No. 609,811. Patented Aug. 30, 1898.

C. M. JOHNSON.

MOTOR VEHICLE.

(Application filed Dec. 22, 1896.)

(No Model.) 2 Sheets—Sheet 1.

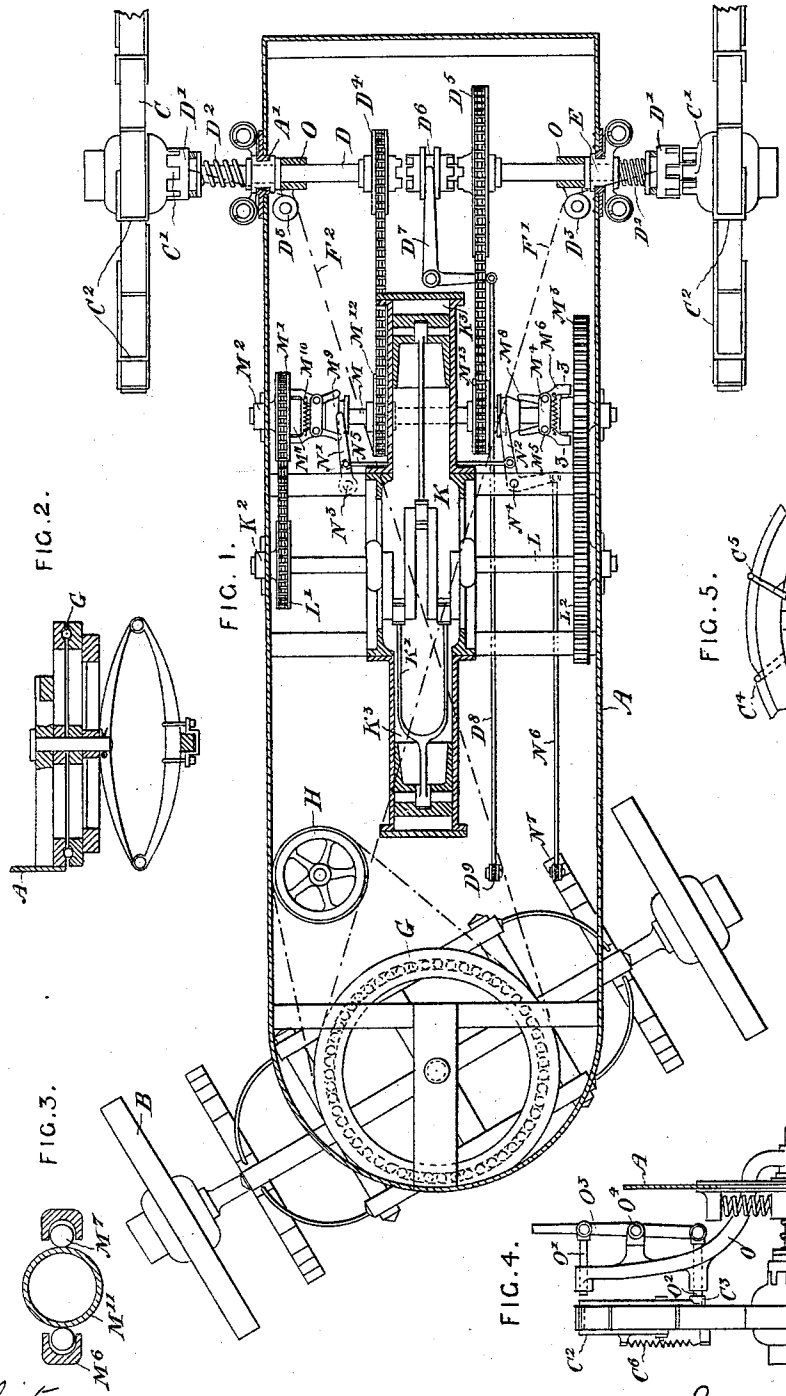


FIG. 1.

FIG. 2.

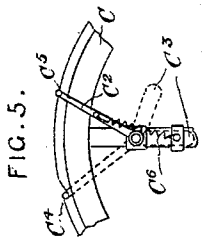


FIG. 5.

FIG. 3.

FIG. 4.

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(No Model.) 2 Sheets—Sheet 2.

FIG. 6.

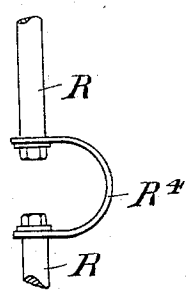


FIG. 7.

