

No. 658,742.

Patented Sept. 25, 1900.

F. J. STALLINGS.

BICYCLE.

(Application filed Nov. 22, 1897.)

(No Model.)

2 Sheets—Sheet 1.

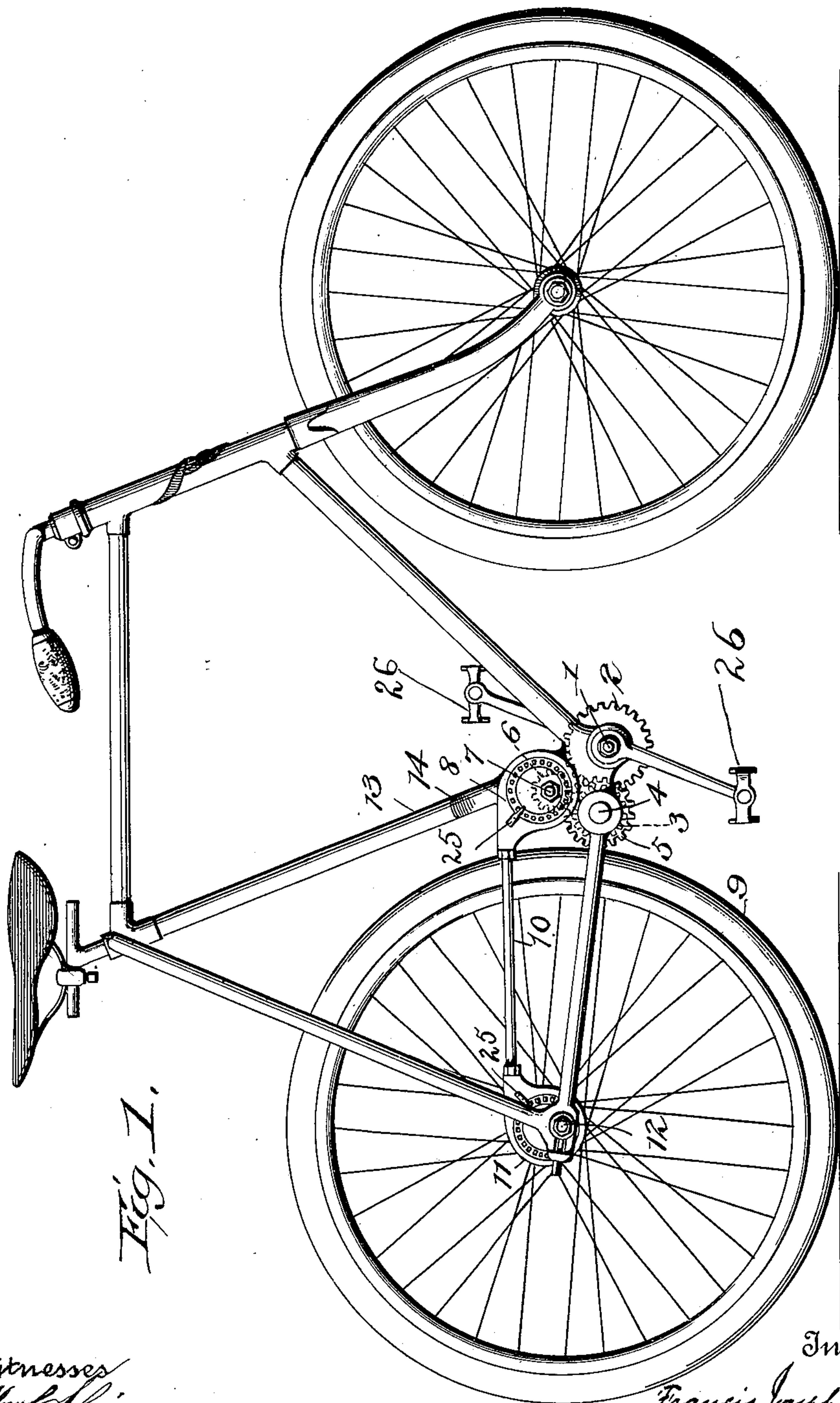


Fig. 1.

