

C. J. PAULSON.
AUTOMOBILE.
APPLICATION FILED OCT. 19, 1907.

903,762.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 2.

FIG. 4.

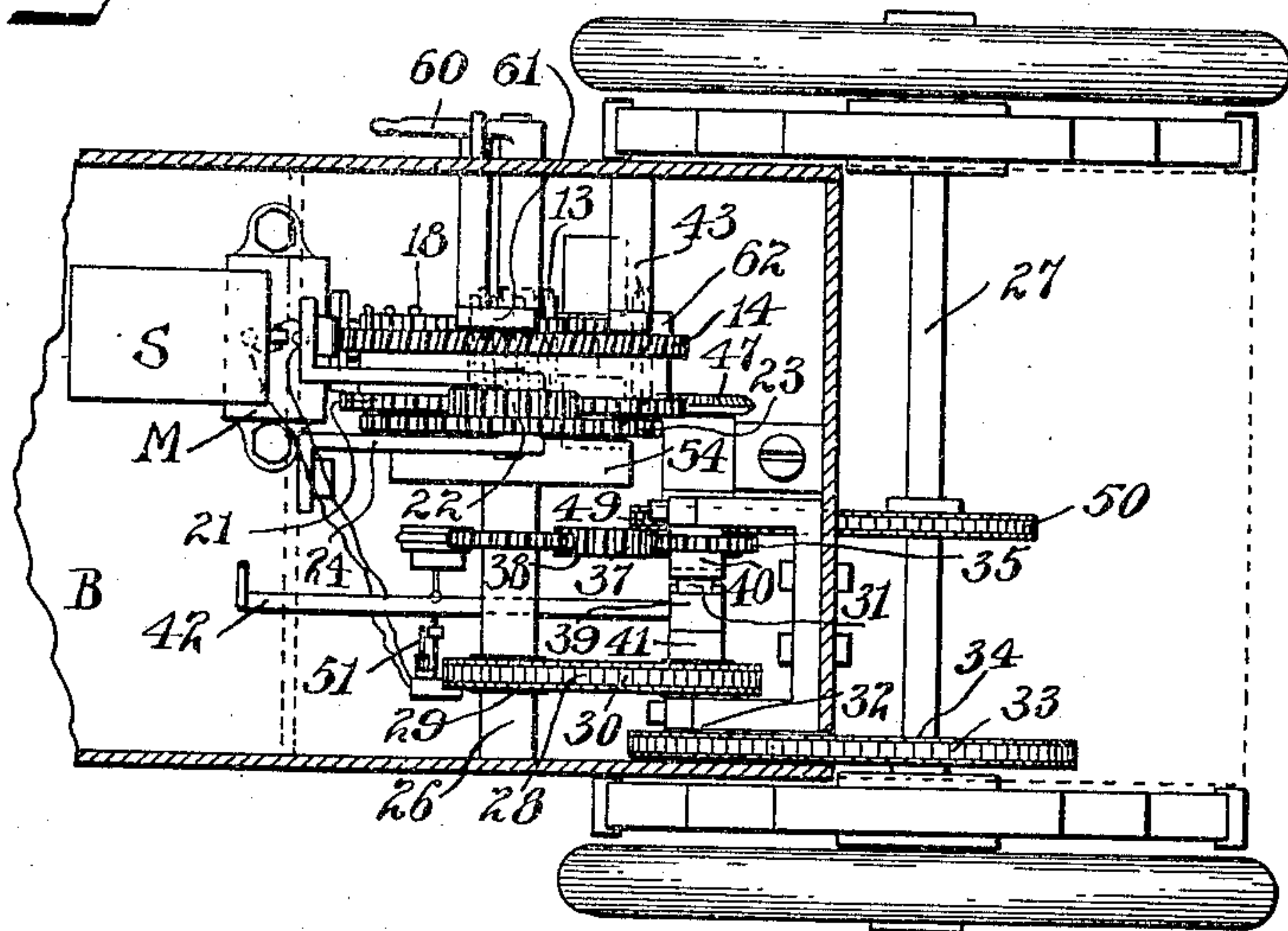


FIG. 6.

