No. 713,674. Patented Nov. 18, 1902.

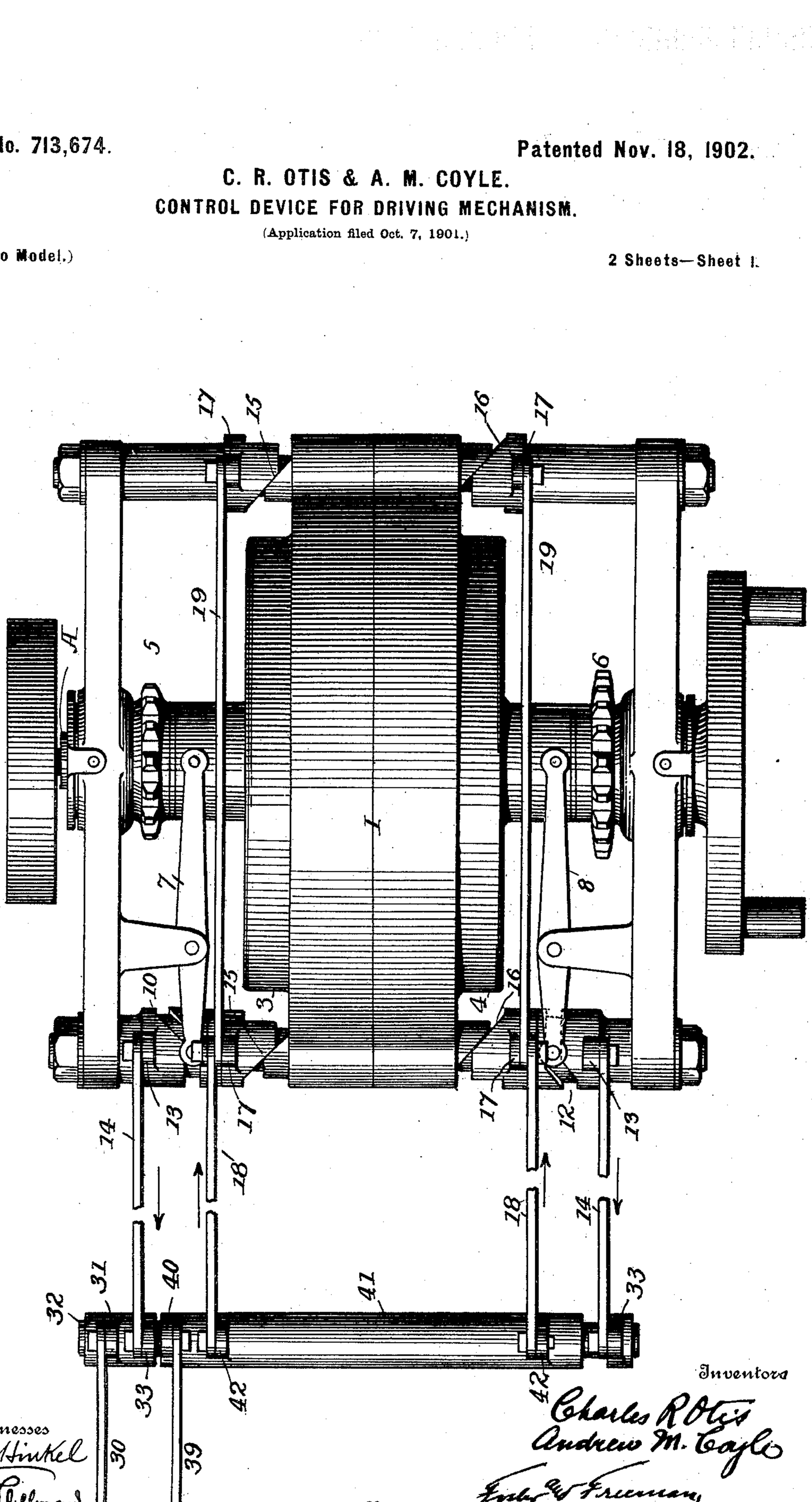
C. R. OTIS & A. M. COYLE.

CONTROL DEVICE FOR DRIVING MECHANISM.

(Application filed Oct. 7, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses
J. G. Hinkel
Thos. Gillman Jr.

