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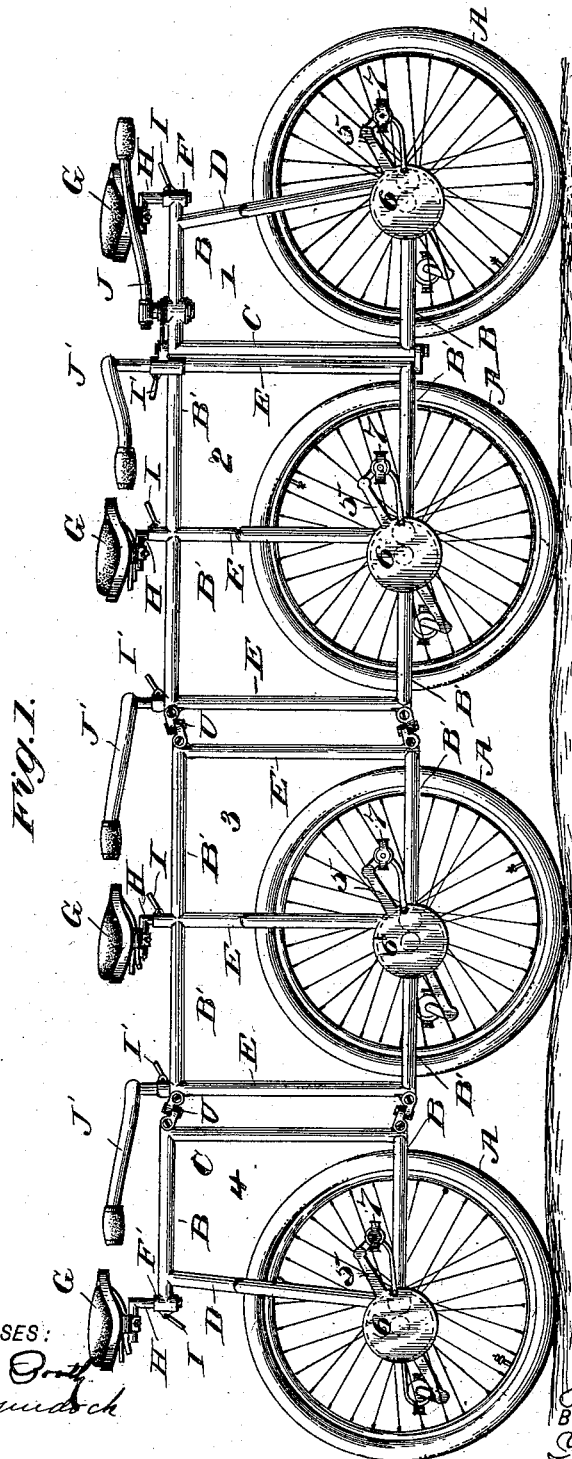
Patented Apr. 17, 1900.

J. C. ANDERSON.  
MULTICYCLE.

(Application filed Aug. 9, 1899.)

(No Model.)

