

(No Model.)

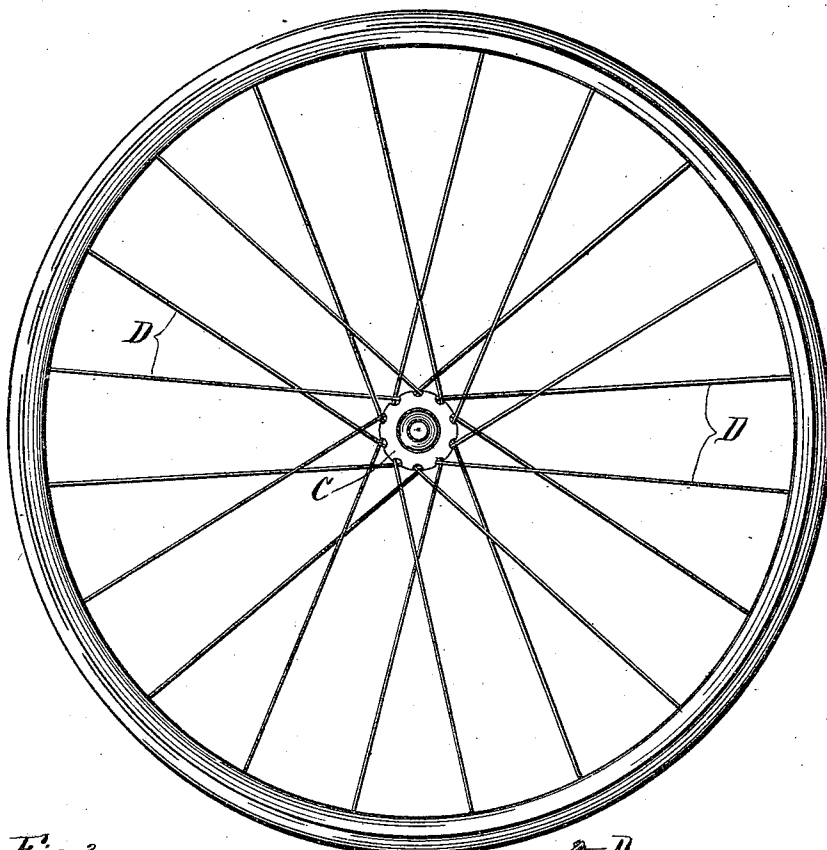
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W. J. EDWARDS.  
VELOCIPED WHEEL.

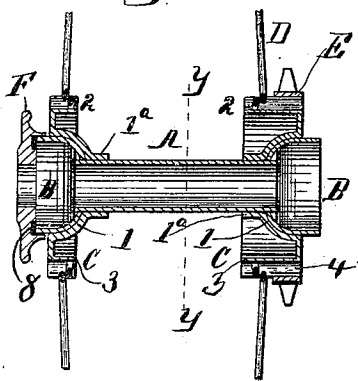
No. 470,185.

Patented Mar. 8, 1892.

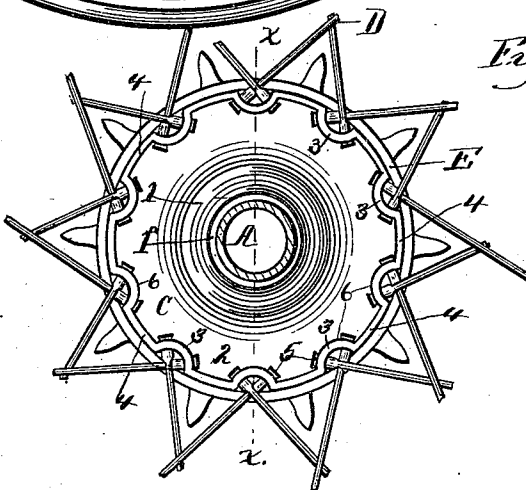
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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(No Model.)

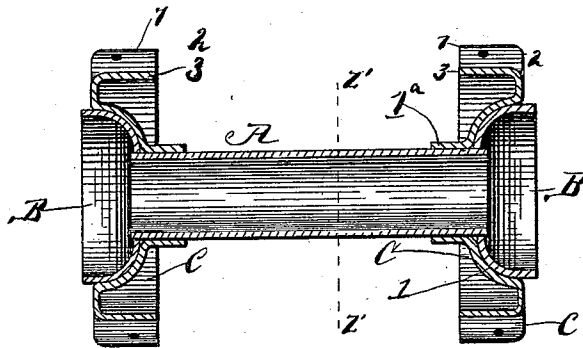
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W. J. EDWARDS.  
VELOCIPED WHEEL.