Inventors
Charles R. Otis
Andrew M. Coyle

By Foster & Freeman, Attorneys

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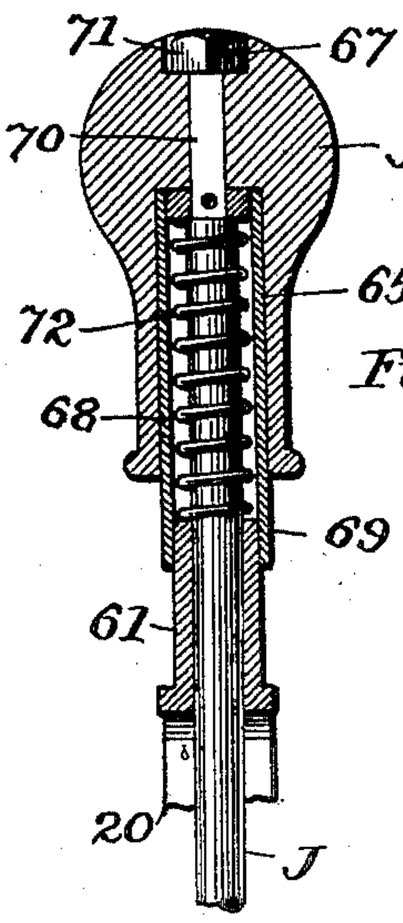


Fig. 4

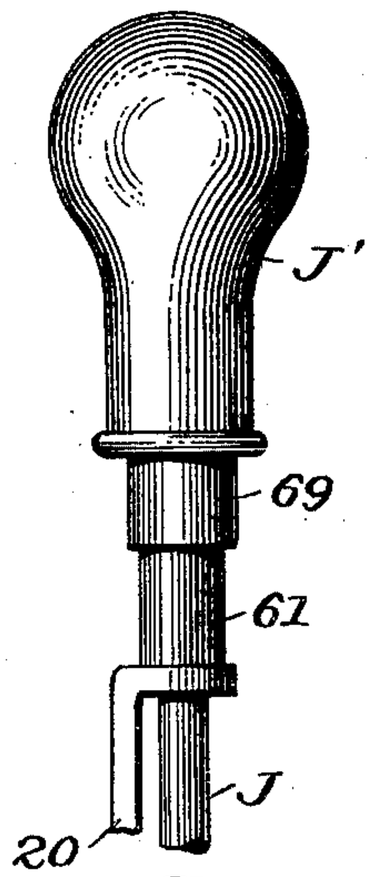
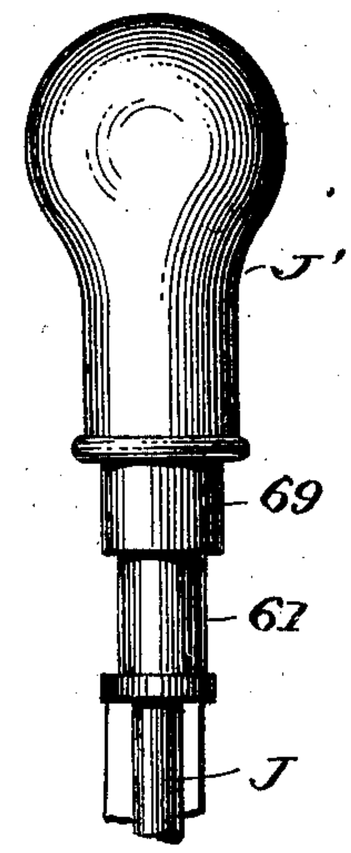


Fig. 2.



