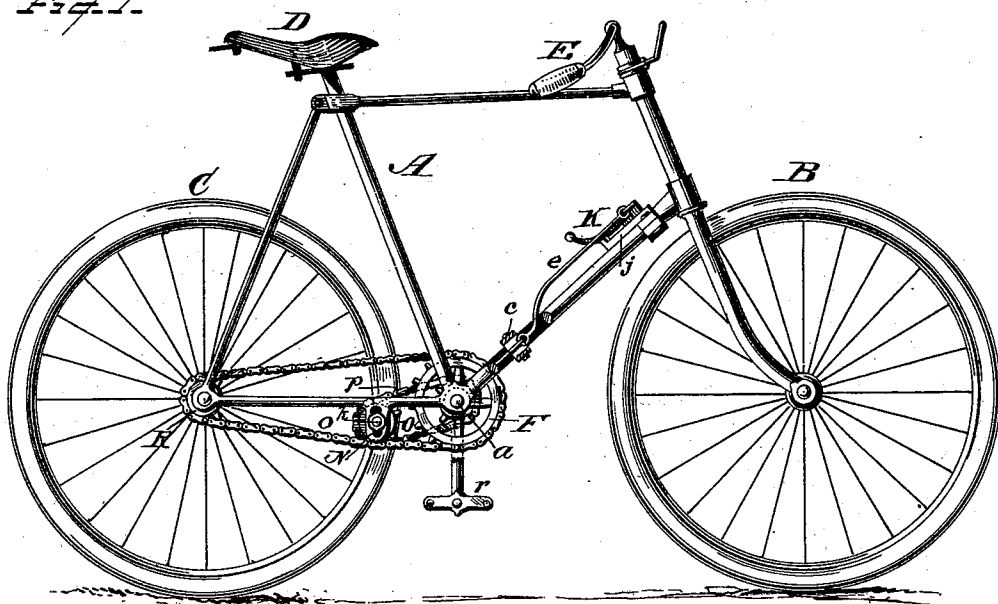


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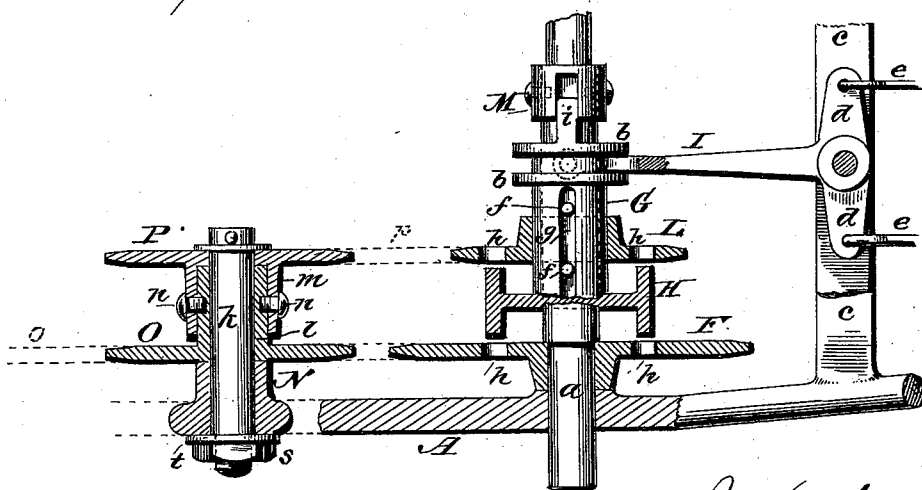
No. 546,703.

Patented Sept. 24, 1895.

Fig. 1.



