No. 780,665. PATENTED JAN. 24, 1905.

H. E. KELLOGG & G. F. SWAIN.

MOTOR VEHICLE.

APPLICATION FILED JUNE 15, 1903.

5 SHEETS—SHEET 1.

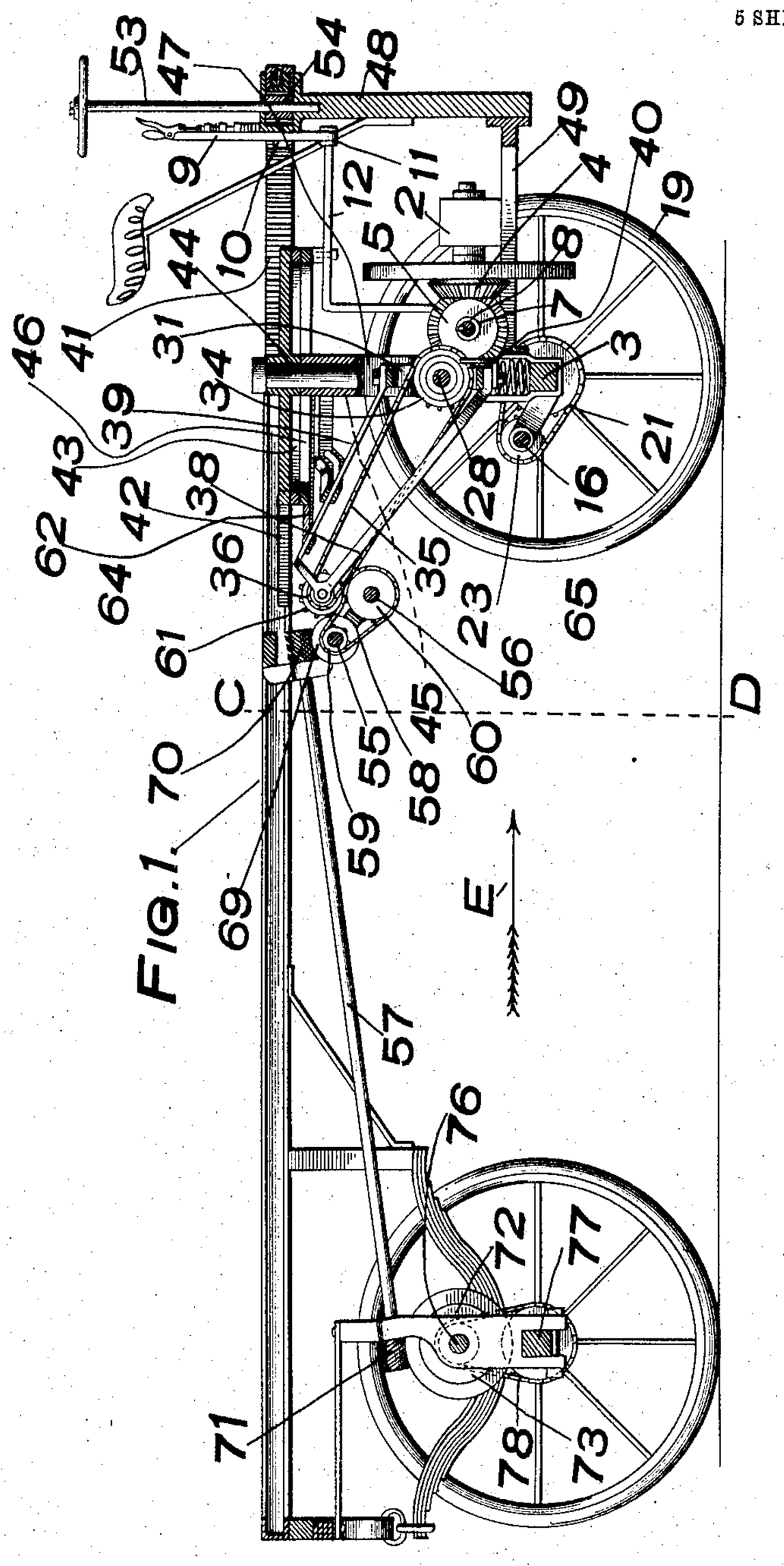

Fig. 1.