Witnesses  
*Wm. L. Shuman*  
*Ralph H. Warfield*

Inventor:  
*Francis Joseph Stallings*  
per *Phineas D. Dyer*  
Attorney

No. 658,742.

Patented Sept. 25, 1900.

F. J. STALLINGS.

BICYCLE.

(Application filed Nov. 22, 1897.)

(No Model.)

2 Sheets—Sheet 2.

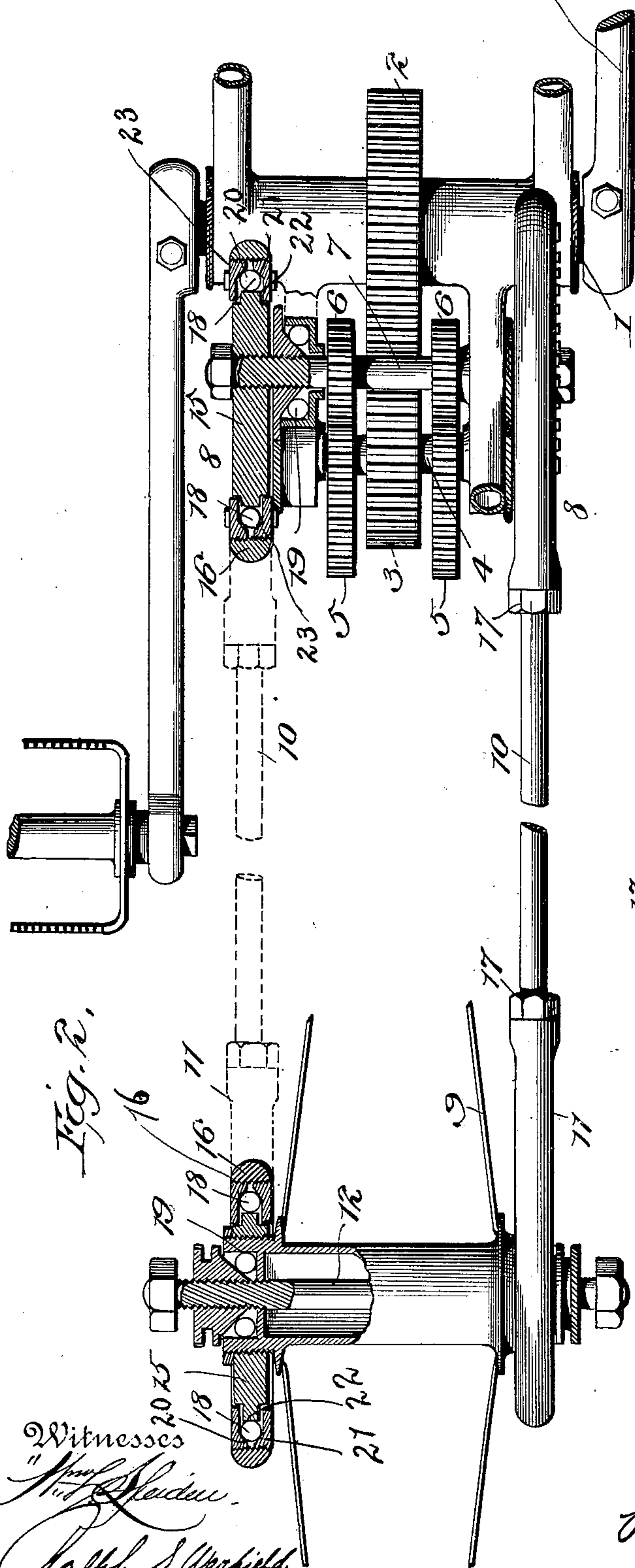


Fig. 2.