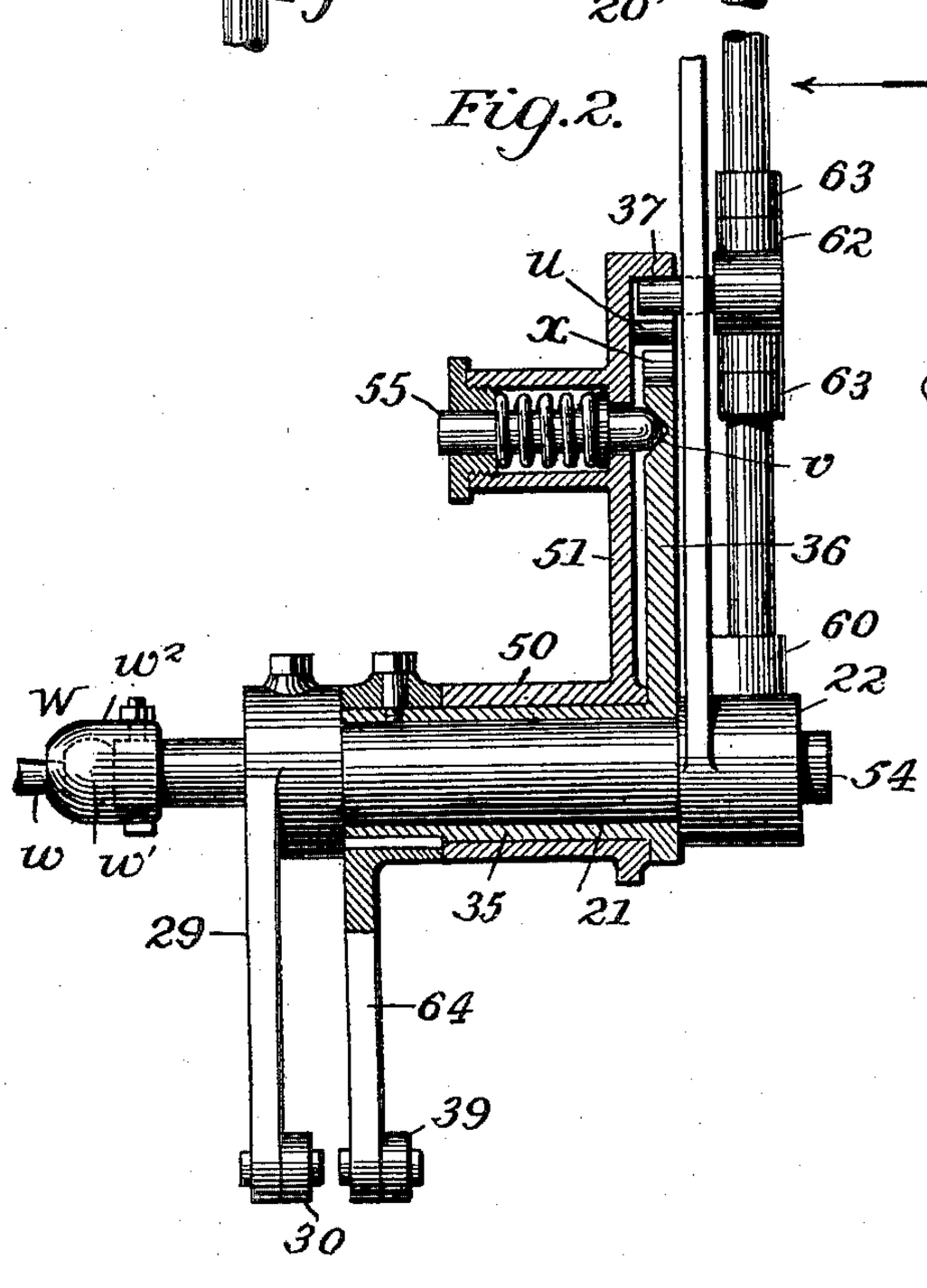
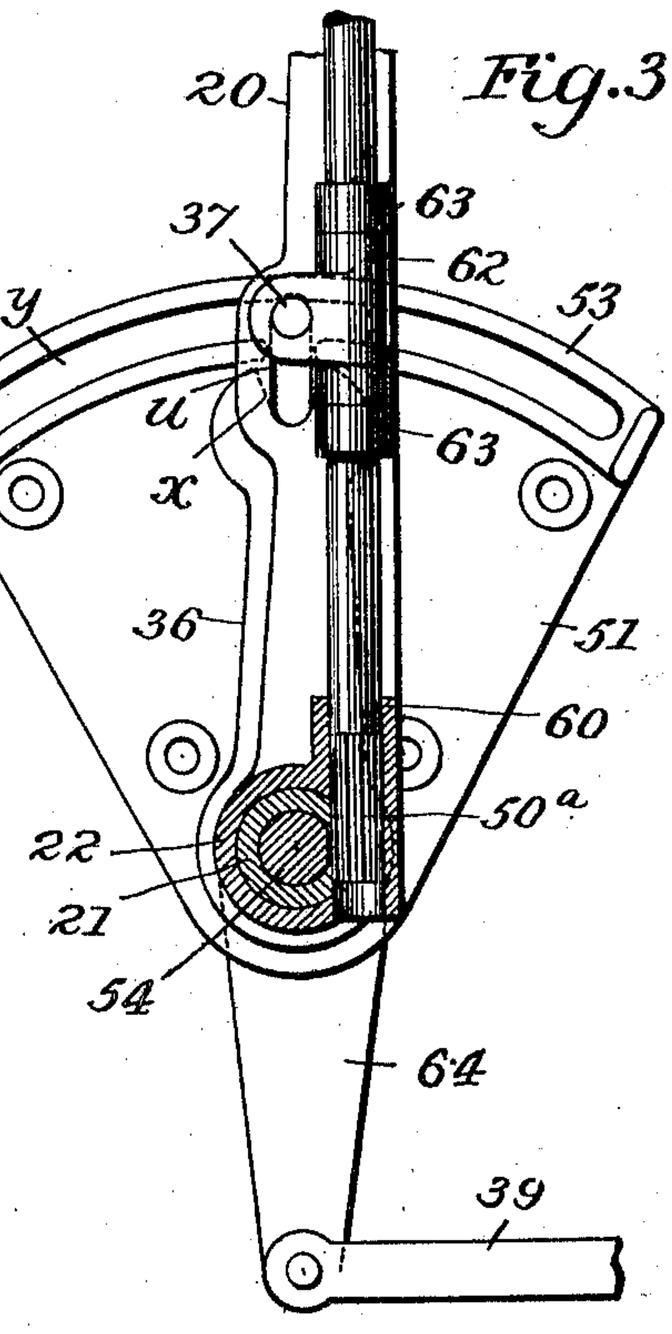


