

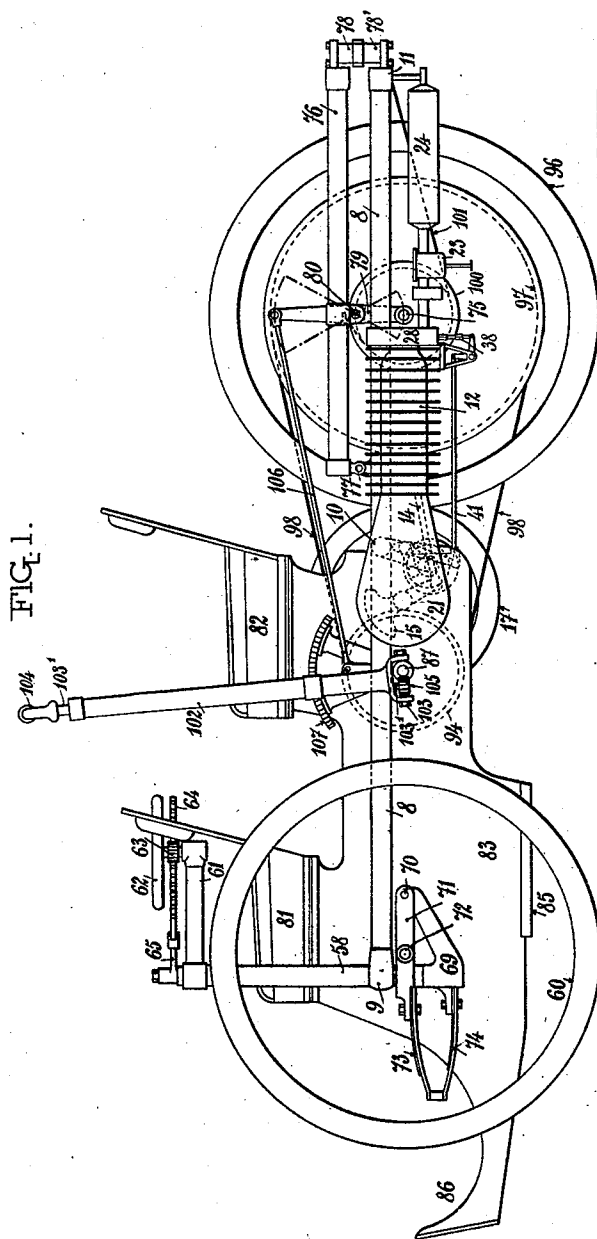
(No Model.)

4 Sheets—Sheet 1.

L. BOLLÉE.
SELF PROPELLING VEHICLE.

No. 601,545.

Patented Mar. 29, 1898.



Witnesses:
W. K. Boulton
C. L. Monahan

Inventor,
Léon Bollée,
By Wm E. Boulter,
attorney

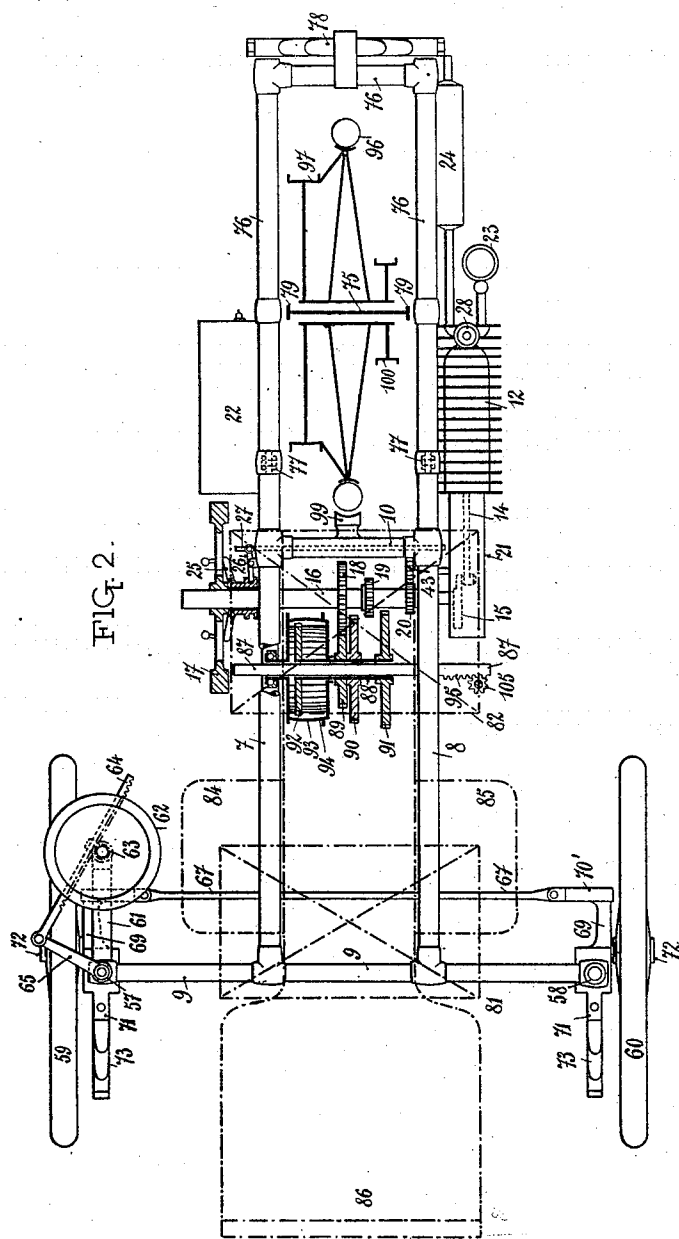
(No Model.)

