





# UNITED STATES PATENT OFFICE.

EDWARD E. WHITE, OF OSHKOSH, WISCONSIN:

## BICYCLE.

SPECIFICATION forming part of Letters Patent No. 616,381, dated December 20, 1898.

Application filed May 21, 1898. Serial No. 681,386. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD E. WHITE, a citizen of the United States, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, have invented new and useful Improvements in Bicycles, of which the following is a specification.

My invention relates to improvements in bicycles; and it consists in certain novel constructions, combinations, and arrangement of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side view of the bicycle. Fig. 2 is a perspective and Fig. 3 a plan view of the propelling-gears. Fig. 4 is a detail of the pin driving-wheel. Figs. 5 and 6 are details of the hubs at each end of the driving-shaft. Fig. 7 is a detail view of the rear pin-wheel, and Fig. 8 a separate view of one of the pins.

Similar letters refer to similar parts in each view.

The object of my invention is to provide a new and improved means of transmitting the power from the pedals to the rear driving-wheel.

In the accompanying drawings, A represents the frame; A', the rear-fork stays; A'', the front fork; B, the rear driving-wheel, and B' the front wheel.

C C are the pedals revolving the crank-shaft D, to which is rigidly attached the large driving-wheel E, having laterally-extending pins *e e e*, &c., upon its inner face.

F is a shaft, provided with hubs G and G' at each end, which transmits the power to the rear smaller pin-wheel H, which is rigidly attached to the hub of the rear driving-wheel. The hubs G and G' are provided with small rollers *g g g*, &c., which are pivoted to each side of the hub, so as to freely revolve.

In the operation of the bicycle the revolution of the crank-shaft, carrying with it the large pin-wheel E, causes each pin to impinge against the corresponding roller in the hub G, which revolves the shaft F and the opposite hub G', and each roller in the hub G' impinges against one of the corresponding pins *h h* in the pin-wheel H, revolving that and the rear driving-wheel attached thereto. The pins in each wheel are provided with prolate spheroidal ends which impinge against

the rollers of the hubs and convolve with the said rollers, so as to eliminate any tendency to rattle. The construction is such that the anterior surface *s* of each spheroidal end convolves with one of the hub-rollers at the same time that the posterior surface *s'* of the adjacent pin convolves with the adjacent roller. The outward lateral pressure of one pin against the roller is counteracted by the inward lateral pressure of the adjoining pin against the adjoining roller. By this means the pins of both wheels are at all times held rigidly against the rollers and noise and rattling thereby effectually prevented in the operation of the gears.

I regard as an important feature of my invention the pivotally-mounted rollers *g g g*, &c., in each hub, which revolve as soon as touched and serve to reduce the friction to a minimum, so that lubrication of the gears is not required.

It will be observed from Fig. 3 that the shaft F extends rearward in a direction inclining slightly outward from the line of the bicycle. I therefore construct the pins of the rear pin-wheel inclining outwardly to a slight degree, so that they will more effectually clear the rollers and conform to the slightly-diagonal situation or location of the connecting-shaft F, and for the same purpose, if desired, the pins of both wheels may be so constructed.

Supports *w w* for the shaft-bearings *x* and *x'* are provided at each end, extending from the frame, and a sleeve F' is also provided, connecting the two shaft-bearing supports and surrounding the shaft F. In the drawings, Fig. 1, the shaft F is shown inclosed in a tube or sleeve F', which is forked at X, where the rear bearing for the shaft is located, and is hung from one end of the rear-fork stays A' by the braces *n n'* and the pivotal arm *m*. The front bearing for the shaft is hung from the frame integral with the crank-hanger at X'. It is obvious, however, that inasmuch as no lubrication of the gears is necessary in my invention any form of sleeve F' may be used carrying the usual and ordinary shaft ball-bearings at each end and may be hung from the frame in any convenient manner. Even the sleeve F' is unnecessary, as any connection between the bearings



to support their relative positions is sufficient. I therefore do not wish to confine my invention to any form of hanging or support for or connection between the bearings X and X' for the shaft F.

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

1. In a gear for cycles, the combination of a pedal-shaft, a gear-wheel carried thereby and provided with pins having prolate spheroidal ends, a gear-wheel on the driving-hub provided with pins having prolate spheroidal ends, and a shaft provided on each end with rollers which engage the pins on the gear-wheels, substantially as described.

2. In a gear for cycles, the combination of

a pedal-shaft, a gear-wheel carried thereby and provided with pins having prolate spheroidal ends, a gear-wheel on the driving-hub provided with outwardly-extending divergent pins having prolate spheroidal ends, and an outwardly-extending divergent shaft provided on each end with revoluble rollers which engage the pins on the gear-wheels, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD E. WHITE.

Witnesses:

F. J. MCKENNEY,  
HENRY HENKEL.