reduced to a minimum and which parts are so related that when properly assembled and adjusted a wheel of maximum strength and one capable of resisting great strain is produced.

A further object of the invention is the provision of a wheel the parts of which may be readily removed when injured and replaced by new parts without disturbing the other portions of the wheel, thereby rendering repairs easy and the performance thereof speedy.

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 transverse sectional view of the hub. Fig. 4 is a side elevation of one of the adjusting-rings. Fig. 5 is a side elevation of one of the spokes. Fig. 6 is a similar view of one of the tie-rods. Fig. 7 is a transverse sectional view of the felly. Fig. 8 is a similar view of the binding-ring carried thereby. Fig. 9 is also a transverse sectional view of another form of felly.

Referring to the drawings, and more particularly to the form of the invention shown in Figs. 1 to 9, the numeral 1 designates the hub of the herein-described wheel, which hub is preferably formed of steel and is tubular, as shown. It will be observed, however, that the outer end of the hub is of less diameter than the inner end thereof, said ends being machined for a purpose to be presently stated. The hub 1 at a point intermediate its ends is provided with an annular projection 2, in which projection is formed a series of radial sockets 3, designed to receive the inner ends of a series of tubular spokes 4, and the outer ends of said spokes are flattened, so that their sides converge, as clearly shown in Fig. 2, which ends abut against a felly 5. The felly 5 is Y-shaped in cross-section and is bent and welded together, so as to form a solid ring in order to surround the spokes 4, and it will be observed that the cross-sectional area of said felly includes a vertically-extending web to which are connected outwardly-extending divergent webs.

Arranged at the sides of each spoke are tie-rods 6, the ends of which are enlarged and perforated, as at 7, and the outer ends of said rods are riveted or otherwise suitably secured to the extremities of the spokes 4 and the vertically-extending web of the felly 5, and in this manner said tie-rods are also connected to a pair of adjusting-rings 8, one of which is arranged at each side of the projection 2 and slidably mounted on the adjacent portion of the hub 1. Each of the rings 8 is provided with a series of radially-arranged ears 9, to each of which one of the tie-rods 6 is connected, and by reason of this it will be observed that as each ring is slid along the hub 1 all of the tie-rods follow bodily such movement, and for effecting such sliding movement of the adjusting-rings 8 the same are each provided with a series of adjusting set-screws 10, the heads of which bear against the annular projection 2, while their shanks are fitted within the rings 8. While this latter arrangement is preferable, it is obvious that the same may be changed, and, if desired, the heads of the screws 10 may be at the outside of the rings. Each of the set-screws 10 carries a jam-nut 11, by means of which said screws when adjusted to their desired positions may be held therein, and by means of these nuts it will be seen that the

screws 10 are prevented rotating, and displacement of the adjusting-rings 8 from the positions to which they have been moved is likewise prevented. The tie-rods 6 are also provided at their inner ends with outwardly-projecting lips 6', which lips take under shoulders formed on the inner sides of the ears 9. Through these lips the strength of the fastenings at the inner ends of the tie-rods is greatly increased.

Surrounding the exterior of the felly 5 is a binding-ring 12, which ring is provided at its edges with locking-ribs 13, and it will be observed that the flared webs of the felly 5 are angular cut in order to fit between the ribs 13 when the ring 12 is placed thereon. By means of this construction and the employment of the ring 12 the flared webs of the felly are prevented spreading, and by forming the felly of Y shape it is obvious that sand and dirt will not be lifted thereby, as in the ordinary construction of flat felly. The binding-ring is shrunk upon the felly 5, and surrounding said binding-ring is the tire proper, 14, which is also shrunk thereon. While the construction of felly, binding-ring, and tire as shown in Fig. 2 is preferred, the same is not essential, and, if desired, the form shown in Fig. 9 may be substituted therefor, and by referring to this figure it will be observed that the construction of the felly in the main is the same as in Fig. 2 or Y-shaped, but the binding-ring 12 is dispensed with, and in lieu thereof a vertical web 15 is formed integral with the felly 5 and arranged between the flared webs thereof, the tire 14 in this instance being shrunk directly upon the felly 5, and the web 15 serving to prevent spreading of the flared webs of said felly.

A bushing 16, provided with a sand-band 17, is arranged within the bore of the hub 1, a space 18 being left between said bushing and said hub, which is adapted to receive Babbitt metal or the like for locking these parts together; but in addition thereto the bushing 16 is provided with longitudinal ribs 19, which fit within corresponding grooves 20, formed in the inner faces of the hub 1. Mounted upon the outer end of the bushing 16 is a pair of locking-rings 21 for preventing longitudinal displacement of the bushing from the hub. These rings are specifically described in my pending application, Serial No. 17,051, and in view of this fact it is not deemed essential to refer to their detail construction, except to point out the fact that whereas in the pending application the locking-rings are secured together by means of screws, in this case such screws are dispensed with and in lieu thereof said rings are provided with lips 22, which lips are designed to be enveloped by the Babbitt metal before referred to, which is caused to lie flush with the outer end of the bushing, whereby endwise movement of the rings is prevented, and through the medium of ribs 23, which are also designed to be enveloped by the Babbitt metal, rotation of said rings is likewise prevented. A sand-band 24 is carried by the hub 1 at its outer end.