Witnesses
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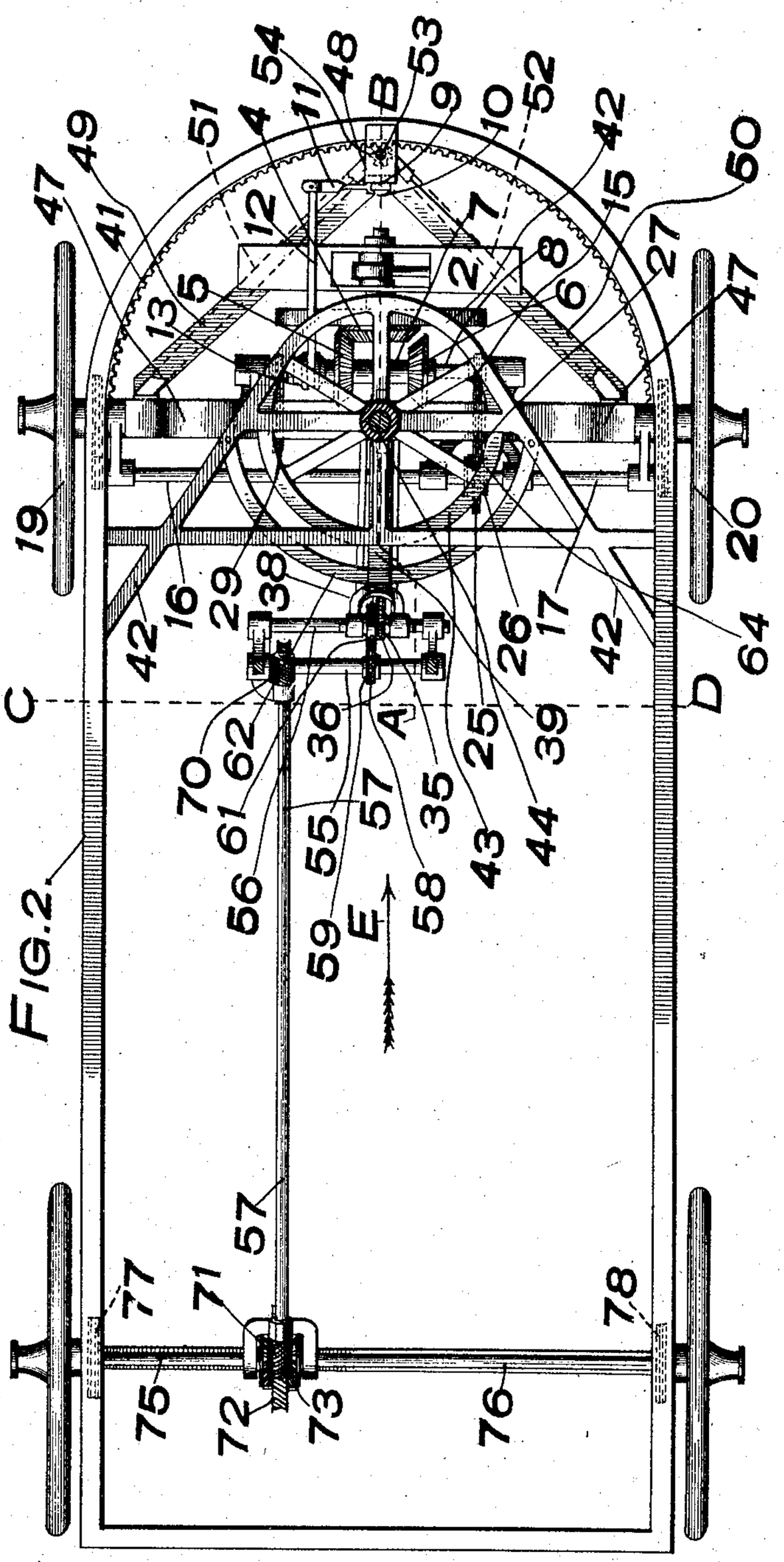

FIG. 2.

Witnesses
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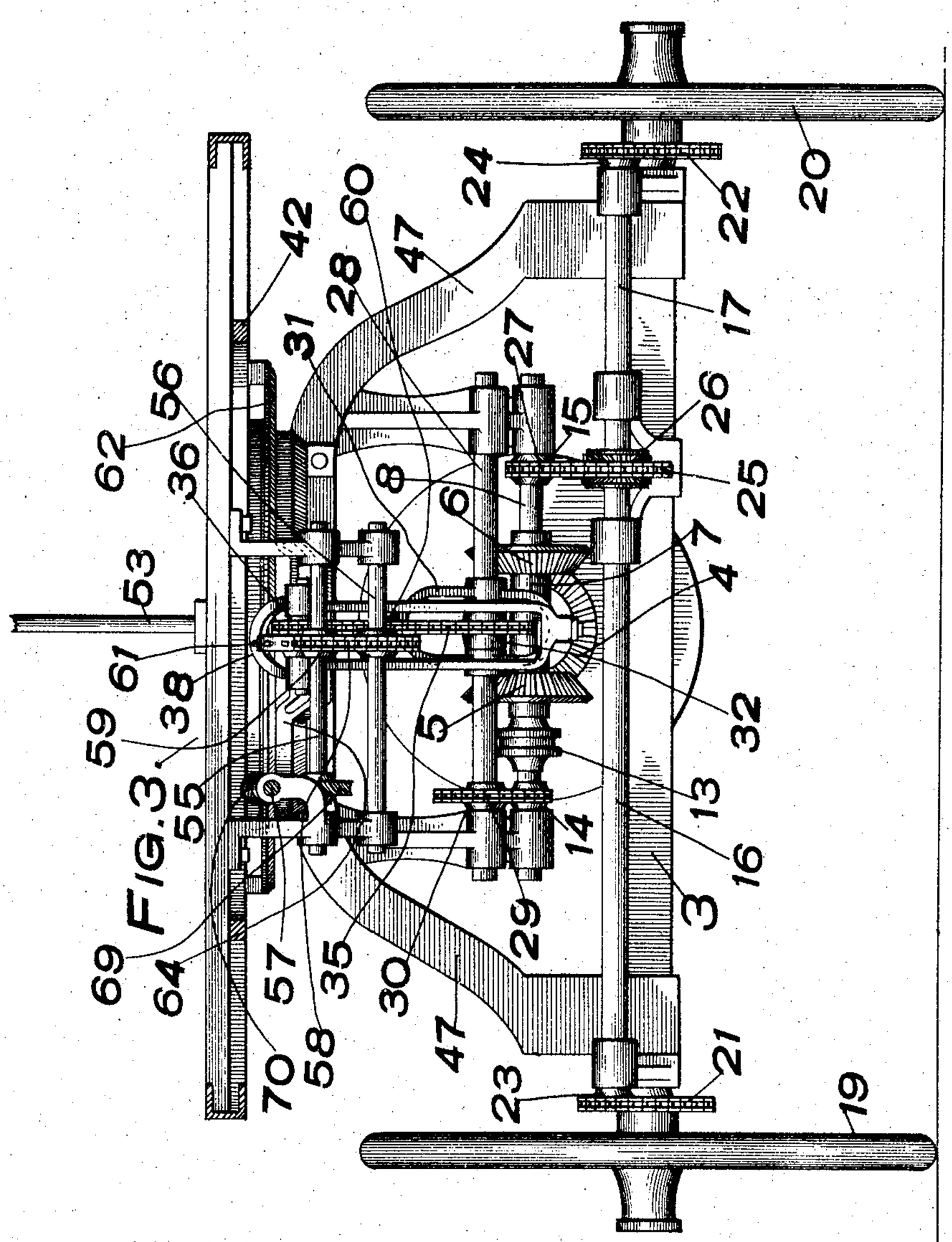

