(No Model.)

4 Sheets—Sheet 1.

C. E. DURYEA.

ROAD VEHICLE.

No. 540,648. Patented June 11, 1895.

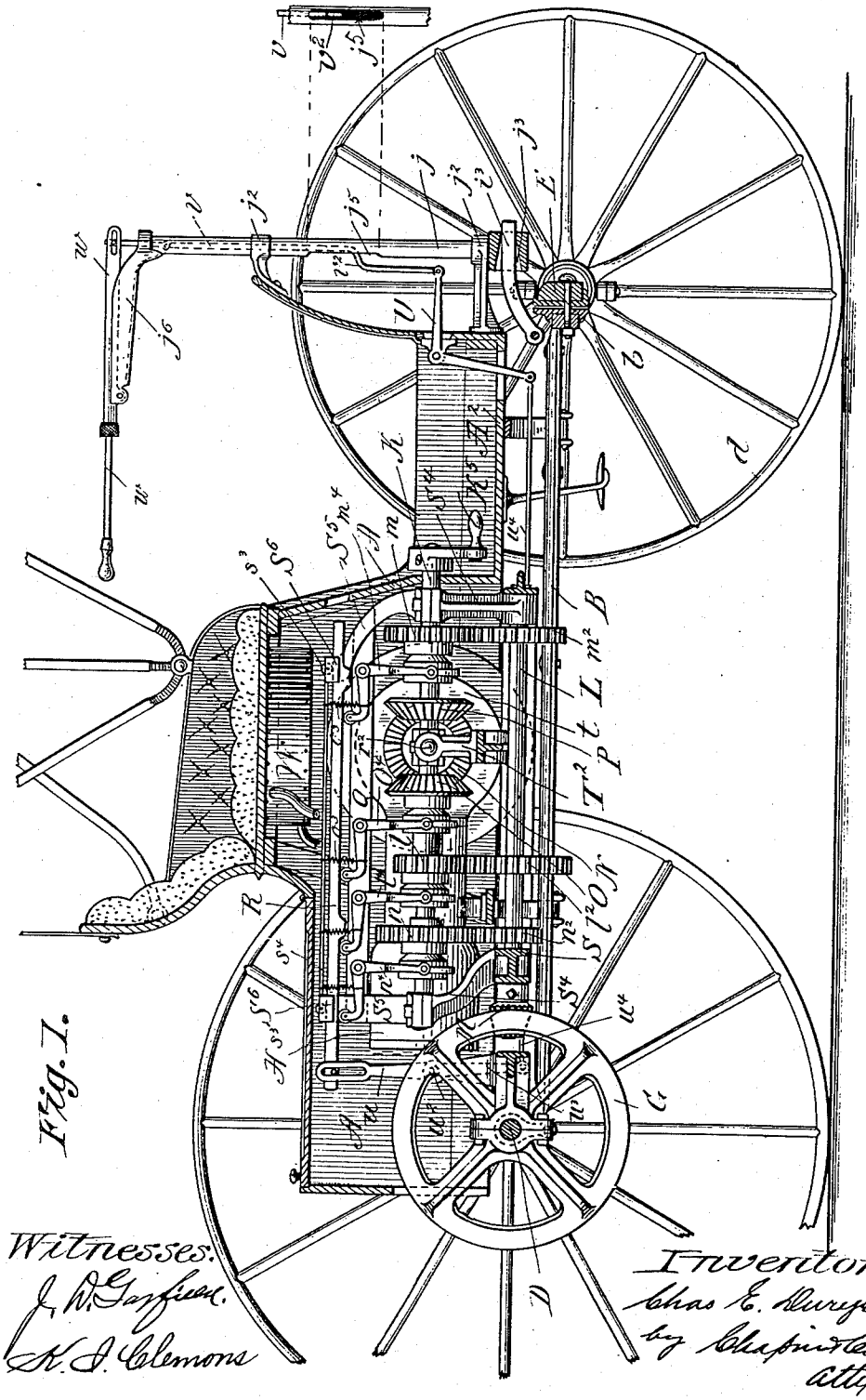

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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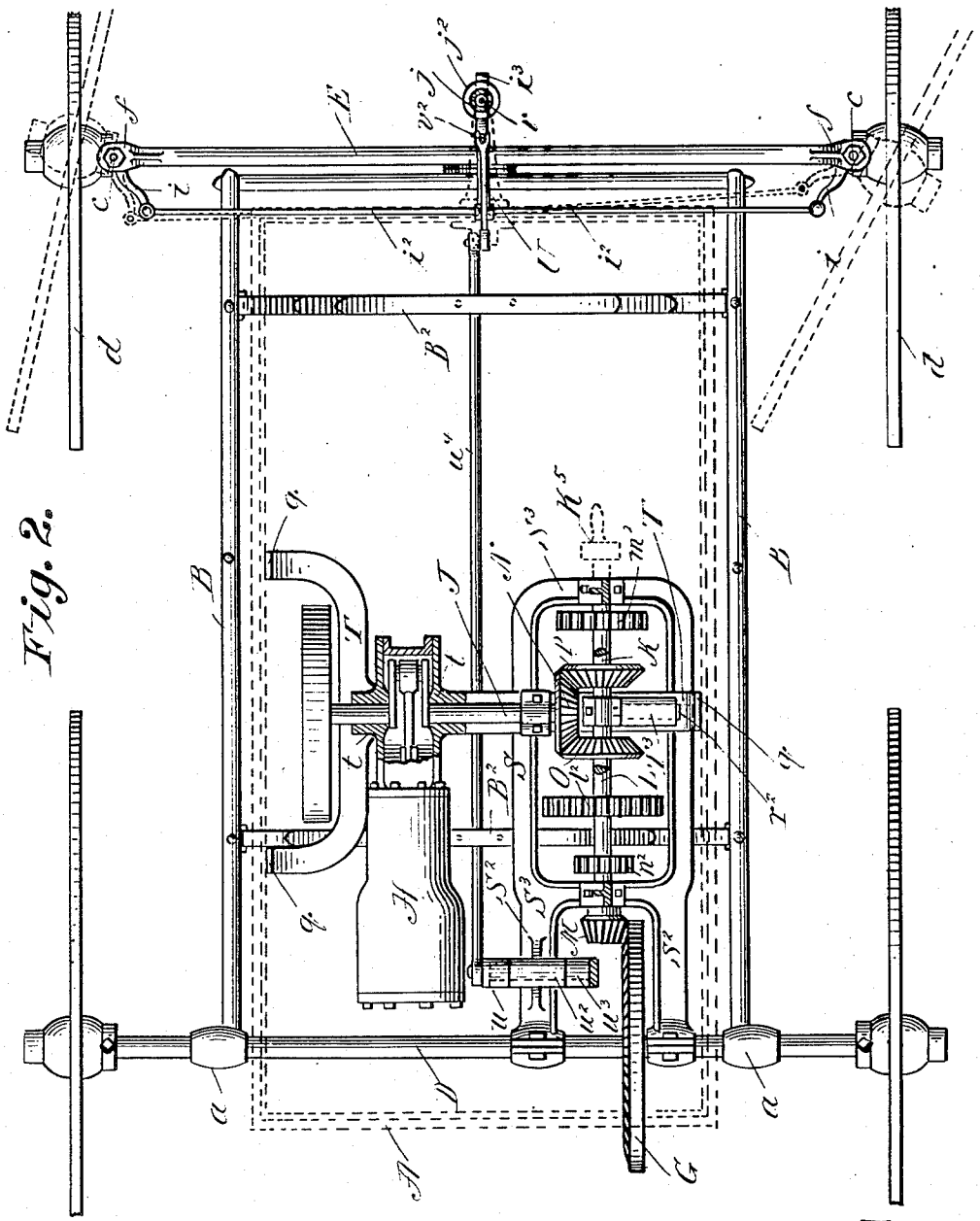
