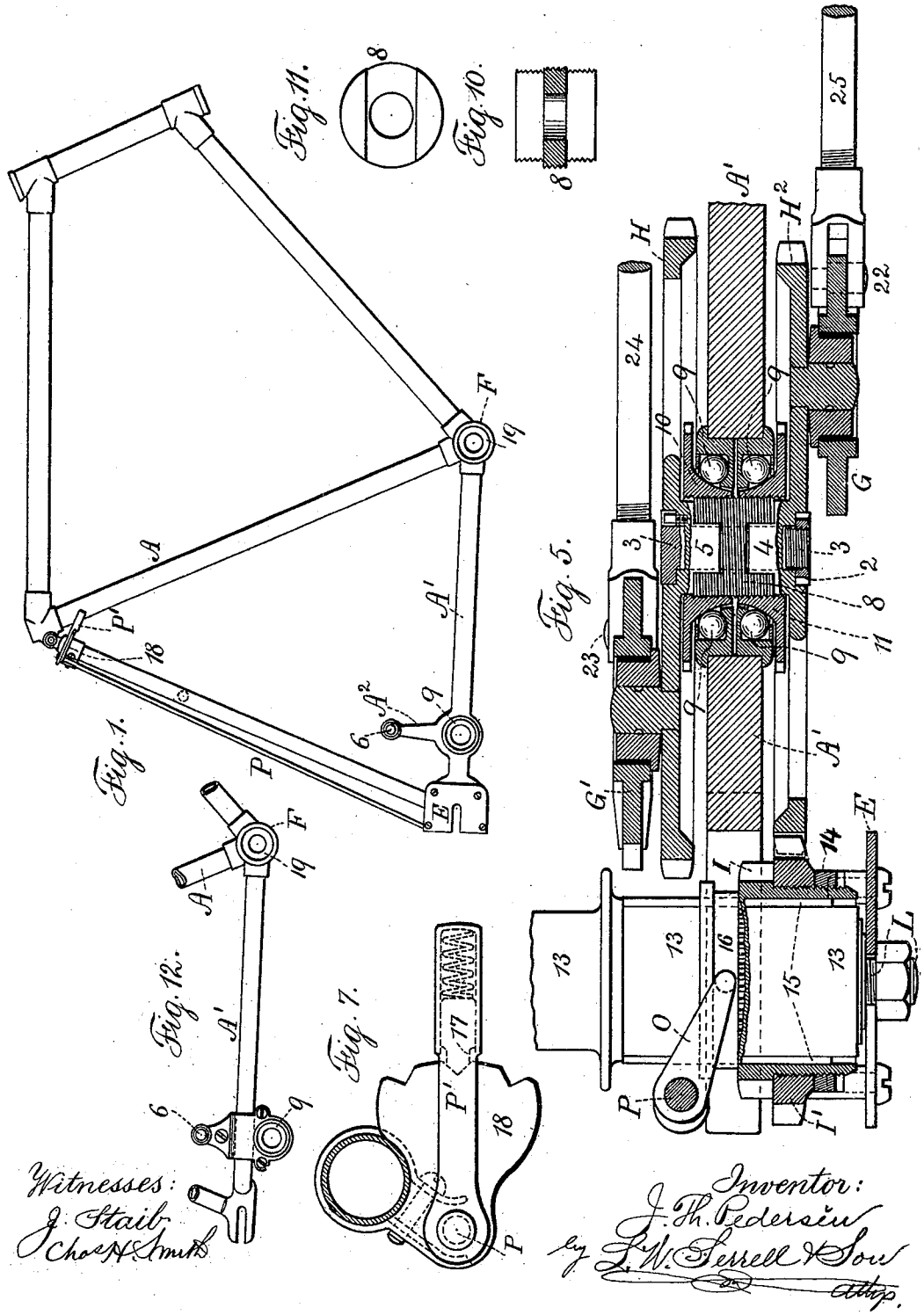
No. 619,498. Patented Feb. 14, 1899.