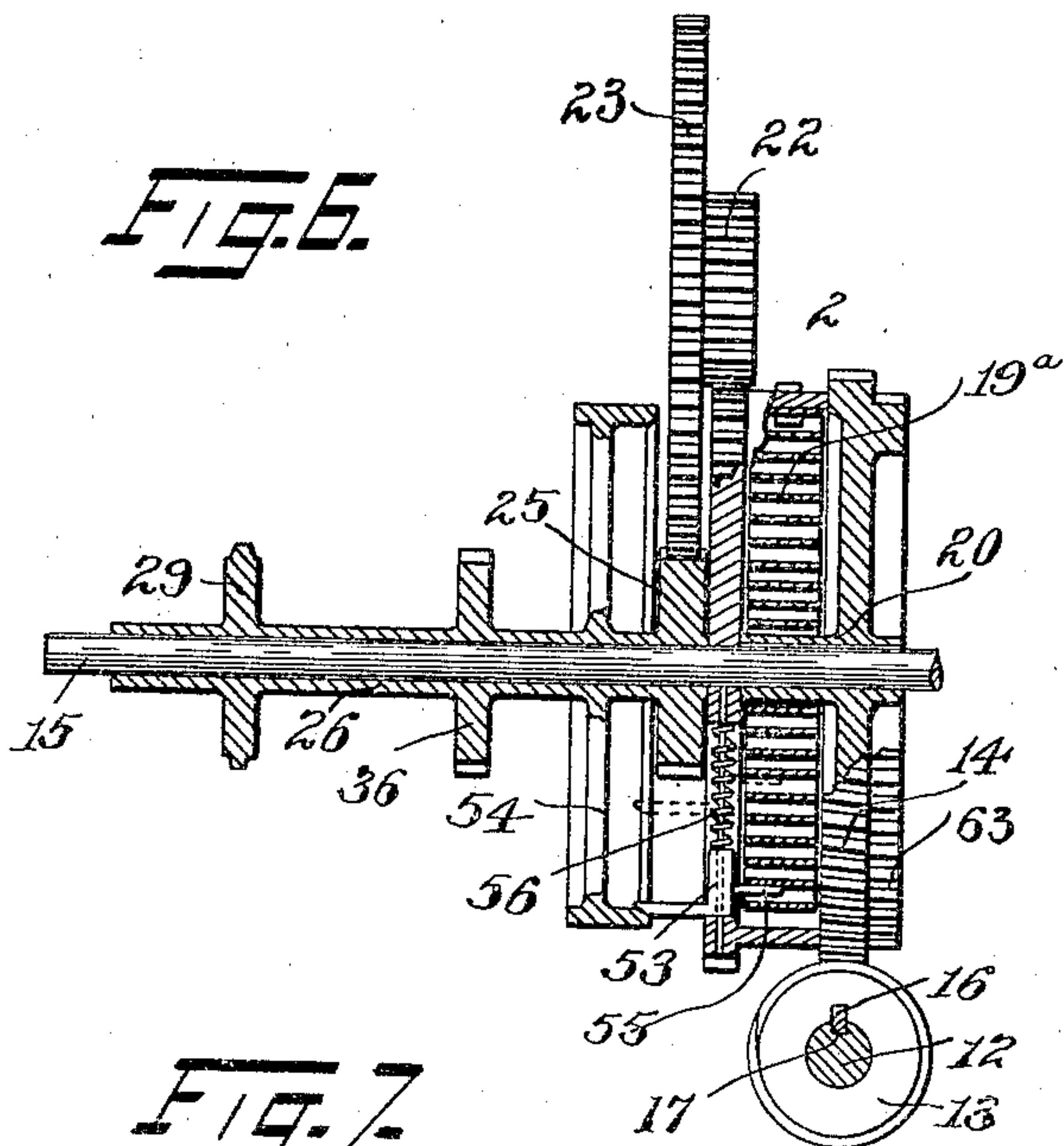


FIG. 7.

