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E. G. LATTA.

VELOCIPEDE.

No. 471,798. Patented Mar. 29, 1892.

Fig. 1.

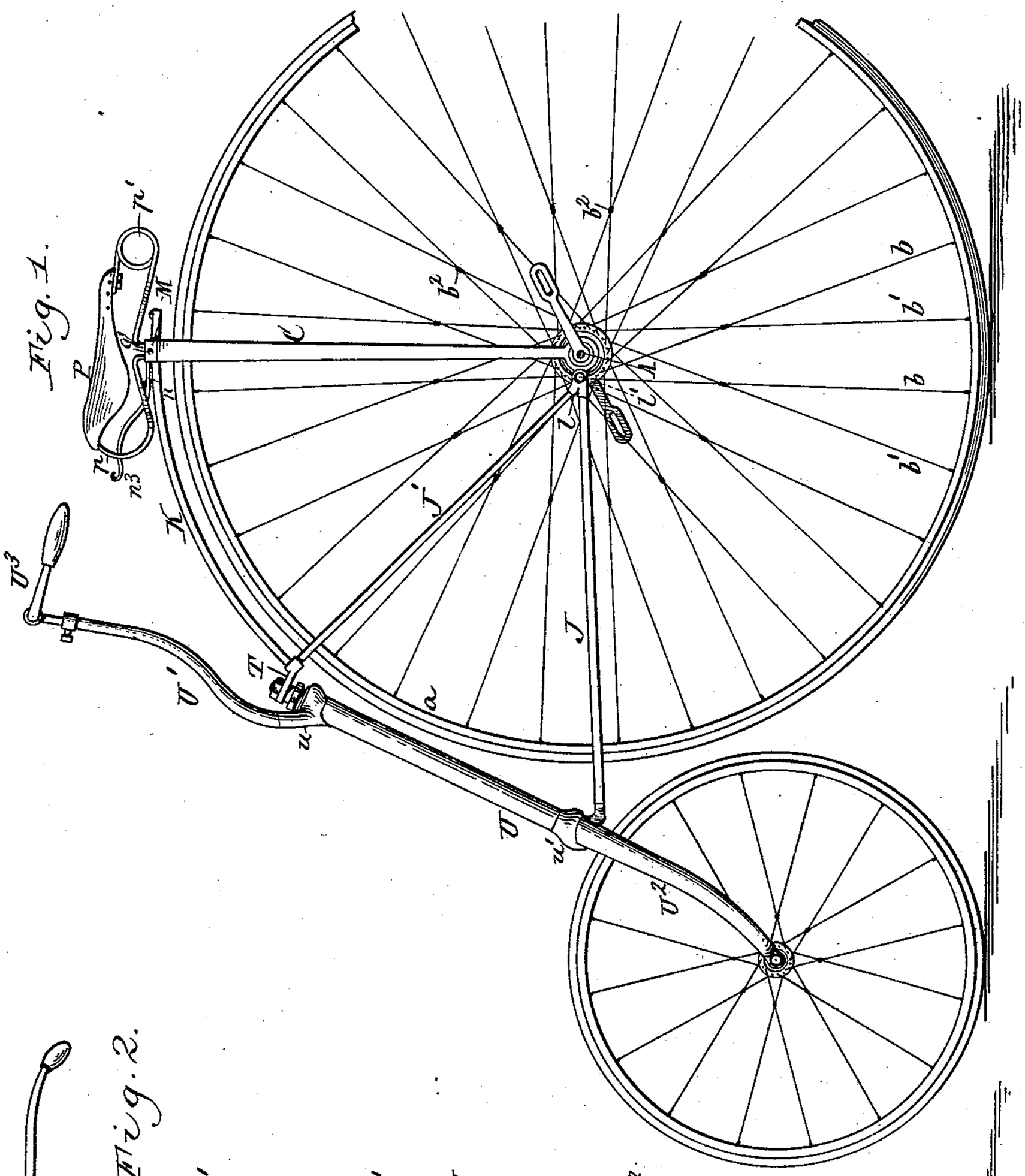
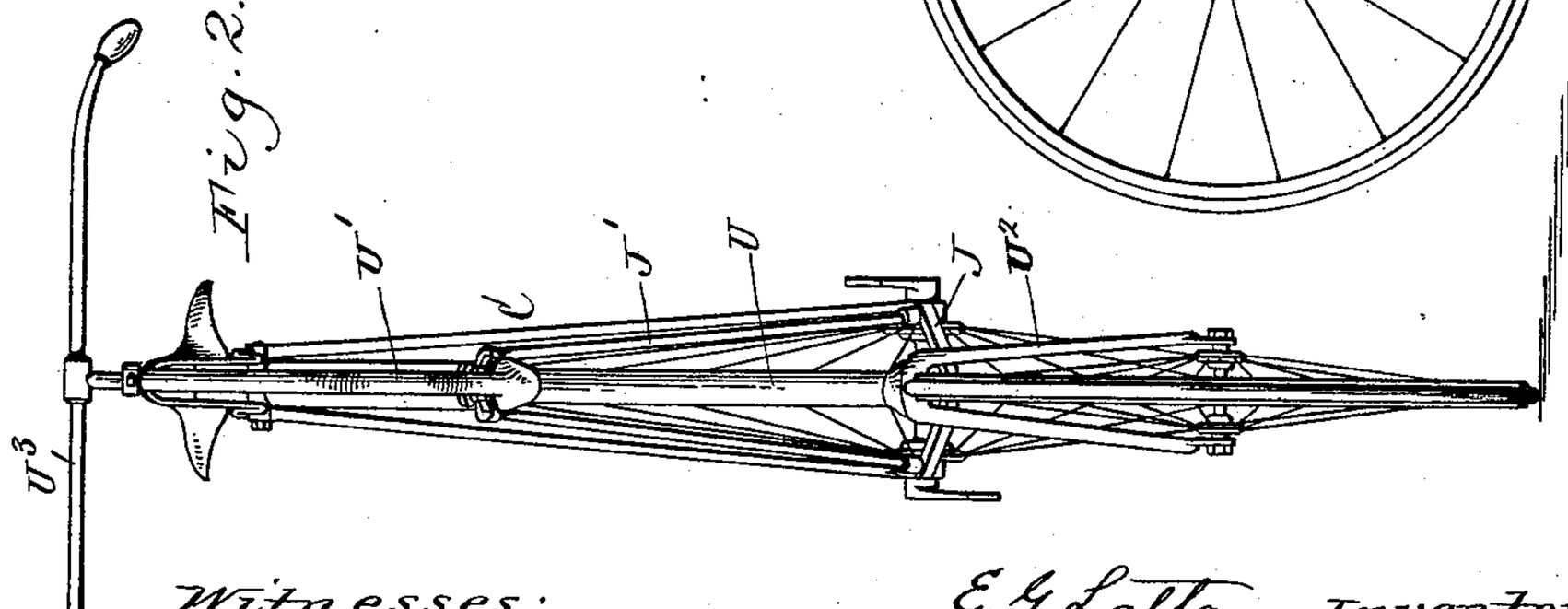


