(No Model.)

3 Sheets—Sheet 1.

E. G. LATTA.

BICYCLE.

No. 301,245. Patented July 1, 1884.

Fig. 1.

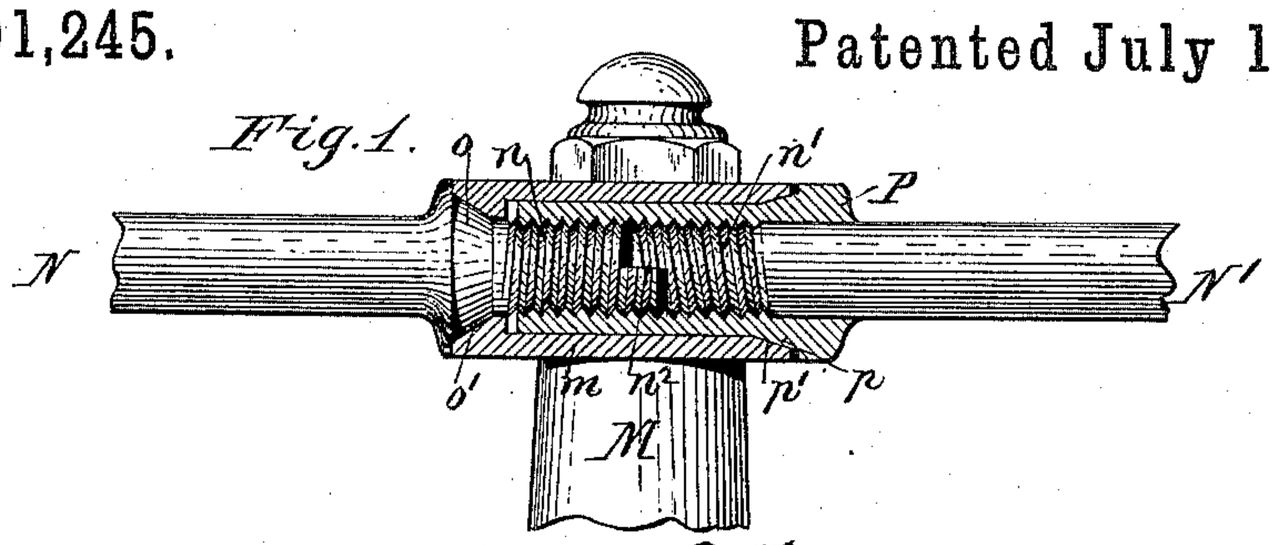

Fig. 2.

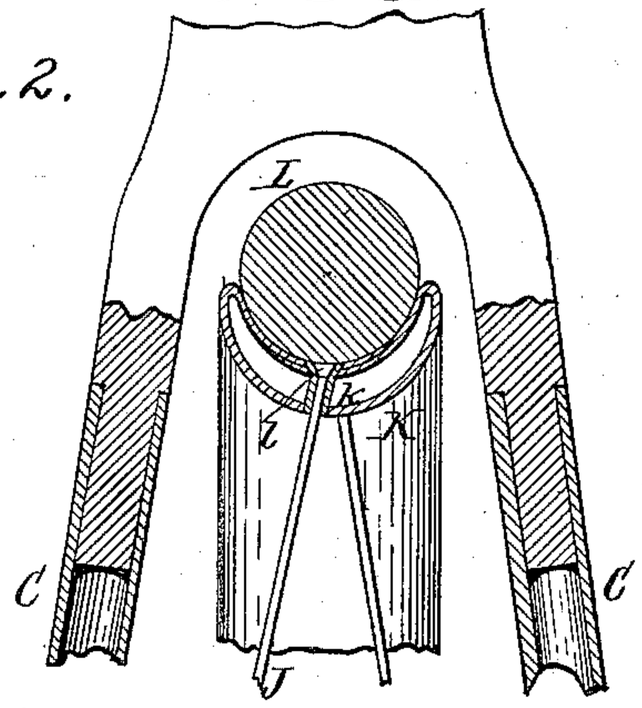

Fig. 3.