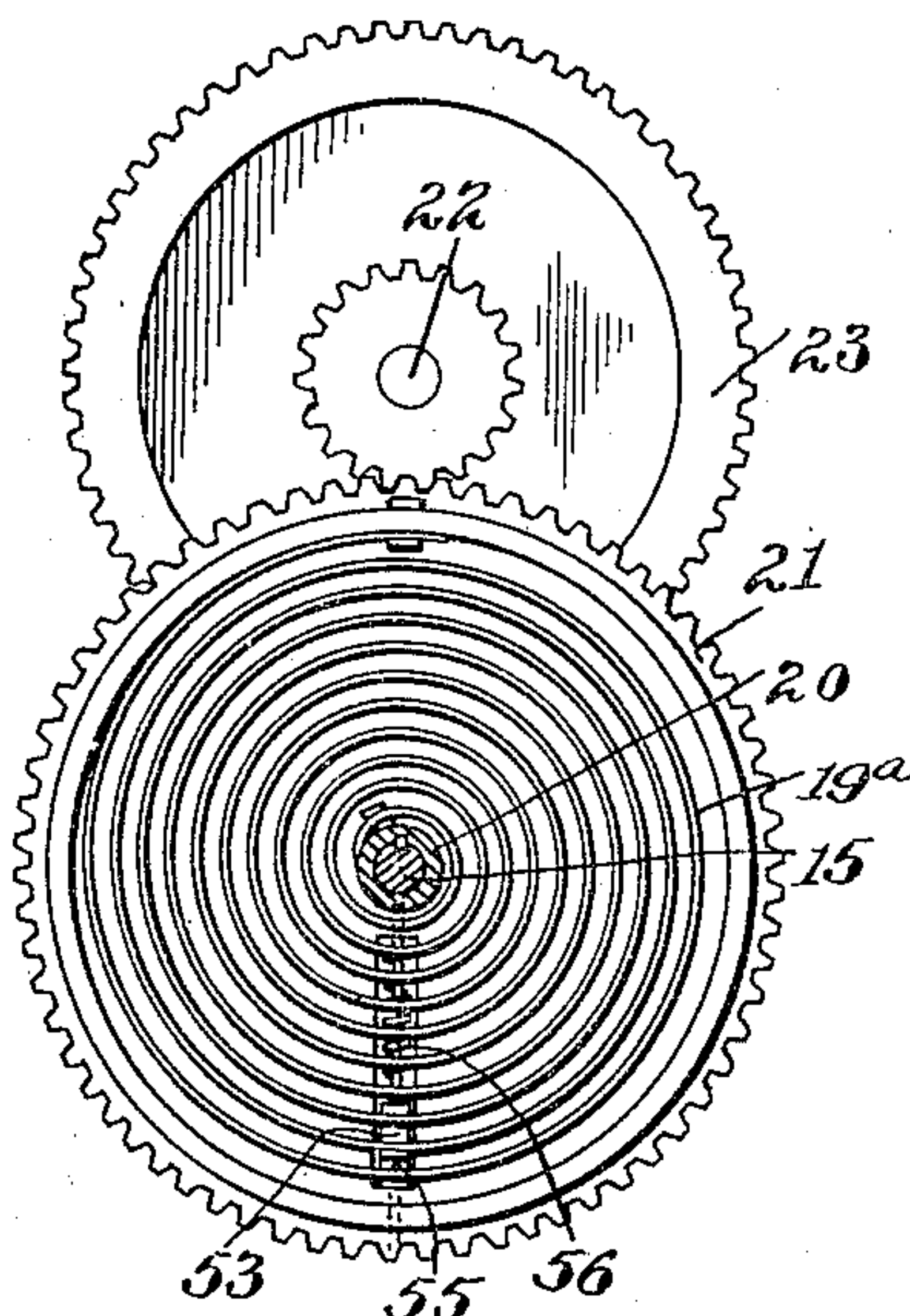