Fig. 3



Witnesses

J. G. Hinkel

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Inventors

Charles R. Otis

Andrew M. Coyle

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UNITED STATES PATENT OFFICE.

CHARLES R. OTIS AND ANDREW M. COYLE, OF YONKERS, NEW YORK;
SAID COYLE ASSIGNOR TO SAID OTIS.

CONTROL DEVICE FOR DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 713,674, dated November 18, 1902.

Application filed October 7, 1901. Serial No. 77,902. (No model.)

To all whom it may concern:

Be it known that we, CHARLES R. OTIS and ANDREW M. COYLE, citizens of the United States, and residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Control Devices for Driving Mechanism, of which the following is a specification.

Our invention relates to a control device for controlling the adjustable parts of a driving mechanism or power transmission by means of which different speeds in different directions may be imparted to the axle of a motor-vehicle or other moving shaft or device; and our invention consists of a lever and certain shafts and connections constructed and operating so as to impart different adjustments to said adjustable parts all by the movements of a single handle-shaft, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a plan view illustrating sufficient of a driving mechanism to show the manner in which such mechanism may be controlled by our improved control device. Fig. 2 is a sectional elevation of the control device. Fig. 3 is a side view of Fig. 2 looking in the direction of the arrow, and Fig. 4 is an enlarged detail view of a construction of the grasp of the handle-shaft.

For the purpose of illustrating our improved controlling device we show it in connection with a driving-gear, as indicated in Fig. 1; but the driving-gear is not fully shown in all its details of construction and operation, as this is not essential for the purposes of this application nor for an understanding of the same; but such gear is fully illustrated and described in our copending application, Serial No. 77,901, filed October 7, 1901, and entitled "Improvements in driving mechanism."

We have shown the driving mechanism and devices indicated in Fig. 1 merely as an illustration of the manner in which our improved controlling device may be applied to effect the various operations hereinafter to be described, and we are not to be understood as limiting ourselves to its use in this precise connection.

