

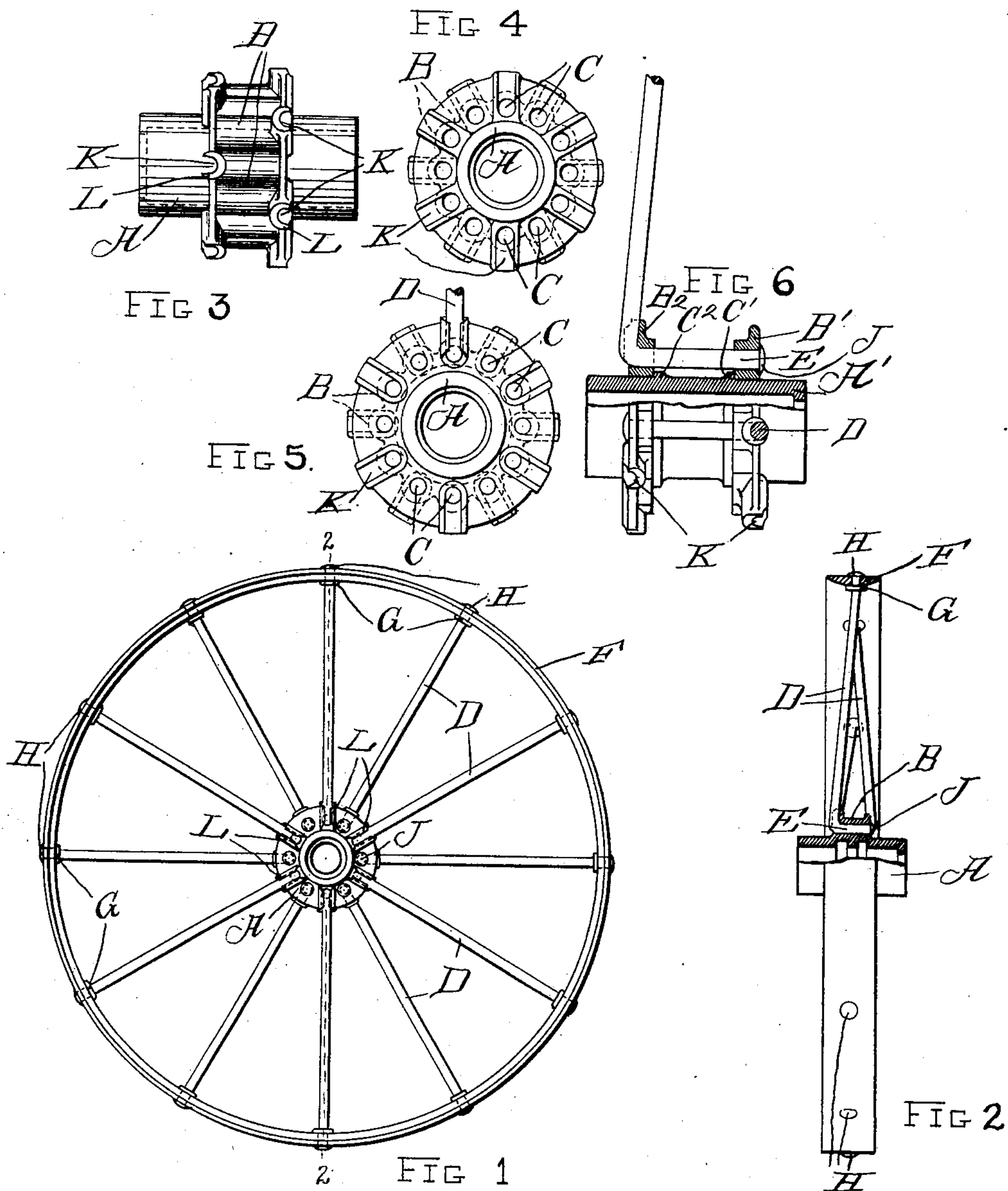
No. 762,403.

PATENTED JUNE 14, 1904.

P. HANSON.  
METAL WHEEL.

APPLICATION FILED JULY 6, 1903.

NO MODEL.



WITNESSES

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# UNITED STATES PATENT OFFICE.

PAUL HANSON, OF ST. PAUL, MINNESOTA.

## METAL WHEEL.

SPECIFICATION forming part of Letters Patent No. 762,403, dated June 14, 1904.

Application filed July 6, 1903. Serial No. 164,450. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL HANSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Metal Wheels, of which the following is a specification.

This invention relates to metal wheels.

The object of the invention is to provide a construction of metal wheels which is simple, economical in manufacture, and efficient in operation.

A further object of the invention is to provide a construction of metal wheels wherein the greatest rigidity and strength are secured with a minimum weight.

A further object of the invention is to provide a construction of metal wheel wherein the spokes are secured to the hub in such relation as to brace and truss the wheel rim or tire and to prevent the same from being bent or deflected laterally out of true position.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation of the metal wheel embodying in its construction the principles of my invention. Fig. 2 is a view, partly in end elevation and partly in vertical transverse section, on the line 2 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a detached detail view of the wheel-hub constructed in accordance with my invention. Fig. 4 is a view in side elevation of the hub shown in Fig. 3. Fig. 5 is a view similar to Fig. 4, illustrating the method of clamping or securing a spoke to the hub. Fig. 6 is a view, partly in side elevation and partly in longitudinal section, of a modified construction of hub embraced within the scope of my invention.