J. T. PEDERSĔN.

DRIVING MECHANISM FOR CYCLES.

(Application filed Oct. 26, 1897.)

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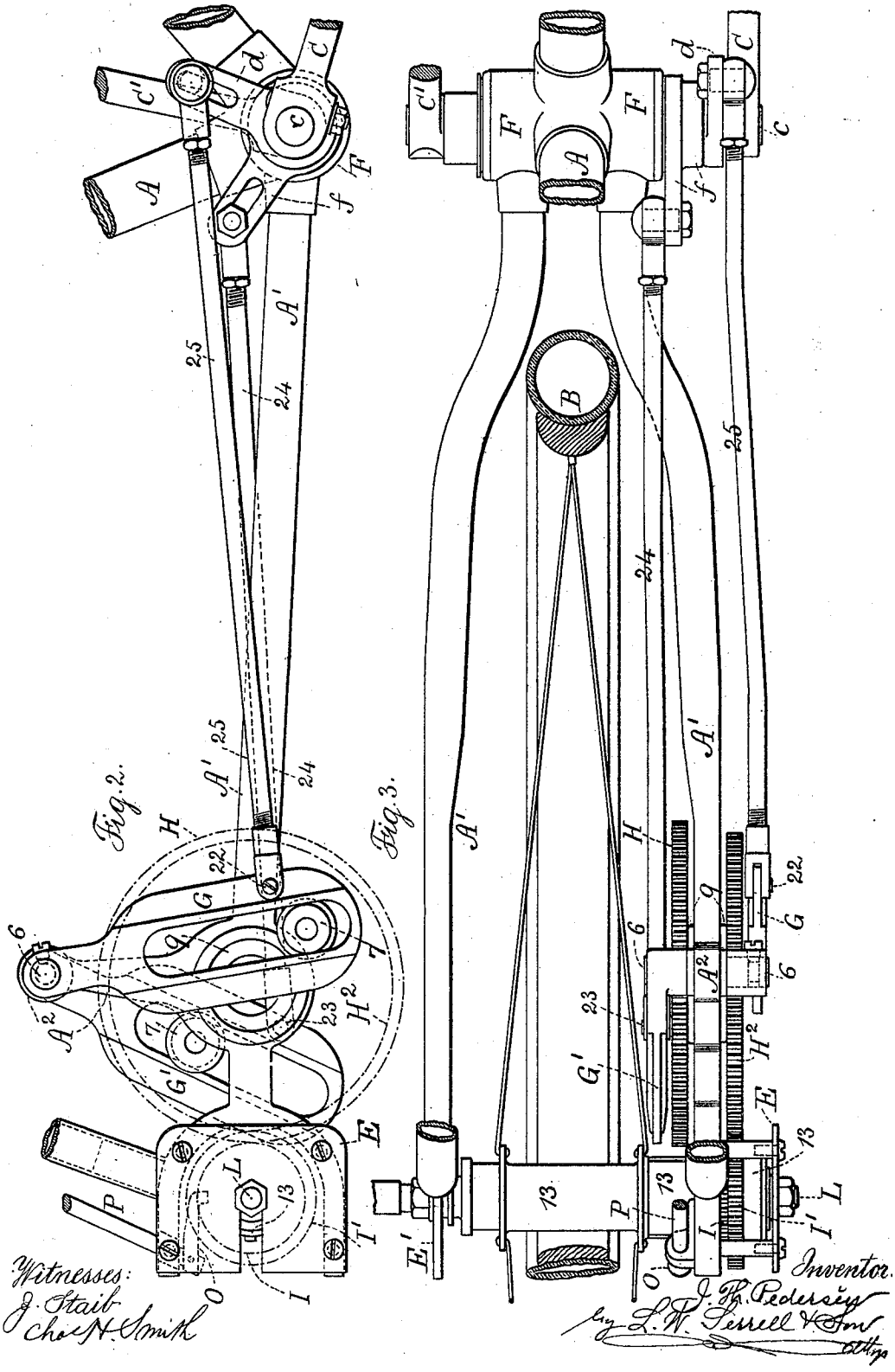
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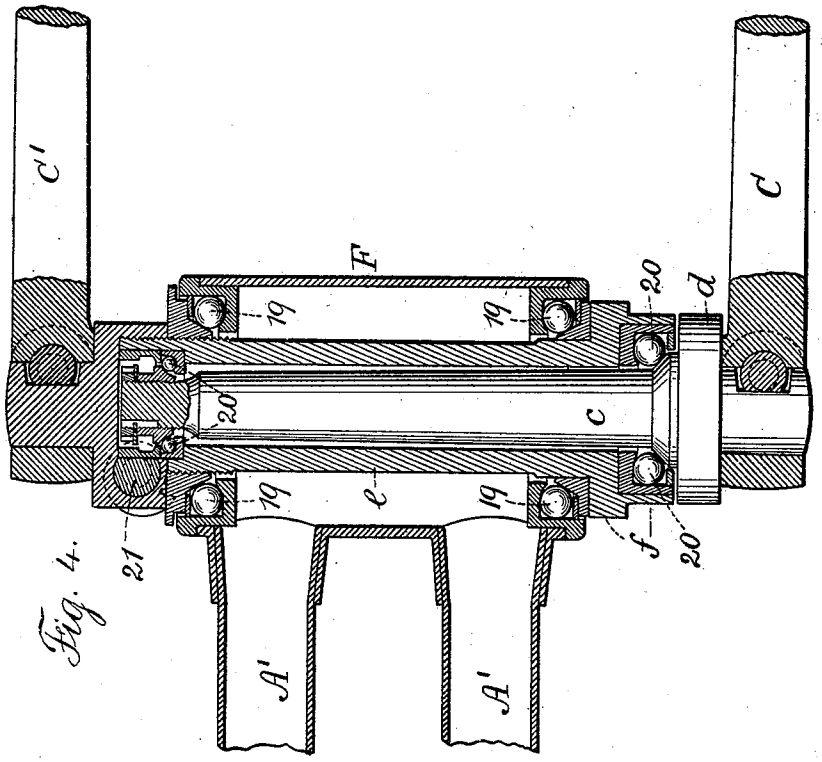


