(No Model.)

# M. A. LILLY.

## VELOCIPEDE.

No. 587,318. Patented Aug. 3, 1897.

Fig 1

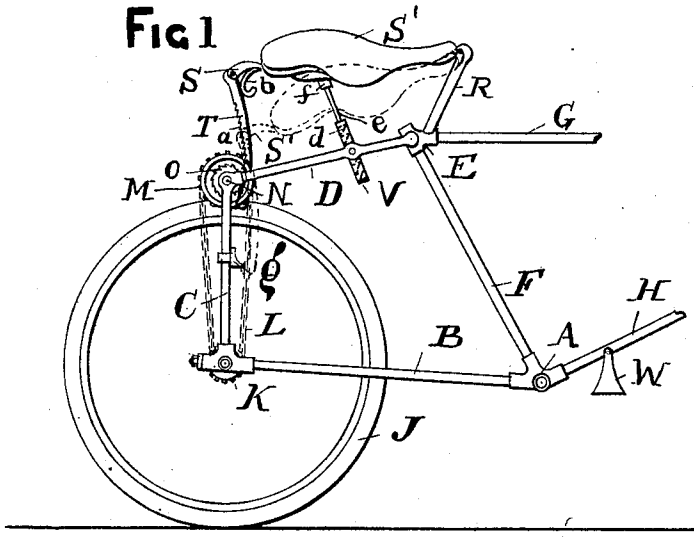



Fig 2

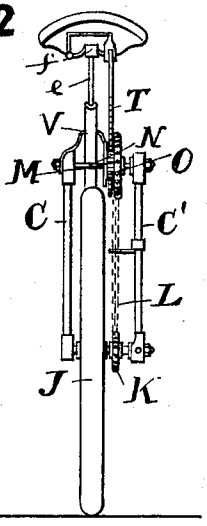



Fig 3

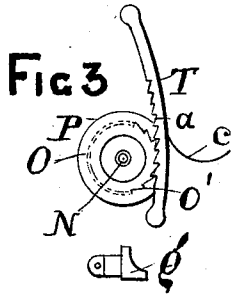
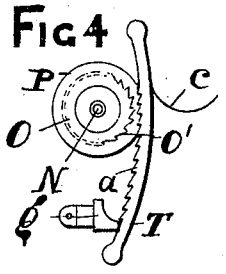



Fig 4

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# UNITED STATES PATENT OFFICE.

MAYFIELD ARCHIBALD LILLY, OF BRISTOL, ENGLAND.

## VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 587,318, dated August 3, 1897.

Application filed December 16, 1896. Serial No. 615,886. (No model.) Patented in England December 18, 1895, No. 24,249.

*To all whom it may concern:*

Be it known that I, MAYFIELD ARCHIBALD LILLY, a subject of Her Majesty the Queen of Great Britain, residing at 35 Colston Street, St. Augustines, Bristol, in the county of Gloucester, England, have invented certain new and useful Improvements in Velocipedes, (for which I have received a patent in Great Britain, No. 24,249, dated December 18, 1895,) of which the following is a specification.

My invention relates to an improved cycle or velocipede having two or more wheels arranged to be propelled by the means of a vertical rack suspended upon the back of the seat of the rider and engaging with a toothed wheel upon the shaft of the back or driven wheel or wheels of the machine, vertical motion being imparted to the said rack and rotary motion to the said back wheel or wheels of the machine in an up-and-down movement of the saddle, occasioned by a movement of the rider, after the manner of a person on horseback, and a suitable spring or springs.

In order that my invention and the manner of its operation may be fully understood, reference is hereinafter made to the accompanying sheet of drawings, of which—

Figures 1 and 2 are side and back elevations, respectively, of so much of a safety-bicycle as will suffice to make my invention more clearly understood. Figs. 3 and 4 are enlarged views of details hereinafter explained.

In the following description of my invention I have assumed and illustrated its application in connection with a safety-bicycle, but I wish it understood that by a very slight modification of the details given (which will be easily appreciated by those skilled in the manufacture of such machines) the same principle may be adapted to tricycles and other velocipedes having more than two wheels; and it is my invention to employ the same in the construction of such machines.

In carrying my invention into effect I dispense with the usual pedal-spindle in the bottom bracket A of the machine and so arrange the back end of the back fork B as to carry a pair of vertical solid or tubular rods C and C′, these being connected at their upper ends to one end of a pair of rods, or a bifurcated rod D, the opposite ends or end of which are or is connected to a junction-piece E, forming a tie for this and a solid or tubular rod F (the latter usually constituting the seat-pillar in this class of machine) and a solid or tubular rod G, the latter and a solid or hollow rod H extending from the bottom bracket A, being both connected to the tube of the front fork (not shown) in the usual way.

