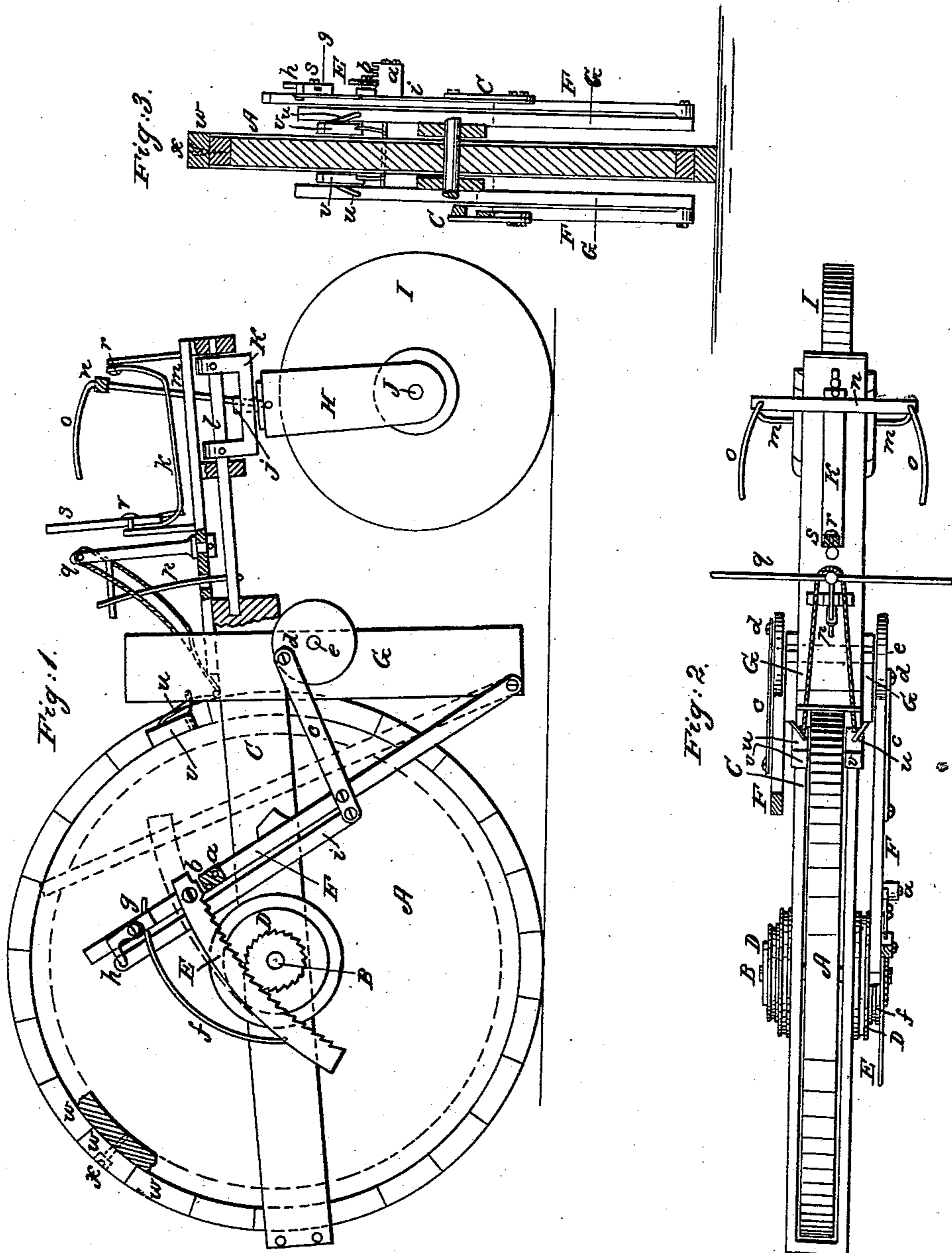


A. M. ALLEN.

Velocipede.

No. 94,055.

Patented Aug. 24, 1869.



Witnesses:

E. F. Kastenhuber  
C. Wahlers.

Inventor:

Arthur M. Allen.  
Per. Santvoordt, Clerk.  
atty.

# United States Patent Office.

ARTHUR M. ALLEN, OF NEW YORK, N. Y.

Letters Patent No. 94,055, dated August 24, 1869.

## IMPROVEMENT IN VELOCIPEDES.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, ARTHUR M. ALLEN, of the city, county, and State of New York, have invented a new and useful Improvement in Velocipedes; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 is a sectional side view of this invention.

Figure 2 is a plan or top view of the same.