FIG. 3.

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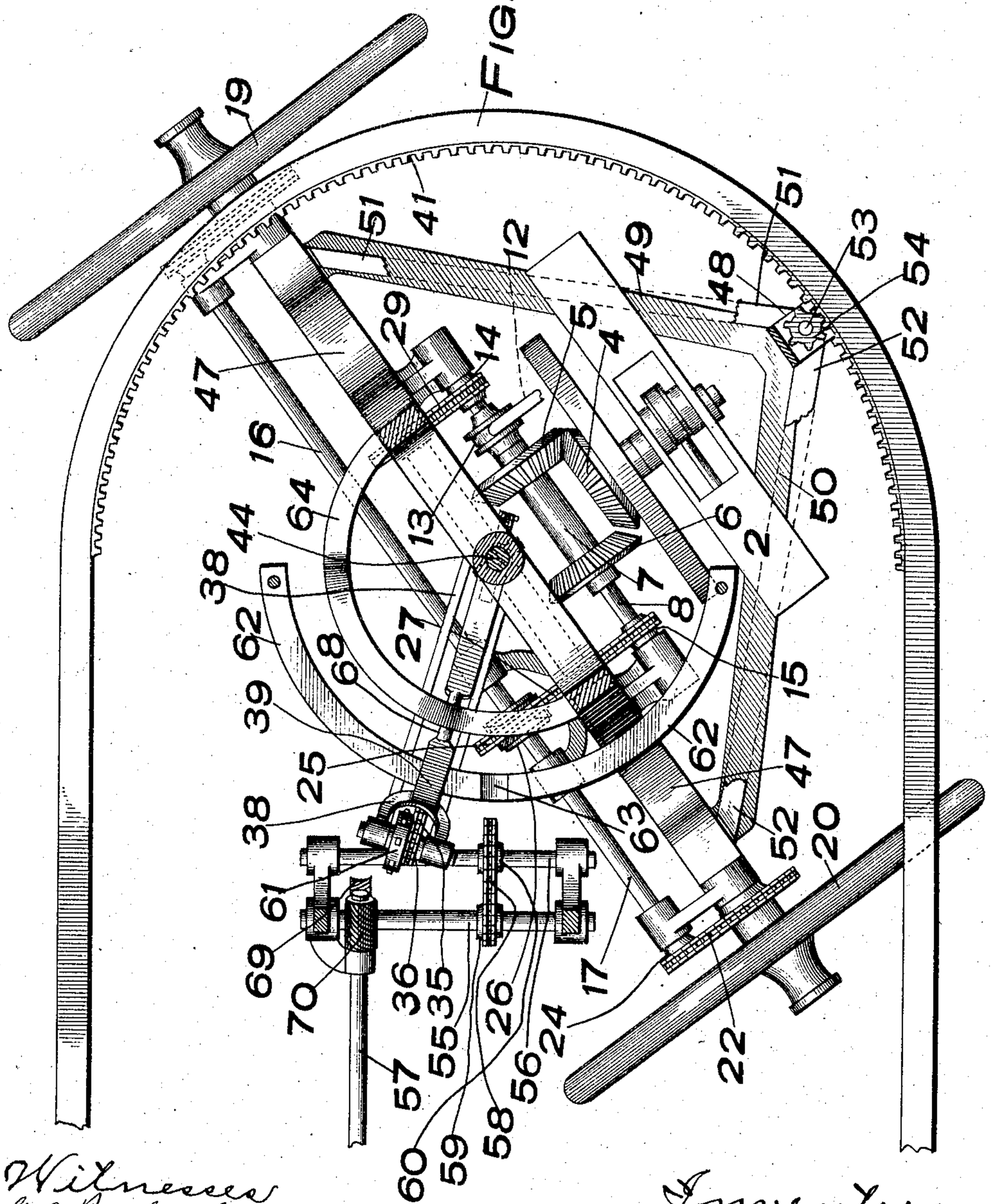
5 SHEETS—SHEET 4.

FIG. 4.



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5 SHEETS—SHEET 5.

FIG. 5.