Referring to the drawings, A, Fig. 1, represents a shaft intended to be rotated, and this shaft carries flanged disks 3 4, which may both be carried simultaneously in the same direction as the shaft or either one of them may be held fixedly in position while the other turns. This operation of the disks 3 4 is secured by means of a shifter I, to which a lateral movement may be imparted in one direction or the other to thereby prevent the rotation of one of the disks. The sprocket-wheels 5 6, preferably of different size, may be detachably connected with the disks 3 4 through the intervention of suitable clutch devices operated by levers 7 8. The sprocket-wheels are adapted to be connected to impart rotation to a part—say an axle—at different speeds, according to the difference in the diameters of the sprockets. The operation of this driving mechanism is substantially the same as that disclosed in the above-numbered application; but the internal construction of the mechanism will not be further referred to, as it forms no part of the present invention. The clutch-levers 7 8 are operated by means of slotted cams 10 12, each provided with an arm 13, to which are attached connecting-rods 14. The shifter I is operated by means of two cams 15 16, shown separate and distinct from the slotted cams 10 12 and arranged at each end of the shifter adjacent to the cams 10 12. The cams 15 16 have inclined faces bearing against inclined faces of the shifter, and each cam has an arm 17, to which are pivoted connecting-rods 18, while the arms 17 of the cams at the opposite ends of the shifter are connected by rods 19, so that all the cams 15 16 may be simultaneously rocked in the same direction.

When the parts are in the positions shown in Fig. 1, it is to be understood that the shaft A may revolve freely without imparting motion to the sprockets; but that if the rods 14 are moved in the direction of the arrows the lever 7 will be moved to connect the sprocket 5 and disk 3 to each other, so that the sprocket 5 will be driven to impart a forward motion to a vehicle at medium speed. If the same rods 14, however, are moved in a reverse direction, the lever 8 will be moved to connect the sprocket 6 and disk 4, so that the sprocket 6 will be driven to impart a rapid forward motion to a vehicle. On the other hand, it is to be understood that if the rods 18 are

moved in the direction of the arrows the disk 3 will be prevented from turning and the disk 4 left free to turn and will be turned slowly, and if at the same time the clutch-lever 8 is thrown into action by moving the appropriate rod 14 in the same direction as rods 18 the sprocket 6 will be connected to move with the disk 4 and the sprocket will be driven to impart a very slow forward motion to a vehicle suitable for hill-climbing. If the rods 18 are moved in a direction the reverse of their arrows, then the disk 4 will be held stationary and disk 3 will be left free to turn; but its direction of rotation will be backward, so as to drive the sprocket 5 in a direction to move a vehicle backward. All of these different movements of the respective parts of the mechanism may be secured by the movements of one and the same actuating handle shaft or rod J, as will now be described. The said rod J passes through and is loosely carried in suitable bearings 60 61. The bearing 60 is in a hub 22 of an arm or lever 20, which hub is connected to a rock-shaft 21 to swing therewith. The bearing 61 is shown in the lever 20. On the rock-shaft 21 is secured an arm 29, from which a connecting-rod 30 extends, in this instance, to an arm 31, Fig. 1, on a shaft 32, provided with suitable connecting-arms 33 33, to which are connected the rods 14 14, so that by swinging the lever 20 the said connecting-rods 14 14 may be carried back and forth to actuate the clutch-levers 7 8 in one direction or the other.

It will be seen that in the construction described the rod J is movable relatively to the shaft 21, for it is slidable in the bearings 60 61 with respect to the shaft. The mechanism described is a means of driving the vehicle either at the highest speed if the lever 20 is moved in one direction or at a medium speed if the lever is moved in the opposite direction. Upon the shaft 21 turns another rock shaft or sleeve 35, provided with an arm 36, which extends upward at one side of the lever 20 and adjacent to the rod J. A locking device is provided which is connected with the rod J and arranged to coöperate with this arm, which extends adjacent to said rod. The arm 36 is provided with a recess (shown as a recess x) in sts upper end for receiving a suitable locking device, (shown in this instance as a pin 37 upon the rod J,) although other locking devices may be used, this locking device or pin 37 being so arranged upon the rod J that said rod may be depressed to carry the pin 37 with the same; but said rod J may be freely rotated about its vertical axis without moving the pin. Any convenient means may be provided for accomplishing this result; but a preferable means is by connecting the pin 37 to a sleeve 62, loosely surrounding the rod J, so that the rod may turn therein, while collars 63, fixed to the rod, cause the sleeve and pin 37, projecting therefrom, to move with the rod when it is depressed or raised again. Then by depressing the rod J, as hereinafter to be described, and carrying the pin 37 into the recess x the arm 36 and its rock-shaft 35 may be caused to swing with the lever 20. On the shaft 35 is an arm 64, to which is connected a rod 39, pivoted to an arm 40 on a sleeve 41, inclosing the shaft 32, Fig. 1, said sleeve 41 being provided with arms 42, each of which is connected with one of the rods 18. Normally it is desirable to maintain the two shafts 21 and 35 out of connection as the lever 20 is moved to control the high and medium forward speeds, and we therefore provide a supporting-bearing 50, adapted for attachment to any part of a vehicle and having a flange 51, with a curved slot y, to receive the pin 37 to prevent the rod J from being depressed except when the pin is above a notch u in a rib 53, above the shaft 21. As shown, the notch u is directly above the shaft 21, and when the lever 20 is in the position described it will therefore be in its central position. After the rod J has been depressed and the pin 37 carried below the slot y and the lever 20 is swung to one side or the other the rod cannot be raised in consequence of the contact of the pin 37 with the rib 53, constituting the bottom of the slot y, and the pin 37 will therefore be held in the recess x until the arm 36 is in an upright position, at which time the pin may be raised through the notch u.

