

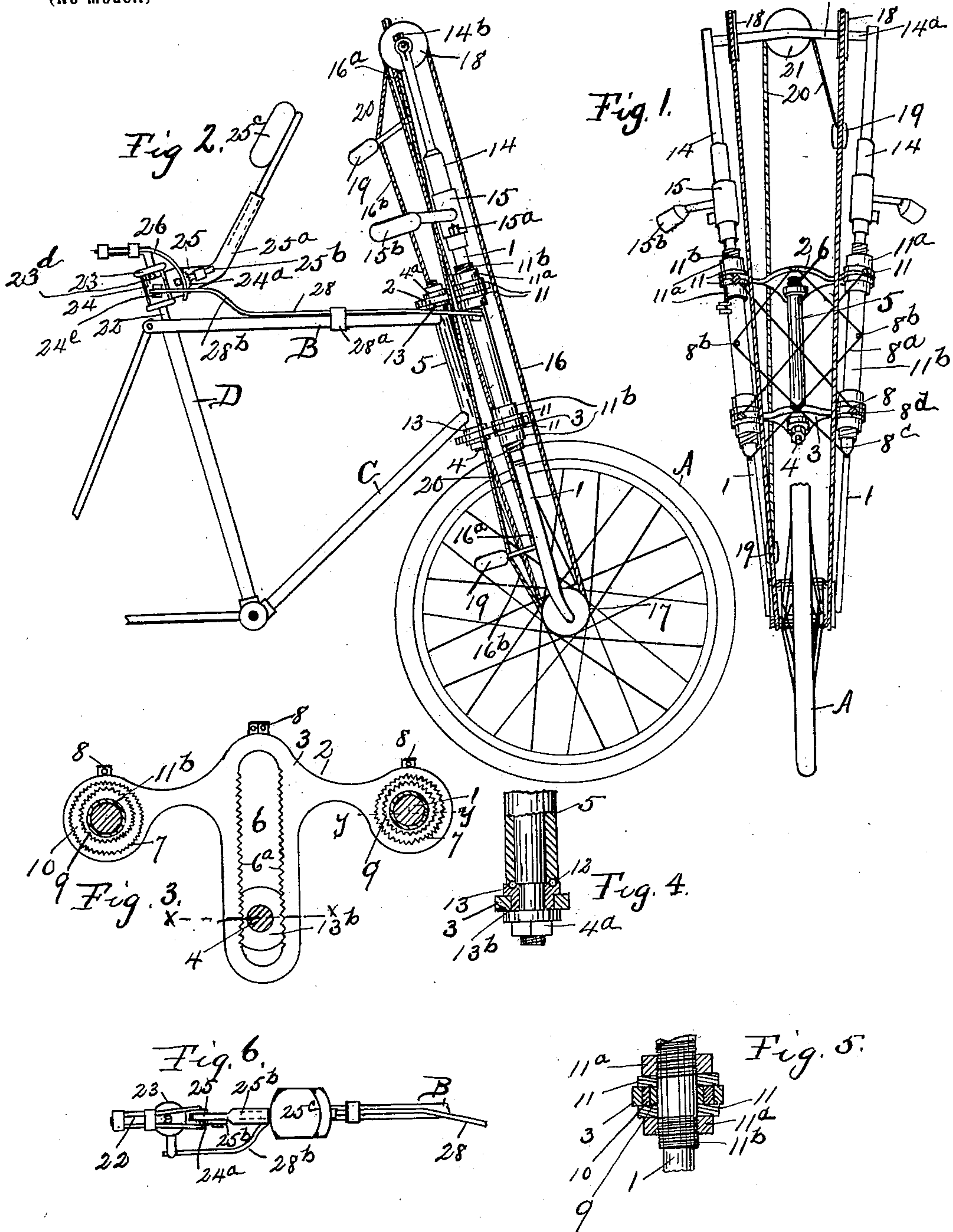
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Patented June 13, 1899.

F. P. BEMIS.  
BICYCLE.

(Application filed Feb. 13, 1897.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

FREDERICK POMEROY BEMIS, OF DAVENPORT, IOWA.

## BICYCLE.

SPECIFICATION forming part of Letters Patent No. 626,852, dated June 13, 1899.

