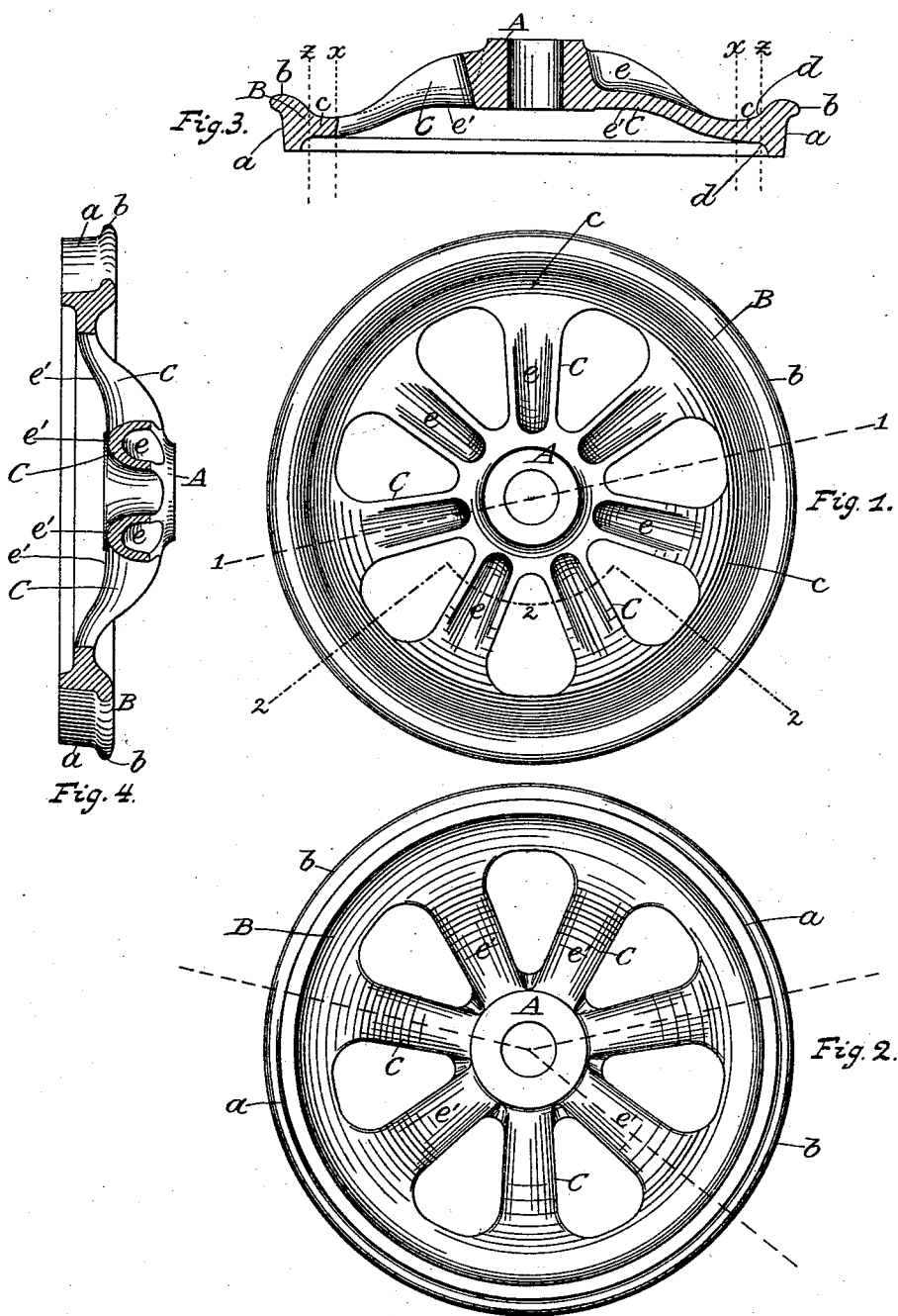


(No Model.)

W. HAILES, Dec'd.
W. H. & F. A. HAILES, Executors.
CAR WHEEL.

No. 506,850.

Patented Oct. 17, 1893.



Witnesses.
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CAR-WHEEL.

SPECIFICATION forming part of Letters Patent No. 506,850, dated October 17, 1893.

Application filed December 3, 1891. Serial No. 413,907. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HAILES, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Car-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.

My invention relates to improvements in open work cast iron car wheels and consists in a car wheel embodying the elements and parts hereinafter particularly described and specifically set forth in the claims.

The object of my invention is to produce an open work cast iron car wheel, having its rim connected with the hub by means of a web which is concentric with the hub and rim and is continuously integral with the latter, at about midway between the face and rear sides of said rim, and also integral with a series of spokes or arms which are of ogee form in direction of their length and are each corrugated lengthwise by a single corrugation, commencing at the hub with great depth and gradually lessening and becoming flattened at their points of union with the said concentric web; whereby the arms and spokes will be made stiff and strong to resist both vertical and lateral strain when the wheel is in service, and be free from liability to crack or fracture in any part, or at their points of junction with the hub and with the concentric web joining with the rim. I attain these objects by the means illustrated in the accompanying drawings forming a part of this specification in which—

Figure 1. is a view of a wheel, from its rear side embodying the improvements in this invention. Fig. 2. is a view of the same from its face side. Fig. 3. is a sectional view taken at line 1. 1. in Fig. 1. and Fig. 4. is a sectional view taken at lines 2. 2. in Fig. 1.

The same letters of reference refer to like parts throughout the several views.

