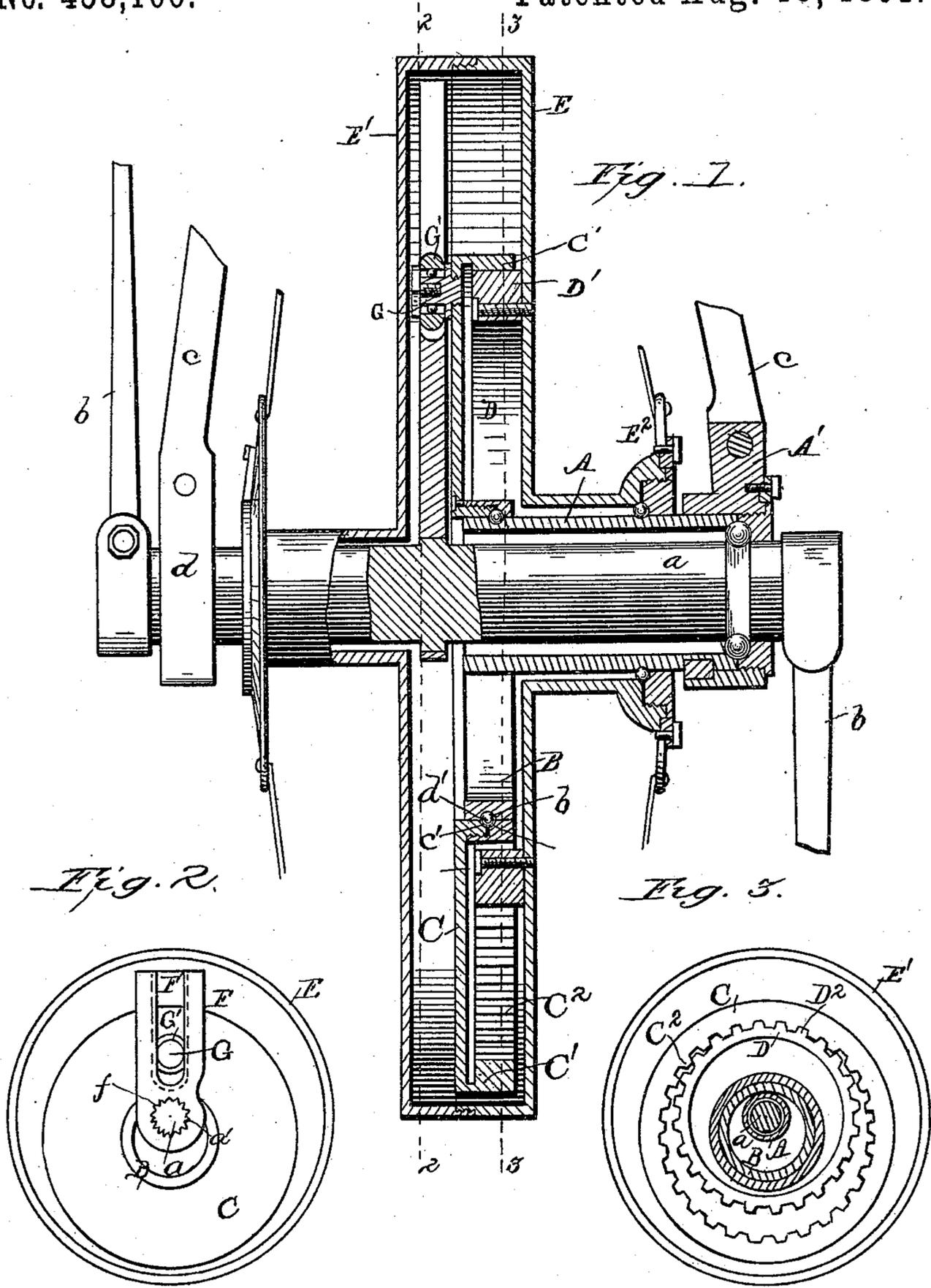


E. H. HATCHER.  
VELOCIPÈDE.

No. 458,106.

Patented Aug. 18, 1891.



