(No Model.) 2 Sheets—Sheet 1.

E. G. LATTA.

VELOCIPEDE WHEEL.

No. 382,885. Patented May 15, 1888.

Fig. 1.

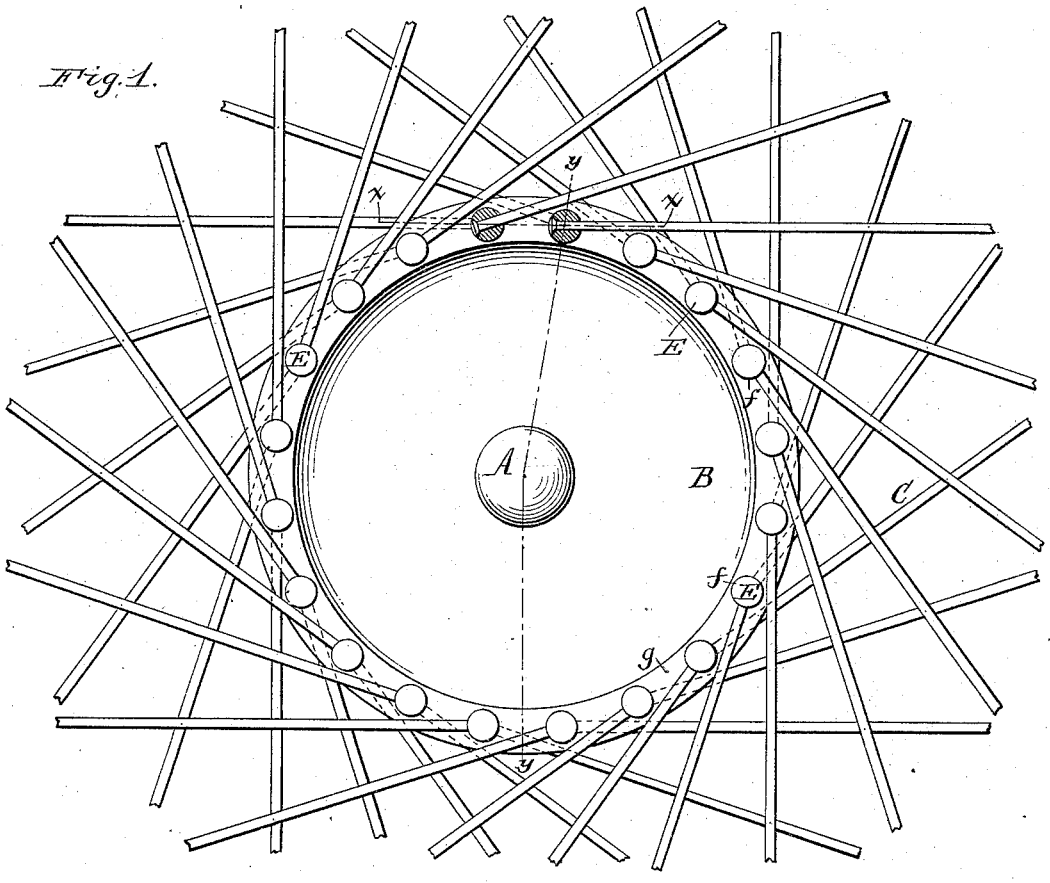


Fig. 2.

Fig. 3.

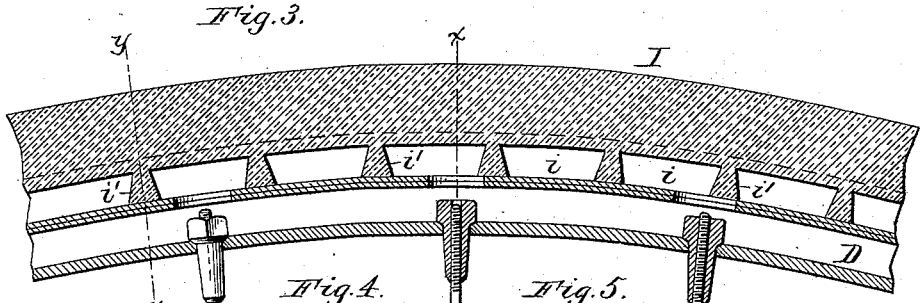
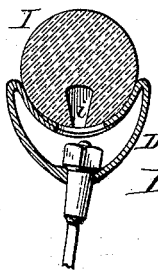


Fig. 4.

Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

E. G. LATTA.

VELOCIPEDE WHEEL.

No. 382,885. Patented May 15, 1888.

Fig. 6.

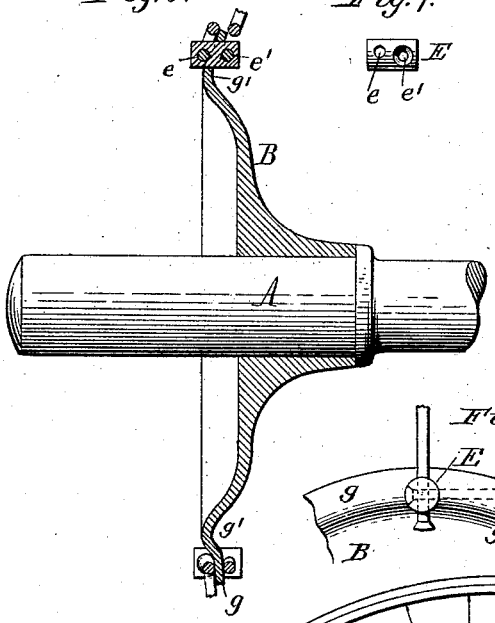

Fig. 7.

Fig. 8.

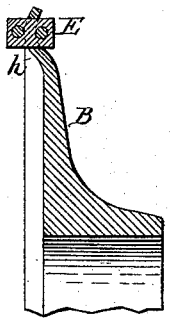

Fig. 9.

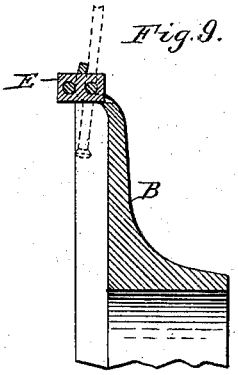

Fig. 10.

Fig. 11.

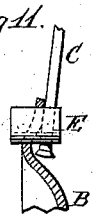

Fig. 12.

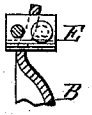

Fig. 13.

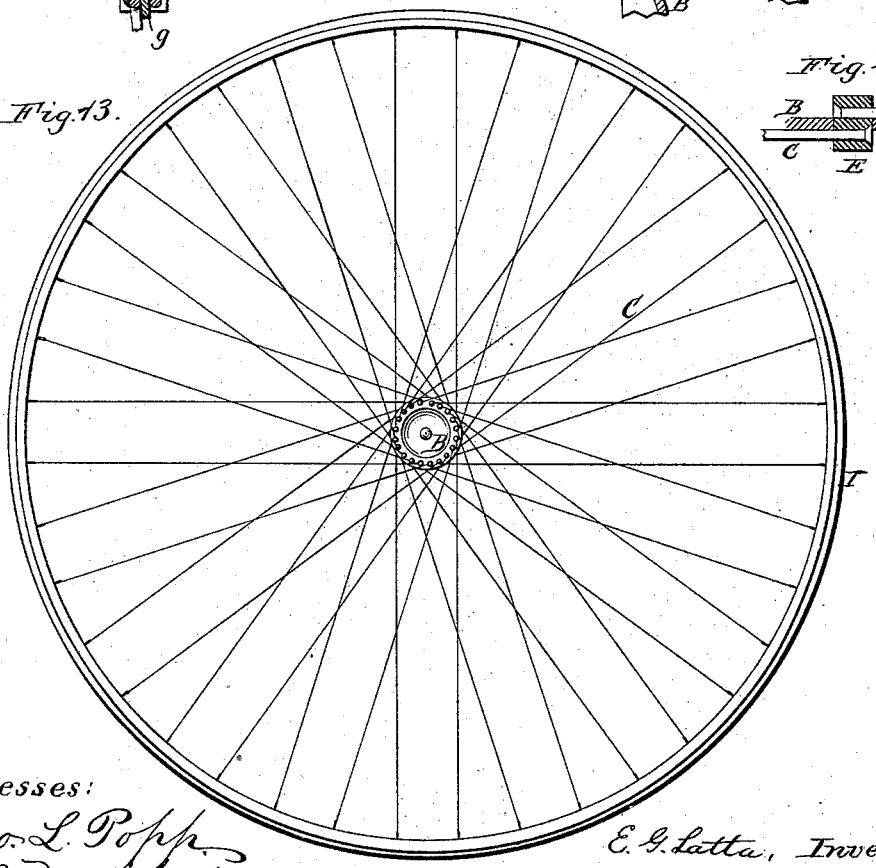

Fig. 14.