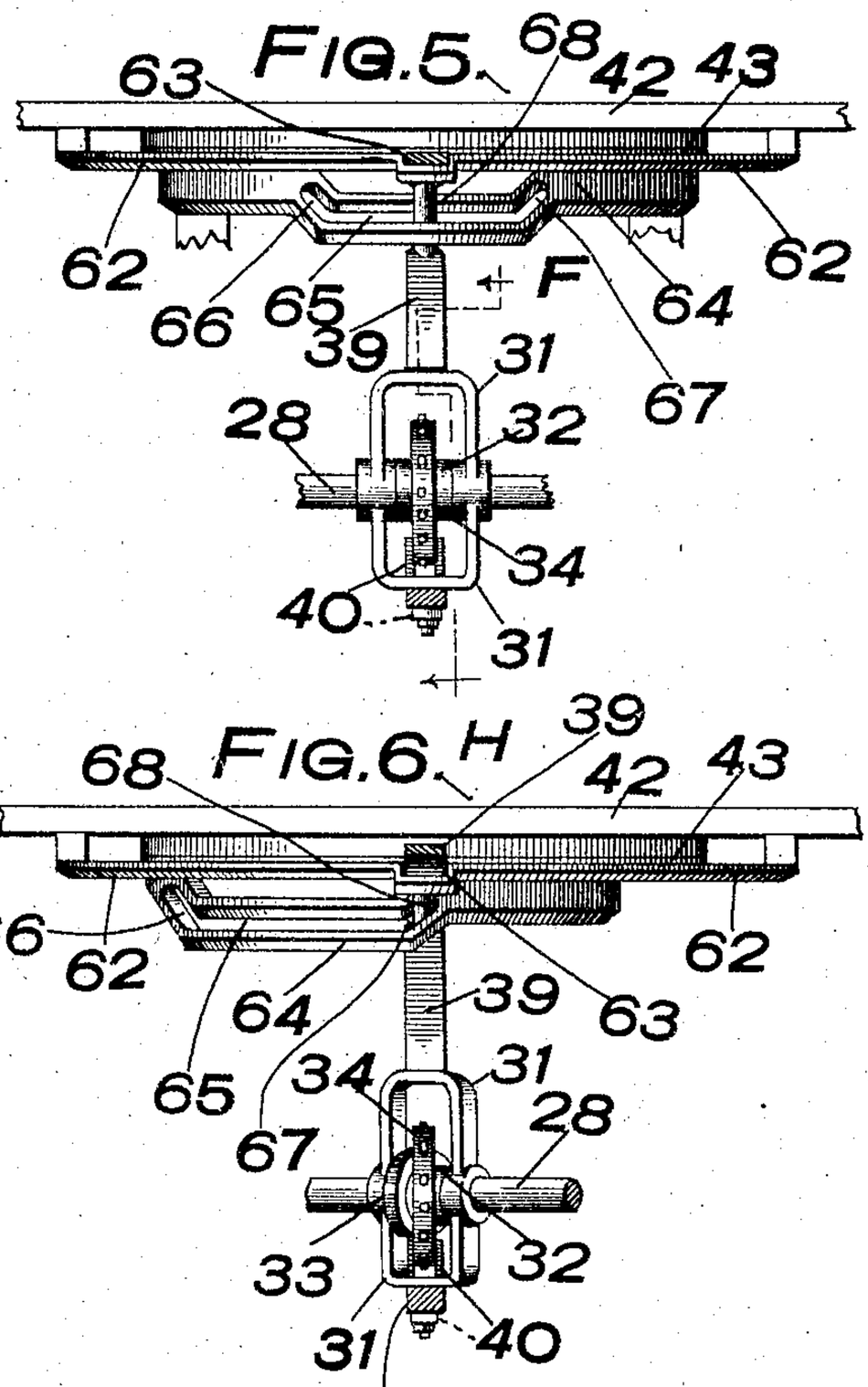


FIG. 6.

FIG. 7.

