

No. 666,307.

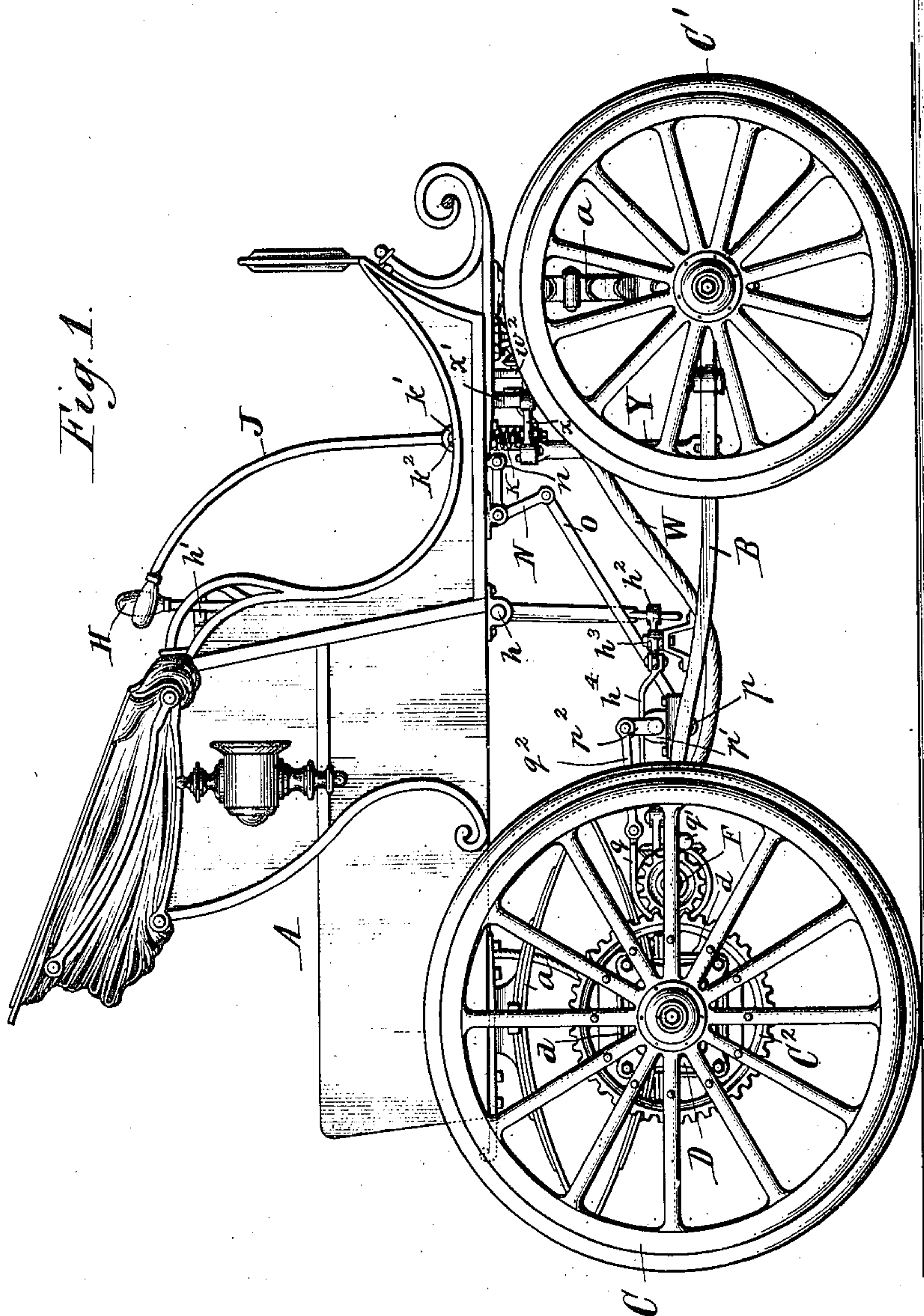
Patented Jan. 22, 1901.

J. W. FARNOFF.
MOTOR VEHICLE.

(Application filed June 13, 1900.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses:
Harry Weinstock
Max M. Kuegel.

Jay W. Farnoff Inventor.
By Neuhart & Burkhardt
Attorneys.

No. 666,307.

