

(No Model.)

D. H. SMITH.
VELOCIPÈDE.

No. 428,356.

Patented May 20, 1890

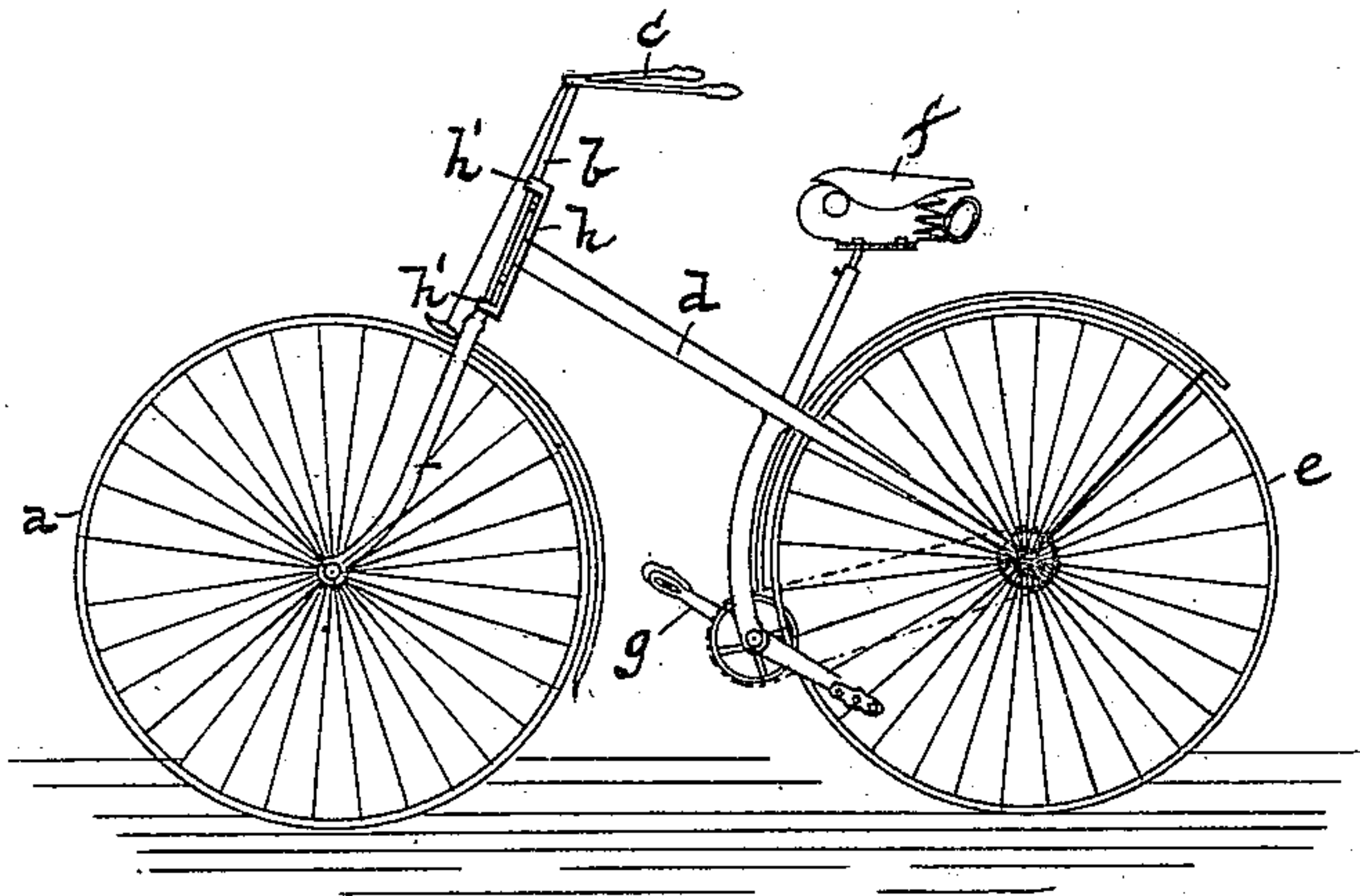


Fig. 1.