*Fig 2.*



Witnesses  
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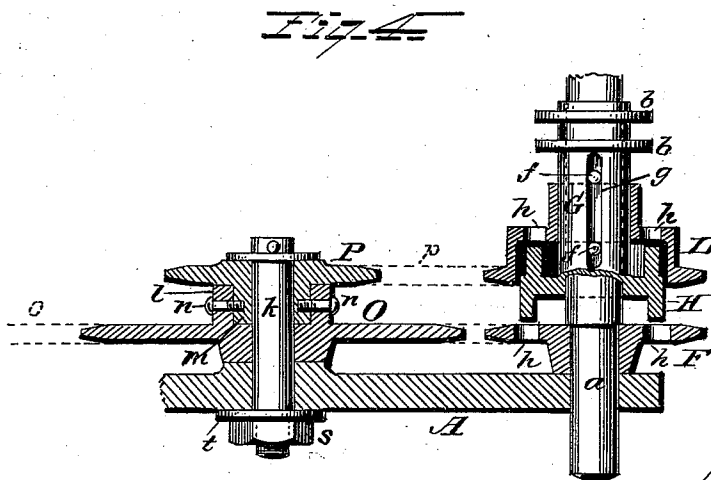
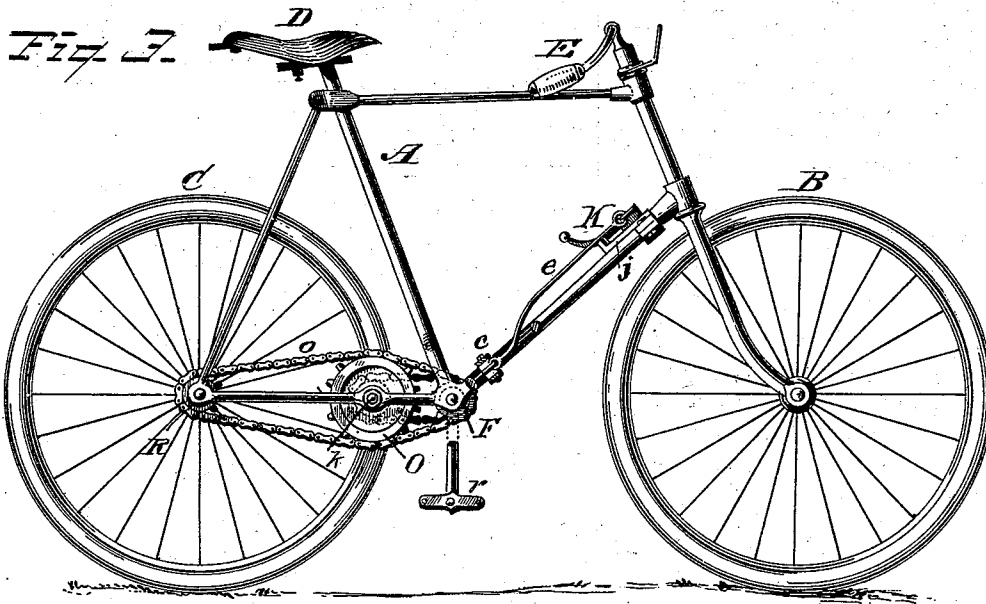
(No Model.)

2 Sheets—Sheet 2.

D. LIPPY & I. E. FINFROCK.  
DRIVING GEAR FOR BICYCLES.

No. 546,703.

Patented Sept. 24, 1895.



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# UNITED STATES PATENT OFFICE.

DAVID LIPPY AND IRA ELMER FINFROCK, OF MANSFIELD, OHIO.

## DRIVING-GEAR FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 546,703, dated September 24, 1895.

Application filed June 26, 1894. Serial No. 515,739. (No model.)

*To all whom it may concern:*

Be it known that we, DAVID LIPPY and IRA ELMER FINFROCK, citizens of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Driving-Gear for Bicycles; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

The present invention has relation to that class of differential-speed mechanism for bicycles in which provision is made for changing the speed and power of the machine to adapt it to the nature or character of the road over which the machine is propelled without the necessity of the rider dismounting, and also enabling the pedal-shaft to be disconnected with the gearing when it is desired to use the machine in "coasting" on downgrades.

It is the object of the invention to improve this differential-speed mechanism, whereby lightness, strength, and durability are secured and the mechanism will be simple in construction and easily operated by the rider without dismounting and while the machine is in motion, which objects are attained by the mechanism substantially as shown in the drawings and hereinafter described and claimed.

Figure 1 of the drawings represents a side elevation of a bicycle with our improved differential-speed mechanism applied thereto. Fig. 2 represents a plan view of the mechanism on an enlarged scale and partly in section; Fig. 3, a similar view to that of Fig. 1, showing a modification of the differential-speed mechanism; Fig. 4, a plan view of the mechanism on an enlarged scale and partly in section.

In the accompanying drawings, A represents the frame of the machine, which may be of any of the usual forms, and B C are the front and rear wheels, respectively, said frame having the usual saddle D and provided with the handle-bar E, all of which are of the well-known construction and common with this class of bicycles.