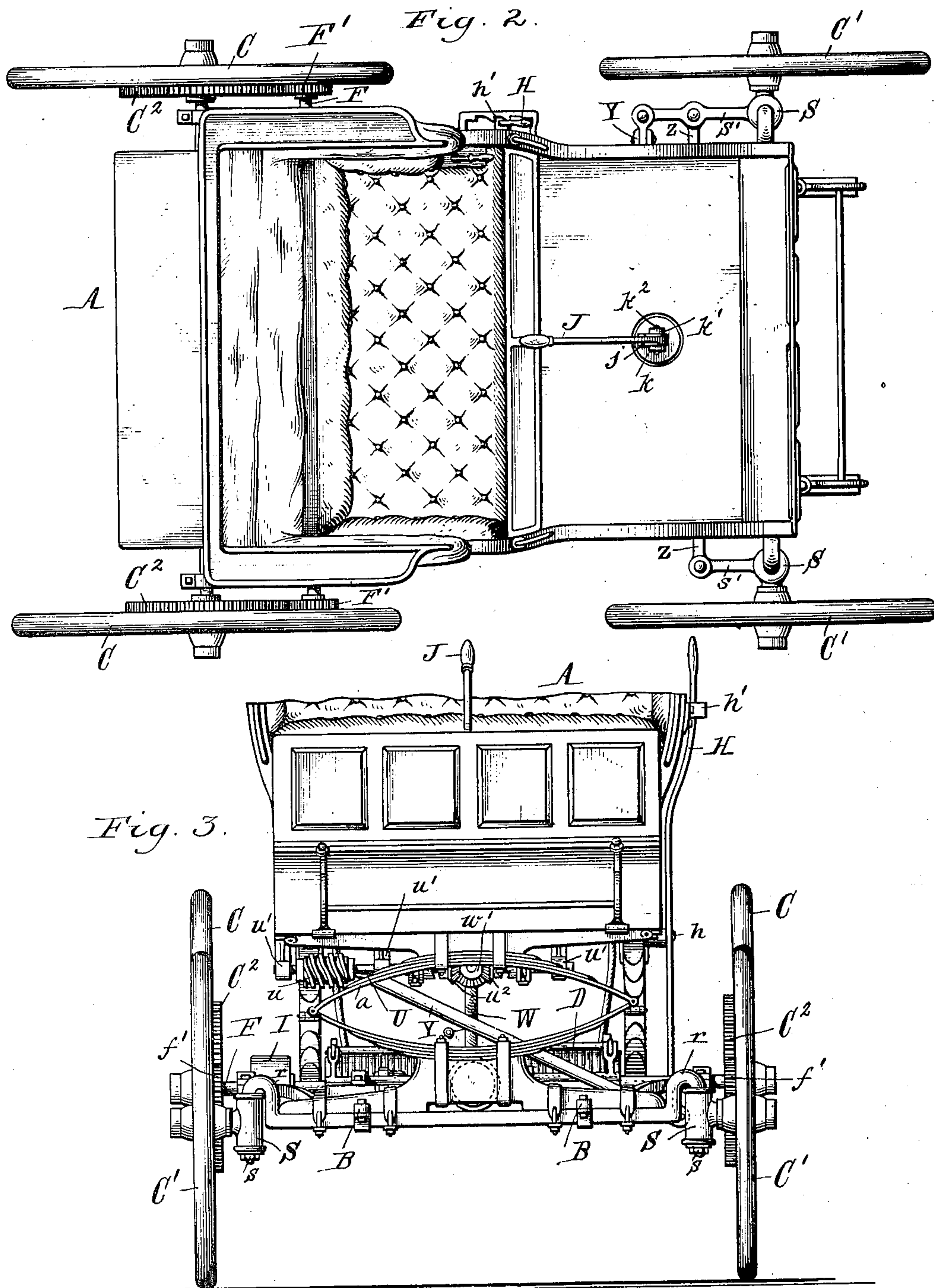
Patented Jan. 22, 1901.

J. W. FARNOFF.
MOTOR VEHICLE.

(Application filed June 13, 1900.)

(No Model.)

5 Sheets—Sheet 2.



Jay W. Farnoff Inventor.
Harry Weinstock } Witnesses. By Neuhardt & Burkhardt.
Max M. Krieger } Attorneys

No. 666,307.

Patented Jan. 22, 1901.