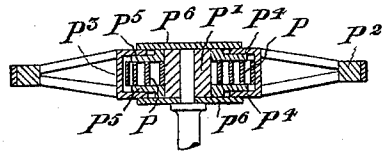


FIG. 10.

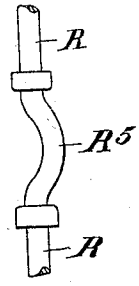


FIG. 9.

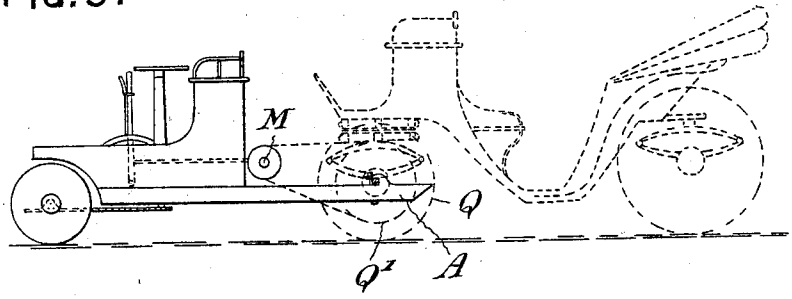
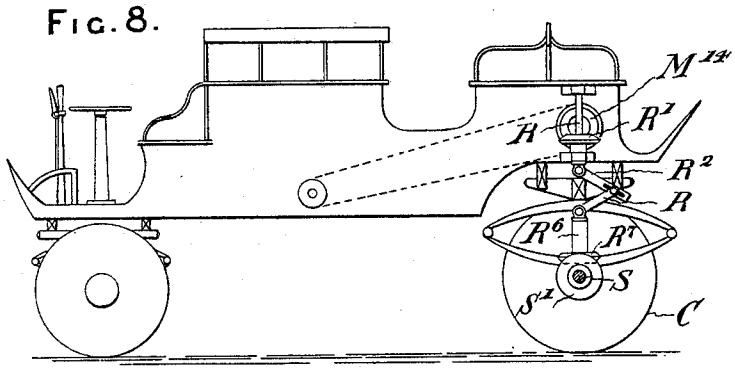


FIG. 8.



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UNITED STATES PATENT OFFICE.

CHARLES M. JOHNSON, OF NEW YORK, N. Y.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 609,811, dated August 30, 1898.

Application filed December 22, 1896. Serial No. 616,633. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. JOHNSON, a citizen of the United States of America, residing at 689 Green street, in the city, county, and State of New York, United States of America, (but temporarily residing at London, England,) have invented new and useful Improvements in Motors and in Motor-Vehicles, of which the following is a specification.

My invention relates to motors propelled by petroleum or other explosive material or gas and to motor-vehicles to be propelled thereby.

In the accompanying sheets of drawings, Figure 1, Sheet 1, is a sectional plan showing the general arrangement. Fig. 2 is a section through the fore-carriage, showing the ball-race. Fig. 3 is a section on the line 3 3, Fig. 1. Figs. 4 and 5 are detail views, on an exaggerated scale, showing an arrangement to prevent the driving-wheels from skidding. Fig. 6, Sheet 2, is a section of a road-wheel provided with a spring attachment between the nave and the felly. Fig. 7 shows a method of attaching the motor-vehicle to carriages of ordinary construction. Fig. 8 shows an arrangement for transmitting motion to the driving-wheels by means of a jointed shaft. Fig. 9 shows a driving-shaft with a spring-joint. Fig. 10 shows a driving-shaft with a joint of flexible shafting.

Referring to Figs. 1 to 5, Sheet 1, the motor-vehicle frame A is supported on springs on one or two guiding-wheels B and two driving-wheels C. The driving-wheels C run loosely on an axle D, which revolves in bearings E, sliding between horn-plates A′ on the carriage-frame A. The bearings E carry springs which support the carriage-frame A. In order that the driving-wheels may not skid when running around curves owing to one wheel revolving more quickly than another, power is conveyed from the axle D to the driving-wheels C by means of clutches C′ D′, the former forming part of or being secured to the hubs of the wheels C and the latter being provided with a feather sliding in a feather-way on the axle D. The clutches D′ are connected by chains F′ F^2 or their equivalents to the axle of the guiding-wheels B, the clutch D′ on the "near" side of the motor-vehicle being connected by means of the chain F′ to the "off" side of the fore-carriage or axle of the guiding-wheels and the clutch D′ on the off side being similarly connected by the chain F^2 to the near side of the fore-carriage. By this arrangement when the fore-carriage is caused to revolve on its pivot, so that the motor-vehicle may turn to the right, the chain F^2 draws the clutch D′ on the off side out of gear with the clutch C′ on the off wheel C, allowing said wheel to revolve independently of the axle D. In the same manner the near wheel C can revolve independently of its axle D by the similar action of the chain F′ when the motor-vehicle is caused to turn to the left. On the motor-vehicle again running a straight course the clutches D′ are brought into gear with the clutches C′ on the driving-wheels C by means of springs D^2 on the axle D, between the clutches D′ and the bearings E. The chains F′ F^2 pass over pulleys D^3, attached to loose collars on the axle D.