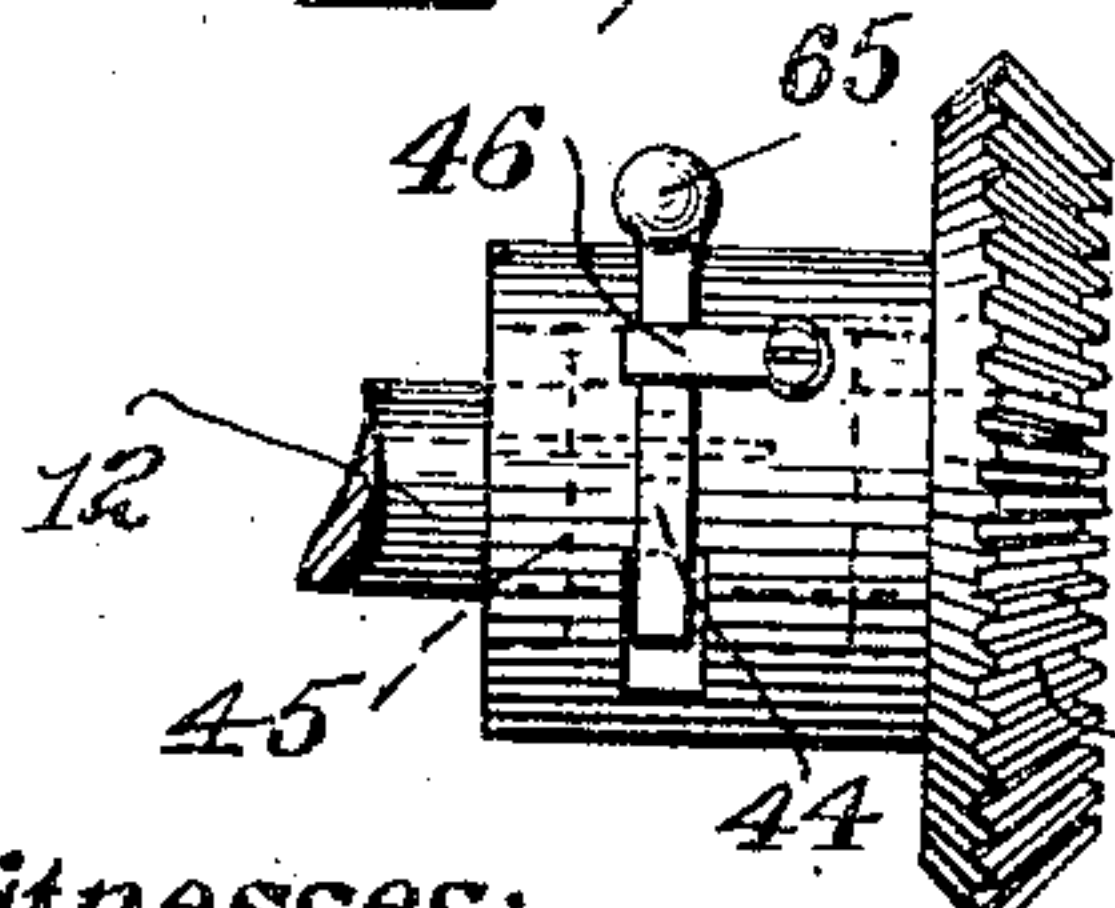
