

(No Model.)

3 Sheets—Sheet 1.

F. J. OSMOND.
CHAIN ADJUSTING DEVICE.

No. 586,912.

Patented July 20, 1897.

Fig. 1.

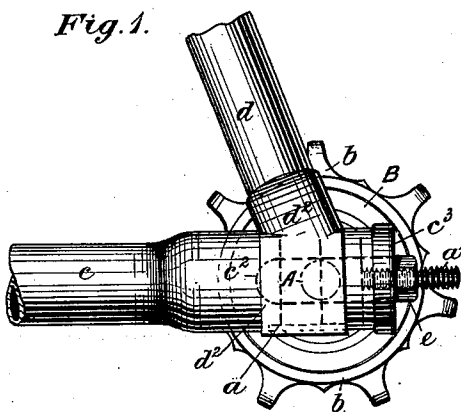


Fig. 2.

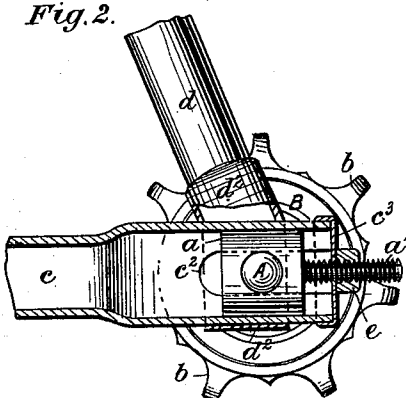


Fig. 3.

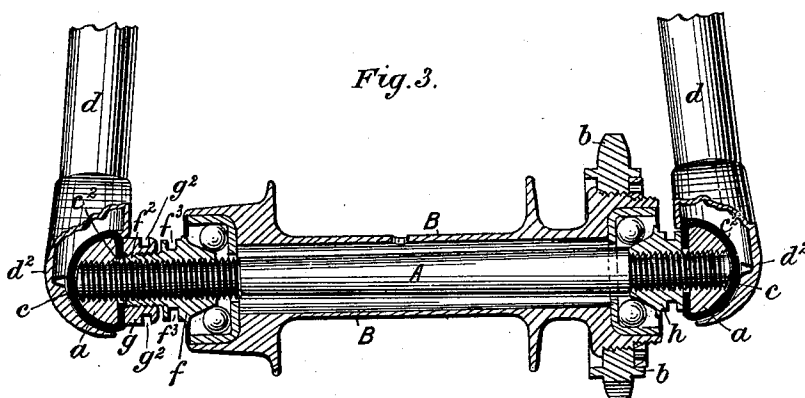


Fig. 4.

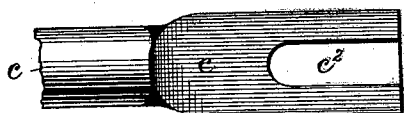


Fig. 4^A.



