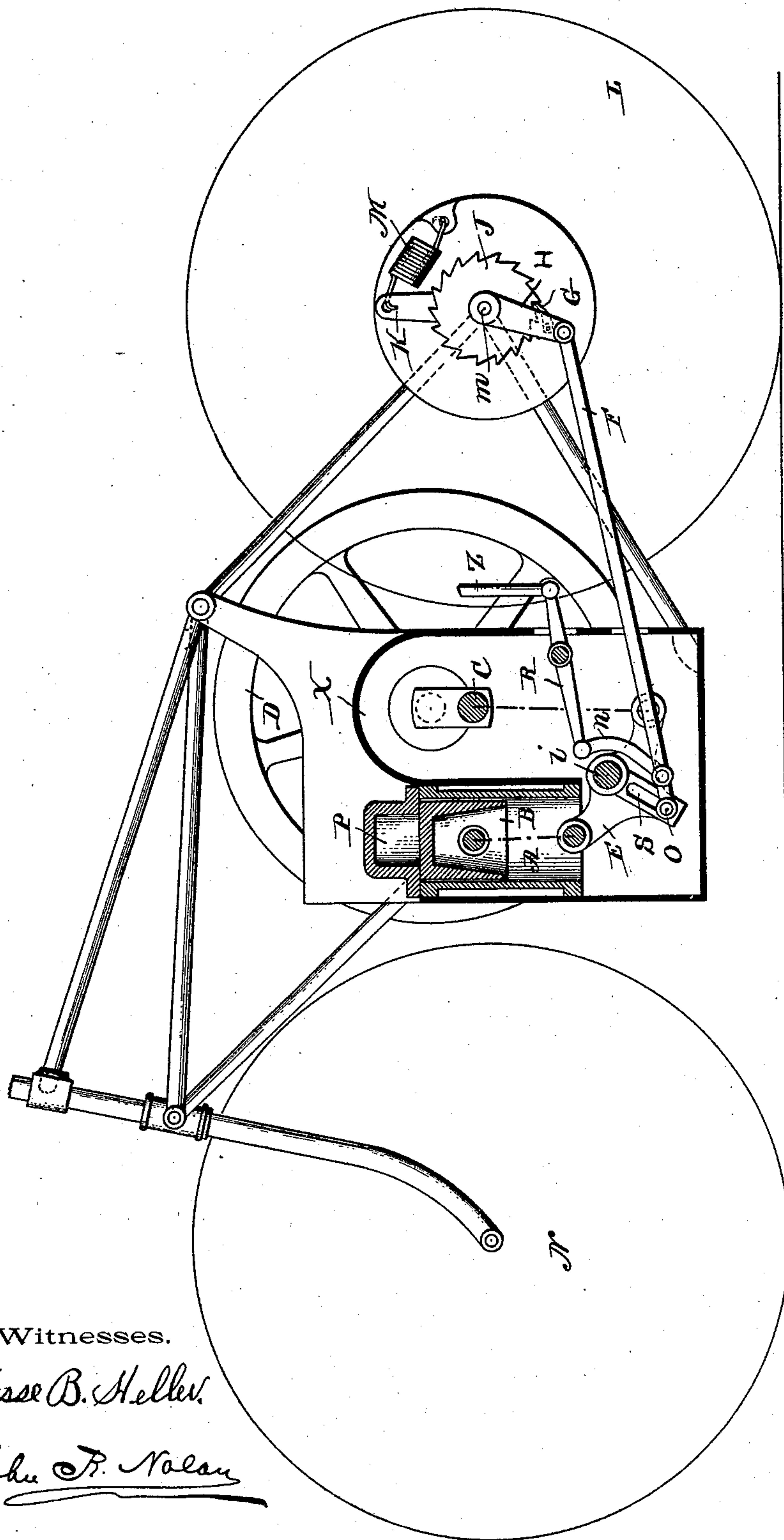


(No Model.)

E. CAPITAINE.
MOTOR VEHICLE.

No. 572,498.

Patented Dec. 1, 1896.



Witnesses.

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MOTOR-VEHICLE.

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To all whom it may concern:

Be it known that I, EMIL CAPITAINÉ, a subject of the King of Prussia, Emperor of Germany, residing at Leipsic, Saxony, Germany,
5 have made new and useful Improvements in Mechanism for Transmitting the Power from Motor to Wheels in a Petroleum-Motor Vehicle, of which the following is a clear and exact specification.