In the drawings A is the hub and B is the rim of the wheel, which rim has its portion *a* of chilled metal, and *b* is the flange portion which is chilled in part. The said rim is connected with the said hub by an open work web composed of a ring portion *c*, which I

term the concentric web, and a series of arms or spokes C C. The said ring portion or concentric web *c* is continuous and neighbors the rim B from its inner side, with which side portion it is integral at a line about midway between the face and rear sides of the said rim, as shown in Figs. 3 and 4. This concentric web extends all around from the inner side of the rim B toward the hub to a distance of about two inches, more or less, as from the line of the inner side of the rim, indicated by dotted line *z* to dotted line *x* Fig. 3, and the corners *d d* where this web joins with the rim and made concave for strength of metal at the junction of said web with said rim and for obviating the liability of fracture of the metal at such lines of junction. The arms or spokes C are integral with both the concentric web *c* and hub A and are, in direction of their length, made with an ogee form on both their face and rear sides, but with the curves of the ogee line of the rear sides of these arms or spokes sharper than the curves of the ogee line of the front sides of the same; yet with the outer end curves of both said ogee lines, occurring at the end portions of said spokes neighboring the concentric web *c*, falling in and coinciding with the respective curved lines (in cross-direction) of the rear and front side surfaces of the said web with which the said spokes or arms blend. These spokes or arms C having their respective ogee lines of rear and front sides diverse in respect to the sharpness of their respective curves, are at their points of beginning and junction with the hub of greater depth from front to rear than they are where they terminate and join with the concentric web *c*, as at dotted line *x*, Fig. 3, so that they gradually taper from a thickness of base, from front to rear, which is about equal to the length of the hub, to a thickness equal to the thickness of the concentric web *c* where said arms or spokes join and blend with said web. These tapering ogee form of arms or spokes C are fluted preferably from their rear sides and in direction to their length from the hub to within a short distance of the points of their junction with the web *c*. The channels *e* of these fluted tapering arms or spokes are sunken in them to such a distance as to leave the metal at the ridge sides, as at *e'*, Fig. 4, nearly as

thick as the metal of the concentric web *c*, while the sides of the said channels *e* may be a little less in thickness as shown in said Fig. 4.

- 5 Although an even number, say as six or eight spokes *C* may be employed in the wheel for connecting the rim with the hub; yet for rendering the wheel slightly elastic between its hub and rim I prefer to use an odd number of arms or spokes *C* in the wheel so that 10 no two spokes or arms will extend from the hub to the rim in coinciding lines, drawn through the center of said spokes from the rim to the center of the hub and thence to 15 pass such center to and through an opposite side arm or spoke as when an even number of arms or spokes are used in the wheel. This use of an odd number of arms *C* in the wheel is of great advantage when the metal 20 of the wheel is cooling as the sudden cooling and more rapid shrinking of the metal of the rim than that of the said arms and hub and the later and uneven times of shrinkage of those parts, will not, when an odd number of 25 spokes having an ogee form are used, operate to introduce into the parts of the wheel any strain of tension of metal which is introduced when the spokes are straight and of even number.
- 30 Although the front end of the hub may have its plane on a line near a line of the plane of the face side of the rim of the wheel, yet I prefer to have the front end of the hub set to a line back of the line of the plane of 35 the face side of the rim to a distance at least equal to one half of the width of the face of the tread, and in some cases to a line about corresponding to the line of the plane of the front side of the flange *b* as shown. As the 40 spokes will be in relation to the hub and rim, they connect, inclined and bracing from front to rear sides, which incline and bracing elements add materially to the strength of the wheel for resisting strain while in service.
- 45 Open work wheels, having their arms or spokes made with a tapering ogee form, in direction to their length, and having in them the channels *e* as above described and connecting with the concentric web *c* instead of 50 with the rim itself as heretofore, may be made stronger with the same metal than open work

wheels as heretofore made and the wheel will be free from checks at the points or lines of junction of the spokes with the hub and rim, and will not have on any of the parts that 55 great strain from tension on the metal usually caused by uneven shrinkage of metal as is had in open work wheels as heretofore made. Further this form of construction of the parts as above described obviates the ne- 60 cessity of reinforcing the spokes from either sides by ribs running in direction of the spokes as heretofore in spoke wheels.

Having described my invention, what I claim, and desire to secure by Letters Patent, 65 is—

1. A cast iron open work wheel which has its rim and hub connected by a series of spokes which taper from the hub toward the rim and have their front and rear sides each 70 of ogee form in direction of their length and are integral with the hub and concentric web *c* while web *c* is integral with said rim as and for the purposes set forth.

2. A cast iron open work wheel having the 75 tapering ogee form of spokes *C* which are channeled longitudinally from the hub toward the rim, substantially as and for the purposes set forth.

3. A cast iron open work wheel having its 80 hub set relatively back from the line of the face side of the rim and connected with said rim by a series of channeled tapering ogee form of spokes *C* which are integral with the said hub and the concentric web *c*, with which 85 web the said rim is integral, substantially as and for the purposes set forth.

4. A cast iron open work wheel having the tapering ogee form of spokes, in an odd number, for connecting the rim with the hub, the 90 said spokes being integral with the hub and a concentric web neighboring the rim and integral therewith substantially as and for the purposes set forth.

In testimony that I claim the invention 95 above set forth I affix my signature in presence of two witnesses.

WILLIAM HAILES.

Witnesses:

ALEX. SELKIRK,
FRED. A. HAILES.