(No Model.)

E. O. & J. E. RICHARD.

VELOCIPEDE.

No. 252,329. Patented Jan. 17, 1882.

Fig. 1.

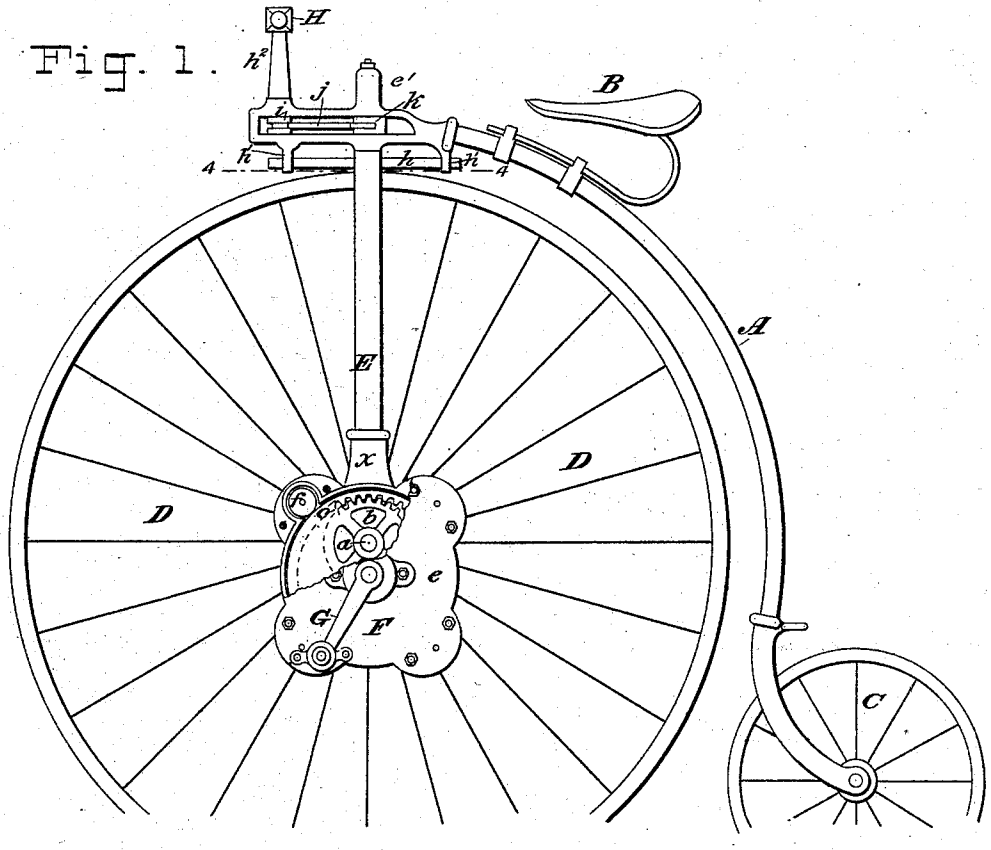


Fig. 2.

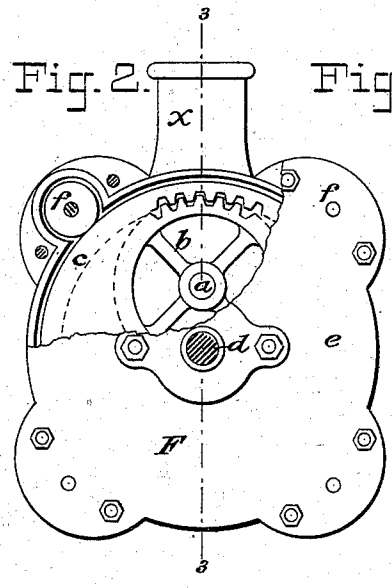


Fig. 3.