In order that the motor-vehicle may more easily be steered by hand, the fore-carriage or fifth-wheel, as shown in Fig. 2, is provided with a ball-race G, thus diminishing friction to a minimum. A steering-wheel H is provided, suitably connected by a chain or otherwise to the fore-carriage.

The motor K, secured to the frame A, is provided with two cylinders K^3, one in either side of the crank-shaft L and arranged on a common axis. The cranks are so set that both pistons arrive at the end of their strokes simultaneously, and therefore receive the explosive impulse also simultaneously. By this arrangement the shock of the explosion in one cylinder is neutralized by the shock of the explosion in the other cylinder. In order that the connecting-rods of the two pistons, as these near the crank-shaft L on the inward stroke, may clear one another, one of the connecting-rods K′ is forked.

The crank-shaft L is extended on either side of the motor K and is provided with bearings K^2 in the frame A.

It is obvious that a motor of this construction is applicable to all other purposes where absence of vibration is of advantage.

I do not confine myself to this particular form of arranging the cylinders, for I may

change the position and form of the cylinders with the same form of crank-shaft without departing from the spirit of my invention.

At one end of the crank-shaft L is keyed a chain-wheel or band-pulley L′, which carries a straight chain or band driving a chain wheel or pulley M′, mounted loosely at one end of a counter-shaft M, running in bearings M^2 or underneath the frame A. At the other end of the crank-shaft L is keyed a toothed wheel L^2, gearing with another toothed wheel M^3, mounted loosely on the corresponding end of the counter-shaft M. Thus the chain-wheel or band-pulley M′ will revolve in a direction opposite to the direction of revolution of the toothed wheel M^3, and by alternately connecting the counter-shaft M to one or another of these two wheels it is obvious that the said counter-shaft will revolve in either direction. For this purpose both the wheel or pulley M′ and the wheel M^3 are provided with a clutch of the following construction: On the counter-shaft M is secured a cross-bar or collar M^4, affording fixed pivots M^5, equidistant from the center of the counter-shaft for two or more levers. The ends M^6 of these levers form a pocket or jaw, into each of which is loosely inserted a roller M^7. (See Fig. 3.) The other ends M^8 of these levers are beveled and are operated by a cone M^9, sliding on the counter-shaft M and provided with a feather which takes into a feather-way on the said shaft. The ends M^6 of these levers are normally kept apart to the required extent by a spring or springs M^{10}. On both the chain wheel or pulley M′ and the toothed wheel M^3 are provided cylindrical bosses M^{11}, upon which revolve the rollers M^7 in the jaws or pockets M^6. The action of this clutch is as follows: The cone M^9 is driven between the ends M^8 of the levers, expanding these and closing in the jaw or pocket ends M^6, compressing the spring or springs M^{10}, and compressing the rollers M^7 between the bottom of the jaws or pockets and the boss M^{11} until the friction on the rollers and between the lever ends M^8 and the cone M^9 is sufficient to revolve the counter-shaft M. On withdrawing the cone M^9 the spring or springs M^8 expand, opening out the lever ends M^6, and thus allowing the rollers M^7 to revolve freely on the boss M^{11}. The two cones M^9, are operated simultaneously in such a manner that both cones may be out of gear or one only in gear with their respective lever ends M^8 at the same time. A convenient means of attaining this object consists of two forked levers N' N^2, taking into grooves provided on the cones M^9, being pivoted on the frame A at N^3 N^4, respectively, and connected together by a connecting-rod N^5. The forked lever N^2 is bell-cranked to receive a connecting-rod N^6, which is carried on the front part of the vehicle and operated by a vertical pivoted reversing-lever N^7, provided with a quadrant. (Not shown.)