4 Sheets—Sheet 2.

L. BOLLÉE.
SELF PROPELLING VEHICLE.

No. 601,545.

Patented Mar. 29, 1898.



Witnesses:

W. K. Boulter

C. H. Hough

Inventor:

Lion Bollée,

By Wm E. Boulter,

attorney

(No Model.)

4 Sheets—Sheet 3.

L. BOLLÉE.
SELF PROPELLING VEHICLE.

No. 601,545.

Patented Mar. 29, 1898.

FIG. 3.

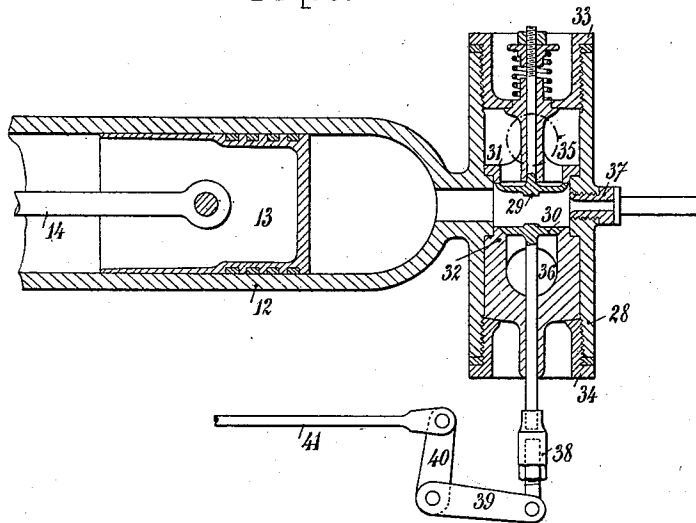


FIG. 4.

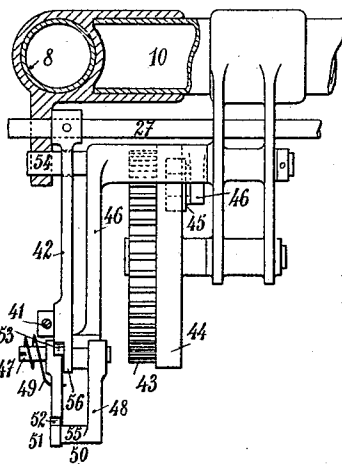
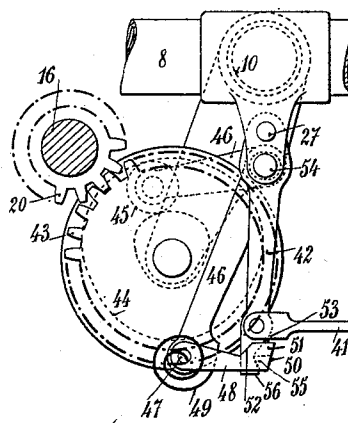


FIG. 5.