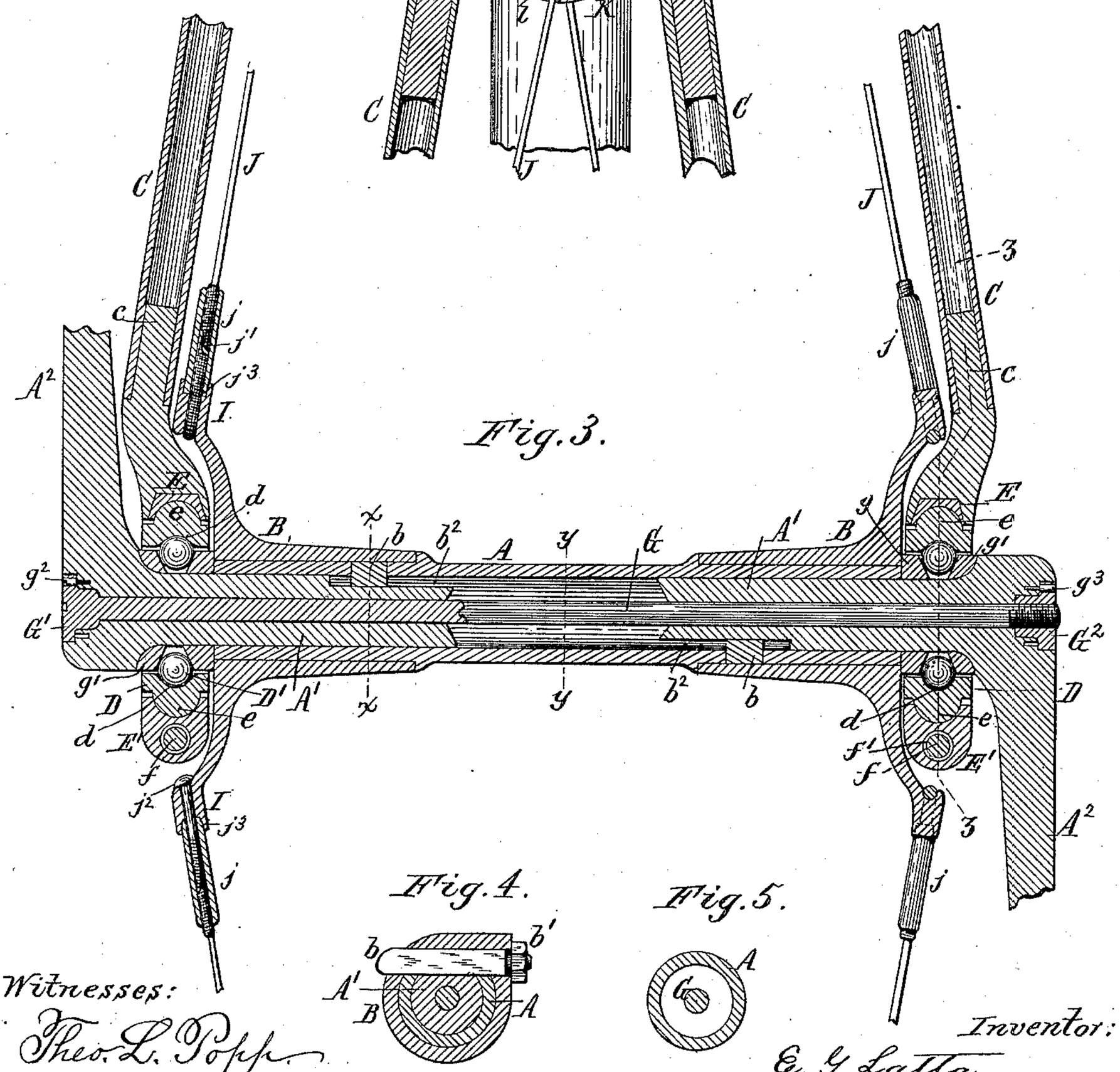

Fig. 4.

Fig. 5.

Witnesses:

Theo. L. Popp

Geo E. Pittman

Inventor:

E. G. Latta

By Wilhelm & Bonner.

Attorneys.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 6.