ROAD VEHICLE.

No. 540,648. Patented June 11, 1895.

Fig. 2.



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ROAD VEHICLE.

No. 540,648. Patented June 11, 1895.

Fig. 3.

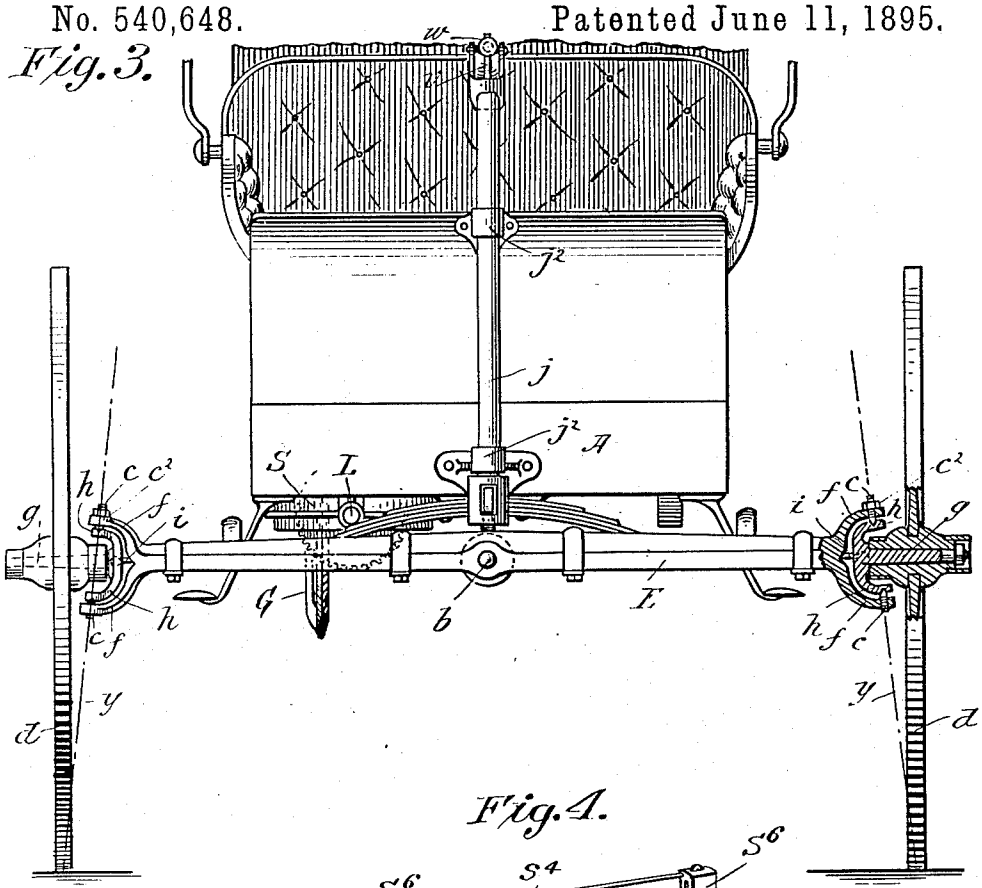
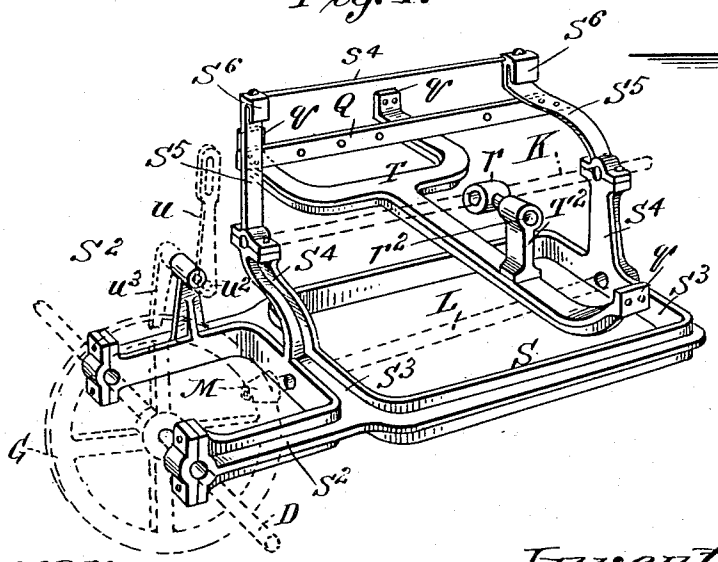