Fig. 2.



Witnesses:
Theo. L. Popp.
Jacob Nufsenblatt.

E. G. Latta Inventor.
By Wilhelm Bonner.
Attorneys.

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E. G. LATTA.

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Fig. 3.

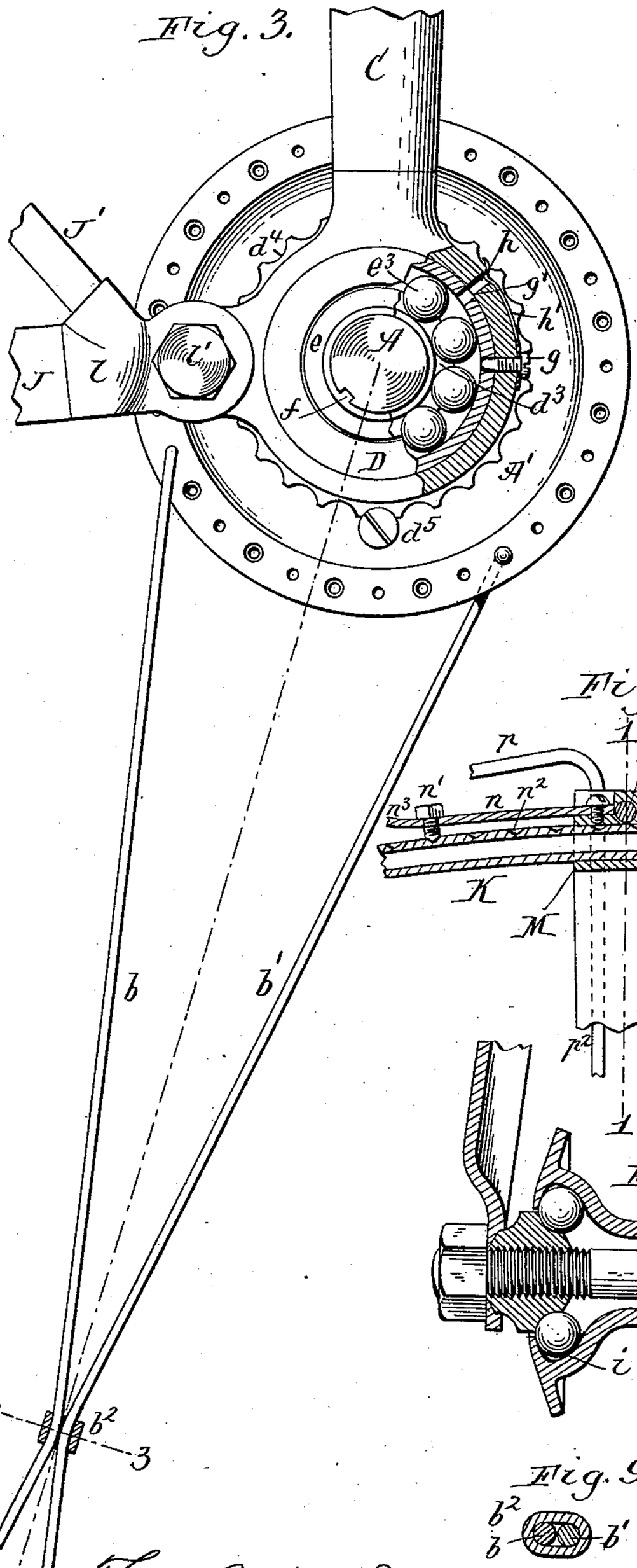

Fig. 4.

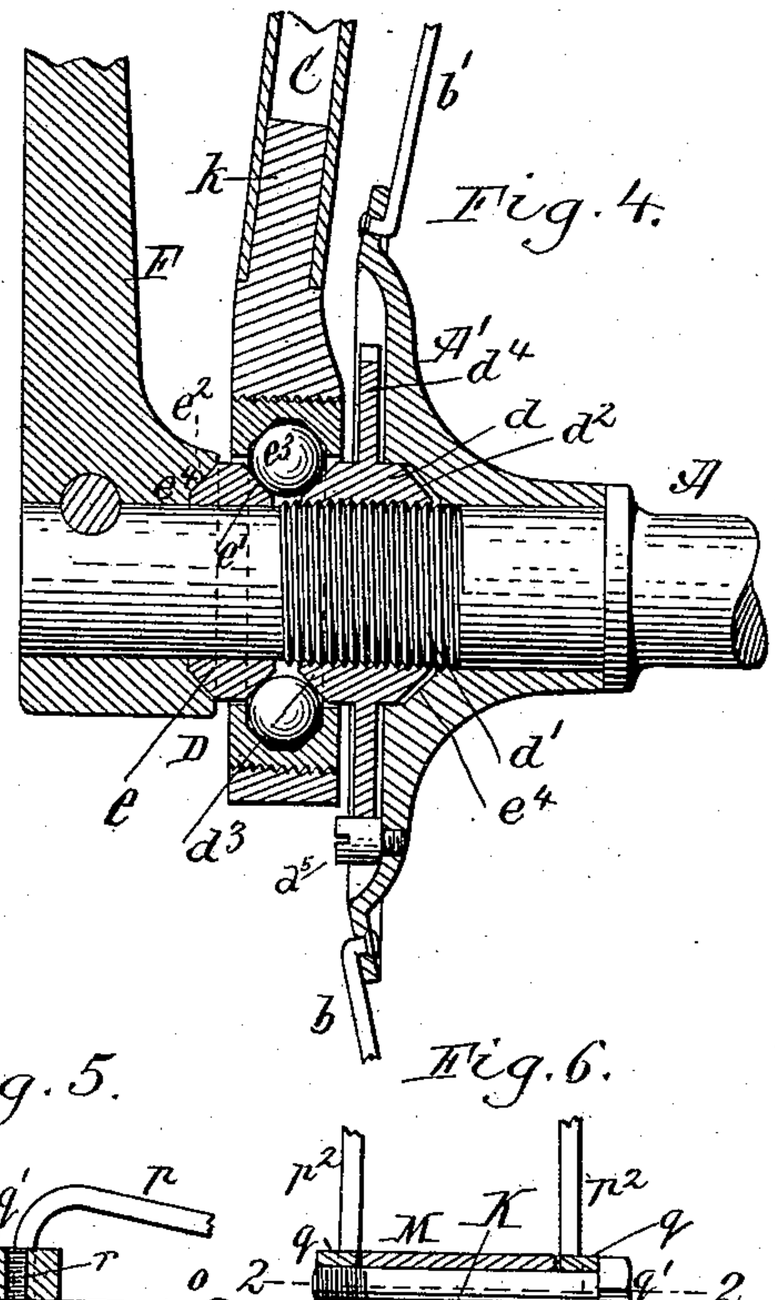

Fig. 5.

Fig. 6.