WITNESSES:  
*A. J. Schwarz*  
*C. S. Frye*

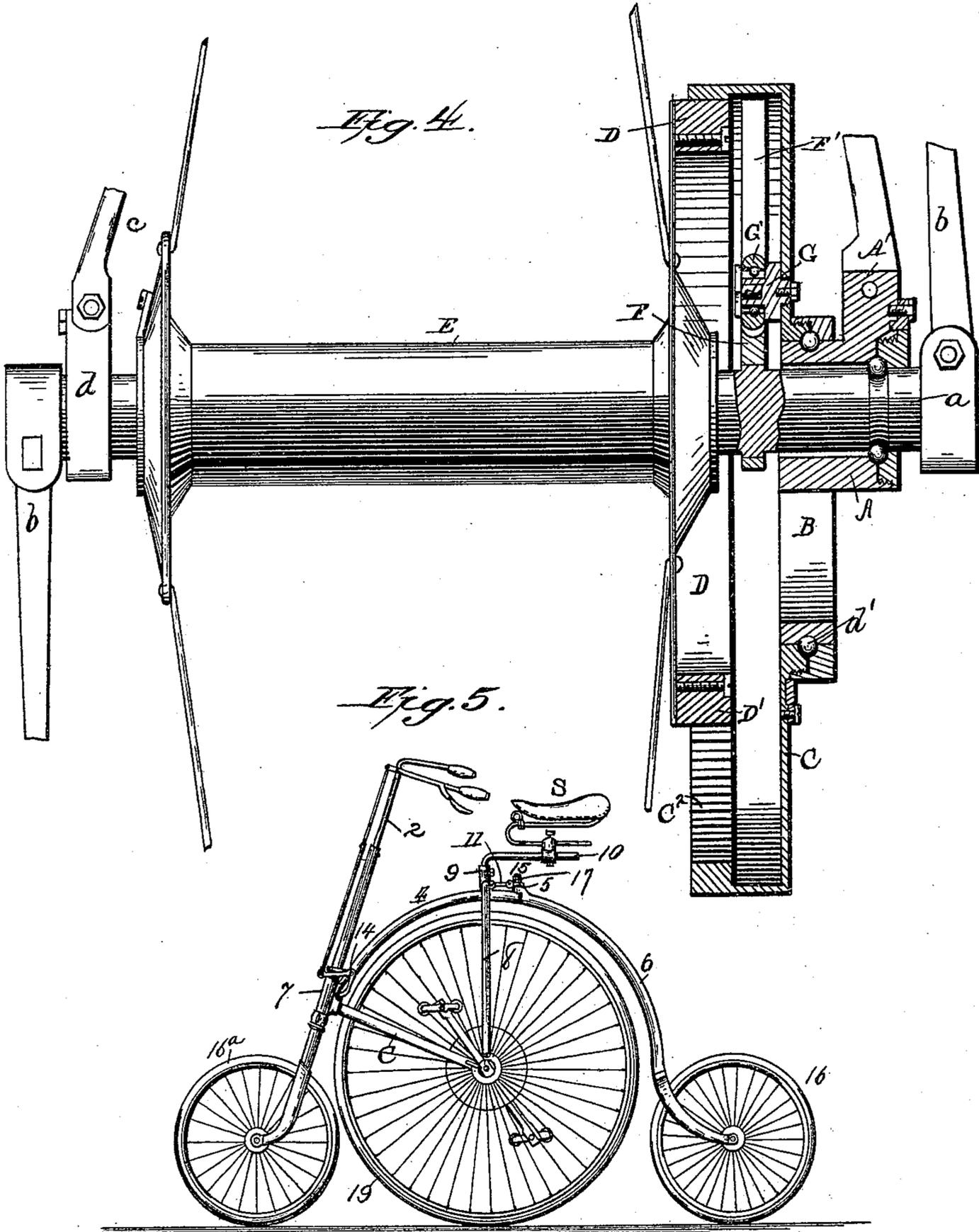
*Edwin H. Hatcher*  
 INVENTOR

BY  
*W. T. H. Herald & Co*  
 ATTORNEY.

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WITNESSES:  
*A. J. Schwartz*  
*J. F. Reily*

INVENTOR  
*Edwin H. Hatcher*  
 BY  
*W. F. Fitzgerald & Co*  
 ATTORNEYS

# UNITED STATES PATENT OFFICE.

EDWIN H. HATCHER, OF NEODESHA, KANSAS.

## VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 458,106, dated August 18, 1891.

Application filed March 24, 1891. Serial No. 386,271. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN H. HATCHER, a citizen of the United States, residing at Neodesha, in the county of Wilson and State of Kansas, have invented certain new and useful Improvements in Tricycles; 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 consists in certain new and useful improvements in bicycles and tricycles, whereby by a novel and peculiar construction I obtain greatly-increased speed with the usual movement of the foot-pedals, causing the main drive-wheel of the bicycle or tricycle to revolve several times for each revolution of the pedal or drive-shaft.

My invention further consists in the peculiar construction and combination of parts of a new and improved tricycle.

My invention will be hereinafter fully described and claimed.

Referring to the accompanying drawings, Figure 1 is a vertical sectional view of my new and improved tricycle. Fig. 2 is a sectional view taken on the plane indicated by line 2 2 of Fig. 1. Fig. 3 is a sectional view taken on the plane indicated by line 3 3 of Fig. 1. Fig 4 is a sectional view of a modification of my invention, showing the multiplying-gear arranged at one end of the wheel-hub outside of the wheel proper. Fig. 5 is a side elevation of my new and improved tricycle.

The same letters and numerals of reference indicate corresponding parts in all the figures.

Referring to the several parts by their designating letters and numerals, *a* indicates the pedal-shaft of my cycle, to the ends of which the pedals *b* are secured.

*c* indicates the fork of the machine, one end of which is secured to the usual collar *d*, in which that end of the pedal-shaft turns, while the other end of the fork is secured to a collar *A'*, keyed on the outer end of a cylinder *A*, which encircles the pedal-shaft at that point, as shown, and within which the pedal-shaft revolves. Upon the inner end of this cylinder is formed or keyed an eccentric disk *B*, and upon the periphery of this disk is mounted and revolves a large annular wheel

*C*. This wheel is grooved at *c'*, and the eccentric disk *B* is grooved at *b'* for the reception of a ball-bearing *d'* between the edge of the disk and the wheel *C*, which causes the latter wheel to run with the minimum of friction. The annular flange *C'* of the wheel *C* extends on one side of the wheel, as shown, and is formed on its inner face with the teeth *C<sup>2</sup>*, which mesh with the teeth *D'* of a small annular wheel *D*, which is secured to the inner side of the hub-casing *E*.

The cylindrical hub of my cycle-wheel is formed at its center with a circular hub-casing formed of two halves or sections *E E'*, the inner meeting ends of these sections being either bolted, riveted, or keyed together, or they may be threaded and screwed together, as shown, while the outer circular ends *E<sup>2</sup>* of the hub have the inner ends of the wire spokes of the main wheel secured in them, as shown. This casing thus forms the hub of the wheel and at the same time completely incloses all the gearing of my cycle, thoroughly protecting it from dirt, dust, or injury of any kind.

The pedal-shaft *a*, at a point within the casing *E E'*, is formed with an annular series of serrations *a'*, and upon it at this point fits a lever-arm *F*, the opening *f* in the inner end of which is serrated to fit the serrations *a'* of the axle. By this peculiar construction the pedal-arm *F* is firmly secured against turning on the axle, and for further precaution it is keyed on by an ordinary key. The outer half of the lever-arm *F* is formed with a longitudinal slot *F'*, the edges of which are preferably curved in cross-section, and in this slot fits and runs a roller or small wheel *G'*. This roller is mounted on the outer part of a heavy pin *G*, which extends from that side of the large annular wheel *C* at the point shown. It will now be seen that in operation as the pedal-shaft is revolved it will revolve the arm *F*, and as the pin *G* of the large wheel *C* fits in the longitudinal slot *F'* of the arm *F* the annular wheel *C* will be thus revolved on the eccentric disk *B*, the disk *B* being held stationary by the cylinder *A*, secured to it and to the machine-fork, the anti-friction roller *G'* on the outer end of the pin *G* sliding in and out in the longitudinal slot *F'* of the lever-arm *F* as the wheel *C* revolves around the eccentric disk *B*. As the wheel *C* re-

volves around the fixed eccentric disk it meshes with a small annular wheel D, which is immovably secured to the main wheel hub-casing E E'. By this construction it will be  
 5 seen that one revolution of the pedal-shaft and pedals will revolve the main drive-wheel for several revolutions, the fixed eccentric disk B always holding the large wheel C, meshing with the teeth of the small wheel D.  
 10 In Fig. 4 of the drawings I have shown the same driving-gear arranged at the outer end of the hub outside of the wheel proper. The hub is in this case a plain cylinder, and at one end is enlarged, as shown, to enable the  
 15 wheel D to be secured to it, and the other parts of the gear are practically the same as in the construction before described, as will be seen.