Figure 3 is a transverse section of the same.

Similar letters indicate corresponding parts.

This invention consists in the arrangement of what may be termed "foot-ratchets," in combination with the driving-wheel of a velocipede and with hinged foot-levers, in such a manner that the power of the feet is always on the live centre during the whole stroke of the ratchet, and that the rider is enabled to increase or decrease the stroke, and to adapt the motion of the foot-levers to the length of his legs without changing any portion of the machine.

With the foot-levers and ratchet-arms, I have combined a crank-shaft and connecting-rods extending from the crank-pins to the foot-levers in such a manner that a reciprocating motion of the ratchet-arms in opposite directions is insured.

The ratchet-arms are combined with ratchet-cones having two or more speeds, so that in going up-hill, or whenever an increased power with a comparative decrease in speed is desired, said ratchet-arms can be used on the large wheels of the ratchet-cones, and the power and speed of the driving-gear can be regulated to suit circumstances while using the same amount of power on the foot-lever.

The ratchet-arms are kept in gear with the ratchet-wheels by springs secured to bell-crank levers, which receive an oscillating motion from the rods connecting the foot-levers and crank-shaft, in such a manner that the springs bear down somewhat equally upon the ratchet-arms, whatever may be the position of the foot-levers.

The tires of the wheels of my velocipedes are composed of end-grain sections fastened to the felloes by square-shouldered screws.

A back and side-rest, combined with the steering-mechanism, enables the rider to steer or balance the machine by the motion of his body.

The steering-wheel is hung on a pivot or shaft, so that it can be swung or tilted sideways in a direction at right angles to the reach, thereby enabling the rider to balance the machine without turning either wheel.

The operation of balancing the machine is further facilitated by the arrangement of a laterally-swinging saddle, combined with a lever, which enables the rider

to throw the weight of his body out on either side, as may be required.

The brake-mechanism consists of shoes, which can be brought to bear from opposite sides on the sides of the wheel, so as to stop the motion of the wheel effectually and without injuring its tread or face.

In the drawing, the letter A designates the driving-wheel of a velocipede, which is mounted on an axle, B, that has its bearing in the reach C.

On the ends of this axle are mounted the ratchet-cones D, each cone being composed of two or more ratchet-wheels of different diameters, as shown in the drawing.

The motion of the wheel A is effected by means of ratchet-arms E, which are hinged to foot-levers F, and so arranged that they can be thrown in gear with either of the speeds of their ratchet-cones, being retained in the required position by notched blocks, a, which are pivoted to the foot-levers, each being provided with two or more notches (see fig. 3) corresponding in number and position to the speeds of the ratchet-cones.

These notches engage with a tooth, b, projecting from the edges of the ratchet-arms, and when the blocks are turned on their pivots they release said teeth b, and the ratchet-arms can be moved in or out on their pivots and brought in position to engage with either of the speeds of the ratchet-cones, and with the corresponding notches in the blocks a.

If desired, additional ratchet-arms may be applied to be operated by hand-levers.

The foot-levers F are pivoted to standards G, which are secured to the reach C, and they are in convenient position to be operated by the feet of the rider, so that by imparting to said foot-levers an oscillating motion, the ratchet-arms will act on the ratchet-cones and the wheel A will be revolved.

The principal advantage of my foot-ratchets over the ordinary foot-cranks is that, by the ratchet-arms, the power of the feet is always applied to the live centre during the entire length of their stroke, whereas, with the foot-cranks, the power is applied to the best advantage only at that moment when the crank passes its live centre, and much power is thereby wasted.

Another advantage is that with my foot-ratchet the stroke or motion of the legs can be lengthened or shortened at pleasure, and by changing the ratchet-arms from one speed of the ratchet-cones to the other, the power and speed of the machine can be regulated without difficulty while in motion.

The machine cannot be run backwards at all, as it will be liable to in going up-hill, each stroke of the foot being independent and secure by itself, for when either connecting-rod e reaches the point farthest from the cones, the wheel cannot turn further backward, and

in using the foot-ratchets, one stroke of either foot can turn the wheel an entire revolution or more, according to the size of the ratchet-wheel, and although the speed and power can be varied to any extent the machine is capable of, the motion of the foot can be always regular and uniform.

The foot-levers *F* connect, by rods *c*, to cranks *d*, secured to the countershaft *e*, which has its bearing in the standard *G*, and the position of the cranks *d* is such that the foot-ratchets are compelled to move in opposite directions, one going forward when the other is going back, and *vice versa*.