Fig. 4.



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ROAD VEHICLE.

No. 540,648. Patented June 11, 1895.

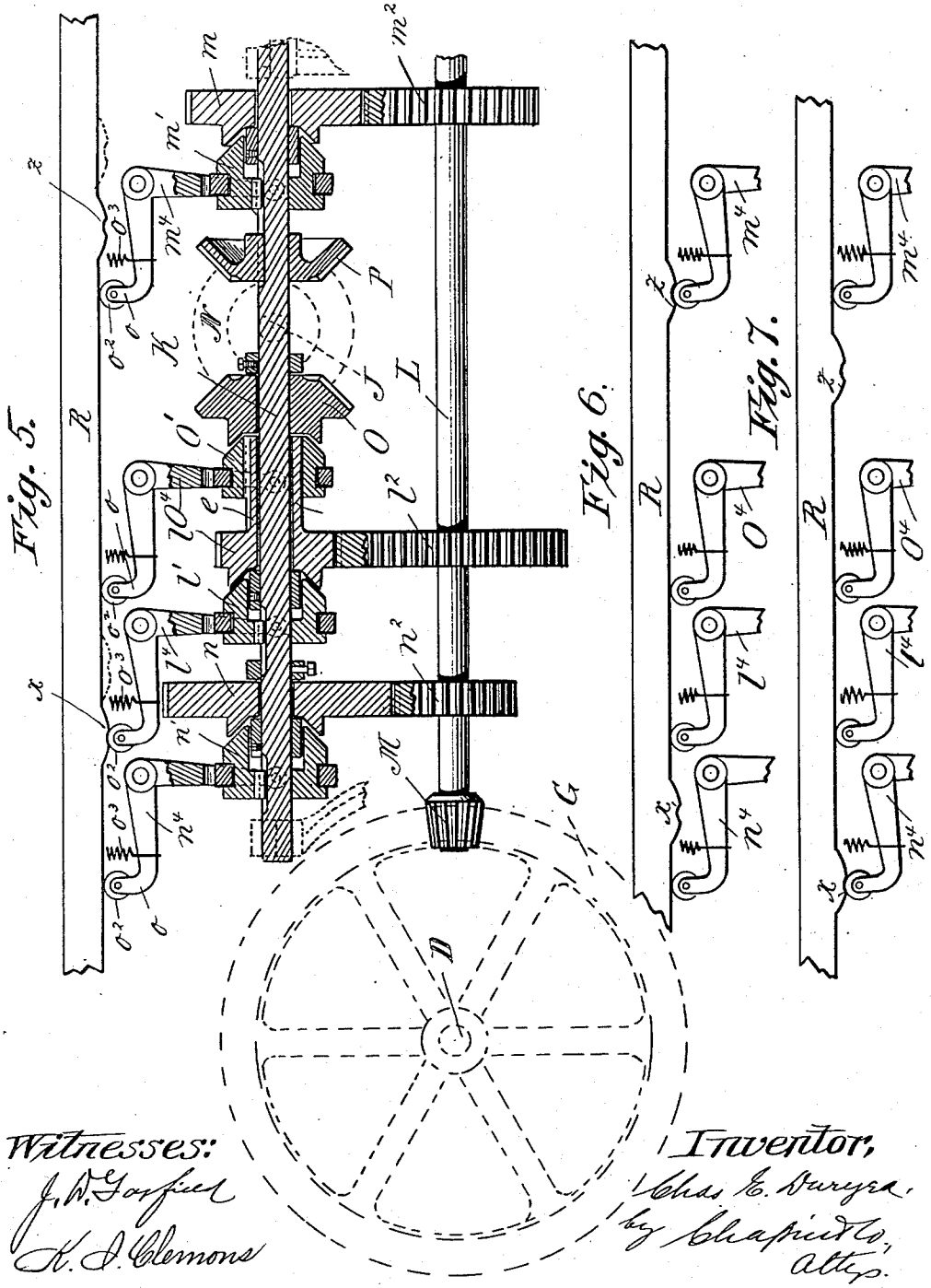

Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES E. DURYEA, OF PEORIA, ILLINOIS.