To maintain the shaft 35 and arm 36 normally in a central or fixed position, suitable means are provided, as a friction device, consisting of a spring-actuated bolt 55, having a rounded end engaging a recess v at the back of the arm 36. On the application of sufficient pressure the arm 36 will force back the pin and the parts may be moved to the desired positions.

It is desirable that means be provided in addition to the slot y in connection with the rod S whereby said rod may be maintained always in a raised position, for if such means were not provided then when the pin 37 was moved to a point over the notch u in the bottom of the slot y there would be nothing to prevent the pin from immediately dropping through the notch and perhaps depressing the rod prematurely, unless an upward pull were continuously applied to the same. As has been seen, the rod J is loosely carried in bearings 60 61, being slidable therein, and we prefer the means shown in detail in Fig. 4, in connection with the hand-grasp of the rod J, for maintaining the rod raised when the pin is opposite the notch u.

In Fig. 4, J′ represents a hand-grasp of any desired shape or material, and it is made with a recess 65, having a squared and narrower portion 66 at the top thereof and also a recess 67 for the reception of a binding-nut 71. Within the recess 65 is secured a sleeve 68, which may be a steel tube of somewhat greater length than the recess 65, so that there is a projecting portion 69. The relative sizes of the sleeve 68 and bearing 61 in this instance

are such that the sleeve may slide outside of the bearing, although any other suitable arrangement may be used. The rod J, as shown, passes through the bearing 61 and sleeve 68, a squared portion 70 of the rod entering the squared portion 66 of the recess, while the binding-nut 71 secures the hand-grasp J′ to the rod J. By then interposing a suitable spring, as a coiled spring 72, between the top of the bearing 61 and the top of the sleeve 68 it will be seen that the tendency of the rod J will always be to rise as far as permitted by the pin 37; but the rod may be depressed in its bearings by pressing down upon the hand-grasp J′, in which case the sleeve 68 slides relatively to the bearing 61. It is also evident that the rod J may be rotated about its vertical axis by turning the hand-grasp J′.

By the arrangement of parts as above described we are enabled by means of a single handle shaft or rod J to control devices by which one movement of the rod imparts one forward speed to the apparatus, another movement of the rod in an opposite direction imparts a medium speed, while by depressing the rod and moving it in one direction we are enabled to impart a still slower forward speed, and by moving it when depressed in the opposite direction we are enabled to reverse the direction of movement of the driven mechanism.

In some instances it is desirable that the rod J shall also control the throttle or other stopping and starting device of an engine, as the engine of a vehicle, and to secure this result we form the lower end of the rod into a long pinion 50^a and extend through the center of the shaft 21, which is made hollow for this purpose, a shaft 54, provided with a rack 51^a for engaging the pinion 50^a, so that according to the rotation of the rod J about its vertical axis a longitudinal movement in one direction or the other is imparted to the shaft 54, which may be connected with the throttle of the engine or other starting and stopping device.