Witnesses:

J. K. Boulter

C. Thompson

Inventor:

Léon Bollée

By Wm E Boulter
att'y

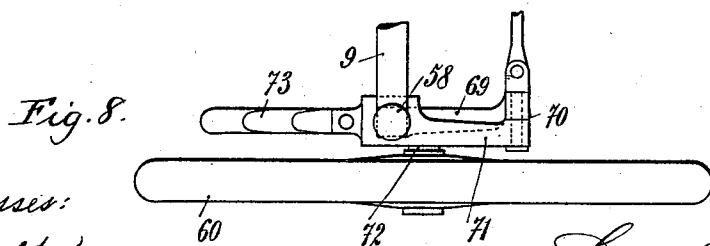
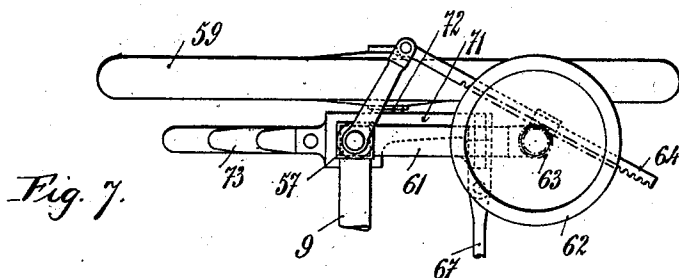
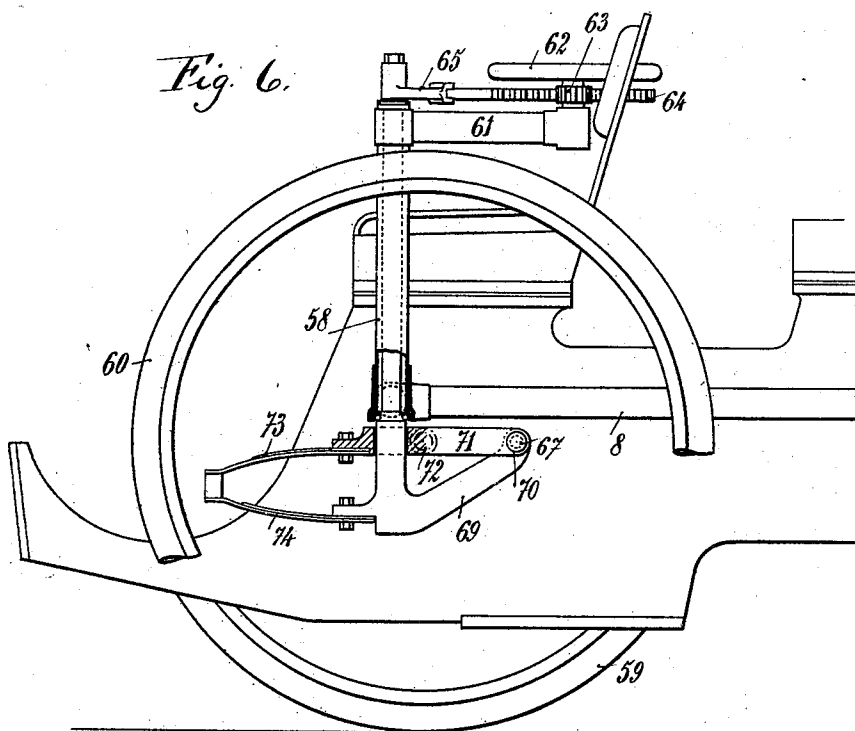
(No Model.)

4 Sheets—Sheet 4.

L. BOLLÉE.
SELF PROPELLING VEHICLE.

No. 601,545.

Patented Mar. 29, 1898.



Witnesses:

J. H. Boulter

B. M. Mott

Inventor:

Lion Bollée

By Wm. E. Boulter,

Attorney.

UNITED STATES PATENT OFFICE.

LÉON BOLLÉE, OF LE MANS, FRANCE.

SELF-PROPELLING VEHICLE.

SPECIFICATION forming part of Letters Patent No. 601,545, dated March 29, 1898.

Application filed June 4, 1896. Serial No. 594,317. (No model.) Patented in France December 4, 1895, No. 252,326; in England April 20, 1896, No. 8,306; in Belgium April 20, 1896, No. 120,944; in Germany April 22, 1896, No. 91,438; in Luxembourg May 23, 1896, No. 2,521; in Italy May 25, 1896, XLI, 677, and in Switzerland May 26, 1896, No. 12,593.

