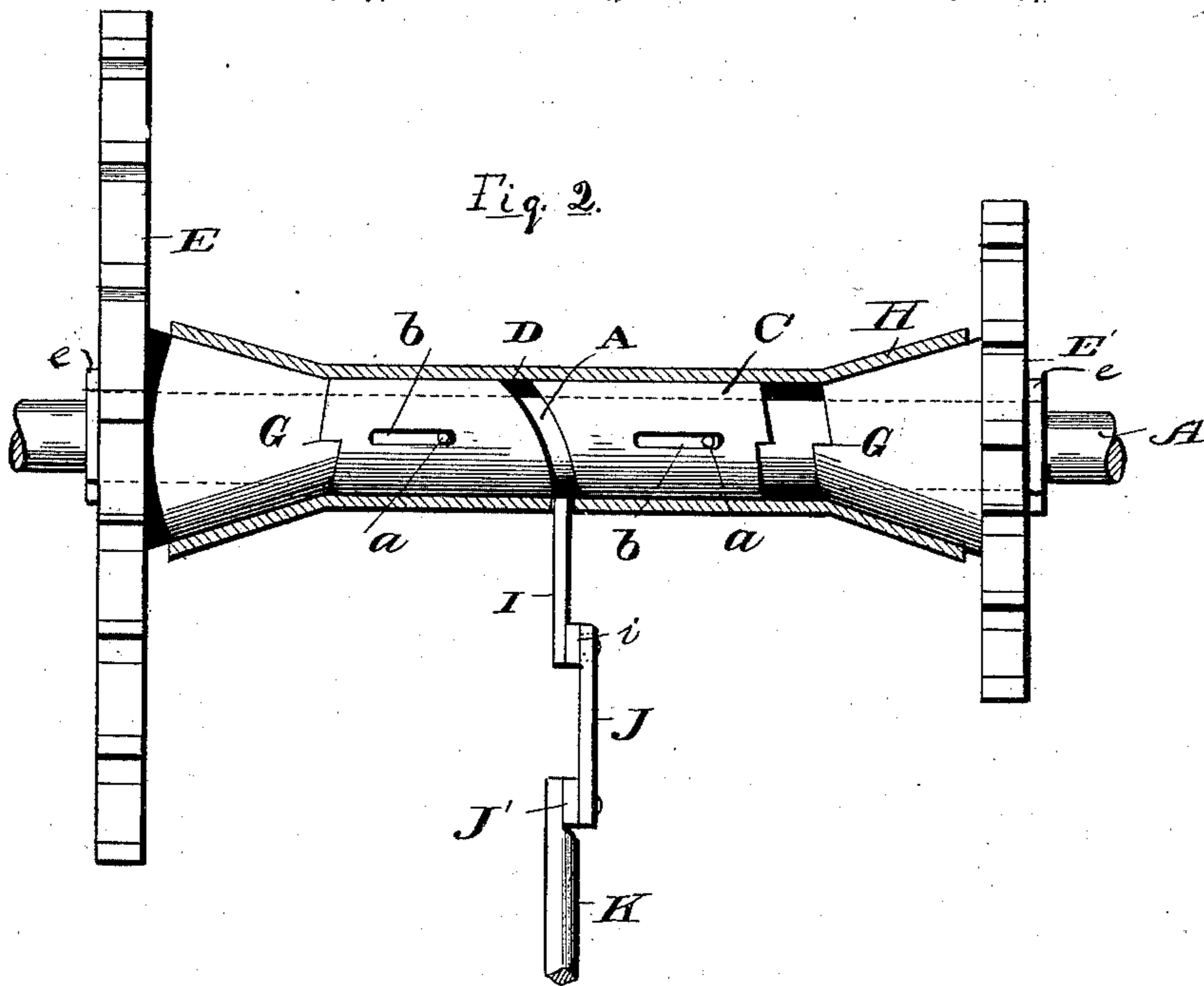
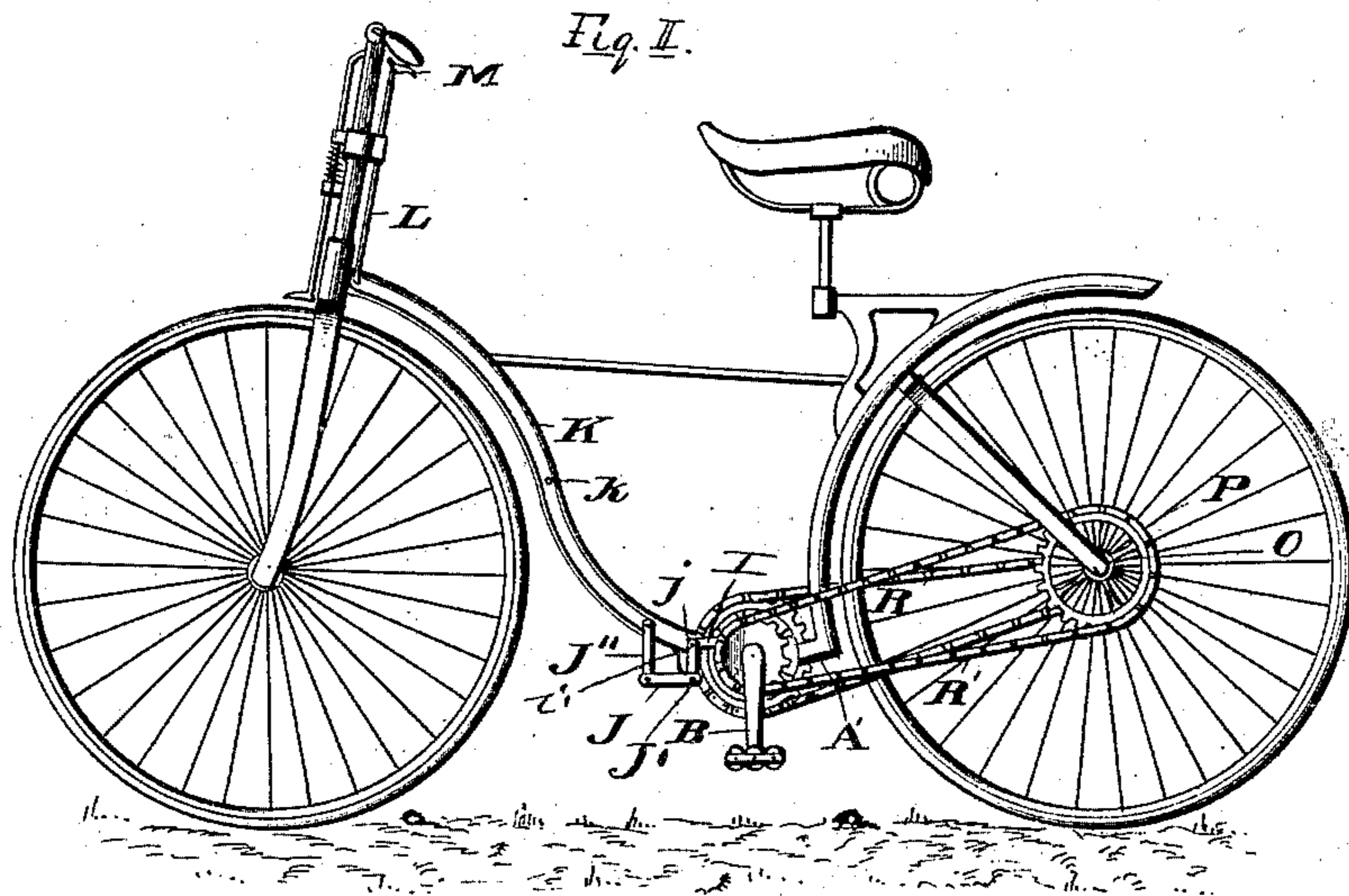


