No. 677,854. Patented July 9, 1901.

F. E. CANDA & L. B. SMYSER.

MOTOR VEHICLE.

(Application filed May 1, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

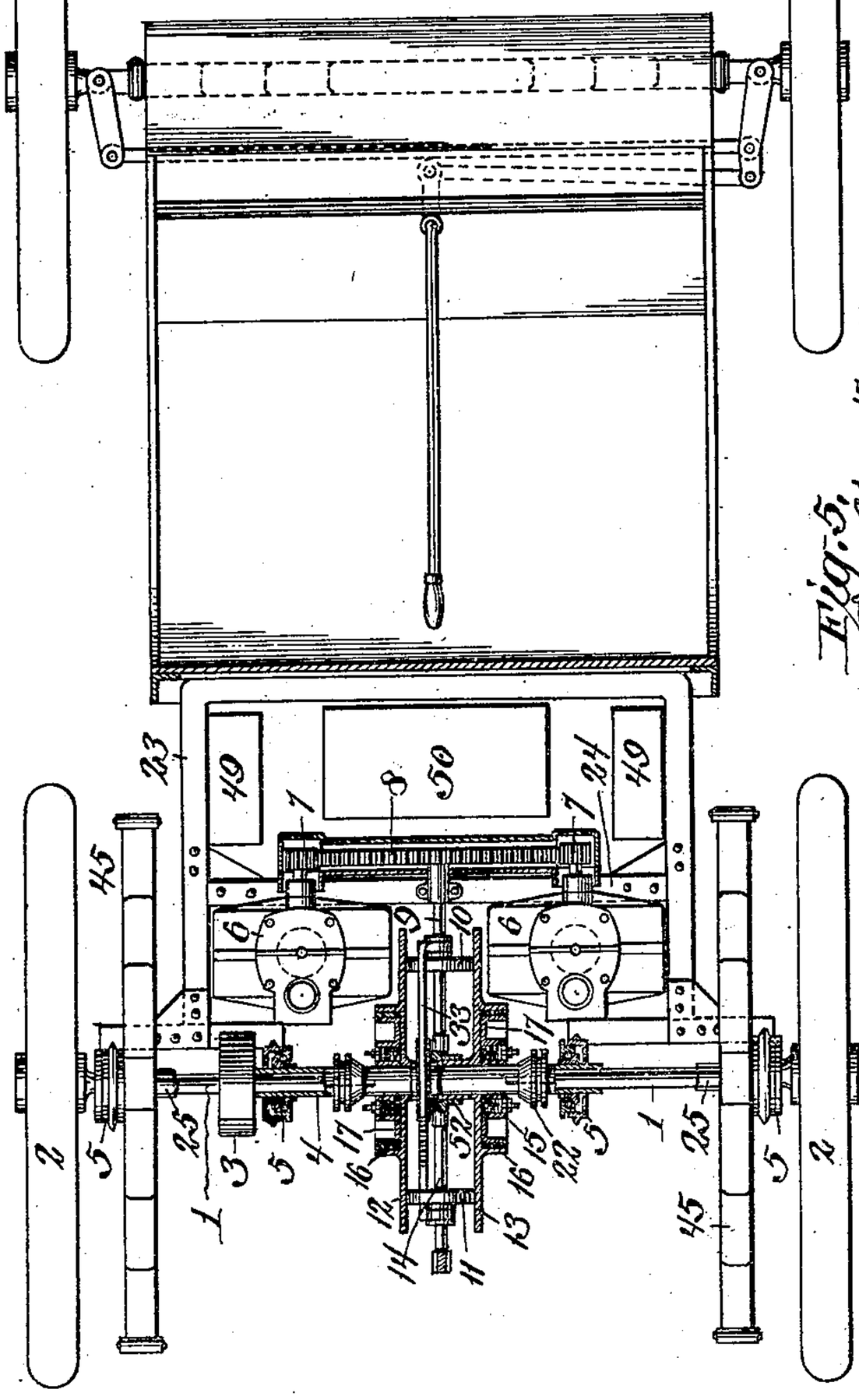
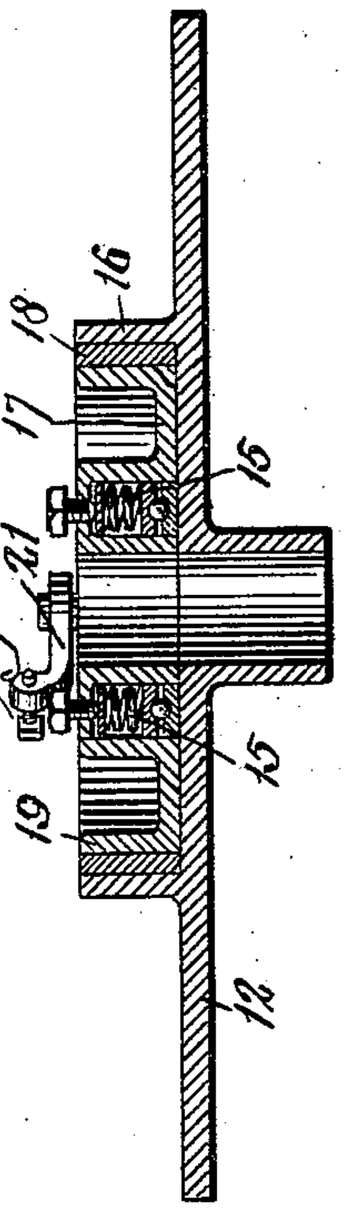