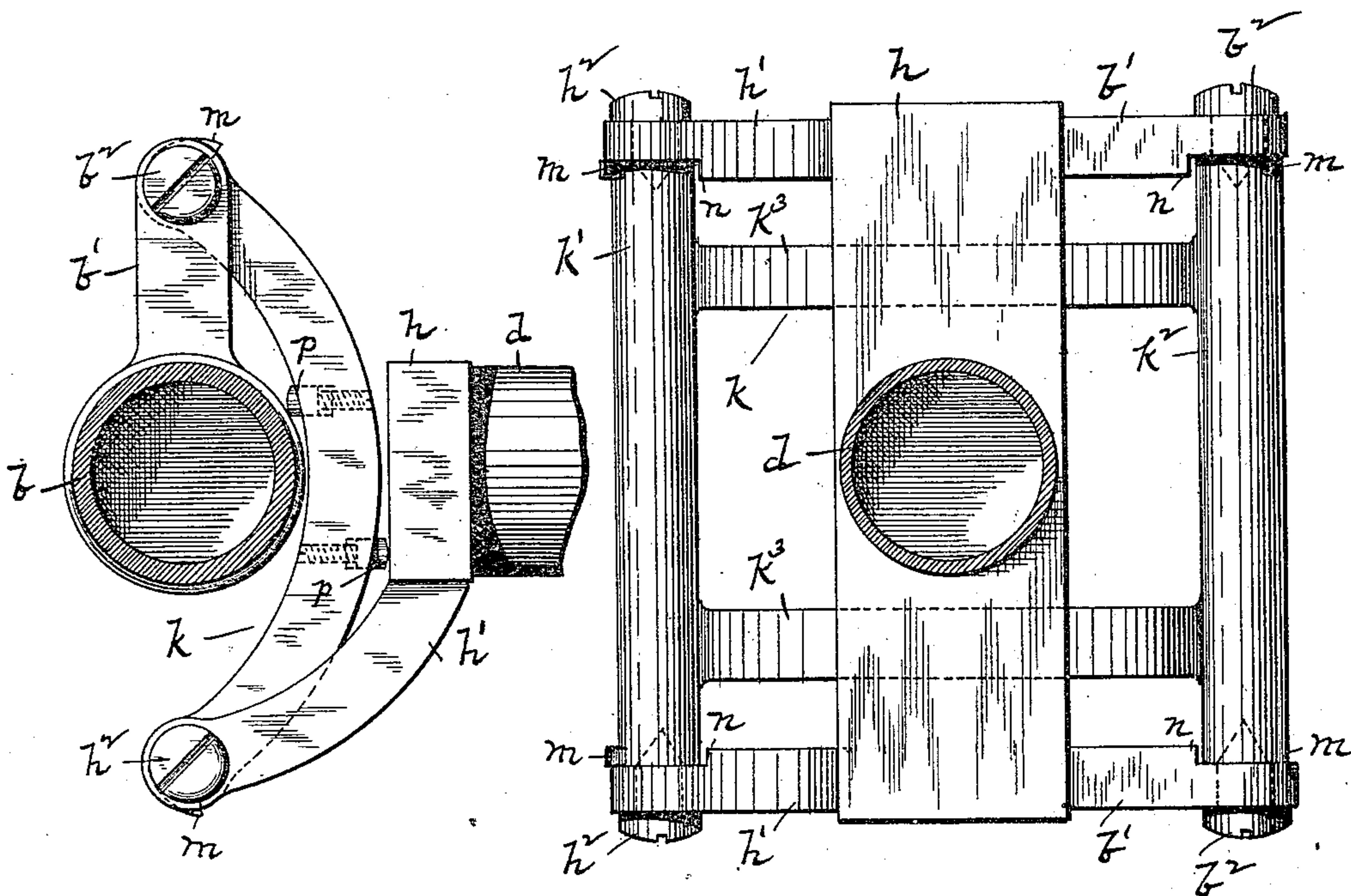


Fig. 2.

Fig. 3.

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VELOCIPEDÉ.

