

No. 504,080.

Patented Aug. 29, 1893.

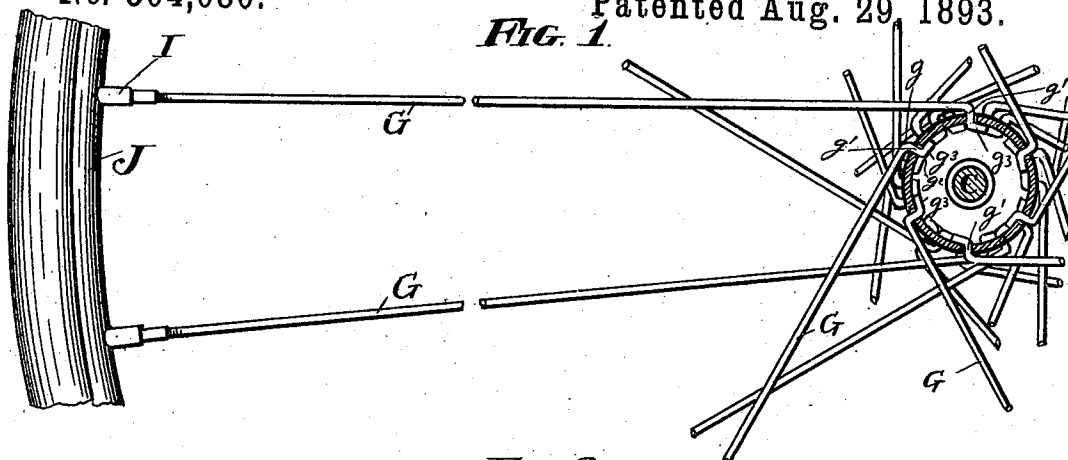
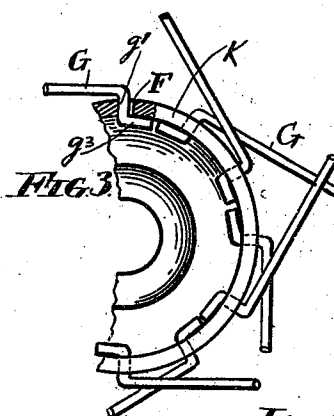
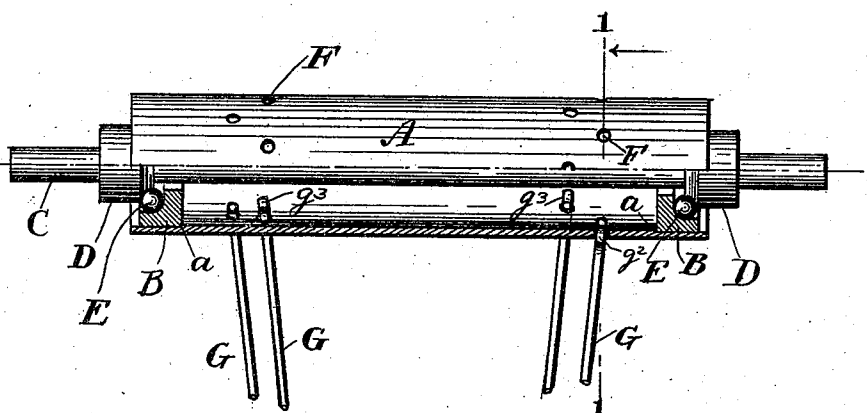


Fig. 2.



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WHEEL.

SPECIFICATION forming part of Letters Patent No. 504,080, dated August 29, 1893.

Application filed May 1, 1893. Serial No. 472,626. (No model.)

To all whom it may concern:

Be it known that I, OTTO CULLMANN, 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 Wheels, of which the following is a specification.

The present invention relates to that class of wheels intended more especially for velocipedes, which have spokes that are arranged tangentially and hold the hub and rim concentric by their tensile strength.

The object of the present invention is to simplify and cheapen, and at the same time improve the construction of wheels of the character in question, and to this end the said invention consists in certain features of novelty that are particularly pointed out in the claims hereinafter.

In the accompanying drawings, which are made a part of this specification:—Figure 1 is a sectional elevation of a portion of a wheel embodying the invention, the cutting plane of the section being indicated by the line 1—1, Fig. 2, and the parts being viewed in the direction of the arrow. Fig. 2 is a sectional elevation of the wheel, the cutting plane being perpendicular to the cutting plane of Fig. 1. Fig. 3 is a sectional elevation of a portion of the hub of a wheel embodying the invention, the hub being modified slightly. Fig. 4 is an elevation of one of the improved spokes.

In the drawings A represents a tube, counter-bored at its ends in order to form shoulders *a*, and B, B, represent rings fitted in the counter-bores of the tube and against the shoulders *a*, and constituting the inner parts of the journal bearings.

