

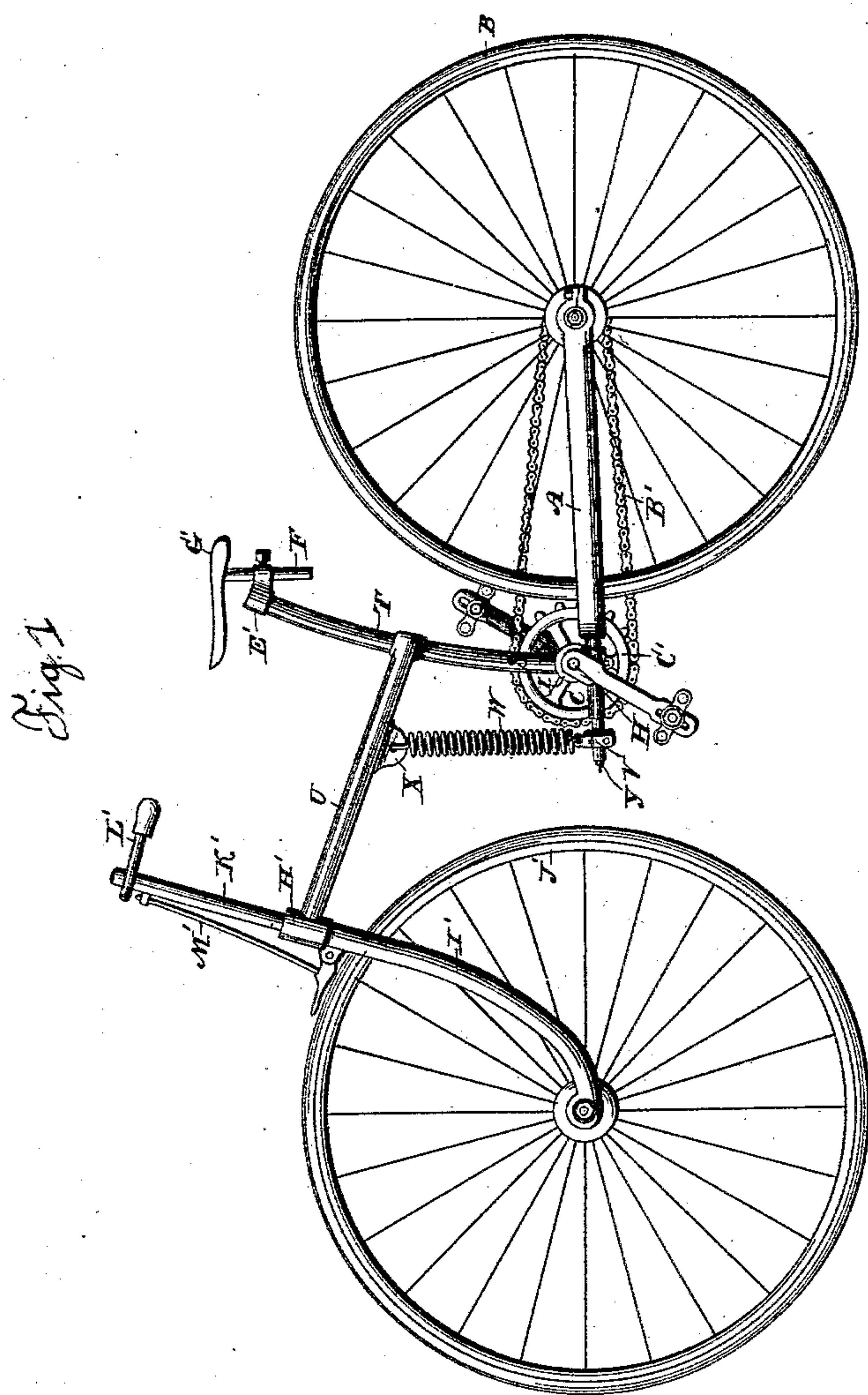
(No Model.)

C. E. W. WOODWARD.  
VELOCIPEDE.

2 Sheets—Sheet 1.

No. 401,237.

Patented Apr. 9, 1889.



Witnesses:  
Chas. B. Shumway  
Wm. A. Rogers.

Inventor,  
Charles E. W. Woodward  
By Geo. W. Seymour  
att'y.