Fig. 5.



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(No Model.) 3 Sheets—Sheet 2.

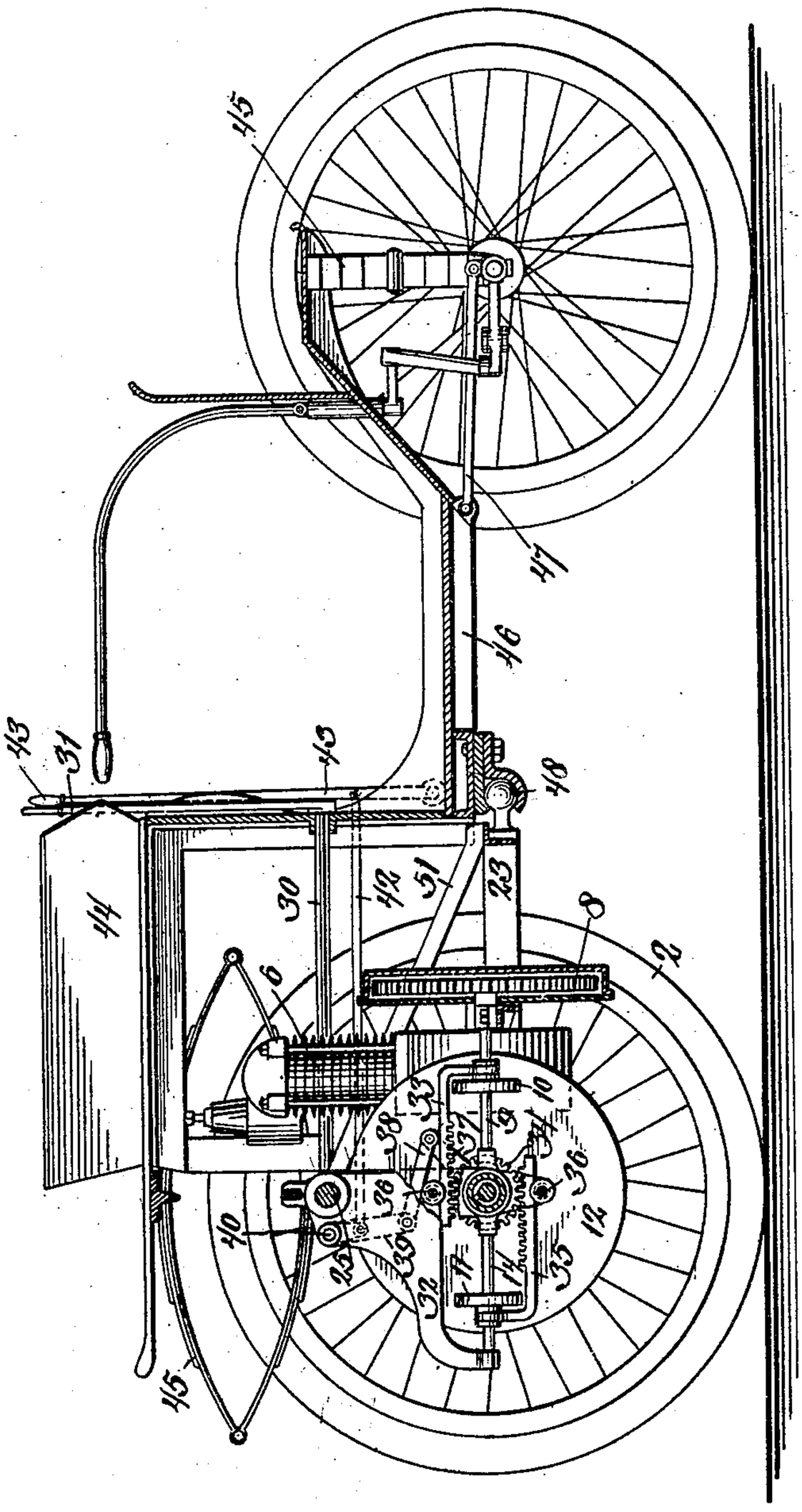

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