Original application filed August 25, 1896, Serial No. 603,909. Divided and this application filed February 13, 1897. Serial No. 623,208. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK POMEROY BEMIS, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Bicycles; and I do hereby 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 ap-  
10 pertains to make and use the same.

My invention has for its object to provide new and novel constructions of several parts of a bicycle, and for this purpose it relates to the construction of the front forks and the  
15 connection thereof with the reach of the bicycle, to means for propelling the bicycle, and to a body-support for the rider, all being adapted to be embodied in a single machine, as will be herein described, although it will  
20 be obvious that each feature is capable of use with other forms of the several features.

To carry out the objects above set forth, I have invented the construction, arrangement, and combination of the several parts herein-  
25 after more fully described and claimed, this application being a division of another application filed by me in the United States Patent Office on the 25th day of August, 1896, and serially numbered 603,909.

Referring to the accompanying drawings, in which corresponding parts are designated by corresponding marks of reference, Figure 1 is a front elevation of a bicycle constructed in accordance with this invention, showing  
35 the construction of the front forks. Fig. 2 is a side elevation thereof, showing also the form of driving mechanism and body-support claimed herein. Fig. 3 is a sectional view taken immediately above the upper bridge-  
40 plate of Figs. 1 and 2. Figs. 4 and 5 are fragmental sections on lines  $x x$  and  $y y$ , respectively, of Fig. 3. Fig. 6 is a plan view of the body-support.

The front fork consists of two uprights of  
45 any suitable material, one upon each side of the front wheel A, the uprights being straight, if desired, although in the accompanying drawings I have shown them as being slightly curved and canted rearwardly, the uprights  
50 extending upwardly above the periphery of the wheel A, which is carried in the lower

ends thereof in suitable bearings, the axle of the wheel uniting the said lower ends. The uprights are connected above the wheel by an upper and a lower bridge-plate 2 and 3, 55 respectively, between which the spindle 4 in the front tube 5 of the frame is carried, thus connecting the fork and the frame. The front tube 5 supports the forward end of the reach, which in the accompanying drawings is shown 60 as consisting of the upper tube B and the lower tube C.

The two bridge-plates are similar in construction, so that the following description of plate 3 should be understood as likewise ap- 65 plying to the plate 2. The plate, which may be a parallelogram, is by preference of the shape shown in Fig. 3, as the weight thereof is thus reduced, and has a central slot 6 therein in the same plane as that in which the wheel A 70 revolves, the edges of the slot having serrations 6<sup>a</sup> thereon. Near the ends of the plate, at an equal distance upon each side of the slot 6, circular apertures 7 are formed, the sides of the apertures being also serrated, and 75 through these apertures the uprights 1 pass. Ears 8 are formed upon the sides of the plates in the front of each of the apertures and of the slot, and to these ears lacings or cross-bracings 8<sup>a</sup> are secured, the lacings or cross- 80 bracings passing over and around or being also secured to projections 8<sup>b</sup> upon the uprights, tying them together, and, as shown, I prefer to commence the lacings below the lower bridge-plate, the lower bracings or la- 85 cings 8<sup>c</sup> crossing each other at the medial line of the lower bridge-plate. The lacings may consist of wire rods, if desired, provided with tightening-nuts 8<sup>d</sup>.

Each upright has mounted thereon two ec- 90 centric collars 9, each collar having a serrated outer periphery and being surrounded by an eccentric washer 10, having serrated inner and outer edges, with the former of which the serrated edge of the collar 9 engages, while 95 the serrations on the outer edge of the collar engage the serrations upon the inner edge of the aperture 7, in which it may be placed. It will be thus seen that by varying the rela- 100 tive positions of the eccentric collars and washers within the corresponding apertures of the plates may be moved in relation to the



uprights, the parts being held in any given position by cover-plates 11, interposed between them and the nuts 11<sup>a</sup> upon the uprights, which are threaded to receive the nuts.

5 When the uprights are of wood, I may, if I so desire and as shown in the drawings, inclose those parts thereof that are between the bridge-plates and slightly above and below them in a metallic tube 11<sup>b</sup>, threaded to receive the nuts.