(No Model.)

T. C. MOORE & S. F. CRULL.
BICYCLE.

No. 476,157.

Patented May 31, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS C. MOORE AND SOLOMON F. CRULL, OF DUBLIN, INDIANA.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 476,157, dated May 31, 1892.

Application filed December 31, 1891. Serial No. 416,621. (No model.)

To all whom it may concern:

Be it known that we, THOMAS C. MOORE and SOLOMON F. CRULL, citizens of the United States, and residents of Dublin, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Bicycles; and we do 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a side elevation. Fig. 2 is an enlarged sectional detail view of the shaft and sprocket-wheels, showing shifting-pin and links.

This invention has relation to certain new and useful improvements in bicycles; and it consists in the novel construction and combination of parts, as hereinafter specified.

In the accompanying drawings, illustrating the invention, the letter A designates the pedal-shaft of the machine, having bearings at its end portions in the side bars or braces A', outside of which it carries the pedals B B.

C designates an elongated cylindric sleeve held on the shaft A and made to turn therewith by the pins or lugs *a a* on the shaft, which engage elongated slots *b b* in the sleeve. By reason of the elongation of these slots said sleeve is capable of an endwise-sliding movement. On each end of the sleeve are formed clutch-teeth *c*, and at the center is a circular cam-slot D.

E and E' designate sprocket-wheels, one of which is carried loosely on each end portion of the shaft A inside of the pedals. The wheel E is preferably of about twice the diameter of the wheel F. These wheels are shown as held in place by the nuts *e*, which have a threaded engagement with the shaft, and have each a conical face engaging a corresponding seat or depression in the wheel. G G are clutches secured to or integral with said wheels and designed, respectively, to have engagement with the clutch-teeth of the sleeve.