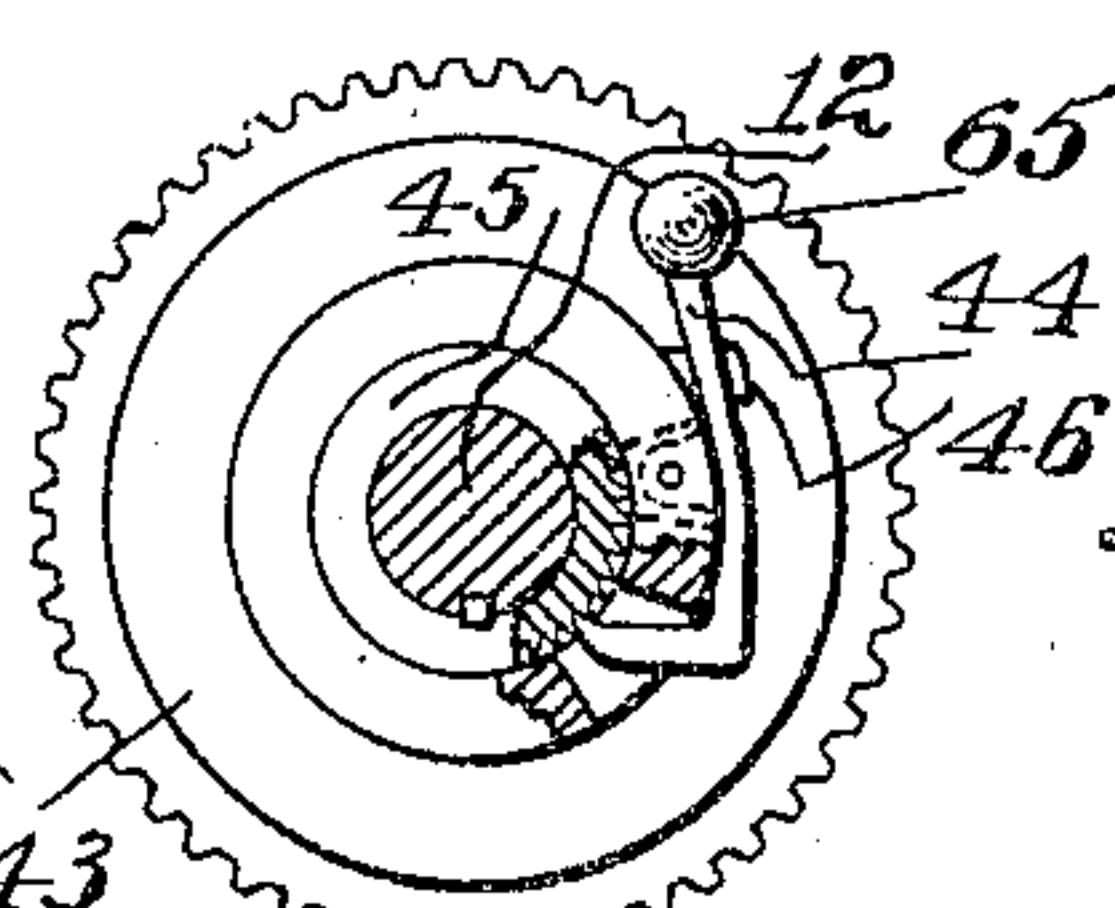