3 Sheets—Sheet 1.



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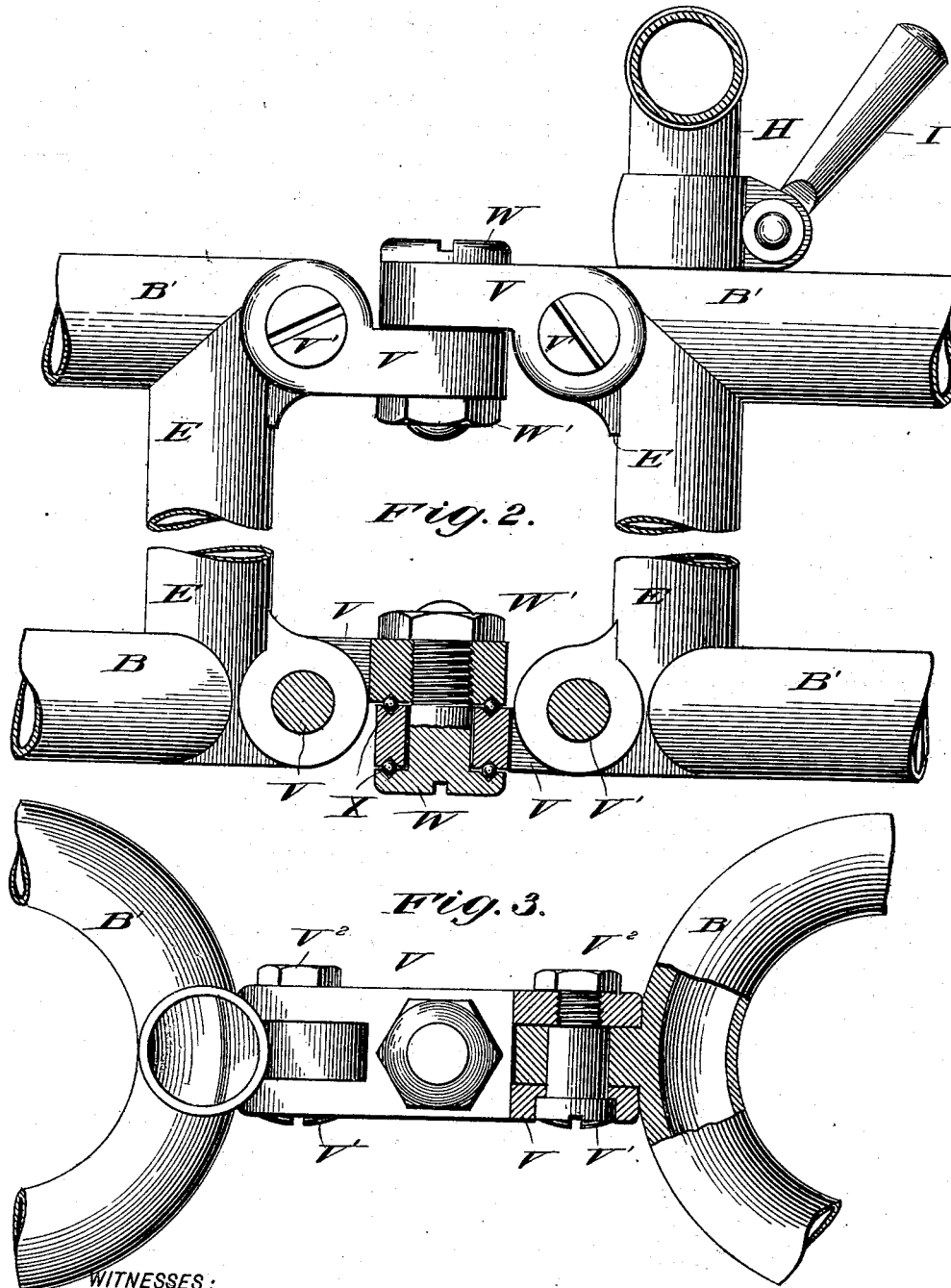
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3 Sheets—Sheet 2.



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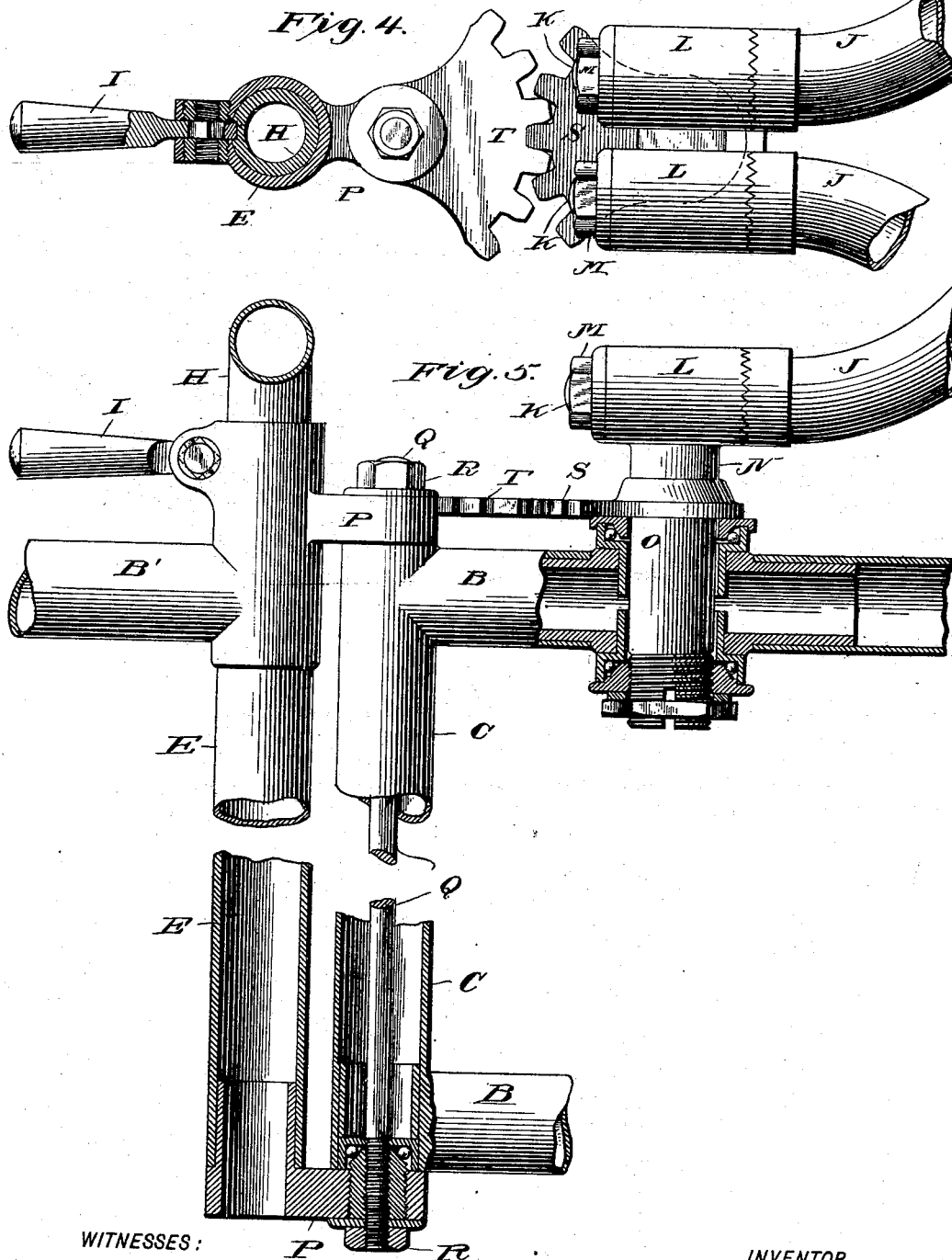
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