ROAD-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 540,648, dated June 11, 1895.

Application filed April 30, 1894. Serial No. 509,466. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. DURYEA, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented new and useful Improvements in Road-Vehicles, of which the following is a specification.

The object of this invention is to produce a road vehicle which shall be self-propelled, not unduly heavy, simple and easy of control and comparatively inexpensive, together with such minor objects as will become hereinafter apparent.

The invention more particularly relates to the construction and arrangement of parts for constituting the driving gearing and to the means for controlling the action thereof; to an improved manner of mounting the front, or steering, wheels upon the front axle, and of mounting the said axle relative to the running gear frame, and to the means for effecting the steering; to the appliances for the support of the motor and driving mechanism in an advantageous and efficient manner, and, generally, to improved and simplified details of construction throughout the vehicle, all as will hereinafter be rendered more apparent, and the invention consists in constructions and combinations of parts, all substantially as will hereinafter fully appear and be set forth in the claims.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a sectional elevation from front to rear of the improved road-vehicle. Fig. 2 is a plan view of the running and driving gear, the vehicle-body being understood as removed. Fig. 3 is a front elevation of the vehicle. Fig. 4 is a perspective view of the support and suspension devices for the driving mechanism. Fig. 5 is a vertical sectional view, longitudinally, through the shiftable driving-gear, the controlling devices employed in conjunction with this mechanism being seen in side elevation. Figs. 6 and 7 show the above-mentioned controlling devices as in operative relations differing the one from the other and also from that of Fig. 5.

Similar letters of reference indicate corresponding parts in all of the views.

The parts will now be described in detail with reference to said drawings, and A represents the body which is spring supported on the frame, B, of the running gear. This frame, as shown, is rectangular, and has the body-supporting springs, B^2, similar to those found in common carriages. This frame has, affixed thereto, at its rear ends, sleeves, *a*, *a*, which loosely embrace the rear wheel axle, D, which is the driven axle of the vehicle. The axle, E, for the front wheels is centrally secured to the running gear frame, B, by the horizontal king-bolt, *b*, whereby such axle may have a swinging movement relative to the frame in a vertical plane, but it has no swinging movement horizontally, the wheels being swivel-mounted on the ends of this axle peculiarly, as will shortly hereinafter be set forth.

The body, as shown, is in the form of an inverted box, the motor, H, and driving gear being accommodated within the downwardly opening inclosure constituted thereby, and the body also has the upwardly open box-like forward extension, or pit, A^2, for the accommodation of the feet of the rider, the rider's seat being constituted by the top forward portion of the box body. Some other suitable design of body may, of course, be used in lieu of this one shown.

The front wheels, *d*, *d*, are hung to the front axle, E, so that the center of each wheel base is in a line coincident with the axis of the pivotal connection which is provided between the journals for the wheels and the axle, which arrangement practically destroys any tendency to deflection from the course that might otherwise arise from striking an obstacle, and so renders the steering easier. In order to effect this the axle is formed with yoked ends, the yoke members, *f*, *f*, being above and below the longitudinal line of the axle. The short journal, *g*, shown for each wheel, has at its inner end an upwardly and downwardly extended arm, *h*, which is return-bent to be loosely embraced by the axle yoke, *f*, *f*. The cone pointed screws, *c*, passed through the yoke members, *f*, and into sockets therefor in the arms, *h*, of the journals, *g*, constitute the means for the swivel connection between said parts. The lock-nuts, c^2, manifestly, are employed with utility in this connection.

It will be perceived that inasmuch as in the arrangement shown, the pivotal connections

between the journals and axle yokes are inside of the plane of rotation of the wheels, in order that the coinciding axes of the two pivots may be in a line which may be produced to intersect the center of the wheel base, that is, the tread part at rest upon the ground. Such pivots are inclined, as seen in Fig. 3, and the said line with which they are coincident is indicated by the letter, *y*. In order to permit this arrangement, an underhanging member, *f*, of the yoke and one of the underhanging journal members, are extended outwardly a little farther than are the opposite overhanging members of the yoke and journal. This is, however, merely a matter of design.

Each of the swiveling journals, *g*, is provided at its butt, or inner end, with inwardly and rearwardly extending levers, *i*, the pair of which are by the connecting rods, i^2, in engagement with the arm, i^3, which projects forwardly through a mortise at the lower extremity of the tubular steering post, *j*, which is mounted in suitable sleeve-bearings, j^2, supported at the front of the vehicle body or to some equipment thereof. It is evident that forwardly, obliquely projecting levers would serve the same purpose. The aforesaid lever arms, *i*, *i*, having the same degree of angularity to the normal running plane of the front wheels, which may be approximately thirty degrees, are arranged by the connections, mentioned, to be moved in unison; but it will be apparent from an inspection of the drawings, that upon a given degree of traverse of the connecting rods, i^2, i^2, in consequence of a corresponding turning of the tubular steering post, *j*, the wheel which is at the side toward which the vehicle is to be turned will have a considerable more deflection than the opposite wheel so that both wheels may describe arcs of different circles and thereby there will be no sidewise scraping movement of the wheels over the ground or pavements in rounding corners. This result is dependent upon the principle that as the rods, i^2, are thrust in either direction, transversely, they act upon one lever-arm, *i*, which, as the movement proceeds, becomes more nearly at right angles to the line of thrust movement, to move it farther than the other arm which, as it swings, has its movement in a line less nearly at a right angle to the thrust movement. This is in a manner illustrated by dotted lines in Fig. 2.