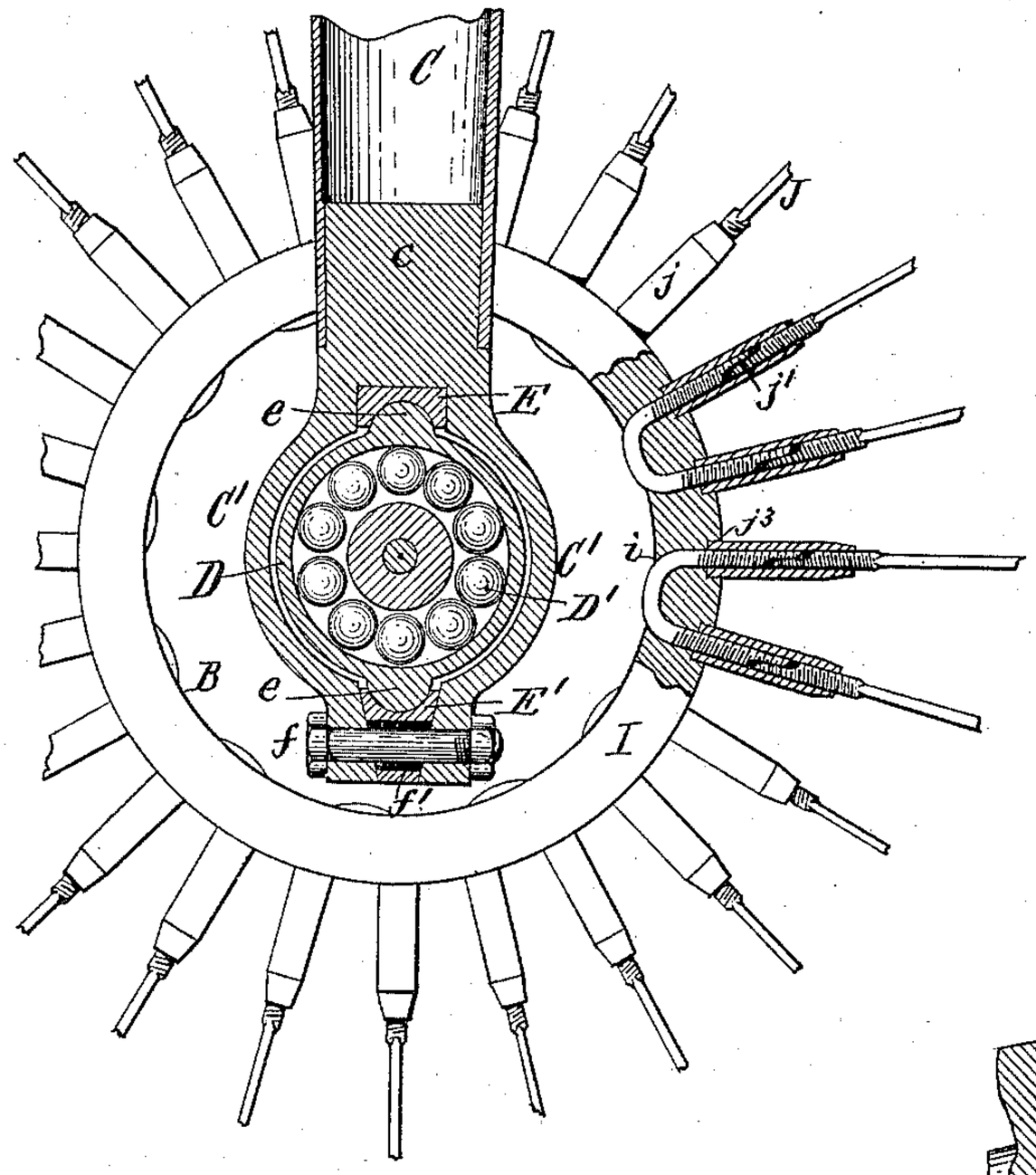

Fig. 7.

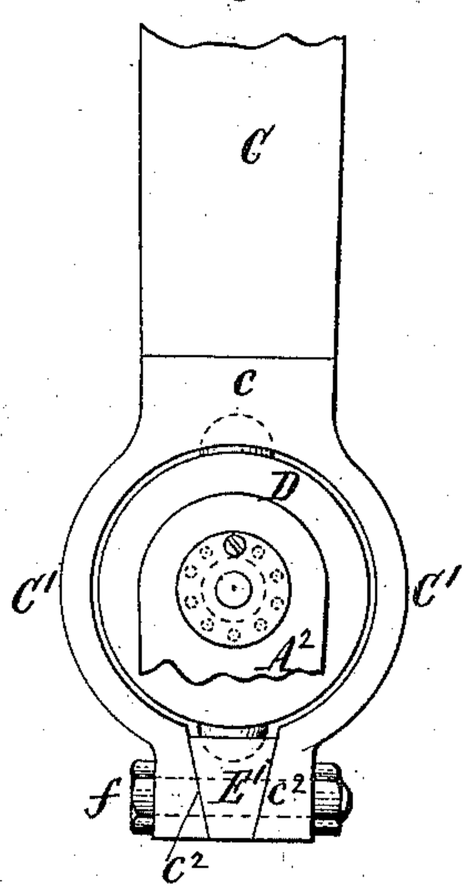

Fig. 9.

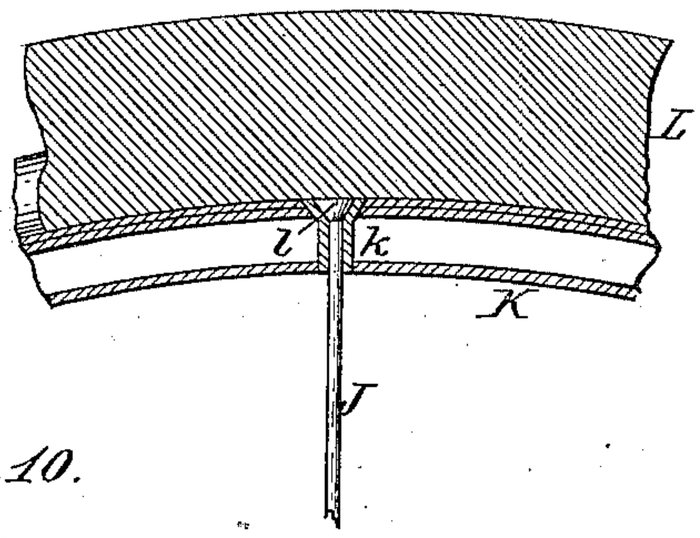

Fig. 8.

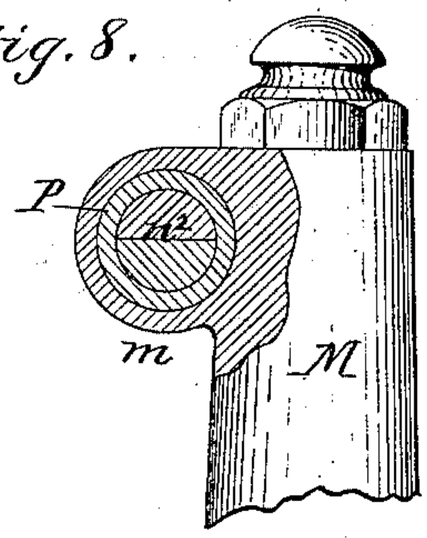

Fig. 10.