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Application filed October 9, 1889. Serial No. 326,422. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. SMITH, of Holyoke, in the county of Hampden and State of Massachusetts, have invented a new and
5 useful Improvement in Velocipedes, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to velocipedes, and
10 particularly to that class of velocipedes in which the steering-wheel is located in front, and in which the propelling-power is applied to the rear wheel or wheels. It is a well-known objection to such machines that, by
15 reason of uneven ground, crumbly or sandy surface, or the uneven balancing of the rider upon the seat, the steering-wheel is liable to be deflected to the right or left of a straight line, thereby requiring the rider to constantly
20 maintain a firm hold upon the handle-bar, and detracting greatly from the safety and enjoyment of the user of such machines. Springs and various other devices have been
25 employed with a view to overcoming such tendency of the steering-wheel; but such devices have not only failed to secure the desired result, but have in most instances formed an unsightly and undesirable adjunct to the machine. In all of them, so far as I
30 am aware, it has been possible for the steering-wheel to be diverted from a straight line by any of the causes mentioned when the machine is in motion, the devices employed being designed to overcome this tendency as
35 much as possible.

It is the object of my invention to provide velocipedes of the class mentioned with means for absolutely preventing the deflection of the steering-wheel from a straight line, while the
40 machine is in motion in a forward direction, by any other means than the handle-bar, and for immediately returning said wheel to its normal position after being turned to the right or left by means of the handle-bar, as
45 soon as the hold of the rider upon the handle-bar is released.

To this end my invention consists in a velocipede in which the motive power is applied to the rear wheel or wheels, and in which
50 the steering-wheel is located in front, the

steering-wheel of which is so connected to the frame of the machine that in order to turn said wheel either to the right or left of a straight line a forward bodily movement must be imparted thereto in addition to its turning
55 movement.

My invention consists, further, in a velocipede having a steering-wheel mounted upon an axis the pivotal center of which, as the wheel is turned either to the right or left of
60 a straight line, lies wholly outside of the plane of the wheel.

My invention consists, further, in a velocipede having its steering-wheel connected to the frame of the machine by means of two
65 pivotal bearings located upon opposite sides of the plane of movement of said wheel when the machine is progressing in a straight line.

The invention consists, finally, in the construction and combination of parts hereinafter fully described, and particularly pointed
70 out in the claims.

Inasmuch as the objections above noted to velocipedes having their steering-wheel located in front and having the power applied
75 to their rear wheel or wheels are particularly true of the well-known "safety" style of machines, I have herein illustrated my invention in connection with one of said machines, and in the drawings, in which like letters
80 designate like parts in the several figures—

Figure 1 is a side elevation of a safety velocipede constructed according to my invention. Fig. 2 is a view upon a larger scale showing the steering-post in cross-section,
85 and showing in plan view the means devised by me for connecting said post to the backbone of the machine. Fig. 3 is a vertical section through the backbone and a rear elevation of said connecting means.
90

The letter *a* designates the steering-wheel, *b* the steering-post, *c* the handle-bar, *d* the backbone, *e* the rear or propelling wheel, *f* the saddle, and *g* the pedals, of a well-known
95 form of velocipede.

In the adaption of my invention to such machine I rigidly secure to the backbone *d*, at the front end of the latter, a head-piece *h*, which, as shown, is rectangular in shape, but
100 which may be of any desired shape. Pro-

jecting laterally from said head-piece, at or near the top and bottom thereof, respectively, are two arms h' , which arms are provided with tapped holes at their outer end to receive conically-pointed screws h^2 .

The letter k designates a frame, which, as shown, is composed of two posts $k' k^2$, rigidly connected together by two cross-bars k^3 , the post k' of which frame is provided with conical depressions in its ends to receive the ends of the screws h^2 , whereby said frame is adapted to swing about said screws as a center. The cross-bars k^3 are of such length as to cause the posts $k' k^2$ to lie upon opposite sides of the central plane of the machine, which term as herein used will be understood to mean the plane of movement of the steering-wheel when the machine is progressing in a straight line.

Two arms b' project laterally from the steering-post b , being rigidly secured thereto by means of one or more bands encircling said post, or in any convenient manner, said arms being provided with tapped holes at their outer ends to receive conically-pointed screws b^2 , which enter conical depressions in the ends of post k^2 , thus enabling the steering-post to swing about said post as a center. I have shown the pointed screws b^2 and h^2 simply as one form of pivotal bearing having but slight friction and wear, and it will be understood that ball-bearings or other common form of bearings can be employed in lieu thereof, if desired.