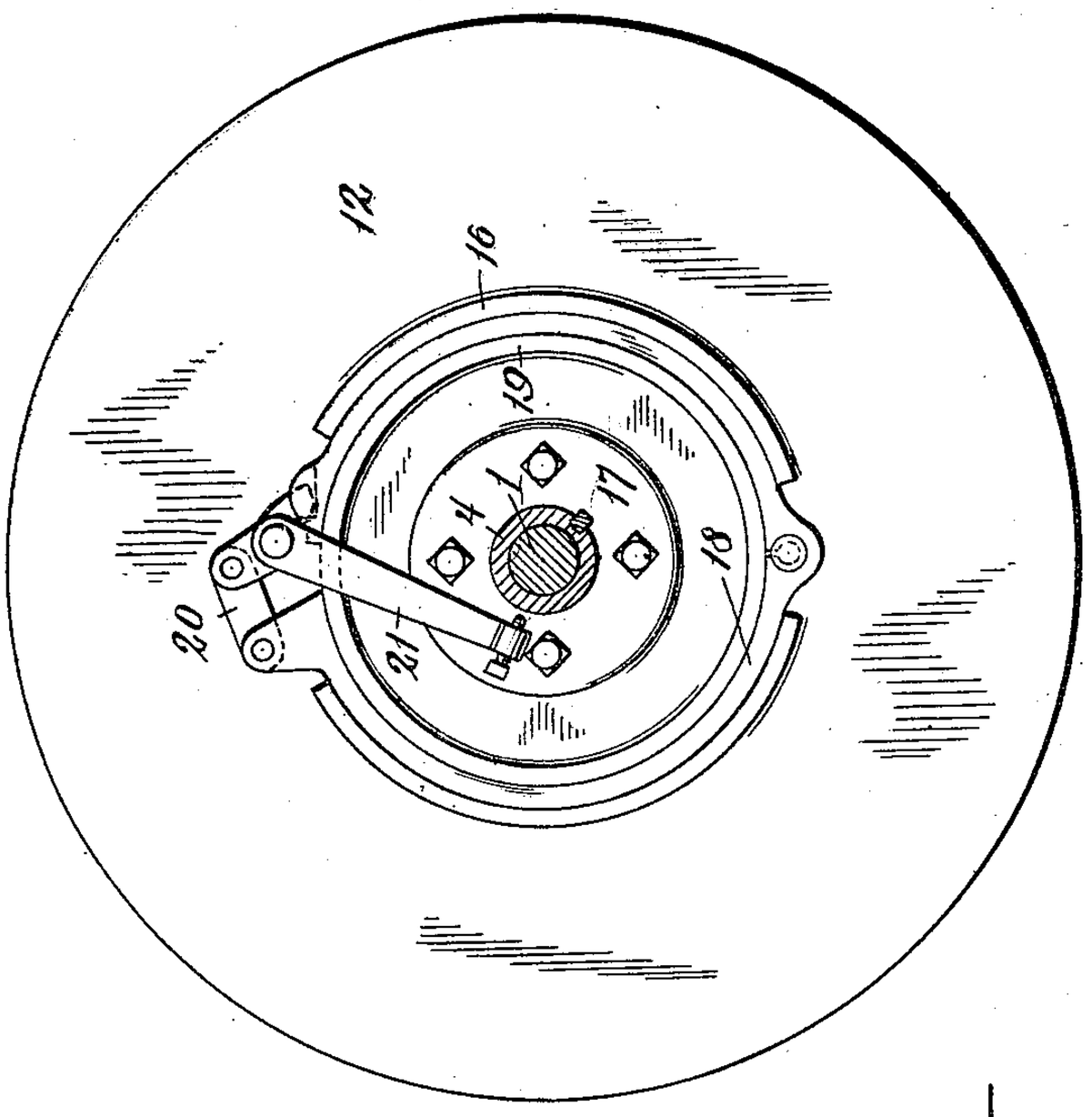
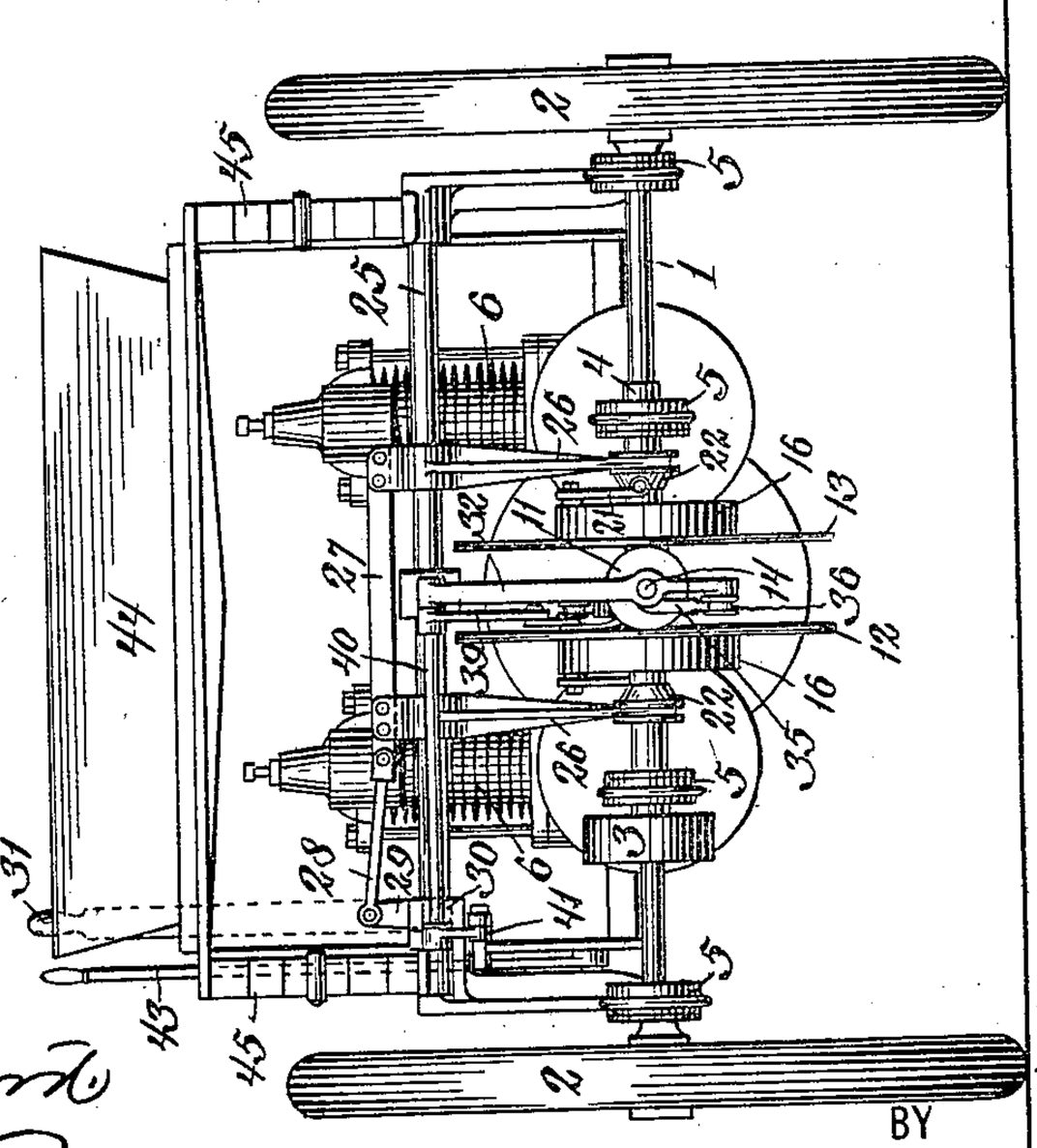