H designates a box, in which the sleeve C bears, the ends of said box being shown as of conical form and forming bearings for the

respective clutches G G, which are shown as of similar form.

I is a shifting-pin, which extends through a slot in the box and is designed to have engagement with the cam-slot D. The opposite end of this pin carries a stud or projection *i*, which engages a slot *j* in the upper end of an arm of an angular or L-shaped lever J, pivoted at J' to the frame. The other arm of said lever is connected by a short link J'' to a lever K, which is shown as conforming in shape to that of the backbone, to which it is pivoted at *k*. The upper end of the lever K is connected by a rod or link L to a hand-lever M underneath the handle-bar on the opposite side from the brake-lever.

O designates the axle of the rear wheel, the hub O' of which carries thereon two sprocket-wheels P and P'. The wheel P is placed in alignment with the wheel E on the pedal-shaft, but is of considerably less diameter, while the wheel P', which is in alignment with the wheel F, is of considerably greater diameter.

R R' are the driving-chains for the respective pairs of wheels.

The purpose and manner of operation of the invention are as follows: When it is desired to increase the power, as in ascending a grade, the sleeve C is shifted by means of the lever and shifting devices described, so as to bring its clutch-teeth on one end into engagement with the clutch of the small sprocket-wheel F, which, as above stated, is geared to a large wheel on the rear axle. When, however, speed is the desideratum to be obtained, the lever M is operated by the rider to actuate the shifting-pin, which will be thrown thereby into engagement with the slot D of the sleeve, causing the latter as it turns an endwise movement, which will throw it out of engagement with the clutch of the wheel F and into engagement with the clutch of the larger wheel E, which is geared to the small wheel on the main axle.

We are aware that the idea of providing a bicycle with changeable gear is not broadly new, and is not so claimed by us; but we are not aware that the arrangement and construction of the clutch-sections connected to the gear-wheels of the pedal-shaft with the con-

cal bearings have ever before been used, or the shifting devices, as hereinbefore set forth.

Having described this invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a bicycle, the combination, with the pedal-shaft, the gear-wheels thereon and of different diameters, the conical clutch-sections fast to each of said wheels, and the elongated sleeve rotating with the pedal-shaft, but capable of an endwise movement thereon, said sleeve having clutch-teeth on each end adapted to engage the conical clutch-sections, of the elongated box forming a bearing for said sleeve and conical clutch-sections, and the lever mechanism for shifting said sleeve, substantially as specified.

2. In a bicycle, the combination, with the rear axle having the sprocket-wheels of different diameters thereon, the pedal-shaft, the loose gear-wheels thereon of different diameters and arranged oppositely to those of the rear axle, the driving-chains for said wheels and conical clutch-sections fast thereto, of the elongated sleeve rotating with the pedal-shaft, but capable of an endwise sliding movement thereon, said sleeve having clutch-teeth at each end designed to engage with the clutch-sections of the respective gear-wheels, a shifting-pin designed to have engagement with said sleeve through a cam-slot therein, and an elongated box forming a bearing for said sleeve and having conical portions forming bearings for the clutch-sections, substantially as specified.

3. A bicycle having its pedal-shaft provided with two loose gear-wheels of different diameters and carrying conical clutches, a clutch-sleeve revoluble with said shaft and capable of an endwise movement thereon, means for effecting such endwise movement, and an elongated box forming a bearing for said sleeve and having conical portions forming bearings

for the clutches of the gear-wheels, substantially as specified.

4. A bicycle having its pedal-shaft carrying loosely two gear-wheels of different diameters, said wheels having conical clutches thereon, a clutch-sleeve revoluble with said shaft and movable endwise thereon, said sleeve having a cam-groove therein, a box forming a bearing for said sleeve and having conical portions in which the conical clutches bear, and a shifting-pin adapted to engage said cam-groove to effect its endwise movement, and lever mechanism for operating said shifting-pin, substantially as specified.

5. The combination, with the pedal-shaft, the gear-wheels loosely mounted thereon, the conical clutches carried by said wheels, and the clutch-sleeve, of the box forming a bearing for said sleeve and clutches, substantially as specified.

6. In a bicycle, the combination, with the variable driving-gear and the clutch-sleeve for effecting the engagement of said gear, of the shifting-pin designed to engage a cam-groove in said sleeve, a stud or projection on said pin, an L-shaped lever J, pivoted to the frame and having a slot in one arm engaging said stud or projection, a short link J', connected to the other arm of said lever, a lever K, connected to said link, said lever conforming to the shape of the backbone and pivoted thereto, the rod or link L, connected to the forward end of said lever K, and a hand-lever M underneath the handle-bar, connected to said link, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS C. MOORE.
SOLOMON F. CRULL.

Witnesses:

SAMUEL HUDDLESTON,
ISAAC H. EARL.