(No Model.)

O. F. JARVIS.

MOTOR GOVERNOR FOR BICYCLES.

No. 557,823. Patented Apr. 7, 1896.

Fig. 1.

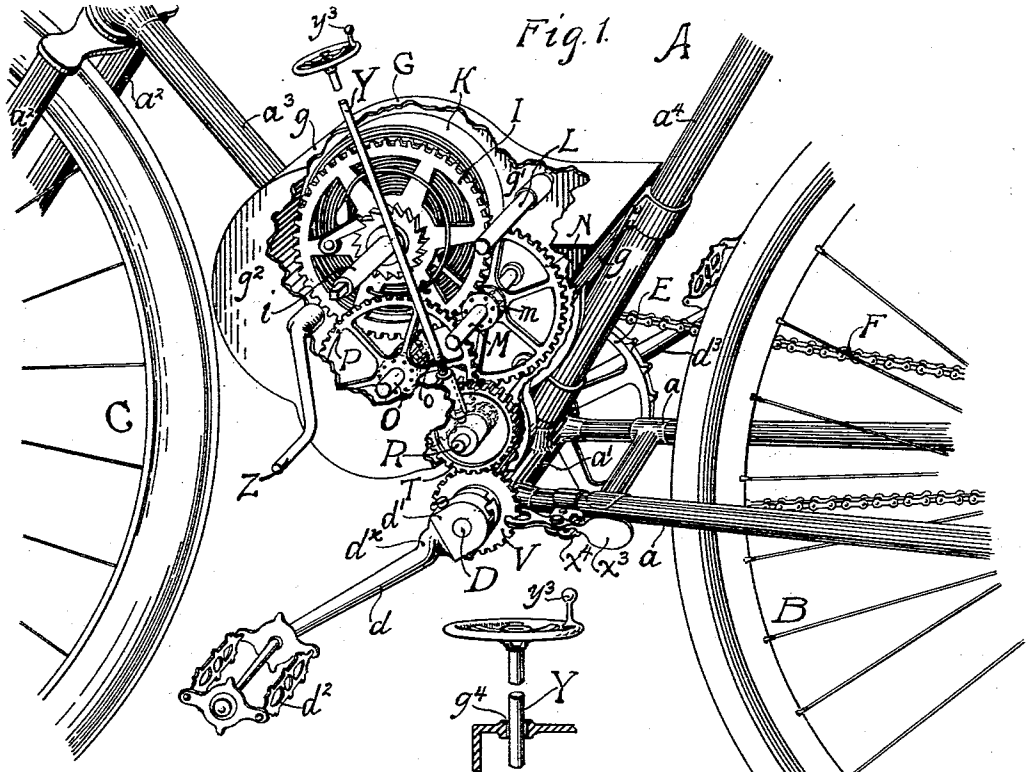
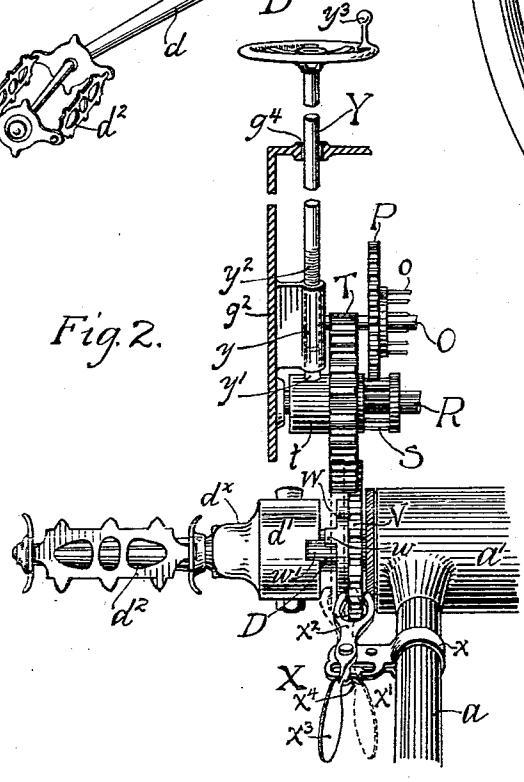


Fig. 2.



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OSCAR FITZELLAN JARVIS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO EDWARD C. SMITH, OF SAME PLACE.

MOTOR-GOVERNOR FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 557,823, dated April 7, 1896.

Application filed February 27, 1895. Serial No. 539,917. (No model.)

To all whom it may concern:

Be it known that I, OSCAR FITZELLAN JARVIS, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Motor-Governors for Bicycles, &c.; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is to actuate the bicycle by means of a latent power when desired; and it consists in the novel means for governing the degree of speed and retarding the action of the motor and for connecting the motor with the crank-shaft of the bicycle.