It being usual to provide a vehicle-motor, whether an electric motor, a gas-engine, or other motor, with a frame and springs therefor separate from the main frame of the vehicle, and since the running-gear and operating devices are ordinarily connected to the main frame, a certain amount of vibration and straining must be provided for between any connections, as shafts or rods, between the running-gear and controlling devices and the vehicle-motor. As has been described, the shaft 54, to which longitudinal movement may be imparted by the rotation of the handle shaft or rod J, is adapted to be connected with the vehicle-motor, as with the throttle of an engine, and to provide for vibration in the connections a suitable universal joint W is placed in that part of the mechanism adapted to be connected with the vehicle-motor. In this instance the universal joint W is shown upon the shaft 54, the rod w presumably extending to the vehicle-motor, and preferably this joint may take the form of a ball-and-socket joint, which ball is represented in dotted lines by w' and the socket by w^2. By this arrangement bending and straining of the parts may be avoided, due either to vibration or to any relative movement of the parts.

By the above construction we are enabled to control the different forward and backward and reverse speed devices and also the engine-controlling devices from a single handle-shaft.

Without limiting ourselves to the precise details of construction and arrangement of parts shown and described, we claim, and desire to obtain by Letters Patent, the following:

1. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod, and a locking device connected with the rod and arranged to coöperate with the arm extending adjacent to said rod, substantially as set forth.

2. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod and having a recess, and a pin on said rod adapted to said recess, substantially as set forth.

3. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod and having a recess, and a locking device movable with said rod and adapted to said recess, substantially as set forth.

4. A controlling device for driving mechanism comprising a rock-shaft provided with arms, a rod slidable with respect to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod and having a recess, and a locking device upon said rod adapted to said recess, substantially as set forth.

5. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod slidable with respect to the shaft, another rock-shaft provided with two arms, one extending adjacent to the rod and having a recess in its end, and a pin upon said rod adapted to said recess, substantially as set forth.

6. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod, a locking device connected with the rod and arranged to coöperate with the arm extending adjacent to said rod, and means for normally

holding said arm in a fixed position, substantially as set forth.

7. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod and having a recess, a pin on said rod adapted to said recess, and yielding means for holding said recessed arm in a fixed position, substantially as set forth.

8. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod movable relatively to the shaft, another rock-shaft also provided with arms, one arm extending adjacent to the rod and having a recess, a locking device movable with said rod and adapted to said recess, and means for normally holding said recessed arm in a fixed position, substantially as set forth.

9. A controlling device for driving mechanism, comprising a rock-shaft provided with arms, a rod slidable with respect to the shaft, another rock-shaft provided with two arms, one extending adjacent to the rod and having a recess in its end, a pin upon said rod adapted to said recess, and a friction device for holding said recessed arm in a fixed position, substantially as set forth.

10. The combination of the shaft 21, a rod J provided with a locking device, a flange or plate having a curved slot and also having a notched rib adapted for the passage of the locking device, a shaft 35 having a recessed arm adapted to receive the locking device, and means for connecting the shafts 21 and 35 with the adjustable parts of driving devices, substantially as set forth.

11. The combination of the shaft 21, a rod J provided with a pin, a flange or plate having a curved slot and also having a notched rib below said slot adapted for the passage of the pin, a shaft 35 having a recessed arm adapted to receive the pin, and means for connecting the shafts 21 and 35 with the adjustable parts of driving devices, substantially as set forth.

12. The combination with the shaft 21, of a sliding and rotating rod provided with a locking device, a shaft 35 having a recess adapted to receive said locking device, means for connecting the shafts with the adjustable parts of driving devices, a shaft 54 provided with a rack, and teeth upon said rod engaging said rack, substantially as set forth.

13. The combination with the shaft 21, of a sliding and rotating rod provided with a pin, a shaft 35 having a recess adapted to receive said pin, means for connecting the shafts with the adjustable parts of driving devices, a shaft 54 provided with a rack, and teeth upon said rod engaging said rack, substantially as set forth.

14. The combination with the shaft 21, of a sliding and rotating rod provided with a locking device, a shaft 35 provided with means adapted to coöperate with said locking device, means for connecting the shafts with the adjustable parts of driving devices, a shaft 54, and means for moving said shaft longitudinally by the rotation of said rod, substantially as set forth.

15. The combination with the shaft 21, of a slidable rod rotatable within a sleeve provided with a pin projecting therefrom, a shaft 35 provided with an arm having a recess adapted to receive said pin, means for connecting the shafts with the adjustable parts of driving devices, a shaft 54 provided with a rack, and teeth upon said rod engaging said rack, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES R. OTIS.
ANDREW M. COYLE.

Witnesses:
GEORGE MARTIN,
HENRY MARTYN BAIRD, Jr.