JAMES C. ANDERSON, OF HIGHLAND PARK, ILLINOIS.

## MULTICYCLE.

SPECIFICATION forming part of Letters Patent No. 647,785, dated April 17, 1900.

Application filed August 9, 1899. Serial No. 726,692. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. ANDERSON, a citizen of the United States, residing at Highland Park, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Multicycles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in bicycles, and has for one object, primarily, the production of what I denominate a "multicycle," which may be added to for the purpose of increasing its carrying capacity, and when arranged as hereinafter set forth may be divided or separated to constitute a number of individual "tandems" having substantially the characteristics as such of a machine described and illustrated in an application filed by me of even date herewith, Serial No. 726,693, for an improvement in tandem bicycles.

It has for a further object to provide a machine in which every wheel constituting the multicycle, with the exception of the first of the series, shall become a steering-wheel, whereby a movement analogous to that of a snake may, when desired, be imparted to the machine.

It has for a further object to so construct and connect the several unitary sections that each of the riders will receive but one momentum shock when the machine encounters ordinary obstructions, and that the machine throughout its length may have a vertically-undulatory motion in order that it may accommodate itself to the uneven surface of the roadway.

It has for a further object to lessen the slipping friction of the driving-wheels existing in all bicycles carrying more than two riders by dispensing with all devices of any character whatever for transmitting the motive force from two or more fixed localities to one common driving-wheel, and likewise

to avoid the sluing or sidewise slipping of all of the wheels succeeding the steering-wheel. The slipping action of the driving-wheel of all bicycles as at present constructed is due to the fact that there is only one driving-wheel, whether the frame be mounted upon two or more wheels, and consequently the combined motive force of all of the riders is transmitted to such wheel, the traction of which is depended upon to push, as it were, all wheels in advance of such driver, and consequently the friction of such advance wheels and the weight carried by them reacting against the propelling force causes the driving-wheel to slip in an obvious manner. The sluing or sidewise-slipping movement of the wheels in turning corners necessarily results from the fact that the frame supporting the riders is rigid and bears a fixed relation to all of the several wheels except the single steering-wheel.

With these objects in view my invention consists of the peculiar construction and arrangement hereinafter more fully explained.

In order that those skilled in the art to which my invention appertains may know how to make and use my invention and understand all of its advantages, I will proceed to describe the same, referring by letters and figures to the accompanying drawings, in which—

Figure 1 is a side elevation of one of my improved multicycles composed of four units or sections and adapted as a whole to carry four riders. Fig. 2 is a detail side-elevation, on an increased scale or full size and partly in section, showing the manner of connecting the several sections other than the first with each other. Fig. 3 is a top or plan view of the connections shown in Fig. 2, the horizontal pivot being shown in section. Fig. 4 is a detail plan view, partly in section, showing the connection between the handle-bars on the first or leading section and the steering mechanism intermediate of said handle-bars and the succeeding section, and also showing the handle-bars of the second section in cross-section; and Fig. 5 is a detail side elevation, partly in section, showing the manner of securing articulate connection between

the first and second sections, and also the manner of securing the handle-bars of the first section and the ball-bearing of the same.