10 The body of the spindle 4 is contained within the front tube 5 of the frame, its ends projecting beyond the top and bottom thereof and being threaded, the ends of the tube having a groove therein to provide a runway for the balls 12. Upon the lower end of the spindle a head 13 is mounted, the spindle passing therethrough, the head having on its upper face and surrounding the spindle an annular groove, which, with the corresponding groove upon the lower end of the tube, forms ball-bearings. An elongated boss 13<sup>b</sup> is formed upon the lower face of the head around the spindle and is adapted to be contained within the slot 6 of the lower plate, the elongated sides of the boss being flattened and serrated, whereby it may be firmly held within the said slot in any desired position, it being secured therein by a nut and washer 4<sup>a</sup>, screwed on the threaded end of the spindle. This construction at the lower end of the spindle is duplicated at the upper end thereof, the head 13 at the latter point being of course inverted, and such construction therefore needs no further description to permit it to be fully understood. From the foregoing it will be seen that by varying the position of the ends of the spindle within the slots 6 in the bridge-plates the lead of the fork in front of the spindle—i. e., the distance between the plane of the uprights and the axis of the spindle—may be varied or absolutely reversed, or that the angle formed by the fork and spindle may be varied, or both, as may be desired, and this may be done either by the adjustment of the spindle in the slots 6 alone, or by the adjustment of the uprights within the apertures 7, or by the conjoint action of the two, and this latter permits a wide range of adjustment.

50 The uprights are continued upwardly by means of tubes 14, mounted upon the upper ends of the uprights and suitably clamped thereon at any desired elevation, the upper ends of the tubes being connected by a cross-bar 14<sup>a</sup>, to which each tube is secured by a clamping-collar 14<sup>b</sup>, encircling the bar, whereby the spread of the uprights when altered may be provided for.

60 Upon each upright I may, if I so desire, mount a sleeve 15, open at both ends and capable of moving upon the tube which it encircles and to be clamped thereon by the clamp 15<sup>a</sup>, each sleeve having a handle 15<sup>b</sup>, by which the bicycle may be steered; but such handles are not essential, as when a body-support is connected to the fork, as will be presently described, the guiding may be ef-

fectured by the inclination of the body of the rider.

As a means for propelling a bicycle either by itself or as auxiliary to any approved form of foot-power I may use a belt 16, passing over a pulley and reciprocated thereon, the belt being tightened and loosened as it is reciprocated, as is claimed in my said application serially numbered 603,909; but the specific construction which I show and claim in this application for effecting such a desired movement of the belt is as follows:

Upon each end of the hub of the front wheel 80 A is secured a pulley 17, while upon the cross-bar 14<sup>a</sup> of the fork and between the uprights thereof is mounted on each side of the plane of the wheel a pulley 18, the two pulleys 18 being separated sufficiently to permit the most advantageous application of the power hereinafter specified. By preference the bar 14<sup>a</sup> is bent, as shown in Fig. 1, whereby the plane of each of the idler-pulleys 18 intersects the corresponding pulley 17 upon the wheel-hub. 90 A belt 16 passes over the pulleys 17 and 18 upon each side of the bicycle, the belt being cut in its rear strand and having the oppositely-disposed ends formed thereby connected with a lever 19, the downcoming end 16<sup>a</sup> of the belt being connected to the forward end of the lever, while the upcoming end 16<sup>b</sup> is connected to the lever in the rear thereof, the rear end of the lever being provided with a handle. The levers upon the opposite sides 100 of the bicycle are connected by a strand 20, passing over a transverse pulley 21, mounted upon the cross-bar 14<sup>a</sup>, the strand being connected to each lever adjacent to the point of attachment of the upcoming end of the belt or slightly in the rear thereof. From this construction it follows that as the rider draws each lever up in the reciprocation of the belt he simultaneously tilts the lever, raising the rear end thereof, and tightens the belt, causing it to bind upon the driving-pulley 17 and to propel or assist in propelling the bicycle, while upon depressing the lever the belt is loosened and is carried over the driving-pulley without stopping the motion thereof. The 115 strand 20 causes the levers to work in opposite directions and causes the downward push exerted upon the downwardly-moving lever (which would otherwise be lost so far as it relates to the propulsion of the bicycle) to assist in raising the opposite and upcoming lever. It is also of course obvious that hoods may be placed over the pulleys 17 and 18 to hold the belts 16 thereon, as is described in my said other application serially numbered 125 603,909, and that the lever-checks and lever-holders and antifriction-rollers for the pulleys 17 described therein may be used in connection with this embodiment of my invention.