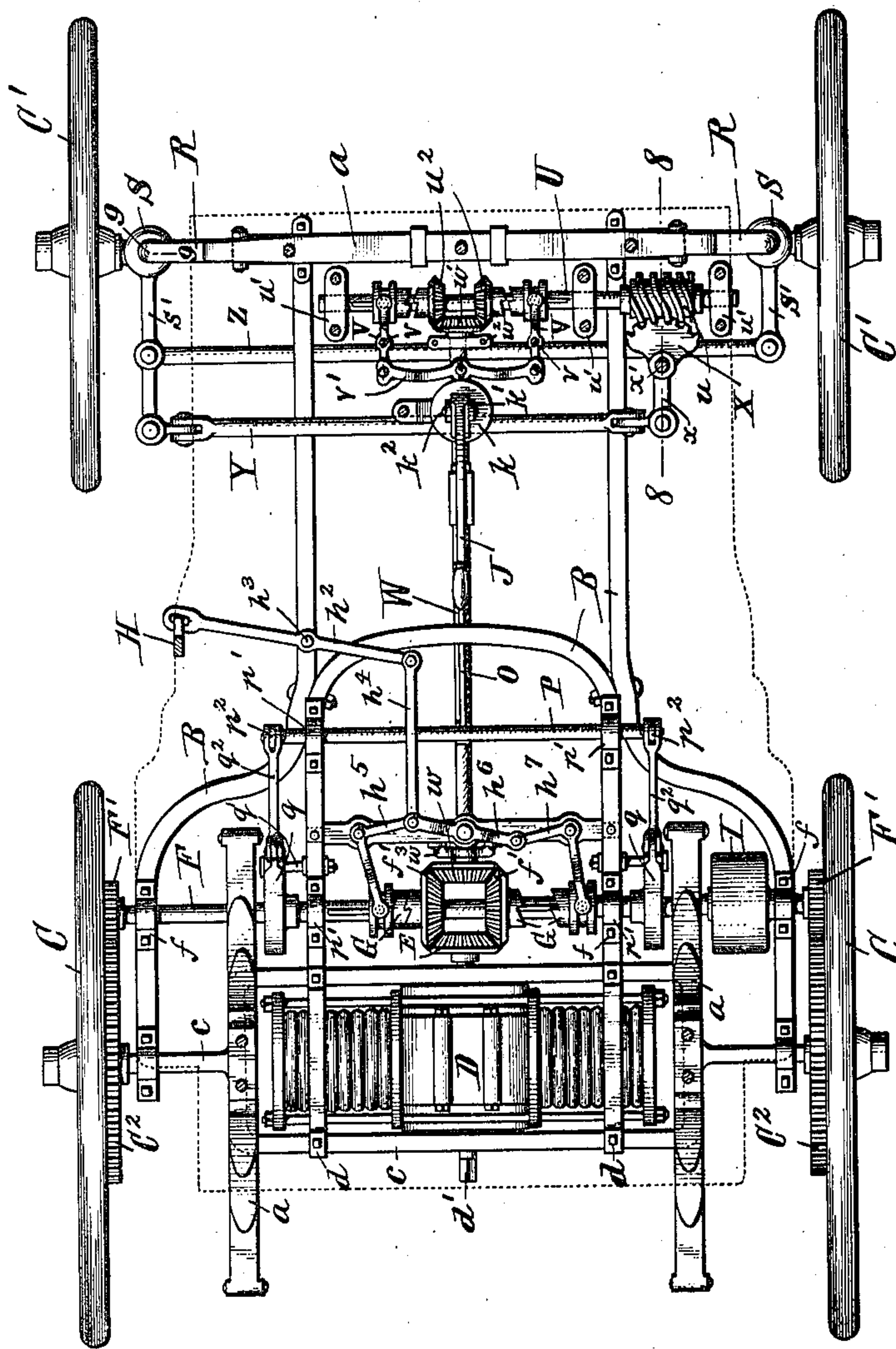
J. W. FARNOFF.
MOTOR VEHICLE.

(Application filed June 13, 1900.)

(No Model.)

5 Sheets—Sheet 3.

Fig. A.



Witnesses:
Harry Weinstock.
Max M. Krüger.

Jay W. Farnoff Inventor.
By Neuhart & Burkhardt.
Attorneys.

No. 666,307.