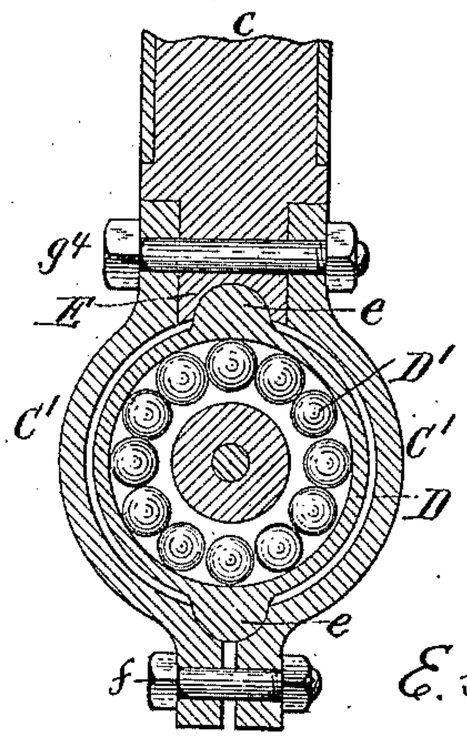

Fig. 11.

Fig. 12.

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By Wilhelm & Bonner
Attorneys.

(No Model.)

3 Sheets—Sheet 3.

E. G. LATTA.

BICYCLE.

No. 301,245. Patented July 1, 1884.

Fig. 13.

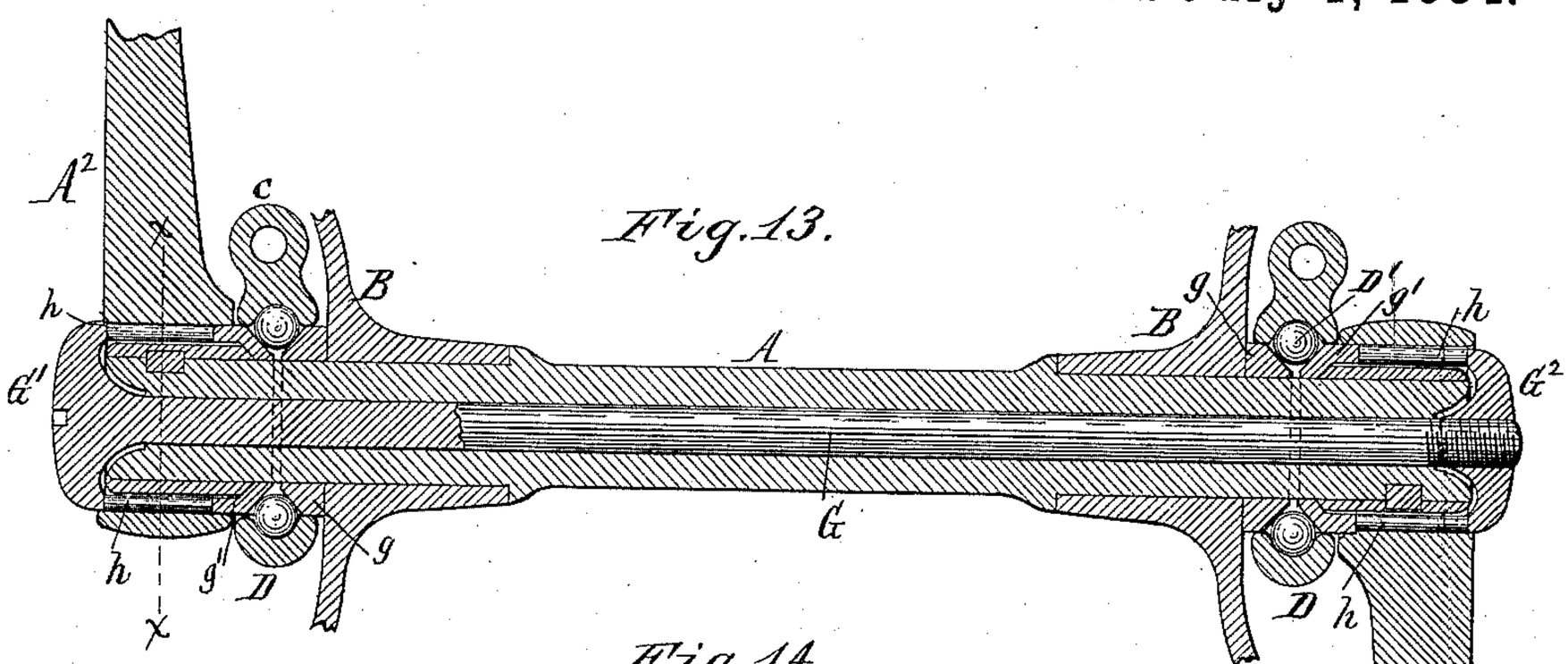


Fig. 14.