FIG. 5.

FIG. 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES J. PAULSON, OF BROOKLYN, NEW YORK, ASSIGNOR OF FORTY-THREE ONE-HUNDREDTHS TO KENNETH F. JUNOR AND THIRTY-SEVEN AND ONE-HALF ONE-HUNDREDTHS TO PHEBE R. MACLAURIN, BOTH OF BROOKLYN, NEW YORK.

AUTOMOBILE

No. 903,762.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES J. PAULSON, a subject of the King of Sweden, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Automobiles, of which the following is a specification.

This invention relates to driving mechanism for motor vehicles of various kinds such as driven by electric motors or explosive engines; and has for its object to provide means in the nature of an auxiliary spring power device, whereby a surplus of power from the motor and also from the momentum of the car can be stored in the spring, to assist in running the car; or if the motor becomes disabled the vehicle can be propelled a short distance.

The accompanying drawing represents one embodiment of my invention.

Figure 1 shows a motor vehicle in side elevation, with a portion of the side broken away showing the driving mechanism. Fig. 2 is a similar view in fragmentary form enlarged. Fig. 3 is a rear elevation with the frame broken away. Fig. 4 is a similar view in plan. Fig. 5 shows the spring and connected parts. Fig. 6 shows the spring and gearing and other parts connected therewith; and Figs. 7 and 8 show in side and end elevations respectively a ratchet device for automatically connecting and disconnecting the driving shaft and the spring member.

The motor vehicle has most of the mechanism contained inside of the body B, and is shown as driven by an electric motor denoted generally by M that may be supplied with current from a storage battery S. The shaft 12 of the motor carries a worm 13 engaging a worm wheel 14 rotatable on a stationary shaft 15 suitably supported in the body. The worm is not secured on the shaft but is rotated by spline 16 on the shaft 12 engaging a slot 17 in the worm. A spring 18 normally presses the worm against a thrust bearing 19. When the worm is rotated by the motor to revolve the wheel in the direction of the arrow shown in Fig. 2 the worm will be pressed against the thrust bearing. But if the worm wheel is itself caused to revolve in the same direction, the worm will be shifted toward the motor and

compress the spring; and after shifting a certain distance will disengage the worm wheel permitting the latter to be rotated in this direction. A coil spring 19^a has its inner end secured to the hub 20 of the worm wheel 14, while its outer end is secured to a gear 21 rotatable on the shaft 15. The latter gear meshes with a pinion 22 that is secured to a gear 23, such members being rotatably supported by a bracket 24. The gear 23 meshes with a pinion 25 fast to a sleeve 26 rotatable on the shaft 15.

Suitable means are provided for driving the rear axle 27 from this sleeve 26, and such means are arranged to drive it in either direction as desired. A chain 28 engages a sprocket 29 on the sleeve 26 and also engages a sprocket 30 on a short shaft 31 suitably supported in the frame. On the latter shaft is a gear 32 from which a chain 33 passes to a gear 34 fast on the rear axle 27.

The shaft 31 carries a gear 35 that is driven in the opposite direction from a gear 36 on sleeve 26, through intermediate gears 37 and 38 but the gears 30 and 35 are not fast on the intermediate shaft directly, but either one is secured thereto by means of a clutch member 39 shiftable to engage clutch members 40 and 41 connected with the said gears, the clutch member 39 being slidable on the shaft but rotatable therewith. A lever 42 connects with the clutch member 39 and extends forward for a convenient operation by the chauffeur. When the clutch member 40 is engaged by the slidable clutch member 39, the car will be driven forward through the intermediate gears; but when the movable clutch member engages the clutch member 41, the car will be driven backward.

On the shaft 12 of the motor is loosely mounted a bevel gear 43 carrying a pawl 44 adapted to engage a ratchet wheel 45 fast on the shaft, the pawl being normally retained out of engagement by a spring 46. Bevel gear 43 meshes with a bevel gear 47 fast on a short shaft 48 suitably mounted in the frame. A spur gear 49 fast on shaft 48 carries a chain passing to a sprocket 50 fast on the rear axle, a suitable weight 65 is fast on the other end of the pawl 44 and upon a certain speed being reached, the

weight will be thrown outward against the force of the spring and bring the pawl into engagement. When the motor reaches a certain speed, a governor 51 suitably driven from shaft 48 operates a switch 52 to reduce the current supplied to the motor, or otherwise suitably reduce the power of the motor. When the spring 19^a becomes unwound, it engages a finger 55 on a brake bar 53 and presses the latter against a fly wheel 54 on the sleeve 26, thereby arresting the mechanism. As the spring is wound up the pin 55 is drawn inward and releases the brake band.

A hand lever 60 is pivoted on the shaft 15 and carries two pawls 61 and 62 that engage a ratchet wheel 63 fast to or a part of the worm wheel 14.