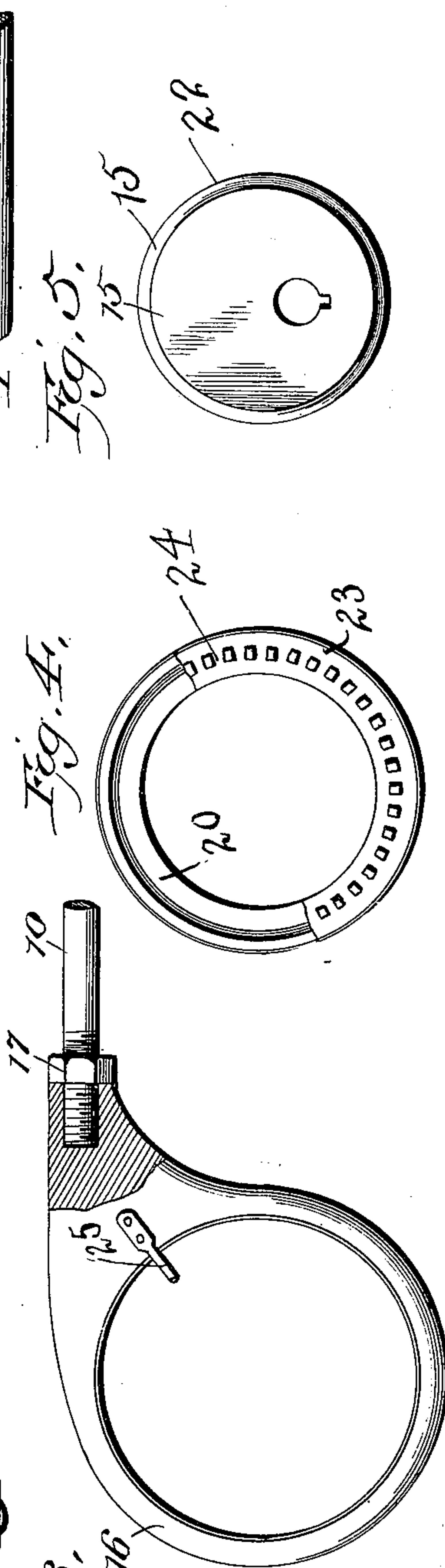


Fig. 3.