From the foregoing description, taken in  
 20 connection with the accompanying drawings, the construction, operation, and great advantages of my new and improved tricycle will be readily understood.

It will be seen that with my invention a  
 25 slow and easy movement of the feet will give a high rate of speed, while the invention is comparatively simple and very strong and durable in its construction.

In Fig. 5 I have shown my new and improved  
 30 tricycle, which consists, broadly, of two small wheels mounted in line with each other at the ends of a backbone which is curved into substantially a half-circle, and a large drive-wheel mounted beneath the center of this  
 35 curved backbone in line with the two small end wheels, and in the peculiar connection between the main fork of the machine-frame and the backbone. 6 indicates the rear curved section of the backbone, having a fork at its  
 40 lower end, in which a small wheel 16 is mounted, and formed at its upper end with a tubular projection 5, as shown. In this tubular projection 5 is pivotally secured by the  
 45 nuts 17 a pivot projection 15, formed on the upper end of the curved front section 4 of the backbone, the forward end of this section being pivoted in a projection 14, formed on the  
 50 handle-jacket 7. 8 indicates the main upright fork, in which is mounted the large main wheel 19, which is thus brought beneath the center of the curved arch or backbone, and a second fork c extends from the handle-jacket 7 to the hub of the main wheel, as  
 55 shown. The handle-bar 2 passes through the jacket 7 and has a fork at its lower end in which is mounted the small wheel 16<sup>a</sup>. In a tubular projection 9 on the upper end of the main fork 8 is adjustably mounted the saddle-support 10, on which the spring-saddle S

is in turn adjustably mounted, thus giving  
 60 vertical adjustment as well as adjustment forward or rearward to the saddle. The upper end of the upright fork 8 is pivotally connected by a link 11 with the upper end of  
 65 the pivot projection 15 of the front fork-section 4, thus giving a flexible or yielding connection between the fork and the backbone.

It will be seen that my new and improved tricycle can run freely and smoothly over all  
 70 kinds of roads, as the backbone will "balance" on the large middle wheel 19 in running over uneven ground, the machine running then on either the middle and rear or middle and front wheels, as will be readily understood.

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

1. In a cycle, the combination of the pedal-shaft, the arm F', keyed thereon and formed with the longitudinal slot F', the cylinder A  
 80 encircling the pedal-shaft and secured at its outer end to the machine-fork, the eccentric disk B, keyed on the inner end of the cylinder, the large wheel C, revolving on the eccentric disk, having the annular flange C',  
 85 formed with teeth on its inner face, and having the projecting pivot-pin G, the main wheel having the hub formed at its center with the casing composed of the two halves or sections E and E', and the small wheel D, se-  
 90 cured to the inner side of the hub-casing, substantially as set forth.

2. The combination, in a tricycle, of the curved backbone-section 6, having the fork at its lower end and formed with the tubular  
 95 projection 5 at its upper end, the curved section 4, having the pivot projection 15 at its upper end, and the retaining-nuts on the upper end of the same, the main fork 8, having  
 100 the tubular projection 9 at its upper end, the link 11, connecting the upper end of the fork 8 with the fork projection 15, the seat-support secured adjustably in the tubular projection  
 105 9, the fork c, the handle-jacket 7, having the projection 14, the steering-bar passing through said jacket and having the fork at its lower end, the large drive-wheel mounted  
 110 in the forks 8 and c, and the two small wheels mounted, respectively, in the forks of the section 6, and the steering-bar 2 in line with the main wheel 19, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN H. HATCHER.

Witnesses:

J. A. HATCHER,  
 CHAS. E. EVANS.