The axle D may conveniently be driven at slow and quick speeds from the counter-shaft M in the following manner: On the counter-shaft M are keyed two chain-wheels or band-pulleys M^{12} M^{13}, which drive, respectively, by means of chains or bands, two chain-wheels or band-pulleys D^4 D^5, mounted loosely on the axle D, provided each with a clutch. The axle D is driven at either rate of speed by means of a double sliding clutch D^6, provided with a feather taking into a feather-way on the axle D, which may conveniently be put into gear with one or the other of the two chain-wheels or band-pulleys D^4 D^5 or thrown out of gear with both by means of a bell-crank lever D^7, suitably pivoted on the frame A. The lever D^7 may be operated from the front by means of a connecting-rod D^8 and a vertical pivoted reversing-lever D^9, provided with a quadrant. (Not shown.)

In order to prevent the driving-wheels C from slipping, they are provided with a suitable number of links C^2 of any desirable section, which take over the tires of the wheels C and normally are flush with said tires, but when required and while the driving-wheels C are revolving may be caused to project beyond the surface of the said tires in the following manner:

Referring to Figs. 1, 4, and 5, the links C^2 are pivoted on one or both sides of the felly or of the spokes, as shown upon the drawings, and on the inner side of the wheel are provided with an arm or extension C^3. For each link are provided in the tires two slots C^4 C^5. The slot C^4 is of sufficient depth to permit of the link being flush with the surface of the tire, while the slot C^5 is of such a depth as to insure the link projecting the required amount beyond the surface of the tire. A spring C^6 is provided to draw the link into either slot C^4 or C^5 when it has passed a position midway between the two slots and also to retain the link in either slot.

Mounted loosely on the axle D are two arms O, which, passing through the horn-plates A′, slide therein above the bearings E. These arms extend upward to the level of the top of the driving-wheels C and carry each two sliding pins O′ O^2 and a lever O^3, pivoted centrally at O^4, which operates said sliding pins. The lever O^3 may be provided with a handle and moved directly or may be operated in any suitable manner from the front of the vehicle. For example, the lever O^3 may be keyed on a rod carried by the arm O at O^4, said rod being extended to the front of the vehicle and carried there by a swiveling bracket and partially rotated then by a suitable handle or lever.

The links C^2 normally rest in the slots C^4; but when the driving-wheels C begin to slip the pin O′ is pushed out toward the wheel C by means of the lever O^3, thus causing the pin O′, as the wheels C revolve, to strike small projections (not shown) on the tops of the links C^2, throwing them out of the slots C^4 toward the slots C^5, the springs C^6 causing

the links to be seated in the slots C^5, as already described. The distance of the said projections on the tops of the links C^2 from the center of the axle D being greater when seated in slots C^5 than when seated in slots C^4 enables the said projections to pass the pin O′ as the wheels continue to revolve.

When the wheels C no longer have a tendency to slip, the position of the lever O^3 is reversed, drawing back the pin O′ and projecting the pin O^2 toward the wheel, causing said pin O^2, as the wheel revolves, to strike the extensions C^3 of the links C^2, thus throwing the links out of the slot O^5 toward the slot O^4, the springs C^6 causing them to be seated in the slot C^4 level with the periphery of the tire, whereupon the extensions C^3 are clear of the pin O^2 as the wheel continues to revolve.

The mechanism herein described for preventing the driving-wheels from slipping is not claimed in the application in the present instance, but forms the subject-matter of a separate application filed by me on the 19th day of April, 1898, and which bears Serial No. 678,194.

Referring to Fig. 6, Sheet 2, the road-wheels may be constructed with one or more coiled or volute springs P, one end of which may be secured to a boss or hub P′ on the axle and the other end secured to the felly or rim P^2 or to an outer nave P^3, as shown in the drawings. The outer nave P^3 is provided with spokes or disks to connect the same with the felly or rim and cheeks P^4, which take over two flanges P^5 on the boss or hub P′. The outer nave P^3 is further secured in place by two outer disks P^6.

In order to make the motor-vehicle applicable for use with carriages of ordinary construction, (see Fig. 7,) the driving-wheels C may be dispensed with, the frame A of the motor-vehicle being hooked on or otherwise coupled to the axle of the leading wheels Q of the carriage. The wheels Q may be provided with suitable chain or band pulleys Q′, driven by chains or bands from the counter-shaft M.