The operation is as follows: When the motor is started, through the worm and worm wheel, the inner end of the spring is rotated winding up the spring. The outer end of the spring is connected through the gearing, clutch mechanism, and chains with the rear axle, and upon the spring being wound up sufficiently it will drive the axle. The spring on the ratchet 44 will hold it out of engagement, but at a certain predetermined speed, the weight will be thrown out and engage the ratchet. But at such a speed, the governor will have reduced the power of the motor, and the pawl and ratchet wheel being now connected, the momentum of the car will through the driving axle and this pawl and ratchet, and the worm and worm wheel, serve to wind up the spring by the rotation of the axle through the direct connection of the clutch members and other parts. As soon as the speed becomes considerably reduced the motor will again be permitted to exert its full power and the pawl and ratchet will disengage. If the motor should stop at any time, the spring would be wound up under considerable tension, and it will serve to drive the car a short distance. Hence if the motor or the power device becomes disabled the spring driving mechanism can be used to propel the car to a convenient garage or repair station. When the motor stops the worm will hold the worm wheel 14 stationary, and hence the sleeve 20 to which the inner end of the spring is secured is held stationary. The spring being under tension, its unwinding will rotate the gear 21 in the same direction that this gear is rotated by the operation of the motor, and therefore the car will be driven in the same direction it would be driven were the motor running, which direction is determined by the position of the movable gear member. But if there is not sufficient power in the spring to drive the car such distance, then the spring can be put under tension again by means of

the hand lever 60, and this lever can be operated to propel the car at a slow speed for any considerable distance desired. Evidently, this lever can be also used to furnish additional power when required for ascending grades. This lever mechanism and pawl in connection with the spring can be used independently of any motor for propelling light vehicles such as used for the delivery of goods for tradesmen. While the vehicle could not be driven directly by the lever, the power can be stored up in the spring and then be used to drive the vehicle.

Having thus described my invention, I claim:

1. In a motor vehicle, the combination of a spring member, a motor connected with one end of the spring member, the other end of the spring member being connected with the driving wheels whereby the motor will wind up the spring and thereupon rotate the driving wheels through the spring, a governor connected with the driving wheels, means for causing the governor upon reaching a certain predetermined speed to reduce the power of the motor, mechanism connecting the motor with the driving wheels separate from the said spring connection, said latter mechanism including a connecting member that is normally inoperative and disconnects such mechanism, but which upon attaining a certain predetermined speed will throw such mechanism into engagement and thereby through said motor connection with the spring end will wind up the spring through the rotation of the driving wheels caused by the momentum of the car, assisted by the reduced power of the motor.

2. In a motor vehicle, the combination of a spring member, a motor connected with one end of the spring member, the other end of the spring member being connected with the driving wheels whereby the motor will wind up the spring and thereupon rotate the driving wheels through the spring, a governor connected with the driving wheels, means for causing the governor upon reaching a certain predetermined speed to reduce the power of the motor, mechanism connecting the motor with the driving wheels separate from the said spring connection, said latter mechanism including a connecting member that is normally inoperative and disconnects such mechanism, but which upon attaining a certain predetermined speed will throw such mechanism into engagement and thereby through said motor connection with the spring end will wind up the spring through the rotation of the driving wheels caused by the momentum of the car, assisted by the reduced power of the motor, a lever on the car in position to be operated by the driver, connections between the spring and the lever whereby the spring can be wound

up, and means in the connection between the motor and the spring whereby the motor will be automatically disconnected when the spring is wound up by said lever.

5 3. In a motor vehicle, the combination of a motor, a worm on the motor shaft, a worm wheel engaging said worm, a spring having one end connected with the worm wheel, mechanism connecting the other end of the
10 spring with the driving axle of the vehicle, mechanism connecting the motor shaft with the rear axle independent of said spring, said latter mechanism including a pawl and ratchet wheel connection, a spring normally
15 holding the pawl out of engagement with the ratchet wheel whereby said connection is inoperative, a weight on said pawl arranged to shift the pawl to engage the ratchet wheel at a certain predetermined speed to effect
20 said connection between the motor and driving axle.