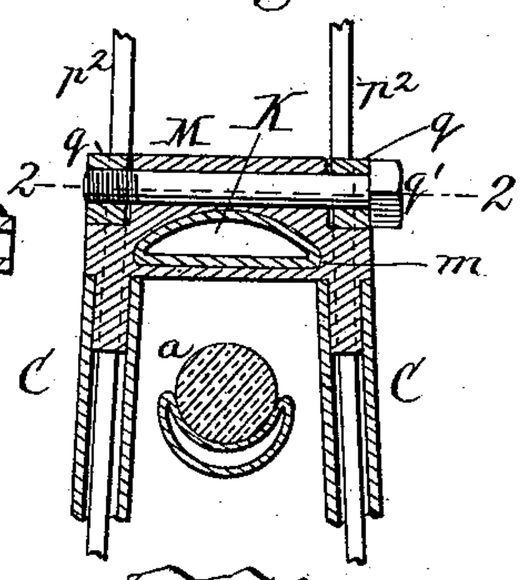

Fig. 7.

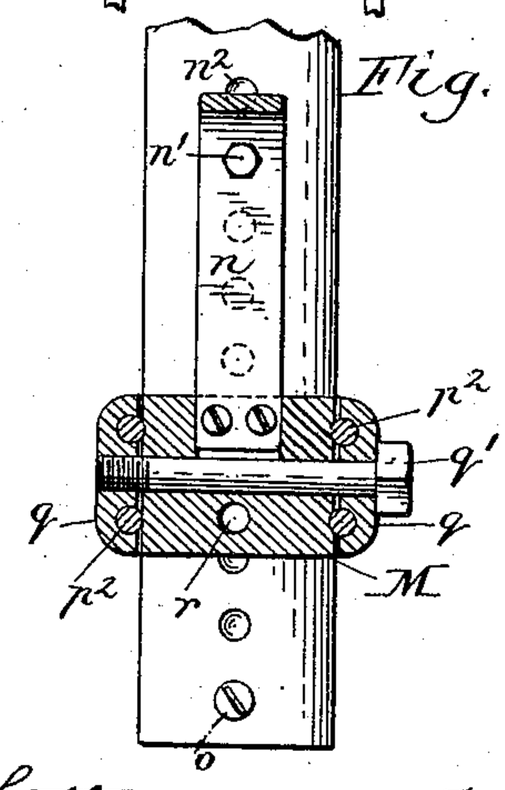

Fig. 8.

Fig. 9.

E. G. Latta Inventor.

Theo. L. Popp
Jacob Nusenblatt } Witnesses.

By Wilhelm & Bonner
Attorneys.

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E. G. LATTA.

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Fig. 10.