10 My invention relates to mechanism to adapt a petroleum or other gas or air motor to transmit its power to bicycles and street-vehicles, and has for its object to obviate the defects existing in such moto-cycles and motor-carri-
15 riages, which consist, chiefly, in the heavy weight of the motor comparatively to the vehicle upon which it is carried and to which its power has to be transmitted, and that such power has not usually been applied directly
20 to the vehicle, but through the intervention of a comparatively heavy fly-wheel and through indirect power-conveying mechanism. It is obvious that if the power of the motor can be applied directly to the running-gear of the ve-
25 hicle both the motor and the vehicle can be made appreciably lighter than has heretofore been practicable. In the embodiment of my invention hereinafter described it will be observed that I have not employed the usual
30 medium of gear-wheels, chains, and belts usually heretofore employed, nor a friction motion between ratchets on the wheels of the motor-vehicle, as has sometimes been proposed.

35 As it is well known, the forms of gas, benzene, or petroleum motors commonly used in actuating street-vehicles have been commonly constructed on what is known as the "four-stroke" principle, the two-stroke work-
40 ing motor being ill adapted for such purposes and whenever used has been found more or less impracticable. In the four-stroke motor there is one power impulse for each four piston-strokes, the other three piston-strokes fur-
45 nishing no power and being necessary only to the production of the power-stroke. In such devices the fly-wheel of the motor must be heavy enough to absorb the surplus power from the power-impulse stroke of the piston,
50 and this surplus power imparted to and stored

in the fly-wheel is given up to produce the next three piston-strokes, as well as for overcoming the intrinsic friction in the motor itself, as for propelling the vehicle forward, and this statement is made to illustrate the
55 necessity for heavy fly-wheels in the construction of motor-vehicles on that principle.

My invention consists in the mechanism hereinafter described whereby the power im-
60 pulse of the piston operates directly upon the actuating-lever of the vehicle in order that simultaneously with the power-stroke of the piston by the explosion of the charge the vehicle is driven or propelled through the ac-
65 tion of the ratchet-lever creating a spring tension which serves to directly impart rotation to the wheels of the vehicle, driving it forward.

The accompanying drawing, illustrating my invention, shows a side elevation, partly in
70 section, of a moto-cycle.

By reference thereto it will be seen that A is the cylinder of the motor. B is the piston. C is the crank-shaft. D is the fly-wheel mounted by its shaft in the frame X and driven by the actuating-lever E. E is the
75 walking-beam or centrally-pivoted rocking lever. F is a rod which transmits the motion of the piston through the actuating-lever E to the lever-arm H. G is a ratchet-pawl mounted on the lever-arm H and operating in
80 connection with the teeth of a ratchet-wheel J, and K is a bracket-arm connected fast with the wheel J. A spring M is mounted upon the vehicle-wheel L and located between it and the ratchet-wheel J through the medium
85 of the arm K, secured to said ratchet-wheel.

N is the forward wheel of the vehicle; shown in this case in the form of a bicycle.

The rod F is connected to a crank-pin O, which vibrates in a slot S in the walking-
90 beam of lever E. The throw of the lever F is capable of adjustment by moving it in the slot S closer to or farther from the fulcrum-point i of the actuating-lever E, and this is accomplished by means of a small rod n, piv-
95 otally mounted at one end to the rod F and at the other end to a lever R, secured near its center to the frame of the motor and connected at its other end to a hand-lever Z, provided with a suitable handle and intended to
100

be actuated by the rider or operator of the vehicle.