My invention further consists in the novel construction and combination of parts, such as will first be fully described, and specifically pointed out in the claim.

Referring to the drawings, Figure 1 is a view in perspective of the frame of a bicycle, showing broken portions of the front and rear wheels, also showing the case for the motor secured to the frame and broken away to show the train of spring-actuated gear, the movable clutch and gear on the crank-shaft and its operating-lever, and the governor for controlling the speed and arresting the movement of the train of gear. Fig. 2 is a plan view in detail of the motor-case and motor-gear and the crank-shaft, showing the clutch and lever, and also the governor, with the separate frictional part in contact with the hub of one of the train of gear.

Similar letters of reference indicate corresponding parts in both figures.

Referring to the drawings, A represents the frame of an ordinary bicycle, of which a a are the horizontal forked bars, which extend from the crank-shaft bearing a' to the axis of the rear wheel B.

a^2 a^2 are the forked bars, which are connected with the axis of the front wheel C.

a^3 is the single bar connected with forked bars a^3 a^2, and which extends in a downward direction and is connected with the crank-shaft bearing a'.

a^4 is the seat-post extending from the crank-shaft bearing a' upwardly and rearwardly.

D is the shaft in the bearing a'.

d is a crank having its head d' connected with one end of shaft D.

d^2 is the pedal.

d^3 represents the crank connected with the other end of the shaft D.

E is the sprocket-wheel on the shaft D and between the crank d^3 and the crank-bearing a'.

F is the sprocket-chain on the sprocket-wheel E, which extends over a sprocket-wheel (not shown in the drawings) on the axis of the wheel B.

In carrying out the details of my invention between the seat-post a^4 and the bar a^3 of the bicycle-frame, and attached rigidly to the post a^4, is the motor-case G, in which is arranged the train of spring-actuated gear H. Said motor-case is made to extend from bearing a' upwardly about half the described height of the frame, and at the top is of the required dimensions to extend from the inner side of bar a^3 to the inner side of the bar a^4. The sides g g of said case G are inclined inwardly toward each other, conforming to the inclination of the bar a^3 and the seat-post a^4. The bottom of the case G, which extends to bearing a', for the crank-shaft D, as well as the sides and ends, are made with close-fitting joints.

In the upper part of the motor-case G and in the end g' is journaled one end of the winding-axle i, the other end of which is journaled in and extends through the end g^2 and beyond the outer side portion of said case. Upon the axle i is the gear-wheel I, upon which is the pawl i', which pawl engages with the ratchet-wheel i^2 on the axle i. Upon said axle i, and connected at one end therewith, is a coiled spring K. The other end of the spring K is connected with the bar L, which extends from one end g' to the end g^2 of the motor-case G and is adjacent to the wheel I. In the respective ends g' g^2 of the case G, beneath the bar L, is journaled a shaft M, upon which is a cog-gear m, which meshes with the gear I. Upon the same shaft is a cog-wheel N. Beneath the gear I and journaled in the sides of the frame G is a shaft O, upon which is a cog-gear o, which meshes with the gear

N. Upon the same shaft is a gear P. Beneath shaft M and journaled in the sides of the case G is a shaft R, upon which is a cog-wheel S, which meshes with the gear P. Upon the same shaft is a power-transmitting gear-wheel T, the periphery of which is made twice the width of the other gear and extends through an opening g^3 in the bottom of the case G a short distance, for the purpose hereinafter described. Upon the side of gear T and rotating therewith is a hub t. On the crank-shaft D in the bearing a' and between said bearing and the head d' of the crank d is mounted loosely a cog-wheel V, which wheel slides on the shaft D and meshes with the gear T in the motor-case G. To the side portion of the gear V in the direction of the crank-head d' is cast the toothed extension w of a clutch W. Upon the adjacent side portion of the head d' of the crank d is made the notched depression w', which forms the other portion of the clutch, and which clutch is operated as follows:

Upon one of the forked bars a, which is close in position to the gear V, is attached rigidly a collar x, from which extends laterally a plate x'. To the upper side of the plate x' is pivoted an operating-lever X. One end of lever X is forked at x^2, and one forked portion is bent inwardly in a curved line of direction and comes in contact with one side and at point near the periphery of the gear V, and the other portion of the forked end is bent in a curved line of direction and contacts with the other side of the gear V, the space between such forked portions being sufficient to give free play to the movements of the gear V without binding. The other end x^3 of the lever X extends a short distance rearwardly from its pivoted point of connection with plate x' and is flattened and extended in a vertical direction a slight distance above the line of the upper side of the bar a. Upon the upper side portion of the plate x' and directly beneath the lever X is a spring-plate x^4, which bears upon the under side of the lever X and retains said lever in the position in which it is placed.