Reference-sign A designates the wheel-hub.

This hub is provided with a flange portion B, through which are formed a series of openings C, said openings extending in a line parallel with the bore or axis of the hub.

D designates the spokes. These are made of steel or other suitable material and at the hub ends thereof are bent into angle portions E, these angle portions or bent ends being arranged to project through the openings C in the hub. In practice I propose to project the bent end portions E of the spokes through the openings C in the flange of the hub in opposite directions or from opposite faces of the wheel-hub flange, as clearly shown in Figs. 1 and 2.

F designates the wheel-rim, to which the outer ends of the spokes are suitably secured and in the same circular path. By this construction it will be seen that adjacent spokes are bent or deflected in opposite directions at their free or rim ends, so as to bring such ends into proper position to occupy the same circumferential path or line.

I preferably form the flange portion B of sufficient width so that its opposite annular faces are a sufficient distance apart to enable the spokes to exert a truss action in holding the rim in position, and in addition the holes in the flange portion are of sufficient length to hold the spokes rigid independent of any other means.

The free ends of the spokes may be secured to the wheel rim or tire in any suitable or convenient manner. I have shown a simple, strong, and durable construction and arrangement for accomplishing this purpose, wherein the outer end of each spoke is shouldered, as indicated at G, such shoulder fitting against the inner surface of the wheel rim, band, or tire F. The extreme outer end of the spoke which extends through the metal rim or tire F is then upset, as indicated at H, thus efficiently binding the tire or rim and the spokes together. By inserting the bent ends of the spokes through the holes C in the flange of the hub in opposite directions and drawing the outer or free ends of the spokes toward each other so as to occupy the same peripheral line the spokes serve as trusses or braces to



strengthen or support the rim or tire and to prevent the same from being laterally bent or deflected out of true circular shape. The bent ends of the spokes may be secured to the hub in any suitable or convenient manner. As shown, the extreme end of the bent portion which projects through the hub-flange is upset, as shown at J. By thus upsetting the extreme end of the bent portion of the spoke the spoke is drawn or held firmly into its bearing in the hole or opening in the hub-flange. If desired, and in order to still further strengthen and brace the spokes and to securely bind the same to the wheel-hub, the side faces of the hub may be provided with seats (indicated at K) to receive the shanks of the spokes at the bends therein or adjacent thereto, and, if desired, these seats may have lips or flanges L, which, in case the hubs are made of malleable iron, may be bent or hammered over upon the shanks of the spokes, as clearly indicated in Figs. 1 and 5, thus securely binding the spokes to the hubs and enabling the spokes to resist lateral strains such as would bend or deflect the rim out of true cylindrical shape.

In Fig. 6 I have shown a slightly-modified arrangement wherein instead of forming the hub-flanges integral with the hub, as shown in Figs. 1, 2, 3, 4, and 5, separate flanges or rings B' B<sup>2</sup> are slipped over the hub portion A' and bear against shoulders C' C<sup>2</sup>, formed on the hub A'. The seats K are formed in the outer faces of the rings or flanges B' B<sup>2</sup> in the same manner as in the case of the flange B. (Shown in Figs. 1, 2, 3, 4, and 5.) By the construction shown in Fig. 6 I am enabled to reduce the weight of the hub without sacrificing anything of strength or rigidity, any strains imposed upon the spokes tending to bend or deflect the same serving to drive flanges B' B<sup>2</sup> toward each other, and hence more firmly binding the spokes and hub portions together. The rings or flanges B' B<sup>2</sup> may be made up in quantities quickly and cheaply and the parts readily assembled.

From the foregoing description it will be seen that I provide an exceedingly simple construction of metal wheel which is economical in manufacture, light, strong, and dura-

ble, and wherein the tire is efficiently and strongly braced and trussed.

A wheel constructed in accordance with the principles of my invention is adapted for use generally with truck-wheels, grain-wheels of harvesting-machines, and the like.

It is obvious that many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a metal wheel, the combination with a hub having a flange, openings formed through such flange, seats formed in the face of such flange, said seats having lips, spokes having their ends bent to extend through said openings, and the shank adjacent to the bend received in said seats, said lips adapted to be bent or hammered over upon the spokes, as and for the purpose set forth.

2. In a metal wheel, a rim, a hub formed to produce on opposite sides thereof a pair of parallel annular faces, a series of holes extending entirely through the hub between said faces, said faces provided with grooves, lips of malleable material upon said grooves, a plurality of spokes having bent ends formed to extend entirely through the hub between the said faces thereof, and means upon the bent ends for drawing the same positively into the holes, whereby the spokes are drawn against the grooves of the faces and into position to be held by the said lips of malleable material, and each spoke is rigidly supported independently of the rim, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 3d day of July, 1903, in the presence of the subscribing witnesses.

PAUL HANSON.

Witnesses:

E. C. SEMPLE,  
S. E. DARBY.