Fig. 3.



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MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 677,854, dated July 9, 1901.

Application filed May 1, 1900. Serial No. 15,062. (No model.)

To all whom it may concern:

Be it known that we, FERDINAND E. CANDA, residing at New York, in the county of New York, State of New York, and LOUIS B. SMYSER, residing at Elizabeth, in the county of Union, State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Motor-Vehicles; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in motor-vehicles and in the driving-gear thereof; and it consists in the novel means employed for transmitting motion from the motors to the wheels and for varying the speed and direction of movement and generally in the novel combination, construction, and arrangement of the parts.

The objects of our invention are to improve and simplify the construction of motor-vehicles and the driving-gear thereof; to improve the mechanism employed for varying the speed and reversing the direction of movement of such vehicles; to arrange twin motors and connect the same to common driving-gear in such manner that if one of the motors becomes deranged it may be readily disconnected, so as to permit the vehicle to be driven by the other motor, and to make the mechanism of the vehicle as simple, compact, durable, and noiseless in operation as possible. These objects are attained in the invention herein described, and illustrated in the drawings, which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 is a top view, with the seat removed, of a vehicle constructed in accordance with our invention. Fig. 2 is a central vertical section of such vehicle. Fig. 3 is a rear elevation of the vehicle. Fig. 4 is a detail view showing one of the friction-clutches employed. Fig. 5 is a detail section of one of the friction-disks.

In the drawings, 1 indicates the rear or driving axle of the vehicle; 2 2, the rear or driving wheels thereof; 3, the casing of the compensating gear, and 4 the hollow sleeve or shaft surrounding the axle 1 and connected to the compensating gear 3 and through which power is transmitted to said compensating gear and thence to the axle.

5 5 are ball-bearings for the axle supporting the frame of the vehicle.

6 6 are twin motors, of the explosive or internal-combustion type, carried by the frame of the vehicle. On their crank-shafts are pinions 7 7, intermeshing with a common gear-wheel 8, mounted on a driving-shaft 9, having bearings in the frame of the vehicle.

Upon the driving-shaft 9 is a friction-wheel 10, which is connected to said shaft 9 by a spline. Opposite said wheel 10 is an idler-wheel 11, mounted loosely on a shaft 14, supported by a bracket 32, hereinafter mentioned. Both wheels are of the same diameter. Upon the axle-sleeve 4 are two corresponding friction-disks 12 and 13, both keyed to the sleeve 4, but arranged to have some slight longitudinal movement thereon, and these disks are pressed against wheels 10 and 11 by springs 15. Both disks are provided with flanges 16, within which are mounted friction-clutches, such as are shown in Fig. 4, and which consist each, essentially, of a flanged wheel 17, keyed to the sleeve 4, a split spring-ring 18, interposed between the flange 19 of the wheel 17 and the flange 16 of the friction-disk, a link 20, connected to one end of the split ring 18, and an operating-lever 21, pivoted to the friction-disk, engaging one end of the spring-ring 18 and connected by a link 20 to the other end of said ring and adapted to be operated by a cone 22, mounted upon the axle-bushing 4. When lever 21 is forced out by the cone, the band or ring 18 is drawn tightly against flange 19.