Fig. 4.

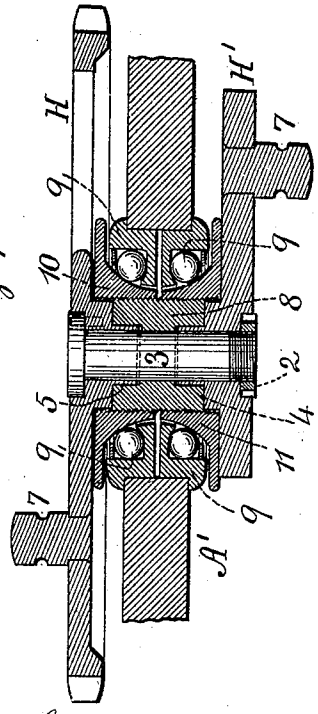


Fig. 9.

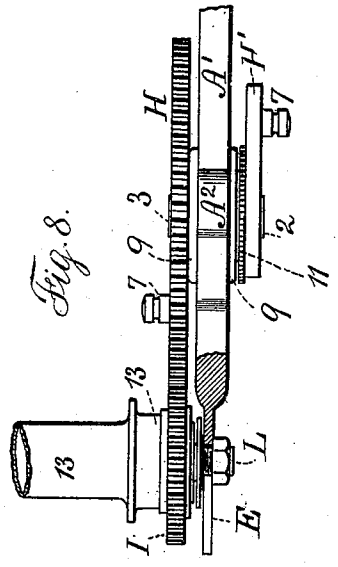


Fig. 8.