Witnesses;—

Richard Bennett
Arthur John Powell

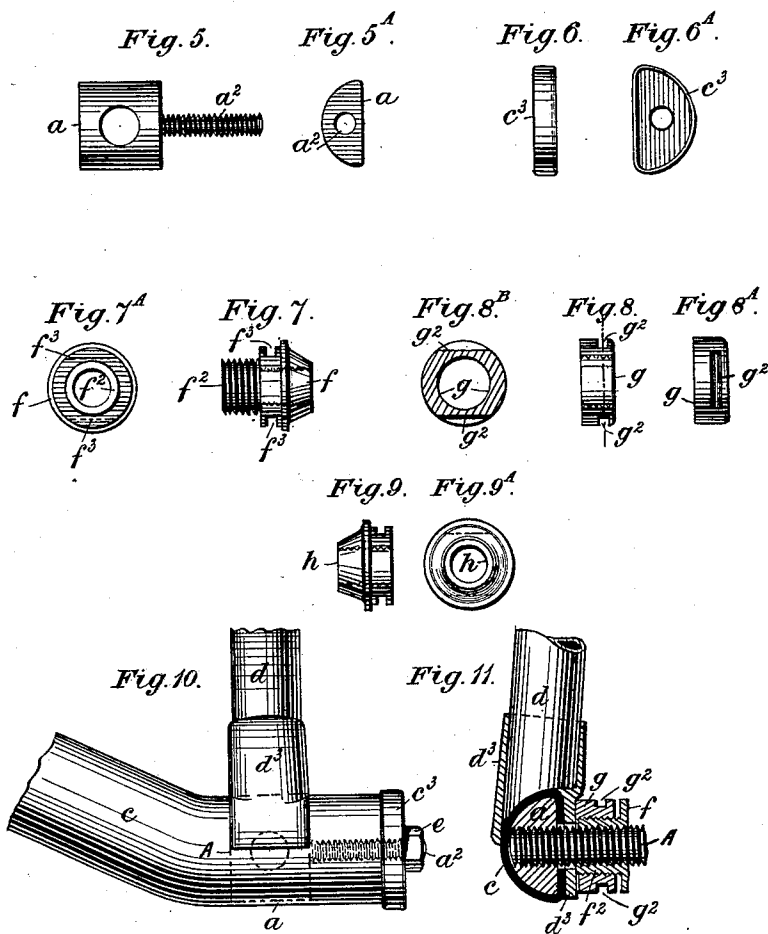
Inventor;—

Frederick John Osmond

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Witnesses ;—

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Fig. 12.

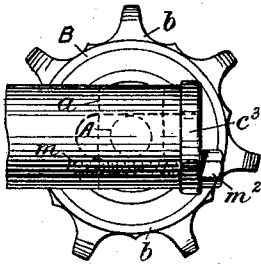


Fig. 13.

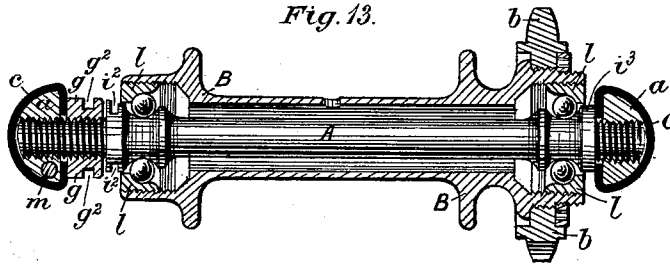


Fig. 14.

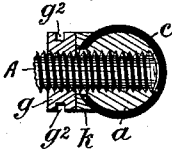


Fig. 17.

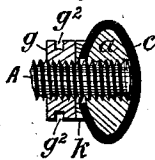


Fig. 18.

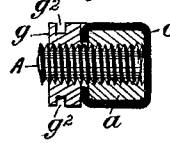


Fig. 15^A.

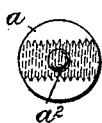


Fig. 15.

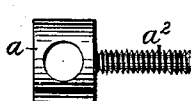


Fig. 16.

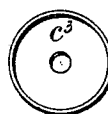


Fig. 16^A.



Fig. 20.

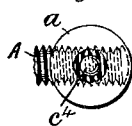


Fig. 19.

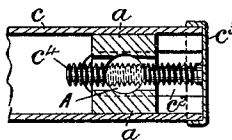


Fig. 19^A.



Witnesses;—

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UNITED STATES PATENT OFFICE.

FREDERICK JOHN OSMOND, OF MOSELEY, ENGLAND.

CHAIN-ADJUSTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 586,912, dated July 20, 1897.

Application filed December 1, 1896. Serial No. 614,091. (No model.) Patented in England February 5, 1894, No. 2,520, and in France November 3, 1894, No. 242,597.

To all whom it may concern:

Be it known that I, FREDERICK JOHN OSMOND, works manager, a subject of the Queen of Great Britain, residing at Ravenswood, Chantry Road, Moseley, in the county of Worcester, England, have invented certain new and useful Improvements in Chain-Adjusting Devices, (for which I have received Letters Patent in Great Britain, No. 2,520, dated February 5, 1894, and in France, No. 242,597, dated November 3, 1894,) of which the following is a specification.

My improvements in adjusting the driving-chains of safety-bicycles and other velocipedes consist of the construction and arrangement of parts, hereinafter described and claimed, for facilitating the change of position of the bearings of the driving-wheel spindle with respect to the bearings of the crank-axes of the said bicycles and other velocipedes and for locking the said driving-wheel spindles in the position to which they may have been brought.

I will describe my invention in connection with a safety-bicycle having a diamond frame.