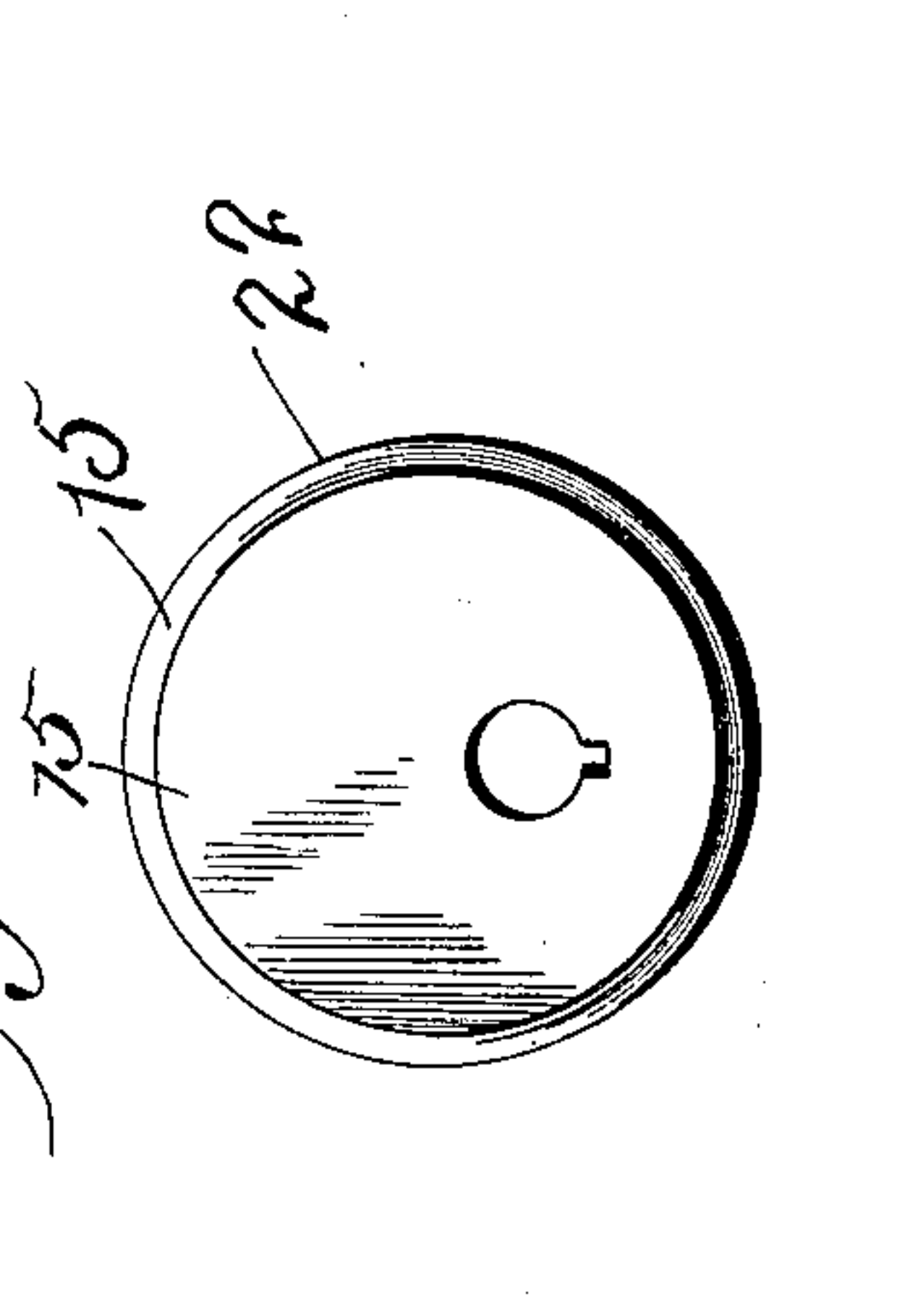


Fig. 4.