The arm, i^3, which is connected to the connecting rods, i^2, has a certain capability for play, relative to the lower end of the steering post, *j*, by reason of the vertical widening of the mortise, substantially as is indicated at j^3, so that any vertical springing movement of the post, *j*, in unison with the body, may be without effect upon the steering gear.

Speaking generally, the rear wheel axle, D, is driven from the running of the motor, H, by reason of the latter driving the transverse crank-shaft, J, which has a bevel gear engagement with the longitudinal shaft, K, which latter is (by changeable gearing) geared to the longitudinal counter-shaft, L, while this counter shaft, L, has a pinion, M, which meshes with the gear, G, of the aforesaid rear wheel axle.

It will be here observed that very peculiar and novel arrangements of gearing and clutch mechanism are provided in conjunction with the shafts, K and L, whereby, at pleasure, under a continuous running of the motor, the shafts, K and L, may have either no motion, a forward driving rotation in two or more degrees of speed, or the reversed rotation, for driving the vehicle backward, and this gearing for driving, accelerating, and reversing will be now described, followed by a description of the mechanism of connection extended from said gearing to the front of the machine for placing the same under the control of the driver, or motor man, in charge of the road vehicle.

The crank-shaft, J, has upon its end the bevel gear wheel, N, which by opposite sides thereof is constantly in mesh with two bevel gears on the longitudinal shaft, K, one of which, O, is loose on said shaft, while the other, P, is keyed on the shaft. These two bevel gears, O and P, as plain, have rotations in opposite directions.

Now it will be noticed that there are, loosely surrounding the longitudinal shaft, K, three spur gear wheels, *l*, *m*, and *n*, of different diameters, and these mesh with spur gear wheels, l^2, m^2, and n^2, on the longitudinal counter shaft, O. Each of the said gears, *l*, *m*, and *n*, has its hub constituted to form one member of a clutch while upon the said shaft, K, are three corresponding annular clutch members, l', m', and n', which are spline engaged with their shaft to rotate therewith, but to have longitudinal movements thereon. Now the shaft, K, being constantly turned through its gear, P, will impart rotary motion to such one of the spur gears, *l*, *m*, or *n*, as has its clutch member in mesh therewith, and then correspondingly, of course, will be driven the shaft, L, and driving axle, D. The bevel-gear, O, also has its hub formed to constitute one member of a clutch while the coacting clutch member, O′, is constituted by a part of a sleeve which surrounds and is spline-engaged with a sleeve-like extension-hub, *e*, of one of the spur gears mounted on shaft, K, namely, in the present instance, the one, *l*. Now, therefore, if none of the clutches, l', m', or n', are forced into clutch with their aforesaid corresponding gears, but if member, O′, is in clutch with gear, O, such gear will cause the reversed rotation of the gear, *l*, and gear, l^2, shaft, L, and axle, D, even while the shaft, K, constantly runs in its original direction, (for the direction of rotation of shaft, K, is constant.)

Each clutch member, n', l', O′, and m', is embraced by a yoke, or shipper, formed on, or carried by, the depending member of an angular shipper lever, l^4, m^4, n^4, or O^4, suitably

pivotally supported, as, for instance, on the horizontally ranging longitudinal bar, Q, which is seen in Fig. 1 as mounted upon the same support for the gearing described, a more complete description of which will be hereinafter given. The horizontal members of the angle-levers have the upturned ear-lugs, *o*, in which are rollers, o^2, while above the edges of these rollers is a bar, R, which is constrained for a longitudinal reciprocatory movement, and which bar has suitable extension cam surfaces for impinging upon, and swinging, the roller-provided, angular, clutch shipper-levers, so that suitable extents of movement of this bar, as predetermined, will place the desired clutch member in engagement with its gear, for the corresponding driving action, or will leave all of the shipper levers free to be held retracted by the retracting springs, o^3, one thereof being applied to each lever. It will be perceived, in specific reference, that this shipper operating bar, R, has a cam surface, *x*, and a second cam surface, *z*, which latter is arranged in proximity to the shipper-lever, m^4, for the clutch of gear, *m*.

In Fig. 5, the cam-bar, R, is indicated as in such a position as to maintain gear, *l*, (which is for the lowest speed) in clutch with the shaft, K, and while the cam surface, *z*, is to the right of the roller for shipper lever, m^4. A movement of the bar to the left so far as to carry cam, *x*, out of engagement with lever, l^4, and to bring cam, *z*, into engagement with the shipper lever, m^4, (see Fig. 6) will establish the next higher degree of running speed whereat shafts, K and L, run at the same rate,—gears, *m* and m^2, being equal;—while a still farther leftward movement of the bar, R, will place cam, *z*, in its idle position (see Fig. 7) and will place cam, *x*, in its position relative to shipper lever, n^4, for the establishment of the highest driving speed, whereupon shaft, L, runs so much faster than shaft, K, as gear, *n*, exceeds in diameter gear, n^2, all as obvious. Now, presuming the machine to be running at the highest speed, and it is decided to reverse,—the bar must be moved to the right so far as to carry the cam, *x*, to engage and operate the shipper lever, O^4, but it will be understood that before this action may ensue gears, *m* and *l*, will each be placed, for an instant, or momentarily, in, and then out of, clutch, so that the shaft, L, comes down to its lowest speed and stops its forward driving motion before the reversely running gear, O, through its clutch, O′, causes the gearing, *l*, l^2, to cause the reversed driving of the vehicle at the lowest driving speed. It is true that while the machine is so operating, the shaft, K, still continues its rotation in the one given direction, but the sleeve and gear, *e*, *l*, are nevertheless, rotated in the reverse direction.