To the inner portion of the end g^2 of the case G, a slight distance above the hub t on the gear T, is rigidly secured an internally-screw-threaded socket y. In the lower end of the socket y is inserted one end of a cylindrical rubber plug y', the other end of which plug extends beyond said socket and bears directly upon the hub t on the driving-gear T.

In the screw-threaded socket y is fitted the lower screw-threaded end y^2 of a rod Y, which end bears upon the upper end of the plug y'. The upper end of the rod Y extends in an upward direction through the perforations g^4 in the top portion of the motor-case G, which is provided with a suitable bushing to exclude dust. Said upper end of rod Y is provided with a crank-wheel y^3, which is in a convenient position for operation.

For the purpose of winding the spring K a detachable crank Z is employed, which is fitted to the extended end of the shaft i.

In the operation of my improved governing devices and of the motor it will be observed, first, that the primary control of the motor is obtained through the medium of the rod or governor Y, which is operated to bring the lower threaded end firmly upon and force the plug y' down upon the hub t on the gear T and prevent any movement of the said gear, and consequently the train of gear. The compression incident to the composition of the plug y' exerts sufficient power in the line of the diameter of the hub t to retard the action of the motor. The expansion of the plug being limited by the sides of the socket y, facilitates this result without weakening its elasticity. The spring K, which possesses sufficient latent power to be utilized for the propulsion of the bicycle, is then wound by the crank Z or similar lever and given the proper tension to develop power. During the winding of the spring K the gear V, which is always in mesh with the gear T and is in the position as seen in full lines in Fig. 2, is close to the bearing a' for shaft D. The rear end of lever X is thrown outwardly from the bar a and the separate parts of the clutch W free from engagement. In this position of the lever the spring x^4 secures the same from any accidental movement. When the power of the motor is required to actuate the bicycle, the end x^3 of the lever X is forced by the action of the foot in the direction of the bar a, which changes the position of the sliding gear V and throws the projection u on the said gear into engagement with the notch u' on the head of the crank d. The crank y^3 of the rod Y is then operated or turned in a slight degree, so as to relieve the pressure of the plug y' in the hub t, and the action of the spring K is immediately transmitted through the train f to gear T and through the gear V on the crank-shaft D, and also to the sprocket-wheel E and chain F, and thence to the rear wheel B. The plug y', which yields in opposite directions, resists the shock, which would otherwise be thrown upon the train of gear. The governor Y y' enables the speed from the motor to the crank-shaft to be transmitted with regularity and the gradual diminution effected with certainty and ease. The power of the motor may be applied while the pedals are being operated by the feet of the rider with equal facility, and for ascending steep grades the availability of the motor is readily to be seen of great value. When the power of the motor is no longer required, the action of the governor Y is first applied to stop the movement of the gear T and the gear V moved in position by changing the position of the end x^2 of the lever X and removing said end its full distance from the bar a. The bicycle is then operated as usual. To obtain a renewal of power, the crank Z is applied to the winding-shaft i and operated as heretofore described.

The plug y' may be made of any suitable material besides rubber, and compositions suitable to the purpose may be employed.

My invention is readily applied to the driving-shaft of the bicycle, the length of the shaft-bearing being slightly reduced when it is not desirable to lengthen the crank-shaft, and to avoid contact with the motor-case the crank d is bent at an angle at $d^{\times}$ and extended outwardly a short distance, as shown in the drawings. Upon the other side of the bicycle-frame the crank d is bent at an angle in precisely the same manner.

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

In a power-actuated bicycle, the combination with the frame of said bicycle and the driving-shaft of a motor-case attached to said frame above said shaft and having a train of spring-actuated gear, a main driving-gear in said train of gear having a wide periphery and a loose gear on said driving-shaft having toothed projections and a pedal-crank having its head connected with the driving-shaft provided with notches adapted to receive the projections on said loose gear a foot-lever on said frame having a forked end and connected with said loose gear and a spring-plate in the path of the free end of said lever a speed-regulating rod extending through said motor-case and having its lower end screw-threaded an internally-screw-threaded socket on the inner side of said motor-case above and in line with the axis of said driving-gear and an elastic plug having one end within said socket and the other end bearing upon the axis of said driving-gear whereby the shock of coupling the loose gear with the pedal-crank head is taken from the train of gear as specified.

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Witnesses:

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