The operation of the device is as follows: When the piston B is given its power impulse or stroke by the explosion in the chamber P, the power is conveyed to the driving-wheel L of the vehicle through the walking-beam or actuating-lever E, which reciprocates the rod F and through it the lever-arm H and the ratchet-pawl G, carried thereby, and hence the ratchet-wheel J is partially rotated, thereby imparting reciprocating motion in an arc of a circle to the lever K. This produces a tension upon the spring M, arranged between the arm K and the driving-wheel L of the vehicle, and the fly-wheel D, being comparatively light and small, is for that reason constantly and quickly moved, and there is great acceleration imparted to it when the spring M is thus set in tension. It must be observed that the arm K is made fast to the ratchet-wheel J and preferably in one piece therewith, and also that the wheel J, with the arm K, is not made fast to the shaft *m*, but is loosely journaled thereon. The spring M should be made of such tension power or with such adjustment of power that it is only possible to exert a tension thereon after a certain pull. The natural resistance encountered to the propelling of the vehicle will more or less affect the tension imparted to the spring M by the piston-stroke through the connecting mechanism hereinbefore described. The greater the resistance offered to the propelling of the vehicle the more essential it will be for the operator or rider to adjust, by means of the handle Z, the throw of the lever-arm F, and by this means the faster or slower propulsion of the vehicle may be regulated and controlled.

It will be observed that in my device the power is not conveyed, as usual, through the crank-shaft to the fly-wheel and from thence to the driving-wheels of the vehicle, but, on the contrary, the power impulse of the piston is transmitted directly to the driving-wheels, the fly-wheel being only operative to maintain rotation over dead-centers and maintain a continuity of action in the motor. Hence the fly-wheel may be comparatively small and light, and the employment of spring-actuation makes it practicable to give to the fly-wheel a correspondingly-greater speed during the period of explosion in the motor-cylinder without at the same time giving any greater speed to the driving-wheels of the vehicle. In short, an important function of the spring is to impart a temporarily greater speed of rotation to the fly-wheel comparatively to the normal speed of the driving-wheels of the vehicle, and this occurs at each power impulse of the piston of the motor.

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

1. In a motor-vehicle, the combination with the piston of a petroleum or other like motor, of mechanism operating to transmit the power impulse thereof direct to the driving-wheel of the vehicle, consisting of a centrally-pivoted lever E directly actuated by the piston, a ratchet-wheel J loosely journaled upon the axle of the driving-wheel, a connection between one arm of said lever and the ratchet-wheel whereby the latter is operated, and a spring connected to the ratchet-wheel and to the driving-wheel and adapted to be brought under tension and exert a propelling force upon the driving-wheel when the ratchet-wheel is actuated, substantially as specified.

2. In a device of the character described, the combination with the piston, of a frame supporting the motor, a fly-wheel journaled in said frame, a centrally-pivoted lever E, connecting devices actuated thereby, a ratchet-disk J loosely journaled upon the axle of the driving-wheel, and a spring M between the same and adapted to be brought under tension upon the partial rotation of the ratchet, substantially as described.

3. The combination in a device of the character described, of a supporting-frame, a motor the piston of which is directly connected with a centrally-pivoted rocking lever, a fly-wheel journaled in the frame and driven by said rocking lever, a spring mounted upon the driving-wheel of the vehicle, devices partially rotatable upon the axle thereof and adapted thereby to exert a tension upon the spring, and connecting actuating devices between the same and the pivoted rocking lever; substantially as described.

4. The combination in a device of the character described of a supporting-frame, a motor, a centrally-pivoted rocking lever E, slotted at S, the rod F vibrated thereby, driving mechanism actuated by said rod; and devices to adjust the throw of the rod F, consisting of the link *n*, the rod R and the operating-bar Z; the same being constructed and operating substantially as described.

5. The combination in a device of the character described, of a supporting-frame, a motor, a centrally-pivoted three-armed lever, one of whose arms is directly connected to the piston of the motor, a fly-wheel connected with the opposite arm of said lever, a ratchet-disk loosely mounted on the shaft of the driving-wheel, connecting actuating devices between the said disk and the third arm of said lever, and a spring connected to said driving-wheel and to the disk, and adapted to be put under tension by the actuation of said disk, substantially as specified.

6. The combination in a device of the character described, of a supporting-frame, a motor, a centrally-pivoted three-armed lever one of whose arms is directly connected to the said piston, a fly-wheel connected with the opposite arm of said lever, a ratchet-disk loosely

mounted upon the axle of the driving-wheel,
a lever for operating the same, a connecting-
rod from said lever to the third arm of the
centrally-pivoted lever, means for varying the
5 throw of the said rod, and a spring connected
to an arm of said ratchet-disk and to the driv-
ing-wheel, substantially as specified.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

EMIL CAPITAINE.

Witnesses:

RUDOLPH FRICKE,
OTTO DOEDERLEIN.