2 Sheets—Sheet 1.

D. & A. W. DAVIS.

VEHICLE-WHEEL.

No. 186,812. Patented Jan. 30, 1877.

Fig. 1.

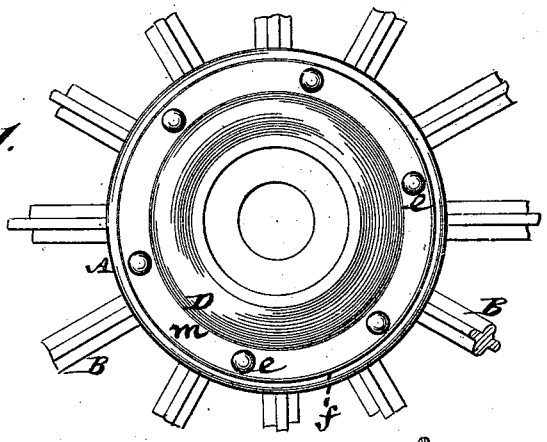


Fig. 2.

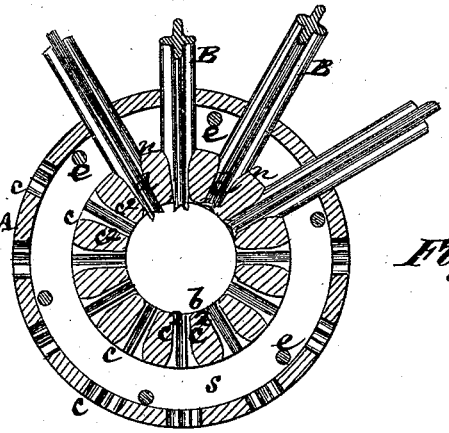


Fig. 4.

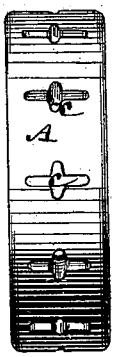
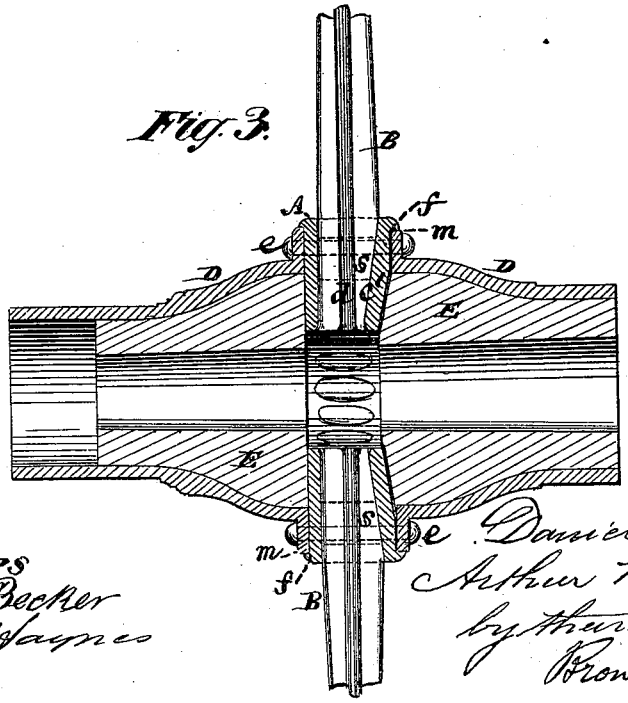


Fig. 3.



Witnesses
John Becker
Fred Haynes

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by their Attorneys
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2 Sheets—Sheet 2.

D. & A. W. DAVIS.

VEHICLE-WHEEL.

No. 186,812. Patented Jan. 30, 1877.

Fig. 5.