4. In a motor vehicle, the combination of a motor, a worm on the motor shaft, a worm wheel engaging said worm, a spring having
25 one end connected with the worm wheel, mechanism connecting the other end of the spring with the driving axle of the vehicle, mechanism connecting the motor shaft with the rear axle independent of said spring,
30 said latter mechanism including a pawl and ratchet wheel connection, a spring normally holding the pawl out of engagement with the ratchet wheel whereby said connection is inoperative, a weight on said pawl ar-
35 ranged to shift the pawl to engage the ratchet wheel at a certain predetermined speed to effect said connection between the motor and driving axle, a governor driven from the rear axle, and means for reducing
40 the power of the motor when the governor attains a certain predetermined speed.

5. In a motor vehicle, the combination of a motor, a worm on the motor shaft, a worm wheel engaging said worm, a spring having
45 one end connected with the worm wheel, mechanism connecting the other end of the spring with the driving axle of the vehicle, mechanism connecting the motor shaft with the rear axle independent of said spring,
50 said latter mechanism including a pawl and ratchet wheel connection, a spring normally holding the pawl out of engagement with the ratchet wheel whereby said connection is inoperative, a weight on said pawl arranged
55 to shift the pawl to engage the ratchet wheel at a certain predetermined speed to effect said connection between the motor and driving axle, a lever on the car, connections between the lever and the spring whereby the
60 latter may be wound up from the lever, said worm being shiftable on the motor shaft whereby winding up of the spring will cause endwise movement of the worm to shift out of engagement with the worm wheel, and a

spring normally retaining the worm in en- 65
gagement with the worm wheel.

6. In a motor vehicle, the combination of a motor, a worm on the motor shaft, a worm wheel engaging said worm, a spring hav-
ing one end connected with the worm wheel, 70
mechanism connecting the other end of the spring with the driving axle of the vehicle, mechanism connecting the motor shaft with the rear axle independent of said spring, said
latter mechanism including a pawl and 75
ratchet wheel connection, a spring normally holding the ratchet out of engagement with the pawl whereby said connection is inopera-
tive, a weight on said pawl arranged to shift the pawl to engage the ratchet wheel at 80
a certain predetermined speed to effect said connection between the motor and driving axle, a lever on the car, connections between the lever and the spring whereby the latter
may be wound up from the lever, said worm 85
being shiftable on the motor shaft whereby the winding up of the spring will cause end-
wise movement of the worm to shift out of engagement with the worm wheel, and a
spring normally retaining the worm in en- 90
gagement with the worm wheel, a governor driven from the rear axle, and means for reducing the power of the motor when the governor attains a certain predetermined
speed. 95

7. In a motor vehicle, the combination with a motor and a spring member, of means for automatically effecting a reduction of the power supplied to the motor upon the
vehicle attaining a certain predetermined 100
speed, said means being also organized to connect the motor to wind up the spring, and also to connect the driving wheels with the spring to assist the motor in winding up the
spring. 105

8. In a motor vehicle, the combination of a motor, a spring member, connections be-
tween the motor and the spring member to cause the spring to be wound up by the
motor, connections between the driving 110
wheels and the spring permitting the wheels to be driven by the spring member, a hand lever, and connections between the hand lever and the spring permitting the spring to be
wound up thereby. 115

9. In a motor vehicle, the combination of a motor, a spring connected with the motor to be wound up thereby, connections between the spring and the driving wheels permit-
ting the motor to drive the wheels through 120
the spring when the spring is wound up, means for disconnecting the motor and the spring member, a hand lever, and means for permitting the hand lever to wind up the
spring to drive the wheels, said means being 125
organized to permit the hand lever to assist the motor in propelling the car.

10. In a motor vehicle, the combination of

a motor, a spring member connected with the motor to be wound up thereby, and connections between the spring member and the driving wheels to permit the vehicle to be
5 driven by the spring member, the connections being arranged to cause the vehicle to be driven by the motor through the spring member when wound up thereby, a hand

lever, and connections between the hand lever and the spring permitting the spring 10 to be wound up thereby.

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