In the illustrations given, the friction clutch devices are indicated as cones, adapted for working into, and out of, the correspondingly formed sockets of the hubs of the respective gear wheels, but, of course, the invention is in nowise limited to any particular description of clutch mechanism.

The driving mechanism may be supported upon the vehicle in any manner desired, but in the present illustrations a mode of hanging is shown which is novel, practical, and advantageous, and which will be now described.

A rectangular frame, S, is provided which has the parallel rearwardly extended arms, S^3, S^3, which are hung upon the driven axle, D. The axle-gear, G, is accommodated in the space between these arms, and the longitudinal counter-shaft, L, is mounted in journal bearings in this frame to have its bevel pinion, M, properly in mesh with said gear, G. The struts, S^3, S^3, of this frame have the standards, S^4, S^4, in and through the journal bearings of which the shaft, K, is mounted.

T represents a frame which is somewhat of a Y form and which has the lugs, *q*, *q*, by means of which this frame is secured to the body (see Figs. 2 and 4), so that it will lie in a plane below the journals for shaft, K. This frame, T, is provided with the standard, T^2, having at its head the transverse socket, T^3, for receiving the stem, r^2, of a sleeve, *r*, or journal strap, which stands axially longitudinally, and which embraces the said shaft, K, and constitutes the means whereby, through said shaft, the frame and gearing hung therein, are upheld so far as their forward end support is concerned. The portion, *t*, which is indicated as an inclosing casing for the forward end of the motor, H, and which also constitutes the journal bearings for the motor crank-shaft, J, is also supported on this frame, while the body of the motor, H, is furthermore supported on the rear cross spring, B^2, of the running gear frame. The balance wheel, g^4, which is upon the crank shaft is accommodated within the bifurcated portion of this frame, T. It therefore becomes apparent that the driving gearing is supported to ride easily and not to be affected disadvantageously by the up and down movement of the body relatively to the running gear, or vice versa, or by any sidewise swaying of the body. It will furthermore be perceived (Figs. 1 and 4) that the standards, S^4, of the frame, S, have the further upwardly and laterally extended arms, S^5, S^5, which constitute the supports for the bar, Q,—upon which the clutch shipper levers are pivotally hung,—and which arms constitute, by the overturned members, S^6, the guides for the longitudinally movable cam-bar, R. The rollers, s^3, are provided for the easy running of the bar and the latter is held up to these rollers by the support of the shipper levers, the horizontal arms of which are upheld by the springs, o^3, secured to such arms and to the longitudinally ranging bar, g^4, which is supported by, and extended between, the tops of the arms, S^5.

Description will be now given of the means for imparting the actuating movements, longi-

tudinally, to the cam-bar, R; and, therefore, it will be seen that there is a lever, u, secured to, and standing above, the rock-shaft, u^2, which is mounted on a part of the frame, S. Another lever arm, u^3, depends from this rock-shaft and to this a rod, u^4, is connected which forwardly extends to connection with the depending arm of the elbow lever, U, which is pivotally mounted at the middle front part of the body. To the forwardly projecting horizontal arm of the said elbow lever, U, the lower end of the vertical thrust-rod, v, is connected. This thrust-rod plays axially within and through the tubular steering-post, j, aforementioned, the latter having an opening, j^5, through its rear side above its lower end so that the offset lower part, v^2, of the thrust-rod may be brought outside of the tubular post to permit the manner of connection with lever, U, shown. It will be here pointed out that the tubular steering post, j, has the rigidly affixed rearwardly extended trough-like arm, or bracket, j^6. Now to the rear end of this bracket the handle-lever, w, is, intermediate between its ends, pivotally mounted so that it may have a swinging motion in a vertical plane, but so that any movement which is given it laterally will cause the corresponding lateral swinging of the bracket arm, j^6, and the turning of the steering post, j, for the deflection of the wheels. The forward end of the said intermediately pivoted handle-lever is linked, or otherwise attached, to the thrust-rod, v, so that the up and down movement thereof will, according to the manipulation of the lever, through the connections recited, place the cam-bar, R, in position for the stoppage of the vehicle, or for the forward running thereof at any of the speeds, or for the backing, while the self-same lever, even while horizontal, or in any of its vertically swung positions, on being turned sidewise, will effect the steering.

While, of course, the handle lever for operating the speed gearing might be mounted independently of the steering post arm, to mount said lever, w, and arm, j^6, in conjunction substantially as described, manifestly, is very advantageous as it places the vehicle entirely under the control of one hand.

The motor, H, has only been referred to in an incidental manner, because the particular kind of motor to be employed forms no part of this invention. It will be however mentioned that an engine operated by gasoline has been employed with efficient results, and such a motor is considered efficient and approved. In the drawings, W indicates a reservoir under the seat for the storage of the motor fluid.

To further simplify the management of the vehicle, a starting device for the motor, consisting of a crank, K^5, is fixed to the end of the shaft, K, and is in easy reach of the operator, as he steps into the vehicle. By this disposition he avoids the necessity of going behind the carriage to give the fly-wheel a turn as is usually necessary with gasoline or other single acting motors.