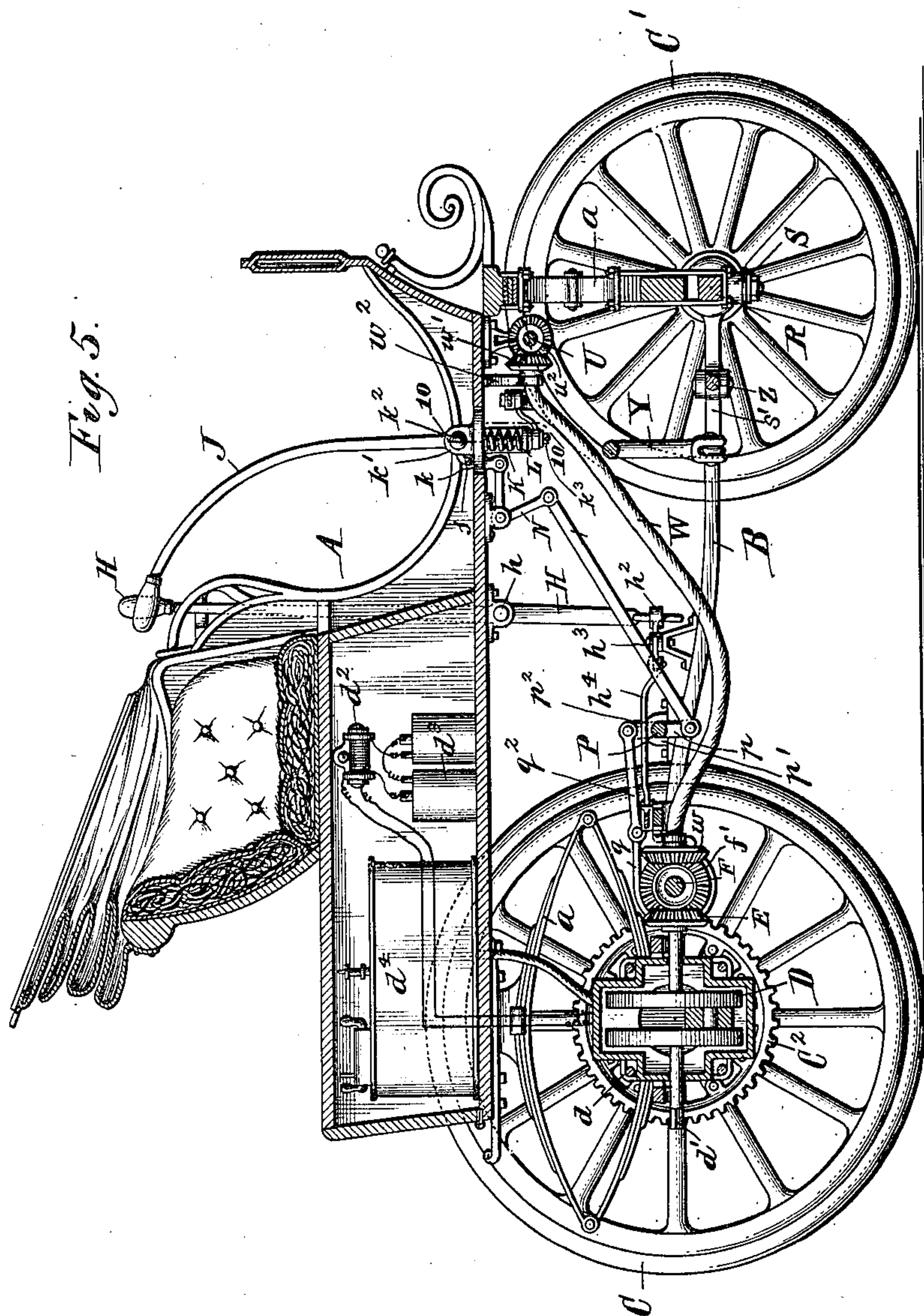
Patented Jan. 22, 1901.

J. W. FARNOFF.
MOTOR VEHICLE.

(Application filed June 13, 1900.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses:

Harry Weinstock.
Max M. Krieger.

Jay W. Farnoff Inventor.
By Neuhart & Burkhardt
Attorneys.

UNITED STATES PATENT OFFICE.

JAY W. FARNOFF, OF BUFFALO, NEW YORK, ASSIGNOR OF TWO-THIRDS
TO HENRY KOONS, OF SAME PLACE.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 666,307, dated January 22, 1901.

Application filed June 13, 1900. Serial No. 20,180. (No model.)

To all whom it may concern:

Be it known that I, JAY W. FARNOFF, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Motor-Vehicles, of which the following is a specification.

My invention relates to motor-vehicles in which a gasoline-motor is employed; but it may as readily be propelled by electricity, liquid air, or any other suitable power.

The object of my invention is to provide a motor-vehicle in which reliability, simplicity, efficiency, and ease of operation are the essential features. These essentials are obtained by providing the vehicle with my improved mechanism, whereby the guiding or steering of the same is accomplished by the motor, to so construct the vehicle as to permit of readily applying the brakes with the same lever with which the vehicle is steered, and to afford facilities for the same whereby it may be propelled forwardly or rearwardly or brought to a stop, either being attained by the movement of a single lever provided therefor.

The invention consists in the novel construction and combination of parts, as herein-after fully described and claimed.

The objects of my invention are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved motor-vehicle. Fig. 2 is a top plan view thereof. Fig. 3 is a front elevation of the same. Fig. 4 is a top plan view of the running-gear, the steering-lever being shown in connection therewith. Fig. 5 is a central longitudinal section through the vehicle. Fig. 6 is a sectional elevation of the driving-shaft and its attached gearing. Fig. 7 is a sectional elevation of the steering-shaft and its attached gearing. Fig. 8 is a longitudinal section taken on line 8 8, Fig. 4, showing the manner in which the gear-segment of the steering mechanism is supported. Fig. 9 is an enlarged transverse section through the steering-knuckle, taken on line 9 9, Fig. 4, the axle being shown in elevation. Fig. 10 is a vertical section, on an enlarged scale, taken on line 10 10, Fig. 5. Fig. 11 is a vertical section on line 11 11, Fig. 10.

