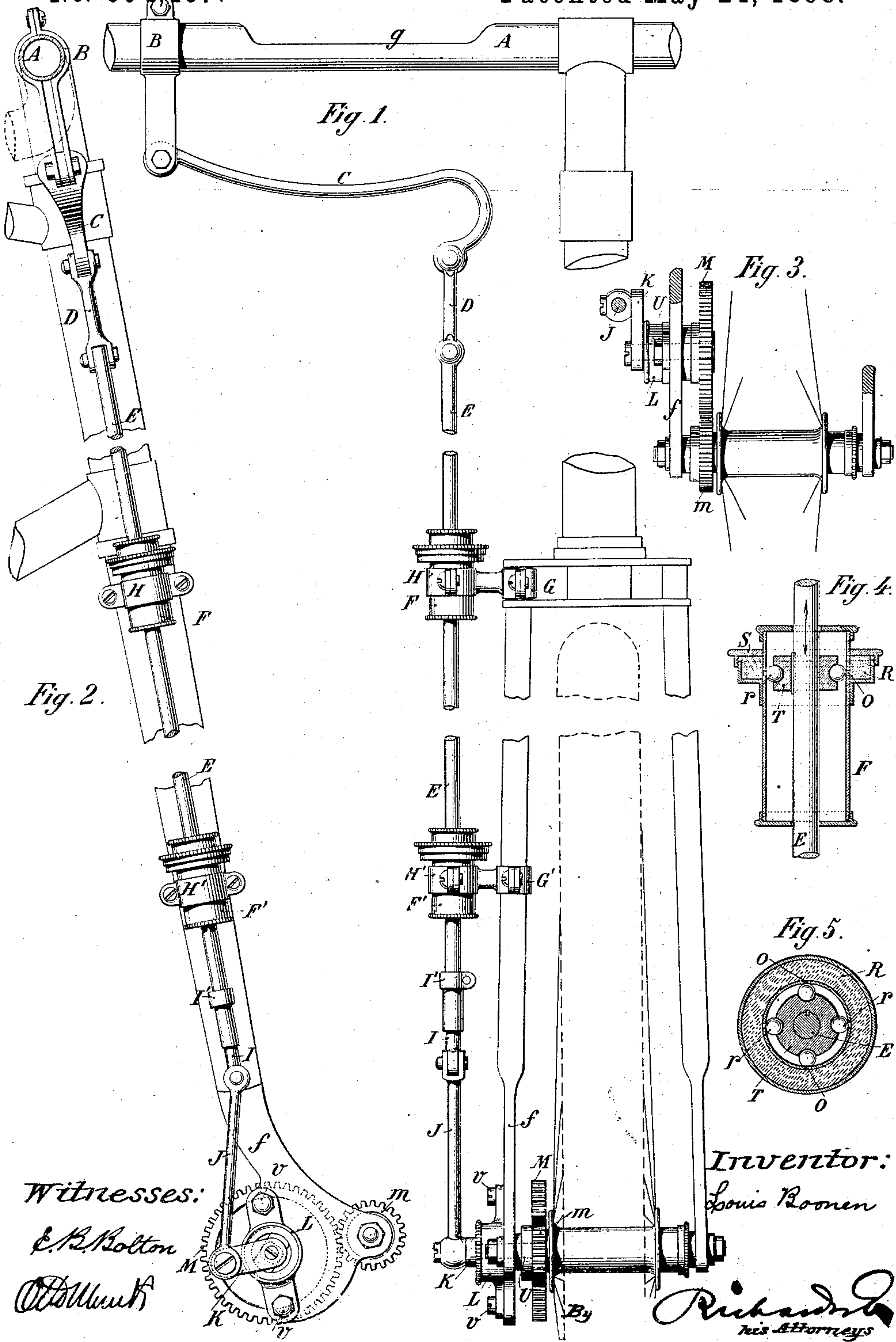


(No Model.)

L. BOONEN.  
BICYCLE.

No. 604,487.

Patented May 24, 1898.



Witnesses:

E. B. Bolton

O. H. Hunt

Inventor:

Louis Boonen

Richardson  
his Attorneys



# UNITED STATES PATENT OFFICE.

LOUIS BOONEN, OF PARIS, FRANCE.

## BICYCLE.

SPECIFICATION forming part of Letters Patent No. 604,487, dated May 24, 1898.