Under some circumstances (see Fig. 8) the motion is conveyed from the counter-shaft to two vertical shafts R, one on either side of the vehicle, by means of bevel-wheels M^{14} on the counter-shaft, which gear with bevel-wheels R′ on the said vertical shafts. The vertical shafts R are broken or divided, the two lengths of each being united by pivoted links R^2 R^3 or by bent springs R^4, Fig. 9, or by short pieces of flexible shafting R^5, Fig. 10, by which arrangements allowance is made for the movement of the carriage-body on the springs, the upper portions of the shafts R being supported in brackets on the carriage-body and the lower portions of said shafts being supported in bearings R^6, secured to the stationary axle S of the driving-wheels C. On the lower ends of the shafts R are provided bevel-wheels R^7, which gear with bevel-wheels S′, running loosely on the axle S and attached to or forming part of the hubs of the driving-wheels C.

I claim—

1. A motor-vehicle provided with two cylinders arranged opposite each other of which the piston of one is connected to one of the cranks of a crank-shaft with three cranks, two of which are opposite to the third crank, while the other piston is connected to the other two cranks in such manner that both pistons receive a simultaneous impulse and approach and recede from each other simultaneously and so that the shock or vibration resulting from the impulse in one cylinder is neutralized by the shock or vibration resulting from the impulse in the opposite cylinder substantially as set forth.

2. A motor-vehicle provided with two cylinders arranged opposite each other of which the piston of one is connected to one of the cranks of a crank-shaft with three cranks, two of which are opposite to the third crank while the other piston is connected to the two other cranks in such manner that both pistons receive a simultaneous impulse and approach and recede from each other simultaneously, gearing for communicating motion from the crank-shaft to the road driving-wheels; clutches for putting said gearing in and out of gear for going forward or backward or stopping, gearing and clutches for varying the speed of the road driving-wheels and means for steering the vehicle substantially as described and shown.

3. A motor-vehicle provided with two cylinders K^3 K^3 arranged opposite to each other of which the piston of one is connected by a connecting-rod K to one of the cranks of a crank-shaft L while the other piston is connected by a forked connecting-rod K′ to the other two cranks, gearing for communicating motion from the crank-shaft to the road driving-wheels C C consisting of a chain-wheel L′ a chain and a chain-wheel M′ mounted loosely on a counter-shaft M and a spur-wheel L^2 gearing with a spur-wheel M^3 also mounted loosely on the counter-shaft, two clutches sliding on and revolving with the counter-shaft and connected together so that either may gear with or not gear with the chain-wheel M′ or spur-wheel M^3 respectively to cause the counter-shaft to revolve in either direction or not to revolve, two chain-wheels mounted on the counter-shaft and communicating motion by chains to two other chain-wheels D^4 and D^5 on the axle of the road driving-wheels, a clutch D^6 sliding on and revolving with the said road-driving-wheels' axle, means for causing the said clutch D^6 for gearing with either or neither of the chain-wheels D^4 or D^5, clutches D′ D′ operated by the turning of the fore-carriage to cause one of the road driving-wheels to be capable of independent revolution when the vehicle turns and means for steering substantially as described and shown.

4. In a motor-vehicle, the combination of a

shaft, a wheel loosely journaled on said shaft and having a projecting hub, a clutch mechanism consisting of a collar fixed on said shaft, a lever pivoted to said collar and adapted to bear at one end on said hub, a ball mounted in the end of said lever bearing on said hub, and means for operating said lever.

5. In a motor-vehicle, the combination of a shaft, a wheel loosely journaled on said shaft and having a projecting hub, a clutch mechanism consisting of a collar fixed on said shaft, a lever pivoted to said collar and adapted to bear at an end on said hub, a ball mounted in the end of said lever bearing on the hub, a cone sliding on said shaft, and means for forcing said cone beneath the free end of said lever.

6. In a motor-vehicle, the combination of a driven shaft, a gear-wheel and a sprocket-wheel mounted on said shaft, a counter-shaft, a gear-wheel loosely journaled on said counter-shaft and meshing with the gear-wheel on said driven shaft, a sprocket-wheel loosely journaled on said counter-shaft, a chain connecting said sprocket-wheels, clutch mechanisms for connecting with the counter-shaft either the sprocket-wheel or the gear-wheel journaled thereon, and means for operating said clutch mechanisms.

7. In a motor-vehicle, the combination of a driven shaft, a gear-wheel and a sprocket-wheel mounted on said driven shaft, a counter-shaft, a gear-wheel loosely journaled on said counter-shaft and meshing with the gear-wheel mounted on the driven shaft, a sprocket-wheel loosely journaled on said counter-shaft, a chain connecting said sprocket-wheels, clutch mechanisms for connecting with the counter-shaft either the gear or sprocket wheels loosely journaled thereon, means for operating said clutch mechanism, a driving-shaft, and mechanism for conveying motion from said counter-shaft to said driving-shaft.

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