To all whom it may concern:

Be it known that I, LÉON BOLLÉE, a citizen of the Republic of France, residing at Le Mans, France, have invented certain new and useful Improvements in or Relating to Self-Propelled Vehicles, (for which Letters Patent have been obtained in France, No. 252,326, dated December 4, 1895; in Germany, No. 91,438, dated April 22, 1896; in England, No. 8,306, dated April 20, 1896; in Belgium, No. 120,944, dated April 20, 1896; in Italy, No. 41/677, dated May 25, 1896; in Switzerland, No. 12,593, dated May 26, 1896, and in Luxembourg, No. 2,521, dated May 23, 1896,) of which the following is a specification.

This self-propelled vehicle forming the subject of the present invention comprises the following five principal parts: first, the motor; second, the frame; third, the transmission-gear; fourth, the brake, and, fifth, the mechanism for engaging and disengaging the motor, for changing the speed of the vehicle, and for actuating the brake. Each of these main parts and their details are represented in the accompanying drawings, in which—

Figure 1 is a longitudinal elevation of the autocar forming the subject of the present invention. Fig. 2 is a plan of the same, certain portions being shown in longitudinal horizontal section. Figs. 3, 4, and 5 are detail views, on an enlarged scale, representing chiefly the governing-gear and valves of the motor. Fig. 6 is a sectional elevation, and Figs. 7 and 8 are plan views illustrating the steering mechanism.

The motor is operated by explosive gases, its framework being formed by a structure of the shape of a ladder, which structure consists of two longitudinal tubes 7 8, connected by three cross-pieces 9 10 11. The cylinder 12 is fixed outside on the tube 8, and its piston 13, by means of the connecting-rod 14, works the crank 15 of the cross-shaft 16, on which are keyed, outside the tube 7, the fly-wheel 17, and inside, between the tubes 7 and 8, the gear-wheels 18 19 20 of the transmission-gear and of the mechanism for changing the speed, the number of such gear-wheels varying, of course, according to circumstances. The connecting-rod 14 and the crank 15 are inclosed in a case 21, secured to the cylinder

12 and containing oil for lubricating the above parts.

Outside, on the tube 7, is fixed a petroleum-tank 22, supplying the carbureter 23, joined to the cylinder 12. A cylindrical casing 24, made of a piece of steel tube, is placed outside the tube 8 and receives the exhaust-gases and serves for preventing any noise being made by these gases.

In the fly-wheel 17 and combined with it is a governor 25, which prevents the motor from exceeding a certain speed by shutting off the exhaust, which governor operates transversely by means of an articulated link 26 and a rod 27, the function of which will be hereinafter described.

The cylinder, which, according to its size, can be made either with "wings" or water circulation, has at its rear end a cylindrical chimney 28, in which are arranged and work the admission-valve 29 and the exhaust-valve 30, the seats 31 32 of which are fixed in the chimney 28 by means of nuts 33 34, screwing in the threaded portions of the chimney, and which nuts when removed enable the said valves 29 30 to be taken off, examined, and cleaned without having to take to pieces the tubes corresponding to the admission-aperture 35 and exhaust-aperture 36, made in the wall of the chimney 28. The ignition is effected at 37 either by an electric igniting-plug or by incandescence.

The exhaust-valve 30 is actuated by a spindle 38, the length of which can be adjusted and which is articulated to a lever 39, which is connected to another lever 40 at right angles and worked by a connecting-rod 41, actuated by a lever 42, fixed to the before-mentioned rod 27. (See Fig. 5.)

The driving-shaft 16 drives, by means of its small pinion 20, a gear-wheel 43, (their relation being one to two,) cut on the cam 44, in which rolls a roller 45, transmitting a rocking motion to a bell-crank lever 46, the lower extremity of this lever having hinged to it at 47 a stirrup 48, on which a spring 49 acts, so as to tend to raise its end 50.