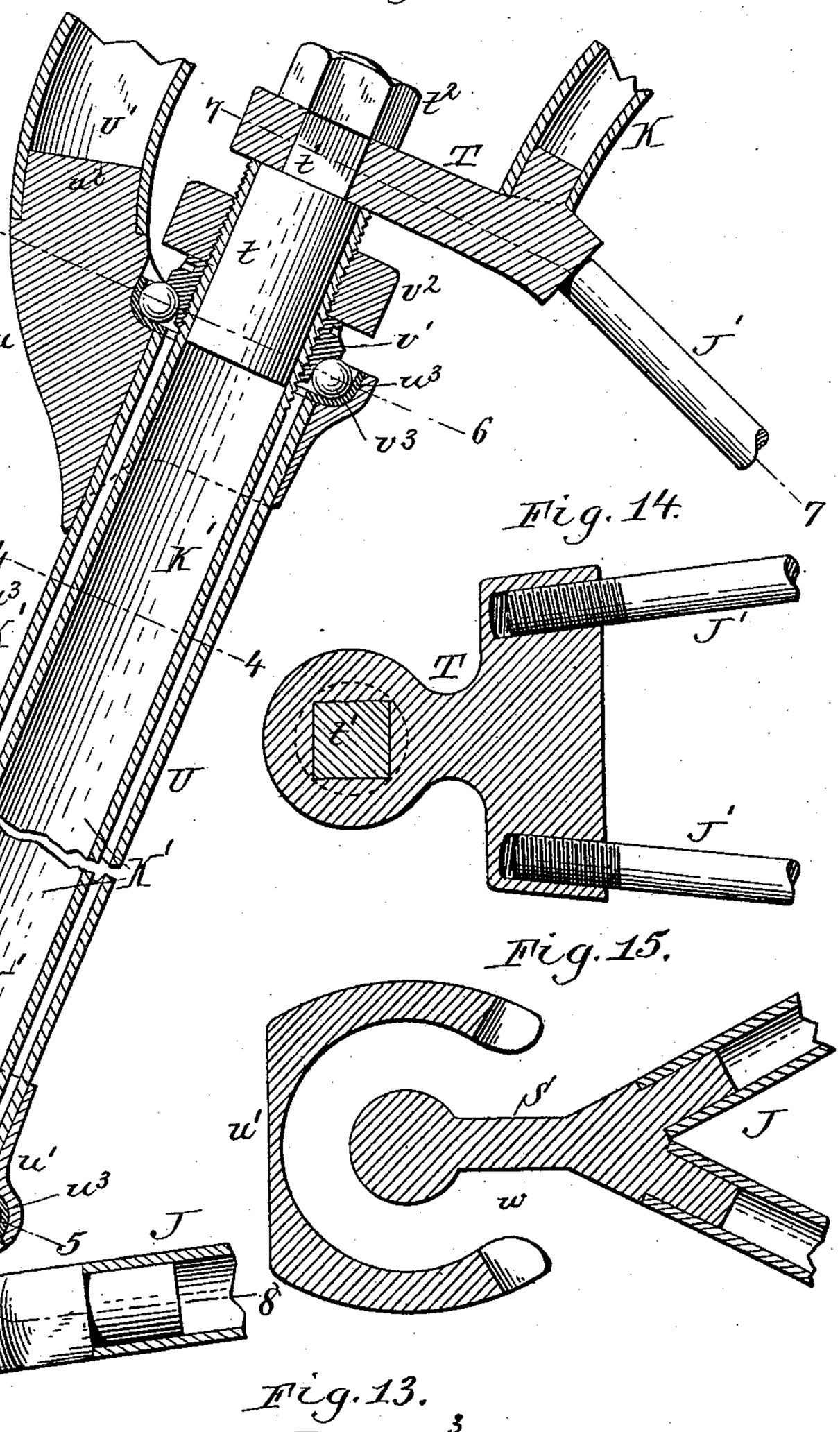


Fig. 11.

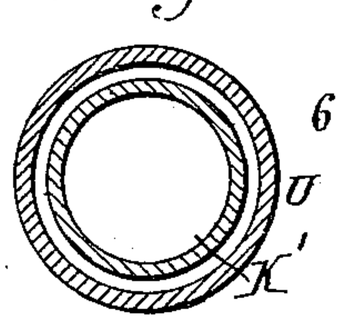


Fig. 12.

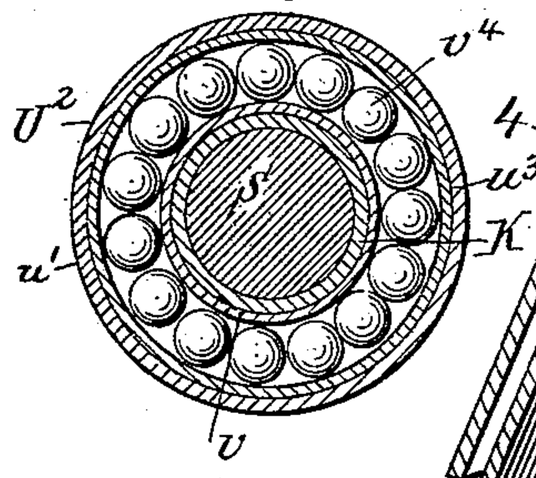
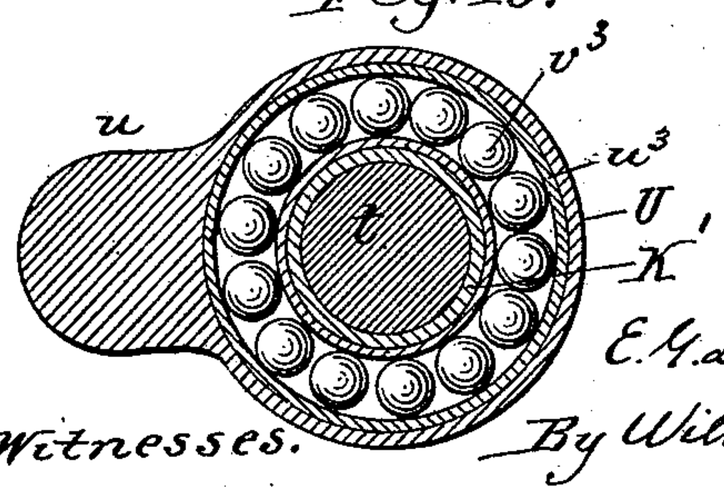


Fig. 14.

Fig. 15.

Fig. 13.



Theo. L. Popp.
Jacob Nussenblatt. } Witnesses.

E. G. Latta Inventor.
By Wilhelm Bonner
Attorneys.

UNITED STATES PATENT OFFICE.

EMMIT G. LATTA, OF FRIENDSHIP, NEW YORK.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 471,798, dated March 29, 1892.

Application filed February 3, 1890. Serial No. 339,024. (No model.)

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, a citizen of the United States, residing at Friendship, in the county of Allegany and State of New York, have invented new and useful Improvements in Velocipedes, of which the following is a specification.

This invention has more especial reference to velocipedes which are provided with a rear driving-wheel and a front steering-wheel, and which are driven by cranks secured directly to the axle of the rear wheel.

My invention has for its objects to increase the durability of the driving-wheel bearings, to render the saddle readily adjustable toward and from the handle-bars in a simple manner, and, finally, to improve the construction of the steering-head.