130 In connection with the manual power described it is proper and convenient to provide means for steering the bicycle other than the handles hereinbefore described for that



purpose and also to provide means for supporting the chest of the rider to afford a bearing upon which he may rest when pulling upwardly upon the handles of the manual power, and for the purposes of this in my present application I construct such a support as follows:

The saddle-post 22 is mounted in the main upright D and has adjustably clamped thereon above the upper end of the upright a sleeve 23, forming a bearing for a collar 24, having cheeks 24<sup>a</sup> thereon, between which is pivoted a plate 25 on the rear end of the bent arm 25<sup>a</sup> of the body-support, the arm being locked at any desired angle by a locking-pin 25<sup>b</sup> engaging serrations on the edge of one of the cheeks. The arm 25<sup>a</sup> may be telescopic and at its upper end is provided with a pad 25<sup>c</sup> to afford an easy rest for the chest of the rider, and it will be seen that such a pad on the end of such an arm is capable of lateral motion from side to side of the bicycle with the forward portion of the body of the rider, the collar turning upon the sleeve to permit this. It is also obvious that the arm may be so made as to be springy, thus adding to the comfort of the rider, while the transverse movement of the pad before described may be governed by means of spring-rods 26, projecting from and secured to the horizontal portion of the saddle-post, the movement of the arm being positively limited by a pin 23<sup>d</sup>.

The collar 24 has on one side thereof projecting lugs 24<sup>e</sup>, between which the rear end of the rod 28, running along the upper tube B of the bicycle through eyes 28<sup>a</sup>, is secured, the rod having its forward end connected to the upright of the fork on the same side of the machine as are the lugs 24<sup>e</sup> and being bent, as at 28<sup>b</sup>, to give it elasticity and prevent the jars upon the fork being imparted to the saddle-post and saddle. From this construction it is obvious that upon turning the collar upon the saddle-post a similar rotation will be imparted to the fork, it being advisable to connect the two in such a manner that the angular movement of the latter is greater—say, for instance, twice as much as that of the former. It will be also seen that this rotation may be imparted to the collar by swinging the pad which is carried thereon from side to side of the machine by a leverage exerted on the breast-rest by the front of the body, and it is to be observed that this side motion of the body in swinging the breast-rest corresponds to the natural motion of the body when the bicycle is caused to turn a curve.

I do not in this application broadly claim the hereinbefore-described mechanism consisting of pulleys, the reciprocating belts passing thereover, and a tilting lever interposed within the belt to reciprocate it and tighten it upon the pulleys, with or without the transverse strand, &c., nor do I here broadly claim a body-support consisting of

an arm pivotally or otherwise mounted at its rear end upon the bicycle, its forward end in front of its point of attachment to the bicycle being adapted to support the body and to swing from side to side either with or without a connection between the said arm and the steering-head, as such matter is fully described and claimed in my said prior application, Serial No. 603,909, filed August 25, 1896; but

What I do claim is—

1. In a bicycle, the combination of a reach and a front fork, the fork being composed of two uprights, one on each side of the wheel, two bridge-plates carried by the uprights, each bridge-plate being independently adjustable thereon, in such a manner that the axes of the uprights may be shifted in respect to the points at which they intersect the planes of the plates, and a spindle carrying the reach and mounted between the bridge-plates, substantially as described.

2. In a bicycle, the combination of a reach and a front fork, the fork being composed of two uprights, one on each side of the front wheel, bridge-plates carried by the uprights, each plate having opposite apertures through which the opposite forks pass, the apertures being larger than the forks contained therein, means for adjusting and for clamping in the adjusted position the forks within the apertures, whereby the axes of the former may be shifted in respect to the axis of the spindle, and a spindle carrying the reach and supported between the bridge-plates, substantially as described.

3. In a bicycle, the combination of a reach and a front fork, the fork being composed of two uprights, one on each side of the front wheel, bridge-plates carried by the uprights, each plate having a longitudinally-elongated slot therein, and a spindle carrying the reach and adjustable in the slots of the bridge-plates, and means for securing the spindle in its adjusted position, substantially as described.