The spindle of the back or driven wheel J carries a small sprocket-wheel K, which gears, by the means of a suitable chain L, with a larger sprocket-wheel M, mounted upon a spindle N, carried by the elbows forming the junction of the rods C and D, the said sprocket-wheel M being connected to or formed integrally with a wheel O, having ratchet-teeth O′ and provided with a broad flange P.

The junction-piece E has brazed or otherwise connected thereto at a suitable angle a standard R, to the upper end of which is pivotally connected the front end of the frame S of any type of seat S′ suitable for the purpose, the back end of the said seat-frame S being pivotally connected to a suitably-curved arm T, which depends therefrom and finds a place between the sprocket-wheel M and the flange P, the said arm having upon its back face ratchet-teeth *a*, similar to those upon the wheel O and may be kept in gear with O by the means of a suitable spring or springs—such, for instance, as that shown by dotted outline at *b*, connected to the seat-frame S, or that shown by dotted outline at *c*, connected to the rod or rods D, or both those or like springs may be employed, but preferably the latter if only one be used, as shown in Figs. 3 and 4.

Upon the rods or bifurcated rod D is pivotally mounted a short tube V, closed at its lower end and provided internally with a spiral spring *d*, the tension of which operates to push outwardly a plunger *e*, having at its upper end a head *f*, pivotally connected in a suitable position to the saddle-frame S, the tension of the said spring serving to keep the seat S′ in its highest and normal position, as shown in full lines in Fig. 1.

The manner of operating the propulsion of the machine is as follows: The rider on mounting the machine would place his feet upon a suitable bar or rest at each side of the machine, which may conveniently take the form of loops or stirrups, such as W, pivotally

mounted upon the frame of the machine in front of and near to the bottom bracket A, as shown in Fig. 1, or in any other position most suitable for the rider, and upon the weight of the rider being deposited upon the seat S′ the back end of this would descend to a greater or lesser wheel, according as the rider may seat himself near to or farther from the standard R, the said descent of the seat carrying with it the arm T, and consequently imparting motion to the toothed wheel O and sprocket-wheel M, the latter of which by means of the chain L would impart motion at a greater speed to the smaller or sprocket wheel K, and consequently the driven wheel J, and so propel the machine for a given distance, before the expiration of which the rider would rise from the saddle and so transfer his weight to the rests or stirrups W, when the seat S′ would acquire rise by the tension of the spring *d*, carrying with it the arm T, the ratchet-teeth *a* of which would pass idly over the teeth O′ of the wheel O, but would be still kept in control therewith by the tension of the spring or springs *b* or *c*, or both, (guided by the sprocket-wheel M on the one side and the flange P on the other,) ready for again operating by its descent, on the rotation of the wheel O, directly the rider again transfers his weight from the rests or stirrups W to the seat S′, and by this means the machine would be propelled by a motion of the rider similar to that of riding on horseback.

Upon the rod C would be mounted and bolted or otherwise fixed a tapered or curved stop-piece *g*, and in a general way, when propelling the machine, the lower end of the arm T would stop short of this, but when the machine is traveling downhill the rider may, by sitting farther back upon the seat or by pressing more firmly upon the rests or stirrups W, or both, lower the said rod until the stop *f* rests upon the upper end of the tube V, the position of the saddle then being that shown by dotted outline on Fig. 1, or thereabout, and this position of the seat would lower the arm T sufficient for its lower end to collide with and pass over the stop-piece *g*, which would place the teeth *a* of arm T out of gear with the wheel O, as shown by the diagram Fig. 4, thus permitting the machine to glide along freely by the aid of gravity alone.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

In combination, in a cycle with the frame, the standard R, the seat pivoted thereto at its front end, the vertical bar C extending up from the bearing of the rear wheel, the sprocket supported thereby at its upper end, the sprocket on the rear wheel, the vertical drive-chain between the sprockets, the rack-bar pivoted to the rear end of the seat and depending therefrom, the ratchet-wheel connected with the sprocket-wheel and engaged by the said rack-bar, the spring for holding the rack in engagement with the ratchet-wheel, the block *g* on the vertical frame-bar for throwing the rack out of engagement with the ratchet-wheel and the spring for elevating the rear end of the seat, said spring being supported on the upper bar D of the frame, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

MAYFIELD ARCHIBALD LILLY.

Witnesses:

ALBERT GEORGE BARNES,

HENRY CONRAD STEIDE.