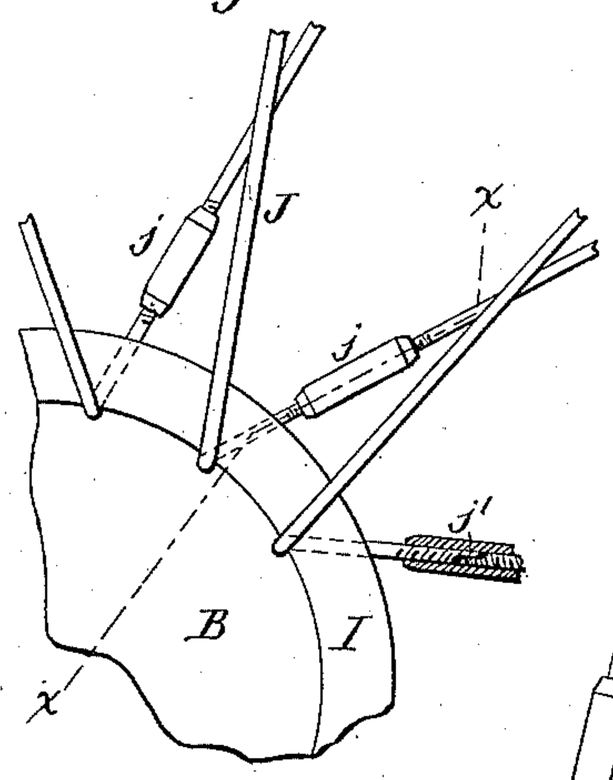


Fig. 17.

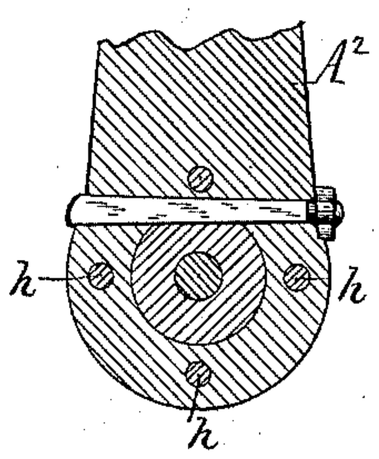


Fig. 18.

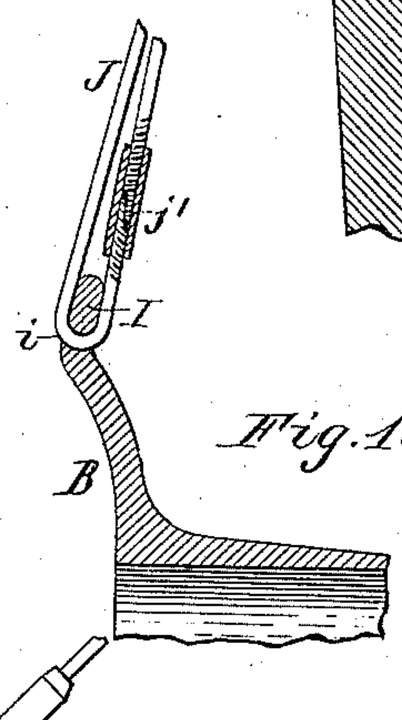


Fig. 15.

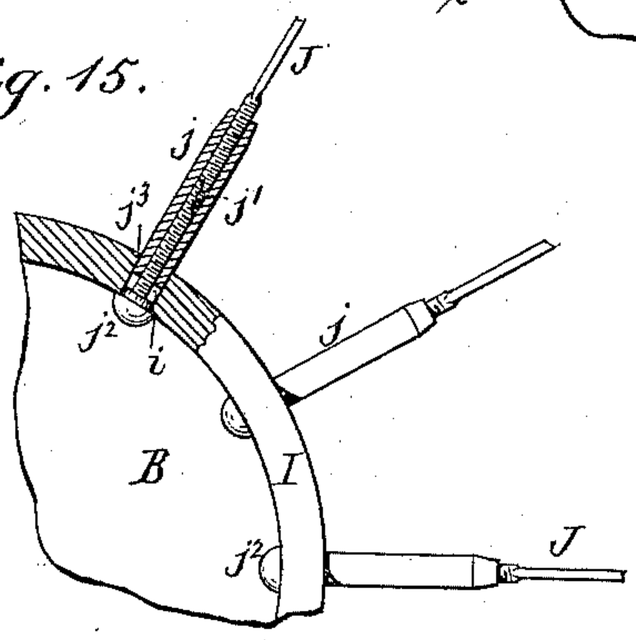


Fig. 16.

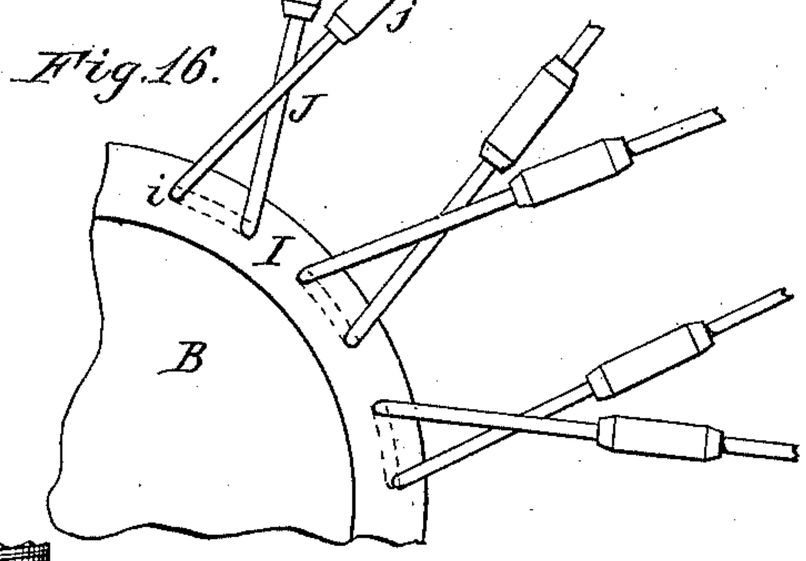
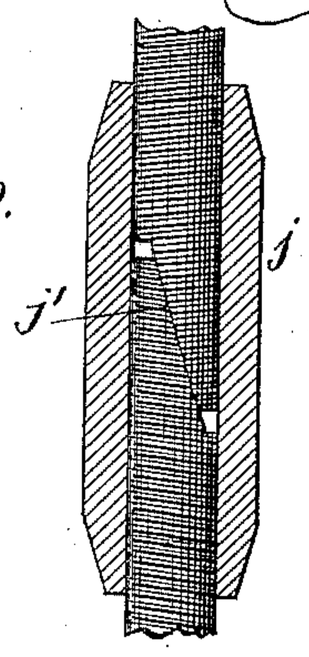