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UNITED STATES PATENT OFFICE.

EMMIT G. LATTA, OF FRIENDSHIP, NEW YORK, ASSIGNOR TO THE POPE MANUFACTURING COMPANY, OF PORTLAND, MAINE.

VELOCIPEDE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 382,885, dated May 15, 1888.

Application filed September 16, 1887. Serial No. 249,853. (No model.)

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, of Friendship, in the county of Allegany and State of New York, have invented new and useful Improvements in Velocipede-Wheels, of which the following is a specification.

This invention relates to an improvement in velocipede-wheels, and has for its object to construct a light and rigid wheel which can be produced at comparatively small expense, and in which the spokes are secured to a light hub-flange without bending the spokes or forming screw-threads on the inner ends thereof, which tend to reduce the strength of the wheel.

The invention has the further object to reduce the weight of the tire and increase its efficiency.

The invention consists of the improvements in the construction of the wheel, which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary side elevation of my improved wheel, showing two of the spoke-couplers in section. Fig. 2 is a horizontal section in line *x x*, Fig. 1. Fig. 3 is a fragmentary vertical section of the rim and tire. Figs. 4 and 5 are cross-sections in lines *x x* and *y y*, Fig. 3, respectively. Fig. 6 is a vertical section of the hub-flange in line *y y*, Fig. 1. Fig. 7 is an elevation of one of the spoke-couplers. Figs. 8 and 9 are vertical sections of modified forms of the hub flange. Fig. 10 is a fragmentary inside view of the hub-flange, showing the manner of attaching the spokes to the couplers. Fig. 11 is a fragmentary vertical section of the hub-flange, showing the position of the coupler for inserting the spoke. Fig. 12 is a similar view showing the position of the coupler when the spoke is in its proper position. Fig. 13 is a side elevation of the wheel. Fig. 14 is a vertical section of a modified form of the hub-flange.

Like letters of reference refer to like parts in the several figures.

A represents the axle, B one of the hub-flanges secured thereto, C the tangential spokes, and D the rim. The outer ends of the spokes are secured to the rim by screw-nipples, or in any other suitable manner. The inner ends of the spokes are secured to the hub-flange by straight couplers E, which are seated in openings *f*, formed in the outer portion of the hub-flange parallel with the axle A. Each coupler E supports two spokes and is provided with two diametrical openings, *e e'*, arranged on opposite sides of the hub-flange and receiving the headed ends of the spokes. The openings *e e'* are countersunk at one end, so as to receive the heads of the spokes, and are arranged at a slight angle to each other to permit the spokes to pass outwardly without striking the next adjacent coupler. The spokes on the inner side of the flange pass outwardly from the couplers at an angle to the spokes on the outer side of the flange in an opposite direction therefrom. The distance between the two openings *e e'* of each coupler is equal to the thickness of the hub-flange, so that the two spokes rest against opposite sides of the hub-flange and prevent the coupler from slipping in the opening *f*.

The marginal portion *g* of the hub-flange, in which the openings *f* for the reception of the couplers are formed, is curved or corrugated concentric with the axle, as shown in Fig. 6, so as to increase the width of the bearing-surface of each coupler in its opening *f* and to form an annular groove or depression, *g'*, within the annular row of couplers, which permits the insertion of the spokes into the couplers.