I make the hollow or tubular branches of the driving-wheel fork or chain stay open at their rear ends, and I make in the inner sides of the open rear ends of the chain-stay longitudinal slots. On the ends of the driving-wheel spindle I screw bearing or carrier blocks of a size and shape suitable to take and slide in the open ends of the chain-stay. I provide the outer sides of the ball-bearing cones with screwed collars, on which I screw nuts for the purposes hereinafter described.

The adjusting of the driving-chain is effected by securing the driving-wheel spindle in position in the slots in the chain-stay in the following manner: The bearing or carrier blocks on the driving-wheel spindle are passed by a sliding motion into the open ends of the chain-stay and adjusted therein, so as to put the desired tension on the driving-chain. The said driving-wheel spindle is now locked in its adjusted position by turning the screw-nuts on the collars of the adjustable bearing-cones until the said screw-nuts bear tightly against the inner or slotted sides of the chain-stay, the said ball-bearing cones being held during the rotation of the screw-nuts on

their collars by a spanner taking onto flats on opposite sides of the said ball-bearing cones. The locking of the driving-wheel spindle in its adjusted position in the manner described also effects the locking of the adjustable bearing-cones on the said spindle. The said ball-bearing cones may be adjusted from time to time to compensate for wear without effecting the secure locking of the driving-wheel spindle in the chain-stay by holding the screw-nuts, hereinbefore described, by means of a spanner and turning the said bearing-cones by means of another spanner in the direction proper to effect the desired adjustment of the said bearing-cones. The open ends of the chain-stay may be closed by means of caps.

I so shape the ends of the lugs which receive the ends of the branches of the top back stay-fork as to embrace the outer sides only of the rear ends of the chain-stay to which they are brazed.

I may effect the sliding motion of the bearing-blocks in the open ends of the chain-stay on the unlocking of the driving-wheel spindle by providing the rear ends of the bearing or carrier blocks with screws, on which nuts (taking a bearing against the caps closing the open ends of the chain-stay) rotate for advancing or withdrawing the said bearing or carrier blocks in the said ends of the chain-stay.

When one of the ball-bearing cones on the spindle is fixed, the adjustment of the said ball-bearings being effected from one side only, the fixed bearing-cone may be without a screw-collar, the locking screw-nut working on the screwed part of the spindle. In this case, however, the locking of the spindle in the chain-stay is effected by advancing the said spindle in the screwed hole in the bearing or carrier block.

Although I have described my improvements in connection with ball-bearings having the adjustable part or cone on the driving-wheel spindle, yet my improvements may be used in combination with ball-bearings having adjustments in the hub.

I prefer to make the slotted ends of the chain-stay semicircular or semielliptical in cross-section, the locking screw-nuts bearing against the flat inner sides of the said chain-

stay, but the slotted ends of the chain-stay may be circular, elliptical, or angular in cross-section. When the inner sides of the chain-stay are curved, I interpose washers between the said inner sides and the locking screw-nuts, the outer faces of the said washers having a shape the counterpart of the inner sides of the chain-stay.

I will now proceed to describe with reference to the accompanying drawings the manner in which my invention is to be performed.

Figures 1 to 11, both inclusive, represent chain-adjusting mechanism for a safety-bicycle constructed according to my invention, Fig. 1 representing in side elevation the said mechanism in conjunction with part of the bicycle; Fig. 2, the same, partly in side elevation and partly in vertical section; and Fig. 3, the same, partly in back elevation and partly in vertical section. Figs. 4 to 9^A, both inclusive, represent views of several of the parts detached; and Figs. 10 and 11 represent, respectively, in side elevation and vertical section, the adjusting mechanism applied to a velocipede having a different-shaped frame. Figs. 12 to 20, both inclusive, represent modifications of my invention herein-after described.

The same letters of reference indicate the same parts in the several figures of the drawings.