It will be observed that the steering-post is rigidly held from movement about its own axis by the arms b^2 , and that while it is free to swing about the post k^2 as a center it must in so doing have a forward movement in addition to its turning movement. It will be observed, also, that while said post and the frame k are free to swing in the opposite direction about the screws h^2 as a center said post must again have a forward movement in addition to its turning movement. It follows, therefore, that while said compound forward and turning movement can be readily imparted to said post and the steering-wheel by means of the handle-bar said wheel can never be turned either to the right or left when the machine is moving forwardly by any obstruction or unevenness in the roadway or from any other cause, since any resistance to its forward movement only serves to increase the force with which it is held in its straight position. It follows, furthermore, that should said post and wheel be turned either to the right or left of a straight line by means of the handle-bar the resistance of the ground will, if the handle-bar be released, immediately cause said wheel to return to its rearmost position, or one coinciding with the central plane of the machine. The construction described, therefore, instead of merely tending to overcome the lateral diversion of the steering-wheel by causes other than a movement of the handle-bar, absolutely pre-

vents such diversion so long as the machine is propelled in a forward direction by power applied to its rear wheel or wheels.

I prefer to curve the arms h' and the cross-bars k^3 of frame k , as shown in Fig. 2, to cause the two pivotal centers about which the steering-wheel turns to lie upon diametrically-opposite sides of the steering-post when the latter is in its normal position, as I thereby gain a possible arc of movement for said post about each of its centers of substantially ninety degrees before the axis of the steering-wheel is brought to a position perpendicular to the axis of the rear wheel or wheels; but inasmuch as the steering-wheel is rarely turned in riding to a position of more than forty-five degrees from its normal position such arrangement is not material.

It will be noted that while, as stated, the steering-wheel is prevented from moving forwardly and laterally so long as the machine is propelled forwardly by power applied to its rear wheel, unless positively so moved by the handle-bar, said wheel can move forwardly, swinging upon both of its centers, should the machine be drawn forwardly by means of its handle-bar or the steering-post, as is customary when the rider leads his machine without mounting, and for the purpose of limiting such forward movement I provide stops, which, as shown, consist of lugs or projections m on the posts $k' k^3$ and shoulders n on the arms $h' b'$, so located as to permit the steering-post to swing upon either center as far as is necessary or desirable in the operation of the steering-wheel when riding, and to prevent any further pivotal movement thereof by being brought into contact with each other. If desired, any suitable form of latch can be employed to prevent any movement of the steering-wheel upon its centers when the machine is thus led by the handle-bar or steering-post, which, of course, it would be necessary to release when the rider mounts the machine.

To obviate noise and jar of the parts when the steering-wheel is returned to its normal position after being diverted therefrom, I provide the cushions or buffers p , preferably made from soft rubber and seated in sockets in the front and rear sides of the cross-bars k^3 , in such position that one of the same will bear against the head-piece and the other against the steering-post, as shown in Fig. 2. Said buffers, however, can be otherwise formed and applied to secure the same result, if desired. I also prefer to provide the machine with adjusting devices, by which the means for connecting the steering-wheel to the frame of the machine can be adjusted to cause said wheel to register accurately with the central plane of the machine at all times when said wheel is in its normal position, and as herein shown said devices consist of set-screws passing through the cross-bars k^3 and bearing against said buffers p , (see broken lines in Fig. 2,) by means of which said buffers can be caused to project more or less beyond the

surface of said bars. Any wearing away of the buffers or of the pivotal centers about which the steering-wheel turns, or any slight bending of the frame k or arms b' h' , from a blow or other cause, which would tend to cause the steering-wheel to stand, in its normal position, out of true alignment with the central plane of the machine, can be compensated for by the adjustment of the buffers by means of said set-screws to true up said wheel. It is obvious, however, that the form of such adjusting devices, as well as those of the various other details of construction herein described, can be greatly varied within the scope of my invention, the generic features of which have been fully set forth.

The adaptation of my invention to other styles of velocipedes than that herein illustrated, whether provided with two or more wheels, will be obvious to persons skilled in the art from the foregoing description and need not be more particularly described herein.

By the use of the means herein described for connecting the steering-wheel of front-steering and rear-driving machines to the frame of the machine both the safety and the comfort of the rider are greatly enhanced, since he need devote no attention to the steering of the machine, except when he desires to deviate from a straight line, and a common cause of accident—to wit, unsteady movement of the steering-wheel—is entirely obviated.