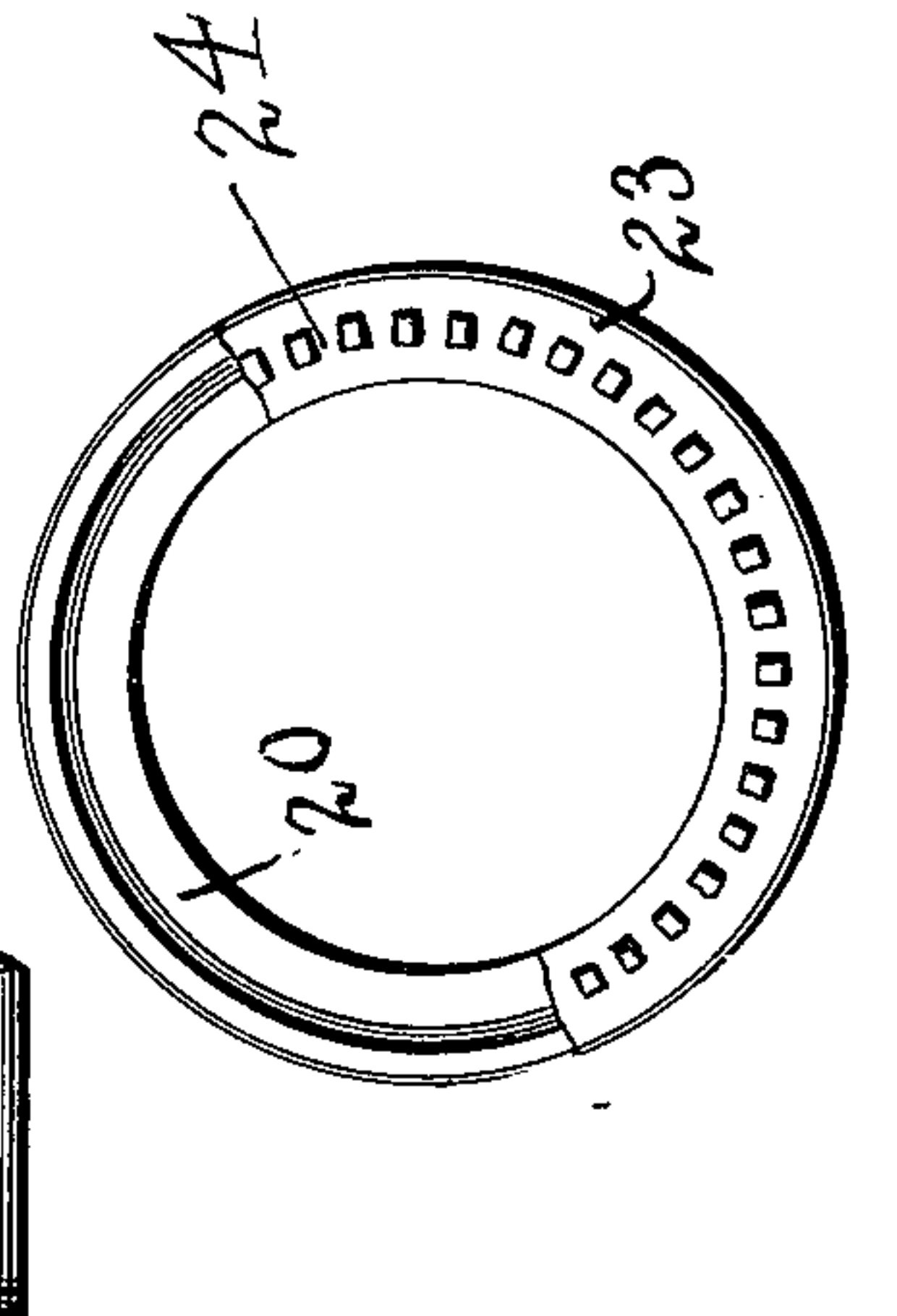


Fig. 5.

Witnesses:  
Wm. H. Shelden.  
Ralph S. Warfield.

Inventor:  
Francis Joseph Stallings  
per Charles H. Davis  
Attorney



# UNITED STATES PATENT OFFICE.

FRANCIS J. STALLINGS, OF EFFINGHAM, ILLINOIS, ASSIGNOR OF ONE-EIGHTH  
TO CAROLINE STALLINGS, OF SAME PLACE.

## BICYCLE.

SPECIFICATION forming part of Letters Patent No. 658,742, dated September 25, 1900.

Application filed November 22, 1897. Serial No. 659,410. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS J. STALLINGS, a citizen of the United States, residing at Effingham, in the county of Effingham and State of Illinois, have invented certain new and useful Improvements in Bicycles; and I 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to chainless bicycle-gearing, and more particularly to gearing embodying crank-driven eccentrics and driving-rods operatively connected to the bicycle-wheel.

My object is the provision of improved gearing of this type constructed and coöperating in a novel manner, whereby the strain on the parts is more evenly distributed than has heretofore been the case and the propulsion of the bicycle rendered easier.

Having the foregoing and other objects in view, the invention consists in certain improved features combined in a novel manner, as will appear more fully hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of an ordinary bicycle equipped with my improved gearing. Fig. 2 is a detail plan view of the invention, certain parts being shown in dotted lines and in section. Fig. 3 is a detail elevation of one of the eccentrics. Fig. 4 is a detail elevation, partly in section, of a set of the bearing-rings; and Fig. 5 is a detail view of one of the eccentric-stocks.