Fig. 19.



Witnesses:
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Geo. E. Pitman

E. G. Latta Inventor.
By Wilkelm & Bonner.
Attorneys.

UNITED STATES PATENT OFFICE.

EMMIT G. LATTA, OF FRIENDSHIP, NEW YORK, ASSIGNOR OF ONE-HALF TO ADRIAN C. LATTA, OF SAME PLACE.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 301,245, dated July 1, 1884.

Application filed July 27, 1883. (No model.)

To all whom it may concern:

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

The object of this invention is to produce a light, strong, and durable wheel in which the desired tension can be readily given to the spokes, and in which both bearings can be simultaneously adjusted for wear, and in which the bearings can adjust themselves to the position of the fork.

My invention also relates to a novel construction of a sectional handle, whereby both parts of the handle are rigidly secured in the desired position.

My invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of three sheets, Figures 1, 2, and 3 are vertical fragmentary cross-sections of the steering-head, wheel, and axle. Figs. 4 and 5 are cross-sections in lines *x x* and *y y*, Fig. 3. Fig. 6 is a cross-section in line *z z*, Fig. 3. Fig. 7 is a side elevation of the bearing. Fig. 8 is a longitudinal sectional elevation of the upper end of the steering-head. Fig. 9 is a longitudinal section of a portion of the rim. Fig. 10 represents a modified construction of the bearing. Fig. 11 is an end elevation of the divided washer on an enlarged scale. Fig. 12 is a sectional elevation of the same. Fig. 13 is a longitudinal section of the axle, representing a modified construction of the device for adjusting the bearing. Figs. 14, 15, and 16 are fragmentary sectional elevations of the hub, showing various applications of the screw-joint whereby the spokes are adjusted. Fig. 17 is a cross-section in line *x x*, Fig. 13. Fig. 18 is a cross-section in line *x x*, Fig. 14. Fig. 19 is a longitudinal section of the screw-joint on an enlarged scale.

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

A represents the hollow central part of the axle; A′ A′, the end portions of the axle, seated in the ends of the hollow portion A, and A^2 A^2 the cranks formed in one piece with the end portions, A′.

B B represent the hubs secured to the hollow central part, A, of the axle near both ends by keys *b* and screw-nuts *b*′. These keys also serve to prevent the end portions, A′, of the axle from turning in the hollow portion A, the inner ends of the end portions, A′, being made flat, as shown at b^2, to engage with said keys in such manner that the end portions, A′, can move lengthwise in the hollow portion A, but cannot turn therein.

C C represent the arms of the fork, and *c c* lugs or shanks secured to the lower ends of the arms C, and terminating in semicircular jaws C′.

D represents annular bearing-boxes, arranged between the jaws C′, and provided on their inner sides with annular grooves *d*, in which are arranged balls D′.

e represents semi-spherical, conical, or similar projections formed, respectively, on the upper and lower sides of the bearing-boxes D, and forming journals or pivots on which the bearing-boxes can turn.

E represents a bearing-piece of hardened steel or similar metal, seated in the shank *c* at the junction of the jaws C′ C′, and provided on its under side with a semi-spherical, conical, or other recess, in which the upper pivot *e* of the adjacent bearing-box D turns.

E′ represents a bearing-piece arranged below each bearing-box D, and provided on its upper side with a recess, in which the lower pivot *e* of the adjacent bearing-box turns. The sides of the bearing-piece E′ converge downwardly, and the adjacent faces c^2 of the jaws C′ also converge downwardly, as clearly represented in Figs. 6 and 7.

f represents a bolt or screw, which passes through the lower ends of the jaws C′ C′ and the bearing-piece E′, whereby the lower ends of the jaws are drawn together, and the bearing-piece E′ is forced upwardly against the bearing-box D and the latter against the bearing-piece E. The bearing-boxes D are loosely fitted in the jaws and bear only at the pivots *e*, so that the boxes can turn freely on their pivots and adjust themselves to the position

of the fork-arms when the latter are thrown out of line, thereby avoiding cramping or binding of the bearings on the axle. By adjusting the screw or bolt *f* a snug fit of the pivots *e* in their sockets can be maintained. The opening *f'* in the bearing-piece E', through which the bolt *f* passes, is made larger than the bolt, so that the bearing-piece E' can move on the bolt, both vertically and horizontally, as the bearing-box is adjusted on the axle.

g represents the inner cone bearings or collars, which rest against the outer ends of the hollow central portion, A, of the axle, and bear with their outer conical faces against the balls D'.

g' represents the outer cone-bearings, which are seated with their outer sides against the hubs of the cranks A^2, and bear with their inner conical faces against the balls D'.