The supporting-frame of the driving mechanism—that is to say, the motor-frame—consists, essentially, of a U-shaped part 23, Fig. 1, supported from the ball-bearings 5 of the axle 1 and having a cross member 24, from which and from other parts of the frame 23 the two motors 6 are supported, a supporting-bar 25, Figs. 2 and 3, above the rear axle and connected by uprights to the outermost ball-bearings 5, and braces 51. Upon the supporting-bar 25 are mounted the shifting-arms 26, by which the cones 22 of the friction-clutches

are moved. Said shifting-arms are connected by a rod 27, to which is connected a link 28, secured at the other end to a lever 29 upon a rock-shaft 30, to which is also secured a reversing-lever 31. The supporting-rod 25 also carries the bracket 32, which supports the stub-shaft 14, carrying the idler-wheel 11.

Change of direction of motion of the vehicle is effected by means of reversing-lever 31, which when moved first releases one friction-clutch and then when moved farther closes the other friction-clutch. When the lever occupies a central position, both clutches are released and the vehicle will remain stationary, notwithstanding the operation of the engines. Band friction-clutches of the type shown in Fig. 4 permit very easy starting of the vehicle, so that when starting it is not necessary to have the speed-varying gear adjusted for the lowest speed.

The regulation of the speed is effected, preferably or principally, by moving the friction-wheel 10 toward or from the centers of the disks 12 and 13. To so move said wheel, we employ a rack 33, intermeshing with a pinion 34, mounted loosely on the axle-sleeve 4. The rack 33 has an ordinary forked connection with the hub of the friction-wheel 10. The wheel 11 is arranged to be moved in the same manner and to the same degree as friction-wheel 10 by a rack 35, likewise intermeshing with pinion 34, and rollers 36, pivoted to the bracket 32, support and guide these racks. To the pinion 34 is connected an arm 37, itself connected by a link 38 to an arm 39 on a transverse rock-shaft 40. Another arm 41 on said shaft is connected by a link 42 to a shifting-lever 43, conveniently located for hand operation. By moving this lever 43 the friction-wheels 10 and 11 may be moved toward or from the centers of the friction-disks 12 and 13, as desired, thereby varying to any extent desired within reasonable limits the speed of the vehicle.

As above mentioned, the wheel 11 is a simple idler. Its purpose is to keep the friction-disks 12 and 13 parallel, and so prevent pinching of the wheel 10 between said disks. It is very important that such pinching be prevented, and since the hubs of the disks 12 and 13 are short some device, such as the wheel 11, is necessary to prevent pinching.

The shaft 9 has a bearing at its outer end and the stub-shaft 14 has a support at its inner end in a block 52, mounted loosely on the hubs of the friction-disks 12 and 13.

The body 44 of the vehicle is supported at the rear by springs 45, resting upon the supporting-bar 25 of the vehicle-frame. At the front the carriage-body is supported by a similar spring, likewise numbered 45, resting upon the front axle. The vehicle has no reach independent of the carriage-body extending from one axle to the other; but the motor-frame 23 has a hinge connection to the floor member 46 of the carriage-body, and said member is connected by links 47 to the front axle. The motor-frame 23 and the floor member 46 of the carriage-body and the links 47 together form the device for connecting the front and rear axles. The hinge connection between the motor-frame 23 and the carriage-body may be in the form of a ball-and-socket joint 48, placed on the longitudinal axis of the vehicle, as shown in Fig. 2. Such a construction avoids straining of the framework of the transmitting mechanism due to inequalities of the road; but we do not limit ourselves to the use of a ball-and-socket-joint connection.

Because of the hinge connection between the motor-frame and the body of the vehicle a large portion of the weight of the mechanism of the vehicle is carried by the springs supporting the body, so that the driving mechanism is spring-supported.

Dispensing with special connecting members extending from one axle to the other avoids much of the cumbersomeness of prior motor-vehicles. The motor-frame 23 carries the mufflers 49 of the engine and also the carbureter 50. It is provided with braces 51, extending from the front of the frame 23 to the supporting-bar 25.