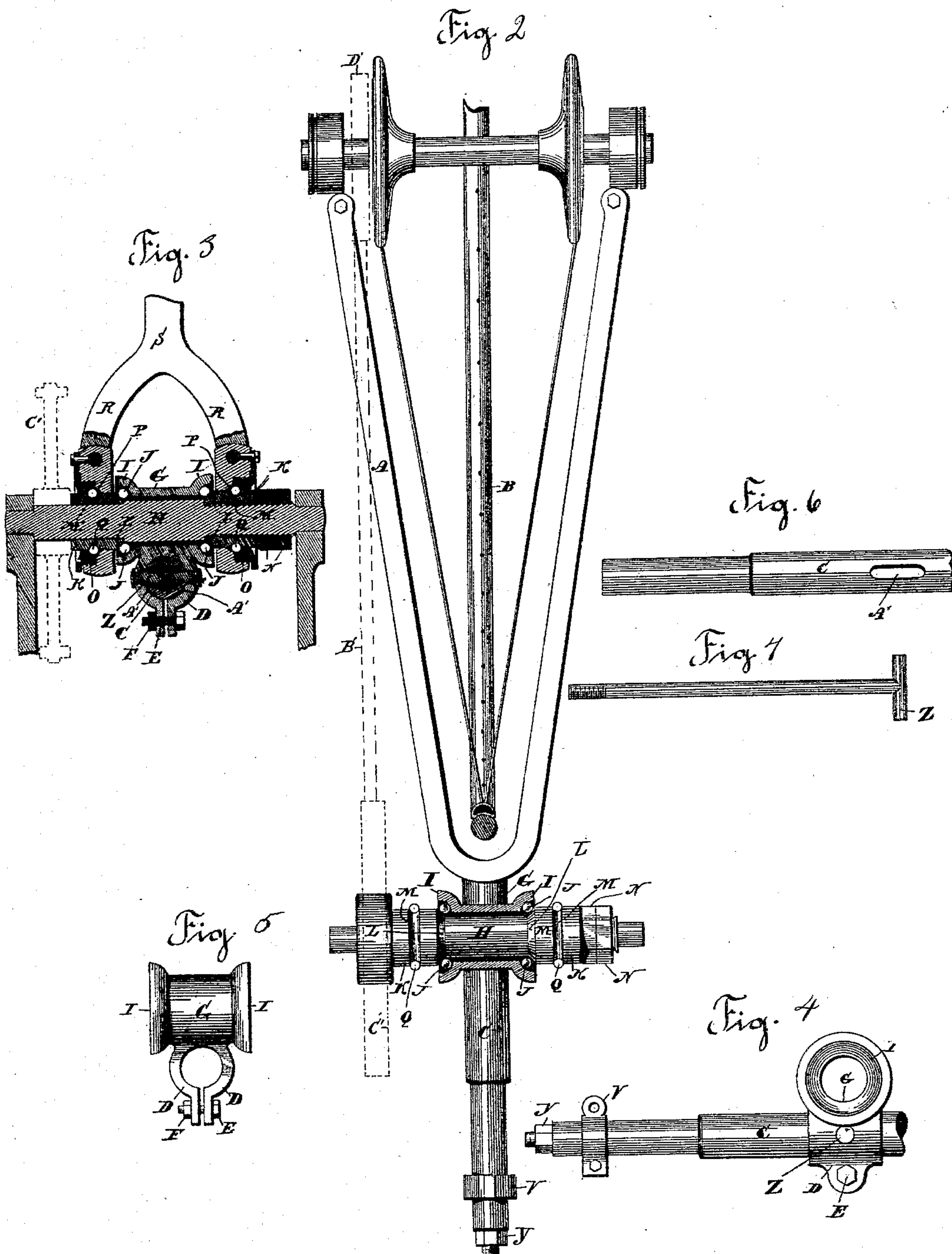
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# UNITED STATES PATENT OFFICE.

CHARLES E. W. WOODWARD, OF CHICOPEE FALLS, ASSIGNOR TO THE  
OVERMAN WHEEL COMPANY, OF BOSTON, MASSACHUSETTS.

## VELOCIPEDÉ.

SPECIFICATION forming part of Letters Patent No. 401,237, dated April 9, 1889.