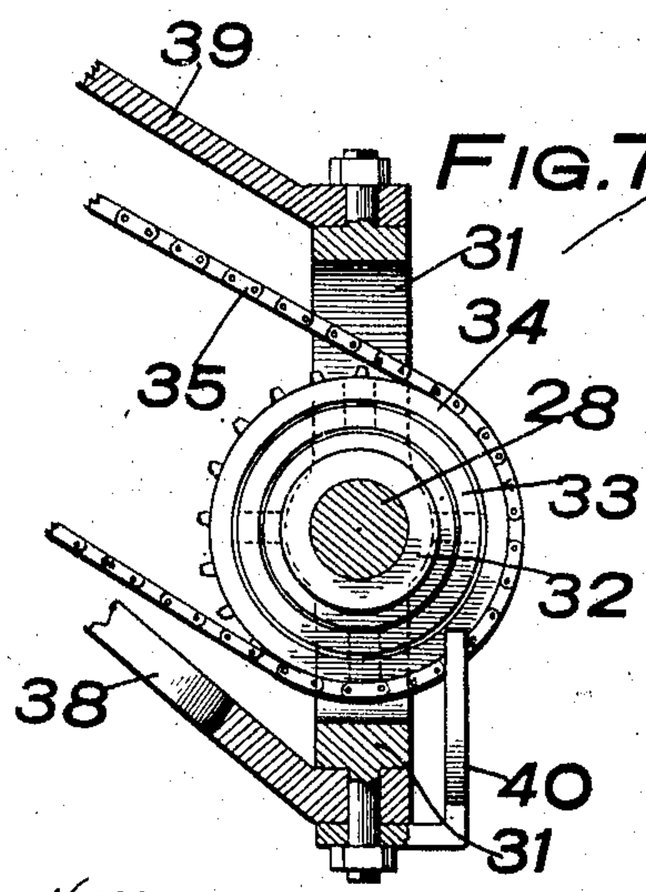
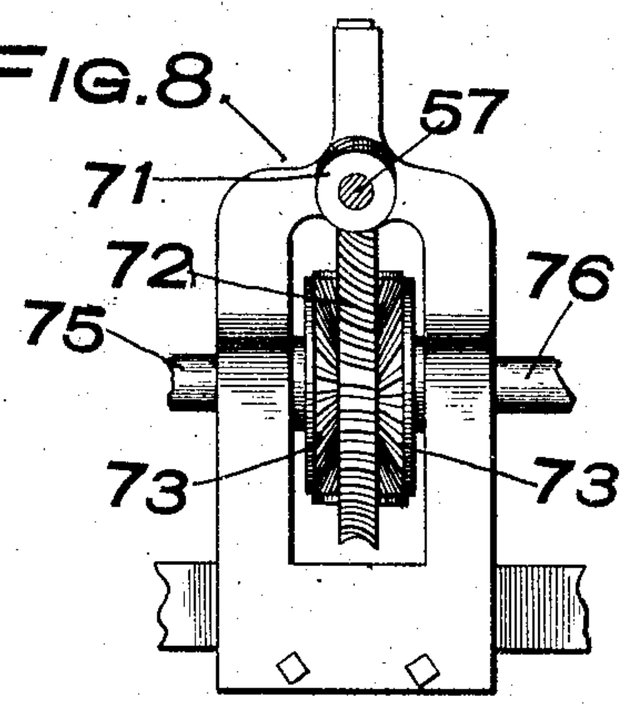


FIG. 8.



Witnesses
G. W. Rauberschmidt
[illegible]

Inventors
Henry E. Kellogg.
George F. Swain.

No. 780,665. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

HENRY E. KELLOGG AND GEORGE F. SWAIN, OF HARVEY, ILLINOIS.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 780,665, dated January 24, 1905.

Application filed June 15, 1903. Serial No. 161,591.

To all whom it may concern:

Be it known that we, HENRY E. KELLOGG and GEORGE F. SWAIN, both residing at Harvey, in the county of Cook and State of Illinois, have invented a new and useful Motor-Vehicle, of which the following is a specification.

Our invention relates to means for transmitting tractive power in motor-vehicles for common roads; and our object is to provide a construction in which the power from the motor, of whatever kind, may be transmitted to all or a part of the supporting-wheels of the vehicle and yet the motion of the vehicle be capable of reversal at any time at the will of the operator, the same being more particularly described hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a vehicle with the main body portion and the nearest side rail or sill of the main frame removed, the front portion of the latter being broken away on a line through the center of the fifth-wheel, as indicated by broken line A B, Fig. 2, to illustrate the operative parts as they are disposed when the vehicle is running a straight course. Fig. 2 is a plan showing the complete frame and operative mechanism attached thereto as these parts appear after the removal of the main body portion and are disposed for a straight course, as in Fig. 1. Fig. 3 is a cross-section on broken line C D, Figs. 1 and 2, showing a rear elevation looking in the direction indicated by arrow E to more fully illustrate the chain-transmission devices and the manner of supporting the bearings for the shafting, the parts being disposed as they appear when the vehicle is running a straight course. Fig. 4 is a plan of what is shown in Fig. 3, but with the front axle and attached parts in a position as in turning a corner to the right, in which position the power is disengaged from the transmission mechanism through which the rear supporting-wheels are driven. Fig. 5 is a rear elevation of the fifth-wheel, showing a double yoke and an intermediate of length portion of a transmission-shaft, together with a chain-wheel mounted on a gimbal universal joint on the shaft within the yoke, as these parts appear when the vehicle is running a straight course, this being part of a device adapted to serve as a connector in coupling the power to the supporting-wheels of the rear axle. Fig. 6 is the same as Fig. 5, but showing the parts in the position they assume when the front axle has been turned at an angle to the right and at the point where the rear power-connector device is adapted to be and is lifted to a position in which the power is disconnected from the rear wheels of the vehicle. Fig. 7 is an enlarged side elevation of the chain-wheel mounted to a shaft on a gimbal universal joint within a double yoke, which latter, together with the lower ends of the power-connector supports pivotally attached thereto, are shown broken away to broken line F H, Fig. 5, to plainly illustrate the manner of mounting the yoke and chain-wheel to permit the power-connector device to partake of a swinging movement in either a horizontal or vertical plane. Fig. 8 is a rear elevation of the manner of connecting power with the rear vehicle-wheels through compensating gears.

Similar numerals indicate like parts throughout the several views.

An internal-combustion engine is indicated at 2; but many other kinds of motors are adapted to use in connection with the features embodied in this invention. In this instance the motor 2, together with the transmitting and reversing gear, are all supported on the front axle 3 and turn in a horizontal plane therewith. At one end of the motor-shaft is a miter cog-wheel 4, which is adapted to be geared with either one of the closely-adjacent miter cog-wheels 5 or 6, which latter are secured to a sleeve 7 on a short shaft 8 by means of a spline, so that the sleeve revolves with the shaft, but is adapted to slide longitudinally thereon when operated through a lever 9, Figs. 1 and 2. Lever 9 is pivoted to the frame at 10, and the lower end thereof is connected to a grooved collar 13 on sleeve 7 by means of the connecting-rod 11 and a lever 12. Secured to the opposite end portions of shaft 8 are chain-wheels 14 and 15, Fig. 3.

