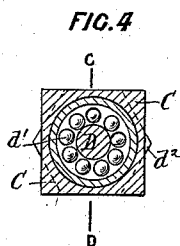
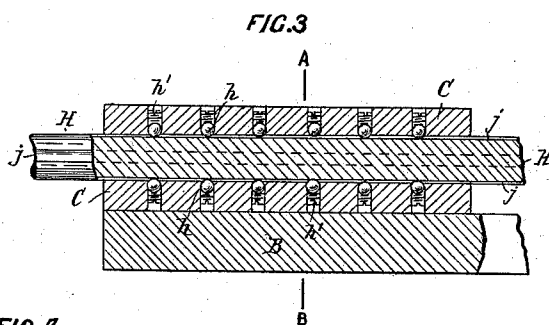
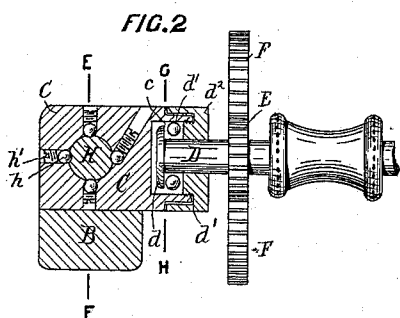
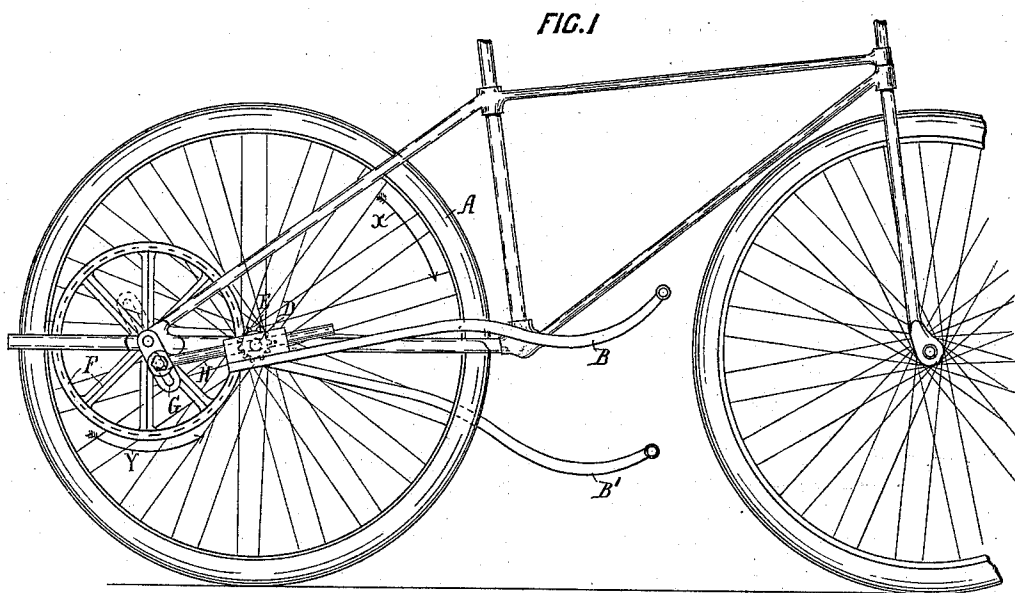


(No Model.)

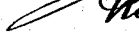
J. J. MARSHALL.
DRIVING GEAR FOR CYCLING MACHINES.

No. 567,787.

Patented Sept. 15, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES JOHN MARSHALL, OF SYDNEY, NEW SOUTH WALES.

DRIVING-GEAR FOR CYCLING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 567,787, dated September 15, 1896.

Application filed June 3, 1896. Serial No. 594,136. (No model.)

To all whom it may concern.

Be it known that I, JAMES JOHN MARSHALL, a subject of the Queen of Great Britain and Ireland, and a resident of Sydney, in the county of Cumberland, Colony of New South Wales, have invented certain new and useful Improvements in Driving-Gear for Cycling-Machines, of which the following is a specification.

This invention has been specially devised for the purpose of increasing the pace at which velocipedes are propelled and for facilitating the movements of the rider.