G represents the adjusting-rod, which extends through an opening formed lengthwise through the axle. The rod G is provided at one end with a head, G', which is seated in a recess in the outer face of one of the axles, and the opposite end of the adjusting-rod is provided with a screw-thread, to which a screw-nut, G^2, is applied, which is seated in a recess in the outer face of the adjacent crank. Upon tightening the screw-nut G^2, the end portions, A', of the axle are drawn toward each other, thereby drawing the outer cone-bearing, *g'*, inwardly and adjusting both bearings simultaneously. The adjusting-rod G may be tightened either by turning the screw-nut G^2 or the head G', the latter being provided with a slot for the insertion of a screw-driver. The head G' and screw-nut G^2 are secured in position, after having been adjusted, by screws g^2 g^3, passed, respectively, through the head G' and screw-nut G^2, and engaging in threaded openings formed in the axle and cranks.

As represented in Figs. 3, 6, and 7, the jaws C' are formed in one piece with the shank *c;* but, if preferred, the jaws may be made separate and attached to the shank *c* by a horizontal bolt, g^4, as represented in Fig. 10, whereby a universal adjustment is provided for the bearings, and the lower bearing-piece E may be omitted, if desired, and the socket for the lower pivot be formed directly in the jaws C' C', as represented in Fig. 10. Any looseness which may exist in the bearings is divided between both bearings by the adjusting-rod G, thereby causing the wheel to run steady, and reducing the wear on the bearings. The nut G^2 may be dispensed with by screwing the threaded end of the adjusting-rod G into a threaded opening formed in the adjacent end portion, A', of the axle; but this construction is not so desirable, because it involves the use of right and left hand portions, one being different from the other. When the axle is constructed in one piece, as represented in Fig. 13, the adjusting-rod G can be connected with the bearings by enlarging the head G' and screw-nut G^2, so as to extend beyond the axle, and connecting the head G' and screw-nut G^2 with the outer cone-bearings, *g'*, by sliding pins or bolts *h*, arranged in longitudinal openings formed in the hubs of the cranks, which latter are in this case secured to the axle by keys or other well-known means. The cranks may be mounted on the axle so as to be capable of lengthwise movement on the same, and the ends of the shifting-rod may be connected with the movable cranks so as to draw the latter against the outer cone-bearings. This method of adjustment may be applied to the rear wheel as well as to the driving-wheel. The bearing-boxes D may be reversed to bring their lower sides above the balls when the upper part of the groove in the bearing-box has become worn, and as the wear is principally on the upper side of the bearing-box this construction of the box nearly doubles the life of the same.

I I are the flanges of the hubs B.

J represents the spokes.

K represents the metallic rim of the wheel, and L the rubber tire.

The spokes J are made in two parts having their ends provided with screw-threads, one being a right-hand and the other a left-hand thread. Both parts are connected by a screw-sleeve, *j*, provided with internal right and left hand screw-threads adapted to engage with the screw-threads on the ends of the spoke. The ends of the spoke are cut away so that they lap by each other when the spoke is tightened, as shown at *j'*, and the fragmentary screw-threads on the flattened end portions of the spoke are jammed or stripped as the sleeve *j* is screwed home, whereby the sleeve is securely held on the spoke. The overlapping ends of the two portions of the spoke are preferably made tapering, whereby they are caused to wedge outwardly against the internal screw-thread of the sleeve and bind in the latter and prevent it from unscrewing. This screw-joint is preferably formed on the spokes by dividing the spoke into two parts, one being passed through the opening in the flange I of the hub B and provided with a head, j^2, on the inner side of the flange. The head j^2 is preferably flattened on one side, to rest against the outer side of the hub, thereby preventing the inner end of the spoke from turning. The other part of the spoke is passed through an opening in the rim K, and provided with a head, *l*, on the outer side of the rim, as clearly represented in Fig. 2. In order to present a neat appearance, the screw-sleeves *j* are preferably arranged against the outer sides of the flanges I, the inner ends of the sleeves projecting into sockets j^3, formed in the outer faces of the flanges I. By turning the sleeves *j* so as to draw the two parts of the spoke together, the proper tension is given to the spokes. The inner portions of the spoke may be constructed in the form of a U or staple, as represented in Fig. 6, both legs of the

staple being screw-threaded, and each staple connected with two spokes; or one spoke may be bent through two of the openings *i* in the flange I, and another spoke may be connected with the bent spoke by the screw-joint above described, so that one screw-sleeve will tighten two spokes, as represented in Fig. 14. The openings through the flange I may be made large enough to pass the screw-sleeve *j* through them, and in this case the inner end of the spoke is provided with a shoulder adjacent to the head j^2, whereby the inner end of the spoke is centered in the opening. The rim K is constructed of a strip of sheet or rolled metal, with its edges overlapping each other on the inner side of the rubber tire L, as clearly represented in Fig. 2. The lapped edges of the rim are brazed together, and the rim possesses two thicknesses of metal on its outer side, whereby the heads of the spokes are supported, and it is therefore less liable to buckle or get out of shape than ordinary rims. The outer headed ends of the spokes are secured to the rim by flanged washers *k*, which fill the holes formed in the rim around the spokes, and prevent the heads of the spokes from drawing through these holes. The holes in the rim can be made large enough to permit the heads of the spokes to pass through them, thereby avoiding the necessity of heading the spokes after they are passed through the rim. The washer *k* may be divided, as represented in Fig. 11, so that it can be clasped around the spoke on the inner-side of its head after the headed end has been passed through the opening in the rim; or it may be made solid and passed over the spoke before heading it, to permit a butt-ended spoke to be put through the same.