The spoke arranged on the outer side of the hub-flange is first inserted into the outer opening, *e*, of the coupler E, and the coupler is then placed into the opening *f* and turned in the latter, so that the countersunk end of the inner opening, *e'*, stands opposite the depression *g'* and opens into the same, as shown in Figs. 10 and 11. The spoke on the inner side of the hub-flange is next inserted into the inner opening, *e'*, of the coupler and drawn into its seat, the groove *g'* permitting this insertion of the spoke. The coupler is then turned so as to bring the spoke into its proper position. In this position of the coupler a portion of the head of the spoke projects into the opening *f*, as shown in Figs. 2 and 12, and bears against the adjacent portion of the hub-flange, thereby securely holding the head in its seat.

By corrugating or curving the hub-flange, as

above described, the flange can be made thin and light, which enables the two sets of spokes to be placed more nearly in the same plane than by employing a flat and thick flange of the same strength.

In the modified construction shown in Fig. 8 the hub-flange is bent or curved outwardly farther than in the construction shown in Fig. 6, so as to form an annular depression, *h*, on the outer side of the flange. The opening *f* is formed in this bent portion of the flange. In this case the coupler, with the inner spoke attached thereto, is inserted into the opening *f* from the inner side of the hub-flange. The outer spoke is drawn through the outer opening in the coupler by turning the latter so that its outer opening stands in line with the depression *h*. The coupler is then turned, as before described, whereby the spoke-head is firmly held in its seat in the coupler.

In the modified construction shown in Fig. 9 the outer edge of the hub-flange is bent or curved externally still farther than in Fig. 8, which enables both spokes to be inserted into the coupler from the outer side of the hub-flange, the opening in the hub-flange permitting the inner spoke to be drawn into its seat in the coupler through said opening.

It is obvious that the hub-flange may be made flat where the couplers are seated in the same, as shown in Fig. 14, in which case the heads of the spokes resting against the outer side of the flange are flattened. The spoke with the flattened head is inserted into the outer opening of the coupler after the inner spoke has been inserted through the inner opening and the coupler has been inserted in the opening of the flange.

My improved wheel is a true tangent wheel, the spokes passing forwardly from one coupler forming a straight line with the spoke passing backwardly from the next adjacent coupler, said line being at right angles to a radial line passing through the center of the wheel and midway between the two couplers, as clearly shown in Figs. 1 and 13.

I represents the rubber tire, which is seated in the rim D and provided on its inner surface with a series of longitudinal depressions or recesses, *i*, which are separated by intermediate solid portions, *i'*, as shown in Fig. 3. These recesses render the tire lighter and more elastic than a solid tire of the same size. The solid portions *i'* impart a varying elasticity to the tire, which is so slight as to be imperceptible to the rider, but yet sufficient to allow the tire to flatten more between the solid portions than directly upon the latter, whereby the tire is prevented from slipping upon the ground. The solid portions also prevent the recesses from closing up after long use, as would be the case if the tire were formed with a continuous groove. The recesses *i* are molded into the tire and may be of any desired form or size. They are preferably enlarged in width toward the tread of the tire, as shown in Fig. 5, to better enable the cement to hold the tire in place and prevent the cement from filling the openings. This construction of the tire effects a saving of rubber which more than compensates for the extra expense of manufacture.

I am aware that tangential spokes have been secured to a plain hub-flange by screwing them into a series of pins projecting from opposite sides of the hub-flange; also, that the spokes have been secured each to a stud countersunk into the hub-flange and each supporting one spoke. I am also aware that a rubber tire having longitudinal grooves arranged side by side on its inner surface is not new, and I do not claim either of these constructions.

I claim as my invention—

1. The combination, with the hub-flange and two spokes headed at their inner ends, of a straight cylindrical coupler seated in an opening in the hub-flange and provided on opposite sides of the hub-flange with countersunk openings in which the headed ends of the spokes are seated, the spokes resting against the flange and the inner side of the spoke-head resting inside the flange, substantially as set forth.

2. The combination, with the spokes and the hub-flange bent or corrugated near its outer edge, of couplers seated in said corrugated portion of the hub-flange and supporting the inner ends of the spokes, substantially as set forth.

3. The combination, with the wheel-rim, of a flexible tire provided on its inner surface with a peripheral series of depressions or recesses separated in the longitudinal direction of the tire by inwardly-projecting transverse solid portions, whereby the tire is composed of alternate portions having the full cross-section of the tire and grooved portions of greater flexibility, substantially as set forth.

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