The differential-speed mechanism which forms the subject of our invention consists of

the large sprocket-wheel F, loosely mounted upon the pedal-shaft *a*, and upon this shaft is a slidable sleeve G, having upon one end a suitable clutch H and upon its opposite end annular flanges *b*, between which is located the forked end of a lever I. This forked lever is suitably pivoted between transverse bars *c* of the bicycle-frame and has laterally-extending arms *d*, to which are connected the ends of rods *e*, said rods in turn being connected to a pivoted shifting-lever K. This lever is in convenient position to be operated by the rider without dismounting and while the machine is in motion and will shift the clutch either to the right or left to engage with the holes *h* in the large sprocket-wheel F or the small sprocket-wheel L, thereby locking the wheel to the pedal-shaft and changing from speed to power, respectively, or vice versa.

The shifting-lever K is held in its adjusted position by engaging with a notched bracket *j*, secured to the frame of the machine, or by any other desirable and well-known means found best adapted to the purpose.

The small sprocket-wheel L is loosely mounted upon the sleeve G and prevented from longitudinal movement thereon by the pins *f*, which pins extend through the pedal-shaft and through longitudinal slots *g* in the sleeve. The slots *g* allow of the free movement of the sleeve lengthwise of the shaft when shifted thereon by the forked lever and its connections, the pins and slots forming guides for the sleeve as well as to prevent it turning upon its axis. The sleeve G at its end has tongues *i*, diametrically opposite each other, which engage with a slotted collar M, rigidly connected to the pedal-shaft *a*. The above means provide an additional security against the sleeve moving laterally or rotating upon its axis and removes any lateral strain upon the pins, which would occur were not additional means provided for holding the sleeve against movement upon its axis. When the clutch is in the position shown in Fig. 2, it is disconnected from both the sprocket-wheels, and consequently the pedal-shaft is disconnected from the driving-gear, thereby enabling the machine to be used in coasting on downgrades without the pedal-shaft rotating.

The frame of the bicycle has a slotted hanger

N, to which is connected a short stationary shaft *k*, and upon this shaft are loosely mounted two sprocket-wheels O P, of uniform size, which wheels have hubs *lm*, respectively, and are connected together by suitable screws or other fastenings, so that the wheels will rotate together. The hub of the bicycle-wheel C is provided with a small sprocket-wheel R, over which passes a sprocket-chain *o*, said chain engaging with the sprocket-wheel F upon the pedal-shaft, and also with the sprocket-wheel O upon the short stationary shaft. A second sprocket-chain *p* connects the two sprocket-wheels P L together, and the shaft *a* is provided with the usual foot-pedals *r* for operating it. The short shaft *k* is rendered vertically adjustable by means of the slotted hanger N, and said shaft is held securely in its adjusted position by means of a nut *s* engaging with the screw-threaded end of the shaft, and if desired a washer *t* may be interposed between the nut and hanger. The adjustment of the short shaft *k* enables the height of the wheels O P to be changed, whereby any slack of the sprocket-chain may be taken up, also rendering the engagement of the sprocket-wheels and chain more certain and removing the liability of the chain becoming accidentally disconnected.

In Figs. 3 and 4 there is shown a modification of the speed mechanism, the slotted hanger being dispensed with and the wheel O increased in size, but the two wheels being

connected together in substantially the same manner as shown in Fig. 2. In this modification the wheel F is shown as the same size as the wheel L, which latter wheel is dished in shape; but in other respects the general construction of the mechanism is substantially the same as that shown in Fig. 2.

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

The treadle shaft *a*, the two wheels F, L, placed loosely thereon, a sliding clutch placed between the wheels and provided with slots *g*, flanges *b*, and tongues *i*; the recessed collar M, and the pins *f*, secured to the shaft, and a mechanism for moving the clutch; combined with a bearing *h*, having one end secured to the frame, the two wheels O, P, placed upon the bearing and having tubular hubs that are secured together, the short chain *p*, that extends only around the wheels L, P, the chain *o*, which extends around the wheels F, H, and past the wheel O, and the wheel H, on the rear hub substantially as described.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

DAVID LIPPY.

IRA ELMER FINFROCK.

Witnesses:

BURTON J. OUSTINE,  
W. H. GIFFORD.