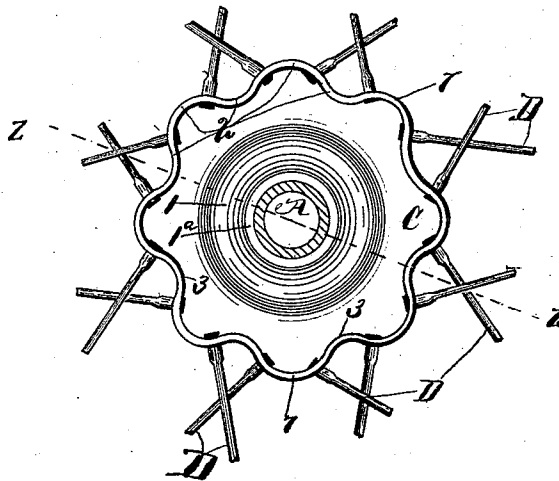
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

WILLIAM J. EDWARDS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNION  
MANUFACTURING AND PLATING COMPANY, OF SAME PLACE.

## VELOCIPEDE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 470,185, dated March 8, 1892.

Original application filed March 10, 1891, Serial No. 384,436. Divided and this application filed November 5, 1891. Serial No. 410,929. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. EDWARDS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Velocipede-Wheels, of which the following is a specification.

This application is made as a division of my application for Letters Patent of the United States, Serial No. 384,436, filed March 10, 1891, and relates to velocipede-wheel hubs of that class in which the hub comprises in its construction an annular spoke-holding plate or disk having a marginal flange to which the spokes are attached. In said construction of hub it has been proposed to form the marginal flange of the disk or plate with a series of outwardly-extending arch-shaped projections formed by pressing the rim outwardly at intervals, and to attach the spokes either to such arch-shaped portions of the flange or to part cylindric portions of the rim left between the arch-shaped portions, and then bend the spokes so that they shall rest against the outer sides of the convex bearing-surfaces formed by the arched portions of the flange and extend tangentially to said convex bearing-surfaces.

In carrying out my invention I provide the annular peripherally-arranged flange of a spoke-holding plate with a series of arch-shaped depressions by depressing the flange at intervals inwardly—that is to say, toward the center of the hub—in contradistinction to the aforesaid mode of pressing the flange outwardly at intervals, and for each of such inwardly-extending depression or arch provide a pair of spokes which are attached to the said inwardly-arched portion and arranged to cross one another at a point opposite the space formed by the concavity in the outer surface of the rim and on a line extending diametrically from the center of the hub through the middle of the inwardly-extending arch, by which arrangement I not only secure the full benefit of the strength of the arch to resist strain, but also avoid bending the spokes and thereby permit them to be applied and removed with ease. I also avoid placing the holes for the spokes undesirably

close together and further arrange the spokes so that their lines of pull shall be in directions tending to close the inwardly-extending arches in place of in directions tending to open the same; and as a further matter of improvement I arrange these inwardly-projecting arches or depressions to alternate with outwardly-projecting portions, and also provide certain matters of further improvement in the hub, as hereinafter set forth.

Certain further objects of my invention are to provide a light, simple, economical, and durable construction of hub, to permit the wire spokes to be readily applied and removed, to so construct the hub and apply the spokes as to provide an exceedingly durable and at the same time simple construction, to provide a simple, effective, and convenient arrangement of dust-guard, and to provide certain novel and improved details serving to facilitate the manufacture and increase the efficiency of velocipede-wheels.

To the attainment of the foregoing and other useful ends my invention consists in matters hereinafter set forth.

In the accompanying drawings, Figure 1 represents in elevation a velocipede-wheel embodying my invention. Fig. 2 represents, on a somewhat larger scale, a central longitudinal section through the hub, the plane on which the section is taken being indicated by the dotted line *xx* in Fig. 3. Fig. 3 shows, on a slightly-larger scale, a section through the hub on line *yy* in Fig. 2. Fig. 4 is a longitudinal section through the hub, particularly adapted for the front wheel of a bicycle, it being understood that the hub shown in the preceding figures is particularly adapted for the rear or driving wheel, the section on which Fig. 4 is taken being indicated by line *zz* in Fig. 5. Fig. 5 is a section on line *z'z'* in Fig. 4.

The hub illustrated in Figs. 2 and 3 comprises a sleeve or table A, through which the axle is understood to extend, cup-bearings B, secured upon the ends of the sleeve or tube and adapted to receive the usual sets of anti-friction balls, and annular spoke-holding plates C, fitted and secured upon the cup-bearings and sleeve and adapted to receive

and hold the inner ends of the wire spokes D. Each spoke-holding plate is formed or provided with an annular inner flange and an outer annular flange. The annular inner flange is shaped to fit the cup bearing and a portion of the sleeve, substantially as shown, and hence is formed with an annular concaved portion 1, which fits the cup-bearing, and with a cylindrical neck 1<sup>a</sup>, which fits upon the sleeve, and the outer flange 2 is provided with openings for the inner ends of the wire spokes.