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

1. In a road vehicle, the combination with a cross axle, or frame, of the wheels and wheel journals, and pivots for connecting said journals with the ends of the axle, which pivots are in lines substantially intersecting the center of the respective wheel bases, substantially as described.

2. In a road vehicle, a propelling mechanism and devices for regulating and controlling the same, and a steering wheel, or wheels, in combination with a handle adapted for movement in two different planes and connected with the steering wheel, or wheels, whereby on being swung in the one plane it controls the steering of the vehicle, and also having a connection with the propulsion controlling devices and adapted when swung in the other plane to operate the latter, substantially as described.

3. In a road vehicle, the combination with a front cross axle, or frame, having yoke-formed ends, of the wheels and independent wheel-journals, and pivots for connecting said journals with the members of the axle yokes which pivots are in lines substantially intersecting the center of the respective wheel bases, substantially as described.

4. In a motor propelled road vehicle, the combination with the running gear frame of the front wheel axle which is connected thereto by the horizontal pivot or king-bolt, and the wheels having independent journals which are swivel connected on the axle for horizontal swinging movements about axes which are in lines substantially intersecting the center of the respective wheel bases, substantially as and for the purposes set forth.

5. In a road vehicle, the combination with the front cross axle, of the journals for the front wheels which are pivoted to the extremities of the axle, and which have lever arms which are extended diagonally rearwardly and inwardly, a steering post mounted for rotational movement at the front of the vehicle body and having the mortise, j^3, at its lower end, the lever engaging through said mortise and the connecting rods, i^2, i^3, secured to said lever, j^3, and respectively to the wheel-journal-levers, substantially as and for the purpose set forth.

6. In a road vehicle, the combination with the front cross axle having at its ends the vertically standing yokes of the front wheel journals, g, provided with the upper and lower extensions, h, h, and the cone pointed screws, engaging through the axle yoke members and by their tapered extremities setting into sockets therefor of the journal extensions, said screws being in a common line which is directed to intersect substantially the center of the wheel bases, substantially as described.

7. In a road vehicle, a motor-propelled shaft, J, having a bevel-gear, N, and a shaft, K, having thereon the fixed bevel-gear, P, and the loose bevel-gear, O, which are at opposite sides of, and both in mesh with, said gear, N; two gears,—as *l* and *m*,—each loose on shaft, K, and each forming a part of an independently operating driving connection between said shaft, K, and the driving axle of the vehicle; and individually operating mechanism which may either place said gear, *m*, in a clutch engagement with the shaft, K, or the gear, *l*, into clutch engagement with the said loose bevel-gear, O, substantially as described.

8. In a road vehicle, a shaft, K, having a gear connection with a driving motor, and having loosely thereon several gears of unequal diameter, a counter shaft mounted in fixed bearings, parallel with said shaft, K, and geared to the driving axle of the vehicle and having fixed gears thereon respectively permanently in mesh with the gears of the shaft, K, and separate mechanisms applied between the shaft, K, and its loose gears, operative, one at a time, for placing said loose gears in clutch with said shaft, and means for individually operating said clutch mechanisms substantially as described.

9. In a road vehicle, a shaft, K, having a connection with a driving motor, and having loosely thereon several gears and a counter shaft, geared to the driving axle of the vehicle, having fixed gears thereon respectively in mesh with the gears of shaft, K, collars spline engaged with said shaft, K, and constituting members of clutches, the fellow members of which are comprised as parts of said loose gears, shipper levers for said splined clutch members, and means for actuating any determined one of said shipper levers, substantially as described.

10. In a road vehicle, a motor propelled shaft, J, having thereon the bevel gear wheel, N, and a shaft, K, having thereon the fixed bevel gear and a loose bevel gear which are at opposite sides of, and both in mesh with, said gear, N, a bevel gear, a wheel loose on said shaft, K, and forming part of a driving connection between said shaft and the driving axle of the vehicle, and mechanism for placing it in clutch with the shaft, K, a sleeve loose on shaft, K, carrying a gear wheel forming part of a reverse driving connection between said shaft and the driving axle of the vehicle, and a clutch collar splined on said sleeve, and adapted to be placed in clutch with the aforesaid loose bevel gear, and means for placing said clutch mechanisms in operation, one at a time, substantially as described.

11. In a road vehicle, in combination, the motor propelled cross shaft, J, having the bevel gear thereon, the longitudinal shaft, K, and the parallel counter shaft, L, geared to the driving axle of the vehicle, and said shaft, K, having thereon fixed and loose bevel gear wheels, P and O, at opposite sides of the bevel gear N, the sleeve, *e*, loose on shaft K, carrying the gear wheel, *l*, and other gear wheels of unequal size, as *m* and *n*, loose on shaft, K, clutch collars splined on shaft, K, and adapted to engage corresponding clutch members on said gears, *l*, *m*, *n*, a clutch member splined on said sleeve and adapted to move endwise to mesh with the loose bevel gear, O, and gears, l^2, m^2, n^2, on said shaft, L, in mesh with the gears, *l*, *m*, and *n*, substantially as described.

12. In a road vehicle, a shaft, K, having a connection with a driving motor, and having thereon several change gear wheels forming parts of differential driving connections for the driving axle of the vehicle, and sliding clutch members to be placed in clutch with said gears, shipper levers engaging said clutch members, and a bar having one or more cam surfaces thereon so that as it is moved endwise it may hold the said members, one at a time, through its shipper lever in clutch, and means for controlling the endwise movement of said bar, substantially as described.