In the accompanying drawings, consisting of three sheets, Figure 1 is a side elevation of my improved velocipede with the brake and pedals omitted. Fig. 2 is a front elevation thereof. Fig. 3 is an enlarged side elevation of the central portion of the driving-wheel with the crank removed and a portion of the bearing-box broken away, showing a pair of spokes in place. Fig. 4 is a sectional elevation of one end of the axle of the driving-wheel and connecting parts. Fig. 5 is a longitudinal section of the reach on an enlarged scale, showing the manner of adjusting the saddle-supporting fork upon the same. Fig. 6 is a vertical section in line 1 1, Fig. 5. Fig. 7 is a horizontal section in line 2 2, Fig. 6. Fig. 8 is a sectional elevation of one end of the front-wheel axle and connecting parts on an enlarged scale. Fig. 9 is a cross-section of the spokes in line 3 3, Fig. 3. Fig. 10 is a sectional elevation of the steering-head on an enlarged scale. Figs. 11, 12, and 13 are cross-sections of the same in lines 4 4, 5 5, and 6 6, Fig. 10, respectively. Fig. 14 is a longitudinal section of the intermediate fork of the driving-wheel in line 7 7, Fig. 10. Fig. 15 is a cross-section in line 8 8, Fig. 10.

Like letters of reference refer to like parts in the several figures.

A represents the axle of the driving-wheel, A′ the hub-flanges mounted thereon, and *a* the rim of the wheel.

b represents a series of spokes extending from the outer face of the hub-flange to the rim, and *b′* a series of spokes extending from the inner face of the hub-flange to the rim at a different angle from the spokes of the opposite series.

C represents the upright fork of the driving-wheel, and D is the bearing-box arranged in the circular opening in the fork end and having an external screw-thread, which engages with an internal thread formed in said opening, as represented in Fig. 4.

d represents an adjustable internally-threaded collar arranged upon the outer threaded portion *d′* of the axle and provided with inner and outer cone-bearings d^2 d^3. This collar is also provided with the usual notched flange d^4, with which the retaining-screw d^5 engages in a well-known manner.

e is a stationary outer collar arranged upon the axle outside of the threaded portion thereof and provided with inner and outer cone-bearings *e′* e^2.

e^3 represents the balls interposed between the adjacent cones of the collars *d e* and the annular groove of the bearing-box D. The inner face of the crank F and the outer face of the hub-flange are recessed, as shown at e^4, to receive the adjacent cones of the collars *d e*. As represented in Fig. 3, the outer stationary cone is held against turning by a projection *f*, formed on the cone and entering a longitudinal groove in the axle. The bearing-box D is held against turning in the fork end by a screw *g*, arranged in a threaded opening in the fork end and engaging with its reduced end in one of several openings *g′*, formed in the periphery of the bearing-box, as represented in Fig. 3. The bearing-box rests with the upper part of its ball-groove upon the anti-friction balls, causing the upper part of the ball-groove to first wear out of true. Upon loosening the holding-screw *g* the box may be removed from the fork end and reversed therein or screwed into the same from the opposite side, so as to change the position of the box when its grooves are worn out of true and bring the part of the box which was below the axle above the same, and thus equalize the wear. After the box has been replaced it is again secured in position by the screw *g*.

h represents an oil-duct formed in the fork end and registering with one of the openings

g' in the bearing-box. The oil-duct h is closed by a cap or cover h', which is secured to the fork by the screw g. The openings g' are arranged at such a distance apart that one opening will register with the oil-duct when the screw g is engaged in the other opening in either position of the bearing-box.

If preferred, the box may be provided with a series of holes extending around the box, which construction permits the box to be adjusted by simply turning it in its seat without removing it from the fork. By making the bearing-box adjustable or reversible in this manner its durability is considerably increased.

Upon removing the crank from the axle one or both of the double cone-bearings d e may be reversed on the axle, so as to bring the opposite cones into play. The anti-friction balls gradually wear a groove into the face of the cones, causing increased friction and eventually requiring a new set of cones, and it frequently happens that a portion of one of the cones breaks off, or, owing to a flaw in the metal or poor tempering thereof, it wears unevenly and requires to be replaced by a new one. In the event of any of these occurrences it is only necessary to reverse the defective cone-bearing to bring the unused cone into an operative position, when the bearing will again be as useful and efficient as a new bearing. By thus making the cones double and reversible the life of the bearing is doubled without materially adding to the weight thereof or increasing its cost.

In case a cone wears out or becomes otherwise disabled when the rider is in a locality where a new one cannot be obtained this double and reversible feature of the cones is especially important and useful, as an impaired cone can be readily reversed and readjusted without delay and inconvenience, so that my improved bearing possesses a greater benefit than the mere saving in the cost of repairs. By seating the short outer cone in the recess formed in the crank-bars, as represented in Fig. 4, the cone is less liable to split under severe shocks than the short cones having square outer ends, as heretofore constructed.