Mounted in boxes attached to front axle 3 are two shafts 16 and 17, which are connected

with chain-wheels on the hubs of the vehicle front wheels 19 and 20 through chains 21 and 22, the latter being engaged with chain-wheels 23 and 24 on these shafts. Shafts 16 and 17 are connected at their inner adjacent ends with a chain-wheel 25 through a compensating-gear device at 26, the chain-wheel 25 being connected by chain 27 to shaft 8 through chain-wheel 15.

The devices hereinbefore described and indicated by numerals relate directly to the transmission of power to the vehicle front wheels 19 and 20. The connector adapted to transmit power to the vehicle rear wheels consists of a shaft 28, revolubly mounted in hangers connected with the frame directly above the front axle 3, this shaft being connected with the reversible transmission-shaft 8 through chain 29, (Fig. 3,) which connects chain-wheels 14 and 30. On the intermediate of length portion of shaft 28 is loosely mounted a double-yoke frame 31, which, as before stated, is shown in part on an enlarged scale in Fig. 7. Within yoke 31 is firmly mounted on shaft 28 a boss 32, to and around whose periphery is mounted a gimbal-universal-joint coupling consisting of a ring 33, which is pivoted to the boss at diametrically opposite sides, and to and around this ring is mounted at diametrically opposite sides and at a right angle to the plane of the pivotal trunnions of ring 33 another ring, 34, which is provided with peripheral teeth and is a chain-wheel adapted to engage the chain 35, which latter connects with a chain-wheel 36 on a short shaft mounted in the upper end portion of the divided inclined power-connector frame 38, the latter having the lower end pivotally secured to the lower end of the double yoke 31 and is braced by a rod 39, Figs. 1 and 2, which latter pivotally connects with the top portion of this yoke, so that the inclined connector-frame, on account of the yoke 31 being loosely mounted in shaft 28, may be swung to a limited degree either in a horizontal or vertical plane when operated to either couple the power to the rear vehicle-wheels or uncouple from them, as desired.

At 40 is a U-shaped device which is integral with the bottom portion of the lower end of the inclined frame 38, Figs. 1, 5, 6, and 7, the two upper extending arms of the device being disposed astraddle the swiveled chain-wheel 34 and serves to hold the latter in line with chain 35 when the inclined frame 38 is swung in a lateral direction either way from its normal position. (Shown in Figs. 2 and 3.)

The means by which the front vehicle-axle 3, together with all the numbered parts hereinbefore described, are made to swing laterally in either direction from the normal position consists of a stationary semicircular inside gear 41, which is disposed at the front end of the main frame of the vehicle. Attached to the main vehicle-frame at the sides thereof and disposed around the center of the semicircular inside gear 41 is a frame 42, whose central portion serves as the support of the vehicle-frame circular upper member of a fifth-wheel ring 43. There is a pivotal pin 44 disposed down through a central boss of the frame 42, which pin is also disposed down through another central boss 45, which is connected by arms with the lower ring number 46 of the fifth wheel, the boss 45 being also a part of an inverted-U-shaped frame 47, Figs. 2, 3, and 4, whose ends are slidingly secured to the front vehicle-axle 3 close to the wheel-hubs, and being slotted at the point of attachment are provided with vertical springs within the slots, which contact the top of the axle and form a resilient bearing thereon, as plainly shown in Fig. 1. There is a vertically-disposed part 48, Figs. 1 and 2, of the frame whose lower end is firmly attached to the outer ends of strong diagonal braces 49 and 50, Figs. 1 and 4, which are firmly fastened to the U-shaped frame 47, and to these braces is secured the motor 2. The upper end of the part 48 is slidingly mounted on the semicircular front portion of the frame and around the internal semicircular toothed gear 41. At 51 and 52, Figs. 2 and 4, are indicated in solid and broken lines braces connecting the top of the part 48 with the inverted-U-shaped part 47 of the frame. In the upper end portion of part 48 is revolubly mounted a vertical shaft 53, having a hand-wheel at the top, and at the lower end in engagement with the teeth of the semicircular cog-gear 41 is a pinion 54, the construction being for the purpose of turning the front axle and all the directly-connected parts either to the right or left around center pin 44 in steering the vehicle.

Pendent from a cross-bar of the frame, Fig. 1, are two shaft-hangers, Figs. 1, 2, 3, and 4, in which are mounted the ends of shafts 55, 56, and 57. Shafts 55 and 56 are connected by means of a chain 58, operating on chain-wheels 59 and 60, and this chain is in such a position that it is engaged by chain-wheel 61, which is secured to the short shaft at the upper end of the inclined connector-frame 38 when chain-wheel 61 is in the position shown in Figs. 1, 2, and 3. The means for holding chain-wheel 61 in gear with chain 58 and for releasing this connection and reconnecting automatically consists of a sector-shaped part 62, which is secured to the lateral brace-frame 42 and is provided with a notch 63, Figs. 5 and 6, at the intermediate portion of its length, which notch is adapted to receive and engage with the square part of the brace 39 of the connector-frame 38.