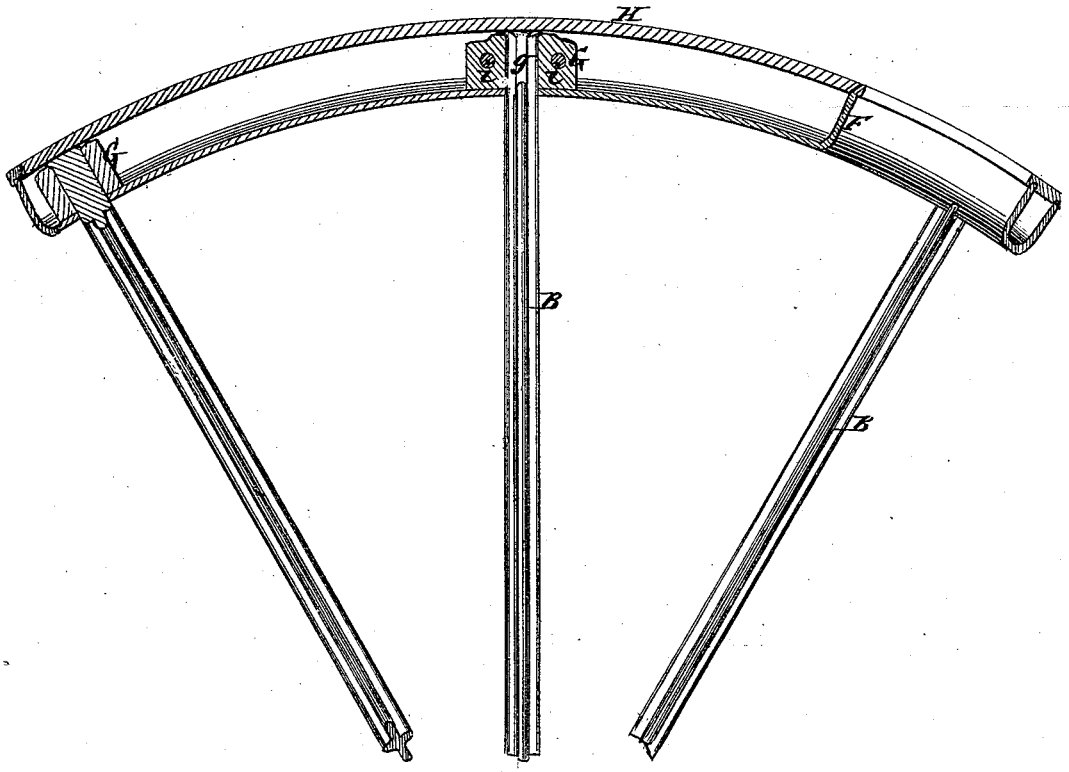


Fig. 6.

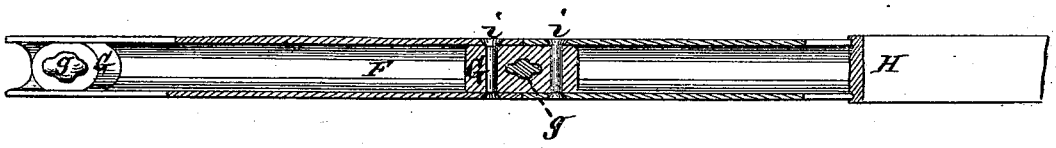
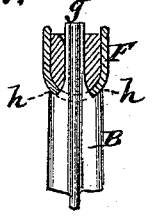


Fig. 7.



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UNITED STATES PATENT OFFICE

DANIEL DAVIS, OF BROOKLYN, AND ARTHUR W. DAVIS, OF FLUSHING, ASSIGNORS TO EDWIN ELDRIDGE, OF ELMIRA, NEW YORK.

IMPROVEMENT IN VEHICLE-WHEELS.

Specification forming part of Letters Patent No. **186,812**, dated January 30, 1877; application filed August 16, 1876.

To all whom it may concern:

Be it known that we, DANIEL DAVIS, of Brooklyn, in the county of Kings and State of New York, and ARTHUR W. DAVIS, of Flushing, in the county of Queens and State aforesaid, have invented certain new and useful Improvements in Wheels for Carriages and other Wheel-Vehicles, of which the following is a specification:

This invention has for its object the production of a wheel applicable to wheel-vehicles of various kinds, in which lightness and neatness are combined with cheapness, solidity, and strength.

One part of the invention relates to the construction of the hub, and of the spokes at their entry, within the latter, and mode of fitting and securing the ends of the spokes in the hub.

The invention consists in a metallic hub center-piece, having an open eye and radial mortises of a tapering construction on certain of their sides, in combination with metal spokes, of a cross shape in their transverse section, made tapering at their inner ends to correspond with the mortises in the center-piece, within and through which they are projected or driven, and riveted within the center-piece to hold them securely in place. The invention also consists in a combination, with a metallic-hub center-piece for holding the spokes, of independent flanged metallic shells secured on opposite sides of the center-piece, and, in connection with a wooden filling and the center-piece, serving to form the hub, when said shells are secured not only by bolts or rivets passing through their flanges and through the metallic center-piece, but are made to rest by their flanges within recesses in the faces of the center-piece, whereby the bolts or rivets are relieved of strain.

Another part of the invention relates to the connection of the spokes with a hollow metallic felly, and consists in a combination of metallic blocks or filling-pieces within the felly, and metallic spokes having their outer ends formed with tapering tenons, made to enter through said blocks, and riveted down on the same; also, having shoulders which hug the felly, the whole being arranged so that when the tire is applied it rests on or covers the blocks and outer ends of the tenons, and the blocks or certain of them also serve, by means of rivets passing through them and the felly, to unite the felly-sections.