Similar letters and numerals of reference indicate like parts in the several figures of the drawings.

A represents the wheels, all of usual construction and connected through ball-bearings with their respective frames in the ordinary or in any preferred manner.

The several sections of the machine are numbered 1, 2, 3, and 4. The first and the fourth or last section-frames consist of two horizontal tubes B B, one vertical tube C at right angles to the tubes B and one vertically-oblique tube D. The intermediate frames 2 and 3 are composed of two horizontal tubes B' and three vertical tubes E in the frames 1 and 4. The front and rear tubes D, respectively, are slightly oblique or at an acute angle to the lower horizontal tube B, while in all intermediate frames the vertical tubes are three in number and are all at right angles to the horizontal tube B'.

The upper horizontal tube B of frame 1 is provided at its front end with a T-joint F, and the similar tube of the frame 4 is provided at its rear end with a similar T-joint F', each of which T-joints constitutes supports for the saddles G, mounted on saddle-posts H, secured in any adjusted position by binding-levers I of ordinary construction, though I prefer to use the construction shown and described in an application filed by me on even date herewith and bearing Serial No. 726,694 for improvement in bicycles for use in the military service.

The front frame or No. 1 is provided with handle-bars J J, secured adjustably by stems or shanks K to tubular twin heads L by nuts M. The heads M are connected with a neck N and vertical stem O, the latter secured in ball-bearings, as shown at Fig. 5, and as illustrated and described in my application for patent for improvement in tandem bicycles hereinbefore referred to.

The front frame No. 1 is articulatively connected to frame No. 2, as shown in Fig. 5, through the medium of the rear vertical tube C of the front frame and the forward vertical tube E of the second frame, lugs P, pintle-rod Q, and securing-nuts R, with suitable ball-bearings (shown in section at Fig. 5 and all as described in the application last referred to) and the vertical articulation between frames 1 and 2 is secured through the medium of two fantail or segmental gears S and T, the former secured to the neck N of the handle-bar head L and the latter to the upper lug P of the tube E, also as shown and described in said last-referred-to application. The succeeding frames are connected together by pivotal joints, (designated by reference-letter U in Fig. 1,) and constructed as shown full size at Figs. 2 and 3 and consisting of lugs V V, pivoted horizontally at the upper

and lower extremities of each frame by a vertical screw-bolt V' and to each other by a vertical screw-bolt W and W' and nuts V<sup>2</sup>, the lugs V and screw-bolt W being formed with ball-races to receive balls X for obvious purposes. From the connection described frame 2, it will be seen, has a horizontal articulation with frame 1 and all succeeding frames have both horizontal and vertical articulation with each other. Frames 1 and 2 are capable of horizontal articulations only, for the reason that the initial steering impulse is communicated through the medium of the handle-bars J on frame 1 to frame 2 through the intermediate fantail-gears S and T.

While I prefer to use the articulative joint between the frames or sections, such as shown and described, I do not wish to be confined to any particular construction, so long as it is capable of permitting the movements of the frames relatively to each other in the direction stated, so that the frames may have the lateral swaying or snake-like motion and the longitudinal undulatory movement explained.

The lower frame-tubes B B' of the respective frames 1 2 3 4 are bifurcated, as shown at Fig. 3, to embrace the wheels A, which are mounted in ball-bearings in the usual or any preferred manner.

The driving mechanism consists of cranks 5, crank-gear 6, and extension-pedals 7, as described in my pending application last referred to, and the saddles G are so mounted upon the frames that the riders shall be directly over the axes of the several wheels, as also explained in said application, in order that the human motive force may be applied to the best advantage.

As already explained, the handle-bars J on frame 1 are so constructed and arranged as to control the articulation between frames 1 and 2. Rigid handle-bars J' are secured within both the front and rear vertical tubes of frame 2 and in the rear vertical tube of frame 3 and of any other number of frames which may be connected or interposed between frame 2 and a final frame similar to frame 4. From this construction and arrangement it will be seen that after frame 2 each succeeding rider's handle-bars are mounted in the rear tube of the frame immediately preceding or in advance, and hence the rider steers the wheel and frame in front of the one he is mounted upon by articulating the frame upon the pivotal joint between them. It will be also observed that the frames are all separable one from another, and that when arranged, as shown in Fig. 1, the frames 3 and 4 may be removed by releasing one or both of the pivot-bolts V', thus leaving frames 1 and 2 to constitute a tandem.

I desire it to be understood that while I have shown only one section constructed like frame No. 1 and connected as shown with frame No. 2 a train may be made up with sec-

tions similar to sections 1 and 2 and connected as said sections are shown and with any number of intermediate sections like No. 3, so that when segregated a number of tandems may be produced like sections 1 and 2.