M represents the steering-head, and N N′ the handle-bars, secured in a lug, *m*, formed on the steering-head. The inner ends of the handle-bars N N′ are provided with screw-threads *n n′*, one being a right-hand and the other a left-hand thread, and the inner portions of the threaded ends are cut away or made flat to lap by each other, as shown at n^2. The handle-bar N is provided with a conical or tapering shoulder, *o*, which fits in a corresponding socket, *o′*, formed in one end of the hollow lug *m*.

P represents a screw-sleeve, which surrounds the inner end of the handle-bar N′ and fits snugly in the bore of the lug *m*. The sleeve P is constructed with a conical or tapering shoulder, *p*, fitting in a corresponding socket, *p′*, formed in the adjacent end of the lug *m*. The screw-thread in the sleeve P is a right and left hand thread, adapted to engage with the right and left hand threads *n n′* of the handle-bars N N′.

In order to secure the handle-bars to the steering-head, the bar N is inserted into the lug *m*, the sleeve P is inserted in the lug from the opposite end and its screw-thread started on the threaded end *n* of the handle-bar N. The handle-bar N′ is then introduced into the opposite end of the sleeve, and its screw-thread *n′* started in the thread of the sleeve. Upon turning the sleeve P by a wrench applied to its outer end, the two handle-bars are drawn together until their inner ends overlap and the conical shoulders are tightened in the ends of the lug *m*.

For bent or dropped handle-bars the end of the sleeve may be made to match the shoulder on the handle-bar N, and the handles themselves may be used to tighten the parts, and by turning the sleeve to the desired point for tightening the bars, the bars can be set to hold the bent ends at any desired angle. This adjustment permits either bar to be quickly removed when required for replacing or adjusting either of the parts, or for storing or shipping the machine, and keeps both ends of a bent handle-bar at the same angle.

I am aware that a rod or bar has been passed through the axle of the wheel for securing the cranks and other parts to the axle, and this I do not claim.

I claim as my invention—

1. The combination, with an axle, of bearings capable of adjustment in the direction of the axle, and a bar or rod passing through the axle, whereby both bearings are simultaneously adjusted, substantially as set forth.

2. The combination, with an axle having movable end portions and a connecting central portion, of bearings capable of adjustment in the direction of the axle, and a bar or rod passing through the axle and connecting the movable end portions, whereby the bearings are adjusted, substantially as set forth.

3. In a bicycle or tricycle, the combination, with a fork provided with two bearings, and a shaft supported in said bearings, of bearing-boxes having pivots on their upper and lower sides, on which the boxes can adjust themselves in the arms of the fork when said arms are thrown out of line, substantially as set forth.

4. The combination, with the fork or frame having jaws C′ C′, of a bearing-box having pivots on its upper and lower sides, and means whereby the box can be adjusted vertically between the jaws C′ C′, substantially as set forth.

5. The combination, with the fork or frame having jaws C′ C′, provided with inclined ends c^2, of a bearing-box having pivots *e* on its upper and lower sides, and a tapering block, E′, supporting the lower pivot and arranged between the inclined ends of the jaws C′, substantially as set forth.

6. The combination, with the fork or frame, of an annular bearing-box having projections or pivots on its upper and lower sides, and made vertically reversible in the fork or frame, substantially as set forth.

7. In a wheel, the combination, with a spoke composed of two parts, having their ends provided, respectively, with right and left hand screw-threads, and made to overlap each other,

of a screw-sleeve connecting the threaded ends of the spoke, substantially as set forth.

8. A wheel-rim consisting of a single strip of sheet metal bent to form a hollow rim, and having its overlapping edges arranged on the outer side of the rim, substantially as set forth.

9. A hollow wheel-rim composed of a single strip of sheet metal constructed with overlapping edges secured together, substantially as set forth.

10. The combination, with a headed spoke, of a rim having an opening large enough to permit the head of the spoke to pass through it, and a divided washer adapted to be closed around the spoke and to prevent its head from drawing through the opening in the rim, substantially as set forth.

11. The combination, with the steering-head having a hollow lug, *m*, of handle-bars N N′, provided with inner threaded ends, *n n′*, having overlapping portions n^2, and a connecting screw-sleeve, P, substantially as set forth.

12. The combination, with the steering-head provided with a hollow lug, *m*, of a handle-bar, N, having an inner threaded end, *n*, and a conical shoulder, *o*, a handle-bar, N′, having an inner threaded end, *n′*, and a connecting screw-sleeve, P, having a conical collar, *p*, substantially as set forth.

Witness my hand this 16th day of July, 1883.

EMMIT G. LATTA.

Witnesses:
S. M. NORTON,
F. B. CHURCH.