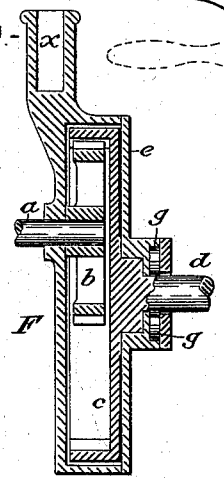
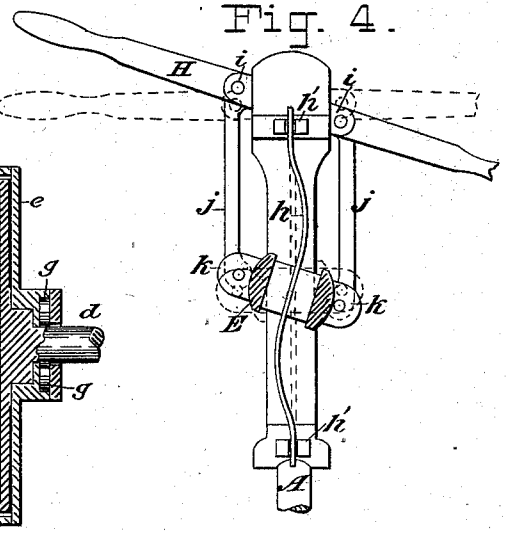


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDMOND O. RICHARD AND JEAN E. RICHARD, OF NEW YORK, N. Y.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 252,329, dated January 17, 1882.

Application filed October 22, 1880. (No model.)

To all whom it may concern:

Be it known that we, EDMOND O. RICHARD and JEAN E. RICHARD, the former having declared his intention to become a citizen of the United States, and the latter a citizen of the United States, and both residents of the city, county, and State of New York, have jointly invented certain Improvements in Bicycles and Velocipedes, of which the following is a specification.

Our invention relates in part to certain improvements in the multiplying-gearing of bicycles and velocipedes, and in part to the steering mechanism of the same, all of which will be fully hereinafter set forth and claimed.

In the present mode of gearing bicycles, whereby one revolution of the cranks will produce more than one revolution of the driving-wheel, a large internal-gear wheel has been employed, to which the crank is attached, and inside of this large wheel a pinion has been mounted on the driving-wheel axle and arranged to mesh with the larger gear-wheel; but in all cases, so far as we are aware, the larger wheel has been mounted on a central arbor, pin, or axis, which restricts the size of the pinion to somewhat less than one-half that of the larger wheel. This construction multiplies too much for ordinary riders, and it is desirable that the pinion shall ordinarily be more than one-half the size of the larger wheel. This we accomplish by so mounting the larger gear-wheel that the central arbor is dispensed with, and thus the whole space within the wheel is left free for a pinion of any size that may be made to mesh with the larger gear-wheel. We are thus enabled to speed up the driving-wheel in any ratio desired, all as will be more fully hereinafter set forth.

In the drawings which serve to illustrate our invention, Figure 1 is a side elevation of a bicycle provided with our improvements, drawn to a small scale. Fig. 2 is a side view detached, showing the gearing. Fig. 3 is a vertical mid-section taken in the plane of the line 3 3 in Fig. 2. Fig. 4 is a detached view, enlarged, taken in the plane of the line 4 4 in Fig. 1, and looking upward.

Let A represent the ordinary frame of a bicycle; B, the rider's seat, mounted thereon; C, the hind wheel; D, the driving or steering wheel, and E the fork or swiveled frame in which the driving-wheel is mounted. These features are, in general, of the ordinary construction. The lower extremities of the branches of the fork E are secured to casings F, being preferably socketed in the same at *x*. As the casings and their inclosed mechanisms are alike on both sides of the driving-wheel, we have only shown that on one side, which will now be described.

The axle *a* of the driving-wheel has a bearing in the casing F, and bears a pinion, *b*, on its outer end and within the hollow of said casing. This pinion meshes with a larger internal-gear wheel *c*, which is affixed to the crank-shaft *d*, or forms one with the same. This shaft has bearings in the cap *e* of the casing F, and bearing-rolls *f f*, mounted in the casing, bear upon the periphery of the gear-wheel *c*, as clearly shown in Figs. 1 and 2. We prefer also to surround the shaft *d* with anti-friction rolls *g g* in its bearings in the cap, as shown in Fig. 3. G is a crank of the ordinary or of any good kind, secured to the outer extremity of the shaft D. By this construction and arrangement of the two gear-wheels B and *c* we are enabled, as will be well understood, to employ a pinion, *b*, of any desired size less than the wheel *c*—a result that cannot be attained by the ordinary construction, where the larger gear-wheel is mounted on an axis or shaft which extends across the space occupied by the pinion.