Application filed June 8, 1888. Serial No. 276,478. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. W. WOODWARD, residing at Chicopee Falls, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Velocipedes; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in cycles or velocipedes, the object being to provide means for absorbing vibration in them, increasing their comfort to the rider, and securing an even driving action and an even pressure for the driving wheel or wheels upon the road-bed, and therefore aiding propulsion.

With these ends in view my invention consists in employing the crank-shaft of the vehicle to pivotally connect the main frame and the rear-wheel frame thereof; in maintaining the crank-shaft, saddle, and steering-bearings fixed in their relations to each other in a cycle in which the main frame and the rear-wheel frame are pivotally connected together; in providing the pivotal rear-wheel frame with a forward extension and connecting that with the main frame of the vehicle, and in certain other details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of a safety-bicycle embodying my invention. Fig. 2 is a detached enlarged view, partly in plan and partly in section, of the rear-wheel frame and the crank-shaft of such machine. Fig. 3 is an enlarged broken view, in vertical section, through the crank-shaft. Fig. 4 is a detached broken view, in side elevation, of the tubular extension of the rear-wheel frame with the rocking sleeve thereupon. Fig. 5 is a detached view, in front elevation, of the rocking sleeve. Fig. 6 is a detached broken view of the tubular extension of the rear-wheel frame with the rocking sleeve removed, and Fig. 7 is a detached plan view of the threaded adjusting rod and pin.

The frame or fork A of the rear driving-wheel, B, of the vehicle is arranged horizontally, or substantially so, and provided at its

forward end with a tubular extension, C, which extends forward of and is clamped between two clamping-lugs, D D, carrying a bolt, E, and nut F, and depending from a rocking sleeve, G, mounted centrally upon the crank-shaft H and having flaring ends I I, adapted to receive anti-friction balls J, as shown. The said crank-shaft is provided with two hardened sleeves, K K, respectively located upon opposite sides of the said rocking sleeve, having their inner ends coned, as at L L, to enter the flaring ends of the rocking sleeve and co-operate therewith in forming raceways for the balls J, and provided each with a groove, M, one of these sleeves being threaded upon the crank-shaft, so as to be adjustable thereon for taking up wear in the coned ends of the hardened sleeves and in the flaring ends of the rocking sleeve, which is longitudinally movable on the crank-shaft. Check-nuts N N, mounted upon the threaded end of the shaft, are provided for locking the adjustable sleeve in place. The said hardened sleeves are respectively embraced by ball-cases O O, which co-operate with them in forming raceways P for the anti-friction balls Q, as shown. These ball-cases are adapted for lateral adjustment and respectively pivoted to the arms R R of a yoke, S, formed at the lower end of the upright T, connected about midway of its length with a substantially horizontal cross-piece, U, the two parts T and U forming a rigid T-shaped frame. The forward end of the tubular extension C is somewhat reduced in size and carries a movable coupling collar or clip V, to which is attached the lower end of a heavy coiled spring, W, connected at its upper end with a perforated lug, X, formed upon the lower face of the cross-piece U aforesaid.

A rod inserted into the tubular extension C from the outer end thereof is threaded at its outer end to receive one or more adjusting-nuts, Y, and provided at its inner end with a transverse pin, Z, the opposite ends whereof extend outward into the lugs D D, through two longitudinal slots, A' A', formed opposite each other in the rear end of the said extension, the adjustment whereof forward and back between the clamping-lugs is limited by the length of the said slots. This ad-



justment is secured by releasing the grip of the clamping-lugs upon the extension and then moving the same manually, and is supplemented by the adjusting-nuts Y on the one side and on the other side by the tension of the chain B', which runs over a sprocket-wheel, C', mounted on one end of the crank-shaft at a point without the arms R R of the yoke S, and carries the said chain crossing the adjacent arm of the rear-wheel frame A obliquely and running over a similar but smaller sprocket-wheel, D', located within the arms of the said frame.

The upper ends of the upright T of the rigid T-shaped frame of the vehicle is provided with a saddle support or bearing, E', carrying an adjustable saddle-post, F', supporting a saddle, G', which, as herein shown, is without a spring, which, under my invention, is not needed for the absorption of vibration, and is always a drawback to the most effective pedaling.