A is the spindle of the rear or driving wheel of the safety-bicycle, on which spindle the hub B, carrying the chain-wheel *b*, turns. The adjustment of the tension of the driving-chain is effected by moving the said spindle A nearer to or farther from the crank-axle of the bicycle, the said crank-axle carrying the driving-chain wheel, as is well understood. In order to effect the said adjustment of the rear driving-wheel spindle A nearer to or farther from the crank-axle of the bicycle, I make the arms or branches *cc* of the chain-stay of the driving-wheel fork open at their ends, the open ends of the said chain-stay *cc* being preferably flattened on their inner sides and made semicircular or semielliptical in cross-section, as will be best understood by referring to the portion of the chain-stay represented detached in Figs. 4 and 4^A. The inner or flattened sides of the arms of the chain-stays *cc* have longitudinal slots *c² c²* made in them, through which the ends of the spindle A pass and in which the said spindle is capable of a sliding motion to and from the crank-axle. The screwed ends of the spindle A are provided with carrier-blocks *aa*, (one of which is shown detached in side elevation in Fig. 5 and back elevation in Fig. 5^A), which fit and work in the semicircular ends of the chain-stay *cc*. The said carrier-blocks *aa* have screw-pins *a² a²* on their rear ends, which screw-pins project through holes in the chain-stay closing-caps *c³ c³*, (one of which is shown detached in side elevation in Fig. 6 and front elevation in Fig. 6^A.) The backward-and-forward motion of the carrier-blocks *aa* in

the chain-stay *cc* is effected by screw-nuts *e*, (see Figs. 1 and 2,) which take a bearing against the closing-caps *c³ c³*.

When the driving-wheel spindle A has been adjusted so as to put the desired tension on the driving-chain, the said spindle A is locked in its adjusted position by the following construction and arrangement of parts: One end of the adjustable bearing-cone *f* is provided with a collar or shank *f²* (see the views of the detached cone, Figs. 7 and 7^A), and a screw-nut *g* (represented detached in Figs. 8, 8^A, and 8^B) for taking upon the screwed shank *f²*. The adjustable cone *f* is provided with flats *f³ f³* at opposite sides, and the screw-nut *g* is provided with similar flats *g² g²*. By holding the cone *f* by means of a spanner embracing the flats *f³ f³* and turning the screw-nut *g* upon the screw *f²* of the cone by means of another spanner embracing the flats *g² g²* the said screw-nut *g* may be advanced against the flattened side of the chain-stay *c*, thereby locking the spindle A at one side in the position to which it has been adjusted by the binding of the said chain-stay between the nut *g* and carrier-block *a*, as will be understood by an examination of the left-hand sectional part of Fig. 3. The other side of the spindle A is locked to the other arm of the chain-stay by advancing the cone *h* on the screwed end of the spindle against the flattened side of the stay, as described with respect to the left-hand side.

In order to effect the adjustment of the bearing-cones, the nut *g* is held and the cone *f* turned in the direction proper to advance it into the cup of the bearing. In the arrangement represented in Figs. 1, 2, and 3 the adjustment of the bearings of the driving-wheel spindle is effected from the left-hand side only, the other side being provided with a non-adjustable bearing-cone *h*, (represented detached in Figs. 9 and 9^A), the said cone *h* only being moved for the purpose of locking the spindle in position at that side in the chain-stay *c* as before described.

When the adjustment of the bearings is to be effected partly at one side and partly at the other side, both sides of the spindle are provided with adjustable bearing-cones of the kind represented in Figs. 7 and 7^A and with locking screw-nuts of the kind represented in Figs. 8, 8^A, and 8^B. When the cones on the spindle A are fixed, the adjustment of the bearings being effected through the bearing-cups in the ends of the hub, the parts are modified in the manner represented in Figs. 12 and 13. In this case the screw-nut *g* is screwed upon the end of the spindle A, and the said spindle has a collar *i*, with flats *i²*, for locking the opposite end of the spindle to the chain-stay by the turning of the said spindle, the turning of the spindle giving to it a cross-motion, which effects the forcing of the collar *i²* on it against the flattened part of the chain-stay, thereby binding the spindle to the said chain-stay. The other

end of the spindle is locked to the chain-stay by the screw-nut *g* in the manner already described.

Instead of a screw-pin *a*² on the rear end of the carrier-blocks *a*, hereinbefore described, and represented in Figs. 1, 2, 3, 5, and 5^A, the said carrier-blocks *a* may have screwed holes passing through them, screw-pins *m*, the heads *m*² of which bear against the closing-caps *c*³, working in the said screwed holes and effecting the motion in one or the other direction of the carrier-blocks *a*, as shown in Figs. 12 and 13.