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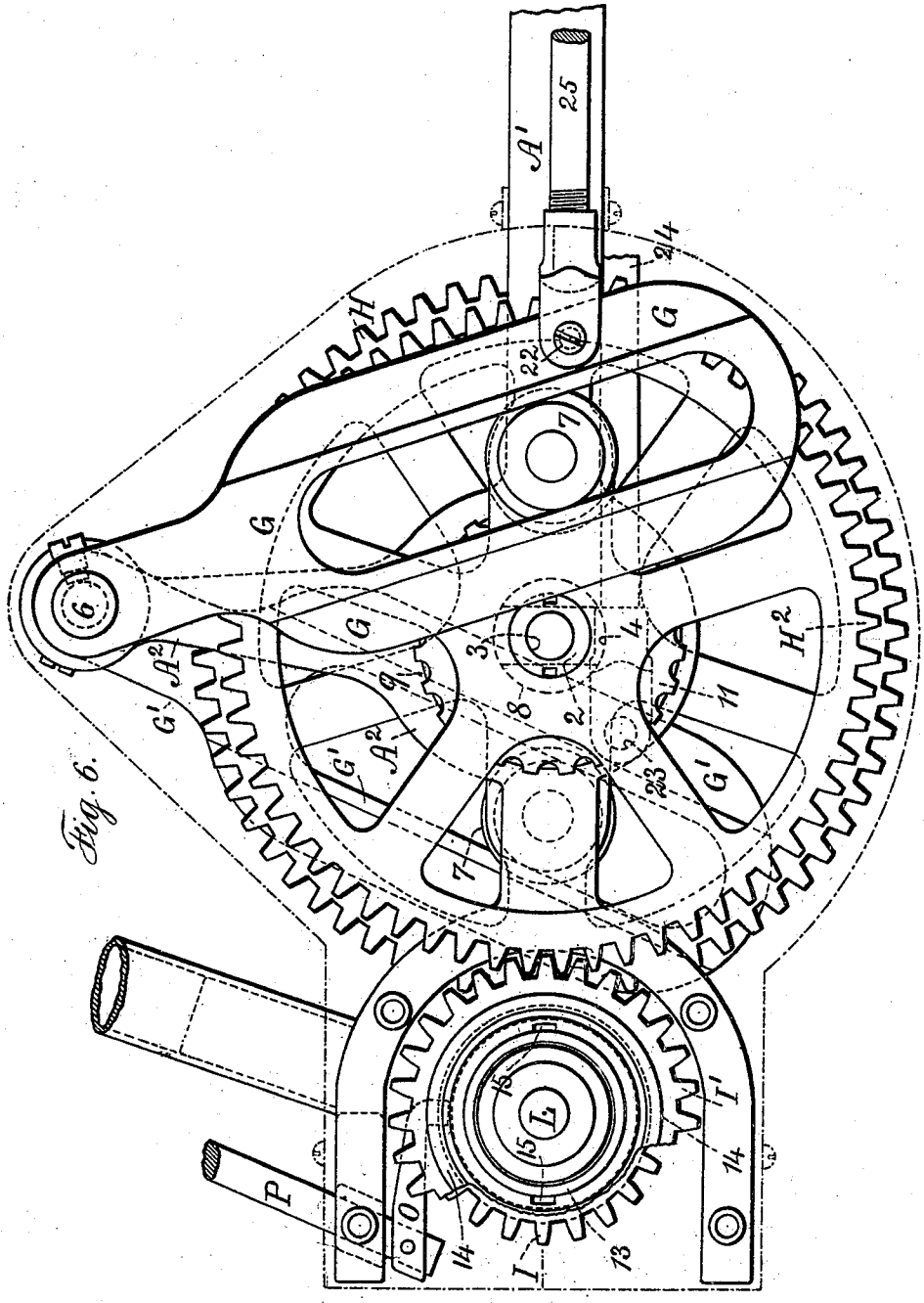


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHANNES TH. PEDERSĔN, OF NEW YORK, N. Y.