In the modified construction of the bearing represented in Fig. 8, in which my improvement is applied to the small steering-wheel, a single double cone or collar is employed at each end of the axle, and the outer end of the cone is seated in a recess in the fork-arm. The hub of the wheel revolves on the axle and is provided in its ends with annular bearing-boxes i in the ordinary manner. In this construction the double cone may be reversed, as in the first-described construction.

In the drawings the bearing is shown as applied to the wheels of a velocipede; but it may obviously be applied to other journal parts of the velocipede. It is also obvious that the movable cone may be adjusted and locked in various ways and that it may be arranged on either side of the balls, or that both cones may be made adjustable, if desired.

J represents the lower horizontal fork of the driving-wheel, and J′ the intermediate fork.

K is the upper rear portion of the reach, and K′ the lower front part thereof, the two parts forming the main connecting-frame.

As represented in Fig. 4, the lower ends of the upright rear fork-arms C are secured to upwardly-projecting lugs k, formed on the fork ends. The lower and intermediate fork-arms are connected together at their rear ends by a coupling l, and are pivoted to a forwardly-projecting lug on the end of the upright fork C by a horizontal pivot-bolt l', as represented in Figs. 1 and 3. As represented in Figs. 1 and 6, the arms of the upright fork C are united above the driving-wheel by a union or coupling M, which is provided with an opening m, through which the upper part K of the reach passes, the upper end of the upright fork C being capable of moving forwardly and backwardly on the upper part of the reach.

Referring to Figs. 1, 5, and 7, n represents a spring-catch secured to the front side of the union M above the upper part of the reach and having a bolt or projection n', which is designed to engage in one of a number of recesses or depressions n^2, formed in the upper side of the reach, so as to lock the upper end of the upright fork C to the reach. The spring-catch n is provided with a forwardly and upwardly curved handle n^3, which terminates in convenient reach of the rider, and whereby the catch is raised to disengage its projection from the reach and release the upright fork.

o is a stop or bolt secured to the rear end of the reach, whereby the upright fork is prevented from moving rearwardly off the reach.

P represents the saddle attached to the upper end of the upright fork C. Upon releasing the fork from the reach the fork, with the saddle, may be adjusted forwardly or backwardly on the reach in the most convenient position for the rider, thereby enabling him to take advantage of the varying road-surface over which he passes by moving the saddle farther forward on ascending grades.

For expert riders the screw or projection n' may be adjusted to project only slightly beyond the spring-catch, so that the saddle-supporting fork may be shifted in either direction by the movement of the body alone without raising the catch by hand.

p p' represent the front and rear springs of the saddle, which support the flexible seat. As represented in Figs. 1, 5, 6, and 7, these springs are each formed with downward extensions or posts p^2, which pass through vertical openings in the coupling M and are adjustably secured in the upper ends of the tubular arms of the fork C by upright clamping-plates q q, arranged on opposite sides of the coupling M, and a horizontal clamping-bolt

q', passing through the coupling and clamping-plates. The upper portion of the coupling M is recessed on opposite sides to receive the clamping-plates, as shown in Fig. 6, and the clamping-plates are provided in their inner faces with grooves in which the vertical posts of the saddle-springs are seated. Upon loosening the clamping-bolt q' the saddle may be adjusted to any desired elevation. As the posts of the two supporting-springs are independent, the posts of the front spring may be raised and those of the rear spring lowered, or vice versa, so as to tilt the saddle in either direction. The springs of the saddle are each preferably composed of a single piece of steel wire secured at its doubled central portion to the end of the saddle, both springs extending outwardly and downwardly from the ends of the saddle, and thence inwardly under the saddle, as represented in Fig. 1. In case the rider does not desire to shift the saddle while riding the spring-catch n is removed and the screw n' thereof inserted in a threaded opening r, formed in the coupling M, so as to project with its end into one of the recesses of the reach and rigidly secure the upright fork to the reach. For a cheaper class of machine the upper end of the upright fork may be permanently secured to the reach by brazing, in which case the spring-catch n is omitted, and the rear ends of the intermediate and lower forks J J′ are rigidly secured to the lower end of the upright fork instead of being pivoted thereto.