In Fig. 4 the stirrup 48 is represented as hanging below the lever 46 for the purpose of better understanding its shape, this stirrup in reality occupying the position shown in

Fig. 5. It has at 51 a projection having an inclined surface 52. The lever 42, actuating the exhaust-valves, has at its lower extremity at 53 an inclined surface similar to that of the stirrup 48. The rod 27 affords a support for the lever 42, through which passes the axis 54 of the lever 46, so as to admit of sufficient oscillation of the said lever 42. The part 55 of the stirrup 48 serves as a hook and acts in combination with the lower part 56 of the lever 42, which serves for a like purpose. From such arrangement it follows that when the governor 25 opens it pushes the rod 27 into the position shown in Fig. 4. The stirrup 48 in its to-and-fro movement, which it receives from the cam 44, is each time lowered in consequence of its inclined plane 52 meeting the inclined plane 53 of the lever 42, in consequence of which the hook 55 of the stirrup 48 passes under the hook 56 of the lever 42 in such way that the said hooks do not meet in this position, and therefore the lever 42 is not affected by the movement of lever 46 and the exhaust-valve 30 remains at rest. On the contrary, when the governor 25 closes it produces retraction of the rod 27 and of the lever 42, the lower extremity of which will be brought inside the stirrup 48 in such manner that the inclined planes 52 53 do not meet, and the stirrup 48 will not, therefore, be lowered, and the hooks 55 56 meeting in the position indicated in Fig. 5 the lever 42 will oscillate, and therefore the exhaust-valve 30 will act. The hooks 55 56 either meet completely or not at all. Their action takes place without friction and their wear is *nil*.

The framing of the present vehicle is almost solely composed by the framework of the motor, which has just been described, but with the following additions: At the two extremities of the front cross-bar 9 are arranged two vertical sleeves 57 58, which serve to maintain the pivots of two steering-wheels 59 60, each of which turns around its pivot to a certain extent. The right sleeve 57 has at the top a horizontal tube 61, supporting the steering hand-wheel 62, by means of which, by its pinion 63, rack 64, and lever 65, the wheel 59 is turned obliquely, whereas the same action is produced on the wheel 60 in the same direction by the rod 67, connecting the pivots of the wheels 59 60, as will be seen later on. The lower extremity of each pivot carries a steel bracket 69, on which the bracket 71 of the axle 72 of the corresponding wheel 60 is hinged at one end at 70. Two connected springs or leaves 73 74 connect the front end of the bracket 71 to the front end of the bracket 69. The same arrangement is made for the wheel 59, and the inwardly-projecting rods or extensions 70' at the inner side of the bracket 69 are pivotally connected to the before-mentioned rod 67, which in this way transmits to the wheel 60 the same steering movement as that given to the wheel 59. This arrangement enables the springs to be used without necessitating the use of an oscillating axle

with the spring placed transversely to the vehicle.

By reason of the pivots passing loosely through the brackets 71 said brackets will be enabled to move vertically on the pivots under the action of the springs when the vehicle passes over obstructions or uneven surfaces, and thus the steering-wheels, and consequently the forward part of the vehicle, are relieved from undue shock and strain.

The hind axle 75 is maintained under a horizontal support 76, made of a U-shaped piece of steel tube, which is hinged at 77 by the extremities of its parallel sides onto the corresponding part of the tubes 7 and 8 of the vehicle-frame. Its opposite extremity is a cross-piece, the support 76 being also attached to the frame by two combined springs 78 78', engaging the cross-piece, which keep the support 76 and the vehicle-frame at the desired normal distance apart.

The axle 75 is supported and fixed at each end in suitable hangers 79, which are attached by hinges 80 to the tubes 76 of the frame. The result of such arrangements is that the axle 75 can move only parallel to itself under the action of the shocks of the vehicle.

The seats 81 82 are arranged one behind another on a small box 83, preferably made of sheet-iron. The traveler seated on the back seat 82 puts his feet on the feet-supports 84 85, formed at each side of the box 83. The traveler seated on the front seat 81 puts his feet on a continuation 86 of the box 83, arranged in front of the cross-bar 9.

The transmitting-gear combined with the described devices is as follows: Parallel to and in front of the driving-shaft 16 is placed a shaft 87, which is supported in such a manner as to enable it to slide laterally, but not to turn. On this shaft 87 is mounted a sleeve 88, so as to be free to rotate, but taking part in the transverse movements of the shaft 87. On this sleeve 88 are keyed the gears 89 90 91, which engage and combine, two and two, according to the velocity desired, with corresponding gears 18 19 20, fixed on the driving-shaft 16. The sleeve 88 has besides keyed on it and taking part in all its movements, whether of rotation or transverse sliding, a narrow disk 92, with toothed periphery engaging with a corresponding wide toothed portion 93 on the inner face of the rim of a pulley 94, which is arranged so as to turn loosely on the shaft 87 and the sleeve 88, but does not move transversely. Under such conditions it is clear that the rotary movement of the sleeve 88 will be transmitted to the pulley 94 by means of the disk 92 in the interior of this pulley, which disk is always in engagement with the said pulley, the pulley always remaining stationary so far as endwise movement is concerned, whereas the disk can move transversely, being moved by the sleeve 88 and the shaft 87, carrying that sleeve, which movement of the sleeve has for its purpose to produce the desired engage-

ment of the gears 89 18, 90 19, 91 20, according to the velocity with which the vehicle ought to move. The transverse movement of the shaft 87, and consequently of the sleeve 5 88, carried by it, is effected, as will be hereinafter described, by a mechanism acting on a rack 95, carried by the end of the shaft 87.