As the parts are shown in Fig. 2, if the handle-bar be turned to the left, the steering-post will swing upon the center k^2 and the steering-wheel will be given a compound forward and curvilinear movement to the right, and if said handle-bar be moved to the right said post will swing upon the center k' and the wheel will be given a similar movement to the left. The leverage afforded by the handle-bar enables such steering movements thereof to be made without any appreciable increase of effort over that required in the steering of such machines as heretofore constructed.

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

1. A rear-driving and front-steering velocipede having its steering-wheel connected to its frame by means of two pivotal bearings located upon opposite sides of the plane of movement of said wheel when the machine is progressing upon a straight line, substantially as described, and for the purpose set forth.

2. A rear-driving and front-steering velocipede having its steering-post rigidly held against movement about its own axis and having said post connected to the frame of the machine by means of two pivotal bearings located upon the opposite sides of the central plane of the machine, substantially as and for the purpose set forth.

3. A velocipede having means for applying power to its rear wheel or wheels and having

its steering-wheel located in front, said steering-wheel being connected to the frame of the machine by means of a double hinge-joint comprising two pivotal centers located upon opposite sides of the central plane of the machine, substantially as described, whereby said wheel in turning from a straight line is given a forward as well as a curvilinear movement.

4. A rear-driving and front-steering velocipede having its steering-post connected to the frame of the machine by means of an intermediate part which is pivotally secured at one end to said post and similarly connected to the frame at its opposite end, said pivotal points being located upon opposite sides of the central plane of the machine, substantially as and for the purpose described.

5. A rear-driving and front-steering velocipede having one or more arms projecting laterally from its frame at the front end of the latter and having one or more arms projecting from its steering-post in a direction opposite to that in which the arm or arms on the frame extend, and an intermediate part pivotally connected at its opposite ends to said arms, substantially as and for the purpose described.

6. A velocipede having its steering-post connected to its frame by means of a swinging frame in such manner that said post swings upon said frame when turning in one direction and swings with said frame about an independent center when turning in the opposite direction, and having stops to limit the swinging movement of said post in both directions, substantially as set forth.

7. A velocipede having its steering-post connected to its frame by means of a swinging frame, by which said post is caused to turn upon two independent centers in diverting the machine to the right and left of a straight line, and adjusting devices for regulating the normal position of said post relatively to said centers, substantially as described.

8. The velocipede herein described having rigidly secured to its backbone d the head-piece h , provided with the laterally-extending arms h' , the steering-post b , provided with the laterally-extending arm b' , and frame k , pivotally connected at its opposite ends to said arms h' b' , respectively, substantially as and for the purpose described.

9. In a velocipede, the combination, with backbone d and steering-post b and arms h' b' , projecting from said backbone and post upon opposite sides of the central plane of the machine, of frame k , pivotally connected at its opposite ends with said arms, respectively, and means, as the buffers and set-screws shown and described, for cushioning said frame with respect to the steering-post and the backbone, and for adjusting the normal position of said post relatively to the two ends of said frame, substantially as set forth.

10. In a velocipede, the combination, with backbone d , of head-piece h , secured thereto,

said head-piece having the arms h' , provided at their outer ends with tapped holes and conically-pointed screws h^2 adapted to said holes, steering-post b , having the arms b' rigidly secured thereto, said arms also being provided with tapped holes and conically-pointed screws b^2 adapted thereto, and frame k , composed of posts k' k^2 and cross-bars k^3 , said posts being provided with conical depressions in their ends to receive said screws h^2 b^2 , said arms h' and cross-bars k^3 being curved, substantially as shown, to cause the posts k' k^2 to lie upon opposite sides of the steering-post when the latter is in its normal position, substantially as set forth.

11. In a velocipede, the combination, with the frame provided with the arms h' and the steering-post provided with the arms b' , of frame k , composed of posts k' k^2 , rigidly connected together and pivotally connected, respectively, to said arms h' b' , and stops, as the lugs m on said posts and shoulders n on said arms, to limit the pivotal movement of said parts in one direction, substantially as and for the purpose set forth.

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Witnesses:

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