Referring to the drawings in detail, like letters of reference indicate corresponding parts in the several figures.

A represents the body of the vehicle, which is supported by springs *a*, secured to the frame B of the running-gear.

C represents the driving-wheels, and C' the steering-wheels. The driving-wheels are revolvably mounted on the rear axle *c*, which is divided centrally to form a pocket in which the motor D, lying in a horizontal position, is supported and held by iron straps or supports *d*, secured to opposite sides of the divided portion of the axle. The straps surround the motor and hold the same rigidly in place. The motor-shaft *d'* extends out through the casing of the motor and has secured thereon a bevel-gear E. The motor, like all gasoline-motors, is fitted with the usual sparking-plug, connected by wire to the induction-coil *d''* and batteries *d'''*, a carbureter *d''''* also being provided to furnish it with the necessary fuel. These accessories are all contained within the body of the vehicle and permit of a construction which is simple and easy-running under all conditions of usage.

F represents the driving-shaft lying in a position at right angles to the motor-shaft and mounted in journals *f*, secured to the frame of the running-gear. To the ends of this shaft pinions F' are secured, which mesh with gear-wheels C', secured to the spokes of the driving-wheels C. Two bevel-gears *f'*, mounted loosely on said shaft in a manner to prevent lengthwise movement thereon, are held in constant mesh with the bevel-gear E at opposite sides thereof and receive motion therefrom in opposite directions. Formed integrally with the bevel-gears *f'* are hubs, which act as the fixed members of clutches G, while the shiftable members thereof turn with the shaft and are arranged to slide on the same toward and from the gears *f'*. These clutches act simultaneously in the same direction and are operated by a series of levers connected to the controlling-lever H, pivoted, as at *h*, to the body A and positioned within easy reach of the operator. This lever is held in the desired position by engaging it with one of three teeth formed on a rack *h'*, also secured to the side of body A. The

lower end of the controlling-lever is secured to a lever h^2 , lying in a horizontal position, by a connection permitting deflection of the vehicle-body without transmitting movement to said lever. This lever is pivoted about centrally between its ends, as at h^3 , to the frame of the running-gear and connected at its opposite end to a connecting-rod h^4 , lying in the same plane at a right angle thereto, the latter being connected at its rear end to both a bell-crank lever h^5 , yoked at its free end to embrace the shiftable member of one of the clutches, and a transversely-disposed lever h^6 , pivoted to the frame of the running-gear at about midway between its ends. To the opposite end of this lever a bell-crank lever h^7 is pivotally connected, which also has its free end yoked to embrace the shiftable member of the other clutch. As shown in the drawings, the controlling-lever H is in its forward position, which, through the medium of the levers h^2 h^6 , rod h^4 , and bell-crank levers h^5 h^7 , engages the shiftable members of the left-hand clutch with the fixed member thereof and propels the vehicle in one direction, the right-hand clutch being disengaged meanwhile. By forcing the controlling-lever backwardly to engage the center tooth of the rack h' the shiftable members of the clutches are made to travel to the left a distance sufficient to disengage the left-hand clutch and still keep the right-hand clutch disengaged, in which position the motor may continue to run without imparting motion to the driving-wheels C. A further backward movement of the controlling-lever engages it with the rear tooth of the rack h' and causes the shiftable members of the clutches to travel still further to the left when the members of the right-hand clutch are engaged and propel the vehicle in the opposite direction, the members of the left-hand clutch still being disengaged. This forms a simple, reliable, and effective device, dispenses with delicate mechanism used heretofore, and permits the vehicle to be reversed or stopped almost immediately. To the driving-shaft F a compensating-gear arrangement I is secured, which compensates for the difference in travel of the inner and outer driving-wheels in rounding corners or turning curves. This, however, is common to vehicles of this character.

J represents a combined steering and braking lever which is pivotally secured to a thrust-rod K, passing through a pressure-disk k , held normally in an opening formed in the bottom of the vehicle-body, the upper face of which is in line with the floor of said body. The upper end of the aforesaid thrust-rod is bifurcated, as at k' , to receive the lower end of the steering and brake lever, a pin k^2 being made to pass through the two, on which the steering-lever can be swung forward for convenience in entering the carriage or backward in the position for steering and braking. The steering-lever is provided at this point

with a rearwardly and downwardly extending pressure-foot j , bearing against the upper face of the pressure-disk k . The lower end of the thrust-rod is reduced in diameter and enters a bracket L, secured to the bottom of the vehicle-body. This reduced portion is squared and extends out through the bracket to enter a corresponding opening formed in a lever, the purpose of which will be explained hereinafter. A nut k^3 is secured to the lower end of said thrust-rod to hold the same rigidly in place. A compression-spring M surrounds the thrust-rod and bears with its lower end against the bracket and with its upper end against the lower face of the pressure-disk, keeping the same in its normal or elevated position, the upper movement being limited by the bifurcated portion of the thrust-rod, which is larger than the opening in said disk.