It will be here observed that the spokes 4 are dished, as clearly shown in Fig. 2, and in assembling the parts of the wheel the same are arranged in the relation shown in Fig. 2. After such assemblage the inner tie-rods 6 are forced outwardly by adjusting the set-screws 10, controlling the same, and by such adjustment the adjusting-ring 8, to which said rods are connected, is slid along the hub 1. When the spokes 4 have become sufficiently tight, the tie-rods at the outside of the wheel are likewise moved outwardly through the medium of the set-screws controlling their movements, and when these rods have been moved to the desired extent the spokes 4 will have become rigidly braced, and thus capable of resisting blows or pressure incident to strain upon the same. When the tie-rods 6 have become so positioned, the jam-nuts 11 are tightened upon their respective screws, and thus said screws are held in locked position.

While the form of the invention shown and described is what is believed to be a preferable embodiment thereof, it will be understood that the same is susceptible of various changes in the form, proportion, and minor details of construction, and the right is therefore reserved to modify or vary the invention 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. In a wheel, the combination with the hub provided at a point intermediate its ends with an outwardly-extending annular projection having a series of radial sockets, of a series of spokes having their inner ends fitted in said sockets, a felly surrounding the outer ends of said spokes, tie-rods connected to said felly, adjusting-rings slidably mounted upon said hub and arranged at the sides of said annular projection and to which the inner ends of said tie-rods are connected, and adjusting-screws carried by said rings and bearing against said annular projection, whereby said rings are moved relatively to said projection when said screws are rotated.

2. In a wheel, the combination with the hub provided at a point intermediate its ends with an outwardly-extending annular projection having a series of radial sockets, of a series of spokes having their inner ends fitted in said sockets, a felly surrounding the outer ends of said spokes, tie-rods connected to said felly, adjusting-rings slidably mounted upon said hub and arranged at the sides of said annular projection, said rings having radial ears to which said tie-rods are connected, and adjusting-screws carried by said rings and bearing against said annular projection, whereby said rings are moved relatively to said projection when said screws are rotated.

3. In a wheel, the combination with the hub provided at a point intermediate its ends with an outwardly-extending annular projection having a series of radial sockets, of a series of spokes having their inner ends fitted in said sockets and their outer ends flattened, whereby the sides of said outer ends converge, a felly surrounding the outer ends of said spokes, tie-rods having their ends flattened and embracing said spokes, the outer ends of said tie-rods being connected to said felly, adjusting-rings slidably mounted upon said hub and arranged at the sides of said annular projection and to which the inner ends of said tie-rods are connected, and adjusting-screws carried by said rings and bearing against said annular projection, whereby said rings are moved relatively to said projection when said screws are rotated.

4. In a wheel, the combination with the hub provided at a point intermediate its ends with an outwardly-extending annular projection having a series of radial sockets, of a series of spokes having their inner ends fitted in said sockets, a felly surrounding the outer ends of said spokes and including in its cross-sectional area a vertically-extending web to which are connected outwardly-extending divergent webs, tie-rods connected to the vertically-extending web of said felly and embracing said spokes, adjusting-rings slidably mounted upon said hub and arranged at the sides of said annular projection and to which the inner ends of said tie-rods are connected, and adjusting-screws carried by said rings and bearing against said annular projection, whereby said rings are moved relatively to said projection when said screws are rotated.

5. In a wheel, the combination with the hub, and a felly the cross-sectional area of which includes a vertically-extending web to which are connected outwardly-extending divergent webs, of a series of tie-rods connected to the vertically-extending web of said felly, an adjusting-ring slidably mounted upon said hub and to which said tie-rods are suitably connected, set-screws for operating said adjusting-ring for regulating the tension of the tie-rods, and jam-nuts carried by said set-screws for locking the latter against rotation.

6. In a wheel, the combination with the hub, of a bushing arranged therein and provided at one of its ends with a sand-band, and a series of locking-rings mounted upon the other end of said bushing and provided with lips and ribs projecting therefrom, and a suitable sealing medium arranged between the hub and the bushing and adapted to coact with the lips and ribs of said rings for retaining the latter upon the bushing.

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

CONRAD MILLER.

Witnesses:
HENRY R. PENDERY,
JOHN LAW.