As represented in Fig. 10, the lower part K′ of the reach is cylindrical in form and rigidly connected at its lower end to the outer end of the lower fork J by an angular coupling or union S, having cylindrical stubs, which enter the ends of the reach and fork and are brazed therein. The lower part K′ of the reach is connected at its upper end to the outer end of the intermediate fork J′ by a coupling T, which is secured to the adjacent front ends of the fork J′ and upper reach K by brazing or in any other suitable manner. The lower part K′ of the reach is provided in its upper end with a stub t, having a square projecting shank t', which passes through a square opening in the coupling T, as represented in Figs. 10 and 14, and is secured to the coupling by a screw-nut t^2, applied to the threaded upper end of its shank. The arms of the intermediate fork J′ are preferably constructed of steel rods and are secured to the unions or couplings l and T by right and left hand threads formed at opposite ends of the rods and engaging in correspondingly-threaded openings or sockets formed, respectively, in said couplings.

U represents the inclined tubular steering-head, which surrounds the lower cylindrical part K′ of the reach.

U′ is an upward extension or handle-bar support secured to the upper end of the cylindrical head by a forging u, and U^2 is the fork of the front wheel secured to the lower end of the steering-head by a forging u'. These forged ends $u\ u'$ are preferably brazed to the steering-head, and the handle-bar support is brazed to a lug u^2, formed on the front side of the forging u. The forgings $u\ u'$ are provided with recessed or open flaring ends to form bearing-boxes, in which are arranged hardened-steel linings u^3.

v is a fixed cone surrounding the lower end of the cylindrical reach inside of the lower box u', and v' is an adjustable cone arranged upon the threaded upper portion of the cylindrical reach inside of the upper box u, and which is held in place by a jam-nut v^2.

v^3 represents a row of balls arranged between the lining of the box u and the adjustable cone v', and v^4 a row of balls interposed between the lining of the lower box u' and the fixed cone v. The handle-bar support U′ is bent or offset to clear the parts at the upper end of the cylindrical reach and is curved inwardly and upwardly to a position in front of the saddle.

U^3 are the handle-bars secured to the support U′. The handle-bars can be adjusted vertically in their support without materially changing their position in front of the saddle.

As represented in Fig. 15, the neck of the angular coupling S is made comparatively narrow, and the opening w in the upper rear side of the front fork is somewhat enlarged to afford the requisite range of movement to the coupling.

I claim as my invention—

1. The combination, with an axle, of a bearing-box having a ball-groove and forming the outer part of the bearing, and a reversible collar or cone arranged upon the axle and forming the inner part of the bearing, substantially as set forth.

2. The combination, with an axle, of a bearing-box provided with a groove adapted to receive a row of balls, and a collar having cones or bearing-surfaces at both ends and made reversible on the axle, substantially as set forth.

3. The combination, with a bearing-box adapted to receive a row of balls, of a pair of collars having cones or bearing-surfaces at both ends and made reversible in the bearing-box, substantially as set forth.

4. The combination, with an axle and a bearing-box having a ball-groove, of a reversible cone or collar adjustably arranged upon the axle, and a fastening whereby the adjustable collar is secured in position, substantially as set forth.

5. The combination, with an axle and a collar arranged upon the axle and having cones or bearing-surfaces at both ends, of a crank or other part whereby the collar is held upon the axle and countersunk or recessed to form a seat for the adjacent end of the collar, substantially as set forth.

6. The combination, with an axle and a pair of reversible collars or cones mounted on the axle, of a bearing-box surrounding said collars and capable of being reversed or turned

in its support to bring different portions of its bearing-surface above the axle, substantially as set forth.

7. The combination, with a hollow steering-head and a handle-bar support attached thereto, of a steering-wheel frame rigidly connected to the steering-head, and a reach or support passing through the steering-head, substantially as set forth.

8. The combination, with a hollow steering-head and a handle-bar support attached thereto, of a steering-wheel frame rigidly connected to the steering-head, and a rear-wheel frame pivotally secured to the steering-wheel frame by a connection or reach passing through the ends of the steering-head, substantially as set forth.

9. The combination, with the front-wheel frame and the rear-wheel frame, of a hollow steering-head rigidly secured at its lower end to the front-wheel frame, and a reach or support passing through the steering-head and connecting the front ends of the rear-wheel frame, substantially as set forth.

10. The combination, with the front-wheel frame and the rear-wheel frame, of a hollow steering-head rigidly secured at its lower end to the front-wheel frame, a reach or support passing through the steering-head and connecting the front ends of the rear-wheel frame, and ball-bearings located at opposite ends of the hollow steering-head and surrounding the reach or support of the rear-wheel frame, substantially as set forth.

11. The combination, with the front-wheel frame and the rear-wheel frame, of a hollow steering-head rigidly secured to the front-wheel frame, a reach or pivotal support passing through the steering-head and connecting the front ends of the rear-wheel frame, a vertical fork pivoted to the rear-wheel frame and capable of swinging forwardly and backwardly on opposite sides of the center of the rear wheel, and a saddle supported upon said fork and made vertically adjustable thereon, substantially as set forth.

Witness my hand this 30th day of January, 1890.

EMMIT G. LATTA.

Witnesses:
C. J. RICE,
FRED H. RICE.