A bell-crank lever N is secured to the bottom of the body A directly in rear of and in line with the center of the pressure-disk, one end thereof being pivotally connected to the pressure-disk, as at n , the other end thereof having pivotal connection with a downwardly and rearward inclined lever O, the rear end of which is secured to the downwardly-disposed rock-arm p of a rock-shaft P, located transversely on the frame of the running-gear and journaled in bearings p' secured thereto. Upwardly-disposed rock-arms p^2 are forged or otherwise formed on the ends of this rock-shaft. Q represents brake-pulleys secured to the driving-shaft by means of keys or in any other practical manner, and q hand-brakes which encircle said pulleys and are adapted to be drawn tightly around the same, one end of said bands being immovably held to the frame of the running-gear, as at q' , the other ends thereof being pivotally connected to one end of rods q^2 , which at their opposite ends are pivotally connected to the rock-arms p^2 .

In applying the brakes the operator simply depresses the free end of the steering and brake lever, the pressure-foot of which will lower the pressure-disk, which in turn will swing the rock-arm p backwardly through the agency of the bell-crank lever N and the lever O. This causes the rock-arms p^2 to swing forwardly and by the connection of the rods q^2 to the band-brakes will cause the same to be pulled tightly around the brake-pulleys Q. By this arrangement the vehicle can be controlled at any speed.

The front axle R is rigidly secured to the frame of the running-gear and at its ends is turned upwardly and thence downwardly to form a gooseneck r , which terminates in vertical spindles r' . These spindles enter vertical bearing-boxes S, between which and the former a series of antifriction-balls are contained. Nuts s are applied to the lower ends of the spindles r' to hold the same within the bearing-boxes, the adjustment of the cones being attained in a manner common to such

bearings. Formed integrally with the bearing-boxes S are the wheel-spindles or stub-axles T, on which the steering-wheels revolve, and rearwardly-extending arms s' , used for a purpose hereinafter described.

Underneath the vehicle-body and arranged transversely therewith is a steering-shaft U, having a spiral gear u secured to one end thereof. This shaft is journaled in bearings u' , secured to the floor of the vehicle. Two bevel-gears u^2 are loosely mounted on the shaft in a manner to prevent lengthwise movement thereon and, like the bevel-gears of the driving-shaft, have one member of a clutch formed integrally therewith. The shiftable members of the clutches are arranged to turn with the shaft and slide toward and from the bevel-gears by means of shifting-levers V, pivoted between their ends to the floor of the vehicle, as at v . One end of these levers is yoked to embrace the shiftable members of the clutches, the other ends thereof having pivotal connection with a rod v' , pivotally connected at its center to a lever v^2 , secured to the lower end of the thrust-rod in the manner hereinbefore mentioned.

W represents a flexible shaft having bevel-gears $w w'$ secured to its ends. The bevel-gear w is arranged to be in continual mesh with the bevel-gears f' of the driving-shaft, while the bevel-gear w' is in continual mesh with the bevel-gears u^2 of the steering-shaft. The front end of the flexible shaft is supported in a hanger w^2 , secured to the floor of the vehicle, and its rear end in a support or hanger w^3 , secured to the frame of the running-gear. This shaft can be curved and arranged in any manner to avoid coming in contact with other parts of the mechanism. It is invaluable and especially adapted for vehicles having other than straight bottoms, such as broughams, victorias, &c.

In mesh with the spiral gear u is a gear-segment X, provided with a rearwardly-extending arm x . This segment is pivotally supported to the body A, as at x' , so as to impart movement to the arm x in a direction opposite to that received from the spiral gear.

Y represents a rod pivotally connected to the arm of the gear-segment in a manner to permit of vertical and horizontal movement and which is inclined downwardly from the same to the end of the arm s' of one of the bearing-boxes S, at which point it is also pivotally connected, so as to permit of vertical and longitudinal movement. The arm s' , to which the rod Y is connected, is longer than the arm s' of the bearing-box; but both arms are pivotally connected together at an equal distance from the center of the bearing-boxes by a rod Z.