The operation of this vehicle is as follows: The engine being started, with the reversing-lever in the central position, the vehicle may be started independent of the speed-changing lever 43 by moving the reversing-lever to the one side or the other, according as it is desired to move forward or backward. In starting it is easy to close the clutch only partly at first and then as the vehicle gains speed to close the clutch completely. By this means a jerky starting of the vehicle may be avoided even when starting with the friction-wheel 10 set for high speed. The vehicle may be stopped at any time by moving the lever 31 back to the central position. To vary the speed, the lever 43 may be moved forward or backward, according as it is desired to make the speed less or greater. Should one of the engines 6 get out of order at any time, it may be thrown out of operation by removing its pinion 7, and the other motor will then drive the vehicle independently. It is intended that the motors shall be of such capacity that either shall be able alone to drive the vehicle, although of course at a less speed than that at which both motors together can drive it.

Having thus completely described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a driving mechanism, the combination, with a shaft, two oppositely-arranged friction-disks mounted thereon and movable longitudinally and rotatively with respect thereto, power-transmitting devices for connecting one or the other of the disks to said shaft at will, and means for operating said power-transmitting devices, of a friction-wheel interposed between, and adapted to coact with, said friction-disks, a shaft upon which said wheel is mounted in driving con-

nection, said wheel being arranged to be moved in and out along the shaft, means for so moving said wheel, and automatic take-up devices operating independently of the operation of the power-transmitting devices of the friction-disks, for pressing said disks against said friction-wheel.

2. In a driving mechanism, the combination, with a shaft, two oppositely-arranged friction-disks mounted thereon and movable longitudinally and rotatively with respect thereto, and band-clutches for connecting one or the other of the disks to said shaft at will, of a friction-wheel interposed between, and adapted to coact with, said friction-disks, a shaft upon which said wheel is mounted in driving connection, said wheel being arranged to be moved in and out along said shaft, means for so moving said wheel and automatic take-up devices operating independently of the operation of the clutches, for pressing the friction-disks against said friction-wheel.

3. In a driving mechanism, the combination, with a shaft, two oppositely-arranged friction-disks mounted thereon and movable longitudinally and rotatively with respect thereto, friction-rings carried by said disks, wheels carried by said shaft, means for pressing said rings against said wheels at will, thereby placing either of said disks, at will, in driving connection with said shaft, and follower-springs, carried by said wheel and tending to press said disks toward each other, of a friction-wheel interposed between, and adapted to coact with, said friction-disks, a shaft upon which said wheel is mounted in driving connection, said wheel being arranged to be moved in and out along said shaft, and means for so moving said wheel.

4. In a driving mechanism, the combination, with two oppositely-arranged friction-disks, a shaft adapted to be driven therefrom, and means for connecting one or the other of the disks to said shaft at will, of a friction-wheel interposed between, and adapted to coact with, said friction-disks, a shaft upon which said wheel is mounted in driving connection, said wheel being arranged to be moved in and out along said shaft, a similar wheel mounted upon the opposite side of the axis of rotation of said friction-disks, and arranged to be moved in and out in accordance with the movement of said friction-wheel, and means for so moving said wheels in conjunction.

5. In a driving mechanism, the combination, with two oppositely-arranged friction-disks, a shaft adapted to be driven therefrom, and means for connecting one or the other of the disks to said shaft at will, of a friction-wheel interposed between, and adapted to coact with, said friction-disks, a shaft upon which said wheel is mounted in driving connection, said wheel being arranged to be moved in and out along said shaft, a similar wheel mounted upon the opposite side of the shaft on which the friction-disks are mounted, and likewise arranged to be moved in and out, a pinion mounted between the friction-disks, rack-bars intermeshing with said pinion and engaging the said wheels and arranged to move the same longitudinally, and means for rotating the pinion.

6. In a driving mechanism, the combination, with a shaft, two oppositely-arranged friction-disks thereon, clutches for connecting either of said disks to said shaft at will, and a friction-wheel interposed between, and adapted to coact with, said friction-disks, of a supporting-bar arranged parallel with said shaft, shifting-arms for operating said clutches, mounted on said bar, and means for moving said arms along the bar.

In testimony whereof we affix our signatures in the presence of two witnesses.

FERDINAND E. CANDA.
LOUIS B. SMYSER.

Witnesses:
ALPHONSE KLOH,
HARRY M. MARBLE.