DRIVING MECHANISM FOR CYCLES.

SPECIFICATION forming part of Letters Patent No. 619,498, dated February 14, 1899.

Application filed October 26, 1897. Serial No. 656,400. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES TH. PEDERSĔN, a citizen of the United States, residing at New York, (Woodside,) in the county of Queens and State of New York, have invented an Improvement in Driving Mechanism for Cycles, of which the following is a specification.

Velocipedes have heretofore been constructed with a change-gear composed of gear-wheels acting upon pinions of different sizes, the pinions being movable longitudinally of the shaft to connect with one of the gears and disconnect from the other, and in a driving mechanism for a cycle the crank on one side has been upon a shaft passing through the ball-bearing and the crank or pedal on the other side has been connected with a tube within the ball-bearings.

In Letters Patent No. 587,601, granted to me August 3, 1897, a gear-wheel and crank-pin are driven by a swinging slotted arm, and the gear-wheel engages a pinion upon the driving-shaft or wheel-hub, and there are two of these devices, one at each side.

The present invention is for dispensing with the gear-wheel and pinion at one side of the driven wheel, so that the cycle can be made with only one gear-wheel and pinion instead of two, and at the same time I am able to employ a change-gear for varying the speed, if desired, by adding a second gear and sliding pinions of different sizes.

In the drawings, Figure 1 is a diagrammatic illustration of the cycle-frame. Fig. 2 is a side view, and Fig. 3 a plan view, illustrative of the general position of the parts made use of by me. Fig. 4 is a horizontal section through the pedal-shafts in larger size. Fig. 5 is a horizontal section showing the axle of the gear-wheel and the ball-bearing supports. Fig. 6 represents the change-gear and swinging slotted arms in larger size. Fig. 7 is a sectional plan view of the handle and its holding device for acting upon the sliding pinions. Fig. 8 shows the single gear and a crank-arm taking the place of the second gear in the change-gearing. Fig. 9 is a partial section similar to Fig. 5, but with the tubular screw in section; Figs. 10 and 11 are section and end views of the tubular screw detached, and Fig. 12 shows a bearing clamped on the frame.

The frame is composed of bars or tubes, as usual, except as hereinafter mentioned, the tube A being adapted to the reception of the saddle-post and the tubes or bars A′ forming the back fork at the sides of the rear or driving wheel B of the cycle.

The back axle L is secured in the frame in any usual manner, the plates E E′ being represented for this purpose as connected to the bars or tubes of the frame, and the hub 13 of the back wheel is adapted to receive the pinion by which the wheel is driven, and the ball-bearings of the back axle may be of any desired character. They, however, are not represented in the drawings.

Upon one of the side bars or tubes A′ is a projection A^2, preferably extending upward and receiving the pivot-pin 6 of the slotted levers G G′, and these act upon the crank-pins and rollers 7 to give motion to the gear-wheel H and by the same rotate the pinion I upon the hub 13 of the cycle-wheel.

The parts before enumerated are approximately similar to those in my aforesaid patent; but in consequence of the connecting-rods 24 25 being at the same side of the wheel and the slotted levers G G′ also being at the same side of the wheel B it is necessary to support the axis of the gear-wheel H upon the side bar A′ beneath the pivot projection A^2 in such a manner that the slotted levers G G′ will both act in giving rotation to the wheel H, and with this object in view a ball-bearing 9 is provided at an opening in the side bar A′, such ball-bearing being composed of two annular ball-ways inserted from opposite sides, and the shaft or axle connecting the gear-wheel H and the crank-arm H′, Figs. 8 and 9, or the gear H^2, Figs. 5 and 6, is formed as next described.