To the pedal-shaft 1 is fixed a driving-gear 2, located midway between the opposite ends of the shaft, and this gear meshes with a pinion 3 on a counter-shaft 4. On this same counter-shaft are located on either side of the pinion 3 two larger gears 5, which mesh with pinions 6 on the shaft 7 above. To this shaft 7 are fixed alternating eccentrics 8, which actuate the rear wheel 9 through the medium of driving-rods 10 and rear eccentrics 11, fixed to the shaft 12 of the rear wheel. The frame 13 is forked at 14 to pass astride the gearing associated with the pedal-shaft. All of the eccentrics are provided with peripheral grooves

containing antifriction-balls 18. The eccentrics are connected to the driving-rods 10 through the medium of stocks 15 and circular straps 16. The driving-rods 10 are preferably hollow and secured in place by lock-nuts 17. Suitable roller-bearings 19 can be provided for the various shafts 7 and 12 in order to reduce friction of the mechanism. The eccentric-straps 16 have internal screw-threads 16'.

The numerals 23 designate duplicate sections of the bearing-rings between which and the stocks 15 the balls 18 run. These sections screw into the eccentric-strap from opposite sides of the latter and have their inner adjacent faces grooved and constitute a raceway for the balls, which contact with them at points 20 and 21 and with the periphery of the stock 15 at the point 22. It will be observed that the balls bear on an annular bearing-flange 15' on the stock, which fits loosely in the raceway. This construction prevents any lateral displacement of the eccentric-strap. The sections of the ring 23 have circularly-arranged indentations or recesses 24, and locking-latches 25, secured to the strap 16, on opposite sides thereof, have their free ends disposed to drop into any one of the notches, and thus lock the ring-sections against turning after they have been properly adjusted.

Having thus described the construction of my mechanism, I will now explain its operation.

When the pedal-shaft is driven forward by the pedal 26, it revolves the driving-gear 2, communicating motion to the pinion 3, actuating shaft 4, which revolves the larger gears 5 on said shaft, thereby turning the pinion 6 on the eccentric-shaft 7 and revolving the eccentrics 8 forward. The eccentrics 8 carry with them the driving-rods 10, one moving forward while the other moves backward in alternate relation. These driving-rods revolve the rear eccentrics 12 and actuate the rear driving-wheel of the bicycle.

I gain two advantages by the employment of the gear-wheels: first, a proper multiplication of the rate of rotation of the crank-shaft and pedals, and, secondly, an even distribution of strain and wear on the parts, for it will be observed that by reason of the gear-wheels being located at the centers of



their respective shafts the strain and wear on the bearings is the same at both ends of all the shafts. Consequently the life of the parts is materially lengthened, and they operate much easier than they would if the ordinary form of gearing were used. This improved construction also permits the "tread" to be narrowed materially, which is advantageous. While the gear-wheels multiply the speed, yet by reason of the driver (gear 2) and the driven (the eccentrics) being of approximately the same size the exertion required to propel the bicycle is minimized and running made extremely easy.

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

The combination with a main frame of the machine, a pedal-shaft journaled in the hanger thereof, said pedal-shaft having a drive-gear secured thereon at or near its center, of a counter-shaft having a pinion thereon which meshes with the gear on the pedal-shaft, a shaft having eccentrics on each end

thereof, gearing for communicating motion from the counter-shaft to said eccentric-shaft, eccentric-straps surrounding these eccentrics, balls interposed between the peripheries of said eccentrics and the straps, a ring screwed into each eccentric-strap for retaining the balls in place therein, adjustable means secured to the straps and engaging the said rings for retaining them in position, the rear-wheel axle having eccentrics thereon, eccentric-straps, balls, rings screwed in the straps, for retaining the balls in position, means for locking said rings in the straps and pitmen extending from the straps on the rear-wheel axle to the straps on the eccentric-shafts for communicating motion from the latter to the former, substantially as set forth.

In witness whereof I affix my signature in presence of two witnesses.

FRANCIS J. STALLINGS.

Witnesses:

A. J. WORMAN,  
CHARLES BOOS.