The essential feature of novelty is a pedal-lever that is pivoted, preferably, onto the same axis as the driving-wheel and is provided with an elongated guide or socket, within which a rod can slide longitudinally. This rod is connected to a crank-arm fixed, preferably, behind the axis of the driving-wheel and is keyed to a gear-wheel which gears into a pinion on the same axis as the driving-wheel and rotates with it; but in order that the invention may be thoroughly understood reference is made to the accompanying sheet of drawings, in which—

Figure 1 is a side elevation of the apparatus. Fig. 2 is a transverse section of the longitudinal bearing on the line A B of Fig. 3 and a longitudinal section of the pivot, taken on the line C D of Fig. 4. Fig. 3 is a longitudinal section of the longitudinal bearing, taken on line E F of Fig. 2. Fig. 4 is a cross-section of the pivot, taken on the line G H of Fig. 2.

A is the driving-wheel.

B B' are the pedal-levers, the rear ends of which are provided with the longitudinal bearing or socket C. This socket may be attached to the levers B B' in any suitable way. In the drawings it is shown placed above the lever, but the rear end of the lever might be made hollow, somewhat similar to a box-spanner, so as to allow the reciprocating lever to reciprocate within it. On the axis D of the driving-wheel is keyed the pinion E, which revolves with the wheel A. As the pedal-levers B B' have a vertical oscillating motion, means are provided for allowing them to oscillate upon the axle D, and the means preferably adopted is shown in Figs. 2 and 4. Preferably placed at the rear of the axle D of the driving-wheel A is a spur-wheel F,

which gears with the pinion E on the axle. The spur-wheel F is provided with a crank G, by means of which it is rotated. Secured to the crank-arm G is the oscillating rod H, that passes axially through the longitudinal bearing C. (Shown in Fig. 3.) Friction on the rod H is reduced to a minimum by means of the balls *h*, the adjustments of which are regulated by the set-screws *h'*. The reciprocating rod H is preferably flattened or grooved at *j* to form races for the balls to run in. The body of the bearing C is hollowed out on its inner side, so as to form a recess to receive the extreme end of the axle D and the balls that form the bearing to reduce the friction on the axle when the pedal-levers are oscillated. This part of the apparatus is distinctly shown in Figs. 2 and 4, *c* being the circular recess on the inner side of the longitudinal bearing C.

d is a flat head formed on the end of the axle D, *d'* are the balls that form the bearing, and *d''* a nut which is screwed into the recess *c*, so as to inclose the balls *d'* and retain them in such recess.

When the machine is to be propelled, the rider will mount the seat in the usual way, placing his feet upon the pedals of the levers B B', the motion of his feet being almost straight up and down, and not circular, as is the case with the ordinary velocipedes. The rear or driving wheel of the bicycle shown in the drawings will revolve in the direction of the arrow X, while the spur-wheel F will revolve in the direction of the arrow Y. (Both shown in Fig. 1.) The pedal-levers B B' will oscillate on the pivot shown in section in Fig. 4, while the rod H will reciprocate in and out of the longitudinal bearing C, somewhat in the same way as a piston-rod will reciprocate through its stuffing-box, thus causing the rotation of the spur-wheel F, which, gearing with the pinion E, will cause the driving-wheel of the cycle to revolve in the direction of the arrow X.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In cycling-machines, in combination vertically-oscillating pedal-levers, the rear ends of which are pivoted on or near to the

axis of the driving-wheel of the cycle and provided with a longitudinal bearing or socket within which will reciprocate longitudinally a rod or arm that is secured to a crank-arm
5 on the axis of a spur-wheel that gears with a spur-pinion secured to the driving-wheel of the cycle as herein set forth.

2. In cycling-machines, in combination, the driving-wheel of the cycle, a spur-pinion connected axially to it, a spur-wheel in gear with
10 the spur-pinion, a crank-arm keyed to the spur-wheel, a rod that is secured to the crank-arm, a longitudinal bearing that is provided with means for reducing friction and within
15 which the rod that is secured to the crank-arm of the spur-wheel can reciprocate longi-

tudinally, a pivot that is provided with means for reducing friction, such pivot being attached directly or indirectly to the longitudinal socket in such a way that the longitudinal
20 socket can oscillate on a center placed upon or near to the axis of the driving-wheel of the machine and pedal-levers extending forward such pedal-levers being secured directly or
indirectly to the longitudinal bearing as
25 specified.

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

JAMES JOHN MARSHALL.

Witnesses:

T. ORMOND O'BRIEN,
MANFIELD NEWTON.