In each of the sections it will be seen that the frame as a whole and the rider are pivotally mounted upon the axis of the supporting-wheel, and by reason of the pivotal connection between the several frames any momentum shock received by any wheel is partially dissipated by the rocking movement of the frame upon said wheel and that so far as each individual rider is concerned he is, practically speaking, mounted upon a unicycle, relieved, however, of the dangers attending such machines as to loss of equilibrium forwardly or backwardly by the sustaining power of the connected sections or frames in front and rear.

By reason of the connections between the several frames the machine as a multicycle may not only be swayed laterally in a snake-like path, as heretofore described, but vertical movement of the sections independently may take place to adapt the machine throughout its entire length to any inequalities in the road with a minimum of vertical movement of the bodies of the several riders, because the vertical movement of each wheel is not only independent of every other wheel, but, for the further reason that the individual frames rocking upon their respective wheels are as a pivotal center, the vertical movement is transformed into motion on an arc of which the axis of the wheel is a center.

Recurring to the pivotal or articulative connection of the several sections of my improved machine and keeping in mind that in machines as at present constructed and designed to carry a multiplicity of riders the frame is continuous and rigid longitudinally it will be seen that by reason of the articulative connection of several sections in contradistinction to a single rigid frame the frame of my machine as a whole is capable of lateral articulation, adapting the several sections and the wheels carried therein to a path of any curve from a straight line, and hence there is no tendency of the wheels following the first or initial of the series to slue or slide out under the action of centrifugal force, as would be the case with a rigid-frame machine. I desire also to call particular attention to the fact that each wheel in my improved multicycle becomes an independent driver, and hence the motive force of the several riders is distributed throughout the several wheels, or, in other words, each rider exerts his motive force to propel the wheel over which he is mounted, and no wheel has any naturally resistant body ahead of it to be pushed or propelled, and hence the slipping action heretofore referred to does not take place. The avoidance of this action is very important in order that the motive force may be exerted to the best advantage and also to

protect the tires of the wheels from the wearing action produced by the slipping and sliding action.

With the frame composed of the articulative sections, the riders mounted directly over the respective wheels of each section, and with each wheel constituting a separate driver and driven with the extra leverage secured through the use of the extension-pedals and gearing referred to it will be obvious that my improved machine may be given great speed and serve to the best advantage as a "pacing-machine" in bicycle-races and for other purposes where fast time is desirable or necessary.

Having described the construction, operation, and advantages of my improved multicycle, what I claim, and desire to secure by Letters Patent, is—

1. A multicycle composed of independent sections or frames each mounted upon a single wheel and connected one with another by an articulative joint adapted to permit the frames to move out of the longitudinal plane of the machine, said joint connected with each section by horizontal pivots whereby the carrying capacity may be increased and diminished at will and the several sections may move vertically and laterally independently of each other, substantially as hereinbefore set forth.

2. A multicycle composed of independent sections or frames, each mounted upon a single wheel and the several sections connected together adjacent to each other and in a plane between the wheels of the respective sections by a joint or link pivoted horizontally at each end to the adjacent sections or frames, substantially as and for the purpose set forth.

3. A multicycle composed of sections each mounted upon a single wheel and articulative connected one with another, and each provided with a saddle and handle-bars, the handle-bars of the intermediate sections being located at the rear end of said sections and in position to be grasped by the rider in rear of said handle-bars, whereby each rider controls the path of movement of the section upon which he is mounted and also the one in advance of him, substantially as hereinbefore set forth.

4. A multicycle composed of sections each mounted upon a single wheel and articulative connected one with another and each provided with a saddle and handle-bars, the handle-bars of the sections intermediate of the leading and trailing sections, being located adjacent to the articulative joint between the sections and adapted to cause said sections to articulate, substantially as described.

5. In combination with the frames 1, 2, 3, 4, the articulative connections U between each section, composed of lugs V secured to the frames by horizontal pivots V', and to each other by vertical pivots W, W', substantially as and for the purposes set forth.

6. In a multicycle having a leading section,  
intermediate sections 2 and 3, and rear sec-  
tion 4, the lugs V secured to sections 2, 3 and  
4, and formed with ball-races, in combina-  
5 tion with antifriction-balls X, screw-bolts W,  
formed with ball-races, and the securing-nuts  
W', substantially as shown and described.

In testimony whereof I affix my signature  
in presence of two witnesses.

.. JAMES C. ANDERSON.

Witnesses:

JENNIE G. BOOTH,  
SMITH D. FRY.