The rods *e* and cranks *d* will, in practice, be made adjustable at both ends to regulate the stroke or throw of the foot-ratchets, and also the position of the centre of the same for people with shorter or longer legs.

The ratchet-arms *E* are kept in gear with the ratchet-cones *D* by means of springs *f*, which are secured in the arms *g* of the bell-crank levers *g h*, pivoted to the foot-levers *F* and bear on the edges of the ratchet-arms.

The arms *h* of the bell-crank levers *g h* connect, by rods *i*, with the connecting-rods *c*, as shown in fig. 1.

By this connection, the springs *f* are caused to bear down somewhat on the ratchet-arms, whatever may be the position of the foot-levers, and the ratchet-motion is rendered sure, and, though making a slight clicking, it must be remarked that a certain amount of noise in a velocipede is desirable, since it serves to call the attention of foot-passengers to the approaching machine.

The reach *C* forms the connection between the front or driving-wheel *A* and the standard *H*, which straddles the hind or steering-wheel *I*, and forms the bearing for the hind axle *J*.

The standard *H* swivels on a pivot, *j*, which has its bearings in a bracket, *k*, that swings on a shaft, *l*, which has its bearings in lugs or ears secured to the under surface of the reach *C*.

By this arrangement, the standard *H* has a double motion, first a swivel motion on its pivot, *j*, and a lateral swinging-motion on the shaft *l*.

Said standard connects, by rods *m*, with the back-rest *n*, and from this back-rest extends the arm-pieces *o* in such a position that they form a convenient rest for the arms of the person occupying the saddle *K*.

By this arrangement, the rider is enabled to steer the velocipede simply by turning his body in the proper direction, and, furthermore, he is enabled to bring the steering-wheel in a laterally-inclined position, so that he is enabled to keep his balance with ease and facility when turning a corner or running on a curve.

If desired, however, a hand-lever, *p*, may be used to bring the wheel *I* into the required inclined position.

This hand-lever extends up from the shaft *l*, and it may be connected to the tiller *q*, or it may be detached and operated, as occasion may require.

The saddle *K* is hung on pivots, *r*, so that it can assume a laterally-swinging motion, and it connects with a hand-lever, *s*, which has its fulcrum on one of the pivots *r*, secured in a standard, which rises from

the reach *C*, or which may have its fulcrum on any other fixed part of the reach, so that by the action of said hand-lever the rider is enabled to throw the weight of his body out on either side, and thereby the operation of balancing the machine is materially facilitated.

The tiller *q* connects, by a rope or chain, or by other suitable means, with the arms *u*, which carry the brake-shoes *v*.

The brake-shoes are situated on the sides of the wheel *A*, so that by twisting the tiller-handles they are made to clamp said wheel from both sides, instead of being brought to bear on its periphery, as usual.

By this arrangement of the brakes, the face or tread of the wheel is saved from being worn out by the action of the brake-shoes, and there is no unusual pressure on the bearings of the wheel.

The rim or tire of the wheel is constructed of a series of sectional blocks, *w*, with the grains running endways, or from the periphery toward the centre of the wheel, and these blocks are fastened to the felloe of the wheel by square-shouldered screws *x*, as shown in fig. 1.

By these means a wheel can be constructed which is durable and easily kept in repair.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The "foot-ratchets" and ratchet-arms, in combination with the driving-wheel of a velocipede, substantially as described.
2. The cranks *d* and connecting-rods *c*, in combination with the "foot-ratchets," and with the driving-wheel of a velocipede, substantially as set forth.
3. The bell-crank levers *g h*, rods *i*, and springs *f*, in combination with the ratchet-arms *E* and foot-lever *F*, substantially as described.
4. The notched blocks *a*, in combination with the ratchet-arms *E* and ratchet-cones *D*, substantially as set forth.
5. The bracket *k* and shaft *l*, in combination with the pivot *j*, standard *H*, and wheel *I*, thereby giving to the standard *H* a double motion, viz, a swivel motion and a laterally-swinging motion, substantially as and for the purpose set forth.
6. Steering or balancing a velocipede by the rest *n*, connected to the standard of the steering-wheel, substantially in the manner described.
7. The combination of the hand-lever *s* with the swinging-saddle *K* and reach *E*, substantially as described.
8. The brake-shoes *v*, arranged to bear on the sides of the driving-wheel, instead of on its circumference, as set forth.
9. A wheel, having its tire constructed of end-grain sections *w*, fastened to the felloe of the wheel by square-shouldered screws *x*, as described.

ARTHUR M. ALLEN.

Witnesses:

W. HAUFF,  
E. F. KASTENHUBER.