Connected firmly to inverted-U-shaped frame 47 and under sector-shaped part 62 is a sector-shaped member 64, Figs. 4, 5, and 6, having therein a cam-slot 65, this slot being straight in the greater part of its length, but having an upward turn, forming cam-surfaces

at the ends 66 and 67, Figs. 5 and 6, and disposed through this slot is the rounded portion 68 of brace 39.

A spiral gear 69 on shaft 55 engages with a spiral gear 70 on shaft 57, Fig. 1, and the latter is connected to the rear wheels of the vehicle through spiral gear 71, which latter is in engagement with spiral gear 72, connected with a compensating gear 73, which latter is connected with the adjacent inner ends of shafts 75 and 76, mounted above the rear axle. The outer ends of shafts 75 and 76 are connected with the hubs of the rear wheels by means of chains 77 and 78, of which one is shown in Fig. 1 and both are indicated in broken lines in Fig. 2.

In operation it is obvious that if the operative parts are in the relative positions shown in Figs. 1, 2, 3, and 5, with miter-wheel 5 in engagement with miter-wheel 4 and chain-wheel 61 in engagement with chain 59, when power is applied to miter-wheel 4 the vehicle will run in a straight course, either in a forward or back direction, as may be desired, the direction of the run being changed at will by either changing the direction of revolution of the motor or by the reverse-gear, which is manipulated through the lever 9 so that either one of the bevel-gears 5 or 6 may be placed in engagement with miter cog-wheel 4. In making a turn to the right around a corner power is applied to pinion 54 through vertical steering-shaft 53, when the connected axle and all the directly-attached parts may be moved around on center pin 44 with certain limits to various angles, as desired, with the brace 39 in engagement with the square notch 63 in the sector 62, when chain-wheel 61 will still be in engagement with chain 58 and connected with the rear wheels of the vehicle. If, however, the front axle is turned, for instance, at the relative angle to a straight course, (shown in Fig. 4,) the round portion 68 of brace 39 will have been operated upon in an upward direction by the terminal cam-surfaces at the end 67 of cam-sector 64, when the whole power-connector device will be lifted, as seen in Fig. 6, so that the chain-wheel 61 will have a position above chain 58 when the connector-frame and mechanism is swung around out of gear with chain 58, as in Fig. 4, when the rear vehicle-wheels are disconnected. As the front axle is being brought back to the straight-course position, as in Figs. 1 and 2, the brace 39 is released from the rise in the end of the slot at 67 and automatically drops into the notch 63 in sector 62, and at the same time chain-wheel 61 is again brought into engagement with chain 58, and thereby again connects the rear wheels with the power.

We claim as our invention—

1. A motor-vehicle having two axles with supporting-wheels mounted thereon, one of the axles pivotally mounted and adapted to be swung laterally and out of parallel with the other axle for steering purposes, a motor supported by one axle and means for normally connecting the motor with the supporting-wheels of both axles but adapted to disconnect the motor from the supporting-wheels of the said other axle after the two axles are out of parallel.

2. A motor-vehicle having two axles with supporting-wheels mounted thereon, one of the axles pivotally mounted and adapted to be moved laterally out of parallel with the other axle for steering purposes, a motor supported by one axle, which motor is in engagement with a train of gearing mounted on a frame adapted to swing in both horizontal and vertical directions and forming a connector, another train of gearing in engagement with the supporting-wheels of the said other axle and partaking of the movement of said wheels, the gearings of the connector adapted to be engaged and disengaged with the last-named train of gearing after the axles are out of parallel.

3. A motor-vehicle comprising two axles having wheels, one axle being mounted for pivotal movement on a vertical axis, a motor carried upon one axle and means comprising a flexible device and disengageable parts extended between the axles, said disengageable parts being adapted, when engaged, to drive the wheels of the other axle from said motor.

4. A motor-vehicle comprising two axles having wheels, one axle being mounted for pivotal movement on a vertical axis, a motor carried upon one axle, means comprising disengageable parts adapted, when engaged, to drive the wheels of the other axle from the motor and mechanism for throwing said disengageable parts in and out of engagement.

5. A motor-vehicle comprising two axles having wheels, one axle being mounted for pivotal movement on a vertical axis, a motor carried on one axle, gearing for driving the wheels of the motor-carrying axle from said motor, and means comprising disengageable parts one of which is independent of the driving-gear for the motor-carrying axle and is, with its reciprocal part, adapted, when engaged to drive the wheels of the other axle from said motor.

6. A motor-vehicle comprising two axles having wheels, one axle being mounted for pivotal movement upon a vertical axis, a motor carried upon one axle, gearing for driving the wheels of the motor-carrying axle from said motor, means comprising disengageable parts adapted, when engaged, to drive the wheels of the other axle from the motor and mechanism for throwing the said disengageable parts out of engagement.

7. A motor-vehicle comprising two axles having wheels, one axle being mounted for pivotal movement on a vertical axis, a motor carried on one axle, means for driving the wheels of the motor-carrying axle from said

motor, means comprising disengageable parts adapted, when engaged, to drive the wheels of the other axle from the motor and mechanism operated from the movement on its pivotal axis of the pivotally-mounted axle, for throwing said disengageable parts into and out of engagement.

8. In a motor-vehicle, the combination of two axles having wheels, one axle being mounted for pivotal movement upon a vertical axis and the other axle being held against such movement, a motor carried on one axle and means for driving the wheels of each axle from said motor, the driving means for the wheels of one axle comprising a flexible and disengageable connection located between the axles and arranged for flexure to compensate for pivotal movement of the pivotally-mounted axle relatively to the fixed axle.