Figure 1 represents a side view of a wheel-hub, constructed in accordance with the invention, and having the inner ends of the spokes secured therein. Fig. 2 is a central transverse section of the same, Fig. 3 a longitudinal section thereof, and Fig. 4 an edge view, of the metallic center-piece of the hub. Fig. 5 is a partially sectional side view of the felly portion of the wheel, in part, and certain of the spokes as secured therein; Fig. 6, a broken and partially sectional outer edge view of the same; and Fig. 7, a transverse section, in part, through one of the blocks or filling-pieces in the felly.

A is the metal center-piece of the hub, having an open eye, *b*, through it, and radial mortises *c* for reception of the spokes, which mortises may be interrupted by an annular reduction, *s*, to lighten the center-piece. The mortises *c* are of the same general contour in their transverse section as the metal spokes B, which it is preferred to make of steel rolled to form ribs, and giving to the spokes a cross shape in their transverse section. This form of spoke combines lightness with strength; but it has heretofore been found very difficult to give it a close fit in all directions within the hub by reason of irregularity in the mortises of the hub, in which they fit in one or more directions of said mortises. To obviate this the mortises *c* are made tapering in at least two or more directions, as shown at c^1 and c^2, and the inner ends of the spokes B made with tenons *d* to correspond. These tenons terminate in a wedge-shaped shoulder, *n*, at their junction with the bodies of the spokes, and are of a length to project through the mortises *c* slightly into the eye *b* of the center-piece, so that, and by reason of the tapering sides c^1 c^2 of the mortises, the spokes B may be firmly secured in the center-piece A by driving them into the latter while hot, and afterward riveting down the inner ends of the spokes within the walls of the eye, or countersunk inner terminations of the mortises *c*.

By this construction and mode of securing the spokes in the hub, or its center-piece A, all looseness and rattle or shake of them in any direction within the mortises receiving them, after the cooling of the center-piece, are avoided, and a firm hold of them on all their sides is obtained.

D D are the two metallic shells of the hub, arranged on opposite sides of the center-piece A. These shells are formed with outer flanges *m* at their inner ends, through which, and the center-piece A, rivets *e e* are passed to hold the shells to their places on the opposite faces of the center-piece. Said flanges *m* are made to fit within recesses *f* formed by outer rims or projections on the faces of the center-piece, whereby the shells D D are supported, not only by the rivets *e*, but by the walls of the recesses in which the flanges *m* fit, thus relieving the rivets of strain. The shells D D have fillings E E of wood, which may be readily bored to fit variously sized axles or axle-boxes, and whereby the wheel is applicable to vehicles now in use, without changing the axles or axle-boxes.

Although wood is, or may be, thus combined with metal in the construction of the wheel, the latter is to all intents and purposes a light metallic one, the felly or felly sections F also being of metal and made hollow.

To secure the outer ends of the spokes B in this felly, said spokes are not merely constructed with outer tapering tenons *g* and shoulders *h* to pass into the felly, and to bear against it on the exterior of its inner periphery; but solid blocks or filling-pieces G are inserted within the hollow felly, and these blocks made with tapering mortises to correspond with the tenons *g*, so that the blocks may be firmly driven over the tenons *g* within the hollow felly, and the outer ends of the tenons afterward riveted down on or within the blocks, as shown in Fig. 5, and to the left hand of Fig. 6. Thus it will be seen that the spokes of the wheel are riveted to their places at both their inner and outer ends.

The blocks G should be of a capacity equal to the depth and width of the channel in the felly, so that when the tire H is applied it will bear on or closely cover the blocks and outer ends of the spokes, and the blocks will form solid filling-pieces where the spokes enter the felly. At the junction of the felly-sections it is desirable to make said blocks G sufficiently long to admit of rivets *i* being passed through them, and through the adjacent ends of the felly-sections to hold the latter together, and to generally brace or stiffen the wheel.

We claim—

1. A wheel-hub composed in part of a metallic center-piece, A, having an open eye, *b*, and radial tapering mortises *c*, of a cross shape in their transverse section, in combination with the spokes B of a similar transverse configuration, and having tapering tenons *d* riveted to their places within the eye of the center-piece, substantially as described.

2. The combination, with the metallic center-piece A of the hub in which the spokes are secured, of the metallic shells D D, formed with flanges *m m*, arranged to enter and rest within recesses *f f* in the opposite faces of the center-piece A, the bolts or rivets *e e*, and the wooden fillings E E, essentially as shown and described.

3. The combination, with the hollow metal felly F and its tire H, of the filling-blocks G, having mortises through them, and the spokes B formed with tenons *g* made to pass through said mortises, and riveted down on the blocks, also formed with shoulders *h*, which hug the felly, substantially as shown and described.

DANIEL DAVIS.
ARTHUR W. DAVIS.

Witnesses:
MICHAEL RYAN,
FRED HAYNES.