The manner in which the vehicle is steered is as follows: The bevel-gear w being continually in mesh with the bevel-gears f' of the driving-shaft revolves the flexible shaft, which by means of the bevel-gear w' being in continual mesh with the bevel-gears u^2 causes

them to revolve so long as the motor is running. The bevel-gears u^2 , however, being loosely mounted on the shaft do not revolve the same until one of the shiftable members of the clutches which are keyed to the shaft is engaged with its coacting member formed on the gear. When the steering-lever is in line with the center of the vehicle, it is being propelled in a straight course. On shifting the steering-lever in one direction the thrust-rod K, which is bifurcated at its upper end to receive the steering-lever, is made to turn therewith. This is done without affecting the braking mechanism, as a different movement is required to operate the same. The lever v^2 being secured to the lower end of the thrust-rod swings in an opposite direction to the steering-lever and through the agency of the rod v' causes the shifting-levers V to swing simultaneously in the same direction. This engages the members of one of the clutches and moves the shiftable member of the other clutch farther out of engagement. The engagement of the one clutch revolves the shaft in one direction, which, through the medium of the spiral gear and gear-segment, swings the segment-arm, which imparts motion to the rod Y. This in turn causes the arms s' , connected together by the rod Z, to turn the bearing-boxes S on the spindles r' and gives the steering-wheels the desired turn.

On swinging the steering-lever in the direction opposite to that above described the clutch described above as engaged will become disengaged, while the clutch described as disengaged will become engaged and the shaft thereby revolved in the opposite direction, which changes the direction of movement of the segment-arm x , rod Y, and arms s' , when the steering-wheels are swung in the opposite direction.

The motor, gearing, and shafting are preferably all inclosed; but to better illustrate the mechanism I have omitted all inclosures.

Having thus described my invention, what I claim is—

1. In a motor-vehicle the combination with the driving-shaft, of shiftable driving-gearing secured thereto, shifting-levers for effecting the shifting of said gearing, a lever connecting said shifting-levers, and a controlling-lever in proximity to the operator having operative connection with said lever, substantially as set forth.

2. In a motor-vehicle, the combination with the motor-shaft having a bevel-gear secured thereto, of a driving-shaft, two bevel-gears loosely mounted thereon and being in continual mesh with the aforesaid bevel-gear at opposite sides thereof, shiftable clutches held on said shaft and adapted to be engaged with said bevel-gears, bell-crank levers for shifting said clutches, a centrally-pivoted and transversely-disposed lever connecting said bell-crank levers together, a rod or link connected at one end to said lever, and a con-

trolling-lever in proximity to the operator having connection with said rod or link, substantially as set forth

3. In a motor-vehicle, the combination with
5 the motor-shaft having a bevel-gear secured thereto, of a driving-shaft, two bevel-gears loosely mounted thereon and being in continual mesh with the aforesaid bevel-gear at opposite sides thereof, shiftable clutches held
10 on said shaft and adapted to be engaged with said bevel-gears, bell-crank levers for shifting said clutches, a centrally-pivoted and transversely-disposed lever connecting said bell-crank levers together, a rod connected at
15 one end to said lever and the end of one bell-crank lever, a centrally-pivoted lever connected to the other end of said rod, and a controlling-lever pivotally secured to the side of the vehicle and having connection with the
20 last-mentioned lever in a manner to permit of vertical deflection of the vehicle without imparting movement to the same, as and for the purpose set forth.

4. In a motor-vehicle, the combination with
25 the driving-shaft, of a shaft operated thereby, a steering-shaft operated by the last-mentioned shaft, clutch-gearing secured to said steering-shaft whereby it is caused to revolve in the desired direction, a steering-lever for
30 controlling the clutch-gearing, and mechanism located between the same and the steering-wheels, substantially as set forth.

5. In a motor-vehicle, the combination with the driving-shaft, of a shaft geared thereto,
35 a steering-shaft geared to said shaft, a steering-lever for controlling said steering-shaft, a spiral gear secured thereto, a gear-segment operated by said spiral gear, steering-knuckles carried on the front axle and having
40 spindles or stub-axles on which the steering-wheels revolve, and mechanism intermediate of said steering-knuckles and the gear-segment adapted to turn the steering-wheels and be operated by the gear-segment, as and for
45 the purpose described.

6. In a motor-vehicle, the combination with the driving-shaft, of a shaft operated thereby and having a gear-wheel secured to its front end, a steering-shaft having two gear-wheels
50 loosely mounted thereon and engaging opposite sides of the aforesaid gear-wheel, a steering-lever in proximity to the operator, mechanism operated by the steering-lever for controlling the direction in which the steering-shaft is revolved, a spiral gear secured to the
55 latter, a gear-segment having an arm extending therefrom and pivotally supported to give said arm movement in a direction opposite to that received from the spiral gear, steering-knuckles carried by the front axle and having lateral-extending wheel-spindles or stub-axles formed thereon, rearwardly-extending arms formed on said steering-knuckles, a rod connecting said arms, and a rod connecting
60 one of said arms with the arm of the gear-segment, as and for the purpose described.