The outer or peripheral flange 2 of the spoke-holding plate is provided at intervals with the inwardly-depressed portions 3, which form along the flange a series of concavities alternating with its part-cylindric plane-surface portions 4. These depressed portions of the flange are formed on the arcs of circles, and hence may be termed "part-circular depressions," it being observed that the centers of such circles are on or outside of the general circle on which the plane-surface portions 4 are formed. Each part-circular inwardly-depressed portion 3 provides a bearing for the inner ends of two wire spokes which are fitted within holes in the said bearing and arranged to cross one another, as in Fig. 3, wherein the spokes of any one pair cross one another on a line radiating from the center of the hub and passing through the middle of the arched depression, to which such spokes are allotted. The provision of the part-circular depression 3 permits the holes formed therein for a couple of spokes to be set sufficiently far apart to avoid weakening the flange, and the holes are formed in the same directions, which permit the two spokes to cross one another adjacent to the flange, and also permit each spoke to "radiate" (so to speak) perpendicular to the inner wall of the depression—that is to say, each spoke is substantially perpendicular to a line or chord taken from one end to the middle of the depression. The inner ends of the spokes are provided with heads 5, formed by enlargements, nuts, or the like, and these said heads are held against what may be termed the "inner bowed" or "arched" sides 6 of the depressions 3, respectively at opposite sides of the middle of the arch, in which way the pull will be in a direction tending to close or crush the arch instead of in a direction tending to open the same, and hence such pull will be effectively resisted by the arch, which of course involves great strength.

In Figs. 4 and 5 the several parts of the hub are formed as hereinbefore described, and are correspondingly lettered, with the exception that in place of the plane-surface portions 4 of Figs. 2 and 3 the flange 2 is bent outwardly to form the outwardly-projecting arched portions 7, which alternate with the inwardly-projecting arched portions 3. The inwardly-projecting arched portions 3, however, correspond with the inwardly-projecting arched

portions 3 of Figs. 2 and 3, and the wire spokes D are secured to them in the same way as in said preceding figures.

In Figs. 2 and 3 the plane-surface portions 4 form bearings for a sprocket-ring E, and hence the hub therein shown is adapted for the rear driving-wheel.

In Figs. 4 and 5 the outer flange is formed with a series of reverse part-circular curves, and the hub thus constructed is more particularly designed for the forward wheel of a bicycle or other wheel of a velocipede, which is not to be provided with a sprocket. It will also be seen that the spokes can be readily inserted through the holes in the flange from the inner side of the latter, and also readily removed, should they require such removal.

Each cup-bearing can be closed by an end cap F, having an annular groove 8, which is filled with paraffine or other suitable packing. These caps can be secured on the axle and set up so as to permit their packings to receive the outer end edges of the cup-bearings, and thus provide effective dust-guards, it being observed that one of such end caps is shown in Fig. 2.

What I claim as my invention is—

1. A wheel-hub for a velocipede, comprising a spoke-holding plate having an annular peripherally-arranged flange formed with a series of part-circular depressions 3, extending inwardly toward the center of the hub and forming inwardly-projecting arches 1, which provide the flange with a series of part-circular concavities in its outer peripheral side, and straight wire spokes D, arranged in pairs with the two spokes of each pair held in the opposite sides of one of said inwardly-projecting arches and arranged to cross one another outside of the flange at a point opposite the spaces formed by the part-circular concavity in the outer side of the flange, substantially as and for the purpose described.

2. The driving-wheel hub of a velocipede, comprising a spoke-holding plate having an annular flange formed with part-cylindric plane-surface portions 4, alternating with depressed portions 3, wire spokes held in the said depressed portions, and a sprocket-ring fitted upon the plane-surface portions 4, substantially as described.

3. A velocipede-wheel hub comprising an annular plate having a flange formed with a series of part-circular inwardly-extending concave depressions 3, and outwardly-extending and correspondingly-formed projections 7, alternating with one another, and straight wire spokes D, secured in the depressed portions and crossing in pairs at points opposite the spaces formed by said concavities in the outer peripheral side of the flange, substantially as set forth.

4. A velocipede-wheel hub comprising the sleeve A, cup-bearings B, rigid on the ends of the sleeve, and plates C, formed with inner flanges, annular concave portions 1, which fit

the cup-bearings, necks 1<sup>a</sup>, which fit the sleeve, and outer flanges 2, which are provided with holes for the wire spokes.

5 5. A velocipede-wheel hub comprising a tube A, cup-bearings B, fitted upon the ends of the tube, plates C, having inner annular concave portions 1, which fit the cup-bearings, neck 1<sup>a</sup>, which fits the sleeve, and outer flanges 2, formed with depressions 3, con-

stituting inwardly-projecting arches, and 10 straight spokes D, crossing one another in pairs, one pair being allotted and secured to each inwardly-projecting arch, substantially as described.

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