We will now describe the improvements relating to the steering mechanism, whereby the operation of steering the bicycle is rendered less laborious than when the ordinary steering mechanism is employed.

In bicycles and velocipedes as ordinarily constructed the driving and steering wheel D turns from side to side so readily as to require a strong muscular effort on the part of the rider to hold the wheel steady, especially when it strikes small obstructions. Indeed, it often happens that the wheel will turn and throw the rider before it can be under control by means of the steering-handle, and this tendency to turn from side to side is aggravated by the alternate side pressure exerted in the cranks. To obviate these difficulties and steady the wheel in its normal position, or in that position in which it stands when moving straight ahead, we provide the following-described mechanism:

A leaf-spring, *h*, passes through a slot in the fork E, just above the crown of the driving-wheel, and its ends rest in notches formed in lugs or projections *h'* on the frame A. With this construction it is obvious that any attempt to turn the axis of the fork in its socket *e'* in either direction will be resisted by the spring *h*, and that the spring tends to return the said axis to its normal position and right the driving-wheel. In Fig. 2 the full lines show the axis forcibly turned, while the dotted lines show the parts in their normal position.

We are aware that springs have been heretofore employed to press the driving-wheel of a velocipede back to its normal position when turned to either side; but they have been in the form of spiral springs engaging opposite sides of an arm projecting from the spindle of the steering-wheel.

In bicycles as ordinarily constructed the cross-handle for steering is mounted upon the axis of the fork E, which projects above its socket *e'* to receive it. We find that this crowds the handle too close up to the body of the rider and makes it less easy for him to exert the necessary muscular force in steering. We therefore mount the said cross-handle H on a vertical axis, which has bearings in a socket, h^2, forward of the socket *e'*, and formed on a prolongation of the frame A. On the lower end of the cross-handle spindle are formed or fixed laterally-branching lugs or arms *i*, from which links, rods, or ties *j* extend back and are coupled to similar lugs or arms, *k*, on the fork E. We employ a pair of these links by preference; but one rigid link would suffice. By means of this arrangement the rider is enabled to rotate the fork E with much greater freedom and power than if the handle H were fixed on the axle of the fork itself.

The lugs *i* and *k* might be of different lengths, if desired, so as to increase or decrease the leverage in the steering; but we prefer ordinarily to make them of the same length.

We are aware that the cross-handle has been carried forward and affixed rigidly to a radial arm extending forward from the top of the fork-spindles, whereby it has been somewhat removed from the body of the rider; but as the axis on which it turned was near his body, there was no material mechanical advantage gained by its change of position.

Having thus described our invention, we claim—

1. The combination, to form a multiplying mechanism for a bicycle or velocipede, of a casing for the gearing secured to the lower extremity of the fork, the axle of the driving-wheel, provided with a bearing in said casing, a pinion mounted on the end of said axle within said casing, an internal-gear wheel mounted in said casing and arranged to mesh with the pinion on the driving-wheel axle, said gear-wheel having an external bearing only, whereby the cavity occupied by the pinion is left unobstructed, and a crank on the projecting axis of the said internal-gear wheel, all arranged substantially as and for the purposes set forth.

2. The combination, to form a multiplying mechanism for a bicycle or velocipede, of the fork E, casing F, driving-axle *a*, pinion *b* on the said axle, the gear-wheel *c*, having an external side bearing in the case *e* of the casing, the bearing-rolls *f*, shaft or axis *d*, and crank G, all arranged to operate substantially as and for the purposes set forth.

3. In a bicycle or velocipede, the combination, with the frame, the steering or driving wheel, and the fork swiveled in said frame, of the leaf-spring *h*, confined in a slot in the fork and its end or ends engaged by lugs *g* projecting from the frame, substantially as set forth.

4. The combination, in a bicycle or similar vehicle, of the driving-wheel and fork, the cross-handle provided with a vertical spindle, the lug or lugs *i* on said spindle, a link or links, *j*, and a lug or lugs, *k*, on the fork-spindle or fork, all arranged to operate substantially as set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

EDMOND O. RICHARD.
JEAN E. RICHARD.

Witnesses:
HENRY CONNETT,
GEO. BAINTON.