The forward end of the cross-piece U carries, in rigid attachment, the steering-bearing H' of the steering-fork I', which forms the frame for the steering-wheel J', and is connected at its upper end to the adjustable steering-rod K', supporting the handle-bars L', from which the brake M' is controlled.

It will be noted that under the above-described construction the crank-shaft bearing, the saddle-bearing, and the steering-bearing are always of invariable distance from each other. This secures comfort to the rider, increases the effect of the pedaling, and secures an even driving action than can be had in machines where these distances may change. It will be noted, also, that the coiled spring is attached to the tubular extension of the rear-wheel frame at a point about midway between the two wheels, so that the spring distributes its action with substantial equality between the two wheels when it is placed under tension by the weight of the rider, which bears directly upon the crank-shaft. However, by shifting the coupling collar or clip upon the extension, the leverage may be changed for adjusting the action of the spring to riders of different weight, or for securing an unequal distribution of its action between the two wheels, if that is found desirable in practice. The spring action upon the driving-wheel is considered to be an advantage in giving a more even pressure upon the road-bed, and consequently aiding propulsion. If desired, the attachment of the spring to the T-shaped frame may be made adjustable for giving a still wider range of effect to the spring.

It is apparent that my invention is not confined to bicycles, but is also applicable to tricycles or other types of velocipedes. I would therefore have it understood that I do not limit myself to the exact construction and arrangement of parts herein shown and described, but hold myself at liberty to make

such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a cycle, the combination, with a main frame, of a rear-wheel frame provided with a forward extension, a crank-shaft forming a pivotal connection between the two frames, and a spring connected with the main frame and the said extension, which extends forward under the main frame, substantially as set forth.

2. In a cycle, the combination, with a main frame, of a rear-wheel frame provided with an extension located in the same horizontal plane with it, a crank-shaft forming a pivotal connection between the two frames, and a spring positively connecting the main frame and the extension and extended under the weight of the rider, substantially as set forth.

3. In a cycle, the combination, with a main frame, of a crank-shaft carried thereby, a rocking sleeve mounted on such shaft, a rear-wheel frame having a forward extension connected with such sleeve, and a spring connecting such extension and the main frame of the vehicle, substantially as set forth.

4. In a cycle, the combination, with the main frame thereof, of a crank-shaft carried thereby, a rear-wheel frame pivotally and adjustably connected to such shaft, and a spring connecting the forward end of such frame with the main frame of the vehicle, substantially as set forth.

5. In a cycle, the combination, with the main frame thereof, of a crank-shaft carried thereby, a rocking sleeve mounted on such shaft and provided with depending clamping-lugs, a rear-wheel frame having a forward extension passing between such lugs, which are clamped upon it, and a spring connecting the forward end of the extension with the main frame of the vehicle, substantially as set forth.

6. In a cycle, the combination, with the main frame thereof, of a crank-shaft carried thereby, a rocking sleeve mounted on such shaft, a rear-wheel frame provided with a tubular forward extension connected with such sleeve, a spring connecting such extension with the main frame of the vehicle, and a threaded rod mounted in the extension, and provided at its forward end with adjusting-nuts and at its inner end with a pin passing through limiting-slots in the extension and connected with the said sleeve, substantially as set forth.

7. In a cycle, the combination, with a main frame having an upright provided at its lower end with a fork each arm whereof carries a ball-bearing case, of a crank-shaft carrying a grooved sleeve for each of such cases, a rocking sleeve located between such grooved sleeves, a rear-wheel frame provided with a forward extension connected with such rock-



ing sleeve, and a spring connecting such extension with the main frame of the vehicle, substantially as set forth.

5 8. In a cycle, the combination, with the main frame having an upright provided at its lower end with a fork each arm whereof carries a ball-bearing case, of a crank-shaft passing through such cases and carrying two grooved and coned sleeves to co-operate with  
10 them, a rocking sleeve having flaring ends mounted on the axle between the said sleeves, the coned ends whereof enter its flaring ends in the formation of raceways for anti-friction

balls, a rear-wheel frame having a forward extension connected with such rocking sleeve, 15 and a spring connecting the said extension with the main frame of the vehicle, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscrib- 20  
ing witnesses.

CHARLES E. W. WOODWARD.

Witnesses:

LUTHER WHITE,  
JAMES L. BUGBEE.