The annular flanged collars 10 and 11 are connected together by a tubular screw 8, and this can be screwed up more or less to take the bearing upon the balls, and in addition to the screw 8 being tubular it is notched crosswise at its ends, and the wheel H has a transverse projection 5 on its hub, fitting into the cross-notch in one end of the tubular screw 8, and the crank H′ or gear H^2 has a similar projection 4 extending into the cross-

notch in the other end of this tubular screw, and the parts are to be put together so that the crank-pins and rollers 7 are at one hundred and eighty degrees apart, and in consequence of the tubular screw 8 being sufficiently strong it is not possible for the crank-pins or rollers to change their relative positions, and in order to hold the parts together the bolt 3 is passed through the central opening in the gear-wheel H, the tubular screw, and the gear-wheel H^2 or crank-arm H′, and a nut secures the parts from becoming separated, and I remark that the nut and head of the bolt should be countersunk, as represented, and a pin provided, passing through the head of the bolt to prevent the same turning or the nut loosening. I have represented the flanges of the collars 10 and 11 as notched on their edges, so that they can be screwed up to compensate wear in the ball-bearings, and any suitable set-screws may be provided to prevent these collars turning and loosening the ball-bearings.

By the aforesaid construction the parts that carry the crank-pins and rollers are reliably connected together and supported by the ball-bearings, so as to revolve freely and without liability to become loose under the action of the cranks.

The connecting-rods 24 and 25 are pivoted at 22 23 upon the respective slotted levers G G′, and these connecting-rods 24 and 25 receive their motion in any suitable manner, preferably as hereinafter described, and by swinging the slotted levers G G′ the crank-pins and rollers 7 are acted upon to turn the wheel H in either direction, and the power is exerted during more than half of the rotation of the wheel in consequence of the levers G G′ swinging upon one pivot, and hence acting through more than one hundred and eighty degrees of the revolution of the wheel H.

Where only one gear-wheel H is made use of and one pinion I is employed, as in Fig. 8, this pinion I is fastened upon the hub 13 of the wheel B and the crank-arm H′ is made use of; but where a change-gear is required the gear H^2 is substituted for the crank-arm H′, as illustrated in Figs. 5 and 6, and the gear H^2 is of a different size to the gear H, and a second pinion I′ is made use of, the pinions I and I′ being connected so as to be moved longitudinally upon the hub of the wheel.

In Fig. 5 the pinion I is shown as with a tubular sleeve or hub, screw-threaded upon the outside and upon which the pinion I′ is screwed, and the lock-nut 14 holds the parts together, and the keys or feathers 15 upon the hub 13 fit the key-seats in the hub of the pinions, so that the parts can be slipped along upon the hub to cause the pinion I′ to engage the gear H^2 or the pinion I to engage the gear H, and I prefer to make the teeth of the gears and pinions rounding near their outer ends, so that the teeth will either interlock or separate without injury.

The tubular hub of the pinion I is formed with a peripheral groove 16, receiving a pin on the swinging arm O, and this arm O is upon a shaft or rod P, at the upper end of which is a handle P′, by which the shaft can be turned and the pinions slipped along upon the wheel-hub, so as to vary the speed by engaging H and I or H^2 and I′, and I remark that the size of the gears and pinions is to be regulated according to the relative speeds desired.

To hold the pinions in either of the positions desired, a spring-stop 17 in the handle P′ is used to engage the notched segment 18, so that when the parts are in the position shown in Fig. 7 both pinions I and I′ will be disengaged from the gear-wheels and when the handle P′ is turned in one direction the pinion I′ engages the wheel H^2 and when swung in the other direction the pinion I engages the gear H, thus allowing the rider to vary the relative speeds of the gearing while the cycle is being ridden.