The rear wheel 96 of the vehicle turns loosely on its axle 75, arranged as has been 10 previously explained. To the side of this wheel corresponding to the pulley 94 is fixed concentrically with the wheel a pulley 97, by which and by means of a belt 98, connecting the two pulleys 94 and 97, the movement 15 of the pulley 94 is transmitted to the wheel 96. By supporting the rear axle 75 in the hangers 79, hinged at 80, this axle is enabled to advance or to retire, and this is utilized for stretching or slackening the belt 98, and 20 thus effecting in a simple manner the engaging and disengaging the transmission of movement for starting or stopping and also adjusting the normal tension of the said belt 98 to secure proper running of the vehicle.

The capability of the axle 75 to advance and 25 to retire is also utilized for bringing into operation a very simple brake. This brake comprises a shoe 99, fixed in a suitable position on the cross-bar 10 of the frame and against which shoe the tire of the wheel 96 30 rubs when the axle 75 is sufficiently advanced in that direction, and also a brake arrangement composed simply of a steel band 101, lined with wood or leather and encircling a 35 pulley 100, keyed on the boss of the wheel 96, the band being attached at its two extremities to two fixed points on the vehicle-frame. It is clear that with such arrangement when the axle 75 advances, the two points of attachment 40 of the band 101 being fixed, this band will be strongly stretched and will exercise a braking action on the pulley 100 and therefore on the rear wheel 96 of the vehicle.

As the driving in a self-propelled vehicle 45 ought to be made as easy and as simple as possible by restricting as much as possible the number and the importance of the manipulations and maneuvers to be executed during the drive, a point has been made of simplifying these in this system of self-propelled vehicles, all the previously-described mechanisms for throwing in and out of gear, changing the velocity, and applying the brake being operated by a single lever. This lever 102, 50 made of a steel tube, is arranged so as to be able to oscillate with its lower extremity in the transverse direction round a shaft 103, which in its turn can oscillate in a longitudinal direction round the shaft 87. A rod 103' 60 is arranged in the interior of the lever 102 and can turn in the latter. The extremities of the rod 103' projecting out of the lever 102 are provided the top one with a closed handle 104 for general control of all the parts connected 65 to the lever 102 and the lower one with a pinion 105, which is constantly in engagement with the rack of the axle 87. The articulated

hangers 79, supporting the rear axle 75, are, moreover, connected by a rod 106 to the lever 102. In consequence of this arrangement 70 when the handle 104 is moved laterally in one direction or the other a transverse movement of the shaft 87 is produced and therefore of the parts, which, as has been described, have to follow the movement of that shaft. When 75 by means of that handle the lever 102 is pushed forward, the axle 75 moves backward and the belt is stretched, thus effecting the throwing-in gear. By pulling the lever 102 back by means of said handle 104 the axle 75 80 advances, whereby throwing out of gear is effected and the brake arrangements previously described are made to act. In the intermediate vertical position of the lever 102 the handle 104 can be freely turned, and so 85 changes of velocity can be effected—that is to say, the engaging of gears corresponding to the desired velocity—without fear of the motor being left engaged or of rupture of the teeth of the gear-wheels. 90

The lever 102 is maintained automatically fixed in any desired position by the combination of said lever with a toothed sector 107, along which it moves and against which it is pressed by a spring in the well-known manner. 95

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— 100

1. In a vehicle the combination with a supporting-frame and hangers pivotally connected therewith, of an axle supported in the hangers, a wheel mounted on the axle, a pulley 105 on the boss of the wheel, a band encircling the pulley and having its ends fixed to the frame and adapted to effect a braking action on the wheel when the axle is shifted in one direction.