9. In a motor-vehicle, the combination of two axles having wheels, one axle being mounted for pivotal movement upon a vertical axis, a motor carried on one axle and means for driving the wheels of each axle from said motor, the driving means for the wheels of one axle being adapted for operation independently of the operation of the driving means for the wheels of the other axle.

10. A motor-vehicle comprising two axles having wheels, a motor carried upon one axle, means for driving the wheels of the other axle from said motor, the motor-carrying axle being mounted for pivotal movement upon a vertical axis, and mechanism operated from the movement of the pivotally-mounted axle upon its pivotal axis for throwing said driving means into and out of operation.

11. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor, one axle being mounted for pivotal movement upon a vertical axis and mechanism comprising transmitting devices movable to compensate for pivotal movement of said pivotally-mounted axle and also movable into and out of engagement for throwing said driving means into and out of operation.

12. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor, the motor-carrying axle being mounted for pivotal movement upon a vertical axis and mechanism comprising transmitting devices movable into and out of engagement for throwing said driving means into and out of operation, one of said transmitting devices being actuated from the pivotally-mounted axle to engage it with and disengage it from the other transmitting device.

13. A motor-vehicle comprising two axles having wheels, a motor carried upon one axle, mechanism comprising disengageable parts for driving the wheels of the other axle from the motor and also comprising means for reversing the direction of movement of said wheels, the motor-carrying axle being mounted for pivotal movement upon a vertical axis and mechanism for throwing the parts of said driving mechanism into and out of engagement.

14. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from said motor and comprising mechanism for reversing the direction of movement of said wheels, the motor-carrying axle being mounted for pivotal movement upon a vertical axis and mechanism operated from the movement of the pivotally-mounted axle upon its pivotal axis for throwing said driving means into and out of operation.

15. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor and comprising a chain and a chain-wheel movable to engage it with or disengage it from said chain, the motor-carrying axle being mounted for pivotal movement upon a vertical axis and mechanism for moving the chain-wheel to engage it with or disengage it from said chain.

16. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor, the motor-carrying axle being mounted for pivotal movement upon a vertical axis, said driving means comprising devices one of which is movable to engage it with or disengage it from another, and a device having an inclined portion and adapted when moved to engage the movable driving device and disengage it from its coöperating device.

17. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor, the motor-carrying axle being mounted for pivotal movement upon a vertical axis, said driving means comprising devices one of which is movable to engage it with or disengage it from another, and a device carried on and moving with the pivotally-mounted axle and having an inclined portion adapted when the axle is moved pivotally to engage the movable driving device and disengage it from its coöperating device.

18. A motor-vehicle comprising two axles having wheels, a motor carried on one axle, means for driving the wheels of the other axle from the motor, the motor-carrying axle being mounted for pivotal movement upon a vertical axis, said driving means comprising a part movable to engage it with or disengage it from another part, and a device carried on and movable with the pivotally-mounted axle and having oppositely-arranged inclined portions adapted, when the axle is moved pivotally in opposite directions, to engage said movable driving part and disengage it from its coacting part.

19. A motor-vehicle comprising a front axle having wheels and mounted for pivotal move-

ment upon a vertical axis, a motor carried upon said axle, a rear axle having wheels and means for driving the wheels of said rear axle from the motor, said means comprising a gear-wheel pivotally held upon a driven shaft for movement in directions at angles to each other to compensate for pivotal movement of said front axle.

20. A motor-vehicle comprising a front axle having wheels and mounted for pivotal movement upon a vertical axis, a motor carried on said axle, a rear axle having wheels and means for driving the wheels of the rear axle from the motor, said means comprising a driven shaft, a ring pivoted at diametrically opposite points on the shaft and adapted to swing, a chain-wheel pivoted at diametrically opposite points upon the ring and also adapted to swing in a direction at right angles to said ring and a chain passed over said chain-wheel.

21. In a motor-vehicle, the combination of two axles, one of which is mounted for pivotal movement upon a vertical axis, a motor carried on one axle and driving means comprising disengageable parts and extended from the motor on one axle to the wheels of the other axle and also comprising a flexible connection located between the axles to permit pivotal movement of the pivotally-mounted axle and means for throwing the disengageable parts of said driving means into and out of operation.

22. A motor-vehicle comprising a front axle having wheels and mounted for pivotal movement upon a vertical axis, a motor on said axle, means for driving the wheels of said axle from the motor, a rear axle also provided with wheels, and a driving connection extended from the motor to the wheels of the rear axle and having means to operate it independently of the operation of the driving means for the wheels of the front axle for operating the wheels of the rear axle from said motor.

23. A motor-vehicle comprising a front axle having wheels and mounted for pivotal movement upon a vertical axis, a motor on said axle, a reversible transmitting mechanism driven from the motor, gearing extended from the transmitting mechanism to the wheels of said front axle, a rear axle also provided with wheels and a detachable driving connection extended from the transmitting mechanism to the wheels of said rear axle.

24. In a motor-vehicle, the combination of two axles having wheels, one axle being mounted for pivotal movement upon a vertical axis, a motor carried on one axle, means for driving the wheels of each axle from said motor and mechanism for controlling the driving means for the wheels of one axle for operation independently of the operation of the driving means for the wheels of the other axle.

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

HENRY E. KELLOGG.
GEORGE F. SWAIN.

Witnesses:
ALBERT E. EBERT,
HUGH WISDOM.