C represents the axle, which passes completely through the tube, and is threaded for the reception of nuts D that constitute the outer parts of the journal bearings, anti-friction balls E being interposed between the two parts of each bearing, in customary manner. This tube A constitutes the hub of the wheel, and between the two journal bearings it is provided with a number of perforations F for receiving the inner ends of the spokes G. It will be observed that it would not be possible to use a hub of this description with headed spokes, because it would not be possible to reach the perforations from the inside of the

hub and pass the spokes outward through them. According to the present invention each of the spokes has its inner end off-set and is without any lateral enlargement that will prevent its being passed through the opening of the hub—that is to say, it is bent at *g* so as to provide a portion *g'* that extends laterally with relation to the main portion of the spoke, and is bent again at *g''* so that the projecting end *g'''* extends laterally with relation to the portion *g'* and in the direction of the length of the main portion of the spoke. In order to apply the spoke thus constructed to the hub, it is placed in such position that the portion *g'''* is substantially radial with relation to the hub, and said portion is inserted in one of the perforations F as far as it will go. The spoke is then moved to such a tangential position that the portion *g'* is substantially radial with relation to the hub, and this portion *g'* is then forced into the perforation as far as it will go. The spoke is then moved to the desired tangential position, bringing the projecting end *g'''* to bear against the inner surface of the hub. The outer screw-threaded end of the spoke is then inserted in the appropriate nipple I of the rim J, and said nipple turned onto the spoke until the proper tension is reached.

In a wheel constructed in accordance with the present invention, as with other wheels having tangential spokes, equal numbers of spokes are arranged to project in opposite directions. I prefer to arrange the perforations F in four rows, each row occupying an independent plane that is perpendicular to the axis of the hub, and I prefer to arrange all of the spokes that project in one direction in one of the series of holes, and the spokes that project in the opposite direction in the other series, at each end of the hub. I prefer also to arrange all of the spokes that project in one direction in the two inner series of holes, and all of the spokes that project in the other direction in the two outer series of holes. The two series of holes at each end of the hub may be placed in planes so close together that the crossing spokes will have contact with each other, but I prefer to locate them at such distance apart that the spokes do not touch.

Figs. 1 and 2 show the invention in its pre-

ferred form. I desire to have it understood however, that a spoke of the construction above described may be used in connection with a hub of any desired construction, as the peculiar shape of the inner end of the spoke is
 5 designed simply to dispense with the customary enlargement or head. In this connection I have shown in Fig. 3 a hub of well known construction, having a flange K per-
 10 forated in the customary manner, and I have also shown a number of spokes, constructed as above described, applied to this hub.

Having thus described my invention, the following is what I claim as new therein and
 15 desire to secure by Letters Patent:

1. As a new article of manufacture, a spoke for wheels, consisting of a rod or wire having its inner end bent in two directions, forming a portion g' that extends laterally with rela-
 20 tion to the main portion of the spoke, and a portion g^3 that extends in the direction of the length of the main portion of the spoke and laterally with relation to the portion g' , the extremity of the spoke being without lateral
 25 enlargement substantially, as set forth.

2. In a wheel, the combination with a hub having a number of perforations, and a rim, of a number of spokes arranged tangentially with relation to the hub, the inner end of each
 30 of said spokes having a portion g' which extends laterally with relation to the main portion of the spoke and occupies a perforation of the hub, and a portion g^3 which extends in the direction of the length of the main por-
 35 tion of the spoke and laterally with relation to the portion g' and is adapted to have contact with the hub and prevent the portion g^3 from being withdrawn, the extremity of the spoke being without lateral enlargement, sub-
 40 stantially as set forth.

3. In a wheel the combination with a hollow hub, having a number of perforations, and a rim, of a number of spokes arranged tangentially with relation to the hub, the in-
 45 ner end of each of said spokes having a portion g' which extends laterally with relation to the main portion of the spoke and occupies a perforation of the hub, and the portion g^3 which extends in the direction of the length

of the main portion of the spoke and laterally 50 with relation to the portion g' and is adapted to have contact with the inner surface of the hub and prevent the portion g' from being withdrawn, the extremity of the spoke being without lateral enlargement, substantially as 55 set forth.

4. In a wheel the combination with a hub, consisting of a tube having in the tubular portion thereof and near its opposite ends a number of perforations arranged in series, a pair of journal bearings arranged outside of said series of perforations, a rim, and a number of tensile spokes having their inner ends inserted in said perforations, and their outer ends secured to the rim, substantially as set 65 forth.

5. In a wheel the combination of a hub, consisting of a tube having in the tubular portion thereof and near its opposite ends two series of perforations, each series occupying 70 an independent plane, a rim, and a number of tangential spokes having their outer ends secured to the rim, and having their inner ends inserted in said perforations, the several series of perforations being located at such 75 distances apart that the spokes do not have contact with each other, substantially as set forth.

6. In a wheel the combination of the tube A, having a number of perforations F, rings 80 B fitting in said tube near its outer ends and forming the inner parts of the journal bearings, the axle C extending through the tube, the nuts D carried by said axle and forming the outer parts of the journal bearings, the 85 rim J, and a number of tangential spokes G, each of said spokes having its inner end bent to form the portion g' extending laterally with relation to the main portion of the spoke and occupying one of said perforations, and a por- 90 tion g^3 extending laterally with relation to the portion g' and adapted to have contact with the inner surface of the tube, substantially as set forth.

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