2. In a vehicle the combination with a supporting-frame and hangers pivotally connected therewith, of an axle supported in the hangers and adapted to be shifted back and forth, a wheel mounted on the axle, a driving-shaft and gearing between the latter and the said wheel, said gearing being adapted to transmit motion to the axle when the latter is shifted in one direction and to free it from such motion when the axle is shifted in the opposite direction. 120

3. In a vehicle, the combination with a supporting-frame and hangers pivotally connected therewith, of an axle supported in the hangers and adapted to be shifted as described, a wheel mounted on the axle, a driving-shaft and gearing between the latter and the axle, said gearing comprising a pulley 125 fixed to the wheel, a second or driving pulley, and a belt engaging both pulleys, said belt adapted to be tightened when the wheel-axle is shifted in one direction and to be slackened 130 by shifting the axle and wheel in the opposite direction, and a hand-lever and connections for shifting said axle.

4. In a vehicle the combination with a supporting-frame and hangers pivotally connected therewith, of an axle supported in the hangers and adapted to be shifted as specified, a wheel mounted on the axle, a driving-shaft and gearing between the latter and the axle, said gearing consisting of a transversely-movable shaft, a sleeve on the latter shaft and rotatable independently thereof, variable gear-wheels mounted on the said sleeve and the driving-shaft and adapted to be brought into engagement as described, a toothed disk on the sleeve and rotatable and transversely movable with the latter, a pulley having an internally-toothed rim with which the toothed disk gears, a pulley fixed to the wheel on the axle and a belt engaging the two pulleys, as specified.

5. In a vehicle the combination with a supporting-frame, of a vertically-arranged sleeve, a rod pivotally arranged within said sleeve, a bracket or arm connected to the said rod, a second bracket or arm pivotally connected at one end to the first bracket, a wheel supported in said second bracket and hinge sections or leaves connected to the opposite end of the second bracket and to the first bracket, as specified.

6. In a vehicle the combination with a supporting-frame, of vertically-arranged sleeves at opposite sides of the frame, rods pivotally arranged within the sleeves, brackets or arms connected to said rods, a second series of brackets or arms pivotally connected at one end to the first brackets or arms, a wheel-axle supported in each of the said second series of brackets, hinge sections or leaves connected to the opposite end of the latter brackets and to the first series of brackets and a transverse rod, pivotally connected to the said first series of brackets, as specified.

7. In a vehicle the combination with a supporting-frame, of vertically-arranged sleeves at opposite sides of the frame, rods pivotally arranged within the sleeves, brackets or arms connected to said rods, a second series of brackets or arms pivotally connected at one end to the first brackets or arms, a wheel-axle supported in each of the said second series of brackets hinge sections or leaves connected to the opposite end of the latter brackets

ets and to the first series of brackets, a transverse rod pivotally connected to the said first series of brackets, an arm on the upper end of one of the pivotally-arranged rods, a hand-wheel carried by said arm, a pinion on the shaft of the hand-wheel, a rack-lever engaging said pinion, and an arm or lever jointed at one end to the rack-lever and secured at the opposite end to the said pivotally-arranged rod.

8. In a vehicle the combination with a driven wheel, an axle supporting said wheel and adapted to be shifted as described, of a driving-shaft, variable gearing between the latter and the wheel, a brake device and a single operating-lever, and means intermediate the latter and the axle and the said gearing whereby said lever is adapted to effect transmission of power from the driving-shaft to the said wheel, cut off such transmission of power, effect a change of gear to vary the speed of the vehicle, and also to effect a braking action upon the wheel, as may be desired.

9. In a vehicle the combination with a driving-shaft, a fly-wheel thereon, a governor device, and a rod movable transversely by said governor a vehicle-wheel and driving mechanism between the latter and the driving-shaft, of a motor comprising a cylinder and piston, a flue or chimney, admission and exhaust valves therein, jointed levers connecting said exhaust-valve with the said transversely-movable rod, an oscillatory lever secured to the latter rod and having an inclined surface, a gear-wheel geared to the driving-shaft, a cam on said gear-wheel, a second oscillatory lever carrying a roller operated by the cam to oscillate the latter lever, a stirrup hinged to the said second oscillatory lever, having an inclined surface adapted to engage the inclined surface on the first oscillatory lever as described, and said stirrup and the first oscillatory lever having hook portions adapted to engage in the manner specified.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

LÉON BOLLÉE.

Witnesses:

J. ROBELET,
HULLIGE.