13. In a road vehicle, the combination with driving axle, D, with bevel gear, G, thereon, of the transverse motor shaft, J, with bevel gear, N, fixed thereon, the longitudinal shaft, K, with fixed bevel gear, P, and loose bevel gear, O, both in mesh with, and at opposite sides of, gear N, to rotate in opposite directions, and the gears, *l*, *m*, and *n*, loose on shaft, K, and the clutch members, *l'*, *m'*, *n'*, splined, for slide movement only, relative to said shaft, K, and a sleeve extension, *e*, of the gear, *l*, having a clutch collar splined to slide along said sleeve extension, and to be placed in clutch with the said loose bevel gear, O, the angular shipper levers, l^4 m^4, n^4, and O^4, having engagement with said clutch collars and the endwise movable bar, R, having one or more cam projections for operating said shipper levers, the longitudinal counter shaft, L, having the gears, l^2, m^2 and n^2, and having the bevel gear, M, in mesh with the axle gear, G, all substantially as described and shown and for the purposes set forth.

14. In a road vehicle, the combination with the running gear and the body spring supported therefrom, of a frame, T, secured to, and depending below, said body, and a frame, S, hung at one end on the rear driven axle and having standards with journal bearings in which is supported the shaft, K, a strap, or collar, surrounding said shaft and having a transverse stem, r^2, which is mounted for a rocking movement in a member of the body supported frame, T, a motor in driving connection with said shaft, K, and driving gearing between said shaft and the rear wheel axle, substantially as described.

15. In a road vehicle, the combination with the running gear and the body spring supported therefrom, of a frame, T, secured to, and depending below, the body and having the standard with the transverse stem, r^2, set for rocking movement therein which stem has the longitudinally ranging collar, *r*, of the frame,

S, having a rear end support from the rear wheel axle of the vehicle and provided with the standards, S^4, S^4, in journals of which is mounted the longitudinal shaft, K, ani nter-mediate portion of which is embraced by said collar, r, thereby affording the supporting connection for the forward part of said frame, S, the counter shaft, L, journaled in this frame, S, and geared to the rear wheel axle, a motor mounted on the vehicle and geared to said shaft, K, and shiftable gearing between shafts, K and L, substantially as described.

16. In a motor propelled carriage, in combination, the running gear frame and body spring supported therefrom, the frame, T, depending below the body, with the motor driven transverse shaft, J, provided with the bevel gear wheel, N, thereon, and having the standard, T^2, the frame, S, at its rear hung upon the rear wheel axle, and having the counter shaft, L, journaled therein which is bevel geared to the axle and having the standards, S^4, S^4, in which is journaled the shaft, K, a collar, or strap, loosely surrounding this shaft and having a transverse stem which has a rocking bearing-support in a journal of the said standard, T^2, one or more bevel gears on said shaft, K, in mesh with the cross shaft gear, N, shiftable gearing on and between said shafts, K and L, and means for controlling same, substantially as described.

17. In a road vehicle, the combination with shiftable driving gearing and the cam bar, R, for effecting the shipping of the gearing, of a handle lever at the front of the vehicle pivotally mounted and mediums of connection between it and the said bar whereby on swinging the lever, the bar will be duly moved, substantially as and for the purpose set forth.

18. In a road vehicle, the combination with the steering wheel or wheels, of a steering post having a rotational movement and a medium of connection between it and said wheels, and a shiftable driving gearing for the vehicle, and mechanism for shipping same, a lever pivotally mounted on the steering post, and having connection with the shipper mechanism whereby upon the swinging of said lever in one plane it will move independently of the post to control the driving gearing while the swinging thereof in another plane will insure the turning of the steering post, substantially as described.

19. In a road vehicle, the combination with shiftable driving gearing and shipper, or clutch, mechanism for controlling the action thereof, and the reciprocatory cam bar, R, for effecting the operations of the shipper mechanism substantially as described, of a lever in engagement with said bar, and an angle lever at the front of the vehicle and connecting rods for imparting the movement to the former lever from the latter, a support at the front upper part of the machine and a handle lever thereon, and a connecting or thrust-rod between this handle lever and an arm of the said angle lever, substantially as described.

20. The combination with the cam-bar, R, lever, u, and angle lever, U, and connections between said levers of the tubular rotatable steering post at the front of the vehicle having the rearwardly extended arm, j^6, the handle lever, w, intermediately thereof pivotally mounted on said arm, and the connecting rod, v, secured to an arm of the handle lever and which is extended down within the steering post and having the offset portion, v^2, which is extended transversely through an opening in the side of the steering post and connected by its lower end to an arm of the angle lever, U, substantially as described.

21. In a motor propelled vehicle, the combination with the frame, S, on which is mounted the shiftable driving gear substantially as described, and which has the upwardly extended arms, S^5, S^5, of the bar, Q, supported by, and extended between said arms, and having the angular shipper levers pivotally mounted thereon, and the cam bar longitudinally guided along members which are provided therefor on said arms, and having cam surfaces on their under edges, substantially as described.

22. In a motor propelled vehicle, the combination with the frame, S, on which is mounted the shiftable driving gear substantially as described, and which has the upwardly extending arms, S^5, S^5, of the bar Q, supported by, and between, said arms, and having the angular shipper levers pivotally mounted thereon, and the cam bar longitudinally guided within members which are provided therefor on said arms, and having cam surfaces on their under edges, and the bar, s^4, extending between said arms above bar, Q, and having secured thereto the ends of springs which are also connected to the shipper-levers, substantially as described.

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Witnesses:
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