Application filed March 18, 1897. Serial No. 628,146. (No model.) Patented in France September 29, 1896, No. 260,067.

*To all whom it may concern:*

Be it known that I, LOUIS BOONEN, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

The invention has been patented in France, No. 260,067, September 29, 1896.

Efforts have long been made for facilitating the climbing of hills or gradients by cyclists. By a better distribution of the power—that is, applying to the front a portion of the power exercised on the rear of the machine—it has been thought that there could be obtained a more regular and better running on the level, combined with a diminution of fatigue on climbing a hill. The devices constructed according to this train of ideas, and which are all designed to produce, by means of the arms, a supplemental power in order to allow the cyclist to get over the dead-point, (which is produced when the line of the pedal-cranks is normal to the ground,) all have the inconvenience of destroying the benefit which they bring to the traveling by an increase of weight and a complicated costly mechanism difficult to operate.

The present invention, although based on the principles hereinbefore enumerated, is of so simple a construction and its operation is so easy that it introduces, so to speak, no complication in the construction of the machine or its maintenance, but it has particularly the advantage of solving the problem of the diminution of exertion by utilizing the natural pull which the cyclist is accustomed to exert on the handle-bar when climbing a hill. I have realized all these advantages by driving the front or steering wheel by means of a very simple mechanism, which normally runs automatically while the machine is running, but to which the cyclist may impart a driving action at will, while maintaining his hand on the steering or handle bar by a very slight pull exerted by the fingers on a lever arranged under the handle-bar like a brake-lever.

My invention is shown in detail in the accompanying drawings, in which—

Figure 1 is a front elevation; Fig. 2, a side elevation of the whole mechanism. Fig. 3 is a plan view in section. Figs. 4 and 5 repre-

sent, on a larger scale, in horizontal and vertical section, respectively, details of the guide-boxes of the rod transmitting the motion.

On the hub of the steering-wheel a little pinion *m* is fixed, which gears with a wheel *M*, mounted on a spindle *U*, revolving in a ball-bearing *L*, provided with a regulating device. This bearing is fixed by two screws *v* to a plate forming an extension of the end of one arm of the front fork *f*. A little crank *K*, fixed at the end of the shaft *U*, is pivoted to a rod *J*, which is pivoted to a socket *I*, in which is fixed by means of a collar *I'* the end of a rod *E*. This rod is guided in a plane parallel to the steering-wheel by boxes *F F'*, attached to the fork by means of clips *G H G' H'*. The upper end of the rod *E* is connected by a small link *D* to a lever *C*, pivoting on a clip *B*, attached to the steering or handle bar *A*. The steering or handle bar has a flat part formed at *g*, on which the hand can rest without danger of slipping. This little mechanism normally runs automatically in consequence of the rotation of the steering-wheel. When, however, the cyclist wishes to accelerate the movement of the steering-wheel and by the movement of the latter assist the driving-wheel over the dead-point, it suffices for him to exert with his fingers a slight pull on the lever *C* at the moment when the rod *E* is rising. This action is transmitted, as will be easily understood, to the steering-wheel and from thence to the whole machine.

I have given the lever *C* a special form enabling the fingers to exert their pull in the direction of the axis of the rod *E*. In this manner the effort is as reduced as possible.

In order to avoid a too strong and useless pull on the part of the cyclist, stops *T*, keyed on the rod *E*, are placed at suitable points. These stops, when the rod *E* is naturally at the highest point of its course, encounter the covers of the guide-boxes *F*. At the same time these stops form part of a small system of ball-bearings and lubricators. (Represented in detail by Figs. 4 and 5.)

*R* is a washer saturated with oil. By screwing down the cover *S* slightly the oil with which the washer is impregnated is forced to escape by the holes in the box *F*. The balls *r*, which roll between their race in the stop

T and the interior surface of the box F, are covered with oil in passing in front of the holes o.

My invention may be adapted with the greatest facility to any existing machine. The modifications which it necessitates are absolutely insignificant.

I claim—

In combination, the pinion *m* and gear M,

the rod E and the boxes F having stops and to ball-bearings and a lubricator carried by said box, substantially as described.

In witness whereof I have hereto set my hand in presence of two witnesses.

LOUIS BOONEN

Witnesses:

EMILY ZERTIO,

EDWARD P. MACLEAN.