7. In a motor-vehicle, the combination with

the driving-shaft, of a flexible shaft geared thereto, a bevel-gear secured to its front end, a steering-shaft journaled in bearings and
70 positioned at a right angle to said flexible shaft, two bevel-gears loosely mounted on the steering-shaft and adapted to mesh with opposite sides of the bevel-gear secured to the flexible shaft, shiftable clutches adapted to
75 engage the bevel-gears of the steering-shaft, shifting-levers for operating said clutches, a steering-lever in proximity to the operator, mechanism located between the steering-lever and the shifting-levers whereby the latter are
80 operated simultaneously in one direction, a spiral gear secured to the steering-shaft, a gear-segment having an arm extending therefrom and being centrally pivoted to the vehicle-body, steering-knuckles carried by the
85 front axle and having the wheel-spindles or stub-axles formed thereon, rearwardly-extending arms formed integrally with said steering-knuckles, one of said arms being longer than the other, a rod connecting said
90 arms equidistant from the center of the steering-knuckles, and a rod connecting the longer arm to the arm of the gear-segment in a manner to permit of vertical movement without imparting movement to the steering-knuckles,
95 as and for the purpose described.

8. In a motor-vehicle, the combination with the brake-pulleys, of a vertically-movable pressure-disk, a lever in proximity to the operator adapted to operate said pressure-disk,
100 and operating mechanism connecting the brake-pulleys with said pressure-disk, substantially as set forth.

9. In a motor-vehicle, the combination with a steering-lever capable of movement on horizontal and vertical planes and having operative
105 connection with the steering-wheels which are turned by moving said lever on a horizontal plane, of a vertically-movable pressure-disk adapted to be operated by vertical movement of said steering-lever, brake-pulleys for braking the vehicle, and operating
110 mechanism between said brake-pulleys and the vertically-movable pressure-disk, substantially as set forth.

10. In a motor-vehicle, the combination with the steering-lever having operative connection with the steering-wheels, of a vertically-movable pressure-disk operated by said
115 steering-lever, brake-pulleys secured to the driving-shaft, and operative mechanism connecting the brake-pulleys with said pressure-disk, substantially as set forth.

11. In a motor-vehicle, the combination with the brake-pulleys, of a vertically-movable pressure-disk, mechanism connecting
125 said pressure-disk with the brake-pulleys, a thrust-rod passing through said pressure-disk, a spring surrounding said thrust-rod and bearing against the under side of the pressure-disk, mechanism connecting the
130 steering-wheels with the thrust-rod, and a steering-lever connected to said thrust-rod in a manner to permit of turning the same

and also to permit of depressing the pressure-disk, substantially as set forth.

12. In a motor-vehicle, the combination with the driving-shaft, of brake-pulleys secured thereto, band-brakes adapted to be drawn tightly around said pulleys, a rock-shaft positioned transversely on the frame of the running-gear and journaled in bearings secured thereto, rock-arms formed on said rock-shaft, rods connected at one end to said rock-arms and at their other ends to the band-brakes, a rock-arm formed on the rock-shaft and disposed in a direction opposite to the aforesaid rock-arms, a rod secured to said rock-arm, a brake-lever in proximity to the operator, and mechanism intermediate of said rod and the brake-lever whereby the movement of the latter is imparted to the former, substantially as set forth.

13. In a motor-vehicle the combination with the driving-shaft, of brake-pulleys secured thereto, band-brakes adapted to be drawn tightly around said pulleys, a rock-shaft positioned transversely on the frame of the running-gear and journaled in bearings secured thereto, rock-arms formed on said

rock-shaft, rods connected at one end to said rock-arms and at their other ends to the band-brakes, a rock-arm formed on the rock-shaft and disposed in a direction opposite to the aforesaid rock-arms, a rod secured to said rock-arm, a bell-crank lever pivoted to the vehicle-body and having pivotal connection with said rod, a pressure-disk held normally in a position even with the floor of the vehicle and having the other end of the bell-crank lever pivotally connected thereto, a thrust-rod passing through said pressure-disk and held in a bracket secured to the body, a bifurcated head formed on said thrust-rod and bearing against the upper face of the pressure-disk, a compression-spring surrounding the thrust-rod to keep the pressure-disk elevated, a brake-lever pivotally held in the bifurcated head of the thrust-rod, and a pressure-foot formed on the lower end of the brake-lever and adapted to depress the pressure-disk, substantially as set forth.

JAY W. FARNOFF.

Witnesses:

WM. J. BUDDENHAGEN,
HARRY H. WEINSTOCK.