In my aforesaid patent the treadles or foot-levers C C′ are illustrated as provided with pedals, and in Figs. 2 and 3 herein portions of these treadles or foot-levers C and C′ are represented, and in Fig. 4 the treadle-shaft bearing is represented in section. The treadle C is rigidly fastened to a shaft *c* and carries the arm *d*, to which the connecting-rod 25 is pivoted, preferably by a screw in a slot, so as to be adjustable, and the treadle or foot-lever C′ is rigidly fastened upon a shaft *e*, which passes through the crank-shaft tube F, and upon the tubular shaft *e* is an arm *f*, adjacent to the arm *d* and to which the connecting-rod 24 is pivoted. Hence the foot-lever or treadle *c* gives motion by the arm *d* and connecting-rod 25 to the slotted lever G, and the foot-lever C′ by the tube *e* and arm *f* gives motion through the connecting-rod 24 to the slotted lever G′, and it is advantageous to screw-thread the rods 24 and 25 at their ends upon which the jaws are connected, so as to adjust the lengths of the connecting-rods, and by moving the pivot-pins in the slotted arms *d* and *f* the leverage of the pedals and foot-levers will be changed, so that more or less motion will have to be given to the pedals.

Ball-bearings at 19 are provided for the tubular shaft *e*, and ball-bearings at 20 are provided for the shaft *c*. These parts may be of any desired character, and it is advantageous to connect the foot-lever C′ to the tube *e* by a hub screwed upon such shaft *e* after the ball-bearing at this end for the shaft *c* has been inserted, and the cross-bolt 21 prevents the hub of the foot-lever C′ from turning upon the tubular shaft *e*.

It will be noticed that the connecting-rods 24 and 25 move substantially horizontally, and there is but little rising-and-falling motion. Hence a case, of sheet metal or other suitable material, made in two parts and indicated by dotted lines in Fig. 6 can be ap-

plied to the cycle to entirely inclose the gearing, there being openings for the passage of such connecting-rods 24 and 25.

I do not limit my present improvements to any particular device for giving motion to the connecting-rods 24 and 25, but prefer the foot-levers, shafts, and slotted arms before described.

It is not necessary that the portion of the frame receiving and supporting the shaft or axle of the gear-wheel H should be integral with said frame, as the supports for the ball-ways and pivots may be clamped upon the frame, as seen in the detached view, Fig. 12, as this is a convenient way of applying this improvement to an old wheel.

It is most convenient to use the tubular screw 8, because the notches in the ends can be cut with facility, and two bolts entered from opposite ends into the tubular screw may take the place of one bolt, the tubular screw being internally threaded, and I do not limit myself to the screw with end notches being tubular, it only being necessary to bolt the parts together.

I claim as my invention—

1. In a cycle, a frame at one side of the driving-wheel having an opening through it near the hub of said wheel, a ball-bearing and a shaft in the opening, a gear attached at one end of the shaft, crank-pins at opposite ends of the shaft, two slotted levers, one at each side of this portion of the frame and acting upon the crank-pin, a pivotal support on said frame for the levers, and connecting-rods at one side of the wheel and foot-levers for giving motion to the rods, slotted levers, crank-pins and gears, and a pinion upon the hub at one side of the driving-wheel engaging the gear-wheel, substantially as set forth.

2. In a cycle, a frame having an opening through it near the hub of the rear wheel, ball-bearings and a shaft in the opening, two gears attached at the ends of the shaft and crank-pins thereon, two slotted levers acting on the crank-pins, a pivotal support for the levers, and connecting-rods and foot-levers for giving motion to the slotted levers, crank-pins and gears, pinions upon the hub of the driving-wheel and means for shifting the same for engaging one or the other of the gear-wheels, substantially as set forth.

3. The combination with the driving-wheel and a pinion upon the hub thereof, of the cycle-frame having an opening through it near the pinion and a projection forming a pivot-support, a ball-bearing within the opening, a shaft passing through the same, a gear-wheel connected to one end of the shaft and having a crank-pin upon it, a crank-pin and a support for the same connected with the other end of the shaft, two slotted levers engaging the crank-pin and having a common pivot upon the projection of the frame, foot-levers and substantially horizontal connections from the same to the slotted levers for giving motion to the same and the gear-wheel in driving the cycle, substantially as set forth.

Signed by me this 19th day of October, 1897.

JOHANNES TH. PEDERSEN.

Witnesses:
GEO. T. PINCKNEY,
S. T. HAVILAND.