4. In a bicycle, the combination with a reach and a fork, the fork being composed of two uprights, one on each side of the front wheel, of bridge-plates carried by the uprights, each plate having apertures therein through which the uprights pass, an eccentric washer contained in each aperture of each plate, an eccentric collar contained in the recess of each washer and surrounding the corresponding upright, and means for locking the said washer and collar in each aperture in different positions therein, the reach being supported by the bridge-plates, substantially as described.

5. In a bicycle, the combination with a reach and a fork, the fork being composed of two uprights, one on each side of the front wheel, of bridge-plates carried by the uprights, each plate having apertures therein through which the uprights pass, an eccentric washer contained in each aperture of each plate, an eccentric collar contained in the recess of each



washer and surrounding the corresponding upright, the said apertures, washers and collars having serrated edges whereby they may be adjusted in respect to each other and secured in their adjusted position, the reach being supported between the bridge-plates, substantially as described.

6. In a bicycle, the combination with a reach and a fork, the fork being composed of two uprights, one on each side of the front wheel, of bridge-plates carried by the uprights, each plate having a slot therein in the plane of rotation of the front wheel, a spindle having upon its ends heads contained within the slots in the opposite plates, and means for adjusting the heads within the corresponding slots, the said spindle supporting the reach, substantially as described.

7. In a bicycle, the combination with a reach and a fork, the fork being composed of two uprights, one on each side of the front wheel, of bridge-plates carried by the uprights, each plate having a slot therein in the plane of rotation of the front wheel; a spindle having upon its ends heads contained within the slots in the opposite plates, the edges of the slots and the heads being provided with engaging serrations, whereby the heads may be adjusted within the slots, the said spindle supporting the reach, substantially as described.

8. In a bicycle, the combination with a driven wheel, of a pulley imparting motion thereto, a guide, a belt passing over the said pulley and guide and imparting motion to the pulley, a tilting lever interposed within the belt to which the oppositely-disposed ends of the belt are attached at different distances from and on the same side of the point of application of the power, whereby the lever will in tilting cause the ends of the belt to move relatively to each other, substantially as described.

9. In a bicycle, the combination with a driven wheel, of two pulleys imparting motion thereto and located upon opposite sides thereof, a guide corresponding to each belt, belts passing over the corresponding pulleys and guides, a tilting lever interposed within each belt and to which the oppositely-disposed ends of the belt are attached at different distances from and on the same side of the point of application of the power, whereby the lever will in tilting cause the ends of the belt to move relatively to each other, and a strand having its opposite ends connected to the two levers and assisting in tilting them, substantially as described.

10. The combination, in a bicycle, of a saddle-post, and an arm pivoted upon the saddle-post to swing transversely thereon, the forward end of the arm forming a support adapted to support the front of the body, substantially as described.

11. The combination in a bicycle, of a saddle-post, an adjustable sleeve mounted thereon, a collar rotating upon the sleeve, and an arm projecting from the collar, the forward end of the arm forming a support adapted to receive the front of the body, substantially as described.

12. The combination, in a bicycle, of a saddle-post, an arm pivoted upon the saddle-post to swing transversely thereon, the forward end of the arm forming a support for the front of the body, and springs governing the transverse swing of the arm, substantially as described.

13. The combination, in a bicycle, of a saddle-post, a pivoted arm mounted thereon at its rear end and having a support for the front of the body upon its forward end capable of moving vertically and laterally, and means for locking the arm against vertical movement on its pivot, substantially as described.

14. The combination, in a bicycle, of a saddle-post, a collar rotatably mounted thereon and having a circular rack on one side thereof, an arm pivoted at its rear end on the collar and carrying a body-support on its forward end, and means upon the arm to lock it to the collar, substantially as described.

15. The combination in a bicycle, of a saddle-post, an arm pivoted upon the saddle-post to swing transversely thereon, the forward end of the arm forming a support adapted to support the front of the body, and a connection between the said arm and the steering-post, whereby the swing of the former turns the latter, substantially as described.

16. The combination in a bicycle, of a saddle-post, an adjustable sleeve mounted thereon, a collar rotating upon the sleeve, and an arm projecting from the collar, the forward end of the arm forming a support adapted to receive the front of the body and a connection between the said collar and the steering-post, whereby the swinging of the arm carried by the former turns the latter, substantially as described.

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

FREDERICK POMEROY BEMIS.

Witnesses:

A. G. BUSH,  
J. A. HOLMES.