Although I prefer to make the ends of the chain-stay *c* semicircular or semielliptical in cross-section, yet the said chain-stay may be circular throughout its length, as represented in Fig. 14. In this case the carrier-blocks *a* and closing-caps *c*³ have a corresponding shape in cross-section, as is represented, respectively, in Figs. 15 and 15^A and 16 and 16^A; or the chain-stay may be elliptical in cross-section, as represented in Fig. 17, or square in cross-section, as represented in Fig. 18. When the inner faces of the arms of the chain-stay are curved, a washer *k*, (see Figs. 14 and 17,) flat on its inner face and curved on its outer face to fit the chain-stay, is preferably interposed between the said chain-stay and the locking screw-nut.

When the chain-stay has a circular figure in cross-section, the adjusting screw-pin may be carried by the circular closing-cap *c*³, as represented in Figs. 19, 19^A, and 20. The screw-pin *c*⁴ in this case works in a screwed cross-hole in the spindle *A* to effect the backward-and-forward motion of the carrier-block *a* and spindle *A*.

In connecting the arms or branches of the top stay *d*, Figs. 1, 2, and 3, of the driving-wheel fork to the ends of the chain-stay I prefer to employ lugs *d*², the ends of which are shaped so as to embrace the outer sides only of the chain-stay; but I may employ a loose lug *d*³, embracing the inner side as well as the outer side, as represented in Figs. 10 and 11, the spindle *A* passing through a hole in the inner side of the lug *d*³. On the adjustment of the spindle the loose lug *d*³ moves with it.

The application of my improvements to velocipedes other than safety-bicycles differs in no essential respect from its application to a safety-bicycle, as hereinbefore described, and illustrated in the accompanying drawings.

What I claim is—

1. The combination of a chain-stay fork constructed with longitudinal, hollow ends, each angular in cross-section, and angular blocks movable in said hollow ends and provided with screw-threaded sockets, with a wheel-spindle having screw-threaded extremities engaging the screw-threaded sockets of said angular blocks, and means for adjusting

said blocks longitudinally in the hollow angular ends of the chain-stay fork, substantially as described.

2. The combination of a chain-stay fork constructed with longitudinal, hollow ends, each angular in cross-section, and angular blocks movable in said hollow ends and provided with screw-threaded sockets and attached longitudinal screw-pins, with a wheel-spindle having screw-threaded extremities engaging the screw-threaded sockets of the angular blocks, and screw-nuts engaging the screw-pins for adjusting the angular blocks longitudinally in the hollow ends of the stay-fork, substantially as described.

3. The combination of a chain-stay fork constructed with longitudinal, hollow ends, each angular in cross-section, and angular blocks movable longitudinally in said hollow ends and provided with screw-threaded sockets and longitudinal screw-pins, with a wheel-spindle having screw-threaded extremities engaging the screw-threaded sockets of the angular blocks, screw-nuts engaging the screw-pins for adjusting the angular blocks longitudinally in the hollow angular ends of the stay-fork, and a locking device adjustable longitudinally of the wheel-spindle, substantially at right angles to the line of adjustment of the angular blocks, for locking the latter in their adjusted position, substantially as described.

4. The combination of a chain-stay fork constructed with longitudinal, hollow ends, each angular in cross-section, and angular blocks movable in said hollow ends and provided with screw-threaded sockets, with a wheel-spindle having screw-threaded extremities engaging the screw-threaded sockets of the angular blocks, means for adjusting the blocks longitudinally in the hollow angular ends of the stay-fork, and locking-nuts adjustable longitudinally of the wheel-spindle for locking the angular blocks in their adjusted position, substantially as described.

5. The combination of a chain-stay fork constructed with longitudinal, hollow ends, angular blocks movable in said hollow ends and provided with longitudinal screw-pins, closing-caps applied to the rear portions of the hollow ends of the stay-fork and through which said screw-pins extend, and screw-nuts engaging said screw-pins for adjusting the angular blocks longitudinally in the hollow ends of the stay-fork, with a wheel-spindle having its extremities engaged with said angular blocks and provided with a locking-nut for locking the angular blocks in their adjusted position, substantially as described.

FREDERICK JOHN OSMOND. [L. S.]

Witnesses:

RICHARD SKERRETT,
ARTHUR JOHN POWELL.